Transcontinental Gas Pipe Line Company, LLC

EROSION AND SEDIMENT CONTROL GENERAL PERMIT (ESCGP-3) PERMIT APPLICATION

Leidy South Project

Clinton, Lycoming, Luzerne, Columbia and Schuylkill Counties, Pennsylvania

Submitted to:

Pennsylvania Department of Environmental Protection

Regional Permit Coordination Office

400 Market Street; P.O. Box 2063

Harrisburg, PA 17105-2063

SEPTEMBER 2019

(REVISED MAY 2020)

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Transcontinental Gas Pipe Line Company, LLC
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June 1, 2020

Rebecca Albert | P.G.
Environmental Group Manager
PADEP Regional Permit Coordination Office
Rachel Carson State Office Building
400 Market Street
Harrisburg, PA 17101

RE: LEIDY SOUTH PROJECT – CLINTON, COLUMBIA, LUZERNE, LYCOMING AND SCHUYLKILL COUNTIES; TECHNICAL DEFICIENCY RESPONSE SUBMITTAL; EROSION & SEDIMENT CONTROL PERMIT APPLICATION; PADEP APPLICATION NO. ESG830019002-00

Dear Ms. Albert;

On September 30, 2019, Transcontinental Gas Pipe Line Company, LLC (Transco), a subsidiary of The Williams Companies, Inc., submitted a Chapter 102 Erosion and Sediment Control Permit Application (ESCGP-3) to the Pennsylvania Department of Environmental Protection (PADEP) for earth disturbance associated with the proposed Leidy South Project (Project) located in Clinton, Columbia, Luzerne, Lycoming and Schuylkill Counties. The PADEP determined the submissions to be complete on December 13, 2019 and issued technical deficiencies on April 3, 2020. The response package herein responds to PADEP's Chapter 102 technical deficiencies.

Minor design changes, modification and updates have been incorporated since the original September 2019 submission. This includes addressing Chapter 102 and 105 technical deficiencies, and design modifications requested by the Federal Energy Regulatory Commission and the Pennsylvania Department of Conservation and Natural Resources.

Transco has responded to the technical deficiencies in the enclosed Attachment A – ESCGP-3 Technical Deficiency Comment / Response document. This document outlines the DEP technical comment, Transco's response and applicable permit requirement sections that are being updated to address the comment. In addition, Attachment B has been provided which responds to public comments submitted during the public comment period that have not been subsequently withdrawn. An electronic copy of the ESCGP-3 Permit submittal updates by county has been uploaded onto PADEP's FTP site. In addition, three compact discs (CD) of the updated permit submittals been sent your attention.

It is our hope that the information as provided will allow you to complete your review in accordance with your regulations and issue the requested ESCGP-3 Permit. If you require any additional information

that will facilitate your review, please do not hesitate to contact Shauna Akers at (713) 215-3012 or at Shauna.Akers@williams.com, or Josh Henry at (412) 713-0485 or at Josh.Henry@williams.com.

Sincerely,

Joseph Dean
Manager, Environmental Health and Safety

Enclosures
Attachment A – ESCGP-3 Technical Deficiency Comment – Response
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ATTACHMENT A

ESCGP-3 TECHNICAL DEFICIENCY COMMENT / RESPONSE

Attachment A - ESCGP-3 Technical Deficiency Comment / Response			
Comment Number	**DEP Technical Comment**	**Section**	**Transco Response**
Notice of Intent			
1. §102.5 Permit Requirements	i. Section F, Erosions and Sediment Control Plan. Please correct typos. Section F.a, correct compost filer socks to compost filter socks. Section F.d, correct Leidy to Lediy and correct folldways to floodways.	Section 1-1	Section F of the NOI has been updated to correct typos.
	ii. Section G, Riparian Buffer. Section G.4 indicates if waivers checked, explain how existing riparian buffers will be undisturbed to the extent practicable. Please provide an explanation or direct to where one can be found.	Section 1-7	Section 1-7 ESCGP Narrative has been updated to provide a discussion on how riparian buffers will be undisturbed to the extent practicable.
	iii. NOI Completeness Checklist, Section 5.b, Pennsylvania Inventory of Historical Places. The inclusion box is not checked for this item. Please verify completeness.	Section 1-2	Section 5.b has been updated to check this item and Transco has verified completeness.
	iv. Section F, Erosion and Sediment Control Plan, Item e. This box should be checked yes since not all discharges from the project will be directly to surface waters. The E&S and PCSM plans should include the demonstration that the discharge will not cause erosion, damage or a nuisance to off-site properties (i.e., site restoration maintaining existing drainage patterns and discharge points). Similar information and revisions should be made to Section H, Item d.	Section 1-1	Section F, Item e has been checked yes to indicate that not all discharges are directly to surface waters. Offsite discharge analysis sections have been added to E&S and PCSM narratives to demonstrate that discharge will not cause erosion or damage to off-site properties.
	v. Section G of the NOI requests a Riparian Buffer Waiver. Section 1-7 of the ESCGP Narrative provides additional details. The Hilltop Loop HL-5 detail page is not included. Please provide details for HL-5.	Section 1-7	Section 1-7 of the ESCGP Narrative has been updated to include replanting at Hilltop Loop HL-5.

	vi. Section H of the NOI addresses PCSM Plans. Pages 17 and 20 of the NOI show Volume Control (VC), Rate Control (RC), & Water Quality (WQ) for three Best Management Practices (BMPs), which are Vegetated Swale, Infiltration Berm, and Soil Amendment. NOI requests that "For Rate Control provide volume of stormwater treated and acres treated for the 100-year/24-hour storm event" and "For volume control and water quality provide volume of stormwater treated and acres treated for the 2-year/24-hour storm event". Only one number is shown for all three BMPs. Please provide the numbers requested on the NOI.	Section 1-1	Section H of the NOI has been updated to include Rate Control for the 100-year/24-hour storm event.
	vii. NOI, page 13 (PCSM /SR Plan Summary) states "Along the pipeline Right-of- Way, typical E&S BMPs such as waterbars and erosion control blanket will be left in place as part of site restoration. Does this mean all waterbars shown on the E&S Plan set will remain post construction? If not, please provide a list of waterbars that will be removed. See below comment in Site Wide section, §102.8(f)(9).	Section 2	All waterbars will remain in place post-construction. Some waterbars are not proposed as temporary waterbars due to the placement of Clean Water Crossings being in place during construction. Waterbars were designed to meet the maximum 2% slope across the right-of-way and at spacing, as required by the PADEP E&S BMP Manual.
	viii. In Section 1-8, PNDI Receipts and Consultations, it appears more information is needed to follow up with the Indiana and northern long-eared bat hibernacula survey. In the June 24, 2019 letter from the Fish and Wildlife Service, the Hibernacula section indicates that Compressor Station 620 Option G had 21 openings considered potential habitat and fall portal surveys were planned at the time. Results and resolution to the fall portal surveys do not appear to be included. Please provide any additional information and clarify how any potential impacts were resolved for the Indiana and northern long-eared bat.	Section 1-8	Compressor Station 620 Option G is not being pursued as an option for placement of Compressor Station 620. Therefore, no additional follow up is needed.
Erosion and Sediment Control			
Site Wide			

2. §102.8(f)(9) Plan Drawings	a. Please clearly label on all plans whether waterbars will be temporary or permanent. Several waterbars are labelled in the legend as “proposed temp./perm. waterbar and outlet structure.” Additionally, some waterbars are not given a temporary or permanent designation. It needs to be clear which waterbars will be left in place as part of the site restoration.	Section 2-1 to 2-3	All waterbars are considered permanent and will remain in place post-construction. Some waterbars are not proposed as temporary waterbars due to the installation of Clean Water Crossings upslope during construction. For these areas, specific call outs have been added to the plan drawings.
	b. The E&S plans do not appear to call out the streambank restoration methods at crossings. Details are included in the plans for Typical Channel and Vegetation Restoration with Forested and Non-Forested Riparian Buffer. Please provide identifier for these details and include a designation on plans that restoration will occur at each crossing.	Sections 2-1 to 2-6	The Typical Channel & Vegetation Restoration-1 and 2 has been revised to "Typical Vegetated Channel & Vegetation Restoration-1 and 2". The detail has also been updated to show the limits of the natural streambed material at the normal high-water mark. Riprap stream bank stabilization (RSS) is proposed at one location (Young Womans Creek) as that is the original (preconstruction) condition of the stream bank. Articulating Concrete Mat (ACM) is proposed at one location (Little Muncy Creek) as that is the original (preconstruction) condition of the stream bank. All other stream channels include a call out of (VCR) which refers to Typical Vegetated Channel & Vegetation Restoration-1 and 2.
	c. Please provide the profile of the proposed natural gas mainline for the project. The profile should be included on the Erosion and Sediment (E&S) Control Plans and show the depth of cover of the natural gas transmission line.	Sections 2-1 to 2-3	The pipeline depth of cover is presented within the “ribbon” at the top of the plan drawings. The minimum depth of cover represents the profile of the pipeline below the surface.
	d. The Bridge Equipment Crossing and Bridge Equipment Crossing with Centered or Multiple Supports Details does not have the height of the proposed side rails. Please be advised that the side rails should be a minimum height of 1-foot.	Sections 2-1 to 2-3	Bridge Equipment Crossing and Bridge Equipment Crossing with Centered or Multiple Supports Details have been updated to include side rails with minimum height of 1-foot.

e. On E&S Plans, section General Maintenance Notes for All BMPs, please modify the paragraph regarding road cleaning to include “as needed” maintenance (current note only says end of each work day).	Sections 2-1 to 2-6	General Maintenance Notes have been updated accordingly.
f. Please provide adequate erosion and sediment control BMPs for construction of stream and wetland crossings. Stream crossing S1-T1-HR and wetlands W3-T7-HL and W14-T6 PEM do not appear to have erosion and sediment control BMPs. Please ensure all stream and resource crossings have proposed erosion and sediment controls throughout project.	Sections 2-1 to 2-3	Erosion and Sediment Control and Site Restoration Plan Drawings have been updated to provide adequate E&S BMP protection adjacent to all streams and wetlands.
g. Please provide stream crossing methods for all streams. On the Benton Loop, Stream S5-T6 on E&S Control Plan Sheet 5 does not show a stream crossing method.	Sections 2-1 to 2-3	Erosion and Sediment Control and Site Restoration Plan Drawings have been updated to outline stream crossing methods for all streams. A stream crossing method of Dam and Pump / Flume Crossing (DPX/FX) in addition to the proposed Bridge Equipment Crossing (BEC) has been added to stream S5-T6 on the Benton Loop.
h. Please clarify general note on all E&S Control Plans, “Areas which are to be top soiled shall be scarified to a minimum depth of 3 to 5 inches 6 to 12 inches on compacted soils prior to placement of topsoil.” Please clarify the statement so that the contractor will be able to adequately scarify prior to the placement of topsoil.	Sections 2-1 to 2-6	General notes on all Erosion and Sediment Control and Site Restoration Plans have been revised to state “Areas which are to be top soiled shall be scarified to a minimum depth of 3 to 5 inches on compacted soils prior to placement of topsoil.”
i. Please provide information on building structures within limit of disturbance (LOD). Specifically, the house located west of Young Woman’s Creek, near MP 185 is within the LOD. Please update plan sheets to confirm if structure still exists and if it will be removed.	Section 2-2	Sheet 5 of Hilltop E&S Control Plans has been updated to call out that the existing structure within the LOD west of Young Women’s Creek, near MP 185 will be removed.

	j. DEP does not recommend use of crown vetch. Tables 11.3, 11.4, and 11.5 in the E&S General Notes mention use of crown vetch in seeding mixtures. Remove these seed mixture options and consider using native upland seed mixtures as an alternative.	Sections 2-1 to 2-6	Tables 11.3, 11.4, and 11.5 in Requirement M - Erosion and Sediment Control Plan Drawings have been updated to remove the seed mixture options with crown vetch.
	k. There was a conference call on March 26, 2020 that included DEP, DCNR and Tri- County Electric. During the call three potential design changes were discussed: co- locating the power line and the pipeline in the Foley Tract, widening the Big Ridge trail access road and replacing the culvert that conveys S2-T7A-HR under Racoon Lane. If you decide to move forward with any of the above listed changes, please revise the plans and project narrative accordingly. If none of the above listed changes are proposed, this comment can be ignored, and nothing needs to be submitted to DEP at this time.	Section 2-1	Only the widening of Big Ridge Trail access road is being addressed in this permit application. The existing haul road will be widened to approximately 14 feet. Due to the limited use of the road, the road will be revegetated after construction of the pipeline construction, which is consistent with its current/preconstruction condition. Erosion Sediment Control and Site Restoration Plan drawings have been updated to include the widening and site restoration of the proposed Big Ridge Trail access road.
3. §102.8(n) Site Stabilization - Restoration	a. Please provide a site restoration plan summarizing extents of previous land use, disturbance activities, restoration measures and how they will be maintained and evaluated for effectiveness. This can include, but is not limited to, restoring original contours, plowing severely compacted areas, changes to permanent topographic land cover along pipeline alignment side, distance of right of way (ROW) to be maintained, permanent waterbar criteria, protection of wetlands/waterbodies, monitoring of wetland revegetation, extents and frequency of ROW maintenance, avoidance of mowing during migratory bird nesting season, avoidance of mowing/clearing of construction ROW in wetlands, time of year restrictions for mowing/clearing of riparian areas and housekeeping materials management and litter control	Section 2-1 to 2-6	A section has been added to all Erosion and Sediment Control and Site Restoration Plan Narratives to address site restoration measures.

4. §102.5 Permit Requirements	a. Please address pertinent sections of the attached public comments submitted to DEP in response to the Pennsylvania Bulletin posting on January 4, 2020	Attachment B	Attachment B has been included with the transmittal letter which responds to public comments submitted during the public comment period that have not been subsequently withdrawn.
Erosion and Sediment Control			
Luzerne County			
5. §102.11(a)(1) – E&SC and PCSM BMPs	a. Please provide proposed final contours for all proposed earthmoving (including Channel #3) that meet the standards in the E&S Manual Appendix D – Standards for Maps and Drawings. Additionally, Channel 3 is present in calculations, but does not appear on drawings.	Section 2-4	A minor redesign of the configuration of Compressor Station 607 has been completed to avoid permanent wetland impacts and minimize temporary wetland impacts. Final contours for all proposed earthmoving has been provided on plan drawings. All channels are presented in both the calculations section and drawings.
	b. Please provide a hard copy of the maximum tributary work map used to delineate the watersheds tributary to the proposed (channels, basins).	Section 2-4	Drainage area maps to each proposed channel and basin have been provided as an attachment to E&S Narrative.
	c. Provide peak flow calculations for all channel(s) See Chapter 5 in E&SPC Manual for guidance on runoff calculations. Standard E&S Worksheets #9 and #10 are recommended for the Rational Equation. An acceptable alternative is the use of the standard multipliers at the top of Standard E&S Worksheet #11.	Section 2-4	Attachment 3 of the E&SC Plan Narrative has been updated to include Peak flow calculations for all channels from HydroCAD.
	d. Please indicate the specific BMPs to be installed prior to each step (or stage) of construction as described in E&SPC Manual Chapter 2 – Best Management Practice Sequencing of the E&SPC Manual.	Section 2-4	The Compressor Station Sequence of Construction outlined on Sheet 4 of 10 has been updated, accordingly.
	e. The plan map(s) show(s) compost sock(s) crossing contours. Sediment barriers should be installed at existing level grade (E&SPC Manual, Chapter 4 - Sediment Barriers and Filters). Please make all necessary corrections. It is recommended that Figure 4.1 be placed upon a detail sheet for clarity.	Section 2-4	Compost Filter Sock placement has been updated to avoid crossing contours on the Erosion and Sediment Control Plan Drawings. Figure 4.1 is located within the Compost Filter Sock Detail.

f. A spot check found that the design bottom elevation of Sediment Basin 1 is below the seasonal high water table and/or the adjacent wetlands. Please justify design or redesign to conform to Item 1 of Chapter 7 – Sediment Basins of the E&SPC Manual. §102.11(a)(1) Test pit reports have not determined whether or not the high water mark was encountered.	Section 2-4	The design bottom elevation for the Sediment Basin 1 has been raised to be above the seasonal high water table. Attachment 3 of the PCSM Narrative has been updated to include soil test pit report data including seasonal high water table.
g. The embankment for Sediment Basin 1 does not meet the standards of the E&SPC Manual Chapter 7 - Sediment Basins. Please revise the design of this basin and any others which do not meet this specification. A temporary basin that will be converted to a permanent basin should meet the standards of a permanent basin (i.e. embankment should be 3:1 inside and outside).	Section 2-4	The proposed embankment slopes were designed to minimize the limits of disturbance and impacts to sensitive environmental resources (forest and wetlands). The embankment slopes, as designed, will not result in stability problems. In addition, the basin will be located within fenced in portion of the facility thereby mitigating public safety concerns.
h. Show all proposed pipe outfall locations and outlet protection on the plan map(s) Riprap Aprons at Culvert #6 and #7 not shown on plan drawings.	Section 2-4	Plan drawings have been updated to include all pipe outfall locations and outlet protection.
i. Please adjust concrete wash out locations. Per E&S Manual Chapter 3 – Site Access, the Concrete Washout section does not permit washout facilities to be placed within 50 feet of storm drains, open ditches or surface waters.	Section 2-4	The Concrete Washout location has been revised to be located a minimum of 50 feet from storm drains, open ditches or surface waters.
j. The plan map(s) show two basin outlets discharging to areas that are not identified as a surface water. If this is a non-surface water discharge, provide a discharge analysis that meets the standards of the E&SPC Manual Chapter 7 – Sediment Basins.	Section 2-4	The E&S Narrative have been updated to include Section 12 and Attachment 4 regarding discharge analysis for the basins.
k. The plan map(s) show(s) compost sock(s) located in potential concentrated flow below Sediment Basin 1 outlet. Revise the location(s) or provide justification.	Section 2-4	Compost Filter Sock is proposed below that outlet of Sediment Basin 1 to catch sediments during construction of the proposed sediment basin. Upon completion of basin installation, the compost filter sock in the area of potential concentrated flow will be removed.

	l. Please explain the purpose of Timber Mats (MAT.1).		The use of Timber Mats in wetlands creates a surface that is sturdy enough to serve as workspace in wetlands. The temporary nature of the timber mats allows vegetation and soils under matting to remain untouched. In two areas, the plans call out " TIMBER MAT (MAT.1) or wetland soil segregation and restoration" where the use of matting may not be feasible due to site conditions and work activities proposed at these locations.
Erosion and Sediment Control			
Clinton County			
6. §102.4(b)(5)(vi) & §102.4(b)(5)(ix) Regarding Contractor Yards	a. E&S Plan set for Hensel Replacement; Sheet 2 of 39, in addition to narrative, refers to One Temporary Offline Contractor Yard. However, two are labeled on Sheet 1 of 39 and Sheet 24 of 39 shows two areas that are not well identified. Please clarify and identify.	Section 2-1	Sheet 2 of 39 of the Erosion and Sediment Control and Site Restoration Plan Drawings for Hensel Replacement has been updated to reference the single proposed offline contractor yard (only one is proposed). Sheet 24 of 39 identifies a small laydown area along Hensel Fork Road on the left side of the page. On the right side of the page, workspace includes an area for a truck turn-around at the intersection of Paddy Run Road, Boone Road, and Sandy Run Road.
	b. E&S Plan set for Hilltop Loop, Sheet 2 of 22 refers to Three Offline Contractor Yards. However, only two are labeled on Sheet 1 of 22 and Sheet SD of 22 shows an area that is not well identified. In certain parts of the E&S Plan Narrative, CY- 005 is referenced, but its location is not identified. Please clarify and identify.	Section 2-2	Sheet 2 of 22 of the Erosion and Sediment Control and Site Restoration Plan Drawings for Hilltop Loop has been updated to reference the single proposed offline contractor yards (only one is proposed). References to CY-005 in the E&S Plan Narrative and Attachments have been removed, as it is no longer proposed.
	c. E&S Plan set for Hensel Replacement, Sheet 21 of 39, the large area north of Tamarack Road and west of station 8700+00 is unidentified. Please identify and provide details, if needed.	Section 2-1	Sheet 21 of 39 of the Erosion and Sediment Control and Site Restoration Plan Drawings has been reconfigured to show the unidentified workspace and details on the alignment sheet.

	d. Details regarding grading, cover, restoration, etc., for work in Temporary Contractor Yards, Offline Contractor Yards, and Contractor Staging Areas are not complete and are not included in the sequence of construction. Please provide.	Sections 2-1 and 2-2	A Contractor Staging Area Sequence of Construction has been added to Sheet 25 of 39 of the Erosion and Sediment Control and Site Restoration Plan Drawings to address work in Temporary Contractor Yards, Offline Contractor Yards, and Contractor Staging Areas.
7. §102.4(b)(5)(ix) Regarding Plan Drawings	a. Hilltop Loop Sheet 2 of 22, Item 7 under Contractor Notes states: "Contractor may elect to use diversion channel or if conditions allow will place an earthen berm of appropriate size that will convey flow to the respective designated Clean Water Crossing." Please add a note that requires the permittee, co-permittee, or consultant to provide advance notice to the Conservation District or DEP.	Section 2-2	Contractor Note 7 of 22 on Sheet 2 has been updated to state: "Contractor may elect to use diversion channel or if conditions allow will place an earthen berm of appropriate size that will convey flow to the respective designated Clean Water Crossing. This action requires the permittee, co-permittee, or consultant to provide advance notice to the Conservation District or DEP."
	b. Hilltop Loop Sheet 5 of 22 contains the acronym for the pipeline installation crossing of CD/DXP. Please confirm the acronym is correct or adjust accordingly.	Section 2-2	The acronym has been revised to CD/DPX. It references the utilization of either a Cofferdam or Dam and Pump Crossing Methodology.
	c. On Hilltop Loop, rip-rap stream bank stabilization detail does not appear to be included in E&S plans for Young Woman's Creek. The stream bank stabilization method should be included for each stream that will be crossed by the pipeline and/or access roadway. Please revise accordingly.	Section 2-2	A call-out of the Rip Rap Stream Bank Stabilization acronym (RSS) has been added to the stream crossing associated with Young Women's Creek. Each stream proposed to be crossed by the pipeline will have the applicable stream bank stabilization and restoration detail included. Stream crossings associated with access roadways are not proposed to be disturbed and will utilize the existing crossing width.
	d. Hensel Replacement Sheet 2 of 39, Item 13 under General Site Notes states: "Placement of Bridge Equipment Crossing shown ... is not final and adjustment of location may be necessary for the removal of Leidy A Line and installation of Leidy Line D." Please add a note that requires the permittee, co-permittee, or consultant to provide advance notice to the Conservation District or DEP.	Section 2-1	General Site Note, Item 13 on Sheet 2 of 39 has been updated to state: "Placement of Bridge Equipment Crossing shown ... is not final and adjustment of location may be necessary for the removal of Leidy A Line and installation of Leidy Line D. This action requires the permittee, co-permittee, or consultant to provide advance notice to the Conservation District or DEP."

e. Hensel Replacement E&S Plan set contains two shaded areas that are difficult to differentiate. Erosion Control Blanket and Proposed Gravel are both yellow. Please show a clear difference.	Section 2-1	Erosion and Sediment Control and Site Restoration Plan Drawings for the Hensel Replacement have been updated to clearly differentiate the difference between Erosion Control Blanket and Proposed Gravel.
f. Hensel Replacement Sheets 6, 7, 8, 9, & 10 of 39 for Big Ridge Trail have very little E&S BMPs, other than the stream or wetland crossings. Please clarify intent for Big Ridge Trail. Additionally, please provide any site restoration measures taken to preserve road quality and minimize stormwater impacts. Practices utilized for low- use roads include, among others, outsloping the road and employing simple BMPs, such as grade breaks.	Section 2-1	The existing haul road will be widened to approximately 14 feet. Due to the limited use of the road, the road will be revegetated after construction of the pipeline construction; which is consistent with its current/preconstruction condition. Erosion and Sediment Control and Site Restoration Plan Drawings Sheets 6, 7, 8, 9, 10, & 34 of 39 have been updated to include additional detail for this proposed access road.
g. Hensel Replacement Sheet 9 of 39 shows a French mattress and Wetland Equipment Crossing (WEC). Is the French mattress a permanent wetland crossing? Please clarify the reason for using a French mattress through a wetland. i. In addition, please provide information if trees will be cut as part of wetland crossing.	Section 2-1	The proposed French Mattress is a permanent wetland crossing. The French mattress installation will allow for clean water to flow through the site during and post construction and allow for the hydrologic connection of adjacent wetlands on both sides of the road. Trees will be cut as part of this wetland crossing, however workspace in this area has been reduced since the original submittal.
h. Regarding the portion of Leidy Line A that will be capped and remain within the Tamarack Swamp: h.i. Please clearly identify each location where Leidy Line A will be capped and allowed to remain in the Tamarack Swamp.	Section 1-10, Section 2-1	Sheet 22A has been added and Sheets 17 and 22 have been updated to define the location and necessary excavation locations associated with the proposed abandonment under the Tamarack Swamp. All staging activities will be located within the identified limits of disturbance for the project . An abandonment sequence for the grouting associated with Leidy Line "A" has been added to Sheet 25. In addition, the Construction Spill Plan outlined in Section 1-10 has been updated to include details and procedures in the event of a spill of the proposed cementitious grout.
h.ii. Also, please provide details for capping and abandoning that portion(s) of Leidy Line A.		
h.iii. Please show on the Erosion and Sedimentation Control Plans the transmission line length to be grouted. This should include staging area and restoration efforts needed to complete the pipeline grouting.		

	i. Hensel Replacement Sheet 22 of 39 shows an area of "No Disturbance". Please clarify what this area will be used for and how it will be field marked to prevent disturbance.	Section 2-1	This area has been removed from the proposed Limits of Disturbance for clarity.
	j. Note 5 under Temporary and Permanent Stabilization on Hensel Replacement Sheet 27 of 39 and Hilltop Loop Sheet 12 of 22 refer to Mixture 1 being on Table 11.3. Please modify to refer to the appropriate table.	Sections 2-1, Section 2-2	Note 5 under Temporary and Permanent Stabilization has been updated for clarity on seeding mixture within riparian buffers on Sheet 27 on Hensel Replacement and Sheet 12 of Hilltop Loop.
Erosion and Sediment Control			
Columbia County			
8. §102.4(b)(5)(iii) - Characteristics of Earth Disturbance	a. Contractor Yard 001 - More information is needed related to the proposed work to be done on the contractor/pipe yard. Will the area be regraded and/or stoned lined or otherwise protected during its use?	Section 2-3	A Contractor Staging Area Sequence of Construction has been added to the on Sheet 12 of 22. Also, temporary topsoil stockpile locations have been added to Sheet 11 of 22. Minor grading for the topsoil stockpile locations will take place. The entire area will be returned to existing contours and conditions post-construction. The sequence indicates the staging area will have a temporary gravel surface.
	b. Compressor Station 610 - More information is needed related to the proposed work to be done on the compressor station staging area. Will the area be regraded and/or stoned lined or otherwise altered during its use?	Section 2-5	A Contractor Staging Area Sequence of Construction has been added to the on Sheet 3 of 6. Also, temporary topsoil stockpile locations have been added to Sheet 2 of 6. Minor grading for the topsoil stockpile locations will take place. The entire area will be returned to existing contours and conditions post-construction. The sequence indicates the staging area will have a temporary gravel surface.
9. §102.4(b)(5)(vii) – BMP Installation and Proper Functioning	a. Contractor Yard 001 - Provide a site-specific construction sequence for the contractor yard showing the installation of all BMPs and the steps needed to restore the site to meadow conditions.	Section 2-3	A Contractor Staging Area Sequence of Construction has been added to the on Sheet 3 of 6.

	b. Compressor Station 610 - The flow path to CFS-610 16-21 appears to extend onto neighboring property and be longer than assumed in the calculations. Provide a drawing justifying the flow length assumed in the plans.	Section 2-5	A drawing justifying the flow length assumed in the plans has been provided as Exhibit 1.0, located after the standard worksheet calculation for compost filter sock in Attachment 3 of the E&S Narrative . The flow length was presumed to stop at a "fence row" located along the property line.
10. §102.4(b)(5)(ix) – Plan Drawings	a. Show an enlargement of each sediment trap indicating how the temporary excavation of the trap bottom will connect to the existing ground at the compost filter socks. Any discharge from the socks should be to stable ground and not to areas disturbed to excavate the trap.	Section 2-3	Plan drawings have been provided to appropriate scale and typical details provided outline sufficient detail for construction of sediment traps. A small "No-disturbance" area has been called out in the location where the sediment trap #2 on CY001 discharges. Additionally, the sediment trap has been slightly relocated to avoid discharging to the adjacent diversion channel.
	b. The cleanout elevation for each trap as well as top and bottom elevations should be provided.	Section 2-3	The table on the Compost Filter Sock Sediment Trap Detail on Sheet 22 of 22 has been updated to include cleanout elevation and top/bottom elevations.
	c. Clearly show that the discharge from the sediment basins is to a stable outlet. If it outlets to the road ditch, provide stability calculations for the road ditch. (Necessary? E&S Manual does not require spillway since “flow-through”)	Section 2-3	No sediment basins are proposed to be constructed at Contractor Yard 001 or Compressor Station 610. Compost Sock Sediment Traps at Contractor Yard 001 are “flow-through” with no spillway required.
	d. The plans should clearly show where each seed mixture on the plans is to be used.	Section 2-3, Section 2-5	The Temporary and Permanent Stabilization Section in the Plan Drawings (Sheet 14 for Benton Loop and Sheet 5 for Compressor Station 610) has been updated to outline a specific seed mixture(s) to be used.

11. §102.4(b)(5)(i) – Existing Topographic Features	a. The existing condition of the area north of compressor station 610 that is included in the LOD for the project should be updated to reflect the most current conditions. As part of the recent final stabilization of the site for the recently completed construction project, several water control diversions and waterways were installed to control gullies that had formed. These should be documented so that they can be replaced as is or with equivalent BMPs during the retirement of the site.	Section 2-5	Existing water control diversions have been surveyed and added the plan drawings. The call out states that these features are to be restored.
Erosion and Sediment Control			
Lycoming County			
12. §102.4(b)(5)(viii) – Supporting Calculations and Measurements	a. Silt Socks BL – 19, 20, 21, 22, 96, 97, 98, 99, 100, and 101 are undersized. Please revise.	Section 2-3	CFS calculations have been reviewed for sizing (specifically 19, 20, 21, 22, 96, 97, 98, 99, 100, and 101). Updates to site plans and CFS worksheets have been provided.
	b. Please provide manufactures spec sheet for all channel linings.	Sections 2-1, 2-2, 2-3, 2-4, 2-6, 3-1, 3-3, 3-4	Manufacturers spec sheets from North American Green have been included in Attachment 3.2 Channel Design Worksheets for all lining types used for the project.
	c. Please provide all information from E&S worksheets 12-17 for the proposed sediment basin.	Section 2-3	All information pertaining to E&S worksheets 12-17 are provided in Attachment 3.5- Sediment Basin Design Worksheets.
	d. Please provide anti-seep collar worksheet for the proposed sediment basin.	Section 2-3	Anti-Seep collar worksheet has been provided as an attachment to E&S narrative.
	e. The typical detail on for the sediment basin is lacking specific information. Please revise this detail to include all necessary construction dimensions.	Section 2-3	The sediment basin detail has been updated to include dimensions.
	f. Fertilizer type should be 10-20-20 or per soil test for permanent stabilization.	Sections 2-1 to 2-6	The fertilizer type on Table 11.2 has been updated to 10-20-20.
	g. Rock aprons for the clean water crossings (CWC) are not shown on E&S worksheet 20. Please include these aprons on this worksheet.	Section 2-3	Sediment trap outlet basins are being utilized instead of rock aprons for clean water crossing outlets. Schedule for CWC pipe sizes and dimensions of sediment trap outlet basin for each pipe size is provided in CWC Details.

	h. The dewatering facility for hydrostatic testing water is located close to a steep slope. Please explain why this was not located farther from this adverse location.	Section 2-3	The location of the dewatering structure will allow for treated discharge water to flow to an undisturbed area. The rate of the discharge will be managed to not allow the flow path to cause erosion as required.
	i. Information on E&S worksheets 11 do not match the channel typical detail on the plan sheets. (i.e. – Channel detail on Sheet 22 has BL-11 with rip-rap lining and BL-12 with grass lining. Whereas worksheet 11 has BL-11 with grass lining and BL-12 with rip-rap). Please ensure information matches between both sources.	Section 2-3	Sheet 22 has been revised to accurately match E&S worksheet 11.
	j. Please define which of the many seed mixes show in the plans will be used for temporary and permanent stabilization. Provide seeding specifics, as per the E&S Manual, references to a standard seed mixture are not acceptable.	Sections 2-1 to 2-6	Temporary and Permanent Stabilization Notes on Sheet 14 of 22 has been updated to include specific seed mixes for upland, wetland and riparian buffer areas.
	k. Please indicate mulch rates and method of anchoring in the plans	Sections 2-1 to 2-6	Table 11.6 - Mulch Application Rates have been added to Sheet 14 of 22.
13. §102.4(b)(5)(ix) – Plan Drawings	a. Sediment basin shows a baffle on the plan sheets. Please provide a detail for the construction of this baffle.	Section 2-3	An errant line has been removed on Sheet 3 of the plan drawings. There is no baffle proposed to be utilized at this basin.
	b. The line type for rock construction entrance (RCE) at several locations is obstructed by other line types. Please make all RCEs visible on the plans for their entire length.	Section 2-3	Plan sheets have been updated to make all RCE's visible.
	c. Please clarify if the channels and check dams also be removed at the Mordan Hollow Access Road?	Section 2-3	The Limits of Disturbance has been updated on Sheet 9A of 22 to include the removal of channels and check dams associated with existing access road west of Mordan Hollow Road.
	d. Please clarify if the existing basins will be removed at station 4787+80.	Section 2-3	A call out on Sheet 9 of 22 has been provided which outlines the removal of the existing basins.
	e. Please show stockpile locations at contractor yards.	Section 2-3	Topsoil stockpile locations have been provided on Sheets 3A, 10 & 11 of 22 of the plan drawings.
	f. Please provide label to green line in DC-BL-10 CY-002.	Section 2-3	The errant green line has been removed on Sheet 10 of plan drawings.

	g. The construction sequence states that all trees will be fell by hand on site. Please clarify if this is how it is intended to read or was if it was meant to be only in critical areas.	Sections 2-1 to 2-6	The title "Tree Felling Notes" on Sheet 12 of 22 has been updated to "Non-Mechanized Tree Felling Notes". The non-mechanized tree felling will take place as necessary in critical areas. In other areas, standard mechanized tree felling practices will be performed. Notes 8 - 14 in the Pipeline BMP Installation Sequence on Sheet 12 of 22 have also been updated for clarity.
	h. Please include construction detail 3-15 and/or 3-13.	Section 2-3	Construction Detail 3-15 has been added to Sheet 22A of 22. The Culvert Equipment Crossing Detail on Sheet 16 of 22 has been updated to include language for usage of single culvert.
	i. Please include the staple pattern for erosion control blanket and channel linings.	Sections 2-1 to 2-6	A staple pattern has been included in the Erosion Control Blanket Detail on Sheet 19.
Erosion and Sediment Control			
Schuylkill County			
14. §102.4(b)(5)(vii) – Sequence of BMP Installation and Removal	a. Provide a site-specific sequence of BMP installation and removal in accordance with Chapter 2 of the E&SPC Manual	Section 2-6	A Compressor Station Construction Sequence has been provided on Sheet 4 of the plan drawings.
15. §102.4(b)(5)(viii) – Supporting Calculations and Measurements	a. Provide peak flow calculations for channel, Diversion Channel #1. See Chapter 5 in E&SPC Manual for guidance on runoff calculations. Standard E&S Worksheets #9 and #10 are recommended for the Rational Equation. An acceptable alternative is the use of the standard multipliers at the top of Standard E&S Worksheet #11. Please provide this worksheet if necessary.	Section 2-6	Attachment 3 of the E&SC Plan Narrative and Drawings has been updated to include Peak flow calculations for all channels from HydroCAD.
	b. It appears Channel BL-1-ECM may be Diversion Channel #1. If this is the case, please label plans and Worksheet #11 to clearly identify channel	Section 2-6	Standard Worksheet #11 has been updated to relabel "Channel BL-1-ECM" as "DC-1".

16. §102.4(b)(5)(ix) – Plan Drawings	a. Please provide contours for Diversion Channel#1.	Section 2-6	As discussed with DEP on 4/15/2020, temporary grading contours for this channel are not being provided on the plan sheet to avoid confusion with permanent channels; however temporary channel dimensions are provided on Sheet 7 of 10. Diversion Channel #1 is a temporary channel which will be restored upon successful revegetation upslope.
	b. Sediment trap BMP's are present in the South Eastern area of the Site, while no improvements or change in cover is proposed in these areas, please describe why these BMP's are needed, as earth disturbance should be minimized	Section 2-6	A callout has been added to the plans to specify that this area will be used as contractor staging / layout area. Appropriate topsoil stockpile locations and a Contractor Staging Area Sequence of Construction has been added to plan drawings.
Post Construction Stormwater Management			
Site Wide			
17. §102.8(g) PCSM Plan Stormwater Analysis	a. Note – Both Worksheet 10 and Worksheet 11 do not need to be filled out for the same drainage area. Worksheet 11 is intended for sites where volume reduction cannot be met. Therefore, if volume reduction is met, Worksheet 11 does not need to be filled out. Completing Worksheet 10 meets the requirement and demonstrates solute reduction.	Sections 3-1 to 3-4	Worksheet #11 has been removed from the PCSM Narratives.
18. §102.8(f)(9) – Plan Drawings	a. The NS BMP 5.6.1 Minimize Total Disturbed area is used throughout the project. Please provide the following notations on the PCSM Plans for the areas proposed to be protected from earth disturbance: a.i. The protected areas shall not be subject to grading or movement of existing soils.	Section 3-1 to 3-4	Notes have be added to the PCSM Plans with the following notations: --The protected areas shall not be subject to grading or movement of existing soils. --Existing vegetation is not to be removed from the protected area. --The protected area must be clearly delineated in the field and protected prior to any construction activities taking place. --Any protected areas that have been disturbed/compacted during construction may require soil amendment and restoration.
	a.ii. Existing vegetation is not to be removed from the protected area.		
	a.iii. The protected area must be clearly delineated in the field and protected prior to any construction activities taking place.		

	a.iv. Any protected areas that have been disturbed/compacted during construction may require soil amendment and restoration.		
	b. The NS BMP 5.6.3 Re-Vegetate and Re-Forest Disturbed Areas is used throughout project. This BMP has two parts, 1) Protect Existing Trees, and 2) Revegetate and Reforest. Please clarify which part will be utilized. Please see PA Stormwater BMP Manual Chapter 8, Criteria and Credits for BMP 5.6.3 and provide appropriate notations on PCSM plans for selected part.	Sections 3-1 to 3-4	For a majority of the Project, the "Reforest and Revegetate" option of NS BMP 5.6.3 will be utilized. An attachment has been provided within the E&S narrative outlining the extents of Non-structural BMPs depict where this BMP is proposed to be utilized. Tree clearing is limited to only that indicated on the plans. Most of the pipeline work is proposed along the existing cleared and maintained Right-of-Way and wouldn't require protection of existing trees, as these areas are co-locating existing pipelines.
Post Construction Stormwater Management			
Compressor Station 607			
19. 102.8(f)(6) A written description of the location and type of PCSM BMPs including construction details for permanent stormwater BMPs including permanent stabilization specifications and locations	a. For wet pond, please provide distances from BMP bed bottom to seasonally high water table and bedrock to demonstrate suitability of location.	Section 3-3	Attachment 3 of Section 3-3 PCSM Plan has been updated to provide details on the distances to the seasonally high water table and bedrock to demonstrate suitability of location. The basin bottom elevation outlined on plan drawings has been updated to be above the seasonal high water table.
	b. For infiltration basin, as per the Pennsylvania Stormwater Best Management Practices Manual, Appendix C, Protocol 2, a 2-foot clearance should be maintained between bottom of the proposed BMP where infiltration is to occur and any limiting zone (mottling, seasonally high water table, bedrock, etc.). The proposed BMP has the potential to have an inadequate distance as specified by the manual. Please provide documentation that shows an adequate distance exists or justification.	Section 3-3	Attachment 3 of Section 3-3 PCSM Plan has been updated to provide details on the distances to the seasonally high water table and bedrock to demonstrate suitability of location. The infiltration basin design elevation outlined on plan drawings has been updated to be 2' above the seasonal high water table.

	c. Extents of BMPs selected on Worksheet 10 and Worksheet 11 need to be described in PCSM narrative. This includes NS BMP 5.6.1 Minimize Total Disturbed Area, NS BMP 5.6.3 Re-Vegetated and Re-Forest Disturbed Areas, NS BMP 5.9.1 Street sweeping (incorrectly labelled as BMP 5.9.15 on Worksheet 11), Structural BMP 6.4.5 Rain Garden/Bioretention and Structural BMP 6.4.8 Vegetated Swale.	Section 3-3	The PCSM Narrative for Compressor Station 607 has been revised to include information regarding non-structural and structural water quality BMPs that are checked on Worksheets 10. Worksheet 11 has been removed because we have met the volume reduction requirements and therefore as noted by PADEP, Worksheet 11 is not required.
	d. The proposed BMP “pipe level spreader” has several deficiencies. Since an insufficient amount of information has been provided on the proposed BMP, the BMP was reviewed to consider most of the possible aspects of the BMP. These deficiencies can include but may not be limited to the following comments. BMP’s should be site specific designs which consider all characteristics of the proposed project site. Therefore, additional information should be provided as necessary.		Level spreaders have been replaced with outlet basins. The originally designed level spreaders were located below the sediment basin/wet pond, the upslope area exceeded 8% due to the embankment slopes.
	d.i. Please demonstrate that a 90% ground vegetative cover (grasses, meadow, brush, short bushes, etc.) exists down slope of the level spreader for the entire flow path and throughout the entire year	Section 3-3	An "offsite discharge analysis" section has been included in the E&S and PCSM narratives to demonstrate that a 90% ground vegetative cover (grasses, meadow, brush, short bushes, etc.) exists down slope of the outlet basin for the entire flow path and throughout the entire year.
	d.ii. Please demonstrate that the slope of grades immediately above the level spreader(s) do not exceed 8 percent.	Section 3-3	Level spreaders are now replaced with outlet basins. Since they are located right below the sediment basin/wet pond, the slopes above this outlet structure exceed 8% because of the basin embankments.
	d.iii. Please provide notation on the PCSM Plans that the receiving down slope soils and land are to remain undisturbed for the entire flow path.	Section 3-3	An "offsite discharge analysis" section has been included in the E&S and PCSM narratives to demonstrate that receiving down slope soils and land are to remain undisturbed for the entire flow path.

20. §102.8(f)(8) Supporting Calculations	a. On Worksheet #4 – existing conditions, only meadow, woodland and impervious are acceptable cover types. Per PA Stormwater BMP Manual, Section 3.3.3, all existing non-forested areas must be considered meadow (good condition) or its equivalent	Section 3-3	Worksheet #4 has been updated to reference an appropriate existing condition. Gravel areas are now labelled as impervious.
21. §102.8(f)(9) Plan Drawings	a. Channel 3 does not appear to be labelled on the PCSM plan, Sheet 3 Drawing. This channel is on the PCSM Standard E&S Worksheet #11. Please label on plan.	Section 3-3	The channel label has been added to the plan sheet. As per Comment 19.c., Worksheet 11 has been removed from the application.
	b. Level spreader design sheets do not appear to match level spreader detail on PCSM Drawing Sheet 6. Design worksheets say pipe diameter is 8 feet, while detail shows 12 feet. Design worksheet also shows perforations. Additionally, drawing indicates a rock apron outlet instead of a pipe level spreader. Will perforations shown on design worksheet be necessary if a stilling basin is used? Please clarify design.	Section 3-3	The Level Spreaders have been replaced with "outlet basins". The corresponding detail on Sheet 6 of 7 has been revised to match the outlet basin design worksheet. The plan drawing has been update to call out outlet basin instead of rock apron.
	c. Since level spreader will be used for E&S, it needs to be reconfigured to its original state before use as a permanent stormwater feature by flushing and cleaning out all sediment. Please include level spreader in steps used to reconfigure wet pond.	Section 3-3	Outlet basins are proposed instead of Level Spreaders. PCSM installation sequence has been revised and an additional step has been added to specify sediment cleaning.
	d. Extents of BMPs selected on Worksheet 10 and Worksheet 11 need to be shown on plans. This includes NS BMP 5.6.1 Minimize Total Disturbed Area and NS BMP 5.6.3 RE-Vegetated and RE-Forest Disturbed Areas.	Section 3-3	The PCSM Narrative for Compressor Station 607 has been revised to include information regarding non-structural and structural water quality BMPs that are checked on Worksheets 10. Worksheet 11 has been removed because we have met the volume reduction requirements and therefore as noted by PADEP, Worksheet 11 is not required.

22. §102.8(f) PCSM Plan Contents	a. Please label attachments correctly. Section 7.0 references Hydrocad design calculations in Attachment 5. There is no Attachment 5, these calculations may be in Attachment 4. Attachment 4 seems to be categorized incorrectly, as the subsections are given Attachment 3 designations.	Section 3-3	Attachments have been re-labeled accordingly.
	b. Section 8.5 states temporary cover includes "see mixture 1 from Table 11.3." Please correct typo and table reference, as Table 11.3 does not have seed mixtures. Permanent cover for riparian areas should not use Mixture 1, as that is a temporary mixture. Please specify seeds, as referencing a seed mix is not appropriate	Section 3-3	Section 8.5 has been updated for clarity on seeding mixtures within riparian buffers.
Post Construction Stormwater Management			
Compressor Station 620			
23. §102.8(f)(6) A written description of the location and type of PCSM BMPs including construction details for permanent stormwater BMPs including permanent stabilization specifications and locations	a. Worksheet 10 and Worksheet 11 mention BMP 5.6.1 Minimize Total Disturbed, BMP 5.6.3 Re-Vegetate/Re-forest Disturbed Areas and BMP 6.4.5 Rain Garden/Bioretention. If utilized, BMPs need to be listed in narrative.	Section 3-4	The PCSM Narrative for Compressor Station 620 has been revised to include information regarding non-structural and structural water quality BMPs that are checked on Worksheets 10. Worksheet 11 has been removed because we have met the volume reduction requirements and therefore as noted by PADEP, Worksheet 11 is not required.
	b. Level spreader should be referenced in PCSM narrative. Please confirm what type of level spreader will be used. PCSM Plan Sheet 3 appears to show a rip-rap apron, while detail on Sheet 6 shows a square basin and the level spreader design worksheet indicates a perforated pipe level spreader. Will pipe going into level spreader be perforated?	Section 3-4	The Level Spreader originally located at the outlet of sediment basin/wet pond has been replaced with an "outlet basin". Corresponding details on Sheet 6 has been revised to match the outlet basin design worksheet. The plan drawing has been revised accordingly.

	c. Furthermore, the proposed BMP “pipe level spreader(s)” have several deficiencies. Since an insufficient amount of information has been provided on the proposed BMP, the BMP was reviewed to consider most of the possible aspects of the BMP. These deficiencies can include but may not be limited to the following comments. BMP’s should be site specific designs which consider all characteristics of the proposed project site. Therefore, additional information should be provided as necessary.	Section 3-4	Level spreaders have been replaced with outlet basins. Since they are located right below the sediment basin/wet pond, the slopes above this outlet structure exceed 8% because of the basin embankments.
	c.i. Please demonstrate that a 90% ground vegetative cover (grasses, meadow, brush, short bushes, etc.) exists down slope of the level spreader for the entire flow path and throughout the entire year.	Section 3-4	An "offsite discharge analysis" section has been included in the E&S and PCSM narratives to demonstrate that a 90% ground vegetative cover (grasses, meadow, brush, short bushes, etc.) exists down slope of the outlet basin for the entire flow path and throughout the entire year.
	c.ii. Please demonstrate that the slope of grades immediately above the level spreader(s) do not exceed 8 percent.	Section 3-4	Level spreaders have been replaced with outlet basins. The originally designed level spreaders were located below the sediment basin/wet pond, the upslope area exceeded 8% due to the embankment slopes.
	c.iii. Please provide notation on the PCSM Plans that the receiving down slope soils and land are to remain undisturbed for the entire flow path.	Section 3-4	An "offsite discharge analysis" section has been included in the E&S and PCSM narratives to demonstrate that receiving down slope soils and land are to remain undisturbed for the entire flow path.
24. 102.8(f)(9) Plan Drawings	a. Since level spreader will be used for E&S, it needs to be reconfigured to its original state before use as a permanent stormwater feature by flushing of perforated pipe and cleaning out all sediment. Please add this to narrative and construction sequence.	Section 3-4	Outlet basins are proposed instead of Level Spreaders. PCSM installation sequence has been revised and an additional step has been added to specify sediment cleaning.

b. PCSM Plan Sheet 4 Riparian Buffer section states no existing or proposed riparian buffers are within site location. Plan maps and narrative section 13.0 indicate a riparian buffer will be temporarily impacted and then restored. A Riparian Buffer Waiver is claimed under 25 PA Code §102.14(d)(2)(iv). Please update Riparian Buffer section on Sheet 4.	Section 3-4	Riparian Buffers section on PCSM Plan Sheet 4 has been revised to match the PCSM narrative that indicated temporary impact and subsequent restoration of riparian buffer with specialized riparian buffer seed mix.
c. Please show extents of BMPs listed on Worksheet #10 and #11 on plans. This includes BMP 5.6.1 Minimize Total Disturbed BMP 5.6.3 Re-Vegetate/Re-forest Disturbed Areas.	Section 3-4	Extents of water quality BMPs selected on Worksheets 10 has been shown on an attachment to PCSM Narrative. Description about the BMPs has also been provided in the PCSM Narrative. Worksheet 11 has been removed.
d. The proposed BMP "vegetated filter swales" have several deficiencies: d.i. Vegetated filter swales typically have a bottom width that ranges from a minimum 2 foot to a maximum of 8 feet. The PCSM plan detail for this swale lists the bottom as between 7 and 18 feet. Please justify or revise.	Section 3-4	Vegetated swale grades on PCSM Plan Sheet 5 and Vegetated swale detail on Sheet 7 has been revised to have 8 ft bottom width for the swale. The HydroCAD report in Attachment 4 of the PCSM Narrative has also been updated to match the design.
d.ii. Vegetated swales with slopes greater than 3% but less than 6% are acceptable as a water quality BMP if check dams or earthen check berms are provided and designed according to the Pennsylvania Stormwater Best Management Practices Manual, November 2006, Chapter 6, vegetated swale. Vegetated swale appears to have slope greater than 3%. Please justify or revise to include check dams.	Section 3-4	Considering the longitudinal slope, check dams will be added to the vegetated swale, per PA Stormwater BMP Manual. This will be shown on the PCSM Plan Sheet 3 and Vegetated swale detail on Sheet 7.
d.iii. Please include information relating to infiltration capabilities of swale. PA Stormwater BMP 6.4.8 mentions swale should be underlain with 24 inches of permeable soil and have a minimum infiltration rate of 0.5 in/hr. The infiltration rate for swale site, TP-10, is 0.22 in/hr. Please show infiltration is appropriate for swale.	Section 3-4	The swale will be underlain with 2 ft of permeable soil to ensure adequate infiltration. This additional information is provided in the PCSM Narrative and PCSM Plan Notes on Sheet 4 and the vegetated swale detail on Sheet 7.

	e. The proposed BMP “wet pond / retention basin” has numerous deficiencies. These deficiencies can include but may not be limited to the following comments. BMP’s should be site specific designs which consider all characteristics of the proposed project site. Therefore, additional information should be provided as necessary.	Section 3-4	Additional information regarding the proposed BMP “wet pond / retention basin" has been provided in Section 3-4, including, but not limited to Comments 24.e.i, e.ii and e.iii.
	e.i. BMP Description on Sheet 4 has wet pond with inside slope of 2:1 and outside slope of 3:1. Please provide both inner and outer embankment side slopes of 4:1 minimum as per the BMP manual.	Section 3-4	The proposed basin side slopes have been selected to minimize environmental impacts by reducing the overall footprint of the pond and constructing of the basin in a steep slope area. The recommended 4:1 sideslopes in the BMP manual are desirable in locations such as residential developments or areas where there is a significant potential for public access. The basin is located within the security fencing of the facility and in a rural area, thereby negating the need for flatter slopes. This was previously discussed and agreed by PADEP.
	e.ii. Please provide the infiltration rate for the basin. Infiltrations seem relatively high for TP-5, TP-6, TP-7 and TP-8, sites where the wet detention basin will be. Will an impermeable soil line basin bottom? Overall, provide demonstration soil types and infiltration will be effective for this basin.	Section 3-4	Infiltration is not proposed within this basin as the basin will be lined with a compacted soil subbase that will have a minimum coefficient permeability to ensure the wet pond does not dry out. This information and suitability of soil types are now provided in the PCSM Narrative, BMP installation sequence on Sheet 4 and additional detail on wet bottom pond lining has been provided on Sheet 6.
	e.iii. Please provide the distances from the BMP infiltration bed bottom to the seasonally high water table and bedrock.	Section 3-4	Attachment 3 of Section 3-4 PCSM Plan has been updated to provide details on the distances to the seasonally high water table and bedrock to demonstrate suitability of location.
Post Construction Stormwater Management			
Hensel Replacement- Western Terminus			

25. §102.8(f)(6) A written description of the location and type of PCSM BMPs including construction details for permanent stormwater BMPs including permanent stabilization specifications and locations	a. Please provide information in narrative for BMPs on Worksheet 10 and Worksheet 11, NS BMP 5.6.1 Minimize Total Disturbed Area, NS BMP 5.4.3 Protect/Utilize Natural Drainage Features, NS BMP 5.6.2 Minimize Soil Compaction, so it can be understood how these BMPs will be implemented and utilized.	Section 3-1	The PCSM Narrative has been revised to include information regarding non-structural and structural water quality BMPs that are checked on Worksheets 10. Worksheet 11 has been removed because we have met the volume reduction requirements and therefore as noted by PADEP, Worksheet 11 is not required.
	b. Please include additional information for level spreader to demonstrate suitability. These deficiencies can include but may not be limited to the following comments. BMP's should be site specific designs which consider all characteristics of the proposed project site. Therefore, additional information should be provided as necessary. b.i. Please demonstrate that a 90% ground vegetative cover (grasses, meadow, brush, short bushes, etc.) exists down slope of the level spreader for the entire flow path and throughout the entire year.	Section 3-1	The mountable berm and level spreader outlined in the original submittal was reevaluated and not considered necessary for the design at this location. This feature and the calculations have been removed Appropriate E&S BMP's and revegetation are considered adequate.
	b.ii. Please demonstrate that the slope of grades immediately above the level spreader(s) do not exceed 8 percent.	Section 3-1	
	b.iii. Please provide notation on the PCSM Plans that the receiving down slope soils and land are to remain undisturbed for the entire flow path.	Section 3-1	

	c. The proposed BMP “infiltration berm(s) / retentive grading” have several deficiencies. Since an insufficient amount of information has been provided on the proposed BMP, the BMP was reviewed to consider most of the possible aspects of the BMP. These deficiencies can include but may not be limited to the following comments. BMP’s should be site specific designs which consider all characteristics of the proposed project site. Therefore, additional information should be provided as necessary. c.i. It appears the infiltration berm is to be constructed on Ungers UpF soil. According to the Table Limitations of Pennsylvania Soils, this soil is low strength/landslide prone. The PA Stormwater BMP Manual BMP 6.4.10 Infiltration Berms does not recommend installing berms on landslide prone slopes. Please demonstrate/clarify suitability of design.	Section 3-1	Additional information regarding the proposed BMP “infiltration berm" has been provided in Section 3-1 to address comments noted in Comments 25.c.i, c.ii and c.iii. The infiltration berm is to be constructed on a relatively flat slope as outline by the contours on Sheet 3. This flat slope is not indicative of the Ungers UpF soil type; which is listed at 25-50% slopes. Due to the area proposed for the infiltration berm being relatively flat and not on a steep slope; therefore, the location of the infiltration berm is considered suitable.
	c.ii. The types of plantings to be utilized on the berms have not been provided. Both inner and outer embankment side slopes of the berms are directly related to the plants that are utilized. Please provide the plantings which will be utilized. Note the following ratios that should not be exceeded: 5:1 for trees, 4:1 for berms to be “mowed”, 3:1 for other herbaceous plants that are not to be mowed, 2:1 for herbaceous plants that demonstrate tolerance to steep slopes and justification is provided.	Section 3-1	The berms are designed to have side slopes of 2:1 and consist of herbaceous vegetation that will not be mowed. Seed Mixture 1 and 3 outlined in Table 11.5 on Sheet 6 of 8 is recommended for the berms due to the slope tolerance and deep rooted nature of the permanent seed mixture consisting of birdsfoot trefoil and tall fescue.
	c.iii. Please provide the distance from the BMP Infiltration Berm bed bottom to the seasonally high water table and bedrock.	Section 3-1	Attachment 3 of Section 3-1 PCSM Plan has been updated to provide details on the distances to the seasonally high water table and bedrock to demonstrate suitability of location.

26. §102.8(f)(9) Plan Drawings	a. Please show extents of NS BMP 5.6.1 Minimize Total Disturbed Area, NS BMP 5.4.3 Protect/Utilize Natural Drainage Features and NS BMP 5.6.2 Minimize Soil Compaction on plan drawings.	Section 3-1	Extents of water quality BMPs selected on Worksheets 10 will be shown on an attachment to PCSM narrative. Description about the BMPs will also provided in the PCSM Narrative.
	b. Please confirm what type of level spreader will be used. PCSM Plan Drawing Sheet 3 appears to show a pipe level spreader, while detail on PCSM Plan Drawing Sheet 7 shows a square basin.	Section 3-1	The level spreader BMP has been removed from the project.
	c. Since level spreader will be used for E&S, it needs to be reconfigured to its original state before use as a permanent stormwater feature by flushing and cleaning out sediment. Please add this to narrative and construction sequence.	Section 3-1	The level spreader BMP has been removed from the project.
	d. Please show channels MB-1 and MB-2 on PCSM Plan Drawing. Channels are included on Standard E&S Worksheet #11 in PCSM Narrative but not shown on Drawings.	Section 3-1	MB-2 has been removed from the PCSM design. MB-1 represents a mountable diversion berms installed at the site. MB-1 is designed similar to a diversion channels and the worksheets provided in Attachment 4 represent the appropriate calculations.
	e. Please provide the following notations on the PCSM Plan with respect to the soil amendment and restoration: e.i. Soil amendment and restoration should not take place within the drip line of trees or tree line to avoid damaging root system.	Section 3-1	The PCSM Installation Sequence of Sheet 6 has been revised to include language that soil amendment and restoration area will take place outside the drip line of trees.
	e.ii. Soil amendment and restoration should not take place over utility installations within 30 inches of the surface.	Section 3-1	The BMP Installation Sequence has been updated to include language that soil amendment and restoration is not proposed to take place over utility installations.
	e.iii. The methodology should only be performed when the soil conditions are dry.	Section 3-1	The BMP Installation Sequence has been updated to include language regarding work should be performed in dry conditions.
	e.iv. The methodology should only be performed using a solid shank ripper, not a disk or plow due to their ineffectiveness.	Section 3-1	The BMP Installation Sequence has been updated to include language regarding deep tilling utilizing a solid shank ripper, not a disc or plow.

	e.v. Please provide on the PCSM Plans for the use of the ratio of soil to compost of 2:1 (soil: compost) as per the PCSM Manual, Chapter 6.	Section 3-1	The BMP Installation Sequence have been updated to include citation of a ratio of soil to compost of 2:1 (soil: compost).
26. §102.8(f)(8) Supporting Calculations	a. Please include level spreader design worksheet to verify design. This was included for other project level spreaders and did not appear to be included.	Section 3-1	The level spreader BMP has been removed from the project.
	b. PCSM Channel Design Worksheet #11 for MB-1 and MB-2 appear to have the Calculated Flow Depth and Total Depth entered incorrectly. The Total Depth should not be less than the Calculated Flow Depth. Please review.	Section 3-1	MB-2 has been removed from the PCSM design. Standard E&S Worksheet for MB-1 has been revised to correctly denote flow depth and total depth values.
Post Construction Stormwater Management			
Hensel Replacement- Eastern Terminus			
28. §102.8(f)(6) A written description of the location and type of PCSM BMPs including construction details for permanent stormwater BMPs including permanent stabilization specifications and locations	a. Please include in the narrative information for the BMPs listed on Worksheet #10 and #11 – NS BMP 5.6.1 Minimize Total Disturbed Area, NS BMP 5.6.3 Re-vegetate/Re-forest Disturbed Areas (Native Species), NS BMP 5.6.2 Minimize Soil Compaction and NS BMP 5.4.3 Protect/Utilize Natural Flow Pathways in Overall Stormwater Planning and Design.	Section 3-1	The PCSM Narrative has been revised to include information regarding non-structural and structural water quality BMPs that are checked on Worksheets 10. Worksheet 11 has been removed because we have met the volume reduction requirements and therefore as noted by PADEP, Worksheet 11 is not required.
29. §102.8(f)(9) Plan Drawings	a. Please confirm designation of channels shown on plans. Plans refer to channels DC HR-28, DC HR-29, and DC HR-30. However, PCSM Report Channel Design Worksheet #11 lists channels HR-32, HR-33 and HR-34.	Section 3-1	Standard E&S Worksheet #11 has been revised to correctly denote Channels as DC HR-28, DC HR-29 and DC HR-30.
	b. Please clarify intent of diversion channels as narrative states purpose of channels is to divert runoff to swales. However, the channels empty into the bottom portion of Vegetated Swale #2 and do not appear to provide treatment for runoff.	Section 3-1	Swale #2 has been replaced with an infiltration berm and soil amendment area to achieve 2-foot separation from the seasonal high water table. This is shown on PCSM Plan Sheet 5. HydroCAD report, PCSM narrative and plan notes have been revised appropriately.

	c. It appears Proposed Culvert 1 on PCSM Plan Drawing Sheet 5 does not have scour protection. Please provide or justify.	Section 3-1	Riprap outlet protection has been provided at the end of Culvert 1 on PCSM Plan Sheet 5. A rip rap outlet protection detail has also been provided on Sheet 7.
	d. Vegetated filter swales typically have a bottom width that ranges from a minimum 2 foot to a maximum of 8 feet. The vegetated swale detail on PCSM Sheet 7 lists a bottom width of 8 to 16 feet for both swales. PA Stormwater BMP Manual BMP 6.4.8 Vegetated Swale recommends employing water obstructions such as berms or walls to prohibit braiding when bottom widths exceed 8 feet. Please confirm design.	Section 3-1	Vegetated swale grades on PCSM Plan Sheet 5 and Vegetated swale detail on Sheet 7 have been revised to have 8 ft minimum bottom width for the swale; The HydroCAD report was appropriately verified to match the design.
	e. Based on slope and proximity of discharge to road, please consider adding check dams to Vegetated Swale 2.	Section 3-1	Swale #2 is now replaced with an infiltration berm and soil amendment area to achieve 2-foot separation from the seasonal high water table.
30. §102.8(f)(8) Supporting Calculations	a. On Worksheet #11, Channel HR-33 does not have an entry for Q (calculated at flow depth d). Please provide.	Section 3-1	Standard E&S Worksheet #11 will be revised to provide the value of Q.
Post Construction Stormwater Management			
Benton Loop			
31. §102.8(f)(6) A written description of the location and type of PCSM BMPs including construction details for permanent stormwater BMPs including permanent stabilization specifications and locations	a. Worksheet 4 included in the PCSM narrative lists gravel as cover type for existing conditions. Only woodland, meadow and impervious are acceptable cover types for this worksheet. Please revise.	Section 3-2	Worksheet #4 has been updated to reference an appropriate existing condition. Previously labeled gravel will be referred to as impervious.
	b. Please include in the PCSM narrative information for the BMPs listed on Worksheet #10 and #11 – NS BMP 5.6.1 Minimize Total Disturbed Area, NS BMP 5.6.3 Re-vegetate/Re-forest Disturbed Areas (Native Species) and Structural BMP 6.4.5 Rain Garden/Bioretention.	Section 3-2	The PCSM Narrative has been revised to include information regarding non-structural and structural water quality BMPs that are checked on Worksheets 10. Worksheet 11 has been removed.

c. PCSM report only identifies 2 soil mapping units within eastern terminus LOD. However, Soils Map in Attachment 2 appears to show additional soils. Of importance is soil type AdB, Albrights silt loam, as this appears to compose a significant portion of the LOD, including proposed location of Wet Pond. Please evaluate and adjust as necessary in PCSM report.	Section 3-2	The PCSM Narrative and soil tables outlined on Sheet 4 has been revised to include all relevant soil types within the LOD and identified within the soil report.
d. Once soil type and limitations have been determined, please describe appropriateness of soil for Wet Pond. If soil modification is required, please include this information.	Section 3-2	The AbB soil type that composes a significant portion of the wet pond falls in C/D hydrological group which is considered suitable for wet ponds per PA Stormwater BMP Manual. In addition, the wet bottom pond will be lined with a compacted soil subbase that will have a minimum coefficient permeability to ensure the wet pond does not dry out. This information and suitability of soil types are now provided in the PCSM Narrative, BMP Installation Sequence on Sheet 4 and an additional detail on wet bottom pond lining has been provided on Sheet 5.
e. Please include level spreader in narrative and clarify what type of level spreader will be used. Construction detail of level spreader on PCSM Sheet 6 indicates a square stilling basin, while drawing on Sheet 3 indicates a riprap apron. Additionally, level spreader design worksheet mentions a perforated pipe.	Section 3-2	The Level Spreader at the outlet of sediment basin/wet pond has been replaced with an "outlet basin". Corresponding details on Sheet 6 have been revised to match the outlet basin design worksheet. The plan drawing has been updated to call out outlet basin.

	f. Furthermore, the proposed BMP “pipe level spreader(s)” have several deficiencies. Since an insufficient amount of information has been provided on the proposed BMP, the BMP was reviewed to consider most of the possible aspects of the BMP. These deficiencies can include but may not be limited to the following comments. BMP’s should be site specific designs which consider all characteristics of the proposed project site. Therefore, additional information should be provided as necessary. f.i. Please demonstrate that a 90% ground vegetative cover (grasses, meadow, brush, short bushes, etc.) exists down slope of the level spreader for the entire flow path and throughout the entire year.	Section 3-2	An "offsite discharge analysis" section has been included in the E&S and PCSM narratives to demonstrate that a 90% ground vegetative cover (grasses, meadow, brush, short bushes, etc.) exists down slope of the outlet basin for the entire flow path and throughout the entire year.
	f.ii. Please demonstrate that the slope of grades immediately above the level spreader(s) do not exceed 8 percent.	Section 3-2	Level spreaders have been replaced with outlet basins. The originally designed level spreaders were located below the sediment basin/wet pond, the upslope area exceeded 8% due to the embankment slopes.
	f.iii. Please provide notation on the PCSM Plans that the receiving down slope soils and land are to remain undisturbed for the entire flow path.	Section 3-2	A new "offsite discharge analysis" section has been included in the E&S and PCSM narratives to demonstrate that receiving down slope soils and land are to remain undisturbed for the entire flow path.
32. 102.8(f)(9) Plan Drawings	a. Please show extents of BMPs NS BMP 5.6.1 Minimize Total Disturbed Area and NS BMP 5.6.3 Re-vegetate/Re-forest Disturbed Areas (Native Species) on PCSM plan drawings.	Section 3-2	An attachment has been added to PCSM narrative to show extents of non-structural BMPs and descriptions are provided on the PCSM narratives.

b. The proposed BMP "wet pond / retention basin" has noted deficiencies. Since an insufficient amount of information has been provided on the proposed BMP, the BMP was reviewed to consider most of the possible aspects of the BMP. These deficiencies can include but may not be limited to the following comments. BMP's should be site specific designs which consider all characteristics of the proposed project site. Therefore, additional information should be provided as necessary. b.i. Please demonstrate that a minimum of 5 acres is draining to the proposed basin or provide proof of sustained base flow to the wet pond / retention basin.	Section 3-2	The revised PCSM Plan (Sheet 3) outlines that a minimum of 5 acres drains to the wet pond. The HydroCAD report has also been revised to reflect this change.
b.ii. Please clarify design. PCSM Plan design on Sheet 3 appears to show a baffle in middle of pond, creating a forebay of substantial size. Forebays generally contain 10-15 percent of the pond volume.	Section 3-2	The proposed wet pond design has been revised to have a forebay that includes 10-15 % of the pond volume.
b.iii. Please provide both inner and outer embankment side slopes of 4:1 minimum as per the BMP manual.	Section 3-2	The proposed embankment slopes were designed to minimize the limits of disturbance and impacts to sensitive environmental resources (forest, wetlands, streams, and floodways). The embankment slopes, as designed, will not result in stability problems. The recommended 4:1 sideslopes in the BMP manual are desirable in locations such as residential developments or areas where there is a significant potential for public access. In addition, the basin will be located within fenced in portion of the facility thereby mitigating public safety concerns.
b.iv. Please provide the distances from the BMP bed bottom to the seasonally high water table and bedrock. Also, provide information on permeability of soils of BMP location to demonstrate suitability.	Section 3-2	Attachment 3 of Section 3-2 PCSM Plan has been updated to provide details on the distances to the seasonally high water table and bedrock to demonstrate suitability of location.

	c. Include flushing out of the level spreader in the BMP installation narrative, to indicate this will be done in conversion to the wet pond.	Section 3-2	An Outlet Basin is being proposed instead of a Level Spreader. The PCSM Installation Sequence has been revised and additional step has been added to specify sediment cleaning.

ATTACHMENT B
PUBLIC COMMENT RESPONSE

GLOSSARY

ABACT	Antidegradation Best Available Combinations of Technologies
BMPs	Best Management Practices
Chapter 102	25 Pennsylvania Code Chapter 102, Erosion and Sediment Control
Chapter 105	25 Pennsylvania Code Chapter 105, Dam Safety and Waterway Management
DEP	Pennsylvania Department of Environmental Protection
DRN	Delaware Riverkeeper Network
E&SC	Erosion and Sediment Control
EV	Exceptional Value
FERC	Federal Energy Regulatory Commission
HQ	High Quality
NGO	Non-Governmental Organization
Project	Leidy South Project
Transco	Transcontinental Gas Pipe Line Company, LLC
WQC	Water Quality Certification

Topic: Impacts

Comment: According to the commenters, state agencies and conservation districts have documented that the construction methods proposed result in environmental harms. The commenters further allege that in Pennsylvania and New Jersey, the Tennessee Gas Pipeline 300 Line and Northeast Upgrade Projects featured frequent noncompliance, with the 300 Line Project alone resulting in approximately 500 to 600 violations in Pennsylvania alone.

Commenter: Abigail M. Jones (PennFuture, CCWEV Committee), and Eric Harder (Mountain Watershed Association, CCWEV Co-Chair) (10/28/2019)

Response: The commentator's statements are unsupported. Transco's E&SC Plans comply with the Pennsylvania Clean Streams Law and the Erosion and Sediment Regulations promulgated pursuant thereto at 25 PA Code Chapter 102 . Transco used the Pennsylvania DEP Erosion and Sediment Pollution Control Program Manual, dated March 2012, as a primary reference for design and selection of E&SC BMPs suitable for use in Pennsylvania, including in HQ and EV watersheds, to be implemented during the Project.

Sediment barriers will not be removed until the site is permanently stabilized with vegetation in accordance with applicable permit conditions.

Existing vegetated areas of the Project area will be restored to approximate original contours and revegetated following pipeline installation, keeping existing drainage patterns intact. Where permanent improvements to grade or vegetative cover are proposed, post construction stormwater management best management practices will be implemented. The permanent easement and temporary workspace areas will be permanently stabilized, and the vegetative cover will be maintained.

Topic: EV Wetlands and EV and HQ Streams

Comment: Considering that the Leidy South project proposes impacts to HQ and EV waters, DEP should further inquire into the project's impacts to these waters before issuing the WQC. Special protection designated uses are to protect the state's cleanest and most biologically diverse waters. HQ and EV streams provide great recreational and economic value to the community. Consequently, these streams must receive the utmost protections to ensure that outstanding water quality is not degraded. As such, the CSL establishes antidegradation regulations which strive to protect the quality of these waters.

Commenter: Abigail M. Jones (PennFuture, CCWEV Committee), and Eric Harder (Mountain Watershed Association, CCWEV Co-Chair) (10/28/2019)

Response: Transco avoided and minimized impacts to all wetlands during siting and design of the Project. Impact minimization measures are included in Requirement S, Section 4.1 of the Chapter 105 applications. In addition, Transco will implement ABACT BMPs in EV wetlands as required by Chapter 102. Transco also evaluated trenchless crossing methods for EV wetlands, as documented in the Trenchless Crossing Analysis in Requirement S, Section 4.1.1 of the Chapter 105 applications.

Topic: Incomplete application

Comment:, DEP should have all relevant information available upon which to make its determination and have the time to thoroughly review the applications for deficiencies. The commenters believe the most effective way to do this would be to require Transco to complete all the relevant state permit proceedings before applying for a certification.

Commenter: Abigail M. Jones (PennFuture, CCWEV Committee), and Eric Harder (Mountain Watershed Association, CCWEV Co-Chair) (10/28/2019)

Response: The application materials were timely submitted consistent with the applicable statutory and regulatory requirements and provide adequate information and sufficient time for DEP to complete its analysis of the Project, and or condition permits accordingly. The commenters objection to a well-developed procedure whereby FERC issues its certificate conditioned upon receipt of state issued federal authorizations and DEP issuing a Section 401 Water Quality Certification conditioned upon the receipt of the Chapter 102 and 105 permits has been upheld. The Third Circuit validated DEP's 401 process, *see Delaware Riverkeeper Network v. Sec. Pennsylvania Dept. of Envtl. Protec*., 833 F.3d 360, 385 (3d Cir. 2016), as did the DC Circuit in a case involving the FERC certificate, *see Delaware Riverkeeper Network v. Fed. Energy Reg. Commn.*, 857 F.3d 388, 397 (D.C. Cir. 2017).

Topic: Incomplete application

Comment: Similarly, DEP lacks sufficient information to conduct meaningful review as required by the Pennsylvania Constitution. As trustee of the state's natural resources, DEP cannot issue a certificate unless it has considered all potential water quality impacts associated with the project.

Commenter: Abigail M. Jones (PennFuture, CCWEV Committee), and Eric Harder (Mountain Watershed Association, CCWEV Co-Chair) (10/28/2019)

Response: The application materials, which are consistent with the applicable statutory and regulatory requirements, provide sufficient information to enable DEP to meaningfully review and analyze the Project consistent with its Constitutional mandate. DEP is in the process of reviewing and thoroughly vetting Transco's application.

Topic: Incomplete application

Comment: At the same time requesting that the public comment on this incomplete information undermines public process. Without having secured and made publicly available the full information necessary to support a 401 Certification determination, the public is unable to comment to the PADEP in an informed, meaningful and timely way. Therefore, the public is being denied its ability and right to comment and to impact or inform the determination to be made at this very critical step that was established under the Clean Water Act.

Commenter: Abigail M. Jones (PennFuture, CCWEV Committee), and Eric Harder (Mountain Watershed Association, CCWEV Co-Chair) (10/28/2019)

Response: The application materials are complete and, consistent with the applicable statutory and regulatory requirements, provide all necessary information for the DEP's use in completing its analysis of the Project. DEP is in the process of reviewing and thoroughly vetting Transco's application.

Topic: Permit Process

Comment: Transco is once again attempting a rush and running rough shod at the Department so the company can meet an arbitrary internal start date to "commence construction in winter 2020/2021 to meet a target in-service date of December 1, 2021".

Commenter: Abigail M. Jones (PennFuture, CCWEV Committee), and Eric Harder (Mountain Watershed Association, CCWEV Co-Chair) (10/28/2019)

Response: The application materials are consistent with the applicable statutory and regulatory requirements for the DEP's use to complete an analysis of the Project. DEP is in the process of reviewing and thoroughly vetting Transco's application.

Topic: Section 401 Water Quality Certification

Comment: The DEP's conditional WQC approval procedure undermines the purpose of Section 401 of the CWA, Pennsylvania Clean Streams Law (CSL), and fails to comply with Article I, Section 27 of the Pennsylvania Constitution.

Commenter: Abigail M. Jones (PennFuture, CCWEV Committee), and Eric Harder (Mountain Watershed Association, CCWEV Co-Chair) (10/28/2019)

Response: Transco's applications were submitted in accordance with the statutes and regulations that DEP administers. The commenter objects to the process of DEP issuing a Section 401 Water Quality Certification conditioned upon the receipt of the Chapter 102 and 105 permits. The Third Circuit validated this exact course of action, *see Delaware Riverkeeper Network v. Sec. Pennsylvania Dept. of Envtl. Protec*., 833 F.3d 360, 385 (3d Cir. 2016), as did the DC Circuit in a case involving FERC, *see Delaware Riverkeeper Network v. Fed. Energy Reg. Commn*., 857 F.3d 388, 397 (D.C. Cir. 2017).

Topic: Section 401 Water Quality Certification

Comment: DEP is certifying that the project will have to get all applicable permits, and therefore, because of those permits, water quality will be assured. This puts the cart before the horse because DEP currently lacks the sufficient information to assure the project will abide by Pennsylvania's water quality standards, even with these "conditions" placed on the WQC. Therefore, DEP cannot issue a WQC for the project at this time. The commenters request DEP meet its obligation to protect Pennsylvania's public trust and water resources. Denying the request would also protect the state under the current requirements that Transco asserts in its August 23, 2019 letter to DEP.

Commenter: Abigail M. Jones (PennFuture, CCWEV Committee), and Eric Harder (Mountain Watershed Association, CCWEV Co-Chair) (10/28/2019)

Response: Transco's applications were submitted in accordance with the statutes and regulations that DEP administers. The commenters object to the DEP process of issuing a Section 401 Water Quality Certification conditioned upon the receipt of the Chapter 102 and 105 permits. The Third Circuit validated this exact course of action, *see Delaware Riverkeeper Network v. Sec. Pennsylvania Dept. of Envtl. Protec.*, 833 F.3d 360, 385 (3d Cir. 2016), as did the DC Circuit in a case involving FERC, *see Delaware Riverkeeper Network v. Fed. Energy Reg. Commn.*, 857 F.3d 388, 397 (D.C. Cir. 2017).

Topic: Section 401 Water Quality Certification

Comment: In Pennsylvania, the state, conservation districts, and NGOs have documented numerous pollution events on pipeline projects certified by the state in the past that are on record (Mariner East 2, Atlantic Sunrise Pipeline, Tennessee Gas Pipeline, Leidy Eastside Expansion - to name a few); based on the evidence, we believe this certification should be denied and certainly not granted prematurely. The DEP should not give away the power and duty it has to wait to thoroughly review the completed applications. Leidy South pipeline project, as other pipelines, will likely employ similar pipeline construction techniques that have failed on multiple fronts in the past causing discharge of pollution to Pennsylvania waterbodies and irreparable harm. DEP must deny this certification.

Commenter: Abigail M. Jones (PennFuture, CCWEV Committee), and Eric Harder (Mountain Watershed Association, CCWEV Co-Chair) (10/28/2019)

Response: The application materials are complete and, consistent with the applicable statutory and regulatory requirements, provide all necessary information for the DEP's use in completing its analysis of the Project. DEP is in the process of reviewing and thoroughly vetting Transco's application.

Topic: Section 401 Water Quality Certification

Comment: Rather than providing assurance, conditional WQC approvals such as DEP issues, and is proposing for the Leidy South pipeline project, hide potential problems with a project from public view and is contrary to the purpose of Section 401 of the CWA.

Commenter: Abigail M. Jones (PennFuture, CCWEV Committee) and Eric Harder (Mountain Watershed Association, CCWEV Co-Chair) (10/28/2019)

Response: Transco's applications were submitted in accordance with the applicable statutes and regulations. The commenter objects to the DEP process of issuing a Section 401 Water Quality Certification conditioned upon the receipt of the Chapter 102 and 105 permits. The Third Circuit validated this exact course of action, *see Delaware Riverkeeper Network v. Sec. Pennsylvania Dept. of Envtl. Protec.*, 833 F.3d 360, 385 (3d Cir. 2016), as did the DC Circuit in a case involving FERC, *see Delaware Riverkeeper Network v. Fed. Energy Reg. Commn.*, 857 F.3d 388, 397 (D.C. Cir. 2017).

Topic: Section 401 Water Quality Certification

Comment: DEP must withdraw its proposed conditional WQC unless and until it has the information necessary to actually assure that the project will comply with state water quality standards. If DEP does not have that information upon which to make those reasonable assurances, then DEP must deny the WQC for the Leidy South pipeline project.

Commenter: Abigail M. Jones (PennFuture, CCWEV Committee), and Eric Harder (Mountain Watershed Association, CCWEV Co-Chair) (10/28/2019)

Response: The commenter objects to the DEP process of issuing a Section 401 Water Quality Certification conditioned upon the receipt of the Chapter 102 and 105 permits. The Third Circuit validated this exact course of action, *see Delaware Riverkeeper Network v. Sec. Pennsylvania Dept. of Envtl. Protec*., 833 F.3d 360, 385 (3d Cir. 2016), as did the DC Circuit in a case involving FERC, *see Delaware Riverkeeper Network v. Fed. Energy Reg. Commn*., 857 F.3d 388, 397 (D.C. Cir. 2017).

Topic: Section 401 Water Quality Certification & Incomplete application

Comment: Given the lack of information known to DEP at this time, it seems impossible that DEP can certify, even with the "conditions" it is imposing on the WQC, that the Leidy South pipeline project will comply with water quality standards. DEP therefore must deny the issuance of a WQC to Transcontinental Gas Pipe Line Company, LLC (Transco), pending further thorough project information and agency review that supports a conclusion that the project will comply with Pennsylvania water quality standards.

Commenter: Abigail M. Jones (PennFuture, CCWEV Committee), and Eric Harder (Mountain Watershed Association, CCWEV Co-Chair) (10/28/2019)

Response: Transco's applications were submitted in accordance with the statutes and regulations that DEP administers. The commenter objects to the process of DEP issuing a Section 401 Water Quality Certification conditioned upon the receipt of the Chapter 102 and 105 permits. The Third Circuit validated this exact course of action, *see Delaware Riverkeeper Network v. Sec. Pennsylvania Dept. of Envtl. Protec*., 833 F.3d 360, 385 (3d Cir. 2016), as did the DC Circuit in a case involving FERC, *see Delaware Riverkeeper Network v. Fed. Energy Reg. Commn*., 857 F.3d 388, 397 (D.C. Cir. 2017).

Topic: Section 401 Water Quality Certification & Incomplete application

Comment: In 2016, DEP issued a conditional WQC for the Atlantic Sunrise project without reviewing any environmental analysis or permit applications for stream crossings and waterways encroachments. After delivering the conditional WQC to FERC, DEP sent nine notices of technical deficiency to Transco, listing significant deficiencies in the permit applications. The problem was simply that many construction and operation details were not available at the time DEP issued its WQC for the project. Prior to issuance of the Final Environmental Impact Statement, in a submission to FERC, Transco proposed at least 388 waterbody crossings as part of its Atlantic Sunrise project. Of these crossings, 66 would impact high-quality, cold water fisheries ("HQ-CWF") waters, which is eight more HQ-CWF crossings than were initially identified by Transco. Clearly, DEP lacked sufficient information to assure compliance and wrongfully assumed that the project would abide by state water quality standards. They simply needed more information before they could issue any WQC, conditional or not.

Commenter: Abigail M. Jones (PennFuture, CCWEV Committee), and Eric Harder (Mountain Watershed Association, CCWEV Co-Chair) (10/28/2019)

Response: The Third Circuit Court of Appeals upheld DEP's 401 WQC issued to Transco for the Atlantic Sunrise Project and the United States Supreme Court declined to consider a challenge to that decision. *Del. Riverkeeper Network v. Sec'y, Pa. Dep't of Envtl. Prot*., 903 F.3d 65 (3d Cir. 2018), cert. denied, 139 S. Ct. 1648 (2019)Transco's pending applications for the Leidy South Project are complete and, consistent with the applicable statutory and regulatory requirements, provide all necessary information for the DEP's use in completing its analysis of the Project. DEP is in the process of reviewing and thoroughly vetting Transco's application.

Topic: Section 401 Water Quality Certification & Incomplete application

Comment: DEP's practice of issuing conditional WQC without having all relevant information, including environmental analyses, undermines the very purpose of Section 401, which is to assure the protection of water quality in Pennsylvania through compliance with state water quality standards and associated state law requirements. Furthermore, with the nature of linear pipeline construction and dozens or sometimes hundreds of stream, wetland and waterbody crossings, the potential for harm is immense and intensified.

Commenter: Abigail M. Jones (PennFuture, CCWEV Committee), and Eric Harder (Mountain Watershed Association, CCWEV Co-Chair) (10/28/2019)

Response: The application materials are complete and, consistent with the applicable statutory and regulatory requirements, provide all necessary information for the DEP's use in completing its analysis of the Project. DEP is in the process of reviewing and thoroughly vetting Transco's application. The commenter objects to the process of DEP issuing a Section 401 Water Quality Certification conditioned upon the receipt of the Chapter 102 and 105 permits. The Third Circuit validated this exact course of action*, see Delaware Riverkeeper Network v. Sec. Pennsylvania Dept. of Envtl. Protec*., 833 F.3d 360, 385 (3d Cir. 2016), as did the DC Circuit in a case involving FERC, *see Delaware Riverkeeper Network v. Fed. Energy Reg. Commn*., 857 F.3d 388, 397 (D.C. Cir. 2017).

Topic: Water Quality

Comment: Field observations and violations on record demonstrate and document that construction, operation and maintenance practices like those being proposed by the Leidy South pipeline company, even when followed in full compliance with regulatory standards, results in unavoidable, unmitigated and irreparable harm and violations of state water quality standards and wetlands protections. In addition, DRN monitoring has documented that over and above these impacts, violations of law are commonplace during pipeline construction, operation and maintenance and as a result the violations of law, including water quality standards and wetland protections, are further undermined. The Department's analysis needs to build in a consideration of the inevitable impacts and implications of construction activity for the project that will necessarily involve violations of the laws governing the construction activity.

Commenter: Abigail M. Jones (PennFuture, CCWEV Committee), and Eric Harder (Mountain Watershed Association, CCWEV Co-Chair) (10/28/2019)

Response: Transco avoided and minimized impacts to all wetlands during siting and design of the Project. Impact minimization measures are included in Requirement S, Section 4.1 of the Chapter 105 applications. In addition, Transco will implement ABACT BMPs in EV wetlands as required by Chapter 102. Transco also evaluated trenchless crossing methods for EV wetlands, as documented in the Trenchless Crossing Analysis in Requirement S, Section 4.1.1 of the Chapter 105 applications.

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF WATER PROGRAMS
OFFICE OF OIL AND GAS MANAGEMENT

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Check No.
Check Date

NOTICE OF INTENT (NOI) FOR COVERAGE UNDER THE EROSION AND SEDIMENT CONTROL GENERAL PERMIT (ESCGP-3) FOR EARTH DISTURBANCE ASSOCIATED WITH OIL AND GAS EXPLORATION, PRODUCTION, PROCESSING, OR TREATMENT OPERATIONS OR TRANSMISSION FACILITIES

READ THE INSTRUCTIONS PROVIDED IN THIS PERMIT APPLICATION PACKAGE BEFORE COMPLETING THIS FORM. PLEASE PRINT OR TYPE INFORMATION IN BLACK OR BLUE INK.

SECTION A. APPLICATION TYPE

Check one:

NEW ☒ **RENEWAL** ☐ **MAJOR MODIFICATIONS (Provide ESCGP number)** ☐

PHASED ☐ (check only if applicable; *note: Most projects are not submitted as phased projects*)

Check one: EXPEDITED ☐ **STANDARD** ☒

If an Expedited Review Process being requested, be advised that the Expedited Review is not available for all projects. Refer to Section D - Expedited Review Process of the ESCGP-3 NOI Instructions to determine if the project is eligible.

SECTION B. CLIENT INFORMATION

Applicant's Last Name (If applicable)	First Name	MI	Telephone No.

Organization Name or Registered Fictitious Name	Telephone No.
Transcontinental Gas Pipe Line Company, LLC (Contact: Joseph Dean)	(713) 215-3427

DEP Client ID No.

Headquarters Mailing Address	City	State	ZIP Code
2800 Post Oak Blvd, Level 11	Houston	TX	77056

Email Address Joseph.Dean@williams.com

Co-Applicant's Last Name (If applicable)	First Name	MI	Telephone No.

Organization Name or Registered Fictitious Name	Telephone No.

Address	City	State	ZIP Code
Email Address			

SECTION C. SITE INFORMATION					
Is there an existing ESCGP associated with this site? ☐ Yes ☒ No If yes, Permit No. _____					
Has a well permit application been submitted for this site? ☐ Yes ☒ No If yes, Permit No. _____ Does this site have a 911 address? ☐ Yes ☒ No If yes, provide site location address.					
Site Name Leidy South Project					
Site Location See Attachment 1-1.1- NOI Supporting Information		Site No. (if another permit has been issued for the site)			
Site Location – City See Attachment 1-1.1- NOI Supporting Information			State PA	ZIP Code	
Detailed Written Directions to Site See Attachment 1-1.1- NOI Supporting Information for locations of all project sites					
Primary Location	County Clinton, Lycoming, Luzerne, Columbia, Schuylkill	Municipality Leidy, Chapman, Jordan, Fairmount, Jackson, Orange, Hegins	City ☐	Boro ☐	Twp. ☒

SECTION D. EXPEDITED REVIEW	
I. Expedited Review Eligibility	
1. Is any part of the project in the watershed of a surface water with an existing or designated use of exceptional value or high quality pursuant to Chapter 93 (relating to water quality standards), in an exceptional value wetland in accordance with 25 Pa. Code § 105.17, or in the watershed of an impaired surface water where the cause of the impairment is identified as siltation?	☒ Yes ☐ No
2. Will the project in which the well pad will be constructed be in or on a floodplain?	☐ Yes ☒ No
3. Is any earth disturbance located or proposed to be located on land known to be contaminated by the release of regulated substances as defined in Section 103 of Act 2, 35 P.S. § 6026.103?	☐ Yes ☒ No

4. Will naturally occurring geologic formations or soil conditions provide hazards to the project or surrounding environment or have the potential to cause or contribute to pollution when disturbed?	☒ Yes ☐ No
5. Do any unresolved non-compliance issues exist with the applicant or the facility?	☐ Yes ☒ No
6. Is the project a transmission project?	☒ Yes ☐ No

If yes to any of the above questions the project is not eligible for Expedited Review; If the project is eligible for Expedited Review, all the following items must be completed.	
II. Expedited Review Process	
1. Is the technically and administratively complete and accurate NOI package prepared and certified by a licensed professional?	☐ Yes ☐ No
2. Are E&S and PCSM/Site Restoration Plan drawings and narrative prepared and sealed by a licensed professional? *(Include interim restoration details when needed)*	☐ Yes ☐ No
3. Include a Resource Delineation Report and answer the following questions: (If the answer to question a. is "Yes" then skip to #4. If the answer to a. is "No" the applicant must answer "Yes" to at least one of the questions, b. through d. to be eligible for expedited review.)	
a. Were all wetland resources delineated during the growing season?	☐ Yes ☐ No
b. If not during the growing season, was a follow-up visit conducted during the growing season to verify/adjust boundaries and look for potentially missed resources?	☐ Yes ☐ No
c. Was a quality assurance field review conducted at a later date by an independent qualified wetland professional to verify boundaries and look for potentially missed resources? (If yes, attach Quality Assurance Field Review Report)	☐ Yes ☐ No
d. Was a Jurisdictional Determination (JD) or Preliminary JD conducted by the US Army Corps of Engineers on the whole project? (If yes, attach Preliminary or Jurisdictional Determination Report)	☐ Yes ☐ No
4. If applicable, have you included PNDI clearance letters or other documentation from applicable resource agencies?	☐ Yes ☐ No
5. If the project site contains, is along, or within 100 feet of a river, stream, creek, lake, pond or reservoir, will you establish new or preserve existing riparian forest buffer at least 100 feet in width between the top of streambank or normal pool elevation of a lake, pond or reservoir and areas of earth disturbances. If no, will a waiver be obtained? ☐ Yes ☐ No	☐ Yes ☐ No
6. Name of Licensed Professional Company	
Address	
Phone	

SECTION E. PROJECT INFORMATION			
1. Total Project Area/Project Site (Ac):	546.9 (Also see Attachment 1-1.1)	Total Disturbed Area (Ac):	414.6 (Also see Attachment 1-1.1)
Increased disturbed acreage *(for permit modification only)*			
Fee: ***(For additional information regarding fees, refer to NOI Instructions #3 Permit NOI Filing Fees.)***			$

2. Project Name: Leidy South Project

3. Project Type (Check all that apply)

☐ Oil/Gas Well [1]
☐ Gathering Facility
☐ Treatment Facility
☒ Compressor Station
☒ Pipeline
☐ Storage Field Facility
☐ Other
☒ Transmission Facility
☐ Processing Facility
☐ Well Development Impoundment
☐ Non-FERC regulated Transmission Facility
☐ Ground/Surface Water Withdrawal Site

[1] If Oil/Gas Well; is the well conventional or unconventional? ☐ Conventional ☐ Unconventional

Project Description

The Project is an expansion of Transco's existing natural gas transmission system and an extension of Transco's system through a capacity lease with National Fuel Gas Supply Corporation. The Project will enable Transco to provide 582,400 dekatherms per day (Dth/d) of incremental firm transportation capacity for abundant supplies of natural gas from northern and western Pennsylvania to existing and growing markets in Transco's Zone 6. Transco's Zone 6 includes the portion of the Transco system in Pennsylvania, New York, New Jersey, and Maryland. The Project consists of the following components:
•6.3 miles of 36-inch pipeline loop along Transco's Leidy Line in Clinton County, Pennsylvania (Hensel Replacement)
•2.4 miles of 36-inch pipeline loop along Transco's Leidy Line in Clinton County, Pennsylvania (Hilltop Loop);
•3.5 miles of 42-inch pipeline loop along Transco's Leidy Line in Lycoming County, Pennsylvania (Benton Loop);
•New Compressor Station 607 (Luzerne County, Pennsylvania);
oInstall two gas turbine-driven compressor units and gas coolers;
•Existing Compressor Station 610 (Columbia County, Pennsylvania);
oAdd one gas turbine-driven compressor unit and gas cooling;
•New Compressor Station 620 (Schuylkill County, Pennsylvania);
oInstall one gas turbine-driven compressor unit;
•Ancillary facilities, such as mainline valves (MLVs), communication facilities, and pig launchers and receivers

See Section 1-4 of this ESCGP-3 Application for complete project description.
Provide the date of pre-application meeting (if conducted with the Department) 2/19/19, 4/11/19, 5/20/19 and 7/18/19

4. Provide the latitude and longitude coordinates for the center of the project. The coordinates should be in Decimal degrees and North American Datum 1983. The coordinates must meet the current DEP policy regarding locational accuracy. For linear projects provide the project's termini. See Attachment 1-1.1

Latitude (DD) . Longitude (DD) - .

Latitude (DD) . Longitude (DD) - .

Horizontal Collection Method: ☐ GPS ☒ Interpolated from U.S.G.S. Topographic Map ☐ DEP's eMAP

5. U.S.G.S. 7.5 min. topographic quadrangle Name (See Attachment 1-1.1)
   (*Include a copy of the project area on the 7.5 min quad map)*

6. Will the project be conducted as a phased permit project? ☐ Yes ☒ No
   If Yes, Include Master Site Plan Estimated Timetable for Phased Projects. ☐ Additional sheet(s) attached.

Phase No. or Name	Description	Total Area	Disturbed Area	Start Date	End Date

7. List existing and previous land use for a minimum of the previous 5 years. (See Section 2 of this ESCGP-3 Application)

8. Other Pollutants: Will the stormwater discharge contain pollutional substances other than sediment? ☐ Yes ☒ No

9. Will fuels, chemicals, solvents, other hazardous waste or materials be used or stored on site during earth disturbance activities or will Horizontal Directional Drilling (HDD) activities be conducted?
   Yes ☒ No ☐ ***(If yes, Preparedness, Prevention and Contingency (PPC) Plan must be maintained on site during earth disturbance. See NOI Instructions, E.9 PPC Plan Guidance for further information.)***

10. Is the project in the watershed of an impaired surface water where the cause of the impairment is identified as siltation?
    Yes ☒ No ☐ (See Section 2-5 of this ESCGP-3 Application) ***(If yes, show how the project will not result in a net change in volume, rate or water quality. See section I below, and E.10 of NOI instructions.)***

11. Are there potentially hazardous naturally occurring geological or soil conditions in any portion of the project or surrounding area? Yes ☒ No ☐

    If yes, do the potentially hazardous geologic or soil conditions have the potential to cause or contribute to pollution as a result of the proposed earth disturbance activities?

    If no, provide an explanation.

    If yes, Geologic Hazard Mitigation Plan must be attached and explain where in this application details are provided.

12. Has the Act 14 Municipal Notification and proof of receipt of notification been attached to the NOI?
    Yes ☒ No ☐ ***(If not, the NOI is not complete, see E.12 and #4 Municipal Notification in the NOI Instructions for additional guidance.)***

13. Has the PNDI receipt been attached to the NOI?
    Yes ☒ No ☐ ***(If not, the NOI is not complete, see E.13 and #5 PNHP in the NOI Instructions for additional guidance.)***

14. Have the E&S Plan and PCSM/SR Plan been planned and designed to be consistent?
    Yes ☒ No ☐

15. Have existing and/or proposed Riparian Forest Buffers been identified?
    Yes ☒ N/A ☐ ***(If yes, they must be shown on the E&S Plan as well as the PCSM/SR Plans.)***

16. Have antidegradation implementation requirements for special protection waters been addressed?
    Yes ☒ No ☐ N/A ☐ ***(If yes, antidegradation requirements must be included in the plan.)***

17. Has the seasonal high groundwater level been identified and 20-inch separation established at all excavation locations for pits for conventional operations and Well Development Impoundments for unconventional operations?
    Yes ☐ No ☐ N/A ☒

18. Receiving Waters	Chapter 93, Designated Use Stream Classification	Chapter 93, Existing Use Stream Classification
Mudlick Run (EV,MF), Dark Hollow (EV,MF), Paddy Run (EV,MF), Hensel Fork (EV,MF), Drury Run (EV,MF), Young Womans Creek (HQ-CWF,MF), Buck Run (EV,MF), Left Branch of Young Womans Creek (EV,MF), Skunk Hollow (HQ-CWF, MF), Post Hollow (EV, MF), Dry Run (HQ-CWF, MF), Turtle Point Hollow (EV, MF), Austin Hollow (EV, MF), Shingle Branch (EV, MF), Sandy Run (HQ-CWF, MF), West Branch Susquehanna River (WWF, MF), Little Indian Run (CWF, MF), West Branch Little Muncy Creek (CWF,MF), Little Muncy Creek (CWF, MF), Buck Run (CWF, MF), Little Brier Run (EV, MF), Little Fishing Creek (CWF,MF), West Creek (CWF, MF), Lick Branch (HQ-CWF, MF), Phillips Creek (HQ-CWF, MF), Green Creek (TSF, MF), Fishing Creek (CWF, MF, Siltation-Impaired), Deep Creek (CWF, MF). See Attachment 1-1.1 for detailed list.	☒ HQ ☒ EV ☒ Other CWF, MF, WWF, TSF ☒ Siltation-impaired ☐ HQ ☐ EV ☐ Other _____ ☐ Siltation-impaired ☐ HQ ☐ EV ☐ Other _____ ☐ Siltation-impaired ☐ HQ ☐ EV ☐ Other _____ ☐ Siltation-impaired	☐ HQ ☒ EV ☒ Other MF ☐ Siltation-impaired ☐ HQ ☐ EV ☐ Other _____ ☐ Siltation-impaired ☐ HQ ☐ EV ☐ Other _____ ☐ Siltation-impaired ☐ HQ ☐ EV ☐ Other _____ ☐ Siltation-impaired
Secondary Receiving Water	Secondary Chapter 93, Designated Use	Secondary Existing Use
Name of Municipal or Private Separate Storm Sewer Operator, if applicable.		

Non-Surface Receiving Water: (include off-site discharges)

SECTION F. EROSION AND SEDIMENT CONTROL (E&S) PLAN

See the attached Instructions for additional guidance with E&S Plans

Erosion and Sediment Control Plan BMPs should be designed to minimize accelerated erosion and sedimentation through limiting the extent and duration of earth disturbance, protection of existing drainage and vegetation, limiting soil compaction and controlling the generation of increased runoff. The Department recommends the use of the *Pennsylvania Erosion & Sedimentation Pollution Control Program Manual (E&S Manual)* (363-2134-008) to achieve this goal. The E&S Plan must meet the requirements of Pa. Code § 102.4(b) and submitted with the NOI. Also, see section 2. of the NOI instruction for detailed information on completing the E&S plan and additional requirements.

a. E&S Plan Summary

Provide a summary of proposed E&S BMPs and their performance to manage E&S for the project.

Typical BMPs provided along the pipeline Right-Of-Way includes waterbars, trench plugs, compost filter socks, compost sediment traps, rock filter outlets, erosion control blankets, rock construction entrances, temporary equipment bridges, timber mats, diversion channels, level spreaders, mulch and seed. An appropraite sediment removal device (filter bag, dewatering structure) and well-vegetated area will be utilized for trench and hydrostatic test dewatering. Other BMPs used for contractor yards, valve yards and compressor stations include vegetated swales and sediment basin. In HQ, EV watersheds, appropriate Antidegradation Best Available Combination of Technologies (ABACT) BMPs will be utilized. Additional information regarding all the proposed BMPs are provided in the Erosion and Sedimentation Control and Site Restoration Plans of respective project components (Section 2 of this ESCGP-3 Application).

b. E&S Plan BMP Design

Check those that apply:

☒ E&S Plan is designed using BMPs in the *E&S Manual*.

☐ E&S Plan is designed using an alternative BMP or design standard approved by DEP.

Note: NOI packages submitted with alternate BMPs not approved by the Department will be returned to the Applicant.

c. Do you have any information regarding riparian buffer which differs from Section G, Riparian Buffer?

Yes ☐ No ☒

Explain:

d. Thermal Impacts Analysis

Explain how thermal impacts associated with this project were avoided, minimized, or mitigated.

Thermal impacts associated with Leidy South Project will be avoided to the maximum extent possible. Minimum permanent changes in land cover are being proposed for constructing the pipeline facilities. Runoff from impervious areas added during the project will be suitably routed to Stormwater BMPs. Gravel will be used for access roads wherever practicable. To avoid thermal impacts arising from clearing and grading, removal of vegetation will be limited to only that necessary for construction and construction Right-Of-Way will be limited to 75 feet in wetlands and folldways where practical. Once construction activities are complete, disturbed areas will be restored to pre-construction contours and seeded as descibed in Erosion and Sediment Control and Site Restoration Plans. Temporary workspaces will be restored back with woody and herbaceous species. Thermal impacts assessments correspoding to each project component including pipelines and aboveground facilities are given in Section 2 and 3 of this ESCGP-3 Application.

e. Off-Site Discharge Analysis

Does the activity propose any off-site discharges to areas other than surface waters? ☒ Yes ☐ No

If yes, it is the applicant's responsibility to ensure that they have legal authority for any off-site discharge to neighboring properties.

The applicant must provide a demonstration in both E&S and PCSM/SR plans that the discharge will not cause erosion, damage, or a nuisance to off-site properties.

See Offsite Discharge Analysis Sections in E&S Narratives

SECTION G. RIPARIAN BUFFER

1. Will you be protecting, converting or establishing a voluntary riparian forest buffer as part of this project?

   ☐ Yes ☒ No

   If yes, as part of the PCSM/SR Plan, provide a Buffer Management Plan.

2. Will proposed earth disturbance activities be conducted in an EV or HQ watershed AND within 150 feet of a perennial or intermittent river, stream, or creek, or lake, pond, or reservoir? ☒ Yes ☐ No

   If no, proceed to the next section/module.

3. Does this project qualify for an exception (see § 102.14(d)(1))? ☒ Yes ☐ No

   If yes, indicate below the type of project for which the exception applies by marking the appropriate box.

   ☐ Oil and gas activities for which site reclamation or restoration is part of the permit authorization in Chapter 78 and 78a.

   ☒ Road maintenance activities.

   ☐ The repair or maintenance of existing pipelines and utilities.

   ☐ Other (see §102.14(d)(1))

   If exceptions are checked, explain how existing riparian buffer will be undisturbed to the extent practicable. Provide a demonstration that the requirements of §102.14(b) are met, or provide the necessary information to request a riparian buffer waiver.

4. Are you requesting a riparian buffer waiver for this project (see § 102.14(d)(2))? ☒ Yes ☐ No

   If yes, indicate below the type of project for which you are requesting a waiver by marking the appropriate box.

   ☒ Linear project that may include pipelines, public roadways, rail lines, or utility lines.

   ☒ Project is of a temporary nature where the site will be fully restored to its preexisting conditions during the ESCGP permit term.

   ☒ Project where compliance with mandatory riparian buffers is not appropriate or feasible due to site characteristics or existing structures at the project site.

   ☐ Other (see §102.14(d)(2)):

   If waivers are checked, explain how existing riparian buffers will be undisturbed to the extent practicable.

   Note: If “Yes” to #2 **AND** “No” to #3 and #4, provide an attachment to demonstrate how the requirements of §102.14 are met.

SECTION H. POST CONSTRUCTION STORMWATER MANAGEMENT (PCSM) AND/OR SITE RESTORATION(SR) PLAN

See NOI Instructions for additional guidance with PCSM Plans

PCSM/SR BMPs should be designed to use natural measures to eliminate pollution, infiltrate runoff, not require extensive construction/maintenance, promote pollutant reduction, and preserve the integrity of stream channels. All PCSM/SR BMPs proposed in the PCSM/SR Plan must be designed in accordance with Ch. 102, Ch. 78a for unconventional operations, Ch. 78 for conventional operations and the *Pennsylvania Stormwater Best Management Practices Manual (Stormwater BMP Manual)* (363-0300-002). If alternate design criteria are utilized for the proposed project, they must have prior approval by the Department, or the NOI Application will be returned to the Applicant.

After construction is completed, how much of the entire disturbed area will be restored to meadow in good condition or better, or existing conditions? ☐ All ☒ Partial ☐ None

Include PCSM narrative and drawings for remaining impervious area. Also include a map showing the proposed contours of the site restoration plan.

If there are additional stages of the project prior to permit termination or expiration, list the stages and provide the documents required by subsection 'a' to section 'g' for each stage (e.g. partial restoration or changes to the amount of compacted areas, gravel, and/or impervious areas). Upload a narrative for each additional stage in addition to the drawings.

EXAMPLE

Stage No	Stage Name	PCSM Plan	SR Plan
Stage 1		☐	☐
Stage 2		☐	☐
Stage 3		☐	☐
Stage 4		☐	☐

Act 167 Consistency. Check those that apply.

Is there an Act 167 Plan? ☒ Yes ☐ No

☒ The attached PCSM/SR Plan is consistent with an applicable approved Act 167 Plan.

Complete the following for all approved Act 167 Stormwater Management Plans. (Use additional sheets if necessary)

Act 167 Plan Name	Date Adopted	Consistency Letter Included ☐
Lycoming County Act 167 Stormwater Management Plan	May 6, 2010	Verification Report Included ☒
Luzerne County Stormwater Management Ordinance	August 18, 2010	

Note: A consistency letter is not required if a verification report is provided. See NOI Instructions. The PCSM/SR Plan must satisfy either sub paragraph 1, 2, or 3 below. Check those that apply.

1. ☒ Act 167 Plan approvals on or after January 2005 – The attached PCSM/SR Plan, in its entirety, is consistent with all requirements pertaining to rate, volume, and water quality from an Act 167 Stormwater Management Plan approved by DEP on or after January 2005. Box 1 must be checked if a current, DEP approved Act 167 plan exists.
2. ☒ The PCSM/SR Plan meets the standard design criteria from sections 102.8(g)(2) and (3) and the *Stormwater BMP Manual*. For projects involving oil and gas activities authorized by a permit issued under Chapter 78 or Chapter 78a (well pads) or pipelines and other similar utility infrastructure, post construction stormwater management requirements are met for all areas that are restored to preconstruction conditions or to a condition of meadow in good condition or better. *[Note: PCSM plans must meet both the volume and rate requirements in the regulations, which are provided in the 2 sections mentioned in this paragraph].*
3. ☐ Alternative Design Standard – The attached PCSM/SR Plan was developed using approaches as provided in 102.8(g)(2)(iv) and 102.8(g)(3)(iii). Demonstrate/explain in the space provided below how this standard will be either more protective than what is required in 102.8(g)(2) and 102.8(g)(3) or will maintain and protect existing water quality and existing and designated uses.

PCSM/SR BMP Alternative Standards:

Has the alternative BMP or design standard been approved by the Department?

☐ Yes

☐ No – Do not submit the ESCGP-3 application and see Section (H) of the NOI Instructions concerning the alternative BMP approval process.

Water Quality Compliance:

Does the PCSM/SR plan comply with requirements for volume control? ☒ Yes ☐ No

If yes, is at least 90% of the disturbed area controlled by a PCSM BMP? ☒ Yes ☐ No

If yes, do you have the Standard PCSM Worksheet # 10 attached to show water quality compliance has achieved?
☒ Yes ☐ No

If no, attach Standard PCSM Worksheets # 12 and #13 to show water quality compliance has achieved.

If PCSM/SR plan is not complying with the requirements for volume control, attach Standard PCSM Worksheets # 11, # 12 and #13 to show water quality compliance has achieved.

a. PCSM/SR Plan Summary

Provide a summary of proposed BMPs and their performance to manage PCSM/SR for the project.

Along the pipeline Right-Of-Way, typical E&S BMPs such as waterbars and erosion control blanket will be left in place as part of site restoration. After construction activities are completed, temporary workspaces will be restored to meadow in good condition or better or existing conditions. For the aboveground facilities, PCSM BMPs such as infiltration basins, diversion channels and vegetated swales will be used and left in place as part of site restoration. Additional information regarding all the proposed BMPs are provided in the Post-Construction Stormwater Management Plans of respective project components (Section 3 of this ESCGP-3 Application).

Check all that apply ☒ PCSM BMPs ☒ SR BMPs

b. Do you have any information regarding riparian buffer which differs from what was submitted in the Section G, Riparian Buffer?

☐ Yes ☒ No

Explain:

c. Thermal Impacts Analysis

Explain how thermal impacts associated with this project were avoided, minimized, or mitigated.

Runoff collected in PCSM BMPS such as infiltration basins will mitogate thermal impacts from post construction stormwater. Runoff collected in infiltration basins are discharge to receiving waters are not expected to be retained for more than 24 hours. Minimum permanent changes in land cover are being proposed for constructing the pipeline facilities. Gravel will be used for access raods wherever practicable. Removal of trees and riparian vegetation and addition of imprevious surfaces will be limited to only that necessary for construction. Once constrcution activities are complete, disturbed areas will be restored to pre-construction contours and seeded as descibed in Erosion and Sedimental Control and Site Restoration Plans. Temporary workspaces will be restored back with woody and herbaceous species. Therman impacts assessments correspoding to each project component including pipelines and aboveground facilities are given in Section 2 and 3 of this ESCGP-3 Application.

d. Off-Site Discharge Analysis.

Does the activity propose any off-site discharges to areas other than surface waters? ☒ Yes ☐ No

If yes, it is the applicant's responsibility to ensure that they have legal authority for any off-site discharge to neighboring properties.

The Applicant must provide a demonstration in both the E&S and PCSM/SR Plans that the discharge will not cause erosion, damage, or a nuisance to off-site properties.

See Offsite Discharge Analysis Sections in PCSM Narratives

NOI Section H. POST CONSTRUCTION STORMWATER MANAGEMENT (PCSM) PLANS

Summary Calculations of Post Construction Stormwater BMPs

1. Hensel Replacement Eastern Terminus Main Line Valve and Access Road
2. Hensel Replacement Western Terminus Main Line Valve
3. Benton Loop Eastern Terminus Main Line Valve and Access Road
4. Compressor Station 607
5. Compressor Station 620

NOTICE OF INTENT (NOI) FOR COVERAGE UNDER THE EROSION AND SEDIMENT CONTROL GENERAL PERMIT (ESCGP-3) FOR EARTH DISTURBANCE ASSOCIATED WITH OIL AND GAS EXPLORATION, PRODUCTION, PROCESSING, OR TREATMENT OPERATIONS OR TRANSMISSION FACILITIES

TABLES IN ADDENDUM OF NOI

SECTION H. POST CONSTRUCTION STORMWATER MANAGEMENT (PLAN) BMPs

Hensel Replacement Eastern Terminus Main Line Valve and Access Road

e. Summary Table for Supporting Calculation and Measurement Data
(See NOI Instructions for additional guidance with this section)

The remainder of this section (Summary Table for Calculation and Measurement Data) does not need to be completed for areas of projects involving oil and gas activities authorized by Chapter 78 or Chapter 78a (well pads) or pipelines and other similar utility infrastructure which will be restored to meadow in good condition or better or existing conditions.

Watershed Name: Mudlick Run

Volume Control design storm frequency 2-year Rainfall amount 2.58 inches	Pre-construction	Post Construction	Net Change
Impervious area (acres)	0.000	0.83	+0.830
Volume of stormwater runoff (acre-feet) without planned stormwater BMPs	0.040	0.094	+0.054
Volume of stormwater runoff (acre-feet) with planned stormwater BMPs		0	-0.040
Stormwater discharge rate for the design frequency storm	Pre-construction	Post Construction	Net Change
1) 2-Year/24-Hour	0.16	0.00	-0.16
2) 10-Year/24-Hour	1.20	0.00	-1.20
3) 50-year/24-Hour	3.41	0.46	-2.95
4) 100-year/24-Hour	4.75	1.75	-3.00

f. Summary Description of PCSM/SR BMPs

In the lists below, check the BMPs identified in the PCSM Plan. The primary function(s) of the BMP listed in the functions column (infiltration/recharge; detention/retention; water quality). Additional functions may be added if applicable to that BMP. List the stormwater volume and area of runoff to be treated by each BMP type when calculations are required. If any BMP in the PCSM/SR Plan is not listed below, describe it in the space provided after "Other". A summary table with infiltration testing information (Attachment E, included in the NOI Instructions) must be submitted for all Bio-infiltration BMPs included in PCSM/SR plan.

For Rate control provide the volume of stormwater treated and acres treated for the 100-year/24-hour storm event.

For volume control and water quality provide the volume of stormwater treated and acres treated for the 2-year/24-hour storm event.

Key for BMP purpose(s): VC = Volume Control; RC = Rate Control; and WQ = Water Quality

BMP	Function(s)	Purpose(s)	Volume of stormwater treated	Acres treated
Site Restoration ONLY				
☐ Restore Site to Meadow in Good Condition or Better, or Existing Conditions	Infiltration/Recharge Detention/WQ Treatment	☐ VC ☐ RC ☐ WQ	_____	_____
Bio-infiltration areas	Infiltration/Recharge			
☐ Infiltration Trench		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Infiltration Bed		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Infiltration Basin		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Rain Garden/ Bioretention		☒ VC ☒ RC ☐ WQ	2,483(2-yr); 6,447(100-yr)	2.10
☒ Infiltration Berm				
☒ Vegetated Swale		☒ VC ☒ RC ☒ WQ	2,342(2-yr); 10,932(100-yr)	4.15
Natural Area Conservation	Infiltration/Recharge			
☐ Streamside Buffer Zone		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Wetland Buffer Zone		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Sensitive Area Buffer Zone		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Pre-Construction Drainage Pattern Intact		☐ VC ☐ RC ☐ WQ	_____	_____
Stormwater Retention	Detention/Retention			
☐ Constructed Wetlands		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Wet Ponds		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Retention Basin		☐ VC ☐ RC ☐ WQ	_____	_____
Sediment and Pollutant Removal	Water Quality Treatment			
☐ Vegetated Filter Strips		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Compost Filter Sock		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Detention Basins		☐ VC ☐ RC ☐ WQ	_____	_____
Access Road Design	Infiltration/Recharge			
☐ Road Crowning		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Ditches		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Turnouts		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Culverts		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Roadside Vegetated Filter Strips		☐ VC ☐ RC ☐ WQ	_____	_____

Stormwater Energy Dissipaters	Infiltration/Recharge			
☐ Level Spreaders		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Riprap Aprons		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Upslope Diversions		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Other_____		☐ VC ☐ RC ☐ WQ	_____	_____

g. Critical PCSM Plan stages

Identify and list critical stages of implementation of the PCSM Plan for which a licensed professional or designee shall be present on site.

1.For the final grading of the access road, ensuring it is constructed according to the plan details for proper conveyance of runoff.

2.Following final grading and seeding of the diversion channels, vegetated swale and infiltration berm, in order to confirm they have been constructed according to the plan details for proper collection, infiltration, and conveyance of runoff. Periodic assessments will need to be made to ensure accumulated sediment have been cleaned out so the swale maintains the necessary design volumes.

3.For the inspection of amended soil to ensure sufficient infiltration occurs behind the berm

4.During the layout and excavation of the outlet pipe, the professional or delegate will ensure sizing, materials specifications, and construction procedures are followed to enable proper storage in the swale and discharge to the pond.

5.For final inspection of constructed swale and infiltration berm.

6.At the establishment of hard surface stabilization or 70% vegetation covers to allow removal of E&S controls.

NOTICE OF INTENT (NOI) FOR COVERAGE UNDER THE EROSION AND SEDIMENT CONTROL GENERAL PERMIT (ESCGP-3) FOR EARTH DISTURBANCE ASSOCIATED WITH OIL AND GAS EXPLORATION, PRODUCTION, PROCESSING, OR TREATMENT OPERATIONS OR TRANSMISSION FACILITIES

TABLES IN ADDENDUM OF NOI

SECTION H. POST CONSTRUCTION STORMWATER MANAGEMENT (PLAN) BMPs

Hensel Replacement Western Terminus Main Line Valve

b. Summary Table for Supporting Calculation and Measurement Data

(See NOI Instructions for additional guidance with this section)

The remainder of this section (Summary Table for Calculation and Measurement Data) does not need to be completed for areas of projects involving oil and gas activities authorized by Chapter 78 or Chapter 78a (well pads) or pipelines and other similar utility infrastructure which will be restored to meadow in good condition or better or existing conditions.

Watershed Name: Turtle Point Hollow

Volume Control design storm frequency 2-year Rainfall amount 2.58 inches	Pre-construction	Post Construction	Net Change
Impervious area (acres)	0.503	0.579	+0.076
Volume of stormwater runoff (acre-feet) without planned stormwater BMPs	0.127	0.143	+0.016
Volume of stormwater runoff (acre-feet) with planned stormwater BMPs		0.035	-0.092
Stormwater discharge rate for the design frequency storm	Pre-construction	Post Construction	Net Change
1) 2-Year/24-Hour	1.08	0.43	-0.66
2) 10-Year/24-Hour	5.67	2.28	-3.39
3) 50-year/24-Hour	13.34	6.94	-6.40
4) 100-year/24-Hour	17.88	17.68	-0.20

c. Summary Description of PCSM/SR BMPs

In the lists below, check the BMPs identified in the PCSM Plan. The primary function(s) of the BMP listed in the functions column (infiltration/recharge; detention/retention; water quality). Additional functions may be added if applicable to that BMP. List the stormwater volume and area of runoff to be treated by each BMP type when calculations are required. If any BMP in the PCSM/SR Plan is not listed below, describe it in the space provided after "Other". A summary table with infiltration testing information (Attachment E, included in the NOI Instructions) must be submitted for all Bio-infiltration BMPs included in PCSM/SR plan.

For Rate control provide the volume of stormwater treated and acres treated for the 100-year/24-hour storm event.

For volume control and water quality provide the volume of stormwater treated and acres treated for the 2-year/24-hour storm event.

Key for BMP purpose(s): VC = Volume Control; RC = Rate Control; and WQ = Water Quality

BMP	Function(s)	Purpose(s)	Volume of stormwater treated	Acres treated
Site Restoration ONLY				
☐ Restore Site to Meadow in Good Condition or Better, or Existing Conditions	Infiltration/Recharge Detention/WQ Treatment	☐ VC ☐ RC ☐ WQ	_____	_____
Bio-infiltration areas	Infiltration/Recharge			
☐ Infiltration Trench		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Infiltration Bed		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Infiltration Basin		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Rain Garden/ Bioretention		☐ VC ☐ RC ☐ WQ	_____	
☒ Infiltration Berm		☒ VC ☒ RC ☐ WQ	4,468(2-yr); 8,058(100-yr)	4.75
☒ Soil Amendment		☒ VC ☐ RC ☒ WQ	192(2-yr); 192(100-yr)	4.75
Natural Area Conservation	Infiltration/Recharge			
☐ Streamside Buffer Zone		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Wetland Buffer Zone		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Sensitive Area Buffer Zone		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Pre-Construction Drainage Pattern Intact		☐ VC ☐ RC ☐ WQ	_____	_____
Stormwater Retention	Detention/Retention			
☐ Constructed Wetlands		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Wet Ponds		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Retention Basin		☐ VC ☐ RC ☐ WQ	_____	_____
Sediment and Pollutant Removal	Water Quality Treatment			
☐ Vegetated Filter Strips		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Compost Filter Sock		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Detention Basins		☐ VC ☐ RC ☐ WQ	_____	_____
Access Road Design	Infiltration/Recharge			
☐ Road Crowning		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Ditches		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Turnouts		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Culverts		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Roadside Vegetated Filter Strips		☐ VC ☐ RC ☐ WQ	_____	_____

Stormwater Energy Dissipaters	Infiltration/Recharge			
☐ Level Spreaders		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Riprap Aprons		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Upslope Diversions		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Other_____		☐ VC ☐ RC ☐ WQ	_____	_____

d. Critical PCSM Plan stages

Identify and list critical stages of implementation of the PCSM Plan for which a licensed professional or designee shall be present on site.

1.Following final grading and seeding of the infiltration berm and installation of mountable berms/diversions in order to confirm they have been constructed according to the plan details for proper collection, infiltration, and conveyance of runoff. Periodic assessment will need to be made to ensure that accumulated sediment have been cleaned out so the area behind the berm maintains the necessary design volume.

2.For the inspection of amended soil to ensure sufficient infiltration occurs behind the berm

3.For final inspection of constructed infiltration berm.

4.At the establishment of hard surface stabilization or 70% vegetation covers to allow removal of E&S controls.

NOTICE OF INTENT (NOI) FOR COVERAGE UNDER THE EROSION AND SEDIMENT CONTROL GENERAL PERMIT (ESCGP-3) FOR EARTH DISTURBANCE ASSOCIATED WITH OIL AND GAS EXPLORATION, PRODUCTION, PROCESSING, OR TREATMENT OPERATIONS OR TRANSMISSION FACILITIES

TABLES IN ADDENDUM OF NOI

SECTION H. POST CONSTRUCTION STORMWATER MANAGEMENT (PLAN) BMPs

Benton Loop Eastern Terminus Main Line Valve and Access Road

b. Summary Table for Supporting Calculation and Measurement Data

(See NOI Instructions for additional guidance with this section)

The remainder of this section (Summary Table for Calculation and Measurement Data) does not need to be completed for areas of projects involving oil and gas activities authorized by Chapter 78 or Chapter 78a (well pads) or pipelines and other similar utility infrastructure which will be restored to meadow in good condition or better or existing conditions.

Watershed Name: Little Fishing Creek

Volume Control design storm frequency 2-year Rainfall amount 3.03 inches	Pre-construction	Post Construction	Net Change
Impervious area (acres)	0.045	0.416	+0.371
Volume of stormwater runoff (acre-feet) without planned stormwater BMPs	0.000	0.000	0.000
Volume of stormwater runoff (acre-feet) with planned stormwater BMPs		0.000	0.000
Stormwater discharge rate for the design frequency storm	Pre-construction	Post Construction	Net Change
1) 2-Year/24-Hour	0.00	0.00	0.00
2) 10-Year/24-Hour	0.02	0.01	-0.01
3) 50-year/24-Hour	0.33	0.19	-0.14
4) 100-year/24-Hour	1.14	0.61	-0.53

c. Summary Description of PCSM/SR BMPs

In the lists below, check the BMPs identified in the PCSM Plan. The primary function(s) of the BMP listed in the functions column (infiltration/recharge; detention/retention; water quality). Additional functions may be added if applicable to that BMP. List the stormwater volume and area of runoff to be treated by each BMP type when calculations are required. If any BMP in the PCSM/SR Plan is not listed below, describe it in the space provided after "Other". A summary table with infiltration testing information (Attachment E, included in the NOI Instructions) must be submitted for all Bio-infiltration BMPs included in PCSM/SR plan.

For Rate control provide the volume of stormwater treated and acres treated for the 100-year/24-hour storm event.

For volume control and water quality provide the volume of stormwater treated and acres treated for the 2-year/24-hour storm event.

Key for BMP purpose(s): VC = Volume Control; RC = Rate Control; and WQ = Water Quality

BMP	Function(s)	Purpose(s)	Volume of stormwater treated	Acres treated
Site Restoration ONLY				
☐ Restore Site to Meadow in Good Condition or Better, or Existing Conditions	Infiltration/Recharge Detention/WQ Treatment	☐ VC ☐ RC ☐ WQ	_____	_____
Bio-infiltration areas	Infiltration/Recharge			
☐ Infiltration Trench		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Infiltration Bed		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Infiltration Basin		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Rain Garden/ Bioretention		☐ VC ☐ RC ☐ WQ	_____	
☐ Infiltration Berm		☐ VC ☐ RC ☐ WQ	_____	_____
Natural Area Conservation	Infiltration/Recharge			
☐ Streamside Buffer Zone		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Wetland Buffer Zone		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Sensitive Area Buffer Zone		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Pre-Construction Drainage Pattern Intact		☐ VC ☐ RC ☐ WQ	_____	_____
Stormwater Retention	Detention/Retention			
☐ Constructed Wetlands		☐ VC ☐ RC ☐ WQ	_____	_____
☒ Wet Ponds		☒ VC ☒ RC ☒ WQ	0.00 (2-yr); 16,351(100-yr)	5.12
☐ Retention Basin		☐ VC ☐ RC ☐ WQ	_____	_____
Sediment and Pollutant Removal	Water Quality Treatment			
☐ Vegetated Filter Strips		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Compost Filter Sock		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Detention Basins		☐ VC ☐ RC ☐ WQ	_____	_____
Access Road Design	Infiltration/Recharge			
☐ Road Crowning		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Ditches		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Turnouts		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Culverts		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Roadside Vegetated Filter Strips		☐ VC ☐ RC ☐ WQ	_____	_____

Stormwater Energy Dissipaters	Infiltration/Recharge			
☐ Level Spreaders		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Riprap Aprons		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Upslope Diversions		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Other_____		☐ VC ☐ RC ☐ WQ	_____	_____

d. Critical PCSM Plan stages

Identify and list critical stages of implementation of the PCSM Plan for which a licensed professional or designee shall be present on site.

1.Following final grading of the wet pond, forebay, access road and outlet structures in order to confirm they have been constructed according to the plan details for proper collection, infiltration, and conveyance of runoff. Periodic assessments will need to be made to ensure that accumulated sediment should be cleaned out so the basin maintains necessary design volume.

2.During the layout and excavation of the outlet structures, the professional or delegate will ensure sizing, materials specifications, and construction procedures are followed to enable proper storage and discharge to the pond/basin.

3.For final inspection of BMPs.

4.At the establishment of 70% vegetation covers to allow removal of E&S controls.

NOTICE OF INTENT (NOI) FOR COVERAGE UNDER THE EROSION AND SEDIMENT CONTROL GENERAL PERMIT (ESCGP-3) FOR EARTH DISTURBANCE ASSOCIATED WITH OIL AND GAS EXPLORATION, PRODUCTION, PROCESSING, OR TREATMENT OPERATIONS OR TRANSMISSION FACILITIES

TABLES IN ADDENDUM OF NOI

SECTION H. POST CONSTRUCTION STORMWATER MANAGEMENT (PLAN) BMPs

Compressor Station 607

b. Summary Table for Supporting Calculation and Measurement Data

(See NOI Instructions for additional guidance with this section)

The remainder of this section (Summary Table for Calculation and Measurement Data) does not need to be completed for areas of projects involving oil and gas activities authorized by Chapter 78 or Chapter 78a (well pads) or pipelines and other similar utility infrastructure which will be restored to meadow in good condition or better or existing conditions.

Watershed Name: Lick Branch

Volume Control design storm frequency 2-year Rainfall amount 2.88 inches	Pre-construction	Post Construction	Net Change
Impervious area (acres)	0.638	4.410	+3.772
Volume of stormwater runoff (acre-feet) without planned stormwater BMPs	1.215	1.533	+0.318
Volume of stormwater runoff (acre-feet) with planned stormwater BMPs		0.792	-0.423
Stormwater discharge rate for the design frequency storm	Pre-construction	Post Construction	Net Change
1) 2-Year/24-Hour	11.16	8.22	-2.94
2) 10-Year/24-Hour	24.72	19.28	-5.44
3) 50-year/24-Hour	45.88	37.30	-8.58
4) 100-year/24-Hour	58.41	49.54	-8.87

c. Summary Description of PCSM/SR BMPs

In the lists below, check the BMPs identified in the PCSM Plan. The primary function(s) of the BMP listed in the functions column (infiltration/recharge; detention/retention; water quality). Additional functions may be added if applicable to that BMP. List the stormwater volume and area of runoff to be treated by each BMP type when calculations are required. If any BMP in the PCSM/SR Plan is not listed below, describe it in the space provided after "Other". A summary table with infiltration testing information (Attachment E, included in the NOI Instructions) must be submitted for all Bio-infiltration BMPs included in PCSM/SR plan.

For Rate control provide the volume of stormwater treated and acres treated for the 100-year/24-hour storm event.

For volume control and water quality provide the volume of stormwater treated and acres treated for the 2-year/24-hour storm event.

Key for BMP purpose(s): VC = Volume Control; RC = Rate Control; and WQ = Water Quality

BMP	Function(s)	Purpose(s)	Volume of stormwater treated	Acres treated
Site Restoration ONLY				
☐ Restore Site to Meadow in Good Condition or Better, or Existing Conditions	Infiltration/Recharge Detention/WQ Treatment	☐ VC ☐ RC ☐ WQ	_____	_____
Bio-infiltration areas	Infiltration/Recharge			
☐ Infiltration Trench		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Infiltration Bed		☐ VC ☐ RC ☐ WQ	_____	_____
☒ Infiltration Basin		☒ VC ☒ RC ☐ WQ	3,176(2-yr); 7,237(100-yr)	1.77
☐ Rain Garden/ Bioretention		☐ VC ☐ RC ☐ WQ	_____	
☐ Infiltration Berm		☐ VC ☐ RC ☐ WQ	_____	_____
Natural Area Conservation	Infiltration/Recharge			
☐ Streamside Buffer Zone		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Wetland Buffer Zone		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Sensitive Area Buffer Zone		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Pre-Construction Drainage Pattern Intact		☐ VC ☐ RC ☐ WQ	_____	_____
Stormwater Retention	Detention/Retention			
☐ Constructed Wetlands		☐ VC ☐ RC ☐ WQ	_____	_____
☒ Wet Ponds		☒ VC ☒ RC ☒ WQ	30,556(2-yr); 105,566(100-yr)	5.95
☐ Retention Basin		☐ VC ☐ RC ☐ WQ	_____	_____
Sediment and Pollutant Removal	Water Quality Treatment			
☐ Vegetated Filter Strips		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Compost Filter Sock		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Detention Basins		☐ VC ☐ RC ☐ WQ	_____	_____
Access Road Design	Infiltration/Recharge			
☐ Road Crowning		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Ditches		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Turnouts		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Culverts		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Roadside Vegetated Filter Strips		☐ VC ☐ RC ☐ WQ	_____	_____

Stormwater Energy Dissipaters	Infiltration/Recharge			
☐ Level Spreaders		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Riprap Aprons		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Upslope Diversions		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Other_____		☐ VC ☐ RC ☐ WQ	_____	_____

d. Critical PCSM Plan stages

Identify and list critical stages of implementation of the PCSM Plan for which a licensed professional or designee shall be present on site.

1. Following final grading and seeding of the collection channels, wet pond and infiltration basin in order to confirm they have been constructed according to the plan details for proper collection, infiltration, and conveyance of runoff. Periodic assessments will need to be made to ensure that accumulated sediment should be cleaned out so the basin maintains necessary design volume.

2.During the layout and excavation of the outlet structures, the professional or delegate will ensure sizing, materials specifications, and construction procedures are followed to enable proper storage and discharge to the pond/basin.

3.For final inspection of constructed BMPs.

4.At the establishment of hard surface stabilization or 70% vegetation covers to allow removal of E&S controls.

NOTICE OF INTENT (NOI) FOR COVERAGE UNDER THE EROSION AND SEDIMENT CONTROL GENERAL PERMIT (ESCGP-3) FOR EARTH DISTURBANCE ASSOCIATED WITH OIL AND GAS EXPLORATION, PRODUCTION, PROCESSING, OR TREATMENT OPERATIONS OR TRANSMISSION FACILITIES

TABLES IN ADDENDUM OF NOI

SECTION H. POST CONSTRUCTION STORMWATER MANAGEMENT (PLAN) BMPs

Compressor Station 620

b. Summary Table for Supporting Calculation and Measurement Data

(See NOI Instructions for additional guidance with this section)

The remainder of this section (Summary Table for Calculation and Measurement Data) does not need to be completed for areas of projects involving oil and gas activities authorized by Chapter 78 or Chapter 78a (well pads) or pipelines and other similar utility infrastructure which will be restored to meadow in good condition or better or existing conditions.

Watershed Name: Deep Creek

Volume Control design storm frequency 2-year Rainfall amount 3.12 inches	Pre-construction	Post Construction	Net Change
Impervious area (acres)	0.078	3.886	+3.808
Volume of stormwater runoff (acre-feet) without planned stormwater BMPs	0.356	0.719	+0.363
Volume of stormwater runoff (acre-feet) with planned stormwater BMPs		0.013	0.343
Stormwater discharge rate for the design frequency storm	Pre-construction	Post Construction	Net Change
1) 2-Year/24-Hour	2.27	0.05	-2.22
2) 10-Year/24-Hour	10.87	1.48	-9.39
3) 50-year/24-Hour	28.69	10.23	-18.46
4) 100-year/24-Hour	41.14	14.81	-26.33

c. Summary Description of PCSM/SR BMPs

In the lists below, check the BMPs identified in the PCSM Plan. The primary function(s) of the BMP listed in the functions column (infiltration/recharge; detention/retention; water quality). Additional functions may be added if applicable to that BMP. List the stormwater volume and area of runoff to be treated by each BMP type when calculations are required. If any BMP in the PCSM/SR Plan is not listed below, describe it in the space provided after "Other". A summary table with infiltration testing information (Attachment E, included in the NOI Instructions) must be submitted for all Bio-infiltration BMPs included in PCSM/SR plan.

For Rate control provide the volume of stormwater treated and acres treated for the 100-year/24-hour storm event.

For volume control and water quality provide the volume of stormwater treated and acres treated for the 2-year/24-hour storm event.

Key for BMP purpose(s): VC = Volume Control; RC = Rate Control; and WQ = Water Quality

BMP	Function(s)	Purpose(s)	Volume of stormwater treated	Acres treated
Site Restoration ONLY				
☐ Restore Site to Meadow in Good Condition or Better, or Existing Conditions	Infiltration/Recharge Detention/WQ Treatment	☐ VC ☐ RC ☐ WQ	_____	_____
Bio-infiltration areas	Infiltration/Recharge			
☐ Infiltration Trench		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Infiltration Bed		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Infiltration Basin		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Rain Garden/ Bioretention		☐ VC ☐ RC ☐ WQ	_____	
☐ Infiltration Berm				
☒ Vegetated Swale		☒ VC ☒ RC ☒ WQ	7,676(2-yr); 9,391(100-yr)	5.59
Natural Area Conservation	Infiltration/Recharge			
☐ Streamside Buffer Zone		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Wetland Buffer Zone		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Sensitive Area Buffer Zone		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Pre-Construction Drainage Pattern Intact		☐ VC ☐ RC ☐ WQ	_____	_____
Stormwater Retention	Detention/Retention			
☐ Constructed Wetlands		☐ VC ☐ RC ☐ WQ	_____	_____
☒ Wet Ponds		☒ VC ☒ RC ☒ WQ	33,647(2-yr); 53,149(100-yr)	20.00
☐ Retention Basin		☐ VC ☐ RC ☐ WQ	_____	_____
Sediment and Pollutant Removal	Water Quality Treatment			
☐ Vegetated Filter Strips		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Compost Filter Sock		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Detention Basins		☐ VC ☐ RC ☐ WQ	_____	_____
Access Road Design	Infiltration/Recharge			
☐ Road Crowning		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Ditches		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Turnouts		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Culverts		☐ VC ☐ RC ☐ WQ	_____	_____

☐ Roadside Vegetated Filter Strips		☐ VC ☐ RC ☐ WQ	_____	_____
Stormwater Energy Dissipaters	Infiltration/Recharge			
☐ Level Spreaders		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Riprap Aprons		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Upslope Diversions		☐ VC ☐ RC ☐ WQ	_____	_____
☐ Other_____		☐ VC ☐ RC ☐ WQ	_____	_____

d. Critical PCSM Plan stages

Identify and list critical stages of implementation of the PCSM Plan for which a licensed professional or designee shall be present on site.

1.Following final grading and seeding of the collection channels, wet pond and infiltration basin in order to confirm they have been constructed according to the plan details for proper collection, infiltration, and conveyance of runoff. Periodic assessments will need to be made to ensure that accumulated sediment should be cleaned out so the basin maintains necessary design volume.

2.During the layout and excavation of the outlet structures, the professional or delegate will ensure sizing, materials specifications, and construction procedures are followed to enable proper storage and discharge to the pond/basin.

3.For final inspection of constructed BMPs.

4.At the establishment of hard surface stabilization or 70% vegetation covers to allow removal of E & S controls

SECTION I. ANTIDEGRADATION ANALYSIS

This section must be completed where earth disturbance activities will be conducted in the watershed of a surface water with an existing or designated use of exceptional value or high quality pursuant to Chapter 93 (relating to water quality standards), projects where any part is located in an exceptional value wetland in accordance with 25 Pa. Code § 105.17, and projects where any part is located in the watershed of an impaired surface water where the cause of impairment is identified as siltation.

Part 1 - NONDISCHARGE ALTERNATIVES EVALUATION

The applicant must consider and describe any and all non-discharge alternatives for the entire project area which are environmentally sound and will**:**

- Minimize accelerated erosion and sedimentation during the earth disturbance activity
- Achieve no net change from pre-development to post-development volume, rate and concentration of pollutants in water quality

E & S Plan	PCSM/SR Plan
Check off the environmentally sound nondischarge Best Management Practices (BMPs) listed below to be used prior to, during, and after earth disturbance activities that have been incorporated into your E & S Plan based on the site analysis. For non-discharge BMPs not checked, provide an explanation of why they were not utilized. Also for BMPs checked, provide an explanation of why they were utilized. (Provide the analysis and attach additional sheets if necessary) See Section 2 of this ESCGP-3 Application	Check off the environmentally sound nondischarge Best Management Practices (BMPs) listed below to be used after construction that have been incorporated into the PCSM/SR Plan based on your site analysis. For non-discharge BMPs not checked, provide an explanation of why they were not utilized. Also for BMPs checked, provide an explanation of why they were utilized. (Provide the analysis and attach additional sheets if necessary) See Section 3 of this ESCGP-3 Application
Nondischarge BMPs ☐ Alternative Siting ☐ Alternative location ☐ Alternative configuration ☐ Alternative location of discharge ☒ Limited Disturbed Area ☐ Limiting Extent & Duration of Disturbance (Phasing, Sequencing) ☐ Riparian Buffers (150 ft. min.) ☐ Riparian Forest Buffer (150 ft. min.) ☐ Other _____	**Nondischarge BMPs** ☐ Alternative Siting ☐ Alternative location ☐ Alternative configuration ☐ Alternative location of discharge ☐ Low Impact Development (LID / BSD) ☐ Riparian Buffers (150 ft. min.) ☐ Riparian Forest Buffer (150 ft. min.) ☒ Infiltration ☐ Water Reuse ☐ Other _____
Will the non-discharge alternative BMPs eliminate the net change in rate, volume and quality during construction? ☐ Yes ☒ No If yes, antidegradation analysis is complete. If no, proceed to Part 2.	Will the non-discharge alternative BMPs eliminate the net change in rate, volume and quality after construction? ☐ Yes ☒ No If yes, antidegradation analysis is complete. If no, proceed to Part 2.

PART 2 - ANTIDEGRADATION BEST AVAILABLE COMBINATION OF TECHNOLOGIES (ABACT)

If the net change in stormwater discharge from or after construction is not fully managed by nondischarge BMPs, the applicant must utilize ABACT BMPs to manage the difference. The Applicant must specify whether the discharge will occur during construction, post-construction or both, and identify the technologies that will be used to ensure that the discharge will be a non-degrading discharge. ABACT BMPs include but are not limited to:

E & S Plan	PCSM/SR Plan
☒ **Treatment BMPs:** ☐ Sediment basin with skimmer ☐ Sediment basin ratio of 4:1 or greater (flow length to basin width) ☒ Sediment basin with 4-7 day detention ☐ Flocculants ☒ Compost Filter Socks ☐ Compost Filter Sock Sediment Basin ☒ RCE w/ Wash Rack ☒ **Land disposal:** ☐ Vegetated filters ☐ Riparian buffers <150ft. ☐ Riparian Forest Buffer <150ft. ☒ Immediate stabilization ☒ **Pollution prevention:** ☒ PPC Plans ☒ Street sweeping ☒ Channels, collectors and diversions lined with permanent vegetation, rock, geotextile or other non-erosive materials ☐ **Stormwater reuse technologies:** ☐ Sediment basin water for dust control ☐ Sediment basin water for irrigation ☐ **Other** _____	☒ **Treatment BMPs:** ☒ Infiltration Practices ☒ Wet ponds ☐ Created wetland treatment systems ☒ Vegetated swales ☐ Manufactured devices ☐ Bio-retention/infiltration ☐ Green Roofs ☐ **Land disposal:** ☐ Vegetated filters ☐ Riparian Buffers <150ft. ☐ Riparian Forest Buffer <150ft. ☐ Disconnection of roof drainage ☐ Bio-retention/bio-infiltration ☒ **Pollution prevention:** ☒ Street sweeping ☐ Nutrient, pesticide, herbicide or other chemical application plan alternatives ☒ PPC Plans ☒ Non-structural Practices ☒ Restoration BMPs ☐ **Stormwater reuse technologies:** ☐ Divert rainwater into impoundment ☐ Underground storage ☐ Spray/Drip Irrigation ☐ **Other** _____
Are the ABACT BMPs selected sufficient to minimize E&S discharges to the extent that existing or designated surface water uses are protected? ☒ Yes ☐ No If yes, Antidegradation analysis is complete. If no, NOI Application will be returned to the Applicant.	Are the ABACT BMPs selected sufficient to achieve no net change and assure that existing or designated surface water uses are protected? ☒ Yes ☐ No If yes, Antidegradation analysis is complete. If no, NOI Application will be returned to the Applicant.

SECTION J. COMPLIANCE HISTORY REVIEW

Is/was the applicant(s) in violation of any Department regulation, order, schedule of compliance or permit or in violation of any department regulated activities within the past five years?

☒ Yes ☐ No

If yes, provide the permit number or facility name, a brief description of the violation, the compliance schedule (including dates and steps to achieve compliance) and the current compliance status. (Attach additional information on a separate sheet, when necessary)

Permit Program or Activity: **Chapter 102, Chapter 105, PAG-10**
Permit Number (if applicable): **ESG03000150001, E-19-311, E-38-195, E-49-336, PAG109632**

Brief Description of non-compliance:

Failure to Comply with permit conditions. Failure to install or maintain BMP, Spill.

Steps taken to achieve compliance	Date(s) compliance achieved
(ESG) Transco modified procedures to maintain compliance.	5/1/2018
(ESG & E-19-311) Transco cleaned up spill per PADEP requirements.	5/11/2018
(ESG & E-38-195) Transco implemented and updated plans and procedures and installed additional BMP's to maintain compliance.	3/9/2018
(ESG) Transco coordinated with PFBC regarding the violation.	12/22/2017
(ESG, E-19-311 & E-49-366) Transco restored compliance using the appropriate BMP's and construction practices.	3/8/2018
(PAG109632) All past due reports were provided to PADEP	12/14/17

Current Compliance Status: ☒ In-Compliance ☐ In Non-Compliance

If in non-compliance, attach schedule for achieving compliance.

SECTION K. CERTIFICATION BY PERSON PREPARING E&S AND PCSM/SR PLANS

I do hereby certify to the best of my knowledge, information, and belief, that the Erosion and Sediment Control and PCSM/Site Restoration Plans are true and correct, represent actual field conditions, and are in accordance with the 25 Pa. Code Chapters 78/78a and 102 of the Department's rules and regulations. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

Print Name Kevin C. Clark	Signature	Professional Seal
Company BAI Group, LLC		
Address 2525 Green Tech Drive, Suite D, State College, PA-16803		
Phone (814) 238-2060		
Most Recent DEP Training Attended _____	Location _____	Date _____
e-Mail Address kclark@baigroupllc.com		

EXPEDITED REVIEW PROCESS

In addition to the certification required above, applicants using the expedited permit review process must attach an E&S and PCSM/Site Restoration Plans developed and sealed by a licensed professional engineer, surveyor or professional geologist. The plans shall contain the following certification:

I do hereby certify to the best of my knowledge, information, and belief, that the E & S Control and PCSM/SR BMPs are true and correct, represent actual field conditions and are in accordance with the 25 Pa. Code Chapters 78 / 78a and 102 of the Department's rules and regulations. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

SECTION L. APPLICANT CERTIFICATION

Applicant Certification

I certify under penalty of law, as provided by 18 Pa. C.S.A. § 4904, that this application and all related attachments were prepared by me or under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my own knowledge and on inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. The responsible official's signature also verifies that the activity is eligible to participate in the ESCGP, and that the applicant agrees to abide by the terms and conditions of the permit. BMP's, E&S Plan, PPC Plan, PCSM Plan, and other controls are being or will be, implemented to ensure that water quality standards and effluent limits are attained.

I grant permission to the agencies responsible for the permitting of this work, or their duly authorized representative to enter the project site for inspection purposes. I will abide by the conditions of the permit if issued and will not begin work prior to permit issuance.

(For individuals no indication of title is necessary, choose the box below. All others proceed to the next paragraph)

☐ **Individual; proceed to signature portion.**

I hereby certify under penalty of law, as provided by 18 Pa. C.S.A. § 4904, that I am the person who is responsible for decision-making regarding environmental compliance functions for Transcontnential Gas Pipe Line Company, LLC, the manager of one or more manufacturing, production, or operating facilities of the applicant and am authorized to make management decisions which govern the operation of regulated facility including having explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure the applicant's long term environmental compliance with environmental laws and regulations; and I am responsible for ensuring that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements.

(choose one of the following; not applicable for individuals):

☐ The responsible corporate officer ☐ president ☐ vice president ☐ secretary
☐ treasure of _____ Corporation/Company
Entity name

☒ The ☐ member or ☒ manager of Transcontinental Gas Pipe Line, LLC
Entity name

☐ The general partner of _____ partnership/LP/LLP
Entity name

☐ The principal executive officer or ranking elected official of _____ Municipality/State/Federal/other public agency
Entity name

☐ Power of Attorney/delegation of contractual authority (documentation supporting delegation of contracting authority must be provided) for _____
Entity name

Joseph E. Dean, Mgr. - Permits
Print Name and Title of Applicant

Print Name and Title of Co-Applicant (if applicable)

Signature of Applicant

Signature of Co-Applicant

Dec. 11, 2019
Date Application Signed

Date Application Signed

Notarization
Sworn to and subscribed to before me this
11th day of December, 2019

Commonwealth of ~~Pennsylvania~~ TEXAS
County of Harris

Joanna K. McKinzie
Notary Public

My Commission expires 02.15.2023

AFFIX SEAL

JOANNA K. MCKINZIE
NOTARY PUBLIC
STATE OF TEXAS
ID 124834581
EXP. 02-15-2023

SECTION M. ADDITIONAL CONTACT INFORMATION				
Contact's Last Name	First Name	MI	Phone (814) 689-1650	
Clark	Kevin	M	FAX	
Mailing Address	City		State	ZIP + 4
2525 Green Tech Drive, Suite B	State College		PA	16803
e-Mail Address kevinc@whmgroup.com				

Section 1-1.1 NOI Supporting Information

Project Component	Site	Site Location City	ZIP Code	County	Municipality	Total Project Area/Project Site (Acre)	Total Disturbed Area (Acre)	Latitude / Longitude	U.S.G.S. 7.5 min. Topographic Quadrangle	Receiving Waters	Chapter 93, Designated Use Stream Classification	Chapter 93, Existing Use Stream Classification	Siltation Impaired
Hensel Replacement				Clinton	Leidy, Chapman	182.56	131.25	(41.4299, -77.8479) (41.3988, -77.7536)	Tamarack, Young Womans Creek & Renovo East	West Branch Susquehanna River, Mudlick Run, Paddy Run, Dark Hollow, Hensel Fork, Sandy Run, Turtle Point Hollow, Drury Run, Austin Hollow, Shingle Branch	EV, MF, HQ-CWF, WWF	-	No
	CY003	North Bend	17760	Clinton	Chapman		8.9	41.33972, -77.70750		West Branch Susquehanna River	WWF, MF	-	No
	Eastern Terminus MLV and Access Road	North Bend	17764	Clinton	Chapman		5.4	41.39615, -77.74697		Mudlick Run	EV, MF	-	No
	Western Terminus MLV	Renovo	17760	Clinton	Leidy		7.80	41.43000, -77.84778		Turtle Point Hollow	EV, MF	-	No
Hilltop Loop				Clinton	Chapman	115.3	86.6	(41.3755, -77.7155) (41.3658, -77.6745)	Young Womans & Renovo East	Young Womans Creek, Paddy Run, Left Branch Young Womans Creek, Skunk Hollow, Post Hollow, Dry Run	EV, MF, HQ-CWF	-	
	CY004	North Bend	17760	Clinton			11.8	41.35366, -77.70067		Young Womans Creek	HQ-CWF, MF	-	No
	CY005	North Bend	17760	Clinton			6.0	41.36283, -77.72407		Young Womans Creek	HQ-CWF, MF	-	No
	CY008	North Bend	17760	Clinton			15.1	41.3567,-76.72922		Paddy Run	EV, MF	-	No
Benton Loop				Lycoming, Columbia	Jackson, Jordan	139.81	112.24	(41.2617, -76.5290) - (41.3261, -76.4617)	Elk Grove & Sonestown	Little Indian Run, West Creek, Little Fishing Creek, Little Brier Run, Little Muncy Creek, Buck Run, West Branch Little Muncy Creek	EV, CWF, MF	EV, MF	
	CY001	Divide	17814	Columbia	Jackson		4.2	41.26789, -76.43538		West Creek	CWF,MF	-	No
	CY002	Unityville	17744	Lycoming	Jordan		15.1	41.26144, -76.54092		Little Indian Run	CWF,MF	-	No
	Eastern Terminus MLV	Divide	17814	Lycoming	Jordan		4.5	41.26758, -76.46183		Little Fishing Creek	CWF, MF	EV, MF	No
Compressor Station 607		Rittenhouse	18656	Luzerne	Fairmount	19.4	18.2	41.29880, -76.22324	Sweet Valley	Lick Branch and Phillips Creek	HQ-CWF, MF	-	No
Compressor Station 610		Rohrsburg	17846	Columbia	Orange	38.8	14.3	41.10687, -76.44922	Bloomsburg	Green Creek, Fishing Creek	TSF, MF, CWF	-	Yes (Fishing Creek)
Compressor Station 620		Hegins	17938	Schuylkill	Hegins	45.7	45.3	40.67472, -76.47222	Tremont	Deep Creek	CWF, MF	-	No

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
OFFICE OF WATER PROGRAMS
OFFICE OF OIL AND GAS MANAGEMENT

NOTICE OF INTENT (NOI) ADMINISTRATIVE COMPLETENESS CHECKLIST EROSION AND SEDIMENT CONTROL GENERAL PERMIT (ESCGP-3) FOR EARTH DISTURBANCE ASSOCIATED WITH OIL AND GAS EXPLORATION, PRODUCTION, PROCESSING, OR TREATMENT OPERATIONS OR TRANSMISSION FACILITIES

Please check the following list to make sure that you have included all the required information. Place a check mark in the column provided for all items completed and/or provided. Failure to provide all of the requested information will delay the processing of the application, may preclude the use of the Expedited Review, and may result in the application being placed ON HOLD with NO ACTION, or being considered withdrawn and the application file closed.

THIS CHECKLIST MUST BE COMPLETED AND ENCLOSED WITH YOUR GENERAL PERMIT NOI

✓CHECKLIST FOR EROSION AND SEDIMENT CONTROL GENERAL PERMIT NOI

☒ **NEW NOI** ☐ **RENEWAL** ☐ **PHASED** ☐ **MAJOR MODIFICATION**

If a Renewal, Phased or Major Modification, identify ESCGP Authorization # _____

Minor revisions are not required to be submitted to the regional office for review.

CLIENT NAME Transcontinental Gas Pipe Line Company, LLC , a subsidiary of The Williams Company, Inc. (Contact: Joseph Dean)

PROJECT and PHASE NAME Leidy South Project **(If applicable)**

				Applicant Check ✓ if Included	Official Use Only
1.	Fully completed, properly signed and notarized Notice of Intent form (1 original and 2 copies for paper application). (Not required for subsequent phases)			☒	☐
2.	Is expedited review requested? If yes, complete items (a) and (b) below. If no, proceed to section 3 of this checklist.			☐ Yes	☒ No
	a. Expedited review eligibility has been completed and determined.	Location: _____	Page: _____	☐	☐
	b. Expedited review process related questions have fully been answered.	Location: _____	Page: _____	☐	☐
3.	Complete **Erosion and Sediment Control (E&S) Plans.** (1 original and 2 copies for paper application) NOTE: Identify locations as Drawings (D), Narrative (N). (Identify Not Applicable as "N/A") The E & S Plan must contain, at a minimum, the following:			☒ Yes	☐ No
	a. **Topographic Features** Existing topographic features of the project site and immediate surrounding area. Include the project area outlined on an 8 ½" x 11" photocopy of the U.S.G.S. topo map area. The map must include the name of the appropriate 1:24,000 scale U.S.G.S. 7.5 minute series quadrangle map where the project is located.	Location: D&N	Page: N Section 2.0 and Attachment 1, D of ESCGP-3 Sections 2-1 to 2-6	☒	☐
	b. **Soil Characteristics** Types, depth, slope, locations and limitations of the soils including methods for resolution of all soil limitations.	Location: D&N	Page: N Section 4.0 and Attachment 2, D of ESCGP-3 Sections 2-1 to 2-6	☒	☐
	c. **Earth Disturbance Activity** The characteristics of the earth disturbance activity, including the past, present and proposed land uses and proposed alteration to the project site.	Location: N	Page: N Section 5.0	☒	☐
	d. **Project Site Runoff**	Location: N	Page: N	☒	☐

		The Volume and rate of runoff from the project site and its upstream watershed area. Runoff impact analysis on downstream watercourse, design computations for protective measures if applicable, discharge analysis for non-surface water discharges.		Section 11.0		
	e.	**Surface Water Classification** The Location of all surface waters of this Commonwealth which may receive runoff within or from the project site including their classification under Chapter 93 and status as siltation-impaired water. All streams, springs, wetlands, and floodways within, adjacent or receiving water from the project site must be shown on drawings with proper identification of special protection waters and existing uses.	Location: D&N	Page: N Section 3.0 and and D of ESCGP-3 Sections 2-1 to 2-6	☒	☐
	f.	**BMP Description Narrative** A narrative description of the location and type of perimeter and onsite BMPs used before, during, and after the earth disturbance activity.	Location: D&N	Page: N Section 6.0 and D of ESCGP-3 Sections 2-1 to 2-6	☒	☐
	g.	**BMP Installation Sequence Narrative** A sequence of BMP installation and removal in relation to the scheduling of earth disturbance activities, prior to, during and after earth disturbance activities that ensures proper functioning of BMPs.	Location: D	Page: D of ESCGP-3 Sections 2-1 to 2-6	☒	☐
	h.	**Supporting Calculations and Measurements** All BMP design calculations and information must be attached with the E&S plans.	Location: N	Page: N Attachment 3	☒	☐
	i.	**Plan Drawings** Plan drawings must include locations of proposed BMPs and a legend for all symbols used on the drawing. Construction details, notes, and specifications must be included to explain the drawings.	Location: D	Page: D of ESCGP-3 Sections 2-1 to 2-6	☒	☐
	j.	**Maintenance Program** A maintenance program which provides for the operation and maintenance of BMPs and the inspection of BMPs on a weekly basis and after each stormwater event, including the repair or replacement of BMPs to ensure effective and efficient operation. The program must provide for completion of a written report documenting each inspection and all BMP repair, or replacement and maintenance activities.	Location: D	Page: D of ESCGP-3 Sections 2-1 to 2-6	☒	☐
	k.	**Material Recycling and Disposal** Procedures which ensure that the proper measures for the recycling or disposal of materials associated with or from the project site will be undertaken in accordance with this title.	Location: D&N	Page: N Section 7.0 and D of ESCGP-3 Sections 2-1 to 2-6	☒	☐
	l.	**Naturally Occurring Geologic Formations and Soil Conditions** Identify naturally occurring geologic formations or soil conditions that may have the potential to cause pollution during earth disturbance activities and include the locations on plan drawings. Include BMPs to avoid or minimize potential pollution and its impacts from the formations. If the applicant suspects substantial possibility of potential slope failure, include a geotechnical report prepared by a geotechnical engineer.	Location: N	Page: N Section 4.0 and Attachment B of ESCGP-3	☒	☐
	m.	**Thermal Impacts** Identification of potential thermal impacts to surface waters	Location: N	Page: N Section 8.0	☒	☐

		of this Commonwealth from the earth disturbance activity including BMPs to avoid, minimize or mitigate potential pollution from thermal impacts.				
	n.	**E&S Plan and PCSM/SR Plan Consistency** The E&S Plan shall be planned, designed and implemented to be consistent with the PCSM Plan under § 102.8. Unless otherwise approved by the Department, the E&S Plan must be separate from the PCSM Plan and labeled "E&S" or "Erosion and Sediment Control Plan" and be the final plan for construction.	Location: N	Page: N Section 1.0	☒	☐
	o.	**Riparian Forest Buffers** Identification of existing and proposed riparian forest buffers should be included on the plan drawings if incorporated into the project site.	Location: N	Page: N Section 10.0	☒	☐
	p.	**Antidegradation Requirements** Satisfy antidegradation implementation requirements for special protection water and siltation-impaired waters including evaluation of nondischarge alternatives and ABACT.	Location: N	Page: N Section 9.0	☒	☐
4.		**Permit NOI Filing Fees** of $500 to the appropriate Clean Water Fund plus $100/Acre of earth disturbance payable to the Commonwealth of PA Clean Water Fund ($500 filing fee not required for subsequent phases) is required. For NOIs submitted to delegated county conservation districts, the administrative fee of $500 must be paid to the conservation district and disturbed acreage fee to the Commonwealth of PA (two checks).	Location: Section 1-3 of ESCGP-3	Page:	☒	☐
5.		**Municipal Notification:** (3 copies) Not required for subsequence phases.			☒	☐
	a.	Act 14 Municipal Notifications to the local municipality and county governments that specify that the application is for Erosion and Sediment Control General Permit for Earth Disturbance Associated with Oil and Gas Activities. A "sample" notification letter is provided as Attachment C of the instructions. **Proof or Receipt** of municipal notifications: copies of certified mail receipts, proof of deliver from a commercial carrier or acknowledgment letters from the local municipality and county government.	Location: Section 1-6 of ESCGP-3	Page:	☒	☐
	b.	Pennsylvania Inventory of Historical Places and the National Register of Historical Places: When conducting earth disturbance activities, the permittee shall protect archaeological specimens and historic resources in accordance with applicable State and Federal laws. For permitted activities on lands of the Allegheny National Forest (ANF) or other federal lands, the permittee should coordinate with the appropriate ANF Ranger or other appropriate federal agency on the protection of historic properties.	Location: Section 1-9 of ESCGP-3	Page:	☒	☐
6.		**Pennsylvania Natural Heritage Program (PNHP).** Include PNDI receipt, PNDI clearance and other information depending on the permit application option. (3 copies for paper application).	Location: Section 1-8 of ESCGP-3	Page:	☒	☐
7.		**Complete PCSM/SR Plans.** (1 Original, 2 copies) NOTE: Identify location(s) as Drawing (D), Narrative (N). (Identify Not Applicable as "N/A".) The PCSM/SR Plan must contain, at a minimum, the following:			☒	☐
	a.	**Topographic Features**	Location: D&N	Page: N	☒	☐

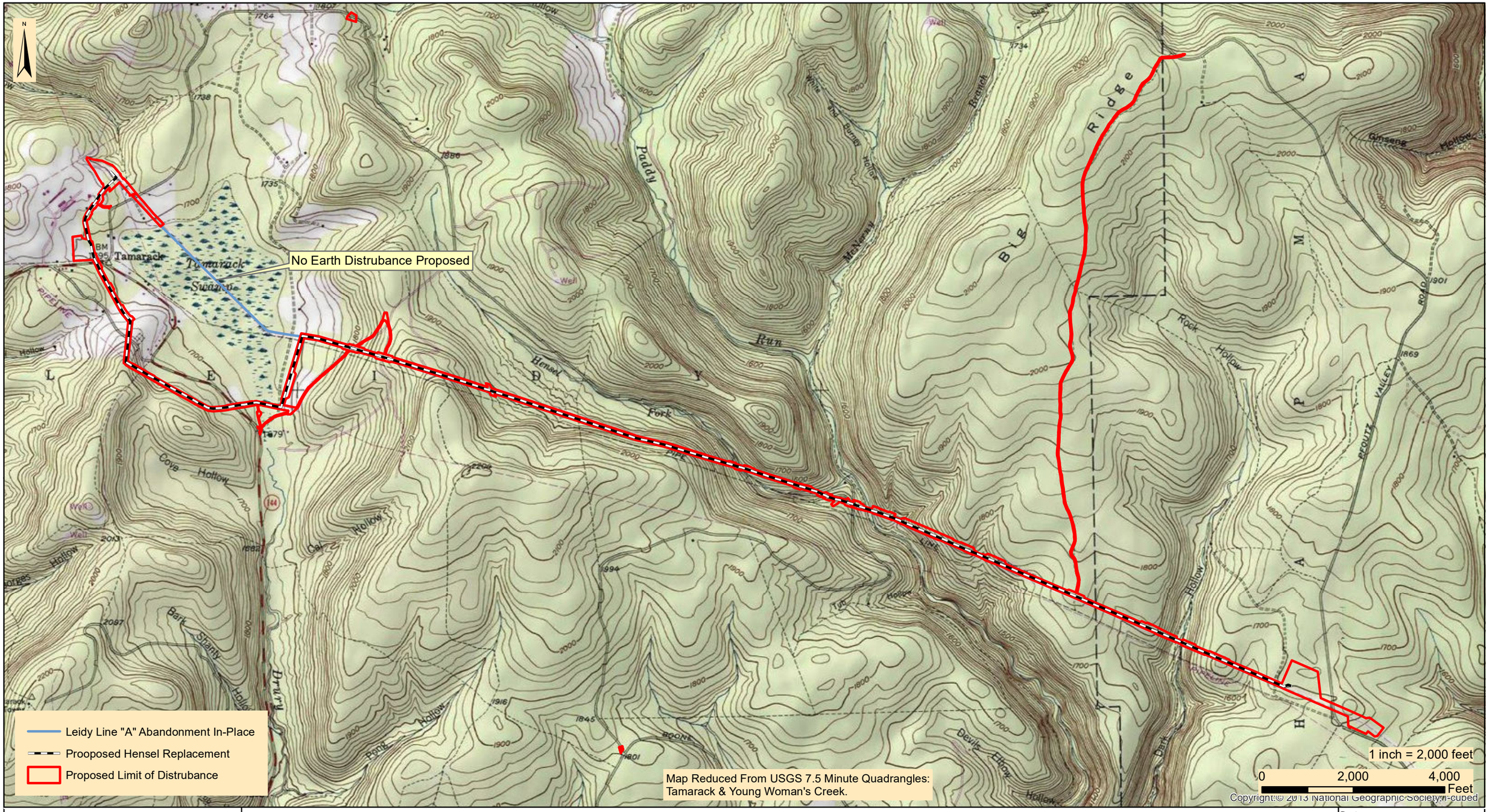
		The existing topographic features of the project site and immediate surrounding area must be shown plan drawings. The name of the USGS quadrangle map must be included.		Section 2.0 and Attachment 1, D of ESCGP-3 Sections 2-1 to 2-3 and 3-1 to 3-4		
	b.	**Characteristics of Naturally Occurring Geologic Formations and Soil Conditions** The types, depth, slope, locations and limitations of the soils and geologic formations.	Location: D&N	Page: N Section 4.0 and Attachment B of ESCGP-3, D of ESCGP-3 Sections 2-1 to 2-3 and 3-1 to 3-4	☒	☐
	c.	**Earth Disturbance Activity Characterization** The characteristics of the project site, including the past, present and proposed land uses Limit of Disturbance (LOD), areas of cuts and fill, proposed impervious areas, locations of roads, proposed contours of project area and the proposed alteration of the project site.	Location: N	Page: N Section 5.0	☒	☐
	d.	**Net Change in Volume and Rate of Runoff** An identification of the net change in volume and rate of stormwater from preconstruction hydrology to post construction hydrology for the entire project site and each drainage area. Include pre-development and post-development drainage area map. Post-development drainage area map must show Point of Discharge(s) (PODs) from PCSM BMPs.	Location: D&N	Page: PCSM N Section 7.0 and E&S/SR N Section 11.0, D of ESCGP-3 Sections 3-1 to 3-4	☒	☐
	e.	**Surface Water Classification** An identification and location of surface waters of this Commonwealth, which may receive runoff within or from the project site and their classification under Chapter 93.	Location: D&N	Page: N Section 3.0 and D of ESCGP-3 Sections 3-1 to 3-4	☒	☐
	f.	**BMP Description Narrative** A written description of the location and type of PCSM/Site Restoration BMPs including construction details for permanent stormwater BMPs including permanent stabilization specifications and locations.	Location: D&N	Page: N Section 6.0 and D of ESCGP-3 Sections 3-1 to 3-4	☒	☐
	g.	**BMP Installation Sequence Narrative** A sequence of PCSM/Site Restoration BMP implementation or installation in relation to earth disturbance activities of the project site and a schedule of inspections for critical stages of PCSM/Site Restoration BMP installation.	Location: D&N	Page: N Section 6.0 and D of ESCGP-3 Sections 3-1 to 3-4	☒	☐
	h.	**Supporting calculations** All design information and calculations must be included with the PCSM/SR plan. Include verification of PCSM/SR plan consistency with the Act 167 plan, if a current and DEP approved Act 167 plan exists. Include summary of bio-infiltration BMPs used for the project using Attachment E of the NOI instructions.	Location: N	Page: PCSM N Attachment 3/4 and Section 3-5 of ECCGP-3	☒	☐
	i.	**Plan Drawings** The locations of BMPs with tributaries must be shown on the drawings. Notes, specifications, any constructions details, and any other supporting information needed to	Location: D	Page: D of ESCGP-3 Sections 2-1 to 2-3 and 3-1	☒	☐

		explain the drawings must also be included.		to 3-4		
	j.	**Long Term Operation and Maintenance Schedule** A long-term operation and maintenance schedule, which provides for inspection of PCSM/Site Restoration BMPs, including the repair, replacement or other routine maintenance of the PCSM/Site Restoration BMPs to ensure proper function and operation. The program must provide for completion of a written report documenting each inspection and all BMP repair and maintenance activities and how access to the PCSM/Site Restoration BMPs will be provided.	Location: D&N	Page: PCSM N Section 9.0 and D of ESCGP-3 Sections 2-1 to 2-3 and 3-1 to 3-4	☒	☐
	k.	**Material Recycling and Disposal** Procedures which ensure that the proper measures for recycling or disposal of materials associated with or from the PCSM/Site Restoration BMPs are in accordance with Department laws, regulations and requirements.	Location: D&N	Page: PCSM N Section 10.0 and E&S/SR N Section 7.0, D of ESCGP-3 Sections 2-1 to 2-3 and 3-1 to 3-4	☒	☐
	l.	**Addressing Impacts from Naturally Occurring Geologic Formations and Soil Conditions** An identification of naturally occurring geologic formations or soil conditions that may have the potential to cause pollution after earth disturbance activities are completed and PCSM/Site Restoration BMPs are operational and development of a management plan to avoid or minimize potential pollution and its impacts.	Location: N	Page: N Section 4.0 and Attachment B of ESCGP-3	☒	☐
	m.	**Thermal Impacts** An Identification of potential thermal impacts from post construction stormwater to surface water of this Commonwealth including BMPs to avoid, minimize or mitigate potential thermal pollution from thermal impacts.	Location: D&N	Page: PCSM N Section 11.0 and E&S/SR N Section 8.0, D of ESCGP-3 Sections 2-1 to 2-3 and 3-1 to 3-4	☒	☐
	n.	**Riparian Forest Buffer Management Plan** A riparian forest buffer management plan when required under § 102.14.	Location: N	Page: PCSM N Section 13.0 and E&S/SR N Section 10.0	☐	☐
	o.	**Antidegradation Requirements** A demonstration of compliance with antidegradation implementation requirements including evaluation of nondischarge alternatives and ABACT for where activities will be conducted in special protection waters or siltation impaired waters.	Location: N	Page: PCSM N Section 12.0 and E&S/SR N Section 9.0	☒	☐
8.	**PCSM Plan Stormwater Analysis** Do the regulated activities require site restoration or reclamation? If Yes, skip to Item 9. If No, provide the following information:			☒ Yes ☐ No	☒	☐
	a.	**Site Characterization and Assessment** Predevelopment site characterization and assessment of soil and geology including infiltration and geotechnical studies that identify location and depths of test sites and methods used.	Location: N	Page: N Section 4.0 and Attachments 2 and 3	☒	☐
	b.	**Volume Reduction and Water Quality Requirements** Analysis demonstrating that the PCSM BMPs will meet the	Location: N	Page: N Section 6.0 &	☒	☐

		volume reduction and water quality requirement specified in an applicable Department approved and current Act 167 stormwater management watershed plan; **or** manage the net change for storms up to and including the 2-year/24-hour storm event when compared to preconstruction runoff volume and water quality.		Attachment 5 and Section 3-5 of NOI		
	c.	**Rate Requirements** Analyses demonstrating that the PCSM BMPs will meet the rate requirements specified in an applicable Department approved and current Act 167 stormwater management watershed plan; **or** manage the net change in peak rate for the 2-, 10-, 50-, and 100-year/24-hour storm event in a manner not to exceed preconstruction rates.	Location: N	Page: N Section 6.0 & Attachment 3/4 and Section 3-5 of ESCGP-3	☒	☐
	d.	**Calculation Methodologies** Identification of the methodologies for calculating total runoff volume and peak rate of runoff and provide supporting documentation and calculations.	Location: N	Page: N Section 6.0 & Attachment 3/4, and Section 3-5 of ESCGP-3	☒	☐
	e.	**Construction Techniques** Identification of construction techniques or special consideration to address soil and geologic limitations.	Location: D&N	Page: N Section 4.0, Attachment B of ESCGP-3 and D of ESCGP-3 Sections 3-1 to 3-4	☒	☐
	f.	**Antidegradation Requirements** Demonstration of compliance with antidegradation implementation requirements including evaluation of nondischarge alternatives and ABACT for where activities will be conducted in special protection waters or siltation impaired waters.	Location: N	Page: N Section 12.0	☒	☐
9.	**Phased Projects** Is the activity being conducted as a phased project? ☐ Yes ☒ No If yes, all of the following must be completed:				☒	☐
	a.	Initial Phase - Is the master plan included? ☐ Yes ☐ No				
	b.	Subsequent Phase(s) – Is(are) the subsequent phase(s) identified in the master plan? ☐ Yes ☐ No				
10.	**Preparedness, Prevention and Contingency (PPC) Plan** Will fuels, chemicals, solvents, other hazardous materials be used or stored on site during earth disturbance activities? ☒ Yes ☐ No If yes, a PPC Plan must be maintained on the site during earth disturbance.				☒	☐
11.	**Subsequent Phase Certification for Expedited Reviews** Is the activity being conducted as a phased project? ☐ Yes ☒ No Is an expedited review being requested for subsequent phase? ☐ Yes ☒ No If yes, all of the following must be completed:				☐	☐

	I do hereby certify to the best of my knowledge, information, and belief, that the Erosion and Sediment Control and PCSM/Site Restoration Plan are true and correct, represent actual field conditions and are in accordance with the 25 Pa. Code Chapters 78 and 102 of the Department's rules and regulations. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.	
	Signature	Professional Seal
	Company BAI Group, LLC	
	Address 2525 Green Tech Drive, Suite D, State College, PA-16803	
	Phone 814-238-2060	
	Most Recent DEP Training Attended Location _____ Date _____	
	e-Mail Address kclark@baigroupllc.com	
	EXPEDITED REVIEW PROCESS In addition to the certification required above, applicants using the expedited permit review process must attach an E&S and PCSM/Site Restoration Plan developed and sealed by a licensed professional engineer, landscape architect, surveyor or professional geologist. The plans shall contain the following certification: ***I do hereby certify to the best of my knowledge, information, and belief, that the Erosion and Sediment Control and PCSM/Site Restoration Plan and Post Construction BMPs are true and correct, represent actual field conditions and are in accordance with the 25 Pa. Code Chapters 78 and 102 of the Department's rules and regulations. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.***	

12.	**Permit Renewal** Is a permit renewal being requested? ☐ Yes ☒ No If yes, all of the following must be completed:		☐	☐
	a.	Administratively complete, signed, and notarized Notice of Intent Form, including Items 1-8. (1 signed original and 2 copies of the NOI/application for paper application)	☐	☐
	b.	Permit filing fee of $500 payable to the appropriate clean water fund plus $100/Acre of earth disturbance payable to the Commonwealth of PA Clean Water Fund.	☐	☐



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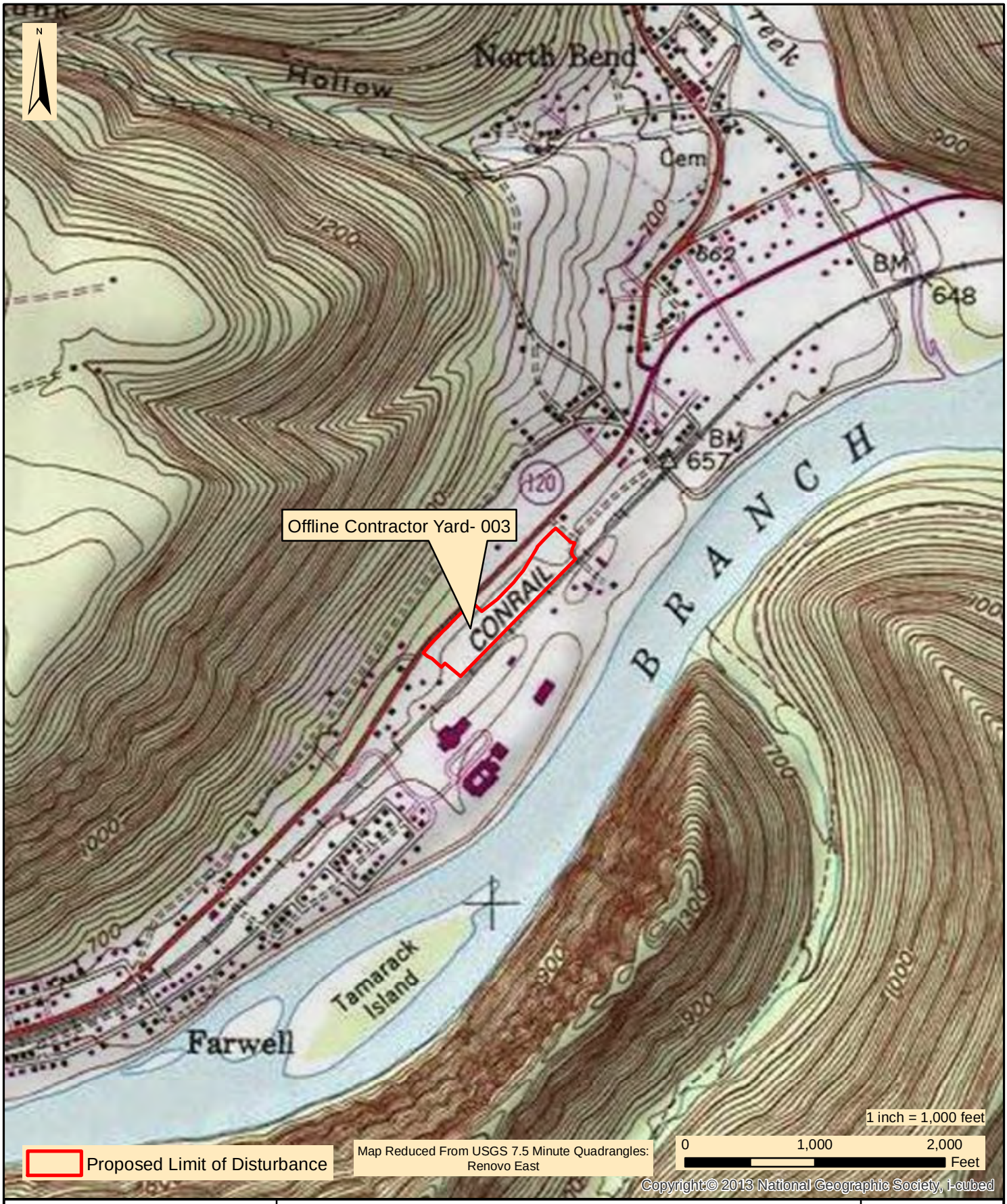
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

LEIDY SOUTH PROJECT

LEIDY LINE D 36" HENSEL REPLACEMENT PROJECT LOCATION MAP

LEIDY & CHAPMAN TOWNSHIP | CLINTON COUNTY | PENNSYLVANIA

Date:	4/28/2020
WHM DRAWING NUMBER:	WILLIAMS202B001
Drawn By:	FTN
Figure Number:	1-1



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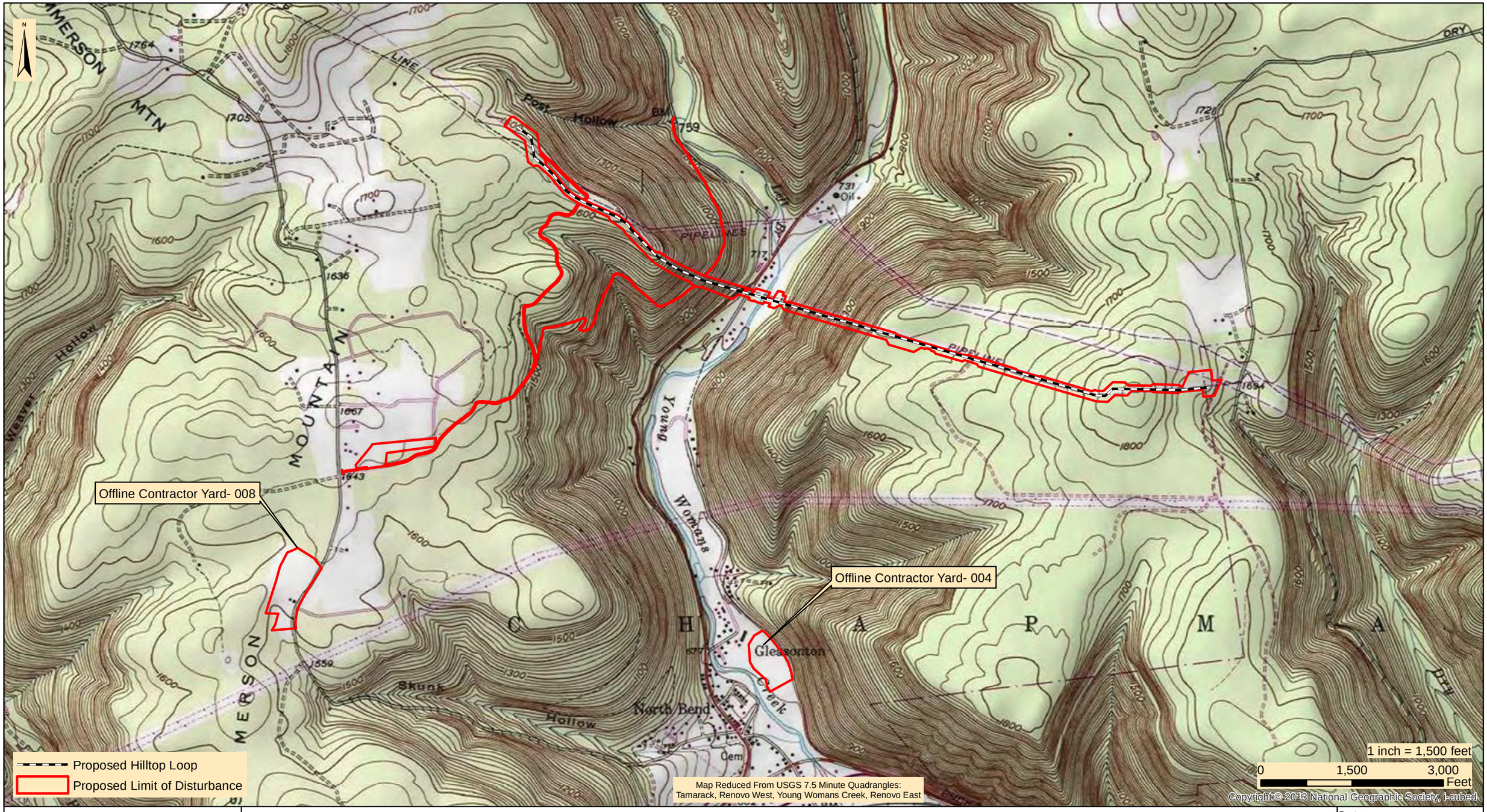
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

LEIDY SOUTH PROJECT

LEIDY LINE D 36" HENSEL REPLACEMENT
PROJECT LOCATION MAP

CHAPMAN TOWNSHIP CLINTON COUNTY PENNSYLVANIA

Date:	8/21/2019
WHM Drawing Number:	WILLIAMS200A001-1
Drawn By:	FTN
Figure Number:	1-2



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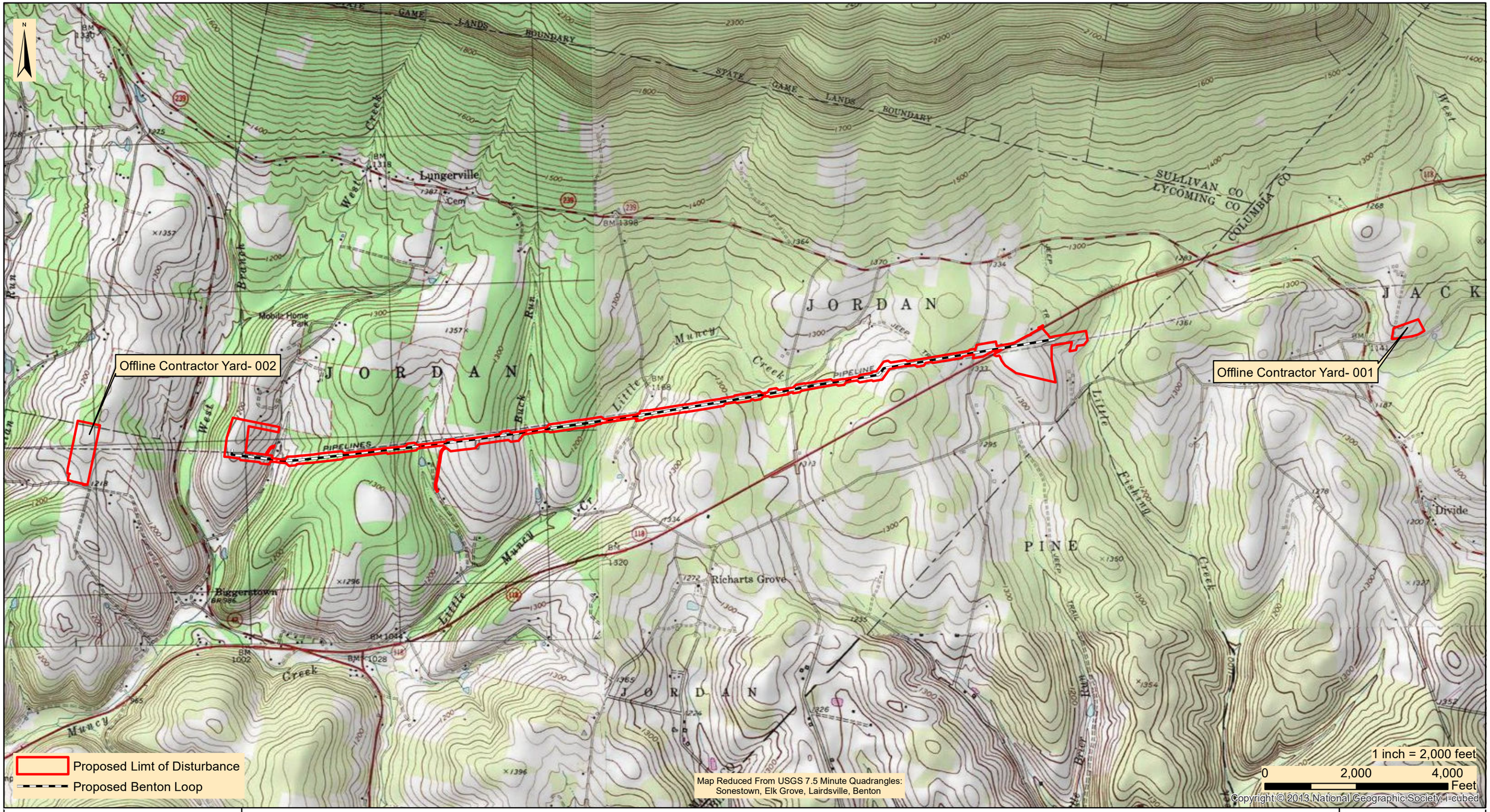
TRANSCONTNENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT

LEIDY LINE D 36" HILLTOP LOOP
PROJECT LOCATION MAP

CHAPMAN TOWNSHIP | CLINTON COUNTY | PENNSYLVANIA

Date:	8/21/2019
WHM DRAWING NUMBER:	WILLIAMS201B002
Drawn By:	FTN
Figure Number:	2-1



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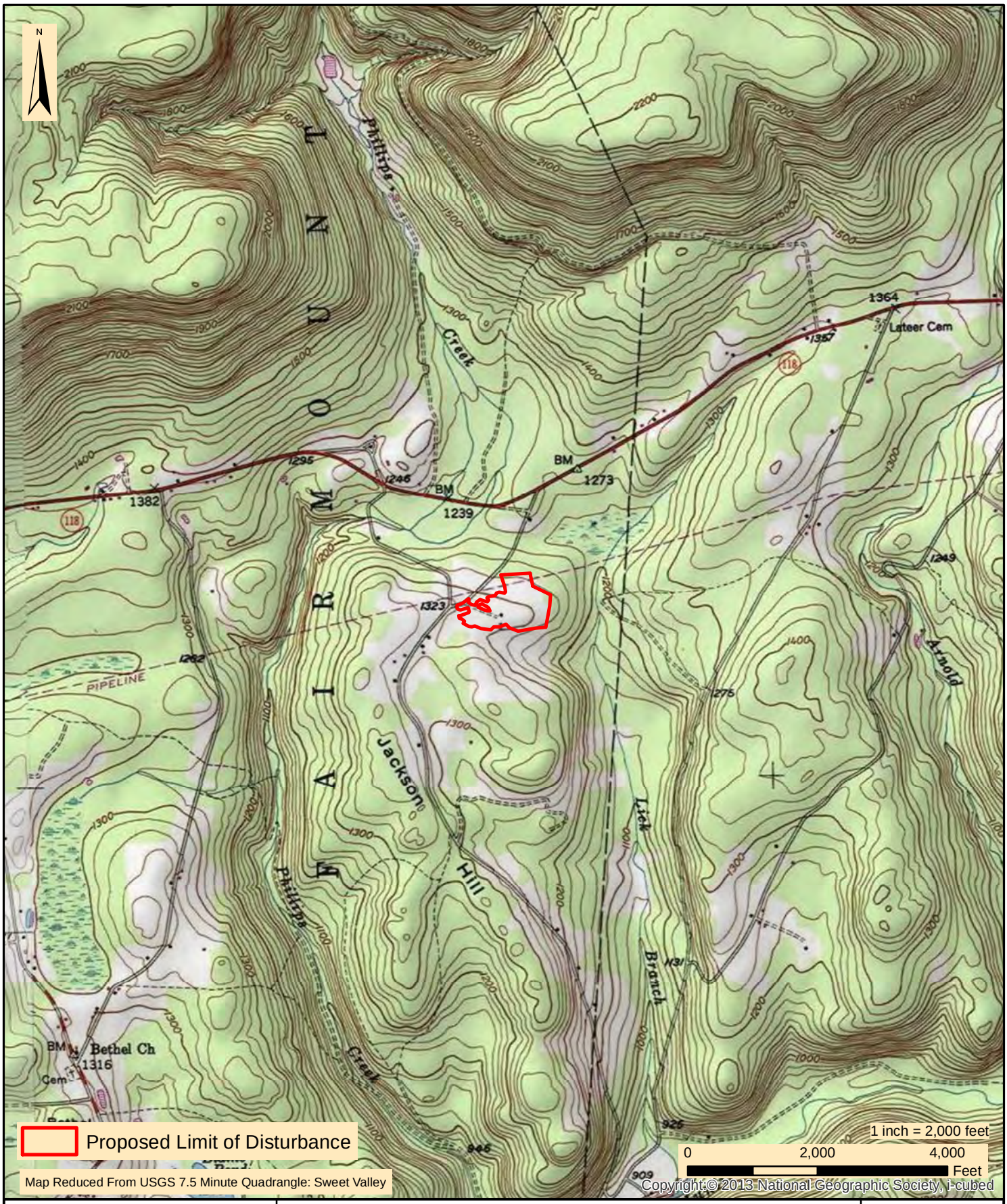
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

LEIDY SOUTH PROJECT

LEIDY LINE D 42" BENTON LOOP
PROJECT LOCATION MAP

LYCOMING & COLUMBIA COUNTIES PENNSYLVANIA

Date:	4/28/2020
WHM DRAWING NUMBER:	WILLIAMS202B003
Drawn By:	FTN
Figure Number:	1



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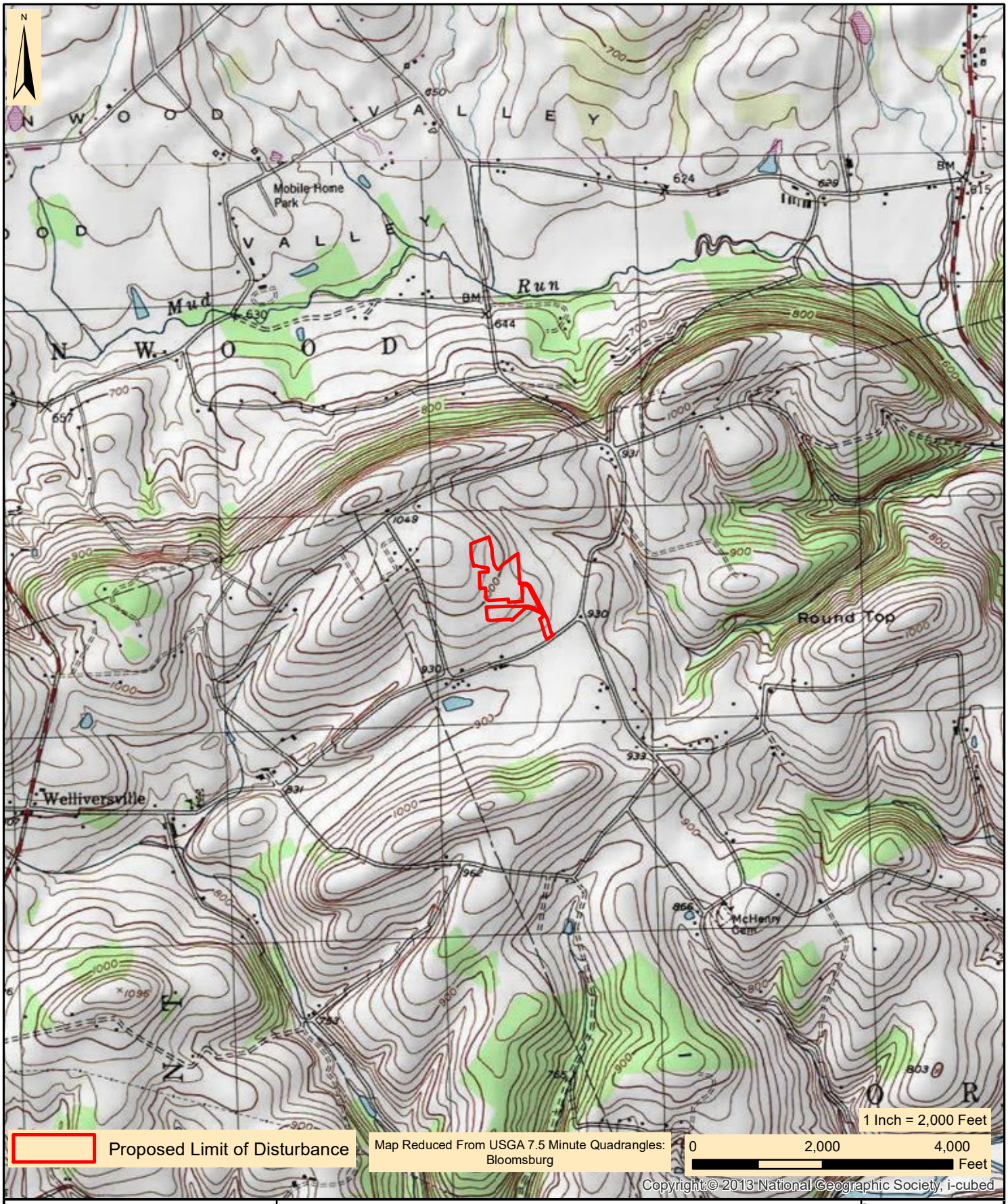
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

LEIDY SOUTH PROJECT

NEW **PROPOSED** COMPRESSOR STATION 607
PROJECT LOCATION MAP

FAIRMOUNT TOWNSHIP LUZERNE COUNTY PENNSYLVANIA

Date:	8/21/2019
WHM Drawing Number:	WILLIAMS204A001
Drawn By:	FTN
Figure Number:	5



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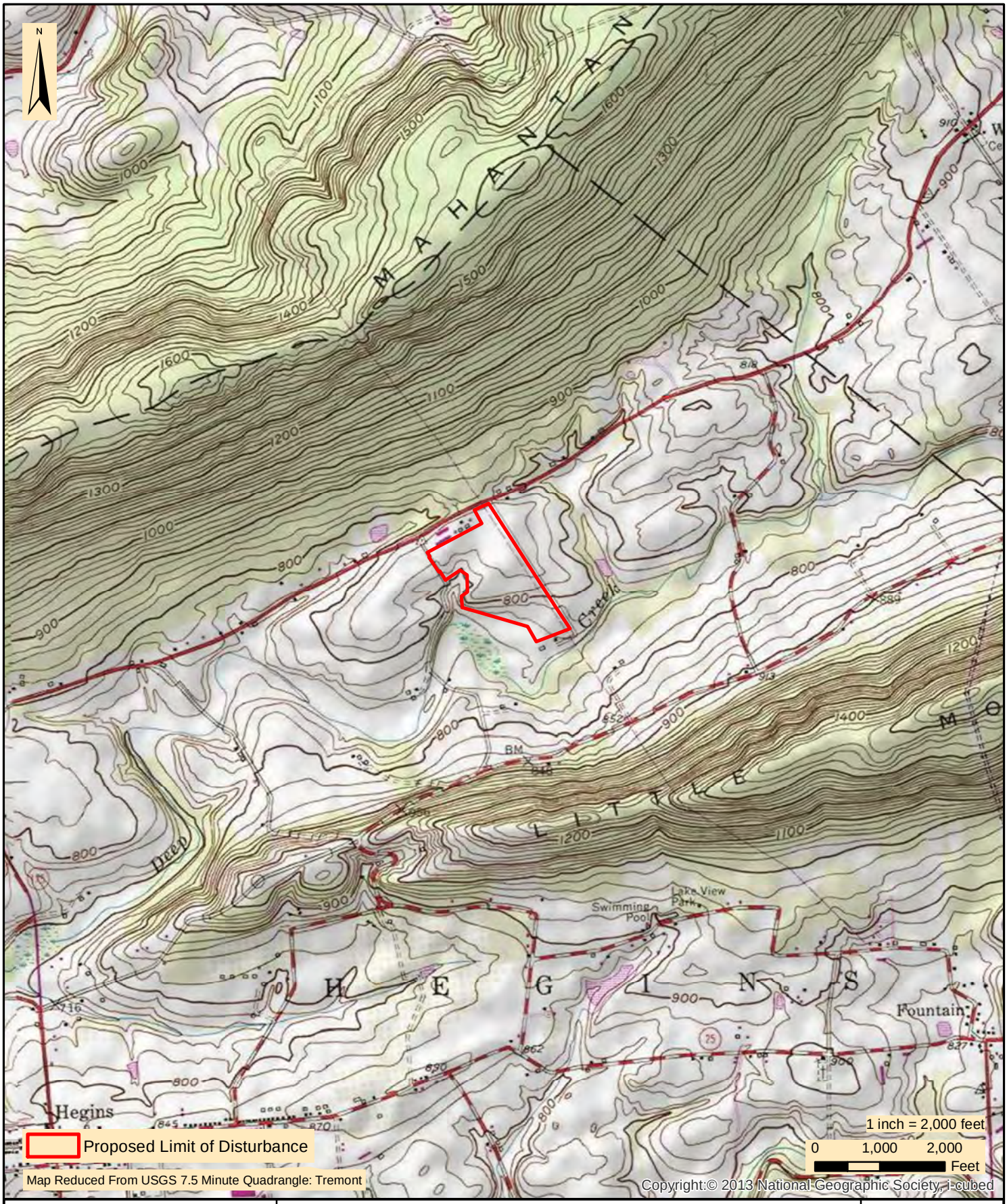
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT

EXISTING COMPRESSOR STATION 610
PROJECT LOCATION MAP

ORANGE TOWNSHIP | COLUMBIA COUNTY | PENNSYLVANIA

Date:	5/20/2020
WHM Drawing Number:	WILLIAMS205A001
Drawn By:	FTN
Figure Number:	6



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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

LEIDY SOUTH PROJECT

NEW **PROPOSED** COMPRESSOR STATION 620
PROJECT LOCATION MAP

HEGINS TOWNSHIP SCHUYLKILL COUNTY PENNSYLVANIA

Date:	8/21/2019
WHM Drawing Number:	WILLIAMS206A001
Drawn By:	FTN
Figure Number:	7

Transcontinental Gas Pipe Line Company, LLC

Section 1-7 Riparian Buffer Waiver Request

Leidy South Project

September 2019
(Revised May 2020)

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- **2.4 Access Roads**

3.0 Riparian Forest Restoration

4.0 Project Summary *(Revised December 2019)*

Attachments

1- **Riparian Buffer Summary Tables** *(Revised December 2019)*
2- **Wetland and Riparian Reforestation Plan** *(Revised May 2020)*

1.0 Introduction

The Pennsylvania Department of Environmental Protection (PA DEP) defines a riparian buffer as an area of permanent vegetation located along a stream or waterbody. Buffers can be comprised solely of grasses and forbs or a mix of trees, shrubs and grasses. Under Chapter 102.14 of the PA Code those conducting earth disturbance activities must protect riparian buffers, convert existing herbaceous buffers to forested buffers, or establish new riparian forest buffers [§102.14(a)(2)]. When converting or establishing new forested buffers, a three-zone approach is to be utilized [§102.14(b)(1)]. In special protection watersheds the buffer must be 150 feet wide or 100 feet wide in nonspecial protection watersheds [§102.14(b)(2)]. The riparian buffer requirements apply to earth disturbance activities within 150 feet of a perennial or intermittent river, stream or creek when the disturbance is located within special protection waters [§102.14 (a)(1)].

Transcontinental Gas Pipe Line Company, LLC (Transco), a subsidiary of The Williams Companies, Inc. conducted a delineation of watercourse resources associated with the Project. Riparian buffers extend 150 feet on each side of the watercourses from the watercourse top of bank. Wetland and waterbody delineation results, in conjunction with aerial imagery, were utilized to determine the riparian buffer crossings. Streams were delineated during the wetland delineation of the Project and results can be seen in Attachment A – Wetland and Watercourse Delineation Report (Attachment B). In total, 16 perennial and intermittent waterways with potential impacts to riparian buffers were identified during the delineation of Benton Loop, 8 of Hilltop Loop, 20 of Hensel Replacement and one each for Compressor Station 607 and 620. Most of the waterways identified have been previously impacted during past projects within the existing ROW. Riparian buffers are shown on the Erosion and Sedimentation and Site Restoration Plan (E&SC/SRP) Drawings.

2.0 Impacts to Riparian Buffers

Due to the linear nature of the Project, impacts associated with riparian buffers are unavoidable. Transco has sited the Project to avoid and minimize effects to watercourses, floodways and riparian buffers to the greatest extent practicable while maintaining constructability and safety. Within the top of bank (TOB) of streams, a 50-foot-wide construction ROW will be used, and a 75-foot-wide construction ROW will be used in floodways, except where Transco has provided site-specific justification. These stream and floodway workspace neck downs are the most reasonable neck downs for pipeline installation within these resources, as it will still allow

for required workspace to complete the construction activities while minimizing environmental impacts. These reductions to the workspace are considered the maximum reductions for the safe operation and passage of equipment and personnel while minimizing the length of time required to cross the features.

Where riparian buffer impacts cannot be avoided, riparian areas will be revegetated with the Ernst Riparian Buffer Mix (ERNMX-178), or an alternative riparian seed mix that contains similar species. This seed mix will be used to revegetate riparian areas where slopes are less than 10%. For slopes greater than 10%, a standard upland ROW seed mix will be used. Erosion control blankets will be placed on restored stream banks at the ordinary water line and should extend 100 feet beyond the top of bank unless wetlands are encountered. Transco will also replant native tree and shrubs within the impacted forested riparian buffers, as outlined in Appendix S4-2 Onsite Wetland and Riparian Reforestation Plan. A 10-foot-wide herbaceous corridor will be maintained over the center of the pipeline within the riparian buffer area. Trees and other woody vegetation will also be allowed to reestablish naturally within the construction ROWs that were cleared for construction of the pipeline. However, trees within 15 feet of the centerline and between existing pipelines will be removed to maintain the integrity of the pipeline.

Construction of the Project will result in the temporary crossings of 33 watercourses and/or floodways, consisting of 24 pipeline crossings and 9 crossings associated with existing bridged or culverted watercourses or associated floodways within the Project's Limit of Disturbance. No modifications to the existing bridges and culverts are being proposed. Riparian buffers impact and associated waivers or exceptions are identified in the riparian buffer summary tables in Attachment 1.

2.1 Pipelines

Given the linear nature of the pipeline component of the Project, total avoidance of these features is not feasible and therefore installation of the proposed pipelines will result in impacts to riparian buffers. Waiver 25 PA Code §102.14(d)(2)(ii) is being sought for these impacts.

2.2 Contractor Yards and Staging Areas

Temporary contractor yards and staging areas are sited outside of riparian buffers with the exception of: Contactor Yard 008 which crosses the riparian buffer of stream S1-T2-HL, Contractor Yard 004 which crosses the riparian buffer of Young Womans Creek. Exemption 25 PA Code §102.14(d)(2)(iv) is being sought for these impacts.

2.3 Compressor Stations

Temporary workspace associated with Compressor Station 607, 610 and 620 are sited outside of riparian buffers with the exception of: a portion of Compressor Station 607 associated with stream S1-T2-CS607A, and a portion of Compressor Station 620 associated with S2-T2-CS620A. Exemption 25 PA Code §102.14(d)(2)(iv) is being sought for these impacts.

Exemption 25 PA Code §102.14(d)(2)(vi) is being sought for a small portion of Compressor Station 607 consisting of 0.24 acres. This riparian buffer impact is considered unavoidable due to the site characteristics associated with minimizing wetland impacts and maintaining constructability.

2.4 Access Roads

Transco will primarily use existing access roads to access the construction ROW. Only maintenance activities such as tree branch clearing, gravel placement, minor grading, and temporary widening are proposed along these roads. Exception 25 PA Code §102.14(d)(1)(v) is being sought for two riparian buffers (streams S8a-T5-HL and S7-T5-HL) associated with the Hilltop Loop portion of the Project. Impacts to riparian buffers at associated with these existing access roads have been minimized to the greatest extent practicable while maintaining constructability and safety.

3.0 Riparian Forest Restoration

Upon completion of in-stream construction, Transco will stabilize the stream banks and streambed to pre-construction contours. Riparian areas will be revegetated with the Ernst Riparian Buffer Mix (ERNMX-178), or an alternative riparian seed mix that contains similar species. This seed mix will be used to revegetate riparian areas where slopes are less than 10%. For slopes greater than 10%, a standard upland ROW seed mix will be used. Erosion control blankets will be placed on restored stream banks at the ordinary water line and should extend 100 feet beyond the top of bank unless wetlands are encountered.

Transco will replant native tree and shrubs within the impacted forested riparian buffers, as outlined in Attachment 2 - Onsite Wetland and Riparian Reforestation Plan. A 10-foot-wide herbaceous corridor will be maintained over the center of the pipeline within the riparian buffer area. Trees and other woody vegetation will also be allowed to reestablish naturally within the construction ROWs that were cleared for construction of the pipeline. However, trees within 15 feet of the centerline and between existing pipelines will be removed to maintain the integrity of

the pipeline. The use of erosion control BMP's will avoid and/or minimize erosion and runoff that could potentially affect surface water quality.

4.0 Project Summary

Transco requests 40 riparian buffer waivers in accordance with 25 PA Code §102.14(d)(2)(ii) for linear project impacts along Benton Loop (16), Hilltop Loop (4) and Hensel Replacement (20), 2 riparian buffer waivers in accordance with 25 PA Code §102.14(d)(1)(v) for road maintenance activities, 4 riparian buffer waivers in accordance with 25 PA Code §102.14(d)(2)(iv) for temporary impacts at contractor yards and staging area, and 1 riparian buffer waiver in accordance with 25 PA Code §102.14(d)(2)(vi) for a portion of riparian buffer impact at Compressor Station 607. The tables in Attachment 1 outlines the areas of riparian buffers that will be crossed or impacted by the Project.

ATTACHMENT 1
RIPARAIN BUFFER SUMMARY TABLES

Table 1. Hensel Replacement Riparian Buffer Summary										
Waterbody ID[a]	**Waterbody Name**	**Mile post**	**County**	**Township**	**Stream Type**	**State Water Quality Use Classification - Designated Use**	**State Water Quality Use Classification - Existing Use**	**State Fishery Classification**	**Delineated Riparian Buffer Acreage within LOD (acres)**	**25 PA Code Waiver/Exception**
S12-T6-HR	UNT to Dark Hollow	189.0	Clinton	Chapman	Perennial	EV, MF	--	Wild Trout Waters	0.82	§102.14(d)(2)(ii)
S9-T6-HR	UNT to Paddy Run	190.3	Clinton	Leidy	Perennial	EV, MF	--	Wild Trout Waters	1.14	§102.14(d)(2)(ii)
S10-T6-HR	UNT to Paddy Run	190.4	Clinton	Leidy	Intermittent	EV, MF	--	Wild Trout Waters		§102.14(d)(2)(ii)
S7-T7-HR	Paddy Run	190.5	Clinton	Leidy	Perennial	EV, MF	--	Wild Trout Waters	1.04	§102.14(d)(2)(ii)
S7-T6-HR	UNT to Hensel Fork	190.6-191.1	Clinton	Leidy	Intermittent	EV, MF	--	Wild Trout Waters	4.01	§102.14(d)(2)(ii)
S6-T6-HR	UNT to Hensel Fork		Clinton	Leidy	Intermittent	EV, MF	--	Wild Trout Waters		§102.14(d)(2)(ii)
S8-T6-HR	UNT to Hensel Fork		Clinton	Leidy	Intermittent	EV, MF	--	Wild Trout Waters		§102.14(d)(2)(ii)
S8-T7-HR	UNT to Hensel Fork		Clinton	Leidy	Intermittent	EV, MF	--	Wild Trout Waters		§102.14(d)(2)(ii)
S9-T7-HR	UNT to Hensel Fork		Clinton	Leidy	Intermittent	EV, MF	--	Wild Trout Waters		§102.14(d)(2)(ii)
S10-T7-HR	UNT to Hensel Fork		Clinton	Leidy	Intermittent	EV, MF	--	Wild Trout Waters		§102.14(d)(2)(ii)
S6-T7-HR	UNT to Hensel Fork		Clinton	Leidy	Intermittent	EV, MF	--	Wild Trout Waters		§102.14(d)(2)(ii)
S5-T7-HR	UNT to Hensel Fork		Clinton	Leidy	Intermittent	EV, MF	--	Wild Trout Waters		§102.14(d)(2)(ii)

S4-T7-HR	UNT to Hensel Fork		Clinton	Leidy	Intermittent	EV, MF	--	Wild Trout Waters		§102.14(d)(2)(ii)
S3-T7-HR	UNT to Hensel Fork		Clinton	Leidy	Intermittent	EV, MF	--	Wild Trout Waters		§102.14(d)(2)(ii)
S2-T7-HR	UNT to Hensel Fork		Clinton	Leidy	Intermittent	EV, MF	--	Wild Trout Waters		§102.14(d)(2)(ii)
S1-T7-HR	Hensel Fork		Clinton	Leidy	Perennial	EV, MF	--	Wild Trout Waters		§102.14(d)(2)(ii)
S1-T7-HR-Braids	Hensel Fork		Clinton	Leidy	Perennial	EV, MF	--	Wild Trout Waters		§102.14(d)(2)(ii)
S2-T5-HR	UNT to Drury Run	193	Clinton	Leidy	Intermittent	EV, MF	--	Wild Trout Waters	0.12	§102.14(d)(2)(ii)
S1-T5-HR	UNT to Drury Run	193.1	Clinton	Leidy	Intermittent	EV, MF	--	Wild Trout Waters	0.95	§102.14(d)(2)(ii)
S2-T7a-HR	Drury Run	193.1	Clinton	Leidy	Perennial	EV, MF	--	Wild Trout Waters	1.19	§102.14(d)(2)(ii)

Table 2. Hilltop Loop Riparian Buffer Summary										
Waterbody ID[a]	**Waterbody Name**	**Mile post**	**County**	**Township**	**Stream Type**	**State Water Quality Use Classification - Designated Use**	**State Water Quality Use Classification - Existing Use**	**State Fishery Classification[d]**	**Delineated Riparian Buffer Acreage within LOD (acres)**	**25 PA Code Waiver/Exception**
S2-T4-HL	UNT to Young Womans Creek	184.9	Clinton	Chapman	Intermittent	HQ-CWF, MF	--	Stocked Trout Waters, Wild Trout Waters	2.18	§102.14(d)(2)(ii)
S1-T4-HL	Young Womans Creek	185.0	Clinton	Chapman	Perennial	HQ-CWF, MF	--	Stocked Trout Waters, Wild Trout Waters		§102.14(d)(2)(ii)
S8-T2-HL	UNT to Young Womans Creek	185.1	Clinton	Chapman	Intermittent	HQ-CWF, MF	--	Stocked Trout Waters, Wild Trout Waters	0.36	§102.14(d)(2)(ii)
S4-T2-HL	UNT to Young Womans Creek	185.1	Clinton	Chapman	Intermittent	HQ-CWF, MF	--	Stocked Trout Waters, Wild Trout Waters	0.003	§102.14(d)(2)(ii)
S8a-T5-HL	Post Hollow Run	Access Road 185.2 N	Clinton	Chapman	Perennial	EV, MF	--	Stocked Trout Waters, Wild Trout Waters, Class A Wild Trout	0.05	§102.14(d)(1)(v)
S7-T5-HL	UNT to Young Womans Creek	Access Road 185.2 S	Clinton	Chapman	Intermittent	HQ-CWF, MF	--	Stocked Trout Waters, Wild Trout Waters	0.37	§102.14(d)(1)(v)
S1-T2-HL	UNT to Skunk Hollow	Contractor Yard 008	Clinton	Chapman	Intermittent	HQ-CWF, MF	--	Stocked Trout Waters, Wild Trout Waters	1.02	§102.14(d)(2)(iv)
S4-T4-HL	Young Womans Creek	Contractor Yard 004	Clinton	Chapman	Perennial	HQ-CWF, MF	--	Wild Trout Waters	0.88	§102.14(d)(2)(iv)

Table 3. Benton Loop Riparian Buffer Summary										
Waterbody ID[a]	**Waterbody Name**	**Mile post**	**County**	**Township**	**Stream Type**	**State Water Quality Use Classification - Designated Use**	**State Water Quality Use Classification - Existing Use**	**State Fishery Classification[d]**	**Delineated Riparian Buffer Acreage within LOD (acres)**	**25 PA Code Waiver/Exception**
S1-T6	UNT to Little Fishing Creek	116.9	Lycoming	Jordan	Perennial	CWF, MF	EV, MF	Wild Trout Waters, Class A Wild Trout Waters	0.78	§102.14(d)(2)(ii)
S1-T7	Little Fishing Creek	116.9	Lycoming	Jordan	Perennial	CWF, MF	EV, MF	Wild Trout Waters, Class A Wild Trout Waters		
S3-T6	UNT to Little Muncy Creek	118.1	Lycoming	Jordan	Perennial	CWF, MF	EV, MF	Wild Trout Waters	0.26	§102.14(d)(2)(ii)
S4-T6	Little Muncy Creek	118.1	Lycoming	Jordan	Perennial	CWF, MF	EV, MF	Wild Trout Waters	0.004	§102.14(d)(2)(ii)
S6-T6	UNT to Little Muncy Creek	118.2	Lycoming	Jordan	Perennial	CWF, MF	EV, MF	Wild Trout Waters	0.88	§102.14(d)(2)(ii)
S3-T5	UNT to Little Muncy Creek	118.8	Lycoming	Jordan	Intermittent	CWF, MF	EV, MF	Wild Trout Waters	1.19	§102.14(d)(2)(ii)
S2-T5	Little Muncy Creek	118.8	Lycoming	Jordan	Perennial	CWF, MF	EV, MF	Wild Trout Waters		
S7-T6	UNT to Little Muncy Creek	118.8	Lycoming	Jordan	Perennial	CWF, MF	EV, MF	Wild Trout Waters		
S1-T5	UNT to Buck Run	119.1	Lycoming	Jordan	Intermittent	CWF, MF	EV, MF	Wild Trout Waters	0.19	§102.14(d)(2)(ii)
S3-T3	Buck Run	119.2	Lycoming	Jordan	Perennial	CWF, MF	EV, MF	Wild Trout Waters	0.63	§102.14(d)(2)(ii)
S2-T2	UNT to Little Muncy Creek	119.6	Lycoming	Jordan	Perennial	CWF, MF	EV, MF	Wild Trout Waters	0.76	§102.14(d)(2)(ii)
S4-T2	UNT to Little Muncy Creek	119.6	Lycoming	Jordan	Perennial	CWF, MF	EV, MF	Wild Trout Waters		
S7-T2	UNT to Little Muncy Creek	119.6	Lycoming	Jordan	Intermittent	CWF, MF	EV, MF	Wild Trout Waters		
S3-T1	UNT to West Branch Little Muncy Creek	120.2	Lycoming	Jordan	Perennial	CWF, MF	EV, MF	Wild Trout Waters	1.35	§102.14(d)(2)(ii)
S1-T1	West Branch Little Muncy Creek	120.2	Lycoming	Jordan	Perennial	CWF, MF	EV, MF	Wild Trout Waters		
S2-T1	UNT to West Branch Little Muncy Creek	120.2	Lycoming	Jordan	Perennial	CWF, MF	EV, MF	Wild Trout Waters		

Table 4. Compressor Station 607 Riparian Buffer Summary									
Waterbody ID[a]	**Waterbody Name**	**County**	**Township**	**Stream Type**	**State Water Quality Use Classification - Designated Use**	**State Water Quality Use Classification - Existing Use**	**State Fishery Classification[d]**	**Delineated Riparian Buffer Acreage within LOD (acres)**	**25 PA Code Waiver/Exception**
S1-T2-CS607 A	UNT to Lick Branch	Luzerne	Fairmount	Intermittent	HQ-CWF, MF	-	Wild Trout Waters, Class A Wild Trout Waters	1.06	§102.14(d)(2)(iv)
S1-T2-CS607 A	UNT to Lick Branch	Luzerne	Fairmount	Intermittent	HQ-CWF, MF	-	Wild Trout Waters, Class A Wild Trout Waters	0.24	§102.14(d)(2)(vi)

Table 4. Compressor Station 620 Riparian Buffer Summary									
Waterbody ID[a]	**Waterbody Name**	**County**	**Township**	**Stream Type**	**State Water Quality Use Classification - Designated Use**	**State Water Quality Use Classification - Existing Use**	**State Fishery Classification[d]**	**Delineated Riparian Buffer Acreage within LOD (acres)**	**25 PA Code Waiver/Exception**
S2-T2-CS620 A	UNT to Deep Creek	Schuylkill	Hegins	Intermittent	CWF, MF	-	Stocked Trout Waters	0.06	§102.14(d)(2)(iv)

Key
HQ: High Quality
EV: Exceptional Value
CWF: Cold Water Fishes
MF: Migratory Fishes

ATTACHMENT 2
WETLAND AND RIPARIAN REFORESTATION PLAN

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT

ONSITE WETLAND AND RIPARIAN REFORESTATION PLAN

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(REVISED May 2020)

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D Planting Details *(Revised May 2020)*

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT

ONSITE WETLAND AND RIPARIAN REFORESTATION PLAN

1.0 PROJECT OVERVIEW

On behalf of Transcontinental Gas Pipe Line Company, LLC (Transco), a subsidiary of The Williams Companies, Inc. (Williams), WHM Consulting, Inc. has prepared an onsite restoration and planting plan for the pipeline facilities associated with the Leidy South Project (Project) located in Clinton and Lycoming Counties. This plan addresses the replanting of trees and shrubs associated with temporarily impacted forested riparian buffers and to Palustrine Forested (PFO) and Palustrine Scrub-Shrub (PSS) wetlands along the pipeline Right-of-Way (ROW). Tree and shrub plantings will take place outside of the permanent maintained ROW.

2.0 FORESTED AND SCRUB-SHRUB WETLANDS

Restoration of temporarily impacted wetlands associated with PFO and PSS wetlands will involve onsite replanting. After the completion of construction, wetland areas within the ROW will be restored to pre-construction contours and seeded with Ernst FACW Meadow Mix (ERNMX-122), as outlined in Attachment A, or an alternative wetland seed mix that contains similar species. After seeding, impacted PSS and PFO wetlands outside the permanent maintained ROW will be replanted with native live stakes, bare root or container tree and shrub species up to 5 feet from the pipeline centerline. In PFO impacted wetlands, only shrub species shall be planted from 5 to 15 feet of the pipeline centerline. Outside 15 feet, tree species may be planted. A summary table outlining proposed PFO and PSS impacted wetlands, their location, and proposed restoration is outlined in Attachment C – Onsite Wetland and Riparian Buffer Replanting Table. In addition, replanting areas for each pipeline facility are outlined on the provided figures.

The vegetative design of the PFO and PSS impacted wetlands outlines a combination of specific native tree and shrub species selected for different hydrologic regimes and different vegetative cover types throughout the Project. Trees and shrubs selected for the replanting were based on species identified during wetland delineations and area outlined in Table 2-1.

TABLE 2-1 - WETLAND REPLANTING SPECIES LIST

COMMON NAME	LATIN NAME	WETLAND INDICATOR	STRATUM
Black Willow	*Salix nigra*	OBL	Tree
Silver Maple	*Acer saccharinum*	FACW	Tree
River Birch	*Betula nigra*	FACW	Tree
Red Maple	*Acer rubrum*	FAC	Tree
Black Gum	*Nyssa sylvatica*	FAC	Tree
American sycamore	*Platanus occidentalis*	FACW	Tree
Quaking Aspen	*Populus tremuloides*	FAC (EMP)	Tree
Smooth Alder	*Alnus serrulata*	OBL	Shrub
Silky Dogwood	*Cornus amomum*	FACW	Shrub
Common Ninebark	*Physocarpus opulifolius*	FACW	Shrub

Highbush Blueberry	*Vaccinium corymbosum*	FACW	Shrub
Winterberry	*Ilex verticillata*	FACW	Shrub
Red Chokeberry	*Aronia arbutifolia*	FACW	Shrub
Northern Spicebush	*Lindera benzoin*	FAC (EMP)	Shrub
Pussy Willow	*Salix discolor*	FACW	Shrub

3.0 FORESTED RIPARIAN BUFFERS

Temporarily impacted riparian buffers (150' from each watercourse) will involve onsite replanting. After the completion of construction, riparian buffers within the ROW will be restored to pre-construction contours and revegetated with Ernst Riparian Buffer Mix (ERNMX-178), as outlined in Attachment B, or an alternative riparian seed mix that contains similar species. Impacted forested riparian buffers outside the permanent maintained ROW will be replanted with native live stakes, bare root or container tree and shrub species up to 5 feet from the pipeline centerline. Only shrub species shall be planted from 5 to 15 feet of the pipeline centerline. Outside 15 feet, both tree and shrub species may be planted. A summary table outlining proposed forested riparian buffer impact areas, their location, and proposed restoration is outlined in Attachment C – Onsite Wetland and Riparian Buffer Replanting Table. In addition, replanting areas for each pipeline facility are outlined on the provided figures.

The vegetative design of the forested riparian buffers outlines a combination of specific native tree and shrub species selected for different hydrologic regimes and different vegetative cover types throughout the Project. Trees and shrubs selected for the project were selected based on the Department of Environmental Protection's Riparian Forest Buffer Guidance, document number 394-5600-001 and observations of woody vegetation within riparian buffers during field surveys. The trees and shrubs selected for forested riparian buffer replanting are in Table 3-1 below:

TABLE 3-1 - RIPARIAN BUFFER REPLANTING SPECIES LIST			
COMMON NAME	**LATIN NAME**	**WETLAND INDICATOR**	**STRATUM**
Black Willow	*Salix nigra*	OBL	Tree
Silver Maple	*Acer saccharinum*	FACW	Tree
American Sycamore	*Platanus occidentalis*	FACW	Tree
River Birch	*Betula nigra*	FACW	Tree
Red Maple	*Acer rubrum*	FAC	Tree
Black Gum	*Nyssa sylvatica*	FAC	Tree
Tuliptree	*Liriodendron tulipifera*	FACU	Tree
Bigtooth Aspen	*Populus grandidentata*	FACU	Tree
White Pine	*Pinus strobus*	FACU	Tree
Eastern Hemlock	*Tsuga canadensis*	FACU	Tree
Smooth Alder	*Alnus serrulata*	OBL	Shrub/Small Tree
Speckled Alder	*Alnus incana*	FACU	Shrub/Small Tree
American Hornbeam	*Carpinus caroliniana*	FAC	Shrub/Small Tree
Silky Dogwood	*Cornus amomum*	FACW	Shrub
Common Ninebark	*Physocarpus opulifolius*	FACW	Shrub

Highbush Blueberry	*Vaccinium corymbosum*	FACW	Shrub
Rosebay Rhododendron	*Rhododendron maximum*	FAC	Shrub
American Hazelnut	*Corylus americana*	FACU	Shrub
Mountain Laurel	*Kalmia latifolia*	FACU	Shrub
Southern Arrowwood	*Viburnum recognitum*	FAC	Shrub

4.0 METHOD OF PLANTING

All plants shall be installed according to acceptable standards of the trade under the supervision of a landscape professional with suitable practical field experience in pipeline replanting projects. A qualified professional with documented experience shall oversee the replanting effort. Minor changes to the plan that will not adversely affect the overall success of the site or changes which enhance the success of the site may be implemented during the project without consultation. Any plan deviations will be documented in the as-built reporting.

All plant materials shall be nursery grown and shall be guaranteed to be true to name and healthy upon delivery. During planting operations, the contractor shall keep the trees and shrubs out of direct sunlight and maintain moisture on the roots to ensure that the roots don't dry out prior to planting. Trees and shrubs shall be planted by digging a hole twice the size of the width of the rootball down into the substrate at the point of installation. If the plant is in a plastic container, this shall be carefully removed to keep the rootball intact. After planting, the area will be backfilled and watered. Trees may be provided with support stakes or tree or shrub shelters. Shelters will only be placed on those plants suitable for shelters. Care shall be taken when installing support stakes or tree shelters to ensure that the root ball is not disturbed when driving the support stake into the soil. Fertilizer tablets may be placed in the backfilled soil to help the growth of the planted trees and shrubs.

5.0 PLANT DENSITY AND PLACEMENT

All plants will be planted in clumps of monocultures consisting of three to six plants of the species. All plants will be planted in a clumped distribution of monoculture blocks of individual species. Monocultures will be planted randomly with spacing of approximately 8.0 feet on center for shrubs and small trees species and 12.0 feet on center for tree species. Trees and shrubs will be planted at a density of 435 stems per acre. No tree plantings are to take place within 15' of the pipeline or between existing utilities. Typical planting details are included within Attachment D.

6.0 WILDLIFE DAMAGE CONTROL

After planting of the site has been completed, tree and shrub shelters shall be installed for those plants suitable for shelters. If deemed necessary, other methods of wildlife damage control may include the application of rodenticide to each tree/shrub or installing bait boxes for meadow vole control.

7.0 AS-BUILT DOCUMENTATION AND MONITORING PLAN

As-built documentation for the planting shall occur as the planting is completed. Thereafter, monitoring of the onsite wetland and riparian buffers replanting areas shall take

place annually for five years after planting to determine the success of the replanting areas. During the monitoring, the survival of trees and shrubs will be counted and documented. Any threats to the riparian buffers will be documented and remedial measures will be recommended. Photographs will be taken at representative crossings to document the success of the replanting areas. The as built documentation and monitoring reports will include, at a minimum, the following information:

a) Dates of inspection and names of inspectors;

b) Photographic Documentation;

c) Hydrology indicators (wetlands);

d) Vegetation data

   a. percent coverage of native hydrophytic species (wetlands);

   b. inventory of plant species; and,

   c. stem count survival.

e) Identification of any problems that need required remedial measures.

8.0 PERFORMANCE STANDARDS

Performance standards have been established for the onsite replanting areas. These standards will be used to determine the success of the replanting effort. By monitoring the site as proposed in the monitoring plan and comparing results to the performance standards, a determination of success can be evaluated. The performance standards are as follows:

- Planted trees and shrubs shall meet 85% survival throughout the 5-year monitoring period.

If the performance standards have not been achieved, appropriate remedial actions, as outlined in the adaptive management plan must take place to ensure the success of the site. A vegetative analysis must continue on a yearly basis until the performance standards or goals have been met. In the situations where the buffer planting is not successful, the monitoring report must include a discussion of remedial measures to correct the deficiencies.

REFERENCES

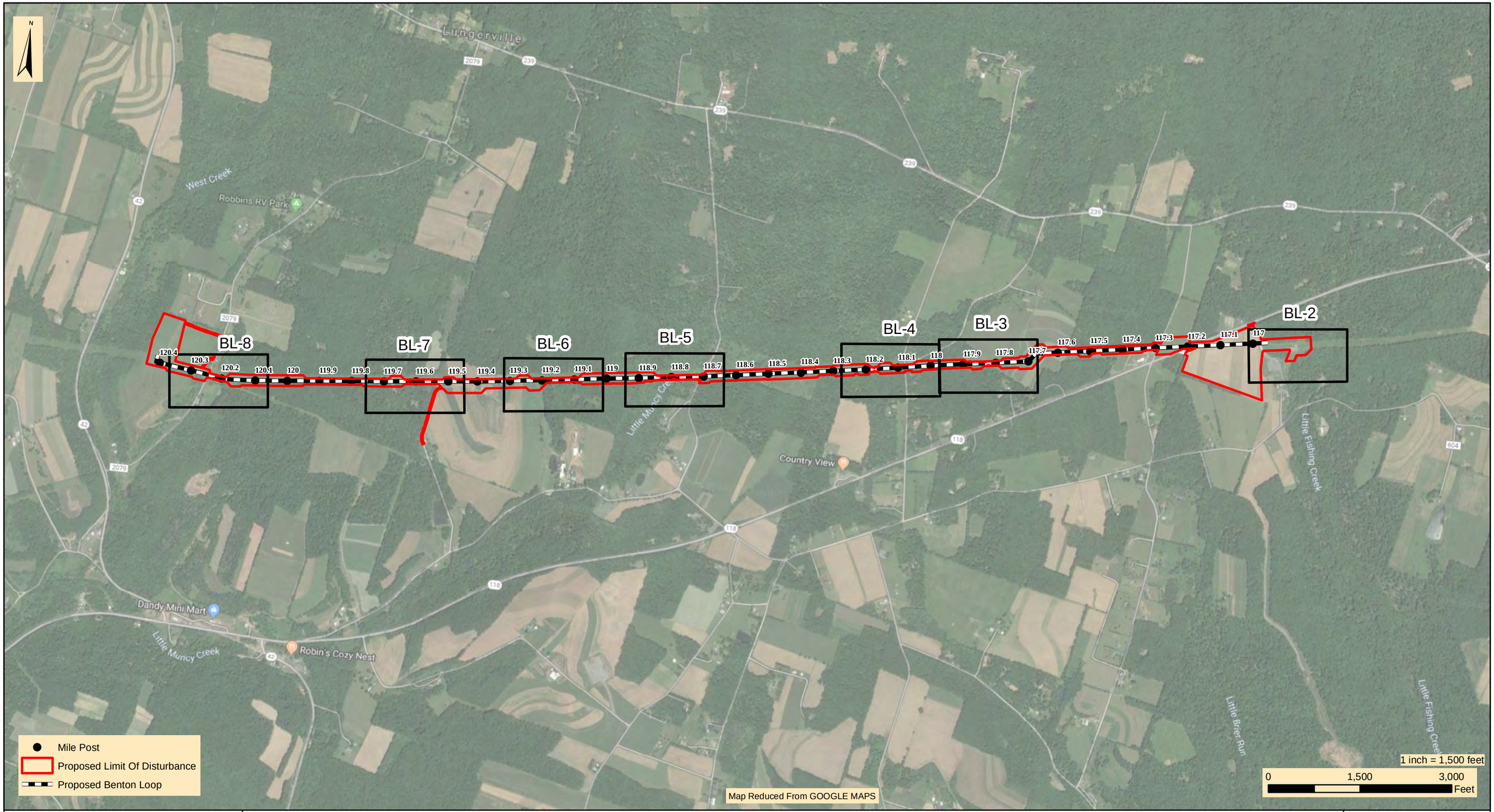
Pennsylvania Department of Environmental Protection Bureau of Watershed Management. 2010. Riparian Forest Buffer Guidance. Document number 394-5600-001. Pennsylvania Department of Environmental Protection. Harrisburg, PA.

U.S. Army Corps of Engineers. 2016. National Wetland Plant List, version 3.3. http://wetland_plants.usace.army.mil/ US Army Corps of Engineers Engineer Research and Development Center Cold Regions Research and Engineering Laboratory, Hanover, NH.

WHM Consulting, Inc. 2019. *Leidy South Project - Wetland and Watercourse Delineation Report.* State College, PA. August, 2019.

FIGURES

BENTON LOOP



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WETLAND AND RIPARIAN REFORESTATION PLAN

MAP KEY

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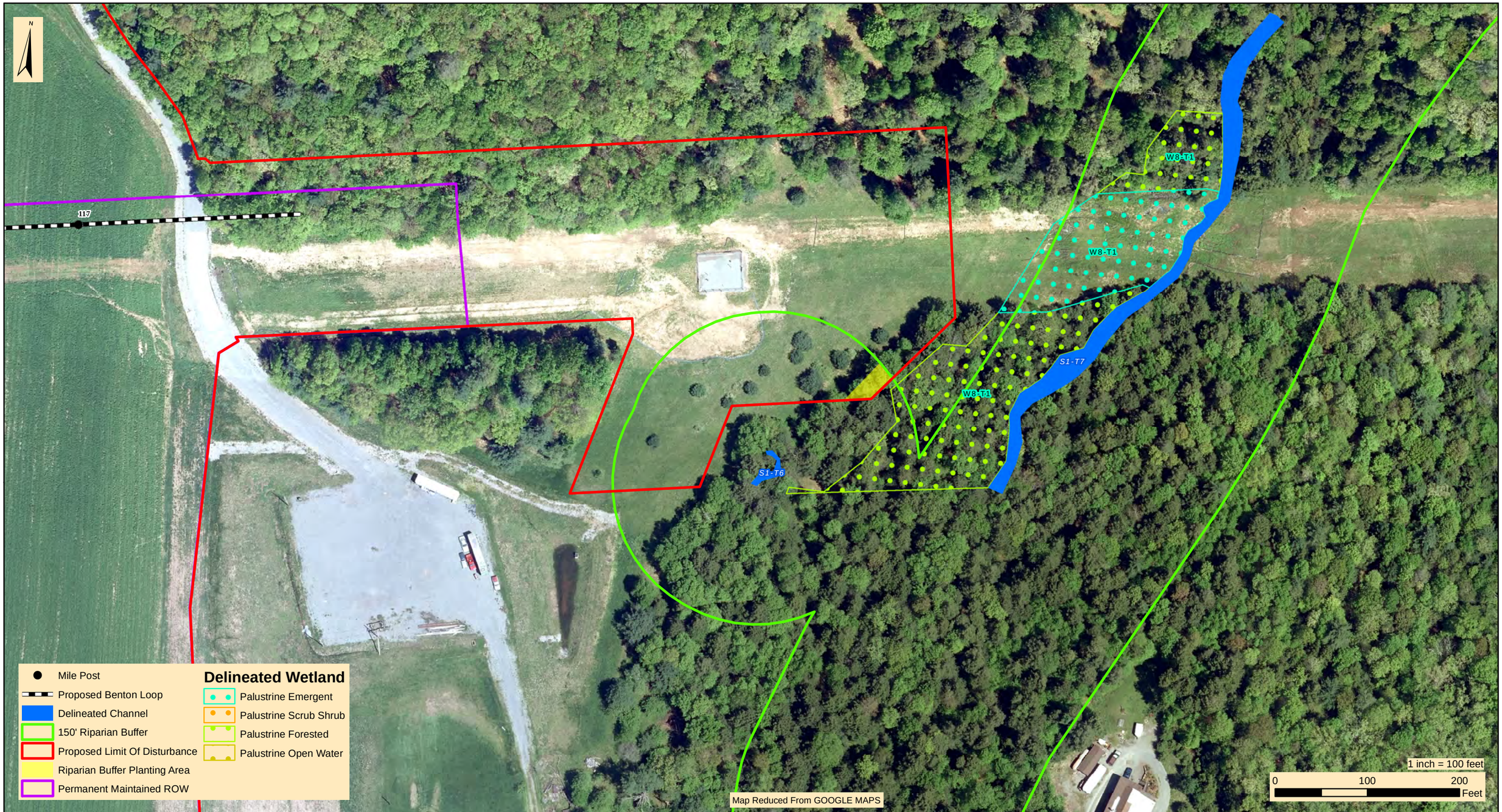

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RESOURCE CROSSING 1 (RP-1)

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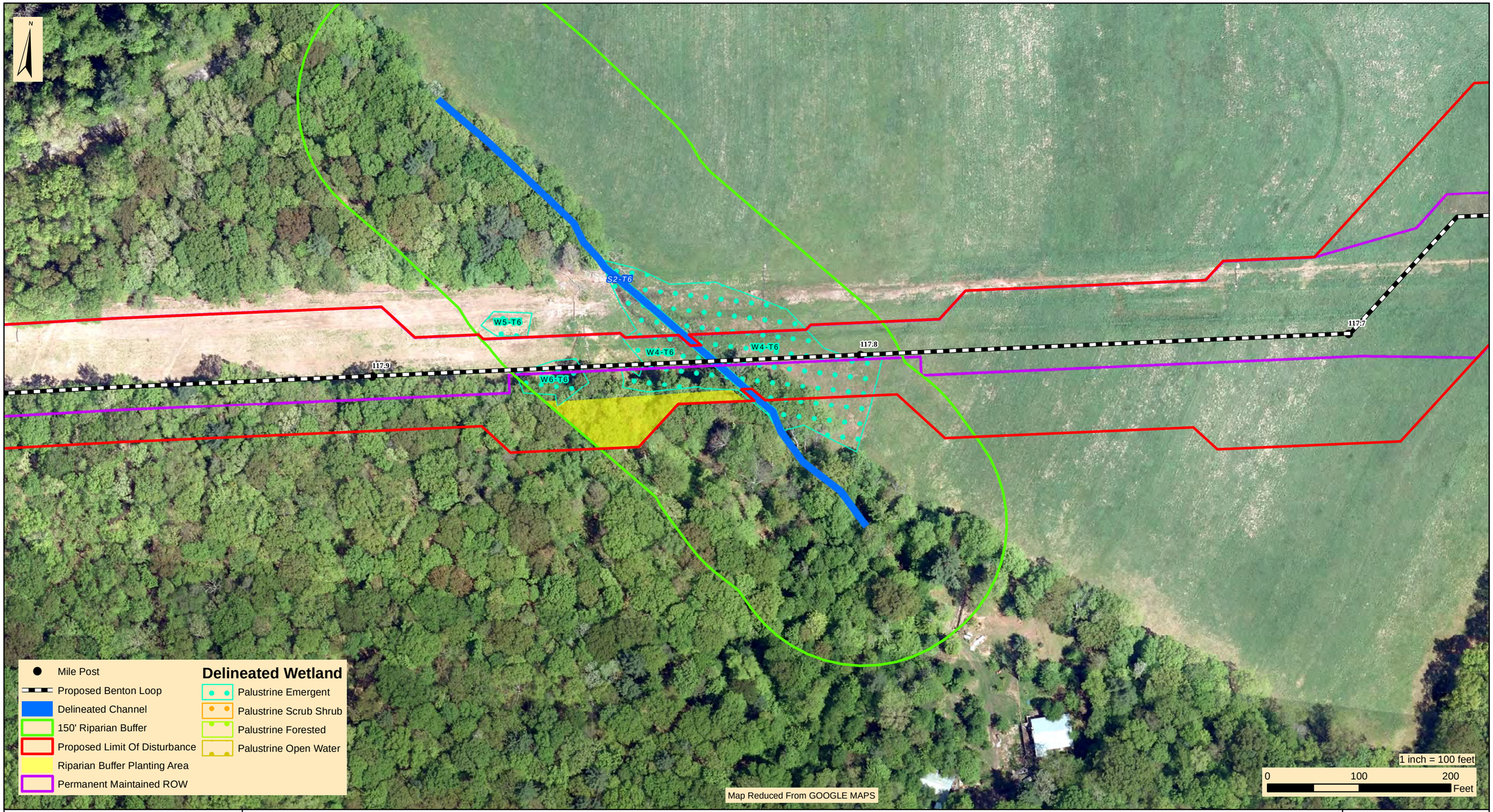

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RESOURCE CROSSING 2 (BL-3)

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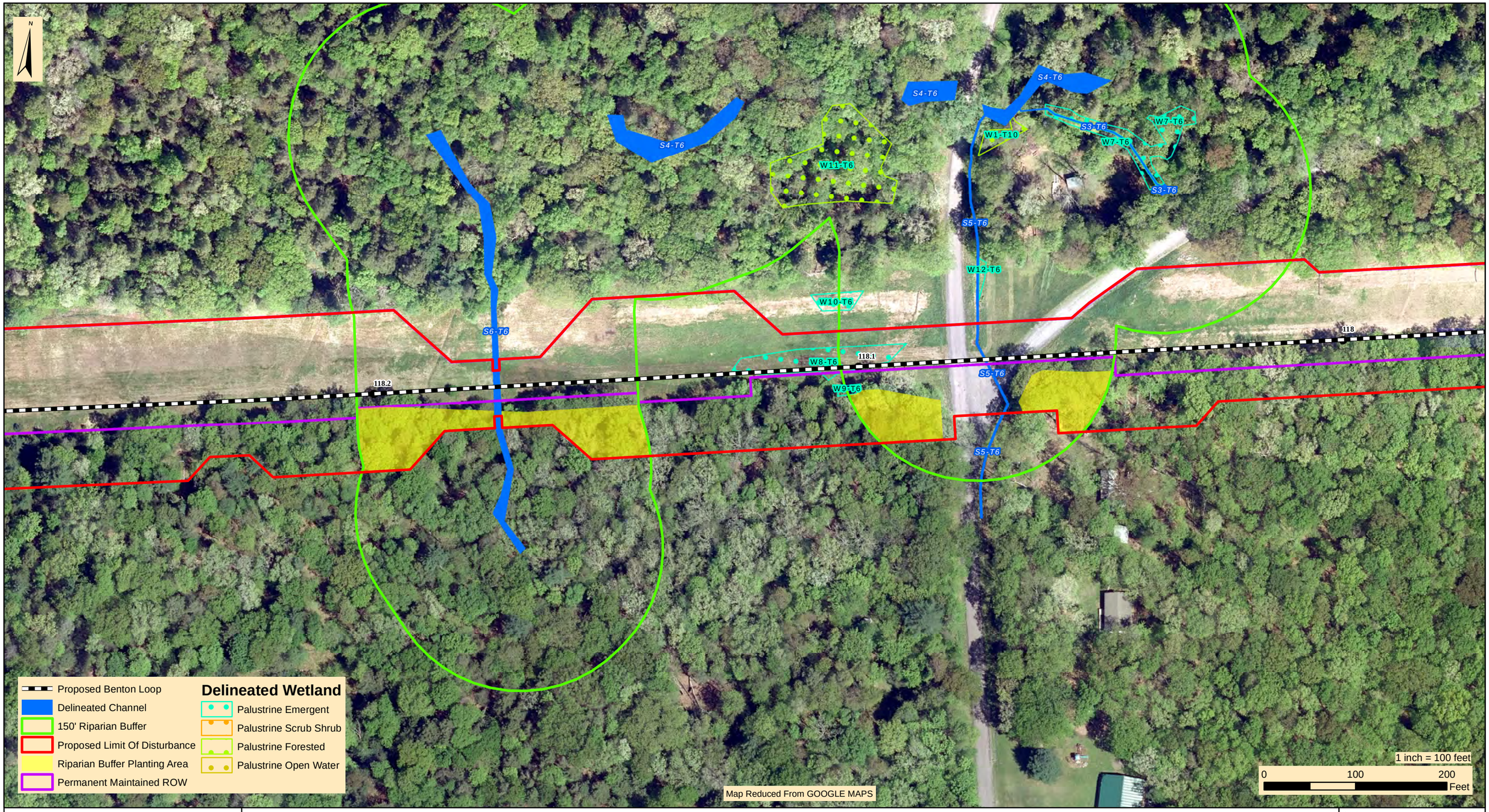

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RESOURCE CROSSING 3 (BL-4, BL-6)

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RESOURCE CROSSING 4 (BL-7)

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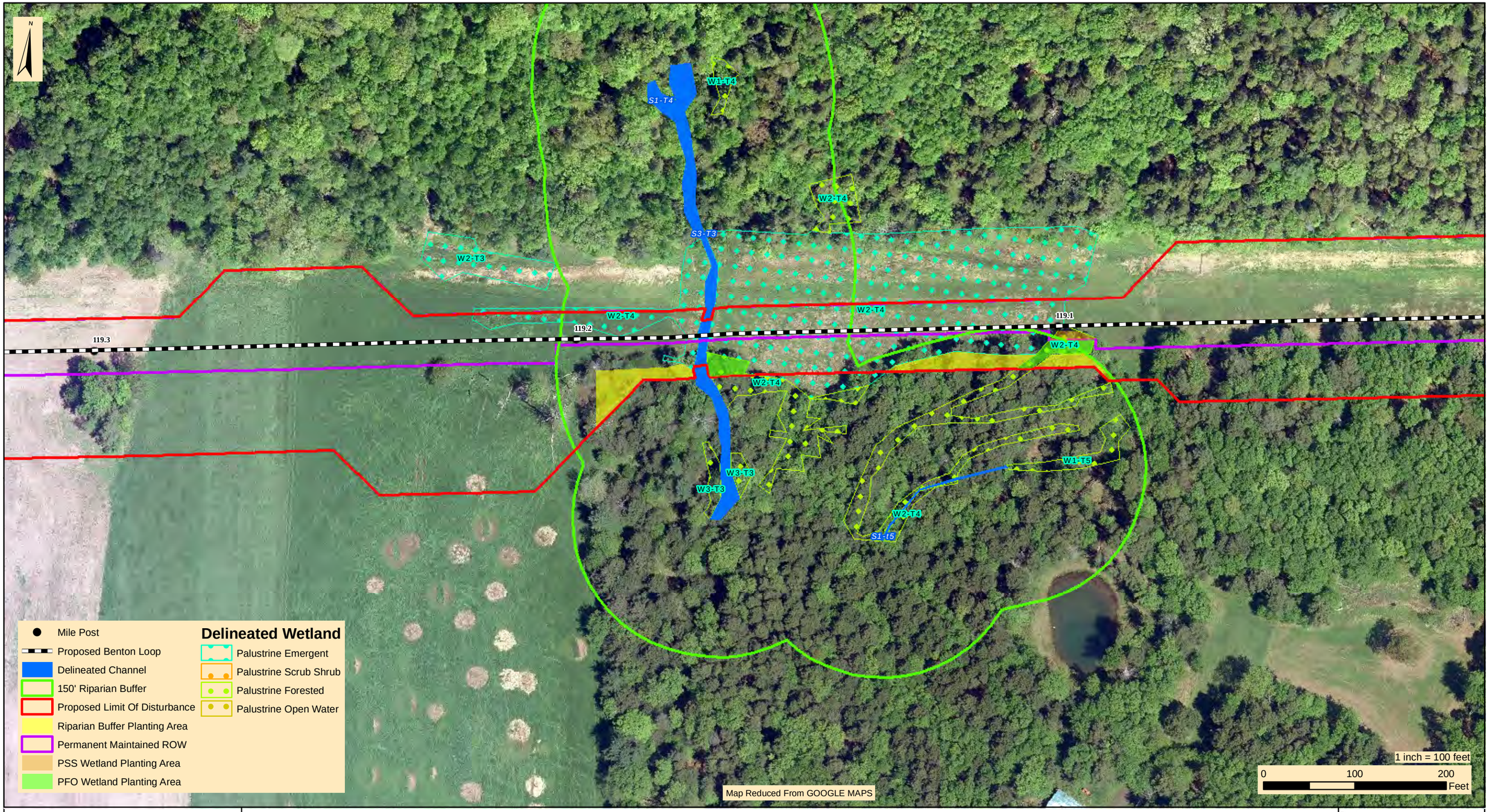

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RESOURCE CROSSING 5 (BL-8)

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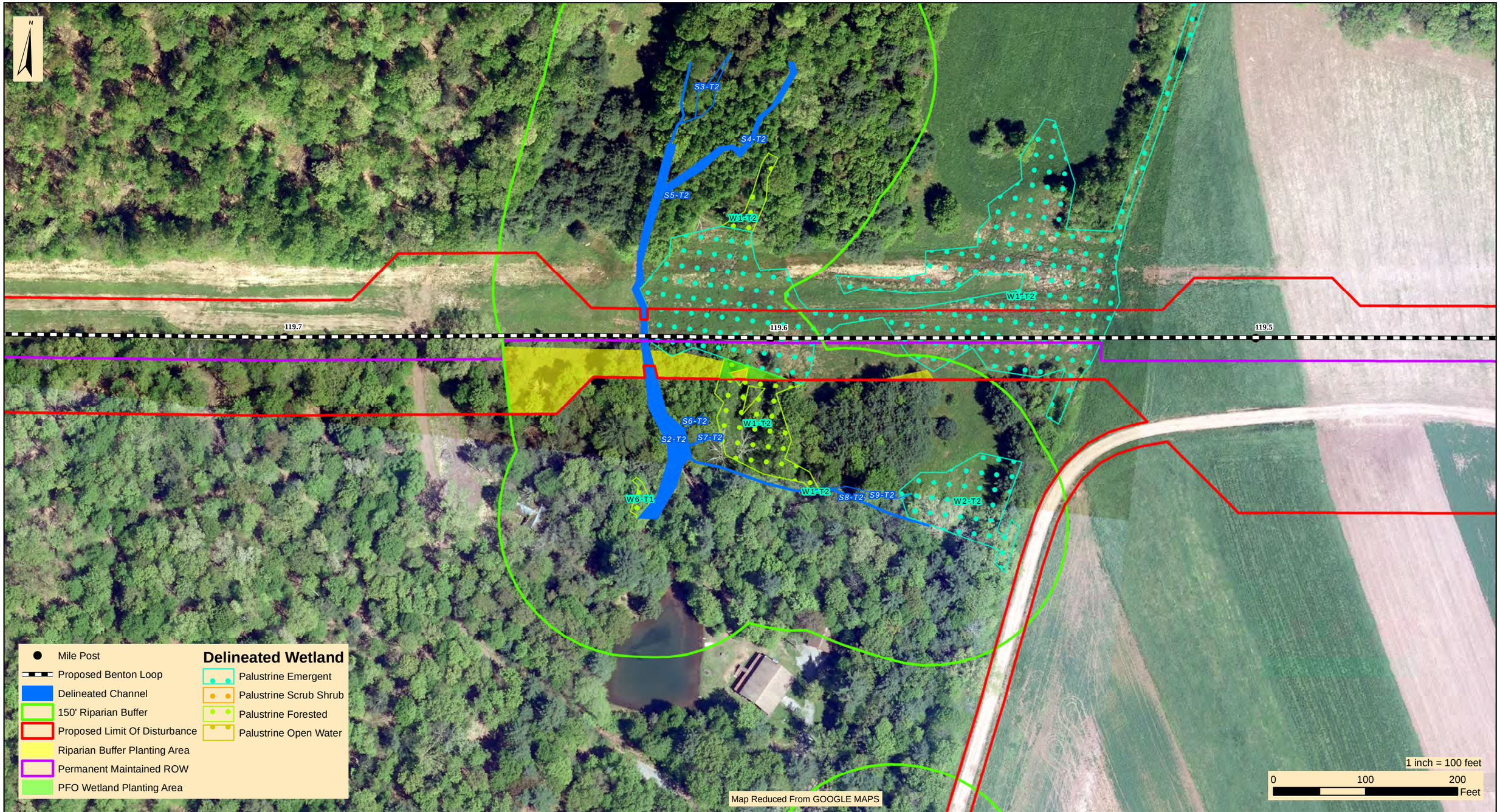

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RESOURCE CROSSING 6 (BL-9)

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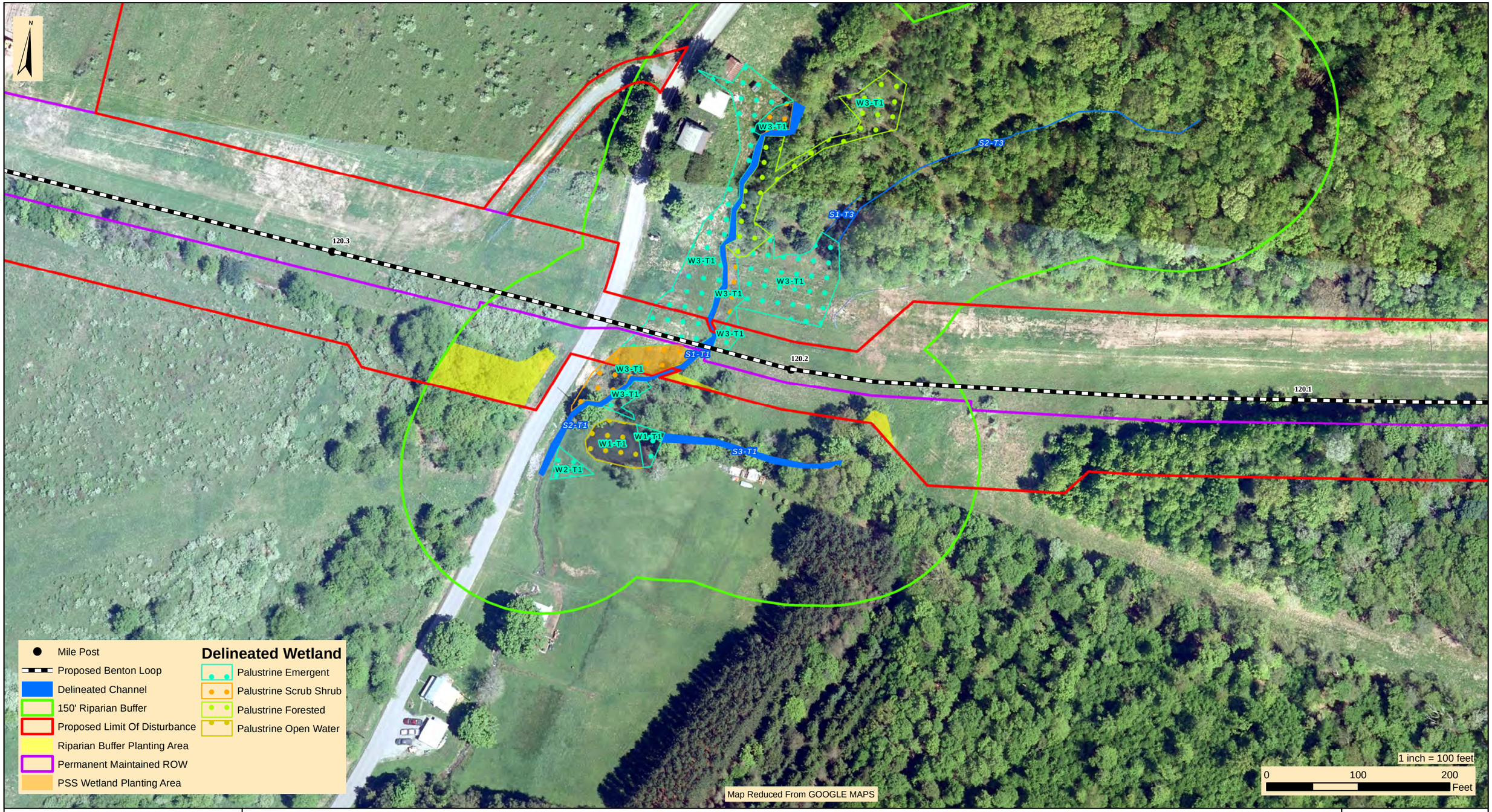

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RESOURCE CROSSING 7 (BL-10)

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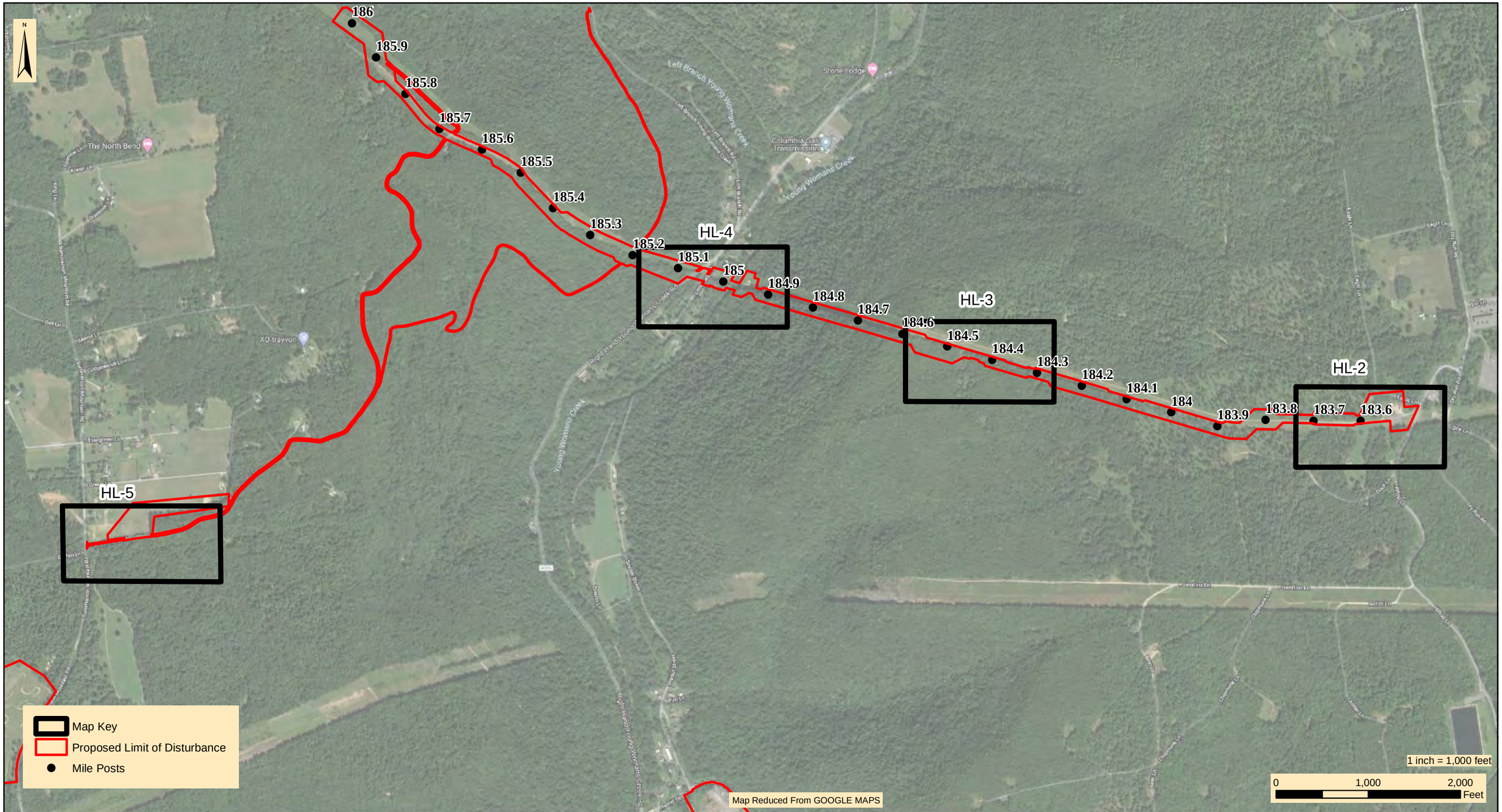
HILLTOP LOOP



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LEIDY SOUTH PROJECT - HILLTOP LOOP
WETLAND AND RIPARIAN REFORESTATION PLAN

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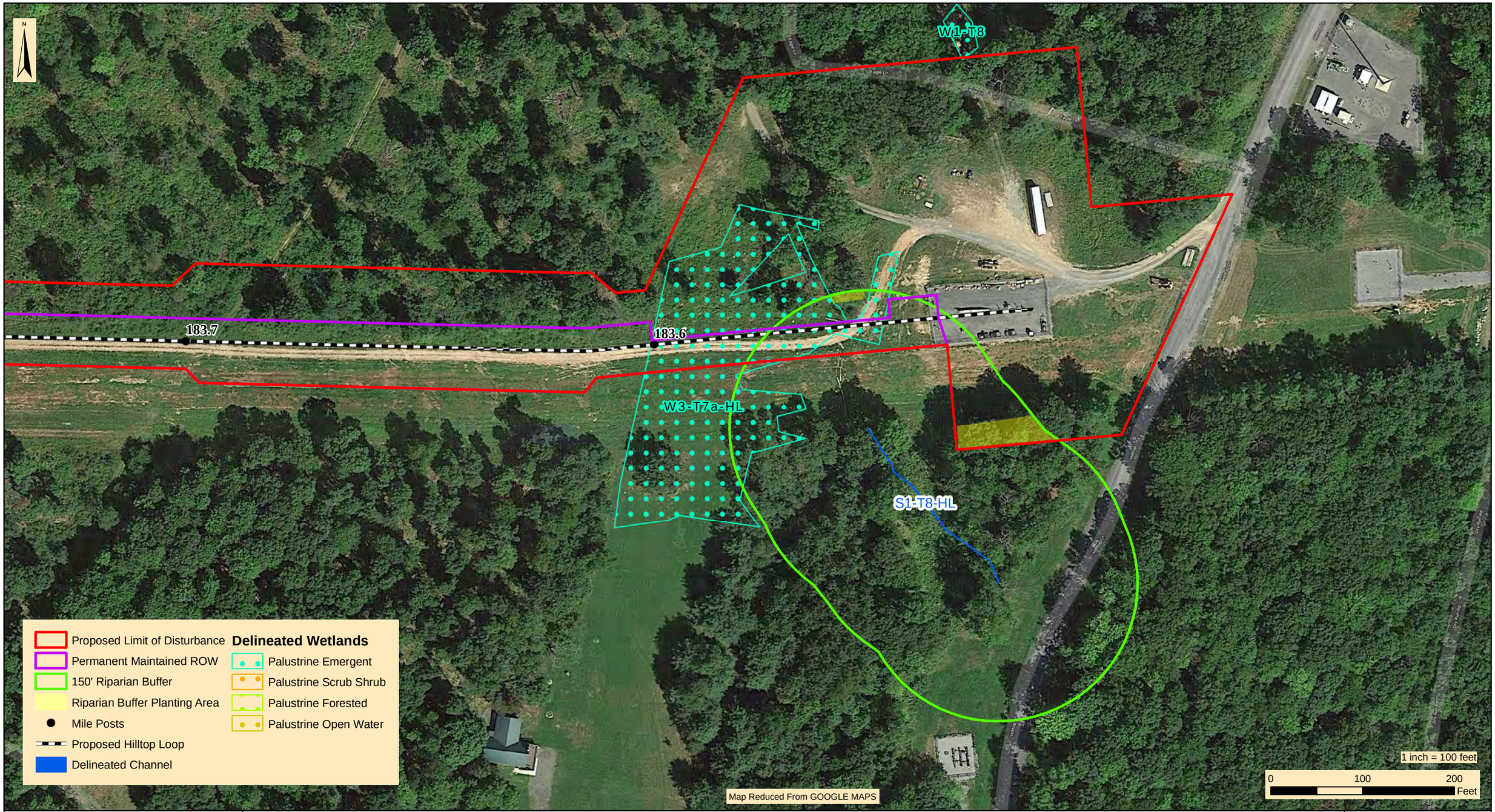

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RESOURCE CROSSING - 1 (RP-1)

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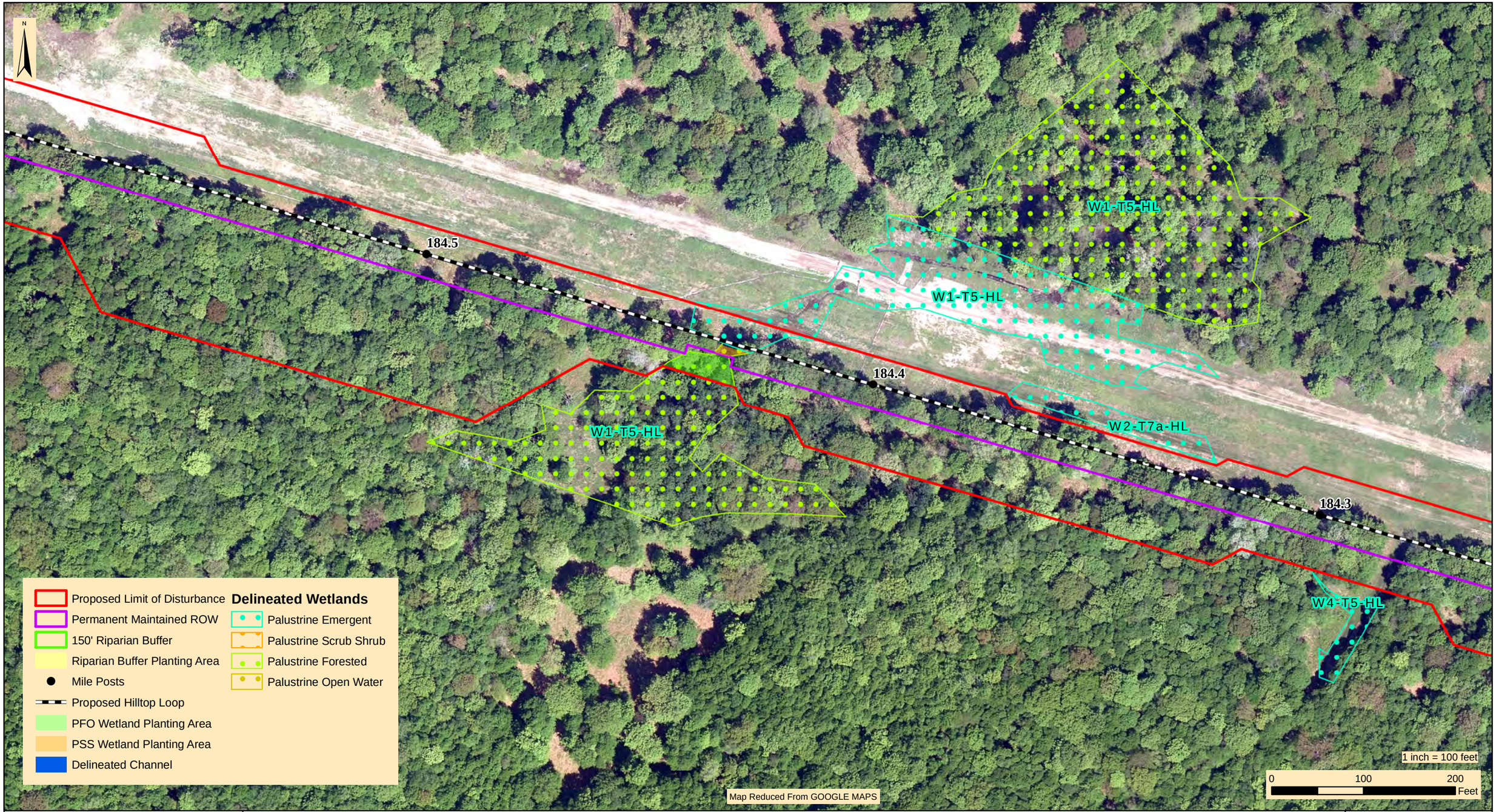

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RESOURCE CROSSING - 2 (HL-2)

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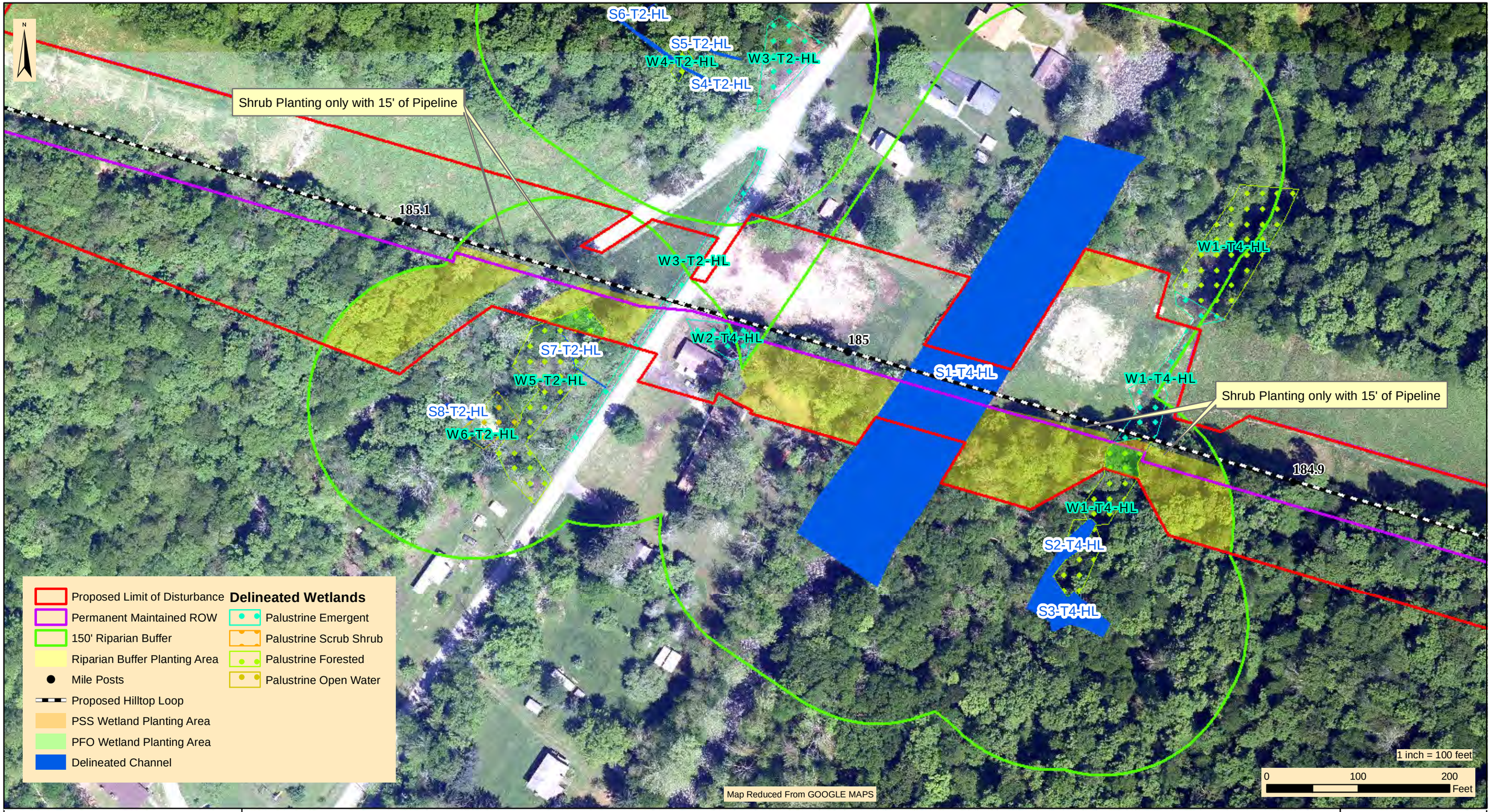

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RESOURCE CROSSING - 4 (RP-2)

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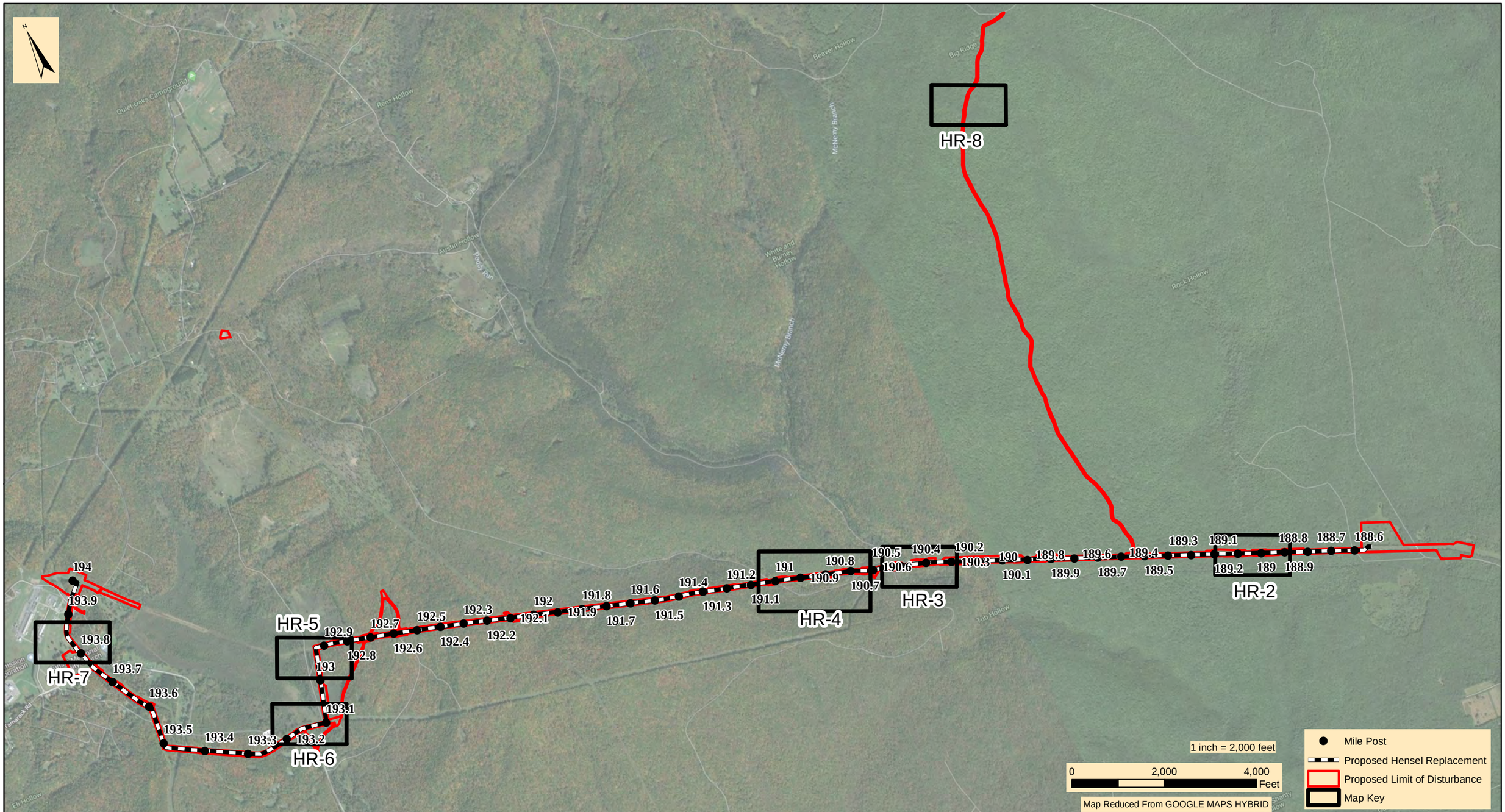
HENSEL REPLACEMENT



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LEIDY SOUTH PROJECT- HENSEL REPLACEMENT
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WETLAND AND RIPARIAN REFORESTATION PLAN

RESOURCE CROSSING - 1 (HR-1)

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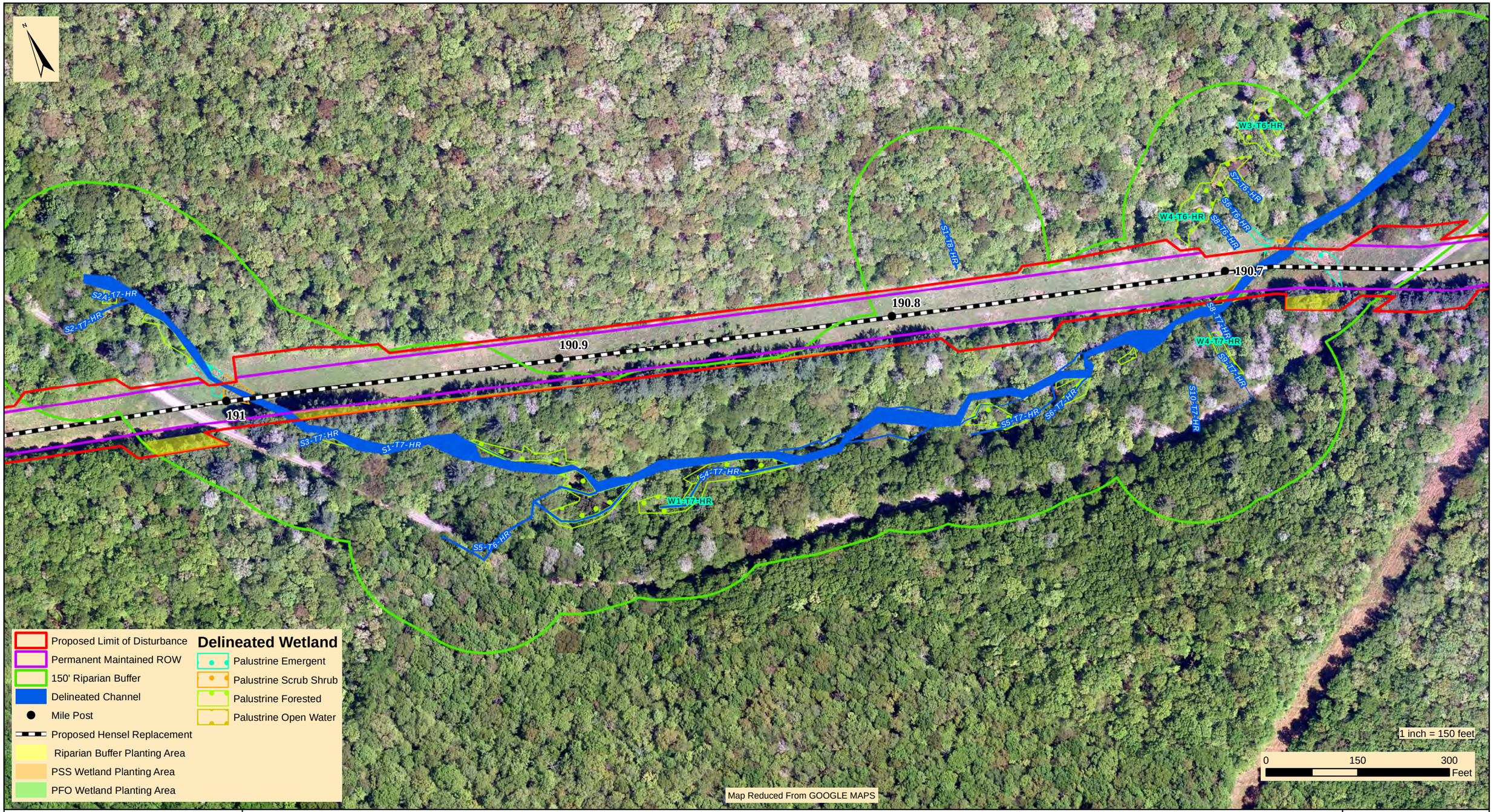
RESOURCE CROSSING - 2 (HR-3)

CHAPMAN TOWNSHIP | CLINTON COUNTY | PENNSYLVANIA

Date:	08/15/19
WHM DRAWING NUMBER:	WILLIAMS200B003-HR
Drawn By:	PJF
Figure Number:	HR-3



WHM designs, permits, resolutions | consulting, INC.
2525 Green Tech Drive, Suite B,
State College, PA 16803
Tele: 814.689.1650 Fax: 814.689.1557

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

LEIDY SOUTH PROJECT- HENSEL REPLACEMENT
WETLAND AND RIPARIAN REFORESTATION PLAN

RESOURCE CROSSING - 3 (HR-5 and HR-7)

LEIDY TOWNSHIP | CLINTON COUNTY | PENNSYLVANIA

Date:	08/15/19
WHM DRAWING NUMBER:	WILLIAMS200B004-HR
Drawn By:	PJF
Figure Number:	HR-4

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

LEIDY SOUTH PROJECT- HENSEL REPLACEMENT
WETLAND AND RIPARIAN REFORESTATION PLAN

RESOURCE CROSSING - 4 (HR-8)

LEIDY TOWNSHIP | CLINTON COUNTY | PENNSYLVANIA

Date:	08/15/19
WHM DRAWING NUMBER:	WILLIAMS200B005-HR
Drawn By:	PJF
Figure Number:	HR-5

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WETLAND AND RIPARIAN REFORESTATION PLAN

RESOURCE CROSSING - **5** (HR-9)

LEIDY TOWNSHIP | CLINTON COUNTY | PENNSYLVANIA

Date:	08/15/19
WHM DRAWING NUMBER:	WILLIAMS200B006-HR
Drawn By:	PJF
Figure Number:	HR-6

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LEIDY SOUTH PROJECT- HENSEL REPLACEMENT
WETLAND AND RIPARIAN REFORESTATION PLAN

RESOURCE CROSSING -6 (RP-1)

LEIDY TOWNSHIP | CLINTON COUNTY | PENNSYLVANIA

Date:	08/15/19
WHM DRAWING NUMBER:	WILLIAMS200B007-HR
Drawn By:	PJF
Figure Number:	HR-7

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State College, PA 16803
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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

LEIDY SOUTH PROJECT- HENSEL REPLACEMENT
WETLAND AND RIPARIAN REFORESTATION PLAN

RESOURCE CROSSING - 7 (AR-2)

LEIDY TOWNSHIP | CLINTON COUNTY | PENNSYLVANIA

Date:	08/15/19
WHM DRAWING NUMBER:	WILLIAMS200B008-HR
Drawn By:	DMW
Figure Number:	HR-8

ATTACHMENT A

ERNST – FACW MEADOW MIX (ERNMX-122)

Ernst Conservation Seeds
8884 Mercer Pike
Meadville, PA 16335
(800) 873-3321 Fax (814) 336-5191
www.ernstseed.com

Date: April 04, 2018

FACW Meadow Mix - ERNMX-122

	Botanical Name	Common Name	Price/lb
32.00 %	*Carex vulpinoidea, PA Ecotype*	Fox Sedge, PA Ecotype	24.00
20.00 %	*Elymus virginicus, PA Ecotype*	Virginia Wildrye, PA Ecotype	9.65
14.00 %	*Carex lurida, PA Ecotype*	Lurid (Shallow) Sedge, PA Ecotype	64.00
10.00 %	*Carex lupulina, PA Ecotype*	Hop Sedge, PA Ecotype	72.00
6.30 %	*Carex scoparia, PA Ecotype*	Blunt Broom Sedge, PA Ecotype	72.00
3.00 %	*Juncus effusus*	Soft Rush	40.00
2.00 %	*Aster puniceus, PA Ecotype*	Purplestem Aster, PA Ecotype	320.00
2.00 %	*Heliopsis helianthoides, PA Ecotype*	Oxeye Sunflower, PA Ecotype	42.00
2.00 %	*Verbena hastata, PA Ecotype*	Blue Vervain, PA Ecotype	32.00
1.50 %	*Asclepias incarnata, PA Ecotype*	Swamp Milkweed, PA Ecotype	240.00
1.00 %	*Aster umbellatus, PA Ecotype*	Flat Topped White Aster, PA Ecotype	320.00
1.00 %	*Eupatorium perfoliatum, PA Ecotype*	Boneset, PA Ecotype	300.00
1.00 %	*Onoclea sensibilis*	Sensitive Fern	108.00
0.50 %	*Alisma subcordatum, PA Ecotype*	Mud Plantain (Water Plantain), PA Ecotype	160.00
0.50 %	*Carex intumescens, PA Ecotype*	Bladder Sedge, PA Ecotype	128.00
0.50 %	*Cinna arundinacea, PA Ecotype*	Wood Reedgrass, PA Ecotype	120.00
0.50 %	*Juncus tenuis, PA Ecotype*	Path Rush, PA Ecotype	66.00
0.50 %	*Scirpus cyperinus, PA Ecotype*	Woolgrass, PA Ecotype	180.00
0.50 %	*Zizia aurea, PA Ecotype*	Golden Alexanders, PA Ecotype	240.00
0.30 %	*Eupatorium fistulosum, PA Ecotype*	Joe Pye Weed, PA Ecotype	228.00
0.30 %	*Penthorum sedoides, PA Ecotype*	Ditch Stonecrop, PA Ecotype	240.00
0.20 %	*Chelone glabra, PA Ecotype*	Turtlehead, PA Ecotype	600.00
0.20 %	*Ludwigia alternifolia, PA Ecotype*	Seedbox, PA Ecotype	180.00
0.20 %	*Mimulus ringens, PA Ecotype*	Square Stemmed Monkeyflower, PA Ecotype	260.00
100.00 %		**Mix Price/lb Bulk:**	**$58.22**

Seeding Rate: 20 lb per acre, or 1/2 lb per 1,000 sq ft

Wet Meadows & Wetlands

The diverse species provide pollinator habitat and erosion control in wet meadows. Excellent for facultative wetland mitigation sites. Mix formulations are subject to change without notice depending on the availability of existing and new products. While the formula may change, the guiding philosophy and function of the mix will not.

Price quotes guaranteed for 30 days.
All prices are FOB Meadville, PA.
Please check our web site at www.ernstseed.com
for current pricing when placing orders.

ATTACHMENT B

ERNST – RIPARAIN BUFFER MIX (ERNMX-178)

Ernst Conservation Seeds
8884 Mercer Pike
Meadville, PA 16335
(800) 873-3321 Fax (814) 336-5191
www.ernstseed.com

Date: February 06, 2018

Riparian Buffer Mix - ERNMX-178

	Botanical Name	Common Name	Price/lb
30.00 %	*Panicum clandestinum, 'Tioga'*	Deertongue, 'Tioga'	17.09
16.00 %	*Sorghastrum nutans, PA Ecotype*	Indiangrass, PA Ecotype	12.62
15.00 %	*Elymus riparius, PA Ecotype*	Riverbank Wildrye, PA Ecotype	7.44
10.00 %	*Andropogon gerardii, 'Niagara'*	Big Bluestem, 'Niagara'	12.25
7.00 %	*Panicum virgatum, 'Carthage', NC Ecotype*	Switchgrass, 'Carthage', NC Ecotype	5.17
3.00 %	*Chamaecrista fasciculata, PA Ecotype*	Partridge Pea, PA Ecotype	10.00
3.00 %	*Rudbeckia hirta, Coastal Plain NC Ecotype*	Blackeyed Susan, Coastal Plain NC Ecotype	20.00
3.00 %	*Verbena hastata, PA Ecotype*	Blue Vervain, PA Ecotype	32.00
2.00 %	*Asclepias incarnata, PA Ecotype*	Swamp Milkweed, PA Ecotype	240.00
2.00 %	*Heliopsis helianthoides, PA Ecotype*	Oxeye Sunflower, PA Ecotype	42.00
2.00 %	*Juncus effusus*	Soft Rush	40.00
2.00 %	*Juncus tenuis, PA Ecotype*	Path Rush, PA Ecotype	66.00
1.50 %	*Aster puniceus, PA Ecotype*	Purplestem Aster, PA Ecotype	320.00
1.00 %	*Eupatorium perfoliatum, PA Ecotype*	Boneset, PA Ecotype	300.00
0.80 %	*Vernonia noveboracensis, PA Ecotype*	New York Ironweed, PA Ecotype	220.00
0.50 %	*Aster novae-angliae, PA Ecotype*	New England Aster, PA Ecotype	360.00
0.50 %	*Eupatorium fistulosum, PA Ecotype*	Joe Pye Weed, PA Ecotype	228.00
0.50 %	*Monarda fistulosa, Fort Indiantown Gap-PA Ecotype*	Wild Bergamot, Fort Indiantown Gap-PA Ecotype	160.00
0.20 %	*Pycnanthemum tenuifolium*	Narrowleaf Mountainmint	140.00
100.00 %		**Mix Price/lb Bulk:**	**$33.05**

Seeding Rate: 20 lb per acre with a cover crop at 30 lb per acre (dry sites - grain oats, Jan 1-Aug 1; or, grain rye, Aug 1-Jan 1; moist sites - grain rye year-round)

Riparian Sites

A diverse mix of upland and wetland grasses, forbs and shrubs with extensive wildlife and pollinator value. Provides food and cover for many of our songbirds, pheasants, deer and turkey. Mix formulations are subject to change without notice depending on the availability of existing and new products. While the formula may change, the guiding philosophy and function of the mix will not.

Price quotes guaranteed for 30 days.
All prices are FOB Meadville, PA.
Please check our web site at www.ernstseed.com
for current pricing when placing orders.

ATTACHMENT C

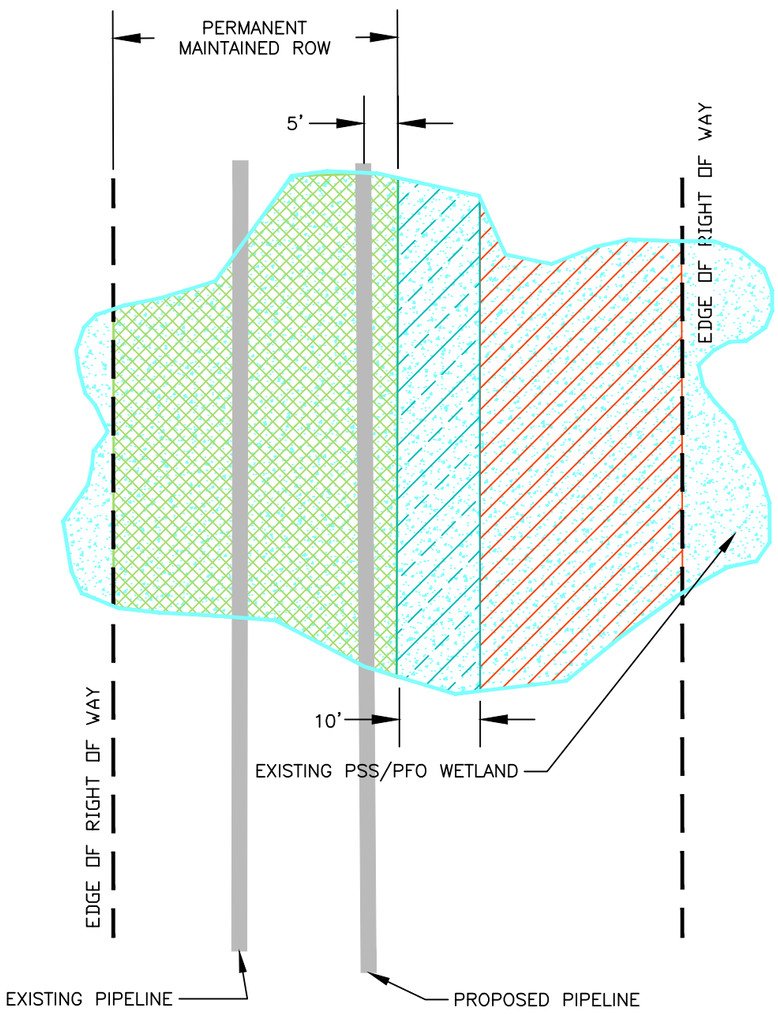
ONSITE WETLAND AND RIPARIAN BUFFER REPLANTING TABLE

ATTACHMENT C
Onsite Wetland and Riparian Buffer Replanting Table

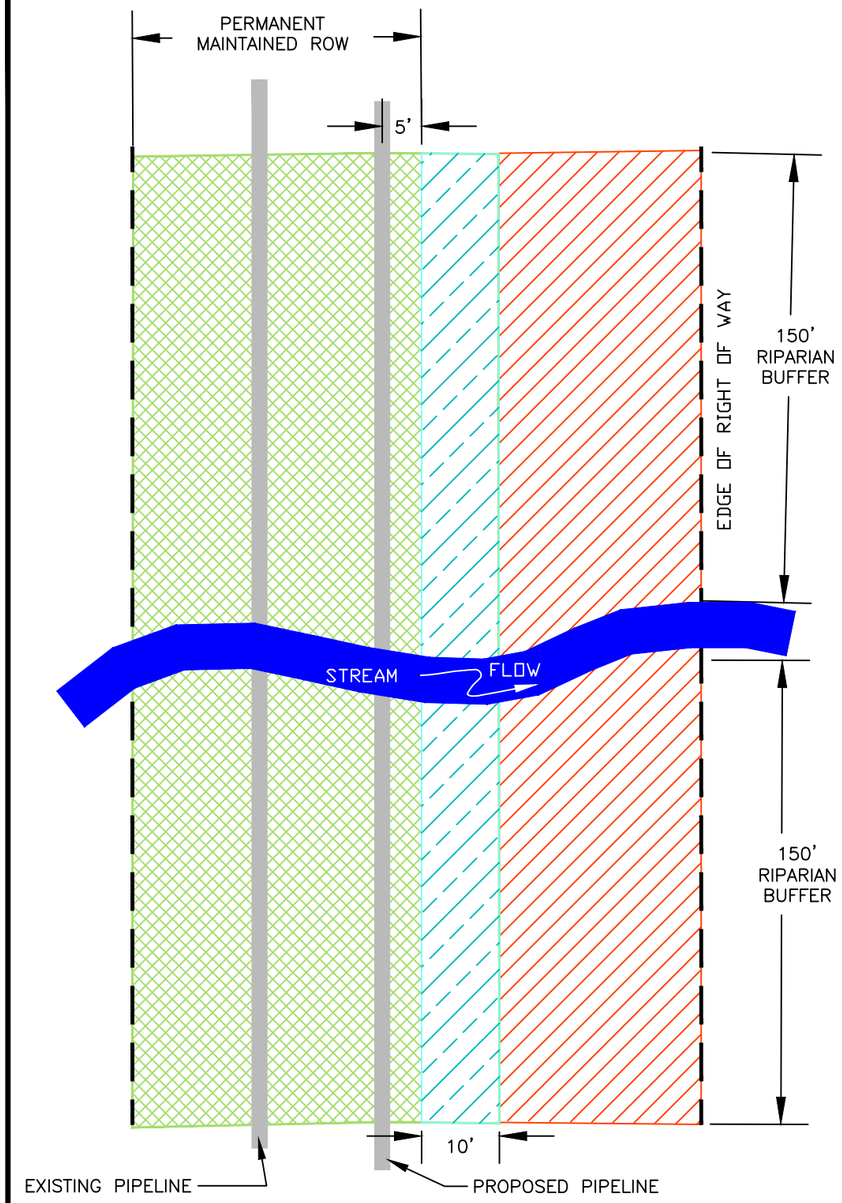
Pipeline Facility	Crossing Number	Mile Post	Feature ID	Type	Replanting Area (sq.ft.)	Replanting Area (acres)
Benton Loop	RP-1	117.0	S1-T6	RIPARIAN	939	0.02
	BL-3	117.8	S2-T6	RIPARIAN	6,251	0.14
	BL-4	118.1	S5-T6	RIPARIAN	9,387	0.22
	BL-6	118.2	S6-T6	RIPARIAN	12,585	0.29
	BL-7	118.7	W16-T6	PFO	2,991	0.07
	BL-7	118.7	S9-T6, S10-T6	RIPARIAN	5,724	0.13
	BL-7	118.8	W4-T5	PFO	326	0.01
	BL-7	118.8	S2-T5, S3-T5	RIPARIAN	13,246	0.30
	BL-8	119.1	W2-T4	PFO	2,026	0.05
	BL-8	119.1	W2-T4	PFO to PSS	388	0.01
	BL-8	119.1	S1-T5	RIPARIAN	3,247	0.07
	BL-8	119.1	S3-T3	RIPARIAN	2,761	0.06
	BL-9	119.6	W1-T2	PFO	728	0.02
	BL-9	119.6	S2-T2, S9-T2	RIPARIAN	9,988	0.23
	BL-10	120.2	W3-T1	PSS	2,101	0.05
	BL-10	120.2	S1-T1, S3-T1	RIPARIAN	6,558	0.15
				PSS Replanting Area	**2,101**	**0.05**
				PFO Replanting Area	**6,071**	**0.14**
				PFO to PSS Conversion Area	**388**	**0.01**
				Forested Riparian Replanting Area	**70,686**	**1.62**
Hilltop Loop	RP-1	183.6	S1-T8-HL	RIPARIAN	2,925	0.07
	HL-2	184.4	W1-T5-HL	PFO	1,638	0.04
	HL-2	184.4	W1-T5-HL	PFO to PSS	240	0.01
	HL-3	184.9	W1-T4-HL	PFO	1,124	0.03
	HL-3	184.9	W1-T4-HL	PFO to PSS	269	0.01
	HL-3	184.9	S2-T4-HL	RIPARIAN	6,661	0.15
	HL-3	185.0	W5-T2-HL	PFO	1,017	0.02
	HL-3	185.0	S1-T4-HL	RIPARIAN	35,434	0.81
	HL-3	185.1	S7-T2-HL, S8-T2-HL	RIPARIAN	17,143	0.39
	RP-2		S1-T2-HL	RIPARIAN	969	0.02
				PFO Replanting Area	**3,779**	**0.09**
				PFO to PSS Conversion Area	**509**	**0.01**
				Forested Riparian Replanting Area	**62,163**	**1.43**
Hensel Replacement	HR-1	189	S12-T6-HR	RIPARIAN	4,067	0.09
	HR-3	190.3	S9-T6-HR	RIPARIAN	814	0.02
	HR-3	190.5	S7-T7-HR	RIPARIAN	2,509	0.06
	HR-3	190.5	W8-T6-HR	PSS	110	0.00
	HR-5	190.7	S1-T7-HR	RIPARIAN	2,367	0.05
	HR-5	190.7	W1-T7-HR	PFO to PSS	200	0.00
	HR-5	190.7	W1-T7-HR	PFO	271	0.01
	HR-7	191	S1-T7-HR	RIPARIAN	5,523	0.13
	HR-8	193.0	W4-T5-HR	PSS	4,182	0.10
	HR-8	193.0	S2-T5-HR	RIPARIAN	673	0.02
	HR-9	193.1	W4-T5-HR	PFO	1,694	0.04
	HR-9	193.1	W4-T5-HR	PSS	10,491	0.24
	HR-9	193.1	W4-T5-HR	PFO to PSS	432	0.01
	HR-9	193.1	S1-T5-HR, S2-T7a-HR	RIPARIAN	10,758	0.25
	RP-1	193.9	S1-T1-HR	RIPARIAN	3,023	0.07
	AR-2		W5-T7a-HR, W6-T7a-HR	PFO	1,989	0.05
				PSS Replanting Area	**14,783**	**0.34**
				PFO Replanting Area	**3,954**	**0.05**
				PFO to PSS Conversion Area	**632**	**0.01**
				Forested Riparian Replanting Area	**29,734**	**0.68**

ATTACHMENT D

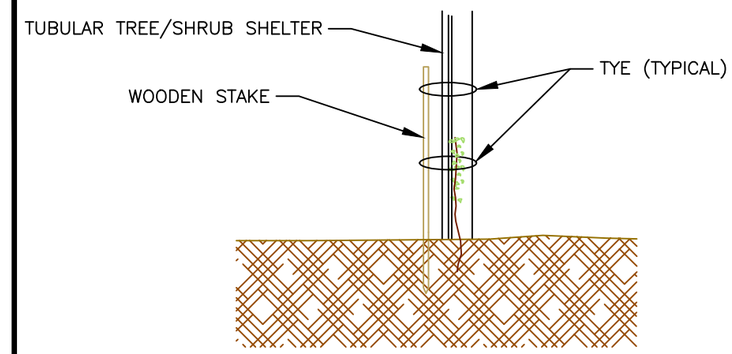
PLANTING DETAILS



TYPICAL PSS / PFO REPLANTING DETAIL
NOT TO SCALE

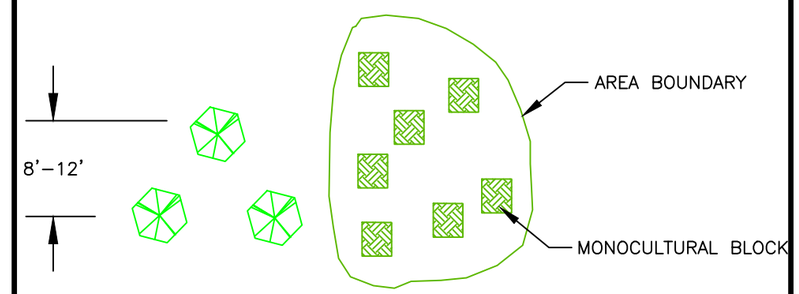


TYPICAL RIPARIAN REPLANTING DETAIL
NOT TO SCALE



NOTE: TREE/SHRUB SHELTERS ARE TO BE MADE FROM BIODEGRADABLE PLASTIC TUBING. SIZE OF SHELTERS AND WOODEN STAKE TO BE DETERMINED BY PROJECT MANAGER.

TYPICAL TREE / SHRUB SHELTER DETAIL
NOT TO SCALE



PLAN VIEW – RANDOMLY SPACED MONOCULTURAL PLANTING BLOCKS
PLANT SPACING WITHIN MONOCULTURAL BLOCKS

1. TYPICAL SPACING IS APPROXIMATE. PLANTS SHOULD BE LOCATED RANDOMLY TO AVOID THE APPEARANCE OF ORGANIZED ROWS WITHIN THE MONOCULTURAL PLANTING BLOCKS.
2. TREES AND SHRUBS ARE TO BE PLANTED IN THE PLANTING ZONES IDENTIFIED IN THE PLANTING SCHEDULE. MONOCULTURAL BLOCKS SHOULD CONTAIN 3–6 PLANTS IN SHRUB AND TREE ZONES. MONOCULTURAL BLOCKS SHOULD BE APPROXIMATELY 20' BY 20' IN SIZE, OR AS DIRECTED OR MODIFIED BY THE CONSTRUCTION MANAGER.

TYPICAL PLANT SPACING DETAIL
NOT TO SCALE

* ALL PLANTINGS ARE TO BE PLANTED AND MAINTAINED IN ACCORDANCE WITH NURSERY RECOMMENDATIONS FOR THE FERTILIZER, LIME, SOIL AMENDMENTS, WATER, AND WILDLIFE PROTECTION. WEEKLY INSPECTION, WATERING AS NEEDED, AND OTHER NECESSARY CARE SHOULD BE PROVIDED DURING THE FIRST WEEKS OF THE GROWING SEASON UNTIL SUCCESSFUL TRANSPLANTATION IS EVIDENT.

LEGEND
- TREE / SHRUB REPLANTING AREA
- SHRUB REPLANTING AREA
- WETLAND / RIPARIAN SEED MIX ONLY

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
1.	04–21–20	FTN	UPDATE TO SHOW SHRUBS FROM 15'			

WHM consulting, INC.
designs, permits, resolutions
2525 GREEN TECH DRIVE, SUITE B
STATE COLLEGE, PA 16803
TELEPHONE: (814)–689–1650 FAX: (814)–689–1557

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

LEIDY SOUTH PROJECT
WETLAND AND RIPARIAN REFORESTATION PLAN

REPLANTING DETAILS

LYCOMING AND CLINTON COUNTY PENNSYLVANIA

DATE: 08/08/19
DRAWN BY: KMC
CHECKED: PF
DRAWING NO. WILLIAMS186B001
SHEET NO. ATTACHMENT D

Transcontinental Gas Pipe Line Company, LLC

Section 1-8

PNDI Receipts and Correspondences

Leidy South Project

August 2019
(Revised May 2020)

PNDI RECEIPT

1. PROJECT INFORMATION

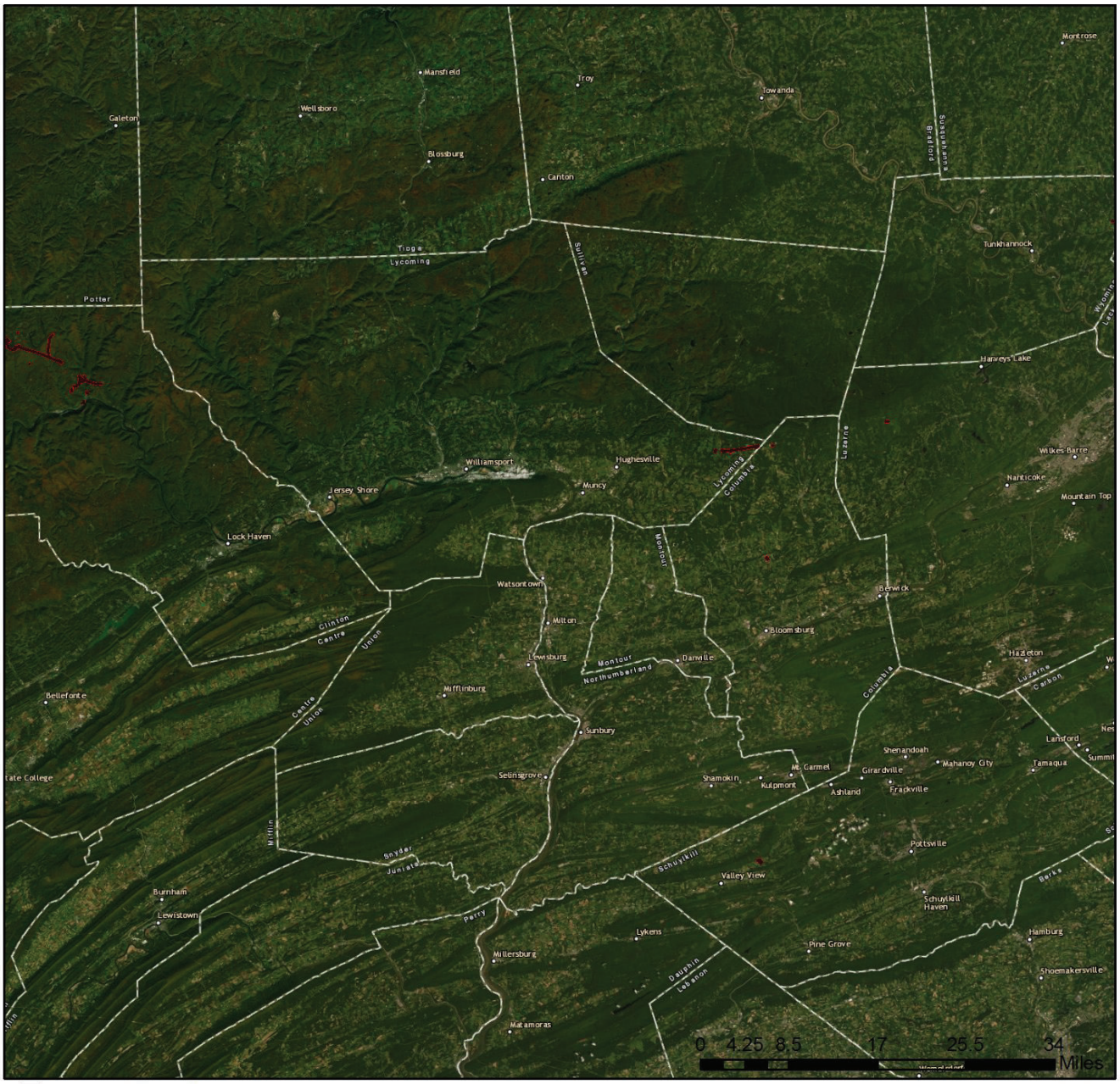
Project Name: **Leidy South Project**
Date of Review: **5/7/2020 03:48:25 PM**
Project Category: **Energy Storage, Production, and Transfer, Energy Transfer, Other**
Project Area: **407.34 acres**
County(s): **Clinton; Columbia; Luzerne; Lycoming; Schuylkill; Wyoming**
Watersheds HUC 8: **Lower Susquehanna-Penns; Lower West Branch Susquehanna; Middle West Branch Susquehanna; Upper Susquehanna-Lackawanna; Upper Susquehanna-Tunkhannock**
Watersheds HUC 12: **Beaver Run; Drury Run; Fishing Creek-Susquehanna River; Hall Run-West Branch Susquehanna River; Hans Yost Creek-Deep Creek; Headwaters Huntington Creek; Kline Hollow Run-Little Fishing Creek; Left Branch Young Womans Creek; Lower South Branch Tunkhannock Creek; Middle Kettle Creek; Mud Run-Green Creek; Paddy Run; Rattlesnake Run-West Branch Susquehanna River; West Creek; Young Womans Creek-West Branch Susquehanna River**
Decimal Degrees: **41.412205, -77.798676**
Degrees Minutes Seconds: **41° 24' 43.9387" N, 77° 47' 55.2322" W**

2. SEARCH RESULTS - LARGE PROJECT

Agency	Results	Response
PA Game Commission	**Potential Impact**	**FURTHER REVIEW IS REQUIRED, See Agency Response**
PA Department of Conservation and Natural Resources	**Potential Impact**	**FURTHER REVIEW IS REQUIRED, See Agency Response**
PA Fish and Boat Commission	**Potential Impact**	**FURTHER REVIEW IS REQUIRED, See Agency Response**
U.S. Fish and Wildlife Service	**Potential Impact**	**FURTHER REVIEW IS REQUIRED, See Agency Response**

Large Project. The project area is greater than 10 miles and/or 5,165 acres and therefore is categorized as a Large Project, and is not analyzed by the PNDI tool. Coordination is therefore required with the four jurisdictional agencies to determine if potential impacts to threatened and endangered and/or special concern species and resources within the project area. Please see the DEP Information section of the receipt if a PA Department of Environmental Protection Permit is required.

Leidy South Project

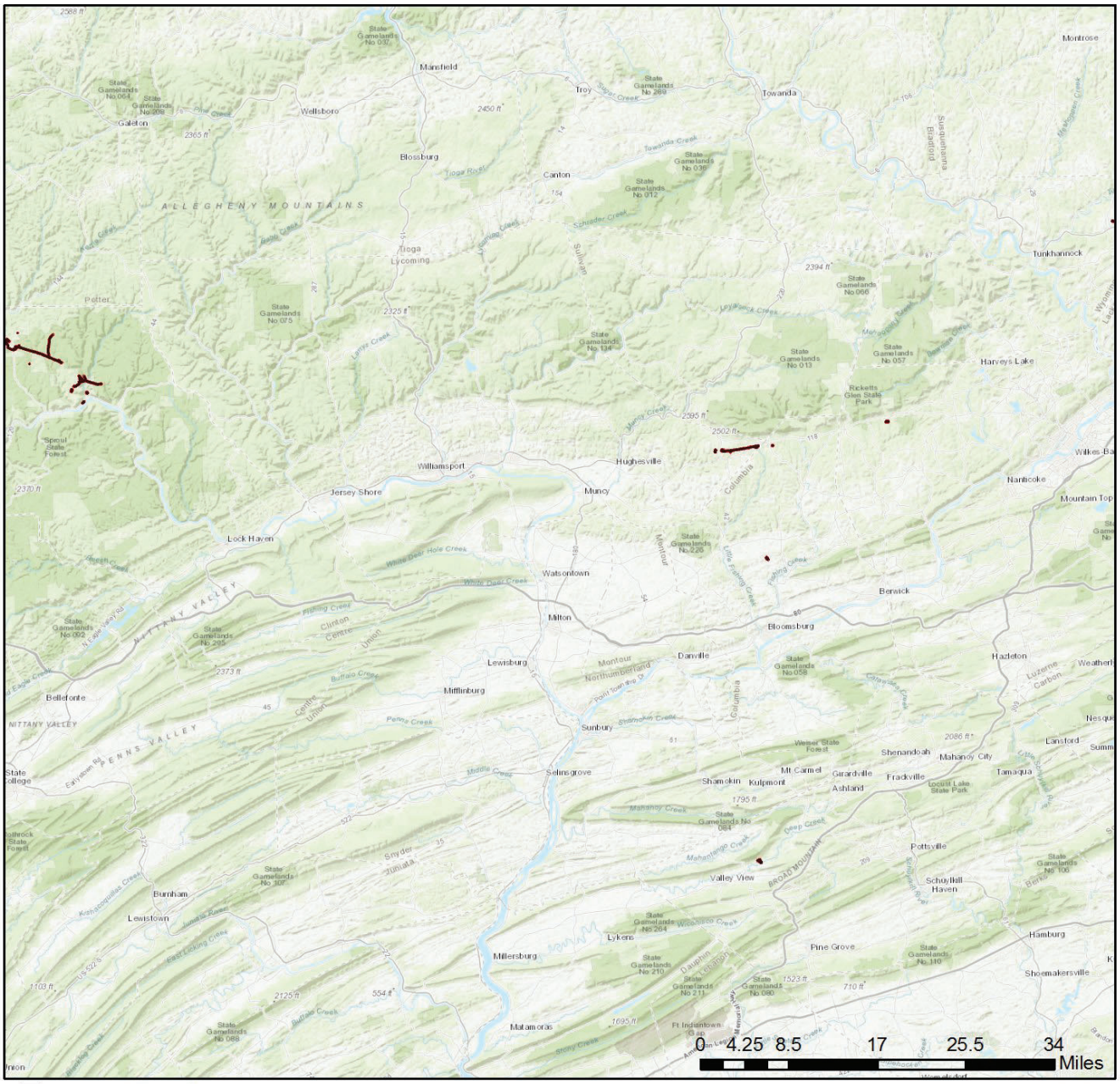


Project Boundary

Buffered Project Boundary

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community

Leidy South Project



Project Boundary

Buffered Project Boundary

Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS,

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for two years** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jursidictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission
RESPONSE:

Further review of this project is necessary to resolve the potential impact(s). Please send project information to this agency for review (see WHAT TO SEND).

PA Department of Conservation and Natural Resources
RESPONSE:

Further review of this project is necessary to resolve the potential impact(s). Please send project information to this agency for review (see WHAT TO SEND).

PA Fish and Boat Commission
RESPONSE:

Further review of this project is necessary to resolve the potential impact(s). Please send project information to this agency for review (see WHAT TO SEND).

U.S. Fish and Wildlife Service
RESPONSE:

Further review of this project is necessary to resolve the potential impact(s). Please send project information to this agency for review (see WHAT TO SEND).

WHAT TO SEND TO JURISDICTIONAL AGENCIES

If project information was requested by one or more of the agencies above, upload* or email* the following information to the agency(s). Instructions for uploading project materials can be found here. This option provides the applicant with the convenience of sending project materials to a single location accessible to all three state agencies. Alternatively, applicants may email or mail their project materials (see AGENCY CONTACT INFORMATION).
***Note:** U.S.Fish and Wildlife Service requires applicants to mail project materials to the USFWS PA field office (see AGENCY CONTACT INFORMATION). USFWS will not accept project materials submitted electronically (by upload or email).

Check-list of Minimum Materials to be submitted:
____Project narrative with a description of the overall project, the work to be performed, current physical characteristics of the site and acreage to be impacted.
____A map with the project boundary and/or a basic site plan(particularly showing the relationship of the project to the physical features such as wetlands, streams, ponds, rock outcrops, etc.)
In addition to the materials listed above, USFWS REQUIRES the following
____**SIGNED** copy of a Final Project Environmental Review Receipt

The inclusion of the following information may expedite the review process.
____Color photos keyed to the basic site plan (i.e. showing on the site plan where and in what direction each photo was taken and the date of the photos)
____Information about the presence and location of wetlands in the project area, and how this was determined (e.g., by a qualified wetlands biologist), if wetlands are present in the project area, provide project plans showing the location of all project features, as well as wetlands and streams.

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. Two review options are available to permit applicants for handling PNDI coordination in conjunction with DEP's permit review process involving either T&E Species or species of special concern. Under sequential review, the permit applicant performs a PNDI screening and completes all coordination with the appropriate jurisdictional agencies prior to submitting the permit application. The applicant will include with its application, both a PNDI receipt and/or a clearance letter from the jurisdictional agency if the PNDI Receipt shows a Potential Impact to a species or the applicant chooses to obtain letters directly from the jurisdictional agencies. Under concurrent review, DEP, where feasible, will allow technical review of the permit to occur concurrently with the T&E species consultation with the jurisdictional agency. The applicant must still supply a copy of the PNDI Receipt with its permit application. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. The applicant and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at https://conservationexplorer.dcnr.pa.gov/content/resources.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a preliminary screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources
Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552
Harrisburg, PA 17105-8552
Email: RA-HeritageReview@pa.gov

U.S. Fish and Wildlife Service
Pennsylvania Field Office
Endangered Species Section
110 Radnor Rd; Suite 101
State College, PA 16801
Email: IR1_ESPenn@fws.gov
NO Faxes Please

PA Fish and Boat Commission
Division of Environmental Services
595 E. Rolling Ridge Dr., Bellefonte, PA 16823
Email: RA-FBPACENOTIFY@pa.gov

PA Game Commission
Bureau of Wildlife Habitat Management
Division of Environmental Planning and Habitat Protection
2001 Elmerton Avenue, Harrisburg, PA 17110-9797
Email: RA-PGC_PNDI@pa.gov
NO Faxes Please

7. PROJECT CONTACT INFORMATION

Name: Kevin M. Clark
Company/Business Name: WHM Consulting, LLC
Address: 2525 Green Tech Drive, Suite B
City, State, Zip: State College, PA 16803
Phone: (814) 689-1650 Fax: ( )
Email: kevinc@whmgroup.com

8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

applicant/project proponent signature

05/07/2020
date

PENNSYLVANIA DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

June 3, 2019

PNDI Number: 670193
Version: Final_1; 10/31/18

Kevin Clark
WHM Consulting, Inc.
2525 Green Tech Dr., Suite B
State College, PA 16803
Email: kevinc@whmgroup.com (hard copy will not follow)

Re: Leidy South Project
Clinton, Columbia, Luzerne, Lycoming, Shuylkill, PA

Dear Mr/Ms Doe,

Thank you for the submission of the Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review Receipt Number 670193 (Final_1) for review. PA Department of Conservation and Natural Resources screened this project for potential impacts to species and resources under DCNR's responsibility, which includes plants, terrestrial invertebrates, natural communities, and geologic features only.

Potential Impact Anticipated

PNDI records indicate species or resources under DCNR's jurisdiction are located in the project vicinity. Based on a detailed PNDI review, DCNR determined potential impacts to the following threatened or endangered species or species of special concern.

Station 607 Maransky and Station 607 Hayfield:

Scientific Name	Common Name	PA Current Status	PA Proposed Status
Scirpus ancistrochaetus	Northeastern Bulrush	Endangered	Threatened
Streptopus amplexifolius	White Twisted-stalk	Threatened	Endangered
Ribes lacustre	Swamp Currant	Special Concern	Endangered
Gaultheria hispidula	Creeping Snowberry	Rare	Rare

Leidy Line D 36" Hensel Replacement:

Scientific Name	Common Name	PA Current Status	PA Proposed Status
Sorbus decora	Showy Mountain-ash	Endangered	Endangered
Carex bebbii	Bebb's Sedge	Endangered	Endangered
Carex disperma	Soft-leaved Sedge	Rare	Rare
Galium latifolium	Purple Bedstraw	None	Special Concern

Survey Request
DCNR requests a survey for the following species:

- ***Scirpus ancistrochaetus* (Northeastern Bulrush):** documented in pipeline ROW and shallow emergent wetland; suitable habitat includes vernal ponds and mudholes; fruits in July, and persists through January
- ***Streptopus amplexifolius* (White Twisted-stalk):** documented in a moist shaded ravine; suitable habitat includes cool ravines; Flowers May-June

- ***Ribes lacustre* (Swamp Currant):** documented in a moist shaded ravine; suitable habitat includes swamps and cold, wet woods; Flowers May - June
- ***Gaultheria hispidula* (Creeping Snowberry):** documented in flat wet woods; suitable habitat includes hummocks and tree stumps in bogs and swamps; Flowers June, fruits September
- ***Sorbus decora* (Showy Mountain-ash):** documented in a tamarack swamp; suitable habitat includes rocky slopes; Flowers May, fruits September – October
- ***Carex bebbii* (Bebb's Sedge):** documented in sphagnum meadow; suitable habitat includes pond edges, boggy pastures, and moist sand flats, Fruits June – July
- ***Carex disperma* (Soft-leaved Sedge):** documented in a tamarack swamp; suitable habitat includes swampy woods, bogs, and rhododendron swamps; fruits May-August
- ***Galium latifolium* (Purple Bedstraw):** documented along Hensel Fork creek; suitable habitat includes woods, rocky slopes and roadsides; Flowers June-July

✓ A botanical survey for the above species should be conducted by a qualified botanist at the appropriate time of year. Please submit the resulting report to our office for review. Contact our office prior to the survey for detailed information about the species or for a list of qualified surveyors.

✓ **Your botanist should carefully review the new DCNR Botanical Survey Protocols available at https://conservationexplorer.dcnr.pa.gov/content/survey-protocols**. These protocols are recommended to ensure that all necessary information is collected and that survey reports are prepared properly. It is the expectation of DCNR that these protocols will be followed when conducting surveys for species under our jurisdiction.

✓ All target and non-target state-listed species found during the botanical survey should be reported to our office. **Please submit a completed Botanical Field Survey Form for each occurrence or population identified: http://www.gis.dcnr.state.pa.us/PNDI/2015%20Field%20Survey%20Form.pdf**. Mitigation measures and monitoring may be requested if state-listed species are found on or adjacent to the site.

✓ If preferred habitat does not exist on site, a survey may not be necessary. Please submit a habitat assessment report which describes the current land cover, habitat types, and species found on site.

This response represents the most up-to-date review of the PNDI data files and is valid for two (2) years only. If project plans change or more information on listed or proposed species becomes available, our determination may be reconsidered. Should the proposed work continue beyond the period covered by this letter and a permit has not been acquired, please resubmit the project to this agency as an "Update" (including an updated PNDI receipt, project narrative, description of project changes and accurate map). As a reminder, this finding applies to potential impacts under DCNR's jurisdiction only. Visit the PNHP website for directions on contacting the Commonwealth's other resource agencies for environmental review.

Should you have any questions or concerns, please contact Alexander Dogonniuck, Ecological Information Specialist, by phone (717-783-3913) or via email (c-adogonni@pa.gov).

Sincerely

Greg Podniesinski

Greg Podniesinski, Section Chief
Natural Heritage Section

From:	Kevin Clark
To:	"Dogonniuck, Alexander"
Cc:	"Henry, Josh"; Richardson, Devyn; Wardwell, Lindsay; "Sheppard, Evan"
Subject:	RE: PNDI-670193 Leidy South Project
Date:	Thursday, November 29, 2018 9:28:00 AM
Attachments:	Station_607_Hayfield_Photo Documentation_112018.pdf Station_607_Maransky_Photo Documentation_112018.pdf

Alex,

Thank you for your response regarding the Leidy South Project (Project). The Project is still in the initial phases and the siting of the potential 607 compressor station has not yet been finalized. Transco will stress avoidance and minimization of impacts to wetlands, streams, and forested areas to the maximum extent practicable. Wetlands delineations have not been completed at this time. Site photographs of the current potential 607 compressor station locations have been provided for your review. Additional data will be provided once surveys of these areas are completed.

Thanks,

Kevin Clark | PWS
Project Manager
WHM Consulting, Inc.
2525 Green Tech Drive; Suite B
State College, PA 16803
(814) 689-1650 ext. 105

From: Dogonniuck, Alexander <c-adogonni@pa.gov>
Sent: Tuesday, November 06, 2018 8:44 AM
To: Kevin Clark <kevinc@whmgroup.com>
Subject: PNDI-670193 Leidy South Project

Hello Mr. Clark,

I have received your project and am reviewing it for potential impacts on threatened, endangered, and special concern species or resources. I am particularly interested in knowing more about the New Grassroots Compressor Station 607 (Luzerne) and Station 620 (Schuylkill). Have wetland delineations or surveys been conducted for the potential project areas. Do you have any site photos on file?

I am more concerned about Station 607 because it will be located in a wooded habitat and there are streams and wetland running through the site.

Please send any additional information you may have on these locations

Thanks,
Alex

November 29, 2018

PNDI Number: 670193
Version: Final_1; 10/31/18

Kevin Clark
WHM Consulting, Inc.
2525 Green Tech Dr., Suite B
State College, PA 16803
Email: kevinc@whmgroup.com (hard copy will not follow)

Re: Leidy South Project
Clinton, Columbia, Luzerne, Lycoming, Shuylkill, PA

Dear Mr/Ms Doe,

Thank you for the submission of the Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review Receipt Number 670193 (Final_1) for review. PA Department of Conservation and Natural Resources screened this project for potential impacts to species and resources under DCNR's responsibility, which includes plants, terrestrial invertebrates, natural communities, and geologic features only.

Potential Impact Anticipated

PNDI records indicate species or resources under DCNR's jurisdiction are located in the project vicinity. Based on a detailed PNDI review, DCNR determined potential impacts to the following threatened or endangered species or species of special concern.

Station 607 Maransky and Station 607 Hayfield:

Scientific Name	Common Name	PA Current Status	PA Proposed Status
Scirpus ancistrochaetus	Northeastern Bulrush	Endangered	Threatened
Streptopus amplexifolius	White Twisted-stalk	Threatened	Endangered
Ribes lacustre	Swamp Currant	Special Concern	Endangered
Gaultheria hispidula	Creeping Snowberry	Rare	Rare

Leidy Line D 36" Hensel Replacement:

Scientific Name	Common Name	PA Current Status	PA Proposed Status
Scirpus ancistrochaetus	Northeastern Bulrush	Endangered	Threatened
Sorbus decora	Showy Mountain-ash	Endangered	Endangered
Carex bebbii	Bebb's Sedge	Endangered	Endangered
Carex disperma	Soft-leaved Sedge	Rare	Rare
Galium latifolium	Purple Bedstraw	None	Special Concern

Survey Request
DCNR requests a survey for the following species:

- ***Scirpus ancistrochaetus* (Northeastern Bulrush):** documented in pipeline ROW and shallow emergent wetland; suitable habitat includes vernal ponds and mudholes; fruits in July, and persists through January
- ***Streptopus amplexifolius* (White Twisted-stalk):** documented in a moist shaded ravine; suitable habitat includes cool ravines; Flowers May-June

- ***Ribes lacustre* (Swamp Currant):** documented in a moist shaded ravine; suitable habitat includes swamps and cold, wet woods; Flowers May - June
- ***Gaultheria hispidula* (Creeping Snowberry):** documented in flat wet woods; suitable habitat includes hummocks and tree stumps in bogs and swamps; Flowers June, fruits September
- ***Sorbus decora* (Showy Mountain-ash):** documented in a tamarack swamp; suitable habitat includes rocky slopes; Flowers May, fruits September – October
- ***Carex bebbii* (Bebb's Sedge):** documented in sphagnum meadow; suitable habitat includes pond edges, boggy pastures, and moist sand flats, Fruits June – July
- ***Carex disperma* (Soft-leaved Sedge):** documented in a tamarack swamp; suitable habitat includes swampy woods, bogs, and rhododendron swamps; fruits May-August
- ***Galium latifolium* (Purple Bedstraw):** documented along Hensel Fork creek; suitable habitat includes woods, rocky slopes and roadsides; Flowers June-July

✓ A botanical survey for the above species should be conducted by a qualified botanist at the appropriate time of year. Please submit the resulting report to our office for review. Contact our office prior to the survey for detailed information about the species or for a list of qualified surveyors.

✓ **Your botanist should carefully review the new DCNR Botanical Survey Protocols available at https://conservationexplorer.dcnr.pa.gov/content/survey-protocols**. These protocols are recommended to ensure that all necessary information is collected and that survey reports are prepared properly. It is the expectation of DCNR that these protocols will be followed when conducting surveys for species under our jurisdiction.

✓ All target and non-target state-listed species found during the botanical survey should be reported to our office. **Please submit a completed Botanical Field Survey Form for each occurrence or population identified: http://www.gis.dcnr.state.pa.us/PNDI/2015%20Field%20Survey%20Form.pdf**. Mitigation measures and monitoring may be requested if state-listed species are found on or adjacent to the site.

✓ If preferred habitat does not exist on site, a survey may not be necessary. Please submit a habitat assessment report which describes the current land cover, habitat types, and species found on site.

This response represents the most up-to-date review of the PNDI data files and is valid for two (2) years only. If project plans change or more information on listed or proposed species becomes available, our determination may be reconsidered. Should the proposed work continue beyond the period covered by this letter and a permit has not been acquired, please resubmit the project to this agency as an "Update" (including an updated PNDI receipt, project narrative, description of project changes and accurate map). As a reminder, this finding applies to potential impacts under DCNR's jurisdiction only. Visit the PNHP website for directions on contacting the Commonwealth's other resource agencies for environmental review.

Should you have any questions or concerns, please contact Alexander Dogonniuck, Ecological Information Specialist, by phone (717-783-3913) or via email (c-adogonni@pa.gov).

Sincerely

Greg Podniesinski

Greg Podniesinski, Section Chief
Natural Heritage Section

DCNR & USFWS BOTANICAL SURVEY REPORT (PRIVILEGED)

October 3, 2019

PNDI Number: 670193
Version: Final_1; 8/21/19

Kevin Clark
WHM Consulting, Inc.
2525 Green Tech Drive, Suite B
State College, PA 16803
Email: kevinc@whmgroup.com (hard copy will not follow)

Re: Leidy South Project
Clinton, Columbia, Luzerne, Lycoming, Schuylkill, Wyoming, PA

Dear Mr. Clark,

Thank you for the submission of your field survey for Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review Receipt Number 670193 (Final_1) for review. PA Department of Conservation and Natural Resources screened this project for potential impacts to species and resources under DCNR's responsibility, which includes plants, terrestrial invertebrates, natural communities, and geologic features only.

No Impact Anticipated per Survey

PNDI records indicate species or resources under DCNR's jurisdiction are located in the vicinity of the project. DCNR requested a botanical survey for the following species on June 3, 2019:

Station 607 Maransky and Station 607 Hayfield:

Scientific Name	Common Name	PA Current Status	PA Proposed Status
Scirpus ancistrochaetus	Northeastern Bulrush	Endangered	Threatened
Streptopus amplexifolius	White Twisted-stalk	Threatened	Endangered
Ribes lacustre	Swamp Currant	Special Concern	Endangered
Gaultheria hispidula	Creeping Snowberry	Rare	Rare

Leidy Line D 36" Hensel Replacement:

Scientific Name	Common Name	PA Current Status	PA Proposed Status
Sorbus decora	Showy Mountain-ash	Endangered	Endangered
Carex bebbii	Bebb's Sedge	Endangered	Endangered
Carex disperma	Soft-leaved Sedge	Rare	Rare
Galium latifolium	Purple Bedstraw	None	Special Concern

A survey was conducted by Mallory Gilbert, Eric Burkhart, and David Woods of WHM on between May and July 2019. *Scirpus ancistrochaetus* and *Galium latifolium* were both found within the survey corridor, but outside the proposed limits of disturbance. Therefore, DCNR has determined that no impact is likely. No further coordination with our agency is needed for this project.

This response represents the most up-to-date review of the PNDI data files and is valid for two (2) years only. If project plans change or more information on listed or proposed species becomes available, our determination may be reconsidered. Should the proposed work continue beyond the period covered by this letter and a permit has not been acquired, please resubmit the project to this agency as an "Update" (including an updated PNDI receipt, project narrative, description of project changes and accurate map). As a reminder, this finding applies to potential impacts under DCNR's jurisdiction only. Visit the PNHP website for directions on contacting the Commonwealth's other resource agencies for environmental review.

Should you have any questions or concerns, please contact Alexander Dogonniuck, Ecological Information Specialist, by phone (717-783-3913) or via email (c-adogonni@pa.gov).

Sincerely

Greg Podniesinski, Section Chief
Natural Heritage Section

Transcontinental Gas Pipe Line Company, LLC
2800 Post Oak Boulevard (77056)
P.O. Box 1396
Houston, Texas 77251-1396
713/215-2000

May 7, 2020

Re: Update PNDI Search ID: PNDI-670193
Transcontinental Gas Pipe Line Company, LLC
Leidy South Project

To Whom it May Concern:

Transcontinental Gas Pipe Line Company, LLC (Transco) is providing an update to the PNDI for the Leidy South Project (Project), PNDI-670193. Minor workspace changes have been incorporated into the design since the last update on August 22, 2019. The following Project information summarizes workspace changes that will take place outside the previously submitted Project Area. All areas outlined below were include in the survey area for species specific surveys conducted for the Project.

Benton Loop

MOC – AR 119.5
Added <0.01 acre of workspace to an existing access road to accommodate the revised Wilson Road Right of Way.

MOC – 120.25
Added 1.37 acre of additional temporary workspace to Access Road AR-120.4 for the purpose of the removing existing post-construction stormwater management facilities installed for the Atlantic Sunrise project that will no longer be required upon the completion of the Leidy South Project.

Hilltop Loop

MOC – 183.5
Modified Contractor Yard to allow for the removal of the existing valve site resulting in the addition of 0.03 acre of temporary workspace.

Hensel Replacement

MOC – 188.1
Added <0.01 acre of workspace to a proposed access road to extend onto Summerson Mountain Road.

MOC – 193.9
Rerouted pipeline centerline to avoid newly installed tanks on Dominion property and relocated the access to an existing road resulting in the addition of 0.45 acre of temporary workspace.

Updated mapping is provided in Attachment A. This mapping outlines the overall Project Location Maps with specific call outs to the updated locations and site-specific mapping for each of the workspace changes listed above. We are requesting verification that the minor changes to the Project since the last submission will not result in changes to your agencies responses regarding potential impacts to rare, candidate, threatened or endangered species.

If you have any questions regarding this correspondence or require additional Project information, please do not hesitate to call me at (412) 713-0485 or contact me via e-mail at josh.henry@williams.com. Alternatively, you can contact Kevin Clark, Project Manager, at WHM Consulting, Inc., at (814) 689-1650 or via e-mail at kevinc@whmgroup.com. I appreciate your assistance and thank you for your attention to this request.

Respectfully submitted,

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

Josh Henry
Environmental Specialist

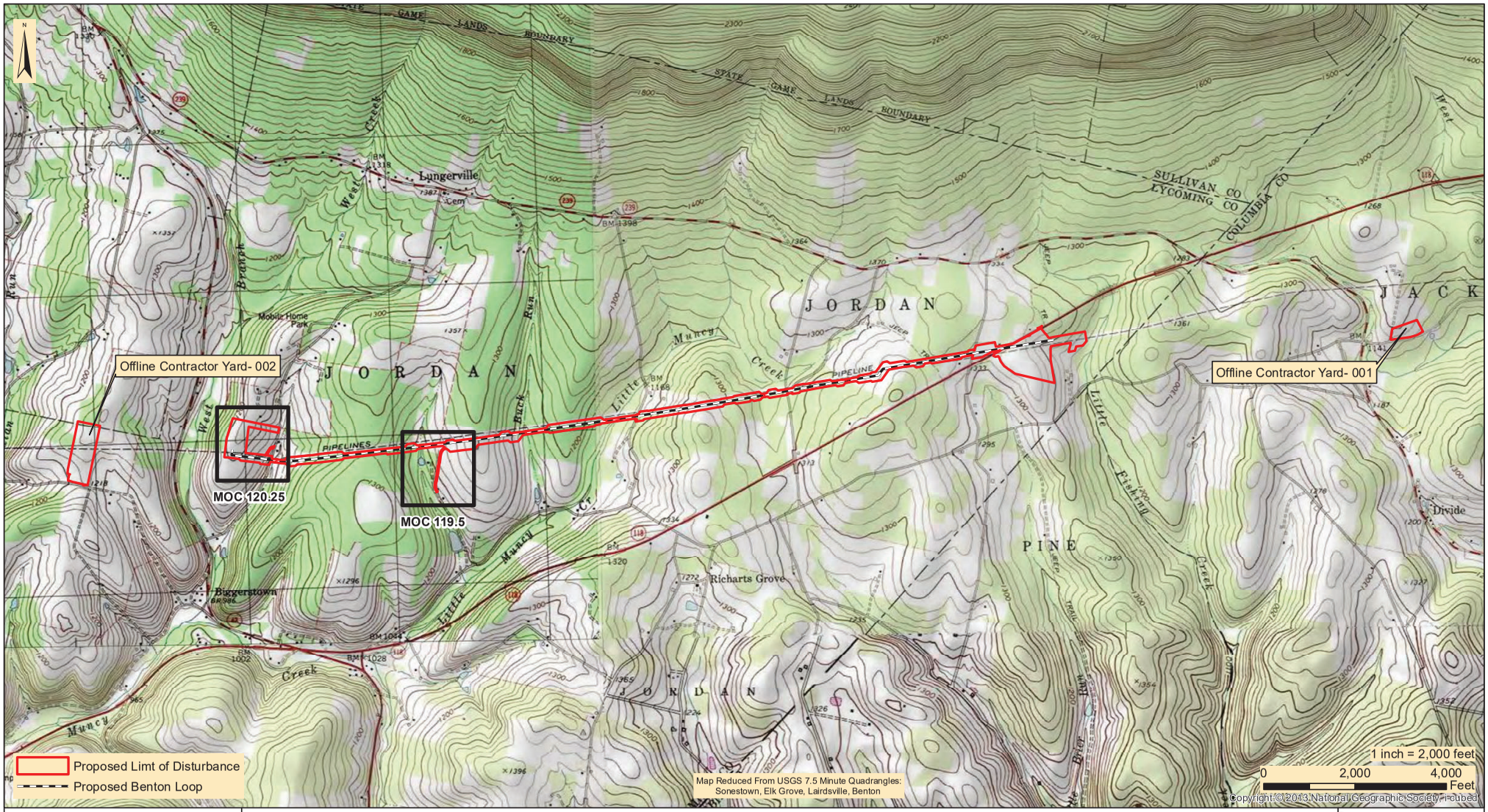
Attachments: Attachment A: Mapping

cc: Shauna Akers, Transco
Kevin Clark, WHM Consulting, Inc.

ATTACHMENT A

MAPPING

BENTON LOOP



designs, permits, resolutions | consulting, INC.
2525 Green Tech Drive, Suite B,
State College, PA 16803
Tele: 814.689.1650 Fax: 814.689.1557

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

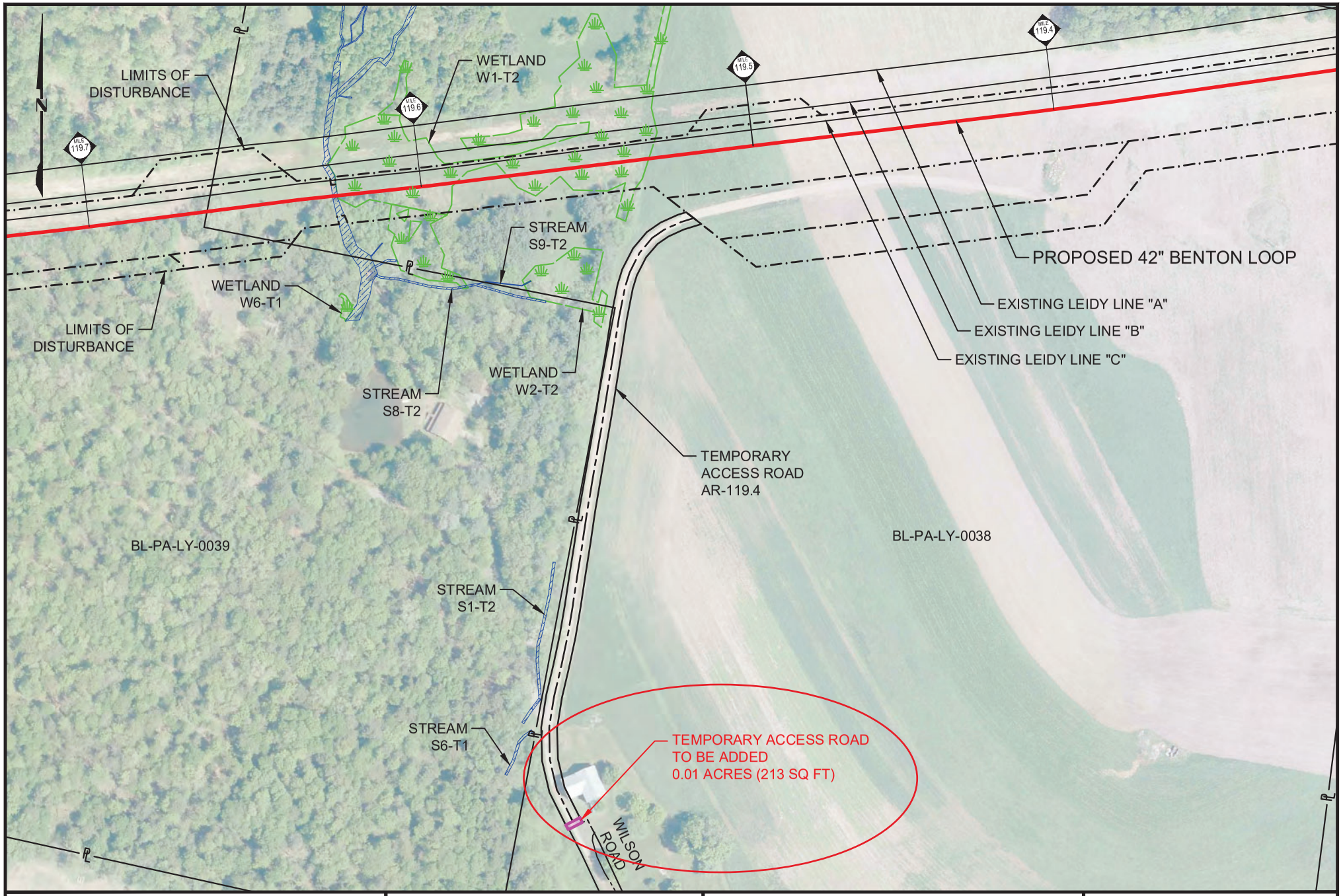
LEIDY SOUTH PROJECT

LEIDY LINE D 42" BENTON LOOP PROJECT LOCATION MAP

LYCOMING & COLUMBIA COUNTIES

PENNSYLVANIA

Date:	5/4/2020
WHM DRAWING NUMBER:	WILLIAMS202B003
Drawn By:	FTN
Figure Number:	1



LEGEND:

- PROPOSED 42" BENTON LOOP
- EXISTING PIPELINES
- LIMITS OF DISTURBANCE
- PROPERTY LINE
- STREAM CROSSING
- WETLAND AREA

200 0 200

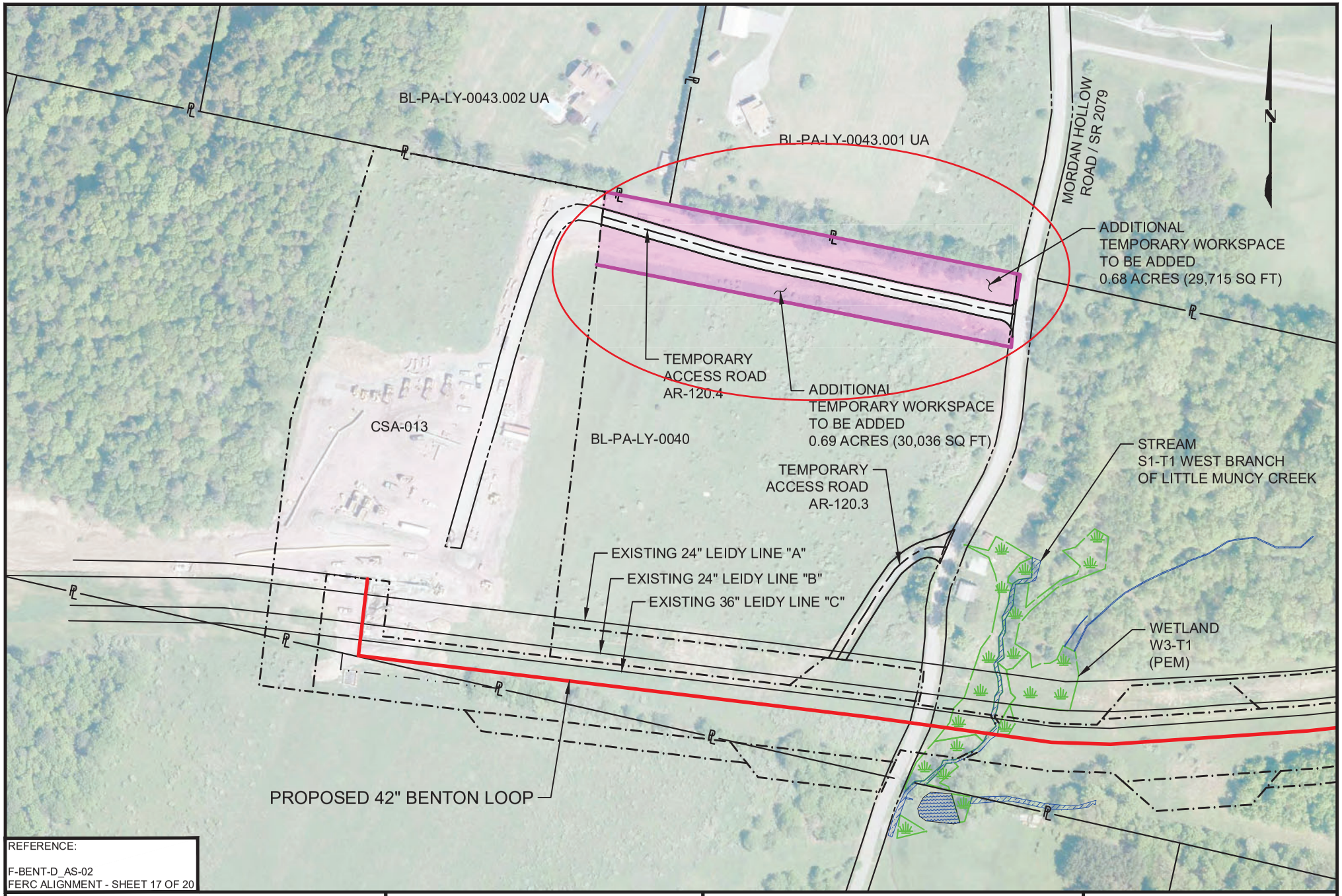
SCALE IN FEET

SHEET 1 OF 1
12/26/2019

LEIDY SOUTH PROJECT
MEMORANDUM OF CHANGE
42" BENTON LOOP
WORKSPACE CHANGE
MOC - 119.5

Williams.

MOC-BENT-AR 119_5



REFERENCE:

F-BENT-D_AS-02
FERC ALIGNMENT - SHEET 17 OF 20

LEGEND:

- PROPOSED 42" BENTON LOOP
- EXISTING PIPELINES
- LIMITS OF DISTURBANCE
- PROPERTY LINE
- STREAM
- WETLAND AREA

200 0 200
SCALE IN FEET

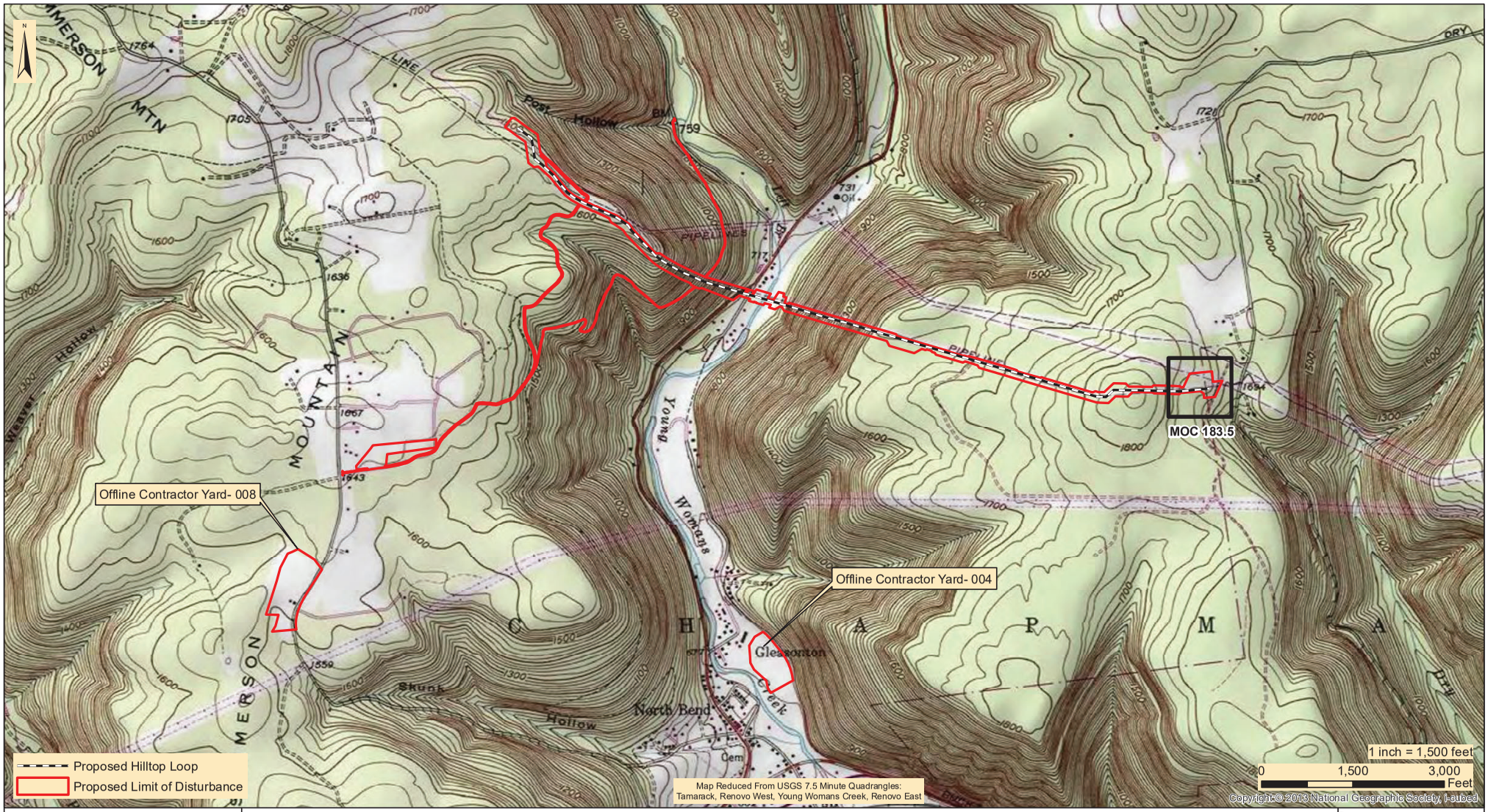
SHEET 1 OF 1
10/04/2019

LEIDY SOUTH PROJECT
MEMORANDUM OF CHANGE
42" BENTON LOOP
WORKSPACE CHANGE
MOC - 120.25

Williams.

MOC-BENT-120_25

HILLTOP LOOP



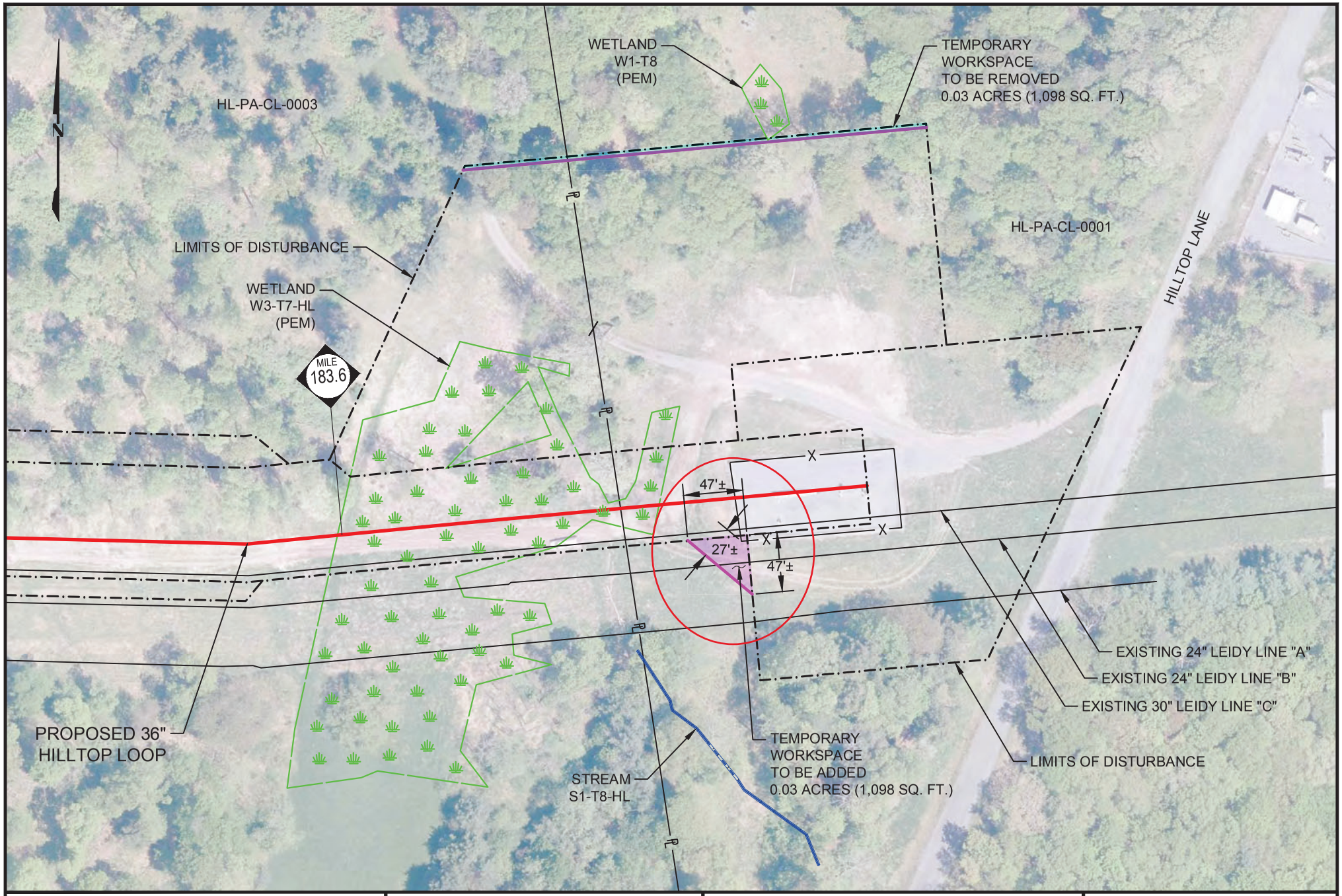
designs, permits, resolutions | consulting, INC.
2525 Green Tech Drive, Suite B,
State College, PA 16803
Tele: 814.689.1650 Fax: 814.689.1557

TRANSCONTNENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT

LEIDY LINE D 36" HILLTOP LOOP
PROJECT LOCATION MAP

CHAPMAN TOWNSHIP | CLINTON COUNTY | PENNSYLVANIA

Date:	5/4/2020
WHM DRAWING NUMBER:	WILLIAMS201B002
Drawn By:	FTN
Figure Number:	2-1



LEGEND:

- PROPOSED 36" HILLTOP LOOP
- EXISTING PIPELINES
- LIMITS OF DISTURBANCE
- PROPERTY LINE
- STREAM
- WETLAND AREA

100 0 100

SCALE IN FEET

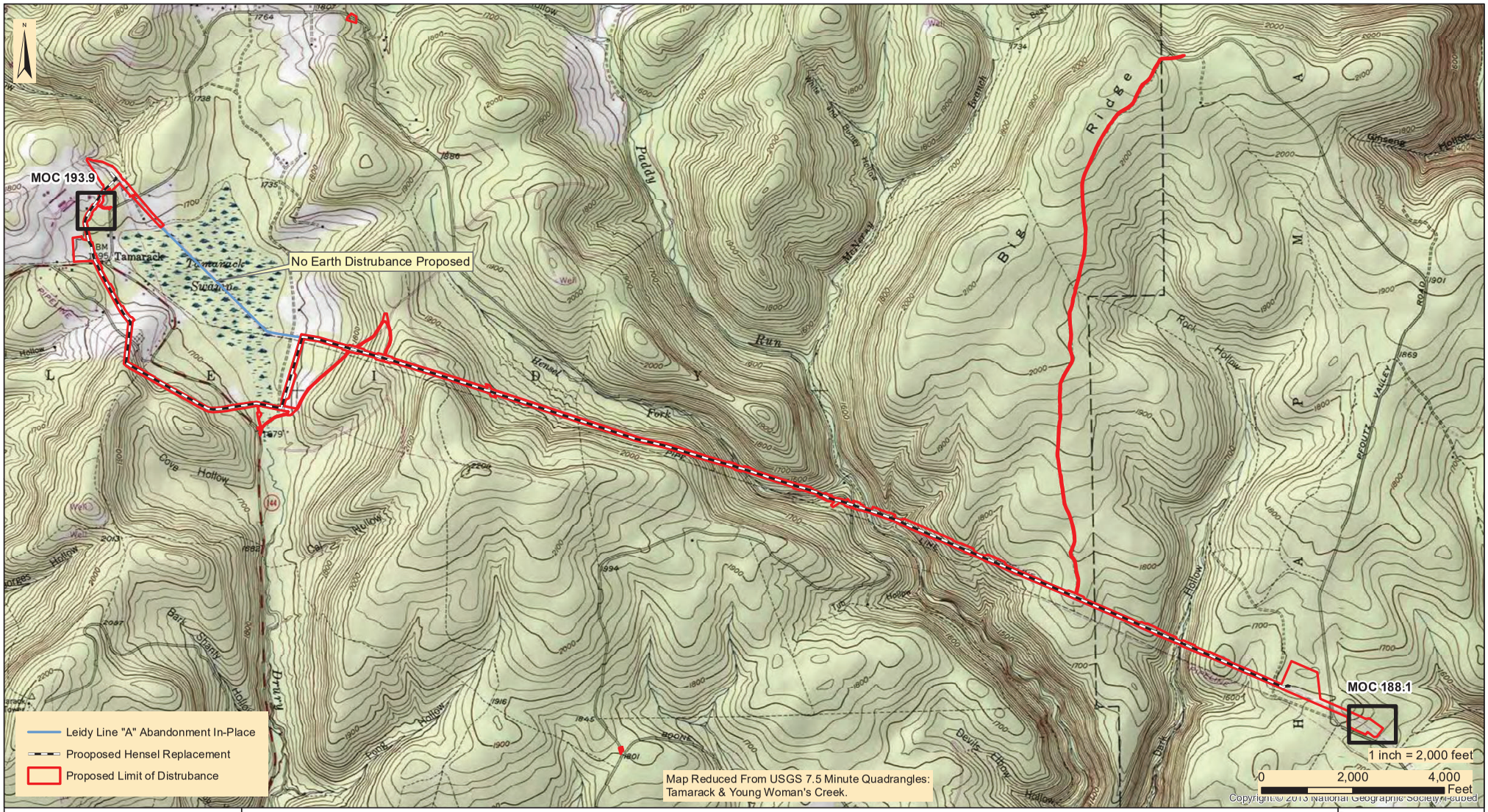
SHEET 1 OF 1
09/13/2019

LEIDY SOUTH PROJECT
MEMORANDUM OF CHANGE
36" HILLTOP LOOP
WORKSPACE CHANGE
MOC 183.5

Williams.

MOC-HILL-183_5

HENSEL REPLACEMENT



designs, permits, resolutions | consulting, INC.
2525 Green Tech Drive, Suite B,
State College, PA 16803
Tele: 814.689.1650 Fax: 814.689.1557

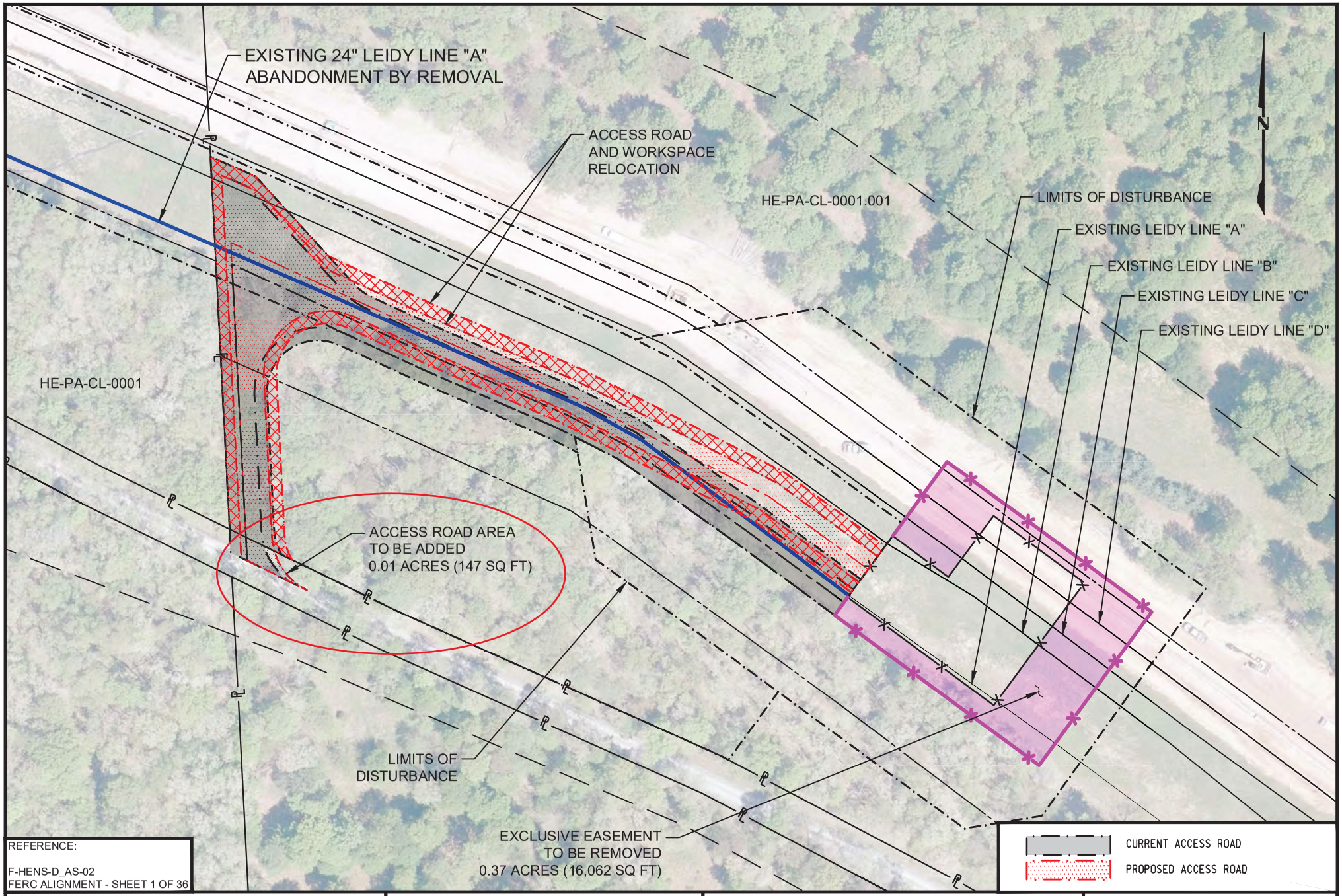
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

LEIDY SOUTH PROJECT

LEIDY LINE D 36" HENSEL REPLACEMENT PROJECT LOCATION MAP

LEIDY & CHAPMAN TOWNSHIP | CLINTON COUNTY | PENNSYLVANIA

Date:	5/4/2020
WHM DRAWING NUMBER:	WILLIAMS202B001
Drawn By:	FTN
Figure Number:	1-1



REFERENCE:

F-HENS-D_AS-02
FERC ALIGNMENT - SHEET 1 OF 36

LEGEND:

- EXISTING 24" LEIDY LINE "A"
- EXISTING PIPELINES
- LIMITS OF DISTURBANCE
- PROPERTY LINE
- STREAM
- WETLAND AREA

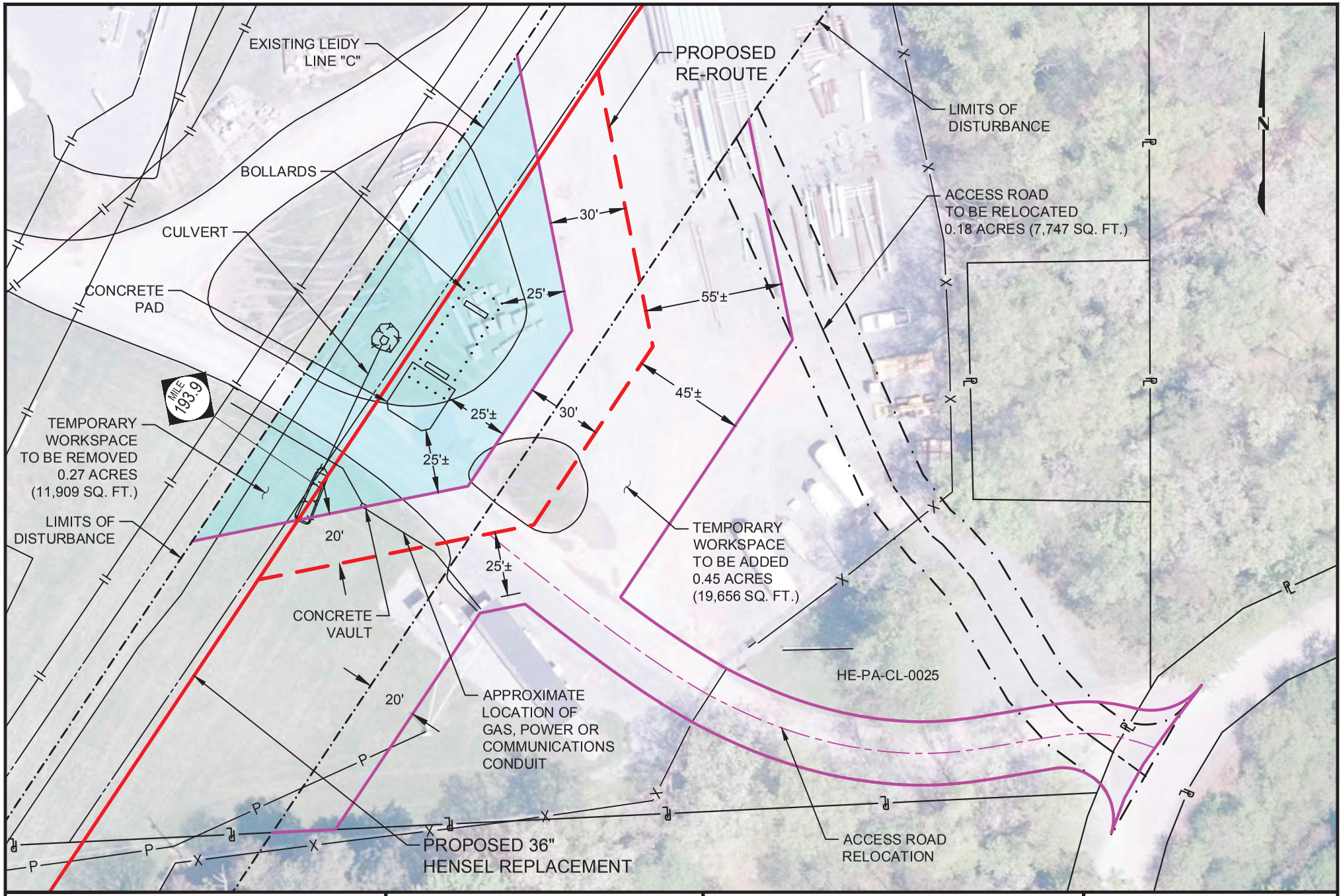
100 0 100
SCALE IN FEET

SHEET 1 OF 1
10/14/2019

LEIDY SOUTH PROJECT
MEMORANDUM OF CHANGE
36" HENSEL REPLACEMENT
EXCLUSIVE EASEMENT & ACCESS ROAD CHANGE
MOC 188.1

Williams.

REV 2
MOC-HENS-188_1



LEGEND:

- PROPOSED 36" HENSEL REPLACEMENT
- EXISTING PIPELINES
- LIMITS OF DISTURBANCE
- PROPERTY LINE
- STREAM
- WETLAND AREA

50 0 50

SCALE IN FEET

SHEET 1 OF 1
09/13/2019

LEIDY SOUTH PROJECT
MEMORANDUM OF CHANGE
36" HENSEL REPLACEMENT
RE-ROUTE & ACCESS ROAD CHANGE
MOC 193.9

Williams.

MOC-HENS-193_9

pennsylvania
DEPARTMENT OF CONSERVATION
AND NATURAL RESOURCES

BUREAU OF FORESTRY

May 20, 2020

PNDI Number: 670193
Version: Final_5; 5/07/20

Kevin Clark
WHM Consulting, Inc.
2525 Green Tech Drive, Suite B
State College, PA 16803
Email: kevinc@whmgroup.com (hard copy will not follow)

Re: Leidy South Project
Clinton, Columbia, Luzerne, Lycoming, Schuylkill, Wyoming; PA

Dear Mr. Clark,

Thank you for the submission of the Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review Receipt Number **670193 (Final_5)** for review. PA Department of Conservation and Natural Resources screened this project for potential impacts to species and resources under DCNR's responsibility, which includes plants, terrestrial invertebrates, natural communities, and geologic features only.

No Impact Anticipated

PNDI records indicate species or resources under DCNR's jurisdiction are located in the vicinity of the project. However, based on the information you submitted concerning the nature of the project, the immediate location, and our detailed resource information, DCNR has determined that no impact is likely. No further coordination with our agency is needed for this project.

This response represents the most up-to-date review of the PNDI data files and is valid for two (2) years only. If project plans change or more information on listed or proposed species becomes available, our determination may be reconsidered. Should the proposed work continue beyond the period covered by this letter and a permit has not been acquired, please resubmit the project to this agency as an "Update" (including an updated PNDI receipt, project narrative, description of project changes and accurate map). As a reminder, this finding applies to potential impacts under DCNR's jurisdiction only. Visit the PNHP website for directions on contacting the Commonwealth's other resource agencies for environmental review.

Should you have any questions or concerns, please contact Alexander Dogonniuck, Ecological Information Specialist, by phone (717-783-3913) or via email (c-adogonni@pa.gov).

Sincerely

Greg Podniesinski, Section Chief
Natural Heritage Section

PENNSYLVANIA GAME COMMISSION

From:	Kevin Clark
To:	olbraun@pa.gov
Cc:	Henry, Josh; Richardson, Devyn; Wardwell, Lindsay
Subject:	RE: Leidy South Project - PGC Request for Additional Information (PGC ID # 201811010501)
Date:	Friday, January 11, 2019 12:52:00 PM
Attachments:	image001.jpg Hilltop_Loop_Topo_Project_Location_010219.pdf HILLTOP LOOP - Aerial and Photograph Location Map_011019.pdf HILLTOP LOOP - Photographic Documentation.pdf

---

Olivia,

Tree removal will be required to accommodate construction of the Leidy Line D 36" Hilltop Loop. Based on the currently proposed alignment and workspace requirements, ±25 acres of tree removal is anticipated along the pipeline ROW. In addition, some of the existing access roads proposed to by utilized for the project will likely require some minor tree clearing to allow for access of heavy equipment. Mapping has been provided that outlines the proposed Limits of Disturbance which includes: temporary workspace, permanent workspace, access roads and staging/support areas. In addition, photographic documentation has been provided to represent habitat within the area proposed to be impacted.

Thanks,
Kevin

From: Braun, Olivia <olbraun@pa.gov>
Sent: Tuesday, December 18, 2018 12:57 PM
To: Kevin Clark <kevinc@whmgroup.com>
Cc: devyn.richardson@williams.com; Henry, Josh <Josh.Henry@williams.com>; Wardwell, Lindsay <LWardwell@ene.com>
Subject: RE: [External] RE: Leidy South Project - PGC Request for Additional Information (PGC ID # 201811010501)

Hi Kevin,
Thanks for this additional information. It's very helpful and has provided much of the clarification we were hoping for.

However, according to the project narrative provided in October 2018, the pipeline facilities are going to be co-located within/adjacent to the existing Transco ROW and temporary and/or permanent ROW will need to be widened at varying widths to accommodate the construction of the loops and replacement. Can you provide additional information pertaining to the ROW needs for the Leidy Line D 36" Hilltop Loop? Will tree removal be required (if so, how much and where) and what is the existing and proposed width of the ROW going to be to accommodate this construction? Also, please provide any mapping that may be available to illustrate the temporary vs. permanent ROW and access roadways for this construction. Finally, if you have color photographs of the habitat within the area that is to be impacted by this loop and could provide them with a photo location map, it would be very helpful as well.

If you have any questions, please let me know.

Thanks,

Olivia A. Braun
Pennsylvania Game Commission
Bureau of Wildlife Habitat Management
Division of Environmental Planning & Habitat Protection
2001 Elmerton Avenue
Harrisburg, PA 17110
Phone: 717-787-4250, Extension 3128

From: Kevin Clark <kevinc@whmgroup.com>
Sent: Monday, December 17, 2018 8:52 AM
To: Braun, Olivia <olbraun@pa.gov>
Cc: devyn.richardson@williams.com; Henry, Josh <Josh.Henry@williams.com>; Wardwell, Lindsay <LWardwell@ene.com>
Subject: [External] RE: Leidy South Project - PGC Request for Additional Information (PGC ID # 201811010501)

***ATTENTION:** This email message is from an external sender. Do not open links or attachments from unknown sources. To report suspicious email, forward the message as an attachment to CWOPA_SPAM@pa.gov.*

Olivia,

Transcontinental Gas Pipe Line Company, LLC proposes to utilize the *Manual Project* for the review of this Project. The following information has been attached to this email:

1. USGS mapping including GPS coordinates for the center of the project area for compressor station locations and the eastern and western terminus for the pipeline segments; and

2. USGS map outlining the abutting Maransky and Hayfield Properties
    a. Polygon shapefiles submitted for the Maransky and Hayfield properties are abutting. When viewed on the PNDI online mapper, these features show as only one polygon; however two shapefiles were submitted. A map has been provided for clarification purposes.

Work being proposed at Compressor Station 605 will not involve earth disturbance, but is considered part of the overall project. Please include a review of this location based on the scope of work proposed.

Thanks and let me know if you need any additional information to complete your initial review, and if hard copies are required of the initial submittal and updated mapping. Once further project information is obtained and field surveys are completed, the additional information will be provided

for your review.

Kevin Clark | PWS
Project Manager
WHM Consulting, Inc.
2525 Green Tech Drive; Suite B
State College, PA 16803
(814) 689-1650 ext. 105

From: Braun, Olivia <olbraun@pa.gov>
Sent: Thursday, December 06, 2018 2:43 PM
To: devyn.richardson@williams.com; Kevin Clark <kevinc@whmgroup.com>
Subject: Leidy South Project - PGC Request for Additional Information (PGC ID # 201811010501)

Good Afternoon,

The PGC is in the process of reviewing the above referenced project and would like to request some additional information. At your earliest convenience, please provide the following information so that we may continue our review of this project.

- Both a PNDI receipt and a Manual Project submission form have been submitted for this project. Please confirm if the Applicant would like the PGC to handle this project as a Manual Project (by using the Manual Project submission form) or an online submission (by using the online PNDI Receipt # 670193). Then depending on whether the Applicant chooses to utilize the Manual Project Submission Form or the online PNDI submittal method, please provide the following information.
    - *Manual Project* – Please provide updated USGS mapping that includes the GPS coordinates for each location where work is anticipated or being considered.

    - *Online PNDI Submittal with PNDI Receipt # 670193)* – Please update the polygon that was submitted into PNDI to include each location where work is anticipated or being considered. For example, the cover letter provided discusses 9 locations where work is anticipated or being considered. However, the PNDI polygon(s) reflect only 7 of those locations. Once the additional locations are included, please re-finalized the PNDI receipt so that all areas are included in the review.

- The PGC recognizes that as of the submittal date, field surveys have not yet been completed for this project. However, if established, please provide mapping and/or GIS shapefiles illustrating where tree removal, ROW widening, permanent or temporary workspaces, access roads, etc. are to be located for the activities included in this review.

If you have any questions, please let me know.

Thanks,

Olivia A. Braun
Pennsylvania Game Commission
Bureau of Wildlife Habitat Management
Division of Environmental Planning & Habitat Protection
2001 Elmerton Avenue
Harrisburg, PA 17110
Phone: 717-787-4250, Extension 3128

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA GAME COMMISSION
2001 Elmerton Avenue
Harrisburg, PA 17110-9797
Wildlife Habitat Management
(717) 787-6818

January 22, 2019 **PGC ID Number: 201811010501**

Mr. Kevin Clark
WHM Consulting, Inc.
2525 Green Tech Drive, Suite B
State College, Pennsylvania 16803
kevinc@whmgroup.com

Re: *Transcontinental Gas Pipe Line Company, LLC (Transco)* - Leidy South Project
PNDI Manual Project Submission
Multiple Townships, Multiple Counties, Pennsylvania

Dear Mr. Clark,

Thank you for submitting the Pennsylvania Natural Diversity Inventory (PNDI) Manual Project Submission Form for review. The Pennsylvania Game Commission (PGC) screened this project for potential impacts to species and resources of concern under PGC responsibility, which includes birds and mammals only.

Potential Impact Anticipated
PNDI records indicate species or resources of concern are located in the vicinity of the project. The PGC has received and thoroughly reviewed the information that you provided to this office, as well as PNDI data, and has determined that potential impacts to the following threatened, endangered, and species of special concern birds and mammals may be associated with your project. Therefore, additional measures may be necessary to avoid potential impacts to the species listed below.

Scientific Name	Common Name	PA Status	Federal Status
Myotis septentrionalis	Northern Long-eared Bat	THREATENED	THREATENED

Next Steps

Northern long-eared bats: Northern long-eared bats are a federally listed threatened species under the jurisdiction of the U.S. Fish and Wildlife Service. As a result, our agency defers comments on potential impacts to Northern long-eared bats to the U.S. Fish and Wildlife Service.

This response represents the most up-to-date summary of the PNDI data files and is valid for two (2) years from the date of this letter. An absence of recorded information does not necessarily imply actual conditions on site. Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered.

Should the proposed work continue beyond the period covered by this letter, please resubmit the project to this agency as an "Update" (including an updated PNDI receipt, project narrative and accurate map). If the proposed work has not changed and no additional information concerning listed species is found, the project will be cleared for PNDI requirements under this agency for two additional years.

This finding applies to impacts to birds and mammals only. To complete your review of state and federally-listed threatened and endangered species and species of special concern, please be sure that the U.S. Fish and Wildlife Service, the PA Department of Conservation and Natural Resources, and/or the PA Fish and Boat Commission have been contacted regarding this project as directed by the online PNDI ER Tool found at www.naturalheritage.state.pa.us.

Sincerely,

Olivia A. Braun
Environmental Planner
Division of Environmental Planning & Habitat Protection
Bureau of Wildlife Habitat Management
Phone: 717-787-4250, Extension 3128
Fax: 717-787-6957
E-mail: Olbraun@pa.gov

A PNHP Partner

Pennsylvania Natural Heritage Program

OAB/oab

cc: Pamela Shellenberger, USFWS
Schnupp
Brauning
Turner
Librandi Mumma
Figured
Wenner
File

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA GAME COMMISSION
2001 Elmerton Avenue
Harrisburg, PA 17110-9797
Wildlife Habitat Management
(717) 787-6818

May 30, 2019 **PGC ID Number: 201811010501 - Revision**

Mr. Kevin Clark
WHM Consulting, Inc.
2525 Green Tech Drive, Suite B
State College, Pennsylvania 16803
kevinc@whmgroup.com

Re: *Transcontinental Gas Pipe Line Company, LLC (Transco)* - Leidy South Project
PNDI Receipt File: *project_receipt_leidy_south_project_670193_FINAL_3.pdf*
Multiple Townships, Clinton, Columbia, Luzerne, Lycoming, Schuylkill and Wyoming Counties, Pennsylvania

Dear Mr. Clark,

Thank you for submitting the Pennsylvania Natural Diversity Inventory (PNDI) Environmental Review Receipt File *project_receipt_leidy_south_project_670193_FINAL_3.pdf* for review. The Pennsylvania Game Commission (PGC) screened this project for potential impacts to species and resources of concern under PGC responsibility, which includes birds and mammals only.

Potential Impact Anticipated
PNDI records indicate species or resources of concern are located in the vicinity of the project. The PGC has received and thoroughly reviewed the information that you provided to this office, as well as PNDI data, and has determined that potential impacts to the following threatened, endangered, and species of special concern birds and mammals may be associated with your project. Therefore, additional measures may be necessary to avoid potential impacts to the species listed below.

Scientific Name	Common Name	PA Status	Federal Status
Myotis septentrionalis	Northern Long-eared Bat	ENDANGERED	THREATENED
N/A	Winter Bat Colony	SPECIAL CONCERN	N/A

Northern long-eared bats: Northern long-eared bats are a federally listed threatened species under the jurisdiction of the U.S. Fish and Wildlife Service. As a result, our agency defers comments on potential impacts to Indiana bats to the U.S. Fish and Wildlife Service.

Winter Bat Colony: The following should be performed for the *Central Penn South Potential Compressor Station 620 Options C and G* so that a more accurate determination of impacts can be made:

- *Winter Hibernacula Habitat Assessment*: In order for the PGC to determine potential impacts to winter bat colonies located on and adjacent to the project area, a winter hibernacula habitat assessment is to be conducted on and within 1,000 feet (within 1/4 mile, if blasting is proposed) of the project area, following the *PGC Protocol for Assessing Abandoned Mines/Caves for Bat Surveys* which can be found in Appendix B of the attached *PGC Eastern Small-footed Bat Environmental Review Guidance Document*. Results of the winter hibernacula habitat assessment are to be submitted to the PGC no later than December 31st of the year the survey is conducted for review.

- Any openings identified during the Winter Hibernacula Habitat Assessment that met the criteria as having the potential as bat hibernacula will need to be surveyed in the fall to determine the presence or absence of bat species. A PGC special use permit needs to be obtained by the consultant in order to conduct any surveys that involve the handling of bats. Results of the fall sampling surveys are to be submitted to the PGC no later than December 31st of the year the survey is conducted. Survey results will be used by the PGC to determine what, if any avoidance and minimization measures need to be implemented.

- In addition to the above surveys, the PGC will require documentation regarding the connectivity between each of potential hibernacula located within ¼ mile of the project area. Since this project may require blasting, the PGC is also concerned that the integrity of potential hibernacula within ¼ mile of the project area may be jeopardized. Therefore, the Applicant must also provide documentation of how the structure, air flow, humidity, etc. at each potential hibernaculum within the 1,000-foot (¼-mile, if blasting is required) radius will be maintained.

Central Penn North, Potential Compressor Station Option B appears to be located on or adjacent to **State Game Lands No. 206**. Please contact Mr. Michael Beahm, Land Management Supervisor, at 570-675-1143 to discuss and coordinate the project on State Game Lands.

Conservation Measure(s)

National Wetland Inventory Mapping (NWI) and/or aerial photos suggest that wetlands are located throughout the project area. The PGC is requesting that the final project avoid, or at least minimize to the greatest practical extent, any adverse impacts to these resources and their associated wildlife habitat.

This response represents the most up-to-date summary of the PNDI data files and is valid for two (2) years from the date of this letter. An absence of recorded information does not necessarily imply actual conditions on site. Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered.

Should the proposed work continue beyond the period covered by this letter, please resubmit the project to this agency as an "Update" (including an updated PNDI receipt, project narrative and accurate map). If the proposed work has not changed and no additional information concerning listed species is found, the project will be cleared for PNDI requirements under this agency for two additional years.

This finding applies to impacts to birds and mammals only. To complete your review of state and federally-listed threatened and endangered species and species of special concern, please be sure that the U.S. Fish and Wildlife Service, the PA Department of Conservation and Natural Resources, and/or the PA Fish and Boat Commission have been contacted regarding this project as directed by the online PNDI ER Tool found at www.naturalheritage.state.pa.us.

Sincerely,

Olivia A. Braun
Environmental Planner
Division of Environmental Planning & Habitat Protection
Bureau of Wildlife Habitat Management
Phone: 717-787-4250, Extension 3128
Fax: 717-787-6957
E-mail: Olbraun@pa.gov

A PNHP Partner

OAB/oab

Enclosure: *PGC Eastern Small-footed Bat Environmental Review Guidance Document*

cc: Pamela Shellenberger, USFWS
Schnupp
Brauning
Turner
Librandi Mumma
Figured
Wenner
File

Transcontinental Gas Pipe Line Company, LLC
2800 Post Oak Boulevard (77056)
P.O. Box 1396
Houston, Texas 77251-1396
713/215-2000

May 7, 2020

Re: Update PNDI Search ID: PNDI-670193
Transcontinental Gas Pipe Line Company, LLC
Leidy South Project

To Whom it May Concern:

Transcontinental Gas Pipe Line Company, LLC (Transco) is providing an update to the PNDI for the Leidy South Project (Project), PNDI-670193. Minor workspace changes have been incorporated into the design since the last update on August 22, 2019. The following Project information summarizes workspace changes that will take place outside the previously submitted Project Area. All areas outlined below were include in the survey area for species specific surveys conducted for the Project.

Benton Loop

MOC – AR 119.5
Added <0.01 acre of workspace to an existing access road to accommodate the revised Wilson Road Right of Way.

MOC – 120.25
Added 1.37 acre of additional temporary workspace to Access Road AR-120.4 for the purpose of the removing existing post-construction stormwater management facilities installed for the Atlantic Sunrise project that will no longer be required upon the completion of the Leidy South Project.

Hilltop Loop

MOC – 183.5
Modified Contractor Yard to allow for the removal of the existing valve site resulting in the addition of 0.03 acre of temporary workspace.

Hensel Replacement

MOC – 188.1
Added <0.01 acre of workspace to a proposed access road to extend onto Summerson Mountain Road.

MOC – 193.9
Rerouted pipeline centerline to avoid newly installed tanks on Dominion property and relocated the access to an existing road resulting in the addition of 0.45 acre of temporary workspace.

Updated mapping is provided in Attachment A. This mapping outlines the overall Project Location Maps with specific call outs to the updated locations and site-specific mapping for each of the workspace changes listed above. We are requesting verification that the minor changes to the Project since the last submission will not result in changes to your agencies responses regarding potential impacts to rare, candidate, threatened or endangered species.

If you have any questions regarding this correspondence or require additional Project information, please do not hesitate to call me at (412) 713-0485 or contact me via e-mail at josh.henry@williams.com. Alternatively, you can contact Kevin Clark, Project Manager, at WHM Consulting, Inc., at (814) 689-1650 or via e-mail at kevinc@whmgroup.com. I appreciate your assistance and thank you for your attention to this request.

Respectfully submitted,

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

Josh Henry
Environmental Specialist

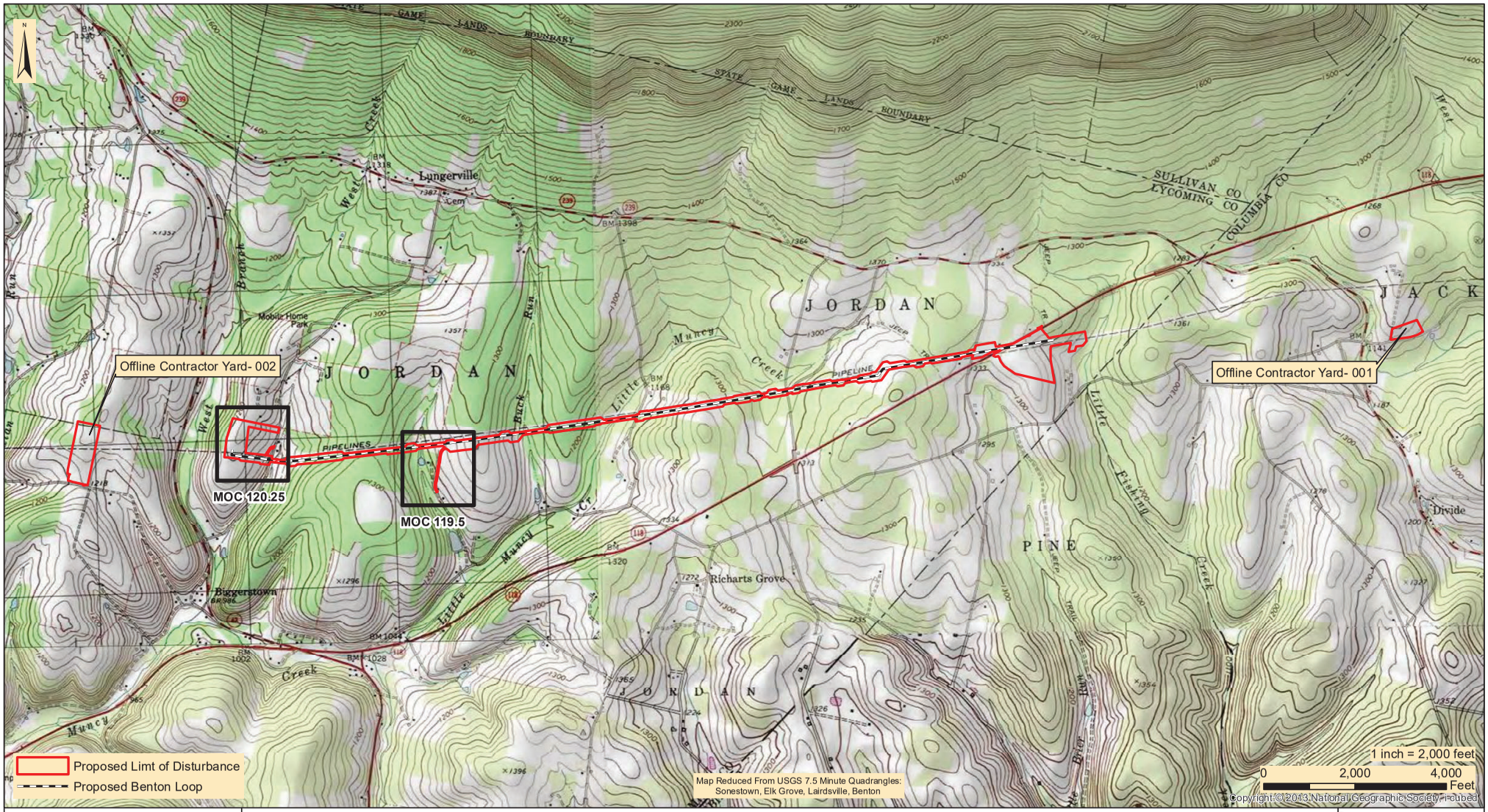
Attachments: Attachment A: Mapping

cc: Shauna Akers, Transco
Kevin Clark, WHM Consulting, Inc.

ATTACHMENT A

MAPPING

BENTON LOOP



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2525 Green Tech Drive, Suite B,
State College, PA 16803
Tele: 814.689.1650 Fax: 814.689.1557

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

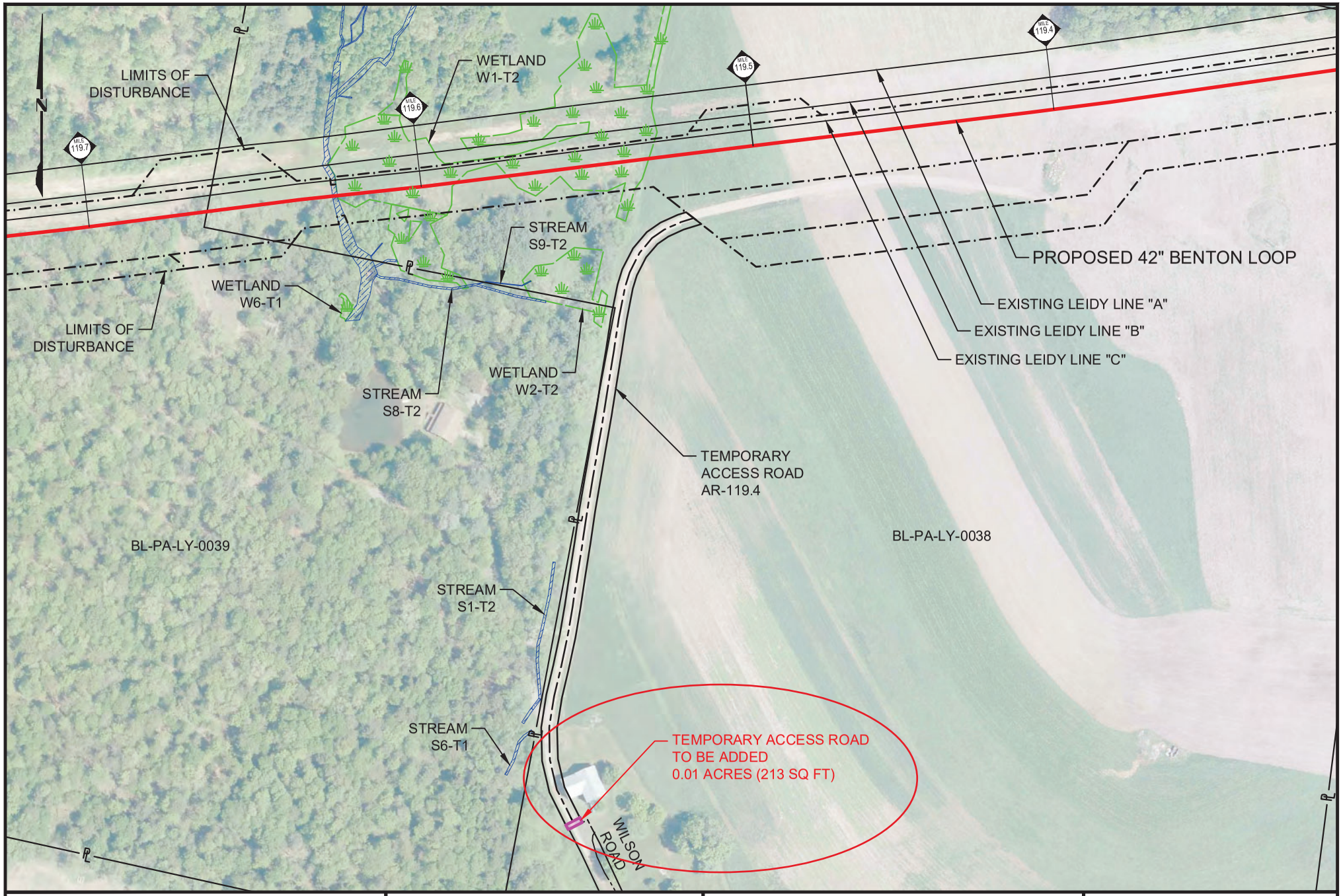
LEIDY SOUTH PROJECT

LEIDY LINE D 42" BENTON LOOP PROJECT LOCATION MAP

LYCOMING & COLUMBIA COUNTIES

PENNSYLVANIA

Date:	5/4/2020
WHM DRAWING NUMBER:	WILLIAMS202B003
Drawn By:	FTN
Figure Number:	1



LEGEND:

- PROPOSED 42" BENTON LOOP
- EXISTING PIPELINES
- LIMITS OF DISTURBANCE
- PROPERTY LINE
- STREAM CROSSING
- WETLAND AREA

200 0 200

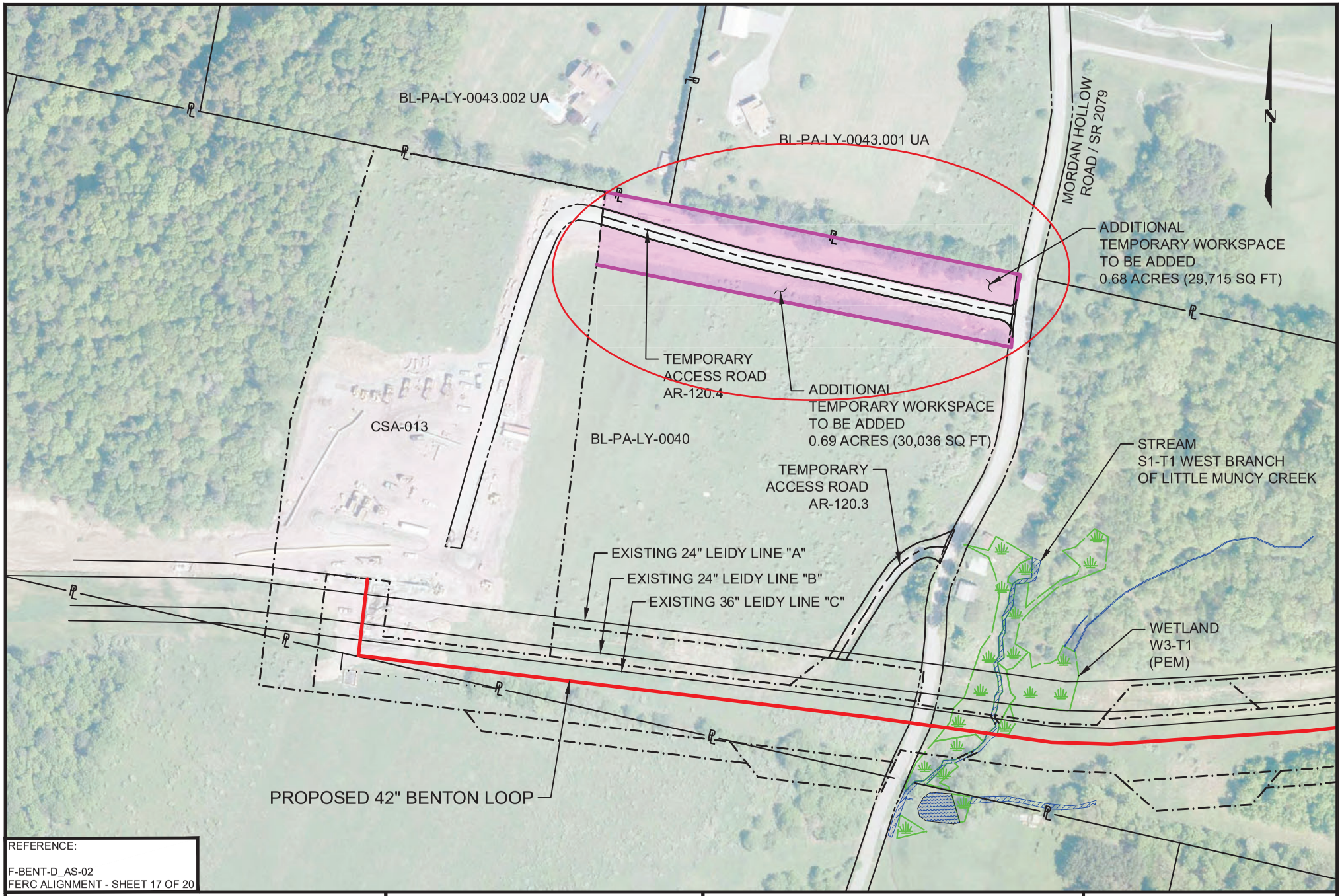
SCALE IN FEET

SHEET 1 OF 1
12/26/2019

LEIDY SOUTH PROJECT
MEMORANDUM OF CHANGE
42" BENTON LOOP
WORKSPACE CHANGE
MOC - 119.5

Williams.

MOC-BENT-AR 119_5



REFERENCE:

F-BENT-D_AS-02
FERC ALIGNMENT - SHEET 17 OF 20

LEGEND:

- PROPOSED 42" BENTON LOOP
- EXISTING PIPELINES
- LIMITS OF DISTURBANCE
- PROPERTY LINE
- STREAM
- WETLAND AREA

200 0 200
SCALE IN FEET

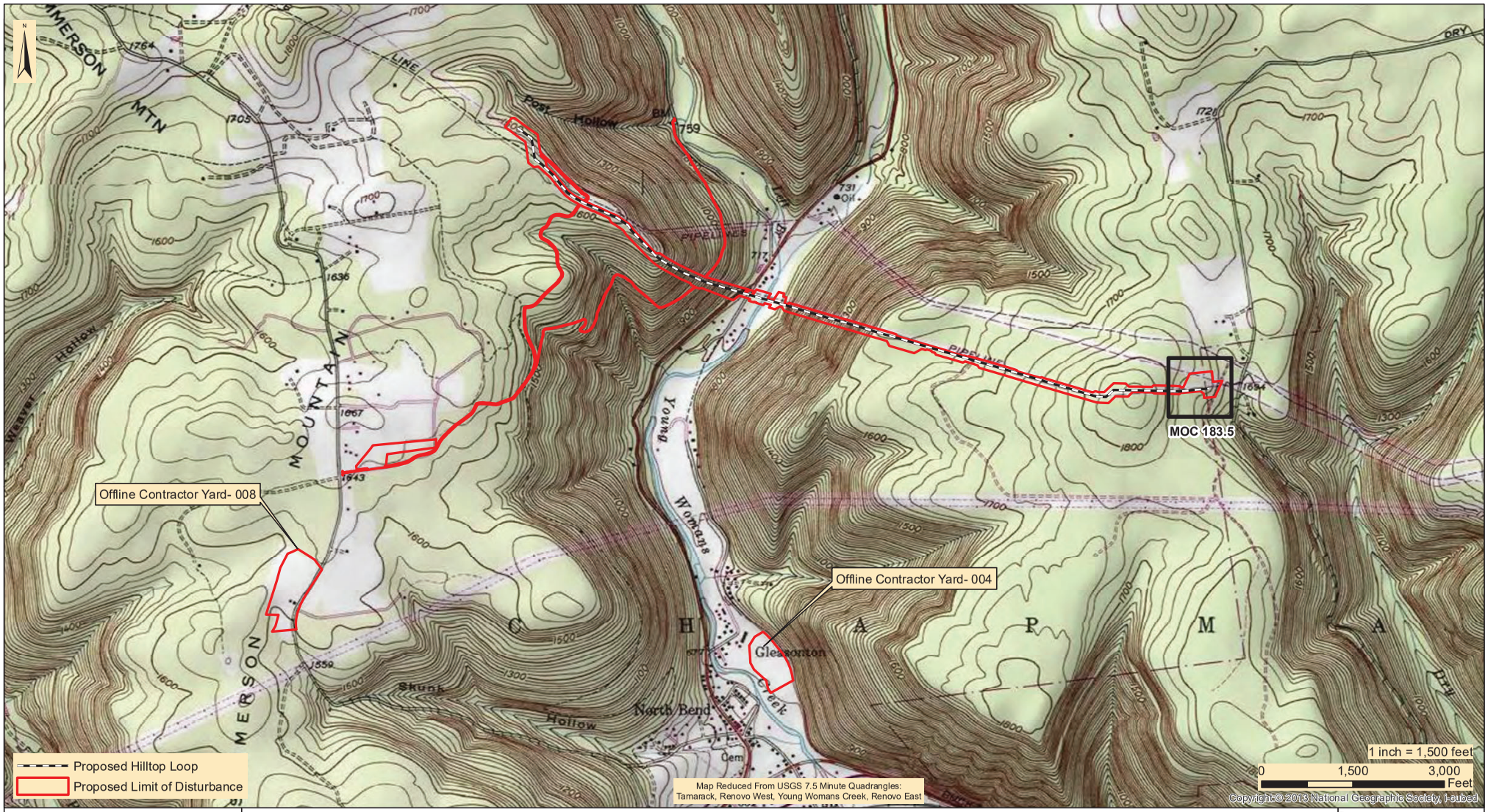
SHEET 1 OF 1
10/04/2019

LEIDY SOUTH PROJECT
MEMORANDUM OF CHANGE
42" BENTON LOOP
WORKSPACE CHANGE
MOC - 120.25

Williams.

MOC-BENT-120_25

HILLTOP LOOP



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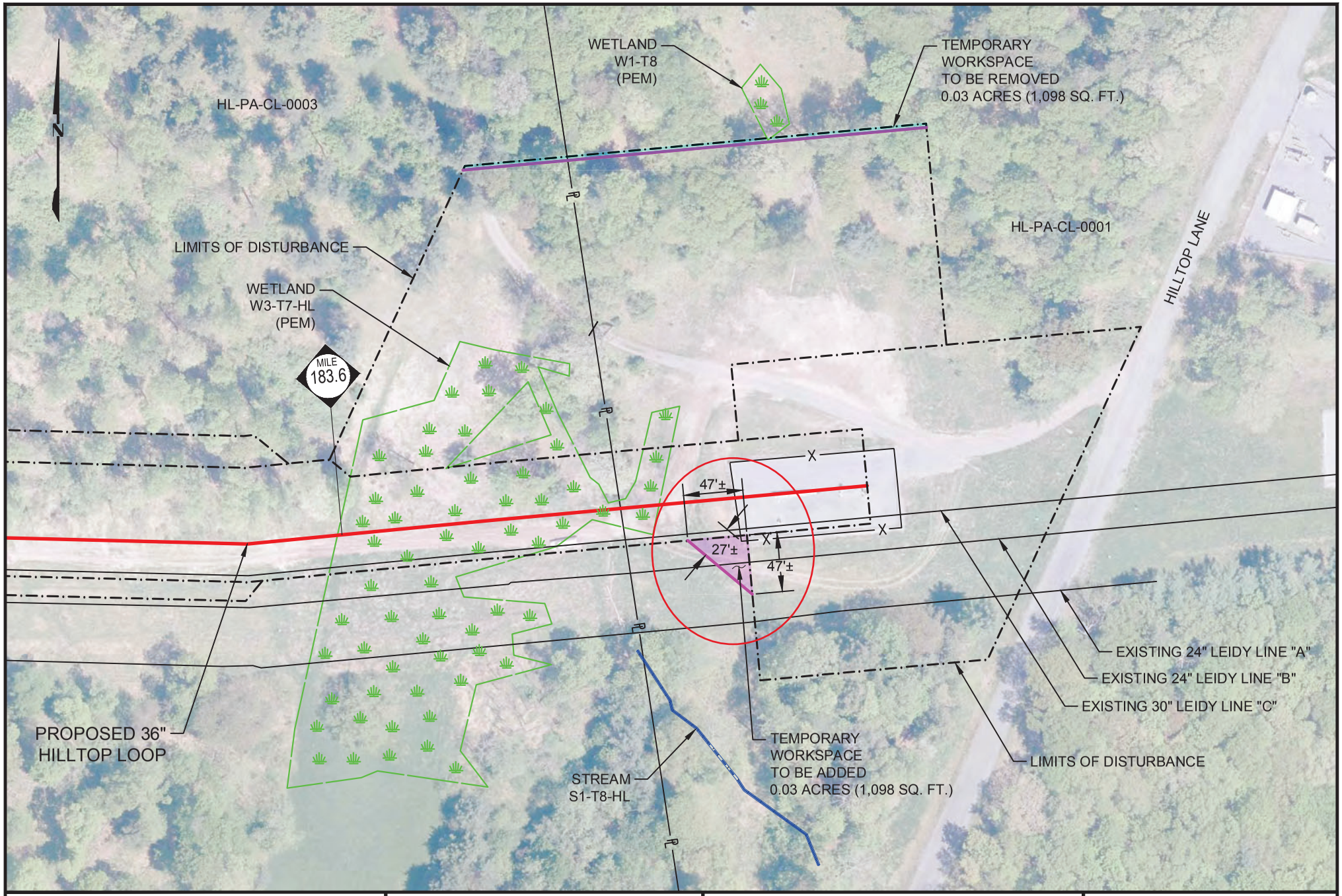
State College, PA 16803
Tele: 814.689.1650 Fax: 814.689.1557

TRANSCONTNENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT

LEIDY LINE D 36" HILLTOP LOOP
PROJECT LOCATION MAP

CHAPMAN TOWNSHIP | CLINTON COUNTY | PENNSYLVANIA

Date:	5/4/2020
WHM DRAWING NUMBER:	WILLIAMS201B002
Drawn By:	FTN
Figure Number:	2-1



LEGEND:

- PROPOSED 36" HILLTOP LOOP
- EXISTING PIPELINES
- LIMITS OF DISTURBANCE
- PROPERTY LINE
- STREAM
- WETLAND AREA

100 0 100

SCALE IN FEET

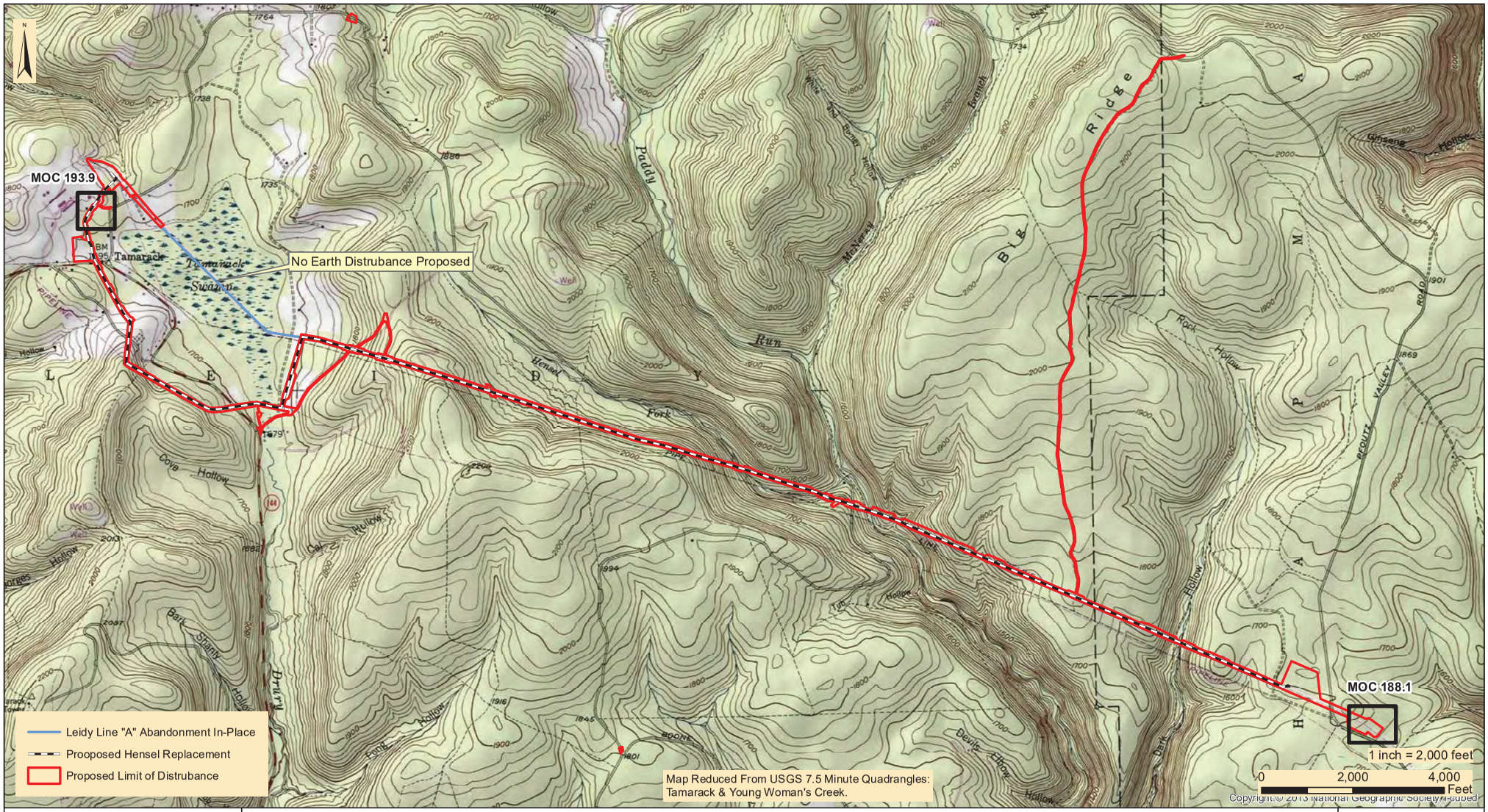
SHEET 1 OF 1
09/13/2019

LEIDY SOUTH PROJECT
MEMORANDUM OF CHANGE
36" HILLTOP LOOP
WORKSPACE CHANGE
MOC 183.5

Williams.

MOC-HILL-183_5

HENSEL REPLACEMENT



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Tele: 814.689.1650 Fax: 814.689.1557

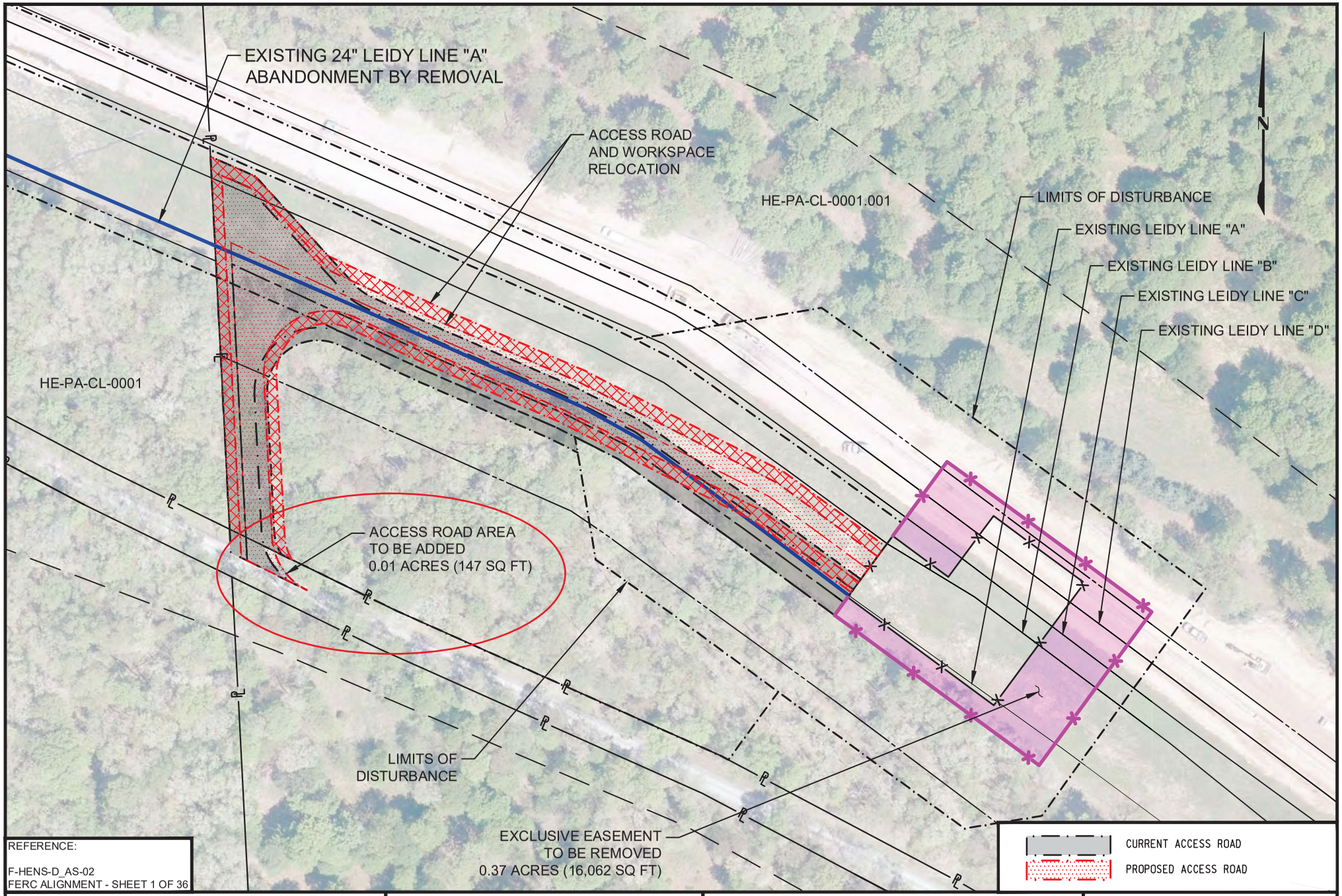
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

LEIDY SOUTH PROJECT

LEIDY LINE D 36" HENSEL REPLACEMENT PROJECT LOCATION MAP

LEIDY & CHAPMAN TOWNSHIP | CLINTON COUNTY | PENNSYLVANIA

Date:	5/4/2020
WHM DRAWING NUMBER:	WILLIAMS202B001
Drawn By:	FTN
Figure Number:	1-1



REFERENCE:

F-HENS-D_AS-02
FERC ALIGNMENT - SHEET 1 OF 36

LEGEND:

- EXISTING 24" LEIDY LINE "A"
- EXISTING PIPELINES
- LIMITS OF DISTURBANCE
- PROPERTY LINE
- STREAM
- WETLAND AREA

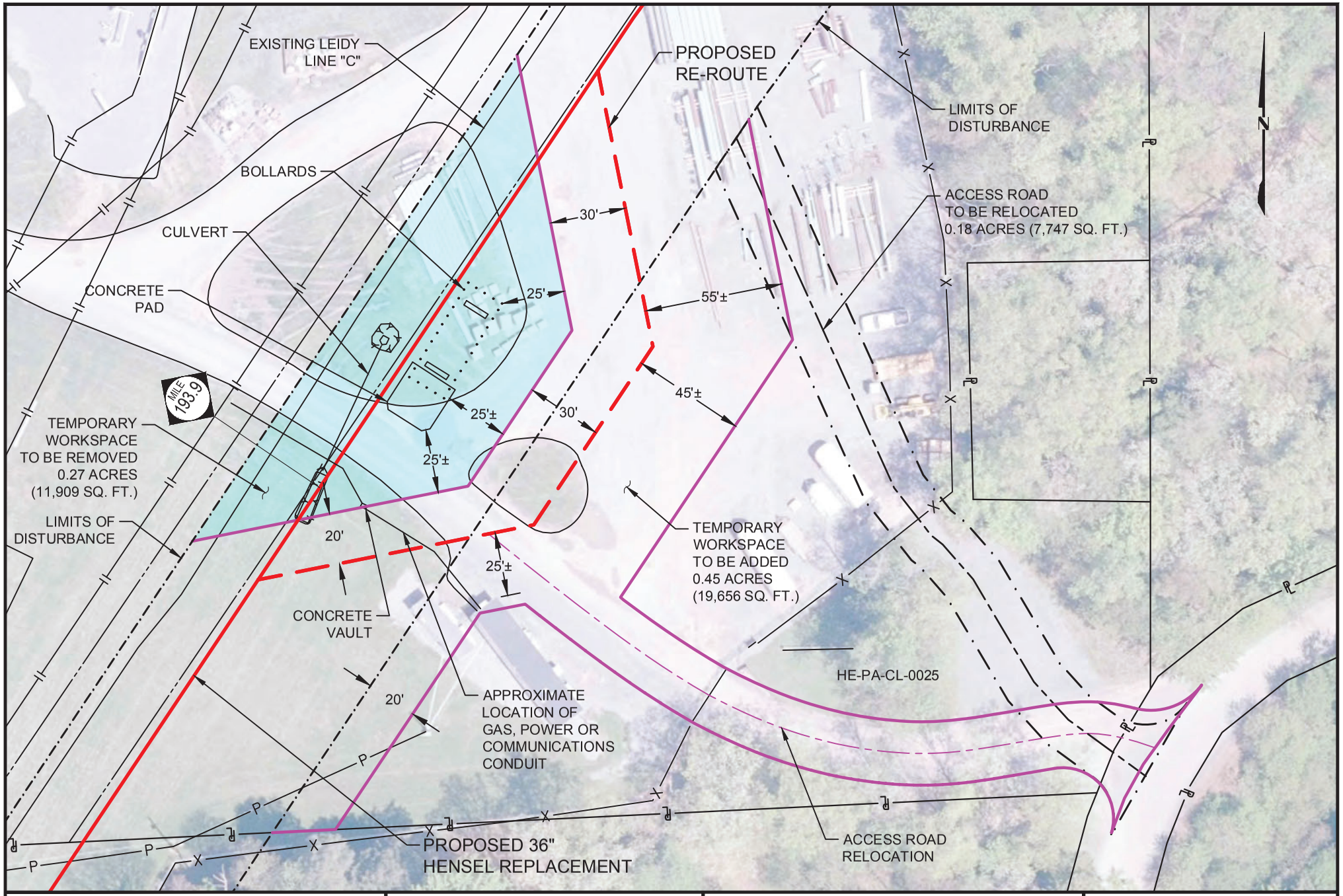
100 0 100
SCALE IN FEET

SHEET 1 OF 1
10/14/2019

LEIDY SOUTH PROJECT
MEMORANDUM OF CHANGE
36" HENSEL REPLACEMENT
EXCLUSIVE EASEMENT & ACCESS ROAD CHANGE
MOC 188.1

Williams.

REV 2
MOC-HENS-188_1



LEGEND:

- PROPOSED 36" HENSEL REPLACEMENT
- EXISTING PIPELINES
- LIMITS OF DISTURBANCE
- PROPERTY LINE
- STREAM
- WETLAND AREA

50 0 50

SCALE IN FEET

SHEET 1 OF 1
09/13/2019

LEIDY SOUTH PROJECT
MEMORANDUM OF CHANGE
36" HENSEL REPLACEMENT
RE-ROUTE & ACCESS ROAD CHANGE
MOC 193.9

Williams.

MOC-HENS-193_9

COMMONWEALTH OF PENNSYLVANIA
PENNSYLVANIA GAME COMMISSION
2001 Elmerton Avenue
Harrisburg, PA 17110-9797
Wildlife Habitat Management
(717) 787-6818

May 20, 2020 **PGC ID Number: 201811010501 - Revision**

Mr. Kevin Clark
WHM Consulting, Inc.
2525 Green Tech Drive, Suite B
State College, Pennsylvania 16803
kevinc@whmgroup.com

Re: *Transcontinental Gas Pipe Line Company, LLC (Transco)* - Leidy South Project
PNDI Receipt File: *project_receipt_leidy_south_project_670193_FINAL_5.pdf*
Multiple Townships, Multiple Counties, Pennsylvania

Dear Mr. Clark,

Thank you for submitting the Pennsylvania Natural Diversity Inventory (PNDI) Manual Project Submission Form for review. The Pennsylvania Game Commission (PGC) screened this project for potential impacts to species and resources of concern under PGC responsibility, which includes birds and mammals only. This is an update to the letter issued on October 1, 2019 based on revisions to the limit of disturbance throughout the project area.

Potential Impact Anticipated
PNDI records indicate species or resources of concern are located in the vicinity of the project. The PGC has received and thoroughly reviewed the information that you provided to this office, as well as PNDI data, and has determined that potential impacts to the following threatened, endangered, and species of special concern birds and mammals may be associated with your project. Therefore, additional measures may be necessary to avoid potential impacts to the species listed below.

Scientific Name	Common Name	PA Status	Federal Status
Myotis septentrionalis	Northern Long-eared Bat	THREATENED	THREATENED

Next Steps

Northern long-eared bats: Northern long-eared bats are a federally listed threatened species under the jurisdiction of the U.S. Fish and Wildlife Service. As a result, our agency defers comments on potential impacts to Northern long-eared bats to the U.S. Fish and Wildlife Service.

This response represents the most up-to-date summary of the PNDI data files and is valid for two (2) years from the date of this letter. An absence of recorded information does not necessarily

imply actual conditions on site. Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered.

Should the proposed work continue beyond the period covered by this letter, please resubmit the project to this agency as an "Update" (including an updated PNDI receipt, project narrative and accurate map). If the proposed work has not changed and no additional information concerning listed species is found, the project will be cleared for PNDI requirements under this agency for two additional years.

This finding applies to impacts to birds and mammals only. To complete your review of state and federally-listed threatened and endangered species and species of special concern, please be sure that the U.S. Fish and Wildlife Service, the PA Department of Conservation and Natural Resources, and/or the PA Fish and Boat Commission have been contacted regarding this project as directed by the online PNDI ER Tool found at www.naturalheritage.state.pa.us.

Sincerely,

Olivia A. Braun
Environmental Planner
Division of Environmental Planning & Habitat Protection
Bureau of Wildlife Habitat Management
Phone: 717-787-4250, Extension 3128
Fax: 717-787-6957
E-mail: Olbraun@pa.gov

A PNHP Partner

Pennsylvania Natural Heritage Program

OAB/oab

cc: Schnupp
Brauning
Turner
Librandi Mumma
Figured
Wenner
File

PENNSYLVANIA FISH AND BOAT COMMISSION

Pennsylvania Fish & Boat Commission

established 1866

Division of Environmental Services
Natural Gas Section
595 E Rolling Ridge Dr.
Bellefonte, PA 16823

November 20, 2018

IN REPLY REFER TO
SIR# 50327

WHM Consulting, Inc.
Kevin Clark
2525 Green Tech Drive
State College, Pennsylvania 16803

RE: Species Impact Review (SIR) – Rare, Candidate, Threatened and Endangered Species
PNDI Search No. 670193_1
Leidy South Project
CLINTON County: - COLUMBIA County: - LUZERNE County: - LYCOMING County: - SCHUYLKILL County:

Dear Kevin Clark:

This responds to your inquiry about a Pennsylvania Natural Diversity Inventory (PNDI) Internet Database search "potential conflict" or a threatened and endangered species impact review. These projects are screened for potential conflicts with rare, candidate, threatened or endangered species under Pennsylvania Fish & Boat Commission jurisdiction (fish, reptiles, amphibians, aquatic invertebrates only) using the Pennsylvania Natural Diversity Inventory (PNDI) database and our own files. These species of special concern are listed under the Endangered Species Act of 1973, the Wild Resource Conservation Act, and the Pennsylvania Fish & Boat Code (Chapter 75), or the Wildlife Code.

Timber Rattlesnake (*Crotalus horridus*, Species of Special Concern)

Timber Rattlesnakes occur in the forested, mountainous regions of the Commonwealth. They prefer forested areas to forage for small mammals (e.g., mice and chipmunks) and southerly-facing slopes for hibernating and other thermoregulatory activities. The Timber Rattlesnake is threatened by habitat loss/alteration, wanton killing, and poaching.

Given the proximity of the project to known Timber Rattlesnake occurrences, we recommend that a habitat assessment be conducted in the project area by a qualified Timber Rattlesnake surveyor to determine if the project is likely to impact the species. The habitat assessment will not be necessary at all project locations included with the PNDI submission but are especially important near the Leidy Line D Hensel Replacement Project in Clinton County, the Hill Top Pipeline Loop Expansion Project in Clinton County and Potential Grass Roots Compressor Station 620-1 location in Schuylkill County. We have included a list of qualified surveyors and habitat assessment protocol for your convenience.

The list is not exhaustive as there may be qualified surveyors who have not asked to be placed on this list. Additionally, it is not mandatory that you use someone on this list. Should you choose to complete the habitat assessment, the qualified surveyor should submit a report to this office for review and comment. The habitat survey report should include color photographs of the project area (keyed to a site map or diagram) and a description of habitats occurring within the immediate area to be developed (including access roads), as well as the surrounding area. Potential Timber Rattlesnake critical habitat (denning/gestating areas) should be photographed and mapped accordingly. In addition, the report should also include detailed project plans and maps with a description of the proposed work (including access roads), project impacts and alternatives. Pending the review of this information, a survey targeting the presence of the Timber Rattlesnake in the project area and/or other project modifications may be requested.

This response represents the most up-to-date summary of the PNDI data and our files and is valid for two (2) years from the date of this letter. An absence of recorded species information does not necessarily imply species absence. Our data files and the PNDI system are continuously being updated with species occurrence information. Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered, and consultation shall be re-initiated.

If you have any questions regarding this review, please contact Jordan R. Allison at 814-359-5236 and refer to the SIR # 50327. Thank you for your cooperation and attention to this important matter of species conservation and habitat protection.

Sincerely,

Jordan R. Allison, Chief
Natural Gas Section

JRA/dn

From: Allison, Jordan
To: Kevin Clark
Subject: RE: E ternal P DI- 019 pdate (Leidy South Project)
Date: Tuesday, June , 2019 11:0 :50 AM
Attachments: image001.jpg

Kevin,

Thank you for sending notifying us of the updated PNDI for proposed changes to the Leidy South Project. I have reviewed the updated PNDI and have no additional comments/recommendations to offer beyond what was expressed in our November 20th, 2018 letter for SIR# 50327. Should you have any additional questions, please feel free to get in touch.

Thanks,

Jordan Allison, Fisheries Biologist
Natural Gas Section
PFBC Centre Region Office
595 E Rolling Ridge DR
Bellefonte, PA 16823

814-359-5236

-The gods do not deduct from man's allotted span the hours spent in fishing-

---

From: Kevin Clark <kevinc@whmgroup.com>
Sent: Monday, April 15, 2019 3:27 PM
To: Allison, Jordan <jorallison@pa.gov>; Dogonniuck, Alexander <c-adogonni@pa.gov>; Braun, Olivia <olbraun@pa.gov>
Cc: Richardson, Devyn <Devyn.Richardson@williams.com>; Henry, Josh <Josh.Henry@williams.com>
Subject: [External] PNDI-670193 Update (Leidy South Project)

***ATTENTION:** This email message is from an external sender. Do not open links or attachments from unknown sources. To report suspicious email, forward the message as an attachment to CWOPA_SPAM@pa.gov.*

To all:

Transcontinental Gas Pipe Line Company, LLC (Transco) is providing an update to the original PNDI Online Large Project Review for the Leidy South Project (Project) submitted on October 31, 2018. This update provides additional project information and details since the previous submission. The information is attached to this email, as well as uploaded on the PNDI website. Should the Project, as presented, indicate the need for additional species-specific field studies or indicate other Project

considerations, please provide a response outlining those requirements.

If you have any questions regarding this correspondence or require additional Project information, please do not hesitate to contact Devyn Richardson at (713) 215-2781 or Devyn.Richardson@Williams.com. Alternatively, you can contact me at (814) 689-1650 or via e-mail at kevinc@whmgroup.com. I appreciate your assistance and thank you for your attention to this request.

Kevin M. Clark | PWS
Project Manager
WHM Consulting, LLC (dba WHM Consulting, Inc)
(814) 689-1650 ext. 105

TIMBER RATTLESNAKE PHASE I HABITAT ASSESSMENT AND PHASE II PRESENCE/ ABSENCE DENNING SURVEY REPORT (PRIVILEGED)

Division of Environmental Services
Natural Gas Section
595 E Rolling Ridge Dr.
Bellefonte, PA 16823

August 21, 2019

IN REPLY REFER TO
SIR# 50327

WHM Consulting, Inc.
Kevin Clark
2525 Green Tech Drive
State College, Pennsylvania 16803

RE: Species Impact Review (SIR) – Rare, Candidate, Threatened and Endangered Species
PNDI Search No. 670193_1
Leidy South Project
CLINTON County: - COLUMBIA County: - LUZERNE County: - LYCOMING County: - SCHUYLKILL County:

Dear Kevin Clark:

This responds to your inquiry about a Pennsylvania Natural Diversity Inventory (PNDI) Internet Database search "potential conflict" or a threatened and endangered species impact review. These projects are screened for potential conflicts with rare, candidate, threatened or endangered species under Pennsylvania Fish & Boat Commission jurisdiction (fish, reptiles, amphibians, aquatic invertebrates only) using the Pennsylvania Natural Diversity Inventory (PNDI) database and our own files. These species of special concern are listed under the Endangered Species Act of 1973, the Wild Resource Conservation Act, and the Pennsylvania Fish & Boat Code (Chapter 75), or the Wildlife Code.

We have received the results of your Phase I Timber Rattlesnake Habitat Assessment and Phase II Denning which were completed in April and May of this year. Your staff confirmed the presence of Timber Rattlesnakes at six den/gestation sites located on or adjacent to the limit of disturbance for the Hensel Replacement portion of the project and three sites for the Hill Top Loop portion. Of the nine confirmed denning sites all but one, the Hilltop Loop habitat area eight, were able to be avoided. Additionally, impacts to potential and occupied gestation habitat are proposed at multiple locations along the Hensel Replacement portion of the project. No impacts to these habitats are proposed for the Hilltop Loop. In order to avoid impacts to denning Timber Rattlesnakes and mitigate impacts to potential and occupied gestation habitat, the commission recommends the following avoidance measures:

1.) All blasting within 50 feet of confirmed denning habitats should occur between May 15th and October 1st to avoid impacts to snakes occupying these sites. If blasting is proposed during this timeframe within 300 feet of a den site, please consult with this office prior to doing so.

2.) We recommend that gestation habitat impacted during construction be recreated in accordance with our "Guidelines for Timber Rattlesnake Habitat creation". I have attached a copy of this document for your convenience.

This response represents the most up-to-date summary of the PNDI data and our files and is valid for two (2) years from the date of this letter. An absence of recorded species information does not necessarily imply species absence. Our data files and the PNDI system are continuously being updated with species occurrence information. Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered, and consultation shall be re-initiated.

If you have any questions regarding this review, please contact Jordan R. Allison at 814-359-5236 and refer to the SIR # 50327. Thank you for your cooperation and attention to this important matter of species conservation and habitat protection.

Sincerely,

Jordan R. Allison, Chief
Natural Gas Section

JRA/dn

Division of Environmental Services
Natural Gas Section
595 E Rolling Ridge Dr.
Bellefonte, PA 16823

August 26, 2019

IN REPLY REFER TO
SIR# 50327

WHM Consulting, Inc.
Kevin Clark
2525 Green Tech Drive
State College, Pennsylvania 16803

RE: Species Impact Review (SIR) – Rare, Candidate, Threatened and Endangered Species
PNDI Search No. 670193_4
Leidy South Project
CLINTON County: - COLUMBIA County: - LUZERNE County: - LYCOMING County: - SCHUYLKILL County:

Dear Kevin Clark:

This responds to your inquiry about a Pennsylvania Natural Diversity Inventory (PNDI) Internet Database search "potential conflict" or a threatened and endangered species impact review. These projects are screened for potential conflicts with rare, candidate, threatened or endangered species under Pennsylvania Fish & Boat Commission jurisdiction (fish, reptiles, amphibians, aquatic invertebrates only) using the Pennsylvania Natural Diversity Inventory (PNDI) database and our own files. These species of special concern are listed under the Endangered Species Act of 1973, the Wild Resource Conservation Act, and the Pennsylvania Fish & Boat Code (Chapter 75), or the Wildlife Code.

According to this submission and our records there have been minor changes in the project since your last submission. However, the Commission's comments regarding potential impacts to rare, candidate, threatened, or endangered species under our jurisdiction, as detailed in our letter of August 21st, 2019 for SIR# 50327 , remain unchanged.

This response represents the most up-to-date summary of the PNDI data and our files and is valid for two (2) years from the date of this letter. An absence of recorded species information does not necessarily imply species absence. Our data files and the PNDI system are continuously being updated with species occurrence information. Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered, and consultation shall be re-initiated.

If you have any questions regarding this review, please contact Jordan R. Allison at 814-359-5236 and refer to the SIR # 50327. Thank you for your cooperation and attention to this important matter of species conservation and habitat protection.

Sincerely,

Jordan R. Allison, Chief
Natural Gas Section

JRA/dn

Transcontinental Gas Pipe Line Company, LLC
2800 Post Oak Boulevard (77056)
P.O. Box 1396
Houston, Texas 77251-1396
713/215-2000

May 7, 2020

Re: Update PNDI Search ID: PNDI-670193
Transcontinental Gas Pipe Line Company, LLC
Leidy South Project

To Whom it May Concern:

Transcontinental Gas Pipe Line Company, LLC (Transco) is providing an update to the PNDI for the Leidy South Project (Project), PNDI-670193. Minor workspace changes have been incorporated into the design since the last update on August 22, 2019. The following Project information summarizes workspace changes that will take place outside the previously submitted Project Area. All areas outlined below were include in the survey area for species specific surveys conducted for the Project.

Benton Loop

MOC – AR 119.5
Added <0.01 acre of workspace to an existing access road to accommodate the revised Wilson Road Right of Way.

MOC – 120.25
Added 1.37 acre of additional temporary workspace to Access Road AR-120.4 for the purpose of the removing existing post-construction stormwater management facilities installed for the Atlantic Sunrise project that will no longer be required upon the completion of the Leidy South Project.

Hilltop Loop

MOC – 183.5
Modified Contractor Yard to allow for the removal of the existing valve site resulting in the addition of 0.03 acre of temporary workspace.

Hensel Replacement

MOC – 188.1
Added <0.01 acre of workspace to a proposed access road to extend onto Summerson Mountain Road.

MOC – 193.9
Rerouted pipeline centerline to avoid newly installed tanks on Dominion property and relocated the access to an existing road resulting in the addition of 0.45 acre of temporary workspace.

Updated mapping is provided in Attachment A. This mapping outlines the overall Project Location Maps with specific call outs to the updated locations and site-specific mapping for each of the workspace changes listed above. We are requesting verification that the minor changes to the Project since the last submission will not result in changes to your agencies responses regarding potential impacts to rare, candidate, threatened or endangered species.

If you have any questions regarding this correspondence or require additional Project information, please do not hesitate to call me at (412) 713-0485 or contact me via e-mail at josh.henry@williams.com. Alternatively, you can contact Kevin Clark, Project Manager, at WHM Consulting, Inc., at (814) 689-1650 or via e-mail at kevinc@whmgroup.com. I appreciate your assistance and thank you for your attention to this request.

Respectfully submitted,

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

Josh Henry
Environmental Specialist

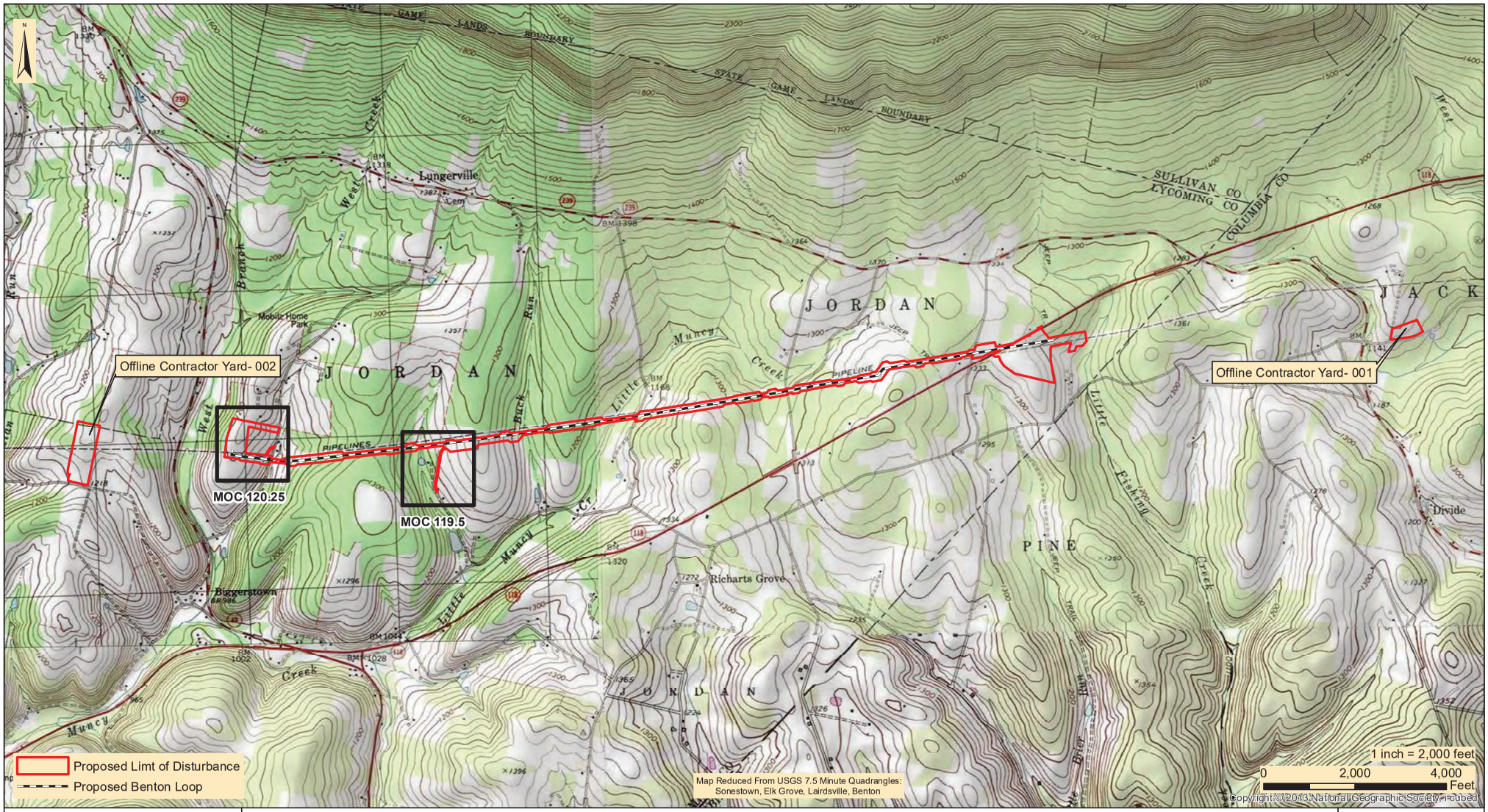
Attachments: Attachment A: Mapping

cc: Shauna Akers, Transco
Kevin Clark, WHM Consulting, Inc.

ATTACHMENT A

MAPPING

BENTON LOOP



designs, permits, resolutions | consulting, INC.
2525 Green Tech Drive, Suite B,
State College, PA 16803
Tele: 814.689.1650 Fax: 814.689.1557

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

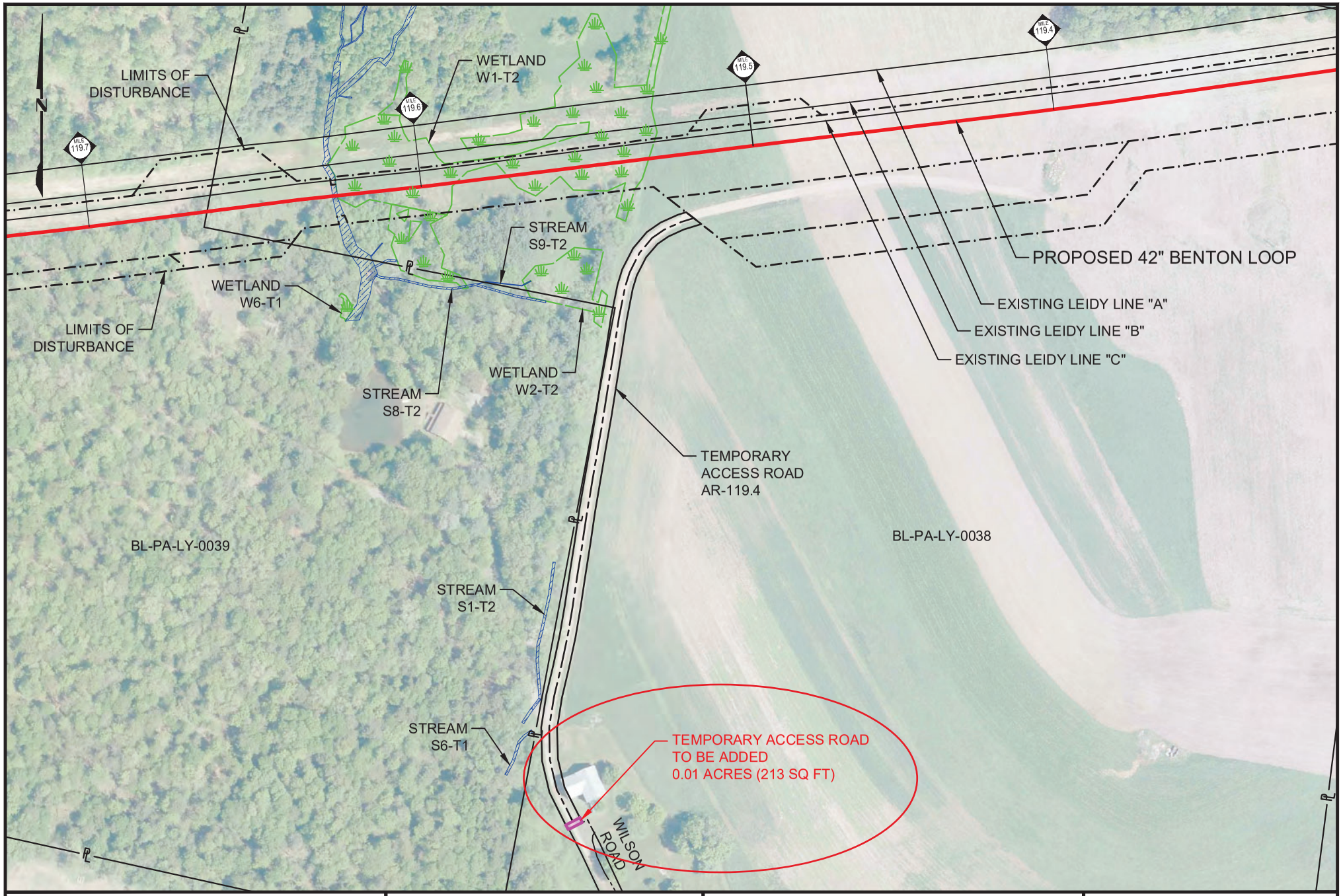
LEIDY SOUTH PROJECT

LEIDY LINE D 42" BENTON LOOP PROJECT LOCATION MAP

LYCOMING & COLUMBIA COUNTIES

PENNSYLVANIA

Date:	5/4/2020
WHM DRAWING NUMBER:	WILLIAMS202B003
Drawn By:	FTN
Figure Number:	1



LEGEND:

- PROPOSED 42" BENTON LOOP
- EXISTING PIPELINES
- LIMITS OF DISTURBANCE
- PROPERTY LINE
- STREAM CROSSING
- WETLAND AREA

200 0 200

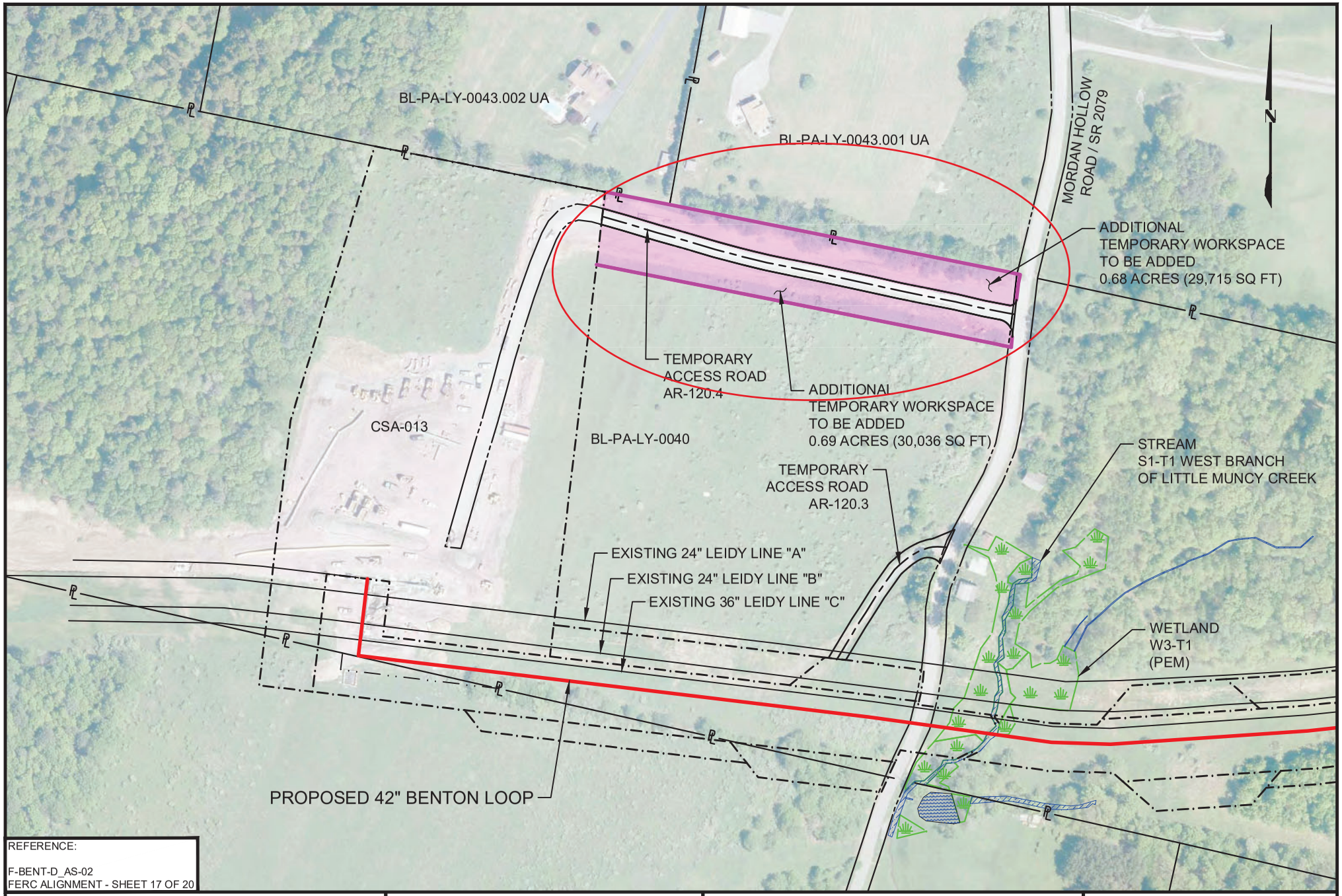
SCALE IN FEET

SHEET 1 OF 1
12/26/2019

LEIDY SOUTH PROJECT
MEMORANDUM OF CHANGE
42" BENTON LOOP
WORKSPACE CHANGE
MOC - 119.5

Williams.

MOC-BENT-AR 119_5



REFERENCE:

F-BENT-D_AS-02
FERC ALIGNMENT - SHEET 17 OF 20

LEGEND:

- PROPOSED 42" BENTON LOOP
- EXISTING PIPELINES
- LIMITS OF DISTURBANCE
- PROPERTY LINE
- STREAM
- WETLAND AREA

200 0 200
SCALE IN FEET

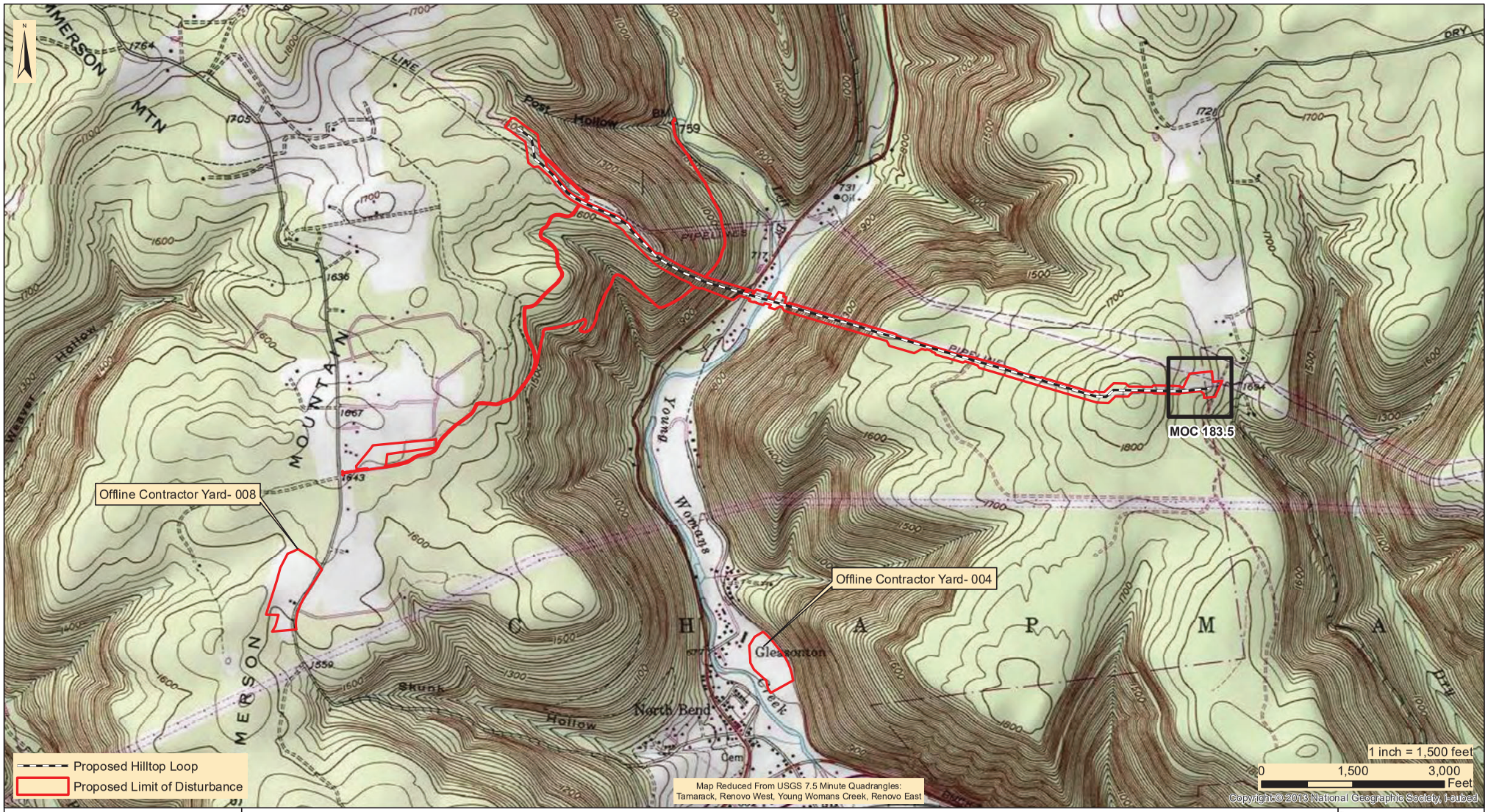
SHEET 1 OF 1
10/04/2019

LEIDY SOUTH PROJECT
MEMORANDUM OF CHANGE
42" BENTON LOOP
WORKSPACE CHANGE
MOC - 120.25

Williams.

MOC-BENT-120_25

HILLTOP LOOP



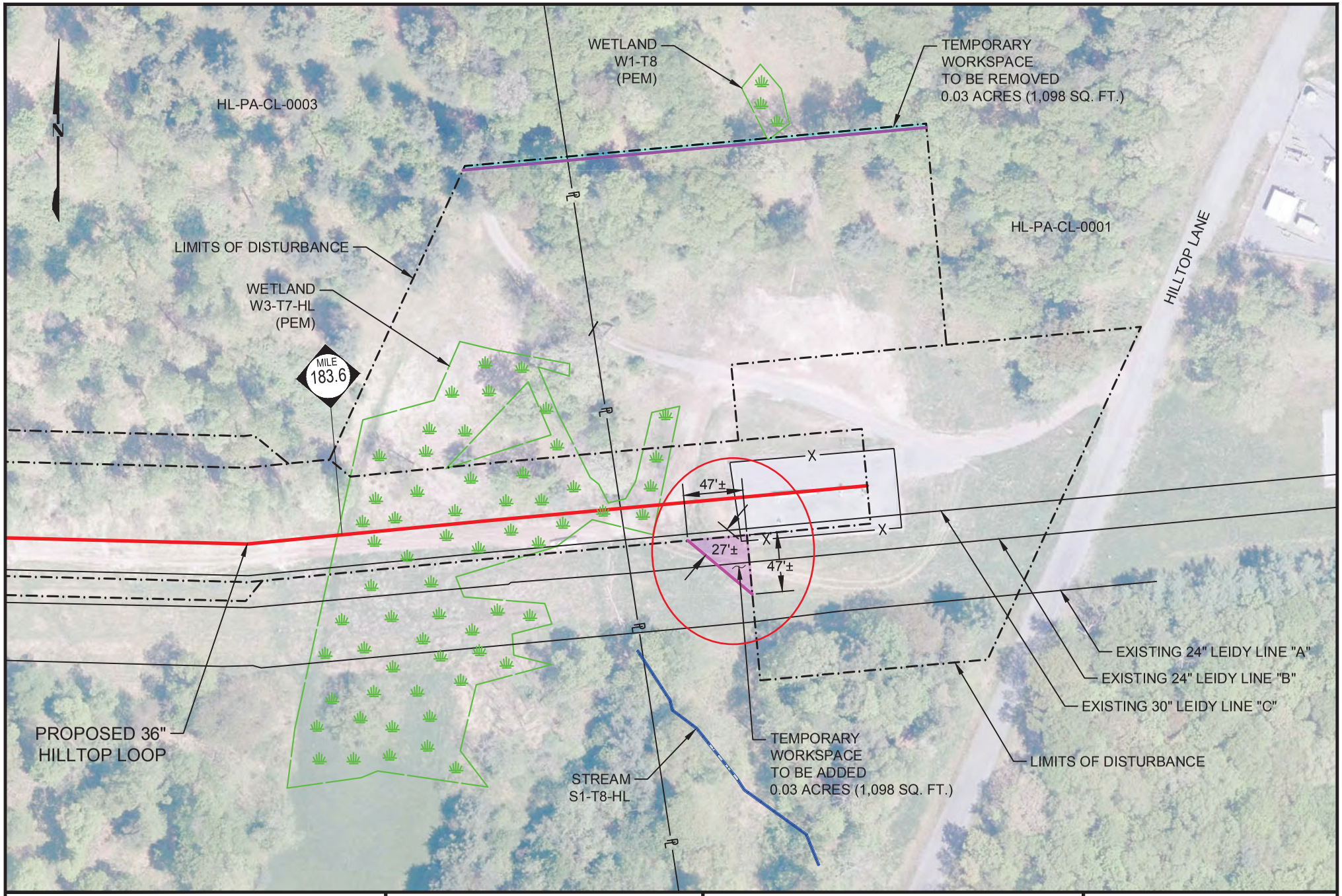
designs, permits, resolutions | consulting, INC.
2525 Green Tech Drive, Suite B,
State College, PA 16803
Tele: 814.689.1650 Fax: 814.689.1557

TRANSCONTNENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT

LEIDY LINE D 36" HILLTOP LOOP
PROJECT LOCATION MAP

CHAPMAN TOWNSHIP | CLINTON COUNTY | PENNSYLVANIA

Date:	5/4/2020
WHM DRAWING NUMBER:	WILLIAMS201B002
Drawn By:	FTN
Figure Number:	2-1



LEGEND:

- PROPOSED 36" HILLTOP LOOP
- EXISTING PIPELINES
- LIMITS OF DISTURBANCE
- PROPERTY LINE
- STREAM
- WETLAND AREA

100 0 100

SCALE IN FEET

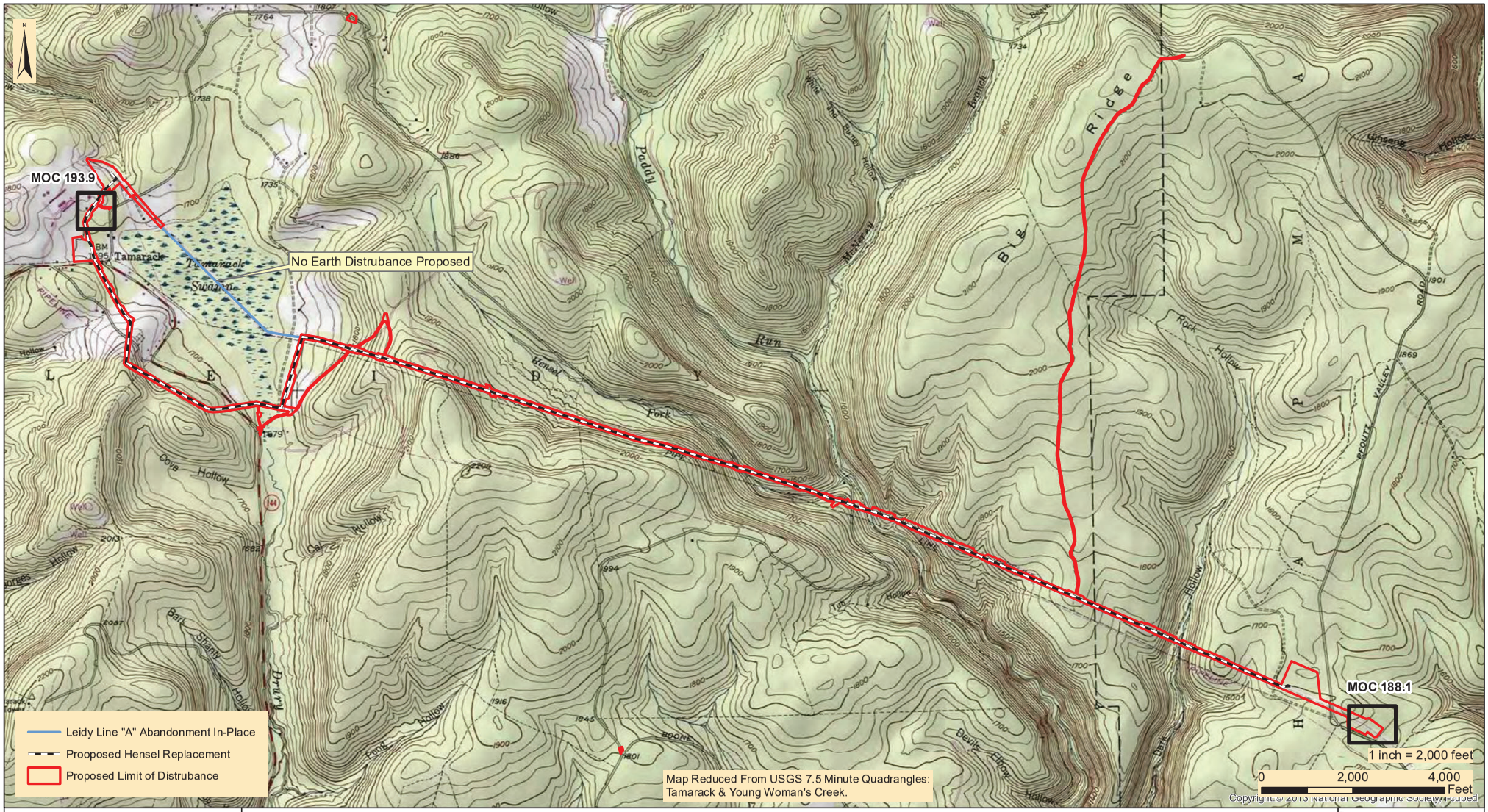
SHEET 1 OF 1
09/13/2019

LEIDY SOUTH PROJECT
MEMORANDUM OF CHANGE
36" HILLTOP LOOP
WORKSPACE CHANGE
MOC 183.5

Williams.

MOC-HILL-183_5

HENSEL REPLACEMENT



designs, permits, resolutions | consulting, INC.
2525 Green Tech Drive, Suite B,
State College, PA 16803
Tele: 814.689.1650 Fax: 814.689.1557

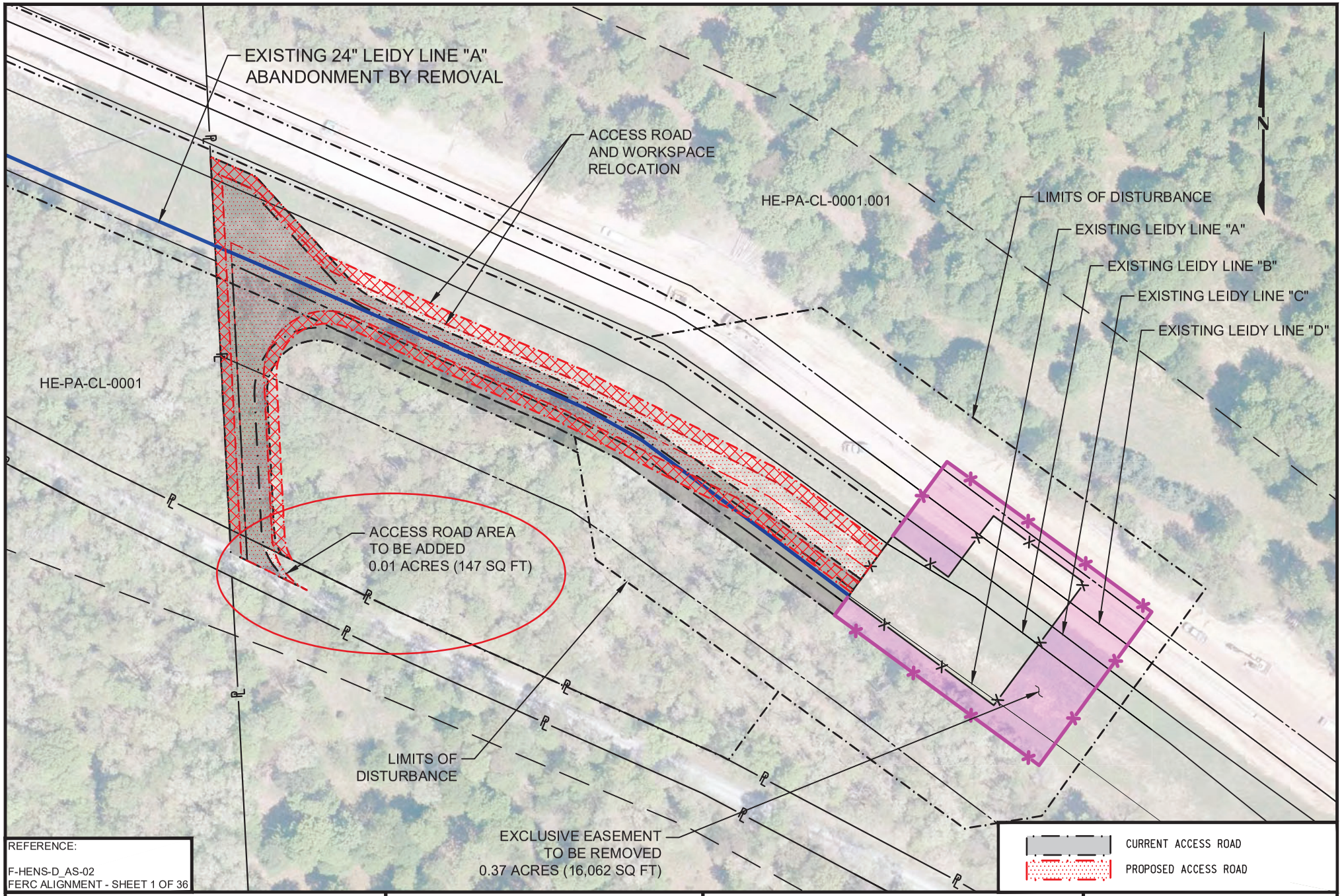
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

LEIDY SOUTH PROJECT

LEIDY LINE D 36" HENSEL REPLACEMENT PROJECT LOCATION MAP

LEIDY & CHAPMAN TOWNSHIP | CLINTON COUNTY | PENNSYLVANIA

Date:	5/4/2020
WHM DRAWING NUMBER:	WILLIAMS202B001
Drawn By:	FTN
Figure Number:	1-1



REFERENCE:

F-HENS-D_AS-02
FERC ALIGNMENT - SHEET 1 OF 36

LEGEND:

- EXISTING 24" LEIDY LINE "A"
- EXISTING PIPELINES
- LIMITS OF DISTURBANCE
- PROPERTY LINE
- STREAM
- WETLAND AREA

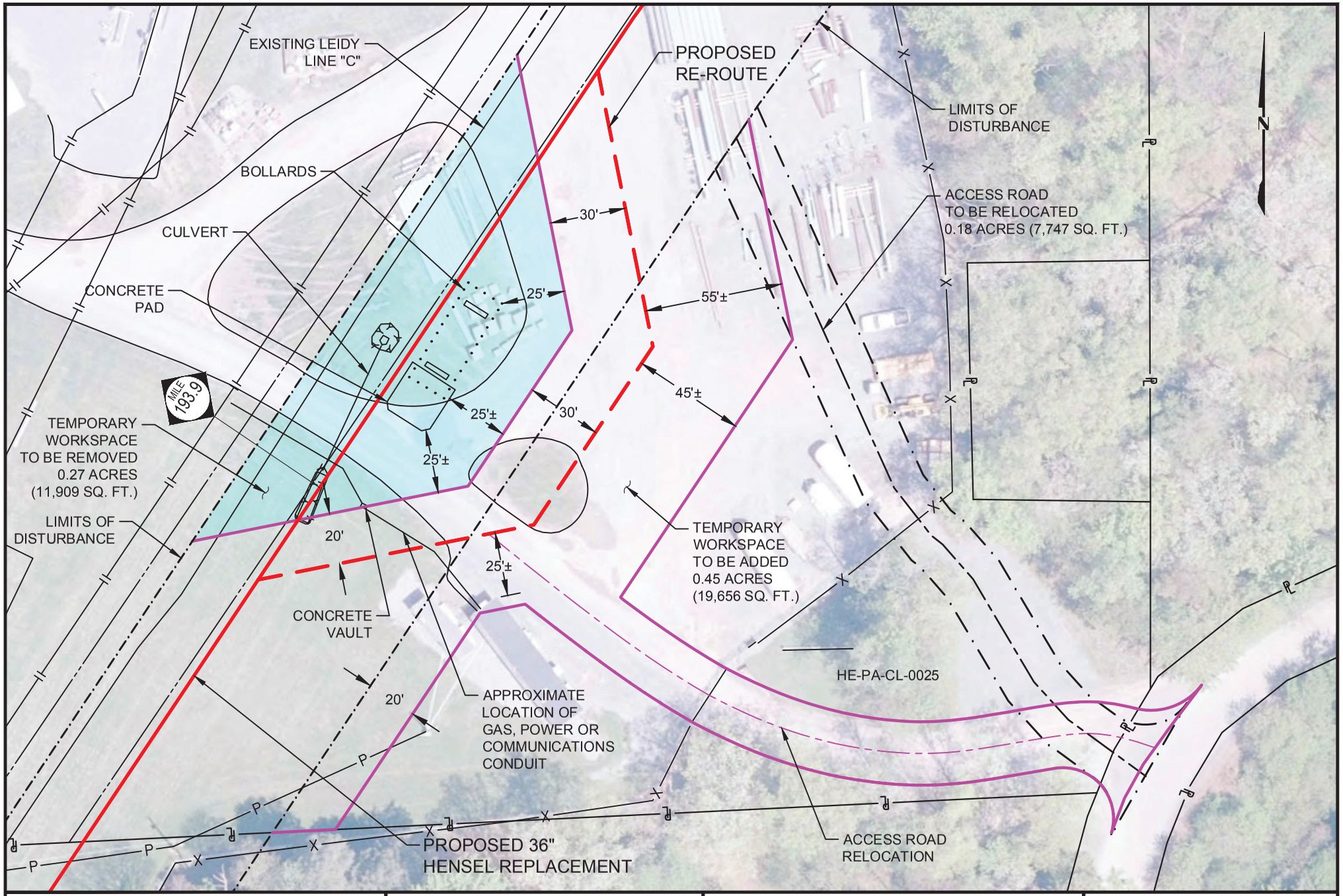
100 0 100
SCALE IN FEET

SHEET 1 OF 1
10/14/2019

LEIDY SOUTH PROJECT
MEMORANDUM OF CHANGE
36" HENSEL REPLACEMENT
EXCLUSIVE EASEMENT & ACCESS ROAD CHANGE
MOC 188.1

Williams.

REV 2
MOC-HENS-188_1



LEGEND:

- PROPOSED 36" HENSEL REPLACEMENT
- EXISTING PIPELINES
- LIMITS OF DISTURBANCE
- PROPERTY LINE
- STREAM
- WETLAND AREA

50 0 50

SCALE IN FEET

SHEET 1 OF 1
09/13/2019

LEIDY SOUTH PROJECT
MEMORANDUM OF CHANGE
36" HENSEL REPLACEMENT
RE-ROUTE & ACCESS ROAD CHANGE
MOC 193.9

Williams.

MOC-HENS-193_9

Pennsylvania Fish & Boat Commission

established 1866

Division of Environmental Services
Natural Gas Section
595 E Rolling Ridge Dr.
Bellefonte, PA 16823

May 11, 2020

IN REPLY REFER TO
SIR# 50327

WHM Consulting, Inc.
Kevin Clark
2525 Green Tech Drive
State College, Pennsylvania 16803

RE: Species Impact Review (SIR) – Rare, Candidate, Threatened and Endangered Species
PNDI Search No. 670193_5
Leidy South Project
CLINTON County: - COLUMBIA County: - LUZERNE County: - LYCOMING County: - SCHUYLKILL County:

Dear Kevin Clark:

This responds to your inquiry about a Pennsylvania Natural Diversity Inventory (PNDI) Internet Database search "potential conflict" or a threatened and endangered species impact review. These projects are screened for potential conflicts with rare, candidate, threatened or endangered species under Pennsylvania Fish & Boat Commission jurisdiction (fish, reptiles, amphibians, aquatic invertebrates only) using the Pennsylvania Natural Diversity Inventory (PNDI) database and our own files. These species of special concern are listed under the Endangered Species Act of 1973, the Wild Resource Conservation Act, and the Pennsylvania Fish & Boat Code (Chapter 75), or the Wildlife Code.

According to this submission and our records there have been no changes in the project or on-site biological information; therefore, the Commission's comments regarding potential impacts to rare, candidate, threatened, or endangered species under our jurisdiction, as detailed in our letter of _____ for SIR# , remain unchanged.

This response represents the most up-to-date summary of the PNDI data and our files and is valid for two (2) years from the date of this letter. An absence of recorded species information does not necessarily imply species absence. Our data files and the PNDI system are continuously being updated with species occurrence information. Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered, and consultation shall be re-initiated.

If you have any questions regarding this review, please contact Jordan R. Allison at 814-359-5236 and refer to the SIR # 50327. Thank you for your cooperation and attention to this important matter of species conservation and habitat protection.

Sincerely,

Jordan R. Allison, Chief
Natural Gas Section

JRA/dn

UNITED STATES FISH AND WILDLIFE SERVICE

Transcontinental Gas Pipe Line Company, LLC
2800 Post Oak Boulevard (77056)
P.O. Box 1396
Houston, Texas 77251-1396
713/215-2000

October 31, 2018

Pamela Shellenberger | Fish & Wildlife Biologist
Endangered Species Program
110 Radnor Rd; Suite 101
State College, PA 16801

Re: PNDI Project Submission for Environmental Review
Transcontinental Gas Pipe Line Company, LLC
Leidy South Project
PNDI Search ID: PNDI-670193

Dear Ms. Shellenberger:

Transcontinental Gas Pipe Line Company, LLC (Transco) is initiating permitting activities for the proposed Leidy South Project (Project) along Transco's existing natural gas transmission system. The Project is an expansion of Transco's system designed to provide firm transportation capacity of 580,000 dekatherms per day (Dth/d) from northern and western Pennsylvania to Transco's River Road interconnect in Lancaster County, Pennsylvania. The target in-service date is December 1, 2021. The Project consists of the following primary components:

Leidy Segments

Table 1 Leidy Segment - Pipeline Facilities			
Facility Type	**Township**	**County**	**Length (miles)**
Leidy Line D Hensel Replacement (L188.51 to L194.00)			
36-inch pipeline	Chapman & Leidy	Clinton	6.09
Leidy Line D Hilltop Loop (L183.55 to L186.01)			
36-inch pipeline	Chapman	Clinton	2.46
Leidy Line D Benton Loop (L116.87 to L120.42)			
42-inch pipeline	Jackson	Lycoming	3.55
		Project Total	**11.78**

The Pipeline Facilities would be co-located within/adjacent to the existing Transco right-of-way (ROW), to the extent possible. The temporary and/or permanent ROW will need to be widened at varying widths to accommodate the construction of the loops and replacement. Mapping depicting the location of the proposed Hensel Replacement, Hilltop Loop, and Benton Loop is provided in Attachment B.

Central Penn North

Table 2
Central Penn North – New Compressor Station & Modification to Existing Compressor Station

Facility ID	Modifications	Township	County	State
Existing Compressor Station 605*	Uprate the two (2) existing electric motor-driven (EMDs) from 15,000 HP to 21,000 HP each	Clinton	Wyoming	PA
New Grassroots Compressor Station 607	Install two (2) Titan 130 units (23,465 nominal HP at ISO conditions each, 46,930 HP total)	TBD	Luzerne	PA

* no earth disturbance necessary

Transco is currently assessing sites for Grassroots Compressor Station 607. Sites of interest are located in Luzerne County and consist of two options: 607 Hayfield and 607 Maransky. Modifications at Existing Compressor Station 605 will include additional horsepower/compression but will not involve earth disturbance. Mapping depicting the locations of the property boundaries of the proposed Compressor Station 607 options as well as the location of Compressor Station 605 is provided in Attachment B.

Central Penn South

Table 3
Central Penn South – New Compressor Station & Modification to Existing Compressor Station

Facility ID	Facility Type	Township	County	State
Existing Compressor Station 610	Install one (1) Titan 250 Unit (31,871 nominal HP at ISO conditions), Re-wheel and uprate two (2) existing EMD units from 20,000 to 21,000 HP, and add unit cooling	Orange	Columbia	PA
New Grassroots Compressor Station 620	Install one (1) Titan 250 Unit (31,871 nominal HP at ISO conditions)	TBD	Schuylkill	PA

Transco is currently assessing sites for Grassroots Compressor Station 620. Sites of interest are located in Schuylkill County and consist of two options: 620-1 and 620-5-1. Modification to Existing Compressor Station 610 will include the installation of additional horsepower/compression and other related modifications which may require additional land disturbance and workspace outside of the existing compressor station footprint. Mapping depicting the locations of the property boundaries of the proposed Compressor Station 620 options, and the approximate location of Existing Compressor Station 610 is provided in Attachment B.

Field surveys have initiated but have not yet been completed for the Project. Temporary and permanent workspaces (e.g. disturbance areas) have not been fully defined at this time. During and following field surveys, the proposed pipeline route and other disturbance areas are subject to refinements in order to avoid various natural resource and land use features along with engineering design requirements. Because the Project design has not been finalized, estimated areas of impact have not been provided on the PNDI Manual Project Submission Form provided in Attachment A.

This correspondence is intended to initiate consultation with the United States Fish and Wildlife Service regarding the presence of Threatened, Endangered, and special concern species occurring along or in the vicinity of the Project. An online PNDI review for the Project was completed on October 31, 2018, and is provided in Attachment C.

Should the Project, as presented, indicate the need for additional species-specific field studies or indicate other Project considerations, please provide a response outlining those requirements.

If you have any questions regarding this correspondence and information request, or require additional Project information, please do not hesitate to call me at (713) 215-2781 or contact me via e-mail at Devyn.Richardson@Williams.com. Alternatively, you can contact Kevin Clark, Project Manager at WHM Consulting, Inc., at (814) 689-1650 or via e-mail at kevinc@whmgroup.com. I appreciate your assistance and thank you for your attention to this request.

Respectfully submitted,

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

Devyn Richardson
Sr. Environmental Project Manager

Attachments: Attachment A: PNDI Manual Project Submission Form
Attachment B: Project Location Maps
Attachment C: PNDI Search ID: PNDI-670193

cc: Josh Henry, Transco
Kevin Clark, WHM Consulting, Inc.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pennsylvania Field Office
110 Radnor Road, Suite 101
State College, Pennsylvania 16801-4850

March 5, 2019

Devyn Richardson
Transcontinental Gas Pipe Line Company, L.L.C.
2800 Post Oak Boulevard (77-56)
P.O. Box 1396
Houston, TX 77251-1396

RE: USFWS Project #2019-0122
PNDI Receipt #670193

Dear Mr. Richardson:

Thank you for your letter dated October 31, 2018, requesting information about federally listed and proposed endangered and threatened species within the area affected by the Transcontinental Gas Pipe Line Company's proposed Leidy South project, portions of which are Clinton, Columbia, Luzern, Lycoming, Schuylkill, and Wyoming Counties, Pennsylvania. The proposed project is located within the range of the Indiana bat (*Myotis sodalis*), a species that is federally listed as endangered and the northern long-eared bat (*Myotis septentrionalis*), a species that is federally listed as threatened. The project is also within the known range of the northeastern bulrush (*Scirpus ancistrochaetus*), a federally listed, endangered plant.

The proposed project involves infrastructure improvement, construction, or modification along an existing gas pipeline, including seven separate facilities (three sections of pipeline replacement or loop sections comprising approximately 11.78 miles and 4 compressor stations). Project design is preliminary and no information is provided regarding possible habitat effects but you do commit, to the extent possible, that all features will be constructed in the right-of-way of the existing pipeline although widening may be required in some locations.

The following comments are provided pursuant to the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq*.) to ensure the protection of endangered and threatened species.

Indiana bat and Northern long-eared bat

Indiana bats and northern long-eared bats hibernate in caves and mines during the winter months (November through March), and use a variety of upland, wetland and riparian habitats during the

spring, summer and fall. Both bat species usually roost in dead or living trees with exfoliating bark, or living or dead trees with crevices or cavities. The female bats form nursery colonies under the exfoliating bark of dead or living trees, such as shagbark hickory, in upland or riparian areas. However, a variety of tree species such as black birch, red and white oak, and sugar maple are also used. Land-clearing, especially of forested areas, may adversely affect Indiana bats and northern long-eared bats by killing, injuring or harassing roosting bats, and by removing or reducing the quality of foraging and roosting habitat.

Proposed pipeline sections in Clinton County are in proximity to several northern long-eared bat captures. On February 16, 2016, a special conservation rule (i.e., 4(d) rule) was adopted that tailors protections for the northern long-eared bat under the Endangered Species Act (81 FR 1900). Incidental take that occurs as a result of tree removal that is not within 0.25 mile of a known northern long-eared bat hibernaculum or within 150 feet from a known, occupied maternity roost tree is not prohibited in accordance with the 4(d) rule.

While take that may occur under the provisions of the 4(d) rule is not prohibited under the Act, when tree removal occurs throughout northern long-eared bat range, and the project is authorized, funded, or permitted by a Federal agency, consultation under section 7 of the Act is required. The Service completed a nationwide biological opinion that fulfills this requirement, provided the conditions of the 4(d) rule are implemented. More information about the programmatic consultation and the streamlined procedures to meet this requirement are detailed at: http://www.fws.gov/midwest/endangered/mammals/nleb/.

Northeastern bulrush

Potential habitat for this species could be affected if project implementation will directly or indirectly affect wetlands. The northeastern bulrush is typically found in ponds, wet depressions, shallow sinkholes, vernal pools, small emergent wetlands, or beaver-influenced wetlands. These wetlands are often located in forested areas and characterized by seasonally variable water levels.

The Fish and Wildlife Service recommends that a qualified botanist with field experience in the identification of this species conduct a thorough survey[1] of all potentially suitable wetland habitat within any proposed project areas to determine the presence of the northeastern bulrush. Surveys for this species should be conducted between June 1 and September 30, when the flowering/fruiting culm is present. A survey report should be submitted to the Service for review and comment. A list of botanists skilled in the location and identification of the northeastern bulrush is available here:
https://www.fws.gov/northeast/pafo/pdf/Bulrush_qualified_10302018.pdf.

[1] When suitable habitat for a listed species is present and effects to the species are reasonably foreseeable, the Service recommends species surveys to enable fact- specific analysis of effects and fact-specific development of conservation measures. Rather than conduct habitat and/or species surveys, a project proponent and action agency may choose to assume presence of the species. However, assuming presence usually makes the analysis of effects significantly more difficult (because the specific nature of the species' presence is not known) and can lead to the incorporation of conservation measures that might otherwise not be needed if surveys were to be conducted and the species were not to be found.

Submission of more detailed project information to this office, particularly regarding the extent of forest habitat removal and wetland disturbance, will be necessary in order to determine whether either bat species or northeastern bulrush may be affected, and whether surveys or further consultation is necessary.

This response relates only to endangered and threatened species under our jurisdiction, based on an office review of the proposed project's location. No field inspection of the project area has been conducted by this office. Consequently, this letter is not to be construed as addressing potential Service concerns under the Fish and Wildlife Coordination Act or other authorities.

To avoid potential delays in reviewing your project, please use the above-referenced USFWS project tracking number in any future correspondence regarding this project.

Please contact Robert Anderson of this office at (814) 234-4090 if you have any questions or require further assistance regarding this matter.

Sincerely,

Sonja Jahrsdoerfer

Sonja Jahrsdoerfer
Project Leader

Transcontinental Gas Pipe Line Company, LLC
2800 Post Oak Boulevard (77056)
P.O. Box 1396
Houston, Texas 77251-1396
713/215-2000

April 15, 2019

Robert Anderson | Supervisory Fish and Wildlife Biologist
United States Fish and Wildlife Service
Pennsylvania Field Office
110 Radnor Rd; Suite 101
State College, PA 16801

Re: Update USFWS Project # 2019-0122; PNDI Receipt#670193
Transcontinental Gas Pipe Line Company, LLC
Leidy South Project

Mr. Anderson,

Transcontinental Gas Pipe Line Company, LLC (Transco) is providing an update to the original PNDI Online Large Project Review for the Leidy South Project (Project) submitted on October 31, 2018. In respect to the overall Project scope, one clarification has been made for the Hensel Replacement; which now includes the abandonment of 3.4 miles of the existing 23.375-inch Leidy Line A. Transco is also evaluating several site alternatives for Compressor Station 620 (Options A, B, C & G). Only one "Option" for Compressor Stations 607 & 620 will be selected.

This update provides additional details since the previous submission, including the information requested in the March 5, 2019, USFWS correspondence letter pertaining to forest habitat removal and wetland disturbance. In addition, a summary of the northern long-eared bat (NLEB) data from the Atlantic Sunrise (ASR) Project is being provided as ASR and the proposed Project have overlapping workspace. As part of ASR, additional mist net surveys were conducted within the vicinity of the proposed Project area.

Project Updates

The following Project information, which summarizes updates since the previous submission, is provided to facilitate your review:

Leidy Segments – Pipeline Facilities

- Defined workspaces associated with pipeline installation;
  - Benton Loop
    - Includes both the proposed alternative and two route alternatives to the south of the proposed pipeline.
  - Hilltop Loop

        - Includes the proposed alternative.
    - Hensel Replacement
        - Includes the proposed alternative, alternative locations for the valve placement, abandonment workspace, and the alternatives associated with a potential Horizontal Directional Drill through the Tamarack Swamp.
- Contractor Staging Area locations; and,
- Access roads to be utilized for the project.

Central Penn North

- Renamed Potential Compressor Station 607 Maransky as 607 Option A and 607 Hayfield as 607 Option B.

Central Penn South

- Renamed Potential Compressor Station 620-1 as 620 Option A;
- Removed Potential Compressor Station 620-5-1 from consideration; and,
- Added Potential Compressor Station 620 Options B, C & G.

Data Request – Forest Habitat Removal and Wetland Disturbance

Forested habitat removal estimates are based on surveyed treeline data for the Benton & Hilltop Loops. For all other facilities, the most recent aerial imagery was utilized. Wetland disturbance estimates are based on surveyed delineation data for the Benton Loop and CS 607 – Option B. For all other facilities, preliminary wetlands data was based on a desktop evaluation / remote sensing, and/or, where land permission has been granted, a field investigation during the non-growing season with frozen soils present.

The below summary table outlines estimated acreages of forest habitat removal and wetland disturbances based on the proposed Limits of Disturbance (LOD) for Benton Loop, Hilltop Loop, Hensel Replacement, Compressor Station 607 Option A, Compressor Station 620 Option A and Compressor Station 610. For Compressor Station 607 Option B and Compressor Station 620 Options B, C & G preliminary workspaces have not been developed to date; however, forest habitat removal and wetland disturbance will be minimized to the extent practical.

Table 1 - Summary of Estimated Forest Removal & Wetland Disturbance

PROPOSED FACILITIES	COUNTY	FOREST HABITAT REMOVAL (AC)[1]	WETLAND IMPACT (AC)[2]
Benton Loop	Lycoming & Columbia	17.7	1.88
Hilltop Loop	Clinton	27.3	<2
Hensel Replacement	Clinton	22.5	<3
CS 605[4]	Wyoming	0	0
CS 607 – Option A[3]	Luzerne	<2	<0.5
CS 607 – Option B[3]	Luzerne	30 – 40	+/- 1
CS 610	Columbia	0	0

CS 620 – Option A[3]	Schuylkill	0.55	0.52
CS 620 – Option B[3]	Schuylkill	<1	<1
CS 620 – Option C[3]	Schuylkill	<5	<1
CS 620 – Option G[3]	Schuylkill	30 – 40	+/- 1
Notes:			
1. Forested habitat removal estimates are based on surveyed treeline data for the Benton & Hilltop Loops. For all other facilities, the most recent aerial imagery was utilized			
2. Wetland disturbance estimates are based on surveyed delineation data for the Benton Loop and CS 607 – Option B. For all other facilities, preliminary wetlands data was based on a desktop evaluation / remote sensing, and/or a field investigation during the non-growing season with frozen soils (where land permission has been granted).			
3. Only one "Option" for Compressor Stations 607 & 620 will be selected.			
4. No earth disturbance proposed at CS 605.			

Northern Long Eared Bat (NLEB) Data from Atlantic Sunrise (ASR) Project

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to the south southwest.

Updated mapping is provided in Attachment A. Also, mapping and Google Earth kmz files have been uploaded on the PNDI website. Should the Project, as presented, indicate the need for additional species-specific field studies or indicate other Project considerations, please provide a response outlining those requirements. If you have any questions regarding this correspondence or require additional Project information, please do not hesitate to call me at (713) 215-2781 or contact me via e-mail at Devyn.Richardson@Williams.com. Alternatively, you can contact Kevin Clark, Project Manager, at WHM Consulting, Inc., at (814) 689-1650 or via e-mail at kevinc@whmgroup.com. I appreciate your assistance and thank you for your attention to this request.

Respectfully submitted,

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

Devyn Richardson
Sr. Environmental Project Manager

Attachments: Attachment A: Project Location Maps

cc: Olivia Braun, Pennsylvania Game Commission
Josh Henry, Transco
Kevin Clark, WHM Consulting, Inc.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pennsylvania Field Office
110 Radnor Road, Suite 101
State College, Pennsylvania 16801-4850

June 24, 2019

Devyn Richardson
Williams Transcontinental Gas Pipe Line Company, LLC
2800 Post Oak Blvd (77056)
P.O. Box 1396
Houston, TX 77251-1396

RE: USFWS Project #2019-0122

Dear Ms. Richardson:

Thank you for your letter of April 15, 2019, regarding information about federally listed and proposed endangered and threatened species within the area affected by Williams Transcontinental Gas Pipe Line Company, LLC's, updates to the Leidy South project that encompasses: Benton Loop, Lycoming and Columbia Counties; Hilltop Loop, Clinton County; Hensel Replacement, Clinton County; Compressor State 605, Wyoming County; Compressor Station 607, Luzerne County (2 potential options being evaluated); Compressor Station 610, Columbia County; and Compressor Station 620, Schuylkill County (4 options being evaluated). The following comments are provided pursuant to the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et se* .) to ensure the protection of endangered and threatened species and the Migratory Bird Treaty Act (MBTA, 16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755, as amended) to ensure the protection of migratory bird species.

The project description consists of updates to the previously submitted project of October 31, 2018.

Federally Listed Species

The proposed project is located within the range of the Indiana bat (*M otis sodalis*), a species that is federally listed as endangered and the federally threatened northern long-eared bat (*M otis septentrionalis*). Additionally, the project is within the known range of the northeastern bulrush (*Scirpus ancistrochaetus*), a federally listed, endangered plant.

Bats

Tree removal

Land-clearing associated with the project may result in the death or injury of roosting Indiana bats if tree-cutting is conducted during the time of year when bats may be present. Due to the potential for Indiana bats to occur within the project area, the Service recommends that measures be implemented to avoid killing or injuring them. This can be accomplished by carrying out tree-cutting activities from November 15 to March 31, during which time bats are hibernating or concentrated near their hibernacula. This seasonal recommendation on tree cutting applies to trees that are greater than or equal to 5 inches in diameter at breast height (DBH). Where possible, retain shagbark hickory trees, dead and dying trees, and large diameter trees (greater than 12 inches DBH) to serve as roost trees for bats. Where possible, also retain forested riparian corridors and forested wetlands.

If you are unable to adopt the tree-cutting restrictions detailed above, a bat survey of the project area should be conducted between May 15 and August 15 by a qualified, Service-approved biologist using the 2019 INDIANA BAT SUMMER SURVEY GUIDELINES, which can be found at the following link: http://www.fws.gov/northeast/pafo/endangered/surveys.html. Survey results should be submitted to the Service for review and concurrence.

Please advise this office as to whether you intend to conduct bat surveys, or assume bats are present and implement a seasonal restriction on tree-cutting.

d ule northern long eared ats

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Federal actions that cause incidental take that is **not** prohibited under the 4(d) rule may still affect individual northern long-eared bats. Under section 7 of the Endangered Species Act, a Federal action agency (FERC) must consult with the Service if their action may affect a listed species, which includes effects to individuals. This requirement does not change when a 4(d) rule is implemented. However, for the northern long-eared bat 4(d) rule, the Service has provided a framework to streamline section 7 consultations when Federal actions may affect the northern long-eared bat but not cause prohibited take.

FERC may fulfill its project-specific section 7 responsibilities by using the Service's framework. The framework relies on the finding of a programmatic biological opinion that the Service prepared for the northern long-eared bat 4(d) rule. The Service requests FERC use the online determination key available through our Information Planning and Consultation website – IPaC (https://ecos.fws.gov/ipac/).

i ernacula

To determine whether this project will affect any potential Indiana bat or northern long-eared bat hibernacula, a ½-mile area around Compressor Station 620 (Options C and G) was surveyed for potential cave and mine openings by Sanders Environmental, Inc[1]. Surveys were conducted on April 17, 30, and May 31, 2019, at Option G and 21 openings were considered potential habitat. Surveys were conducted at Option C on June 3, 2019, and no potential hibernacula were identified.

On May 30, 2019, Pam Shellenberger, of my office, met with your company, WHM, FERC, Pennsylvania Game Commission (PGC), and Sanders Environmental Inc., to discuss Option G. During that time, the Service recommended that impacts to the portals and the area in the immediate vicinity of these openings be avoided. However, if avoidance is not feasible, these portals should be surveyed by a qualified bat surveyor. Surveys should be carried out in accordance with survey protocols and a copy of the survey results should be submitted to the Service and the PGC for review and concurrence. If surveys cannot be conducted, another option is to assume presence of federally listed bats in these portals and FERC would consult with the Service through Section 7 formal consultation. At this time, the company is planning to conduct fall portal surveys.

Prior to conducting any survey, the PGC should be contacted to determine whether or not they have surveyed the cave/mine in the past. If adequate surveys have been conducted in the recent past, this may preclude the need to conduct additional surveys.

Should Indiana bats or northern long-eared bats be found during any survey, further consultation with the Service will be necessary, including the submission of detailed project plans, and an analysis of alternatives to avoid and minimize adverse effects.

Northeastern bulrush

Potential habitat for this species could be affected if the project will directly or indirectly affect wetlands. The northeastern bulrush is typically found in ponds, wet depressions, shallow sinkholes, vernal pools, small emergent wetlands, or beaver-influenced wetlands. These wetlands are often located in forested areas and characterized by seasonally variable water levels.

To conserve northeastern bulrush (if present) and other wetland-dependent species of concern, project-related activities should avoid adversely affecting the surface and groundwater recharge areas. This would include establishment of 300-foot wide upland buffer areas around wetlands, as well as 50-100 foot wide buffers along waterways (perennial and intermittent rivers, streams, creeks and tributaries). When adequately vegetated, these buffers will act to filter pollutants and stabilize streambanks. Earth disturbance, spraying or tree-cutting activities (tree felling, skid

[1] Portal searches only occurred at Compressor Station 620 Options C and G due to the past mining that has occurred under and surrounding these potential sites. The Service did not recommend any other portal searches for the other options or loops in previous correspondence.

trails etc.), should not occur in these wetlands and their buffers. If these buffers are included, implementation of the proposed project is not likely to adversely affect the northeastern bulrush.

If you are unable to adopt the buffers detailed above, we recommend that a qualified botanist with field experience in the identification of this species conduct a thorough survey of all potentially suitable wetland habitat within the proposed project area to determine the presence of the northeastern bulrush before any permits are approved or earth-moving activities begin.

Surveys for this species should be conducted between June 1 and September 30, when the flowering/fruiting culm is present. A survey report should be submitted to the Service for review and comment.

Please notify this office whether buffers will be adopted as part of this project, or alternatively if surveys will be conducted for this species.

Assessment of Risks to Migratory Birds

The Service is the principal Federal agency charged with protecting and enhancing populations and habitat of migratory bird species. The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Department of the Interior.

You have indicated that you plan to minimize potential impacts by scheduling construction during seasons when migratory birds are not present or nesting in the project areas. The Service recognizes that some birds may be killed even if all reasonable measures to avoid take are implemented. Thank you for considering impacts to migratory birds.

To avoid potential dela s in reviewing our pro ect, please use the a ove referenced S WS pro ect tracking num er in an future correspondence regarding this pro ect.

If you have any questions regarding this matter, please contact Pamela Shellenberger of my staff at 814-206-7459.

Sincerely,

Sonja Jahrsdoerfer

Sonja Jahrsdoerfer
Project Leader

cc: David Hanobic – FERC

August 28, 2019

Sonja Jahrsdoerfer, Project Leader
United States Department of Interior
Fish and Wildlife Service
Pennsylvania Field Office
110 Radnor Road, Suite 101
State College, PA 16801-4850

RE: TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC; LEIDY SOUTH PROJECT; DCNR & USFWS BOTANICAL SURVEY REPORT; USFWS PROJECT NO. 2019-0122; PNDI RECEIPT NO. 670193; CLINTON, LYCOMING & LUZERNE COUNTY, PENNSYLVANIA

Dear Ms. Jahrsdoerfer,

On behalf of Transcontinental Gas Pipe Line Company, LLC (Transco), a subsidiary of The Williams Companies, Inc. (Williams), WHM Consulting, Inc. (WHM) conducted Botanical Surveys associated with the Leidy South Project. Botanical surveys were conducted for the Hensel Replacement, Hilltop Loop, Benton Loop and Compressor Station 607 in Clinton, Lycoming and Luzerne Counties. The surveys were conducted between May and July of 2019.

Enclosed you will find one copy of the 2019 DCNR & USFWS Botanical Survey Report for your review. This report includes proposed avoidance and minimization measures for potential impacts associated with *Scirpus ancistrochaetus* (northeastern bulrush) that was identified outside the proposed Limit of Disturbance during the surveys. The botanical survey report also includes information on target species under the PA DCNR's jurisdiction.

If you have any questions regarding this correspondence, please do not hesitate to call me at (814) 689-1650 or contact me via e-mail at kevinc@whmgroup.com. Alternatively, you can contact Josh Henry with Transco at (412) 713-0485 or via e-mail at Josh.Henry@Williams.com.

Sincerely,

WHM Consulting, Inc.

Kevin Clark
Project Manager

cc: Josh Henry, Transco

DCNR & USFWS BOTANICAL SURVEY REPORT

(INCLUDED ABOVE UNDER DCNR COORESPONDENCE)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pennsylvania Field Office
110 Radnor Road, Suite 101
State College, Pennsylvania 16801-4850

October 1, 2019

Kevin Clark
WHM Consulting, Inc.
2525 Green Tech Drive, Suite B
State College, PA 16803

RE: USFWS Project #2019-0122
PNDI Receipt #670193

Dear Mr. Clark:

The U.S. Fish and Wildlife Service (Service) received your survey report of August 12, 2019, regarding information about federally threatened and endangered species within the area affected by the Transcontinental Gas Pipe Line Company's proposed Leidy South project, portions of which are in Clinton, Columbia, Luzerne, Lycoming, Schuylkill, and Wyoming Counties, Pennsylvania. The proposed project is located within the range of the Indiana bat (*Myotis sodalis*), a species that is federally listed as endangered and the northern long-eared bat (*Myotis septentrionalis*), a species that is federally listed as threatened. The project is also within the known range of the northeastern bulrush (*Scirpus ancistrochaetus*), a federally listed, endangered plant.

The proposed project involves infrastructure improvement, construction, or modification along an existing gas pipeline, including seven separate facilities (three sections of pipeline replacement or loop sections comprising approximately 11.78 miles). Additional information was provided in your email of August 21, 2019, which included an updated PNDI receipt to reflect changes in the project limits of disturbance (LOD); and your email of September 30, 2019, which provided additional information on wetland impacts. The following comments are provided pursuant to the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq*.) to ensure the protection of endangered and threatened species.

Indiana bat and northern long-eared bat

Please see our comments regarding impacts to bats from tree removal in our letter of June 24, 2019. In addition, regarding potential impacts from compressor stations, compressor station 607 (Option B) and compressor station 620 (Options B, C, & G) outlined in previous submittals have

been removed; and the company is selecting compressor station 620 Option A, which is located in a farm field, with no wetland, stream, tree or hibernacula impacts.

Northeastern bulrush

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This response relates only to endangered and threatened species under our jurisdiction, based on an office review of the proposed project's location. No field inspection of the project area has been conducted by this office. Consequently, this letter is not to be construed as addressing potential Service concerns under the Fish and Wildlife Coordination Act or other authorities.

To avoid potential delays in reviewing your project, please use the above-referenced USFWS project tracking number in any future correspondence regarding this project.

Please contact Pamela Shellenberger of this office at (814) 206-7459 if you have any questions or require further assistance regarding this matter.

Sincerely,

Sonja Jahrsdoerfer

Sonja Jahrsdoerfer
Project Leader

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pennsylvania Ecological Services Field Office
110 Radnor Road Suite 101
State College, PA 16801-7987
Phone: (814) 234-4090 Fax: (814) 234-0748
http://www.fws.gov/northeast/pafo/

In Reply Refer To: November 14, 2019
Consultation Code: 05E2PA00-2020-TA-0204
Event Code: 05E2PA00-2020-E-00976
Project Name: Leidy South Project

Subject: Verification letter for the 'Leidy South Project' project under the January 5, 2016, Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-eared Bat and Activities Excepted from Take Prohibitions.

Dear Kevin Clark:

The U.S. Fish and Wildlife Service (Service) received on November 14, 2019 your effects determination for the 'Leidy South Project' (the Action) using the northern long-eared bat (*Myotis septentrionalis*) key within the Information for Planning and Consultation (IPaC) system. This IPaC key assists users in determining whether a Federal action is consistent with the activities analyzed in the Service's January 5, 2016, Programmatic Biological Opinion (PBO). The PBO addresses activities excepted from "take"[1] prohibitions applicable to the northern long-eared bat under the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.).

Based upon your IPaC submission, the Action is consistent with activities analyzed in the PBO. The Action may affect the northern long-eared bat; however, any take that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o). Unless the Service advises you within 30 days of the date of this letter that your IPaC-assisted determination was incorrect, this letter verifies that the PBO satisfies and concludes your responsibilities for this Action under ESA Section 7(a)(2) with respect to the northern long-eared bat.

Please report to our office any changes to the information about the Action that you submitted in IPaC, the results of any bat surveys conducted in the Action area, and any dead, injured, or sick northern long-eared bats that are found during Action implementation. If the Action is not completed within one year of the date of this letter, you must update and resubmit the information required in the IPaC key.

This IPaC-assisted determination allows you to rely on the PBO for compliance with ESA Section 7(a)(2) only for the northern long-eared bat. It **does not** apply to the following ESA-protected species that also may occur in the Action area:

- Bog Turtle, *Clemmys muhlenbergii* (Threatened)
- Indiana Bat, *Myotis sodalis* (Endangered)
- Northeastern Bulrush, *Scirpus ancistrochaetus* (Endangered)

If the Action may affect other federally listed species besides the northern long-eared bat, a proposed species, and/or designated critical habitat, additional consultation between you and this Service office is required. If the Action may disturb bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act is recommended.

---

[1]Take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct [ESA Section 3(19)].

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

Leidy South Project

2. Description

The following description was provided for the project 'Leidy South Project':

> Transcontinental Gas Pipe Line Company, LLC (Transco), a subsidiary of The Williams Companies, Inc.is proposing the Leidy South Project (Project). The Project is an expansion of Transco's existing natural gas transmission system and an extension of Transco's system through a capacity lease with National Fuel Gas Supply Corporation. The Project will enable Transco to provide 582,400 dekatherms per day (Dth/d) of incremental firm transportation capacity for abundant supplies of natural gas from northern and western Pennsylvania to existing and growing markets in Transco's Zone 6. Transco's Zone 6 includes the portion of the Transco system in Pennsylvania, New York, New Jersey, and Maryland. The Project consists of the following components:
>
> • 6.3 miles of 36-inch pipeline loop along Transco's Leidy Line in Clinton County, Pennsylvania (Hensel Replacement) and the related abandonment of 5.8 miles of existing 23.375-inch pipeline on Leidy Line A;
>
> • 2.4 miles of 36-inch pipeline loop along Transco's Leidy Line in Clinton County, Pennsylvania (Hilltop Loop);
>
> • 3.5 miles of 42-inch pipeline loop along Transco's Leidy Line in Lycoming County, Pennsylvania (Benton Loop);
>
> • Existing Compressor Station 605 (Wyoming County, Pennsylvania); Increase the total certificated horsepower of the two electric motor-driven units from 30,000 horsepower (HP) to 42,000 HP and modifications to existing coolers;
>
> • New Compressor Station 607 (Luzerne County, Pennsylvania); Install two gas turbine-driven compressor units (23,465 nominal HP at International Organization for Standardization [ISO] conditions each, 46,930 HP total) and gas coolers;
>
> • Existing Compressor Station 610 (Columbia County, Pennsylvania); o Add one gas turbine-driven compressor unit (31,871 nominal HP at ISO conditions) and gas cooling; Increase the total certificated horsepower of the two electric motor-driven units from 40,000 HP to 42,000 HP and re-wheel the existing compressors;
> • New Compressor Station 620 (Schuylkill County, Pennsylvania); o Install one

gas turbine-driven compressor unit (31,871 nominal HP at ISO conditions);

• Ancillary facilities, such as mainline valves (MLVs), communication facilities, cathodic protection and pig launchers and receivers in Pennsylvania.

Subject to the Federal Energy Regulatory Commission (FERC) approval of the Project and receipt of the necessary permits and authorizations, Transco anticipates that construction of the Project will commence in winter 2020/2021 to meet a target in-service date of December 1, 2021.

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/41.299238244285945N76.22241376288787W

Determination Key Result

This Federal Action may affect the northern long-eared bat in a manner consistent with the description of activities addressed by the Service's PBO dated January 5, 2016. Any taking that may occur incidental to this Action is not prohibited under the final 4(d) rule at 50 CFR §17.40(o). Therefore, the PBO satisfies your responsibilities for this Action under ESA Section 7(a)(2) relative to the northern long-eared bat.

Determination Key Description: Northern Long-eared Bat 4(d) Rule

This key was last updated in IPaC on May 15, 2017. Keys are subject to periodic revision.

This key is intended for actions that may affect the threatened northern long-eared bat.

The purpose of the key for Federal actions is to assist determinations as to whether proposed actions are consistent with those analyzed in the Service's PBO dated January 5, 2016.

Federal actions that may cause prohibited take of northern long-eared bats, affect ESA-listed species other than the northern long-eared bat, or affect any designated critical habitat, require ESA Section 7(a)(2) consultation in addition to the use of this key. Federal actions that may affect species proposed for listing or critical habitat proposed for designation may require a conference under ESA Section 7(a)(4).

Determination Key Result

This project may affect the threatened Northern long-eared bat; therefore, consultation with the Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.) is required. However, based on the information you provided, this project may rely on the Service's January 5, 2016, *Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-Eared Bat and Activities Excepted from Take Prohibitions* to fulfill its Section 7(a)(2) consultation obligation.

Qualification Interview

1. Is the action authorized, funded, or being carried out by a Federal agency?

   Yes

2. Have you determined that the proposed action will have "no effect" on the northern long-eared bat? (If you are unsure select "No")

   No

3. Will your activity purposefully **Take** northern long-eared bats?

   No

4. Is the project action area located wholly outside the White-nose Syndrome Zone?

   Automatically answered
   No

5. Have you contacted the appropriate agency to determine if your project is near a known hibernaculum or maternity roost tree?

   Location information for northern long-eared bat hibernacula is generally kept in state Natural Heritage Inventory databases – the availability of this data varies state-by-state. Many states provide online access to their data, either directly by providing maps or by providing the opportunity to make a data request. In some cases, to protect those resources, access to the information may be limited. A web page with links to state Natural Heritage Inventory databases is available at www.fws.gov/midwest/endangered/mammals/nleb/nhisites.html.

   Yes

6. Will the action affect a cave or mine where northern long-eared bats are known to hibernate (i.e., hibernaculum) or could it alter the entrance or the environment (physical or other alteration) of a hibernaculum?

   No

7. Will the action involve Tree Removal?

   Yes

8. Will the action only remove hazardous trees for the protection of human life or property?

   No

9. Will the action remove trees within 0.25 miles of a known northern long-eared bat hibernaculum at any time of year?

   No

10. Will the action remove a known occupied northern long-eared bat maternity roost tree or any trees within 150 feet of a known occupied maternity roost tree from June 1 through July 31?

    No

Project Questionnaire

If the project includes forest conversion, report the appropriate acreages below. Otherwise, type '0' in questions 1-3.

1. Estimated total acres of forest conversion:

70

2. If known, estimated acres of forest conversion from April 1 to October 31

0

3. If known, estimated acres of forest conversion from June 1 to July 31

0

If the project includes timber harvest, report the appropriate acreages below. Otherwise, type '0' in questions 4-6.

4. Estimated total acres of timber harvest

0

5. If known, estimated acres of timber harvest from April 1 to October 31

0

6. If known, estimated acres of timber harvest from June 1 to July 31

0

If the project includes prescribed fire, report the appropriate acreages below. Otherwise, type '0' in questions 7-9.

7. Estimated total acres of prescribed fire

0

8. If known, estimated acres of prescribed fire from April 1 to October 31

0

9. If known, estimated acres of prescribed fire from June 1 to July 31

0

If the project includes new wind turbines, report the megawatts of wind capacity below. Otherwise, type '0' in question 10.

10. What is the estimated wind capacity (in megawatts) of the new turbine(s)?

0

Transcontinental Gas Pipe Line Company, LLC
2800 Post Oak Boulevard (77056)
P.O. Box 1396
Houston, Texas 77251-1396
713/215-2000

May 7, 2020

Re: Update PNDI Search ID: PNDI-670193
Transcontinental Gas Pipe Line Company, LLC
Leidy South Project

To Whom it May Concern:

Transcontinental Gas Pipe Line Company, LLC (Transco) is providing an update to the PNDI for the Leidy South Project (Project), PNDI-670193. Minor workspace changes have been incorporated into the design since the last update on August 22, 2019. The following Project information summarizes workspace changes that will take place outside the previously submitted Project Area. All areas outlined below were include in the survey area for species specific surveys conducted for the Project.

Benton Loop

MOC – AR 119.5
Added <0.01 acre of workspace to an existing access road to accommodate the revised Wilson Road Right of Way.

MOC – 120.25
Added 1.37 acre of additional temporary workspace to Access Road AR-120.4 for the purpose of the removing existing post-construction stormwater management facilities installed for the Atlantic Sunrise project that will no longer be required upon the completion of the Leidy South Project.

Hilltop Loop

MOC – 183.5
Modified Contractor Yard to allow for the removal of the existing valve site resulting in the addition of 0.03 acre of temporary workspace.

Hensel Replacement

MOC – 188.1
Added <0.01 acre of workspace to a proposed access road to extend onto Summerson Mountain Road.

MOC – 193.9
Rerouted pipeline centerline to avoid newly installed tanks on Dominion property and relocated the access to an existing road resulting in the addition of 0.45 acre of temporary workspace.

Updated mapping is provided in Attachment A. This mapping outlines the overall Project Location Maps with specific call outs to the updated locations and site-specific mapping for each of the workspace changes listed above. We are requesting verification that the minor changes to the Project since the last submission will not result in changes to your agencies responses regarding potential impacts to rare, candidate, threatened or endangered species.

If you have any questions regarding this correspondence or require additional Project information, please do not hesitate to call me at (412) 713-0485 or contact me via e-mail at josh.henry@williams.com. Alternatively, you can contact Kevin Clark, Project Manager, at WHM Consulting, Inc., at (814) 689-1650 or via e-mail at kevinc@whmgroup.com. I appreciate your assistance and thank you for your attention to this request.

Respectfully submitted,

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

Josh Henry
Environmental Specialist

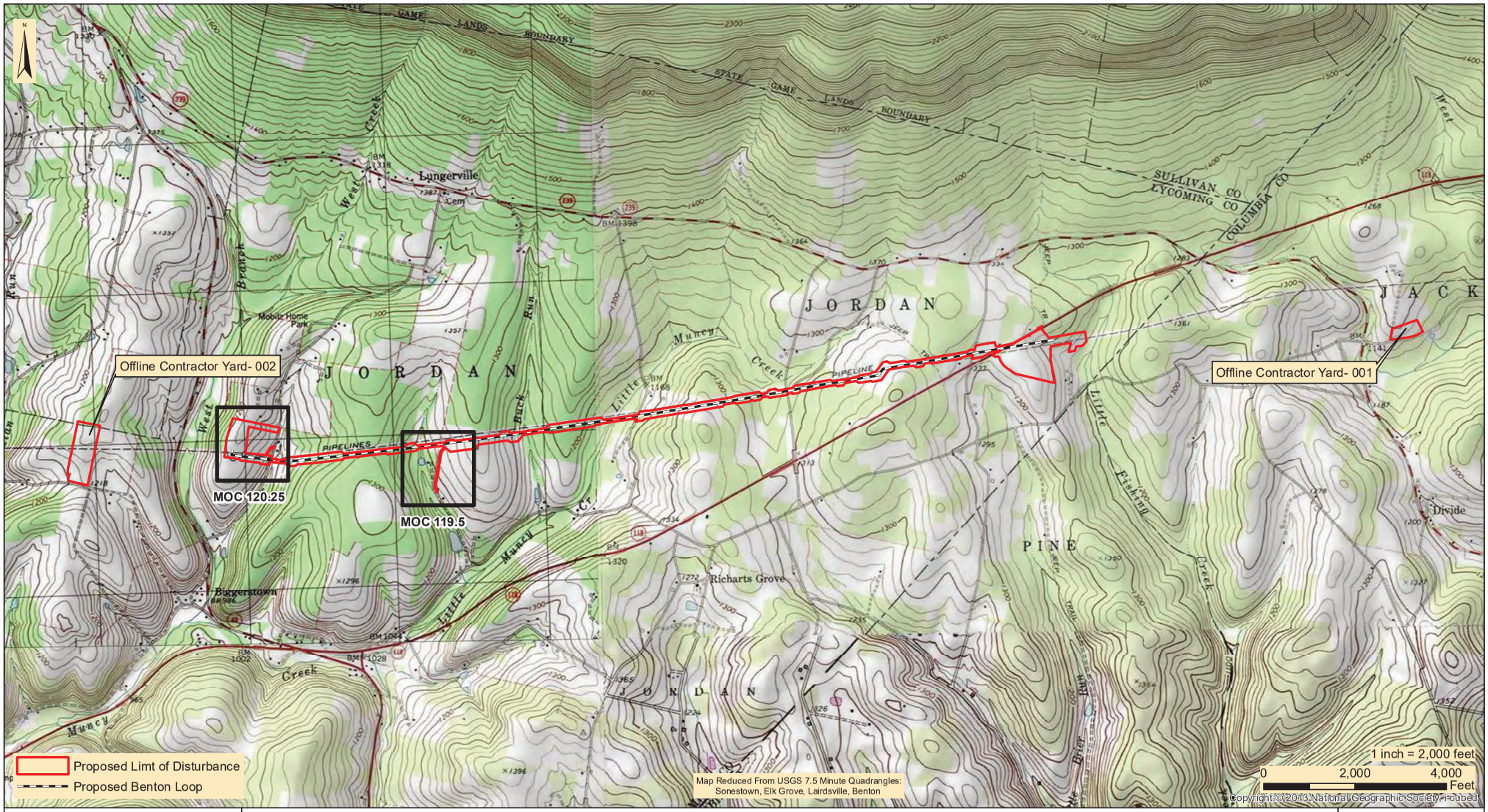
Attachments: Attachment A: Mapping

cc: Shauna Akers, Transco
Kevin Clark, WHM Consulting, Inc.

ATTACHMENT A

MAPPING

BENTON LOOP



designs, permits, resolutions | consulting, INC.
2525 Green Tech Drive, Suite B,
State College, PA 16803
Tele: 814.689.1650 Fax: 814.689.1557

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

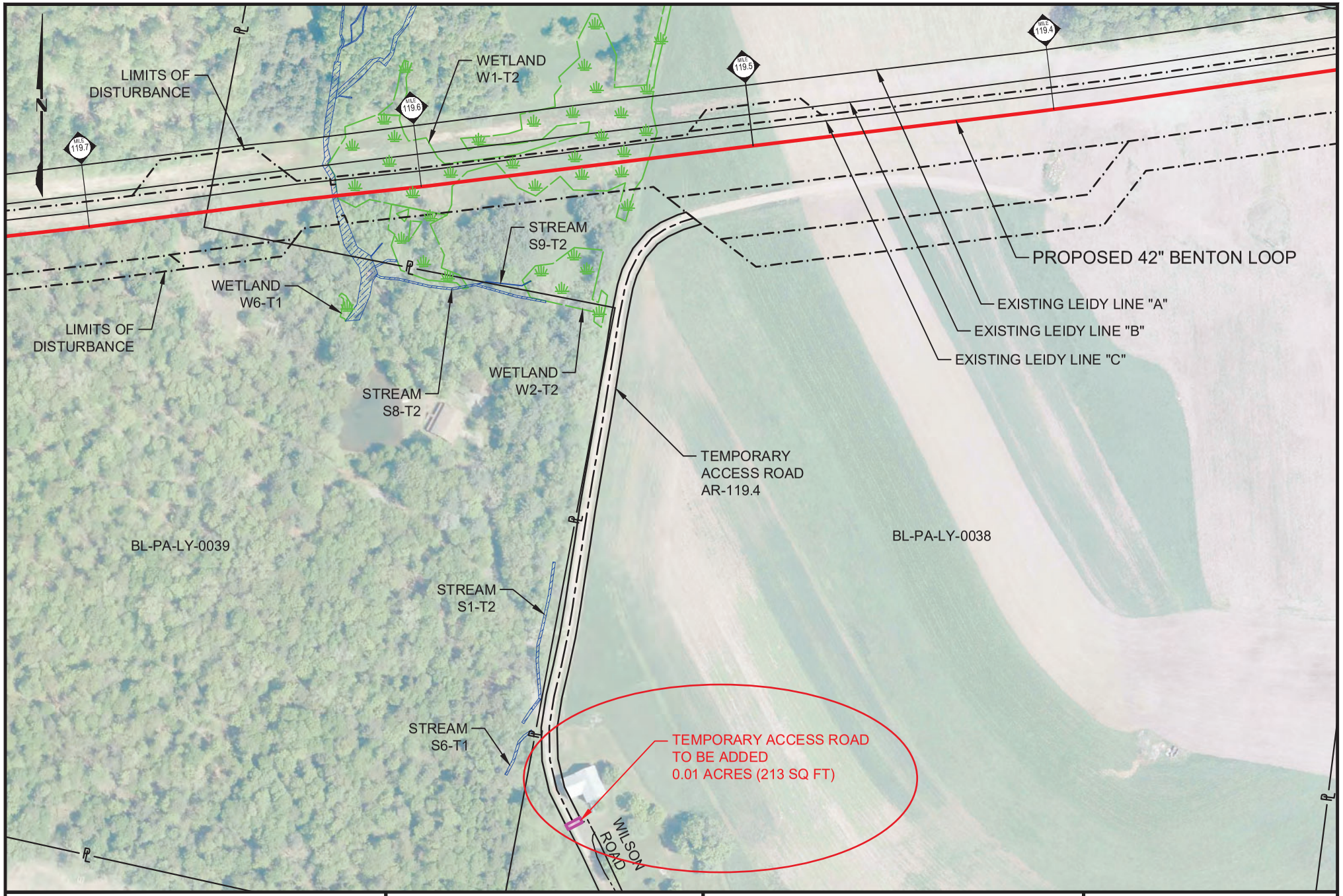
LEIDY SOUTH PROJECT

LEIDY LINE D 42" BENTON LOOP PROJECT LOCATION MAP

LYCOMING & COLUMBIA COUNTIES

PENNSYLVANIA

Date:	5/4/2020
WHM DRAWING NUMBER:	WILLIAMS202B003
Drawn By:	FTN
Figure Number:	1



LEGEND:

- PROPOSED 42" BENTON LOOP
- EXISTING PIPELINES
- LIMITS OF DISTURBANCE
- PROPERTY LINE
- STREAM CROSSING
- WETLAND AREA

200 0 200

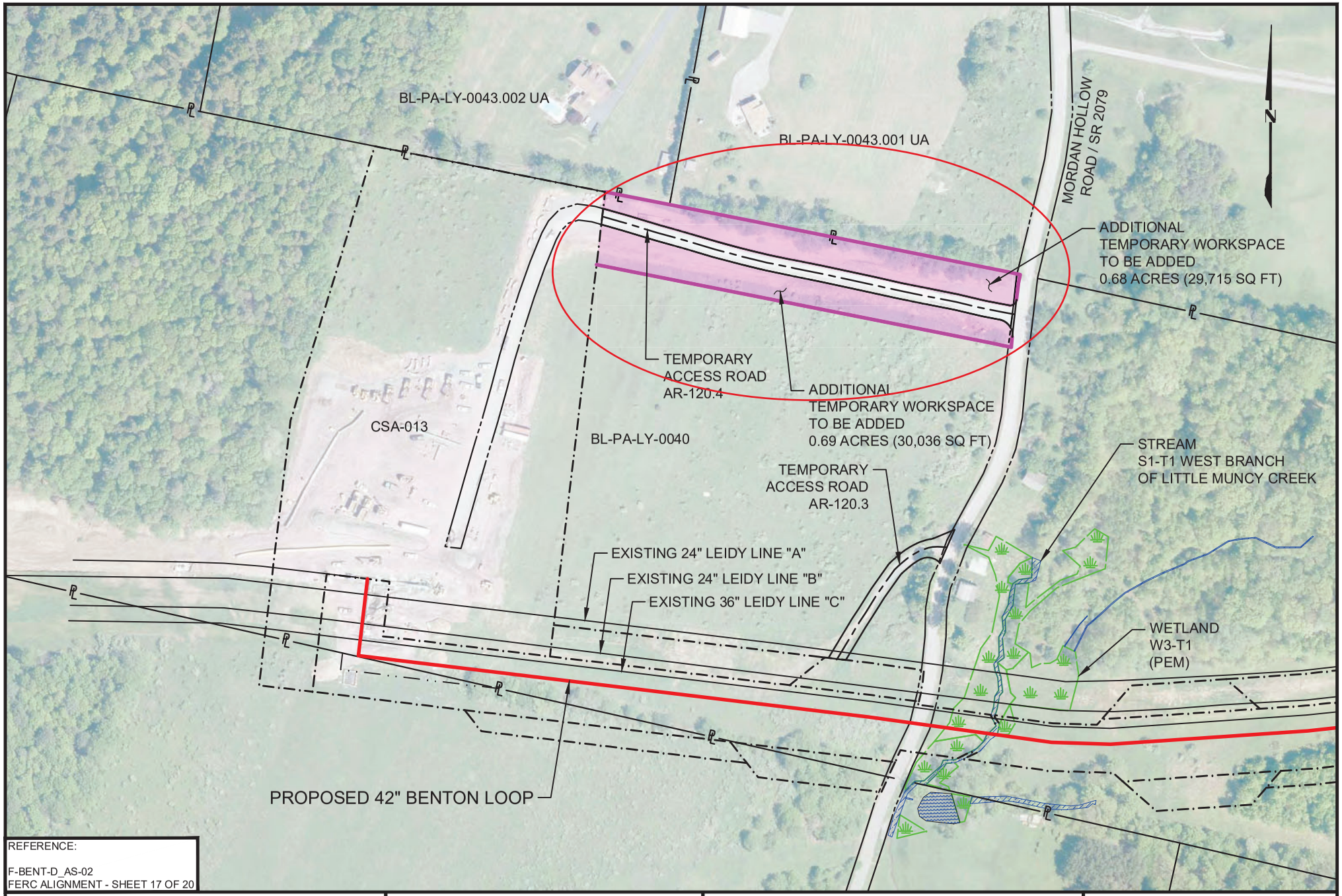
SCALE IN FEET

SHEET 1 OF 1
12/26/2019

LEIDY SOUTH PROJECT
MEMORANDUM OF CHANGE
42" BENTON LOOP
WORKSPACE CHANGE
MOC - 119.5

Williams.

MOC-BENT-AR 119_5



REFERENCE:

F-BENT-D_AS-02
FERC ALIGNMENT - SHEET 17 OF 20

LEGEND:

- PROPOSED 42" BENTON LOOP
- EXISTING PIPELINES
- LIMITS OF DISTURBANCE
- PROPERTY LINE
- STREAM
- WETLAND AREA

200 0 200
SCALE IN FEET

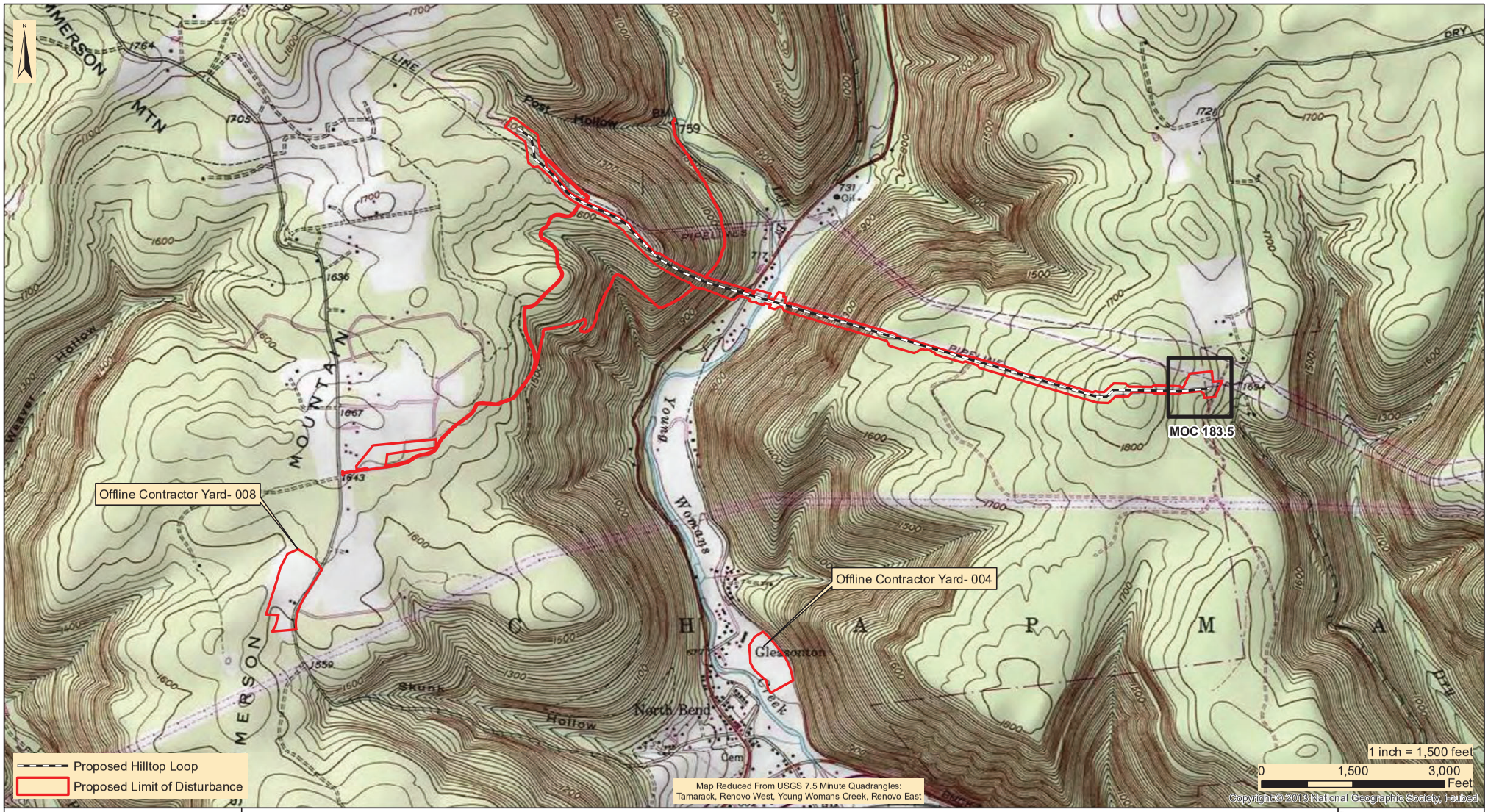
SHEET 1 OF 1
10/04/2019

LEIDY SOUTH PROJECT
MEMORANDUM OF CHANGE
42" BENTON LOOP
WORKSPACE CHANGE
MOC - 120.25

Williams.

MOC-BENT-120_25

HILLTOP LOOP



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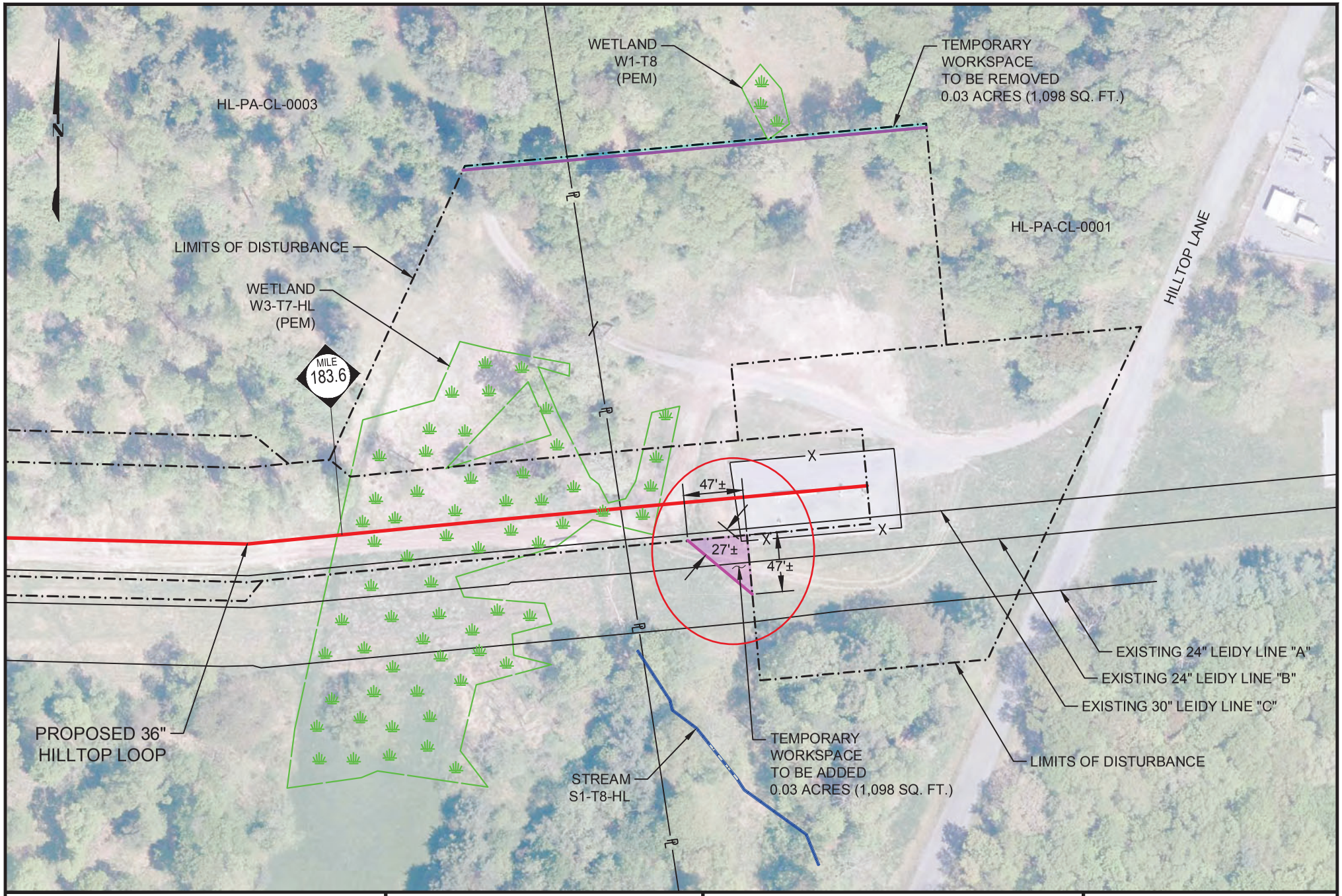
2525 Green Tech Drive, Suite B,
State College, PA 16803
Tele: 814.689.1650 Fax: 814.689.1557

TRANSCONTNENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT

LEIDY LINE D 36" HILLTOP LOOP
PROJECT LOCATION MAP

CHAPMAN TOWNSHIP | CLINTON COUNTY | PENNSYLVANIA

Date:	5/4/2020
WHM DRAWING NUMBER:	WILLIAMS201B002
Drawn By:	FTN
Figure Number:	2-1



LEGEND:

- PROPOSED 36" HILLTOP LOOP
- EXISTING PIPELINES
- LIMITS OF DISTURBANCE
- PROPERTY LINE
- STREAM
- WETLAND AREA

100 0 100

SCALE IN FEET

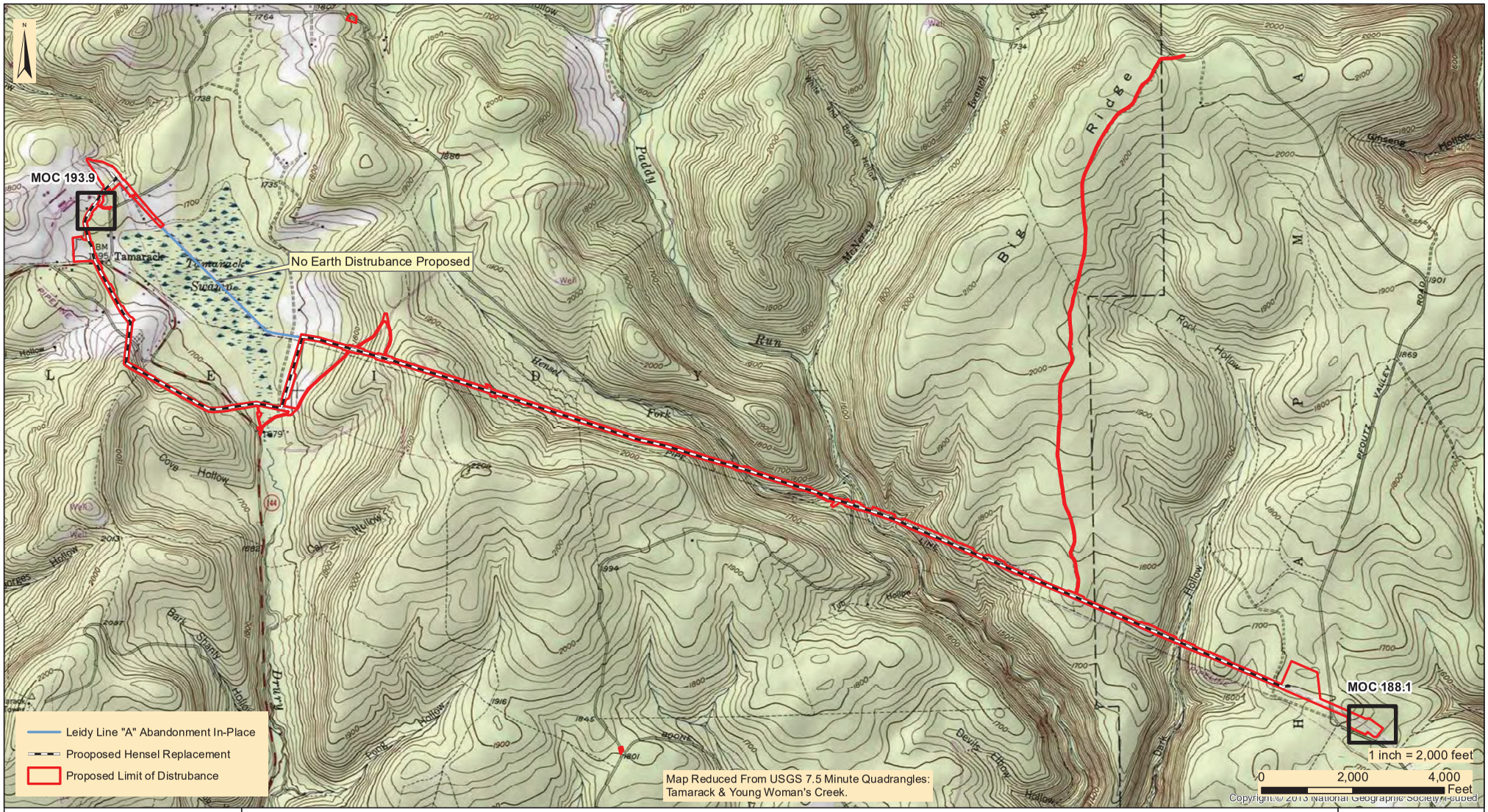
SHEET 1 OF 1
09/13/2019

LEIDY SOUTH PROJECT
MEMORANDUM OF CHANGE
36" HILLTOP LOOP
WORKSPACE CHANGE
MOC 183.5

Williams.

MOC-HILL-183_5

HENSEL REPLACEMENT



designs, permits, resolutions | consulting, INC.
2525 Green Tech Drive, Suite B,
State College, PA 16803
Tele: 814.689.1650 Fax: 814.689.1557

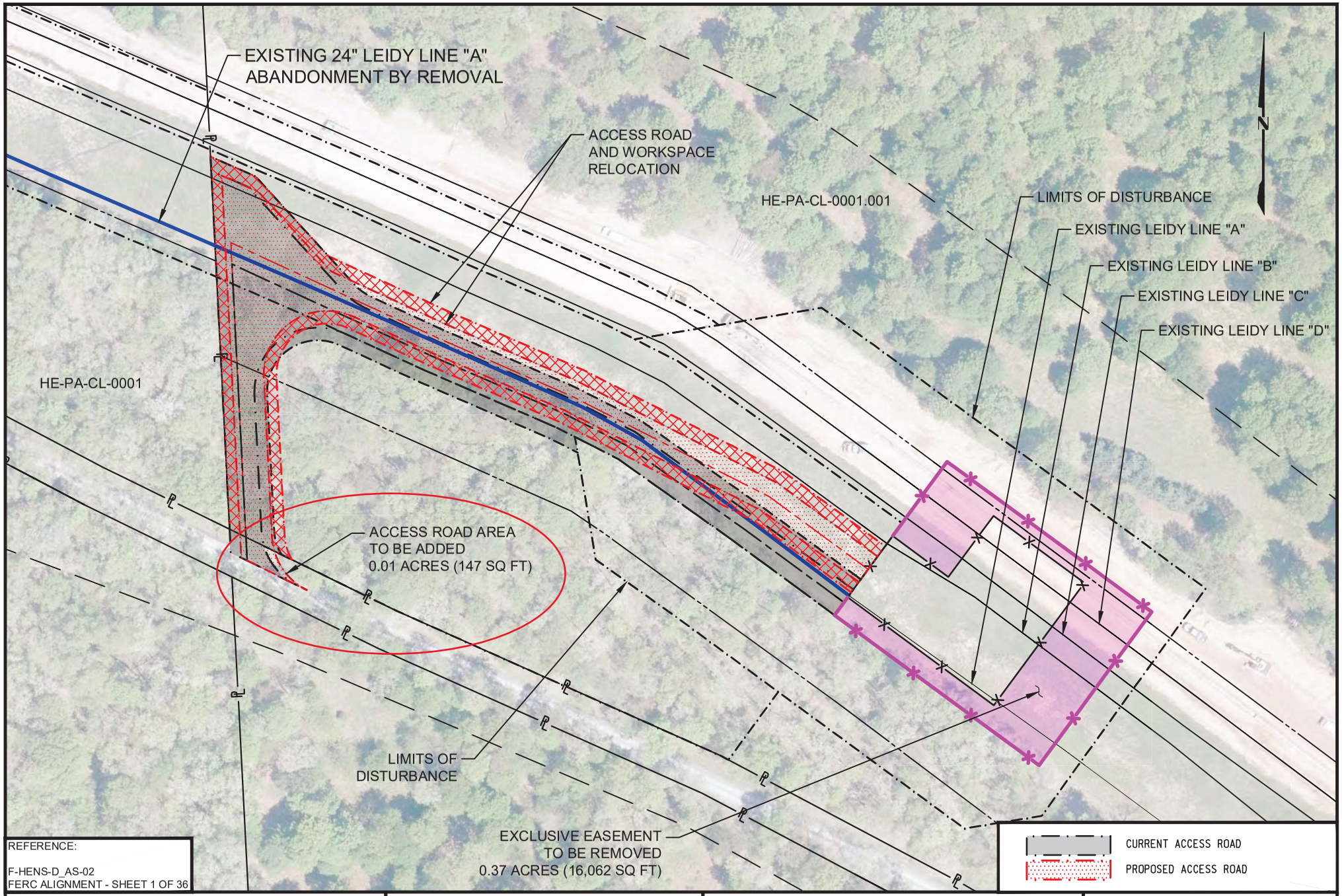
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

LEIDY SOUTH PROJECT

LEIDY LINE D 36" HENSEL REPLACEMENT PROJECT LOCATION MAP

LEIDY & CHAPMAN TOWNSHIP | CLINTON COUNTY | PENNSYLVANIA

Date:	5/4/2020
WHM DRAWING NUMBER:	WILLIAMS202B001
Drawn By:	FTN
Figure Number:	1-1



REFERENCE:

F-HENS-D_AS-02
FERC ALIGNMENT - SHEET 1 OF 36

LEGEND:

- EXISTING 24" LEIDY LINE "A"
- EXISTING PIPELINES
- LIMITS OF DISTURBANCE
- PROPERTY LINE
- STREAM
- WETLAND AREA

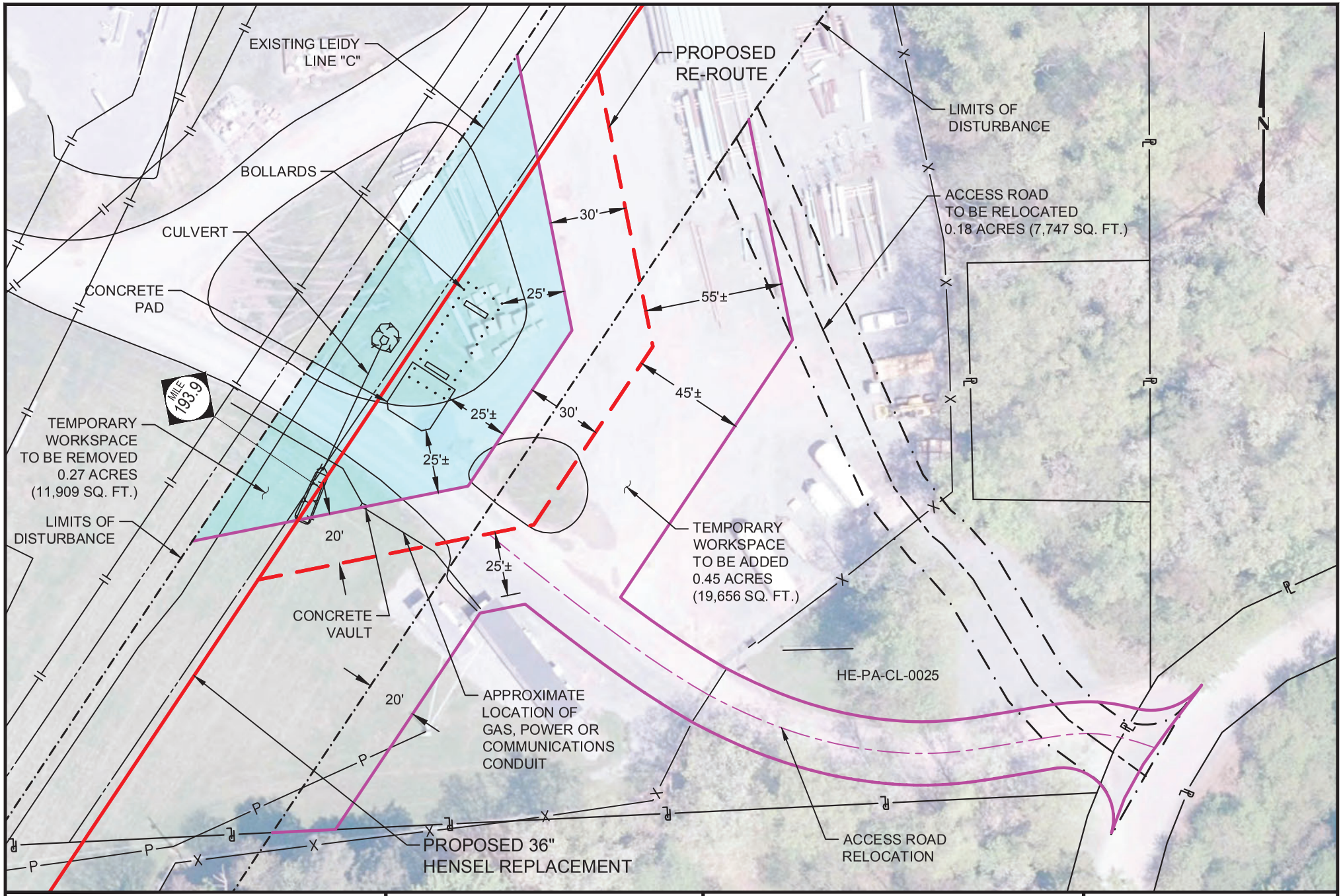
100 0 100
SCALE IN FEET

SHEET 1 OF 1
10/14/2019

LEIDY SOUTH PROJECT
MEMORANDUM OF CHANGE
36" HENSEL REPLACEMENT
EXCLUSIVE EASEMENT & ACCESS ROAD CHANGE
MOC 188.1

Williams.

REV 2
MOC-HENS-188_1



LEGEND:

- PROPOSED 36" HENSEL REPLACEMENT
- EXISTING PIPELINES
- LIMITS OF DISTURBANCE
- PROPERTY LINE
- STREAM
- WETLAND AREA

50 0 50

SCALE IN FEET

SHEET 1 OF 1
09/13/2019

LEIDY SOUTH PROJECT
MEMORANDUM OF CHANGE
36" HENSEL REPLACEMENT
RE-ROUTE & ACCESS ROAD CHANGE
MOC 193.9

Williams.

MOC-HENS-193_9

Kevin Clark

From: Shellenberger, Pamela <pamela_shellenberger@fws.gov>
Sent: Wednesday, May 20, 2020 5:07 PM
To: Kevin Clark
Cc: Akers, Shauna; Henry, Josh
Subject: Re: [EXTERNAL] RE: UPDATE - USFWS Project # 2019-0122; PNDI Receipt #670193; Consultation Code: 05E2PA00-2020-TA-0204

Kevin,

Thank you for providing additional information regarding the minor workspace changes on the Benton Loop, Hilltop Loop and Hensel Replacement projects associated with the Leidy South Project. You indicated that all changes outlined will take place in previously disturbed areas with no additional tree clearing or water resources impacts proposed, and that the changes in the workspace are minor. Therefore, determinations in our letters of June 24, 2019 and October 1, 2019 remain unchanged.

Please let me know if you have any questions.
Thank you,

_____

Pamela Shellenberger

U.S. Fish and Wildlife Service
Pennsylvania Field Office
110 Radnor Road, Suite 101
State College, PA 16801
814-234-4090 x7459
http://www.fws.gov/northeast/pafo/

Working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people.

Note: I am temporarily teleworking. You can continue to reach me through email or by calling the number listed above.

From: Kevin Clark <kevinc@whmgroup.com>
Sent: Thursday, May 7, 2020 11:07 AM
To: Shellenberger, Pamela <pamela_shellenberger@fws.gov>
Cc: Akers, Shauna <Shauna.Akers@williams.com>; Henry, Josh <Josh.Henry@williams.com>
Subject: [EXTERNAL] RE: UPDATE - USFWS Project # 2019-0122; PNDI Receipt #670193; Consultation Code: 05E2PA00-2020-TA-0204

Pam,

Transcontinental Gas Pipe Line Company, LLC (Transco) is providing an update to the PNDI for the Leidy South Project (Project), USFWS Project # 2019-0122, PNDI-670193, Consultation Code: 05E2PA00-2020-TA-0204. Minor workspace changes have been incorporated into the design since the last update on August 22, 2019. The following Project information summarizes workspace changes that will take place outside the previously submitted Project Area. All areas outlined below were included in the survey area for species specific surveys conducted for the Project.

Benton Loop

MOC – AR 119.5
Added <0.01 acre of workspace to an existing access road to accommodate the revised Wilson Road Right of Way.

MOC – 120.25
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Hilltop Loop

MOC – 183.5
Modified Contractor Yard to allow for the removal of the existing valve site resulting in the addition of 0.03 acre of temporary workspace.

Hensel Replacement

MOC – 188.1
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MOC – 193.9
Rerouted pipeline centerline to avoid newly installed tanks on Dominion property and relocated the access to an existing road resulting in the addition of 0.45 acre of temporary workspace.

Updated mapping is provided in Attachment A. This mapping outlines the overall Project Location Maps with specific call outs to the updated locations and site-specific mapping for each of the workspace changes listed above. We are requesting verification that the minor changes to the Project since the last submission will not result in changes to your agencies responses regarding potential impacts to threatened or endangered species. All changes outlined will take place in previously disturbed areas with no additional tree clearing or water resources impacts proposed.

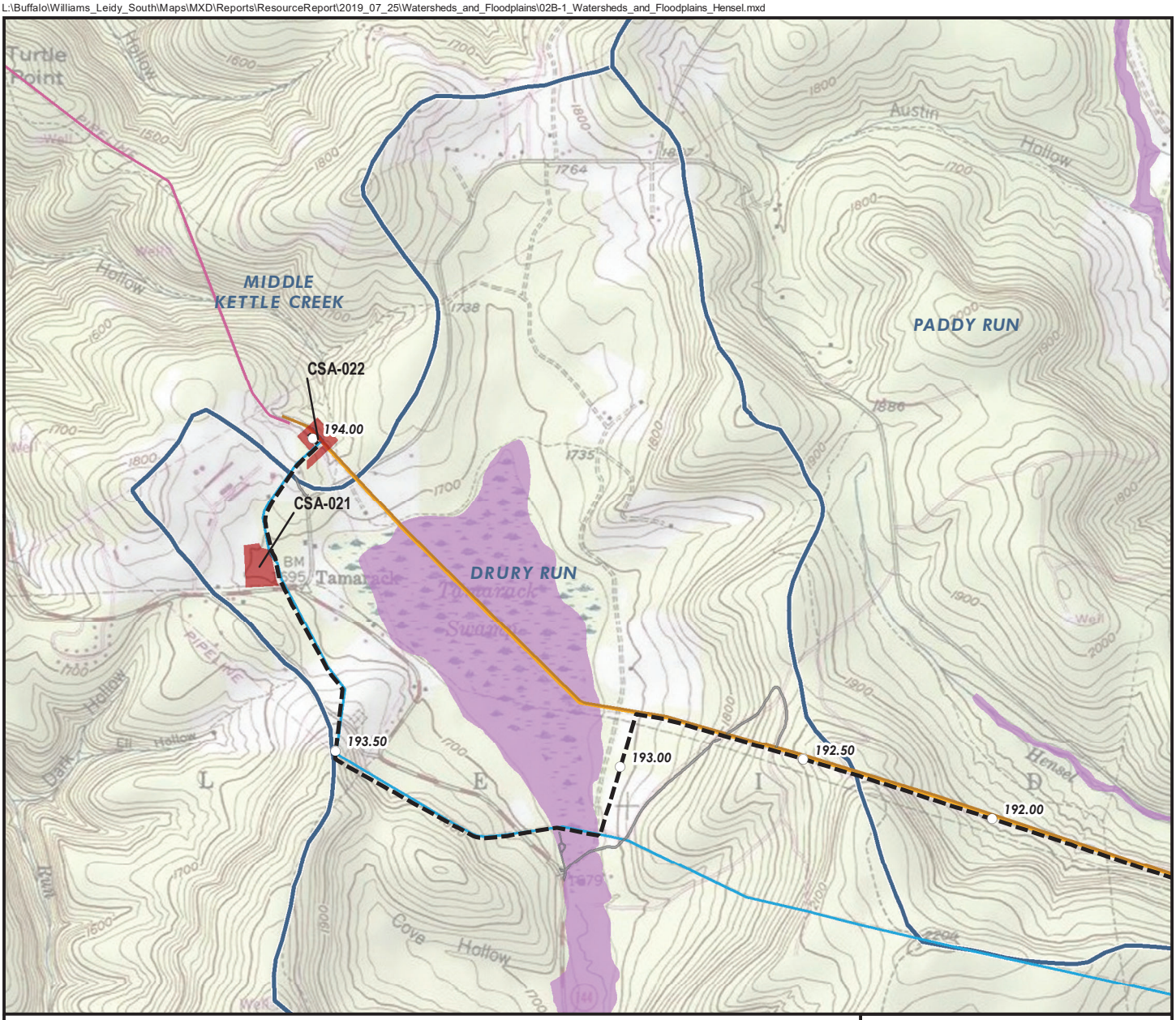
I appreciate your assistance, and thank you for your attention to this request.

Kevin M. Clark | PWS
Senior Project Manager / Office Manager
WHM Consulting, LLC
(814) 689-1650 ext. 105 - office
(814) 404-6241 - cell

If you have received this message in error, please reply to advise the sender of the error and then immediately delete this message.

FIGURES

L:\Buffalo\Williams_Leidy_South\Maps\MXD\Reports\ResourceReport\2019_07_25\Watersheds_and_Floodplains\02B-1_Watersheds_and_Floodplains_Hensel.mxd



Legend:

- Milepost
- Proposed 36" Hensel Replacement
- Existing Leidy Line "A" Pipeline
- Existing Leidy Line "B" Pipeline
- Existing Leidy Line "C" Pipeline
- Leidy Wharton Storage 24"
- Access Road
- Contractor/ Pipe Yards and Staging Areas
- Watershed Boundary (12-digit HUC)

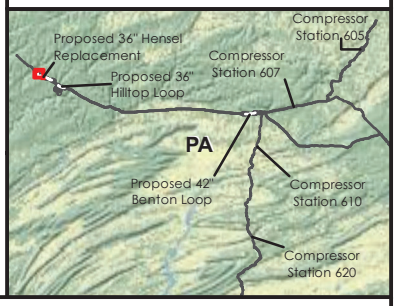
Flood Zone

- 100-year Floodplain

0 0.25 0.5
SCALE IN MILES

N

SITE LOCATION



DRAWING NO.	REFERENCE TITLE
	2B-1

TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
WATERSHED AND FEMA 100-YEAR FLOOD ZONES
CROSSED BY PROPOSED 36" HENSEL REPLACEMENT
LEIDY SOUTH PROJECT
M.P. 188.51 TO M.P. 194.00
PENNSYLVANIA

Williams

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
A	7/25/2019	HT	ISSUE FOR FERC APPLICATION	1211223	ES	ES

DRAWN BY: HT	DATE: 7/25/2019	ISSUE FOR BID: N/A	SCALE: 1:24,000
CHECKED BY: ES	DATE: 7/25/2019	ISSUE FOR CONSTRUCTION: N/A	REVISION: A
APPROVED BY: ES	DATE: 7/25/2019	DRAWING NUMBER: 5:22 PM 7/25/2019	FIGURE 2B-1
WO: 1211223			SHEET 1 of 4

Data Sources: FEMA 2018; USGS 2018, USDA 2014.

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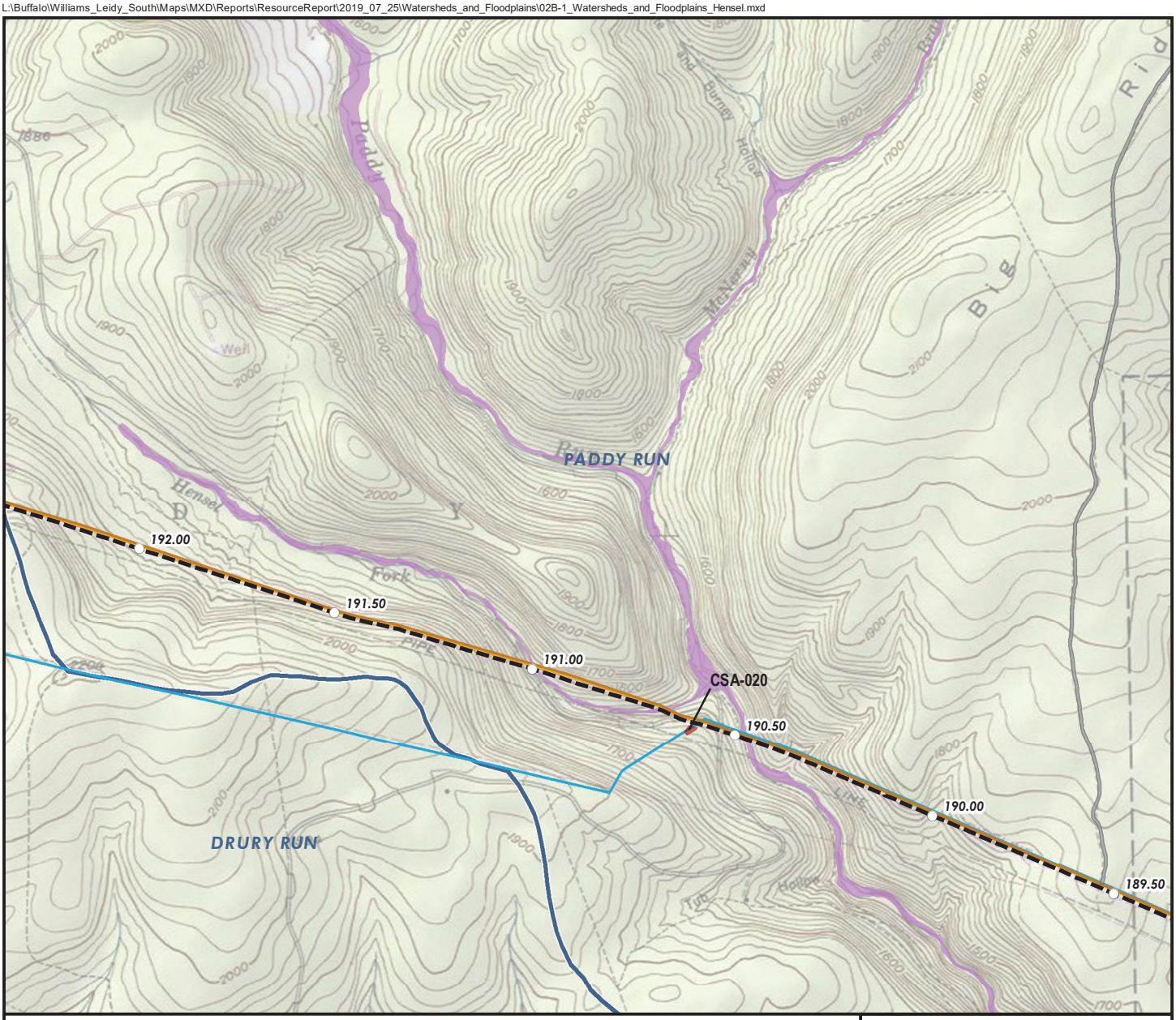


Legend:

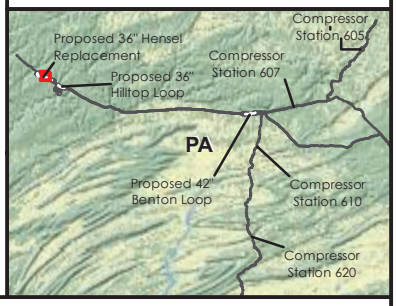
- Milepost
- Proposed 36" Hensel Replacement
- Existing Leidy Line "A" Pipeline
- Existing Leidy Line "B" Pipeline
- Existing Leidy Line "C" Pipeline
- Access Road
- Contractor/ Pipe Yards and Staging Areas
- Watershed Boundary (12-digit HUC)

Flood Zone

- 100-year Floodplain

0 0.25 0.5
SCALE IN MILES

SITE LOCATION



DRAWING NO.	REFERENCE TITLE
	2B-1

TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
WATERSHED AND FEMA 100-YEAR FLOOD ZONES
CROSSED BY PROPOSED 36" HENSEL REPLACEMENT
LEIDY SOUTH PROJECT
M.P. 188.51 TO M.P. 194.00
PENNSYLVANIA

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
A	7/25/2019	HT	ISSUE FOR FERC APPLICATION	1211223	ES	ES

DRAWN BY: HT	DATE: 7/25/2019	ISSUE FOR BID: N/A	SCALE: 1:24,000
CHECKED BY: ES	DATE: 7/25/2019	ISSUE FOR CONSTRUCTION: N/A	REVISION: A
APPROVED BY: ES	DATE: 7/25/2019	DRAWING NUMBER: 5:22 PM 7/25/2019	FIGURE 2B-1
WO: 1211223			SHEET 2 of 4

Data Sources: FEMA 2018; USGS 2018, USDA 2014.

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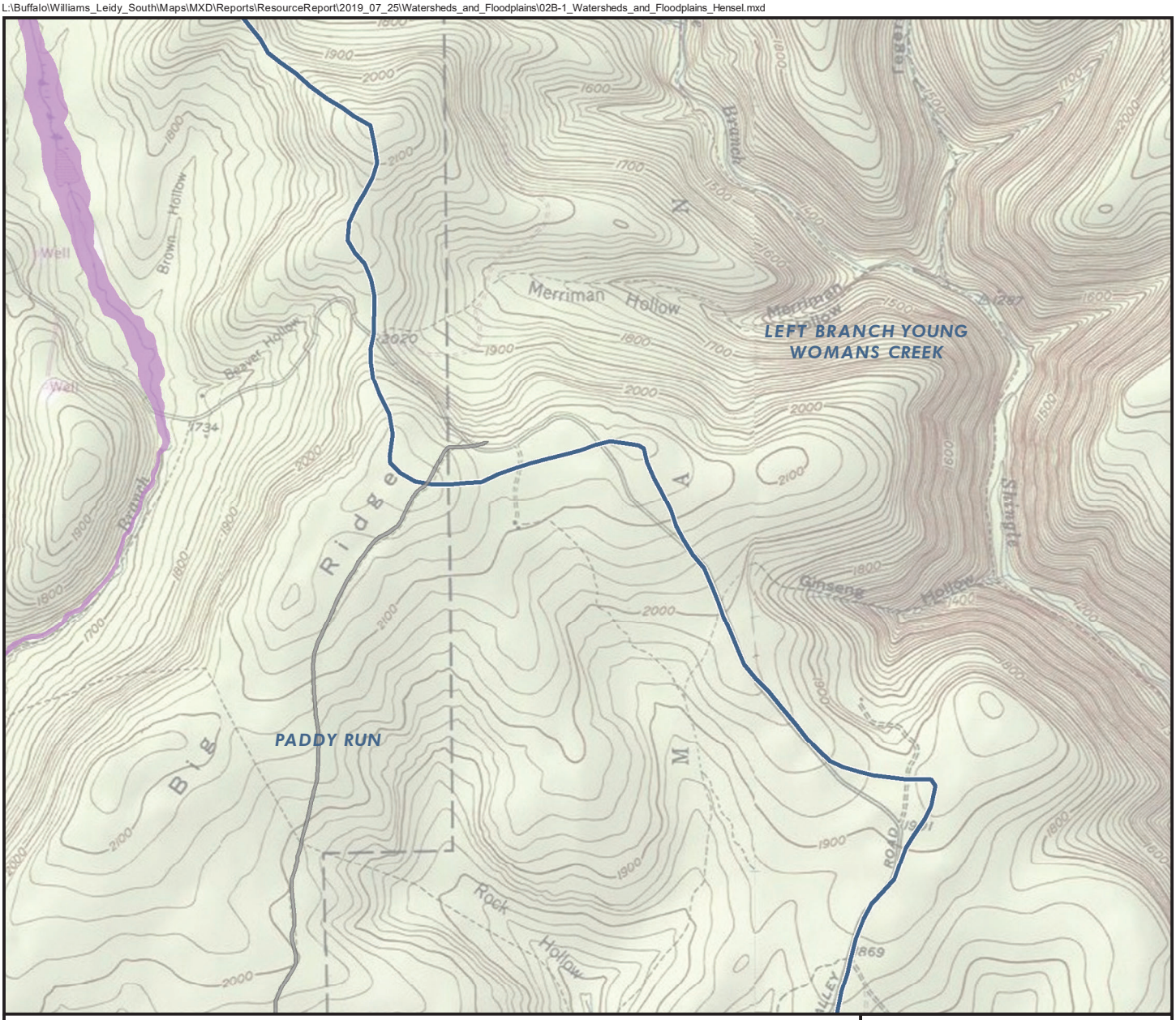


Legend:

- Access Road
- Watershed Boundary (12-digit HUC)

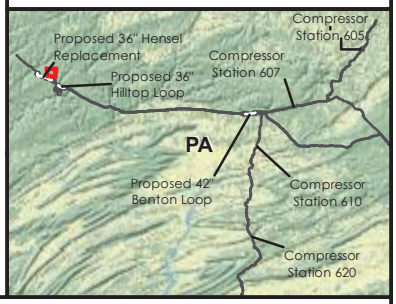
Flood Zone

- 100-year Floodplain

0 0.25 0.5
SCALE IN MILES

N

SITE LOCATION



DRAWING NO.	REFERENCE TITLE
	2B-1

TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
WATERSHED AND FEMA 100-YEAR FLOOD ZONES
CROSSED BY PROPOSED 36" HENSEL REPLACEMENT
LEIDY SOUTH PROJECT
M.P. 188.51 TO M.P. 194.00
PENNSYLVANIA

Williams

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
A	7/25/2019	HT	ISSUE FOR FERC APPLICATION	1211223	ES	ES

DRAWN BY: HT	DATE: 7/25/2019	ISSUE FOR BID: N/A	SCALE: 1:24,000
CHECKED BY: ES	DATE: 7/25/2019	ISSUE FOR CONSTRUCTION: N/A	REVISION: A
APPROVED BY: ES	DATE: 7/25/2019	DRAWING NUMBER: 5:23 PM 7/25/2019	FIGURE 2B-1
WO: 1211223			SHEET 3 of 4

Data Sources: FEMA 2018; USGS 2018, USDA 2014.

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Legend:

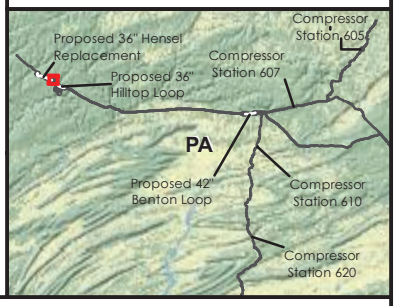
- Milepost
- Proposed 36" Hensel Replacement
- Existing Leidy Line "A" Pipeline
- Existing Leidy Line "B" Pipeline
- Existing Leidy Line "C" Pipeline
- Existing Leidy Line "D" Pipeline
- Access Road
- Contractor/ Pipe Yards and Staging Areas
- Watershed Boundary (12-digit HUC)

Flood Zone

- 100-year Floodplain

0 0.25 0.5
SCALE IN MILES
N

SITE LOCATION



DRAWING NO.	REFERENCE TITLE
	2B-1

TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
WATERSHED AND FEMA 100-YEAR FLOOD ZONES
CROSSED BY PROPOSED 36" HENSEL REPLACEMENT
LEIDY SOUTH PROJECT
M.P. 188.51 TO M.P. 194.00
PENNSYLVANIA

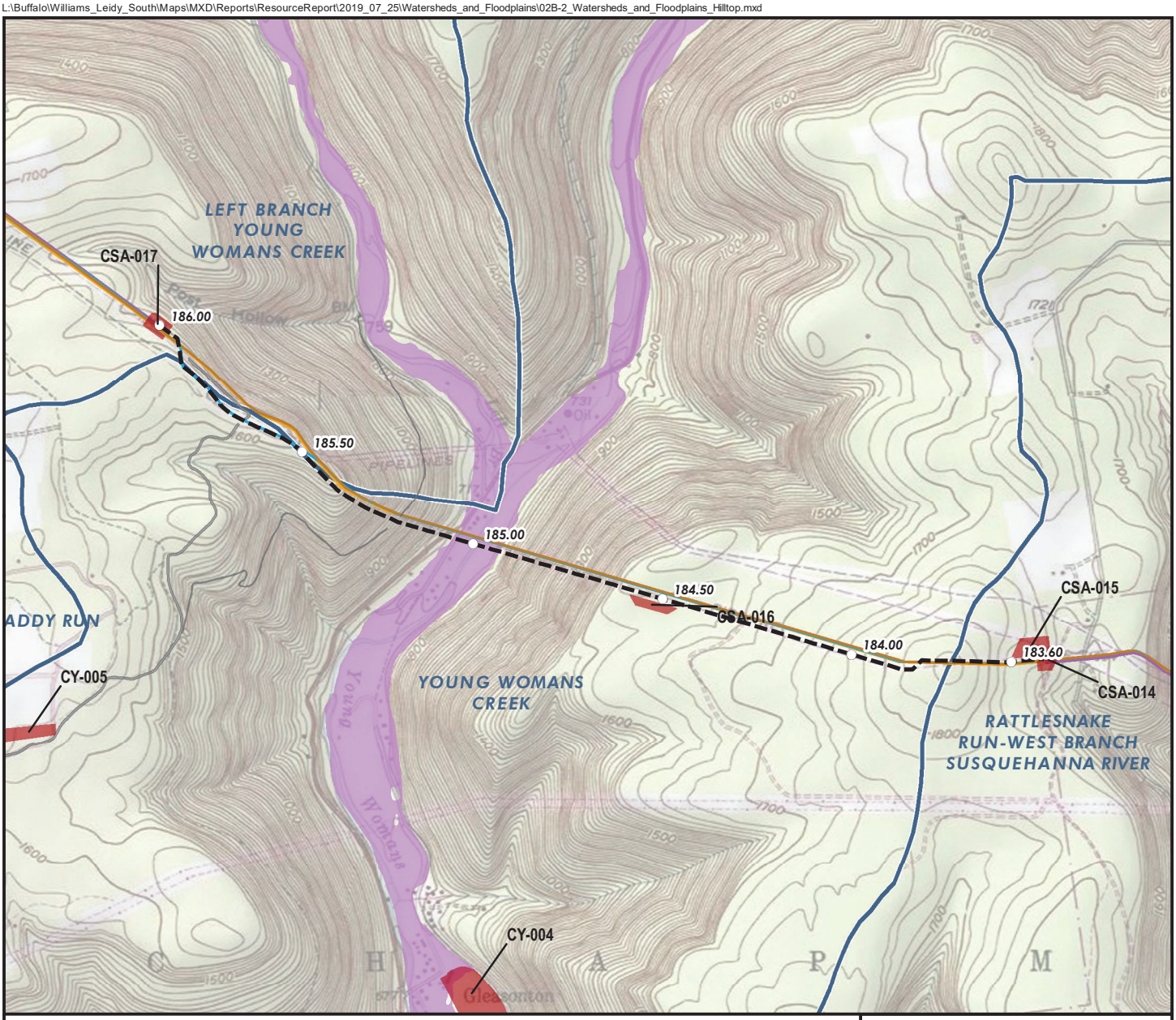
Williams

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
A	7/25/2019	HT	ISSUE FOR FERC APPLICATION	1211223	ES	ES

DRAWN BY: HT	DATE: 7/25/2019	ISSUE FOR BID: N/A	SCALE: 1:24,000
CHECKED BY: ES	DATE: 7/25/2019	ISSUE FOR CONSTRUCTION: N/A	REVISION: A
APPROVED BY: ES	DATE: 7/25/2019	DRAWING NUMBER: 5:23 PM 7/25/2019	FIGURE 2B-1
WO: 1211223			SHEET 4 of 4

Data Sources: FEMA 2018; USGS 2018, USDA 2014.

L:\Buffalo\Williams_Leidy_South\Maps\MXD\Reports\ResourceReport\2019_07_25\Watersheds_and_Floodplains\02B-2_Watersheds_and_Floodplains_Hilltop.mxd



Legend:

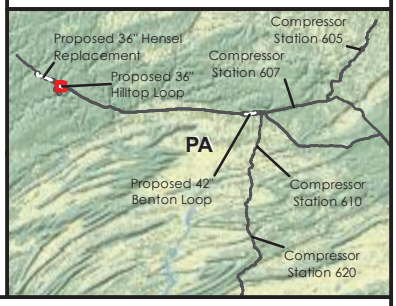
- Milepost
- Proposed 36" Hilltop Loop
- Existing Leidy Line "A" Pipeline
- Existing Leidy Line "B" Pipeline
- Existing Leidy Line "C" Pipeline
- Existing Leidy Line "D" Pipeline
- Existing Leidy Line "D" Pipeline
- Access Road
- Contractor/ Pipe Yards and Staging Areas
- Watershed Boundary (12-digit HUC)

Flood Zone

- 100-year Floodplain

0 0.25 0.5
SCALE IN MILES
N

SITE LOCATION



DRAWING NO.	REFERENCE TITLE
	2B-2

TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
WATERSHED AND FEMA 100-YEAR FLOOD ZONES
CROSSED BY PROPOSED 36" HILLTOP LOOP
LEIDY SOUTH PROJECT
M.P. 183.55 TO M.P. 186.01
PENNSYLVANIA

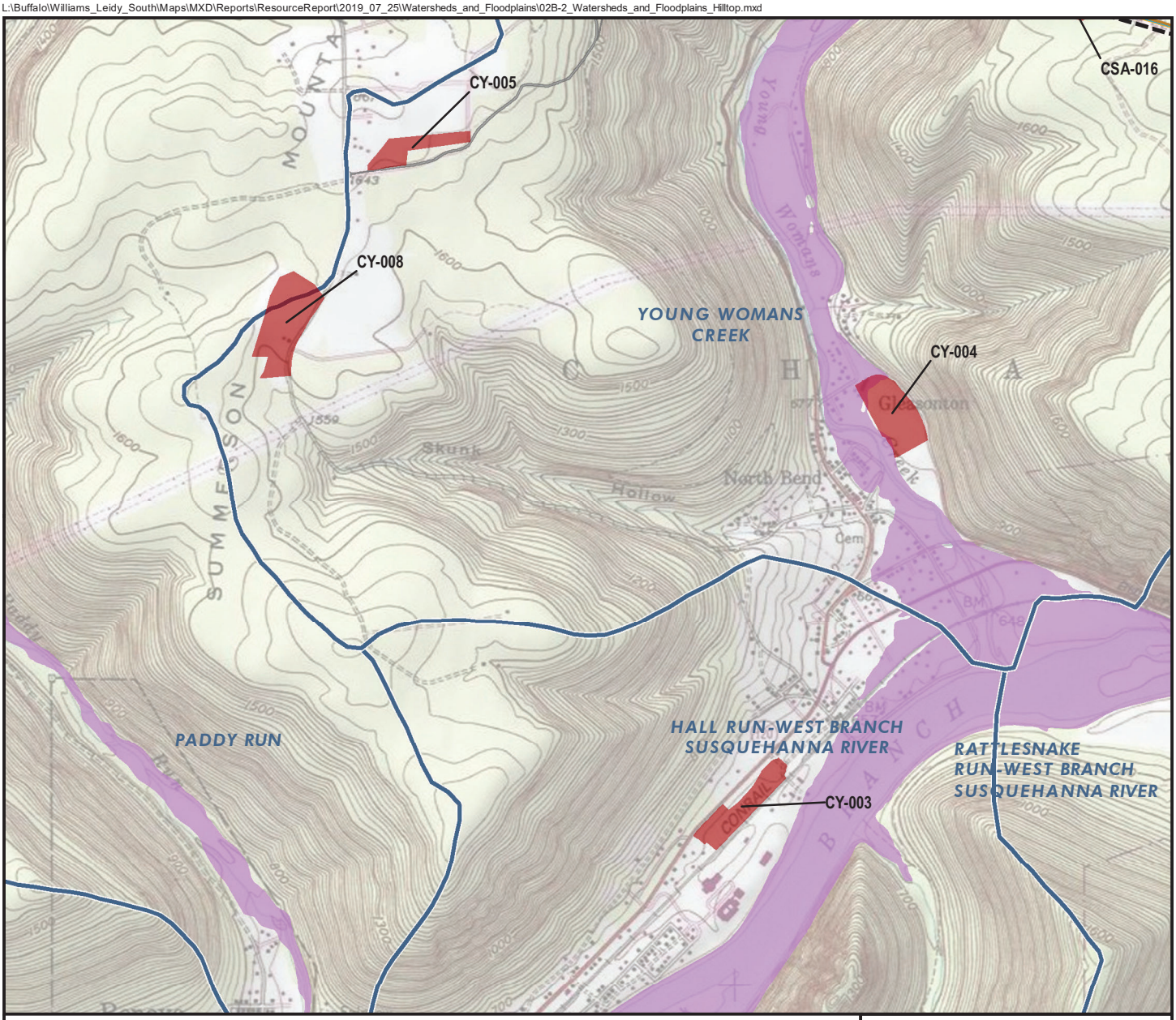
Williams

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
A	7/25/2019	HT	ISSUE FOR FERC APPLICATION	1211229	ES	ES

DRAWN BY: HT	DATE: 7/25/2019	ISSUE FOR BID: N/A	SCALE: 1:24,000
CHECKED BY: ES	DATE: 7/25/2019	ISSUE FOR CONSTRUCTION: N/A	REVISION: A
APPROVED BY: ES	DATE: 7/25/2019	DRAWING NUMBER: 5:22 PM 7/25/2019	FIGURE 2B-2
WO: 1211229			SHEET 1 of 2

Data Sources: FEMA 2018; USGS 2018, USDA 2014.

L:\Buffalo\Williams_Leidy_South\Maps\MXD\Reports\ResourceReport\2019_07_25\Watersheds_and_Floodplains\02B-2_Watersheds_and_Floodplains_Hilltop.mxd



Legend:

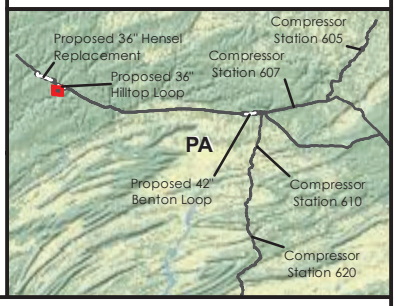
- Proposed 36" Hilltop Loop
- Existing Leidy Line "A" Pipeline
- Existing Leidy Line "B" Pipeline
- Existing Leidy Line "C" Pipeline
- Access Road
- Contractor/ Pipe Yards and Staging Areas
- Watershed Boundary (12-digit HUC)

Flood Zone

- 100-year Floodplain

0 0.25 0.5
SCALE IN MILES
N

SITE LOCATION



DRAWING NO.	REFERENCE TITLE
	2B-2

TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
WATERSHED AND FEMA 100-YEAR FLOOD ZONES
CROSSED BY PROPOSED 36" HILLTOP LOOP
LEIDY SOUTH PROJECT
M.P. 183.55 TO M.P. 186.01
PENNSYLVANIA

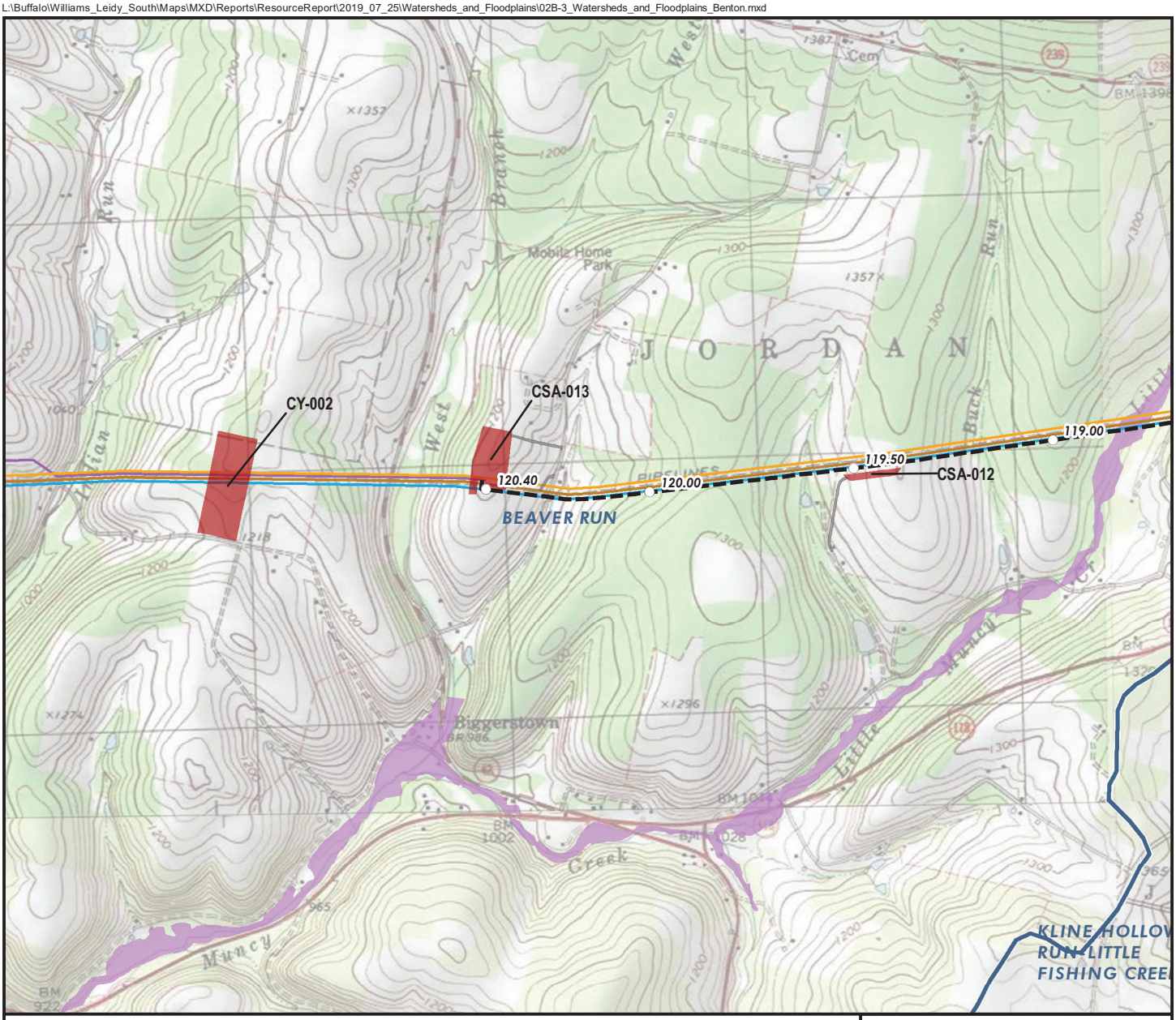
Williams

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
A	7/25/2019	HT	ISSUE FOR FERC APPLICATION	1211229	ES	ES

DRAWN BY: HT	DATE: 7/25/2019	ISSUE FOR BID: N/A	SCALE: 1:24,000
CHECKED BY: ES	DATE: 7/25/2019	ISSUE FOR CONSTRUCTION: N/A	REVISION: A
APPROVED BY: ES	DATE: 7/25/2019	DRAWING NUMBER: 5:23 PM 7/25/2019	FIGURE 2B-2
WO: 1211229			SHEET 2 of 2

Data Sources: FEMA 2018; USGS 2018, USDA 2014.

L:\Buffalo\Williams_Leidy_South\Maps\MXD\Reports\ResourceReport\2019_07_25\Watersheds_and_Floodplains\02B-3_Watersheds_and_Floodplains_Benton.mxd



Legend:

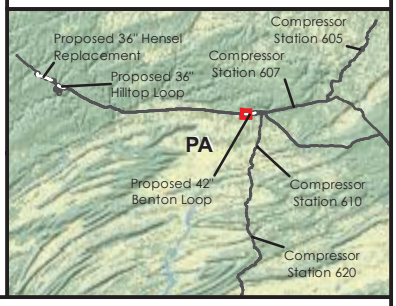
- Milepost
- Proposed 42" Benton Loop
- Existing Leidy Line "A" Pipeline
- Existing Leidy Line "B" Pipeline
- Existing Leidy Line "C" Pipeline
- Existing Leidy Line "D" Pipeline
- Access Road
- Contractor/ Pipe Yards and Staging Areas
- Watershed Boundary (12-digit HUC)

Flood Zone

- 100-year Floodplain

0 0.25 0.5
SCALE IN MILES
N

SITE LOCATION



DRAWING NO.	REFERENCE TITLE
	2B-3

TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
WATERSHED AND FEMA 100-YEAR FLOOD ZONES
CROSSED BY PROPOSED 42" BENTON LOOP
LEIDY SOUTH PROJECT
M.P. 116.95 TO M.P. 120.44
PENNSYLVANIA

Williams

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
A	7/25/2019	HT	ISSUE FOR FERC APPLICATION	1211227	ES	ES

DRAWN BY: HT	DATE: 7/25/2019	ISSUE FOR BID: N/A	SCALE: 1:24,000
CHECKED BY: ES	DATE: 7/25/2019	ISSUE FOR CONSTRUCTION: N/A	REVISION: A
APPROVED BY: ES	DATE: 7/25/2019	DRAWING NUMBER: 5:23 PM 7/25/2019	FIGURE 2B-3
WO: 1211227			SHEET 1 of 2

Data Sources: FEMA 2018; USGS 2018, USDA 2014.

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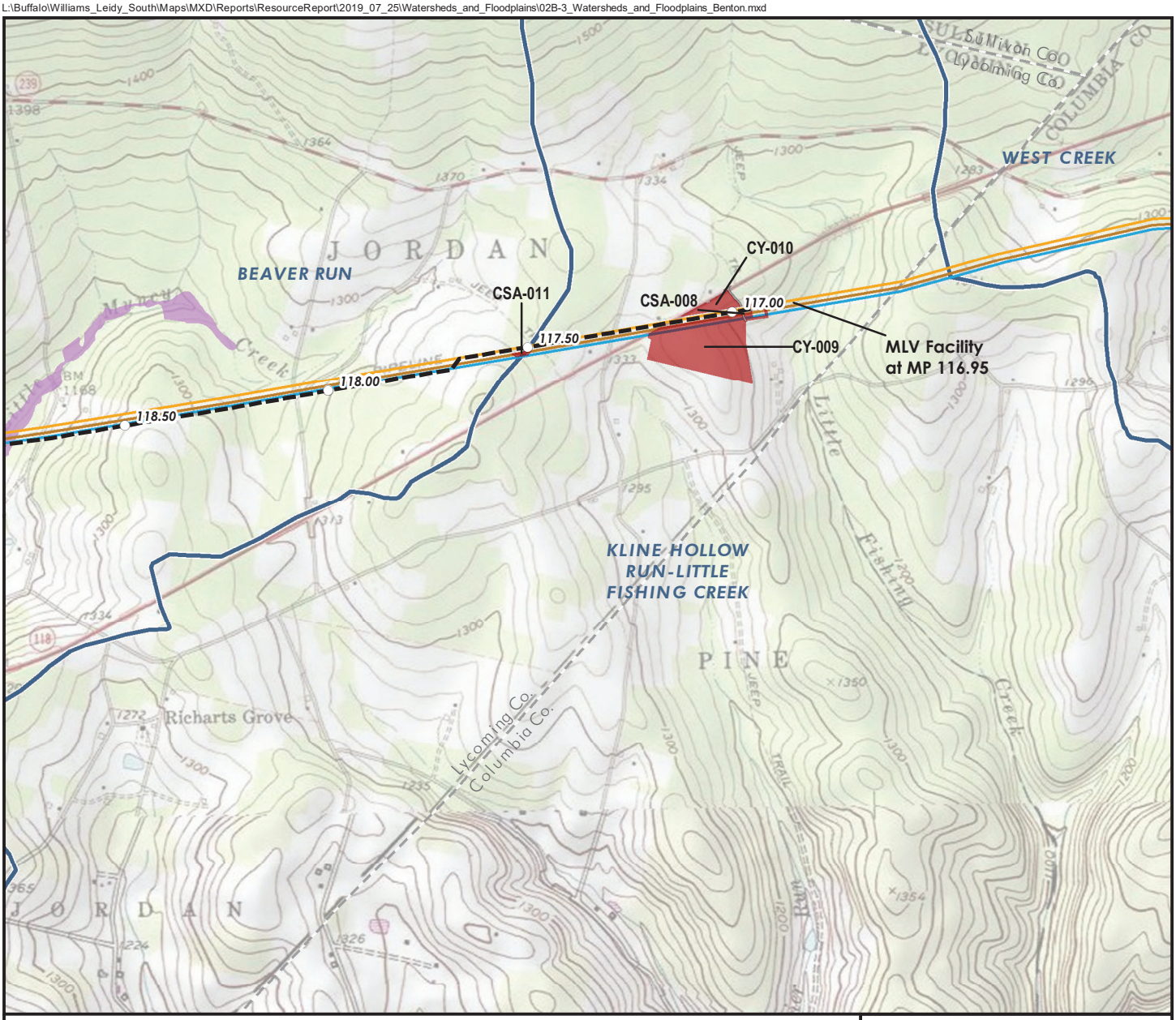
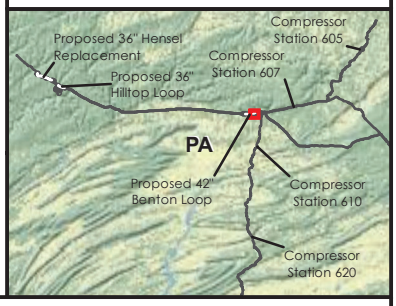


Legend:

- Milepost
- Proposed 42" Benton Loop
- Existing Leidy Line "A" Pipeline
- Existing Leidy Line "B" Pipeline
- Existing Leidy Line "C" Pipeline
- Access Road
- Contractor/ Pipe Yards and Staging Areas
- Watershed Boundary (12-digit HUC)
- Flood Zone
- 100-year Floodplain
- County Boundary

0 0.25 0.5
SCALE IN MILES

SITE LOCATION



DRAWING NO.	REFERENCE TITLE
	2B-3

TRANSCONTINENTAL GAS PIPE LINE COMPANY LLC
WATERSHED AND FEMA 100-YEAR FLOOD ZONES
CROSSED BY PROPOSED 42" BENTON LOOP
LEIDY SOUTH PROJECT
M.P. 116.95 TO M.P. 120.44
PENNSYLVANIA

Williams

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
A	7/25/2019	HT	ISSUE FOR FERC APPLICATION	1211227	ES	ES

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APPROVED BY: ES	DATE: 7/25/2019	DRAWING NUMBER: 5:23 PM 7/25/2019	FIGURE 2B-3
WO: 1211227			SHEET 2 of 2

Data Sources: FEMA 2018; USGS 2018, USDA 2014.

November 19, 2018

Devyn Richardson
Transcontinental Gas Pipe Line Company, LLC
2800 Post Oak Boulevard (77056)
P.O. Box 1396
Houston, Texas 77251-1396

Re: File No. ER 2015-0967-042-N
FERC Phase I Literature Review & Cultural Resources Survey Plan: Transcontinental Gas Pipe Line Company, LLC, Leidy South Project, Clinton, Columbia, Luzerne, Lycoming, Schuylkill & Wyoming Counties

Dear Mr. Richardson:

Thank you for submitting information concerning the above referenced project. The Pennsylvania State Historic Preservation Office (PA SHPO) reviews projects in accordance with state and federal laws. Section 106 of the National Historic Preservation Act of 1966, and the implementing regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation, is the primary federal legislation. The Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988) is the primary state legislation. These laws include consideration of the project's potential effects on both historic and archaeological resources.

Archaeological Resources

Based on an evaluation by our staff, including a review of the Statewide Pre-Contact Predictive Model, there is a high probability that National Register significant archaeological sites are present within this project area. These resources could be adversely affected by project activities. Our review considers the locations of known archaeological resources, soil type, topographic setting, slope direction and distance to water, among other regionally specific predictive factors for archaeological site locations. It is our opinion that a Phase I archaeological survey should be conducted to locate potentially significant resources. Guidelines and instructions for conducting all phases of archaeological survey in Pennsylvania are available on our website http://www.phmc.pa.gov/Preservation/About/Documents/SHPO-Guidelines-Archaeological-Investigation.pdf.

The PASHPO will keep the information you provided for this submission and any subsequent submission on file. Please provide a copy of this letter and any other project-related correspondence to your state or federal permitting or funding agency.

Transcontinental Gas Pipe Line Company, LLC

Section 1-9

Cultural Resource Notice

Leidy South Project

August 2019
(Revised May 2020)

Above Ground Resources

A preliminary review of this project indicates that there may be National Register-eligible above ground resources in the project area. Underground pipelines have the potential to affect these resources when compressor stations are proposed; and/or the line requires the clear cutting of a new right-of-way or access roads through hedgerows, wooded area, and other landscape features; or placement of new features amongst clusters of buildings associated with a farm.

A farm is defined as encompassing the farm dwelling(s), barn, outbuildings and the crop fields, meadows, pastures, orchards, woodlots, etc. and including landscape features such as fences, tree lines, contour strips, streams, etc. and circulation networks. Please use the PHMC-PA SHPO Historic Agricultural Resources of Pennsylvania, c 1700-1960 context which is available here:
http://www.phmc.state.pa.us/portal/communities/agriculture/history/index.html to determine the identified agricultural region your project is located within and its registration requirements (farm, farmstead or rural historic district).

An identification documentation submission of the project area is required to locate potentially significant above ground resources. Please see the "Survey Guidelines for Pipeline Projects – Above Ground Resources" for additional guidance available here:
http://www.phmc.pa.gov/Preservation/About/Pages/Forms-Guidance.aspx.
For more information on survey strategies and methodologies, please contact the staff referenced below.

Provide historic (www.pennpilot.psu.edu) and current aerial mapping comparisons showing overall landscape features. Photographs of the project vicinity including setting/landscape views are required. Land use planning and tax maps that show parcel boundaries and land use are also helpful to the assessment of rural historic landscapes.

If you need further information regarding archaeological resources, please contact Steven McDougal at smcdougal@pa.gov or (717) 772-0923. If you need further information concerning above ground resources, please contact Cheryl Nagle at chnagle@pa.gov or (717) 772-4519.

Sincerely,

Douglas C. McLearen, Chief
Division of Environmental Review

DCM/tmw

Pennsylvania State Historic Preservation Office
PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION

July 9, 2019

Christopher Bergman, PhD.
AECOM
525 Vine Street, Suite 1800
Cincinnati, Ohio 45202

RE: ER 2015-0967-042-P: Phase I Cultural Resources Survey for the Leidy South Project, Compressor Station 607-A; Volume I: Archaeology

Dear Dr. Bergman:

Thank you for submitting the report for the above referenced project. The Pennsylvania State Historic Preservation Office (PA SHPO) reviews projects in accordance with state and federal laws. Section 106 of the National Historic Preservation Act of 1966, and the implementing regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation, is the primary federal legislation. The Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988) is the primary state legislation. These laws include consideration of the project's potential effects on both historic and archaeological resources.

We concur with the findings in the report that the following properties are not eligible for listing in the National Register of Historic Places due to a lack of integrity and/or significance:

36LU0346

This report meets our standards and specifications as outlined in *Guidelines for Archaeological Investigations in Pennsylvania* (SHPO 2017) and the Secretary of the Interior's Guidelines for Archaeological Documentation. We agree with the recommendations of this report and, in our opinion, no further archaeological work is necessary for this project.

If you have any questions or comments concerning this review, please contact me at (717) 772-0923 or chanson@pa.gov.

Sincerely,

Douglas C. McLearen, Chief
Division of Environmental Review

Pennsylvania State Historic Preservation Office
PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION

August 13, 2019

Christopher Bergman, PhD.
AECOM
525 Vine Street, Suite 1800
Cincinnati, OH 45202

RE: ER 2015-0967-042-Q: Phase I Cultural Resources Survey for Leidy South Project, Clinton, Columbia, Luzerne, Lycoming, Schuylkill, and Wyoming Counties, Pennsylvania, Volume I: Archaeology

Dear Dr. Bergman:

Thank you for submitting the report for the above referenced project. The Pennsylvania State Historic Preservation Office (PA SHPO) reviews projects in accordance with state and federal laws. Section 106 of the National Historic Preservation Act of 1966, and the implementing regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation, is the primary federal legislation. The Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988) is the primary state legislation. These laws include consideration of the project's potential effects on both historic and archaeological resources.

We concur with the findings in the report that the following properties are not eligible for listing in the National Register of Historic Places due to a lack of integrity and/or significance:

36CN0208; 36CN0228; 36SC0092; 36LU0346 (Previously Determined Not Eligible 7/9/2019)

This report meets our standards and specifications as outlined in *Guidelines for Archaeological Investigations in Pennsylvania* (SHPO 2017) and the Secretary of the Interior's Guidelines for Archaeological Documentation. We agree with the recommendations of this report and, in our opinion, no further archaeological work is necessary for this project.

If you have any questions or comments concerning this review, please contact me at (717) 772-0923 or chanson@pa.gov.

Sincerely,

Douglas C. McLearen, Chief
Division of Environmental Review

Pennsylvania State Historic Preservation Office
PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION

October 1, 2019

Rebecca H. Turner
AECOM
525 Vine Street, Suite 1800
Cincinnati OH 45202

ER 2015-0967-042-T: FERC, Leidy South Project (pipeline and compressor stations), Phase 1 Above Ground Resource Recon Survey, Volume II: Architectural History, Clinton, Columbia, Luzerne, Lycoming, Schuylkill and Wyoming Counties

Dear Ms. Turner,

Thank you for submitting information concerning the above referenced project. The Pennsylvania State Historic Preservation Office (PA SHPO) reviews projects in accordance with state and federal laws. Section 106 of the National Historic Preservation Act of 1966, and the implementing regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation, is the primary federal legislation. The Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution, and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988) is the primary state legislation. These laws include consideration of the project's potential effects on both historic and archaeological resources.

Above Ground Resources Review - Additional Information Recommendation
Compressor Station 620
Due to the nature of the proposed project (construction of the compressor station and the construction of a communication tower) and the types of potential historic resources (agricultural properties) we are recommending additional information to complete our review. In accordance with our statewide historic agricultural context as approved by the National Park Service, a farm as a property type/registration requirement is not just the built environment (house, barn, and outbuildings) but includes circulation patterns, landscape features, croplands, historically associated fields, etc. as well.

Therefore, we are requesting completion of full Historic Resource Survey Forms (HRSFs) for the properties listed below be prepared that applies the agricultural context.

BHP Key # 862025
BHP Key #862026
BHP Key #210604/210607 – it appears to be one resource (house, barn and outbuildings). Current ownership does not determine the resource – if this was historically the same property, submit a HRSF, or provide narrative that explains that these buildings are not historically related.
BHP Key #862027
BHP Key #862028
BHP Key #862029

A copy of the agricultural context and registration requirements for that region are available via the agricultural history website:
http://www.phmc.state.pa.us/portal/communities/agriculture/history/index.html

The HRSF should also include agricultural census data for the property and the township, as well as a site plan with the buildings labeled with approximate construction dates. In addition, as part of the HRSF, please provide historic and current aerial photographs of the property (available via www.pennpilot.psu.edu).

Please note, the PA SHPO has new guidance for the surveying/documentation of farms that date from c. 1960 to 1980. Please refer to the information posted here https://pahistoricpreservation.com/agricultural-history-updates/. And note that there are additional items that are to be submitted with the HRSFs.

Viewshed Analysis - Photo Sims
Please provide photo Sims from the Key Numbers listed below for both the proposed Compressor Station 620 and the proposed communication tower

BHP Key # 862025
BHP Key #862026
BHP Key #210604/210607
BHP Key #862027
BHP Key #862028
BHP Key #862029

General Information/Direction for future project submissions

- Please map all newly identified, unevaluated, eligible and listed Key Numbers on the USGS/Aerial maps that include the proposed ROW, access roads, and other components.

If you need further information in this matter, please contact Cheryl L. Nagle at chnagle@pa.gov or (717) 772-4519.

Sincerely,

Douglas C. McLearen, Chief
Division of Environmental Review

Pennsylvania State Historic Preservation Office
PENNSYLVANIA HISTORICAL AND MUSEUM COMMISSION

December 30, 2019

Christopher Bergman, PhD.
AECOM
525 Vine Street, Suite 1800
Cincinnati, OH 45202

Re: ER 2015-0967-042-U; FERC: Phase I Cultural Resources Survey for the Leidy South Pipeline Project, Addendum 1, Clinton County, Pennsylvania.

Dear Dr. Bergman:

Thank you for submitting additional information concerning the above referenced project. The Pennsylvania State Historic Preservation Office (PA SHPO) reviews projects in accordance with state and federal laws. Section 106 of the National Historic Preservation Act of 1966, and the implementing regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation, is the primary federal legislation. The Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988) is the primary state legislation. These laws include consideration of the project's potential effects on both historic and archaeological resources.

This report meets our standards and specifications as outlined in Guidelines for Archaeological Investigations in Pennsylvania (SHPO 2017) and the Secretary of the Interior's Guidelines for Archaeological Documentation. We agree with the recommendations of this report and, in our opinion, no further archaeological work is necessary for this project.

If you need further information concerning archaeological issues, please consult Casey Hanson at chanson@pa.gov or (717) 772-0923.

Sincerely,

Douglas C. McLearen, Chief
Division of Environmental Review

April 9, 2020

Rebecca H. Turner
AECOM
525 Vine Street, Suite 1800
Cincinnati OH 45202

ER 2015-0967-042-W: FERC, TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC, LEIDY SOUTH PROJECT, receipt of additional information (addendum to HRSFs)

Dear Ms. Turner,

Thank you for submitting information concerning the above referenced project. The Pennsylvania State Historic Preservation Office (PA SHPO) reviews projects in accordance with state and federal laws. Section 106 of the National Historic Preservation Act of 1966, and the implementing regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation, is the primary federal legislation. The Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988) is the primary state legislation. These laws include consideration of the project's potential effects on both historic and archaeological resources.

Above Ground Resources - Assessment of Eligibility
Based on the information received and available in our files, it is the opinion of the Pennsylvania State Historic Preservation Officer that the following properties are eligible for listing in the National Register of Historic Places:

> The ***Kessler Farm, Key #210604/210607*** is eligible under Criterion A in the Area of Agriculture as a farmette meeting the PA Agricultural Context for the Pocono Anthracite Region, for 1860-1915, Diversified Vegetable, Fruit, Poultry, Dairy, and Hay Production for Local Markets period. The proposed period of significance begins in c1860 and ends in 1915. The proposed boundary includes the current tax parcel boundaries. This resource has not been evaluated for archaeological potential.
>
> The ***Otto Farm, Key 862027*** is eligible under Criterion A in the Area of Agriculture as a farm meeting the PA Agricultural Context for the Pocono Anthracite Region, for 1940-1960. The proposed period of significance begins in 1940 and ends in 1960. The proposed boundary includes the current tax parcel boundary. This resource has not been evaluated for archaeological potential.

We concur with the findings of the agency that the following properties are not eligible for listing in the National Register of Historic Places due to a lack of integrity and/or significance:

> ***Coleman Natural Foods/Dennis & Carol Rebuck, Key # 862025***
> ***Kroh Farm, Key # 862028***
> ***Ebert Farm, Key #862026***
> ***Hurtzinger Farmette, Key #862029***

We concur the scope and level of effort utilized to identify historic properties for this project is appropriate pursuant to 36CFR 800.4. Our evaluation is based upon the information

provided and available in our files for review. If National Register listing for this property is sought in the future, additional documentation of the property's significance and integrity may be required to both verify this evaluation and satisfy the requirements of the National Park Service (36 CFR Part 60). Thus, the outcome of the National Register listing process cannot be assured by this evaluation.

Assessment of Effect
The PA SHPO offices are currently closed due to the Governor's Order. We are unable to access the paper project files related to this submission. If you have an electronic copy of the project submission, you may email it to Cheryl Nagle at chnagle@pa.gov.

Sincerely,

Douglas C. McLearen, Chief
Division of Environmental Review

April 21, 2020

Rebecca H. Turner
AECOM
525 Vine Street Suite 1800
Cincinnati OH 45202

ER 2015-0967-042-X: FERC, Leidy South Project, replacement of Leidy Line A (Hensel Replacement), partial abandonment Leidy Line A; Hilltop Loop; Benton Loop; addition to Compressor Station 605; New compressor Station 607 (reviewed previously); addition to Compressor Station 610; New Compressor Station 620; etc.

Dear Ms. Turner,

Thank you for submitting information concerning the above referenced project. The Pennsylvania State Historic Preservation Office (PA SHPO) reviews projects in accordance with state and federal laws. Section 106 of the National Historic Preservation Act of 1966, and the implementing regulations (36 CFR Part 800) of the Advisory Council on Historic Preservation, is the primary federal legislation. The Environmental Rights amendment, Article 1, Section 27 of the Pennsylvania Constitution and the Pennsylvania History Code, 37 Pa. Cons. Stat. Section 500 et seq. (1988) is the primary state legislation. These laws include consideration of the project's potential effects on both historic and archaeological resources.

Above Ground Resources
There may be above ground historic properties near or within the project area of potential effect. However, in our opinion the project as proposed will have no effect on historic properties, should they exist. Should the scope and/or nature of the project change the PA SHPO should be contacted immediately.

Specific to Compressor Station 620
The properties listed below, listed in or eligible for the National Register of Historic Places, are located near or in the project area. In our opinion, the activity described in your proposal will have no effect on such resources. Should the scope and/or nature of the project activities change, the PA SHPO should be contacted immediately.

Otto Farm, Key # 862027
Kessler Farm, Key # 210604/210607

If you need further information on above ground resources please consult Cheryl Nagle at chnagle@pa.gov or (717) 772-4519.

Sincerely,

Douglas C. McLearen, Chief
Division of Environmental Review

Transcontinental Gas Pipe Line Company, LLC

Construction Spill Prevention and Response Procedures for Oil and Hazardous Materials

Leidy South Project

July 2019
(Revised May 2020)

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Williams —Proprietary Information • For Internal Williams Use Only

SECTION 1 - GENERAL INFORMATION

1.1 SPILL PLAN REQUIREMENTS

Contractor shall determine the approximate quantities of oil or oil-like substances (including fuels) and any hazardous materials or substances that will be present or stored at the work site(s) to assist Company's Environmental Inspector in identifying the appropriate spill plan that shall be applicable for the Work. The quantities carried by fuel trucks that are on site temporarily to refuel equipment shall not be included in Contractor's calculation of the amount of oil or oil-like substances stored at any facility/site.

1.1.1 Company Construction Spill Plan For Oil and Hazardous Materials

If during the course of Work, 1,320 gallons or less of oil or oil-like substances or hazardous materials will be present or stored at any facility/site, Contractor shall comply with and complete the remaining sections and requirements of this document (i.e., Construction Spill Plan). Contractor's field personnel shall be familiar with this plan before initiating any onsite activities and shall follow all requirements and responsibilities of this plan as they are listed for Contractor. Contractor shall provide, prior to start of the Work but no later than the pre-job meeting, all of the initial information required by the applicable/designated plan. Contractor shall provide Company with additional information to keep the plan current.

1.1.2 U.S. Environmental Protection Agency Tier I Qualified Facility Spill Prevention, Control, and Countermeasure (SPCC) Plan

If during the course of Work, greater than 1,320 gallons of oil or oil-like substances but less than 10,000 gallons with no containers greater than 5,000 gallons in capacity will be present or stored at any facility/site, Contractor shall comply with and complete the remaining sections and requirements of this document PLUS comply with and complete the requirements of the "U.S. Environmental Protection Agency Tier I Qualified Facility SPCC Plan," attached to this section, or develop a full SPCC Plan. Contractor's field personnel shall be familiar with this plan before initiating any onsite activities and shall follow all requirements and responsibilities of this plan as they are listed for Contractor. Contractor shall provide, prior to start of the Work but no later than the pre-job meeting, all of the initial information required by the plan. Contractor shall provide Company with additional information to keep the plan current.

1.1.3 U.S. Environmental Protection Agency Full SPCC Plan

If during the course of Work, 5,000 gallons or more of oil or oil-like substances contained in a single container, or a total of 10,000 gallons or more, will be present or stored at any facility/site, Contractor shall comply with and complete the remaining section of this document PLUS comply with and complete the requirements of a full U.S. Environmental Protection Agency SPCC Plan, which must be reviewed and approved by a professional engineer. Contractor's field personnel shall be familiar with this plan before initiating any onsite activities and shall follow all requirements and responsibilities of this plan as they are listed for Contractor. Contractor shall provide, prior to start of the Work but no later than the pre-job meeting, all of the initial information required by the plan. Contractor shall provide Company with additional information to keep the plan current.

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1.2 PROJECT LOCATION AND DESCRIPTION

This Construction Spill Plan was developed for the following project:

Leidy South Project

- *Compressor Station 607*
- *Compressor Station 610*
- *Compressor Station 620*
- *Benton Loop*
- *Hilltop Loop*
- *Hensel Replacement*
  - *Installation of Leidy Line D*
  - *Abandonment of Leidy Line A*

Definitions:

Oil is defined in the SPCC regulations as oil of any kind or in any form including, but not limited to, petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil and oily mixtures.

Hazardous Material as defined by the DOT includes hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (see 49 CFR 172.101), and materials that meet the defining criteria for hazard classes and divisions in part 173 of subchapter C of this chapter. Hazardous Materials typically found on construction projects include, but are not limited to, petroleum oils, hydraulic fluids, engine coolants (ethylene glycol), x-ray film developer, chemical additives, pipe coatings, used abrasive blasting media, etc.

Contractor Responsibility:

The Contractor shall be familiar with this Construction Spill Plan and its contents prior to commencing any construction-related activities. All workers handling fuels, oils or other hazardous materials shall be properly trained. The Plan will be followed to prevent any spills that may occur during the project and to mitigate any spills that do occur.

Company representatives assigned to this project include:

Manager, Operations (MO):	*To be inserted*
Chief Inspector (CI):	*To be inserted*
Company Lead Environmental Specialist:	*To be inserted*
Land, GIS, & Permits Lead:	*To be inserted*

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SECTION 2 - DRAINAGE PATTERNS AND SPILL PREVENTION PRACTICES

2.1 DRAINAGE PATTERNS

Insert a brief description about the general drainage patterns at the work site(s).

Responsibility: Chief Inspector

Construction and Technicians will be familiar with drainage patterns for the project and be prepared to implement measures to control any release.

2.2 SPILL PREVENTION PRACTICES

The Contractor shall take the following precautions to ensure that an oil or hazardous materials spill does not occur:

A. Containers/Pumps/Concrete Coating

(1) All containers of oil, fuel, or hazardous materials shall be stored on level ground at least 100 feet from any waterway, wetland, or designated municipal watershed area or as prescribed by a project specific permit or agency. All containers should be located within temporary containment.

(2) Temporary containment will include, but not be limited to, temporary hay bale berms with plastic sheets underlining the entire contained area and it is recommended that these areas be inspected daily or after any significant precipitation event.

(3) Containment areas shall be capable of containing 100% of the volume of the single largest container of hazardous material being stored plus sufficient freeboard to hold the 25 year/24 hour storm.

(4) All container storage areas shall be routinely inspected for integrity purposes. If hazardous wastes are being stored a weekly inspection must be documented.

(5) Leaking and/or deteriorated containers shall be replaced as soon as the condition is first detected with clean-up measures immediately taking place.

(6) No incompatible materials shall be stored in the same containment area.

(7) No container storage areas shall be left unsecured during non-work hours.

(8) Accumulated rainwater in the containment areas must be inspected prior to release to the ground; it must be free of sheens or other hazardous materials.

(9) Pumps operating within 100 feet of a waterbody or wetland boundary shall utilize the appropriate agricultural or industrial grade containers/materials as a secondary containment system to prevent spills.

(10) Concrete coating operations shall not be performed within 100 feet of a wetland or waterbody unless the location is an existing industrial site designated for such use. If no reasonable alternatives exist, consult with the EI and Company Environmental Lead for other options.

B. Tanks

(1) The Contractor shall operate only those tanks that meet the requirements and specifications of applicable regulations and that are surrounded with temporary containment as described above.

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(2) Self-supporting tanks shall be constructed of materials compatible with its contents.

(3) All tanks shall be routinely inspected for integrity purposes.

(4) Vehicle mounted tanks shall be equipped with flame/spark arrestors on vents to ensure that self-ignition does not occur.

(5) Tanks will not be used to store incompatible materials in sequence unless first thoroughly decontaminated.

(6) Any tank utilized for storing different products between construction locations will be thoroughly decontaminated prior to refilling.

C. Unloading/Loading Areas

(1) If it is necessary during the project, re-fueling and transferring of liquids shall only occur in pre-designated locations that are on level ground and at least 100 feet from any waterway. This activity must be continuously manned (minimum of two attendants plus a Company inspector) to ensure that overfilling, leaks, or spills do not occur. In addition, all equipment must be surrounded by temporary containment as described above.

Where conditions require construction equipment (e.g., Bobcat/front-end loader/excavator) to be re-fueled within 100 feet of any waterway, or as prescribed by a project specific permit, the above requirements shall also apply and will be strictly enforced.

(2) All service vehicles used to transport fuel must travel only on approved access roads and workspace and be equipped with an appropriate number of fire extinguishers and an oil spill response kit as identified in Appendix C.

D. Leidy South- Hensel Replacement- Abandonment of Leidy Line A

(1) During the abandonment grouting process, visual inspection of the limits of disturbance and alignment of the proposed abandonment, in conjunction with monitoring the volume of fluids will be accomplished to identify any inadvertent return or spill of the cementitious grout. In the event that a spill or an inadvertent return occurs, abandonment operations will temporarily cease while measures to mitigate the spill or inadvertent return are employed. These measures will at a minimum include; notification to construction supervision and appropriate regulatory agencies, surrounding the area with the approved sediment barrier, collection of fluids that have accumulated at the land surface, containerizing the fluids, and characterization for proper disposal. The ground surface at the inadvertent return or spill location will be restored to pre-existing grade and conditions.

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SECTION 3 - EMERGENCY RESPONSE PROCEDURES

This section provides a generic description of emergency response procedures to be performed to address oil and hazardous materials spills at the job site. Each response will vary depending upon the nature and extent of the incident. However, the general procedures outlined below will be followed.

3.1 CONTRACTOR RESPONSIBILITIES

(1) The Contractor must designate both an Emergency Coordinator (EC) and an Alternate EC for the project.

(2) The Contractor is responsible for immediately and appropriately addressing all spills that occur directly as a result of construction-related activities.

(3) For all spills the internal notification requirements of this Plan need to be followed.

(4) The Contractor shall supply the necessary manpower, PPE, and spill response equipment to immediately and appropriately address all spills that directly occur as a result of construction-related activities.

(5) Ensure that all emergency spill response equipment and PPE is well-stocked and in good condition. Replace used materials immediately after a response. .

(6) If the situation warrants, the Contractor, in consultation with the CI, shall immediately notify any local emergency spill response contractors for assistance.

(7) The Contractor shall be responsible for hiring a Company approved emergency spill response contractor if the nature of the incident requires it.

(8) The Contractor is responsible for immediately notifying the CI, EI or Operations Manager of any spills.

3.2 COMPANY RESPONSIBILITIES

(1) The Company shall be responsible for ensuring that the Contractor adequately follows the procedures outlined in this Plan at all times.

(2) The Company shall be responsible for all verbal and written external notifications made to any regulatory agency or any local emergency responders.

3.3 EMERGENCY CONTACTS

Table I (Appendix A) provides a list of Company and Contractor emergency contacts.

3.4 DUTIES OF CHIEF INSPECTOR OR MANAGER, OPERATIONS.

The duties of the CI, EI or MO for reportable spills include the following:

(1) Determine the source, character, amount, and extent of the spill.

(2) Assess the potential hazards to the job site, environment, and surrounding community and contact the Construction Safety Representative if any hazards are detected.

(3) Evacuate the area if necessary.

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(4) Report the spill in accordance with the internal notification procedures outlined in Section 5.1 and the external notification procedures outlined in Section 5.2.

(5) Commit manpower and equipment for minor incidents that can be reasonably remediated by the Contractor.

(6) Oversee Contractor's spill response efforts to contain and control all spills to ensure they adequately follow the procedures outlined in this Plan.

(7) Document the Contractor's response effort, including taking photographs wherever possible.

(8) Generate an Emergency Incident Report (form WGP-0187).

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SECTION 4 - EMERGENCY SPILL RESPONSE AND PERSONAL PROTECTIVE EQUIPMENT

Each construction crew (including cleanup crews) shall have on-hand sufficient supplies, as Identified in Appendix C; of absorbents, barrier materials, and personal protective equipment (PPE) to allow for the rapid containment and recovery of any spilled material.

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SECTION 5 - SPILL NOTIFICATION PROCEDURES

5.1 INTERNAL NOTIFICATIONS

(1) All spills are to be immediately reported to the CI, EI or MO who will immediately contact The Security Operations Center (SOC). Table I (Appendix A) includes a list of emergency contacts.

(2) The person reporting the spill/release should use the checklist in Appendix B to ensure that the minimum information needed is collected in order to make a report.

(3) The SOC is responsible for generating a Concern Report in Gensuite and notifying the appropriate Environmental Specialist.

(4) The Environmental Specialist will review the Concern Report and “escalate” or “close” the concern as appropriate.

5.2 EXTERNAL NOTIFICATIONS

(1) The CI, EI and or MO will consult with the appropriate Company Lead Environmental Specialist and determine who will be responsible for any necessary first-response notifications to an emergency spill response team to help contain the spill. If the spill occurs offshore, refer to the Offshore Spill Response Plan (OSRP).

(2) After all required immediate internal notifications are made by the SOC, the Company Lead Environmental Specialist and the SOC shall confer and use the gathered information to make any necessary subsequent verbal and written notifications to regulatory agencies.

(3) If a spill poses an immediate threat to human health or the environment, the CI, EI or MO shall immediately contact the Local Emergency Planning Committee (LEPC). When determining if the LEPC should be contacted, any gas release to the atmosphere must be taken into consideration. Note: Linear Projects may extend through multiple LEPC jurisdictions. As a result, all jurisdictions must be listed below.

The appropriate LEPC is:

Name:	*To be inserted*
Organization:	*To be inserted*
Phone Number:	*To be inserted*

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5.3 EMERGENCY SPILL RESPONSE CONTRACTORS

The Company has arrangements with several emergency spill response contractors to address emergency responses beyond the capabilities of the Contractor.

If necessary, the following firms could be utilized for this project:

Company: *To be inserted*

Name:

Location:

Phone Number:

Company:

Name:

Location:

Phone Number:

5.4 LOCAL EMERGENCY RESPONDERS

The Contractor or the CI (or MO) may call the following local emergency responders should their assistance be required: Note: Linear Projects may extend through multiple Emergency Responder areas. Contractor must insure all jurisdictions are listed. Use attachments as needed.

Service	Telephone Number
Emergency Medical Services	*To be inserted*
Hospital	*To be inserted*
Fire	*To be inserted*
Police	*To be inserted*

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SECTION 6 – CLEAN-UP PROCEDURES

The following section outlines specific procedures to be followed when addressing spills:

6.1 SPILLS

(1) Small spills and leaks must be remediated immediately. Use adsorbent pads wherever possible.

(2) Restrict spills to the containment area if possible by stopping or diverting flow.

(3) If the spill exceeds the containment structure's capacity, immediately construct additional containment using sandbags or fill material. Every effort must be made to prevent the spills from entering a water body.

(4) If a spill reaches a water body, immediately place oil booms downstream in order to contain the material. As soon as possible, remove the floating layer with absorbent pads.

(5) After all recoverable spilled material has been collected, place all contaminated PPE, spill clean-up equipment, and any impacted soil into appropriate containers.

(6) For significant quantities of impacted soils, construct temporary waste piles using plastic sheets. This material should subsequently be transferred into lined roll-off boxes as soon as feasible.

(7) The Company Lead Environmental Representative will coordinate all waste characterization, profiling, and disposal activities.

6.2 EQUIPMENT CLEANING/STORAGE

(1) Upon completion of remedial activities, the Contractor shall be responsible for decontaminating reusable emergency response equipment and PPE.

(2) The Contractor shall be responsible for replacing any spent emergency response equipment and PPE prior to resuming construction-related activities.

(3) Decontamination rinse fluids shall be collected and containerized. The Company Lead Environmental Representative will coordinate waste characterization and disposal activities.

(4) Reusable PPE shall be tested and inventoried prior to being placed back into service.

6.3 WASTE DISPOSAL

The Contractor may be responsible for waste management and waste disposal or any waste generated as the result of a spill or materials generated as part of the project. (review contract language and project specifics); however, The Lead Environmental Representative will coordinate and approve all waste characterization, profiling, and disposal activities. For the Leidy South Project the anticipated materials to be generated requiring disposal may include; pigging waste (pipeline liquids and rubber or foam pigs), waste cementitious grout, and hydrostatic testing water. All waste generated will be characterized for disposal and ultimately disposed of at a permitted disposal facility. Detailed information pertaining to actual disposal facility information will be included on the Project Specific Waste Management Plan to be completed just prior to the start of construction.

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APPENDIX A

TABLE I: LIST OF EMERGENCY CONTACTS

Names	Job Description	Phone Number
Security Operations Center		855-945-5762 (24-hrs)
To be inserted	Chief Inspector	*to be inserted by*
To be inserted	Manager, Operations	*to be inserted by*
To be inserted	Company Lead Environmental Specialist	*to be inserted by*
Contractor	**Job Description**	**Phone Number**
To be inserted	Emergency Coordinator	*to be inserted by*
To be inserted	Alternate Emergency Coordinator	*to be inserted by*
Regulatory Agencies	**Name**	**Phone Number**
	National Response Center	800/424-8802
	State Environmental Agency	*To be inserted*

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APPENDIX B

SPILL/RELEASE REPORTING CHECKLIST

APPENDIX B SPILL / RELEASE REPORTING CHECKLIST			
Please see below for a summary of information to be obtained for reporting spills / releases:			**Comments**
Name Title, Company and Phone number of Person Reporting Incident	☐		
Spill / Release Location, Project, Facility, ROW (State, county, city, township, range, address, coordinates, if on ROW-nearest crossroads)	☐		
Date of Spill/Release	☐		
Was material released as a liquid, solid, or gas	☐		
Description of material released (oil, hydraulic fluid, glycol, condensate, etc.)	☐		
Time of Spill/Release	☐		
Estimated amount (volume or weight) of material spilled / released (Specify unit - gal, ft^3, lbs, etc.)	☐		
Has spill / release been stopped?	☐		
Duration of Spill/Release (Date and Time release was stopped)	☐		
Affected Media (Land, Water, Air, secondary containment, building)	☐		
Has affected area of spill / release been cleaned up?	☐		
Duration of spill / release cleanup activities	☐		
Estimated volume and/or weight of cleaned up material. Specify type of material removed, such as soil, concrete, pads, and unit of measure (gal, ft^3, lbs, etc.)	☐		
Containment of cleaned up material (drum, tank, roll-off) and location (spill site, contractor yard, station)	☐		
Brief description of cause of spill / release	☐		
Complete Form WGP-0187	☐		
Contacted:	Supervisor	☐	
	Pipeline Control	☐	
	Environmental Services Manager	☐	
	Environmental Field Rep	☐	
Notes:			

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APPENDIX C

EMERGENCY SPILL RESPONSE AND PERSONAL PROTECTIVE EQUIPMENT

Equipment Inventory Option (to be determined by Company):

_____ **Option 1 – Adequate supplies as determined by the Contractor (min = supplies to respond to a 5 gal spill).**

_____ **Option 2 – As Directed by a Company representative with below minimum requirements.**

Equipment	Quantity	Location
(1) chemical spill kit	1	Office or storage accessible within 1 hour
(2) oil spill kit	1	adjacent to work space and fuel service vehicles

SPILL KIT CONTENTS:

(1) 1 bag loose chemical pulp	3 chemical pillows (18” x 18”)
3 chemical socks (48” x 3”)	10 chemical mats/pads (24” x 24”)
1 box contractor-sized, 6-mil, disposal polyethylene bags (w/ ties)	
blank drum labels	one 30-gallon PE open-head drum or equal
2 shovels	
(2) 1 oil boom (100’ x 3”)	10 oil pillows (18” x 18”)
10 oil socks (48” x 3”)	25 oil mats/pads (24” x 24”)
1 box contractor-sized, 6-mil, disposal polyethylene bags (w/ ties)	
blank drum labels	three, 55-gallon PE open-head drums
4 shovels	
Detergent (Dawn, Simple Green,etc…)	Spray Bottles

PERSONAL PROTECTIVE EQUIPMENT:

The inventory of PPE should include enough for at least 4 responders reacting to a significant leak/spill including the below items.

Splash goggles, half-face respirators (w/ cartridges for benzene),
Tyvek suits, nitrile gloves, waterproof/ chemical resistant hip-waders

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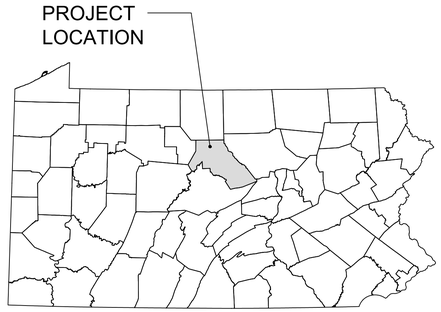
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

LEIDY SOUTH PROJECT
36" HENSEL REPLACEMENT

LEIDY AND CHAPMAN TOWNSHIPS,
CLINTON COUNTY, PENNSYLVANIA

SEPTEMBER 2019
(REVISED MAY 2020)



VICINITY MAP
N.T.S.

PROJECT OWNER/APPLICANT

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
2800 POST OAK BLVD. LEVEL 11
HOUSTON, TX. 77056
PH: (713) 215-3427
CONTACT: JOSEPH DEAN, ENVIRONMENTAL MANAGER

PLAN PREPARER / ENGINEER

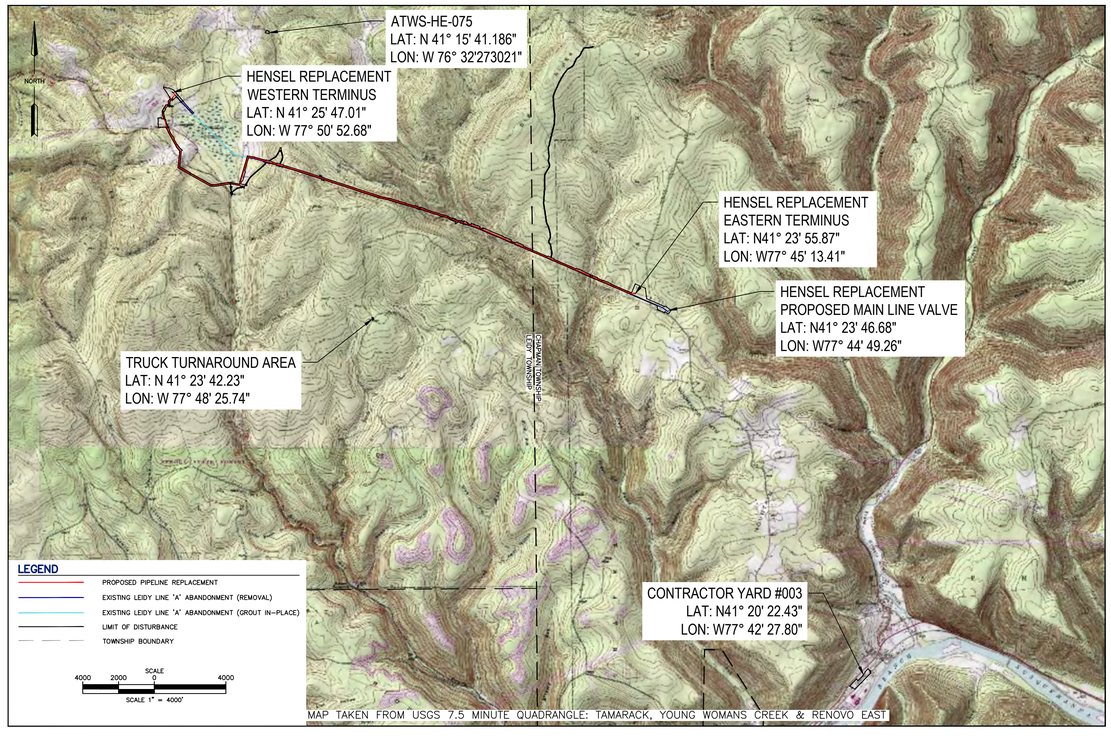
WHM CONSULTING, INC
2525 GREEN TECH DRIVE, SUITE B
STATE COLLEGE, PA 16803
PH: (814) 689-1650
CONTACT: KEVIN M. CLARK, PROJECT MANAGER

BAI GROUP, LLC.
2525 GREEN TECH DRIVE, SUITE D
STATE COLLEGE, PA 16803
PH: (814) 238-2060
CONTACT: KEVIN C. CLARK, P.E.

PROJECT INFORMATION

ESCGP-3 PERMIT BOUNDARY: 182.56 ACRES

LIMIT OF DISTURBANCE: 131.25 ACRES



LOCATION MAP

SHEET INDEX	
SHEET NUMBER	DRAWING TITLE
1 OF 39	EROSION & SEDIMENT CONTROL COVER SHEET
2 OF 39	EROSION & SEDIMENT CONTROL INDEX SHEET
3 - 23 OF 39	EROSION & SEDIMENT CONTROL SITE PLAN
24 - 25 OF 39	EROSION & SEDIMENT CONTROL NOTES
26 - 35 OF 39	EROSION & SEDIMENT CONTROL DETAILS
36 - 39 OF 39	GEOHAZARD MITIGATION MEASURES

RECEIVING WATERS			
NAME	DESIGNATED USE	EXISTING USE	PFBC CLASSIFICATION
TURTLE POINT HOLLOW	EV, MF	-	NATURALLY REPRODUCING TROUT
DRURY RUN	EV, MF	-	NATURALLY REPRODUCING TROUT
AUSTIN HOLLOW	EV, MF	-	NATURALLY REPRODUCING TROUT
HENSEL FORK	EV, MF	-	NATURALLY REPRODUCING TROUT
PADDY RUN	EV, MF	-	NATURALLY REPRODUCING TROUT
DARK HOLLOW	EV, MF	-	NATURALLY REPRODUCING TROUT
SHINGLE BRANCH	EV, MF	-	CLASS A WILD TROUT
MUDLICK RUN	EV, MF	-	CLASS A WILD TROUT
SANDY RUN	HQ-CWF, MF	-	NATURALLY REPRODUCING TROUT
WEST BRANCH SUSQUEHANNA RIVER	WWF, MF	-	-

EV: EXCEPTIONAL VALUE, MF: MIGRATORY FISHES, WWF: WARM WATER FISHES
HQ-CWF: HIGH QUALITY - COLD WATER FISHES

Call before you dig.
1-800-242-1776 or 811

PENNSYLVANIA ACT 287 (1974) AS AMENDED BY PENNSYLVANIA LESS THAN THREE (3) WORKING DAYS AND NO MORE THAN (10) WORKING DAYS NOTICE TO UTILITIES BEFORE YOU EXCAVATE, DRILL, BLAST OR DEMOLISH.

WHM consulting, INC. designs, permits, resolutions
BAI GROUP

KEVIN C. CLARK, P.E.
COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
KEVIN C. CLARK
ENGINEER
047211-E
PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS						
NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

Williams.

COVER SHEET

LEIDY & CHAPMAN TOWNSHIPS, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1" = 4000'
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19	DRAWING NUMBER: 26-1000-70-28-D	SHEET 1 OF 39
WO: 121227	RID:		

E&S BMP LEGEND

DESCRIPTION	SYMBOL	SHEET NUMBER
CONSTRUCTION ENTRANCE	CE	28
TIMBER MATTING CONSTRUCTION	MAT.1	28
TIMBER MATTING WITH FILL OVER EXISTING PIPELINES	MAT.2	28
TIMBER MATTING AIR BRIDGE	MAT.3	28
BROAD-BASED DIP	BBD	28
BRIDGE EQUIPMENT CROSSING	BEC	29
CULVERT EQUIPMENT CROSSING	CEC	29
WETLAND EQUIPMENT CROSSING	WEC	29
PUMP WATER FILTER BAG	PWB	29
TRENCH DEWATERING	TD	29
TRENCH PLUG INSTALLATION	TP	29
SAFETY FENCE	SF	29
PERMANENT / TEMPORARY STONE ACCESS ROAD		29
WETLAND CROSSING CONFIGURATION	WCC	30
TYPE I "DRY WETLAND" INSTALLATION PROCEDURE	WCC.1	30
TYPE II "SATURATED WETLAND" INSTALLATION PROCEDURE	WCC.2	30
TYPE III "FLOODED WETLAND" INSTALLATION PROCEDURE	WCC.3	30
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DAM AND PUMP STREAM CROSSING	DPX	30
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E&S BMP LEGEND

DESCRIPTION	SYMBOL	SHEET NUMBER
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CLEAN WATER CROSSING (TEMP. LEVEL SPREADER)	CWC-LS	35
CLEAN WATER CROSSING (RIP RAP OUTLET BASIN)	CWC-OB	35
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COMPOST SOCK CONCRETE WASHOUT INSTALLATION		15

(XXX) INDICATES SOIL EROSION CONTROL MEASURE DETAIL

GENERAL SITE NOTES

1. THE STAGING OF EARTHMOVING ACTIVITIES FOR THIS PROJECT IS A GENERAL DESCRIPTION OF THE WORK REQUIRED. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH PROJECT OWNER STANDARDS, THE PADEP REGULATIONS, AND ALL OTHER APPLICABLE FEDERAL, STATE, OR LOCAL REQUIREMENTS.
2. PIPELINE CONSTRUCTION IS ACCOMPLISHED THROUGH A SET OF SEQUENTIAL OPERATIONS: SURVEYING; INSTALLATION OF BMPS; CLEARING AND GRUBBING; GRADING; TRENCHING; PIPE STRINGING, ASSEMBLY AND WELDING; LOWERING-IN; TRENCH BACKFILL; HYDROSTATIC TESTING AND FINAL TIE-IN; FINAL GRADING; AND PERMANENT STABILIZATION. THE CONSTRUCTION SPREAD SHALL PROCEED ALONG THE PIPELINE ROW TO COMPLETE THESE ACTIVITIES AS ONE CONTINUOUS OPERATION IN ORDER TO MINIMIZE THE DURATION OF EARTH DISTURBANCE.
3. SCHEDULE WORK TO BE PERFORMED IN A MANNER THAT MINIMIZES THE LENGTH OF TIME THAT BARE SOIL WILL BE EXPOSED TO THE ELEMENTS.
4. THE AMOUNT AND DURATION OF OPEN TRENCH SHALL BE MINIMIZED DURING THE PROJECT.
5. CONTRACTOR SHALL FAMILIARIZE THEMSELVES WITH THE SOIL EROSION AND SEDIMENT CONTROL NARRATIVE AND ENVIRONMENTAL CONSTRUCTION PLAN AND MINIMIZE THE TOTAL AREA OF DISTURBANCE, WHEN PRACTICAL.
6. DISCHARGING SEDIMENT LADEN WATER WHICH WILL CAUSE OR CONTRIBUTE TO THE DEGRADATION OF A BENEFICIAL USE OF A WATER OF THE STATE FROM THE CONSTRUCTION SITE, A DEWATERING SITE, OR SEDIMENT BASIN/TRAP INTO ANY WATER BODY OR STORM DRAIN WITHOUT FILTRATION OR EQUIVALENT TREATMENT IS PROHIBITED.
7. DISCHARGES ORIGINATING FROM OFF-SITE SOURCES, WHICH FLOW THROUGH OR ACROSS THE AREAS DISTURBED BY CONSTRUCTION, SHALL BE DIVERTED AROUND THE ACTIVE CONSTRUCTION AREA WHENEVER POSSIBLE.
8. ALL EXCAVATED MATERIALS THAT WILL NOT BE USED ON THE SITE CANNOT BE STORED IN THE FLOODPLAIN AND MUST BE HAULED TO A DISPOSAL SITE LOCATED OUTSIDE OF THE FLOODPLAIN.
9. NO EROSION CONTROL BLANKET SHALL BE INSTALLED IN AGRICULTURAL AREAS EXCEPT AS REQUIRED TO CONSTRUCT THE TEMPORARY FLUME CROSSINGS.
10. HYDRAULICALLY APPLIED EROSION CONTROL BLANKETS MAY BE USED IN LIEU OF EROSION CONTROL BLANKETS WITH PRIOR APPROVAL FROM THE LOCAL COUNTY CONSERVATION DISTRICT.
11. LOCATION AND SPACING OF THE WATERBARS ARE SHOWN ON THE PLAN. WATERBARS MAY BE ADJUSTED IN THE FIELD DUE TO ACTUAL SITE CONDITIONS. HOWEVER, INSTALLATION AND SPACING MUST CONFORM TO THE DETAILS PROVIDED AND APPROVAL MUST BE OBTAINED FROM THE LOCAL COUNTY CONSERVATION DISTRICT OR PA DEP.
12. THE APPROVED EROSION AND SEDIMENTATION CONTROL PLAN, INCLUDING THE SOIL EROSION CONTROL DRAWINGS AND NARRATIVE, SHALL BE AVAILABLE ON SITE AT ALL TIMES DURING EARTH DISTURBANCE.
13. PLACEMENT OF BRIDGE EQUIPMENT CROSSING SHOWN ON DRAWING IS NOT FINAL AND ADJUSTMENT OF LOCATION MAY BE NECESSARY FOR THE REMOVAL OF THE LEIDY A LINE AND INSTALLATION OF LEIDY LINE D. THIS ACTION REQUIRES THE PERMITTEE, CO-PERMITTEE, OR CONSULTANT TO PROVIDE ADVANCE NOTICE TO THE CONSERVATION DISTRICT OR DEP.

EXISTING CONDITION NOTES/SOURCES

1. EXISTING CONTOURS WITHIN AND SURROUNDING THE PIPELINE RIGHT-OF-WAY PROVIDED BY QUANTUM (5/24/18). OFFLINE CONTRACTOR STAGING AREAS AND ACCESS ROADS OUTSIDE THE PIPELINE RIGHT-OF-WAY WERE DERIVED FROM PAMAP PROGRAM 3.2 FT DIGITAL ELEVATION MODEL OF PENNSYLVANIA; DEVELOPED BY PAMAP PROGRAM, PA DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES, BUREAU OF TOPOGRAPHIC AND GEOLOGIC SURVEY DATED DECEMBER 2006.
2. EXISTING ROADWAYS ARE DERIVED FROM A FIELD SURVEY PERFORMED BY TRANSCO BETWEEN OCTOBER 2018 TO JULY 2019.
3. PROPERTY BOUNDARIES BASED EITHER ON TAX PARCEL INFORMATION PROVIDED BY TRANSCO OR A COMBINATION OF DEED REFERENCE AND FIELD LOCATED EVIDENCE. PROPERTY BOUNDARY LOCATIONS BASED ON TAX PARCEL INFORMATION ARE APPROXIMATE.
4. THE FLOODWAY/FLOODPLAIN LINE AS SHOWN ON THE PLANS WAS DEVELOPED FROM AVAILABLE FEMA FLOODWAY MAPPING, FEMA FLOODPLAIN MAPPING, AND THE PA CHAPTER 105 DEFINITION.
5. PIPELINE ALIGNMENTS AND LIMITS OF DISTURBANCE PROVIDED BY TRANSCO.
6. STREAM AND WETLAND BOUNDARIES BASED ON SURVEYS CONDUCTED BY WHM CONSULTING FROM OCTOBER 2018 TO JUNE 2019.
7. DATUM BASED ON PENNSYLVANIA STATE PLANE COORDINATE SYSTEM, NAD 83 NORTH ZONE, NAVD88, ELEVATION MSL, DERIVED FROM GPS OBSERVATION.
8. OTHER EXISTING INFORMATION SHOWN IN PLANS, PROVIDED BY A COMBINATION OF TRANSCO AND HUNT, GUILLOT & ASSOCIATES, LLC.

PROJECT DESCRIPTION

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC (TRANSCO), A SUBSIDIARY OF THE WILLIAMS COMPANIES, INC. IS PROPOSING THE LEIDY SOUTH PROJECT – HENSEL REPLACEMENT. THE HENSEL REPLACEMENT CONSISTS OF INSTALLING APPROXIMATELY 6.3 MILES OF 36-INCH PIPELINE LOOP ALONG TRANSCO'S LEIDY LINE IN LEIDY AND CHAPMAN TOWNSHIPS, CLINTON COUNTY. THIS PIPELINE WILL REPLACE THE CAPACITY OF A SEGMENT OF TRANSCO'S EXISTING 23.375-INCH LEIDY LINE A PIPELINE, AND THIS SEGMENT OF THE LEIDY LINE A PIPELINE TOTALING 5.8 MILES WILL BE ABANDONED AND REMOVED WITH THE EXCEPTION OF 0.8 MILE UNDER THE TAMARACK SWAMP NATURAL AREA, WHICH IS PROPOSED TO BE GROUTED IN-PLACE. ONCE PLACED INTO OPERATION, TRANSCO WILL REFER TO THE HENSEL REPLACEMENT AS THE LEIDY LINE D. TRANSCO WILL BE RELOCATING AND INSTALLING A MAINLINE VALVE (MLV) NEAR THE EASTERN TERMINUS OF THE HENSEL REPLACEMENT AS A MEANS TO ISOLATE GAS FLOWS ALONG SECTIONS OF A PIPELINE. AT THE WESTERN TERMINUS OF THE HENSEL REPLACEMENT AT AN EXISTING MLV, PIG TRAPS AND BLOCK VALVES WILL BE ADDED. CATHODIC PROTECTION CABLE WILL BE INSTALLED FROM PROPOSED MLV NEAR THE EASTERN TERMINUS TO MP 190.5, AND FROM THE WESTERN TERMINUS OF HENSEL REPLACEMENT TO THE TAMARACK SWAMP NATURAL AREA AND ASSOCIATED WETLANDS ON THE LEIDY LINE "A" AND "B" EXISTING RIGHT-OF-WAY. THE CATHODIC PROTECTION CABLE WILL BE INSTALLED IN THE SAME TRENCH AS THE PIPELINE WITHIN WETLAND, STREAM AND FLOODWAY CROSSINGS. THE HENSEL REPLACEMENT WILL INCLUDE THE CONSTRUCTION OF TWO TEMPORARY OFFLINE CONTRACTOR YARDS.

THE EROSION AND SEDIMENTATION CONTROL PLAN (ENVIRONMENTAL PLAN OR PLANS) HAS BEEN DEVELOPED FOR THE PROJECT, AS DEPICTED ON THE DRAWINGS. THE E&S PLAN SHALL BE PLANNED, DESIGNED, AND IMPLEMENTED TO BE CONSISTENT WITH THE POST CONSTRUCTION STORMWATER MANAGEMENT (PCSM) PLAN UNDER 25 PA. CODE § 102.8 (RELATING TO PCSM REQUIREMENTS). TRANSCO WILL USE AND IMPLEMENT THE PRACTICES, MEASURES AND DETAILS OUTLINED HEREIN TO CONTROL SOIL EROSION AND SEDIMENTATION. ALL WORK AND DISTURBED AREAS ARE LOCATED WITHIN TRANSCO PROPERTY, EXISTING EASEMENTS OR LEGALLY OBTAINED WORKSPACE. THE LIMIT OF DISTURBANCE WILL BE 131.25 ACRES. CONSTRUCTION IS SCHEDULED TO BEGIN IN 2021. THE PROJECT WILL TAKE PLACE PRIMARILY WITHIN AN EXISTING AND MAINTAINED PIPELINE ROW.

CONTRACTOR NOTES

1. ALL EXISTING UTILITY DATA IS PROVIDED FOR INFORMATIONAL USE ONLY. ALTHOUGH THE DATA IS SHOWN AS ACCURATELY AS POSSIBLE, THE CONTRACTOR IS CAUTIONED THAT THE OWNER AND THE ENGINEER NEITHER ASSUME NOR IMPLY ANY RESPONSIBILITY FOR THE ACCURACY OF THIS DATA.
2. THE CONTRACTOR IS TO VERIFY LOCATION AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.
3. ALL CONTRACTORS/SUBCONTRACTORS PERFORMING WORK ON THIS PROJECT SHALL FAMILIARIZE THEMSELVES WITH THE SITE AND SHALL BE SOLELY RESPONSIBLE FOR ANY DAMAGE TO EXISTING FACILITIES RESULTING DIRECTLY OR INDIRECTLY FROM THEIR OPERATIONS. ANY REMOVAL OR DAMAGE TO EXISTING IMPROVEMENTS SHALL BE REPLACED OR REPAIRED BY THE CONTRACTORS AT THEIR EXPENSE AND SHALL BE APPROVED BY THE OWNER/REP. SAID EXISTING IMPROVEMENTS INCLUDE BUT ARE NOT LIMITED TO BERMS, DITCHES, FENCES, AND PLANTS.
4. CONTRACTORS MUST CONFINE THEIR ACTIVITIES TO THE WORK AREA. NO ENCROACHMENTS ONTO DEVELOPED AREAS WILL BE ALLOWED. ANY DAMAGE RESULTING THEREFROM SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR.
5. IT WILL BE THE RESPONSIBILITY OF EACH CONTRACTOR TO PROTECT ALL EXISTING PUBLIC AND PRIVATE UTILITIES THROUGHOUT THE CONSTRUCTION OF THIS PROJECT. CONTRACTORS SHALL CONTACT THE APPROPRIATE UTILITY COMPANIES FOR LINE LOCATES PRIOR TO COMMENCEMENT OF CONSTRUCTION AND SHALL ASSUME FULL LIABILITY FOR ANY DAMAGES CAUSED TO THOSE COMPANIES' FACILITIES.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING TRENCH SAFETY REQUIREMENTS IN ACCORDANCE WITH STANDARD WILLIAMS' TRENCH SAFETY GUIDELINES.
7. CONTRACTOR MAY ELECT TO USE DIVERSION CHANNEL OR IF CONDITIONS ALLOW WILL PLACE AN EARTHEN BERM OF APPROXIMATE SIZE THAT WILL CONVEY FLOW TO THE RESPECTIVE DESIGNATED CLEAN WATER CROSSING. THIS ACTION REQUIRES THE PERMITTEE, CO-PERMITTEE, OR CONSULTANT TO PROVIDE ADVANCE NOTICE TO THE CONSERVATION DISTRICT OR DEP.

WHM consulting, INC. designs, permits, resolutions

BA GROUP

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL ENGINEER
KEVIN C. CLARK
ENGINEER
047271-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

Williams.

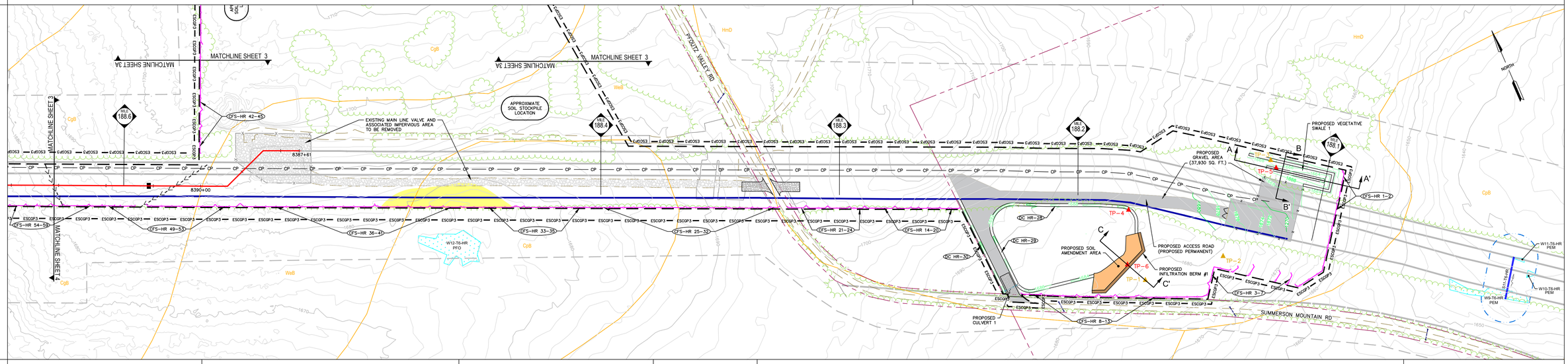
INDEX SHEET

LEIDY & CHAPMAN TOWNSHIPS, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1" = 2000'
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19	DRAWING NUMBER: 26-1000-70-28-D	SHEET 2 OF 39
WO: 121227	RID:		

OWNERSHIP & TRACT NUMBER	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0001			SUMMERSON MOUNTAIN RD ROW	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0001	LUCKY LEAP GUN CLUB HE-PA-CL-0001.001	
PROFILE (MIN. PIPE DEPTH)	3'	N/A					
COVER TYPE	MAINTAINED ROW/MIXED FOREST LAND	SHRUB AND BRUSH RANGELANDMIXED FOREST LAND/MAINTAINED ROW	MAINTAINED ROW/MIXED FOREST LAND	TRANSPORTATION/COMMUNICATION/MIXED FOREST LAND/MAINTAINED ROW	MIXED FOREST LAND/MAINTAINED ROW		
RECEIVING WATERS	DARK HOLLOW (EV, MF) (PUBLIC WATER SUPPLY)				MUDLICK RUN (EV, MF)		

ALIGNMENT



SOIL TYPE	CgB	WeB	CpB	WeB	HmD		CpB
AVERAGE % SLOPE	3%	1%	3%		9%	5%	5%

CONSTRUCTION RIGHT-OF-WAY CONFIGURATION

LEGEND

- PROPOSED WATERBAR & OUTLET STRUCTURE
- TRENCH PLUG
- DIVERSION CHANNEL
- CLEAN WATER CROSSING
- EROSION CONTROL BLANKET
- ROCK CONSTRUCTION ENTRANCE
- PROPOSED PIPELINE
- ESCGP3 — ESCGP-3 PERMIT BOUNDARY
- LIMITS OF DISTURBANCE
- APPROX. ENVIRONMENTAL STUDY LIMITS
- DELINEATED WETLAND
- DELINEATED WATERWAY / STREAM (TOP OF BANK)
- STREAM FLOW DIRECTION
- RIPARIAN BUFFER
- 50'/FEMA FLOODWAY
- FEMA — FEMA 100-YEAR FLOODPLAIN
- MrB2 — SOIL BOUNDARY / TYPE
- EXISTING TREELINE / TREE/SHRUB
- PROPERTY LINE
- EXISTING LEIDY / TGPL PIPELINES
- EXISTING LEIDY LINE 'A' ABANDONMENT (REMOVAL)
- EXISTING LEIDY LINE 'A' ABANDONMENT (GROUT IN-PLACE)
- EXISTING FOREIGN PIPELINES
- EXISTING UTILITY POLE / TOWER
- EXISTING UTILITY LINE
- EXISTING VALVE
- EXISTING CULVERT
- EXISTING FENCE
- PROPOSED FENCE
- EXISTING STRUCTURE
- EXISTING ROAD (GRAVEL)
- EXISTING ROAD (PAVED)
- EXISTING GRAVEL AREAS
- PROPOSED GRAVEL
- 1250 — EXISTING GRADE MAJOR CONTOURS (2' C.I.)
- 1244 — EXISTING GRADE MINOR CONTOURS (10' C.I.)
- 1250 — PROPOSED GRADE MAJOR CONTOURS (2' C.I.)
- 1244 — PROPOSED GRADE MINOR CONTOURS (10' C.I.)
- TIMBER MAT/BRIDGE
- COMPOST FILTER SOCK
- COMPOST FILTER SOCK SEDIMENT TRAP
- CP — CATHODIC PROTECTION DEVICE
- PROPOSED CULVERT
- TP-3 — TEST PIT LOCATION (2019)
- TP-6 — TEST PIT LOCATION (2020)

SOIL LEGEND

CgB	CLYMER-COOKPORT CHANNERY LOAMS, EXTREMELY STONY, 0 TO 8 PERCENT SLOPES
CpB	COOKPORT CHANNERY LOAM, EXTREMELY STONY, 0 TO 8 PERCENT SLOPES
HmD	HAZLETON-CLYMER CHANNERY LOAMS, EXTREMELY STONY, 8 TO 25 PERCENT SLOPES
WeB	WHARTON SILT LOAM, VERY STONY, 0 TO 8 PERCENT SLOPES

SCALE 1" =100'

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — KEVIN C. CLARK — ENGINEER — 047211-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	11-04-19	JLD	RELOCATED HYDROSTATIC DISCHARGE LOCATION			
2	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

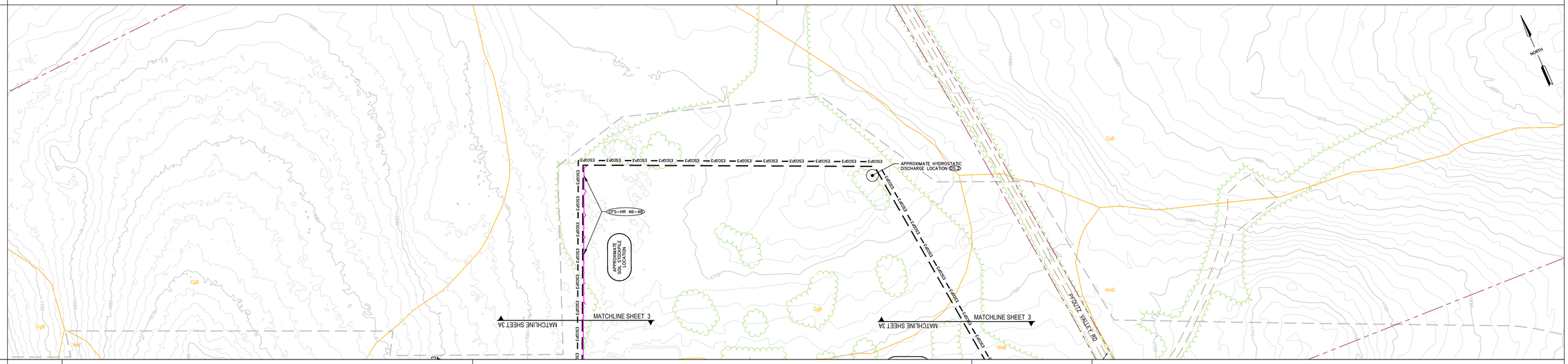
SITE PLAN

CHAPMAN TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		SHEET 3
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	OF 39

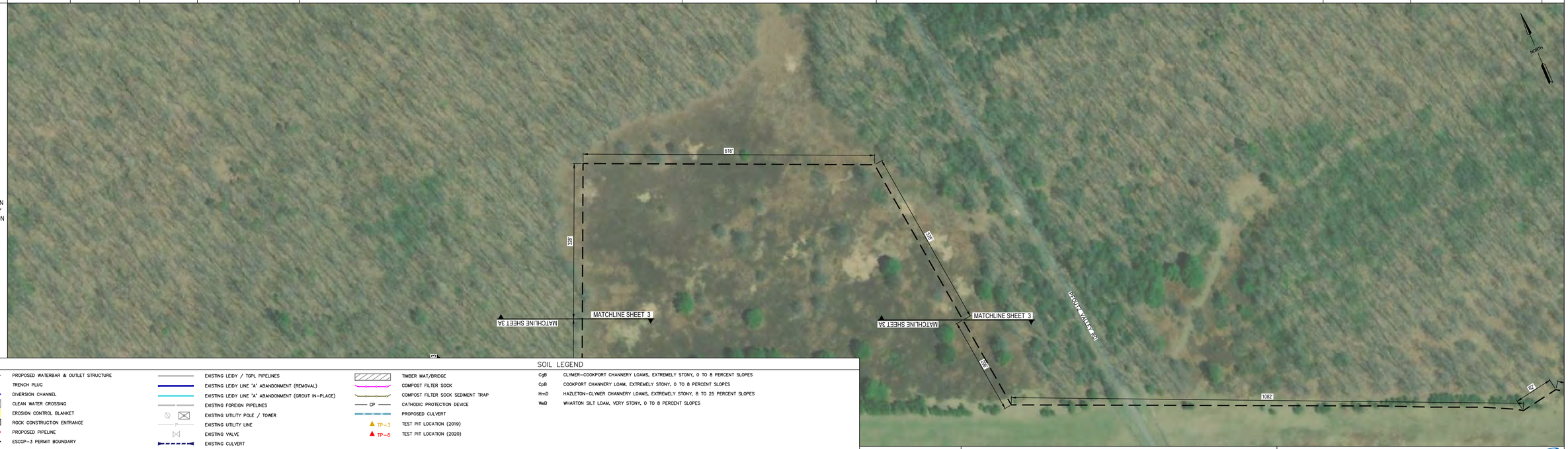
OWNERSHIP & TRACT NUMBER	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0001				
PROFILE (MIN. PIPE DEPTH)	N/A				
COVER TYPE	MAINTAINED ROW/MIXED FOREST LAND	SHRUB AND BRUSH RANGELANDMIXED FOREST LAND/MAINTAINED ROW	MAINTAINED ROW/MIXED FOREST LAND	TRANSPORTATION/COMMUNICATION/MIXED FOREST LAND/MAINTAINED ROW	MIXED FOREST LAND/MAINTAINED ROW
RECEIVING WATERS	DARK HOLLOW (EV, MF) (PUBLIC WATER SUPPLY)				MUDLICK RUN (EV, MF)

ALIGNMENT



SOIL TYPE	CgB	CpB	CgB	WeB	HmD
AVERAGE % SLOPE	13%	23%	8%	3%	3%	1%	3%	9%	5%

CONSTRUCTION RIGHT-OF-WAY CONFIGURATION



LEGEND

- PROPOSED WATERBAR & OUTLET STRUCTURE
- TRENCH PLUG
- DIVERSION CHANNEL
- CLEAN WATER CROSSING
- EROSION CONTROL BLANKET
- ROCK CONSTRUCTION ENTRANCE
- PROPOSED PIPELINE
- ESCGP-3 PERMIT BOUNDARY
- LIMITS OF DISTURBANCE
- APPROX. ENVIRONMENTAL STUDY LIMITS
- DELINEATED WETLAND
- DELINEATED WATERWAY / STREAM (TOP OF BANK)
- STREAM FLOW DIRECTION
- RIPARIAN BUFFER
- 50'/FEMA FLOODWAY
- FEMA 100-YEAR FLOODPLAIN
- SOIL BOUNDARY / TYPE
- EXISTING TREELINE / TREE/SHRUB
- PROPERTY LINE
- EXISTING LEIDY / TGPL PIPELINES
- EXISTING LEIDY LINE 'A' ABANDONMENT (REMOVAL)
- EXISTING LEIDY LINE 'A' ABANDONMENT (GROUT IN-PLACE)
- EXISTING FOREIGN PIPELINES
- EXISTING UTILITY POLE / TOWER
- EXISTING UTILITY LINE
- EXISTING VALVE
- EXISTING CULVERT
- EXISTING FENCE
- PROPOSED FENCE
- EXISTING STRUCTURE
- EXISTING ROAD (GRAVEL)
- EXISTING ROAD (PAVED)
- EXISTING GRAVEL AREAS
- PROPOSED GRAVEL
- EXISTING GRADE MAJOR CONTOURS (2' C.I.)
- EXISTING GRADE MINOR CONTOURS (10' C.I.)
- PROPOSED GRADE MAJOR CONTOURS (2' C.I.)
- PROPOSED GRADE MINOR CONTOURS (10' C.I.)
- TIMBER MAT/BRIDGE
- COMPOST FILTER SOCK
- COMPOST FILTER SOCK SEDIMENT TRAP
- CP — CATHODIC PROTECTION DEVICE
- PROPOSED CULVERT
- TP-3 — TEST PIT LOCATION (2019)
- TP-6 — TEST PIT LOCATION (2020)

SOIL LEGEND

CgB	CLYMER-COOKPORT CHANNERY LOAMS, EXTREMELY STONY, 0 TO 8 PERCENT SLOPES
CpB	COOKPORT CHANNERY LOAM, EXTREMELY STONY, 0 TO 8 PERCENT SLOPES
HmD	HAZLETON-CLYMER CHANNERY LOAMS, EXTREMELY STONY, 8 TO 25 PERCENT SLOPES
WeB	WHARTON SILT LOAM, VERY STONY, 0 TO 8 PERCENT SLOPES

SCALE
100 50 0 100
SCALE 1" =100'

W-M consulting, inc. designs, permits, resolutions | BA GROUP

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
KEVIN C. CLARK
ENGINEER
042211-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	11-04-19	JLD	RELOCATED HYDROSTATIC DISCHARGE LOCATION			
2	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

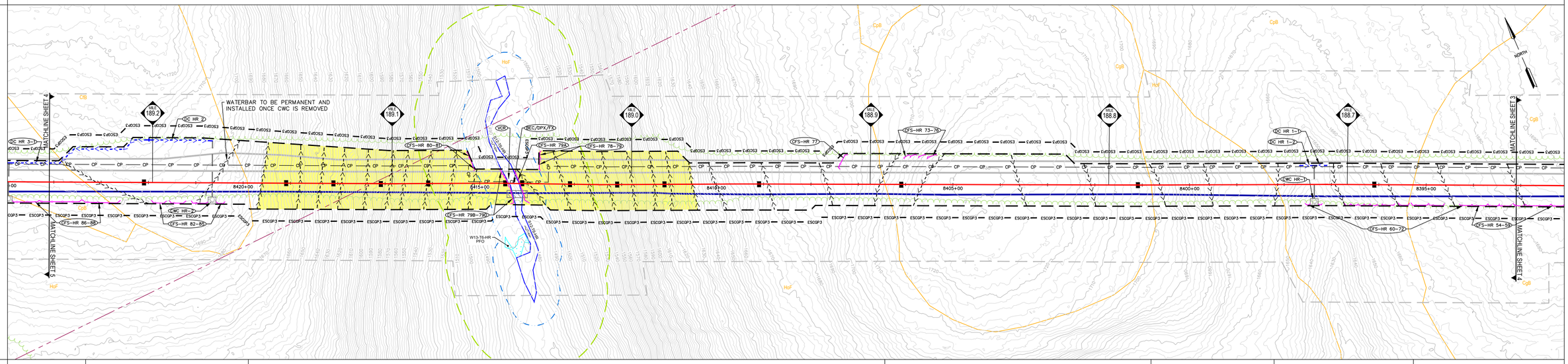
SITE PLAN

CHAPMAN TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	SHEET 3A OF 39

OWNERSHIP & TRACT NUMBER	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0002		DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0001
PROFILE (MIN. PIPE DEPTH)	3'	4'	3'
COVER TYPE	MAINTAINED ROW/MIXED FOREST LAND		
RECEIVING WATERS	DARK HOLLOW (EV, MF) (PUBLIC WATER SUPPLY)		

ALIGNMENT



SOIL TYPE	CpB	CfB	HoF	CgB	HoF	CpB	CgB
AVERAGE % SLOPE	1%	38%	5%	41%	19%	13%	13%
	13%	13%	23%	8%	3%	3%	

CONSTRUCTION RIGHT-OF-WAY CONFIGURATION

LEGEND

- PROPOSED WATERBAR & OUTLET STRUCTURE
- TRENCH PLUG
- DIVERSION CHANNEL
- CLEAN WATER CROSSING
- EROSION CONTROL BLANKET
- ROCK CONSTRUCTION ENTRANCE
- PROPOSED PIPELINE
- ESCGP-3 PERMIT BOUNDARY
- LIMITS OF DISTURBANCE
- APPROX. ENVIRONMENTAL STUDY LIMITS
- DELINEATED WETLAND
- DELINEATED WATERWAY / STREAM (TOP OF BANK)
- STREAM FLOW DIRECTION
- RIPARIAN BUFFER
- 50'/FEMA FLOODWAY
- FEMA 100-YEAR FLOODPLAIN
- SOIL BOUNDARY / TYPE
- EXISTING TREELINE / TREE/SHRUB
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- EXISTING LEIDY / TGPL PIPELINES
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- EXISTING VALVE
- EXISTING CULVERT
- EXISTING FENCE
- PROPOSED FENCE
- EXISTING STRUCTURE
- EXISTING ROAD (GRAVEL)
- EXISTING ROAD (PAVED)
- EXISTING GRAVEL AREAS
- PROPOSED GRAVEL
- EXISTING GRADE MAJOR CONTOURS (2' C.I.)
- EXISTING GRADE MINOR CONTOURS (10' C.I.)
- PROPOSED GRADE MAJOR CONTOURS (2' C.I.)
- PROPOSED GRADE MINOR CONTOURS (10' C.I.)
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- COMPOST FILTER SOCK
- COMPOST FILTER SOCK SEDIMENT TRAP
- CATHODIC PROTECTION DEVICE
- PROPOSED CULVERT
- TP-3 TEST PIT LOCATION (2019)
- TP-6 TEST PIT LOCATION (2020)

SOIL LEGEND

CfB	CLYMER CHANNERY LOAM, EXTREMELY STONY, 0 TO 8 PERCENT SLOPES
CgB	CLYMER-COOKPORT CHANNERY LOAMS, EXTREMELY STONY, 0 TO 8 PERCENT SLOPES
CpB	COOKPORT CHANNERY LOAM, EXTREMELY STONY, 0 TO 8 PERCENT SLOPES
HoF	HAZELTON-LAIDIG COMPLEX, EXTREMELY STONY, 25 TO 50 PERCENT SLOPES

SCALE 1" =100'

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — KEVIN C. CLARK — ENGINEER — 047211-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

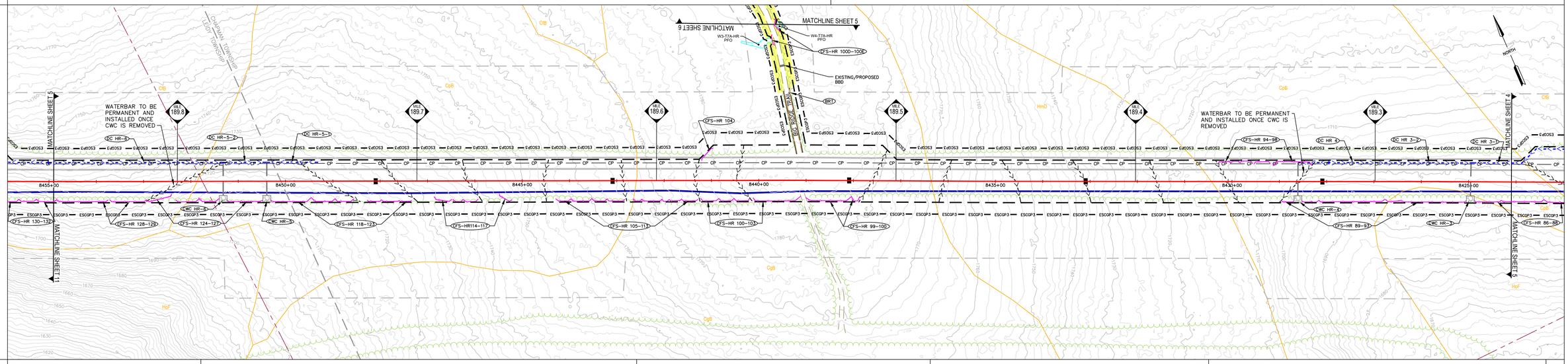
SITE PLAN

CHAPMAN TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	SHEET 4 OF 39

OWNERSHIP & TRACT NUMBER	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0004	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0002	
PROFILE (MIN. PIPE DEPTH)	3'		
COVER TYPE	MAINTAINED ROW/MIXED FOREST LAND	TRANSPORTATION/COMMUNICATION	MAINTAINED ROW/MIXED FOREST LAND
RECEIVING WATERS	PADDY RUN (EV, MF) (PUBLIC WATER SUPPLY)		DARK HOLLOW (EV, MF) (PUBLIC WATER SUPPLY)

ALIGNMENT



SOIL TYPE	CfB	CpB	CgB	HmD	CpB	CfB	
AVERAGE % SLOPE	5%	3%	7%	2%	10%	4%	1%

CONSTRUCTION RIGHT-OF-WAY CONFIGURATION

LEGEND

- PROPOSED WATERBAR & OUTLET STRUCTURE
- TRENCH PLUG
- DIVERSION CHANNEL
- CLEAN WATER CROSSING
- EROSION CONTROL BLANKET
- ROCK CONSTRUCTION ENTRANCE
- PROPOSED PIPELINE
- ESCGP3 — ESCGP-3 PERMIT BOUNDARY
- LIMITS OF DISTURBANCE
- APPROX. ENVIRONMENTAL STUDY LIMITS
- DELINEATED WETLAND
- DELINEATED WATERWAY / STREAM (TOP OF BANK)
- STREAM FLOW DIRECTION
- RIPARIAN BUFFER
- 50'/FEMA FLOODWAY
- FEMA — FEMA 100-YEAR FLOODPLAIN
- MrB2 — SOIL BOUNDARY / TYPE
- EXISTING TREELINE / TREE/SHRUB
- PROPERTY LINE
- EXISTING LEIDY / TGPL PIPELINES
- EXISTING LEIDY LINE 'A' ABANDONMENT (REMOVAL)
- EXISTING LEIDY LINE 'A' ABANDONMENT (GROUT IN-PLACE)
- EXISTING FOREIGN PIPELINES
- EXISTING UTILITY POLE / TOWER
- EXISTING UTILITY LINE
- EXISTING VALVE
- EXISTING CULVERT
- EXISTING FENCE
- PROPOSED FENCE
- EXISTING STRUCTURE
- EXISTING ROAD (GRAVEL)
- EXISTING ROAD (PAVED)
- EXISTING GRAVEL AREAS
- PROPOSED GRAVEL
- 1250 — EXISTING GRADE MAJOR CONTOURS (2' C.I.)
- 1244 — EXISTING GRADE MINOR CONTOURS (10' C.I.)
- 1250 — PROPOSED GRADE MAJOR CONTOURS (2' C.I.)
- 1244 — PROPOSED GRADE MINOR CONTOURS (10' C.I.)
- TIMBER MAT/BRIDGE
- COMPOST FILTER SOCK
- COMPOST FILTER SOCK SEDIMENT TRAP
- CP — CATHODIC PROTECTION DEVICE
- PROPOSED CULVERT
- TP-3 — TEST PIT LOCATION (2019)
- TP-6 — TEST PIT LOCATION (2020)

SOIL LEGEND

CfB	CLYMER CHANNERY LOAM, EXTREMELY STONY, 0 TO 8 PERCENT SLOPES
CgB	CLYMER-COOKPORT CHANNERY LOAMS, EXTREMELY STONY, 0 TO 8 PERCENT SLOPES
CpB	COOKPORT CHANNERY LOAM, EXTREMELY STONY, 0 TO 8 PERCENT SLOPES
HmD	HAZLETON-CLYMER CHANNERY LOAMS, EXTREMELY STONY, 8 TO 25 PERCENT SLOPES
HoF	HAZELTON-LAIDIG COMPLEX, EXTREMELY STONY, 25 TO 50 PERCENT SLOPES

SCALE 1" =100'

100 50 0 100

designs, permits, resolutions WM consulting, inc. BA GROUP

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — KEVIN C. CLARK — ENGINEER — 047211-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC — Williams.
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

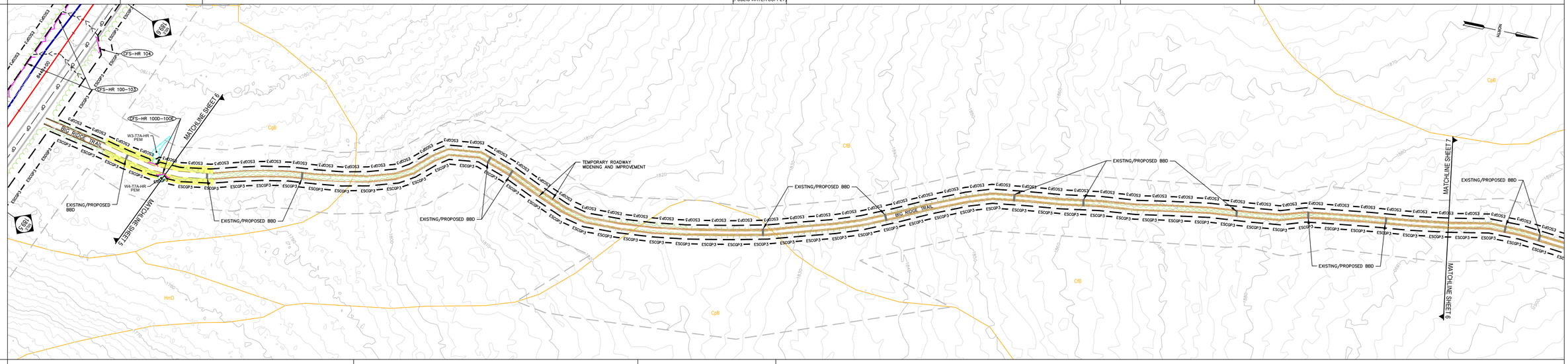
SITE PLAN

CHAPMAN TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	SHEET 5 OF 39

OWNERSHIP & TRACT NUMBER	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0002
PROFILE (MIN. PIPE DEPTH)	N/A
COVER TYPE	MIXED FOREST LAND
RECEIVING WATERS	PADDY RUN (EV, MF) (PUBLIC WATER SUPPLY) · DARK HOLLOW (EV, MF) (PUBLIC WATER SUPPLY) · PADDY RUN (EV, MF) (PUBLIC WATER SUPPLY) · DARK HOLLOW (EV, MF) (PUBLIC WATER SUPPLY) · PADDY RUN (EV, MF) (PUBLIC WATER SUPPLY) · DARK HOLLOW (EV, MF) (PUBLIC WATER SUPPLY) · PADDY RUN (EV, MF) (PUBLIC WATER SUPPLY)

ALIGNMENT



SOIL TYPE	CgB	CfB	CpB	CfB
AVERAGE % SLOPE				

CONSTRUCTION CONFIGURATION

LEGEND

- PROPOSED WATERBAR & OUTLET STRUCTURE
- TRENCH PLUG
- DIVERSION CHANNEL
- CLEAN WATER CROSSING
- EROSION CONTROL BLANKET
- ROCK CONSTRUCTION ENTRANCE
- PROPOSED PIPELINE
- ESCGP3 — ESCGP-3 PERMIT BOUNDARY
- LIMITS OF DISTURBANCE
- APPROX. ENVIRONMENTAL STUDY LIMITS
- DELINEATED WETLAND
- DELINEATED WATERWAY / STREAM (TOP OF BANK)
- STREAM FLOW DIRECTION
- RIPARIAN BUFFER
- 50'/FEMA FLOODWAY
- FEMA — FEMA 100-YEAR FLOODPLAIN
- MrB2 — SOIL BOUNDARY / TYPE
- EXISTING TREELINE / TREE/SHRUB
- PROPERTY LINE
- EXISTING LEIDY / TGPL PIPELINES
- EXISTING LEIDY LINE "A" ABANDONMENT (REMOVAL)
- EXISTING LEIDY LINE "A" ABANDONMENT (GROUT IN-PLACE)
- EXISTING FOREIGN PIPELINES
- EXISTING UTILITY POLE / TOWER
- EXISTING UTILITY LINE
- EXISTING VALVE
- EXISTING CULVERT
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- COMPOST FILTER SOCK SEDIMENT TRAP
- CP — CATHODIC PROTECTION DEVICE
- PROPOSED CULVERT
- TP-3 — TEST PIT LOCATION (2019)
- TP-6 — TEST PIT LOCATION (2020)

SOIL LEGEND

CfB	CLYMER CHANNERY LOAM, EXTREMELY STONY, 0 TO 8 PERCENT SLOPES
CpD	COOKPORT CHANNERY LOAM, EXTREMELY STONY, 8 TO 25 PERCENT SLOPES
HmD	HAZLETON-CLYMER CHANNERY LOAMS, EXTREMELY STONY, 8 TO 25 PERCENT SLOPES

SCALE 1" =100'

100 50 0 100

WHM designs, permits, resolutions consulting, INC.

BA GROUP

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL ENGINEER — KEVIN C. CLARK — ENGINEER — 047211-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

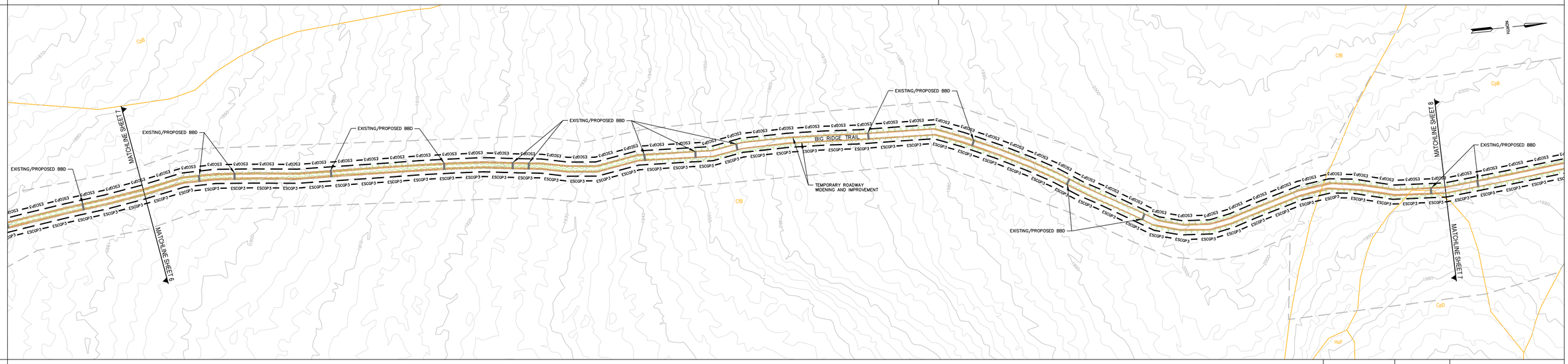
NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

SITE PLAN

CHAPMAN TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		SHEET 6
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	OF 39

OWNERSHIP & TRACT NUMBER	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0002				
PROFILE (MIN. PIPE DEPTH)	N/A				
COVER TYPE	MIXED FOREST LAND				
RECEIVING WATERS	PADDY RUN (EV, MF) (PUBLIC WATER SUPPLY)	DARK HOLLOW (EV, MF) (PUBLIC WATER SUPPLY)			
ALIGNMENT					
SOIL TYPE	CfB			CpB	CpD / CpB
AVERAGE % SLOPE	3%	6%	3%	3%	1%
CONSTRUCTION CONFIGURATION					

LEGEND

- PROPOSED WATERBAR & OUTLET STRUCTURE
- TRENCH PLUG
- DIVERSION CHANNEL
- CLEAN WATER CROSSING
- EROSION CONTROL BLANKET
- ROCK CONSTRUCTION ENTRANCE
- PROPOSED PIPELINE
- ESCGP3 — ESCGP-3 PERMIT BOUNDARY
- LIMITS OF DISTURBANCE
- APPROX. ENVIRONMENTAL STUDY LIMITS
- DELINEATED WETLAND
- DELINEATED WATERWAY / STREAM (TOP OF BANK)
- STREAM FLOW DIRECTION
- RIPARIAN BUFFER
- 50'/FEMA FLOODWAY
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- EXISTING LEIDY LINE 'A' ABANDONMENT (REMOVAL)
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SOIL LEGEND

CfB	CLYMER CHANNERY LOAM, EXTREMELY STONY, 0 TO 8 PERCENT SLOPES
CpB	COOKPORT CHANNERY LOAM, EXTREMELY STONY, 0 TO 8 PERCENT SLOPES
CpD	COOKPORT CHANNERY LOAM, EXTREMELY STONY, 8 TO 25 PERCENT SLOPES
HoF	HAZELTON-LAIDIG COMPLEX, EXTREMELY STONY, 25 TO 50 PERCENT SLOPES

SCALE 1" =100'

WSM consulting, inc. — designs, permits, resolutions

BA GROUP

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL ENGINEER — KEVIN C. CLARK — ENGINEER — 047211-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

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1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC — Williams.
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

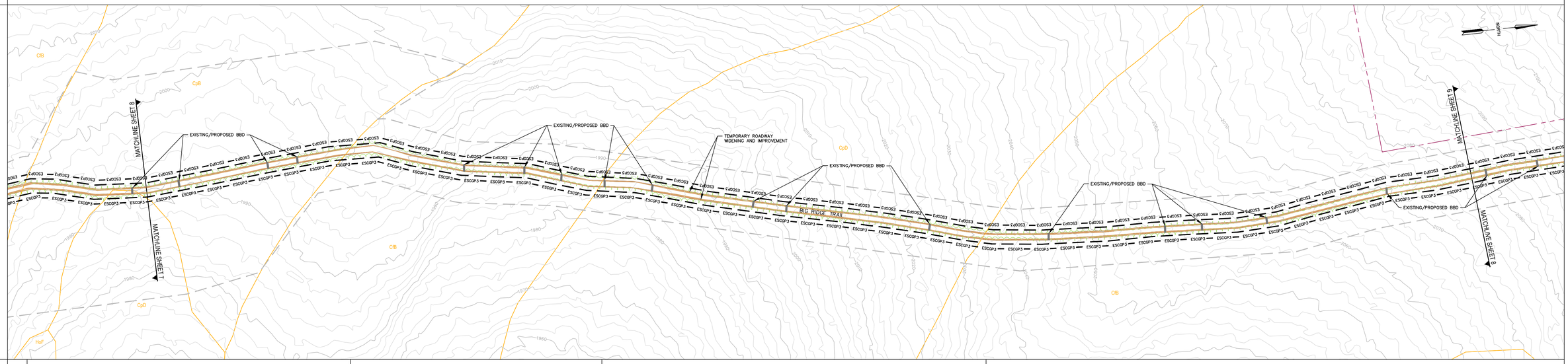
SITE PLAN

CHAPMAN TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	SHEET 7 OF 39

OWNERSHIP & TRACT NUMBER	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0002
PROFILE (MIN. PIPE DEPTH)	N/A
COVER TYPE	TRANSPORTATION/COMMUNICATION/MIXED FOREST LAND/MAINTAINED ROW
RECEIVING WATERS	DARK HOLLOW (EV ,MF) (PUBLIC WATER SUPPLY)

ALIGNMENT



SOIL TYPE	CfB	CpB/CpD	CfB	CpD	CfB
AVERAGE % SLOPE	3%	3%	3%	7%	3%	5%

CONSTRUCTION CONFIGURATION

LEGEND

- PROPOSED WATERBAR & OUTLET STRUCTURE
- TRENCH PLUG
- DIVERSION CHANNEL
- CLEAN WATER CROSSING
- EROSION CONTROL BLANKET
- ROCK CONSTRUCTION ENTRANCE
- PROPOSED PIPELINE
- ESCGP3 — ESCGP-3 PERMIT BOUNDARY
- LIMITS OF DISTURBANCE
- APPROX. ENVIRONMENTAL STUDY LIMITS
- DELINEATED WETLAND
- DELINEATED WATERWAY / STREAM (TOP OF BANK)
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SOIL LEGEND

CfB	CLYMER CHANNERY LOAM, EXTREMELY STONY, 0 TO 8 PERCENT SLOPES
CpB	COOKPORT CHANNERY LOAM, EXTREMELY STONY, 0 TO 8 PERCENT SLOPES
CpD	COOKPORT CHANNERY LOAM, EXTREMELY STONY, 8 TO 25 PERCENT SLOPES

SCALE
100 50 0 100
SCALE 1" =100'

W-M consulting, inc. designs, permits, resolutions | BA GROUP

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
KEVIN C. CLARK
ENGINEER
042211-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

Williams.

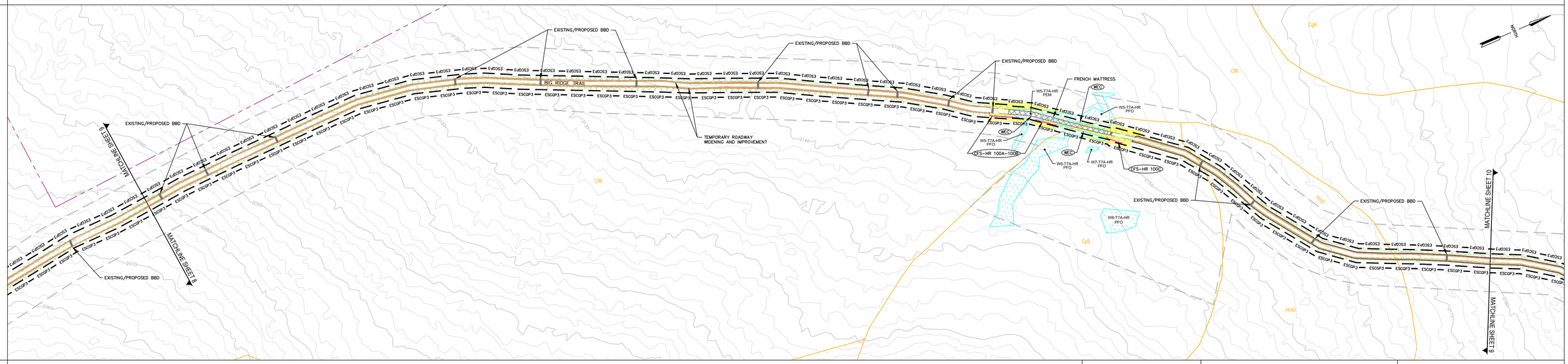
SITE PLAN

CHAPMAN TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	SHEET 8 OF 39

OWNERSHIP & TRACT NUMBER	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0002		
PROFILE (MIN. PIPE DEPTH)	N/A		
COVER TYPE	MIXED FOREST LAND/MAINTAINED ROW	MAINTAINED ROW	MIXED FOREST LAND/MAINTAINED ROW
RECEIVING WATERS	DARK HOLLOW (EV, MF) (PUBLIC WATER SUPPLY)		

ALIGNMENT



SOIL TYPE	CfB	CpB	HmD	CfB
AVERAGE % SLOPE	6%	4%	1%	2%	6%

CONSTRUCTION CONFIGURATION

LEGEND

- PROPOSED WATERBAR & OUTLET STRUCTURE
- TRENCH PLUG
- DIVERSION CHANNEL
- CLEAN WATER CROSSING
- EROSION CONTROL BLANKET
- ROCK CONSTRUCTION ENTRANCE
- PROPOSED PIPELINE
- ESCGP-3 PERMIT BOUNDARY
- LIMITS OF DISTURBANCE
- APPROX. ENVIRONMENTAL STUDY LIMITS
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- 50'/FEMA FLOODWAY
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- SOIL BOUNDARY / TYPE
- EXISTING TREELINE / TREE/SHRUB
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SOIL LEGEND

CfB	CLYMER CHANNERY LOAM, EXTREMELY STONY, 0 TO 8 PERCENT SLOPES
CpB	COOKPORT CHANNERY LOAM, EXTREMELY STONY, 0 TO 8 PERCENT SLOPES
HmD	HAZLETON-CLYMER CHANNERY LOAMS, EXTREMELY STONY, 8 TO 25 PERCENT SLOPES

SCALE 1" =100'

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL ENGINEER — KEVIN C. CLARK — ENGINEER — 047211-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
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SITE PLAN

CHAPMAN TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

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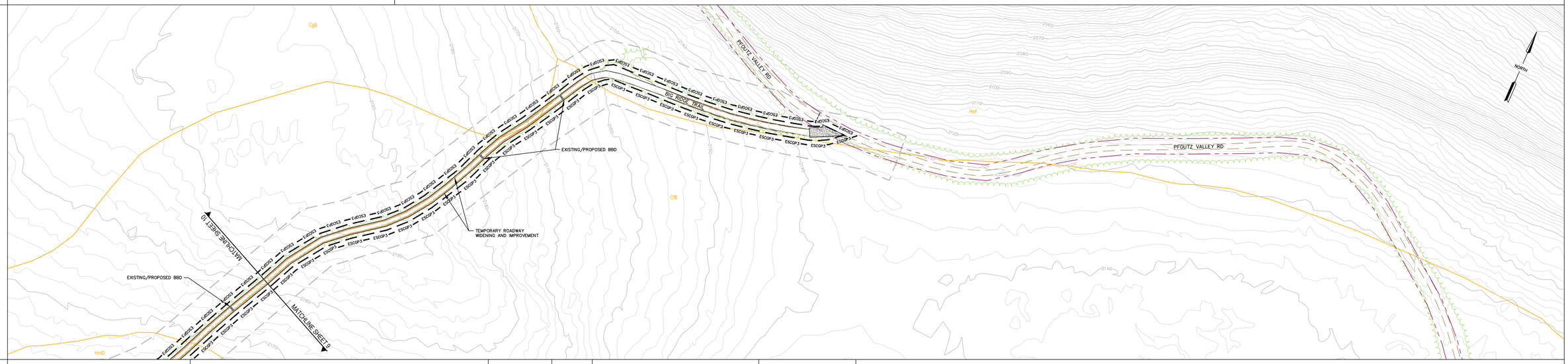
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	SHEET 9 OF 39

OWNERSHIP & TRACT NUMBER	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0002		
PROFILE (MIN. PIPE DEPTH)	N/A		
COVER TYPE	MIXED FOREST LAND/MAINTAINED ROW	MIXED FOREST LAND/MAINTAINED ROW/TRANSPORTATION/COMMUNICATION	MIXED FOREST LAND/MAINTAINED ROW
RECEIVING WATERS	DARK HOLLOW (EV, MF) (PUBLIC WATER SUPPLY)	SHINGLE BRANCH (EV, MF)	

ALIGNMENT



SOIL TYPE	HmD	CfB	CgB/CfB	CfB	HoF	HoF/CfB	HoF
AVERAGE % SLOPE	7%		6%				

CONSTRUCTION CONFIGURATION

LEGEND

- PROPOSED WATERBAR & OUTLET STRUCTURE
- TRENCH PLUG
- DIVERSION CHANNEL
- CLEAN WATER CROSSING
- EROSION CONTROL BLANKET
- ROCK CONSTRUCTION ENTRANCE
- PROPOSED PIPELINE
- ESCGP-3 PERMIT BOUNDARY
- LIMITS OF DISTURBANCE
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- 50'/FEMA FLOODWAY
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SOIL LEGEND

CfB	CLYMER-COOKPORT CHANNERY LOAMS, EXTREMELY STONY, 0 TO 8 PERCENT SLOPES
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HoF	HAZELTON-LAIDIG COMPLEX, EXTREMELY STONY, 25 TO 50 PERCENT SLOPES

SCALE 1" =100'

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PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

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SITE PLAN

CHAPMAN TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

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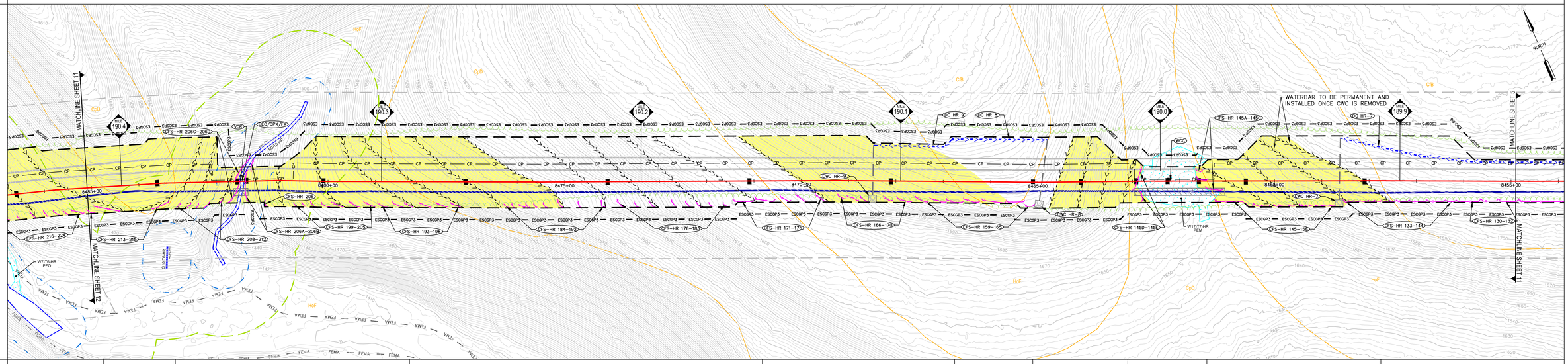
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	SHEET 10 OF 39

OWNERSHIP & TRACT NUMBER	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0004									
PROFILE (MIN. PIPE DEPTH)	3'	4'	3'							
COVER TYPE	MIXED FOREST LAND/MAINTAINED ROW		MIXED FOREST LAND/MAINTAINED ROW/TRANSPORTATION/COMMUNICATION					MIXED FOREST LAND/MAINTAINED ROW		
RECEIVING WATERS	PADDY RUN (EV, MF) (PUBLIC WATER SUPPLY)									
ALIGNMENT										
SOIL TYPE	HoF	CpD	HoF	CpD		HoF	CfB	HoF	CpD	HoF	CfB
AVERAGE % SLOPE	8%	24%	21%		8%	1%			4%	5%
CONSTRUCTION RIGHT-OF-WAY CONFIGURATION										

LEGEND

- PROPOSED WATERBAR & OUTLET STRUCTURE
- TRENCH PLUG
- DIVERSION CHANNEL
- CLEAN WATER CROSSING
- EROSION CONTROL BLANKET
- ROCK CONSTRUCTION ENTRANCE
- PROPOSED PIPELINE
- ESCGP-3 PERMIT BOUNDARY
- LIMITS OF DISTURBANCE
- APPROX. ENVIRONMENTAL STUDY LIMITS
- DELINEATED WETLAND
- DELINEATED WATERWAY / STREAM (TOP OF BANK)
- STREAM FLOW DIRECTION
- RIPARIAN BUFFER
- 50'/FEMA FLOODWAY
- FEMA 100-YEAR FLOODPLAIN
- SOIL BOUNDARY / TYPE
- EXISTING TREELINE / TREE/SHRUB
- PROPERTY LINE
- EXISTING LEIDY / TGPL PIPELINES
- EXISTING LEIDY LINE 'A' ABANDONMENT (REMOVAL)
- EXISTING LEIDY LINE 'A' ABANDONMENT (GROUT IN-PLACE)
- EXISTING FOREIGN PIPELINES
- EXISTING UTILITY POLE / TOWER
- EXISTING UTILITY LINE
- EXISTING VALVE
- EXISTING CULVERT
- EXISTING FENCE
- PROPOSED FENCE
- EXISTING STRUCTURE
- EXISTING ROAD (GRAVEL)
- EXISTING ROAD (PAVED)
- EXISTING GRAVEL AREAS
- PROPOSED GRAVEL
- EXISTING GRADE MAJOR CONTOURS (2' C.I.)
- EXISTING GRADE MINOR CONTOURS (10' C.I.)
- PROPOSED GRADE MAJOR CONTOURS (2' C.I.)
- PROPOSED GRADE MINOR CONTOURS (10' C.I.)
- TIMBER MAT/BRIDGE
- COMPOST FILTER SOCK
- COMPOST FILTER SOCK SEDIMENT TRAP
- CATHODIC PROTECTION DEVICE
- PROPOSED CULVERT
- TP-3 TEST PIT LOCATION (2019)
- TP-6 TEST PIT LOCATION (2020)

SOIL LEGEND

CgB	CLYMER-COOKPORT CHANNERY LOAMS, EXTREMELY STONY, 0 TO 8 PERCENT SLOPES
CpD	COOKPORT CHANNERY LOAM, EXTREMELY STONY, 8 TO 25 PERCENT SLOPES
HmD	HAZLETON-CLYMER CHANNERY LOAMS, EXTREMELY STONY, 8 TO 25 PERCENT SLOPES
HoF	HAZELTON-LAIDIG COMPLEX, EXTREMELY STONY, 25 TO 50 PERCENT SLOPES
HuB	HUSTONTOWN SILT LOAM, 3 TO 8 PERCENT SLOPES

SCALE 1" =100'

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — KEVIN C. CLARK — ENGINEER — 047211-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

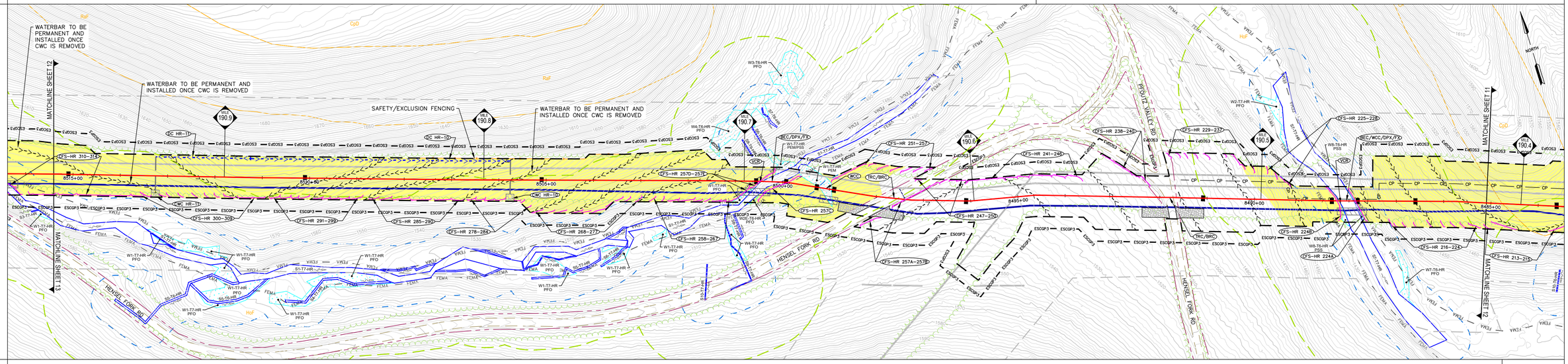
SITE PLAN

LEIDY TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	SHEET 11 OF 39

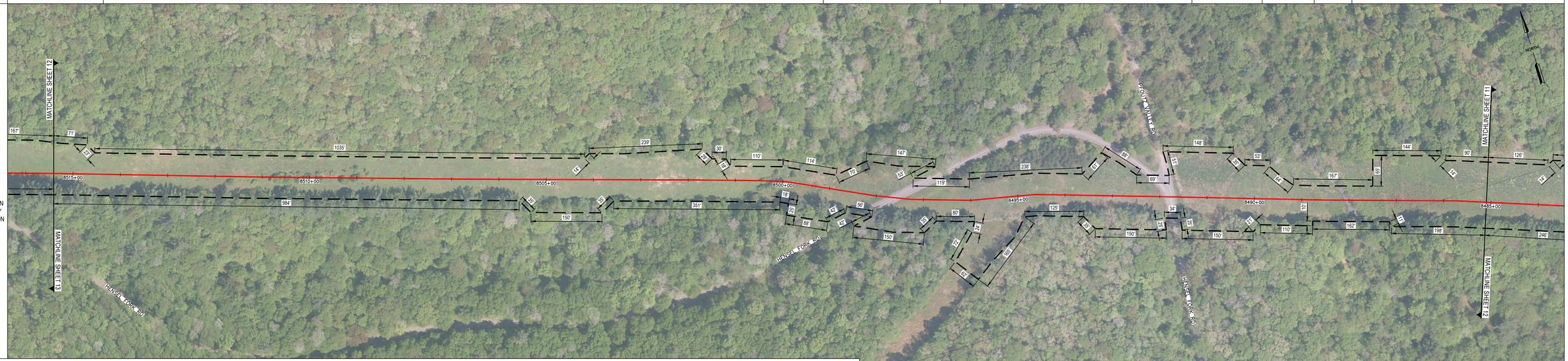
OWNERSHIP & TRACT NUMBER	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0007				HENSEL FORK RD ROW	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0004		PADDY RUN RD ROW	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0004			
PROFILE (MIN. PIPE DEPTH)	3'		4'	3'	5'	3'		5'	3'		4'	3'
COVER TYPE	MIXED FOREST LAND/MAINTAINED ROW			MIXED FOREST LAND/MAINTAINED ROW/TRANSPORTATION/COMMUNICATION					MIXED FOREST LAND/MAINTAINED ROW			
RECEIVING WATERS	HENSEL FORK (EV, MF) (PUBLIC WATER SUPPLY)								PADDY RUN (EV, MF) (PUBLIC WATER SUPPLY)			

ALIGNMENT



SOIL TYPE	HoF							CpD
AVERAGE % SLOPE	2%	5%		13%	8%	15%	31%	10%	8%

CONSTRUCTION RIGHT-OF-WAY CONFIGURATION



LEGEND

- PROPOSED WATERBAR & OUTLET STRUCTURE
- TRENCH PLUG
- DIVERSION CHANNEL
- CLEAN WATER CROSSING
- EROSION CONTROL BLANKET
- ROCK CONSTRUCTION ENTRANCE
- PROPOSED PIPELINE
- ESCGP-3 PERMIT BOUNDARY
- LIMITS OF DISTURBANCE
- APPROX. ENVIRONMENTAL STUDY LIMITS
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- DELINEATED WATERWAY / STREAM (TOP OF BANK)
- STREAM FLOW DIRECTION
- RIPARIAN BUFFER
- 50'/FEMA FLOODWAY
- FEMA 100-YEAR FLOODPLAIN
- SOIL BOUNDARY / TYPE
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- PROPOSED FENCE
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- PROPOSED GRAVEL
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- PROPOSED GRADE MAJOR CONTOURS (2' C.I.)
- PROPOSED GRADE MINOR CONTOURS (10' C.I.)
- TIMBER MAT/BRIDGE
- COMPOST FILTER SOCK
- COMPOST FILTER SOCK SEDIMENT TRAP
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- PROPOSED CULVERT
- TP-3 TEST PIT LOCATION (2019)
- TP-6 TEST PIT LOCATION (2020)

SOIL LEGEND

CgB	CLYMER-COOKPORT CHANNERY LOAMS, EXTREMELY STONY, 0 TO 8 PERCENT SLOPES
CpD	COOKPORT CHANNERY LOAM, EXTREMELY STONY, 8 TO 25 PERCENT SLOPES
HmD	HAZLETON-CLYMER CHANNERY LOAMS, EXTREMELY STONY, 8 TO 25 PERCENT SLOPES
HoF	HAZELTON-LAIDIG COMPLEX, EXTREMELY STONY, 25 TO 50 PERCENT SLOPES
HuB	HUSTONTOWN SILT LOAM, 3 TO 8 PERCENT SLOPES

SCALE 1" =100'

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER KEVIN C. CLARK ENGINEER 047231-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

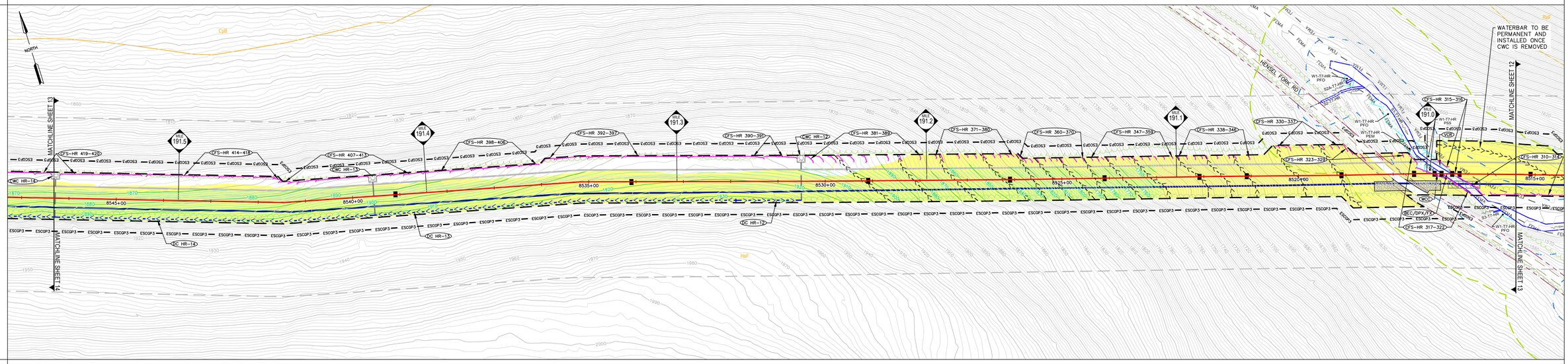
SITE PLAN

LEIDY TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		SHEET 12
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	OF 39

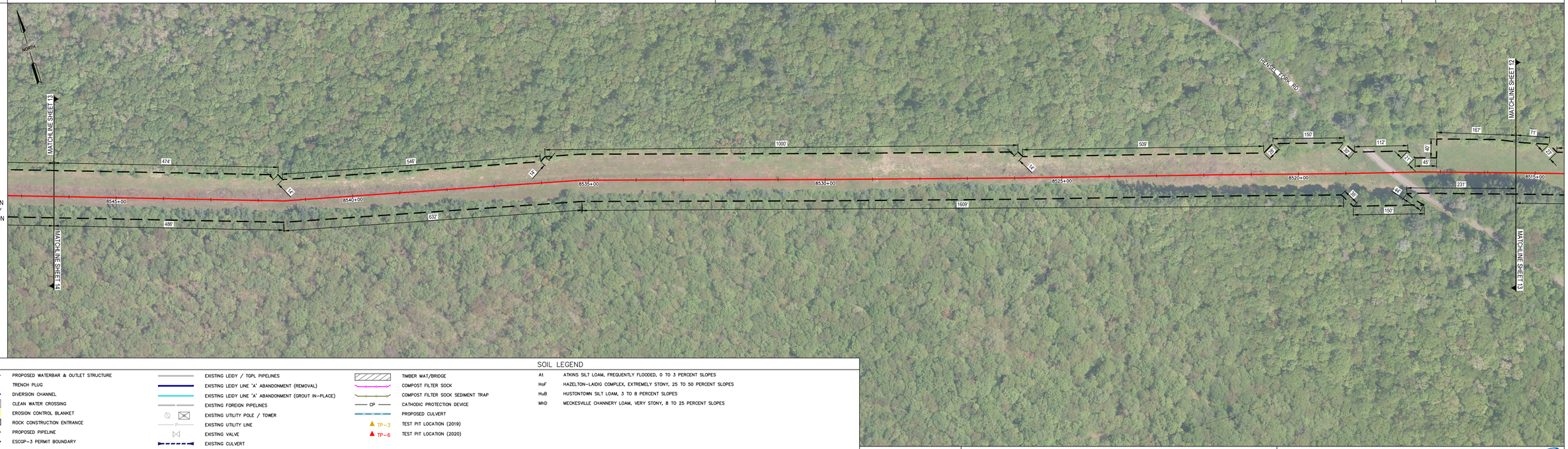
OWNERSHIP & TRACT NUMBER	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0004	HENSEL FORK RD ROW	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0007		
PROFILE (MIN. PIPE DEPTH)	3'	5'	3'	4'	3'
COVER TYPE	MIXED FOREST LAND/MAINTAINED ROW/DECIDUOUS FOREST LAND				
RECEIVING WATERS	HENSEL FORK (EV, MF) (PUBLIC WATER SUPPLY)				

ALIGNMENT



SOIL TYPE	HoF		
AVERAGE % SLOPE	3%	23%	25%	2%

CONSTRUCTION RIGHT-OF-WAY CONFIGURATION



LEGEND

- PROPOSED WATERBAR & OUTLET STRUCTURE
- TRENCH PLUG
- DIVERSION CHANNEL
- CLEAN WATER CROSSING
- EROSION CONTROL BLANKET
- ROCK CONSTRUCTION ENTRANCE
- PROPOSED PIPELINE
- ESCGP3 — ESCGP-3 PERMIT BOUNDARY
- LIMITS OF DISTURBANCE
- APPROX. ENVIRONMENTAL STUDY LIMITS
- DELINEATED WETLAND
- DELINEATED WATERWAY / STREAM (TOP OF BANK)
- STREAM FLOW DIRECTION
- RIPARIAN BUFFER
- 50'/FEMA FLOODWAY
- FEMA — FEMA 100-YEAR FLOODPLAIN
- MrB2 — SOIL BOUNDARY / TYPE
- EXISTING TREELINE / TREE/SHRUB
- PROPERTY LINE
- EXISTING LEIDY / TGPL PIPELINES
- EXISTING LEIDY LINE "A" ABANDONMENT (REMOVAL)
- EXISTING LEIDY LINE "A" ABANDONMENT (GROUT IN-PLACE)
- EXISTING FOREIGN PIPELINES
- EXISTING UTILITY POLE / TOWER
- EXISTING UTILITY LINE
- EXISTING VALVE
- EXISTING CULVERT
- EXISTING FENCE
- PROPOSED FENCE
- EXISTING STRUCTURE
- EXISTING ROAD (GRAVEL)
- EXISTING ROAD (PAVED)
- EXISTING GRAVEL AREAS
- PROPOSED GRAVEL
- 1250 — EXISTING GRADE MAJOR CONTOURS (2' C.I.)
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- 1250 — PROPOSED GRADE MAJOR CONTOURS (2' C.I.)
- 1244 — PROPOSED GRADE MINOR CONTOURS (10' C.I.)
- TIMBER MAT/BRIDGE
- COMPOST FILTER SOCK
- COMPOST FILTER SOCK SEDIMENT TRAP
- CP — CATHODIC PROTECTION DEVICE
- PROPOSED CULVERT
- TP-3 — TEST PIT LOCATION (2019)
- TP-6 — TEST PIT LOCATION (2020)

SOIL LEGEND

At	ATKINS SILT LOAM, FREQUENTLY FLOODED, 0 TO 3 PERCENT SLOPES
HoF	HAZELTON-LAIDIG COMPLEX, EXTREMELY STONY, 25 TO 50 PERCENT SLOPES
HuB	HUSTONTOWN SILT LOAM, 3 TO 8 PERCENT SLOPES
MhD	MECKESVILLE CHANNERY LOAM, VERY STONY, 8 TO 25 PERCENT SLOPES

SCALE 1" =100'

100 50 0 100

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL ENGINEER — KEVIN C. CLARK — ENGINEER — 047211-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

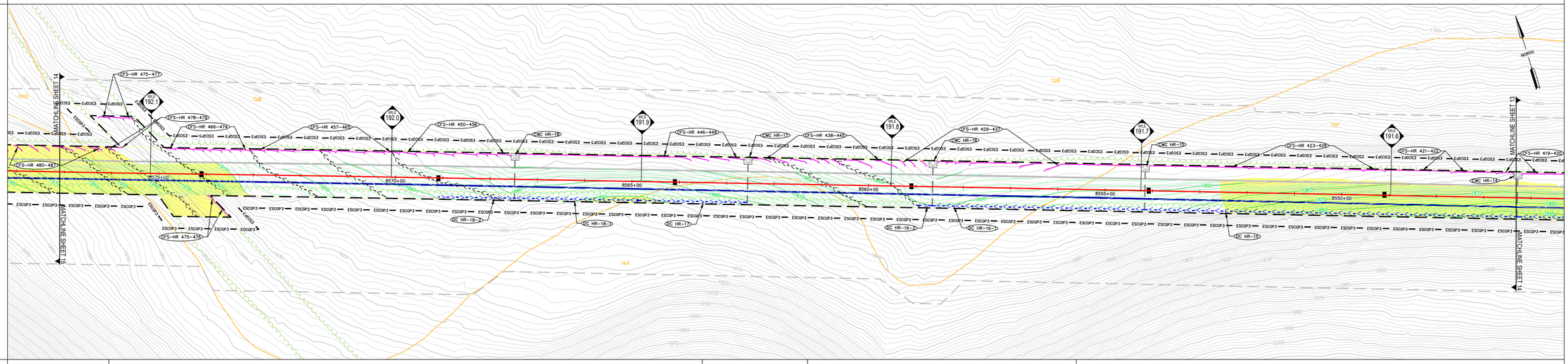
SITE PLAN

LEIDY TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	SHEET 13 OF 39

OWNERSHIP & TRACT NUMBER	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0004				
PROFILE (MIN. PIPE DEPTH)	3'				
COVER TYPE	DECIDUOUS FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS	DECIDUOUS FOREST LAND/ MAINTAINED ROW/TRANSITIONAL AREAS/TRANSPORTATION/COMMUNICATION	DECIDUOUS FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS	MIXED FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS	DECIDUOUS FOREST LAND/MAINTAINED ROW/MIXED FOREST LAND
RECEIVING WATERS	HENSEL FORK (EV, MF) (PUBLIC WATER SUPPLY)				

ALIGNMENT



SOIL TYPE	HoF	CpB	HoF	CpB	HoF
AVERAGE % SLOPE	18%	3%			3%

CONSTRUCTION RIGHT-OF-WAY CONFIGURATION

LEGEND

- PROPOSED WATERBAR & OUTLET STRUCTURE
- TRENCH PLUG
- DIVERSION CHANNEL
- CLEAN WATER CROSSING
- EROSION CONTROL BLANKET
- ROCK CONSTRUCTION ENTRANCE
- PROPOSED PIPELINE
- ESCGP3 — ESCGP-3 PERMIT BOUNDARY
- LIMITS OF DISTURBANCE
- APPROX. ENVIRONMENTAL STUDY LIMITS
- DELINEATED WETLAND
- DELINEATED WATERWAY / STREAM (TOP OF BANK)
- STREAM FLOW DIRECTION
- RIPARIAN BUFFER
- 50'/FEMA FLOODWAY
- FEMA — FEMA 100-YEAR FLOODPLAIN
- MrB2 — SOIL BOUNDARY / TYPE
- EXISTING TREELINE / TREE/SHRUB
- PROPERTY LINE
- EXISTING LEIDY / TGPL PIPELINES
- EXISTING LEIDY LINE 'A' ABANDONMENT (REMOVAL)
- EXISTING LEIDY LINE 'A' ABANDONMENT (GROUT IN-PLACE)
- EXISTING FOREIGN PIPELINES
- EXISTING UTILITY POLE / TOWER
- EXISTING UTILITY LINE
- EXISTING VALVE
- EXISTING CULVERT
- EXISTING FENCE
- PROPOSED FENCE
- EXISTING STRUCTURE
- EXISTING ROAD (GRAVEL)
- EXISTING ROAD (PAVED)
- EXISTING GRAVEL AREAS
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- 1250 — EXISTING GRADE MAJOR CONTOURS (2' C.I.)
- 1244 — EXISTING GRADE MINOR CONTOURS (10' C.I.)
- 1250 — PROPOSED GRADE MAJOR CONTOURS (2' C.I.)
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- TIMBER MAT/BRIDGE
- COMPOST FILTER SOCK
- COMPOST FILTER SOCK SEDIMENT TRAP
- CP — CATHODIC PROTECTION DEVICE
- PROPOSED CULVERT
- TP-3 — TEST PIT LOCATION (2019)
- TP-6 — TEST PIT LOCATION (2020)

SOIL LEGEND

CpD	COOKPORT CHANNERY LOAM, EXTREMELY STONY, 8 TO 25 PERCENT SLOPES
HmD	HAZLETON-CLYMER CHANNERY LOAMS, EXTREMELY STONY, 8 TO 25 PERCENT SLOPES
HoF	HAZELTON-LAIDIG COMPLEX, EXTREMELY STONY, 25 TO 50 PERCENT SLOPES

SCALE
100 50 0 100
SCALE 1" =100'

WM consulting, inc. designs, permits, resolutions — BA GROUP

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL ENGINEER — KEVIN C. CLARK — ENGINEER — 047211-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC — Williams.
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

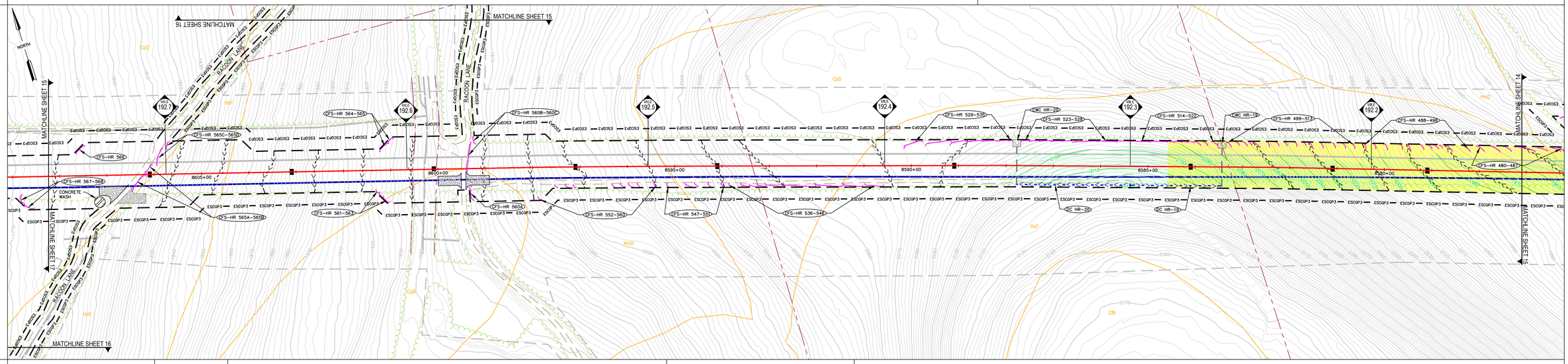
SITE PLAN

LEIDY TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	SHEET 14 OF 39

OWNERSHIP & TRACT NUMBER	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0011				DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0010		DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0004
PROFILE (MIN. PIPE DEPTH)	3'	5'	3'	5'	3'		
COVER TYPE	DECIDUOUS FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS	DECIDUOUS FOREST LAND/ MAINTAINED ROW/TRANSITIONAL AREAS/TRANSPORTATION/ COMMUNICATION	DECIDUOUS FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS		MIXED FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS		DECIDUOUS FOREST LAND/MAINTAINED ROW/MIXED FOREST LAND
RECEIVING WATERS	DRURY RUN (EV, MF)					HENSEL FORK (EV, MF) (PUBLIC WATER SUPPLY)	

ALIGNMENT



SOIL TYPE	CpD	HoF	HmD	CpD	HoF
AVERAGE % SLOPE	14%	20%		5%	7% 18%

CONSTRUCTION RIGHT-OF-WAY CONFIGURATION

LEGEND

- PROPOSED WATERBAR & OUTLET STRUCTURE
- TRENCH PLUG
- DIVERSION CHANNEL
- CLEAN WATER CROSSING
- EROSION CONTROL BLANKET
- ROCK CONSTRUCTION ENTRANCE
- PROPOSED PIPELINE
- ESCGP3 — ESCGP-3 PERMIT BOUNDARY
- LIMITS OF DISTURBANCE
- APPROX. ENVIRONMENTAL STUDY LIMITS
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- 50'/FEMA FLOODWAY
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SOIL LEGEND

CpD	COOKPORT CHANNERY LOAM, EXTREMELY STONY, 8 TO 25 PERCENT SLOPES
HmD	HAZLETON-CLYMER CHANNERY LOAMS, EXTREMELY STONY, 8 TO 25 PERCENT SLOPES
HoF	HAZELTON-LAIDIG COMPLEX, EXTREMELY STONY, 25 TO 50 PERCENT SLOPES

SCALE 1" =100'

100 50 0 100

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — KEVIN C. CLARK — ENGINEER — 047211-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

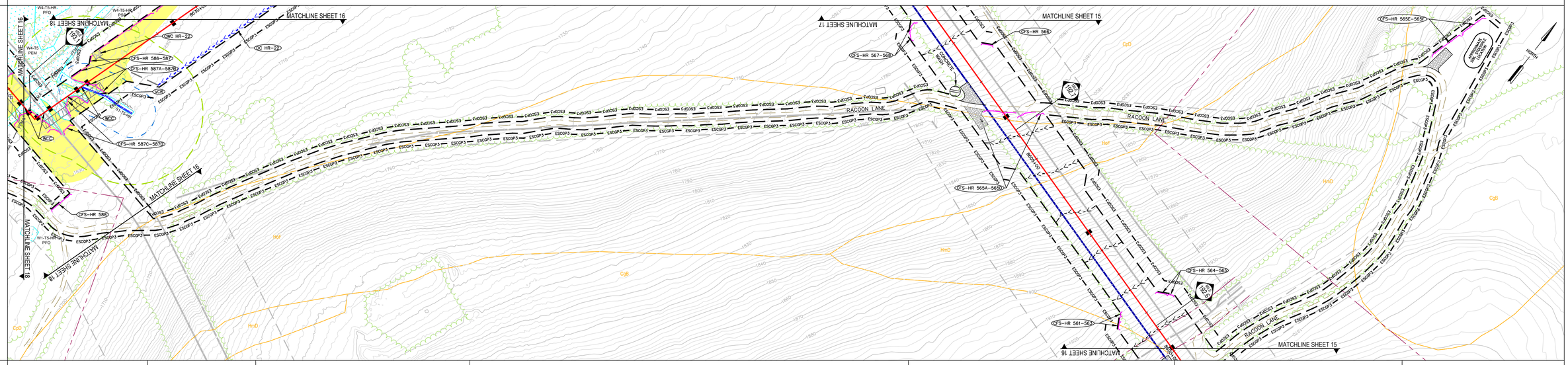
SITE PLAN

LEIDY TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	SHEET 15 OF 39

OWNERSHIP & TRACT NUMBER	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0011						
PROFILE (MIN. PIPE DEPTH)	N/A			3'	5'	3'	N/A
COVER TYPE	DECIDUOUS FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS	DECIDUOUS FOREST LAND/ MAINTAINED ROW/TRANSITIONAL AREAS/TRANSPORTATION/COMMUNICATION	DECIDUOUS FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS		MIXED FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS		DECIDUOUS FOREST LAND/MAINTAINED ROW/MIXED FOREST LAND
RECEIVING WATERS	DRURY RUN (EV, MF)						

ALIGNMENT



SOIL TYPE	CpD	HoF	CpD	HoF	CpD	HmD	CgB
AVERAGE % SLOPE	7%	7%	4%		12%		6%

CONSTRUCTION RIGHT-OF-WAY CONFIGURATION

LEGEND

- PROPOSED WATERBAR & OUTLET STRUCTURE
- TRENCH PLUG
- DIVERSION CHANNEL
- CLEAN WATER CROSSING
- EROSION CONTROL BLANKET
- ROCK CONSTRUCTION ENTRANCE
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- 50'/FEMA FLOODWAY
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- EXISTING TREELINE / TREE/SHRUB
- PROPERTY LINE
- EXISTING LEIDY / TGPL PIPELINES
- EXISTING LEIDY LINE 'A' ABANDONMENT (REMOVAL)
- EXISTING LEIDY LINE 'A' ABANDONMENT (GROUT IN-PLACE)
- EXISTING FOREIGN PIPELINES
- EXISTING UTILITY POLE / TOWER
- EXISTING UTILITY LINE
- EXISTING VALVE
- EXISTING CULVERT
- EXISTING FENCE
- PROPOSED FENCE
- EXISTING STRUCTURE
- EXISTING ROAD (GRAVEL)
- EXISTING ROAD (PAVED)
- EXISTING GRAVEL AREAS
- PROPOSED GRAVEL
- EXISTING GRADE MAJOR CONTOURS (2' C.I.)
- EXISTING GRADE MINOR CONTOURS (10' C.I.)
- PROPOSED GRADE MAJOR CONTOURS (2' C.I.)
- PROPOSED GRADE MINOR CONTOURS (10' C.I.)
- TIMBER MAT/BRIDGE
- COMPOST FILTER SOCK
- COMPOST FILTER SOCK SEDIMENT TRAP
- CATHODIC PROTECTION DEVICE
- PROPOSED CULVERT
- TP-3 TEST PIT LOCATION (2019)
- TP-6 TEST PIT LOCATION (2020)

SOIL LEGEND

CgB	CLYMER-COOKPORT CHANNERY LOAMS, EXTREMELY STONY, 0 TO 8 PERCENT SLOPES
CpD	COOKPORT CHANNERY LOAM, EXTREMELY STONY, 8 TO 25 PERCENT SLOPES
HmD	HAZLETON-CLYMER CHANNERY LOAMS, EXTREMELY STONY, 8 TO 25 PERCENT SLOPES
HoF	HAZELTON-LAIDIG COMPLEX, EXTREMELY STONY, 25 TO 50 PERCENT SLOPES

SCALE 1" =100'

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL ENGINEER — KEVIN C. CLARK — ENGINEER — 047211-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

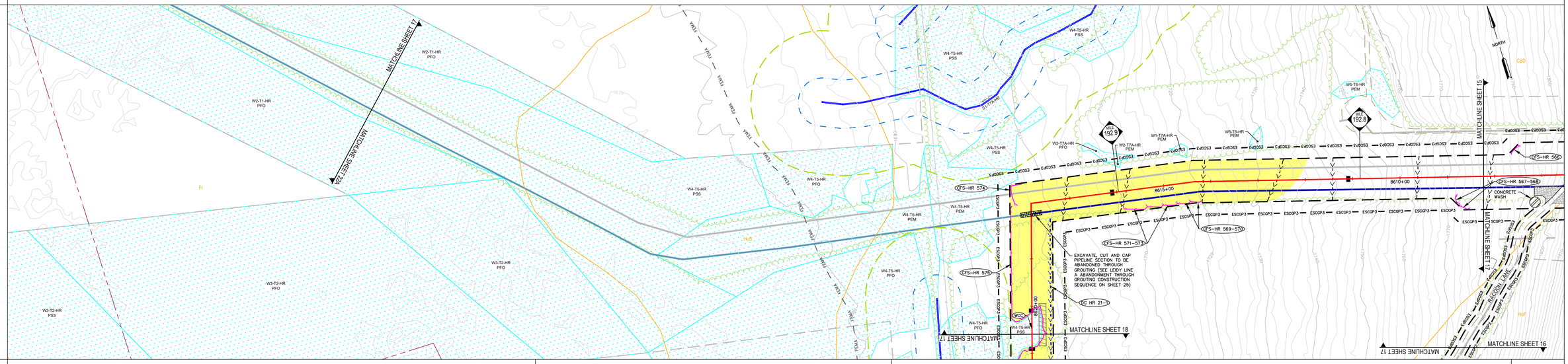
SITE PLAN

LEIDY TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	SHEET 16 OF 39

OWNERSHIP & TRACT NUMBER	COMMONWEALTH OF PA - DEPARTMENT OF CONSERVATION & NATURAL RESOURCES HE-PA-CL-0011				
PROFILE (MIN. PIPE DEPTH)	N/A			3'	
COVER TYPE	DECIDUOUS FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS	DECIDUOUS FOREST LAND/ MAINTAINED ROW / TRANSITIONAL AREAS / TRANSPORTATION / COMMUNICATION	DECIDUOUS FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS	MIXED FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS	DECIDUOUS FOREST LAND/MAINTAINED ROW/MIXED FOREST LAND
RECEIVING WATERS	DRURY RUN (EV, MF)				

ALIGNMENT



SOIL TYPE	Fr	HuB	CpD		HoF
AVERAGE % SLOPE			7%		14%

CONSTRUCTION RIGHT-OF-WAY CONFIGURATION

LEGEND

- PROPOSED WATERBAR & OUTLET STRUCTURE
- TRENCH PLUG
- DIVERSION CHANNEL
- CLEAN WATER CROSSING
- EROSION CONTROL BLANKET
- ROCK CONSTRUCTION ENTRANCE
- PROPOSED PIPELINE
- ESCGP-3 PERMIT BOUNDARY
- LIMITS OF DISTURBANCE
- APPROX. ENVIRONMENTAL STUDY LIMITS
- DELINEATED WETLAND
- DELINEATED WATERWAY / STREAM (TOP OF BANK)
- STREAM FLOW DIRECTION
- RIPARIAN BUFFER
- 50'/FEMA FLOODWAY
- FEMA 100-YEAR FLOODPLAIN
- SOIL BOUNDARY / TYPE
- EXISTING TREELINE / TREE/SHRUB
- PROPERTY LINE
- EXISTING LEIDY / TGPL PIPELINES
- EXISTING LEIDY LINE "A" ABANDONMENT (REMOVAL)
- EXISTING LEIDY LINE "A" ABANDONMENT (GROUT IN-PLACE)
- EXISTING FOREIGN PIPELINES
- EXISTING UTILITY POLE / TOWER
- EXISTING UTILITY LINE
- EXISTING VALVE
- EXISTING CULVERT
- EXISTING FENCE
- PROPOSED FENCE
- EXISTING STRUCTURE
- EXISTING ROAD (GRAVEL)
- EXISTING ROAD (PAVED)
- EXISTING GRAVEL AREAS
- PROPOSED GRAVEL
- EXISTING GRADE MAJOR CONTOURS (2' C.I.)
- EXISTING GRADE MINOR CONTOURS (10' C.I.)
- PROPOSED GRADE MAJOR CONTOURS (2' C.I.)
- PROPOSED GRADE MINOR CONTOURS (10' C.I.)
- TIMBER MAT/BRIDGE
- COMPOST FILTER SOCK
- COMPOST FILTER SOCK SEDIMENT TRAP
- CATHODIC PROTECTION DEVICE
- PROPOSED CULVERT
- TP-3 TEST PIT LOCATION (2019)
- TP-6 TEST PIT LOCATION (2020)

SOIL LEGEND

CpD	COOKPORT CHANNERY LOAM, EXTREMELY STONY, 8 TO 25 PERCENT SLOPES
HoF	HAZELTON-LAIDIG COMPLEX, EXTREMELY STONY, 25 TO 50 PERCENT SLOPES
HuB	HUSTONTOWN SILT LOAM, 3 TO 8 PERCENT SLOPES

SCALE 1" =100'

100 50 0 100

WHM designs, permits, resolutions consulting, INC.

BA GROUP

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER KEVIN C. CLARK ENGINEER 042214-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC Williams.
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

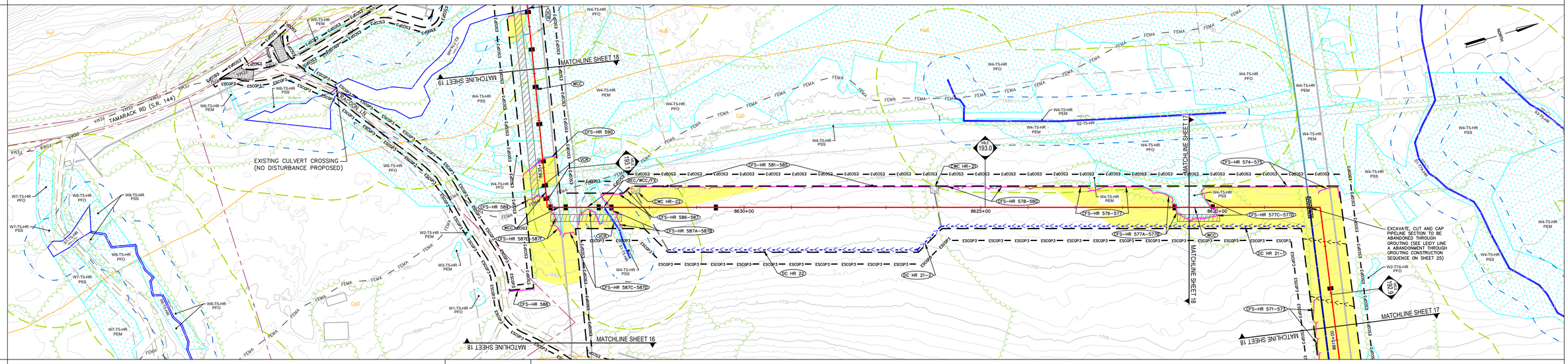
SITE PLAN

LEIDY TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	SHEET 17 OF 39

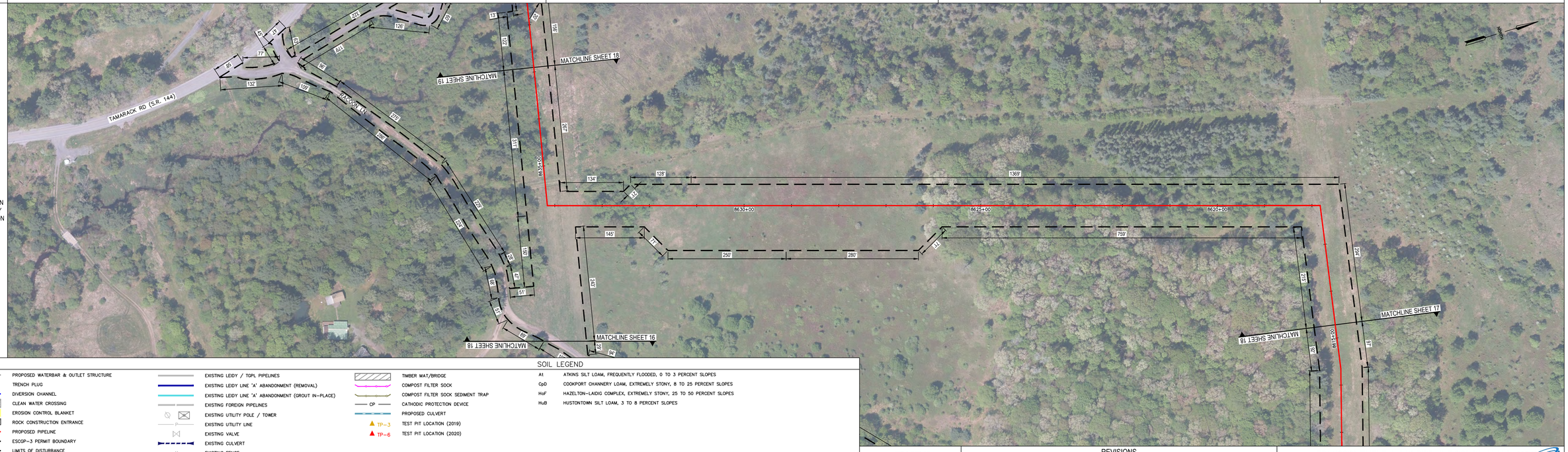
OWNERSHIP & TRACT NUMBER	COMMONWEALTH OF PA - DEPARTMENT OF CONSERVATION & NATURAL RESOURCES HE-PA-CL-0011				
PROFILE (MIN. PIPE DEPTH)	N/A		3'		N/A
COVER TYPE	DECIDUOUS FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS	DECIDUOUS FOREST LAND/ MAINTAINED ROW/TRANSITIONAL AREAS/TRANSPORTATION/ COMMUNICATION	DECIDUOUS FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS	MIXED FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS	DECIDUOUS FOREST LAND/MAINTAINED ROW/MIXED FOREST LAND
RECEIVING WATERS	DRURY RUN (EV, MF)				

ALIGNMENT



SOIL TYPE	At	HuB	CpD		
AVERAGE % SLOPE	1%	2%	1%		7%

CONSTRUCTION RIGHT-OF-WAY CONFIGURATION



LEGEND

- PROPOSED WATERBAR & OUTLET STRUCTURE
- TRENCH PLUG
- DIVERSION CHANNEL
- CLEAN WATER CROSSING
- EROSION CONTROL BLANKET
- ROCK CONSTRUCTION ENTRANCE
- PROPOSED PIPELINE
- ESCGP3 — ESCGP-3 PERMIT BOUNDARY
- LIMITS OF DISTURBANCE
- APPROX. ENVIRONMENTAL STUDY LIMITS
- DELINEATED WETLAND
- DELINEATED WATERWAY / STREAM (TOP OF BANK)
- STREAM FLOW DIRECTION
- RIPARIAN BUFFER
- 50'/FEMA FLOODWAY
- FEMA — FEMA 100-YEAR FLOODPLAIN
- MrB2 — SOIL BOUNDARY / TYPE
- EXISTING TREELINE / TREE/SHRUB
- PROPERTY LINE
- EXISTING LEIDY / TGPL PIPELINES
- EXISTING LEIDY LINE 'A' ABANDONMENT (REMOVAL)
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- EXISTING UTILITY POLE / TOWER
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- EXISTING VALVE
- EXISTING CULVERT
- EXISTING FENCE
- PROPOSED FENCE
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- EXISTING GRAVEL AREAS
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- 1250 — EXISTING GRADE MAJOR CONTOURS (2' C.I.)
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- COMPOST FILTER SOCK
- COMPOST FILTER SOCK SEDIMENT TRAP
- CP — CATHODIC PROTECTION DEVICE
- PROPOSED CULVERT
- TP-3 — TEST PIT LOCATION (2019)
- TP-6 — TEST PIT LOCATION (2020)

SOIL LEGEND

At	ATKINS SILT LOAM, FREQUENTLY FLOODED, 0 TO 3 PERCENT SLOPES
CpD	COOKPORT CHANNERY LOAM, EXTREMELY STONY, 8 TO 25 PERCENT SLOPES
HoF	HAZELTON-LAIDIG COMPLEX, EXTREMELY STONY, 25 TO 50 PERCENT SLOPES
HuB	HUSTONTOWN SILT LOAM, 3 TO 8 PERCENT SLOPES

SCALE 1" =100'

W-M consulting, INC. designs, permits, resolutions

BA GROUP

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL KEVIN C. CLARK ENGINEER 042121-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

Williams.

LEIDY SOUTH PROJECT - HENSEL REPLACEMENT

SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

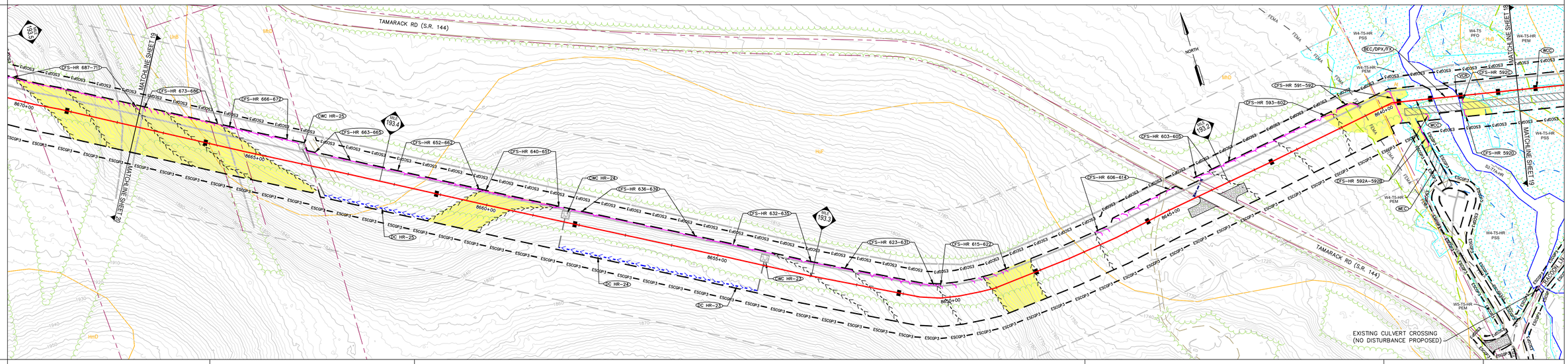
SITE PLAN

LEIDY TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	SHEET 18 OF 39

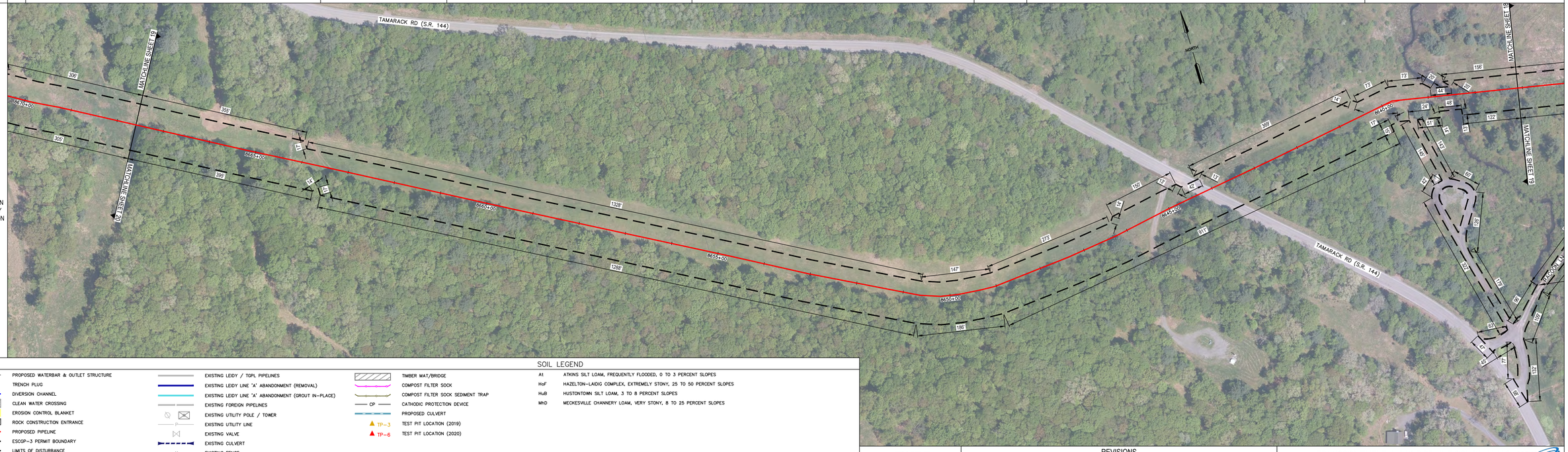
OWNERSHIP & TRACT NUMBER	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0005.010	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0004	COMMONWEALTH OF PA - DEPARTMENT OF CONSERVATION & NATURAL RESOURCES HE-PA-CL-0005.007	TAMARACK RD (S.R. 144) ROW	COMMONWEALTH OF PA - DEPARTMENT OF CONSERVATION & NATURAL RESOURCES HE-PA-CL-0005.0007	COMMONWEALTH OF PA - DEPARTMENT OF CONSERVATION & NATURAL RESOURCES HE-PA-CL-0011		
PROFILE (MIN. PIPE DEPTH)	3'			5'	3'		4'	3'
COVER TYPE	DECIDUOUS FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS	DECIDUOUS FOREST LAND/ MAINTAINED ROW/TRANSITIONAL AREAS/TRANSPORTATION/COMMUNICATION	DECIDUOUS FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS		MIXED FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS		DECIDUOUS FOREST LAND/MAINTAINED ROW/MIXED FOREST LAND	
RECEIVING WATERS	DRURY RUN (EV, MF)							

ALIGNMENT



SOIL TYPE	HoF	MhD	HoF	MhD	At	HuB
AVERAGE % SLOPE	1% 2%	4%	9% 7%	29% 10%	1%	

CONSTRUCTION RIGHT-OF-WAY CONFIGURATION



LEGEND

- PROPOSED WATERBAR & OUTLET STRUCTURE
- TRENCH PLUG
- DIVERSION CHANNEL
- CLEAN WATER CROSSING
- EROSION CONTROL BLANKET
- ROCK CONSTRUCTION ENTRANCE
- PROPOSED PIPELINE
- ESCGP3 — ESCGP-3 PERMIT BOUNDARY
- LIMITS OF DISTURBANCE
- APPROX. ENVIRONMENTAL STUDY LIMITS
- DELINEATED WETLAND
- DELINEATED WATERWAY / STREAM (TOP OF BANK)
- STREAM FLOW DIRECTION
- RIPARIAN BUFFER
- 50'/FEMA FLOODWAY
- FEMA — FEMA 100-YEAR FLOODPLAIN
- MrB2 — SOIL BOUNDARY / TYPE
- EXISTING TREELINE / TREE/SHRUB
- PROPERTY LINE
- EXISTING LEIDY / TGPL PIPELINES
- EXISTING LEIDY LINE 'A' ABANDONMENT (REMOVAL)
- EXISTING LEIDY LINE 'A' ABANDONMENT (GROUT IN-PLACE)
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- EXISTING UTILITY POLE / TOWER
- EXISTING UTILITY LINE
- EXISTING VALVE
- EXISTING CULVERT
- EXISTING FENCE
- PROPOSED FENCE
- EXISTING STRUCTURE
- EXISTING ROAD (GRAVEL)
- EXISTING ROAD (PAVED)
- EXISTING GRAVEL AREAS
- PROPOSED GRAVEL
- 1250 — EXISTING GRADE MAJOR CONTOURS (2' C.I.)
- 1244 — EXISTING GRADE MINOR CONTOURS (10' C.I.)
- 1250 — PROPOSED GRADE MAJOR CONTOURS (2' C.I.)
- 1244 — PROPOSED GRADE MINOR CONTOURS (10' C.I.)
- TIMBER MAT/BRIDGE
- COMPOST FILTER SOCK
- COMPOST FILTER SOCK SEDIMENT TRAP
- CP — CATHODIC PROTECTION DEVICE
- PROPOSED CULVERT
- TP-3 — TEST PIT LOCATION (2019)
- TP-6 — TEST PIT LOCATION (2020)

SOIL LEGEND

At	ATKINS SILT LOAM, FREQUENTLY FLOODED, 0 TO 3 PERCENT SLOPES
HoF	HAZELTON-LAIDIG COMPLEX, EXTREMELY STONY, 25 TO 50 PERCENT SLOPES
HuB	HUSTONTOWN SILT LOAM, 3 TO 8 PERCENT SLOPES
MhD	MECKESVILLE CHANNERY LOAM, VERY STONY, 8 TO 25 PERCENT SLOPES

SCALE 1" =100'

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — KEVIN C. CLARK — ENGINEER — 047211-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

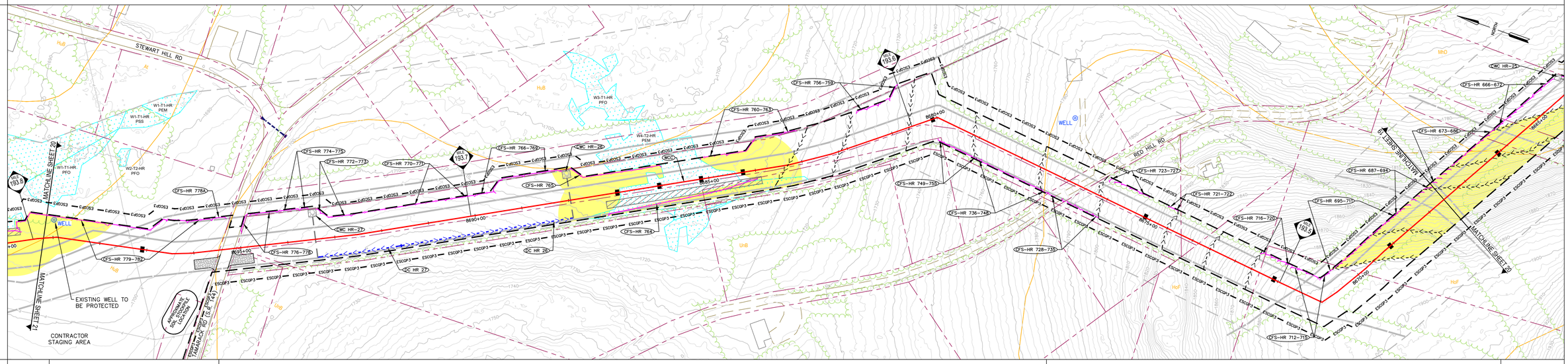
SITE PLAN

LEIDY TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		SHEET 19
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	OF 39

OWNERSHIP & TRACT NUMBER	DOMINION TRANSMISSION INC. HE-PA-CL-0005.030	TAMARACK RD (S.R. 144) ROW	RAYMOND D. WOLFE HE-PA-CL-0005.016	RED HILL RD (S.R. 144) ROW	KERRY B. WILSON HE-PA-CL-0005.013	DANIEL M. LUCAS HE-PA-CL-0005.012	JOHN C. SMITH HE-PA-CL-0005.011	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0005.010	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0004
PROFILE (MIN. PIPE DEPTH)	3'	5'	3'	5'	3'				
COVER TYPE	DECIDUOUS FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS	DECIDUOUS FOREST LAND/ MAINTAINED ROW/TRANSITIONAL AREAS/TRANSPORTATION/COMMUNICATION	DECIDUOUS FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS		MIXED FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS			DECIDUOUS FOREST LAND/MAINTAINED ROW/MIXED FOREST LAND	
RECEIVING WATERS	DRURY RUN (EV, MF)								

ALIGNMENT



SOIL TYPE	At	HuB	UnB	HoF	MhD
AVERAGE % SLOPE	1%	1%	1%	6%	3%	6%	1%	2%

CONSTRUCTION RIGHT-OF-WAY CONFIGURATION

LEGEND

- PROPOSED WATERBAR & OUTLET STRUCTURE
- TRENCH PLUG
- DIVERSION CHANNEL
- CLEAN WATER CROSSING
- EROSION CONTROL BLANKET
- ROCK CONSTRUCTION ENTRANCE
- PROPOSED PIPELINE
- ESCGP3 — ESCGP-3 PERMIT BOUNDARY
- LIMITS OF DISTURBANCE
- APPROX. ENVIRONMENTAL STUDY LIMITS
- DELINEATED WETLAND
- DELINEATED WATERWAY / STREAM (TOP OF BANK)
- STREAM FLOW DIRECTION
- RIPARIAN BUFFER
- 50'/FEMA FLOODWAY
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- MrB2 — SOIL BOUNDARY / TYPE
- EXISTING TREELINE / TREE/SHRUB
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- PROPOSED CULVERT
- TP-3 — TEST PIT LOCATION (2019)
- TP-6 — TEST PIT LOCATION (2020)

SOIL LEGEND

At	ATKINS SILT LOAM, FREQUENTLY FLOODED, 0 TO 3 PERCENT SLOPES
HoF	HAZELTON-LAIDIG COMPLEX, EXTREMELY STONY, 25 TO 50 PERCENT SLOPES
HuB	HUSTONTOWN SILT LOAM, 3 TO 8 PERCENT SLOPES
MhD	MECKESVILLE CHANNERY LOAM, VERY STONY, 8 TO 25 PERCENT SLOPES
UnB	UNGERS LOAM, 3 TO 8 PERCENT SLOPES

SCALE 1" =100'

100 50 0 100

WM consulting, inc. designs, permits, resolutions

BA GROUP

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER KEVIN C. CLARK ENGINEER 042121-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

Williams.

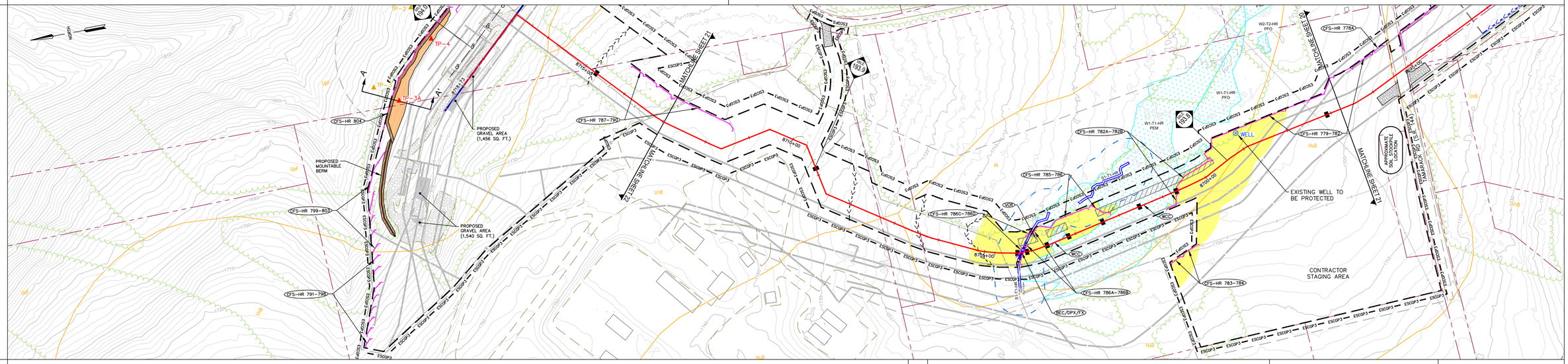
SITE PLAN

LEIDY TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	SHEET 20 OF 39

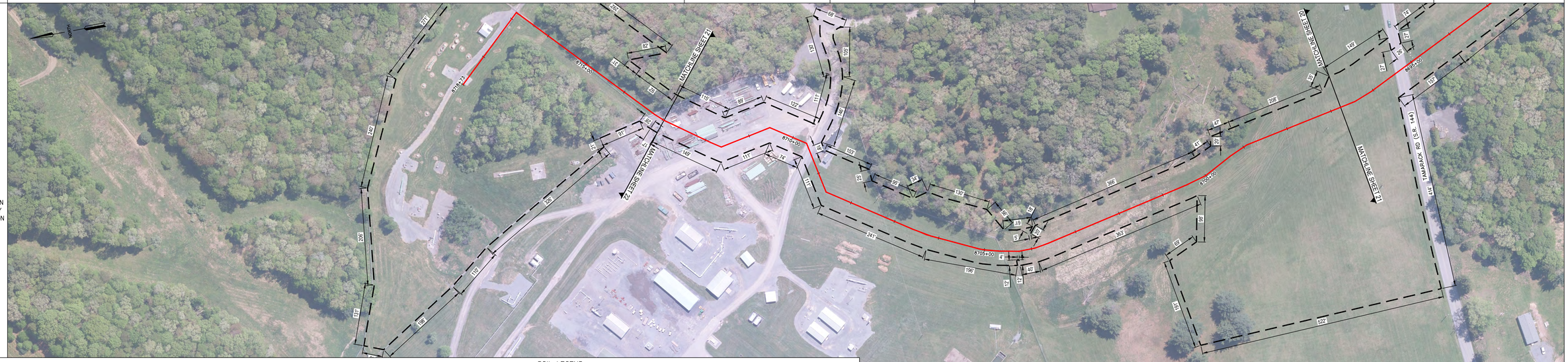
OWNERSHIP & TRACT NUMBER	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0024		DOMINION TRANSMISSION INC. HE-PA-CL-0025	DOMINION TRANSMISSION INC. HE-PA-CL-0005.032	DOMINION TRANSMISSION INC. HE-PA-CL-0005.027			TAMARACK RD (S.R. 144) ROW	RAYMOND D. WOLFE HE-PA-CL-0005.016
PROFILE (MIN. PIPE DEPTH)	N/A		3'		4'	3'		5'	3'
COVER TYPE	DECIDUOUS FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS	DECIDUOUS FOREST LAND/ MAINTAINED ROW/TRANSITIONAL AREAS/TRANSPORTATION/COMMUNICATION	DECIDUOUS FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS		MIXED FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS		DECIDUOUS FOREST LAND/MAINTAINED ROW/MIXED FOREST LAND		
RECEIVING WATERS	TURTLE POINT HOLLOW (EV, MF)				DRURY RUN (EV, MF)				

ALIGNMENT



SOIL TYPE	UnB/UpF	HuB	At	HuB	UnB	
AVERAGE % SLOPE	13%	1%	7%	1%	11%	

CONSTRUCTION RIGHT-OF-WAY CONFIGURATION



LEGEND

- PROPOSED WATERBAR & OUTLET STRUCTURE
- TRENCH PLUG
- DIVERSION CHANNEL
- CLEAN WATER CROSSING
- EROSION CONTROL BLANKET
- ROCK CONSTRUCTION ENTRANCE
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- STREAM FLOW DIRECTION
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- 50'/FEMA FLOODWAY
- FEMA — FEMA 100-YEAR FLOODPLAIN
- MrB2 — SOIL BOUNDARY / TYPE
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- PROPERTY LINE
- EXISTING LEIDY / TGPL PIPELINES
- EXISTING LEIDY LINE 'A' ABANDONMENT (REMOVAL)
- EXISTING LEIDY LINE 'A' ABANDONMENT (GROUT IN-PLACE)
- EXISTING FOREIGN PIPELINES
- EXISTING UTILITY POLE / TOWER
- EXISTING UTILITY LINE
- EXISTING VALVE
- EXISTING CULVERT
- EXISTING FENCE
- PROPOSED FENCE
- EXISTING STRUCTURE
- EXISTING ROAD (GRAVEL)
- EXISTING ROAD (PAVED)
- EXISTING GRAVEL AREAS
- PROPOSED GRAVEL
- 1250 — EXISTING GRADE MAJOR CONTOURS (2' C.I.)
- 1244 — EXISTING GRADE MINOR CONTOURS (10' C.I.)
- 1250 — PROPOSED GRADE MAJOR CONTOURS (2' C.I.)
- 1244 — PROPOSED GRADE MINOR CONTOURS (10' C.I.)
- TIMBER MAT/BRIDGE
- COMPOST FILTER SOCK
- COMPOST FILTER SOCK SEDIMENT TRAP
- CP — CATHODIC PROTECTION DEVICE
- PROPOSED CULVERT
- TP-3 — TEST PIT LOCATION (2019)
- TP-6 — TEST PIT LOCATION (2020)

SOIL LEGEND

At	ATKINS SILT LOAM, FREQUENTLY FLOODED, 0 TO 3 PERCENT SLOPES
HuB	HUSTONTOWN SILT LOAM, 3 TO 8 PERCENT SLOPES
UnB	UNGERS LOAM, 3 TO 8 PERCENT SLOPES
UpF	UNGERS-MECKESVILLE COMPLEX, 25 TO 50 PERCENT SLOPES, EXTREMELY STONY

SCALE 1" =100'

100 50 0 100

WHM designs, permits, resolutions consulting, INC.

BA GROUP

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL ENGINEER KEVIN C. CLARK ENGINEER 042121-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

Williams.

LEIDY SOUTH PROJECT - HENSEL REPLACEMENT

SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

SITE PLAN

LEIDY TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	SHEET 21 OF 39

OWNERSHIP & TRACT NUMBER	DOMINION TRANSMISSION INC. HE-PA-CL-0025	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0024	STEWART HILL RD ROW	SCOTT BASKIN HE-PA-CL-0022	CHARLES R. ROSAMILIA JR. HE-PA-CL-0021	CHARLES R. ROSAMILIA JR. HE-PA-CL-0020	NATIONAL FUEL GAS SUPPLY CORP. HE-PA-CL-0019

PROFILE (MIN. PIPE DEPTH)	N/A	3'	N/A

COVER TYPE	DECIDUOUS FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS	DECIDUOUS FOREST LAND/ MAINTAINED ROW/TRANSITIONAL AREAS/TRANSPORTATION/COMMUNICATION	DECIDUOUS FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS	MIXED FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS	DECIDUOUS FOREST LAND/MAINTAINED ROW/MIXED FOREST LAND

RECEIVING WATERS	TURTLE POINT HOLLOW (EV, MF)	DRURY RUN (EV, MF)

ALIGNMENT

SOIL TYPE	UpF	HuB	UnB	HuB	CaB	UnB	HuB

AVERAGE % SLOPE	2%

CONSTRUCTION RIGHT-OF-WAY CONFIGURATION

LEGEND

Symbol	Description
—>—>—>—	PROPOSED WATERBAR & OUTLET STRUCTURE
	TRENCH PLUG
	DIVERSION CHANNEL
	CLEAN WATER CROSSING
	EROSION CONTROL BLANKET
	ROCK CONSTRUCTION ENTRANCE
	PROPOSED PIPELINE
ESCGP3	ESCGP-3 PERMIT BOUNDARY
	LIMITS OF DISTURBANCE
	APPROX. ENVIRONMENTAL STUDY LIMITS
	DELINEATED WETLAND
	DELINEATED WATERWAY / STREAM (TOP OF BANK)
	STREAM FLOW DIRECTION
	RIPARIAN BUFFER
	50'/FEMA FLOODWAY
FEMA	FEMA 100-YEAR FLOODPLAIN
MrB2	SOIL BOUNDARY / TYPE
	EXISTING TREELINE / TREE/SHRUB
	PROPERTY LINE
	EXISTING LEIDY / TGPL PIPELINES
	EXISTING LEIDY LINE 'A' ABANDONMENT (REMOVAL)
	EXISTING LEIDY LINE 'A' ABANDONMENT (GROUT IN-PLACE)
	EXISTING FOREIGN PIPELINES
	EXISTING UTILITY POLE / TOWER
P	EXISTING UTILITY LINE
	EXISTING VALVE
	EXISTING CULVERT
X	EXISTING FENCE
X	PROPOSED FENCE
	EXISTING STRUCTURE
	EXISTING ROAD (GRAVEL)
	EXISTING ROAD (PAVED)
	EXISTING GRAVEL AREAS
	PROPOSED GRAVEL
1250	EXISTING GRADE MAJOR CONTOURS (2' C.I.)
1244	EXISTING GRADE MINOR CONTOURS (10' C.I.)
1250	PROPOSED GRADE MAJOR CONTOURS (2' C.I.)
1244	PROPOSED GRADE MINOR CONTOURS (10' C.I.)
	TIMBER MAT/BRIDGE
	COMPOST FILTER SOCK
	COMPOST FILTER SOCK SEDIMENT TRAP
CP	CATHODIC PROTECTION DEVICE
	PROPOSED CULVERT
TP-3	TEST PIT LOCATION (2019)
TP-6	TEST PIT LOCATION (2020)

SOIL LEGEND

CaB	CALVIN CHANNERY SILT LOAM, 3 TO 8 PERCENT SLOPES
HuB	HUSTONTOWN SILT LOAM, 3 TO 8 PERCENT SLOPES
UnB	UNGERS LOAM, 3 TO 8 PERCENT SLOPES
UpF	UNGERS-MECKESVILLE COMPLEX, 25 TO 50 PERCENT SLOPES, EXTREMELY STONY

SCALE 100 50 0 100
SCALE 1" =100'

WHM consulting, INC. designs, permits, resolutions

BA GROUP

KEVIN C. CLARK, P.E.
COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL KEVIN C. CLARK ENGINEER 041211-E
PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

Williams.

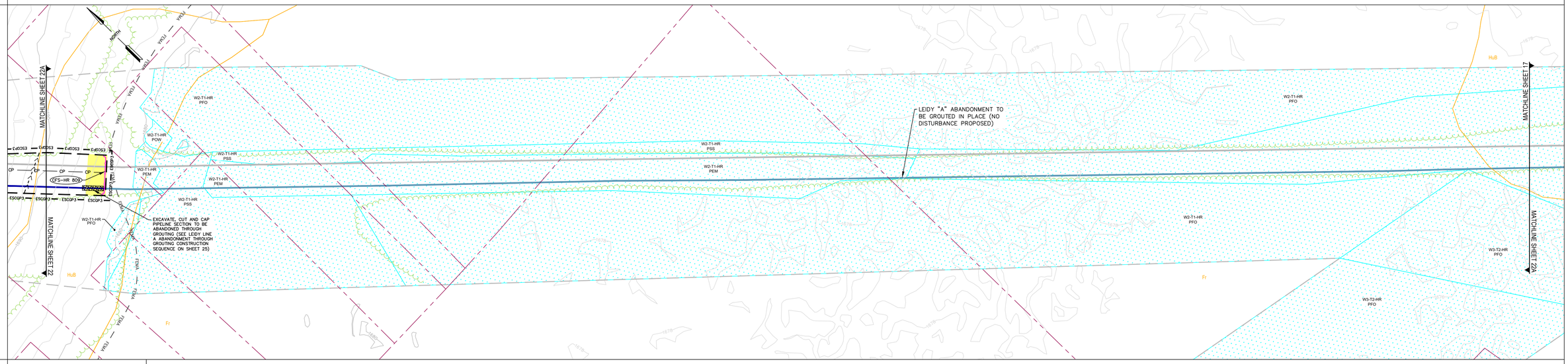
SITE PLAN

LEIDY TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19	DRAWING NUMBER: 26-1000-70-28-D	SHEET 22 OF 39
WO: 121227	RID:		

OWNERSHIP & TRACT NUMBER	CHARLES R. ROSAMILIA JR. HE-PA-CL-0021	CHARLES R. ROSAMILIA JR. HE-PA-CL-0020	NATIONAL FUEL GAS SUPPLY CORP. HE-PA-CL-0019	NATIONAL FUEL GAS SUPPLY CORP. HE-PA-CL-0018	PAUL T. GAVLOCK HE-PA-CL-0017	DEPARTMENT OF ENVIRONMENTAL RESOURCES HE-PA-CL-0016	OSCAR WINTERS HE-PA-CL-0015	COMMONWEALTH OF PA - DEPARTMENT OF CONSERVATION & NATURAL RESOURCES HE-PA-CL-0011
PROFILE (MIN. PIPE DEPTH)	N/A							
COVER TYPE	DECIDUOUS FOREST LAND/MAINTAINED ROW/MIXED FOREST LAND							
RECEIVING WATERS	DRURY RUN (EV, MF)							

ALIGNMENT



SOIL TYPE	HuB	Fr
AVERAGE % SLOPE	4.9%	0.1%

CONSTRUCTION RIGHT-OF-WAY CONFIGURATION

LEGEND

- PROPOSED WATERBAR & OUTLET STRUCTURE
- TRENCH PLUG
- DIVERSION CHANNEL
- CLEAN WATER CROSSING
- EROSION CONTROL BLANKET
- ROCK CONSTRUCTION ENTRANCE
- PROPOSED PIPELINE
- ESCGP3 — ESCGP-3 PERMIT BOUNDARY
- LIMITS OF DISTURBANCE
- APPROX. ENVIRONMENTAL STUDY LIMITS
- DELINEATED WETLAND
- DELINEATED WATERWAY / STREAM (TOP OF BANK)
- STREAM FLOW DIRECTION
- RIPARIAN BUFFER
- 50'/FEMA FLOODWAY
- FEMA — FEMA 100-YEAR FLOODPLAIN
- MrB2 — SOIL BOUNDARY / TYPE
- EXISTING TREELINE / TREE/SHRUB
- PROPERTY LINE
- EXISTING LEIDY / TGPL PIPELINES
- EXISTING LEIDY LINE "A" ABANDONMENT (REMOVAL)
- EXISTING LEIDY LINE "A" ABANDONMENT (GROUT IN-PLACE)
- EXISTING FOREIGN PIPELINES
- EXISTING UTILITY POLE / TOWER
- EXISTING UTILITY LINE
- EXISTING VALVE
- EXISTING CULVERT
- EXISTING FENCE
- PROPOSED FENCE
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- TP-3 — TEST PIT LOCATION (2019)
- TP-6 — TEST PIT LOCATION (2020)

SOIL LEGEND

CoB	CALVIN CHANNERY SILT LOAM, 3 TO 8 PERCENT SLOPES
HuB	HUSTONTOWN SILT LOAM, 3 TO 8 PERCENT SLOPES
UnB	UNGERS LOAM, 3 TO 8 PERCENT SLOPES
UpF	UNGERS-MECKESVILLE COMPLEX, 25 TO 50 PERCENT SLOPES, EXTREMELY STONY

SCALE
100 50 0 100
SCALE 1" =100'

designs, permits, resolutions WM consulting, inc. BA GROUP

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — KEVIN C. CLARK — ENGINEER — 042121-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC — Williams.
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

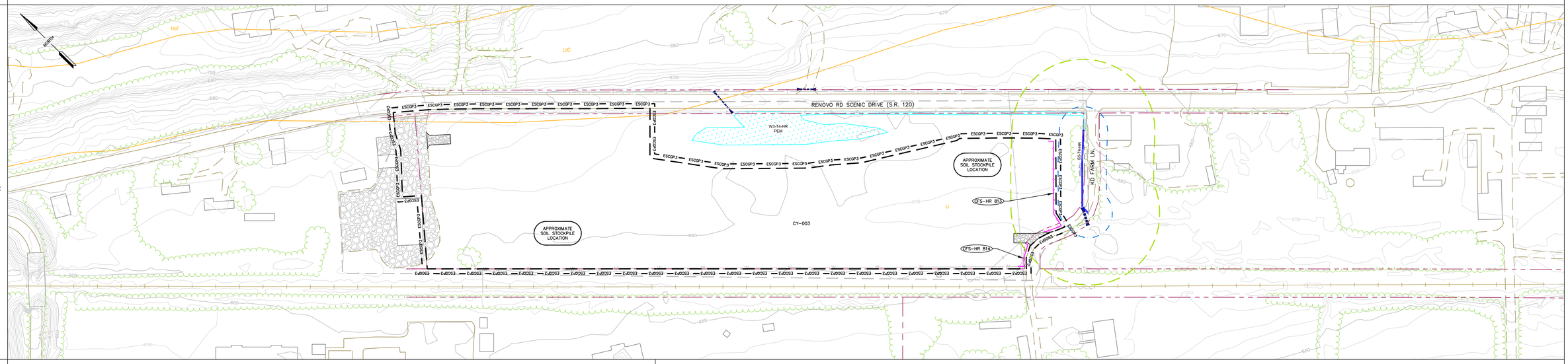
SITE PLAN

LEIDY TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	SHEET 22A OF 39

OWNERSHIP & TRACT NUMBER	THOMPSON LOGGING & TRUCKING	LEE E. JR. & TAMERLIE J. THOMPSON HE-PA-CL-0024	KD FARM LN. ROW	VITO A. JR. & WENDY D. JANERELLA	
PROFILE (MIN. PIPE DEPTH)	N/A				
COVER TYPE	DECIDUOUS FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS	DECIDUOUS FOREST LAND/ MAINTAINED ROW/TRANSITIONAL AREAS/TRANSPORTATION/COMMUNICATION	DECIDUOUS FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS	MIXED FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS	DECIDUOUS FOREST LAND/MAINTAINED ROW/MIXED FOREST LAND
RECEIVING WATERS	WEST BRANCH SUSQUEHANNA RIVER (WWF,MF)				

CONTRACTOR YARD



SOIL TYPE	LdC/Lr	Lr
AVERAGE % SLOPE	1%	

CONSTRUCTION RIGHT-OF-WAY CONFIGURATION

LEGEND

- PROPOSED WATERBAR & OUTLET STRUCTURE
- TRENCH PLUG
- DIVERSION CHANNEL
- CLEAN WATER CROSSING
- EROSION CONTROL BLANKET
- ROCK CONSTRUCTION ENTRANCE
- PROPOSED PIPELINE
- ESCGP3 — ESCGP-3 PERMIT BOUNDARY
- LIMITS OF DISTURBANCE
- APPROX. ENVIRONMENTAL STUDY LIMITS
- DELINEATED WETLAND
- DELINEATED WATERWAY / STREAM (TOP OF BANK)
- STREAM FLOW DIRECTION
- RIPARIAN BUFFER
- 50'/FEMA FLOODWAY
- FEMA — FEMA 100-YEAR FLOODPLAIN
- MrB2 — SOIL BOUNDARY / TYPE
- EXISTING TREELINE / TREE/SHRUB
- PROPERTY LINE
- EXISTING LEIDY / TGPL PIPELINES
- EXISTING LEIDY LINE 'A' ABANDONMENT (REMOVAL)
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- CP — CATHODIC PROTECTION DEVICE
- PROPOSED CULVERT
- TP-3 — TEST PIT LOCATION (2019)
- TP-6 — TEST PIT LOCATION (2020)

SOIL LEGEND

HoF	HAZELTON-LAIDIG COMPLEX, EXTREMELY STONY, 25 TO 50 PERCENT SLOPES
LdC	LAIDIG GRAVELLY LOAM, 8 TO 25 PERCENT SLOPES, EXTREMELY STONY
Lr	LINDEN SILT LOAM, RARELY FLOODED

SCALE 1" =100'

100 50 0 100

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — KEVIN C. CLARK — ENGINEER — 047211-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

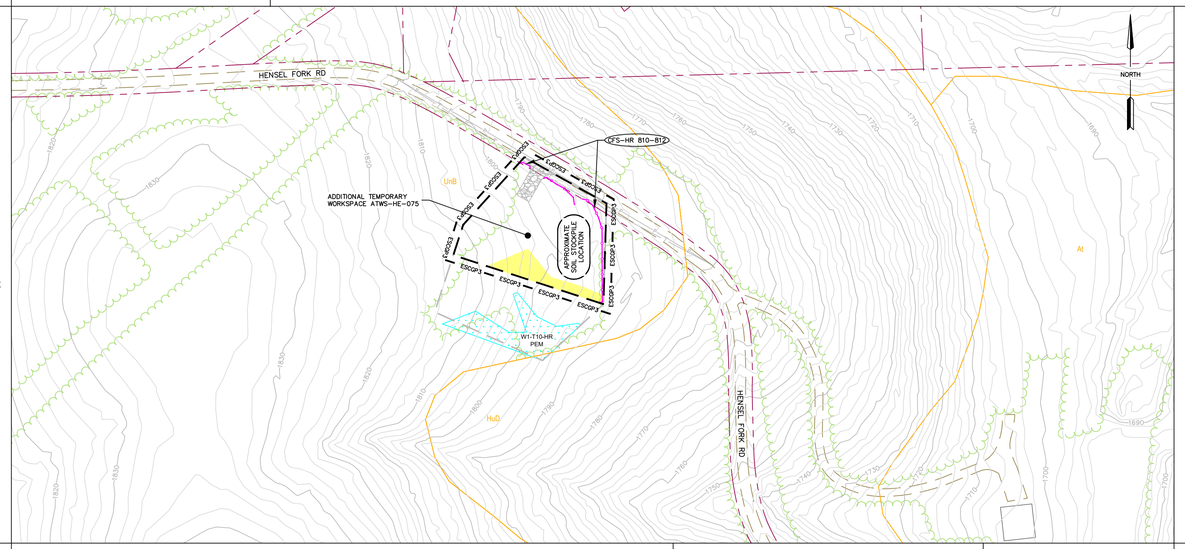
SITE PLAN

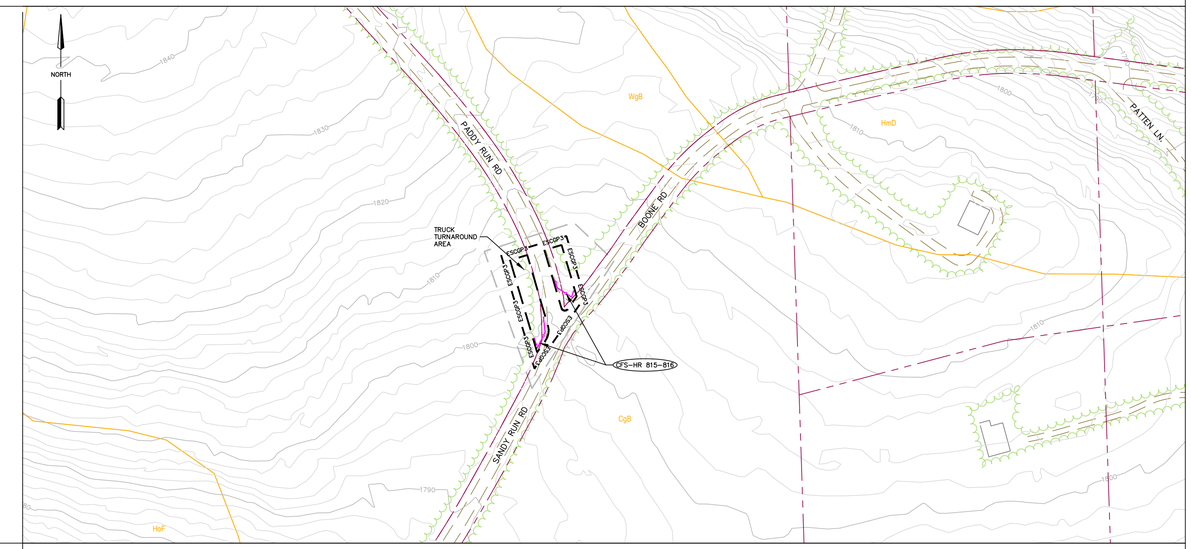
LEIDY TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		SHEET 23
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	OF 39

OWNERSHIP & TRACT NUMBER	JACOB & LAURIE CLEVENGER			DEPARTMENT OF ENVIRONMENTAL RESOURCES	PADDY RUN RD. ROW	DEPARTMENT OF ENVIRONMENTAL RESOURCES	BOONE RD. ROW	DEPARTMENT OF ENVIRONMENTAL RESOURCES	DAN L. & MARCIA K. ARNOLD	
PROFILE (MIN. PIPE DEPTH)	N/A			N/A						
COVER TYPE	DECIDUOUS FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS	DECIDUOUS FOREST LAND / MAINTAINED ROW / TRANSITIONAL AREAS / TRANSPORTATION / COMMUNICATION	DECIDUOUS FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS		MIXED FOREST LAND/MAINTAINED ROW/TRANSITIONAL AREAS			DECIDUOUS FOREST LAND/MAINTAINED ROW/MIXED FOREST LAND		
RECEIVING WATERS	DRURY RUN (EV, MF)	AUSTIN HOLLOW (EV, MF)			SANDY RUN (HQ, CWF, MF)					

CONTRACTOR YARD





SOIL TYPE	UnB	HuD	At	CgB		
AVERAGE % SLOPE		9%			3%	

CONSTRUCTION RIGHT-OF-WAY CONFIGURATION

LEGEND

- PROPOSED WATERBAR & OUTLET STRUCTURE
- TRENCH PLUG
- DIVERSION CHANNEL
- CLEAN WATER CROSSING
- EROSION CONTROL BLANKET
- ROCK CONSTRUCTION ENTRANCE
- PROPOSED PIPELINE
- ESCGP3 — ESCGP-3 PERMIT BOUNDARY
- LIMITS OF DISTURBANCE
- APPROX. ENVIRONMENTAL STUDY LIMITS
- DELINEATED WETLAND
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- STREAM FLOW DIRECTION
- RIPARIAN BUFFER
- 50'/FEMA FLOODWAY
- FEMA — FEMA 100-YEAR FLOODPLAIN
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- EXISTING TREELINE / TREE/SHRUB
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- EXISTING UTILITY POLE / TOWER
- EXISTING UTILITY LINE
- EXISTING VALVE
- EXISTING CULVERT
- EXISTING FENCE
- PROPOSED FENCE
- EXISTING STRUCTURE
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- 1244 — PROPOSED GRADE MINOR CONTOURS (10' C.I.)
- TIMBER MAT/BRIDGE
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- COMPOST FILTER SOCK SEDIMENT TRAP
- CP — CATHODIC PROTECTION DEVICE
- PROPOSED CULVERT
- TP-3 — TEST PIT LOCATION (2019)
- TP-6 — TEST PIT LOCATION (2020)

SOIL LEGEND

At	ATKINS SILT LOAM, FREQUENTLY FLOODED, 0 TO 3 PERCENT SLOPES
CgB	CLYMER-COOKPORT CHANNERY LOAMS, 0 TO 8 PERCENT SLOPES, EXTREMELY STONY
HuD	HUSTONTOWN SILT LOAM, 15 TO 25 PERCENT SLOPES

SCALE 1" =100'

100 50 0 100

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL ENGINEER — KEVIN C. CLARK — ENGINEER — 047211-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

SITE PLAN

LEIDY TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1" = 100'
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		SHEET 24
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	OF 39

STANDARD EROSION AND SEDIMENT POLLUTION CONTROL NOTES

1. ALL EARTH DISTURBANCES, INCLUDING CLEARING AND GRUBBING AS WELL AS CUTS AND FILLS SHALL BE DONE IN ACCORDANCE WITH THE APPROVED E&S PLAN. A COPY OF THE APPROVED DRAWINGS (STAMPED, SIGNED AND DATED BY THE REVIEWING AGENCY) MUST BE AVAILABLE AT THE PROJECT SITE AT ALL TIMES. THE REVIEWING AGENCY SHALL BE NOTIFIED OF ANY CHANGES TO THE APPROVED PLAN PRIOR TO IMPLEMENTATION OF THOSE CHANGES. THE REVIEWING AGENCY MAY REQUIRE A WRITTEN SUBMITTAL OF THOSE CHANGES FOR REVIEW AND APPROVAL AT ITS DISCRETION.
2. AT LEAST 7 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, INCLUDING CLEARING AND GRUBBING, THE OWNER AND/OR OPERATOR SHALL INVITE ALL CONTRACTORS, THE LANDOWNER, APPROPRIATE MUNICIPAL OFFICIALS, THE E&S PLAN PREPARER, THE PCSM PLAN PREPARER, THE LICENSED PROFESSIONAL RESPONSIBLE FOR OVERSIGHT OF CRITICAL STAGES OF IMPLEMENTATION OF THE PCSM PLAN, AND A REPRESENTATIVE FROM THE LOCAL CONSERVATION DISTRICT TO AN ON–SITE PRECONSTRUCTION MEETING.
3. AT LEAST 3 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, OR EXPANDING INTO AN AREA PREVIOUSLY UNMARKED, THE PENNSYLVANIA ONE CALL SYSTEM INC. SHALL BE NOTIFIED AT 1–800–242–1776 FOR THE LOCATION OF EXISTING UNDERGROUND UTILITIES.
4. ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE SEQUENCE PROVIDED ON THE PLAN DRAWINGS. DEVIATION FROM THAT SEQUENCE MUST BE APPROVED IN WRITING FROM THE LOCAL COUNTY CONSERVATION DISTRICT OR BY THE DEPARTMENT PRIOR TO IMPLEMENTATION.
5. AREAS TO BE FILLED ARE TO BE CLEARED, GRUBBED, AND STRIPPED OF TOPSOIL TO REMOVE TREES, VEGETATION, ROOTS AND OTHER OBJECTIONABLE MATERIAL.
6. CLEARING, GRUBBING, AND TOPSOIL STRIPPING SHALL BE LIMITED TO THOSE AREAS DESCRIBED IN EACH STAGE OF THE CONSTRUCTION SEQUENCE. GENERAL SITE CLEARING, GRUBBING AND TOPSOIL STRIPPING MAY NOT COMMENCE IN ANY STAGE OR PHASE OF THE PROJECT UNTIL THE E&S BMPS SPECIFIED BY THE BMP SEQUENCE FOR THAT STAGE OR PHASE HAVE BEEN INSTALLED AND ARE FUNCTIONING AS DESCRIBED IN THIS E&S PLAN.
7. AT NO TIME SHALL CONSTRUCTION VEHICLES BE ALLOWED TO ENTER AREAS OUTSIDE THE LIMIT OF DISTURBANCE BOUNDARIES SHOWN ON THE PLAN MAPS. THESE AREAS MUST BE CLEARLY MARKED AND FENCED OFF BEFORE CLEARING AND GRUBBING OPERATIONS BEGIN.
8. TOPSOIL REQUIRED FOR THE ESTABLISHMENT OF VEGETATION SHALL BE STOCKPILED AT THE LOCATION(S) SHOWN ON THE PLAN MAPS IN THE AMOUNT NECESSARY TO COMPLETE THE FINISHED GRADING OF ALL EXPOSED AREAS THAT ARE TO BE STABILIZED BY VEGETATION. EACH STOCKPILE SHALL BE PROTECTED IN THE MANNER SHOWN ON THE PLAN DRAWINGS. STOCKPILE HEIGHTS SHALL NOT EXCEED 35 FEET. STOCKPILE SLOPES SHALL BE 2H:1V OR FLATTER. STOCKPILES SHALL BE LOCATED WITHIN THE LIMIT OF DISTURBANCE (LOD). FILTER SOCK OR SILT FENCE SHALL BE PLACED DOWNGRADIENT OF STOCKPILES.
9. IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE OPERATOR SHALL IMPLEMENT APPROPRIATE BEST MANAGEMENT PRACTICES TO MINIMIZE THE POTENTIAL FOR EROSION AND SEDIMENT POLLUTION AND NOTIFY THE LOCAL CONSERVATION DISTRICT AND/OR THE REGIONAL OFFICE OF THE DEPARTMENT.
10. ALL BUILDING MATERIALS AND WASTES SHALL BE REMOVED FROM THE SITE AND RECYCLED OR DISPOSED OF IN ACCORDANCE WITH THE DEPARTMENT'S SOLID WASTE MANAGEMENT REGULATIONS AT 25 PA. CODE 260.1 ET SEQ., 271.1, AND 287.1 ET. SEQ. NO BUILDING MATERIALS OR WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURNED, BURIED, DUMPED, OR DISCHARGED AT THE SITE.
11. ALL OFF–SITE WASTE AND BORROW AREAS MUST HAVE AN E&S PLAN APPROVED BY THE LOCAL COUNTY CONSERVATION DISTRICT OR THE DEPARTMENT FULLY IMPLEMENTED PRIOR TO BEING ACTIVATED.
12. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ANY MATERIAL BROUGHT ON SITE IS CLEAN FILL. FORM FP–001 MUST BE RETAINED BY THE PROPERTY OWNER FOR ANY FILL MATERIAL AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE BUT QUALIFYING AS CLEAN FILL DUE TO ANALYTICAL TESTING.
13. ALL PUMPING OF WATER FROM ANY WORK AREA SHALL BE DONE ACCORDING TO THE PROCEDURE DESCRIBED IN THIS PLAN, OVER UNDISTURBED VEGETATED AREAS.
14. VEHICLES AND EQUIPMENT MAY NEITHER ENTER DIRECTLY NOR EXIT DIRECTLY FROM LOTS AND ONTO ROADS AS IDENTIFIED ON THE PLANS.
15. UNTIL THE SITE IS STABILIZED, ALL EROSION AND SEDIMENT BMPS SHALL BE MAINTAINED PROPERLY. MAINTENANCE SHALL INCLUDE INSPECTIONS OF ALL EROSION AND SEDIMENT BMPS AFTER EACH RUNOFF EVENT AND ON A WEEKLY BASIS. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK, INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, REGARDING, RESEEDING, REMULCHING AND RENETTING MUST BE PERFORMED IMMEDIATELY. IF THE E&S BMPS FAIL TO PERFORM AS EXPECTED, REPLACEMENT BMPS, OR MODIFICATIONS OF THOSE INSTALLED WILL BE REQUIRED.
16. A LOG SHOWING DATES THAT E&S BMPS WERE INSPECTED AS WELL AS ANY DEFICIENCIES FOUND AND THE DATE THEY WERE CORRECTED SHALL BE MAINTAINED ON THE SITE AND BE MADE AVAILABLE TO REGULATORY AGENCY OFFICIALS AT THE TIME OF INSPECTION.
17. SEDIMENT TRACKED ONTO ANY PUBLIC ROADWAY OR SIDEWALK SHALL BE RETURNED TO THE CONSTRUCTION SITE AS NEEDED AND BY THE END OF EACH WORK DAY AND DISPOSED IN THE MANNER DESCRIBED IN THIS PLAN. IN NO CASE SHALL THE SEDIMENT BE WASHED, SHOVELED, OR SWEPT INTO ANY ROADSIDE DITCH, STORM SEWER, OR SURFACE WATER.
18. ALL SEDIMENT REMOVED FROM BMPS SHALL BE DISPOSED OF IN THE MANNER DESCRIBED ON THE PLAN DRAWINGS.
19. AREAS WHICH ARE TO BE TOPSOILED SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 3 TO 5 INCHES ON COMPACTED SOILS PRIOR TO PLACEMENT OF TOPSOIL. AREAS TO BE VEGETATED SHALL HAVE A MINIMUM 4 INCHES OF TOPSOIL IN PLACE PRIOR TO SEEDING AND MULCHING. FILL OUTSLOPES SHALL HAVE A MINIMUM OF 2 INCHES OF TOPSOIL.
20. ALL FILLS SHALL BE COMPACTED AS REQUIRED TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, SUBSIDENCE OR OTHER RELATED PROBLEMS. FILL INTENDED TO SUPPORT BUILDINGS, STRUCTURES AND CONDUITS, ETC. SHALL BE COMPACTED IN ACCORDANCE WITH LOCAL REQUIREMENTS OR CODES.
21. ALL EARTHEN FILLS SHALL BE PLACED IN COMPACTED LAYERS NOT TO EXCEED 9 INCHES IN THICKNESS.
22. FILL MATERIALS SHALL BE FREE OF FROZEN PARTICLES, BRUSH, ROOTS, SOD, OR OTHER FOREIGN OR OBJECTIONABLE MATERIALS THAT WOULD INTERFERE WITH OR PREVENT CONSTRUCTION OF SATISFACTORY FILLS.
23. FROZEN MATERIALS OR SOFT, MUCKY, OR HIGHLY COMPRESSIBLE MATERIALS SHALL NOT BE INCORPORATED INTO FILLS.
24. FILL SHALL NOT BE PLACED ON SATURATED OR FROZEN SURFACES.
25. SEEPS OR SPRINGS ENCOUNTERED DURING CONSTRUCTION SHALL BE HANDLED IN ACCORDANCE WITH THE STANDARD AND SPECIFICATION FOR SUBSURFACE DRAIN OR OTHER APPROVED METHOD.
26. ALL GRADED AREAS SHALL BE PERMANENTLY STABILIZED IMMEDIATELY UPON REACHING FINISHED GRADE. CUT SLOPES IN COMPETENT BEDROCK AND ROCK FILLS NEED NOT BE VEGETATED. SEEDED AREAS WITHIN 50 FEET OF A SURFACE WATER, OR AS OTHERWISE SHOWN ON THE PLAN DRAWINGS, SHALL BE BLANKETED ACCORDING TO THE STANDARDS OF THIS PLAN.
27. IMMEDIATELY AFTER EARTH DISTURBANCE ACTIVITIES CEASE IN ANY AREA OR SUBAREA OF THE PROJECT, THE OPERATOR SHALL STABILIZE ALL DISTURBED AREAS. DURING NON–GERMINATING MONTHS, MULCH OR PROTECTIVE BLANKETING SHALL BE APPLIED AS DESCRIBED IN THE PLAN. AREAS NOT AT FINISHED GRADE, WHICH WILL BE REACTIVATED WITHIN 1 YEAR, MAY BE STABILIZED IN ACCORDANCE WITH THE TEMPORARY STABILIZATION SPECIFICATIONS. THOSE AREAS WHICH WILL NOT BE REACTIVATED WITHIN 1 YEAR SHALL BE STABILIZED IN ACCORDANCE WITH THE PERMANENT STABILIZATION SPECIFICATIONS.
28. PERMANENT STABILIZATION IS DEFINED AS A MINIMUM UNIFORM, PERENNIAL 70% VEGETATIVE COVER OR OTHER PERMANENT NON–VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED EROSION. CUT AND FILL SLOPES SHALL BE CAPABLE OF RESISTING FAILURE DUE TO SLUMPING, SLIDING, OR OTHER MOVEMENTS.
29. E&S BMPS SHALL REMAIN FUNCTIONAL AS SUCH UNTIL ALL AREAS TRIBUTARY TO THEM ARE PERMANENTLY STABILIZED OR UNTIL THEY ARE REPLACED BY ANOTHER BMP APPROVED BY THE LOCAL CONSERVATION DISTRICT OR THE DEPARTMENT.
30. UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE LOCAL CONSERVATION DISTRICT FOR AN INSPECTION PRIOR TO REMOVAL/CONVERSION OF THE E&S BMPS.
31. AFTER FINAL SITE STABILIZATION HAS BEEN ACHIEVED, TEMPORARY EROSION AND SEDIMENT BMPS MUST BE REMOVED OR CONVERTED TO PERMANENT POST CONSTRUCTION STORMWATER MANAGEMENT BMPS. AREAS DISTURBED DURING REMOVAL OR CONVERSION OF THE BMPS SHALL BE STABILIZED IMMEDIATELY. IN ORDER TO ENSURE RAPID REVEGETATION OF DISTURBED AREAS, SUCH REMOVAL/CONVERSIONS ARE TO BE DONE ONLY DURING THE GERMINATING SEASON.
32. UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE LOCAL CONSERVATION DISTRICT TO SCHEDULE A FINAL INSPECTION.
33. FAILURE TO CORRECTLY INSTALL E&S BMPS, FAILURE TO PREVENT SEDIMENT–LADEN RUNOFF FROM LEAVING THE CONSTRUCTION SITE, OR FAILURE TO TAKE IMMEDIATE CORRECTIVE ACTION TO RESOLVE FAILURE OF E&S BMPS MAY RESULT IN ADMINISTRATIVE, CIVIL, AND/OR CRIMINAL PENALTIES BEING INSTITUTED BY THE DEPARTMENT AS DEFINED IN SECTION 602 OF THE PENNSYLVANIA CLEAN STREAMS LAW. THE CLEAN STREAMS LAW PROVIDES FOR UP TO $10,000 PER DAY IN CIVIL PENALTIES, UP TO $10,000 IN SUMMARY CRIMINAL PENALTIES, AND UP TO $25,000 IN MISDEMEANOR CRIMINAL PENALTIES FOR EACH VIOLATION.
34. CONCRETE WASH WATER SHALL BE HANDLED IN THE MANNER DESCRIBED ON THE PLAN DRAWINGS. IN NO CASE SHALL IT BE ALLOWED TO ENTER ANY SURFACE WATERS OR GROUNDWATER SYSTEMS.
35. ALL E&S CONVEYANCE CHANNELS SHALL BE KEPT FREE OF OBSTRUCTIONS INCLUDING BUT NOT LIMITED TO FILL, ROCKS, LEAVES, WOODY DEBRIS, ACCUMULATED SEDIMENT, EXCESS VEGETATION, AND CONSTRUCTION MATERIAL/WASTES.
36. UNDERGROUND UTILITIES CUTTING THROUGH ANY ACTIVE E&S CONVEYANCE CHANNELS SHALL BE IMMEDIATELY BACKFILLED AND THE CHANNEL RESTORED TO ITS ORIGINAL CROSS–SECTION AND PROTECTIVE LINING. ANY BASE FLOW WITHIN THE CHANNEL SHALL BE CONVEYED PAST THE WORK AREA IN THE MANNER DESCRIBED IN THIS PLAN UNTIL SUCH RESTORATION IS COMPLETE.
37. E&S CONVEYANCE CHANNELS HAVING RIPRAP, RENO MATTRESS, OR GABION LININGS MUST BE SUFFICIENTLY OVER–EXCAVATED SO THAT THE DESIGN DIMENSIONS WILL BE PROVIDED AFTER PLACEMENT OF THE PROTECTIVE LINING.
38. SEDIMENT BASINS AND/OR TRAPS SHALL BE KEPT FREE OF ALL CONSTRUCTION WASTE, WASH WATER, AND OTHER DEBRIS HAVING POTENTIAL TO CLOG THE BASIN/TRAP OUTLET STRUCTURES AND/OR POLLUTE THE SURFACE WATERS.
39. SEDIMENT BASINS SHALL BE PROTECTED FROM UNAUTHORIZED ACTS BY THIRD PARTIES.
40. ANY DAMAGE THAT OCCURS IN WHOLE OR IN PART AS A RESULT OF BASIN OR TRAP DISCHARGE SHALL BE IMMEDIATELY REPAIRED BY THE PERMITTEE IN A PERMANENT MANNER SATISFACTORY TO THE MUNICIPALITY, LOCAL CONSERVATION DISTRICT, AND THE OWNER OF THE DAMAGED PROPERTY.
41. UPON REQUEST, THE APPLICANT OR HIS CONTRACTOR SHALL PROVIDE AN AS–BUILT (RECORD DRAWING) FOR ANY SEDIMENT BASIN OR TRAP TO THE MUNICIPAL INSPECTOR, LOCAL COUNTY CONSERVATION DISTRICT OR THE DEPARTMENT.
42. EROSION CONTROL BLANKETING SHALL BE INSTALLED ON ALL SLOPES 3H:1V OR STEEPER, WITHIN 100' OF A STREAM OR WETLAND IN A HIGH QUALITY OR EXCEPTIONAL VALUE WATERSHED, WITHIN 50' OF A STREAM OR WETLAND IN A NON–HIGH QUALITY OR EXCEPTIONAL VALUE WATERSHED, AND ON ALL OTHER DISTURBED AREAS SPECIFIED ON THE PLAN MAPS AND/OR DETAIL SHEETS.
43. FILL MATERIAL FOR EMBANKMENTS SHALL BE FREE OF ROOTS, OR OTHER WOODY VEGETATION, ORGANIC MATERIAL, LARGE STONES, AND OTHER OBJECTIONABLE MATERIALS.

PIPELINE BMP INSTALLATION SEQUENCE

1. AT LEAST 10 WORKING DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, OR EXPANDING INTO AN AREA PREVIOUSLY UNMARKED, THE PENNSYLVANIA ONE CALL SYSTEM INC. SHALL BE NOTIFIED AT 1–800–242–1776 FOR THE LOCATION OF EXISTING UNDERGROUND UTILITIES.
2. AT LEAST 7 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, INCLUDING CLEARING AND GRUBBING, THE OWNER AND/OR OPERATOR SHALL INVITE ALL CONTRACTORS, ENVIRONMENTAL INSPECTORS, APPROPRIATE MUNICIPAL OFFICIALS, THE E&S PLAN PREPARER, THE PCSM PLAN PREPARER, THE LICENSED PROFESSIONAL RESPONSIBLE FOR OVERSIGHT OF CRITICAL STAGES OF IMPLEMENTATION OF THE PCSM PLAN, AND A REPRESENTATIVE FROM THE LOCAL CONSERVATION DISTRICT TO AN ON–SITE PRECONSTRUCTION MEETING.
3. HOLD PRE–CONSTRUCTION CONFERENCE WITH THE ENVIRONMENTAL INSPECTORS, LOCAL COUNTY CONSERVATION DISTRICT (CCD), PADEP, CONSTRUCTION CHIEF, AND DESIGN ENGINEER.
4. WILLIAMS SURVEY WILL FIELD LOCATE AND STAKE THE LOD.
5. LOCATE PROJECT ACCESS POINTS INCLUDING CONSTRUCTION ENTRANCES.
6. FLAG AND/OR STAKE WETLANDS, STREAMS AND OTHER SENSITIVE RESOURCES THAT WILL BE IMPACTED BY THE PROJECT.
7. INSTALL ORANGE CONSTRUCTION FENCE ALONG LIMITS OF DISTURBANCE IN AREAS ADJACENT TO STREAMS, WETLANDS, OR OTHER SENSITIVE RESOURCE, AS DESIGNATED ON THE PLANS.
8. NON–MECHANIZED TREE FELLING WILL TAKE PLACE WHERE NECESSARY (SEE NON–MECHANIZED TREE FELLING NOTES)
9. INSTALL CONSTRUCTION ENTRANCES.
10. REMOVE FELLED TREES, CLEAR AND GRUB AS NECESSARY TO EFFECTIVELY INSTALL PERMANENT AND TEMPORARY ACCESS ROADS AND ASSOCIATED BMPS (VEGETATED ROADSIDE DITCHES, DITCH RELIEF CULVERTS, AND RIPRAP OUTLET PROTECTION, AND SEDIMENT BARRIER).
11. REMOVE FELLED TREES, CLEAR AND GRUB AS NECESSARY TO INSTALL BRIDGE EQUIPMENT CROSSINGS, WETLAND TIMBER MATTING, TIMBER MATTING AIR BRIDGES, AND SEDIMENT BARRIERS AT WETLAND AND WATERBODY CROSSINGS AS INDICATED ON THE PLANS.
12. FELL TREES FOR THE REMAINDER OF THE SITE BETWEEN NOVEMBER 16TH AND MARCH 31ST.
13. REMOVE FELLED TREES FOR THE REMAINDER OF THE SITE
14. CLEAR AND GRUB AS NECESSARY TO EFFECTIVELY INSTALL THE REMAINDER OF PERIMETER CONTROLS.
15. INSTALL PERIMETER CONTROLS.
16. COMPLETE SITE CLEARING AND GRUBBING.
17. AS THE GRUBBING OPERATION CONTINUES, INSTALL THE APPROPRIATE BMPS ASSOCIATED PER THE APPROVED PLANS FOR ITEMS INCLUDING BUT NOT LIMITED TO: ROCK FILTER OUTLETS, WATERBARS, DIVERSIONS, OUTLET STRUCTURES, VEGETATED ROADSIDE DITCHES, DITCH RELIEF CULVERTS, AND RIPRAP OUTLET PROTECTION.
18. STRIP AND STOCKPILE TOPSOIL.
19. CONTINUE EXCAVATION TO FACILITATE INSTALLATION OF PIPELINE.
20. CONTRACTOR SHALL INSTALL TRENCH PLUGS DURING CONSTRUCTION AS IDENTIFIED ON THE APPROVED PLANS.
21. BACKFILL PIPE TRENCH WITHIN 30 DAYS OF EXCAVATING, REPAIR PERMANENT WATERBARS, REMOVE TEMPORARY WATERBARS, RETURN TEMPORARILY GRADED AREAS TO PRE–DEVELOPMENT GRADE, REPAIR/INSTALL EROSION CONTROL BLANKET AS NEEDED, REPLACE TOPSOIL AND SEED AND STABILIZE DISTURBED AREAS (SLOPES, DITCHES AND CHANNELS) AS THEY ARE RETURNED TO FINAL GRADE.
22. TRANSCO WILL COMPLETE UPLAND FINAL GRADING, TOPSOIL REPLACEMENT, INSTALLATION OF PERMANENT E&S MEASURES WITHIN 20 DAYS AFTER BACKFILLING THE TRENCH IN ALL AREAS EXCEPT RESIDENTIAL AREAS, WHICH WILL BE COMPLETED WITHIN 10 DAYS.
23. PERFORM HYDROSTATIC PRESSURE TEST OF PIPELINE.
24. DEWATER PIPELINE UTILIZING APPROPRIATE BMPS, COMPLETE FINAL TIE–INS.
25. AN AREA SHALL BE CONSIDERED TO HAVE ACHIEVED FINAL STABILIZATION WHEN IT HAS A MINIMUM UNIFORM 70% PERENNIAL VEGETATIVE COVER OR OTHER PERMANENT NON–VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED SURFACE EROSION AND SUBSURFACE CHARACTERISTICS SUFFICIENT TO RESIST SLIDING AND OTHER MOVEMENTS. WHEN CONTROLS ARE TO BE REMOVED IN AGRICULTURAL NON–SENSITIVE AREAS (STREAMS/WETLANDS), AGRICUTLURAL LANDOWNERS SHALL MAINTAIN AGRICULTURAL BMPS PER PADEP REGULATIONS.
26. UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE PERMITTEE AND/OR OPERATORS SHALL CONTACT THE LOCAL CCD AND/OR PADEP FOR AN INSPECTION PRIOR TO THE REMOVAL OF THE E&SC BMPS.
27. REMOVE AND PROPERLY DISPOSE OF/RECYCLE E&SC BMPS. REMOVE STAKES AND ORANGE CONSTRUCTION FENCE. REPAIR AND PERMANENTLY STABILIZE AREAS DISTURBED DURING E&SC BMP REMOVAL.

NON–MECHANIZED TREE FELLING NOTES

1. TREE FELLING IS TO BEGIN NO EARLIER THAN NOVEMBER 16TH AND END NO LATER THAN MARCH 31.
2. THE CONSERVATION DISTRICT IS TO BE NOTIFIED PRIOR TO ACCESSING THE SITE AND UPON COMPLETION OF TREE FELLING ACTIVITIES.
3. TREES ARE TO BE FELLED BY WORKERS ON FOOT USING CHAIN SAWS.
4. TREE STUMPS WILL NOT BE REMOVED FROM THE RIGHT OF WAY UNTIL FULL SCALE CONSTRUCTION BEGINS.
5. DURING THE TREE FELLING PROCESS THERE WILL BE NO REMOVAL OR GRINDING OF TREE STUMPS.
6. TREES ARE NOT BE HAULED OFF SITE, EXCEPT IN CASES WHERE STEEP SLOPES PRESENT A SAFETY CONCERN, OR IN RESIDENTIAL AREAS WHERE A LANDOWNER INSISTS THAT THE TREES BE MOVED.
7. NO CLEARING OR GRUBBING WILL OCCUR.
8. THE USE OF EQUIPMENT (RUBBER TIRED AND / OR TRACKED) IS TO BE MINIMIZED.
9. IF PASSAGE OF LIGHT–DUTY TRUCKS AND SIMILAR EQUIPMENT IN EXISTING CLEARED PIPELINE RIGHT OF WAY LEADS TO THE CREATION OF ANY RUTS, THEY WILL BE SMOOTHED OVER AND GRASS SEED AND MULCH WILL BE SPREAD AT THE COMPLETION OF TREE FELLING, AS REQUIRED.
10. IF ANY RUTS OR LAND DISTURBANCE RESULTS IN AN EROSIVE CONDITION, THE RUTS WILL BE SMOOTHED OVER IMMEDIATELY AND IF NECESSARY, SEDIMENT BARRIER WILL BE INSTALLED IN THE LOCALIZED AREA OF THE DISTURBANCE.
11. FOLLOWING THE COMPLETION OF TREE FELLING OPERATIONS, DISTURBED AREAS WILL BE SMOOTHED, SEEDED AND MULCHED.
12. IF VEGETATION ALONG THE RIGHT OF WAY IS DISTURBED AND REQUIRES REMEDIAL ACTION, THE DISTURBED AREA(S) ARE TO BE SEEDED AND MULCHED AT THE COMPLETION OF TREE FELLING ACTIVITIES.
13. FOLLOWING THE COMPLETION OF TREE FELLING OPERATIONS, DISTURBED AREAS WILL BE SMOOTHED, SEEDED AND MULCHED.
14. IF VEGETATION ALONG THE RIGHT OF WAY IS DISTURBED AND REQUIRES REMEDIAL ACTION, THE DISTURBED AREA(S) ARE TO BE SEEDED AND MULCHED AT THE COMPLETION OF TREE FELLING ACTIVITIES.

THERMAL IMPACTS

DUE TO THE OVERALL NATURE OF THE PROJECT, THERMAL IMPACTS TO SURFACE WATERS ARE NOT ANTICIPATED. THE PIPELINE INSTALLATION ACTIVITIES WILL PRIMARILY TAKE PLACE WITHIN AN EXISTING CLEARED AND MAINTAINED PIPELINE RIGHT–OF–WAY. THERE WILL BE NO INCREASE IN STORMWATER DISCHARGE. THE PRIMARY MEANS TO ADDRESS THERMAL IMPACTS ON THIS PROJECT IS TO LIMIT THE SIZE AND DURATION OF EXPOSED EARTH. REVEGETATION PROCEDURES AND THE SEQUENCE OF CONSTRUCTION OUTLINE DISTURBED AREAS BEING IMMEDIATELY REVEGETATED.

STORMWATER RUNOFF ASSOCIATED WITH THE INSTALLATION OF THE MLV'S WILL BE ROUTED THROUGH THE STORMWATER BMP'S DESIGNED TO RETAIN AND INFILTRATE THE FIRST SURGE OF WATER FROM THE SITE. THE FIRST SURGE OF WATER WILL BE THE WARMEST WATER FOR THE DURATION OF THE STORM EVENT AND WILL QUICKLY COOL AS THE STORM EVENT PROGRESSES. THE BMPS ARE DESIGNED TO CAPTURE AND INFILTRATE THIS WARMEST SURGE OF STORMWATER. BASED ON ROUTING CALCULATIONS, STORMWATER IS NOT DISCHARGED FROM THE BMPS FOR THE FIRST 12 HOURS DURING A 100–YEAR/24–HOUR STORM EVENT. THE RETENTION PERIOD IS LONGER FOR LESS INTENSE STORMS. THEREFORE, THROUGH THESE MEASURES, THERE IS NO SIGNIFICANT THERMAL IMPACT TO THE RECEIVING WATERS ANTICIPATED.

CONTRACTOR STAGING AREA SEQUENCE OF CONSTRUCTION

1. AT LEAST 10 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, OR EXPANDING INTO AN AREA PREVIOUSLY UNMARKED, THE PENNSYLVANIA ONE CALL SYSTEM INC. SHALL BE NOTIFIED AT 1–800–242–1776 FOR THE LOCATION OF EXISTING UNDERGROUND UTILITIES.
2. AT LEAST 7 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, INCLUDING CLEARING AND GRUBBING, THE OWNER AND/OR OPERATOR SHALL INVITE ALL CONTRACTORS, ENVIRONMENTAL INSPECTORS, THE LANDOWNER, APPROPRIATE MUNICIPAL OFFICIALS, THE E&S PLAN PREPARER, THE PCSM PLAN PREPARER, THE LICENSED PROFESSIONAL RESPONSIBLE FOR OVERSIGHT OF CRITICAL STAGES OF IMPLEMENTATION OF THE PCSM PLAN, AND A REPRESENTATIVE FROM THE LOCAL CONSERVATION DISTRICT TO AN ON–SITE PRE–CONSTRUCTION MEETING.
3. HOLD PRE–CONSTRUCTION CONFERENCE WITH THE ENVIRONMENTAL INSPECTORS, LOCAL COUNTY CONSERVATION DISTRICT (CCD), PADEP AND DESIGN ENGINEER.
4. LOCATE STAGING AREAS AND ACCESS POINTS INCLUDING CONSTRUCTION ENTRANCES. INSTALL SEDIMENT BARRIERS (COMPOST FILTER SOCK) DOWN SLOPE OF THESE AREAS.
5. INSTALL CONSTRUCTION ENTRANCE.
6. REMOVE BRUSH TO EFFECTIVELY INSTALL PERIMETER CONTROLS, LEVEL SIDE CUTS TO GRANT ACCESS FOR VEHICLES AND WORKERS TO SAFELY PERFORM THE INSTALLATION OF SEDIMENT BARRIERS ON THE SITE AS SHOWN ON THE CONSTRUCTION DRAWINGS.
7. INSTALL PERIMETER FILTER SOCK DIVERSIONS, DIVERSION SWALES, COMPOST FILTER SOCKS, SEDIMENT TRAP AND ALL ASSOCIATED EROSION CONTROL BLANKETS AND RIP RAP APRONS.
8. PROCEED WITH MAJOR CLEARING AND GRUBBING.
9. BEGIN GRADING AND STRIP AND STOCKPILE TOPSOIL WITHIN THE DESIGNATED AREA AND INSTALL SEDIMENT BARRIERS AROUND STOCKPILES.
10. IF APPLICABLE, INSTALL ORANGE SECURITY FENCE. THE NECESSITY OF A SECURITY FENCE WILL BE AT THE DISCRETION OF THE CONTRACTOR.
11. BEGIN CONSTRUCTION STAKING FOR LAYOUT OF TEMPORARY GRAVEL SURFACE.
12. IMMEDIATELY STABILIZE THE SITE WITH GEOTEXTILE AND GRAVEL SURFACING WITHIN LIMITS OF DISTURBANCE (PORTION OF THE SITE OR ENTIRE SITE). THE REMAINING DISTURBED AREAS SHALL BE FERTILIZED, SEEDED, AND MULCHED. SEED MIXTURES, FERTILIZER, AND MULCH APPLICATION RATES AND DATES SHALL BE IN ACCORDANCE WITH THE E&SC PLANS.
13. UPON TEMPORARY CESSATION OF AN EARTH DISTURBANCE ACTIVITY OR ANY STAGE OF AN ACTIVITY WHERE THE CESSATION OF EARTH DISTURBANCE ACTIVITIES WILL EXCEED FOUR DAYS, THE SITE SHALL BE IMMEDIATELY SEEDED, MULCHED, OR OTHERWISE PROTECTED FROM ACCELERATED EROSION AND SEDIMENTATION PENDING FUTURE EARTH DISTURBANCE ACTIVITIES. FOR AN EARTH DISTURBANCE ACTIVITY OR ANY STAGE OF AN ACTIVITY TO BE CONSIDERED TEMPORARILY STABILIZED, THE DISTURBED AREAS SHALL BE COVERED WITH ONE OF THE FOLLOWING: A MINIMUM UNIFORM COVERAGE OF MULCH AND SEED, WITH A DENSITY CAPABLE OF RESISTING ACCELERATED EROSION AND SEDIMENTATION, OR AN ACCEPTABLE BMP, WHICH TEMPORARILY MINIMIZES ACCELERATED EROSION AND SEDIMENTATION. TEMPORARY STABILIZATION WILL NOT OCCUR ON ACTIVE VEHICULAR TRAVEL WAYS WITHIN THE RIGHT OF WAY. THE ON–SITE ENVIRONMENTAL INSPECTOR WILL LOG DAILY ACTIVITY WITHIN THE LIMITS OF DISTURBANCE AND NOTIFY THE CONTRACTOR OF AREAS REQUIRING TEMPORARY STABILIZATION (I.E., AREAS WHERE WORK HAS CEASED FOR AT LEAST FOUR DAYS).
14. ONCE THE SITE IS DEEMED NO LONGER NECESSARY; REMOVE ALL GRAVEL AND GEOTEXTILE FABRIC FROM THE SITE. BMPS WILL REMAIN IN PLACE AND FUNCTIONAL.
15. SCARIFY TO DE–COMPACT RESTORATION AREAS. SPREAD THE TOPSOIL FROM THE STOCKPILES THROUGHOUT THE SITE AND GRADE SITE TO MATCH PRE–DEVELOPED GRADE. IMMEDIATELY FERTILIZE, SEED AND STABILIZE AREAS AT FINISHED GRADE. MAINTAIN E&SC CONTROL DEVICES UNTIL SITE WORK IS COMPLETE AND SITE IS STABILIZED. WITH THE EXCEPTION OF AGRICULTURAL USE AREAS, AN AREA SHALL BE CONSIDERED TO HAVE ACHIEVED FINAL STABILIZATION WHEN IT HAS MINIMUM UNIFORM 70% PERENNIAL VEGETATION COVER OR OTHER PERMANENT NON–VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED SURFACE EROSION AND SUBSURFACE CHARACTERISTICS SUFFICIENT TO RESIST SLIDING AND OTHER MOVEMENTS. WHEN E&S CONTROLS ARE TO BE REMOVED IN AGRICULTURAL NON–SENSITIVE AREAS (STREAMS/WETLANDS), AGRICULTURAL LANDOWNERS SHALL MAINTAIN AGRICULTURAL BMPS PER PADEP REGULATIONS.
16. UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATORS SHALL CONTACT THE LOCAL CCD FOR AN INSPECTION PRIOR TO THE REMOVAL OF E&SC BMPS.
17. AFTER SITE IS PERMANENTLY STABILIZED AND UPON COMPANY APPROVAL OF STABILIZATION AND RE–VEGETATION, REMOVE TEMPORARY E&SC MEASURES AND STABILIZE AREAS DISTURBED BY REMOVAL.
18. COMPLETE SITE STABILIZATION, INCLUDING SOIL TREATMENT, SEED APPLICATION AND MULCHING.
19. UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES, REMOVAL OF ALL TEMPORARY BMPS AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATORS SHALL CONTACT THE LOCAL CCD FOR A FINAL INSPECTION.
20. REMOVE AND PROPERLY DISPOSE/RECYCLE E&SC BMPS. REMOVE ORANGE CONSTRUCTION FENCING AND SECURITY FENCE. REPAIR AND PERMANENTLY STABILIZE AREAS DISTURBED DURING BMP REMOVAL.

NON–MECHANIZED TREE FELLING NOTES

1. TREE FELLING IS TO BEGIN NO EARLIER THAN NOVEMBER 16TH AND END NO LATER THAN MARCH 31.
2. THE CONSERVATION DISTRICT IS TO BE NOTIFIED PRIOR TO ACCESSING THE SITE AND UPON COMPLETION OF TREE FELLING ACTIVITIES.
3. TREES ARE TO BE FELLED BY WORKERS ON FOOT USING CHAIN SAWS.
4. TREE STUMPS WILL NOT BE REMOVED FROM THE RIGHT OF WAY UNTIL FULL SCALE CONSTRUCTION BEGINS.
5. DURING THE TREE FELLING PROCESS THERE WILL BE NO REMOVAL OR GRINDING OF TREE STUMPS.
6. TREES ARE NOT BE HAULED OFF SITE, EXCEPT IN CASES WHERE STEEP SLOPES PRESENT A SAFETY CONCERN, OR IN RESIDENTIAL AREAS WHERE A LANDOWNER INSISTS THAT THE TREES BE MOVED.
7. NO CLEARING OR GRUBBING WILL OCCUR.
8. THE USE OF EQUIPMENT (RUBBER TIRED AND / OR TRACKED) IS TO BE MINIMIZED.
9. IF PASSAGE OF LIGHT–DUTY TRUCKS AND SIMILAR EQUIPMENT IN EXISTING CLEARED PIPELINE RIGHT OF WAY LEADS TO THE CREATION OF ANY RUTS, THEY WILL BE SMOOTHED OVER AND GRASS SEED AND MULCH WILL BE SPREAD AT THE COMPLETION OF TREE FELLING, AS REQUIRED.
10. IF ANY RUTS OR LAND DISTURBANCE RESULTS IN AN EROSIVE CONDITION, THE RUTS WILL BE SMOOTHED OVER IMMEDIATELY AND IF NECESSARY, SEDIMENT BARRIER WILL BE INSTALLED IN THE LOCALIZED AREA OF THE DISTURBANCE.
11. FOLLOWING THE COMPLETION OF TREE FELLING OPERATIONS, DISTURBED AREAS WILL BE SMOOTHED, SEEDED AND MULCHED.
12. IF VEGETATION ALONG THE RIGHT OF WAY IS DISTURBED AND REQUIRES REMEDIAL ACTION, THE DISTURBED AREA(S) ARE TO BE SEEDED AND MULCHED AT THE COMPLETION OF TREE FELLING ACTIVITIES.

RESPONSIBILITIES FOR FILL MATERIALS

IF THE SITE WILL NEED TO HAVE FILL IMPORTED FROM AN OFF SITE LOCATION, THE RESPONSIBILITY FOR PERFORMING ENVIRONMENTAL DUE DILIGENCE AND THE DETERMINATION OF CLEAN FILL WILL IN MOST CASES RESIDE WITH THE OPERATOR.

IF THE SITE WILL HAVE EXCESS FILL THAT WILL NEED TO BE EXPORTED TO AN OFF SITE LOCATION, THE RESPONSIBILITY OF CLEAN FILL DETERMINATION AND ENVIRONMENTAL DUE DILIGENCE RESTS ON THE APPLICANT.

IF ALL CUT AND FILL MATERIALS WILL BE USED ON THE SITE, A CLEAN FILL DETERMINATION IS NOT REQUIRED BY THE OPERATOR UNLESS THERE IS A BELIEF THAT A SPILL OR RELEASE OF A REGULATED SUBSTANCE OCCURRED ON SITE.

APPLICANTS AND/OR OPERATORS MUST USE ENVIRONMENTAL DUE DILIGENCE TO ENSURE THAT THE FILL MATERIAL ASSOCIATED WITH THIS PROJECT QUALIFIES AS CLEAN FILL. DEFINITIONS OF CLEAN FILL AND ENVIRONMENTAL DUE DILIGENCE ARE PROVIDED BELOW. ALL FILL MATERIAL MUST BE USED IN ACCORDANCE WITH THE DEPARTMENT'S POLICY "MANAGEMENT OF FILL," DOCUMENT NUMBER 258 2182 773. A COPY OF THIS POLICY IS AVAILABLE ONLINE AT WWW.DEPWEB.STATE.PA.US.

CLEAN FILL IS DEFINED AS: UNCONTAMINATED, NON–WATER SOLUBLE, NON–DECOMPOSABLE, INERT, SOLID MATERIAL. THE TERM INCLUDES SOIL, ROCK, STONE, DREDGED MATERIAL, USED ASPHALT, AND BRICK, BLOCK OR CONCRETE FROM CONSTRUCTION AND DEMOLITION ACTIVITIES THAT IS SEPARATE FROM OTHER WASTE AND IS RECOGNIZABLE AS SUCH. THE TERM DOES NOT INCLUDE MATERIALS PLACED IN OR ON THE WATERS OF THE COMMONWEALTH UNLESS OTHERWISE AUTHORIZED. (THE TERM "USED ASPHALT" DOES NOT INCLUDE MILLED ASPHALT OR ASPHALT THAT HAS BEEN PROCESSED FOR RE–USE.)

ENVIRONMENTAL DUE DILIGENCE: INVESTIGATIVE TECHNIQUES, INCLUDING, BUT NOT LIMITED TO, VISUAL PROPERTY INSPECTIONS, ELECTRONIC DATA BASE SEARCHES, REVIEW OF PROPERTY OWNERSHIP, REVIEW OF PROPERTY USE HISTORY, SANBORN MAPS, ENVIRONMENTAL QUESTIONNAIRES, TRANSACTION SCREENS, ANALYTICAL TESTING, ENVIRONMENTAL ASSESSMENTS OR AUDITS. ANALYTICAL TESTING IS NOT A REQUIRED PART OF DUE DILIGENCE UNLESS VISUAL INSPECTION AND/OR REVIEW OF THE PAST LAND USE OF THE PROPERTY INDICATES THAT THE FILL MAY HAVE BEEN SUBJECTED TO A SPILL OR RELEASE OF REGULATED SUBSTANCE. IF THE FILL MAY HAVE BEEN AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE, IT MUST BE TESTED TO DETERMINE IF IT QUALIFIES AS CLEAN FILL. TESTING SHOULD BE PERFORMED IN ACCORDANCE WITH APPENDIX A OF THE DEPARTMENT'S POLICY "MANAGEMENT OF FILL."

FILL MATERIAL THAT DOES NOT QUALIFY AS CLEAN FILL IS REGULATED FILL. REGULATED FILL IS WASTE AND MUST BE MANAGED IN ACCORDANCE WITH THE DEPARTMENT'S MUNICIPAL OR RESIDUAL WASTE REGULATIONS BASED ON 25 PA. CODE CHAPTERS 287 RESIDUAL WASTE MANAGEMENT OR 271 MUNICIPAL WASTE MANAGEMENT, WHICHEVER IS APPLICABLE.

PIPELINE WORK SEQUENCE IN WETLANDS

FOR WORK IN WETLANDS, THE FOLLOWING STEPS SHALL BE INSERTED IN THE GENERAL PIPELINE CONSTRUCTION SEQUENCE ABOVE:

1. INSTALL ORANGE SAFETY FENCE AND PERIMETER BMPS AS DESIGNATED ON PLANS.
2. MATS, PADS, OR SIMILAR DEVICES SHALL BE USED DURING THE CROSSINGS OF WETLANDS.
3. DEWATER WORK AREA; WATER FROM THE EXCAVATION SHALL BE PUMPED TO A SEDIMENT TRAP OR A FILTER BAG.
4. SOIL EXCAVATED FROM WETLAND AREAS SHALL BE PROPERLY SEGREGATED WITH UPPER SOIL PROFILE BEING REMOVED WITH THE ROOTS INTACT. THE SEGREGATED SOIL LAYERS SHOULD BE PLACED IN A SEPARATE STOCKPILE TO BE REUSED DURING THE WETLAND SURFACE RESTORATION.
5.
   A. REMOVE LEIDY LINE A (WHERE NECESSARY).
   B. INSTALL PIPE WITH BUOYANCY CONTROL (IF APPLICABLE).
6. INSTALL TRENCH PLUGS AS DESIGNATED ON PLANS TO PREVENT THE TRENCH FROM DRAINING THE WETLAND OR CHANGING ITS HYDROLOGY.
7. BACKFILL PIPE TRENCH WITH PROPERLY SEGREGATE SOILS TO MATCH ORIGINAL SURFACE GRADES. ORIGINAL GRADES THROUGH WETLANDS MUST BE RESTORED AFTER TRENCHING AND BACKFILLING. ANY EXCESS FILL MATERIALS GENERATED BY PIPE INSTALLATION MUST BE REMOVED FROM THE WETLAND.
8. MAINTAIN ALL E&SC DEVICES UNTIL SITE WORK IS COMPLETE AND A MINIMUM UNIFORM 70 PERCENT PERENNIAL VEGETATIVE COVER IS ESTABLISHED.
9. REMOVE ALL SOIL AND E&SC MEASURES UPON ESTABLISHMENT OF A MINIMUM UNIFORM 70 PERCENT PERENNIAL VEGETATIVE COVER OF THE DISTURBED AREA. REGRADE AND REVEGATE AREAS DISTURBED DURING THE REMOVAL OF THE SOIL E&SCS.

PIPELINE WORK SEQUENCE AT STREAM CROSSINGS

FOR STREAM CROSSINGS, THE FOLLOWING STEPS SHALL BE INSERTED IN THE GENERAL PIPELINE CONSTRUCTION SEQUENCE ABOVE:

1. PRIOR TO INITIATING CONSTRUCTION OF A STREAM CHANNEL LARGER THAN 10 FEET CONTRACTORS AND ENVIRONMENTAL INSPECTOR SHALL EVALUATE WEATHER FORECASTS FOR ANTICIPATED INCLEMENT WEATHER WHICH MAY RESULT IN FLOW CONDITIONS UNSUITABLE FOR CONSTRUCTION. BEFORE CONSTRUCTION OF A STREAM CROSSING GREATER THAN 10 FEET, ENVIRONMENTAL INSPECTOR, FOREMAN, AND ANY OTHER RESPONSIBLE INDIVIDUAL SHOULD SIGN–OFF THAT THE CROSSING CAN BE CONSTRUCTED DURING THE SPECIFIC TIME FRAME.
2. IF INCLEMENT WEATHER IS ANTICIPATED, A CONTINGENCY PLAN WILL BE DISCUSSED TO AVOID THE STREAM CROSSING DURING THE POTENTIALLY UNSUITABLE CONDITIONS.
3. AFTER INSTALLATION OF APPROPRIATE E&S BMPS, INSTALL TEMPORARY EQUIPMENT BRIDGE IN ACCORDANCE WITH DETAILS.
4. FOR DRY OPEN CUT CROSSINGS, INSTALL DAM AND PUMP, OR FLUME AS DESCRIBED IN STREAM CROSSING DETAILS.
5. DEWATER WORK AREA. WATER FROM THE EXCAVATION SHALL BE PUMPED TO A SEDIMENT FILTER BAG. WHERE POSSIBLE, EXCAVATION SHALL BE FROM THE TOP OF THE STREAM BANK.
6.
   A. REMOVE LEIDY A LINE (WHERE NECESSARY).
   B. INSTALL PIPE
7. A UTILITY LINE CROSSING OF A STREAM CHANNEL (DITCHING AND STABILIZATION FROM TOP OF BANK TO TOP OF BANK) SHALL BE COMPLETED WITHIN 24 HOURS FOR STREAM CHANNELS 10 FEET OR LESS AND 48 HOURS FOR STREAM CHANNELS BETWEEN 10 – 100 FEET UNLESS SPECIFICALLY OUTLINED IN THE APPROVED PERMIT OR AUTHORIZED BY PADEP.
8. STABILIZE CHANNEL EXCAVATION AND STREAM BANKS PRIOR TO REDIRECTING STREAM FLOW.

LEIDY LINE 'A' ABANDONMENT THROUGH GROUTING CONSTRUCTION SEQUENCE

1. PRIOR TO THE REMOVAL AND ABANDONMENT, LLA WILL BE CLEANED INTERNALLY WITH CLEANING PIGS OUTFITTED WITH MAGNETS AND BRUSHES DESIGNED TO SCRUB THE INSIDE OF THE PIPELINE AND COLLECT LOSE FERROUS MATERIAL.
2. LLA WILL BE REMOVED TO THE EASTERN AND WESTERN TERMINUS OF THE LARGE WETLAND COMPLEX ASSOCIATED WITH THE TAMARACK SWAMP NATURAL AREA, AS DESIGNATED ON THE E&S PLANS.
3. BOTH ENDS OF THE PORTION OF THE PIPELINE TO BE ABANDONED WILL BE EXPOSED THROUGH EXCAVATION. ALL DISTURBANCE ASSOCIATED WITH EXCAVATING AND EXPOSING THE PIPELINE IS INCLUDED WITHIN THE IDENTIFIED LIMITS OF DISTURBANCE.
4. THE WESTERN TERMINUS OF THE PIPELINE WILL BE CAPPED AND VENTED TO FACILITATE THE ABANDONMENT.
5. THE PIPE WILL BE GROUTED USING A CEMENTITIOUS GROUT FROM THE EASTERN TERMINUS BASED ON THE EXISTING PIPELINE ELEVATION. IF A DIFFERENT GROUT IS PREFERRED BY THE CONTRACTOR, PRIOR NOTIFICATION WILL BE MADE TO PADEP.
6. GROUT TRUCKS WILL MOBILIZE FROM A PERMITTED CONTRACTOR YARD AND THE GROUT WILL BE PUMPED INTO THE PORTION OF PIPELINE TO BE ABANDONED. ALL
7. EQUIPMENT TO FACILITATE THE GROUTING WILL BE CONTAINED WITHIN THE IDENTIFIED LIMITS OF DISTURBANCE.
8. ONCE THE GROUT HAS BEEN INSTALLED, BOTH ENDS OF THE PIPE WILL BE CAPPED AND THE GROUTING AND ABANDONMENT WILL BE COMPLETE.

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KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL KEVIN C. CLARK ENGINEER 041211–E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

NOTES SHEET

LEIDY & CHAPMAN TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1 = 1
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19	DRAWING NUMBER: 26-1000-70-28-D	SHEET 25 OF 39
WO: 121227	RID:		

MEASURES OF RECYCLING & DISPOSAL OF MATERIALS FROM THE PROJECT AREA

THE RESTORATION OF THE PIPELINE RIGHT–OF–WAY WILL REQUIRED THE REMOVAL OF THE TEMPORARY MATERIALS. THE TEMPORARY MATERIALS INCLUDE, BUT MAY NOT BE LIMITED TO, STONE SURFACES AND ASSOCIATED GEOTEXTILES. THE CONTRACTORS ARE REQUIRED TO DISPOSE OF THE MATERIALS AT SUITABLE DISPOSALS OR RECYCLING SITES AND IN COMPLIANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS.

CONTRACTORS ARE REQUIRED TO INVENTORY AND MANAGE THEIR CONSTRUCTION SITE MATERIALS. THE GOAL IS TO BE AWARE OF THE MATERIALS ON–SITE, ENSURE THEY ARE PROPERLY MAINTAINED, USED, AND DISPOSED OF, AND TO MAKE SURE THE MATERIALS ARE NOT EXPOSED TO STORMWATER.

MATERIALS COVERED

THE FOLLOWING MATERIALS OR SUBSTANCES ARE EXPECTED TO BE PRESENT ON–SITE DURING CONSTRUCTION (NOTE: THIS LIST IS NOT AN ALL–INCLUSIVE LIST AND THE MATERIALS MANAGEMENT PLAN CAN BE MODIFIED TO ADDRESS ADDITIONAL MATERIALS USED ON–SITE):

- ACIDS
- DETERGENTS
- FERTILIZERS (NITROGEN/PHOSPHORUS)
- HYDROSEEDING MIXTURES
- PETROLEUM BASED PRODUCTS
- SANITARY WASTES
- SOIL STABILIZATION ADDITIVES
- SOLDER
- SOLVENTS
- OTHER (LIST HERE):

THESE MATERIALS MUST BE STORED AS APPROPRIATE AND SHALL NOT CONTACT STORM OR NON–STORMWATER DISCHARGES. CONTRACTOR SHALL PROVIDE A WEATHER PROOF CONTAINER TO STORE CHEMICALS OR ERODIBLE SUBSTANCES THAT MUST BE KEPT ON THE SITE. CONTRACTOR IS RESPONSIBLE FOR READING, MAINTAINING, AND MAKING EMPLOYEES AND SUBCONTRACTORS AWARE OF MATERIAL SAFETY DATA SHEETS (MSDSs).

MATERIAL MANAGEMENT PRACTICES

THE FOLLOWING ARE MATERIAL MANAGEMENT PRACTICES THAT WILL BE USED TO REDUCE THE RISK OF SPILLS OR OTHER ACCIDENTAL EXPOSURE OF MATERIALS AND SUBSTANCES TO STORMWATER RUNOFF.

1. GOOD HOUSEKEEPING PRACTICES
   THE FOLLOWING GOOD HOUSEKEEPING PRACTICES WILL BE FOLLOWED ON SITE DURING CONSTRUCTION:
   STORE ONLY ENOUGH MATERIAL REQUIRED TO DO THE JOB.
   STORE MATERIALS IN A NEAT, ORDERLY MANNER.
   STORE CHEMICALS IN WATERTIGHT CONTAINERS OR IN A STORAGE SHED, UNDER A ROOF, COMPLETELY ENCLOSED, WITH APPROPRIATE SECONDARY CONTAINMENT TO PREVENT SPILL OR LEAKAGE. DRIP PANS SHALL BE PROVIDED UNDER DISPENSERS.
   SUBSTANCES WILL NOT BE MIXED WITH ONE ANOTHER UNLESS RECOMMENDED BY THE MANUFACTURER.
   MANUFACTURER'S RECOMMENDATIONS FOR PROPER USE AND DISPOSAL WILL BE FOLLOWED.
   INSPECTIONS WILL BE PERFORMED TO ENSURE PROPER USE AND DISPOSAL OF MATERIALS.
   COVER AND BERM LOOSE STOCKPILED CONSTRUCTION MATERIALS THAT ARE NOT ACTIVELY BEING USED (I.E. SOIL, SPOILS, AGGREGATE, ETC.).
   MINIMIZE EXPOSURE OF CONSTRUCTION MATERIALS TO PRECIPITATION.
   MINIMIZE THE POTENTIAL FOR OFF–SITE TRACKING OF LOOSE CONSTRUCTION AND LANDSCAPE MATERIALS.

2. HAZARDOUS PRODUCTS
   THESE PRACTICES WILL BE USED TO REDUCE THE RISKS ASSOCIATED WITH HAZARDOUS MATERIALS. MSDSS FOR EACH SUBSTANCE WITH HAZARDOUS PROPERTIES THAT IS USED ON THE JOB SITE(S) WILL BE OBTAINED AND USED FOR THE PROPER MANAGEMENT OF POTENTIAL WASTES THAT MAY RESULT FROM THESE PRODUCTS. A MSDS WILL BE POSTED IN THE IMMEDIATE AREA WHERE SUCH PRODUCT IS STORED AND/OR USED AND ANOTHER COPY OF EACH MSDS WILL BE MAINTAINED IN A FILE AT THE JOB SITE CONSTRUCTION TRAILER OFFICE. EACH EMPLOYEE WHO MUST HANDLE A SUBSTANCE WITH HAZARDOUS PROPERTIES WILL BE INSTRUCTED ON THE USE OF MSDS AND THE SPECIFIC INFORMATION IN THE APPLICABLE MSDS FOR THE PRODUCT HE/SHE IS USING, PARTICULARLY REGARDING SPILL CONTROL TECHNIQUES.

   - PRODUCTS WILL BE KEPT IN ORIGINAL CONTAINERS WITH THE ORIGINAL LABELS IN LEGIBLE CONDITION.
   - ORIGINAL LABELS AND MSDS WILL BE PRODUCED AND USED FOR EACH MATERIAL.
   - IF SURPLUS PRODUCT MUST BE DISPOSED OF, MANUFACTURER'S OR LOCAL/STATE/FEDERAL RECOMMENDED METHODS FOR PROPER DISPOSAL WILL BE FOLLOWED.

3. HAZARDOUS WASTES
   ALL HAZARDOUS WASTE MATERIALS WILL BE DISPOSED OF BY THE CONTRACTOR IN THE MANNER SPECIFIED BY LOCAL, STATE, AND/OR FEDERAL REGULATIONS AND BY THE MANUFACTURER OF SUCH PRODUCTS. SITE PERSONNEL WILL BE INSTRUCTED.

4. CONCRETE AND OTHER WASH WATERS
   PREVENT DISPOSAL OF RINSE, WASH WATERS, OR MATERIALS ON IMPERVIOUS OR PERVIOUS SURFACES, INTO STREAMS, WETLANDS OR OTHER WATER BODIES.

   CONCRETE TRUCKS WILL BE ALLOWED TO WASH OUT OR DISCHARGE SURPLUS CONCRETE OR DRUM WASH WATER ON THE SITE, BUT ONLY EITHER (1) SPECIFICALLY DESIGNATED DIKED AREAS WHICH HAVE BEEN PREPARED TO PREVENT CONTACT BETWEEN THE CONCRETE AND/OR WASHOUT AND SOIL AND STORMWATER HAVING THE POTENTIAL TO BE DISCHARGED FROM THE SITE OR (2) IN LOCATIONS WHERE WASTE CONCRETE CAN BE POURED INTO FORMS TO MAKE RIPRAP OR OTHER USEFUL CONCRETE PRODUCTS.

   THE HARDENED RESIDUE FROM THE CONCRETE WASHOUT DIKED AREAS WILL BE DISPOSED OF IN THE SAME MANNER AS OTHER NON–HAZARDOUS CONSTRUCTION WASTE MATERIALS OR MAY BE BROKEN UP AND USED ON THE SITE AS DEEMED APPROPRIATE BY THE CONTRACTOR AND GEOTECHNICAL ENGINEER. THE CONTRACTOR WILL BE RESPONSIBLE FOR SEEING THAT THESE PROCEDURES ARE FOLLOWED.

   ALL CONCRETE WASHOUT AREAS WILL BE LOCATED IN AN AREA WHERE THE LIKELIHOOD OF THE AREA CONTRIBUTING TO STORMWATER DISCHARGE IS NEGLIGIBLE. IF REQUIRED, ADDITIONAL BMPS MUST BE IMPLEMENTED TO PREVENT CONCRETE WASTES FROM CONTRIBUTING TO STORMWATER DISCHARGES. THE LOCATION OF THE CONCRETE WASHOUT AREA(S) MUST BE IDENTIFIED, BY THE CONTRACTOR/JOB SITE SUPERINTENDENT, ON THE JOB SITE COPY OF THE EROSION AND SEDIMENT CONTROL PLAN(S) IN THIS ESCP.

5. SANITARY WASTES
   ALL SANITARY WASTE UNITS WILL BE LOCATED IN AN AREA WHERE THE LIKELIHOOD OF THE UNIT CONTRIBUTING TO STORMWATER DISCHARGES IS NEGLIGIBLE. ADDITIONAL BMPS MUST BE IMPLEMENTED, SUCH AS CONTAINMENT TRAYS (PROVIDED BY THE RENTAL COMPANY) OR SPECIAL CONTAINMENT CREATED WITH 2"X4" LUMBER, IMPERVIOUS PLASTIC, AND GRAVEL. THE LOCATION OF THE SANITARY WASTE UNITS MUST BE IDENTIFIED ON THE JOB SITE COPY OF THE EROSION AND SEDIMENT CONTROL PLAN(S), IN THIS ESCP, BY THE CONTRACTOR/JOB SITE SUPERINTENDENT.

6. SOLID AND CONSTRUCTION WASTES
   ALL WASTE MATERIALS WILL BE COLLECTED AND STORED IN A SECURELY LIDDED METAL DUMPSTER. THE DUMPSTER WILL COMPLY WITH ALL LOCAL AND STATE SOLID WASTE MANAGEMENT REGULATIONS. THE DUMPSTER/CONTAINER LIDS SHALL BE CLOSED AT THE END OF EVERY BUSINESS DAY AND DURING RAIN EVENTS. APPROPRIATE MEASURES SHALL BE TAKEN TO PREVENT DISCHARGES FROM WASTE DISPOSAL CONTAINERS TO THE RECEIVING WATER.

7. CONSTRUCTION ACCESS
   A STABILIZED CONSTRUCTION ENTRANCE WILL BE PROVIDED TO HELP REDUCE VEHICLE TRACKING OF SEDIMENTS, THE PAVED ROADS ADJACENT TO THE SITE ENTRANCE WILL BE INSPECTED DAILY AND SWEPT AS NECESSARY TO REMOVE ANY EXCESS MUD, DIRT, OR ROCK TRACKED FROM THE SITE. DUMP TRUCKS HAULING MATERIAL FROM THE CONSTRUCTION SITE WILL BE COVERED WITH A TARPAULIN AS NECESSARY.

8. PETROLEUM PRODUCTS
   ON–SITE VEHICLES WILL BE MONITORED FOR LEAKS AND RECEIVE REGULAR PREVENTATIVE MAINTENANCE. PETROLEUM PRODUCTS WILL BE STORED IN TIGHTLY SEALED CONTAINERS WHICH ARE CLEARLY LABELED. PETROLEUM STORAGE TANKS ON SITE WILL HAVE A DIKE OR BERM CONTAINMENT STRUCTURE CONSTRUCTED AROUND IT TO CONTAIN SPILLS WHICH MAY OCCUR (CONTAINMENT VOLUME TO BE 110% OF VOLUME STORED). THE DIKE OR BERMED AREA SHALL BE LINED WITH AN IMPERVIOUS MATERIAL SUCH AS A HEAVY DUTY PLASTIC SHEET. DRIP PANS SHALL BE PROVIDED FOR ALL DISPENSERS. ANY ASPHALT SUBSTANCES USED ON THE SITE WILL BE APPLIED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.

9. FERTILIZERS AND LANDSCAPE MATERIALS
   FERTILIZERS WILL BE APPLIED ONLY IN THE MINIMUM AMOUNTS RECOMMENDED BY THE MANUFACTURER. ONCE APPLIED, FERTILIZER WILL BE WORKED INTO THE SOIL TO MINIMIZE THE POTENTIAL FOR EXPOSURE TO STORMWATER. STORAGE WILL BE UNDER COVER. THE CONTENTS OF ANY PARTIALLY USED BAGS OF FERTILIZER WILL BE TRANSFERRED TO A SEALABLE PLASTIC BIN TO MINIMIZE THE POTENTIAL FOR SPILLS. THE BIN SHALL BE LABELED APPROPRIATELY.

   CONTAIN STOCKPILED MATERIALS, SUCH AS BUT NOT LIMITED TO, MULCHES, TOP SOIL, ROCKS AND GRAVEL, AND DECOMPOSED GRANITE, WHEN THEY ARE NOT ACTIVELY BEING USED.

   APPLY ERODIBLE LANDSCAPE MATERIAL AT QUANTITIES AND APPLICATION RATES ACCORDING TO MANUFACTURER RECOMMENDATIONS OR BASED ON WRITTEN SPECIFICATIONS BY KNOWLEDGEABLE AND EXPERIENCE FIELD PERSONNEL. DISCONTINUE THE APPLICATION OF ANY ERODIBLE LANDSCAPE MATERIAL WITHIN TWO DAYS PRIOR TO A FORECASTED RAIN EVENT OR DURING PERIODS OF PRECIPITATION.

10. PAINTS, PAINT SOLVENTS AND CLEANING SOLVENTS
    CONTAINERS WILL BE TIGHTLY SEALED AND STORED WHEN NOT IN USE. EXCESS PAINT AND SOLVENTS WILL BE PROPERLY DISPOSED OF ACCORDING TO MANUFACTURER'S INSTRUCTIONS OR LOCAL/STATE/FEDERAL REGULATIONS.

11. CONTAMINATED SOILS
    ANY CONTAMINATED SOILS (RESULTING FROM SPILLS OF MATERIALS WITH HAZARDOUS PROPERTIES) WHICH MAY RESULT FROM CONSTRUCTION ACTIVITIES WILL BE CONTAINED AND CLEANED UP IMMEDIATELY IN ACCORDANCE WITH APPLICABLE STATE AND FEDERAL REGULATIONS.

12. OFF–SITE WASTE AND BORROW AREAS
    ALL OFF–SITE WASTE AND BORROW AREAS MUST HAVE AN E&S PLAN APPROVED BY THE LOCAL COUNTY CONSERVATION DISTRICT OF PADEP FULLY IMPLEMENTED PRIOR TO BEING ACTIVATED. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE REMOVAL OF ANY EXCESS MATERIAL AND TO DEVELOP A PLAN THAT MEETS THE CONDITIONS OF CHAPTER 102, NPDES PERMIT CONDITIONS, AND/OR OTHER STATE AND FEDERAL REGULATIONS.

WETLAND CROSSING AND RESTORATION METHODS

CLEARING AND GRADING

1. LIMIT CONSTRUCTION ACTIVITY AND GROUND DISTURBANCE IN WETLAND AREAS TO A CONSTRUCTION ROW WIDTH AS SHOWN ON THE CONSTRUCTION PLANS.
2. WETLAND BOUNDARIES AND BUFFERS MUST BE CLEARLY MARKED IN THE FIELD WITH SIGNS AND/OR HIGHLY VISIBLE FLAGGING UNTIL CONSTRUCTION–RELATED GROUND DISTURBING ACTIVITIES ARE COMPLETE.
3. RESTRICT EXTRA WORK AREAS (SUCH AS STAGING AREAS AND ADDITIONAL SPOIL STORAGE AREAS) TO THOSE SHOWN ONLY ON THE CONSTRUCTION PLANS. ALL EXTRA WORK AREAS MUST BE LOCATED AT LEAST 50 FEET AWAY FROM WETLAND BOUNDARIES, EXCEPT WHERE THE ADJACENT UPLAND CONSISTS OF ACTIVELY CULTIVATED OR ROTATED CROPLAND OR OTHER DISTURBED LAND. STOCKPILE SOIL OR SUBSOIL OUTSIDE OF THE WETLAND BOUNDARIES TO THE EXTENT PRACTICABLE BASED ON CONSIDERATIONS OF DURATION, TOPOGRAPHY, ACCESS, AND AVAILABILITY OF ADJACENT WORKSPACE.
4. USE TIMBER MATS, PREFABRICATED EQUIPMENT MATS OR TERRA MATS ON THE WORKING SIDE OF THE ROW DURING CLEARING OPERATIONS.
5. CUT VEGETATION JUST ABOVE GROUND LEVEL AND GRIND STUMPS TO GROUND LEVEL, LEAVING EXISTING ROOT SYSTEMS IN PLACE. IMMEDIATELY REMOVE ALL CUT TREES, CHIPS FROM GRINDING AND BRANCHES FROM THE WETLAND AND STOCKPILE IN AN UPLAND AREA ON ROW FOR DISPOSAL.
6. LIMIT PULLING OF TREE STUMPS AND GRADING ACTIVITIES TO DIRECTLY OVER TRENCH LINE. DO NOT GRADE OR REMOVE STUMPS OR ROOT SYSTEMS FROM THE REST OF THE ROW IN WETLANDS UNLESS THE CHIEF INSPECTOR AND EI DETERMINE THAT SAFETY–RELATED CONSTRUCTION CONSTRAINTS REQUIRE REMOVAL OF TREE STUMPS FROM UNDER THE WORKING SIDE OF THE ROW.
7. DO NOT CUT TREES OUTSIDE OF THE CONSTRUCTION ROW TO OBTAIN TIMBER FOR RIPRAP OR EQUIPMENT MATS.
8. CLEARED MATERIALS (SLASH, LOGS, BRUSH, WOOD CHIPS) SHALL NOT BE PERMANENTLY PLACED WITHIN WETLAND AREAS.

TEMPORARY EROSION AND SEDIMENT CONTROL

1. INSTALL SEDIMENT BARRIERS IMMEDIATELY AFTER CLEARING AND PRIOR TO GROUND DISTURBANCE AT THE FOLLOWING LOCATIONS:
   A. WITHIN THE ROW AT THE EDGE OF THE BOUNDARY BETWEEN WETLAND AND UPLAND;
   B. ACROSS THE ENTIRE ROW IMMEDIATELY UPSLOPE OF THE WETLAND BOUNDARY TO PREVENT SEDIMENT FLOW INTO THE WETLAND;
   C. ALONG THE EDGE OF THE ROW, WHERE THE ROW SLOPES TOWARD THE WETLAND, TO PROTECT ADJACENT OFF ROW WETLAND; AND
   D. ALONG THE EDGE OF THE ROW AS NECESSARY TO CONTAIN SPOIL AND SEDIMENT WITHIN THE ROW THROUGH WETLANDS.
2. MAINTAIN ALL SEDIMENT BARRIERS THROUGHOUT CONSTRUCTION AND REINSTALL AS NECESSARY (SUCH AS AFTER BACKFILLING OF THE TRENCH) UNTIL REPLACED BY PERMANENT EROSION CONTROLS OR RESTORATION OF ADJACENT UPLAND AREAS IS COMPLETE.
3. DEPTH OF TOPSOIL SEGREGATION SHOULD BE 12 INCHES, IF PRESENT, UNLESS OTHERWISE INDICATED BY THE LANDOWNER IF RELATING TO AGRICULTURAL LAND.

CROSSING PROCEDURE

1. MINIMIZE THE LENGTH OF TIME THAT TOPSOIL IS SEGREGATED AND THE TRENCH IS OPEN.
2. DO NOT USE ROCK / SOIL IMPORTED FROM OUTSIDE THE WETLAND, TREE STUMPS, OR BRUSH RIPRAP TO STABILIZE THE ROW.
3. PERFORM TOPSOIL SEGREGATION AND TRENCH DEWATERING. IF A RESTRICTIVE LAYER, INCLUDING BUT NOT LIMITED TO CLAY OR FRAGIPANS, IS ENCOUNTERED DURING THE TRENCH EXCAVATION OF A WETLAND, THE ENVIRONMENTAL INSPECTION SHALL OVERSEE BACKFILLING OF THE TRENCH AND INSTALLATION OF TRENCH PLUGS, IN ORDER TO MAINTAIN WETLAND HYDROLOGY.
4. ASSEMBLE THE PIPELINE IN AN UPLAND AREA UNLESS THE WETLAND IS DRY ENOUGH TO ADEQUATELY SUPPORT SKIDS AND PIPE.
5. USE "PUSH–OFF" OR "FLOAT" TECHNIQUES TO PLACE THE PIPE IN THE TRENCH WHERE WATER AND OTHER SITE CONDITIONS ALLOW.
6. INSTALL TRENCH PLUGS AND/OR SEAL THE TRENCH BOTTOM AS NECESSARY TO MAINTAIN THE ORIGINAL WETLAND HYDROLOGY AT LOCATIONS WHERE THE PIPELINE TRENCH MAY DRAIN A WETLAND.
7. INSTALL A PERMANENT INTERCEPTOR DIKE AND A TRENCH PLUG AT THE BASE OF SLOPES NEAR THE BOUNDARY BETWEEN THE WETLAND AND ADJACENT UPLAND AREAS. IN ADDITION, INSTALL SEDIMENT BARRIERS. PERMANENT INTERCEPTOR DIKES SHALL NOT BE INSTALLED IN AGRICULTURAL AREAS.
8. RESTORE SEGREGATED TOPSOIL AND SUBSOIL TO ITS ORIGINAL POSITION AFTER BACKFILLING IS COMPLETE. WHEN REQUIRED, ADDITIONAL MATERIAL IMPORTED FROM OFF THE ROW MUST BE APPROVED BY THE EI. THE ORIGINAL WETLAND CONTOURS AND FLOW REGIMES WILL BE RESTORED TO THE EXTENT PRACTICAL.

CLEANUP AND RESTORATION

1. REVEGETATE THE ROW WITH ANNUAL RYEGRASS AT 40 LBS / ACRE PURE LIVE SEED AND WITH THE RECOMMENDED WETLAND SEED MIX, UNLESS STANDING WATER IS PRESENT.
2. DO NOT USE LIME, FERTILIZER OR MULCH IN WETLAND AREAS.
3. IN THE EVENT THAT FINAL SEEDING AND MULCHING IS DEFERRED MORE THAN 20 DAYS AFTER THE TRENCH IS BACKFILLED, ALL SLOPES ADJACENT TO WETLANDS SHALL BE BLANKETED FOR A MINIMUM OF 100 FEET ON EACH SIDE OF THE CROSSING.
4. REMOVE ALL EQUIPMENT MATS UPON COMPLETION OF CONSTRUCTION.
5. DEVELOP SPECIFIC PROCEDURES IN COORDINATION WITH THE APPROPRIATE LAND MANAGEMENT OR STATE AGENCY, WHERE NECESSARY, TO PREVENT THE INVASION OR SPREAD OF UNDESIRABLE EXOTIC VEGETATION (SUCH AS PURPLE LOOSE STRIFE AND PHRAGMITES).
6. ENSURE THAT ALL DISTURBED AREAS PERMANENTLY REVEGETATE.
7. REMOVE TEMPORARY SEDIMENT BARRIERS LOCATED AT THE BOUNDARY BETWEEN WETLAND AND ADJACENT UPLAND AREAS AFTER UPLAND REVEGETATION AND STABILIZATION OF ADJACENT UPLAND AREAS ARE SUCCESSFUL

GENERAL MAINTENANCE NOTES FOR ALL BMPs:

ROUTINE MAINTENANCE INSPECTIONS WILL BE REQUIRED TO ENSURE THE PERFORMANCE OF ALL THE SEDIMENT CONTROL BMP DEVICES. AT A MINIMUM, ALL STRUCTURES AND DEVICES SHALL BE INSPECTED ONCE EVERY SEVEN (7) CALENDAR DAYS AND WITHIN 24 HOURS AFTER ANY STORM EVENT. THIS INSPECTION SHALL BE FOLLOWED WITH A REPAIR SCHEDULE OF ALL NOTED DEFICIENCIES. VEGETATION PROGRESS SHALL ALSO BE INCLUDED IN THIS INSPECTION. VOID AREAS SHALL PROMPTLY BE RESEEDED AND MULCHED TO ESTABLISH PROTECTION.

UNTIL THE SITE IS STABILIZED, ALL EROSION AND SEDIMENT BMPs MUST BE MAINTAINED PROPERLY. MAINTENANCE MUST INCLUDE INSPECTIONS OF ALL EROSION AND SEDIMENT CONTROL BMPs AFTER EACH RUNOFF EVENT AND ON A WEEKLY BASIS. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, REGRADING, RESEEDING, REMULCHING, AND RENETTING, MUST BE DONE IMMEDIATELY. IF EROSION AND SEDIMENT CONTROL BMPs FAIL TO PERFORM AS EXPECTED, REPLACEMENT BMPs, OR MODIFICATIONS TO THOSE INSTALLED, WILL BE REQUIRED.

SEDIMENT REMOVED FROM BMPs SHALL BE DISPOSED OF WITHIN THE LIMIT OF DISTURBANCE IN LANDSCAPE AREAS OUTSIDE OF STEEP SLOPES, WETLANDS, FLOODPLAINS OR DRAINAGE SWALES AND IMMEDIATELY STABILIZED, OR PLACED IN STOCKPILES AREAS.

ALL CHANNELS MUST BE KEPT FREE OF OBSTRUCTIONS SUCH AS FILL, FALLEN LEAVES & WOODY DEBRIS, ACCUMULATED SEDIMENT, AND CONSTRUCTION MATERIALS/WASTES WITH EXCEPTION TO OTHER REQUIRED BMPs (I.E., CHECK DAMS). CHANNELS SHOULD BE KEPT MOWED AND/OR FREE OF ALL WEEDY, BRUSHY OR WOODY GROWTH. ANY UNDERGROUND UTILITIES RUNNING ACROSS/ THROUGH THE CHANNEL(S) SHALL BE IMMEDIATELY BACKFILLED AND THE CHANNEL(S) REPAIRED AND STABILIZED PER THE CHANNEL SECTION DETAIL.

SEDIMENT TRACKED ONTO ANY PUBLIC ROADWAY OR SIDEWALK SHALL BE RETURNED TO THE CONSTRUCTION SITE AS NEEDED AND BY THE END OF EACH WORK DAY AND DISPOSED IN THE MANNER DESCRIBED IN THIS PLAN. IN NO CASE SHALL THE SEDIMENT BE WASHED, SHOVELED, OR SWEPT INTO ANY ROADSIDE DITCH, STORM SEWER, OR SURFACE WATER.

ALL NECESSARY REPAIRS WILL BE MADE IMMEDIATELY.

MAINTENANCE SCHEDULE

CONTROL MEASURE	INSPECT	PROBLEMS TO LOOK FOR	POSSIBLE REMEDIES
BROAD BASED DIP	DAILY	SEDIMENT/DEBRIS BLOCKING THE NORMAL FLOW OF WATER. WASHOUTS, BULGES, OR SLUMPS.	REPAIR DAMAGED OR NON–FUNCTIONING DIPS.
COMPOST FILTER SOCK	ONCE A WEEK AND AFTER EVERY RUNOFF EVENT	BARRIER HAS BEEN UNDERMINED OR TOPPED SEDIMENT AT 1/2 HEIGHT OF BARRIER TORN OR DAMAGED FABRIC SOCK IS OLDER THAN PERMITTED RUNOFF ESCAPING AROUND BARRIER	REPLACE WITH A ROCK FILTER OUTLET. INCREASE NUMBER OF STAKES AT AFFECTED AREA. REMOVE SEDIMENT, PLACE ACROSS SITE AS FILL. REPAIR ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACE. EXTEND BARRIER.
CLEAN WATER CROSSING	CONTINUOUSLY. ONCE A WEEK AND AFTER EVERY RUNOFF EVENT. MONTHLY/AS NEEDED	CHANNEL THICKNESS NOT MAINTAINED. EROSION AROUND TRENCH INLETS AND WATERSHEDS. DAMAGED CHANNEL LINING. SEDIMENT/DEBRIS BLOCKING NORMAL FLOW OF WATER. TRASH AND DEBRIS.	RECONSTRUCT CHANNEL. REGRADE AND REPAIR ANY UNDERMINED OR WASHED OUT AREAS. REPLACE CHANNEL LINING. REMOVE SEDIMENT WHEN TOTAL CHANNEL DEPTH IS REDUCED BY 25%. REMOVE TRASH AND DEBRIS.
DIVERSION BERM / DIVERSION TERRACE	ONCE A WEEK AND AFTER EVERY RUNOFF EVENT	SEDIMENT/DEBRIS BLOCKING THE NORMAL FLOW OF WATER. WASH OUTS, BULGES OR SLUMPS. UNSTABLE SIDE SLOPES. DAMAGED CHANNEL LINING. REDUCED CAPACITY DUE TO DECREASE IN CHANNEL DIMENSIONS. VEGETATION GROWTH.	REMOVE SEDIMENT/DEBRIS, SPREAD SEDIMENT ACROSS SITE. REPAIR OR REPLACE IMMEDIATELY UPON DISCOVERY. RECONSTRUCT CHANNEL. REPLACE CHANNEL LINING. RE–SEED.
EROSION CONTROL BLANKET	ONCE A WEEK AND AFTER EVERY RUNOFF EVENT	TORN OR LOOSE STAPLED AREAS. VEGETATION GROWTH. BLANKET DESTROYED OR DAMAGED.	REMOVE AND REPLACE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. REGRADE AND REPAIR ANY UNDERMINED OR WASHED OUT AREAS. RE–SEED.
HYDROSTATIC DEWATERING STRUCTURE	DURING DEWATERING ACTIVITIES.	ACCUMULATIONS REACH 1/3 THE ABOVEGROUND HEIGHT OF THE BARRIER. DAMAGED OR DETERIORATED STRAW BALES.	REMOVE SEDIMENT/DEBRIS. REPLACE STRAW BALES.
PUMPED WATER FILTER BAG	BEFORE AND AFTER EACH USE	TORN FABRIC, TEARS OR BREACHES. SEDIMENT ESCAPING WITH PURGE WATER. MORE THAN 50% FILLED WITH SEDIMENT.	REPLACE FILTER BAG. REMOVE SEDIMENT, SPREAD OVER SITE.
ROCK CONSTRUCTION ENTRANCE	ONCE A WEEK AND AFTER EVERY RUNOFF EVENT	STONE THICKNESS NOT CONSTANTLY MAINTAINED. SEDIMENT ON PUBLIC ROADWAY.	ADD ROCK TO BRING TO SPECIFIED DIMENSIONS. SWEEP MATERIAL BACK TO PROJECT SITE. DO NOT WASH ROADWAY WITH WATER.
ROCK FILTER OUTLET	ONCE A WEEK AND AFTER EVERY RUNOFF EVENT	LINING WASHED AWAY. SEDIMENT AT 1/3 HEIGHT OF BARRIER. RUNOFF ESCAPING AROUND BARRIER. CLOGGING.	RESHAPE AS NECESSARY AND REPLACE TOP LAYER WITH CLEAN STONE. REPLACE RIPRAP WITH LARGER SIZE RIPRAP. REBUILD/EXTEND BARRIER. WASH OR REPLACE SEDIMENT LADEN STONE.
TRENCH PLUG	ONCE A WEEK AND AFTER EVERY RUNOFF EVENT	STORMWATER POOLING WITHIN THE EXCAVATION BEHIND A TRENCH PLUG	PUMP WATER THROUGH A PUMPED WATER FILTER BAG OVER STABLE, UNDISTURBED EARTH.
VEGETATION	ONCE A WEEK AND AFTER EVERY RUNOFF EVENT	SEDIMENT AT TOE–OF–SLOPE. RILLS & GULLIES FORMING. BARE SOIL PATCHES.	CHECK FOR TOE–OF–SLOPE DIVERSION & INSTALL, IF NEEDED. FILL RILLS AND RE–GRADE GULLIED SLOPES. RE–SEED, FERTILIZE, LIME AND RE–MULCH.
SEDIMENT TRAP	ONCE A WEEK AND AFTER EVERY RUNOFF EVENT	TRASH AND OTHER DEBRIS. SEDIMENT AT CLEAN–OUT ELEVATION. DAMAGED OR CLOGGED COMPOST FILTER SOCK. EROSION. VEGETATION GROWTH. STANDING WATER MORE THAN 7 DAYS AFTER RAINFALL EVENT.	DISPOSE OF TRASH PROPERLY. REMOVE SEDIMENT, PLACE ACROSS SITE AS FILL. REMOVE CLOGGED MATERIAL. RESTORE TO DESIGN SPECIFICATIONS. PUMP WATER THROUGH A PUMPED WATER FILTER BAG OVER STABLE, UNDISTURBED EARTH.

* REFER TO BMP DETAIL FOR ADDITIONAL MAINTENANCE REQUIREMENTS AND REMEDIES.

RESOLUTIONS TO LIMITING SOIL CHARACTERISTICS

LIMITATION	RESOLUTION
ERODIBLE	PROTECTIVE LINING, SEEDING AND MULCHING, EROSION CONTROL BLANKETS (ROLLS OF HYDRAULICALLY APPLIED), TRACKING SLOPES, UPSTREAM DIVERSIONS, WATERBARS, ETC, TO MINIMIZE EROSION OF THE SOILS.
CUT BANKS CAVE	TO OFFSET THE CAVING OF CUTBANKS, TRENCHING OPERATIONS WILL BE CONDUCTED IN ACCORDANCE WITH THE OSHA TECHNICAL MANUAL FOR TRENCHING (OR "TRENCHES SHALL BE EXCAVATED WITH APPROPRIATE LAYBACK BANKS TO PREVENT CAVE–INS. STOCKPILES SHALL BE LOCATED AT A SUFFICIENT DISTANCE AWAY FROM THE TRENCH."
CORROSIVE TO CONCRETE OR STEEL	PREVENTATIVE COATINGS SHALL BE USED TO PREVENT CORROSION OF CONCRETE AND/OR STEEL.
DROUGHTY	SOIL TESTING IS ENCOURAGED TO DETERMINE THE APPROPRIATE APPLICATIONS OF SOIL AMENDMENTS TO PROMOTE GROWTH. SOILS ONSITE THAT ARE FAIR SOURCES OF TOPSOIL WILL BE IDENTIFIED, STRIPPED AND STOCKPILED FOR USE DURING RESTORATION.
PRONE TO FLOODING, SLOW PERCOLATION, PONDING, WETNESS, HIGH WATER TABLE, OR HYDRIC	DEWATER WITH APPROPRIATE MEANS SUCH AS PUMP WATER FILTER BAGS, SEDIMENT TRAPS, ETC. AS EXCAVATIONS IN SOILS THAT HAVE THESE CHARACTERISTICS WILL LIKELY ENCOUNTER WATER.
HIGH WATER TABLE	PUMPS AND WATER FILTER BAGS SHALL BE UTILIZED IF GROUNDWATER IS ENCOUNTERED.
LOW STRENGTH	PRECAUTIONS WILL BE TAKEN TO PREVENT SLOPE FAILURE WHEN WORKING WITHIN LOW STRENGTH SOILS BY FLATTENING CUT/FILL SLOPES, NOT OVERLOADING, MAINTAINING LATERAL SUPPORT, AND PREVENTING SATURATION OF SOILS. USE OF THESE SOILS WILL BE AVOIDED FOR ROADWAY CONSTRUCTION.
PIPING	TRENCH PLUGS SHALL BE UTILIZED IN ACCORDANCE WITH THE STANDARD DETAIL. WATER SHALL BE DIVERTED AWAY FROM OPEN TRENCHES.
POOR TOPSOIL	SOIL TESTING IS ENCOURAGED TO DETERMINE THE APPROPRIATE APPLICATIONS OF SOIL AMENDMENTS TO PROMOTE GROWTH. SOILS ONSITE THAT ARE FAIR SOURCES OF TOPSOIL WILL BE IDENTIFIED, STRIPPED AND STOCKPILED FOR USE DURING RESTORATION.
FROST ACTION	SOILS THAT HAVE THE POTENTIAL TO HEAVE DUE TO FROST ACTION MAY CAUSE DAMAGE TO ROADWAYS OR PADS WHERE FOUNDATIONS ARE CRITICAL REMOVAL AND REPLACEMENT SOILS WITH SUITABLE MATERIAL MAY BE REQUIRED.
WETNESS	SOIL TESTING IS ENCOURAGED TO DETERMINE THE APPROPRIATE APPLICATIONS OF SOIL AMENDMENTS TO PROMOTE GROWTH. SOILS ONSITE THAT ARE FAIR SOURCES OF TOPSOIL WILL BE IDENTIFIED, STRIPPED AND STOCKPILED FOR USE DURING RESTORATION.

Limitations of Pennsylvania Soils Pertaining to Earth Disturbance Projects (Erosion and Sediment Control Best Management Practice (BMP) Manual – Technical Guidance Number 363-3134-008/Page 401)

SOIL NAME	SOIL WITH SLOPE CLASS	CUTBANKS CAVE	CORROSIVE TO CONCRETE\STEEL	DROUGHTY	EASILY ERODIBLE	FLOODING	DEPTH TO SATURATED ZONE/ SEASONAL HIGH WATER TABLE	HYDRIC/ HYDRIC INCLUSIONS	LOW STRENGTH / LANDSLIDE PRONE	SLOW PERCOLATION	PIPING	POOR SOURCE OF TOPSOIL	FROST ACTION	SHRINK - SWELL	POTENTIAL SINKHOLE	PONDING	WETNESS
Atkins	At	X	C/S			X	X	X	X	X	X	X	X				X
Barbour	Bb	X	C	X		X	X	X				X	X				X
Calvin	CaB	X	C	X	X			X			X		X				
Cookport	CpB, CpB	X	C/S	X	X		X	X	X	X	X	X	X				X
Freetown	Fr	X	C/S				X	X	X				X			X	
Hazleton	HmD, HoF	X	C	X	X			X	X	X	X	X	X				
Hustontown	HuB, HuD	X	C/S	X			X	X		X	X		X				
Laidig	LdC	X	C/S	X	X		X	X	X	X	X	X	X				
Linden	Lr	X	C			X	X	X	X	X	X		X				
Meckesville	MhD	X	C/S				X		X	X	X	X	X				X
Ungers	UnB, UpF	X	C		X				X	X			X				
Wharton	WeB, WgB	X	C/S		X		X	X	X	X	X	X	X	X			X

ACID–PRODUCING SOILS AND BEDROCK CONTROL PLAN

THE FOLLOWING ACID PRODUCING SOILS CONTROL PLAN WAS DEVELOPED TO IDENTIFY BMPS AND PROCEDURES FOR MINIMIZING THE POTENTIAL FOR POLLUTION ASSOCIATED WITH THE DISTURBANCE OF THE AREAS WITHIN THE PROPOSED RIGHT–OF–WAY THAT CONTAIN ACID–PRODUCING SOILS WITH A pH LESS THAN 4.0.

ACID–PRODUCING SOILS AND BEDROCK CONTROL PLAN:

1. CONTRACTOR SHALL LIMIT THE EXCAVATION AREA AND EXPOSURE TIME WHEN HIGH ACID–PRODUCING SOILS ARE ENCOUNTERED. LOCATIONS WHERE ACIDIC SOILS ARE ANTICIPATED TO BE PRESENT ALONG THE PIPELINE CORRIDOR ARE PROVIDED IN THE COUNTY–SPECIFIC TABLE INCLUDED AT THE END OF THIS PLAN SET.
2. CONTRACTOR SHALL SEPARATELY STORE TOPSOIL STRIPPED FROM THE SITE AWAY FROM TEMPORARILY STOCKPILED HIGH ACID–PRODUCING SOILS AND BEDROCKS.
3. CONTRACTOR SHALL STOCKPILE HIGH ACID–PRODUCING SOILS AND BEDROCK MATERIAL ON LEVEL GROUND TO MINIMIZE ITS MOVEMENT, ESPECIALLY WHEN THESE MATERIALS HAVE A HIGH CLAY CONTENT.
4. CONTRACTOR SHALL COVER TEMPORARILY STOCKPILED HIGH ACID–PRODUCING SOIL AND BEDROCK MATERIAL TO BE EXPOSED MORE THAN 30 DAYS WITH PROPERLY ANCHORED, HEAVY–GRATE SHEETS OF POLYETHYLENE, WHERE POSSIBLE. IF NOT POSSIBLE, STOCKPILES SHALL BE COVERED WITH A MINIMUM OF THREE TO SIX INCHES OF WOOD CHIPS TO MINIMIZE EROSION OF THE STOCKPILE. IN ADDITION, THE CONTRACTOR SHALL INSTALL SILT FENCE AT THE TOE OF THE STOCKPILE SLOPE TO CONTAIN MOVEMENT OF MATERIAL. CONTRACTOR SHALL NOT APPLY TOPSOIL TO THE HIGH ACID–PRODUCING SOIL OR BEDROCK STOCKPILES TO PREVENT TOPSOIL CONTAMINATION.
5. CONTRACTOR SHALL ULTIMATELY DISPOSE OF HIGH ACID–PRODUCING SOILS OR BEDROCK WITH A pH OF OUR OR LESS, OR CONTAINING IRON SULFIDE (INCLUDING BORROW FROM CUTS) BY PLACING THE MATERIAL COMBINED WITH LIMESTONE AT THE RATE OF 6 TONS PER ACRE (OR 275 POUNDS PER 1,000 SQUARE FEET OF SURFACE AREA) AND COVERING THE MIXTURE WITH A MINIMUM OF 12 INCHES OF SETTLED SOILS WITH A pH OF FIVE OR MORE EXCEPT AS FOLLOWS:
   a. IN THE AREAS WHERE TREES OR SHRUBS ARE TO BE PLANTED, THE CONTRACTOR SHALL COVER THE LIMESTONE/SOIL MIXTURE WITH A MINIMUM OF 24 INCHES OF SOILS WITH A pH OF 5 OR MORE.
   b. CONTRACTOR SHALL NOT LOCATE ANY DISPOSAL AREA WITHIN 24 INCHES OR ANY SURFACE OF A SLOPE OR BANK, SUCH AS BERMS, STREAM BANKS, DITCHES, AND OTHER SURFACE WATERS TO PREVENT POTENTIAL LATERAL LEACHING DAMAGES.
6. AT THE END OF EACH DAY, CONTRACTOR SHALL CLEAN ALL EQUIPMENT USED TO HANDLE HIGH ACID–PRODUCING SOILS OR BEDROCK TO PREVENT SPREADING OF HIGH–ACID MATERIALS TO OTHER PARTS OF THE PROPOSED RIGHT–OF–WAY, INTO STREAMS, OR STORMWATER CONVEYANCES, AND TO PROTECT MACHINERY FROM ACCELERATED CORROSION.
7. CONTRACTOR SHALL PROVIDE AND INSTALL NON–VEGETATIVE EROSION CONTROLS (STONE TRACKING PADS, STRATEGICALLY–PLACED LIMESTONE CHECK DAMS, SILT FENCES, WOOD CHIPS) TO LIMIT THE MOVEMENT OF HIGH ACID–PRODUCING SOILS FROM, AROUND, OR OFF OF THE PROPOSED RIGHT–OF–WAY.
8. FOLLOWING THE BURIAL OR REMOVAL OF HIGH ACID–PRODUCING SOILS AND BEDROCK, TOP SOILING, AND SEEDING OF THE PROPOSED RIGHT–OF–WAY, TRANSCO SHALL MONITOR THE SITE FOR APPROXIMATELY SIX TO 12 MONTHS TO ASSURE THERE IS ADEQUATE STABILIZATION AND THAT NO HIGH–ACID SOIL OR BEDROCK PROBLEMS EMERGE. CONTRACTOR SHALL CORRECT ANY PROBLEMS THAT ARE DISCOVERED WITHIN THIS TIME PERIOD.
9. IF PROBLEMS OCCUR WHERE HIGH ACID–PRODUCING SOILS OR BEDROCK HAVE BEEN PLACED OR BURIED, THE APPLICANT SHALL MONITOR THESE AREAS FOR AT LEAST TWO YEARS TO ASSURE THERE IS NO MIGRATION OF POTENTIAL ACID LEACHATE.

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL KEVIN C. CLARK ENGINEER 041211-E

PENNSYLVANIA PROFESSIONAL ENGINEER

designs, permits, resolutions WHM consulting, INC. | BA GROUP

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC Williams.
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

NOTES SHEET

LEIDY & CHAPMAN TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1 = 1
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19	DRAWING NUMBER: 26-1000-70-28-D	SHEET 26 OF 39
WO: 121227	RID:		

TABLE 11.2
Soil Amendment Application Rate Equivalents

Soil Amendment	Permanent Seeding Application Rate			Notes
	Per Acre	Per 1,000 sq. ft.	Per 1,000 sq. yd.	
Agricultural lime	6 tons	240 lb.	2,480 lb.	Or as per soil test; may not be required in agricultural fields
10-20-20 fertilizer	1,000 lb.	25 lb.	210 lb.	Or as per soil test; may not be required in agricultural fields
Temporary Seeding Application Rate				
Agricultural lime	1 ton	40 lb.	410 lb.	Typically not required for topsoil stockpiles
10-10-10 fertilizer	500 lb.	12.5 lb.	100 lb.	Typically not required for topsoil stockpiles

Adapted from Penn State, "Erosion Control and Conservation Plantings on Noncropland"

NOTE: A compost blanket which meets the standards of this chapter may be substituted for the soil amendments shown in Table 11.2.

TABLE 11.3
Plant Tolerances of Soil Limitation Factors

Species	Growth Habit[1]	Tolerates				Minimum Seed Specifications[4]					
		Wet Soil	Dry Site	Low Fertility	Acid Soil (pH 5-5.5)[2]	Purity (%)	Ready Germ (%)	Hard Seed (%)	Total Germ (%)	Seeds/lb (1,000s)
Warm-Season Grasses										
Deertongue	bunch	yes	yes	yes	yes	95	75		75	250
Weeping lovegrass	bunch	no	yes	yes	yes	97	75		75	1,500
Switchgrass[5]	bunch	yes	yes	yes	yes		(60 PLS)			390
Big bluestem	bunch	no	yes	yes	yes		(60 PLS)			150
Cool-Season Grasses										
Tall Fescue	bunch	yes	no	yes	no	95	80		80	227
Redtop	sod	yes	yes	yes	yes	92	80		80	5,000
Fine fescues	sod	no	no	yes	no	95	80		80	400
Perennial ryegrass	bunch	yes	no	no	no	95	85		85	227
Annual ryegrass	bunch	yes	no	yes	no	95	85		85	227
Kentucky bluegrass	sod	no	no	no	no	85	75		75	2,200
Reed canarygrass	sod	yes	yes	yes	no	95	70		70	520
Orchardgrass	bunch	yes	yes	yes	yes	95	80		80	654
Timothy	bunch	yes	no	yes	yes	95	80		80	1,230
Smooth bromegrass	sod	no	yes	yes	no	95	80		80	136
Legumes[6]										
Birdsfoot trefoil[7]	bunch	yes	no	yes	yes	98	60	20	80	400
Flatpea	sod	no	no	yes	yes	98	55	20	75	10
Serecia lespedeza	bunch	no	yes	yes	yes	98	60	20	80	335
Cereals										
Winter wheat	bunch	no	no	no	no	98	85		85	15
Winter rye	bunch	no	no	yes	yes	98	85		85	18
Spring oats	bunch	no	no	no	no	98	85		85	13
Sundangrass	bunch	no	yes	no	no	98	85		85	55
Japanese millet	bunch	yes	no	yes	yes	98	80		80	155

[1] Growth habit refers to the ability of the species to either form a dense sod by vegetative means (stolons, rhizomes, or roots) or remain in a bunch or single plant form. If seeded heavily enough, even bunch formers can produce a very dense stand. This is sometimes called a sod, but not in the sense of a sod formed by vegetative means.

[2] Once established, plants may grow at a somewhat lower pH, but cover generally is only adequate at pH 6.0 or above.

[3] *Minimum seed lots are truly minimum, and seed lots to be used for revegetation purposes should equal or exceed these standards.* Thus, deertongue grass should germinate 75% or better. Crownvetch should have at least 40% readily germinable seed and 30% hard seed. Commonly, seed lots are available that equal or exceed minimum specifications. Remember that disturbed sites are adverse for plant establishment. Ready germination refers to seed that germinates during the period of the germination test and that would be expected, if conditions are favorable, to germinate rapidly when planted. The opposite of ready germination is dormant seed, of which hard seed is one type.

[4] Switchgrass seed is sold only on the basis of PLS.

[5] Need specific legume inoculant. Inoculant suitable for garden peas and sweetpeas usually is satisfactory for flatpea.

[6] Birdsfoot trefoil is adapted over the entire state, except in the extreme southeast where crown and root rots may injure stands.

Penn State, "Erosion Control and Conservation Plantings on Noncropland,"

TABLE 11.4
Recommended Seed Mixtures

Mixture Number	Species	Seeding Rate - Pure Live Seed [1]	
		Most Sites	Adverse Sites
1[2]	Spring oats (spring), or	64	96
	Annual ryegrass (spring or fall), or	10	15
	Winter wheat (fall), or	90	120
	Winter rye (fall)	56	112
2[3]	Tall fescue, or	60	75
	Fine fescue, or	35	40
	Kentucky bluegrass, plus	25	30
	Redtop[4], or	3	3
	Perennial ryegrass	15	20
3	Birdsfoot trefoil, plus	6	10
	Tall fescue	30	35
4	Birdsfoot trefoil, plus	6	10
	Reed canarygrass	10	15
8	Flatpea, plus	20	30
	Tall fescue, or	20	30
	Perennial ryegrass	20	25
9[6]	Serecia lespedeza, plus	10	20
	Tall fescue, plus	20	25
	Redtop[4]	3	3
10	Tall fescue, plus	40	60
	Fine fescue	10	15
11	Deertongue, plus	15	20
	Birdsfoot trefoil	6	10
12[7]	Switchgrass, or	15	20
	Big Bluestem, plus	15	20
	Birdsfoot trefoil	6	10
13	Orchardgrass, or	20	30
	Smooth bromegrass, plus	25	35
	Birdsfoot trefoil	6	10

Penn State, "Erosion Control and Conservation Plantings on Noncropland"

1. PLS is the product of the percentage of pure seed times percentage germination divided by 100. For example, to secure the actual planting rate for switchgrass, divide 12 pounds PLS shown on the seed tag. Thus, if the PLS content of a given seed lot is 35%, divide 12 PLS by 0.35 to obtain 34.3 pounds of seed required to plant one acre. All mixtures in this table are shown in terms of PLS.
2. If high-quality seed is used, for most sites seed spring oats at a rate of 2 bushels per acre, winter wheat at 11.5 bushels per acre, and winter rye at 1 bushel per acre. If germination is below 90%, increase these suggested seeding rates by 0.5 bushel per acre.
3. This mixture is suitable for frequent mowing. Do not cut shorter than 4 inches.
4. Keep seeding rate to that recommended in table. These species have many seeds per pound and are very competitive. To seed small quantities of small seeds such as weeping lovegrass and redtop, dilute with dry sawdust, sand, rice hulls, buckwheat hulls, etc.
5. Use for highway slopes and similar sites where the desired species after establishment is crownvetch.
6. Use only in extreme southeastern or extreme southwestern Pennsylvania. *Serecia lespedeza* is not well adapted to most of PA.
7. Do not mow shorter than 9 to 10 inches.
8. Seed mixtures containing crown vetch should not be used in areas adjacent to wetlands or stream channels due to the invasive nature of this species.

TABLE 11.5
Recommended Seed Mixtures for Stabilizing Disturbed Areas

Site Condition	Nurse Crop	Seed Mixture (Select one mixture)
Slopes and Banks (not mowed)		
Well-drained	1 plus	3, 8, or 12[1]
Variable drainage	1 plus	3
Slopes and Banks (mowed)		
Well-drained	1 plus	2 or 10
Slopes and Banks (grazed/hay)		
Well-drained	1 plus	2, 3, or 13
Gullies and Eroded Areas	1 plus	3, or 12[1]
Erosion Control Facilities (BMPs)		
Sod waterways, spillways, frequent water flow areas	1 plus	2, 3, or 4
Drainage ditches		
Shallow, less than 3 feet deep	1 plus	2, 3, or 4
Deep, not mowed	1 plus	
Pond banks, dikes, levees, dams, diversion channels, And occasional water flow areas		
Mowed areas	1 plus	2 or 3
Non-mowed areas	1 plus	
For hay or silage on diversion channels and occasional water flow areas	1 plus	3 or 13
Highways [2]		
Non-mowed areas		
Well-drained	1 plus	8, 9, or 10
Variable drained	1 plus	3
Poorly drained	1 plus	3 or 4
Areas mowed several times per year	1 plus	2, 3, or 10
Utility Right-of-way		
Well-drained	1 plus	8, or 12[1]
Variable drained	1 plus	3
Well-drained areas for grazing/hay	1 plus	2, 3, or 13
Effluent Disposal Areas	1 plus	3 or 4
Sanitary Landfills	1 plus	3, 5, 11[1], or 12[1]
Surface mines		
Spoils, mine wastes, fly ash, slag, settling basin		
Residues and other severely disturbed areas (lime to soil test)	1 plus	3, 4, 8, 9, 11[1], or 12[1]
Severely disturbed areas for grazing/hay	1 plus	3 or 13

Penn State, "Erosion Control and Conservation Plantings on Noncropland"

1. For seed mixtures 11 and 12, only use spring oats or weeping lovegrass (included in mix) as nurse crop.
2. Contact the Pennsylvania Department of Transportation district roadside specialist for specific suggestions on treatment techniques and management practices.
3. Seed mixtures containing crown vetch should not be used in areas adjacent to wetlands or stream channels due to the invasive nature of this species.

TABLE 11.6
Mulch Application Rates

Mulch Type	Application Rate (Min.)		
	Per Acre	Per 1,000 sq. ft.	Per 1,000 sq. yd.
Straw	3 tons	140 lb.	1,240 lb.
Hay	3 tons	140 lb.	1,240 lb.
Wood Chips	4 - 6 tons	185 - 275 lb.	1,650 - 2,500 lb.
Hydromulch	1 ton	47 lb.	415

Notes:

1. Shredded paper hydromulch should not be used on slopes steeper than 5%. Wood fiber hydromulch may be applied on steeper slopes provided a tackifier is used. The application rate for any hydromulch should be 2,000 lb/acre at a minimum.
2. Mulch on slopes of 8% or steeper should be held in place with netting. Lightweight plastic, fiber, or paper nets may be stapled over the mulch according to manufacturer's recommendations.
3. Synthetic binders, or chemical binders, may be used as recommended by the manufacturer to anchor mulch provided sufficient documentation is provided to show they are non-toxic to native plant and animal species.
4. Polymeric and gum tackifiers mixed and applied according to manufacturer's recommendations may be used to tack mulch. Avoid application during rain and on windy days. A 24-hour curing period and a soil temperature higher than 45O F are typically required. Application should generally be heaviest at edges of seeded areas and at crests of ridges and banks to prevent loss by wind. The remainder of the area should have binder applied uniformly. Binders may be applied after mulch is spread or sprayed into the mulch as it is being blown onto the soil. Applying straw and binder together is generally more effective.
5. Straw and hay mulch should be anchored or tackified immediately after application to prevent being windblown. A tractor-drawn implement may be used to "crimp" the straw or hay into the soil — about 3 inches. This method should be limited to slopes no steeper than 3H:1V. The machinery should be operated on the contour. Note: Crimping of hay or straw by running over it with tracked machinery is not recommended.

Wetland - Seed Mix

Leidy South Project by Transcontinental Gas Pipe Line Company, LLC
Sproul State Forest
Chapman and Leidy Townships, Clinton County

Table 3
Wetlands / Riparian Areas - Native Seed Mix

Areas with Less than 15% Slope	
Location: Utilize this seed mix application between Mile Posts 192.9 (leaving Lines A & B) and 193.2 (S.R. 144).	
35% Fox Sedge (*Carex vulpinoidea*)	Seeding Rate: twenty (20) lbs. per acre
15% Riverbank wildrye (*Elymus riparius*)	
10% Lurid sedge (*Carex lurida*)	
10% Hop sedge (*Carex lupulina*)	
10% Juncus effusus (*Soft rush*)	
5% Blue vervain (*Verbena hastata*)	
5% Pointed broom sedge (*Carex scoparia*)	
3% Woolgrass (*Scirpus cyperinus*)	
2% Swamp milkweed (*Asclepias incarnata*)	
2% Hollow Joe-pye weed (*Eupatorium fistulosum*)	
1% Sneezeweed (*Helenium autumnale*)	
1% Allegheny monkeyflower (*Mimulus ringens*)	
1% Turtlehead (*Chelone glabra*)	
PA Ecotype is to be specified for all species. All quantities are given Pure Live Seed (PLS).	

1. Erosion control blankets must be completely biodegradable made of a substance such as jute matting; *Synthetic materials* **(i.e. monofilament, polypropylene, etc.)** *based erosion control blankets are prohibited.*
   a. If utilizing Curlex material, the blankets must be of a natural material; and,
   b. Care must be taken not to allow Curlex "tenting" or the separation of the seed from soil contact.
2. Mulch must be weed free (e.g. apply wheat straw as opposed to hay).
3. When ordering quantities of all native species, ensure to specify "*Pounds live seed*."
4. The seed mix tags must be presented to the District Forester immediately following planting.
5. The *Native Wetland Seed Mix* is to be applied in spring (April – May), if reclamation projects begin outside of the planting window, apply a cover crop then return the following spring to apply this mix.
6. Mulch must be weed free; an example is wheat straw as opposed to hay. Densely applied mulch must be avoided in wetlands and riparian areas.
7. Avoid the use of lime fertilizer in the wetland mix.

Area of Application: Mile Post: 192.9 (Racoon Lane) to Mile Post 193.2 (State Route 144)

Maintained Right-of-Way: Standard Seed Mix

Licensee shall apply this seed mix as described in Table 1 to the maintained Right-of-Way corridor; and,

1) Use one (1) bushel of winter grain rye per acre as nurse crop; use winter wheat in place of grain rye.
2) All erosion control blankets must be completely biodegradable and made of a substance such as jute matting; the use of monofilament based erosion control blankets is prohibited on state forests.
3) Mulch must be weed free such as wheat straw applied to one hundred (100) bales of straw per acre; the use of hay is prohibited.
4) Seeding must take place in the Spring (May) or Fall (September). If the project is completed outside either of these planting windows, a cover crop shall be applied until the appropriate time.

Table 1

Areas with Less than 15% Slope	
Lime	3 tons per acre
Fertilizer	500 pounds of 10-20-20 per acre
Big bluestem (*Andropogon gerardii*)	2 pounds per acre
Little bluestem (*Schizachyrium scoparium*)	2 pounds per acre
White Clover (*Ladino*)	8 pounds per acre
Timothy (*Phleum pratense*)	4 pounds per acre
Canadian Wildrye (*Elymus canadensis*)	6 pounds per acre
Partridge Pea (*Chamaecrista fasciculata*)	2 pounds per acre
Black-eyed Susan *(Rudbeckia hirta)*	0.5 pound per acre
Annual ryegrass	8 pounds per acre
Deertongue (*Panicum clandestinum*)	3 pounds per acre
Areas with Greater than 15% Slope	
Lime	3 tons per acre
Fertilizer	500 pounds of 10-20-20 per acre
Big bluestem *(Andropogon gerardii)*	3 pounds per acre
Little bluestem (*Schizachyrium scoparium*)	3 pounds per acre
Indiangrass (*Sorghastrum nutans*)	3 pounds per acre
Switchgrass (*Panicum virgatum*)	2 pounds per acre (Blackwell Variety)
Canadian Wild Rye (*Elymus canadensis)*	6 pounds per acre
White Clover (*Ladino)*	8 pounds per acre
Timothy (*Phleum pratense*)	6 pounds per acre
Annual ryegrass	20 pounds per acre
Deertongue (*Panicum clandestinum*)	5 pounds per acre
Black-eyed Susan *(Rudbeckia hirta)*	1 pound per acre
Partridge Pea (*Chamaecrista fasciculata*)	2 pounds per acre

Temporary Workspace Seed Mix

Licensee shall apply this seed mix described in Table 2 to temporary workspace or additional temporary workspace areas not a part of the maintained Right-of-Way corridor; and,

1) All erosion control blankets must be completely biodegradable and made of a substance such as jute matting; the use of monofilament-based erosion control blankets is prohibited on state forests.
2) Mulch must be weed free such as wheat straw applied to one hundred (100) bales of straw per acre; the use of hay is prohibited.
3) Seeding must take place in the Spring (May) or Fall (September). If the project is completed outside either of these planting windows, a cover crop shall be applied until the appropriate time.

Table 2

Common Name	#PLS/acre	PLS/sq ft	% of Mix
Big bluestem (*Andropogon gerardii*)	2.0	6.0	10%
Little bluestem (*Schizachyrium scoparium*)	0.8	4.8	8%
White Clover (*Ladino*)	1.1	21.0	35%
Timothy (*Phleum pratense*)	0.6	18.0	30%
Canadian Wildrye (*Elymus canadensis)*	1.1	3.0	5%
Partridge Pea (*Chamaecrista fasciculata*)	1.3	1.8	3%
Black-eyed Susan *(Rudbeckia hirta)*	0.1	2.4	4%
Deertongue (*Panicum clandestinum*)	0.33	3.0	5%
Total	7.33	60	100%
Annual ryegrass	10 pounds per acre		

#PLS = pounds live seed mix

ERNST - FACW MEADOW MIX (ENST-122)		
(Application Rate - 20 pounds per acre)		
Percent	*Scientific Name*	*Common Name*
33.20%	*Carex vulpinoidea*	Fox Sedge
20.00%	*Elymus virginicus*	Virginia Wildrye
8.00%	*Carex lupulina*	Hop Sedge
8.00%	*Carex lurida*	Lurid Sedge
8.00%	*Carex scoparia*	Blunt Broom sedge
4.00%	*Verbena hastata*	Blue Vertain
3.00%	*Cinna arundinacea*	Wood Reedgrass
3.00%	*Juncus effusus*	Soft Rush
2.50%	*Asclepias incarnata*	Swamp Milkweed
2.00%	*Heliopsis helianthoides*	Oxeye Sunflower
1.20%	*Aster puniceus*	Purplestem Aster
1.20%	*Aster umbellatus*	Flap Topped White Aster
1.00%	*Eupatorium perfoliatum*	Boneset
1.00%	*Helenium autumnale*	Common Sneezeweed
0.60%	*Aster novae-angliae*	New England Aster
0.50%	*Alisma Subcordatum*	Mud Plantain
0.50%	*Lobelia siphilitica*	Great Blue Lobelia
0.50%	*Penthorum sedoides*	Ditch Stonecrop
0.50%	*Scirpus atrovirens*	Green Bulrush
0.50%	*Scirpus cyperinus*	Woolgrass
0.30%	*Eupatorium fistulosum*	Joe Pye Weed
0.30%	*Onoclea sensibils*	Sensitive Fern
0.10%	*Chelone glabra*	Turtlehead
0.10%	*Mimulus ringens*	Square Stemmed Monkeyflower

ERNST RIPARIAN BUFFER MIX - ERNMX 178		
PERCENTAGE OF MIX COMPOSITION	SCIENTIFIC NAME	COMMON NAME
30.0%	*PANICUM CLANDESTINUM*	DEERTONGUE
20.0%	*ELYMUS VIRGINICUS*	VIRGINIA WILDRYE
11.8%	*ANDROPOGON GERARDII*	BIG BLUESTEM
10.5%	*SORGHASTRUM NUTANS*	INDIANAGRASS
5.0%	*PANICUM VIRGATUM*	SWITCHGRASS
4.0%	*CHAMAECRISTA FASCICULATA*	PARTRIDGE PEA
4.0%	*VERBENA HASTATA*	BLUE VERVAIN
3.0%	*JUNCUS EFFUSUS*	SOFT RUSH
3.0%	*RUDBECKIA HIRTA*	BLACKEYED SUSAN
2.0%	*HELIOPSIS HELIANTHOIDES*	OXEYE SUNFLOWER
1.0%	*ASCLEPIAS INCARNATA*	SWAMP MILKWEED
0.7%	*ASTER NOVAE-ANGLIAE*	NEW ENGLAND ASTER
0.7%	*ASTER UMBELLATUS*	FLAT TOPPED WHITE ASTER
0.7%	*EUPATORIUM PERFOLIATUM*	BONESET
0.5%	*AGROSTIS PERENNANS*	AUTUMN BENTGRASS
0.5%	*HELENIUM AUTUMNALE*	COMMON SNEEZEWEED
0.5%	*MONARDA FISTULOSA*	WILD BERGAMOT
0.5%	*VERNONIA NOVEBORACENSIS*	NEW YORK IRONWEED
0.4%	*PYCNANTHEMUM TENUIFOLIUM*	NARROWLEAF MOUNTAINMINT
0.4%	*SOLIDAGO PATULA*	ROUGHLEAF GOLDENROD
0.3%	*EUPATORIUM FISTULOSUM*	JOE PYE WEED
0.3%	*LOBELIA SIPHILITICA*	GREAT BLUE LOBELIA
0.2%	*ASTER PUNICEUS*	PURPLESTEM ASTER

1. SEEDING RATE: 20 LBS/ACRE WITH A COVER CROP AT 30 LBS/ACRE
2. THIS SEED MIX IS TO BE USED TO REVEGETATE WORKSPACE WITHIN THE DESIGNATED 150' RIPARIAN BUFFER AREA WHERE SLOPES ARE LESS THAN 10% . IF THE SLOPE EXCEEDS 10% , A STANDARD UPLAND ROW MIX SHOULD BE USED.
3. AN ALTERNATIVE SEED MIXTURE THAT CONTAINS SIMILAR SPECIES IS ACCEPTABLE.

TEMPORARY AND PERMANENT STABILIZATION:

1. PERMANENT STABILIZATION: UPON FINAL COMPLETION OF AN EARTH DISTURBANCE ACTIVITY OR ANY STAGE OR PHASE OF AN ACTIVITY, THE SITE SHALL IMMEDIATELY HAVE TOPSOIL RESTORED, REPLACED, OR AMENDED, SEEDED, WITH SEED MIXTURE 1 PLUS 3 FROM TABLE 11.4 (OR APPROVED ALTERNATIVE), ON PRIVATE LANDS AND DCNR RECOMMENDED SEED MIXTURES ON SPROUL STATE FOREST, MULCHED OR OTHERWISE PERMANENTLY STABILIZED AND PROTECTED FROM ACCELERATED EROSION AND SEDIMENTATION.

   E&S BMPS SHALL BE IMPLEMENTED AND MAINTAINED UNTIL THE PERMANENT STABILIZATION IS COMPLETED. ONCE PERMANENT STABILIZATION HAS BEEN ESTABLISHED, THE TEMPORARY E&S BMPS SHALL BE REMOVED. ANY AREAS DISTURBED IN THE ACT OF REMOVING TEMPORARY E&S BMPS SHALL BE PERMANENTLY STABILIZED UPON COMPLETION OF THE TEMPORARY E&S BMP REMOVAL ACTIVITY.

   FOR AN EARTH DISTURBANCE ACTIVITY OR ANY STAGE OR PHASE OF AN ACTIVITY TO BE CONSIDERED PERMANENTLY STABILIZED, THE DISTURBED AREAS SHALL BE COVERED WITH ONE OF THE FOLLOWING:

   - A MINIMUM UNIFORM 70% PERENNIAL VEGETATIVE COVER, WITH A DENSITY CAPABLE OF RESISTING ACCELERATED EROSION AND SEDIMENTATION.
   - AN ACCEPTABLE BMP WHICH PERMANENTLY MINIMIZES ACCELERATED EROSION AND SEDIMENTATION.

   WHEN EROSION AND SEDIMENTATION CONTROLS ARE TO BE REMOVED IN AGRICULTURAL NON–SENSITIVE AREAS (STREAMS/WETLANDS), AGRICULTURAL LANDOWNERS SHALL MAINTAIN AGRICULTURAL BMPS PER PADEP REGULATIONS.

2. TEMPORARY STABILIZATION: UPON TEMPORARY CESSATION OF AN EARTH DISTURBANCE ACTIVITY OR ANY STAGE OR PHASE OF AN ACTIVITY WHERE A CESSATION OF EARTH DISTURBANCE ACTIVITIES WILL EXCEED 4 DAYS (INCLUDING AGRICULTURAL AREAS), THE SITE SHALL BE IMMEDIATELY SEEDED, MULCHED, OR OTHERWISE PROTECTED FROM ACCELERATED EROSION AND SEDIMENTATION PENDING FUTURE EARTH DISTURBANCE ACTIVITIES.

   FOR AN EARTH DISTURBANCE ACTIVITY OR ANY STAGE OR PHASE OF AN ACTIVITY TO BE CONSIDERED TEMPORARILY STABILIZED, THE DISTURBED AREAS SHALL BE COVERED WITH ONE OF THE FOLLOWING:

   - A MINIMUM UNIFORM COVERAGE OF MULCH AND SEED, WITH A DENSITY CAPABLE OF RESISTING ACCELERATED EROSION AND SEDIMENTATION.
   - AN ACCEPTABLE BMP WHICH TEMPORARILY MINIMIZES ACCELERATED EROSION AND SEDIMENTATION.

3. STABILIZATION DURING NON–GROWING SEASONS

   WHEN UTILITY CONSTRUCTION MUST BE DONE AND IS COMPLETED DURING A NON–GROWING SEASON, INTERIM STABILIZATION BMPS MUST BE IMPLEMENTED AND ADEQUATELY MAINTAINED. THE APPLICATION OF STRAW MULCH AND THE RATE OF 3.0 TONS PER ACRE IS REQUIRED. THE BMPS SHOULD BE INSPECTED WEEKLY (UNLESS SNOW COVERED) AND AFTER EACH RUNOFF EVENT TO IDENTIFY AREAS THAT BECOME BARE.

   BARE AREAS SHALL BE COVERED WITH A PROPERLY INSTALLED EROSION CONTROL BLANKET. ALL TEMPORARY EROSION AND SEDIMENT POLLUTION CONTROLS MUST BE MAINTAINED UNTIL PERMANENT VEGETATION IS ESTABLISHED.

4. WETLAND STABILIZATION. TEMPORARY COVER FOR WETLANDS AREAS WILL INCLUDE ANNUAL RYEGRASS AT 40LBS/ACRE. DO NOT LIME, FERTILIZE OR MULCH WETLAND AREAS. PERMANENT WETLAND MIX IS ERNST 122 FACW MEADOW MIX AT 20 LB/ACRE.

5. RIPARIAN BUFFER STABILIZATION – TEMPORARY COVER FOR RIPARIAN AREAS TO INCLUDE SEED FROM MIXTURE 1 FROM TABLE 11.4, AT THE OUTLINED SEEDING RATE. PERMANENT COVER FOR RIPARIAN AREAS WILL INCLUDE 30LBS/ACRE OF ERNST 178 RIPARIAN BUFFER MIX. WHERE SLOPES EXCEED 10% THE PERMANENT MIX SHALL BE SEED MIXTURE 3 (OR APPROVED ALTERNATIVE) OR PRIVATE LANDS AND DCNR RECOMMENDED SEED MIXTURES ON SPROUL STATE FOREST. EROSION CONTROL BLANKET IS TO BE UTILIZED ALONG STREAM BANKS, AS OUTLINED IN THE ECB DETAIL. ADD LIME AND FERTILIZER AS OUTLINED IN TABLE 11.2. ADD LIME AND FERTILIZER AS OUTLINED IN TABLE 11.2.

KEVIN C. CLARK, P.E.
COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
KEVIN C. CLARK
ENGINEER
047271-E
PENNSYLVANIA PROFESSIONAL ENGINEER

WHM consulting, INC. (designs, permits, resolutions) | BA GROUP

REVISIONS

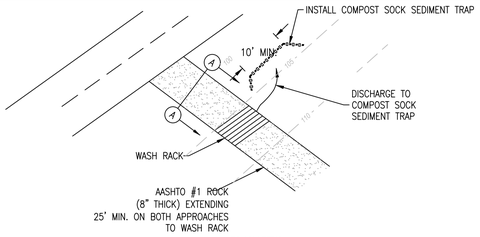
NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

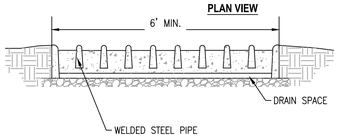
NOTES SHEET

LEIDY & CHAPMAN TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

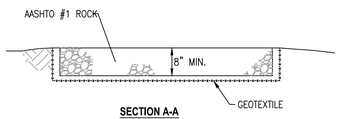
DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1 = 1
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	SHEET 27 OF 39



PLAN VIEW



WASH RACK

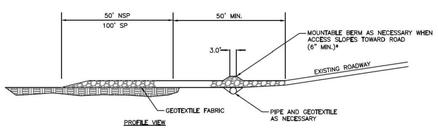


SECTION A-A

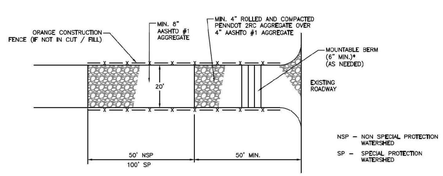
NOTE:
1) WASH RACK SHALL BE 20 FEET (MIN.) WIDE OR TOTAL WIDTH OF ACCESS, WHICHEVER IS GREATER.
2) WASH RACK SHALL BE CONSTRUCTED TO ACCOMMODATE ANTICIPATED CONSTRUCTION VEHICULAR TRAFFIC.
3) A WATER SUPPLY SHALL BE MADE AVAILABLE TO WASH THE WHEELS OF ALL VEHICLES EXITING THE SITE.
4) MAINTENANCE: ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE OF ROCK MATERIAL SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE DRAIN SPACE UNDER WASH RACK SHALL BE KEPT OPEN AT ALL TIMES. DAMAGE TO THE WASH RACK SHALL BE REPAIRED PRIOR TO FURTHER USE OF THE RACK. ALL SEDIMENT DEPOSITED ON ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. WASHING THE ROADWAYS OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.

CONSTRUCTION ENTRANCE
TEMPORARY EROSION CONTROL MEASURE

Example Alternative Rock Construction Entrance



PROFILE VIEW



PLAN VIEW

NOTES:

1) REMOVE TOPSOIL PRIOR TO INSTALLATION OF ROCK CONSTRUCTION ENTRANCE. EXTEND ROCK OVER FULL WIDTH OF ENTRANCE.
2) MOUNTABLE BERM SHALL BE INSTALLED WHEREVER OPTIONAL CULVERT PIPE IS USED AND PROPER PIPE COVER AS SPECIFIED BY MANUFACTURER IS NOT OTHERWISE PROVIDED. PIPE SHALL BE SIZED APPROPRIATELY FOR SIZE OF DITCH BEING CROSSED.
3) MAINTENANCE: ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE. ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY. IF EXCESSIVE AMOUNTS OF SEDIMENT ARE BEING DEPOSITED ON ROADWAY, EXTEND LENGTH OF ROCK CONSTRUCTION ENTRANCE BY 50 FOOT INCREMENTS UNTIL CONDITION IS ALLEVIATED OR INSTALL WASH RACK. WASHING THE ROADWAY OR SWEEPING THE DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.
4) STREET SWEEPING ON PAVED ROADS
   a. USE A VACUUM TRUCK SWEEPER OR SWEEPER WITH A CATCH BIN ATTACHMENT.
   b. AT A MINIMUM – ANY DAY IN WHICH CONSTRUCTION TRAFFIC IS EXITING THE ROCK CONSTRUCTION ENTRANCE, THE VACUUM TRUCK SWEEPER OR SWEEPER WITH A CATCH BIN ATTACHMENT SHALL CLEAN THE ROAD WAY AT THE END OF THE WORK DAY AND PRIOR TO ANY FORECASTED RAIN EVENT.
5) STREET SWEEPING ON DIRT OR GRAVEL SURFACE PUBLIC ROADS
   a. RIGOROUS MANUAL REMOVAL OF MUD/DIRT FROM VEHICLE/EQUIPMENT TIRES PRIOR TO EXITING CONSTRUCTION SITE, SUPPLEMENTED BY IMMEDIATE RECOVERY, BY MANUAL OR MECHANICAL MEANS, OF SOIL WHICH MAY BECOME DISCHARGED ONTO PUBLIC ROADWAYS. DUST CONTROL AND/OR COMPACTION VIA ROLLING OF THE DIRT PUBLIC ROAD SURFACE WILL BE IMPLEMENTED AS NEEDED.

CONSTRUCTION ENTRANCE (ALTERNATIVE)
TEMPORARY EROSION CONTROL MEASURE

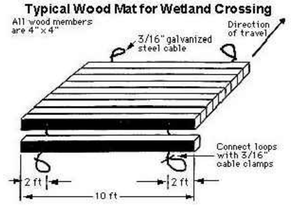
PENNSYLVANIA

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE CORPORATION
STANDARD ENVIRONMENTAL DETAIL
CE CONSTRUCTION ENTRANCE

NOTE: THIS WILLIAMS STANDARD DETAIL IS BASED ON PADEP FIGURE 3.07.

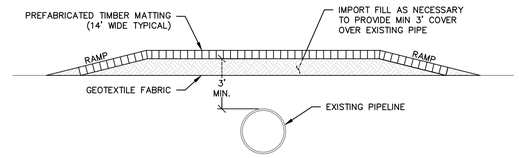
FIGURE 3.7
Typical Wood Mat for Wetland Crossing



University of Minnesota FS 07009
A geotextile underlayment shall be used under the wood mat.

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL
MAT.1 TIMBER MATTING CONSTRUCTION

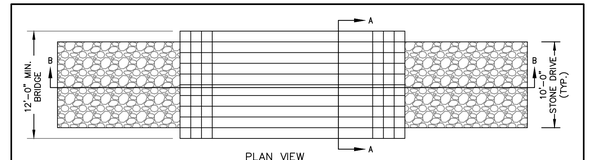


NOTES:

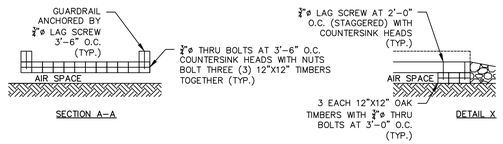
1. THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER TO DETERMINE THE NUMBER OF EQUIPMENT MATS REQUIRED.

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

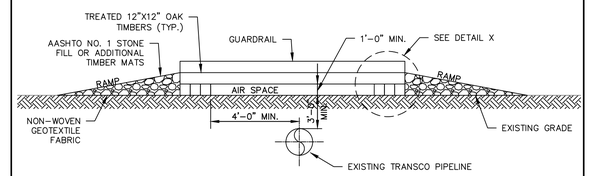
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL
MAT.2 TIMBER MATTING WITH FILL OVER EXISTING PIPELINES



PLAN VIEW



SECTION A–A DETAIL X



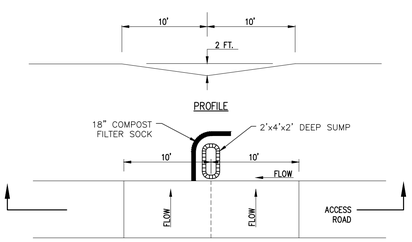
SECTION B–B

NOTES:

1. IF STONE USED FOR RAMP, INSTALL 1 (ONE) LAYER OF NON-WOVEN GEOTEXTILE FABRIC PRIOR TO INSTALLING THE STONE.
2. MINIMUM WIDTH OF BRIDGE IS 12'-0" WITH A 10'-0" WIDE STONE DRIVE.

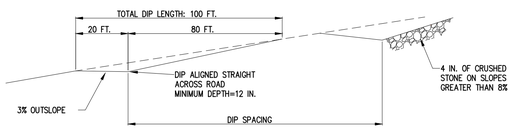
NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL
MAT.3 TIMBER MATTING AIR BRIDGE



PLAN

BROAD-BASED DIP – LOW GRADIENT (< 5%) ROADWAYS



PROFILE VIEW

BROAD-BASED DIP – HIGH GRADIENT (5% – 10%) ROADWAYS

NOTES:

1. BROAD-BASED DIPS SHALL BE CONSTRUCTED TO THE DIMENSIONS SHOWN AND AT THE LOCATIONS SHOWN ON THE PLAN DRAWINGS.
2. DIPS SHALL BE ORIENTED SO AS TO DISCHARGE TO THE LOW SIDE OF THE ROADWAY.
3. DIPS SHALL BE INSPECTED DAILY. DAMAGED OR NON-FUNCTIONING DIPS SHALL BE REPAIRED BY THE END OF THE WORKDAY.
4. MAXIMUM SPACING OF BROAD-BASED DIPS SHALL BE AS SHOWN IN TABLE 3.2.
5. *INSTALL A 2' WIDE BY 4' LONG BY 2' DEEP SUMP AND 18" COMPOST FILTER SOCK ON THE DOWNHILL SIDE OF THE BROAD BASED DIP. THE ORIENTATION OF THE COMPOST FILTER SOCK WILL VARY BASED ON EXISTING GROUND ELEVATIONS. INSTALL THE COMPOST PARALLEL TO EXISTING CONTOURS.*

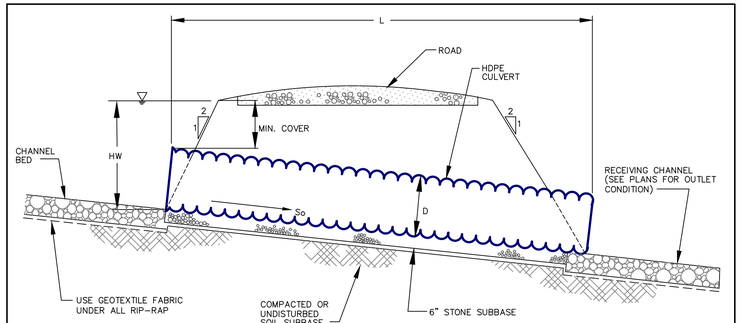
TABLE 3.2 – MAXIMUM SPACING OF BROAD-BASED DIPS

PERCENT SLOPE	SPACING BETWEEN BROAD-BASED DIPS (FT)
<2	300
3	235
4	200
5	180
6	165
7	155
8	150
9	145
10	140

USDA FOREST SERVICE

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL
BBD BROAD-BASED DIP



NOTES:

1. BARRELS SHALL BE PLACED AT THE MINIMUM SLOPE INDICATED FOR THE CHANNEL.
2. AN ADDITIONAL 0.5 OF FREEBOARD SHALL BE PROVIDED IN THE CHANNEL ON THE INVERT SIDE OF THE CULVERT.
3. IF MULTIPLE BARRELS ARE USED, THEY SHALL BE PLACED SUCH THAT THERE IS A MINIMUM OF 1 BARREL WIDTH BETWEEN.
4. CORRUGATED METAL OR HDPE MAY BE USED UPON EVALUATION BY AN ENGINEER.

ID	DRAINAGE AREA (AC)	REQ'D FLOW (CFS)	LENGTH (FT)	INLET INVERT (FT)	OUTLET INVERT (FT)	SLOPE (FT/FT)	NO. OF PIPES	PIPE DIAMETER (IN)
CULVERT #1	0.14	0.67	37.00	1686.2	1686.0	0.005	1	12

PENNSYLVANIA

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE CORPORATION
STANDARD ENVIRONMENTAL DETAIL
RC TYPICAL ACCESS ROAD CULVERT

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
KEVIN C. CLARK
ENGINEER
047217-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

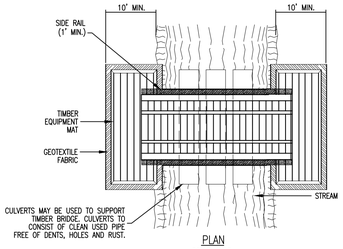
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

DETAILS SHEET

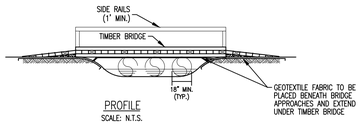
LEIDY & CHAPMAN TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1 = 1
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		SHEET 28
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	OF 39

designs, permits, resolutions WHM consulting, INC. BA GROUP



PLAN
SCALE: N.T.S.



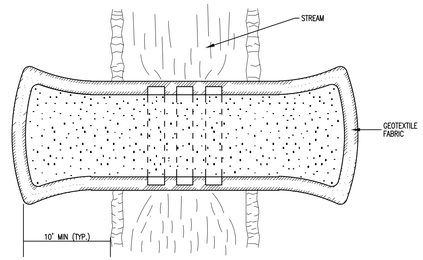
PROFILE
SCALE: N.T.S.

NOTES:

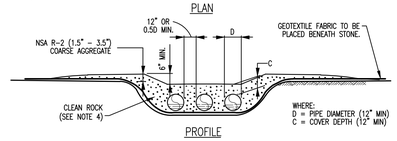
1. TIMBER BRIDGES SHALL BE ADEQUATELY ANCHORED AT BOTH ENDS.
2. PERIODICALLY CHECK BRIDGE INSTALLATION AND REMOVE BUILD-UP OF SEDIMENT OR DEBRIS ON BRIDGE.
3. BRIDGE APPROACHES SHALL BE TIMBER EQUIPMENT MATS.
4. MATERIALS PLACED ALONG STREAM CHANNEL SHALL BE COMPLETELY REMOVED DURING FINAL CLEAN-UP. REMOVAL OF THIS STRUCTURE IS NOT CONTINGENT UPON ESTABLISHMENT OF PERMANENT VEGETATION.
5. CULVERTS MAY BE USED TO SUPPORT THE TIMBER BRIDGE TO PREVENT SETTLEMENT OF THE BRIDGE, IF THE GEOMETRY OF THE STREAM ALLOWS FOR SUCH INSTALLATION. THE TIMBER BRIDGE AND GEOTEXTILE FABRIC SHALL REMAIN ABOVE THE WATER SURFACE ELEVATION AT ALL TIMES.
6. SIDE RAILS SHALL BE INSTALLED ON BOTH SIDES OF THE BRIDGE EQUIPMENT CROSSING IN ORDER TO PREVENT SEDIMENT FROM ENTERING THE WATERBODY. SIDE RAILS TO BE CONSTRUCTED OF PLYWOOD NAILED TO THE OUTER EDGES OF THE TIMBER EQUIPMENT MATS AND SHALL BE A MINIMUM HEIGHT OF 1'.
7. TIMBER EQUIPMENT MATS SHALL EXTEND A MINIMUM OF 10 FEET OUTSIDE OF THE WATERBODY OR WETLAND BOUNDARIES.
8. PIPES SHALL EXTEND BEYOND THE TOE OF THE ROADWAY.
9. RUNOFF FROM THE ROADWAY SHALL BE DIVERTED OFF THE ROADWAY AND INTO A SEDIMENT REMOVAL BMP BEFORE IT REACHES THE ROCK APPROACH TO THE CROSSING.
10. SUITABLE OUTLET PROTECTION SHOULD BE PROVIDED TO BE PREVENT SCOUR AT THE PIPE OUTLET. WHEREVER SOFT CHANNEL BED CONDITIONS EXIST, RIPRAP PROTECTION SHOULD ALSO BE PROVIDED AT THE CULVERT ENTRANCE.
11. AS SOON AS THE TEMPORARY CROSSING IS NO LONGER NEEDED IT SHALL BE REMOVED. ALL MATERIALS SHOULD BE DISPOSED OF PROPERLY AND DISTURBED AREAS STABILIZED.

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
1	4/20/20	KMC	ADDED 1' MIN. HEIGHT			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL
BEC — BRIDGE EQUIPMENT CROSSING (TIMBER MAT BRIDGE)
Williams



PLAN



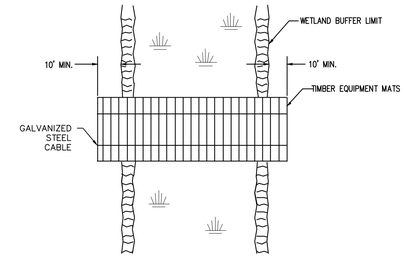
PROFILE

NOTES:

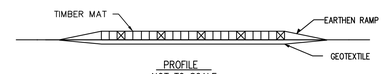
1. PERIODICALLY CHECK BRIDGE INSTALLATION AND REMOVE BUILD-UP OF SEDIMENT OR DEBRIS ON BRIDGE.
2. CULVERTS SHALL BE PLACED AT LEAST ONE-HALF (1/2) THEIR DIAMETER APART.
3. MATERIALS PLACED IN STREAM CHANNEL SHALL BE COMPLETELY REMOVED DURING FINAL CLEANUP-UP. REMOVAL OF THIS ITEM IS NOT CONTINGENT UPON ESTABLISHMENT OF PERMANENT VEGETATION.
4. RIPRAP (OR ROCK) TO 10" AVERAGE DIAMETER CAN BE USED FOR ALL BUT THE TOP 6" OF STONE FILL. THE TOP 6" MUST CONSIST OF NSA R-2 (1.5" - 3.5") COARSE AGGREGATE.
5. PROVIDE 50' STABILIZED ACCESS TO CROSSING ON BOTH SIDES OF STREAM (SEE DETAIL CE).
6. PIPES SHALL EXTEND BEYOND THE TOE OF THE ROADWAY.
7. RUNOFF FROM THE ROADWAY SHALL BE DIVERTED OFF THE ROADWAY AND INTO A SEDIMENT REMOVAL BMP BEFORE IT REACHES THE ROCK APPROACH TO THE CROSSING.
8. SUITABLE OUTLET PROTECTION SHOULD BE PROVIDED TO BE PREVENT SCOUR AT THE PIPE OUTLET. WHEREVER SOFT CHANNEL BED CONDITIONS EXIST, RIPRAP PROTECTION SHOULD ALSO BE PROVIDED AT THE CULVERT ENTRANCE.
9. AS SOON AS THE TEMPORARY CROSSING IS NO LONGER NEEDED IT SHALL BE REMOVED. ALL MATERIALS SHOULD BE DISPOSED OF PROPERLY AND DISTURBED AREAS STABILIZED.
10. NUMBER OF CULVERTS MAY VARY DEPENDING ON STREAM CHARACTERISTICS.

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
1	4/20/20	KMC	ADDED NOTE 10			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL
CEC — CULVERT EQUIPMENT CROSSING
Williams



PLAN
NOT TO SCALE



PROFILE
NOT TO SCALE

NOTES:

1. PERIODICALLY CHECK INSTALLATION AND REMOVE BUILD-UP OF SEDIMENT OR DEBRIS.
2. MATERIALS PLACED IN WETLANDS SHALL BE COMPLETELY REMOVED DURING FINAL CLEAN-UP. REMOVAL OF THIS STRUCTURE IS NOT CONTINGENT UPON ESTABLISHMENT OF PERMANENT VEGETATION.
3. IF A WATERBODY IS LOCATED WITHIN A WETLAND SYSTEM, EXTEND TIMBER EQUIPMENT MATS TO THE BRIDGE EQUIPMENT CROSSING (BEC) USED TO CROSS THE WATERBODY IN ORDER TO ALLOW FOR CONTINUOUS TIMBER EQUIPMENT MAT COVERAGE THROUGH THE WETLAND AND WATERBODY AREA.
4. USE ADDITIONAL TIMBER MAT LAYERS TO RAISE CROSSING ABOVE GRADE WHERE POOR SOIL CONDITIONS EXIST.
5. TIMBER EQUIPMENT MATS SHALL EXTEND A MINIMUM OF 10 FEET OUTSIDE OF THE WETLAND BOUNDARIES.
6. INSTALL EARTHEN RAMP APPROACHES TO TIMBER EQUIPMENT MATS. EARTHEN RAMPS TO BE CONSTRUCTED OF UPLAND MATERIAL, TOP SOIL SHALL NOT BE USED TO CONSTRUCT EARTHEN RAMPS.
7. A GEOTEXTILE UNDERLAYMENT SHALL BE USED UNDER THE WOOD MAT.

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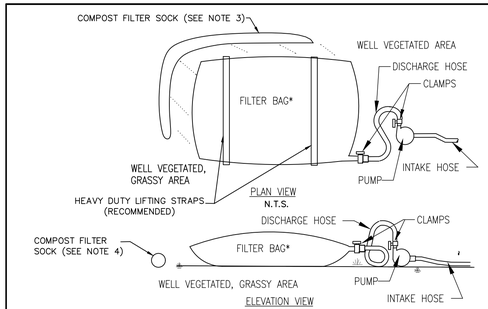
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL
WEC — WETLAND EQUIPMENT CROSSING
Williams



LOW VOLUME FILTER BAGS SHALL BE MADE FROM NON-WOVEN GEOTEXTILE MATERIAL SEWN WITH HIGH STRENGTH, DOUBLE STITCHED "J" TYPE. THEY SHALL BE CAPABLE OF TRAPPING PARTICLES LARGER THAN 150 MICRONS. HIGH VOLUME FILTER BAGS MAY BE MADE FROM WOVEN GEOTEXTILES THAT MEET THE FOLLOWING STANDARDS:

PROPERTY	TEST METHOD	MINIMUM STANDARD
AVG. WIDE WIDTH STRENGTH	ASTM D-4884	60 LB/IN
GRAB TENSILE	ASTM D-4632	205 LB
PUNCTURE	ASTM D-4833	110 LB
MULLEN BURST	ASTM D-3786	350 PSI
UV RESISTANCE	ASTM D-4355	70%
AOS % RETAINED	ASTM D-4751	80 SIEVE

NOTES:

1) A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES MUST BE PROVIDED. FILTER BAGS SHALL BE REPLACED WHEN THEY BECOME ½ FULL OF SEDIMENT. SPARE BAGS SHALL BE KEPT AVAILABLE FOR REPLACEMENT OF THOSE THAT HAVE FAILED OR ARE FILLED. BAGS TO BE PLACED ON STRAPS TO FACILITATE REMOVAL UNLESS BAGS COME WITH LIFTING STRAPS ALREADY ATTACHED.
2) BAGS SHALL BE LOCATED IN WELL-VEGETATED (GRASSY) AREA, AND DISCHARGE ONTO STABLE, EROSION RESISTANT AREAS. WHERE THIS IS NOT POSSIBLE, A GEOTEXTILE UNDERLAYMENT AND FLOW PATH SHALL BE PROVIDED. BAGS MAY BE PLACED ON FILTER STONE TO INCREASE DISCHARGE CAPACITY. BAGS SHALL NOT BE PLACED ON SLOPES GREATER THAN 5%. FOR SLOPES EXCEEDING 5%, CLEAN ROCK OR OTHER NON-ERODIBLE AND NON-POLLUTING MATERIAL MAY BE PLACED UNDER THE BAG TO REDUCE SLOPE STEEPNESS.
3) NO DOWNSLOPE SEDIMENT BARRIER IS REQUIRED FOR MOST INSTALLATIONS. COMPOST BERM OR COMPOST FILTER SOCK SHALL BE INSTALLED BELOW BAGS LOCATED IN HQ OR EV WATERSHEDS, WITHIN 50 FEET OF ANY RECEIVING SURFACE WATER OR WHERE GRASSY AREA IS NOT AVAILABLE.
4) THE PUMP DISCHARGE HOSE SHALL BE INSERTED INTO THE BAGS IN THE MANNER SPECIFIED BY THE MANUFACTURER AND SECURELY CLAMPED. A PIECE OF PVC PIPE IS RECOMMENDED FOR THIS PURPOSE.
5) THE PUMPING RATE SHALL BE NO GREATER THAN 750 GPM OR ½ THE MAXIMUM SPECIFIED BY THE MANUFACTURER, WHICHEVER IS LESS. PUMP INTAKES SHALL BE FLOATING AND SCREENED.
6) FILTER BAGS SHALL BE INSPECTED DAILY. IF ANY PROBLEM IS DETECTED, PUMPING SHALL CEASE IMMEDIATELY AND NOT RESUME UNTIL THE PROBLEM IS CORRECTED.
7) CONTRACTOR SHALL PROPERLY REMOVE AND PROPERLY DISPOSE OF USED FILTER BAGS UPON COMPLETION OF DEWATERING OPERATIONS.

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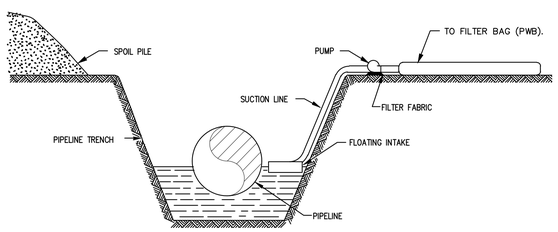
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL
PWB — PUMP WATER FILTER BAG
Williams



ELEVATION
N.T.S.

NOTES:

1. WATER PUMPED OUT OF TRENCH SHALL NOT BE DISCHARGED INTO WATERWAYS. WATER SHALL BE DISCHARGED INTO A FILTER BAG OR DEWATERING STRUCTURE.
2. PUMP SHALL BE CONTROLLED SO THAT DISCHARGE DOES NOT OVERFLOW DEWATERING STRUCTURE.
3. PUMP SUCTION HOSE MUST NOT BE ALLOWED TO COME IN CONTACT WITH TRENCH BOTTOM. PROVISIONS MUST BE MADE TO ELEVATE THE SUCTION HOSE TO AT LEAST ONE FOOT ABOVE THE BOTTOM OF THE PIPE TRENCH UNTIL BOTTOM DEWATERING IS NECESSARY.
4. DEWATERING SHALL NOT OCCUR DURING TIMES OF HEAVY RAINFALL EXCEPT AS REQUIRED TO PREVENT FLOODING OF CONSTRUCTION EQUIPMENT LOCATED IN BORE PITS AND TRENCHES.
5. PUMP WATER FILTER BAG (PWB) SHALL BE PLACED ON A WELL VEGETATED AREA AWAY FROM CONSTRUCTION SO THAT FILTERED WATER IS NOT RETURNED TO THE TRENCH.

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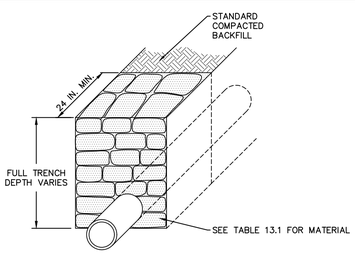
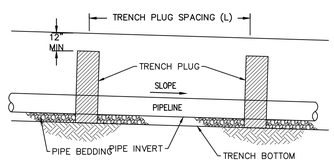
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL
TD — TRENCH DEWATERING
Williams



SECTION VIEW
NOT TO SCALE



PROFILE VIEW
NOT TO SCALE

TABLE 13.1
MAXIMUM SPACING AND MATERIALS FOR TRENCH PLUGS

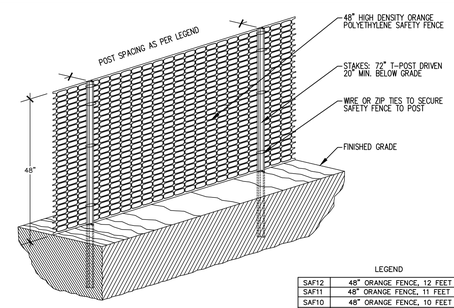
TRENCH SLOPE (%)	SPACING L (FT)	TRENCH PLUG MATERIAL FOR FILLED SACKS
<5	1,000	* CLAY, BENTONITE, OR CONCRETE FILLED SACKS
5 – 15	500	* CLAY, BENTONITE, OR CONCRETE FILLED SACKS
15 – 25	300	* CLAY, BENTONITE, OR CONCRETE FILLED SACKS
25 – 35	200	* CLAY, BENTONITE, OR CONCRETE FILLED SACKS
35 – 100	100	* CLAY, BENTONITE, OR CONCRETE FILLED SACKS
>100	50	CEMENT FILLED BAGS (WETTED) OR MORTARED STONE

*TOPSOIL MAY NOT BE USED TO FILL SACKS.

IMPERVIOUS TRENCH PLUGS ARE REQUIRED FOR ALL STREAM, RIVER, WETLAND, OR OTHER WATER BODY CROSSINGS. FOAM TRENCH PLUGS ARE AN APPROVED ALTERNATE E&S BMP.

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL
TP — TRENCH PLUG INSTALLATION
Williams



LEGEND

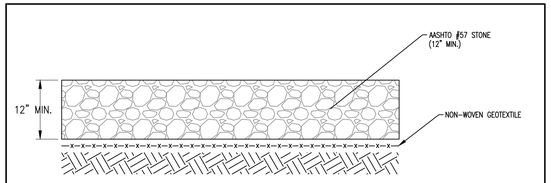
SAF12	48" ORANGE FENCE, 12 FEET O.C.
SAF11	48" ORANGE FENCE, 11 FEET O.C..
SAF10	48" ORANGE FENCE, 10 FEET O.C.
SAF9	48" ORANGE FENCE, 9 FEET O.C.
SAF8	48" ORANGE FENCE, 8 FEET O.C..
SAF7	48" ORANGE FENCE, 7 FEET O.C.
SAF6	48" ORANGE FENCE, 6 FEET O.C.

NOTES:

1. ALL SENSITIVE AREAS SHALL BE PROTECTED AS PER PLAN.
2. SAFETY FENCE SHOULD BE FASTENED SECURELY TO THE T-POSTS.
3. THE FENCING MUST REMAIN IN PLACE DURING ALL PHASES OF CONSTRUCTION; ANY CHANGE OF THE PROTECTIVE FENCING MUST BE APPROVED.

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE CORPORATION
STANDARD ENVIRONMENTAL DETAIL
SF — SAFETY FENCE
Williams



NOTES:

1. CROSS SECTION TO BE APPLIED TO DRY AREAS WITHOUT DRAINAGE CONCERNS.
2. EXISTING MATERIAL TO BE REMOVED AND STOCKPILED IN AN APPROVED LOCATION ONLY.
3. EXISTING DRAINAGE PATTERNS SHALL BE MAINTAINED IN ACCORDANCE WITH THE APPROVED EROSION & SEDIMENT POLLUTION CONTROL PLAN FOR THE PROJECT.
4. GRADING AND CROSS SLOPES VARY BY EXISTING CONDITIONS; SEE SPECIFIC DESIGN AND PROFILE FOR MORE DETAIL.
5. WITHIN EXTENTS OF GRADING FOR PERMANENT ACCESS ROADS AND VALVE SITES, COMPACT ALL SOIL FILL/BACKFILL AND COARSE AGGREGATE WITH FINES TO 95% OF MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D-1557. CONTRACTOR SHALL UTILIZE ADEQUATELY SIZED AND CONFIGURED EQUIPMENT TO ACHIEVE SPECIFIED COMPACTION.
6. AS DIRECTED BY ENGINEER AND APPROVED BY OWNER, EXCAVATE AND STABILIZE SOFT SPOTS, UNSATISFACTORY SOILS AND AREAS OF EXCESSIVE PUMPING OR RUTTING.
7. PROOF-ROLLING OF SUBGRADE MAY BE REQUIRED TO DETERMINE PROPER COMPACTION BY OWNER.

PENNSYLVANIA

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE CORPORATION
STANDARD ENVIRONMENTAL DETAIL
AR — PERMANENT/TEMPORARY STONE ACCESS ROAD
Williams

WHM consulting, INC. — designs, permits, resolutions
BA GROUP

KEVIN C. CLARK, P.E.
COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL — KEVIN C. CLARK — ENGINEER — 047217-E
PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

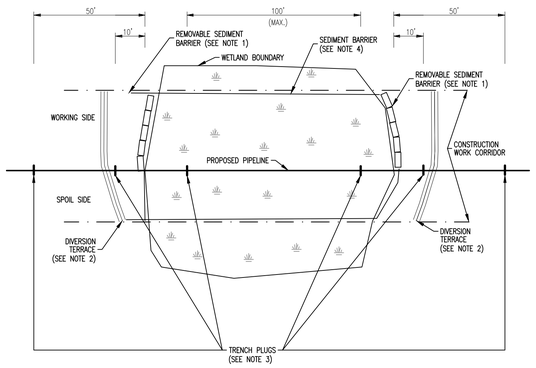
NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN
Williams

DETAILS SHEET

LEIDY & CHAPMAN TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1 = 1
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		SHEET 29
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	OF 39



NOTES:

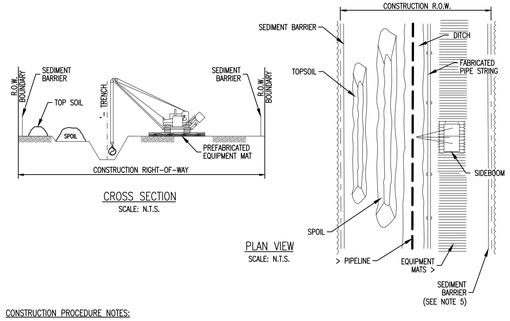
1. INSTALL REMOVABLE SEDIMENT BARRIERS (COMPOST FILTER SOCK) OR DRIVABLE BERMS ACROSS THE TRAVEL LANE AT BOTH WETLAND BOUNDARIES. THE REMOVABLE SEDIMENT BARRIERS CAN BE REMOVED DURING THE CONSTRUCTION DAY, BUT MUST BE RE-INSTALLED AFTER CONSTRUCTION HAS STOPPED FOR THE DAY AND/OR WHEN HEAVY PRECIPITATION IS IMMINENT.
2. INSTALL DIVERSION TERRACES IMMEDIATELY UPSLOPE OF BOTH WETLAND BOUNDARIES TO PREVENT SEDIMENT FROM ENTERING THE WETLAND.
3. INSTALL TRENCH PLUGS TEN (10) FEET FROM THE EDGE OF A WETLAND; FIFTY (50) FEET FROM THE EDGE OF A WETLAND; PLACE A MINIMUM OF ONE (1) TRENCH PLUG AT A MAXIMUM SPACING OF 100 FEET BETWEEN TRENCH PLUGS WITHIN A WETLAND TO PREVENT DIVERSION OF WATER INTO UPLAND PORTIONS OF THE PIPELINE TRENCH AND TO KEEP ANY ACCUMULATED UPLAND TRENCH WATER OUT OF WETLAND. WETLAND CROSSINGS LESS THAN FIFTY (50) FEET DO NOT REQUIRE AN INTERNAL TRENCH PLUG.
4. FOR TYPE II ("SATURATED") AND TYPE III ("FLOODED") WETLANDS, INSTALL SEDIMENT BARRIERS AT WETLAND BOUNDARIES AND ALONG BOTH WETLAND EDGES. FOR TYPE I ("DRY") WETLANDS, INSTALL SEDIMENT BARRIERS AT WETLAND BOUNDARIES, ALONG THE EDGE OF THE SPOIL SIDE OF THE CONSTRUCTION CORRIDOR AND ALONG THE DOWNSLOPE EDGE OF THE WETLAND. IF THE DOWNSLOPE EDGE OF THE WETLAND IS THE SPOIL SIDE, THEN SEDIMENT BARRIERS ARE NOT REQUIRED ON THE WORKING SIDE OF THE CORRIDOR UNLESS EQUIPMENT TRAVERSING THROUGH THE WETLAND CAUSES SPOIL AND SEDIMENT TO EXIT THE CONSTRUCTION CORRIDOR.

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL

WCC WETLAND CROSSING CONFIGURATION TYPE I, II AND III WETLANDS

Williams.



CONSTRUCTION PROCEDURE NOTES:

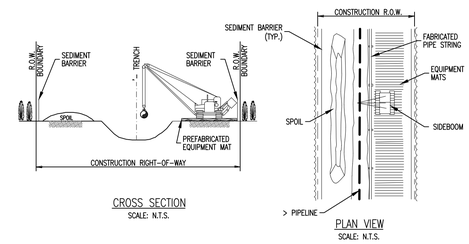
1. FLAG WETLAND BOUNDARIES AND INSTALL BOUNDARY SIGNS PRIOR TO CLEARING.
2. NO OVERNIGHT PARKING OR REFUELING OF MOBILE EQUIPMENT IS ALLOWED WITHIN 100 FEET OF WETLAND. PLACE "NO FUELING" SIGN POSTS 100 FEET BACK FROM WETLAND BOUNDARY. REFUEL STATIONARY EQUIPMENT AS PER SPCC PLAN.
3. INSTALL TEMPORARY DIVERSION TERRACES UPSLOPE OF WETLAND BOUNDARIES AS SHOWN ON DRAWINGS AND SPECIFICATIONS.
4. INSTALL PREFABRICATED EQUIPMENT MATS THROUGH ENTIRE WETLAND AREA ON THE WORKING SIDE OF THE CONSTRUCTION CORRIDOR.
5. AVOID ADJACENT WETLANDS. INSTALL SEDIMENT BARRIERS AT OUTER BOUNDARIES OF THE WETLAND. INSTALL SEDIMENT BARRIERS ALONG THE EDGE OF THE SPOIL SIDE OF THE CONSTRUCTION CORRIDOR THROUGH THE WETLAND AND ALONG THE DOWNSLOPE EDGE OF THE WETLAND. IF THE DOWNSLOPE EDGE OF THE WETLAND IS THE SPOIL SIDE, THEN SEDIMENT BARRIERS ARE NOT REQUIRED ON THE WORKING SIDE OF THE CORRIDOR UNLESS EQUIPMENT TRAVERSING THROUGH THE WETLAND CAUSES SPOIL AND SEDIMENT TO EXIT THE CONSTRUCTION CORRIDOR.
6. LIMIT PULLING OF TREE STUMPS AND GRADING ACTIVITIES TO DIRECTLY OVER THE TRENCH LINE. DO NOT GRADE OR REMOVE STUMPS OR ROOT SYSTEMS FROM THE REST OF THE RIGHT-OF-WAY IN WETLANDS UNLESS THE CHIEF INSPECTOR AND COMPANY ENVIRONMENTAL INSPECTOR DETERMINE THAT SAFETY-RELATED CONSTRUCTION CONSTRAINTS REQUIRE REMOVAL OF TREE STUMPS FROM UNDER THE WORKING SIDE OF THE RIGHT-OF-WAY.
7. CONDUCT TRENCH LINE TOPSOIL STRIPPING (IF TOPSOIL IS NOT SATURATED). SALVAGE SATURATED TOPSOIL TO ACTUAL DEPTH OR A MAXIMUM DEPTH OF 12 INCHES, AS DETERMINED BY THE COMPANY ENVIRONMENTAL INSPECTOR. TOPSOIL AND SATURATED TOPSOIL SHALL BE STOCKPILED SEPARATELY. SEGREGATED TOPSOIL PILE MAY BE LOCATED ON SPOIL SIDE, AS REQUIRED.
8. LEAVE HARD PLUGS AT THE EDGES OF WETLAND UNTIL JUST PRIOR TO TRENCHING.
9. TRENCHING THROUGH WETLANDS MAY PROCEED WHEN THE PIPE SECTION IS FABRICATED AND READY TO LAY. ONCE TRENCHING COMMENCES, CONSTRUCTION THROUGH THE WETLAND IS TO PROCEED CONTINUOUSLY UNTIL THE CROSSING IS COMPLETED, BACKFILLED AND RESTORED IN ORDER TO MINIMIZE THE LENGTH OF TIME THE TRENCH IS OPEN.
10. PIPE SECTION MAY BE FABRICATED WITHIN THE WETLAND ADJACENT TO PIPE TRENCH, OR IN STAGING AREA OUTSIDE THE WETLAND AND WALKED IN. NO CONCRETE COATING ACTIVITY WITHIN 100 FEET OF WETLAND BOUNDARY UNLESS APPROVED BY COMPANY ENVIRONMENTAL INSPECTOR.
11. LOWER-IN PIPE. PRIOR TO BACKFILLING TRENCH, INSTALL TRENCH PLUGS IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS.
12. RESTORE GRADE TO NEAR PRE-CONSTRUCTION TOPOGRAPHY, REPLACE SATURATED TOPSOIL AND TOPSOIL (IF NOT SATURATED) AND INSTALL PERMANENT EROSION CONTROL.
13. REMOVE PREFABRICATED MATS FROM WETLANDS UPON COMPLETION.
14. SEED DISTURBED WETLANDS AREA AS DETERMINED BY THE ENVIRONMENTAL INSPECTOR AND AS SHOWN ON DRAWINGS.

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL

WCC.1 TYPE I "DRY WETLAND" INSTALLATION PROCEDURE

Williams.



CONSTRUCTION PROCEDURE NOTES:

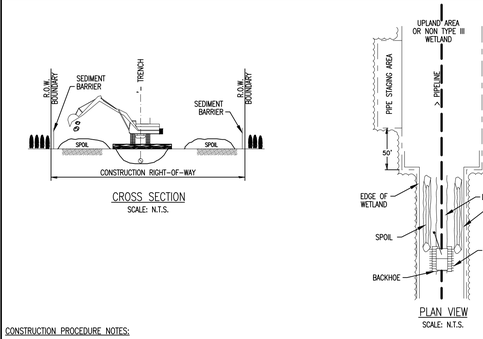
1. FLAG WETLAND BOUNDARIES AND INSTALL BOUNDARY SIGNS PRIOR TO CLEARING.
2. NO OVERNIGHT PARKING OR REFUELING OF MOBILE EQUIPMENT IS ALLOWED WITHIN 100 FEET OF WETLAND. PLACE "NO FUELING" SIGN POSTS 100 FEET BACK FROM WETLAND BOUNDARY. REFUEL STATIONARY EQUIPMENT AS PER SPCC PLAN.
3. INSTALL TEMPORARY DIVERSION TERRACES UPSLOPE OF WETLAND BOUNDARIES AS SHOWN ON DRAWINGS AND SPECIFICATIONS.
4. INSTALL PREFABRICATED EQUIPMENT MATS THROUGH ENTIRE WETLAND AREA ON THE WORKING SIDE OF THE CONSTRUCTION CORRIDOR.
5. AVOID ADJACENT WETLANDS. INSTALL SEDIMENT BARRIERS AT OUTER BOUNDARIES OF WETLAND AND ALONG BOTH WETLAND EDGES.
6. LIMIT PULLING OF TREE STUMPS AND GRADING ACTIVITIES TO DIRECTLY OVER THE TRENCH LINE. DO NOT GRADE OR REMOVE STUMPS OR ROOT SYSTEMS FROM THE REST OF THE RIGHT-OF-WAY IN WETLANDS UNLESS THE CHIEF INSPECTOR AND COMPANY ENVIRONMENTAL INSPECTOR DETERMINE THAT SAFETY RELATED CONSTRUCTION CONSTRAINTS REQUIRE REMOVAL OF TREE STUMPS FROM UNDER THE WORKING SIDE OF THE RIGHT-OF-WAY.
7. TOPSOIL STRIPPING SHALL NOT BE REQUIRED IN SATURATED SOIL CONDITIONS.
8. LEAVE HARD PLUGS AT THE EDGES OF WETLAND UNTIL JUST PRIOR TO TRENCHING.
9. TRENCHING THROUGH WETLANDS MAY PROCEED WHEN THE PIPE SECTION IS FABRICATED AND READY TO LAY. ONCE TRENCHING COMMENCES, CONSTRUCTION THROUGH THE WETLAND IS TO PROCEED CONTINUOUSLY UNTIL THE CROSSING IS COMPLETED, BACKFILLED AND RESTORED IN ORDER TO MINIMIZE THE LENGTH OF TIME THE TRENCH IS OPEN.
10. PIPE SECTION MAY BE FABRICATED WITHIN THE WETLAND ADJACENT TO PIPE TRENCH, OR IN STAGING AREA OUTSIDE THE WETLAND AND WALKED IN. NO CONCRETE COATING ACTIVITY WITHIN 100 FEET OF WETLAND BOUNDARY, UNLESS APPROVED BY COMPANY ENVIRONMENTAL INSPECTOR.
11. LOWER-IN PIPE. PRIOR TO BACKFILLING, INSTALL TRENCH PLUGS IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS. RESTORE GRADE TO NEAR PRE-CONSTRUCTION TOPOGRAPHY AND INSTALL PERMANENT EROSION CONTROL. REMOVE PREFABRICATED MATS FROM WETLANDS UPON COMPLETION. SEED DISTURBED WETLAND AREA AS DETERMINED BY THE ENVIRONMENTAL INSPECTOR AND AS SHOWN ON DRAWINGS.

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL

WCC.2 TYPE II "SATURATED WETLAND" INSTALLATION PROCEDURE

Williams.



CONSTRUCTION PROCEDURE NOTES:

1. FLAG WETLAND BOUNDARIES AND INSTALL WETLAND BOUNDARY SIGNS PRIOR TO CLEARING.
2. NO OVERNIGHT PARKING OR REFUELING OF MOBILE EQUIPMENT IS ALLOWED WITHIN 100 FEET OF WETLAND. PLACE "NO FUELING" SIGN POSTS 100 FEET BACK FROM WETLAND BOUNDARY. REFUEL STATIONARY EQUIPMENT AS PER SPCC PLAN.
3. INSTALL TEMPORARY DIVERSION TERRACES UPSLOPE OF WETLAND BOUNDARIES AS SHOWN ON DRAWINGS AND SPECIFICATIONS.
4. AVOID ADJACENT WETLANDS. INSTALL SEDIMENT BARRIERS AT OUTER BOUNDARIES OF WETLAND AND ALONG BOTH WETLAND EDGES.
5. LIMIT PULLING OF TREE STUMPS AND GRADING ACTIVITIES TO DIRECTLY OVER TRENCH LINE. DO NOT GRADE OR REMOVE STUMPS OR ROOT SYSTEMS FROM THE REST OF THE RIGHT-OF-WAY IN WETLANDS UNLESS THE CHIEF INSPECTOR AND COMPANY ENVIRONMENTAL INSPECTOR DETERMINE THAT SAFETY RELATED CONSTRUCTION CONSTRAINTS REQUIRE REMOVAL OF TREE STUMPS FROM UNDER THE WORKING SIDE OF THE RIGHT-OF-WAY.
6. TOPSOIL STRIPPING SHALL NOT BE REQUIRED IN SATURATED SOIL CONDITIONS.
7. UTILIZE AMPHIBIOUS EXCAVATORS (PONTOON MOUNTED BACKHOES) OR TRACKED BACKHOES SUPPORTED BY PREFABRICATED EQUIPMENT MATS OR FLOATS, TO EXCAVATE TRENCH. IF PREFABRICATED EQUIPMENT MATS ARE USED FOR STABILIZATION, THE BACKHOE SHALL GRADUALLY MOVE ACROSS THE WETLAND BY MOVING THE MATS FROM IMMEDIATELY BEHIND TO IMMEDIATELY IN FRONT OF THE BACKHOE'S PATH.
8. FABRICATE PIPE IN A STAGING AREA OUTSIDE THE TYPE III WETLAND AS INDICATED ON THE CONSTRUCTION DRAWINGS. NO CONCRETE COATING ACTIVITY WITHIN 100 FEET OF WETLAND BOUNDARY, UNLESS APPROVED BY COMPANY ENVIRONMENTAL INSPECTOR.
9. LEAVE HARD PLUGS AT THE EDGE OF TYPE III WETLAND UNTIL JUST PRIOR TO PIPE PLACEMENT.
10. FLOAT PIPE IN PLACE, LOWER-IN, INSTALL TRENCH PLUGS IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS, AND BACKFILL.
11. RESTORE GRADE TO NEAR PRE-CONSTRUCTION TOPOGRAPHY AND INSTALL PERMANENT EROSION CONTROL.
12. REMOVE ANY MATS UTILIZED TO SUPPORT AMPHIBIOUS EQUIPMENT FROM WETLANDS UPON COMPLETION.
13. WETLANDS CROSSED USING PUSH/PULL METHOD TEND TO BE TOO WET FOR EFFECTIVE SEEDING. HOWEVER, IF THE SITE IS DRY ENOUGH AND IF DIRECTED BY THE ENVIRONMENTAL INSPECTOR, THE RIGHT-OF-WAY SHALL BE SEEDED IN ACCORDANCE WITH DRAWINGS.

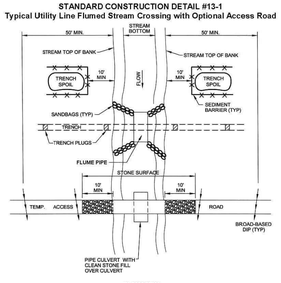
NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL

WCC.3 TYPE III "FLOODED WETLAND" INSTALLATION PROCEDURE

Williams.

STANDARD CONSTRUCTION DETAIL #13-1
Typical Utility Line Flumed Stream Crossing with Optional Access Road



PA DEP

Grubbing shall not take place within 50 feet of top-of-bank until all materials required to complete crossing are on site and pipe is ready for installation.

Pipe culvert for access road and flume pipe may be one continuous pipe.

Trench plugs shall be installed within the trench on both sides of the stream channel (Standard Construction Detail #13-4).

Water accumulating within the work area shall be pumped to a pumped water filter bag or sediment trap prior to discharging into any surface water.

Hazardous or pollutant material storage areas shall be located at least 100 feet back from the top of streambank.

All excess excavated material shall be immediately removed from the stream crossing area.

All disturbed areas within 50 feet of top-of-bank shall be blanketed or matted within 24 hours of initial disturbance for minor streams or 48 hours of initial disturbance for major streams unless otherwise authorized. Appropriate streambank protection shall be provided within the channel.

(SEE INSTREAM CROSSING DURATION TABLE).

WILLIAMS STANDARD NOTES:

1. CONSTRUCTION OF THE STREAM CROSSING (FROM CLEARING OF VEGETATION TO FINAL RESTORATION) SHOULD BE CONDUCTED "AS QUICKLY AS POSSIBLE";
2. THE 24-48 HOUR TIMEFRAME FOR MINOR AND MAJOR WATERBODY CROSSINGS BEGINS WHEN DITCHING OCCURS WITHIN THE STREAM TOP OF BANK;
3. THE PROVIDED "INSTREAM CROSSING DURATION" TABLE OUTLINES STREAM CROSSING ASSOCIATED WITH THE PROJECT AND SPECIFIES CERTAIN CROSSINGS WHERE DITCHING IN STREAMS IS EXPECTED TO TAKE LONGER THAN THE 24 OR 48 HOURS. APPROVAL OF THIS PERMIT INCLUDES THE AUTHORIZATION TO EXCEED 24-48 HOUR TIME FRAMES WHERE SPECIFIED.
5. SANDBAG DAM MAY BE SUBSTITUTED WITH METAL/ROAD PLATE(S) OR EQUIVALENT.

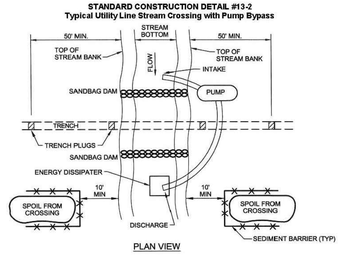
NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL

FX FLUME STREAM CROSSING

Williams.

STANDARD CONSTRUCTION DETAIL #13-2
Typical Utility Line Stream Crossing with Pump Bypass



PA DEP

Grubbing shall not take place within 50 feet of top-of-bank until all materials required to complete crossing are on site and pipe is ready for installation.

Bypass pump intake shall be maintained a sufficient distance from the bottom to prevent pumping of channel bottom materials.

Trench plugs shall be installed within the trench on both sides of the stream channel (Standard Construction Detail #13-4).

Water accumulating within the work area shall be pumped to a pumped water filter bag or sediment trap prior to discharging into any receiving surface water.

Hazardous or pollutant material storage areas shall be located at least 100 feet back from the top of streambank.

All excess excavated material shall be immediately removed from the stream crossing area.

All disturbed areas within 50 feet of top-of-bank shall be blanketed or matted within 24 hours of initial disturbance for minor streams or 48 hours of initial disturbance for major streams unless otherwise authorized.

Appropriate streambank protection shall be provided within the channel.

(SEE INSTREAM CROSSING DURATION TABLE).

WILLIAMS STANDARD NOTES:

1. CONSTRUCTION OF THE STREAM CROSSING (FROM CLEARING OF VEGETATION TO FINAL RESTORATION) SHOULD BE CONDUCTED "AS QUICKLY AS POSSIBLE";
2. THE 24-48 HOUR TIMEFRAME FOR MINOR AND MAJOR WATERBODY CROSSINGS BEGINS WHEN DITCHING OCCURS WITHIN THE STREAM TOP OF BANK;
3. THE PROVIDED "INSTREAM CROSSING DURATION" TABLE OUTLINES STREAM CROSSING ASSOCIATED WITH THE PROJECT AND SPECIFIES CERTAIN CROSSINGS WHERE DITCHING IN STREAMS IS EXPECTED TO TAKE LONGER THAN THE 24 OR 48 HOURS. APPROVAL OF THIS PERMIT INCLUDES THE AUTHORIZATION TO EXCEED 24-48 HOUR TIME FRAMES WHERE SPECIFIED.
4. DAM-AND-PUMPS MAY ONLY BE IN THE STREAM FOR TWO WEEKS.
5. SANDBAG DAM MAY BE SUBSTITUTED WITH METAL/ROAD PLATE(S) OR EQUIVALENT.

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL

DPX DAM AND PUMP STREAM CROSSING

Williams.

Hensel Replacement - Instream Crossing Duration

Waterway ID	Waterway Name	Milepost	Crossing Length (Linear Ft.)[1]	Crossing Method	Secondary Crossing Method (if trenchless methodology is proposed)	Instream Crossing Duration[2] (hours)	Justification for Exceeding Standard Crossing Window
S12-T6-HR	UNT to Dark Hollow	189.05	20.6	Dam & Pump / Flume	-	96	Includes Pipeline Installation and Removal of Leidy Line "A"
S9-T6-HR	UNT to Paddy Run	190.36	6	Dam & Pump / Flume	-	96	Includes Pipeline Installation and Removal of Leidy Line "A"
S7-T7-HR	Paddy Run	190.47	30.6	Dam & Pump / Flume	-	96	Includes Pipeline Installation and Removal of Leidy Line "A"
S1-T7-HR	Hensel Fork	190.69	39.3	Dam & Pump / Flume	-	96	Includes Pipeline Installation and Removal of Leidy Line "A"
S1-T7-HR	Hensel Fork	190.99	20.4	Dam & Pump / Flume	-	96	Includes Pipeline Installation and Removal of Leidy Line "A"

Notes:
1. Measured from top of bank to top of bank
2. Crossing Window is designated as time within or below top of bank. Duration is determined by length of crossing:
   a. For crossings less than 10 feet in length, the standard crossing window is 24 hours
   b. For crossings that are 10 - 100 feet in length, the standard crossing window is 48 hours
   c. Crossings not referened in table will meet standard crossing windows

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
KEVIN C. CLARK
ENGINEER
047271-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

WHM consulting, INC. designs, permits, resolutions

BA GROUP

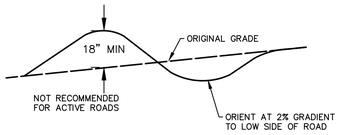
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

Williams.

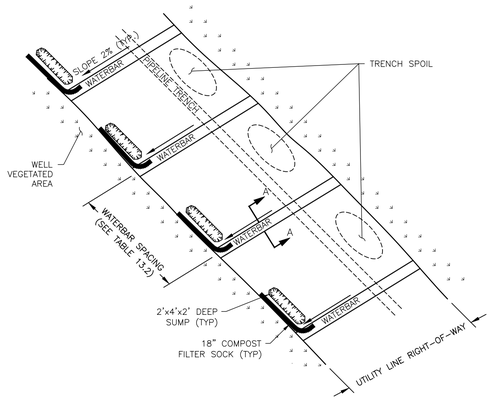
DETAILS SHEET

LEIDY & CHAPMAN TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

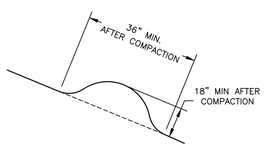
DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1 = 1
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		SHEET 30
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	OF 39



PLAN VIEW
N.T.S.



LAYOUT VIEW
N.T.S.



SECTION A–A

NOTES:

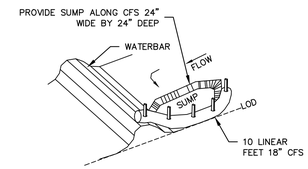
1. DURING CONSTRUCTION, WATERBARS SHALL BE PREPARED AT THE END OF EACH WORK DAY AND PRIOR TO STORM EVENTS.
2. AFTER EARTH DISTURBING WORK HAS BEGUN, WATERBARS SHALL BE INSTALLED AT THE SPACING SHOWN IN THE ABOVE TABLE OR AS SHOWN ON THE DRAWINGS. WATERBARS SHALL BE IMMEDIATELY STABILIZED WITH EROSION CONTROL BLANKET.
3. TEMPORARY AND PERMANENT WATERBARS ARE REQUIRED AT ALL WATERBODY CROSSINGS AND UPSLOPE FROM ALL WETLAND BOUNDARIES.
4. THE WATERBAR OUTLET SHALL BE LOCATED WHERE RUNOFF WILL BE RELEASED ONTO AN EXISTING WELL–VEGETATED AREA. AN OUTLET STRUCTURE (OS) MUST BE INSTALLED AT THE WATERBAR OUTLET.
5. WHEREVER EDIBLE SOILS ARE PRESENT, OR WHERE THERE IS NOT A SUFFICIENT VEGETATIVE FILTER STRIP BETWEEN THE WATERBAR AND A RECEIVING SURFACE WATER, THE WATERBAR SHOULD BE PROVIDED WITH A TEMPORARY PROTECTIVE LINER.

TABLE 3.1 – MAXIMUM WATERBAR SPACING

PERCENT SLOPE	SPACING (FT)
<5	250
5–15	150
>15–30	100
>30	50

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE, LLC
STANDARD ENVIRONMENTAL DETAIL
WB WATERBAR

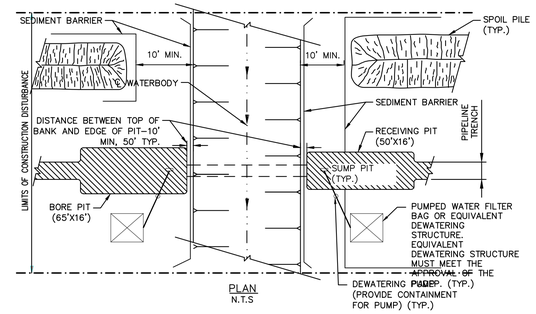


NOTES:

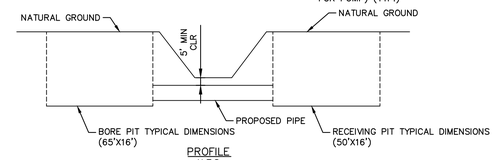
1. 10 LINEAR FEET OF 18 INCH COMPOST FILTER SOCK (CFS) SHALL BE INSTALLED WITH ONE END RESTING ON THE WATERBAR AS PER DETAIL CFS, ALLOWING FOR 8 FEET OF EFFECTIVE LENGTH AND A SPECIFIED FLOW THROUGH RATE OF 15 GALLONS PER MINUTE PER LINEAR FOOT. A PASS THROUGH FLOW OF 0.26 CUBIC FEET PER SECOND CAN BE ACCOMMODATED THROUGH THE FILTER SOCK. THIS FLOW RATE IS ADEQUATE FOR 20,000 SQUARE FEET OF DRAINAGE AREA FOR THE 2–YEAR, 24–HOUR STORM, 5 MINUTE TIME OF CONCENTRATION (RATIONAL METHOD).
2. CONSTRUCTION OF A 24" WIDE AND 24" DEEP SUMP AT THE DISCHARGE END OF THE WATERBAR WILL REDUCE VELOCITY AND PROVIDE A SHEET FLOW CONDITION TO THE CFS. THE SUMP SHALL BE MAINTAINED AND CLEAN OUT WHEN IT BECOMES A MINIMUM OF 12" DEEP. THE SUMP SHALL BE FILLED AND STABILIZED WHEN THE CFS IS REMOVED AFTER SITE STABILIZATION.
3. TRAFFIC SHALL NOT BE PERMITTED TO CROSS FILTER SOCKS.
4. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES HALF THE ABOVEGROUND HEIGHT OF THE SOCK AND DISPOSED IN ACCORDANCE WITH WILLIAMS STANDARDS. SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION.
5. BIODEGRADABLE FILTER SOCK SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL
OS CFS AT WATERBAR DISCHARGE FOR ABACT LEVEL PROTECTION



PLAN
N.T.S



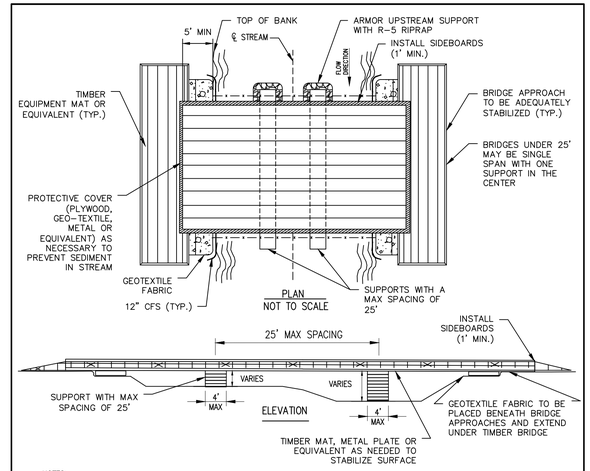
PROFILE
N.T.S

NOTES:

1. SEDIMENT BARRIER SHALL BE INSTALLED AT THE BASE OF SLOPES ADJACENT TO ROAD CROSSINGS WHERE VEGETATION IS DISTURBED, TO INTERCEPT SURFACE RUNOFF.
2. PROTECTION FOR SPOIL PILES SHALL BE INSTALLED ONLY WHERE SEDIMENT BARRIERS ACROSS THE ENTIRE DISTURBED AREA ARE NOT REQUIRED.
3. SEDIMENT BARRIERS SHALL REMAIN IN PLACE UNTIL PERMANENT REVEGETATION IS ESTABLISHED.
4. WATER REMOVED FROM BORE PIT AND RECEIVING PIT SHALL BE FILTERED THROUGH A DEWATERING STRUCTURE OR FILTER BAG.
5. IF WELL POINTING IS REQUIRED PRIOR TO EXCAVATING BORE PITS, CONTRACTOR SHALL CONSULT WITH THE ENVIRONMENTAL INSPECTOR PRIOR TO COMMENCEMENT OF WORK IN ORDER TO DETERMINE PROPER DEWATERING LOCATION.
6. CONTRACTOR SHALL BE REQUIRED TO KEEP THE AREA CLEAN OF DEBRIS AT ALL TIMES.
7. CONTRACTOR MAY ELECT TO UTILIZE SHEET PILING IN ORDER TO STABILIZE BORE PITS.
8. DEPENDING ON TOPOGRAPHY AND STATE REQUIREMENTS, SEDIMENT BARRIER MAY BE REQUIRED ACROSS THE ENTIRE CONSTRUCTION RIGHT OF WAY AT THE EDGE OF ROAD. IN ADDITION TO THIS DETAIL, REFER TO THE ENVIRONMENTAL ALIGNMENT DRAWINGS FOR PLACEMENT OF SEDIMENT BARRIERS.

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL
WBX BORED WATERBODY CROSSING



PLAN
NOT TO SCALE

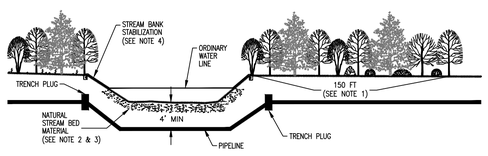
ELEVATION

NOTES:

1. THIS TYPE OF BRIDGE IS GENERALLY USED FOR INTERMEDIATE TO LARGE STREAM CROSSINGS GREATER THAN 20' IN WIDTH IN COMBINATION WITH A PROPER STREAM BANK CONFIGURATION.
2. BOTTOM CHORD OF BRIDGE STRUCTURE SHALL BE CONSTRUCTED ABOVE ORDINARY HIGH WATER MARK/TOP OF BANK.
3. BRIDGE TO REMAIN IN PLACE UNTIL THE COMPLETION OF FINAL RESTORATION.
4. A "SKIRT" FORMED OF GEOTEXTILE FABRIC OR EQUIVALENT SHALL BE PLACED ON THE SIDES AND BOTTOM OF THE BRIDGE TO TRAP SEDIMENT.
5. INDIVIDUAL MATS SHALL BE ANCHORED AND BUTTED TIGHTLY TO MINIMIZE THE INTRODUCTION OF SEDIMENT TO THE WATER BODY.
6. COMPOST FILTER SOCK WILL BE PLACED AT THE EDGE OF EQUIPMENT BRIDGE AT THE END OF THE WORK DAY TO PREVENT EROSION BUT WILL BE REMOVED DURING CONSTRUCTION ACTIVITY.
7. CONTRACTOR SHALL EXTEND TIMBER MAT BRIDGE A MINIMUM OF 10' BEYOND TOP OF STREAM BANK. ABUTMENTS MAY BE KEYED INTO BANK WHERE NEEDED TO INSURE SAFETY.
8. BRIDGES SHALL BE ADEQUATELY ANCHORED AT BOTH ENDS.
9. PERIODICALLY CHECK BRIDGE INSTALLATION AND REMOVE BUILD–UP OF SEDIMENT OR DEBRIS ON BRIDGE.
10. BRIDGE APPROACHES SHALL BE TIMBER EQUIPMENT MATS.
11. MATERIALS PLACED ALONG STREAM CHANNEL SHALL BE COMPLETELY REMOVED DURING FINAL CLEANUP. REMOVAL OF THIS STRUCTURE IS NOT CONTINGENT UPON ESTABLISHMENT OF PERMANENT VEGETATION.
12. RUNOFF FROM ROADWAY SHALL BE DIVERTED OFF THE ROADWAY AND INTO A SEDIMENT REMOVAL BMP BEFORE IT REACHES THE ROCK APPROACH TO THE CROSSING.
13. INSTALLATION AND REMOVAL OF INSTREAM SUPPORT SHALL ADHERE TO TIME OF YEAR RESTRICTIONS.

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
1	4/20/20	KMC	ADDED 1' MIN. HEIGHT			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL
BCC BRIDGE EQUIPMENT CROSSING WITH CENTERED OR MULTIPLE SUPPORTS



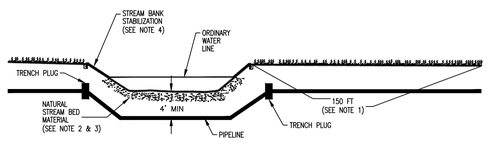
NOTES:

1. RESTORE IMPACTED FOREST BUFFER TO 150' WIDTH OR EXISTING WIDTH OF FOREST BUFFER IF LESS THAN THESE MINIMUM REQUIREMENTS. FOR DETAILS REGARDING RECOMMENDED PLANTINGS AND SEED MIXES, REFER TO ONSITE WETLAND AND RIPARIAN BUFFER REFORESTATION PLAN OUTLINES IN CHAPTER 105 PERMIT.
2. REMOVE EXISTING STREAMBED MATERIAL AND STOCKPILE SEPARATELY.
3. AFTER PIPELINE INSTALLATION, REPLACE STREAMBED MATERIAL BELOW ORDINARY HIGH WATER AND RESTORE EXISTING CONDITION OF STREAMBED AND BANKS. NO CHANGES IN STREAMBED GRADE AND THALWAG PROFILE SHALL OCCUR AND STREAM SHALL MEET PRE–CONSTRUCTION ALIGNMENT.
4. EROSION CONTROL BLANKETS (NORTH AMERICAN GREEN, SC150BN OR APPROVED EQUIVALENT) SHALL BE PLACED ON RESTORED BANKS TO THE ORDINARY WATER LINE. IN UPLAND AREAS, EROSION CONTROL BLANKET SHALL BE INSTALLED A MINIMUM OF 100 FT BEYOND THE TOP OF BANK (MORE AS NEEDED DEPENDING ON SLOPES). EROSION CONTROL BLANKETS SHALL NOT BE INSTALLED IN WETLANDS. STREAMS THAT HAVE EXISTING ROCK BANK PROTECTION OR ARTICULATING CONCRETE MATTING SHALL BE RESTORED TO THEIR PRE–EXISTING CONDITIONS, REFER TO RSS AND ACM DETAILS.
5. ERNST MIX 178– RIPARIAN BUFFER MIX OR EQUIVALENT SHALL BE APPLIED AT 20 LBS PER ACRE WITHIN RIPARIAN ZONES UNLESS SLOPE EXCEEDS 10% OR WITHIN WETLANDS.
6. NO TREE SHALL BE PLANTED IN AN AREA 15FT CENTERED OVER THE PIPELINE. SHRUBS MAY BE PLANTED WITHIN 5 FT CENTERED OVER THE PIPELINE.

PENNSYLVANIA

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL
TYPICAL VEGETATED CHANNEL & VEGETATION RESTORATION – 1
WATER BODIES WITH EXISTING FORESTED RIPARIAN BUFFER
VCR–1



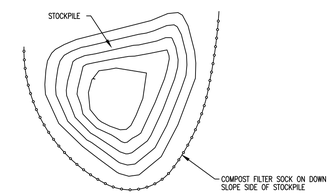
NOTES:

1. RESTORE IMPACTED RIPARIAN ZONES TO 150' OR EXISTING WIDTH OF RIPARIAN ZONE IF LESS THAN THESE MINIMUM REQUIREMENTS. FOR DETAILS REGARDING RECOMMENDED SEED MIXES, REFER TO ONSITE WETLAND AND RIPARIAN BUFFER RESTORATION PLAN OUTLINED IN CHAPTER 105 PERMIT.
2. REMOVE EXISTING STREAMBED MATERIAL AND STOCKPILE SEPARATELY.
3. EROSION AFTER PIPELINE INSTALLATION, REPLACE STREAMBED MATERIAL BELOW ORDINARY HIGH WATER AND RESTORE EXISTING CONDITION OF STREAMBED AND BANKS. NO CHANGES IN STREAMBED GRADE AND THALWAG PROFILE SHALL OCCUR AND STREAM SHALL MEET MEET PRE–CONSTRUCTION ALIGNMENT.
4.
5. EROSION CONTROL BLANKETS (NORTH AMERICAN GREEN, SC150BN OR APPROVED EQUIVALENT) SHALL BE PLACED ON RESTORED BANKS TO THE ORDINARY WATER LINE. IN UPLAND AREAS, EROSION CONTROL BLANKET SHALL BE INSTALLED A MINIMUM OF 100 FT BEYOND THE TOP OF BANK (MORE AS NEEDED DEPENDING ON SLOPES). EROSION CONTROL BLANKETS SHALL NOT BE INSTALLED IN WETLANDS. STREAMS THAT HAVE EXISTING ROCK BANK PROTECTION OR ARTICULATING CONCRETE MATTING SHALL BE RESTORED TO THEIR PRE–EXISTING CONDITIONS, REFER TO RSS AND ACM DETAILS.
6. ERNST MIX 178– RIPARIAN BUFFER MIX OR EQUIVALENT SHALL BE APPLIED AT 20 LBS PER ACRE WITHIN RIPARIAN ZONES UNLESS SLOPE EXCEEDS 10% OR WITHIN WETLANDS.

PENNSYLVANIA

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL
TYPICAL VEGETATED CHANNEL & VEGETATION RESTORATION – 2
WATER BODIES WITH NON–FORESTED RIPARIAN BUFFER
VCR–2



NOTES:

1. MAXIMUM STOCKPILE HEIGHT IS 35 FEET.
2. STOCKPILE SLOPES MUST BE NO STEEPER THAN 2H:1V.
3. STOCKPILE LOCATIONS SHOWN ON THE PLANS ARE ILLUSTRATIVE AND MAY VARY IN LOCATION AS CONSTRUCTION PROCEEDS.
4. STOCKPILE IS TO BE STABILIZED IN ACCORDANCE WITH TEMPORARY SEEDING SPECIFICATIONS AND MULCH IS TO BE MAINTAINED UNTIL THE STOCKPILE IS STABILIZED.
5. COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE SOCK SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN SOCK ALIGNMENT.

PENNSYLVANIA

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL
TYPICAL TOPSOIL STOCKPILE

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
KEVIN C. CLARK
ENGINEER
042214-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

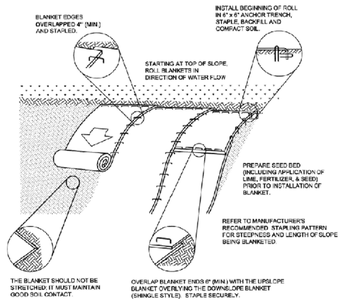
NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

DETAILS SHEET

LEIDY & CHAPMAN TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1 = 1
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		SHEET 31
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	OF 39



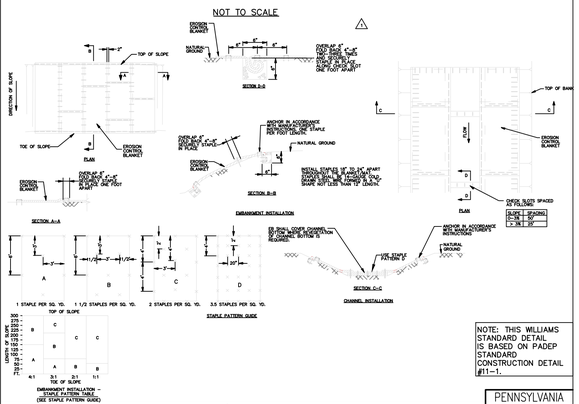
NOTES:

1. SEED AND SOIL AMENDMENTS SHALL BE APPLIED ACCORDING TO THE RATES IN THE PLAN DRAWING PRIOR TO INSTALLING THE BLANKET.
2. PROVIDE ANCHOR TRENCH AT TOE OF SLOPE IN SIMILAR FASHION AS AT TOP OF SLOPE.
3. SLOPE SURFACE SHALL BE FREE OF ROCKS, CLODS, STICKS, AND GRASS.
4. BLANKET SHALL HAVE GOOD CONTINUOUS CONTACT WITH UNDERLYING SOIL THROUGHOUT ENTIRE LENGTH. LAY BLANKET LOOSELY AND STAKE OR STAPLE TO MAINTAIN DIRECT CONTACT WITH SOIL. DO NOT STRETCH BLANKET.
5. STAPLING OF THE BLANKET SHALL BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
6. BLANKETED AREAS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT UNTIL PERENNIAL VEGETATION IS ESTABLISHED TO A MINIMUM UNIFORM 70% COVERAGE THROUGHOUT THE BLANKETED AREA. DAMAGED OR DISPLACED BLANKETS SHALL BE RESTORED OR REPLACED WITHIN 4 CALENDAR DAYS.
7. BIODEGRADABLE STAPLES SHALL BE USED.

WILLIAMS SUPPLEMENTAL NOTES:

1. CONTRACTOR MAY USE SINGLE MAT STRAW FOR SLOPES FLATTER THAN 3:1.
2. HYDRAULIC APPLIED EROSION CONTROL BLANKETS MAY BE USED IN LIEU OF ECB.
3. EROSION CONTROL MATS FOR STEEP SLOPE APPLICATIONS AND TEMPORARY CHANNEL LININGS SHALL CONSIST OF NATURAL MATERIALS SUCH AS SC150BN OR C125BN (OR EQUIVALENT). PERMANENT CHANNEL LININGS INSTALLED FOR AT POST-CONSTRUCTION STORMWATER MANAGEMENT FACILITIES SHALL CONSIST OF SC250 (OR EQUIVALENT). SEE CHANNEL DETAILS FOR SPECIFIC LINING TYPE AND E&S NARRATIVE FOR MANUFACTURERS SPECIFICATIONS.

NOT TO SCALE



NOTE: THIS WILLIAMS STANDARD DETAIL IS BASED ON PADEP STANDARD CONSTRUCTION DETAIL #11-1.

PENNSYLVANIA

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.
1.	04-22-20	FTN	ADDED STAPLE PATTERN GUIDE			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL

EROSION CONTROL BLANKET (ECB)

HYDRAULICALLY APPLIED BLANKETS

Hydraulically applied blankets should not be used in areas of concentrated flow (e.g. channels).

A **Bonded Fiber Matrix (BFM)** can be an effective method of stabilizing steep slopes when used properly. BFMs make use of a cross-linked hydrocolloid tackifier to bond thermally processed wood fibers. Application rates vary according to site conditions. For slopes up to 3H:1V the BFM should be applied at a rate of 3,000 lb/acre. Steeper slopes may need as much as 4,000 lb/acre. In any case, manufacturer's recommendations should be followed.

BFMs should only be used when no rain is forecast for at least 48 hours following the application. This is to allow the tackifier sufficient time to cure properly. Once properly applied, a BFM is typically 90% effective in preventing accelerated erosion. **Bonded Fiber Matrix should not be applied between September 30 and April 1.**

Other fiber matrices that have been shown to be effective in preventing erosion on disturbed surfaces may be used in accordance with manufacturer's recommendations if sufficient supporting documentation is provided.

A **Flexible Growth Medium (FGM)** has the added component of ½ inch long, crimped organic or manmade fibers which add a mechanical bond to the chemical bond provided by BFMs. This increases the blanket's resistance to both raindrop impact and erosion due to runoff. Unlike BFMs, a flexible growth medium typically does not require a curing time to be effective. Properly applied, an FGM may be as much as 99% effective.

A **Polymer Stabilized Fiber Matrix (PSFM)** can also be an effective method of stabilizing steep slopes when used properly. PSFMs make use of a linear soil stabilizing tackifier that works directly on soil to maintain soil structure, maintain pore space capacity and flocculate dislodged sediment that will significantly reduce runoff turbidity. Properly applied, a PSFM may be as much as 99% effective.

PSFMs can be used in re-vegetation applications and for site winterization and/or dormant seeding — fall planting for spring germination — applications. Application rates vary according to site conditions

and the following application rates are suggested. In any case, manufacturer's recommendations should be followed. The following are typical application rates:

TABLE 11.7
Typical Polymer Stabilized Fiber Matrix Application Rates

Maximum Rainfall of ≤ 20"							
SLOPE	6:1	5:1	4:1	3:1	2:1	1.5:1	1:1
Soil Stabilizer (gals/acre)	4	5	6	7	8	9	10
Fiber (lb/acre)	1,500	1,500	1,500	1,800	2,000	2,500	3,000

Maximum Rainfall of > 20" and for Site Winterization			
SLOPE	≤5:1	4:1	≥3:1
Soil Stabilizer (gals/acre)	6	8	10
Fiber (lb/acre)	2,000	2,500	3,000

Unlike rolled blankets, there is no need to smooth the slope prior to application of hydraulically applied blankets. In fact some roughening of the surface, either natural or mechanically induced, is preferable. However, large rocks, those ≥ 9 inches, and existing rills should be removed prior to application. Tracking or grooving of slopes should be considered to slow water flows during a storm event. Slope interruption devices such as stair step grading or benching should be applied prior to the application. Mixing and application rates should follow manufacturer's recommendations.

Hydraulically applied blankets are typically applied in two stages. Unless specifically recommended to be applied in one application by the manufacturer, the seed mixture and soil amendments should be applied first. If the seed is applied at the same time as the hydraulically applied blanket, the bonded fibers may keep the seed from making sufficient contact with the soil to germinate. After the seed mixture is applied, the BFM, FGM, or PSFM should be sprayed over the area at the required application rate.

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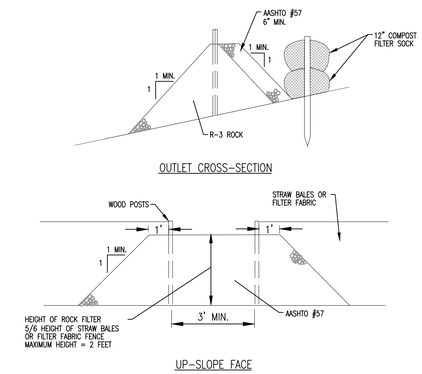
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

HYDRAULICALLY APPLIED BLANKETS



NOTES:

1. ROCK FILTER OUTLETS SHALL BE PLACED ALONG SEDIMENT BARRIERS AS SHOWN ON THE PLAN. THE ROCK FILTER OUTLET IS NOT INTENDED TO BE PLACED IN STREAMS, RIVERS, CREEKS OR DITCHES THAT NORMALLY HAVE FLOWING WATER.
2. ONCE THE DISTURBED AREA IS STABILIZED, THE ROCK FILTER OUTLET SHALL BE REMOVED AND ANY DISTURBED AREAS CAUSED BY REMOVAL SHALL BE RETURNED TO ORIGINAL CONDITION AND REVEGETATED.
3. SEDIMENT MUST BE REMOVED FROM THE ROCK FILTER OUTLET WHEN ACCUMULATIONS REACH 1/3 THE HEIGHT OF THE OUTLET.
4. INSTALL NSA-R3 ROCK AT THE OUTLET SIDE OF THE SEDIMENT BARRIER AS SHOWN IN THE DETAIL. AFTER INSTALLING NSA-R3 ROCK, INSTALL AASHTO #57 ROCK AT THE INLET SIDE OF THE SEDIMENT BARRIER TO CREATE AN ADEQUATE FILTER STONE FACE FOR THE OUTLET STRUCTURE.

PENNSYLVANIA

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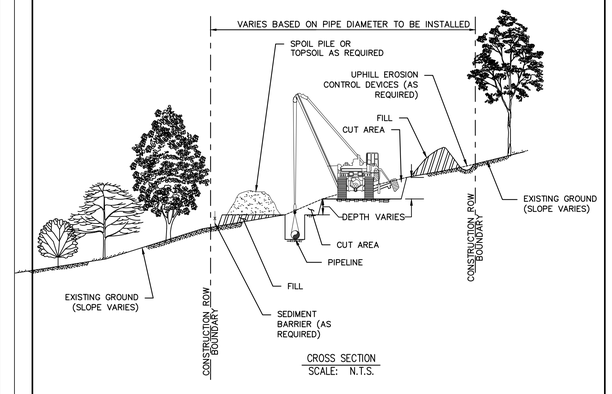
TRANSCONTINENTAL GAS PIPE LINE CORPORATION
STANDARD ENVIRONMENTAL DETAIL

RFO ROCK FILTER OUTLET



NOTES:

1. TWO-TONE THE RIGHT-OF-WAY TO LIMIT THE NEED FOR DEEP CUTS AND ADDITIONAL RIGHT-OF-WAY ON STEEP SLOPES. THE MINIMUM WORKSPACE WIDTH ALONG STEEP SIDE SLOPES WILL VARY DEPENDING ON THE DIAMETER OF PIPE TO BE INSTALLED. ADDITIONAL TEMPORARY WORKSPACE MAY BE REQUIRED FOR WORKER SAFETY DEPENDING ON THE SEVERITY OF THE GRADE.
2. EMPLOY EROSION CONTROL MEASURES SUCH AS WATERBARS, CROSS DITCHES, TEMPORARY DRAINAGE PIPES, TEMPORARY SWALES, TEMPORARY OUTLET PROTECTION, ETC. AS REQUIRED TO PREVENT EROSION AND SEDIMENTATION OUTSIDE OF THE CONSTRUCTION RIGHT-OF-WAY. CLEAR AND STAKE ATWS TO ALLOW FOR EXTRA SPOIL.
3. ENSURE SIDE BOOM TRACTORS ARE EQUIPPED WITH BOOM EXTENDERS AND COUNTERWEIGHTS IF REQUIRED.
4. USE BACKHOE TO ASSIST BULLDOZERS WITH REPLACING CUTS.
5. RESTORE GRADE TO NEAR PRE-CONSTRUCTION TOPOGRAPHY, REPLACE TOPSOIL AND INSTALL PERMANENT EROSION CONTROL MEASURES AS REQUIRED.
6. REVEGETATE / SEED DISTURBED AREAS AS NOTED IN THE CONSTRUCTION DOCUMENTS OR AS DETERMINED BY THE ENVIRONMENTAL INSPECTOR.

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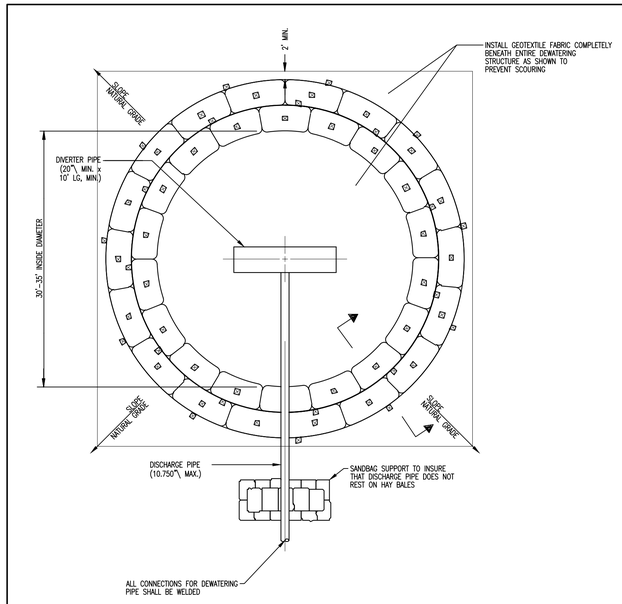
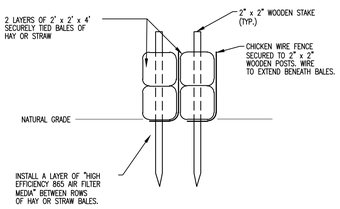
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL

TTS SIDE SLOPE (TWO-TONE) CONSTRUCTION PROCEDURE





SECTION

NOTE:

STAKES SECURING "HIGH EFFICIENCY 865 AIR FILTER MEDIA" AND CHICKEN WIRE FENCE ARE NOT SHOWN FOR CLARITY PURPOSES.

NOTES:

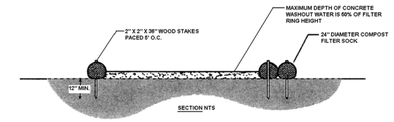
1. STRUCTURE SHALL BE PLACED ON A LEVEL WELL VEGETATED SITE SUCH THAT WATER WILL FLOW AWAY FROM STRUCTURE AND ANY WORK AREAS.
2. FLOW RATES THROUGH DISCHARGE AND DIVERTER PIPES SHALL BE SUCH THAT STRUCTURE WILL NOT OVERFLOW.
3. WHERE CONDITIONS WARRANT A 30' x 30' RECTANGULAR STRUCTURE MAY BE SUBSTITUTED FOR THE CIRCULAR CONFIGURATION SHOWN.
4. DIMENSIONS SHOWN ARE THE MINIMUM ACCEPTABLE VALUES AND MAY BE VARIED DEPENDING UPON SPECIFIC LOCATION.
5. CONTRACTOR SHALL PROPERLY REMOVE AND DISPOSE OF DEWATERING STRUCTURE IMMEDIATELY UPON COMPLETION OF DEWATERING OPERATIONS. UNDER NO CIRCUMSTANCES SHALL USED DEWATERING STRUCTURES BE LEFT IN PLACE FOR A PERIOD OF TIME GREATER THAN 48 HOURS AFTER DEWATERING OPERATIONS ARE COMPLETE.
6. "HIGH EFFICIENCY 865 AIR FILTER MEDIA" CAN BE PURCHASED FROM THE FOLLOWING:
   UNITED AIR FILTER COMPANY
   1000 WEST PALMER STREET
   CHARLOTTE, NORTH CAROLINA 28234
   (704) 334-5311

PENNSYLVANIA

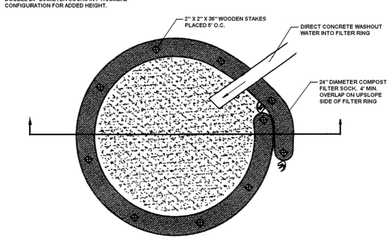
NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE CORPORATION
STANDARD ENVIRONMENTAL DETAIL

DS.2 HYDROSTATIC DEWATERING STRUCTURE



NOTES:
1. INSTALL ON FLAT GRADE FOR OPTIMUM PERFORMANCE
2. 18" DIAMETER FILTER SOCK MAY BE STACKED ONTO DOUBLE 24" DIAMETER SOCKS IN PYRAMIDAL CONFIGURATION FOR ADDED HEIGHT.



A SUITABLE IMPERVIOUS GEOMEMBRANE SHALL BE PLACED AT THE LOCATION OF THE WASHOUT PRIOR TO INSTALLING THE SOCKS.

PENNSYLVANIA

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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL

COMPOST SOCK CONCRETE WASHOUT INSTALLATION

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL ENGINEER
KEVIN C. CLARK
ENGINEER 041211-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

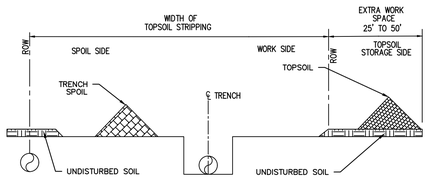
NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

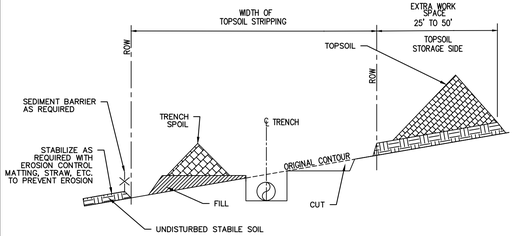
DETAILS SHEET

LEIDY & CHAPMAN TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1 = 1
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		SHEET 32
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	OF 39



FULL RIGHT-OF-WAY TOPSOIL STRIPPING ADJACENT EXISTING PIPELINE
N.T.S.



FULL RIGHT-OF-WAY TOPSOIL STRIPPING-SIDE SLOPES
N.T.S.

NOTES:

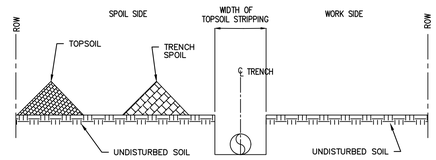
1. ALLOW FOR A SEPARATION BETWEEN THE TOPSOIL PILE AND THE TRENCH SPOIL.
2. RETURN TRENCH SPOIL TO TRENCH AND COMPACT. FEATHER OUT EXCESS SPOIL OVER STRIPPED AREA LEAVING A LOW CROWN CENTERED OVER THE TRENCH. ALLEVIATE COMPACTION OF SUBSOILS OVER THE STRIPPED AREA.
3. RETURN TOPSOIL EVENLY OVER THE STRIPPED AREA AFTER TRENCH HAS SUFFICIENTLY SETTLED OR HAS BEEN COMPACTED
4. ALLEVIATE COMPACTION OF TOPSOIL OVER ENTIRE RIGHT-OF-WAY.
5. SEGREGATED TOPSOIL MAY NOT BE USED FOR PADDING THE PIPE.
6. INSTALL SEDIMENT BARRIER AS SHOWN ON PLAN.

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL

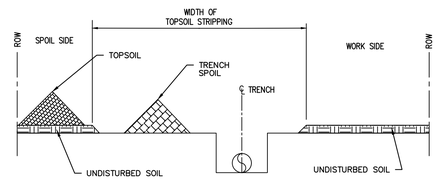
TS.1 TOPSOIL SEGREGATION (1)

Williams.



DITCH LINE TOPSOIL STRIPPING
N.T.S.

ALSO USED IN NON-SATURATED WETLANDS



DITCH PLUS SPOIL SIDE SEGREGATION
N.T.S.

NOTES:

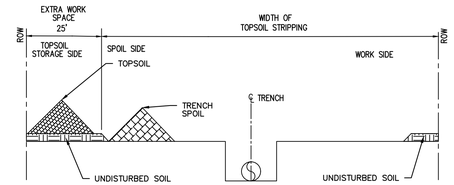
1. ALLOW FOR A SEPARATION BETWEEN THE TOPSOIL PILE AND THE TRENCH SPOIL.
2. RETURN TRENCH SPOIL TO TRENCH AND COMPACT. FEATHER OUT EXCESS SPOIL OVER STRIPPED AREA LEAVING A LOW CROWN CENTERED OVER THE TRENCH. ALLEVIATE COMPACTION OF SUBSOILS OVER THE STRIPPED AREA.
3. RETURN TOPSOIL EVENLY OVER THE STRIPPED AREA AFTER TRENCH HAS SUFFICIENTLY SETTLED OR HAS BEEN COMPACTED.
4. ALLEVIATE COMPACTION OF TOPSOIL OVER ENTIRE RIGHT-OF-WAY.
5. SEGREGATED TOPSOIL MAY NOT BE USED FOR PADDING THE PIPE.
6. INSTALL SEDIMENT BARRIER AS SHOWN ON PLAN.

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

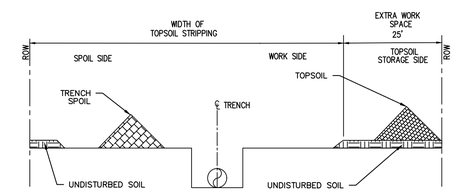
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL

TS.2 TOPSOIL SEGREGATION (2)

Williams.



FULL RIGHT-OF-WAY TOPSOIL STRIPPING - A
N.T.S.



FULL RIGHT-OF-WAY TOPSOIL STRIPPING - B
N.T.S.

NOTES:

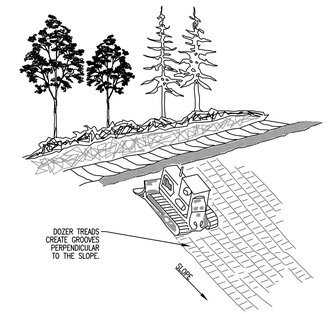
1. ALLOW FOR A SEPARATION BETWEEN THE TOPSOIL PILE AND THE TRENCH SPOIL.
2. RETURN TRENCH SPOIL TO TRENCH AND COMPACT. FEATHER OUT EXCESS SPOIL OVER STRIPPED AREA LEAVING A LOW CROWN CENTERED OVER THE TRENCH. ALLEVIATE COMPACTION OF SUBSOILS OVER THE STRIPPED AREA.
3. RETURN TOPSOIL EVENLY OVER THE STRIPPED AREA AFTER TRENCH HAS SUFFICIENTLY SETTLED OR HAS BEEN COMPACTED.
4. ALLEVIATE COMPACTION OF TOPSOIL OVER ENTIRE RIGHT-OF-WAY.
5. SEGREGATED TOPSOIL MAY NOT BE USED FOR PADDING THE PIPE.
6. INSTALL SEDIMENT BARRIER AS SHOWN ON PLAN.

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL

TS.3 TOPSOIL SEGREGATION (3)

Williams.



NOTES:

1. SURFACE ROUGHENING SHOULD BE APPLIED TO ALL SLOPES STEEPER THAN 3:1 UNLESS A STABLE ROCK FACE IS PROVIDED.
2. TRACKING SLOPES IS DONE BY RUNNING TRACKED MACHINERY UP AND DOWN THE SLOPE, LEAVING TREAD MARKS PARALLEL TO THE CONTOUR. CARE SHOULD BE EXERCISED ON SOILS HAVING A HIGH CLAY CONTENT TO AVOID OVER-COMPACTION.
3. IF A BULLDOZER IS USED, THE BLADE SHOULD BE UP.

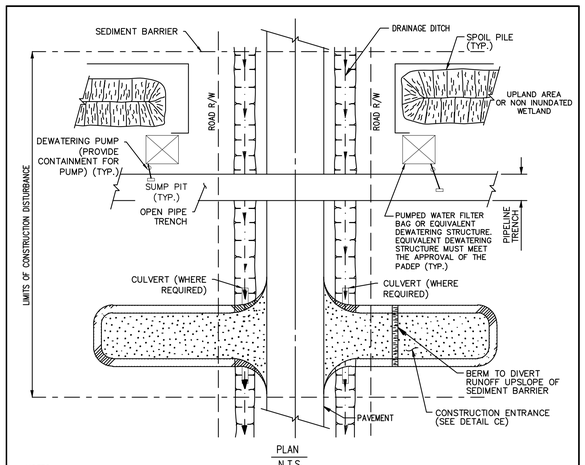
PENNSYLVANIA

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE CORPORATION
STANDARD ENVIRONMENTAL DETAIL

SR SURFACE ROUGHENING
TEMPORARY EROSION CONTROL MEASURE

Williams.



PLAN
N.T.S.

NOTES:

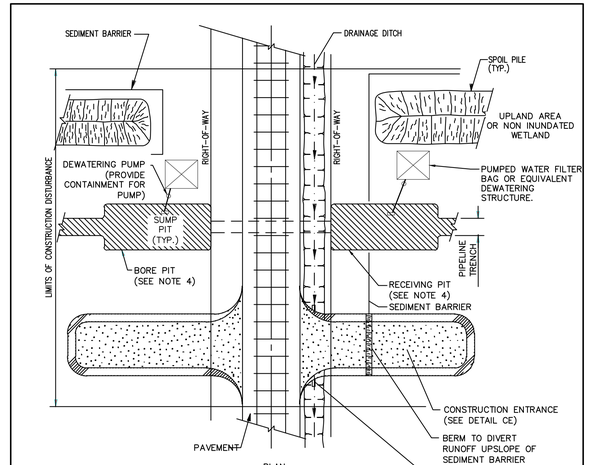
1. SEDIMENT BARRIER SHALL BE INSTALLED AT THE BASE OF SLOPES ADJACENT TO ROAD CROSSINGS WHERE VEGETATION IS DISTURBED, TO INTERCEPT SURFACE RUNOFF. TEMPORARILY RELOCATE SEDIMENT BARRIERS WITHIN LIMITS OF TRENCH OPENING AS NEEDED TO INSTALL PIPE. IMMEDIATELY REPLACE BARRIERS AFTER BACKFILLING TRENCH.
2. PROTECTION FOR SPOIL PILES SHALL BE INSTALLED ONLY WHERE SEDIMENT BARRIERS ACROSS THE ENTIRE DISTURBED AREA ARE NOT REQUIRED.
3. SEDIMENT BARRIERS SHALL REMAIN IN PLACE UNTIL PERMANENT REVEGETATION IS ESTABLISHED.
4. CULVERTS TO BE SIZED AND PLACED WHERE REQUIRED TO MAINTAIN WATER FLOW.
5. CONTRACTOR SHALL BE REQUIRED TO KEEP THE ROAD CLEAN OF DEBRIS AT ALL TIMES.
6. CONTRACTOR MAY ELECT TO UTILIZE SHEET PILING IN ORDER TO STABILIZE PIPE TRENCH.
7. CONTRACTOR MAY ELECT TO UTILIZE WELL-POINTS IN ORDER TO REDUCE THE WATER TABLE PRIOR TO COMMENCING EXCAVATION.
8. DEPENDING ON TOPOGRAPHY AND STATE REQUIREMENTS, SEDIMENT BARRIER MAY BE REQUIRED ACROSS THE ENTIRE CONSTRUCTION RIGHT-OF-WAY AT THE EDGE OF ROAD. IN ADDITION TO THIS DETAIL, REFER TO THE ENVIRONMENTAL ALIGNMENT DRAWINGS FOR PLACEMENT OF SEDIMENT BARRIERS.
9. CONSTRUCTION ENTRANCE NEEDED AS SHOWN ON SPECIFIC PLAN.

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL

TRC TRENCHED ROAD CROSSING

Williams.



PLAN
N.T.S.

NOTES:

1. SEDIMENT BARRIER SHALL BE INSTALLED AT THE BASE OF SLOPES ADJACENT TO ROAD CROSSINGS WHERE VEGETATION IS DISTURBED, TO INTERCEPT SURFACE RUNOFF.
2. PROTECTION FOR SPOIL PILES SHALL BE INSTALLED ONLY WHERE SEDIMENT BARRIERS ACROSS THE ENTIRE DISTURBED AREA ARE NOT REQUIRED.
3. SEDIMENT BARRIERS SHALL REMAIN IN PLACE UNTIL PERMANENT REVEGETATION IS ESTABLISHED.
4. WATER REMOVED FROM BORE PIT AND RECEIVING PIT SHALL BE FILTERED THROUGH A DEWATERING STRUCTURE OR FILTER BAG.
5. IF WELL POINTING IS REQUIRED PRIOR TO EXCAVATING BORE PITS, CONTRACTOR SHALL CONSULT WITH COMPANY'S ENVIRONMENTAL INSPECTOR PRIOR TO COMMENCEMENT OF WORK IN ORDER TO DETERMINE PROPER DEWATERING LOCATION.
6. CONTRACTOR SHALL BE REQUIRED TO KEEP THE CROSSING CLEAN OF DEBRIS AT ALL TIMES.
7. CONTRACTOR MAY ELECT TO UTILIZE SHEET PILING IN ORDER TO STABILIZE BORE PITS.
8. DEPENDING ON TOPOGRAPHY AND STATE REQUIREMENTS, SEDIMENT BARRIER MAY BE REQUIRED ACROSS THE ENTIRE CONSTRUCTION RIGHT OF WAY AT THE EDGE OF ROAD. IN ADDITION TO THIS DETAIL, REFER TO THE ENVIRONMENTAL ALIGNMENT DRAWINGS FOR PLACEMENT OF SEDIMENT BARRIERS.

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL

BRC BORED ROAD CROSSING

Williams.

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
KEVIN C. CLARK
ENGINEER
047271-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

WHM consulting, INC. designs, permits, resolutions

BA GROUP

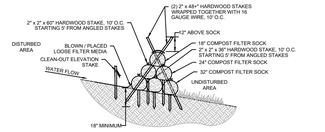
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

Williams.

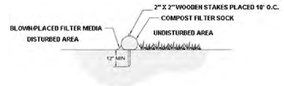
DETAILS SHEET

LEIDY & CHAPMAN TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

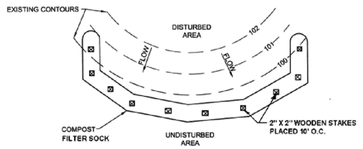
DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1 = 1
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		SHEET 33
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	OF 39



TRIPLE STACK SOCK TRAP SECTION
N.T.S.



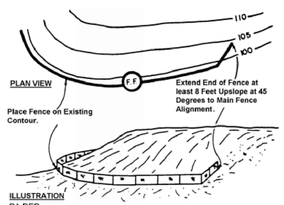
SECTION VIEW
NTS



PLAN VIEW

NOT TO SCALE

FIGURE 4.1
Sediment Barrier Alignment



NOT TO SCALE

NOTES:

1. ALL MATERIAL TO MEET MANUFACTURER SPECIFICATIONS.
2. COMPOST FILTER SOCK FILL TO MEET APPLICATION REQUIREMENTS.
3. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY CONSTRUCTION CONTRACTOR.
4. COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF THE SOCK SHALL BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN SOCK ALIGNMENT.
5. TRAFFIC SHALL NOT BE PERMITTED TO CROSS FILTER SOCKS.
6. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/2 THE ABOVE GROUND HEIGHT OF THE SOCK AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.
7. SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOURS OF INSPECTION WITH ADDITIONAL SOCK OR ROCK FILTER.
8. BIODEGRADABLE FILTER SOCK SHALL BE REPLACED AFTER 6 MONTHS; PHOTODEGRADABLE SOCKS AFTER 1 YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
9. UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE REMOVED. THE SOCK MAY BE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LAITER CASE, THE MESH SHALL BE CUT OPEN AND THE MULCH SPREAD AS A SOIL SUPPLEMENT.

ORGANIC MATTER CONTENT	25% – 100% (DRY WEIGHT BASIS)
ORGANIC PORTION	FIBROUS AND ELONGATED
pH	5.5 – 8.5
MOISTURE CONTENT	30% – 60%
PARTICLE SIZE	30% – 50% PASS THROUGH 3/8" SIEVE
SOLUBLE SALT CONCENTRATION	5.0 dS/m (mmhos/cm) MAXIMUM

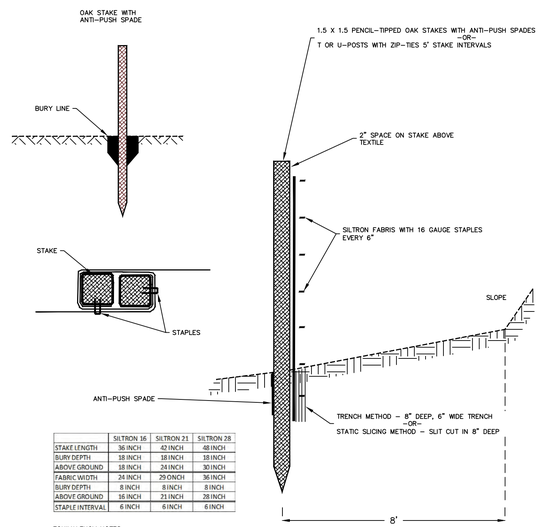
MATERIAL TYPE	3 mil HDPE	5 mil HDPE	5 mil HDPE	MULTI-FILAMENT POLYPROPYLENE (MFPP)	HEAVY-DUTY MULTI-FILAMENT POLYPROPYLENE (HDMFPP)
MATERIAL CHARACTERISTICS	PHOTO-DEGRADABLE	PHOTO-DEGRADABLE	BIO-DEGRADABLE	PHOTO-DEGRADABLE	PHOTO-DEGRADABLE
SOCK DIAMETERS	12" 18"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"
MESH OPENING	3/8"	3/8"	3/8"	3/8"	1/8"
TENSILE STRENGTH		26 psi	26 psi	44 psi	202 psi
ULTRAVIOLET STABILITY % ORIGINAL STRENGTH (ASTM G-155)	23% at 1000 hr.	23% at 1000 hr.		100% at 1000 hr.	100% at 1000 hr.
MINIMUM FUNCTIONAL LONGEVITY	6 MONTHS	9 MONTHS	6 MONTHS	1 YEAR	2 YEARS
TWO-PLY SYSTEMS					
INNER CONTAINMENT NETTING	HDPE BIAXIAL NET CONTINUOUSLY WOUND FUSION-WELDED JUNCTURES 3/4" x 3/4" MAX. APERTURE SIZE				
OUTER FILTRATION MESH	COMPOSITE POLYPROPYLENE FABRIC (WOVEN LAYER AND NON-WOVEN FLEECE MECHANICALLY FUSED VIA NEEDLE PUNCH) 3/16" MAX. APERTURE SIZE				
SOCK FABRICS COMPOSED OF BURLAP MAY BE USED ON PROJECTS LASTING 6 MONTHS OR LESS.					

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE CORPORATION
STANDARD ENVIRONMENTAL DETAIL

CFS COMPOST FILTER SOCK

Williams.



	SILTRON 16	SILTRON 21	SILTRON 28
STAKE LENGTH	36 INCH	42 INCH	48 INCH
BURY DEPTH	18 INCH	18 INCH	18 INCH
ABOVE GROUND	18 INCH	24 INCH	30 INCH
FABRIC WIDTH	24 INCH	29 ONCH	36 INCH
BURY DEPTH	8 INCH	8 INCH	8 INCH
ABOVE GROUND	16 INCH	21 INCH	28 INCH
STAPLE INTERVAL	6 INCH	6 INCH	6 INCH

EQUIVALENCY NOTES:
THE 16" FILTER FENCE WILL USE SLOPE LENGTHS EQUIVALENT TO AND 18" COMPOST FILTER SOCK; THE 21" FILTER FENCE WILL USE SLOPE LENGTHS EQUIVALENT TO A 24" COMPOST FILTER SOCK; THE 28" FILTER FENCE WILL USE SLOPE LENGTHS EQUIVALENT TO A 32" COMPOST FILTER SOCK.

NOTES:
MAINTENANCE:
SEDIMENT SHALL BE REMOVED WHEN ACCUMULATIONS REACH HALF THE ABOVE GROUND HEIGHT OF THE FENCE.
ANY SECTION OF FENCE WHICH HAS BEEN COMPROMISED THROUGH PHYSICAL DAMAGE OR IS BLINDED WITH SEDIMENT OR HYDROCARBONS SHALL BE IMMEDIATELY REPLACED WITH EITHER A ROCK FILTER OUTLET CONFIGURATION, OR FILTER SOCK (COMPOST OR SWITCHGRASS).
IF UNDERCUTTING OCCURS, FILL MUST BE ADDED TO TRENCH AND AREA RE-COMPACTED.

REMOVAL:
FENCE SHALL BE REMOVED AND PROPERLY DISPOSED OF WHEN TRIBUTARY AREA IS PERMANENTLY STABILIZED.

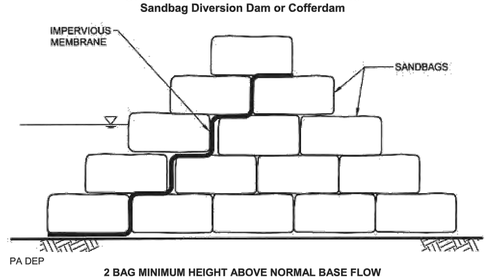
NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

SPF SILTRON POLLUTION PREVENTION FENCE
TEMPORARY EROSION CONTROL MEASURE

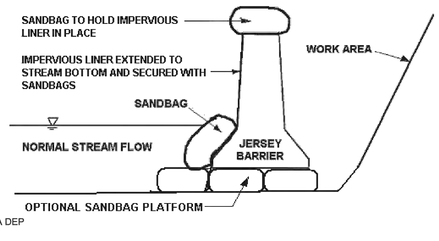
Williams.

STANDARD CONSTRUCTION DETAIL #3-15
Sandbag Diversion Dam or Cofferdam



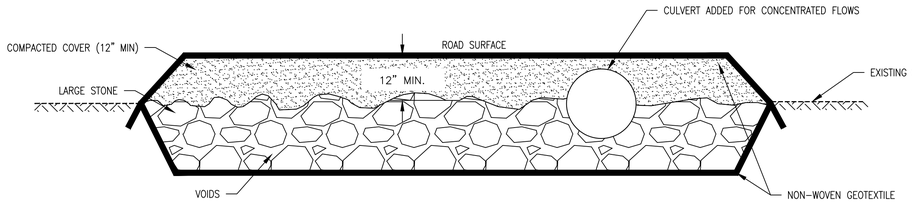
2 BAG MINIMUM HEIGHT ABOVE NORMAL BASE FLOW

FIGURE 3.13
Jersey Barrier Cofferdam – End View



NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

SD SANDBAG DIVERSION DAM DETAIL



CONSTRUCTION SEQUENCE:

1. EXCAVATE THE MATTRESS TO DESIRED DEPTH & SLOPE, ALLOWING FOR A MINIMUM OF 12 INCHES OF COMPACTED COVER OVER THE MATTRESS. PLACE THE GEOTEXTILE FABRIC IN THE TRENCH. ALLOW ENOUGH FABRIC ON THE ENDS TO OVERLAP THE TOP PIECE OF GEOTEXTILE IN THE FINISHED MATTRESS.
2. PLACE POROUS AASHTO 1 STONE ON TOP OF THE FABRIC AND SPREAD INTO A UNIFORM BED OF THE DESIRED DEPTH.
3. PLACE A PIECE OF FABRIC OVERTOP OF THE INSTALLED STONE. BE SURE TO OVERLAP ALL FABRIC JOINTS BY AT LEAST 12 INCHES. LEAVE THE STONE EXPOSED ALONG ANY ROAD EDGES.
4. SHAPE AND COMPACT FILL OVERTOP OF THE FINISHED MATTRESS. ESTABLISH THE DESIRED ROAD SURFACE SHAPE IN THE FILL. PLACE ENOUGH FILL TO ENSURE A MINIMUM OF 12" COMPACTED COVER ONCE THE FILL AND SURFACE AGGREGATE ARE INSTALLED.

MATERIALS REQUIRED FOR CONSTRUCTION:

1. GEOTEXTILE FABRIC (CLASS 1 NON-WOVEN). SEPARATION FABRIC AROUND THE MATTRESS ALLOWS WATER TO PASS THROUGH WHILE BLOCKING FINE SILT AND CLAY, WHICH WOULD EVENTUALLY CLOG THE STRUCTURE.
2. CLEAN STONE. IT IS IMPORTANT TO USE CLEAN STONE. CLEAN STONE IS RELATIVELY UNIFORM IN SIZE WITH NO FINE MATERIAL. TYPICALLY 3 TO 4 INCH DIAMETER STONE IS USED. SMALLER STONE SHOULD BE AVOIDED AS IT REQUIRES LATERAL CONFINEMENT TO STABILIZE. ADDITIONALLY, LARGER STONE WILL INCREASE THE BRIDGING POTENTIAL AND THE FLOW CAPACITY OF THE MATTRESS.

IMPORTANT CONSIDERATIONS:

1. MATTRESSES ARE NOT SUITABLE REPLACEMENTS FOR ROAD DRAINAGE PIPES, OR ANYWHERE CONCENTRATED OVERLAND FLOW CARRIES SEDIMENT. THESE FLOWS WILL CLOG THE MATTRESS OVER TIME AND ARE TO BE HANDLED BY DRAINAGE PIPES.
2. MATTRESS SIZE IS FLEXIBLE. SMALLER MATTRESS ALLOWS ROADSIDE SPRINGS TO BLEED THROUGH THE ROAD BASE WHILE MAINTAINING ROAD STABILITY. THE LARGER MATTRESS CREATED A STABLE FOUNDATION FOR THE ROAD THROUGH AN AREA OF SOFT WET SOILS.
3. A FRENCH MATTRESS SHOULD BE COVERED BY A MINIMUM IF 12" OF COMPACTED FILL MATERIAL.
4. IN MOST SITUATIONS, THE MATTRESS SHOULD BE LEVEL END TO END (WITH ROAD ALIGNMENT).
5. A FRENCH MATTRESS SHOULD PROVIDE UNRESTRICTED FLOW THROUGH THE ROAD. IN WETLAND SITUATIONS, THE SIDE SLOPE MAY BE FLAT OR MINIMAL. IN SLOPED AREAS, A 1–2 PERCENT FALL FROM INLET TO OUTLET WILL AID IN DRAINAGE.
6. THE MATTRESS MUST BE FREE DRAINING AT THE OUTLET TO AVOID PONDING WATER BENEATH THE ROAD.

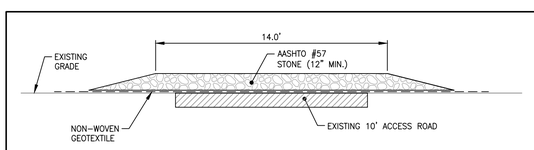
PENNSYLVANIA

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE CORPORATION
STANDARD ENVIRONMENTAL DETAIL

FRENCH MATTRESS

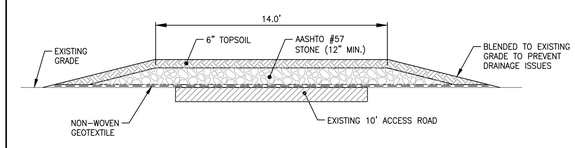
Williams.



NOTES:

1. EXISTING DRAINAGE PATTERNS SHALL BE MAINTAINED IN ACCORDANCE WITH THE APPROVED EROSION & SEDIMENT POLLUTION CONTROL PLAN FOR THE PROJECT.
2. NO MATERIAL IS TO BE EXCAVATED FOR THE PROPOSED TEMPORARY ACCESS ROAD IMPROVEMENTS.
3. WETLAND CROSSINGS SHALL UTILIZE THE APPROVED METHOD(S) FOR TEMPORARYS ACCESS ROAD IMPROVEMENTS/CROSSINGS AS SHOWN ELSEWHERE IN THIS PLAN.

DURING CONSTRUCTION



SEQUENCE OF TEMPORARY ACCESS ROAD RESTORATION

RESTORATION ACTIVITIES FOR THE TEMPORARY ACCESS ROAD IMPROVEMENTS SHALL TAKE PLACE IN 500' SEGMENTS STARTING AT THE FURTHEST END OF THE TEMPORARY ACCESS ROAD AND WORKING OUTWARDS TOWARD THE MAIN ROADWAY POINT OF ACCESS. AS EACH 500' SEGMENT ACHIEVES PERMANENT SUCCESSFUL REVEGETATION AS DEFINED BY DEP, RESTORATION WORK SHALL BE UNDERTAKEN IN THE NEXT 500' SEGMENT UNTIL THE ENTIRE TEMPORARY ACCESS ROAD IS RESTORED.

RESTORATION OF EACH SEGMENT OF TEMPORARY ACCCESS ROAD SHALL BE AS FOLLOWS:

1. IN ALL AREAS OUTSIDE OF WETLAND CROSSINGS PLACE 6 INCH MINIMUM TOPSOIL LAYER OVERTOP THE TEMPORARY ACCESS ROAD.
2. WHERE NECESSARY PLACE TOPSOIL BEYOND THE TEMPORARY ACCESS ROAD LIMITS TO PRVENT DRAINAGE ISSUES.
3. REVEGETATE ENTIRE DISTURBED AREA WITH DCNR SEED MIX AND MULCH.
4. IN WETLAND AREAS THE TEMPORARY ACCESS ROAD SHALL BE RESTORED AS PER THE WETLAND CROSSING/RESTORATION DETAILS SHOWN ELSEWHERE IN THIS PLAN.

POST CONSTRUCTION

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

BRT BIG RIDGE TRAIL – TEMPORARY ACCESS ROAD IMPROVEMENTS AND RESTORATION DETAIL

WHM consulting, INC. designs, permits, resolutions

BA GROUP

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
KEVIN C. CLARK
ENGINEER
047217-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

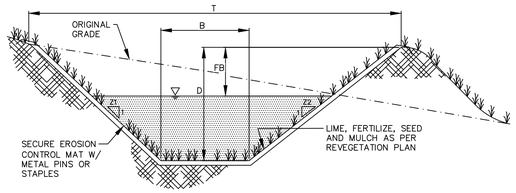
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

Williams.

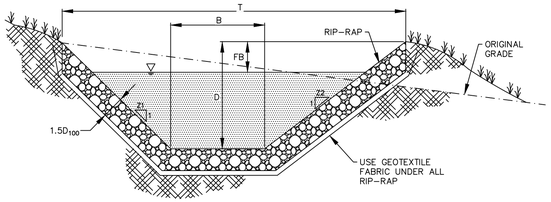
DETAILS SHEET

LEIDY & CHAPMAN TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1 = 1
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		SHEET 34
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	OF 39



GRASS LINED CHANNEL
NO SCALE



ROCK LINED CHANNEL
NO SCALE

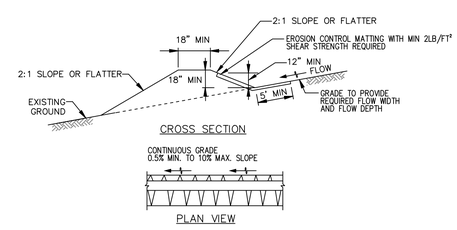
GENERAL NOTES:

AT THE DIRECTION OF THE OWNER OR THEIR DESIGNATED REPRESENTATIVE, A MOUNTABLE EARTHEN BERM AS SHOWN BELOW MAY BE UTILIZED IN PLACE OF A DIVERSION CHANNEL.

HENSEL REPLACEMENT CHANNEL SCHEDULE

Channel ID	LENGTH [FT]	SLOPE [%]	BASE WIDTH [FT]	DEPTH [FT]	SIDE SLOPES [Z1/Z2]	TOP WIDTH [FT]	LINING	OUTLET
HR1-1	21	3.5	4	2.25	3/1	17.50	R-6 Riprap	HR1-C1
HR1-2	18	4.0	4	2.25	3/1	17.50	R-6 Riprap	HR1-C1
HR2	134	6.2	2	0.75	2/1	5	ECM (SC150BN)	HR2-C2
HR3-1	302	2.3	2	1	2/1	6	ECM (SC150BN)	HR3-C3
HR3-2	300	1.0	2	1.25	2/1	7	ECM (SC150BN)	HR3-C3
HR4	65	1.6	2	1.25	2/1	7	ECM (SC150BN)	HR4-C4
HR5-1	108	2.3	2	1.25	2/1	7	ECM (SC150BN)	HR5-C5
HR5-2	94	1.5	2	1.25	2/1	7	ECM (SC150BN)	HR5-C5
HR6	368	4.1	2	1	2/1	6	ECM (SC150BN)	HR6-C6
HR7	364	2.2	2	1	2/1	6	ECM (SC150BN)	HR7-C7
HR8	186	12.0	2	0.75	2/1	5	ECM (SC150BN)	HR8-C8
HR9	181	12.0	2	0.75	2/1	5	ECM (SC150BN)	HR9-C9
HR10	548	8.9	6	1.25	2/1	11	R-6 Riprap	HR10-C10
HR11	201	14.4	2.5	0.75	2/1	5.5	ECM (SC150BN)	HR11-C11
HR12	138	8.8	2	0.75	2/1	5	ECM (SC150BN)	HR12-C12
HR13	759	2.6	2	1.25	2/1	7	ECM (SC150BN)	HR13-C13
HR14	682	2.5	2	1.25	2/1	7	ECM (SC150BN)	HR14-C14
HR15	787	4.9	2	1	2/1	6	ECM (SC150BN)	HR15-C15
HR16-1	456	1.6	2	1.25	2/1	7	ECM (SC150BN)	HR16-C16
HR16-2	13	9.2	2	1	2/1	6	ECM (SC150BN)	HR16-C16
HR17	231	7.3	5	1	2/1	9	ECM (SC150BN)	HR17-C17
HR18-1	260	4.9	2	1	2/1	6	ECM (SC150BN)	HR18-C18
HR18-2	160	5.0	2	1	2/1	6	ECM (SC150BN)	HR18-C18
HR19	193	8.3	2	0.75	2/1	5	ECM (SC150BN)	HR19-C19
HR20	240	7.1	2	0.75	2/1	5	ECM (SC150BN)	HR20-C20
HR21-1	762	1.0	2	0.75	2/1	5	ECM (SC150BN)	HR21-C21
HR21-2	67	7.5	2	0.75	2/1	5	ECM (SC150BN)	HR21-C21
HR22	528	1.3	2	1.25	2/1	7	ECM (SC150BN)	HR22-C22
HR23	254	3.4	2	1	2/1	6	ECM (SC150BN)	HR23-C23
HR24	189	1.1	2	1	2/1	6	ECM (SC150BN)	HR24-C24
HR25	229	9.7	2	1	2/1	6	ECM (SC150BN)	HR25-C25
HR26	370	3.4	2	0.75	2/1	5	ECM (SC150BN)	HR26-C26
HR27	179	2.5	2	0.75	2/1	5	ECM (SC150BN)	HR27-C27

TYPICAL MOUNTABLE EARTHEN BERM
NO SCALE

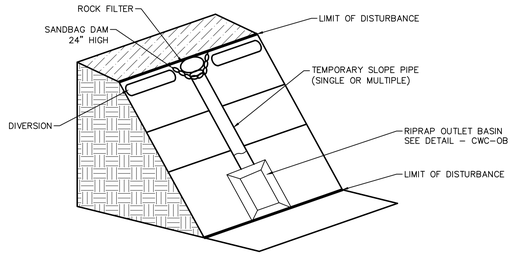


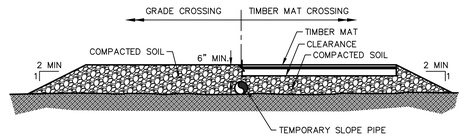
CONSTRUCTION SPECIFICATIONS

1. REMOVE AND DISPOSE OF ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SO AS NOT TO INTERFERE WITH PROPER FUNCTION OF EARTHDIKE.
2. EXCAVATE OR SHAPE EARTH DIKE TO LINE, GRADE, AND CROSS SECTION AS SPECIFIED. BANK PROJECTIONS OR OTHER IRREGULARITIES ARE NOT ALLOWED.
3. COMPACT FILL.
4. CONSTRUCT FLOW CHANNEL ON AN UNINTERRUPTED, CONTINUOUS GRADE, ADJUSTING THE LOCATION DUE TO FIELD CONDITIONS AS NECESSARY TO MAINTAIN POSITIVE DRAINAGE.
5. PROVIDE OUTLET PROTECTION AS REQUIRED ON APPROVED PLAN.
6. STABILIZE EARTH DIKE WITHIN THREE DAYS OF INSTALLATION. STABILIZE FLOW CHANNEL FOR CLEAR WATER DIVERSION WITHIN 24 HOURS OF INSTALLATION.
7. MAINTAIN LINE, GRADE, AND CROSS SECTION. REMOVE ACCUMULATED SEDIMENT AND DEBRIS, AND MAINTAIN POSITIVE DRAINAGE. KEEP EARTH DIKE AND POINT OF DISCHARGE FREE OF EROSION, AND CONTINUOUSLY MEET REQUIREMENTS FOR ADEQUATE VEGETATIVE ESTABLISHMENT IN ACCORDANCE WITH SECTION B-4 VEGETATIVE STABILIZATION.
8. UPON REMOVAL OF EARTH DIKE, GRADE AREA FLUSH WITH EXISTING GROUND. WITHIN 24 HOURS OF REMOVAL STABILIZE DISTURBED AREA WITH TOPSOIL, SEED, AND MULCH, OR AS SPECIFIED ON APPROVED PLAN.

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL
DC — TYPICAL DIVERSION CHANNEL (ROCK-LINED/GRASS-LINED)
Williams





TEMPORARY SLOPE PIPE CROSSING
NO SCALE

NOTES:

CLEARWATER CROSSING TO BE INSPECTED WEEKLY OR AFTER MEASURABLE RAINFALL EVENT AND SHALL BE MAINTAINED IN GOOD CONDITION AT ALL TIMES.

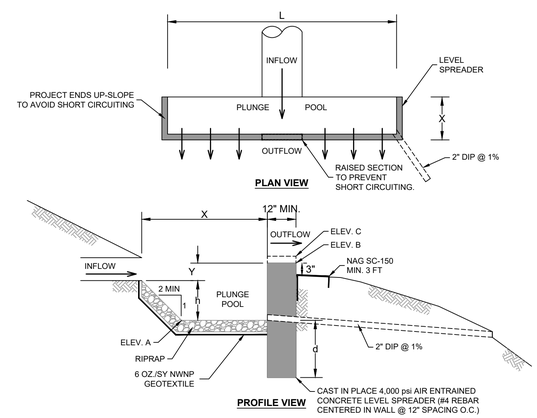
Hensel Replacement - CWC's Schedule

I.D.	Drainage Area [ac]	Req'd Flow [cfs]	Length [ft]	Slope [ft/ft]	No. of Pipes	Pipe Diameter [in]
HR1-C1	112.42	118.7	86.00	0.105	4	18
HR2-C2	0.24	0.2	138.0	0.065	1	12
HR3-C3	14.72	7.7	91.00	0.066	1	18
HR4-C4	7.42	4.1	86.0	0.047	1	12
HR5-C5	28.97	9.8	89.0	0.096	1	18
HR6-C6	7.55	2.4	88.0	0.125	1	12
HR7-C7	2.79	1.3	139.0	0.266	1	12
HR8-C8	0.45	0.2	139.0	0.130	1	12
HR9-C9	0.56	0.3	123.0	0.390	1	12
HR10-C10	8.12	13.0	93.0	0.247	1	18
HR11-C11	1.63	3.1	92.0	0.641	1	12
HR12-C12	0.92	0.54	74.0	0.197	1	12
HR13-C13	9.90	4.49	90.0	0.378	1	12
HR14-C14	14.02	6.60	100.0	0.374	1	12
HR15-C15	14.31	5.43	100.0	0.150	1	12
HR16-C16	25.89	14.94	100	0.170	1	12
HR17-C17	19.18	11.10	100	0.135	1	18
HR18-C18	14.09	10.36	85	0.148	1	18
HR19-C19	2.99	1.07	85	0.330	1	12
HR20-C20	0.97	0.5	85	0.160	1	12
HR21-C21	14.89	18.3	74	0.160	1	12
HR22-C22	3.56	4.6	135	0.045	1	18
HR23-C23	4.22	1.74	73	0.152	1	12
HR24-C24	1.2	0.52	72	0.155	1	12
HR25-C25	6.1	2.6	106	0.149	1	12
HR26-C36	2.38	0.93	98	0.051	1	12
HR27-C27	1.14	0.46	98	0.060	1	12

PENNSYLVANIA

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE CORPORATION
STANDARD ENVIRONMENTAL DETAIL
CWC — CLEAN WATER CROSSING
Williams



LEVEL SPREADER	RIPRAP SIZE (R-)	RIPRAP THICK. Rt (IN)	DIMENSIONS Y (FT)	h (FT)	X (FT)	L (FT)	ELEV. A (FT)	ELEV. B (FT)	ELEV. C (FT)	MIN. DEPTH d (FT)
LEVEL SPREADER	R-3	9.0	2.2	4.4	13.2	40.5	1706.60	1713.20	1716.10	3.0

NOTES:

1. LEVEL SPREADER SHALL BE CONSTRUCTED AND MAINTAINED LEVEL. SMALL VARIATIONS IN HEIGHT ON THE DOWNSTREAM LIP SHALL BE LESS THAN 0.05% SLOPE ALONG THE WEIR.
2. VARIATIONS IN EXISTING GROUND ELEVATION SHALL BE LESS THAN 4 INCHES.
3. CLEAR DEBRIS (I.E. EARTH, WOOD, AND OTHER ORGANIC MATTER) LOCATED WITHIN 15 FEET DOWN SLOPE OF THE LEVEL SPREADER THAT MAY ACCUMULATE.
4. TO PRESERVE INFILTRATION CAPACITY, THE UNDERLYING SOILS SHOULD REMAIN UNDISTURBED, UNCOMPACTED, AND PROTECTED FROM HEAVY EQUIPMENT.

OPERATION & MAINTENANCE:

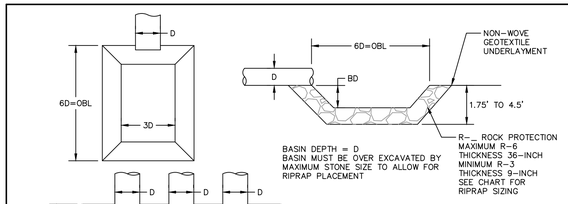
1. LEVEL SPREADER SHALL BE MONITORED FOR 2 YEARS ON A QUARTERLY BASIS AND SEMI-ANNUALLY THEREAFTER.
2. INSPECTIONS SHALL BE MADE FOLLOWING RAINFALL EVENTS EXCEEDING 1 INCH.
3. MONITORING INCLUDES BOTH THE LEVEL SPREADER AND THE DOWN SLOPE AREA UP TO AND INCLUDING THE RECEIVING STREAM.

LEVEL SPREADER
PERMANENT STORMWATER MEASURE — LS

PENNSYLVANIA

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE CORPORATION
PROJECT SPECIFIC DETAIL
LS — LEVEL SPREADER
Williams GAS PIPELINE



NOTES:

1. ALL RIPRAP OUTLET BASINS SHALL BE INSPECTED ON AT LEAST A WEEKLY BASIS AND AFTER EACH RUNOFF EVENT.
2. DISPLACED RIPRAP WITH THE OUTLET BASIN SHALL BE REPLACED IMMEDIATELY.
3. SIDE SLOPES SHALL NOT EXCEED 1.5H:1V.
4. IF NOT ON LEVEL GROUND, AREA NEAR PIPE SHALL BE EXCAVATED TO MAKE GENERALLY LEVEL TRAP.
5. RIPRAP WILL BE REMOVED AND DISTURBED AREA TO BE RESTORED IN ACCORDANCE WITH THE E&S PLAN.
6. RIPRAP WILL HAVE NON-WOVEN GEOTEXTILE UNDERLAYMENT BETWEEN THE STONE AND THE SOIL.

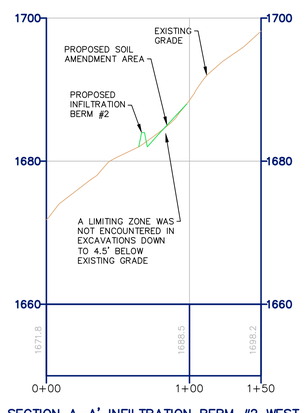
Clean Water Crossing Outlet Basin

Pipe Diameter (D)	Basin Length (6D)	Basin Inside Width (3D)	Basin Depth (BD)
12"	6'	3'	1'
18"	9'	4.5'	1.5'
24"	12'	6'	2'

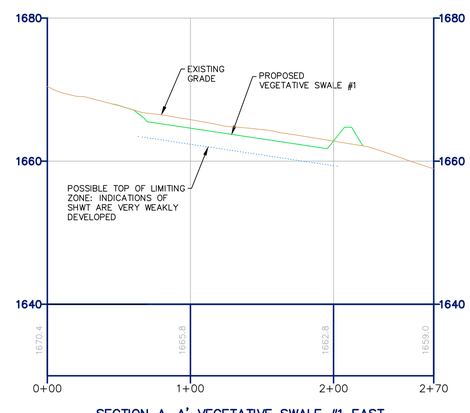
PENNSYLVANIA

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

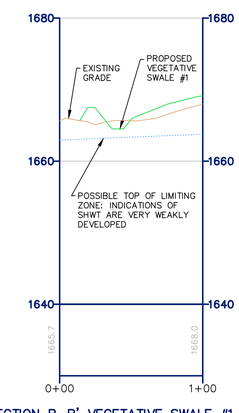
TRANSCONTINENTAL GAS PIPE LINE CORPORATION
STANDARD ENVIRONMENTAL DETAIL
CWC-OB — CLEAN WATER CROSSING (SEDIMENT TRAP OUTLET BASIN)
STANDARD CONSTRUCTION DETAIL #8-6
Williams



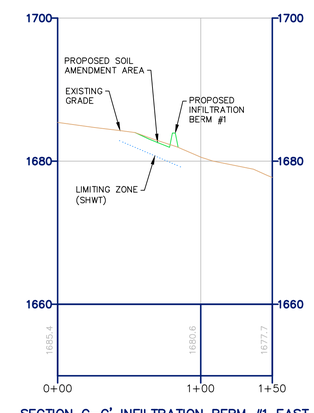
SECTION A–A' INFILTRATION BERM #2 WEST
HORIZONTAL SCALE: 1"=100'
VERTICAL SCALE: 1"=20'



SECTION A–A' VEGETATIVE SWALE #1 EAST
HORIZONTAL SCALE: 1"=100'
VERTICAL SCALE: 1"=20'



SECTION B–B' VEGETATIVE SWALE #1 EAST
HORIZONTAL SCALE: 1"=100'
VERTICAL SCALE: 1"=20'



SECTION C–C' INFILTRATION BERM #1 EAST
HORIZONTAL SCALE: 1"=100'
VERTICAL SCALE: 1"=20'

KEVIN C. CLARK, P.E.
COMMONWEALTH OF PENNSYLVANIA — REGISTERED PROFESSIONAL ENGINEER — KEVIN C. CLARK — ENGINEER — 047214-E
PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

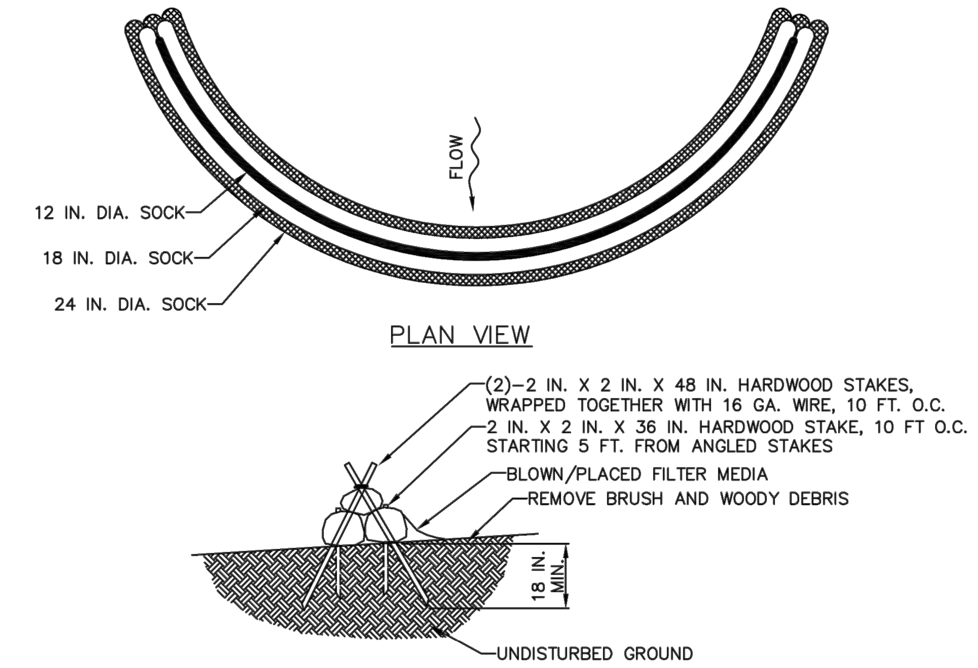
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

DETAILS SHEET

LEIDY & CHAPMAN TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1 = 1
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		SHEET 35
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	OF 39

designs, permits, resolutions | consulting, inc. | BA GROUP



STAKING DETAIL
NOT TO SCALE

DESIGN NOTES:

1. COMPOST SOCK SEDIMENT TRAP SHALL BE SIZED TO PROVIDE 2000 CUBIC FEET OF STORAGE CAPACITY FOR EACH ACRE TRIBUTARY TO THE TRAP.
2. MINIMUM BASE WIDTH IS EQUAL TO THE HEIGHT.
3. SEDIMENT ACCUMULATION SHALL NOT EXCEED 1/3 THE TOTAL HEIGHT OF THE TRAP.
4. SOCKS SHALL BE OF LARGER DIAMETER AT THE BASE OF THE TRAP AND DECREASE IN DIAMETER FOR SUCCESSIVE LAYERS AS SHOWN ON THE PLAN VIEW.
5. ENDS OF THE TRAP SHALL BE A MINIMUM OF 1 FOOT HIGHER IN ELEVATION THAN THE MID-SECTION, WHICH SHALL BE LOCATED AT THE POINT OF DISCHARGE.

NOTES:

SOCK MATERIAL SHALL MEET THE STANDARDS OF TABLE 4.1 OF THE PA DEP EROSION CONTROL MANUAL. COMPOST SHALL MEET THE STANDARDS OF TABLE 4.2 OF THE PA DEP EROSION CONTROL MANUAL.

COMPOST SOCK SEDIMENT TRAPS SHALL NOT EXCEED THREE SOCKS IN HEIGHT AND SHALL BE STACKED IN PYRAMIDAL FORM AS SHOWN ABOVE. MINIMUM TRAP HEIGHT IS ONE 24" DIAMETER SOCK. ADDITIONAL STORAGE MAY BE PROVIDED BY MEANS OF AN EXCAVATED SUMP 12" DEEP EXTENDING 1 TO 3 FEET UPSLOPE OF THE SOCKS ALONG THE LOWER SIDE OF THE TRAP.

COMPOST SOCK SEDIMENT TRAPS SHALL PROVIDE 2,000 CUBIC FEET STORAGE CAPACITY WITH 12" FREEBOARD FOR EACH TRIBUTARY DRAINAGE ACRE. (SEE MANUFACTURER FOR ANTICIPATED SETTLEMENT.)

THE MAXIMUM TRIBUTARY DRAINAGE AREA IS 5.0 ACRES. SINCE COMPOST SOCKS ARE "FLOW-THROUGH," NO SPILLWAY IS REQUIRED.

COMPOST SOCK SEDIMENT TRAPS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT. SEDIMENT SHALL BE REMOVED WHEN IT REACHES 1/3 THE HEIGHT OF THE SOCKS.

PHOTODEGRADABLE AND BIODEGRADABLE SOCKS SHALL NOT BE USED FOR MORE THAN 1 YEAR.

NO.	DATE	BY	REVISION DESCRIPTION	W.O. NO.	CHK.	APP.

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
STANDARD ENVIRONMENTAL DETAIL
CST COMPOST SOCK SEDIMENT TRAP
Williams.

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 1	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 2	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 3	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 4	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 5	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 6	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 7	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 8	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 9	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 10	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 11	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 12	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 13	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 14	18	see map	4	384
CFS-HR 15	18	see map	4	384
CFS-HR 16	18	see map	4	384
CFS-HR 17	18	see map	4	384
CFS-HR 18	18	see map	4	384
CFS-HR 19	18	see map	4	384
CFS-HR 20	18	see map	4	384
CFS-HR 21	18	see map	4	384
CFS-HR 22	18	see map	4	384
CFS-HR 23	18	see map	4	384
CFS-HR 24	18	see map	4	384
CFS-HR 25	18	see map	4	384
CFS-HR 26	18	see map	3	459
CFS-HR 27	18	see map	3	459
CFS-HR 28	18	see map	3	459
CFS-HR 29	18	see map	3	459
CFS-HR 30	18	see map	3	459
CFS-HR 31	18	see map	3	459
CFS-HR 32	18	see map	3	459
CFS-HR 33	18	see map	3	459
CFS-HR 34	12	see map	12	100
CFS-HR 35	12	see map	12	100
CFS-HR 36	12	see map	12	100
CFS-HR 37	12	see map	12	100
CFS-HR 38	12	see map	12	100
CFS-HR 39	12	see map	12	100
CFS-HR 40	12	see map	12	100
CFS-HR 41	12	see map	12	100
CFS-HR 42	32	see map, CSA018	6	566
CFS-HR 43	32	see map, CSA019	6	567
CFS-HR 44	32	see map, CSA019	6	567
CFS-HR 45	32	see map, CSA019	6	567
CFS-HR 46	32	see map, CSA019	6	567
CFS-HR 47	32	see map, CSA019	6	567
CFS-HR 48	32	see map, CSA019	6	567
CFS-HR 49	12	see map	12	100
CFS-HR 50	12	see map	12	100
CFS-HR 51	24	see map	6	376
CFS-HR 52	24	see map	6	376
CFS-HR 53	24	see map	6	376
CFS-HR 54	24	see map	6	376
CFS-HR 55	24	see map	6	376
CFS-HR 56	12	see map	9	127
CFS-HR 57	12	see map	9	127
CFS-HR 58	12	see map	9	127
CFS-HR 59	12	see map	9	127
CFS-HR 60	12	see map	9	127
CFS-HR 61	12	see map	9	127
CFS-HR 62	12	see map	9	127
CFS-HR 63	12	see map	9	127
CFS-HR 64	18	see map	16	104
CFS-HR 65	18	see map	16	104
CFS-HR 66	18	see map	16	104
CFS-HR 67	18	see map	16	104
CFS-HR 68	18	see map	16	104
CFS-HR 69	18	see map	16	104
CFS-HR 70	18	see map	16	104
CFS-HR 71	12	see map	7	88
CFS-HR 72	18	see map	16	104
CFS-HR 73	18	see map	22	72
CFS-HR 74	18	see map	22	72
CFS-HR 75	18	see map	22	72
CFS-HR 76	18	see map	22	72
CFS-HR 77	18	see map	22	72
CFS-HR 78	12	see map	27	37
CFS-HR 79	12	see map	27	37
CFS-HR 79A	12	see map	17	30
CFS-HR 79B	18	see map	16	93
CFS-HR 79C	18	see map	16	93
CFS-HR 79D	18	see map	16	39
CFS-HR 80	18	see map	30	43
CFS-HR 81	18	see map	30	43
CFS-HR 82	12	see map	7	140
CFS-HR 83	12	see map	7	140
CFS-HR 84	12	see map	7	140
CFS-HR 85	12	see map	7	140
CFS-HR 86	12	see map	7	140
CFS-HR 87	12	see map	7	140
CFS-HR 88	12	see map	7	140
CFS-HR 89	12	see map	7	140
CFS-HR 90	12	see map	7	140
CFS-HR 91	12	see map	7	140
CFS-HR 92	12	see map	7	140
CFS-HR 93	12	see map	7	140
CFS-HR 94	12	see map	6	131
CFS-HR 95	12	see map	6	131
CFS-HR 96	12	see map	6	131
CFS-HR 97	12	see map	6	131
CFS-HR 98	12	see map	6	131
CFS-HR 99	12	see map	3	126
CFS-HR 100	12	see map	3	126

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 101	12	see map	3	126
CFS-HR 102	12	see map	9	89
CFS-HR 103	12	see map	9	89
CFS-HR 104	12	see map	9	89
CFS-HR 105	12	see map	9	89
CFS-HR 106	12	see map	9	89
CFS-HR 107	12	see map	9	89
CFS-HR 108	12	see map	9	89
CFS-HR 109	12	see map	9	89
CFS-HR 110	12	see map	9	89
CFS-HR 111	12	see map	9	89
CFS-HR 112	12	see map	9	89
CFS-HR 113	12	see map	9	89
CFS-HR 114	12	see map	9	89
CFS-HR 115	12	see map	10	135
CFS-HR 116	12	see map	10	135
CFS-HR 117	12	see map	10	135
CFS-HR 118	12	see map	3	126
CFS-HR 119	12	see map	3	126
CFS-HR 120	12	see map	3	126
CFS-HR 121	12	see map	9	89
CFS-HR 122	12	see map	9	89
CFS-HR 123	12	see map	9	89
CFS-HR 124	12	see map	9	89
CFS-HR 125	12	see map	9	89
CFS-HR 126	12	see map	9	89
CFS-HR 127	12	see map	9	89
CFS-HR 128	12	see map	9	89
CFS-HR 129	12	see map	9	89
CFS-HR 130	12	see map	9	89
CFS-HR 131	12	see map	9	89
CFS-HR 132	12	see map	12	121
CFS-HR 133	12	see map	12	121
CFS-HR 134	12	see map	12	121
CFS-HR 135	12	see map	12	121
CFS-HR 136	12	see map	12	121
CFS-HR 137	12	see map	12	121
CFS-HR 138	12	see map	12	121
CFS-HR 139	12	see map	12	121
CFS-HR 140	12	see map	12	121
CFS-HR 141	12	see map	12	121
CFS-HR 142	12	see map	11	85
CFS-HR 143	12	see map	11	85
CFS-HR 144	12	see map	11	85
CFS-HR 145	12	see map	11	85
CFS-HR 145A	24	see map	24	143
CFS-HR 145B	24	see map	24	143
CFS-HR 145C	24	see map	24	143
CFS-HR 145D	12	see map	20	41
CFS-HR 145E	12	see map	20	41
CFS-HR 146	12	see map	11	85
CFS-HR 147	12	see map	11	85
CFS-HR 148	12	see map	11	85
CFS-HR 149	24	see map	24	143
CFS-HR 150	24	see map	24	143
CFS-HR 151	24	see map	24	143
CFS-HR 152	24	see map	24	143
CFS-HR 153	24	see map	24	143
CFS-HR 154	24	see map	24	143
CFS-HR 155	24	see map	24	143
CFS-HR 156	24	see map	24	143
CFS-HR 157	24	see map	24	143
CFS-HR 158	24	see map	24	143
CFS-HR 159	18	see map	20	137
CFS-HR 160	18	see map	20	137
CFS-HR 161	18	see map	20	137
CFS-HR 162	18	see map	20	137
CFS-HR 163	24	see map	37	65
CFS-HR 164	24	see map	37	65
CFS-HR 165	24	see map	37	65
CFS-HR 166	24	see map	37	65
CFS-HR 167	24	see map	37	65
CFS-HR 168	24	see map	37	65
CFS-HR 169	24	see map	37	65
CFS-HR 170	24	see map	37	65
CFS-HR 171	24	see map	37	65
CFS-HR 172	24	see map	37	65
CFS-HR 173	24	see map	37	65
CFS-HR 174	24	see map	37	65
CFS-HR 175	24	see map	37	65
CFS-HR 176	24	see map	37	65
CFS-HR 177	24	see map	37	65
CFS-HR 178	24	see map	37	65
CFS-HR 179	24	see map	37	65
CFS-HR 180	24	see map	37	65
CFS-HR 181	24	see map	37	65
CFS-HR 182	24	see map	37	65
CFS-HR 183	24	see map	37	65
CFS-HR 184	24	see map	37	65
CFS-HR 185	24	see map	37	65
CFS-HR 186	24	see map	37	65
CFS-HR 187	24	see map	37	65
CFS-HR 188	24	see map	37	65
CFS-HR 189	24	see map	37	65
CFS-HR 190	24	see map	37	65
CFS-HR 191	24	see map	37	65
CFS-HR 192	24	see map	37	65
CFS-HR 193	24	see map	37	65
CFS-HR 194	24	see map	37	65
CFS-HR 195	24	see map	37	65
CFS-HR 196	24	see map	37	65
CFS-HR 197	24	see map	37	65
CFS-HR 198	24	see map	37	65
CFS-HR 199	24	see map	37	65
CFS-HR 200	24	see map	37	65

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 201	24	see map	37	65
CFS-HR 202	24	see map	37	65
CFS-HR 203	24	see map	37	65
CFS-HR 204	24	see map	37	65
CFS-HR 205	24	see map	37	65
CFS-HR 206	24	see map	37	65
CFS-HR 206A	24	see map	37	73
CFS-HR 206B	24	see map	37	73
CFS-HR 206C	24	see map	37	73
CFS-HR 206D	24	see map	37	73
CFS-HR 207	12	see map	34	35
CFS-HR 208	12	see map	34	35
CFS-HR 209	12	see map	34	35
CFS-HR 210	12	see map	34	35
CFS-HR 211	12	see map	34	35
CFS-HR 212	12	see map	34	35
CFS-HR 213	12	see map	34	35
CFS-HR 214	24	see map	36	84
CFS-HR 215	24	see map	36	84
CFS-HR 216	24	see map	36	84
CFS-HR 217	24	see map	36	84
CFS-HR 218	24	see map	44	66
CFS-HR 219	24	see map	44	66
CFS-HR 220	24	see map	44	66
CFS-HR 221	24	see map	44	66
CFS-HR 222	24	see map	44	66
CFS-HR 223	24	see map	33	90
CFS-HR 224	24	see map	33	90
CFS-HR 224A	24	see map	22	88
CFS-HR 224B	24	see map	22	88
CFS-HR 225	24	see map	33	90
CFS-HR 226	24	see map	33	90
CFS-HR 227	24	see map	33	90
CFS-HR 228	24	see map	33	90
CFS-HR 229	24	see map	33	90
CFS-HR 230	24	see map	33	90
CFS-HR 231	24	see map	33	90
CFS-HR 232	24	see map	33	90
CFS-HR 233	18	see map	20	118
CFS-HR 234	18	see map	20	118
CFS-HR 235	18	see map	20	118
CFS-HR 236	18	see map	20	118
CFS-HR 237	18	see map	20	118
CFS-HR 238	18	see map	18	111
CFS-HR 239	18	see map	18	111
CFS-HR 240	18	see map	18	111
CFS-HR 241	18	see map	18	111
CFS-HR 242	18	see map	18	111
CFS-HR 243	18	see map	18	111
CFS-HR 244	18	see map	18	111
CFS-HR 245	18	see map	18	111
CFS-HR 246	18	see map	18	111
CFS-HR 247	18	see map	18	111
CFS-HR 248	18	see map	18	111
CFS-HR 249	18	see map	18	111
CFS-HR 250	18	see map	18	111
CFS-HR 251	32	see map, CSA020	18	120
CFS-HR 252	32	see map, CSA020	18	120
CFS-HR 253	18	see map	18	111
CFS-HR 254	18	see map	18	111
CFS-HR 255	18	see map	18	111
CFS-HR 256	18	see map	18	111
CFS-HR 257	18	see map	18	111
CFS-HR 257A	12	see map	30	30
CFS-HR 257B	12	see map	30	30
CFS-HR 257C	24	see map	wetland protection	
CFS-HR 257D	24	see map	wetland protection	
CFS-HR 257E	24	see map	wetland protection	
CFS-HR 258	24	see map	41	64
CFS-HR 259	24	see map	41	64
CFS-HR 260	24	see map	41	64
CFS-HR 261	24	see map	41	64
CFS-HR 262	24	see map	41	64
CFS-HR 263	24	see map	41	64
CFS-HR 264	24	see map	41	64
CFS-HR 265	24	see map	41	64
CFS-HR 266	24	see map	41	64
CFS-HR 267	24	see map	41	64
CFS-HR 268	18	see map	36	50
CFS-HR 269	18	see map	36	50
CFS-HR 270	18	see map	36	50
CFS-HR 271	18	see map	36	50
CFS-HR 272	18	see map	36	50
CFS-HR 273	18	see map	36	50
CFS-HR 274	18	see map	36	50
CFS-HR 275	18	see map	36	50
CFS-HR 276	18	see map	36	50
CFS-HR 277	18	see map	36	50
CFS-HR 278	18	see map	33	72
CFS-HR 279	18	see map	33	72
CFS-HR 280	18	see map	33	72
CFS-HR 281	18	see map	33	72
CFS-HR 282	18	see map	33	72
CFS-HR 283	18	see map	33	72
CFS-HR 284	18	see map	33	72
CFS-HR 285	18	see map	33	72
CFS-HR 286	18	see map	33	72
CFS-HR 287	18	see map	33	72
CFS-HR 288	18	see map	33	72
CFS-HR 289	18	see map	33	72
CFS-HR 290	18	see map	33	72
CFS-HR 291	18	see map	33	72
CFS-HR 292	18	see map	33	72
CFS-HR 293	18	see map	33	72

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 294	18	see map	33	72
CFS-HR 295	18	see map	33	72
CFS-HR 296	18	see map	33	72
CFS-HR 297	18	see map	33	72
CFS-HR 298	18	see map	33	72
CFS-HR 299	18	see map	33	72
CFS-HR 300	24	see map	33	86
CFS-HR 301	18	see map	41	58
CFS-HR 302	18	see map	41	58
CFS-HR 303	18	see map	41	58
CFS-HR 304	18	see map	41	58
CFS-HR 305	18	see map	41	58
CFS-HR 306	12	see map	11	79
CFS-HR 307	12	see map	11	79
CFS-HR 308	12	see map	11	79
CFS-HR 309	12	see map	11	79
CFS-HR 310	12	see map	11	79
CFS-HR 311	12	see map	11	79
CFS-HR 312	12	see map	11	79
CFS-HR 313	12	see map	11	79
CFS-HR 314	12	see map	11	79
CFS-HR 315	12	see map	11	79
CFS-HR 316	12	see map	11	79
CFS-HR 317	18	see map	35	60
CFS-HR 318	18	see map	35	60
CFS-HR 319	18	see map	35	60
CFS-HR 320	18	see map	35	60
CFS-HR 321	18	see map	35	60
CFS-HR 322	18	see map	35	60
CFS-HR 323	18	see map	35	60
CFS-HR 324	18	see map	35	60
CFS-HR 325	18	see map	35	60
CFS-HR 326	24	see map	29	90
CFS-HR 327	24	see map	29	90
CFS-HR 328	24	see map	29	90
CFS-HR 329	24	see map	29	90
CFS-HR 330	24	see map	29	90
CFS-HR 331	24	see map	29	90
CFS-HR 332	24	see map	29	90
CFS-HR 333	24	see map	29	90
CFS-HR 334	24	see map	29	90
CFS-HR 335	24	see map	29	90
CFS-HR 336	24	see map	29	90
CFS-HR 337	24	see map	29	90
CFS-HR 338	24	see map	29	90
CFS-HR 339	24	see map	29	90
CFS-HR 340	24	see map	29	90
CFS-HR 341	24	see map	29	90
CFS-HR 342	24	see map	29	90
CFS-HR 343	24	see map	29	90
CFS-HR 344	24	see map	29	90
CFS-HR 345	24	see map	29	90
CFS-HR 346	24	see map	29	90
CFS-HR 347	24	see map	29	90
CFS-HR 348	24	see map	29	90
CFS-HR 349	24	see map	29	90
CFS-HR 350	24	see map	29	90
CFS-HR 351	24	see map	29	90
CFS-HR 352	24	see map	29	90
CFS-HR 353	24	see map	29	90
CFS-HR 354	24	see map	29	90
CFS-HR 355	24	see map	29	90
CFS-HR 356	24	see map	29	90
CFS-HR 357	24	see map	29	90
CFS-HR 358	24	see map	29	90
CFS-HR 359	24	see map	29	90
CFS-HR 360	24	see map	29	90
CFS-HR 361	24	see map	29	90
CFS-HR 362	24	see map	29	90
CFS-HR 363	24	see map	29	90
CFS-HR 364	24	see map	29	90
CFS-HR 365	24	see map	29	90
CFS-HR 366	24	see map	29	90
CFS-HR 367	24	see map	29	90
CFS-HR 368	24	see map	29	90
CFS-HR 369	24	see map	29	90
CFS-HR 370	24	see map	29	90
CFS-HR 371	24	see map	29	90
CFS-HR 372	24	see map	29	90
CFS-HR 373	24	see map	29	90
CFS-HR 374	24	see map	29	90
CFS-HR 375	24	see map	29	90
CFS-HR 376	24	see map	29	90
CFS-HR 377	24	see map	29	90
CFS-HR 378	24	see map	29	90
CFS-HR 379	24	see map	29	90
CFS-HR 380	24	see map	29	90
CFS-HR 381	24	see map	29	90
CFS-HR 382	24	see map	29	90
CFS-HR 383	24	see map	29	90
CFS-HR 384	24	see map	29	90
CFS-HR 385	24	see map	29	90
CFS-HR 386	24	see map	29	90
CFS-HR 387	24	see map	29	90
CFS-HR 388	24	see map	29	90
CFS-HR 389	24	see map	29	90
CFS-HR 390	24	see map	29	90
CFS-HR 391	32	see map	34	99
CFS-HR 392	32	see map	34	99
CFS-HR 393	32	see map	34	99
CFS-HR 394	32	see map	34	99
CFS-HR 395	32	see map	34	99
CFS-HR 396	32	see map	34	99
CFS-HR 397	32	see map	34	99

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 398	32	see map	34	99
CFS-HR 399	32	see map	34	99
CFS-HR 400	32	see map	34	99
CFS-HR 401	32	see map	34	99
CFS-HR 402	32	see map	34	99
CFS-HR 403	32	see map	34	99
CFS-HR 404	32	see map	34	99
CFS-HR 405	32	see map	34	99
CFS-HR 406	32	see map	34	99
CFS-HR 407	32	see map	34	99
CFS-HR 408	32	see map	34	99
CFS-HR 409	32	see map	34	99
CFS-HR 410	32	see map	34	99
CFS-HR 411	32	see map	34	99
CFS-HR 412	32	see map	34	99
CFS-HR 413	32	see map	34	99
CFS-HR 414	32	see map	34	99
CFS-HR 415	32	see map	34	99
CFS-HR 416	32	see map	34	99
CFS-HR 417	32	see map	34	99
CFS-HR 418	32	see map	34	99
CFS-HR 419	32	see map	34	99
CFS-HR 420	32	see map	34	99
CFS-HR 421	32	see map	34	99
CFS-HR 422	32	see map	34	99
CFS-HR 423	32	see map	34	99
CFS-HR 424	32	see map	34	99
CFS-HR 425	32	see map	34	99
CFS-HR 426	32	see map	34	99
CFS-HR 427	32	see map	34	99
CFS-HR 428	24	see map	29	90
CFS-HR 429	18	see map	15	98
CFS-HR 430	18	see map	15	98
CFS-HR 431	18	see map	15	98
CFS-HR 432	18	see map	15	98
CFS-HR 433	18	see map	15	98
CFS-HR 434	18	see map	25	97
CFS-HR 435	18	see map	25	97
CFS-HR 436	18	see map	25	97
CFS-HR 437	18	see map	25	97
CFS-HR 438	18	see map	25	97
CFS-HR 439	18	see map	25	97
CFS-HR 440	18	see map	25	97
CFS-HR 441	18	see map	25	97
CFS-HR 442	18	see map	25	97
CFS-HR 443	18	see map	25	97
CFS-HR 444	18	see map	25	97
CFS-HR 445	18	see map	25	97
CFS-HR 446	18	see map	25	97
CFS-HR 447	18	see map	25	97
CFS-HR 448	18	see map	25	97
CFS-HR 449	18	see map	25	97
CFS-HR 450	18	see map	25	97
CFS-HR 451	18	see map	25	97
CFS-HR 452	18	see map	25	97
CFS-HR 453	18	see map	25	97
CFS-HR 454	18	see map	25	97
CFS-HR 455	18	see map	25	97
CFS-HR 456	18	see map	25	97
CFS-HR 457	18	see map	25	97
CFS-HR 458	18	see map	25	97
CFS-HR 459	18	see map	25	97
CFS-HR 460	18	see map	25	97
CFS-HR 461	18	see map	25	97
CFS-HR 462	18	see map	25	97
CFS-HR 463	18	see map	25	97
CFS-HR 464	18	see map	25	97
CFS-HR 465	24	see map	42	66
CFS-HR 466	24	see map	42	66
CFS-HR 467	24	see map	42	66
CFS-HR 468	24	see map	42	66
CFS-HR 469	24	see map	42	66
CFS-HR 470	24	see map	42	66
CFS-HR 471	24	see map	42	66
CFS-HR 472	24	see map	42	66
CFS-HR 473	24	see map	42	66
CFS-HR 474	24	see map	42	66
CFS-HR 475	24	see map	42	66
CFS-HR 476	24	see map	42	66
CFS-HR 477	24	see map	42	66
CFS-HR 478	24	see map	42	66
CFS-HR 479	24	see map	42	66
CFS-HR 480	24	see map	42	66
CFS-HR 481	24	see map	42	66
CFS-HR 482	24	see map	42	66
CFS-HR 483	24	see map	42	66
CFS-HR 484	24	see map	42	66
CFS-HR 485	24	see map	42	66
CFS-HR 486	24	see map	42	66
CFS-HR 487	24	see map	42	66
CFS-HR 488	24	see map	42	66
CFS-HR 489	24	see map	42	66
CFS-HR 490	24	see map	42	66
CFS-HR 491	24	see map	42	66
CFS-HR 492	24	see map	42	66
CFS-HR 493	24	see map	42	66
CFS-HR 494	24	see map	42	66
CFS-HR 495	24	see map	42	66
CFS-HR 496	24	see map	42	66
CFS-HR 497	24	see map	42	66
CFS-HR 498	24	see map	42	66
CFS-HR 499	24	see map	42	66
CFS-HR 500	24	see map	42	66
CFS-HR 501	24	see map	42	66

KEVIN C. CLARK, P.E.
COMMONWEALTH OF PENNSYLVANIA REGISTERED PROFESSIONAL KEVIN C. CLARK ENGINEER 041211-E
PENNSYLVANIA PROFESSIONAL ENGINEER

WHM consulting, INC. designs, permits, resolutions
BA GROUP

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN
Williams.

DETAILS SHEET

LEIDY & CHAPMAN TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1 = 1
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19	DRAWING NUMBER: 26-1000-70-28-D	SHEET 36 OF 39
WO: 121227	RID:		

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 502	24	see map	42	66
CFS-HR 503	24	see map	42	66
CFS-HR 504	24	see map	42	66
CFS-HR 505	24	see map	42	66
CFS-HR 506	24	see map	42	66
CFS-HR 507	24	see map	42	66
CFS-HR 508	24	see map	42	66
CFS-HR 509	24	see map	42	66
CFS-HR 510	24	see map	26	109
CFS-HR 511	24	see map	26	109
CFS-HR 512	24	see map	26	109
CFS-HR 513	24	see map	26	109
CFS-HR 514	24	see map	26	109
CFS-HR 515	24	see map	26	109
CFS-HR 516	24	see map	26	109
CFS-HR 517	24	see map	26	109
CFS-HR 518	24	see map	26	109
CFS-HR 519	24	see map	26	109
CFS-HR 520	24	see map	26	109
CFS-HR 521	24	see map	26	109
CFS-HR 522	24	see map	26	109
CFS-HR 523	24	see map	26	109
CFS-HR 524	24	see map	26	109
CFS-HR 525	24	see map	26	109
CFS-HR 526	24	see map	26	109
CFS-HR 527	24	see map	26	109
CFS-HR 528	24	see map	26	109
CFS-HR 529	24	see map	26	109
CFS-HR 530	24	see map	26	109
CFS-HR 531	24	see map	26	109
CFS-HR 532	24	see map	26	109
CFS-HR 533	18	see map	5	256
CFS-HR 534	18	see map	5	256
CFS-HR 535	18	see map	5	256
CFS-HR 536	18	see map	5	256
CFS-HR 537	18	see map	5	256
CFS-HR 538	18	see map	5	256
CFS-HR 539	18	see map	5	256
CFS-HR 540	18	see map	17	132
CFS-HR 541	18	see map	17	132
CFS-HR 542	18	see map	17	132
CFS-HR 543	18	see map	17	132
CFS-HR 544	18	see map	17	132
CFS-HR 545	18	see map	17	132
CFS-HR 546	18	see map	17	132
CFS-HR 547	18	see map	17	132
CFS-HR 548	18	see map	17	132
CFS-HR 549	18	see map	17	132
CFS-HR 550	18	see map	17	132
CFS-HR 551	18	see map	17	132
CFS-HR 552	18	see map	17	132
CFS-HR 553	18	see map	17	132
CFS-HR 554	18	see map	17	132
CFS-HR 555	18	see map	17	132
CFS-HR 556	18	see map	17	132
CFS-HR 557	18	see map	17	132
CFS-HR 558	18	see map	17	132
CFS-HR 559	18	see map	17	132
CFS-HR 560	18	see map	17	132
CFS-HR 560A	18	see map	25	32
CFS-HR 560B	18	see map	25	32
CFS-HR 560C	18	see map	25	32
CFS-HR 561	18	see map	26	69
CFS-HR 562	18	see map	26	69
CFS-HR 563	18	see map	26	69
CFS-HR 564	18	see map	26	69
CFS-HR 564A	18	see map	25	56
CFS-HR 564B	18	see map	25	56
CFS-HR 564C	18	see map	25	56
CFS-HR 564D	18	see map	25	56
CFS-HR 565	18	see map	26	69
CFS-HR 566	18	see map	26	69
CFS-HR 567	18	see map	26	69
CFS-HR 568	18	see map	26	69
CFS-HR 569	18	see map	26	69
CFS-HR 570	18	see map	26	69
CFS-HR 571	18	see map	26	69
CFS-HR 572	18	see map	26	69
CFS-HR 573	18	see map	26	69
CFS-HR 574	12	see map	5	111
CFS-HR 575	12	see map	5	111
CFS-HR 576	12	see map	5	111
CFS-HR 577	12	see map	5	111
CFS-HR 577A	12	see map	5	111
CFS-HR 577B	12	see map	5	111
CFS-HR 577C	12	see map	5	111
CFS-HR 577D	12	see map	5	111
CFS-HR 578	12	see map	5	111
CFS-HR 579	12	see map	5	111
CFS-HR 580	12	see map	5	111
CFS-HR 581	12	see map	7	98
CFS-HR 582	12	see map	7	98
CFS-HR 583	12	see map	7	98
CFS-HR 584	12	see map	7	98
CFS-HR 585	12	see map	7	98
CFS-HR 586	12	see map	7	98
CFS-HR 587	12	see map	7	98
CFS-HR 587A	12	see map	wetland protection	
CFS-HR 587B	12	see map	wetland protection	
CFS-HR 587C	24	see map	wetland protection	
CFS-HR 587D	24	see map	wetland protection	
CFS-HR 587E	24	see map	wetland protection	
CFS-HR 587F	12	see map	wetland protection	
CFS-HR 588	12	see map	7	98

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 589	12	see map	7	99
CFS-HR 590	12	see map	7	90
CFS-HR 591	12	see map	12	117
CFS-HR 592	12	see map	12	117
CFS-HR 592A	12	see map	5	171
CFS-HR 592B	32	see map	10	355
CFS-HR 592C	12	see map	2	20
CFS-HR 592D	12	see map	2	20
CFS-HR 593	12	see map	12	117
CFS-HR 594	12	see map	12	117
CFS-HR 595	12	see map	12	117
CFS-HR 596	12	see map	12	117
CFS-HR 597	12	see map	12	117
CFS-HR 598	12	see map	12	117
CFS-HR 599	12	see map	12	117
CFS-HR 600	12	see map	12	117
CFS-HR 601	12	see map	12	117
CFS-HR 602	12	see map	12	117
CFS-HR 603	12	see map	12	117
CFS-HR 604	12	see map	12	117
CFS-HR 605	12	see map	12	117
CFS-HR 606	12	see map	12	117
CFS-HR 607	12	see map	12	117
CFS-HR 608	12	see map	12	117
CFS-HR 609	12	see map	12	117
CFS-HR 610	12	see map	12	117
CFS-HR 611	12	see map	12	117
CFS-HR 612	12	see map	12	117
CFS-HR 613	12	see map	12	117
CFS-HR 614	12	see map	12	117
CFS-HR 615	18	see map	34	47
CFS-HR 616	18	see map	34	47
CFS-HR 617	18	see map	34	47
CFS-HR 618	18	see map	34	47
CFS-HR 619	18	see map	34	47
CFS-HR 620	18	see map	42	52
CFS-HR 621	18	see map	42	52
CFS-HR 622	18	see map	42	52
CFS-HR 623	18	see map	42	52
CFS-HR 624	18	see map	42	52
CFS-HR 625	18	see map	42	52
CFS-HR 626	18	see map	42	52
CFS-HR 627	18	see map	42	52
CFS-HR 628	18	see map	42	52
CFS-HR 629	18	see map	42	52
CFS-HR 630	18	see map	42	52
CFS-HR 631	18	see map	42	52
CFS-HR 632	18	see map	42	52
CFS-HR 633	18	see map	42	52
CFS-HR 634	18	see map	28	71
CFS-HR 635	18	see map	28	71
CFS-HR 636	18	see map	28	71
CFS-HR 637	18	see map	28	71
CFS-HR 638	18	see map	28	71
CFS-HR 639	18	see map	28	71
CFS-HR 640	18	see map	28	71
CFS-HR 641	18	see map	28	71
CFS-HR 642	18	see map	28	71
CFS-HR 643	18	see map	28	71
CFS-HR 644	18	see map	28	71
CFS-HR 645	18	see map	28	71
CFS-HR 646	18	see map	28	71
CFS-HR 647	18	see map	28	71
CFS-HR 648	24	see map	29	90
CFS-HR 649	24	see map	29	90
CFS-HR 650	24	see map	29	90
CFS-HR 651	24	see map	29	90
CFS-HR 652	24	see map	29	90
CFS-HR 653	24	see map	29	90
CFS-HR 654	24	see map	29	90
CFS-HR 655	24	see map	29	90
CFS-HR 656	24	see map	29	90
CFS-HR 657	24	see map	29	90
CFS-HR 658	24	see map	29	90
CFS-HR 659	24	see map	29	90
CFS-HR 660	24	see map	29	90
CFS-HR 661	24	see map	29	90
CFS-HR 662	24	see map	29	90
CFS-HR 663	24	see map	29	90
CFS-HR 664	24	see map	29	90
CFS-HR 665	24	see map	29	90
CFS-HR 666	24	see map	29	90
CFS-HR 667	18	see map	41	54
CFS-HR 668	18	see map	41	54
CFS-HR 669	18	see map	41	54
CFS-HR 670	18	see map	41	54
CFS-HR 671	18	see map	41	54
CFS-HR 672	18	see map	41	54
CFS-HR 673	18	see map	41	54
CFS-HR 674	18	see map	41	54
CFS-HR 675	18	see map	41	54
CFS-HR 676	18	see map	41	54
CFS-HR 677	18	see map	41	54
CFS-HR 678	18	see map	41	54
CFS-HR 679	18	see map	41	54
CFS-HR 680	18	see map	41	54
CFS-HR 681	18	see map	41	54
CFS-HR 682	18	see map	41	54
CFS-HR 683	18	see map	41	54
CFS-HR 684	18	see map	41	54
CFS-HR 685	18	see map	41	54
CFS-HR 686	18	see map	41	54
CFS-HR 687	18	see map	41	54

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 688	18	see map	41	54
CFS-HR 689	18	see map	41	54
CFS-HR 690	18	see map	41	54
CFS-HR 691	18	see map	41	54
CFS-HR 692	18	see map	41	54
CFS-HR 693	18	see map	41	54
CFS-HR 694	18	see map	41	54
CFS-HR 695	18	see map	41	54
CFS-HR 696	18	see map	41	54
CFS-HR 697	18	see map	41	54
CFS-HR 698	18	see map	41	54
CFS-HR 699	18	see map	41	54
CFS-HR 700	18	see map	41	54
CFS-HR 701	18	see map	41	54
CFS-HR 702	18	see map	41	54
CFS-HR 703	18	see map	41	54
CFS-HR 704	18	see map	41	54
CFS-HR 705	18	see map	41	54
CFS-HR 706	18	see map	41	54
CFS-HR 707	18	see map	41	54
CFS-HR 708	18	see map	41	54
CFS-HR 709	18	see map	41	54
CFS-HR 710	18	see map	41	54
CFS-HR 711	18	see map	41	54
CFS-HR 712	18	see map	41	54
CFS-HR 713	18	see map	41	54
CFS-HR 714	18	see map	41	54
CFS-HR 715	18	see map	41	54
CFS-HR 716	18	see map	41	54
CFS-HR 717	18	see map	41	54
CFS-HR 718	18	see map	41	54
CFS-HR 719	18	see map	41	54
CFS-HR 720	18	see map	41	54
CFS-HR 721	18	see map	16	137
CFS-HR 722	18	see map	16	137
CFS-HR 723	18	see map	16	137
CFS-HR 724	18	see map	16	137
CFS-HR 725	18	see map	16	137
CFS-HR 726	18	see map	16	137
CFS-HR 727	18	see map	16	137
CFS-HR 728	18	see map	16	137
CFS-HR 729	18	see map	16	137
CFS-HR 730	18	see map	16	137
CFS-HR 731	18	see map	16	137
CFS-HR 732	18	see map	16	137
CFS-HR 733	18	see map	16	137
CFS-HR 734	18	see map	16	137
CFS-HR 735	18	see map	16	137
CFS-HR 736	18	see map	16	137
CFS-HR 737	18	see map	16	137
CFS-HR 738	18	see map	16	137
CFS-HR 739	18	see map	16	137
CFS-HR 740	18	see map	16	137
CFS-HR 741	18	see map	16	137
CFS-HR 742	18	see map	16	137
CFS-HR 743	18	see map	16	137
CFS-HR 744	18	see map	16	137
CFS-HR 745	18	see map	16	137
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CFS-HR 751	18	see map	16	137
CFS-HR 752	18	see map	16	137
CFS-HR 753	18	see map	16	137
CFS-HR 754	18	see map	16	137
CFS-HR 755	18	see map	16	137
CFS-HR 756	18	see map	16	137
CFS-HR 757	18	see map	16	137
CFS-HR 758	18	see map	16	137
CFS-HR 759	18	see map	16	137
CFS-HR 760	32	see map	16	281
CFS-HR 761	32	see map	16	281
CFS-HR 762	32	see map	16	281
CFS-HR 763	32	see map	16	281
CFS-HR 764	32	see map	16	281
CFS-HR 765	32	see map	16	281
CFS-HR 766	32	see map	16	281
CFS-HR 767	32	see map	16	281
CFS-HR 768	32	see map	16	281
CFS-HR 769	32	see map	16	281
CFS-HR 770	32	see map	16	281
CFS-HR 771	32	see map	16	281
CFS-HR 772	32	see map	16	281
CFS-HR 773	32	see map	16	281
CFS-HR 774	32	see map	16	281
CFS-HR 775	32	see map	16	281
CFS-HR 776	32	see map	16	281
CFS-HR 777	32	see map	16	281
CFS-HR 778	32	see map	16	281
CFS-HR 778A	32	see map, CSA021	5	546
CFS-HR 779	32	see map, CSA021	5	546
CFS-HR 780	32	see map, CSA021	5	546
CFS-HR 781	32	see map, CSA021	5	546
CFS-HR 782	32	see map, CSA021	5	546
CFS-HR 782A	32	see map, CSA021	5	592
CFS-HR 782B	32	see map, CSA021	5	592
CFS-HR 783	32	see map, CSA021	5	546
CFS-HR 784	32	see map, CSA021	5	546
CFS-HR 785	18	see map	wetland protection	
CFS-HR 786	18	see map	wetland protection	
CFS-HR 786A	12	see map	4	111
CFS-HR 786B	12	see map	4	111

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 786C	12	see map	5	130
CFS-HR 786D	12	see map	5	130
CFS-HR 787	32	see map	5	546
CFS-HR 788	32	see map	5	546
CFS-HR 789	32	see map	5	546
CFS-HR 790	32	see map	5	546
CFS-HR 791	18	see map, Western Terminus Valve Yard	12	115
CFS-HR 792	18	see map, Western Terminus Valve Yard	12	115
CFS-HR 793	18	see map, Western Terminus Valve Yard	12	115
CFS-HR 794	18	see map, Western Terminus Valve Yard	12	115
CFS-HR 795	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 796	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 797	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 798	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 799	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 800	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 801	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 802	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 803	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 804	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 805	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 806	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 807	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 808	12	see map	2	45
CFS-HR 809	12	see map	6	152
CFS-HR 810	24	see map	8	340
CFS-HR 811	24	see map	8	340
CFS-HR 812	24	see map	8	340
CFS-HR 813	24	Along the west of Paddy Run Road	6	226
CFS-HR 814	24	Along the east of Paddy Run Road	4	486
CFS-HR 815	24	See map, CY003	1	983
CFS-HR 816	24	See map, CY003	1	983

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
KEVIN C. CLARK
ENGINEER
047231-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

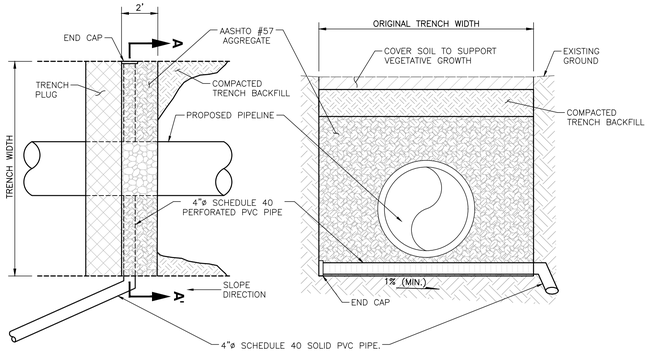
NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

DETAILS SHEET

LEIDY & CHAPMAN TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1 = 1
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19	DRAWING NUMBER: 26-1000-70-28-D	SHEET 37 OF 39
WO: 121227	RID:		



PLAN

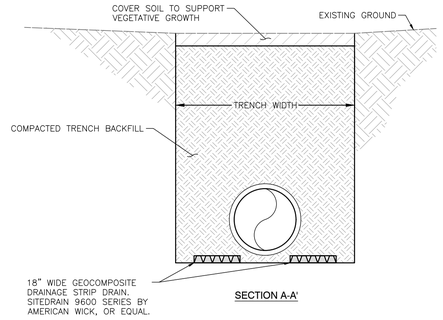
SECTION A-A'

NOTE:

1. DAYLIGHT DISCHARGE PIPE TO RIPRAP EMBEDMENT TERMINUS (SEE DETAIL 9).
2. SLOPE BASE OF PIPE TRENCH, AT THE UPSLOPE SIDE OF TRENCH PLUG TOWARDS THE OUTLET PIPE AT A MINIMUM 1% GRADE.

DETAIL 1
DRAINED TRENCH PLUG

NOT TO SCALE



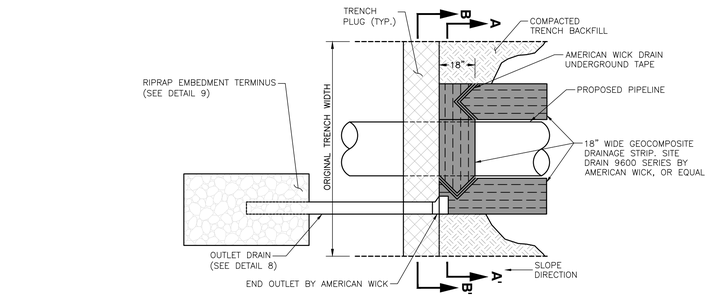
SECTION A-A'

NOTES:

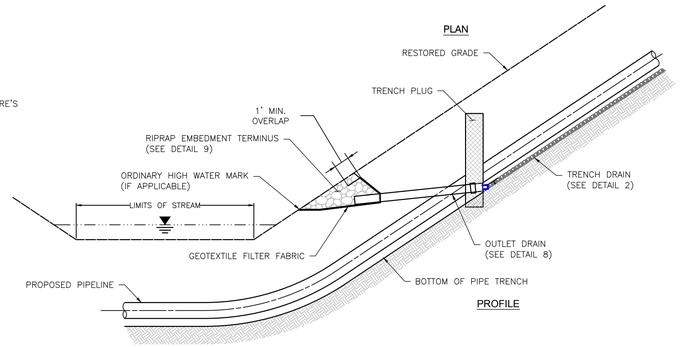
1. SPLICE GEOCOMPOSITE DRAINAGE STRIPS IN ACCORDANCE WITH THE MANUFACTURE'S RECOMMENDATIONS.
2. PLACE GEOCOMPOSITE DRAINAGE STRIPS AT THE BOTTOM OF THE PIPE TRENCH PRIOR TO BACKFILLING. DO NOT CRUSH DRAIN WITH CRIBBING.

DETAIL 2
TRENCH DRAIN

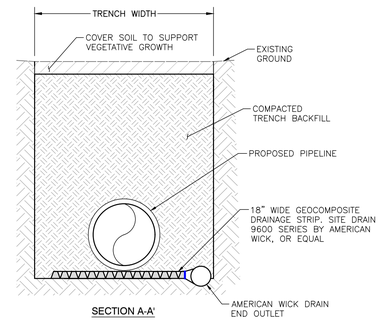
NOT TO SCALE



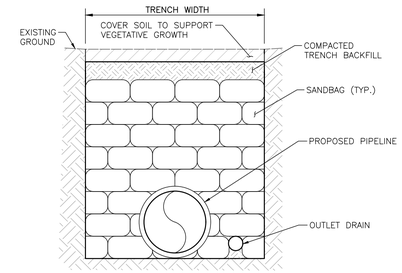
PLAN



PROFILE



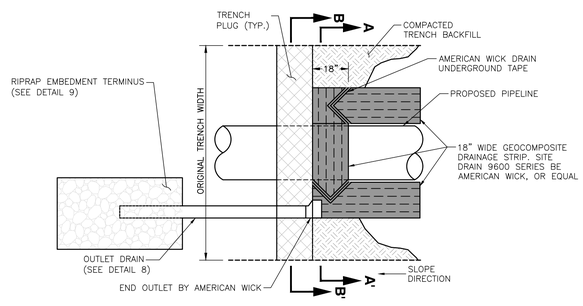
SECTION A-A'



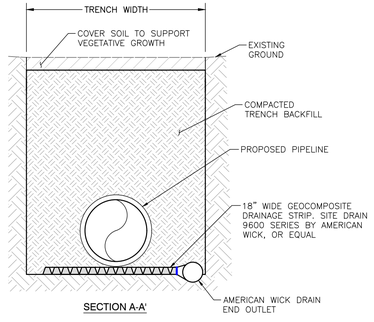
SECTION B-B'

DETAIL 3
SLOPE TOE TRENCH DRAIN OUTLET

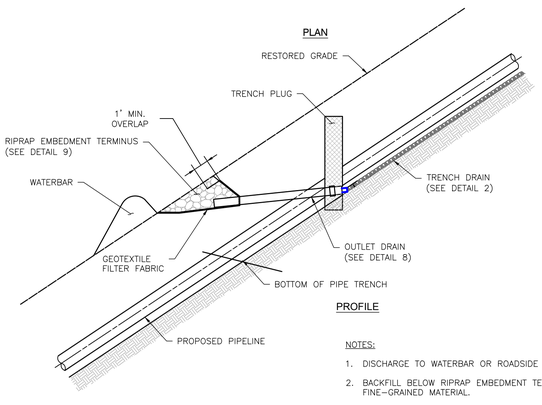
NOT TO SCALE



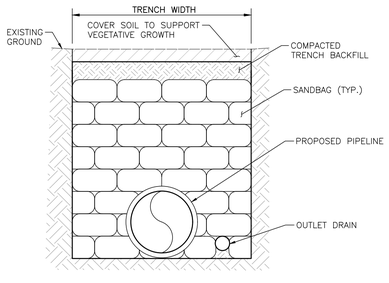
PLAN



SECTION A-A'



PROFILE



SECTION B-B'

NOTES:

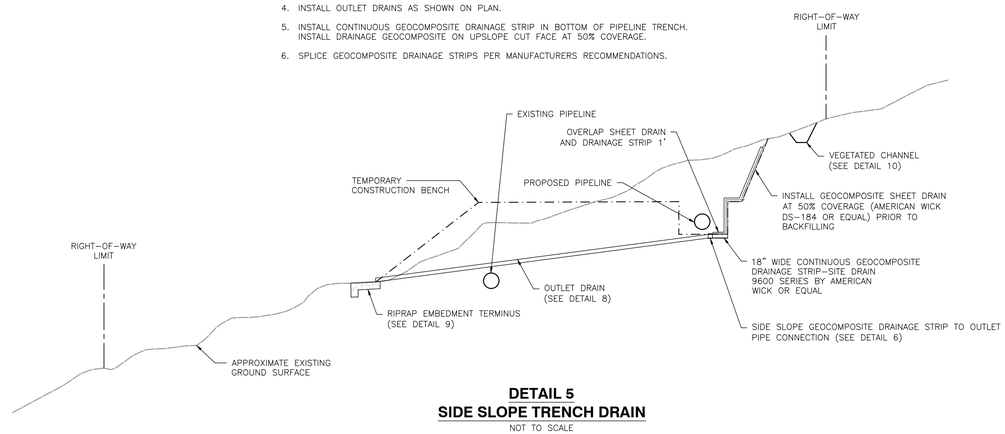
1. DISCHARGE TO WATERBAR OR ROADSIDE DITCH.
2. BACKFILL BELOW RIPRAP EMBEDMENT TERMINUS WITH CLAY OR OTHER FINE-GRAINED MATERIAL.

DETAIL 4
WATERBAR TRENCH DRAIN OUTLET

NOT TO SCALE

SIDE SLOPE DETAIL NOTES

1. INSTALL TOP OF PIPELINE AT 8' BELOW THE EXISTING GROUND SURFACE. EVALUATE ACTUAL LANDSLIDE/COLLUVIUM DEPTH PRIOR TO TRENCHING BY EXCAVATING TEST PITS UNDER THE DIRECTION OF A CEC GEOTECHNICAL REPRESENTATIVE. CONSIDER DEEPENING/SHALLOWING PIPELINE BASED ON FINDINGS.
2. MONITOR AREAS UPSLOPE AND DOWNSLOPE FROM TRENCH FOR MOVEMENT DURING PIPELINE TRENCHING AND INSTALLATION.
3. SLOPE TEMPORARY EXCAVATION AWAY FROM PIPELINE TRENCH.
4. INSTALL OUTLET DRAINS AS SHOWN ON PLAN.
5. INSTALL CONTINUOUS GEOCOMPOSITE DRAINAGE STRIP IN BOTTOM OF PIPELINE TRENCH. INSTALL DRAINAGE GEOCOMPOSITE ON UPSLOPE CUT FACE AT 50% COVERAGE.
6. SPLICE GEOCOMPOSITE DRAINAGE STRIPS PER MANUFACTURERS RECOMMENDATIONS.



DETAIL 5
SIDE SLOPE TRENCH DRAIN

NOT TO SCALE

KEVIN C. CLARK, P.E.

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ENGINEER
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PENNSYLVANIA PROFESSIONAL ENGINEER

WHM consulting, INC. designs, permits, resolutions | BA GROUP

REVISIONS						
NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

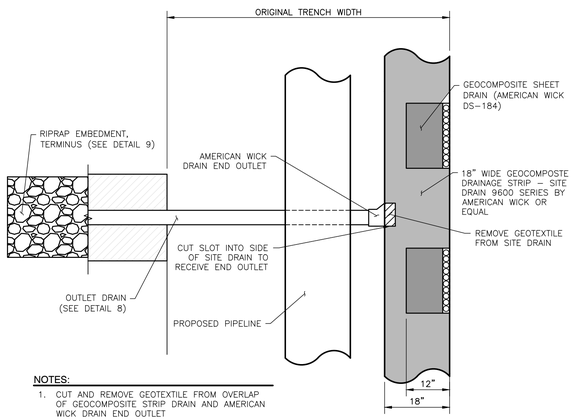
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

Williams.

GEOHAZARD MITIGATION MEASURES - SHEET 1

LEIDY & CHAPMAN TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

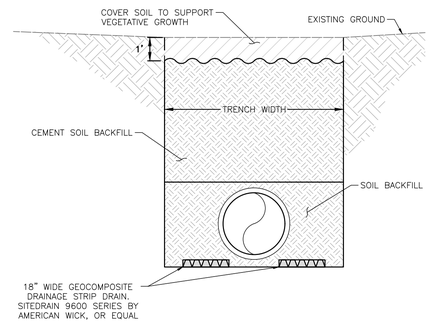
DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1 = 1
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		SHEET 38
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	OF 39



NOTES:

1. CUT AND REMOVE GEOTEXTILE FROM OVERLAP OF GEOCOMPOSITE STRIP DRAIN AND AMERICAN WICK DRAIN END OUTLET

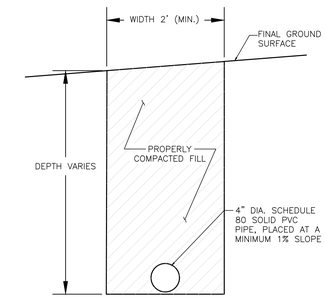
DETAIL 6
SIDE SLOPE GEOCOMPOSITE DRAINAGE STRIP TO OUTLET PIPE CONNECTION
NOT TO SCALE



NOTES:

1. CEMENT SOIL BACKFILL SHALL BE THOROUGHLY MIXED WITH 8% CEMENT. BREAK ALL CLUMPS AND CLODS DURING MIXING. ADD WATER DURING MIXING AS NECESSARY TO PROPERLY HYDRATE.
2. LEAVE SURFACE OF BACKFILL ROUGHENED AND COVER WITH 1 FOOT OF SOIL FOR VEGETATION.

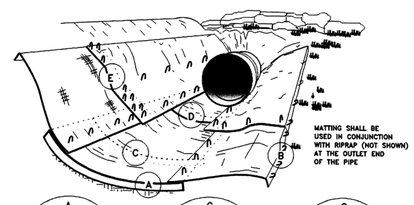
DETAIL 7
PIPELINE TRENCH CEMENT SOIL BACKFILL
NOT TO SCALE

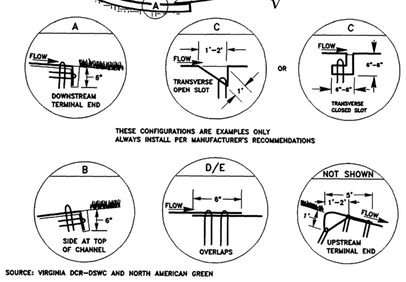


DETAIL 8
OUTLET DRAIN
NOT TO SCALE

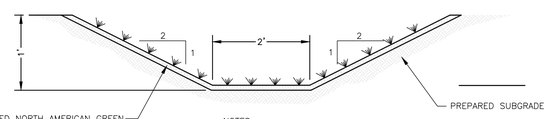
FIGURE 3.13.1

TYPICAL RECP CHANNEL INSTALLATION





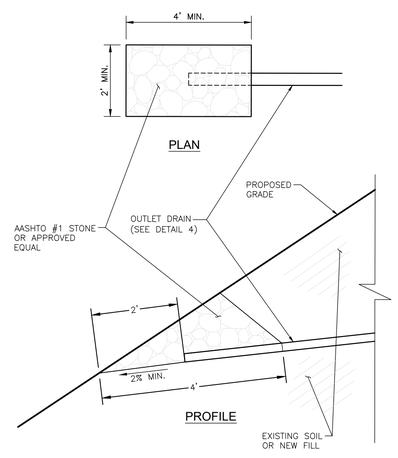
SOURCE: VIRGINIA DCR–DSWC AND NORTH AMERICAN GREEN



NOTES:

1. CHANNEL ALIGNMENTS ARE APPROXIMATE AND SHALL BE FIELD MODIFIED AS NECESSARY.
2. CHANNEL DESIGN WAS APPROXIMATED BASED ON EXISTING GRADE, BUT DID NOT CONSIDER PROPOSED GRADING. ADJUSTMENTS TO THE OVERALL DIMENSIONS OF THE CHANNEL MAY BE NECESSARY TO AVOID GRADING OUTSIDE OF THE LIMITS OF DISTURBANCE, AND CONFLICT WITH THE PROPOSED PIPELINE.
3. THE CONTRACTOR SHALL NOTIFY CEC OF ANY DEVIATION FROM THE DESIGNED CHANNELS AS INDICATED ON THE PLAN SHEETS AND IN THE STANDARD DETAIL FOR REVIEW BEFORE CONSTRUCTING.
4. CHANNEL LINER STAPLE PATTERN PER FIGURE 3.13.1 ABOVE.

DETAIL 10
VEGETATED CHANNEL
NOT TO SCALE



DETAIL 9
RIPRAP EMBEDMENT TERMINUS
NOT TO SCALE

GEOHAZARD MITIGATION MEASURES

Area of Interest	Geohazard Identified	Mitigation Measure(s)
MP 188.9 to 189.04	Surface erosion through waterbar, Steep slope	Drained Trench Plug, Waterbar Trench Drain Outlet
MP 189.09 to 189.15	Possible toe, Possible scarp, Surface erosion, Steep slope	Drained Trench Plug, Waterbar Trench Drain Outlet
MP 190.2 to 190.31	Side slope alignment	Drained Trench Plug, Waterbar Trench Drain Outlet, Pipeline Trench Cement Soil Backfill
MP 190.37 to 190.39	Side slope alignment	Drained Trench Plug, Slope Toe Trench Drain Outlet
MP 190.44 to 190.48	Sandstone outcrop	Drained Trench Plug, Slope Toe Trench Drain Outlet
MP 190.83 to 190.91	Steep slope	Side Slope Trench Drain, Pipeline Trench Cement Soil Backfill
MP 191.05 to 191.96	Creep along travel lane berm, Existing travel lane/Steep fill slope	Side Slope Trench Drain
MP 192.09 to 192.15	Existing travel lane/Steep fill slope	Drained Trench Plug, Waterbar Trench Drain Outlet
MP 192.2 to 192.3	Hummocky (Signs of movement)	Drained Trench Plug, Waterbar Trench Drain Outlet
MP 193.45 to 193.48	Hummocky (Potential movement)	Side Slope Trench Drain

Note: Please refer to Attachment D of ESCGP-3 application for the detailed Geohazard Mitigation Plan

KEVIN C. CLARK, P.E.

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
KEVIN C. CLARK
ENGINEER
047271-E

PENNSYLVANIA PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	BY	DESCRIPTION	W.O. NO.	CHK.	APP.
1	05-04-20	RHM	UPDATED PER PADEP COMMENTS			

TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC
LEIDY SOUTH PROJECT - HENSEL REPLACEMENT
SOIL EROSION & SEDIMENT CONTROL AND SITE RESTORATION PLAN

GEOHAZARD MITIGATION MEASURES - SHEET 2

LEIDY & CHAPMAN TOWNSHIP, CLINTON COUNTY, PENNSYLVANIA

DRAWN BY: RHM	DATE: 3/22/19	ISSUED FOR BID:	SCALE: 1 = 1
CHECKED BY: KMC	DATE: 9/15/19	ISSUED FOR CONSTRUCTION:	REVISION:
APPROVED BY: KCC	DATE: 9/20/19		SHEET 39
WO: 121227	RID:	DRAWING NUMBER: 26-1000-70-28-D	OF 39

designs, permits, resolutions WHM consulting, INC. BA GROUP

Transcontinental Gas Pipe Line Company, LLC

Section 2-1 E&SC/SR Plan Narrative and Drawings

Leidy South Project – Hensel Replacement

September 2019
(Revised May 2020)

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- 4.2 Geologic Formations

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- 11.1 Eastern Terminus Main Line Valve and Access Road
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13.0 The Erosion and Sediment Control Plan Shall be Prepared by a Person Trained and Experienced in Erosion Control Methods and Techniques

Attachments

1 Project Location Map

2 Soils Map and Report

3 E&SC Plan BMP Design Worksheets and Calculations *(Revised May 2020)*

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1.0 Project Description (NOI Checklist Item 3.n)

Transcontinental Gas Pipe Line Company, LLC (Transco), a subsidiary of The Williams Companies, Inc. is proposing the Leidy South Project – Hensel Replacement. The Hensel Replacement consists of installing approximately 6.3 miles of 36-inch pipeline loop along Transco's Leidy Line in Leidy and Chapman Townships, Clinton County. This pipeline will replace the capacity of a segment of Transco's existing 23.375-inch Leidy Line A pipeline, and this segment of the Leidy Line A pipeline totaling 5.8 miles will be abandoned and removed with the exception of 0.8 mile under the Tamarack Swamp Natural Area, which is proposed to be grouted in-place. Once placed into operation, Transco will refer to the Hensel Replacement as the Leidy Line D. Transco will be relocating and installing a Mainline Valve (MLV) near the eastern terminus of the Hensel Replacement as a means to isolate gas flows along sections of a pipeline. At the western terminus of the Hensel Replacement at an existing MLV, pig traps and block valves will be added. Cathodic protection cable will be installed from proposed MLV near the eastern terminus to MP 190.5, and from the western terminus of Hensel Replacement to the Tamarack Swamp Natural Area and associated wetlands on the Leidy Line "A" and "B" existing right-of-way. The cathodic protection cable will be installed in the same trench as the pipeline within wetland, stream and floodway crossings. The Hensel Replacement will include the construction of two temporary offline contractor yards and five temporary contractor staging areas.

The Hensel Replacement is proposed as part of the overall Leidy South Project (Project). The Project is an expansion of Transco's existing natural gas transmission system and an extension of Transco's system through a capacity lease with National Fuel Gas Supply Corporation. The Project will enable Transco to provide 582,400 dekatherms per day (Dth/d) of incremental firm transportation capacity for abundant supplies of natural gas from northern and western Pennsylvania to existing and growing markets in Transco's Zone 6. Transco's Zone 6 includes the portion of the Transco system in Pennsylvania, New York, New Jersey, and Maryland.

The E&SC and SR Plan shall be designed and implemented to be consistent with the Post Construction Stormwater Management (PCSM) Plan under 25 Pa. Code § 102.8 (relating to PCSM requirements). Transco will use and implement the practices, measures and details outlined herein to control soil erosion and off-site sedimentation. All work and disturbed areas are located within Transco property, existing easements or legally obtained workspace. The limit of disturbance (LOD) for the Hensel Replacement will be approximately 131.25 acres. Subject to

receipt of permits and authorizations, Transco anticipates construction of the Project would commence in January 2021 to meet a target in-service date of December 1, 2021.

2.0 Topographic Features of the Area (NOI Checklist Item 3.a, 7.a)

A Project Location Map for the Hensel Replacement is included in Attachment 1. This map shows the topographical features of the general site vicinity and is based on the USGS 7.5 Minute topographical mapping of the Tamarack, Young Womans Creek and Renovo East, Pennsylvania quadrangles.

3.0 Receiving Surface Waters (NOI Checklist Item 3.e, 7.e)

The following table (Table 1) list each watershed located Hensel Replacement Project Area, its Chapter 93 Water Quality Standards, and Pennsylvania Fish and Boat Commission classifications. A Wetland and Watercourse Delineation Report is included in Attachment A of the ESCGP-3 permit application.

Table 1 Receiving Waters

Watershed Name	Designated Use	Existing Use	PFBC Classification
Turtle Point Hollow	EV, MF	-	Naturally Reproducing Trout
Drury Run	EV, MF	-	Naturally Reproducing Trout
Austin Hollow	EV, MF	-	Naturally Reproducing Trout
Hensel Fork	EV, MF	-	Naturally Reproducing Trout
Paddy Run	EV, MF	-	Naturally Reproducing Trout
Dark Hollow	EV, MF	-	Naturally Reproducing Trout
Shingle Branch	EV, MF	-	Class A Wild Trout
Mudlick Run	EV, MF	-	Class A Wild Trout
Sandy Run	HQ-CWF, MF	-	Naturally Reproducing Trout
West Branch Susquehanna River	WWF, MF	-	-

EV: Exceptional Value, MF: Migratory Fishes, WWF: Warm Water Fishes
HQ-CWF: High Quality- Cold Water fishes

4.0 Types, Depth, Slope, Locations & Limitation of the Soils and Geologic Formations (NOI Checklist Item 3.b, 3.l, 7.b, 7.l)

The soil associations on site were identified by soil map units as mapped in the Web Soil Survey website (https://websoilsurvey.sc.egov.usda.gov/) by the United States Dept. of Agriculture (USDA), Natural Resources Conservation Service (NRCS). There are 18 soil mapping units located within the LOD, see Table 2 below:

Table 2 – Soils mapping units within the LOD	
Soil Mapping Unit	**Soil Series**
At	Atkins silt loam, 0 to 3 percent slopes, frequently flooded
Bb	Barbour-Craigsville complex
CaB	Calvin channery silt loam, 3 to 8 percent slopes
CfB	Clymer channery loam, 0 to 8 percent slopes, extremely stony
CgB	Clymer-Cookport channery loams, 0 to 8 percent slopes, extremely stony
CpB	Cookport channery loam, 0 to 8 percent slopes, extremely stony
CpD	Cookport channery loam, 8 to 25 percent slopes, extremely stony
Fr	Freetown mucky peat
HmD	Hazleton-Clymer channery loams, 8 to 25 percent slopes, extremely stony
HoF	Hazleton-Laidig complex, 25 to 50 percent slopes, extremely stony
HuB	Hustontown silt loam, 3 to 8 percent slopes
HuD	Hustontown silt loam, 15 to 25 percent slopes
LdC	Laidig gravelly loam, 8 to 25 percent slopes, extremely stony
Lr	Linden silt loam, rarely flooded
MhD	Meckesville channery loam, 8 to 25 percent slopes, very stony
UnB	Ungers loam, 3 to 8 percent slopes
UpF	Ungers-Meckesville complex, 25 to 50 percent slopes, extremely stony
WeB	Wharton silt loam, 0 to 8 percent slopes, very stony
WgB	Wharton-Cookport complex, 0 to 8 percent slopes, very stony

Detailed descriptions and mapping of soil mapping units are provided in the Attachment 2. Soil use limitations (outlined in Table 3) were reviewed in relation to the Hensel Replacement and resolutions were identified in Section 4.1.

Table 3. Limitations of Pennsylvania Soils Pertaining to Earth Disturbance Projects (Erosion and Sediment Control Best Management Practice (BMP) Manual – Technical Guidance Number 363-3134-008/Page 401)

SOIL NAME	SOIL WITH SLOPE CLASS	CUTBANKS CAVE	CORROSIVE TO CONCRETE\STEEL	DROUGHTY	EASILY ERODIBLE	FLOODING	DEPTH TO SATURATED ZONE/ SEASONAL HIGH WATER TABLE	HYDRIC/ HYDRIC INCLUSIONS	LOW STRENGTH / LANDSLIDE PRONE	SLOW PERCOLATION	PIPING	POOR SOURCE OF TOPSOIL	FROST ACTION	SHRINK - SWELL	POTENTIAL SINKHOLE	PONDING	WETNESS
Atkins	At	X	C/S			X	X	X	X	X	X	X	X				X
Barbour	Bb	X	C	X		X	X	X				X	X				X

Table 3. Limitations of Pennsylvania Soils Pertaining to Earth Disturbance Projects (Erosion and Sediment Control Best Management Practice (BMP) Manual – Technical Guidance Number 363-3134-008/Page 401)

SOIL NAME	SOIL WITH SLOPE CLASS	CUTBANKS CAVE	CORROSIVE TO CONCRETE\STEEL	DROUGHTY	EASILY ERODIBLE	FLOODING	DEPTH TO SATURATED ZONE/ SEASONAL HIGH WATER TABLE	HYDRIC/ HYDRIC INCLUSIONS	LOW STRENGTH / LANDSLIDE PRONE	SLOW PERCOLATION	PIPING	POOR SOURCE OF TOPSOIL	FROST ACTION	SHRINK - SWELL	POTENTIAL SINKHOLE	PONDING	WETNESS
Calvin	CaB	X	C	X	X			X			X		X				
Cookport	CpB, CpB	X	C/S	X	X		X	X	X	X	X	X	X				X
Freetown	Fr	X	C/S				X	X	X				X			X	
Hazleton	HmD , HoF	X	C	X	X			X	X	X	X	X	X				
Hustontown	HuB, HuD	X	C/S	X			X	X		X	X		X				
Laidig	LdC	X	C/S	X	X		X	X	X	X	X	X	X				
Linden	Lr	X	C			X	X	X	X	X	X		X				
Meckesville	MhD	X	C/S				X		X	X	X	X	X				X
Ungers	UnB, UpF	X	C		X				X	X			X				
Wharton	WeB , WgB	X	C/S		X		X	X	X	X	X	X	X	X			X

4.1 Resolution of Soil Limitations

Transco proposes the following resolutions to compensate for soil limitations summarized in Table 3 above:

1. To offset the caving of cutbanks, trenching operations will be conducted in accordance with the OSHA Technical Manual for Trenching.
2. Preventative coatings shall be used to prevent corrosion of concrete and/ or steel.

3. When bedrock is encountered it will be removed by mechanical methods or blasting. Blasting operations will conform with all local, state, and federal regulations.
4. Precautions will be taken to prevent slope failure when working within low strength soils by flattening cut / fill slopes, not overloading, maintaining lateral support, and preventing saturation of soils. Low strength soils will not be used for roadway construction.
5. Excavation in soils prone to flooding, slow percolation, ponding, wetness, located in a seasonal high water table, or which are hydric, will likely encounter water. Compensation will involve dewatering with appropriate means such as pump water filter bags, sediment traps, etc.
6. Soils that have the potential to swell, shrink, or heave due to frost action may cause damage to roadways or pads. Where foundations are critical, compensation may require removal and replacement of soils with suitable material.
7. In circumstances where soils appear to be a poor source of topsoil, droughty or prone to wetness, soil testing will be performed to determine the appropriate applications of soil amendments to promote growth. Soils onsite that are fair sources of topsoil, will be identified, stripped and stockpiled for use during restoration.
8. In order to minimize erosion of soils that are easily erodible, compensation may involve providing a protective lining, to apply seed, mulch, erosion control blankets (either in rolls or hydraulically applied), tracking slopes, upstream diversions, waterbars, etc to minimize soil erosion.

4.2 Geologic Formations

Transco utilized United States Geological Survey (USGS), Geologic Map of Pennsylvania - Map 1, dated 1980 (online), to evaluate geologic hazards on the Project. The desktop analysis completed for the Project revealed that the Hensel Replacement does not cross any known, mapped, or inferred faults. No mines or Karst formations were identified in the site vicinity. However, the analysis outlined that Hensel Replacement lies within a zone of moderate to high landslide incidence and susceptibility.

Due to the moderate to high landslide incidence and susceptibility, a Geological Hazard Assessment and Mitigation Plan was completed and is submitted with this application (Attachment B). This report provides information about any potential geological hazards occurring in the

vicinity of the Hensel Replacement Project area. The Geological Hazard Assessment and Mitigation Plan also identifies appropriate best management practices to avoid and mitigate for conditions encountered during construction.

5.0 Characterizations of Earth Disturbance Activities, Including Past, Present and Proposed Land Uses (NOI Checklist Item 3.c, 7.c)

The Hensel Replacement will be primarily co-located with the existing Transco Leidy Lines in Clinton County, Pennsylvania. The existing Leidy Line A pipeline totaling 5.8 miles will be abandoned and removed with the exception of 0.8 mile under the Tamarack Swamp Natural Area; which is proposed to be grouted in place. Transco will be relocating and installing a Mainline Valve (MLV) near the eastern terminus as a means to isolate gas flows. Pig launchers/receivers will be located at this MLV facility. At the western terminus, at an existing MLV, pig traps and block valves will be added. All work and disturbed areas are located within Transco property, existing easements, or legally obtained workspace where the past, present, and proposed land use is primarily an existing pipeline ROW. Along the edges of the ROW land use is primarily forested. The proposed contractor yard and staging areas will be used temporarily and subsequently removed after the completion of the Project. Staging areas will be used for parking, equipment turn-arounds, and temporary storage of equipment. Transco will use a contractor yard for parking, contractor offices, and the storage of construction equipment and pipes. This contactor yard consists of an agricultural field. All disturbed areas within these temporary workspaces will be restored to the original contours. Transco will use and implement the practices, measures, and details to control soil erosion and off-site sedimentation during construction. Using data taken from Google Earth and Multi-Resolution Land Characteristics (MRLC) Consortium website (https://www.mrlc.gov/viewer/), it appears that the Hensel Replacement site has been an existing and maintained gas pipeline right-of-way for the past 20 years and will continue to be an existing and maintained gas pipeline right-of-way once the Project is complete. Based on the surrounding land characteristics, land use prior to ROW construction within the past 50 years likely would have been either forested land or meadow.

6.0 Erosion and Sediment Control Best Management Practices (NOI Checklist Item 3.f, 7.f)

Various erosion and sediment control measures will be used during the construction of the Hensel Replacement. BMPs proposed to be used at the Site to control soil erosion and sediment pollution are listed below. Details of BMPs proposed to be used at the Project location is included

in the Erosion and Sedimentation Control Plan sheets. BMP's listed will be used at the Project location at the discretion of the environmental inspector, when found necessary to comply with 25 PA Code Chapter 102 and to adequately address potential erosion and sediment control issues.

Rock Construction Entrances

Rock construction entrances shall be installed whenever sediment tracking onto road surfaces is a potential or if required by the county conservation district or other agency. Soil erosion control measures shall be installed, if required and as needed. In special protection watersheds, either a 100' long rock construction entrance or a standard 50' rock construction entrance with a wash rack will be used at the construction entrance to wash construction vehicle wheels before they enter the public roadway. The wash rack will discharge to a 24" compost filter sock (min.). Rock construction entrance thickness shall be constantly maintained to the specified dimensions by adding rock. All sediment deposited on roadways shall be removed and returned to the construction site immediately.

Compost Filter Sock

Compost filter sock shall be placed downslope of disturbed areas to serve as a sediment barrier and filter. Filter sock shall be placed at existing level grade, parallel to contours, with both ends of the sock extended up slope at a 45 degree angle. Socks can be used on both steep and rocky slopes. Socks can range in size from 12 inch to 32 inch diameter depending on the site conditions. The Maximum Permissible Slope Lengths Above Compost Filter Socks will be used to determine the sizes of compost filter.

Compost Filter Sock Sediment Trap

Runoff may be directed into the Compost Filter Sock Sediment Traps of sheet flow into the trap. Compost sock sediment traps shall not exceed three socks in height and shall be stacked in pyramidal form. Minimum trap height is one 24" diameter sock. Additional storage may be provided by means of an excavated sump 12" deep extending 1 to 3 feet upslope of the socks along the lower side of the trap. The maximum tributary drainage area is 5.0 acres. Since compost socks are "flow-through," no spillway is required. Installation of an excavated sump immediately above the socks may increase trap efficiency where soil conditions permit their construction.

Broad Based Dips

Broad-based dips may be used to direct runoff from access roads to well-vegetated areas. In HQ/EV watersheds, sump with compost filter sock should be utilized at the discharge end of the broad-based dip.

Waterbars

Waterbars will be aligned along the pipeline ROW to direct runoff towards the downslope side of the disturbed area and to avoid backflow into the ROW. Compost filter sock shall be installed along the edge of the limit of disturbance to slow run off. Compost filter sock hooks shall be installed at an upslope angle and shall discharge to a well-vegetated area. Upslope of the CFS, a sump shall be constructed to reduce velocity and provide a sheet flow condition to the CFS. Permanent waterbars within the ROW shall be left in place after permanent stabilization has been achieved.

Compost Filter Sock Waterbar Discharge / Waterbar Sump

An 18” Compost Filter Sock shall be installed at the edge of the LOD where waterbar cross the LOD. Upslope of the CFS a 24” x 24” sump shall be constructed to reduce velocity and provide a sheet flow condition to the CFS. The sump shall be filled and stabilized when the CFS is removed after site stabilization.

Diversion Channels / Mountable Berms

Diversion channels or mountable berms shall be used to divert runoff from disturbed areas and convey it to appropriate BMPs such as a sedimentation basin sediment trap or clean water crossing.

Trench Plug

These will be placed at the banks of waterbodies in order to maintain stable working conditions and keep sediment from entering the waterways. Earth filled sacks will be used to secure the plug. The spacing of these structures varies based on the site and the slope of the dig location, as indicated in the plan drawings.

Erosion Control Blankets

A suitable erosion control blanket or soil stabilizer shall be used wherever earth disturbance occurs in close proximity (within 50 feet) of surface waters especially if site conditions make use of conventional E&S BMPs difficult. Erosion control blankets should be used on finished slopes greater than 3:1.

Timber Mats

Timber mats can be used for temporary wetland crossings. The timber mats are placed over the wetland to allow equipment to cross and then are removed.

Temporary Equipment Bridges

A temporary bridge equipment crossing will be built in order to cross any streams along the pipeline installation. The bridge equipment crossing will utilize geotextile material, timber mats, and a timber or metal bridge with side rails any may include instream supports (where necessary). Culvert Equipment crossings may be used in areas where equipment must cross stream channels. Culverts shall be placed in the stream channel sized appropriately to convey the flow within the channel and shall be placed at least one-half their diameter apart. Coarse aggregate may be used for fill surrounding the culverts. Upon completion, all material placed in the stream channel shall be completely removed.

Flumed Crossing/ Dam and Pump Crossing

These may be used when work is to be completed in a waterway. A flumed crossing involves the placement of a flume pipe within the waterway and using diversion structures up and down gradient to divert flow through the flume pipe and out of the work area. A dam and pump crossing involves placing sandbag barriers on the upstream and downstream sides of the work space to prevent water from entering the maintenance area. A pump shall be placed to move any water from the upstream side, around the workspace and back to the downstream side of the work area. Trench plugs may be used on the banks of the stream to keep water from leaving the bed and banks limit of the waterway.

Pumped Water Filter Bag

Filter bags shall be placed in well-vegetated grassy areas and discharge onto stable, erosion resistant areas, and staked if the slope is greater than 5 percent. In the event that this is not possible, a geotextile path will be provided. A compost filter sock shall be placed below the filter bag when placed within 50 of streams or wetlands located within a HQ/EV watershed.

Trench Dewatering

Trench dewatering may be required, depending on the site conditions during the excavation. Water shall be pumped out and discharged into a filter bag or a dewatering structure when deemed necessary.

Safety Fence

Safety fence shall be installed to protect sensitive environmental features as depicted on the plan drawings. The fencing shall remain in place during all phases of construction.

Siltron Pollution Prevention Fence

Siltron Pollution Prevention Fence may be used throughout the project where environmental features make it necessary in lieu of Compost Filter Sock (CFS). The site specific sediment barriers will be selected by the environmental inspector on a site by site basis. These barriers will be placed at existing level grade, with both ends of the barrier extending at least 8' upslope at a 45 degree angle. Sediment must be removed when accumulations reach ½ the above ground height of the fence. The size and type of fence will be selected based on slope lengths as determined in the maximum slope length for Multi-Layer Geotextile Filter Fence figures. The 16-inch filter fence is equivalent to an 18-inch compost filter sock, the 21-inch filter fence is equivalent to a 24-inch compost filter sock, and a 28-inch filter fence is equivalent to a 32-inch compost filter sock. Approved for use as an Alternative E&S and PCSM BMP by PA DEP on 8/22/18.

Rock Filter Outlet

Rock filter outlets may be used to address areas where concentrated flows intersect sediment barriers. They may also be used in instances where sediment barriers such as silt fence or compost filter socks have failed due to concentrated flow.

Wetland Installation Procedures

During the course of pipeline maintenance and replacement within wetland areas, BMP's including slope breakers, equipment mats, sediment barriers, and trench plugs may be used to prevent altering the hydrology of the wetland and to prevent sediment from entering the wetland. Work within the wetland boundaries shall be limited to the extent possible. Upon completion of work the wetland area shall be restored to pre-construction grades and seeded with an appropriate wetland seed mixture.

Hydrostatic Dewatering Structure

A hydrostatic dewatering structure will be placed on a level, well vegetated site such that water will flow away from the structure and work areas. Flow rates through discharge and diverter pipes will be such that structures will not overflow. Contractor will properly remove and dispose of the dewatering structure immediately upon completion of dewatering operations.

Bored Road Crossing/Trenched Road Crossing

These may be used where pipeline installation or maintenance under a bored road is necessary. Sediment barriers shall be used around the work area. Culverts will be placed where required to maintain water flow for stormwater ditches.

Clean Water Crossings

Temporary diversion channels or mountable berms shall be used to divert runoff from undisturbed upslope areas and convey the runoff around areas of earth disturbance within the pipeline ROW corridor. From the diversion, the flow will outlet to a temporary pipe(s) crossing, which is installed across the right-of-way, and discharge to an outlet basin. Clean water leaving the outlet basin will return to sheet flow downslope of the disturbed ROW.

Revegetation Plan and Procedures

The construction site should be stabilized as soon as possible after completion. Establishment of final cover must be initiated no later than 7 days after reaching final grade. Temporary erosion and sedimentation control BMPs can be removed when the site meets final stabilization. Final stabilization means that all soil-disturbing activities are completed, and that either a permanent vegetative cover with a density of 70% or greater has been established or that the surface has been stabilized by hard cover such as pavement or buildings. It should be noted that the 70% requirement refers to the total area vegetated and not just a percent of the site.

Surface Roughening

Surface roughening is the practice of providing a rough soil surface with horizontal depressions for the purpose of reducing runoff velocity, increasing infiltration, aiding the establishment of vegetation, and reducing erosion. Surface roughening should be applied to slopes 3H:1V or steeper unless a stable rock face is provided or it can be shown that there is not a potential for sediment pollution to surface waters. For roughened surfaces within 50 feet of a surface water, and where blanketing of seeded areas is proposed as the means to achieving permanent stabilization, spray-on type blankets are recommended.

Typical Topsoil Stockpile

The maximum stockpile height shall not exceed 35 feet. Stockpile slopes shall be no steeper than 2H:1V. Stockpiles shall be stabilized in accordance with temporary seeding specifications and mulch is to be maintained until the stockpile is stabilized. Stockpile location shown on the plans are illustrative and may vary in location as construction proceeds.

Typical Channel and Vegetation Restoration

The impacted riparian zone will be restored for a minimum of 15 feet landward of the top of bank. If the pre-impact riparian buffer of native herbaceous and shrub vegetation exceeds 15 feet beyond the top of bank, the area to be seeded should be as follows: 150 feet in High-Quality waters, 100 feet in other waters, or existing width of the riparian zone if it is less than the minimum requirements. Ernst Seed Mix 178 (Riparian Buffer Mix) or similar shall be applied on restored banks and riparian zones. In addition, where existing forested buffers are impacted these shall be replanted outside of the existing maintained ROW, as indicated in forest replanting plans for the Project outlined in the Chapter 105 permit.

7.0 Recycling and Disposal of Materials (NOI Checklist Item 3.k, 7.k)

The restoration of the pipeline right-of-way will require the removal of the temporary materials. The temporary materials include, but may not be limited to, stone surfaces and associated geotextiles. The contractors are required to dispose of the materials at suitable disposal or recycling sites and in compliance with local, state and federal regulations.

Contractors are required to inventory and manage their construction site materials. The goal is to be aware of the materials on-site, ensure they are properly maintained, used, and disposed of, and to make sure the materials are not exposed to stormwater. The following materials or substances are expected to be present on-site during construction (Note: this list is not an all-inclusive list and the materials management plan can be modified to address additional materials used on-site):

- Acids
- Detergents
- Fertilizers (nitrogen/phosphorus)
- Hydroseeding mixtures
- Petroleum based products
- Sanitary wastes
- Soil stabilization additives
- Solder
- Solvents
- Other (list here):

These materials must be stored as appropriate and shall not contact storm or non-stormwater discharges. Contractor shall provide a weatherproof container to store chemicals or erodible substances that must be kept on the site. Contractor is responsible for reading, maintaining, and making employees and subcontractors aware of Material Safety Data Sheets (MSDSs).

8.0 Thermal Impacts (NOI Checklist Item 3.m, 7.m)

Due to the overall nature of the Project, thermal impacts to surface waters are not anticipated. The pipeline installation activities will primarily take place within an existing cleared and maintained pipeline right-of-way. There will be no increase in stormwater discharge. The primary means to address thermal impacts on this Project is to limit the size and duration of exposed earth. Revegetation procedures and the Sequence of Construction outline disturbed areas being immediately revegetated.

Stormwater runoff associated with the installation of the MLV's will be routed through the stormwater BMP's designed to retain and infiltrate the first surge of water from the site. The first surge of water will be the warmest water for the duration of the storm event and will quickly cool as the storm event progresses. The BMPs are designed to capture and infiltrate this warmest surge of stormwater. Based on routing calculations, stormwater is not discharged from the BMPs for the first 12 hours during a 100-year/24-hour storm event. The retention period is longer for less intense storms. Therefore, as a result of these measures, no significant thermal impact to the receiving waters is anticipated.

9.0 Antidegradation Requirements (NOI Checklist Item 3.p, 7.o)

Transco evaluated the feasibility of non-discharge alternatives that would be located outside of exceptional value (EV) or high-quality (HQ) watersheds. Hydraulic models were analyzed from an efficiency and effectiveness point of view to confirm and minimize the necessary pipeline lengths and diameters to meet the Project purpose and need. The hydraulic model determined the eastern and western terminus of the Hensel Replacement. In order for the Project to meet the required purpose and need, siting the Hensel Replacement outside of EV and HQ watersheds, is not feasible.

Therefore, Transco determined that there are no cost-effective and environmental sound viable non-discharge alternatives for the project. Transco has minimized project impacts to EV and HQ watersheds through the use of co-location with existing pipelines and protecting riparian

buffers within the project workspace. Earth disturbance will be minimized to the extent practical and will be phased or sequenced to only disturbed portions that are necessary for the specific scope of work. Wherever possible, the LOD was decreased to avoid disturbing additional ground and will be kept to the minimum width and depth necessary to safely complete construction activities

Anti-Degradation Best Available Combination of Technologies (ABACT) standards have been proposed for the Hensel Replacement because there are no viable non-discharge alternatives. The Erosion and Sediment Control Plan prepared for the Project outlines a more stringent design and E&S BMPs that meet ABACT standards.

Pipeline installation activities along the pipeline ROW and at the contractor yards/staging areas will not result in increase in discharge of stormwater to surface waters. The existing / designated use of the streams within the Project area are to be protected through E&S and PCSM measures taken by Transco.

The eastern and western terminus MLV sites will result in increased discharge of stormwater to surface waters which will be mitigated by the implementation of post-construction stormwater management (PCSM) BMP's. Proposed PCSM BMPs are designed with stormwater volume reduction and water quality treatment maximized to the extent practicable within the site constraints to maintain and protect existing water quality and existing and designated uses.

10.0 Riparian Buffers (NOI Checklist Item 3.o, 7.n)

Pipeline installation will take place within an existing cleared and maintained pipeline ROW and forested areas. Due to the linear nature of the project, temporary impacts within riparian buffers are unavoidable. At locations where it was impossible to avoid riparian impacts due to safety issues, Transco will implement BMPs to minimize the impacts. After completing the construction activities, all areas used for pipeline installation and as contractor yards/staging areas will be restored back to pre-existing contours and reseeded with a riparian seed mix in areas where slopes are less than 10%. At the eastern and western terminus sites where permanent increase in impervious area is proposed, no riparian buffers were identified. Tree and shrub plantings will occur in forested riparian buffers outside of the maintained ROW as outlined in riparian reforestation plans outlined in the Chapter 105 permit.

Linear projects including pipelines are eligible for the Riparian Buffer Waiver under 25 PA Code §102.14(d)(2)(ii) if riparian buffers are undisturbed to the extent practicable. As such, a Riparian Buffer Waiver has been requested along with this ESCGP-3 application (Section 1-7).

11.0 Project Site Runoff (NOI Checklist Item 3.d, 7.d)

Changes in Project site runoff are not anticipated for the Project except at the eastern and western terminus MLV sites where increase in impervious areas are proposed. The Project site is primarily existing and maintained pipeline right-of-way in meadow condition with a forested fringe. The ROW will be restored to meadow condition upon the completion of construction. Proposed BMPs were sized based on the maximum tributary drainage area anticipated during construction. An analysis of pre- and post-development stormwater runoff was performed for the MLV sites. The installation of the valves and associated access road will increase the volume of stormwater runoff due to the increase in the type and size of the impervious area. The contractor will construct stormwater BMPs to mitigate the increase in volume and peak rates associated with construction. Refer to the Post-Construction Stormwater Management (PCSM) Plan for additional information (Section 3 of this ESCGP-3 Application). Changes in stormwater runoff between pre- and post-development conditions for 2-year rainfall event and changes in peak discharge rates for 1,2,10,25,50 and 100-yr storms are given in the tables below.

11.1 Eastern Terminus Main Line Valve and Access Road

Pre- and Post-Development Stormwater Volume for 2-yr Rainfall (cf)		
Pre-development	**Post-development before BMPs**	**Net**
1,761	4,118	2,357

Pre-Construction Peak Discharge Rates (cfs)					
1-year	**2-year**	**10-year**	**25-year**	**50-year**	**100-year**
0.03	0.16	1.20	2.30	3.41	4.75

Post-Construction without BMPs Peak Discharge Rates (cfs)					
1-year	**2-year**	**10-year**	**25-year**	**50-year**	**100-year**
0.36	0.98	3.33	5.23	7.05	9.12

11.2 Western Terminus Main Line Valve

Pre- and Post-Development Stormwater Volume for 2-yr Rainfall (cf)		
Pre-development	**Post-development before BMPs**	**Net**
5,532	6,229	697

Pre-Construction Peak Discharge Rates (cfs)					
1-year	**2-year**	**10-year**	**25-year**	**50-year**	**100-year**
0.17	1.09	5.67	9.63	13.34	17.88

Post-Construction Peak Discharge Rates (cfs)					
1-year	**2-year**	**10-year**	**25-year**	**50-year**	**100-year**
0.42	1.77	7.36	11.97	16.35	21.44

12.0 Site Restoration Plan

12.1 Previous Land Use

The Project site is primarily existing and maintained pipeline right-of-way in meadow condition with a forested fringe. Using data taken from Google Earth and Multi-Resolution Land Characteristics (MRLC) Consortium website (https://www.mrlc.gov/viewer/), it appears that the Hensel Replacement site has been an existing and maintained gas pipeline right-of-way for the past 20 years and will continue to be an existing and maintained gas pipeline right-of-way once the Project is complete. Based on the surrounding land characteristics, land use prior to ROW construction within the past 50 years likely would have been either forested land or meadow.

12.2 Disturbance Activities, Changes to Permanent Topographic Land Cover Along Pipeline Alignment

The existing Leidy Line A pipeline totaling 5.8 miles will be abandoned and removed with the exception of 0.8 mile under the Tamarack Swamp Natural Area; which is proposed to be grouted in place. Transco will be relocating and installing a Mainline Valve (MLV) near the eastern terminus as a means to isolate gas flows. Pig launchers/receivers will be located at this MLV facility. At the western terminus, at an existing MLV, pig traps and block valves will be added. All work and disturbed areas are located within Transco property, existing easements, or legally obtained workspace where the past, present, and proposed land use is primarily an existing pipeline ROW. Along the edges of the ROW land use is primarily forested. The proposed contractor yard and staging areas will be used temporarily and subsequently removed after the completion of the Project. Staging areas will be used for parking, equipment turn-arounds, and temporary storage of equipment. Transco will use a contractor yard for parking, contractor offices, and the storage of construction equipment and pipes. This contactor yard consists of an agricultural field. All disturbed areas within these temporary workspaces will be restored to the original contours. In addition to the E&S BMP measures listed in Section 6.0 Transco will use and implement the following practices, measures, and details to control soil erosion and off-site sedimentation during construction.

12.3 Restoration Measures

Pipeline components of the Project will take place within or adjacent to a previously disturbed pipeline ROW. Stormwater controls which will be installed during construction have been designed to avoid impacts to natural drainage features. These controls will only have temporary impacts while installed and will be removed once the site is stabilized with vegetation. Minimal impacts to wetland resources is anticipated, as these functions are generally limited when compared to watercourses. The Hensel Replacement workspaces will be restored by to pre-construction contours, with the exception of MP 191.10 to MP 192.55, where Transco will regrade the ROW in this area to restore approximate original contours to remove a two-tone area as requested by DCNR.

Cleanup operations will commence immediately following backfill operations. Final grading, topsoil replacement, and installation of permanent erosion control structures will be completed within 20 days after backfilling the trench (10 days in residential areas).Construction debris will be removed from all construction work areas unless the

landowner or land managing agency approves leaving materials onsite for beneficial reuse, stabilization, or habitat restoration. Rock in excess of four inches from at least the top 12 inches of soil in all cultivated or rotated cropland, managed pastures, hayfields, and residential areas, as well as other areas will be removed at the landowner's request. Construction right-of-way will be graded to restore pre-construction contours and leave the soil in the proper condition for planting. Temporary sediment barriers will be removed and replaced by permanent erosion control measures or when revegetation is successful.

Wetland Restoration Procedures

The wetlands will be revegetated with annual ryegrass at 40 lbs / acre pure live seed and with the recommended wetland seed mix, unless standing water is present. Lime, fertilizer or mulch will not be used in wetland areas. In the event that final seeding and mulching is deferred more than 20 days after the trench is backfilled, all slopes adjacent to wetlands shall be blanketed for a minimum of 100 feet on each side of the crossing.

Specific procedures will be developed in coordination with the appropriate land management or state agency, where necessary, to prevent the invasion or spread of undesirable exotic vegetation (such as purple loose strife and phragmites). It will be ensured that all disturbed areas permanently revegetate.

All equipment mats will be removed upon completion of construction, as well as temporary sediment barriers located at the boundary between wetland and adjacent upland areas after upland revegetation and stabilization of adjacent upland areas are successful.

Permanent Erosion Control Measures

Trench plugs are intended to slow the flow of subsurface water along the trench. Trench plugs may be constructed of materials such as sand bags or polyurethane foam. Do not use topsoil in trench breakers.. At a minimum, install a trench breaker at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from a waterbody or wetland and where needed to avoid draining a waterbody or wetland. Trench breakers will be installed in wetlands to prevent water from traveling along the trench and altering micro-watersheds within the wetlands.

Waterbars are intended to reduce runoff velocity, divert water and prevent sediment deposition into sensitive resources. Waterbars shall be constructed using spacing recommendations outlined below. In the absence of written recommendations, use the following spacing unless closer spacing is necessary to avoid excessive erosion on the construction right-of-way:

Slope (%)	Spacing (feet)
<5	250
5-15	150
>15-30	100
>30	50

Waterbars will be constructed to divert surface flow to a stable area without causing water to pool or erode behind the breaker. In the absence of a stable area, construct appropriate energy-dissipating devices at the end of the waterbar.

Big Ridge Trail

Big Ridge Trail will be restored to a grass covered roadway upon completion of the project. Six inches of topsoil will be placed overtop the 12 inch thick AASHTO #57 stone roadway surface. The disturbed area will then be revegetated with a DCNR approved seed mix.

Where necessary, broad based dips will be installed to facilitate proper drainage and maintain existing drainage patterns along the roadway. Disturbed areas associated with the broad based dip installation will be revegetated with a DCNR approved seed mix.

In wetland areas, the French Mattress installed during construction will remain in place as the roadway. Any disturbed areas within the wetlands will be reseeded with an appropriate wetland seed mix.

Soil Compaction Measures

Topsoil and subsoil will be tested for compaction at regular intervals in agricultural and residential areas disturbed by construction activities. Tests will be conducted on the same soil type under similar moisture conditions in undisturbed areas to approximate preconstruction conditions. Penetrometers or other appropriate devices will be used to conduct tests.

Severely compacted agricultural areas will be plowed with a paraplow or other deep tillage implement. In areas where topsoil has been segregated, plow the subsoil before replacing the segregated topsoil. If subsequent construction and cleanup activities result in further compaction, conduct additional tilling. Refer to the Transco Project-specific Agricultural Construction and Monitoring Plan. Appropriate soil compaction mitigation will be performed in severely compacted residential areas.

Revegetation Plan and Procedures

The construction site should be stabilized as soon as possible after completion. Establishment of final cover must be initiated no later than 7 days after reaching final grade. Temporary erosion and sedimentation control BMPs can be removed when the site meets final stabilization. Final stabilization means that all soil-disturbing activities are completed, and that either a permanent vegetative cover with a density of 70% or greater has been established or that the surface has been stabilized by hard cover such as pavement or buildings. It should be noted that the 70% requirement refers to the total area vegetated and not just a percent of the site.

Surface Roughening

Surface roughening is the practice of providing a rough soil surface with horizontal depressions for the purpose of reducing runoff velocity, increasing infiltration, aiding the establishment of vegetation, and reducing erosion. Surface roughening should be applied to slopes 3H:1V or steeper unless a stable rock face is provided or it can be shown that there is not a potential for sediment pollution to surface waters. For roughened surfaces within 50 feet of a surface water, and where blanketing of seeded areas is proposed as the means to achieving permanent stabilization, spray-on type blankets are recommended.

Typical Channel and Vegetation Restoration

The impacted riparian zone will be restored for a minimum of 15 feet landward of the top of bank. If the pre-impact riparian buffer of native herbaceous and shrub vegetation exceeds 15 feet beyond the top of bank, the area to be seeded should be as follows: 150 feet or the existing width of the riparian zone if it is less than the minimum requirements. Ernst Seed Mix 178 (Riparian Buffer Mix) or similar shall be applied on restored banks and riparian zones. In addition, where existing forested buffers are impacted these shall

be replanted outside of the existing maintained ROW, as indicated in forest replanting plans for the Project outlined in the Chapter 105 permit.

12.4 Maintenance and Evaluation for Effectiveness

Follow-up inspections of all disturbed areas will be conducted as necessary, to determine the success of revegetation and address landowner concerns. At a minimum, conduct inspections after the first and second growing seasons. Revegetation in non-agricultural areas shall be considered successful if upon visual survey the density and cover of non-nuisance vegetation are similar in density and cover to adjacent undisturbed lands. In agricultural areas, revegetation shall be considered successful when upon visual survey, crop growth and vigor are similar to adjacent undisturbed portions of the same field, unless the easement agreement specifies otherwise. Continue revegetation efforts until revegetation is successful.

All BMPs should be properly maintained to ensure their effectiveness. Sheet flow conditions and infiltration must be sustained throughout the life of the BMP. BMPs should be inspected for clogging from sediment of debris, damage by foot or vehicular traffic, and flow channelization. Inspections should be made on a quarterly basis for the first two years following installation, and then twice per year thereafter. Inspections should also be made after every storm event greater than 1 inch during the establishment period.

Channel linings should be inspected for signs of erosion or dislodging, as applicable. Channels should be inspected for debris, overgrown vegetation, and other blockages. Vegetated areas will be inspected weekly and after runoff events until permanent vegetation is achieved. Once the vegetation is established, inspections of health, diversity, and density should be performed at least twice per year, during both the growing and non-growing season. Vegetative cover should be sustained at 85% and reestablished if damage greater than 50% is observed. Damaged BMPs will be repaired as soon as possible upon discovery. Repairs will be made to restore to BMPs to the original design condition.

Monitor and correct problems with drainage and irrigation systems problems resulting from pipeline construction in agricultural areas will be monitored and corrected until restoration is successful. Restoration will be considered successful when the surface condition is similar to adjacent undisturbed lands, construction debris is removed, revegetation is successful, and proper drainage has been restored.

Vegetated areas will be inspected weekly and after runoff events until permanent vegetation is achieved. Once the vegetation is established, inspections of health, diversity, and density should be performed at least twice per year, during both the growing and non-growing season. Vegetative cover should be sustained at 85% and reestablished if damage greater than 50% is observed. Damaged BMPs will be repaired as soon as possible upon discovery. Repairs will be made to restore damaged BMPs to the original design condition.

Maintenance activities on the vegetated swale should be done annually and within 48 hours after every major storm event (> 1-inch rainfall depth). Erosion problems, damage to vegetation, sediment and debris accumulation, uniformity of in cross-section and pools of standing water should be inspected.

Routine vegetation mowing or clearing over the full width of the permanent right-of-way in uplands will not be done more frequently than every three years. Transco will limit routine vegetation mowing or clearing within wetlands and adjacent to waterbodies. A 10-foot-wide herbaceous corridor will be maintained over the center of the pipeline within the wetland and riparian buffer areas. Trees and other woody vegetation will also be allowed to reestablish naturally within the construction ROWs that were cleared for construction of the pipeline. However, trees within 15 feet of the centerline and between existing pipelines will be removed to maintain the integrity of the pipeline. In no case will routine vegetation mowing or clearing occur during the migratory bird nesting season between April 15 and August 1 of any year unless specifically approved in writing by the responsible land management agency or the U.S. Fish and Wildlife Service. Transco will not use herbicides or pesticides in or within 100 feet of a waterbody except as allowed by the appropriate land management or state agency.

Efforts to control unauthorized off-road vehicle use, in cooperation with the landowner, shall continue throughout the life of the project. Maintain signs, gates, and permanent access roads as necessary.

Wetlands and waterbodies will be protected through use of waterbars, diversion/collection channels, trench plugs, and erosion control blankets. Broad-based dips may be used to direct runoff from access roads to well-vegetated areas. In HQ/EV watersheds, sump with compost filter sock should be utilized at the discharge end of the waterbar. Diversion channels shall be used to divert runoff from disturbed areas and convey

it to appropriate BMPs such as a sedimentation basin sediment trap or clean water crossing. These will be placed at the banks of waterbodies in order to maintain stable working conditions and keep sediment from entering the waterways. Earth filled sacks will be used to secure the plug. The spacing of these structures varies based on the site and the slope of the dig location, as indicated in the plan drawings. A suitable erosion control blanket or soil stabilizer shall be used wherever earth disturbance occurs in close proximity of surface waters especially if site conditions make use of conventional E&S BMPs difficult. Erosion control blankets should be used on finished slopes greater than 3:1.

Post-Construction Wetland and Watercourse Monitoring shall occur annually for a period of five years following construction and include wetlands and watercourses impacted by the Project, and a monitoring report submitted thereafter. Each monitoring report will include, at a minimum, the following information:

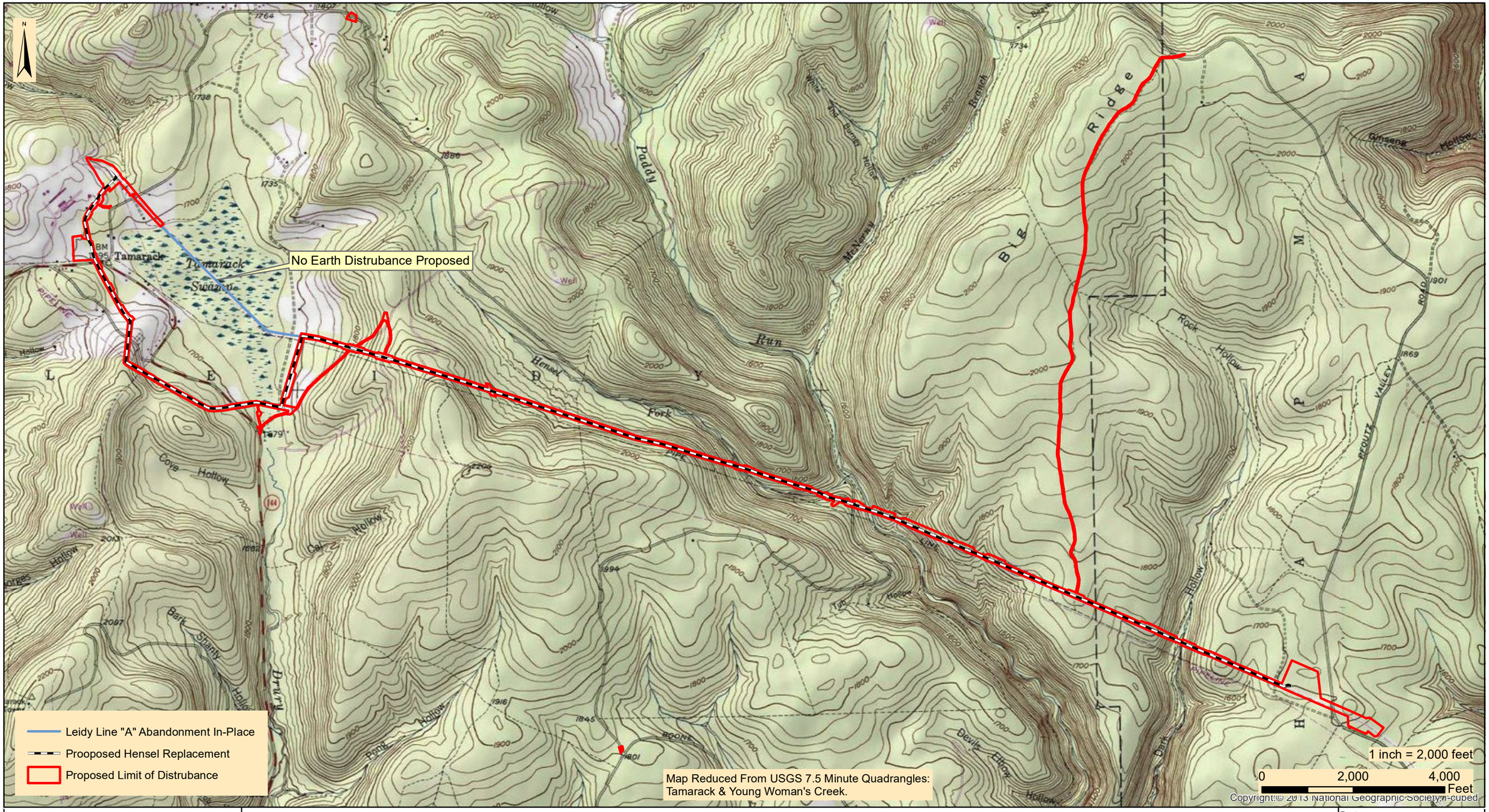
- Information describing the presence or absence of hydrology at the time of inspection and a narrative comparison to hydrology present in the wetland or watercourse during pre-permitting field investigation(s);
- Photographic Documentation;
- Vegetation data including inventory of plant species, percent coverage of native hydrophytic species (wetlands), and stem counts survival; and
- Identification of any problems or concerns that require remedial measures, including loss of hydrology, and a plan to address the deficiencies.

Contractor shall provide a weatherproof container to store chemicals or erodible substances that must be kept on the site. Contractor is responsible for reading, maintaining, and making employees and subcontractors aware of Material Safety Data Sheets (MSDSs).

13.0 The Erosion and Sediment Control Plan Shall be Prepared By a Person Trained and Experienced in Erosion Control Methods and Techniques

These plans and narrative were prepared by Kevin Clark, PE (BAI Group, LLC) of State College, PA in accordance with the Pennsylvania Department of Environmental Protection Erosion and Sediment Pollution Control Program Manual, March 2012. Plan preparer's resume is provided in Attachment C of the ESCGP-3 permit package).

ATTACHMENT 1
PROJECT LOCATION MAP



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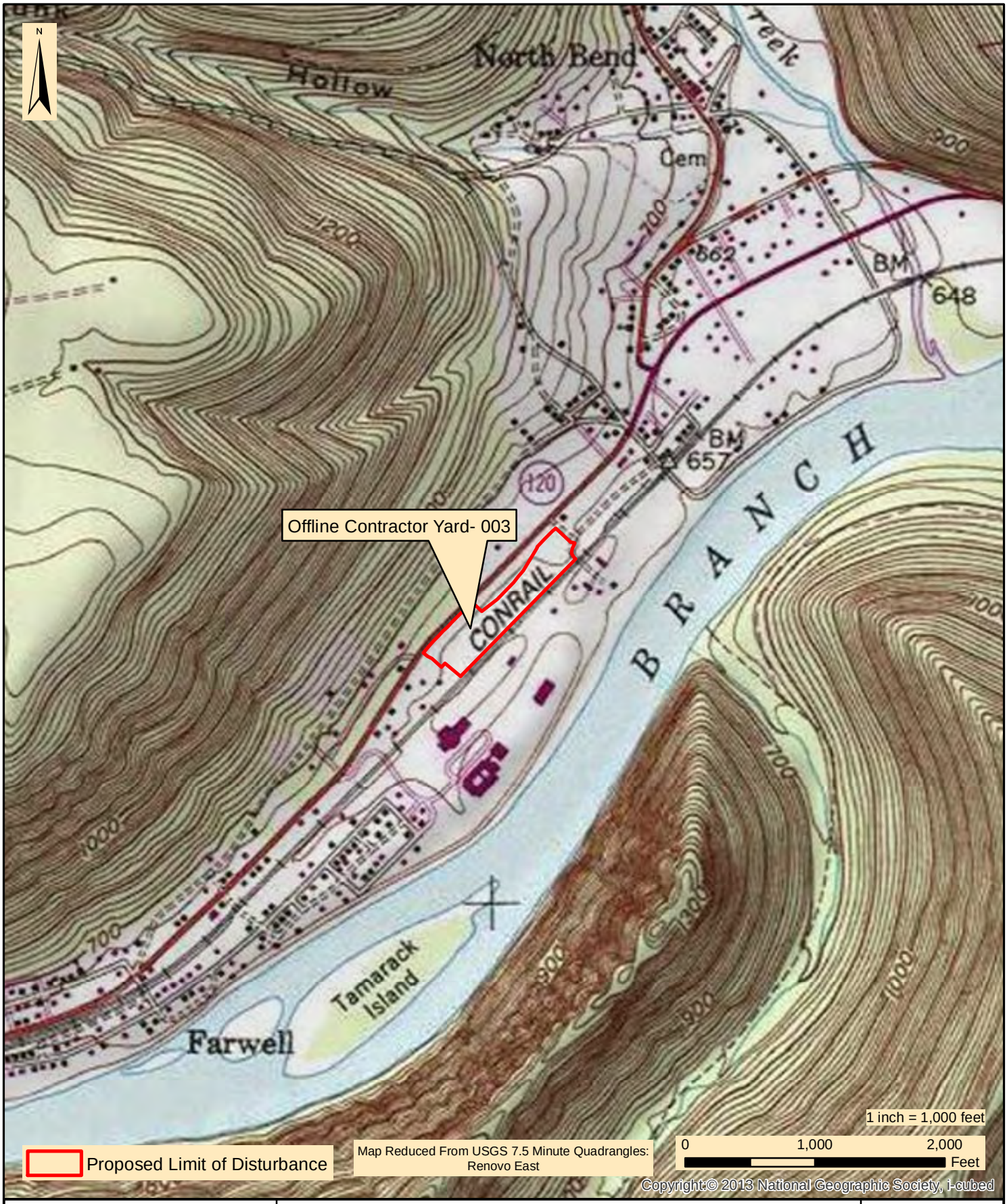
TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

LEIDY SOUTH PROJECT

LEIDY LINE D 36" HENSEL REPLACEMENT PROJECT LOCATION MAP

LEIDY & CHAPMAN TOWNSHIP | CLINTON COUNTY | PENNSYLVANIA

Date:	4/28/2020
WHM DRAWING NUMBER:	WILLIAMS202B001
Drawn By:	FTN
Figure Number:	1-1



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TRANSCONTINENTAL GAS PIPE LINE COMPANY, LLC

LEIDY SOUTH PROJECT

LEIDY LINE D 36" HENSEL REPLACEMENT
PROJECT LOCATION MAP

CHAPMAN TOWNSHIP CLINTON COUNTY PENNSYLVANIA

Date:	8/21/2019
WHM Drawing Number:	WILLIAMS200A001-1
Drawn By:	FTN
Figure Number:	1-2

ATTACHMENT 2
SOILS MAP AND REPORT

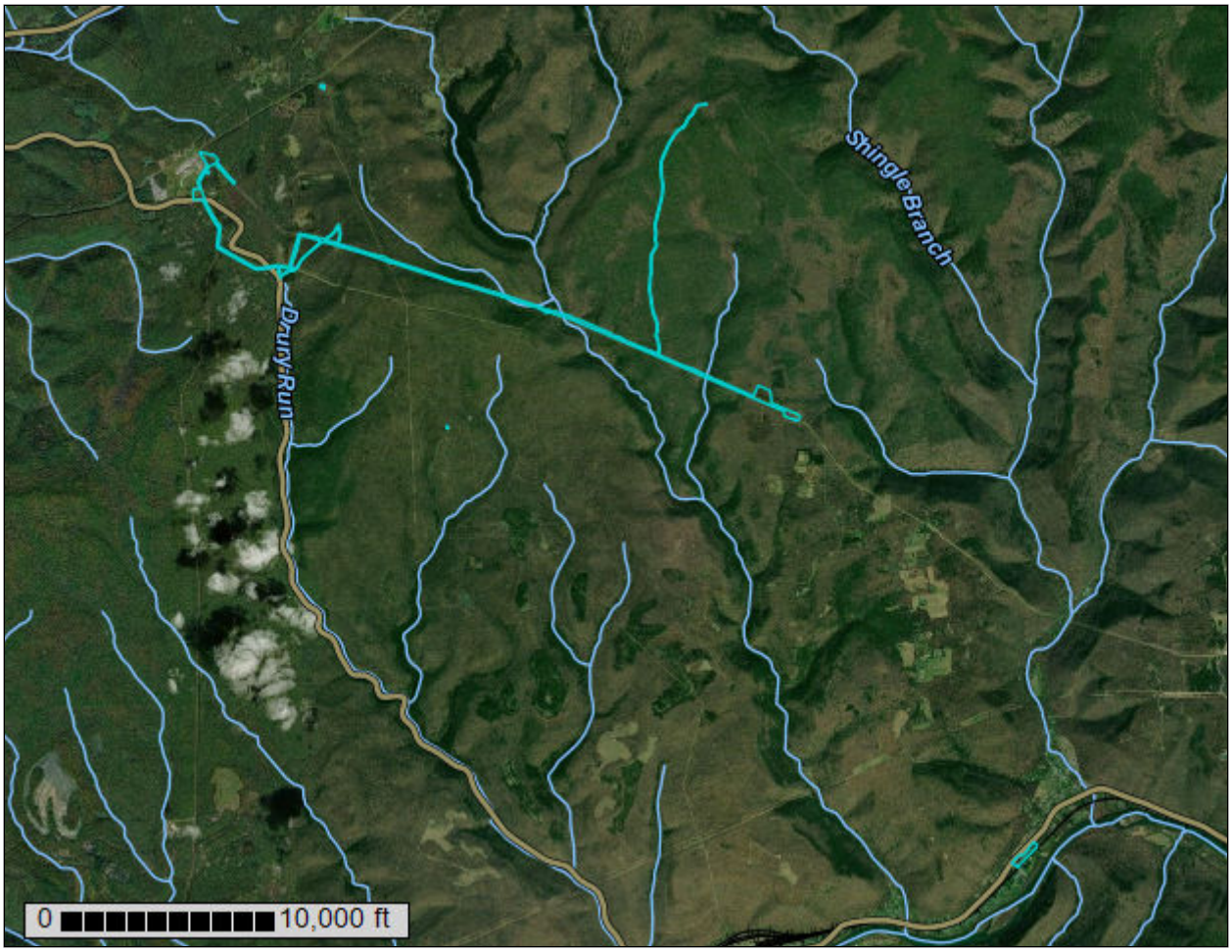
United States Department of Agriculture

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Clinton County, Pennsylvania

Hensel Replacement



July 2, 2019

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

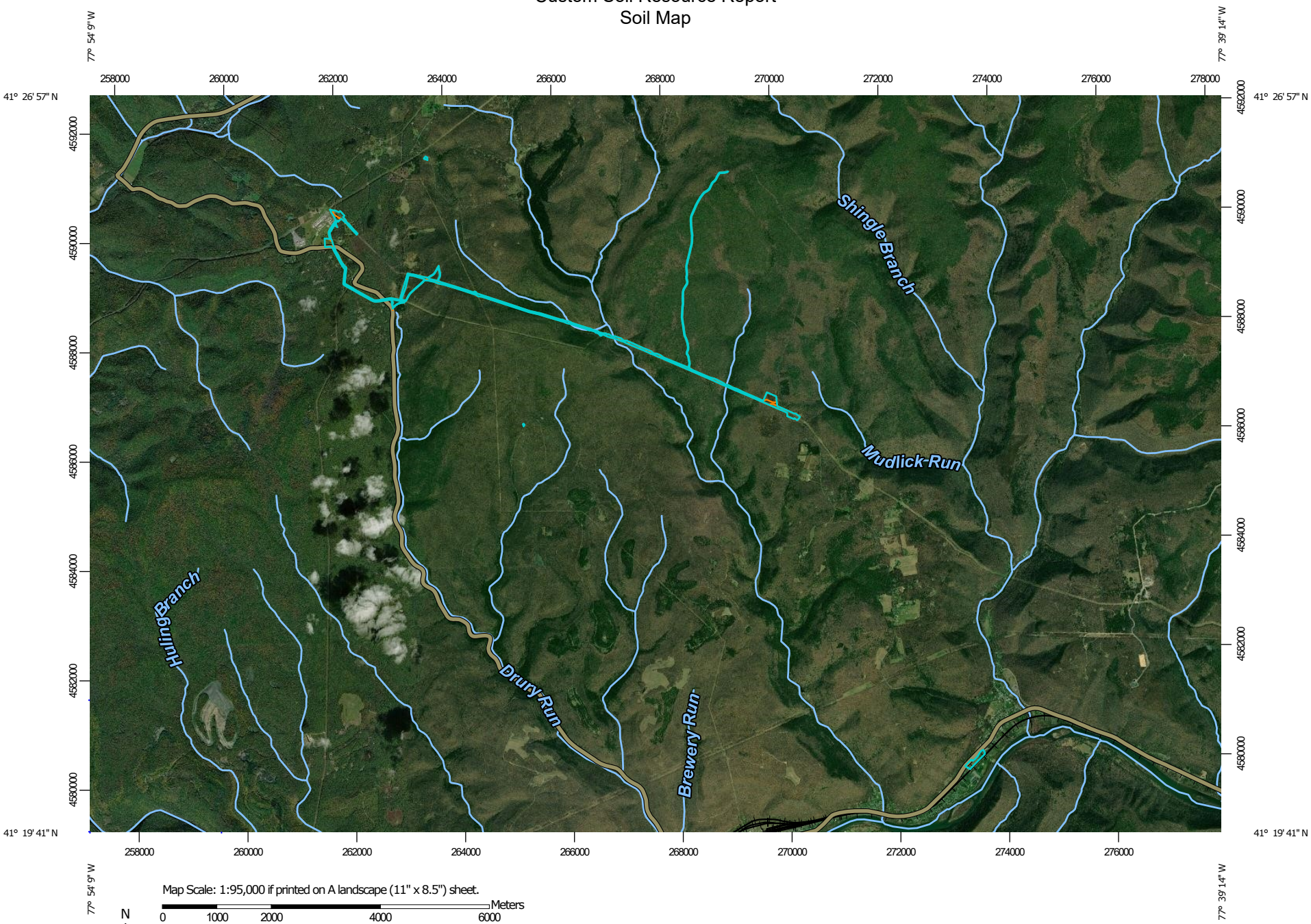
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:95,000 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 1000 2000 4000 6000

Feet: 0 4500 9000 18000 27000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clinton County, Pennsylvania
Survey Area Data: Version 14, Sep 18, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 4, 2012—Sep 10, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
At	Atkins silt loam, 0 to 3 percent slopes, frequently flooded	2.4	1.7%
CaB	Calvin channery silt loam, 3 to 8 percent slopes	1.0	0.7%
CfB	Clymer channery loam, 0 to 8 percent slopes, extremely stony	11.6	8.5%
CgB	Clymer-Cookport channery loams, 0 to 8 percent slopes, extremely stony	12.5	9.2%
CpB	Cookport channery loam, 0 to 8 percent slopes, extremely stony	11.1	8.2%
CpD	Cookport channery loam, 8 to 25 percent slopes, extremely stony	13.4	9.9%
HmD	Hazleton-Clymer channery loams, 8 to 25 percent slopes, extremely stony	10.7	7.9%
HoF	Hazleton-Laidig complex, 25 to 50 percent slopes, extremely stony	36.6	27.0%
HuB	Hustontown silt loam, 3 to 8 percent slopes	6.4	4.7%
LdC	Laidig gravelly loam, 8 to 25 percent slopes, extremely stony	0.3	0.2%
Lr	Linden silt loam, rarely flooded	8.6	6.3%
MhD	Meckesville channery loam, 8 to 25 percent slopes, very stony	2.5	1.8%
UnB	Ungers loam, 3 to 8 percent slopes	9.4	6.9%
UpF	Ungers-Meckesville complex, 25 to 50 percent slopes, extremely stony	5.0	3.7%
WeB	Wharton silt loam, 0 to 8 percent slopes, very stony	4.1	3.0%
Totals for Area of Interest		**135.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps.

The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Clinton County, Pennsylvania

At—Atkins silt loam, 0 to 3 percent slopes, frequently flooded

Map Unit Setting

National map unit symbol: 2sfsp
Elevation: 550 to 2,790 feet
Mean annual precipitation: 38 to 50 inches
Mean annual air temperature: 45 to 49 degrees F
Frost-free period: 126 to 165 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Atkins and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Atkins

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Acid fine-loamy alluvium derived from sandstone and shale

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 8 inches: silt loam
Bg - 8 to 26 inches: loam
BCg - 26 to 38 inches: silt loam
Cg - 38 to 80 inches: gravelly sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 0 to 6 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: B/D
Hydric soil rating: Yes

Minor Components

Philo

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Basher

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Linden

Percent of map unit: 5 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

CaB—Calvin channery silt loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: l801
Elevation: 300 to 2,800 feet
Mean annual precipitation: 34 to 50 inches
Mean annual air temperature: 45 to 57 degrees F
Frost-free period: 110 to 200 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Calvin and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Calvin

Setting

Landform: Ridges on valleys
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Crest

Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Acid reddish brown residuum weathered from shale and siltstone

Typical profile

A - 0 to 1 inches: channery silt loam
BE - 1 to 3 inches: very channery silt loam
Bw - 3 to 30 inches: very channery silt loam
R - 30 to 40 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Klinesville

Percent of map unit: 10 percent
Landform: Ridges, valleys
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Meckesville

Percent of map unit: 5 percent
Landform: Mountain valleys
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Hustontown

Percent of map unit: 5 percent
Hydric soil rating: No

Leck kill

Percent of map unit: 5 percent
Hydric soil rating: No

CfB—Clymer channery loam, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: l80f
Elevation: 1,000 to 4,000 feet
Mean annual precipitation: 32 to 60 inches
Mean annual air temperature: 45 to 59 degrees F
Frost-free period: 110 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Clymer and similar soils: 70 percent
Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Clymer

Setting

Landform: Ridges on plateaus
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Mountaintop, upper third of mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Stony residuum weathered from sandstone and shale

Typical profile

A - 0 to 2 inches: loam
Bt - 2 to 28 inches: channery loam
C - 28 to 50 inches: channery sandy loam
R - 50 to 60 inches: bedrock

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Cookport

Percent of map unit: 10 percent
Landform: Ridges on plateaus
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: No

Hartleton

Percent of map unit: 5 percent
Landform: — error in exists on —
Landform position (two-dimensional): Shoulder, backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave
Hydric soil rating: No

Hazleton

Percent of map unit: 5 percent
Landform: Mountain slopes on mountains
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Mountainflank, mountaintop, upper third of mountainflank
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Leetonia

Percent of map unit: 5 percent
Landform: Ridges on plateaus
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Unnamed

Percent of map unit: 5 percent
Hydric soil rating: No

CgB—Clymer-Cookport channery loams, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: l80g
Elevation: 1,000 to 2,500 feet
Mean annual precipitation: 35 to 60 inches

Mean annual air temperature: 41 to 62 degrees F
Frost-free period: 101 to 190 days
Farmland classification: Not prime farmland

Map Unit Composition

Clymer and similar soils: 40 percent
Cookport and similar soils: 35 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Clymer

Setting

Landform: Ridges on plateaus
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Mountaintop, upper third of mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Stony residuum weathered from sandstone and shale

Typical profile

A - 0 to 2 inches: channery loam
Bt - 2 to 28 inches: channery loam
C - 28 to 50 inches: channery sandy loam
R - 50 to 60 inches: bedrock

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 10.0 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Description of Cookport

Setting

Landform: Ridges on plateaus
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Concave, linear
Across-slope shape: Concave
Parent material: Residuum weathered from acid sandstone

Typical profile

A - 0 to 8 inches: channery loam

Bt - 8 to 22 inches: loam
Btx - 22 to 46 inches: loam
C - 46 to 54 inches: channery loam
R - 54 to 64 inches: bedrock

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 10.0 percent
Depth to restrictive feature: 16 to 30 inches to fragipan; 40 to 72 inches to lithic bedrock
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 10 to 21 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Wharton

Percent of map unit: 10 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve, side slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

Hazleton

Percent of map unit: 5 percent
Landform: Mountain slopes on mountains
Landform position (two-dimensional): Backslope, summit
Landform position (three-dimensional): Mountainflank, mountaintop, upper third of mountainflank
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Dekalb

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Buchanan

Percent of map unit: 5 percent

Hydric soil rating: No

CpB—Cookport channery loam, 0 to 8 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2wshh
Elevation: 910 to 2,620 feet
Mean annual precipitation: 38 to 50 inches
Mean annual air temperature: 45 to 49 degrees F
Frost-free period: 126 to 165 days
Farmland classification: Not prime farmland

Map Unit Composition

Cookport and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cookport

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Concave, linear
Across-slope shape: Linear
Parent material: Acid fine-loamy residuum weathered from sandstone

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: channery loam
E - 4 to 8 inches: channery loam
Bt - 8 to 23 inches: channery loam
Btx - 23 to 40 inches: channery sandy clay loam
C - 40 to 46 inches: channery sandy loam
R - 46 to 56 inches: bedrock

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 16 to 30 inches to fragipan; 40 to 72 inches to lithic bedrock
Natural drainage class: Moderately well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: About 15 to 21 inches
Frequency of flooding: None
Frequency of ponding: None

Available water storage in profile: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Clymer

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Andover

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Head slope
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: Yes

Fenwick

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Acid Loams (AL3)
Hydric soil rating: No

CpD—Cookport channery loam, 8 to 25 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: 2wshq
Elevation: 610 to 2,450 feet
Mean annual precipitation: 38 to 50 inches
Mean annual air temperature: 45 to 49 degrees F
Frost-free period: 126 to 165 days
Farmland classification: Not prime farmland

Map Unit Composition

Cookport and similar soils: 80 percent
Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cookport

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, head slope
Down-slope shape: Concave, linear
Across-slope shape: Linear
Parent material: Acid fine-loamy residuum weathered from sandstone

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
Oe - 1 to 2 inches: moderately decomposed plant material
A - 2 to 4 inches: channery loam
E - 4 to 8 inches: channery loam
Bt - 8 to 23 inches: channery loam
Btx - 23 to 40 inches: channery sandy clay loam
C - 40 to 46 inches: channery sandy loam
R - 46 to 56 inches: bedrock

Properties and qualities

Slope: 8 to 25 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 16 to 30 inches to fragipan; 40 to 72 inches to lithic bedrock
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.01 to 0.20 in/hr)
Depth to water table: About 15 to 21 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Clymer

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, head slope
Down-slope shape: Concave, linear
Across-slope shape: Linear
Hydric soil rating: No

Andover

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope, head slope
Down-slope shape: Concave, linear
Across-slope shape: Linear
Hydric soil rating: Yes

Hazleton

Percent of map unit: 5 percent
Landform: Hillslopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Side slope, nose slope
Down-slope shape: Concave, linear
Across-slope shape: Linear
Hydric soil rating: No

Fenwick

Percent of map unit: 5 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Mountaintop
Down-slope shape: Convex
Across-slope shape: Linear
Other vegetative classification: Acid Loams (AL3)
Hydric soil rating: No

HmD—Hazleton-Clymer channery loams, 8 to 25 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: l82t
Elevation: 800 to 4,000 feet
Mean annual precipitation: 32 to 55 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 101 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Hazleton and similar soils: 50 percent
Clymer and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hazleton

Setting

Landform: Mountains
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Mountaintop, upper third of mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Stony residuum weathered from sandstone

Typical profile

A - 0 to 3 inches: channery sandy loam
Bw - 3 to 42 inches: channery sandy loam
C - 42 to 60 inches: very channery sandy loam
R - 60 to 68 inches: bedrock

Properties and qualities

Slope: 8 to 25 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 40 to 68 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Hydric soil rating: No

Description of Clymer

Setting

Landform: Ridges on plateaus
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Mountaintop, upper third of mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Stony residuum weathered from sandstone and shale

Typical profile

A - 0 to 2 inches: loam
Bt - 2 to 28 inches: channery loam
C - 28 to 50 inches: channery sandy loam
R - 50 to 60 inches: bedrock

Properties and qualities

Slope: 8 to 25 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Laidig
Percent of map unit: 5 percent
Landform: Mountains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Concave
Across-slope shape: Concave

Wharton
Percent of map unit: 5 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Interfluve, side slope, head slope
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

Unnamed
Percent of map unit: 5 percent
Hydric soil rating: No

Leetonia
Percent of map unit: 5 percent
Landform: Ridges on plateaus
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

HoF—Hazleton-Laidig complex, 25 to 50 percent slopes, extremely stony

Map Unit Setting
National map unit symbol: l82w
Elevation: 800 to 2,900 feet
Mean annual precipitation: 34 to 60 inches
Mean annual air temperature: 46 to 59 degrees F
Frost-free period: 101 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition
Hazleton and similar soils: 35 percent
Laidig and similar soils: 35 percent

Minor components: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hazleton

Setting

Landform: Mountains
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Mountaintop, upper third of mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Stony residuum weathered from sandstone

Typical profile

A - 0 to 3 inches: channery sandy loam
Bw - 3 to 42 inches: channery sandy loam
C - 42 to 60 inches: very channery sandy loam
R - 60 to 68 inches: bedrock

Properties and qualities

Slope: 25 to 50 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 40 to 68 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Hydric soil rating: No

Description of Laidig

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Stony colluvium derived from sandstone and shale

Typical profile

A - 0 to 3 inches: extremely stony loam
Bt - 3 to 34 inches: gravelly silt loam
Btx - 34 to 65 inches: very channery silty clay loam

Properties and qualities

Slope: 25 to 50 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 30 to 50 inches to fragipan; 61 to 120 inches to lithic bedrock

Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 27 to 47 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.4 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Clymer
Percent of map unit: 10 percent
Hydric soil rating: No

Hapludults, nonstony
Percent of map unit: 10 percent
Hydric soil rating: No

Unnamed
Percent of map unit: 10 percent
Hydric soil rating: No

HuB—Hustontown silt loam, 3 to 8 percent slopes

Map Unit Setting
National map unit symbol: l835
Elevation: 600 to 2,800 feet
Mean annual precipitation: 34 to 48 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 110 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Hustontown and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hustontown

Setting
Landform: Valley sides
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Mountainbase

Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Red residuum weathered from sandstone and shale

Typical profile

Ap - 0 to 7 inches: silt loam
Bt - 7 to 24 inches: silt loam
Bt - 24 to 30 inches: channery silt loam
Btx - 30 to 65 inches: channery silt loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 18 to 32 inches to fragipan
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 12 to 26 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Meckesville

Percent of map unit: 10 percent
Landform: Mountain valleys
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Hydric soil rating: No

Ungers

Percent of map unit: 5 percent

Unnamed

Percent of map unit: 5 percent

Leck kill

Percent of map unit: 5 percent

LdC—Laidig gravelly loam, 8 to 25 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: l83s

Elevation: 900 to 1,400 feet
Mean annual precipitation: 34 to 55 inches
Mean annual air temperature: 46 to 57 degrees F
Frost-free period: 110 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Laidig and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Laidig

Setting

Landform: Mountain slopes, valley sides
Landform position (two-dimensional): Backslope, footslope
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Stony colluvium derived from sedimentary rock

Typical profile

A - 0 to 3 inches: gravelly loam
Bt - 3 to 34 inches: gravelly silt loam
Btx - 34 to 65 inches: very channery silty clay loam

Properties and qualities

Slope: 8 to 25 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 30 to 50 inches to fragipan; 61 to 120 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 27 to 47 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Buchanan

Percent of map unit: 10 percent
Hydric soil rating: No

Hazleton

Percent of map unit: 5 percent
Landform: Mountain slopes on mountains
Landform position (two-dimensional): Backslope, summit

Landform position (three-dimensional): Mountainflank, mountaintop, upper third of mountainflank
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Hydric soil rating: No

Clymer
Percent of map unit: 5 percent
Hydric soil rating: No

Murrill
Percent of map unit: 5 percent
Hydric soil rating: No

Lr—Linden silt loam, rarely flooded

Map Unit Setting
National map unit symbol: l84b
Elevation: 520 to 1,000 feet
Mean annual precipitation: 32 to 45 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 140 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Linden and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Linden

Setting
Landform: Flood plains on river valleys
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile
Ap - 0 to 12 inches: silt loam
B - 12 to 48 inches: gravelly silt loam
C - 48 to 70 inches: sandy loam

Properties and qualities
Slope: 0 to 3 percent
Depth to restrictive feature: 61 to 120 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: About 36 to 72 inches

Frequency of flooding: Rare
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.5 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Philo
Percent of map unit: 10 percent
Hydric soil rating: No

Barbour
Percent of map unit: 5 percent
Hydric soil rating: No

Basher
Percent of map unit: 5 percent
Hydric soil rating: No

MhD—Meckesville channery loam, 8 to 25 percent slopes, very stony

Map Unit Setting
National map unit symbol: l84q
Elevation: 700 to 1,100 feet
Mean annual precipitation: 34 to 48 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 101 to 140 days
Farmland classification: Not prime farmland

Map Unit Composition
Meckesville and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Meckesville

Setting
Landform: Mountain valleys
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Sandstone, siltstone and shale colluvium derived from sedimentary rock

Typical profile
A - 0 to 4 inches: channery loam

Bt - 4 to 35 inches: channery silt loam
Btx - 35 to 66 inches: channery silt loam

Properties and qualities

Slope: 8 to 25 percent
Percent of area covered with surface fragments: 3.0 percent
Depth to restrictive feature: 30 to 48 inches to fragipan; 61 to 120 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 27 to 45 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Ungers

Percent of map unit: 10 percent
Hydric soil rating: No

Laidig

Percent of map unit: 5 percent
Landform: Mountains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: No

Albrights

Percent of map unit: 5 percent
Hydric soil rating: No

UnB—Ungers loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: l863
Elevation: 900 to 2,200 feet
Mean annual precipitation: 38 to 48 inches
Mean annual air temperature: 48 to 55 degrees F
Frost-free period: 110 to 170 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Ungers and similar soils: 75 percent
Minor components: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ungers

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope, shoulder
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone and siltstone

Typical profile

Ap - 0 to 9 inches: loam
Bt - 9 to 33 inches: channery clay loam
BC - 33 to 48 inches: very channery clay loam
R - 48 to 58 inches: bedrock

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Meckesville

Percent of map unit: 10 percent
Hydric soil rating: No

Leck kill

Percent of map unit: 5 percent
Hydric soil rating: No

Hustontown

Percent of map unit: 5 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 5 percent
Hydric soil rating: No

UpF—Ungers-Meckesville complex, 25 to 50 percent slopes, extremely stony

Map Unit Setting

National map unit symbol: l869
Elevation: 900 to 2,200 feet
Mean annual precipitation: 34 to 48 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 101 to 140 days
Farmland classification: Not prime farmland

Map Unit Composition

Ungers and similar soils: 50 percent
Meckesville and similar soils: 30 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ungers

Setting

Landform: Mountain slopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Stony residuum weathered from sandstone and siltstone

Typical profile

A - 0 to 6 inches: very stony loam
Bt - 6 to 33 inches: very channery clay loam
BC - 33 to 48 inches: very channery clay loam
R - 48 to 58 inches: bedrock

Properties and qualities

Slope: 25 to 50 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B

Hydric soil rating: No

Description of Meckesville

Setting

Landform: Mountain valleys
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Lower third of mountainflank
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Sandstone, siltstone and shale colluvium derived from sedimentary rock

Typical profile

A - 0 to 4 inches: silt loam
Bt - 4 to 35 inches: channery silt loam
Btx - 35 to 66 inches: channery silt loam

Properties and qualities

Slope: 25 to 50 percent
Percent of area covered with surface fragments: 9.0 percent
Depth to restrictive feature: 30 to 48 inches to fragipan; 61 to 120 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 30 to 48 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Leck kill

Percent of map unit: 10 percent
Hydric soil rating: No

Albrights

Percent of map unit: 5 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 5 percent
Hydric soil rating: No

WeB—Wharton silt loam, 0 to 8 percent slopes, very stony

Map Unit Setting

National map unit symbol: l86l
Elevation: 1,600 to 2,350 feet
Mean annual precipitation: 35 to 50 inches
Mean annual air temperature: 46 to 55 degrees F
Frost-free period: 110 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Wharton and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wharton

Setting

Landform: Ridges on plateaus
Landform position (two-dimensional): Summit, backslope
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear, concave
Across-slope shape: Linear, concave, convex
Parent material: Stony interbedded residuum weathered from shale and siltstone

Typical profile

A - 0 to 4 inches: silt loam
Bt - 4 to 20 inches: silt loam
Bt - 20 to 45 inches: channery silt loam
BC - 45 to 65 inches: very channery loam

Properties and qualities

Slope: 0 to 8 percent
Percent of area covered with surface fragments: 1.6 percent
Depth to restrictive feature: 61 to 72 inches to lithic bedrock
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.60 in/hr)
Depth to water table: About 15 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C/D
Hydric soil rating: No

Minor Components

Cookport

Percent of map unit: 10 percent
Landform: Ridges on plateaus
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Upper third of mountainflank
Down-slope shape: Concave, linear
Across-slope shape: Concave
Hydric soil rating: No

Tilsit

Percent of map unit: 5 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 5 percent
Hydric soil rating: No

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ATTACHMENT 3

E&SC PLAN BMP DESIGN WORKSHEETS AND CALCULATIONS

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Attachment

3.1 Compost Filter Sock Worksheets (Standard E&S Worksheet #1)

3.2 Channel Design Worksheets (Standard E&S Worksheet #11)

3.3 Riprap Apron Worksheet (Standard E&S Worksheet #20)
3.4 Culvert Schedule

ATTACHMENT 3.1
COMPOST FILTER SOCK WORKSHEETS

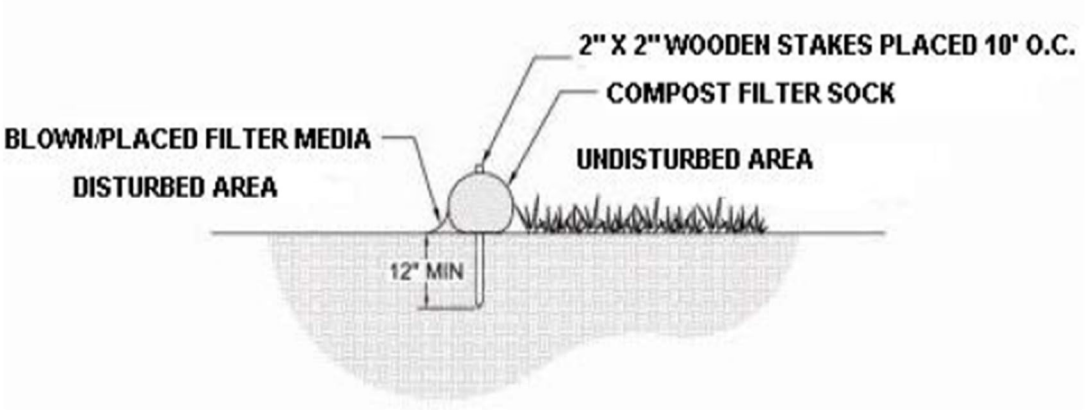
STANDARD E&S WORKSHEET #1
Compost Filter Socks

PROJECT NAME: Leidy South – Hensel Replacement

LOCATION: Hensel Replacement-ROW

PREPARED BY: FJ DATE: 7/26/2019

CHECKED BY: KCC DATE: 8/8/2019



SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 1	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 2	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 3	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 4	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 5	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 6	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 7	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 8	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 9	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 10	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 11	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 12	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 13	18	see map, Lucky Leap Valve Yard and CSA018	7	243
CFS-HR 14	18	see map	4	384
CFS-HR 15	18	see map	4	384
CFS-HR 16	18	see map	4	384
CFS-HR 17	18	see map	4	384
CFS-HR 18	18	see map	4	384
CFS-HR 19	18	see map	4	384

STANDARD E&S WORKSHEET #1
Compost Filter Socks

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 20	18	see map	4	384
CFS-HR 21	18	see map	4	384
CFS-HR 22	18	see map	4	384
CFS-HR 23	18	see map	4	384
CFS-HR 24	18	see map	4	384
CFS-HR 25	18	see map	4	384
CFS-HR 26	18	see map	3	459
CFS-HR 27	18	see map	3	459
CFS-HR 28	18	see map	3	459
CFS-HR 29	18	see map	3	459
CFS-HR 30	18	see map	3	459
CFS-HR 31	18	see map	3	459
CFS-HR 32	18	see map	3	459
CFS-HR 33	18	see map	3	459
CFS-HR 34	12	see map	12	100
CFS-HR 35	12	see map	12	100
CFS-HR 36	12	see map	12	100
CFS-HR 37	12	see map	12	100
CFS-HR 38	12	see map	12	100
CFS-HR 39	12	see map	12	100
CFS-HR 40	12	see map	12	100
CFS-HR 41	12	see map	12	100
CFS-HR 42	32	see map, CSA018	6	566
CFS-HR 43	32	see map, CSA019	6	567
CFS-HR 44	32	see map, CSA019	6	567
CFS-HR 45	32	see map, CSA019	6	567
CFS-HR 46	32	see map, CSA019	6	567
CFS-HR 47	32	see map, CSA019	6	567
CFS-HR 48	32	see map, CSA019	6	567
CFS-HR 49	12	see map	12	100
CFS-HR 50	12	see map	12	100
CFS-HR 51	24	see map	6	376
CFS-HR 52	24	see map	6	376
CFS-HR 53	24	see map	6	376
CFS-HR 54	24	see map	6	376
CFS-HR 55	24	see map	6	376
CFS-HR 56	12	see map	9	127
CFS-HR 57	12	see map	9	127
CFS-HR 58	12	see map	9	127

STANDARD E&S WORKSHEET #1
Compost Filter Socks

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 59	12	see map	9	127
CFS-HR 60	12	see map	9	127
CFS-HR 61	12	see map	9	127
CFS-HR 62	12	see map	9	127
CFS-HR 63	12	see map	9	127
CFS-HR 64	18	see map	16	104
CFS-HR 65	18	see map	16	104
CFS-HR 66	18	see map	16	104
CFS-HR 67	18	see map	16	104
CFS-HR 68	18	see map	16	104
CFS-HR 69	18	see map	16	104
CFS-HR 70	18	see map	16	104
CFS-HR 71	12	see map	7	88
CFS-HR 72	18	see map	16	104
CFS-HR 73	18	see map	22	72
CFS-HR 74	18	see map	22	72
CFS-HR 75	18	see map	22	72
CFS-HR 76	18	see map	22	72
CFS-HR 77	18	see map	22	72
CFS-HR 78	12	see map	27	37
CFS-HR 79	12	see map	27	37
CFS-HR 79A	12	see map	17	30
CFS-HR 79B	18	see map	16	93
CFS-HR 79C	18	see map	16	93
CFS-HR 79D	18	see map	16	39
CFS-HR 80	18	see map	30	43
CFS-HR 81	18	see map	30	43
CFS-HR 82	12	see map	7	140
CFS-HR 83	12	see map	7	140
CFS-HR 84	12	see map	7	140
CFS-HR 85	12	see map	7	140
CFS-HR 86	12	see map	7	140
CFS-HR 87	12	see map	7	140
CFS-HR 88	12	see map	7	140
CFS-HR 89	12	see map	7	140
CFS-HR 90	12	see map	7	140
CFS-HR 91	12	see map	7	140
CFS-HR 92	12	see map	7	140
CFS-HR 93	12	see map	7	140

STANDARD E&S WORKSHEET #1
Compost Filter Socks

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 94	12	see map	6	131
CFS-HR 95	12	see map	6	131
CFS-HR 96	12	see map	6	131
CFS-HR 97	12	see map	6	131
CFS-HR 98	12	see map	6	131
CFS-HR 99	12	see map	3	126
CFS-HR 100	12	see map	3	126
CFS-HR 101	12	see map	3	126
CFS-HR 102	12	see map	9	89
CFS-HR 103	12	see map	9	89
CFS-HR 104	12	see map	9	89
CFS-HR 105	12	see map	9	89
CFS-HR 106	12	see map	9	89
CFS-HR 107	12	see map	9	89
CFS-HR 108	12	see map	9	89
CFS-HR 109	12	see map	9	89
CFS-HR 110	12	see map	9	89
CFS-HR 111	12	see map	9	89
CFS-HR 112	12	see map	9	89
CFS-HR 113	12	see map	9	89
CFS-HR 114	12	see map	9	89
CFS-HR 115	12	see map	10	135
CFS-HR 116	12	see map	10	135
CFS-HR 117	12	see map	10	135
CFS-HR 118	12	see map	3	126
CFS-HR 119	12	see map	3	126
CFS-HR 120	12	see map	3	126
CFS-HR 121	12	see map	9	89
CFS-HR 122	12	see map	9	89
CFS-HR 123	12	see map	9	89
CFS-HR 124	12	see map	9	89
CFS-HR 125	12	see map	9	89
CFS-HR 126	12	see map	9	89
CFS-HR 127	12	see map	9	89
CFS-HR 128	12	see map	9	89
CFS-HR 129	12	see map	9	89
CFS-HR 130	12	see map	9	89
CFS-HR 131	12	see map	9	89
CFS-HR 132	12	see map	12	121

STANDARD E&S WORKSHEET #1
Compost Filter Socks

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 133	12	see map	12	121
CFS-HR 134	12	see map	12	121
CFS-HR 135	12	see map	12	121
CFS-HR 136	12	see map	12	121
CFS-HR 137	12	see map	12	121
CFS-HR 138	12	see map	12	121
CFS-HR 139	12	see map	12	121
CFS-HR 140	12	see map	12	121
CFS-HR 141	12	see map	12	121
CFS-HR 142	12	see map	11	85
CFS-HR 143	12	see map	11	85
CFS-HR 144	12	see map	11	85
CFS-HR 145	12	see map	11	85
CFS-HR 145A	24	see map	24	143
CFS-HR 145B	24	see map	24	143
CFS-HR 145C	24	see map	24	143
CFS-HR 145D	12	see map	20	41
CFS-HR 145E	12	see map	20	41
CFS-HR 146	12	see map	11	85
CFS-HR 147	12	see map	11	85
CFS-HR 148	12	see map	11	85
CFS-HR 149	24	see map	24	143
CFS-HR 150	24	see map	24	143
CFS-HR 151	24	see map	24	143
CFS-HR 152	24	see map	24	143
CFS-HR 153	24	see map	24	143
CFS-HR 154	24	see map	24	143
CFS-HR 155	24	see map	24	143
CFS-HR 156	24	see map	24	143
CFS-HR 157	24	see map	24	143
CFS-HR 158	24	see map	24	143
CFS-HR 159	18	see map	20	137
CFS-HR 160	18	see map	20	137
CFS-HR 161	18	see map	20	137
CFS-HR 162	18	see map	20	137
CFS-HR 163	24	see map	37	65
CFS-HR 164	24	see map	37	65
CFS-HR 165	24	see map	37	65
CFS-HR 166	24	see map	37	65

STANDARD E&S WORKSHEET #1
Compost Filter Socks

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 167	24	see map	37	65
CFS-HR 168	24	see map	37	65
CFS-HR 169	24	see map	37	65
CFS-HR 170	24	see map	37	65
CFS-HR 171	24	see map	37	65
CFS-HR 172	24	see map	37	65
CFS-HR 173	24	see map	37	65
CFS-HR 174	24	see map	37	65
CFS-HR 175	24	see map	37	65
CFS-HR 176	24	see map	37	65
CFS-HR 177	24	see map	37	65
CFS-HR 178	24	see map	37	65
CFS-HR 179	24	see map	37	65
CFS-HR 180	24	see map	37	65
CFS-HR 181	24	see map	37	65
CFS-HR 182	24	see map	37	65
CFS-HR 183	24	see map	37	65
CFS-HR 184	24	see map	37	65
CFS-HR 185	24	see map	37	65
CFS-HR 186	24	see map	37	65
CFS-HR 187	24	see map	37	65
CFS-HR 188	24	see map	37	65
CFS-HR 189	24	see map	37	65
CFS-HR 190	24	see map	37	65
CFS-HR 191	24	see map	37	65
CFS-HR 192	24	see map	37	65
CFS-HR 193	24	see map	37	65
CFS-HR 194	24	see map	37	65
CFS-HR 195	24	see map	37	65
CFS-HR 196	24	see map	37	65
CFS-HR 197	24	see map	37	65
CFS-HR 198	24	see map	37	65
CFS-HR 199	24	see map	37	65
CFS-HR 200	24	see map	37	65
CFS-HR 201	24	see map	37	65
CFS-HR 202	24	see map	37	65
CFS-HR 203	24	see map	37	65
CFS-HR 204	24	see map	37	65
CFS-HR 205	24	see map	37	65

STANDARD E&S WORKSHEET #1
Compost Filter Socks

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 206	24	see map	37	65
CFS-HR 206A	24	see map	37	73
CFS-HR 206B	24	see map	37	73
CFS-HR 206C	24	see map	37	73
CFS-HR 206D	24	see map	37	73
CFS-HR 207	12	see map	34	35
CFS-HR 208	12	see map	34	35
CFS-HR 209	12	see map	34	35
CFS-HR 210	12	see map	34	35
CFS-HR 211	12	see map	34	35
CFS-HR 212	12	see map	34	35
CFS-HR 213	12	see map	34	35
CFS-HR 214	24	see map	36	84
CFS-HR 215	24	see map	36	84
CFS-HR 216	24	see map	36	84
CFS-HR 217	24	see map	36	84
CFS-HR 218	24	see map	44	66
CFS-HR 219	24	see map	44	66
CFS-HR 220	24	see map	44	66
CFS-HR 221	24	see map	44	66
CFS-HR 222	24	see map	44	66
CFS-HR 223	24	see map	33	90
CFS-HR 224	24	see map	33	90
CFS-HR 224A	24	see map	22	88
CFS-HR 224B	24	see map	22	88
CFS-HR 225	24	see map	33	90
CFS-HR 226	24	see map	33	90
CFS-HR 227	24	see map	33	90
CFS-HR 228	24	see map	33	90
CFS-HR 229	24	see map	33	90
CFS-HR 230	24	see map	33	90
CFS-HR 231	24	see map	33	90
CFS-HR 232	24	see map	33	90
CFS-HR 233	18	see map	20	118
CFS-HR 234	18	see map	20	118
CFS-HR 235	18	see map	20	118
CFS-HR 236	18	see map	20	118
CFS-HR 237	18	see map	20	118
CFS-HR 238	18	see map	18	111

STANDARD E&S WORKSHEET #1
Compost Filter Socks

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 239	18	see map	18	111
CFS-HR 240	18	see map	18	111
CFS-HR 241	18	see map	18	111
CFS-HR 242	18	see map	18	111
CFS-HR 243	18	see map	18	111
CFS-HR 244	18	see map	18	111
CFS-HR 245	18	see map	18	111
CFS-HR 246	18	see map	18	111
CFS-HR 247	18	see map	18	111
CFS-HR 248	18	see map	18	111
CFS-HR 249	18	see map	18	111
CFS-HR 250	18	see map	18	111
CFS-HR 251	32	see map, CSA020	18	120
CFS-HR 252	32	see map, CSA020	18	120
CFS-HR 253	18	see map	18	111
CFS-HR 254	18	see map	18	111
CFS-HR 255	18	see map	18	111
CFS-HR 256	18	see map	18	111
CFS-HR 257	18	see map	18	111
CFS-HR 257A	12	see map	30	30
CFS-HR 257B	12	see map	30	30
CFS-HR 257C	24	see map	wetland protection	
CFS-HR 257D	24	see map	wetland protection	
CFS-HR 257E	24	see map	wetland protection	
CFS-HR 258	24	see map	41	64
CFS-HR 259	24	see map	41	64
CFS-HR 260	24	see map	41	64
CFS-HR 261	24	see map	41	64
CFS-HR 262	24	see map	41	64
CFS-HR 263	24	see map	41	64
CFS-HR 264	24	see map	41	64
CFS-HR 265	24	see map	41	64
CFS-HR 266	24	see map	41	64
CFS-HR 267	24	see map	41	64
CFS-HR 268	18	see map	36	50
CFS-HR 269	18	see map	36	50
CFS-HR 270	18	see map	36	50
CFS-HR 271	18	see map	36	50
CFS-HR 272	18	see map	36	50

STANDARD E&S WORKSHEET #1
Compost Filter Socks

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 273	18	see map	36	50
CFS-HR 274	18	see map	36	50
CFS-HR 275	18	see map	36	50
CFS-HR 276	18	see map	36	50
CFS-HR 277	18	see map	36	50
CFS-HR 278	18	see map	33	72
CFS-HR 279	18	see map	33	72
CFS-HR 280	18	see map	33	72
CFS-HR 281	18	see map	33	72
CFS-HR 282	18	see map	33	72
CFS-HR 283	18	see map	33	72
CFS-HR 284	18	see map	33	72
CFS-HR 285	18	see map	33	72
CFS-HR 286	18	see map	33	72
CFS-HR 287	18	see map	33	72
CFS-HR 288	18	see map	33	72
CFS-HR 289	18	see map	33	72
CFS-HR 290	18	see map	33	72
CFS-HR 291	18	see map	33	72
CFS-HR 292	18	see map	33	72
CFS-HR 293	18	see map	33	72
CFS-HR 294	18	see map	33	72
CFS-HR 295	18	see map	33	72
CFS-HR 296	18	see map	33	72
CFS-HR 297	18	see map	33	72
CFS-HR 298	18	see map	33	72
CFS-HR 299	18	see map	33	72
CFS-HR 300	24	see map	33	86
CFS-HR 301	18	see map	41	58
CFS-HR 302	18	see map	41	58
CFS-HR 303	18	see map	41	58
CFS-HR 304	18	see map	41	58
CFS-HR 305	18	see map	41	58
CFS-HR 306	12	see map	11	79
CFS-HR 307	12	see map	11	79
CFS-HR 308	12	see map	11	79
CFS-HR 309	12	see map	11	79
CFS-HR 310	12	see map	11	79
CFS-HR 311	12	see map	11	79

STANDARD E&S WORKSHEET #1
Compost Filter Socks

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 312	12	see map	11	79
CFS-HR 313	12	see map	11	79
CFS-HR 314	12	see map	11	79
CFS-HR 315	12	see map	11	79
CFS-HR 316	12	see map	11	79
CFS-HR 317	18	see map	35	60
CFS-HR 318	18	see map	35	60
CFS-HR 319	18	see map	35	60
CFS-HR 320	18	see map	35	60
CFS-HR 321	18	see map	35	60
CFS-HR 322	18	see map	35	60
CFS-HR 323	18	see map	35	60
CFS-HR 324	18	see map	35	60
CFS-HR 325	18	see map	35	60
CFS-HR 326	24	see map	29	90
CFS-HR 327	24	see map	29	90
CFS-HR 328	24	see map	29	90
CFS-HR 329	24	see map	29	90
CFS-HR 330	24	see map	29	90
CFS-HR 331	24	see map	29	90
CFS-HR 332	24	see map	29	90
CFS-HR 333	24	see map	29	90
CFS-HR 334	24	see map	29	90
CFS-HR 335	24	see map	29	90
CFS-HR 336	24	see map	29	90
CFS-HR 337	24	see map	29	90
CFS-HR 338	24	see map	29	90
CFS-HR 339	24	see map	29	90
CFS-HR 340	24	see map	29	90
CFS-HR 341	24	see map	29	90
CFS-HR 342	24	see map	29	90
CFS-HR 343	24	see map	29	90
CFS-HR 344	24	see map	29	90
CFS-HR 345	24	see map	29	90
CFS-HR 346	24	see map	29	90
CFS-HR 347	24	see map	29	90
CFS-HR 348	24	see map	29	90
CFS-HR 349	24	see map	29	90
CFS-HR 350	24	see map	29	90

STANDARD E&S WORKSHEET #1
Compost Filter Socks

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 351	24	see map	29	90
CFS-HR 352	24	see map	29	90
CFS-HR 353	24	see map	29	90
CFS-HR 354	24	see map	29	90
CFS-HR 355	24	see map	29	90
CFS-HR 356	24	see map	29	90
CFS-HR 357	24	see map	29	90
CFS-HR 358	24	see map	29	90
CFS-HR 359	24	see map	29	90
CFS-HR 360	24	see map	29	90
CFS-HR 361	24	see map	29	90
CFS-HR 362	24	see map	29	90
CFS-HR 363	24	see map	29	90
CFS-HR 364	24	see map	29	90
CFS-HR 365	24	see map	29	90
CFS-HR 366	24	see map	29	90
CFS-HR 367	24	see map	29	90
CFS-HR 368	24	see map	29	90
CFS-HR 369	24	see map	29	90
CFS-HR 370	24	see map	29	90
CFS-HR 371	24	see map	29	90
CFS-HR 372	24	see map	29	90
CFS-HR 373	24	see map	29	90
CFS-HR 374	24	see map	29	90
CFS-HR 375	24	see map	29	90
CFS-HR 376	24	see map	29	90
CFS-HR 377	24	see map	29	90
CFS-HR 378	24	see map	29	90
CFS-HR 379	24	see map	29	90
CFS-HR 380	24	see map	29	90
CFS-HR 381	24	see map	29	90
CFS-HR 382	24	see map	29	90
CFS-HR 383	24	see map	29	90
CFS-HR 384	24	see map	29	90
CFS-HR 385	24	see map	29	90
CFS-HR 386	24	see map	29	90
CFS-HR 387	24	see map	29	90
CFS-HR 388	24	see map	29	90
CFS-HR 389	24	see map	29	90

STANDARD E&S WORKSHEET #1
Compost Filter Socks

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 390	24	see map	29	90
CFS-HR 391	32	see map	34	99
CFS-HR 392	32	see map	34	99
CFS-HR 393	32	see map	34	99
CFS-HR 394	32	see map	34	99
CFS-HR 395	32	see map	34	99
CFS-HR 396	32	see map	34	99
CFS-HR 397	32	see map	34	99
CFS-HR 398	32	see map	34	99
CFS-HR 399	32	see map	34	99
CFS-HR 400	32	see map	34	99
CFS-HR 401	32	see map	34	99
CFS-HR 402	32	see map	34	99
CFS-HR 403	32	see map	34	99
CFS-HR 404	32	see map	34	99
CFS-HR 405	32	see map	34	99
CFS-HR 406	32	see map	34	99
CFS-HR 407	32	see map	34	99
CFS-HR 408	32	see map	34	99
CFS-HR 409	32	see map	34	99
CFS-HR 410	32	see map	34	99
CFS-HR 411	32	see map	34	99
CFS-HR 412	32	see map	34	99
CFS-HR 413	32	see map	34	99
CFS-HR 414	32	see map	34	99
CFS-HR 415	32	see map	34	99
CFS-HR 416	32	see map	34	99
CFS-HR 417	32	see map	34	99
CFS-HR 418	32	see map	34	99
CFS-HR 419	32	see map	34	99
CFS-HR 420	32	see map	34	99
CFS-HR 421	32	see map	34	99
CFS-HR 422	32	see map	34	99
CFS-HR 423	32	see map	34	99
CFS-HR 424	32	see map	34	99
CFS-HR 425	32	see map	34	99
CFS-HR 426	32	see map	34	99
CFS-HR 427	32	see map	34	99
CFS-HR 428	24	see map	29	90

STANDARD E&S WORKSHEET #1
Compost Filter Socks

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 429	18	see map	15	98
CFS-HR 430	18	see map	15	98
CFS-HR 431	18	see map	15	98
CFS-HR 432	18	see map	15	98
CFS-HR 433	18	see map	15	98
CFS-HR 434	18	see map	25	97
CFS-HR 435	18	see map	25	97
CFS-HR 436	18	see map	25	97
CFS-HR 437	18	see map	25	97
CFS-HR 438	18	see map	25	97
CFS-HR 439	18	see map	25	97
CFS-HR 440	18	see map	25	97
CFS-HR 441	18	see map	25	97
CFS-HR 442	18	see map	25	97
CFS-HR 443	18	see map	25	97
CFS-HR 444	18	see map	25	97
CFS-HR 445	18	see map	25	97
CFS-HR 446	18	see map	25	97
CFS-HR 447	18	see map	25	97
CFS-HR 448	18	see map	25	97
CFS-HR 449	18	see map	25	97
CFS-HR 450	18	see map	25	97
CFS-HR 451	18	see map	25	97
CFS-HR 452	18	see map	25	97
CFS-HR 453	18	see map	25	97
CFS-HR 454	18	see map	25	97
CFS-HR 455	18	see map	25	97
CFS-HR 456	18	see map	25	97
CFS-HR 457	18	see map	25	97
CFS-HR 458	18	see map	25	97
CFS-HR 459	18	see map	25	97
CFS-HR 460	18	see map	25	97
CFS-HR 461	18	see map	25	97
CFS-HR 462	18	see map	25	97
CFS-HR 463	18	see map	25	97
CFS-HR 464	18	see map	25	97
CFS-HR 465	24	see map	42	66
CFS-HR 466	24	see map	42	66
CFS-HR 467	24	see map	42	66

STANDARD E&S WORKSHEET #1
Compost Filter Socks

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 468	24	see map	42	66
CFS-HR 469	24	see map	42	66
CFS-HR 470	24	see map	42	66
CFS-HR 471	24	see map	42	66
CFS-HR 472	24	see map	42	66
CFS-HR 473	24	see map	42	66
CFS-HR 474	24	see map	42	66
CFS-HR 475	24	see map	42	66
CFS-HR 476	24	see map	42	66
CFS-HR 477	24	see map	42	66
CFS-HR 478	24	see map	42	66
CFS-HR 479	24	see map	42	66
CFS-HR 480	24	see map	42	66
CFS-HR 481	24	see map	42	66
CFS-HR 482	24	see map	42	66
CFS-HR 483	24	see map	42	66
CFS-HR 484	24	see map	42	66
CFS-HR 485	24	see map	42	66
CFS-HR 486	24	see map	42	66
CFS-HR 487	24	see map	42	66
CFS-HR 488	24	see map	42	66
CFS-HR 489	24	see map	42	66
CFS-HR 490	24	see map	42	66
CFS-HR 491	24	see map	42	66
CFS-HR 492	24	see map	42	66
CFS-HR 493	24	see map	42	66
CFS-HR 494	24	see map	42	66
CFS-HR 495	24	see map	42	66
CFS-HR 496	24	see map	42	66
CFS-HR 497	24	see map	42	66
CFS-HR 498	24	see map	42	66
CFS-HR 499	24	see map	42	66
CFS-HR 500	24	see map	42	66
CFS-HR 501	24	see map	42	66
CFS-HR 502	24	see map	42	66
CFS-HR 503	24	see map	42	66
CFS-HR 504	24	see map	42	66
CFS-HR 505	24	see map	42	66
CFS-HR 506	24	see map	42	66

STANDARD E&S WORKSHEET #1
Compost Filter Socks

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 507	24	see map	42	66
CFS-HR 508	24	see map	42	66
CFS-HR 509	24	see map	42	66
CFS-HR 510	24	see map	26	109
CFS-HR 511	24	see map	26	109
CFS-HR 512	24	see map	26	109
CFS-HR 513	24	see map	26	109
CFS-HR 514	24	see map	26	109
CFS-HR 515	24	see map	26	109
CFS-HR 516	24	see map	26	109
CFS-HR 517	24	see map	26	109
CFS-HR 518	24	see map	26	109
CFS-HR 519	24	see map	26	109
CFS-HR 520	24	see map	26	109
CFS-HR 521	24	see map	26	109
CFS-HR 522	24	see map	26	109
CFS-HR 523	24	see map	26	109
CFS-HR 524	24	see map	26	109
CFS-HR 525	24	see map	26	109
CFS-HR 526	24	see map	26	109
CFS-HR 527	24	see map	26	109
CFS-HR 528	24	see map	26	109
CFS-HR 529	24	see map	26	109
CFS-HR 530	24	see map	26	109
CFS-HR 531	24	see map	26	109
CFS-HR 532	24	see map	26	109
CFS-HR 533	18	see map	5	256
CFS-HR 534	18	see map	5	256
CFS-HR 535	18	see map	5	256
CFS-HR 536	18	see map	5	256
CFS-HR 537	18	see map	5	256
CFS-HR 538	18	see map	5	256
CFS-HR 539	18	see map	5	256
CFS-HR 540	18	see map	17	132
CFS-HR 541	18	see map	17	132
CFS-HR 542	18	see map	17	132
CFS-HR 543	18	see map	17	132
CFS-HR 544	18	see map	17	132
CFS-HR 545	18	see map	17	132

STANDARD E&S WORKSHEET #1
Compost Filter Socks

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 546	18	see map	17	132
CFS-HR 547	18	see map	17	132
CFS-HR 548	18	see map	17	132
CFS-HR 549	18	see map	17	132
CFS-HR 550	18	see map	17	132
CFS-HR 551	18	see map	17	132
CFS-HR 552	18	see map	17	132
CFS-HR 553	18	see map	17	132
CFS-HR 554	18	see map	17	132
CFS-HR 555	18	see map	17	132
CFS-HR 556	18	see map	17	132
CFS-HR 557	18	see map	17	132
CFS-HR 558	18	see map	17	132
CFS-HR 559	18	see map	17	132
CFS-HR 560	18	see map	17	132
CFS-HR 560A	18	see map	25	32
CFS-HR 560B	18	see map	25	32
CFS-HR 560C	18	see map	25	32
CFS-HR 561	18	see map	26	69
CFS-HR 562	18	see map	26	69
CFS-HR 563	18	see map	26	69
CFS-HR 564	18	see map	26	69
CFS-HR 564A	18	see map	25	56
CFS-HR 564B	18	see map	25	56
CFS-HR 564C	18	see map	25	56
CFS-HR 564D	18	see map	25	56
CFS-HR 565	18	see map	26	69
CFS-HR 566	18	see map	26	69
CFS-HR 567	18	see map	26	69
CFS-HR 568	18	see map	26	69
CFS-HR 569	18	see map	26	69
CFS-HR 570	18	see map	26	69
CFS-HR 571	18	see map	26	69
CFS-HR 572	18	see map	26	69
CFS-HR 573	18	see map	26	69
CFS-HR 574	12	see map	5	111
CFS-HR 575	12	see map	5	111
CFS-HR 576	12	see map	5	111
CFS-HR 577	12	see map	5	111

STANDARD E&S WORKSHEET #1
Compost Filter Socks

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 578	12	see map	5	111
CFS-HR 579	12	see map	5	111
CFS-HR 580	12	see map	5	111
CFS-HR 581	12	see map	7	98
CFS-HR 582	12	see map	7	98
CFS-HR 583	12	see map	7	98
CFS-HR 584	12	see map	7	98
CFS-HR 585	12	see map	7	98
CFS-HR 586	12	see map	7	98
CFS-HR 587	12	see map	7	98
CFS-HR 587A	12	see map	wetland protection	
CFS-HR 587B	12	see map	wetland protection	
CFS-HR 587C	24	see map	wetland protection	
CFS-HR 587D	24	see map	wetland protection	
CFS-HR 587E	24	see map	wetland protection	
CFS-HR 587F	12	see map	wetland protection	
CFS-HR 588	12	see map	7	98
CFS-HR 589	12	see map	7	99
CFS-HR 590	12	see map	7	90
CFS-HR 591	12	see map	12	117
CFS-HR 592	12	see map	12	117
CFS-HR 593	12	see map	12	117
CFS-HR 594	12	see map	12	117
CFS-HR 595	12	see map	12	117
CFS-HR 596	12	see map	12	117
CFS-HR 597	12	see map	12	117
CFS-HR 598	12	see map	12	117
CFS-HR 599	12	see map	12	117
CFS-HR 600	12	see map	12	117
CFS-HR 601	12	see map	12	117
CFS-HR 602	12	see map	12	117
CFS-HR 603	12	see map	12	117
CFS-HR 604	12	see map	12	117
CFS-HR 605	12	see map	12	117
CFS-HR 606	12	see map	12	117
CFS-HR 607	12	see map	12	117
CFS-HR 608	12	see map	12	117
CFS-HR 609	12	see map	12	117
CFS-HR 610	12	see map	12	117

STANDARD E&S WORKSHEET #1
Compost Filter Socks

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 611	12	see map	12	117
CFS-HR 612	12	see map	12	117
CFS-HR 613	12	see map	12	117
CFS-HR 614	12	see map	12	117
CFS-HR 615	18	see map	34	47
CFS-HR 616	18	see map	34	47
CFS-HR 617	18	see map	34	47
CFS-HR 618	18	see map	34	47
CFS-HR 619	18	see map	34	47
CFS-HR 620	18	see map	42	52
CFS-HR 621	18	see map	42	52
CFS-HR 622	18	see map	42	52
CFS-HR 623	18	see map	42	52
CFS-HR 624	18	see map	42	52
CFS-HR 625	18	see map	42	52
CFS-HR 626	18	see map	42	52
CFS-HR 627	18	see map	42	52
CFS-HR 628	18	see map	42	52
CFS-HR 629	18	see map	42	52
CFS-HR 630	18	see map	42	52
CFS-HR 631	18	see map	42	52
CFS-HR 632	18	see map	42	52
CFS-HR 633	18	see map	42	52
CFS-HR 634	18	see map	28	71
CFS-HR 635	18	see map	28	71
CFS-HR 636	18	see map	28	71
CFS-HR 637	18	see map	28	71
CFS-HR 638	18	see map	28	71
CFS-HR 639	18	see map	28	71
CFS-HR 640	18	see map	28	71
CFS-HR 641	18	see map	28	71
CFS-HR 642	18	see map	28	71
CFS-HR 643	18	see map	28	71
CFS-HR 644	18	see map	28	71
CFS-HR 645	18	see map	28	71
CFS-HR 646	18	see map	28	71
CFS-HR 647	18	see map	28	71
CFS-HR 648	24	see map	29	90
CFS-HR 649	24	see map	29	90

STANDARD E&S WORKSHEET #1
Compost Filter Socks

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 650	24	see map	29	90
CFS-HR 651	24	see map	29	90
CFS-HR 652	24	see map	29	90
CFS-HR 653	24	see map	29	90
CFS-HR 654	24	see map	29	90
CFS-HR 655	24	see map	29	90
CFS-HR 656	24	see map	29	90
CFS-HR 657	24	see map	29	90
CFS-HR 658	24	see map	29	90
CFS-HR 659	24	see map	29	90
CFS-HR 660	24	see map	29	90
CFS-HR 661	24	see map	29	90
CFS-HR 662	24	see map	29	90
CFS-HR 663	24	see map	29	90
CFS-HR 664	24	see map	29	90
CFS-HR 665	24	see map	29	90
CFS-HR 666	24	see map	29	90
CFS-HR 667	18	see map	41	54
CFS-HR 668	18	see map	41	54
CFS-HR 669	18	see map	41	54
CFS-HR 670	18	see map	41	54
CFS-HR 671	18	see map	41	54
CFS-HR 672	18	see map	41	54
CFS-HR 673	18	see map	41	54
CFS-HR 674	18	see map	41	54
CFS-HR 675	18	see map	41	54
CFS-HR 676	18	see map	41	54
CFS-HR 677	18	see map	41	54
CFS-HR 678	18	see map	41	54
CFS-HR 679	18	see map	41	54
CFS-HR 680	18	see map	41	54
CFS-HR 681	18	see map	41	54
CFS-HR 682	18	see map	41	54
CFS-HR 683	18	see map	41	54
CFS-HR 684	18	see map	41	54
CFS-HR 685	18	see map	41	54
CFS-HR 686	18	see map	41	54
CFS-HR 687	18	see map	41	54
CFS-HR 688	18	see map	41	54

STANDARD E&S WORKSHEET #1
Compost Filter Socks

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 689	18	see map	41	54
CFS-HR 690	18	see map	41	54
CFS-HR 691	18	see map	41	54
CFS-HR 692	18	see map	41	54
CFS-HR 693	18	see map	41	54
CFS-HR 694	18	see map	41	54
CFS-HR 695	18	see map	41	54
CFS-HR 696	18	see map	41	54
CFS-HR 697	18	see map	41	54
CFS-HR 698	18	see map	41	54
CFS-HR 699	18	see map	41	54
CFS-HR 700	18	see map	41	54
CFS-HR 701	18	see map	41	54
CFS-HR 702	18	see map	41	54
CFS-HR 703	18	see map	41	54
CFS-HR 704	18	see map	41	54
CFS-HR 705	18	see map	41	54
CFS-HR 706	18	see map	41	54
CFS-HR 707	18	see map	41	54
CFS-HR 708	18	see map	41	54
CFS-HR 709	18	see map	41	54
CFS-HR 710	18	see map	41	54
CFS-HR 711	18	see map	41	54
CFS-HR 712	18	see map	41	54
CFS-HR 713	18	see map	41	54
CFS-HR 714	18	see map	41	54
CFS-HR 715	18	see map	41	54
CFS-HR 716	18	see map	41	54
CFS-HR 717	18	see map	41	54
CFS-HR 718	18	see map	41	54
CFS-HR 719	18	see map	41	54
CFS-HR 720	18	see map	41	54
CFS-HR 721	18	see map	16	137
CFS-HR 722	18	see map	16	137
CFS-HR 723	18	see map	16	137
CFS-HR 724	18	see map	16	137
CFS-HR 725	18	see map	16	137
CFS-HR 726	18	see map	16	137
CFS-HR 727	18	see map	16	137

STANDARD E&S WORKSHEET #1
Compost Filter Socks

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 728	18	see map	16	137
CFS-HR 729	18	see map	16	137
CFS-HR 730	18	see map	16	137
CFS-HR 731	18	see map	16	137
CFS-HR 732	18	see map	16	137
CFS-HR 733	18	see map	16	137
CFS-HR 734	18	see map	16	137
CFS-HR 735	18	see map	16	137
CFS-HR 736	18	see map	16	137
CFS-HR 737	18	see map	16	137
CFS-HR 738	18	see map	16	137
CFS-HR 739	18	see map	16	137
CFS-HR 740	18	see map	16	137
CFS-HR 741	18	see map	16	137
CFS-HR 742	18	see map	16	137
CFS-HR 743	18	see map	16	137
CFS-HR 744	18	see map	16	137
CFS-HR 745	18	see map	16	137
CFS-HR 746	18	see map	16	137
CFS-HR 747	18	see map	16	137
CFS-HR 748	18	see map	16	137
CFS-HR 749	18	see map	16	137
CFS-HR 750	18	see map	16	137
CFS-HR 751	18	see map	16	137
CFS-HR 752	18	see map	16	137
CFS-HR 753	18	see map	16	137
CFS-HR 754	18	see map	16	137
CFS-HR 755	18	see map	16	137
CFS-HR 756	18	see map	16	137
CFS-HR 757	18	see map	16	137
CFS-HR 758	18	see map	16	137
CFS-HR 759	18	see map	16	137
CFS-HR 760	32	see map	16	281
CFS-HR 761	32	see map	16	281
CFS-HR 762	32	see map	16	281
CFS-HR 763	32	see map	16	281
CFS-HR 764	32	see map	16	281
CFS-HR 765	32	see map	16	281
CFS-HR 766	32	see map	16	281

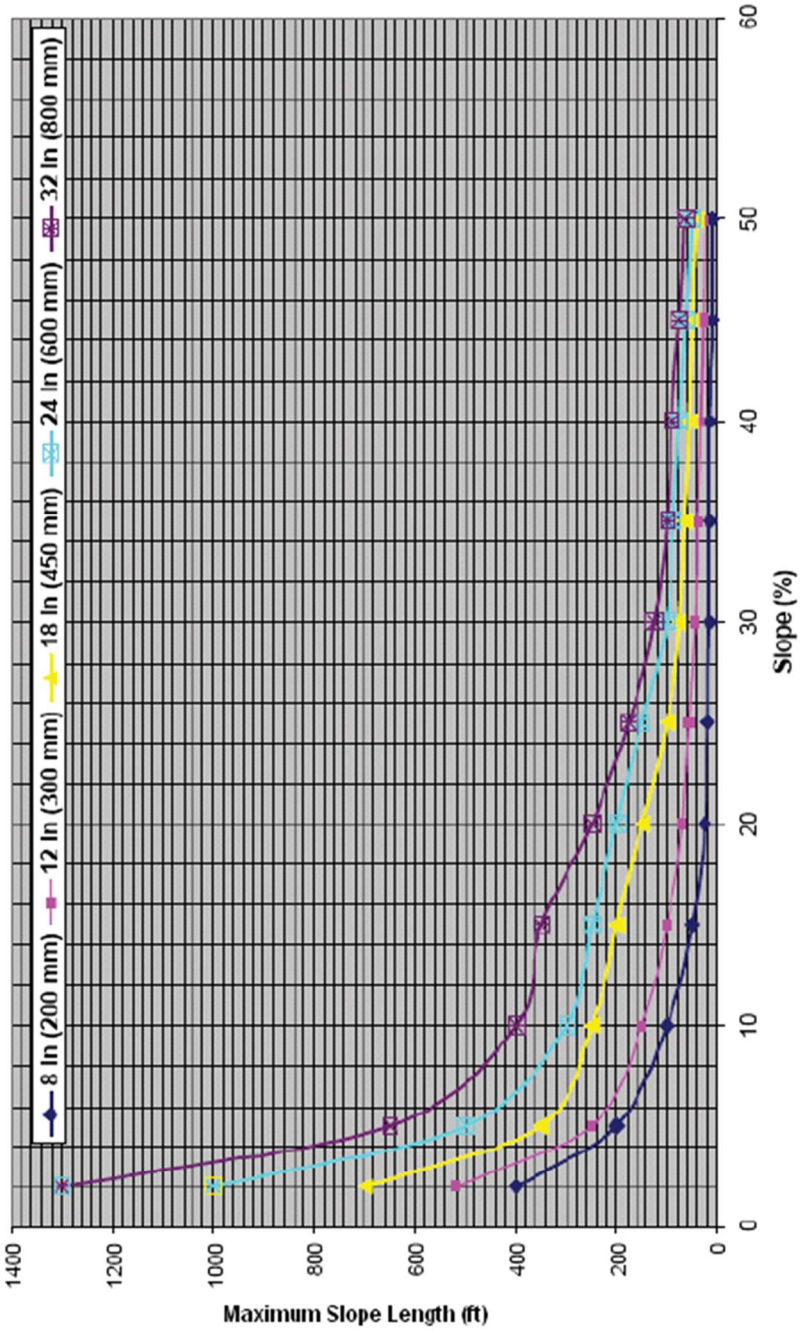
STANDARD E&S WORKSHEET #1
Compost Filter Socks

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 767	32	see map	16	281
CFS-HR 768	32	see map	16	281
CFS-HR 769	32	see map	16	281
CFS-HR 770	32	see map	16	281
CFS-HR 771	32	see map	16	281
CFS-HR 772	32	see map	16	281
CFS-HR 773	32	see map	16	281
CFS-HR 774	32	see map	16	281
CFS-HR 775	32	see map	16	281
CFS-HR 776	32	see map	16	281
CFS-HR 777	32	see map	16	281
CFS-HR 778	32	see map	16	281
CFS-HR 779	32	see map, CSA021	5	546
CFS-HR 780	32	see map, CSA021	5	546
CFS-HR 781	32	see map, CSA021	5	546
CFS-HR 782	32	see map, CSA021	5	546
CFS-HR 783	32	see map, CSA021	5	546
CFS-HR 784	32	see map, CSA021	5	546
CFS-HR 785	18	see map	wetland protection	
CFS-HR 786	18	see map	wetland protection	
CFS-HR 786A	12	see map	4	111
CFS-HR 786B	12	see map	4	111
CFS-HR 786C	12	see map	5	130
CFS-HR 786D	12	see map	5	130
CFS-HR 787	32	see map	5	546
CFS-HR 788	32	see map	5	546
CFS-HR 789	32	see map	5	546
CFS-HR 790	32	see map	5	546
CFS-HR 791	18	see map, Western Terminus Valve Yard	12	115
CFS-HR 792	18	see map, Western Terminus Valve Yard	12	115
CFS-HR 793	18	see map, Western Terminus Valve Yard	12	115
CFS-HR 794	18	see map, Western Terminus Valve Yard	12	115
CFS-HR 795	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 796	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 797	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 798	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 799	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 800	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 801	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 802	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 803	18	see map, Western Terminus Valve Yard	15	119

STANDARD E&S WORKSHEET #1
Compost Filter Socks

SOCK NO.	Dia. In.	LOCATION	SLOPE PERCENT	SLOPE LENGTH ABOVE BARRIER (FT)
CFS-HR 804	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 805	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 806	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 807	18	see map, Western Terminus Valve Yard	15	119
CFS-HR 808	12	see map	2	45
CFS-HR 809	12	see map	6	152
CFS-HR 810	24	see map	8	340
CFS-HR 811	24	see map	8	340
CFS-HR 812	24	see map	8	340
CFS-HR 813	24	Along the west of Paddy Run Road	6	226
CFS-HR 814	24	Along the east of Paddy Run Road	4	486
CFS-HR 815	24	See map, CY003	1	983
CFS-HR 816	24	See map, CY003	1	983

FIGURE 4.2
MAXIMUM PERMISSIBLE SLOPE LENGTH ABOVE COMPOST FILTER SOCKS



NOTE: 8" diameter socks should only be used to control small (≤ ¼ acre) disturbed areas on individual house lots).

Adapted from Filtrexx

ATTACHMENT 3.2
CHANNEL DESIGN WORKSHEETS

STANDARD E&S WORKSHEET # 11
Channel Design Data

PROJECT NAME: Leidy South-Hensel Replacement Pipeline Clean Water Crossing Prepared by: FJ, 7/2019
LOCATION: Clinton County, Pennsylvania Checked by: KCC, 7/2019

CHANNEL OR CHANNEL SECTION		HR1-1	HR1-2	HR2	HR3-1	HR3-2
TEMPORARY OR PERMANENT?	(T OR P)	T	T	T	T	T
DESIGN STORM	(2, 5, OR 10 YR)	10 yr	10 yr	10 yr	10 yr	10 yr
ACRES	(AC)	61.287	61.133	0.239	7.484	7.24
MULTIPLIER	(1.6, 2.25, or 2.75)[1]	N/A	N/A	N/A	N/A	N/A
Q_r (REQUIRED CAPACITY)	(CFS)	59.43	59.28	0.16	2.68	5
Q (CALCULATED AT FLOW DEPTH d)	(CFS)	61.5	60.7	1.5	3.89	6.30
PROTECTIVE LINING[2]		R-6 Riprap	R-6 Riprap	ECM	ECM	ECM
n (MANNING'S COEFFICIENT)[2]		0.0594	0.0601	0.036	0.036	0.025
V_a (ALLOWABLE VELOCITY)	(FPS)	13.0	13.0	6.8	6.8	6.8
V (CALCULATED AT FLOW DEPTH d)	(FPS)	4.6	4.8	3.1	3.0	3.3
τ_a (MAX ALLOWABLE SHEAR STRESS)	(LB/FT^2)	4.0	4.0	2.0	2.0	2.0
τ_d (CALC'D SHEAR STRESS AT FLOW DEPTH d)	(LB/FT^2)	3.4	3.7	0.8	0.7	0.4
CHANNEL BOTTOM WIDTH	(FT)	4	4	2	2	2
CHANNEL SIDE SLOPES	(H:V)	3	3	2	2	2
D (TOTAL DEPTH)	(FT)	2.25	2.25	0.75	1	1.25
CHANNEL TOP WIDTH @ D	(FT)	17.5	17.5	5	6	7
d (CALCULATED FLOW DEPTH)	(FT)	1.55	1.5	0.2	0.45	0.6
CHANNEL TOP WIDTH @ FLOW DEPTH d	(FT)	13.3	13.0	2.8	3.8	4.4
BOTTOM WIDTH: FLOW DEPTH RATIO	(12:1 MAX)	2.58	2.67	10	4.4	3.3
d_{50} STONE SIZE	(IN)	12	12	--	--	--
A (CROSS-SECTIONAL AREA)	(SQ. FT.)	13.41	12.75	0.48	1.305	1.92
R (HYDRAULIC RADIUS)		0.971	0.945	0.17	0.325	0.41
S (BED SLOPE)[3]	(FT/FT)	0.035	0.040	0.062	0.023	0.01
S_c (CRITICAL SLOPE)	(FT/FT)	0.054	0.056	0.035	0.029	0.013
$.7S_c$	(FT/FT)	0.038	0.039	0.025	0.0203	0.0091
$1.3S_c$	(FT/FT)	0.070	0.072	0.046	0.0377	0.0169
STABLE FLOW?	(Y/N)	Y	N	Y	N	N
FREEBOARD BASED ON UNSTABLE FLOW	(FT)	--	0.5	--	0.1	0.15
FREEBOARD BASED ON STABLE FLOW	(FT)	0.4	--	0.1	--	--
MINIMUM REQUIRED FREEBOARD[4]	(FT)	0.5	0.5	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING [5]		V	V	V	V	V

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns. ECM linings were designed with SC150BN lining.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

CHANNEL OR CHANNEL SECTION		HR4	HR5-1	HR5-2	HR6	HR7
TEMPORARY OR PERMANENT?	(T OR P)	T	T	T	T	T
DESIGN STORM	(2, 5, OR 10 YR)	10 yr	10 yr	10 yr	10 yr	10 yr
ACRES	(AC)	7.42	13.032	15.936	7.551	2.794
MULTIPLIER	(1.6, 2.25, or 2.75)[1]	N/A	N/A	N/A	N/A	N/A
Q_r (REQUIRED CAPACITY)	(CFS)	4.08	5.27	4.52	2.39	1.29
Q (CALCULATED AT FLOW DEPTH d)	(CFS)	6.73	8.05	6.64	4.16	3.04
PROTECTIVE LINING[2]		ECM	ECM	ECM	ECM	ECM
n (MANNING'S COEFFICIENT)[2]		0.025	0.025	0.025	0.036	0.036
V_a (ALLOWABLE VELOCITY)	(FPS)	6.8	6.8	6.8	6.8	6.8
V (CALCULATED AT FLOW DEPTH d)	(FPS)	3.9	4.7	3.9	3.7	2.7
τ_a (MAX ALLOWABLE SHEAR STRESS)	(LB/FT^2)	2.0	2.0	2.0	2.0	2.0
τ_d (CALC'D SHEAR STRESS AT FLOW DEPTH d)	(LB/FT^2)	0.5	0.8	0.5	1.0	0.5
CHANNEL BOTTOM WIDTH	(FT)	2	2	2	2	2
CHANNEL SIDE SLOPES	(H:V)	2	2	2	2	2
D (TOTAL DEPTH)	(FT)	1.25	1.25	1.25	1	1
CHANNEL TOP WIDTH @ D	(FT)	7	7	7	6	6
d (CALCULATED FLOW DEPTH)	(FT)	0.55	0.55	0.55	0.4	0.4
CHANNEL TOP WIDTH @ FLOW DEPTH d	(FT)	4.2	4.2	4.2	3.6	3.6
BOTTOM WIDTH: FLOW DEPTH RATIO	(12:1 MAX)	3.6	3.6	3.6	5.0	5.0
d_{50} STONE SIZE	(IN)	--	--	--	--	--
A (CROSS-SECTIONAL AREA)	(SQ. FT.)	1.705	1.705	1.705	1.12	1.12
R (HYDRAULIC RADIUS)		0.382	0.382	0.382	0.296	0.296
S (BED SLOPE)[3]	(FT/FT)	0.016	0.023	0.015	0.041	0.022
S_c (CRITICAL SLOPE)	(FT/FT)	0.013	0.013	0.013	0.03	0.03
$.7S_c$	(FT/FT)	0.0091	0.0091	0.0091	0.021	0.021
$1.3S_c$	(FT/FT)	0.0169	0.0169	0.0169	0.039	0.039
STABLE FLOW?	(Y/N)	N	Y	N	Y	N
FREEBOARD BASED ON UNSTABLE FLOW	(FT)	0.2	--	0.2	--	0.1
FREEBOARD BASED ON STABLE FLOW	(FT)	--	0.1	--	0.1	--
MINIMUM REQUIRED FREEBOARD[4]	(FT)	0.5	0.5	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING[5] PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)		V	V	V	V	V

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns. ECM linings were designed with SC150BN lining.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

CHANNEL OR CHANNEL SECTION		HR8	HR9	HR10	HR11	HR12
TEMPORARY OR PERMANENT?	(T OR P)	T	T	T	T	T
DESIGN STORM	(2, 5, OR 10 YR)	10 yr	10 yr	10 yr	10 yr	10 yr
ACRES	(AC)	0.454	0.56	8.121	1.629	0.92
MULTIPLIER	(1.6, 2.25, or 2.75)[1]	N/A	N/A	N/A	N/A	N/A
Q_r (REQUIRED CAPACITY)	(CFS)	0.22	0.29	12.99	3.14	0.54
Q (CALCULATED AT FLOW DEPTH d)	(CFS)	2.07	2.07	13.1	3.30	1.8
PROTECTIVE LINING[2]		ECM	ECM	R-6 Riprap	ECM	ECM
n (MANNING'S COEFFICIENT)[2]		0.036	0.036	0.097	0.036	0.036
V_a (ALLOWABLE VELOCITY)	(FPS)	6.8	6.8	13.0	6.8	6.8
V (CALCULATED AT FLOW DEPTH d)	(FPS)	4.3	4.3	2.9	5.1	3.7
τ_a (MAX ALLOWABLE SHEAR STRESS)	(LB/FT^2)	2.0	2.0	4.0	2.0	2.0
τ_d (CALC'D SHEAR STRESS AT FLOW DEPTH d)	(LB/FT^2)	1.5	1.5	3.4	1.98	1.1
CHANNEL BOTTOM WIDTH	(FT)	2	2	6	2.5	2
CHANNEL SIDE SLOPES	(H:V)	2	2	2	2	2
D (TOTAL DEPTH)	(FT)	0.75	0.75	1.25	0.75	0.75
CHANNEL TOP WIDTH @ D	(FT)	5	5	11	5.5	5
d (CALCULATED FLOW DEPTH)	(FT)	0.2	0.2	0.62	0.22	0.2
CHANNEL TOP WIDTH @ FLOW DEPTH d	(FT)	2.8	2.8	8.5	3.4	2.8
BOTTOM WIDTH: FLOW DEPTH RATIO	(12:1 MAX)	10	10	9.7	11.4	10
d_{50} STONE SIZE	(IN)	--	--	12.0	--	--
A (CROSS-SECTIONAL AREA)	(SQ. FT.)	0.48	0.48	4.49	0.65	0.48
R (HYDRAULIC RADIUS)		0.166	0.166	0.512	0.186	0.166
S (BED SLOPE)[3]	(FT/FT)	0.12	0.12	0.089	0.144	0.088
S_c (CRITICAL SLOPE)	(FT/FT)	0.035	0.035	0.177	0.034	0.035
$.7S_c$	(FT/FT)	0.0245	0.0245	0.124	0.0238	0.025
$1.3S_c$	(FT/FT)	0.0455	0.0455	0.230	0.0442	0.046
STABLE FLOW?	(Y/N)	Y	Y	Y	Y	Y
FREEBOARD BASED ON UNSTABLE FLOW	(FT)	--	--	--	--	--
FREEBOARD BASED ON STABLE FLOW	(FT)	0.1	0.1	0.2	0.1	0.1
MINIMUM REQUIRED FREEBOARD[4]	(FT)	0.5	0.5	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING[5] PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)		S	S	S	S	V

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns. ECM linings were designed with SC150BN lining.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

CHANNEL OR CHANNEL SECTION		HR13	HR14	HR15	HR16-1	HR16-2
TEMPORARY OR PERMANENT?	(T OR P)	T	T	T	T	T
DESIGN STORM	(2, 5, OR 10 YR)	10 yr	10 yr	10 yr	10 yr	10 yr
ACRES	(AC)	9.901	14.022	14.309	14.756	11.13
MULTIPLIER	(1.6, 2.25, or 2.75)[1]	N/A	N/A	N/A	N/A	N/A
Q_r (REQUIRED CAPACITY)	(CFS)	4.49	6.59	5.43	8.52	4.13
Q (CALCULATED AT FLOW DEPTH d)	(CFS)	7.5	7.3	6.8	10.7	4.6
PROTECTIVE LINING[2]		ECM	ECM	ECM	ECM	ECM
n (MANNING'S COEFFICIENT)[2]		0.025	0.025	0.036	0.025	0.036
V_a (ALLOWABLE VELOCITY)	(FPS)	6.8	6.8	6.8	6.8	6.8
V (CALCULATED AT FLOW DEPTH d)	(FPS)	4.8	4.8	4.6	4.5	5.1
τ_a (MAX ALLOWABLE SHEAR STRESS)	(LB/FT^2)	2.0	2.0	2.0	2.0	2.0
τ_d (CALC'D SHEAR STRESS AT FLOW DEPTH d)	(LB/FT^2)	0.8	0.8	1.5	0.7	1.95
CHANNEL BOTTOM WIDTH	(FT)	2	2	2	2	2
CHANNEL SIDE SLOPES	(H:V)	2	2	2	2	2
D (TOTAL DEPTH)	(FT)	1.25	1.25	1	1.25	1
CHANNEL TOP WIDTH @ D	(FT)	7	7	6	7	6
d (CALCULATED FLOW DEPTH)	(FT)	0.51	0.51	0.5	0.7	0.34
CHANNEL TOP WIDTH @ FLOW DEPTH d	(FT)	4.0	4.0	4	4.8	3.4
BOTTOM WIDTH: FLOW DEPTH RATIO	(12:1 MAX)	3.9	3.9	4	2.9	5.9
d_{50} STONE SIZE	(IN)	--	--	--	--	--
A (CROSS-SECTIONAL AREA)	(SQ. FT.)	1.54	1.54	1.5	2.38	0.91
R (HYDRAULIC RADIUS)		0.36	0.36	0.354	0.464	0.259
S (BED SLOPE)[3]	(FT/FT)	0.026	0.025	0.049	0.016	0.092
S_c (CRITICAL SLOPE)	(FT/FT)	0.014	0.014	0.028	0.013	0.031
$.7S_c$	(FT/FT)	0.010	0.010	0.020	0.0091	0.022
$1.3S_c$	(FT/FT)	0.018	0.018	0.036	0.0169	0.0403
STABLE FLOW?	(Y/N)	Y	Y	Y	N	Y
FREEBOARD BASED ON UNSTABLE FLOW	(FT)	--	--	--	0.2	--
FREEBOARD BASED ON STABLE FLOW	(FT)	0.1	0.1	0.1	--	0.1
MINIMUM REQUIRED FREEBOARD[4]	(FT)	0.5	0.5	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING[5] PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)		V	V	V	V	V

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns. ECM linings were designed with SC150BN lining.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

CHANNEL OR CHANNEL SECTION		HR17	HR18-1	HR18-2	HR19	H20
TEMPORARY OR PERMANENT?	(T OR P)	T	T	T	T	T
DESIGN STORM	(2, 5, OR 10 YR)	10 yr	10 yr	10 yr	10 yr	10 yr
ACRES	(AC)	19.175	14.089	14.089	2.994	0.97
MULTIPLIER	(1.6, 2.25, or 2.75)[1]	N/A	N/A	N/A	N/A	N/A
Q_r (REQUIRED CAPACITY)	(CFS)	11.1	10.4	10.4	1.07	0.53
Q (CALCULATED AT FLOW DEPTH d)	(CFS)	12.1	12.4	12.4	1.72	1.59
PROTECTIVE LINING[2]		ECM	ECM	ECM	ECM	ECM
n (MANNING'S COEFFICIENT)[2]		0.036	0.036	0.036	0.036	0.036
V_a (ALLOWABLE VELOCITY)	(FPS)	6.8	6.8	6.8	6.8	6.8
V (CALCULATED AT FLOW DEPTH d)	(FPS)	5.9	4.6	4.6	3.6	3.3
τ_a (MAX ALLOWABLE SHEAR STRESS)	(LB/FT^2)	2.0	2.0	2.0	2.0	2.0
τ_d (CALC'D SHEAR STRESS AT FLOW DEPTH d)	(LB/FT^2)	1.9	1.5	1.6	1.0	1.0
CHANNEL BOTTOM WIDTH	(FT)	5	2	2	2	2
CHANNEL SIDE SLOPES	(H:V)	2	2	2	2	2
D (TOTAL DEPTH)	(FT)	1.00	1.0	1.0	0.75	0.75
CHANNEL TOP WIDTH @ D	(FT)	9	6	6	5	5
d (CALCULATED FLOW DEPTH)	(FT)	0.42	0.5	0.5	0.2	0.2
CHANNEL TOP WIDTH @ FLOW DEPTH d	(FT)	6.7	4.0	4.0	2.8	2.8
BOTTOM WIDTH: FLOW DEPTH RATIO	(12:1 MAX)	11.9	4.0	4.0	10	10
d_{50} STONE SIZE	(IN)	--	--	--	--	--
A (CROSS-SECTIONAL AREA)	(SQ. FT.)	2.45	1.5	1.5	0.48	0.48
R (HYDRAULIC RADIUS)		0.357	0.354	0.354	0.166	0.166
S (BED SLOPE)[3]	(FT/FT)	0.073	0.049	0.049	0.083	0.071
S_c (CRITICAL SLOPE)	(FT/FT)	0.027	0.028	0.028	0.035	0.035
$.7S_c$	(FT/FT)	0.019	0.020	0.020	0.0245	0.0245
$1.3S_c$	(FT/FT)	0.035	0.037	0.037	0.0455	0.0455
STABLE FLOW?	(Y/N)	Y	Y	Y	Y	Y
FREEBOARD BASED ON UNSTABLE FLOW	(FT)	--	--	--	--	--
FREEBOARD BASED ON STABLE FLOW	(FT)	0.1	0.1	0.1	0.1	0.1
MINIMUM REQUIRED FREEBOARD[4]	(FT)	0.5	0.5	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING[5] PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)		V	V	V	V	V

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns. ECM linings were designed with SC150BN lining.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

CHANNEL OR CHANNEL SECTION		HR21-1	HR21-2	HR22	HR23	HR24
TEMPORARY OR PERMANENT?	(T OR P)	T	T	T	T	T
DESIGN STORM	(2, 5, OR 10 YR)	10 yr	10 yr	10 yr	10 yr	10 yr
ACRES	(AC)	14.5	0.40	3.55	4.22	1.20
MULTIPLIER	(1.6, 2.25, or 2.75)[1]	N/A	N/A	N/A	N/A	N/A
Q_r (REQUIRED CAPACITY)	(CFS)	14.5	0.82	4.60	1.74	0.52
Q (CALCULATED AT FLOW DEPTH d)	(CFS)	17.3	1.6	5.3	3.0	1.3
PROTECTIVE LINING[2]		ECM	ECM	ECM	ECM	ECM
n (MANNING'S COEFFICIENT)[2]		0.025	0.036	0.036	0.036	0.036
V_a (ALLOWABLE VELOCITY)	(FPS)	6.8	6.8	6.8	6.8	6.8
V (CALCULATED AT FLOW DEPTH d)	(FPS)	4.3	3.4	3.1	3.0	1.6
τ_a (MAX ALLOWABLE SHEAR STRESS)	(LB/FT^2)	2.0	2.0	2.0	2.0	2.0
τ_d (CALC'D SHEAR STRESS AT FLOW DEPTH d)	(LB/FT^2)	0.6	0.9	0.3	0.7	0.2
CHANNEL BOTTOM WIDTH	(FT)	2	2	2	2	2
CHANNEL SIDE SLOPES	(H:V)	2	2	2	2	2
D (TOTAL DEPTH)	(FT)	1.5	0.75	1.25	1.0	1.0
CHANNEL TOP WIDTH @ D	(FT)	8	5	7	6	6
d (CALCULATED FLOW DEPTH)	(FT)	1.0	0.2	0.55	0.35	0.30
CHANNEL TOP WIDTH @ FLOW DEPTH d	(FT)	6	2.8	4.2	3.4	3.2
BOTTOM WIDTH: FLOW DEPTH RATIO	(12:1 MAX)	2.0	10	3.64	5.7	6.7
d_{50} STONE SIZE	(IN)	--	--	--	--	--
A (CROSS-SECTIONAL AREA)	(SQ. FT.)	4.0	0.48	1.71	0.945	0.78
R (HYDRAULIC RADIUS)		0.618	0.166	0.382	0.265	0.233
S (BED SLOPE)[3]	(FT/FT)	0.010	0.071	0.01	0.034	0.011
S_c (CRITICAL SLOPE)	(FT/FT)	0.012	0.035	0.013	0.031	0.032
$.7S_c$	(FT/FT)	0.008	0.0245	0.009	0.022	0.022
$1.3S_c$	(FT/FT)	0.016	0.0455	0.055	0.040	0.042
STABLE FLOW?	(Y/N)	N	Y	Y	N	Y
FREEBOARD BASED ON UNSTABLE FLOW	(FT)	0.3	--	--	0.1	--
FREEBOARD BASED ON STABLE FLOW	(FT)	--	0.1	0.1	--	0.1
MINIMUM REQUIRED FREEBOARD[4]	(FT)	0.5	0.5	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING[5] PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)		V	V	V	V	V

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns. ECM linings were designed with SC150BN lining.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

CHANNEL OR CHANNEL SECTION		HR25	HR26	HR27
TEMPORARY OR PERMANENT?	(T OR P)	T	T	T
DESIGN STORM	(2, 5, OR 10 YR)	10 yr	10 yr	10 yr
ACRES	(AC)	3.97	2.38	1.14
MULTIPLIER	(1.6, 2.25, or 2.75)[1]	N/A	N/A	N/A
Q_r (REQUIRED CAPACITY)	(CFS)	2.62	0.93	0.46
Q (CALCULATED AT FLOW DEPTH d)	(CFS)	3.8	1.6	1.4
PROTECTIVE LINING[2]		ECM	ECM	ECM
n (MANNING'S COEFFICIENT)[2]		0.036	0.036	0.036
V_a (ALLOWABLE VELOCITY)	(FPS)	6.8	6.8	6.8
V (CALCULATED AT FLOW DEPTH d)	(FPS)	4.9	1.6	2.2
τ_a (MAX ALLOWABLE SHEAR STRESS)	(LB/FT^2)	2.0	2.0	2.0
τ_d (CALC'D SHEAR STRESS AT FLOW DEPTH d)	(LB/FT^2)	1.8	0.5	0.4
CHANNEL BOTTOM WIDTH	(FT)	2	2	2
CHANNEL SIDE SLOPES	(H:V)	2	2	2
D (TOTAL DEPTH)	(FT)	1.0	0.75	0.75
CHANNEL TOP WIDTH @ D	(FT)	6	5	5
d (CALCULATED FLOW DEPTH)	(FT)	0.30	0.25	0.25
CHANNEL TOP WIDTH @ FLOW DEPTH d	(FT)	3.2	3.0	3.0
BOTTOM WIDTH: FLOW DEPTH RATIO	(12:1 MAX)	6.7	8.0	8.0
d_{50} STONE SIZE	(IN)	--	--	--
A (CROSS-SECTIONAL AREA)	(SQ. FT.)	0.78	0.625	0.625
R (HYDRAULIC RADIUS)		0.233	0.200	0.200
S (BED SLOPE)[3]	(FT/FT)	0.097	0.034	0.025
S_c (CRITICAL SLOPE)	(FT/FT)	0.032	0.033	0.033
$.7S_c$	(FT/FT)	0.022	0.023	0.0231
$1.3S_c$	(FT/FT)	0.042	0.043	0.043
STABLE FLOW?	(Y/N)	Y	N	N
FREEBOARD BASED ON UNSTABLE FLOW	(FT)	--	0.1	0.04
FREEBOARD BASED ON STABLE FLOW	(FT)	0.1	--	--
MINIMUM REQUIRED FREEBOARD[4]	(FT)	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING[5] PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)		V	V	V

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns. ECM linings were designed with SC150BN lining.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

STANDARD E&S WORKSHEET # 11
Channel Design Data

PROJECT NAME: Leidy South-Hensel Replacement Eastern Terminus Main Line Valve and Access Road

Prepared by: FJ, 8/2019

LOCATION: Chapman Township, Clinton County, PA

Checked by: KCC, 8/2019

CHANNEL OR CHANNEL SECTION		HR-28	HR-28	HR-29	HR-29
TEMPORARY OR PERMANENT?	(T OR P)	P	P	P	P
DESIGN STORM	(2, 5, OR 10 YR)	10 yr	10 yr	10 yr	10 yr
ACRES	(AC)	0.862	0.862	0.441	0.441
MULTIPLIER	(1.6, 2.25, or 2.75)[1]	N/A	N/A	N/A	N/A
Q_r (REQUIRED CAPACITY)	(CFS)	0.75	0.75	0.89	0.89
Q (CALCULATED AT FLOW DEPTH d)	(CFS)	1.1	1.5	1.9	2.1
PROTECTIVE LINING[2]		ECM (SC250)	Vegetated ECM	ECM (SC250)	Vegetated ECM
n (MANNING'S COEFFICIENT)[2]		0.04	0.06	0.04	0.06
V_a (ALLOWABLE VELOCITY)	(FPS)	9.5	15	9.5	15
V (CALCULATED AT FLOW DEPTH d)	(FPS)	2.2	1.9	2.4	1.9
τ_a (MAX ALLOWABLE SHEAR STRESS)	(LB/FT^2)	2.5	8	2.5	8
τ_d (CALC'D SHEAR STRESS AT FLOW DEPTH d)	(LB/FT^2)	0.5	0.7	0.6	0.7
CHANNEL BOTTOM WIDTH	(FT)	2	2	2	2
CHANNEL SIDE SLOPES	(H:V)	2	2	2	2
D (TOTAL DEPTH)	(FT)	0.75	1.00	1.00	1.00
CHANNEL TOP WIDTH @ D	(FT)	5	6	6	6
d (CALCULATED FLOW DEPTH)	(FT)	0.2	0.3	0.3	0.4
CHANNEL TOP WIDTH @ FLOW DEPTH d	(FT)	2.8	3.2	3.2	3.6
BOTTOM WIDTH: FLOW DEPTH RATIO	(12:1 MAX)	10	6.67	6.67	5
d_{50} STONE SIZE	(IN)	N/A	N/A	N/A	N/A
A (CROSS-SECTIONAL AREA)	(SQ. FT.)	0.48	0.78	0.78	1.12
R (HYDRAULIC RADIUS)		0.166	0.233	0.233	0.296
S (BED SLOPE)[3]	(FT/FT)	0.04	0.04	0.03	0.03
S_c (CRITICAL SLOPE)	(FT/FT)	0.044	0.089	0.039	0.083
$.7S_c$	(FT/FT)	0.0308	0.0623	0.0273	0.0581
$1.3S_c$	(FT/FT)	0.0572	0.1157	0.0507	0.1079
STABLE FLOW?	(Y/N)	N	Y	N	Y
FREEBOARD BASED ON UNSTABLE FLOW	(FT)	0.05	N/A	0.075	N/A
FREEBOARD BASED ON STABLE FLOW	(FT)	N/A	0.075	N/A	0.1
MINIMUM REQUIRED FREEBOARD[4]	(FT)	0.5	0.5	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING[5] PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)		V	V	V	V

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

CHANNEL OR CHANNEL SECTION		HR-30	HR-30
TEMPORARY OR PERMANENT?	(T OR P)	P	P
DESIGN STORM	(2, 5, OR 10 YR)	10 yr	10 yr
ACRES	(AC)	0.138	0.138
MULTIPLIER	(1.6, 2.25, or 2.75)[1]	N/A	N/A
Q_r (REQUIRED CAPACITY)	(CFS)	0.67	0.67
Q (CALCULATED AT FLOW DEPTH d)	(CFS)	2.2	1.5
PROTECTIVE LINING[2]		ECM (SC250)	Vegetated ECM
n (MANNING'S COEFFICIENT)[2]		0.04	0.06
V_a (ALLOWABLE VELOCITY)	(FPS)	9.5	15
V (CALCULATED AT FLOW DEPTH d)	(FPS)	2.8	1.9
τ_a (MAX ALLOWABLE SHEAR STRESS)	(LB/FT^2)	2.5	8
τ_d (CALC'D SHEAR STRESS AT FLOW DEPTH d)	(LB/FT^2)	0.7	0.7
CHANNEL BOTTOM WIDTH	(FT)	2	2
CHANNEL SIDE SLOPES	(H:V)	2	2
D (TOTAL DEPTH)	(FT)	1	1.00
CHANNEL TOP WIDTH @ D	(FT)	6	6
d (CALCULATED FLOW DEPTH)	(FT)	0.3	0.3
CHANNEL TOP WIDTH @ FLOW DEPTH d	(FT)	3.2	3.2
BOTTOM WIDTH: FLOW DEPTH RATIO	(12:1 MAX)	6.67	6.67
d_{50} STONE SIZE	(IN)	N/A	N/A
A (CROSS-SECTIONAL AREA)	(SQ. FT.)	0.78	0.78
R (HYDRAULIC RADIUS)		0.233	0.233
S (BED SLOPE)[3]	(FT/FT)	0.04	0.04
S_c (CRITICAL SLOPE)	(FT/FT)	0.039	0.089
$.7S_c$	(FT/FT)	0.0273	0.0623
$1.3S_c$	(FT/FT)	0.0507	0.1157
STABLE FLOW?	(Y/N)	N	Y
FREEBOARD BASED ON UNSTABLE FLOW	(FT)	0.075	N/A
FREEBOARD BASED ON STABLE FLOW	(FT)	N/A	0.075
MINIMUM REQUIRED FREEBOARD[4]	(FT)	0.5	0.5
DESIGN METHOD FOR PROTECTIVE LINING [5] PERMISSIBLE VELOCITY (V) OR SHEAR STRESS (S)		V	V

1. Use 1.6 for Temporary Channels; 2.25 for Temporary Channels in Special Protection (HQ or EV) Watersheds; 2.75 for Permanent Channels. For Rational Method, enter "N/A" and attach E&S Worksheets 9 and 10. For TR-55 enter "N/A" and attach appropriate Worksheets.
2. Adjust "n" value for changes in channel liner and flow depth. For vegetated channels, provide data for manufactured linings without vegetation and with vegetation in separate columns.
3. Slopes may not be averaged.
4. Minimum Freeboard is 0.5 ft. or ¼ Total Channel Depth, whichever is greater
5. Permissible velocity lining design method is not acceptable for channels with a bed slope of 10% or greater. Shear stress lining design method is required for channels with a bed slope of 10% or greater. Shear stress lining design method may be used for any channel bed slope.

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HYDROCAD CHANNEL PEAK FLOW CALCULATIONS

Summary for Subcatchment 1S: DA-H1-1

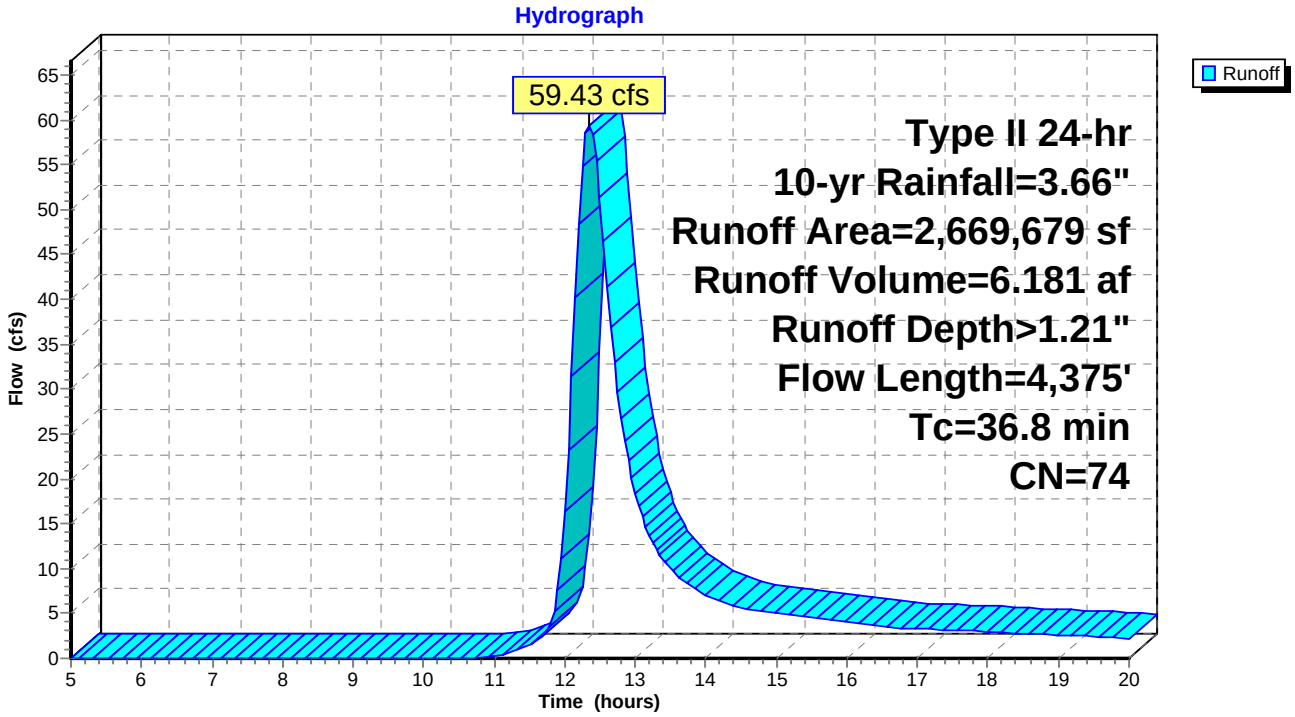
Runoff = 59.43 cfs @ 12.35 hrs, Volume= 6.181 af, Depth> 1.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

Area (sf)	CN	Description
2,012,695	79	Woods, Fair, HSG D
656,984	60	Woods, Fair, HSG B
2,669,679	74	Weighted Average
2,669,679		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	100	0.0520	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
20.5	4,275	0.4830	3.47		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
36.8	4,375	Total			

Subcatchment 1S: DA-H1-1



Summary for Subcatchment 2S: DA-H1-2

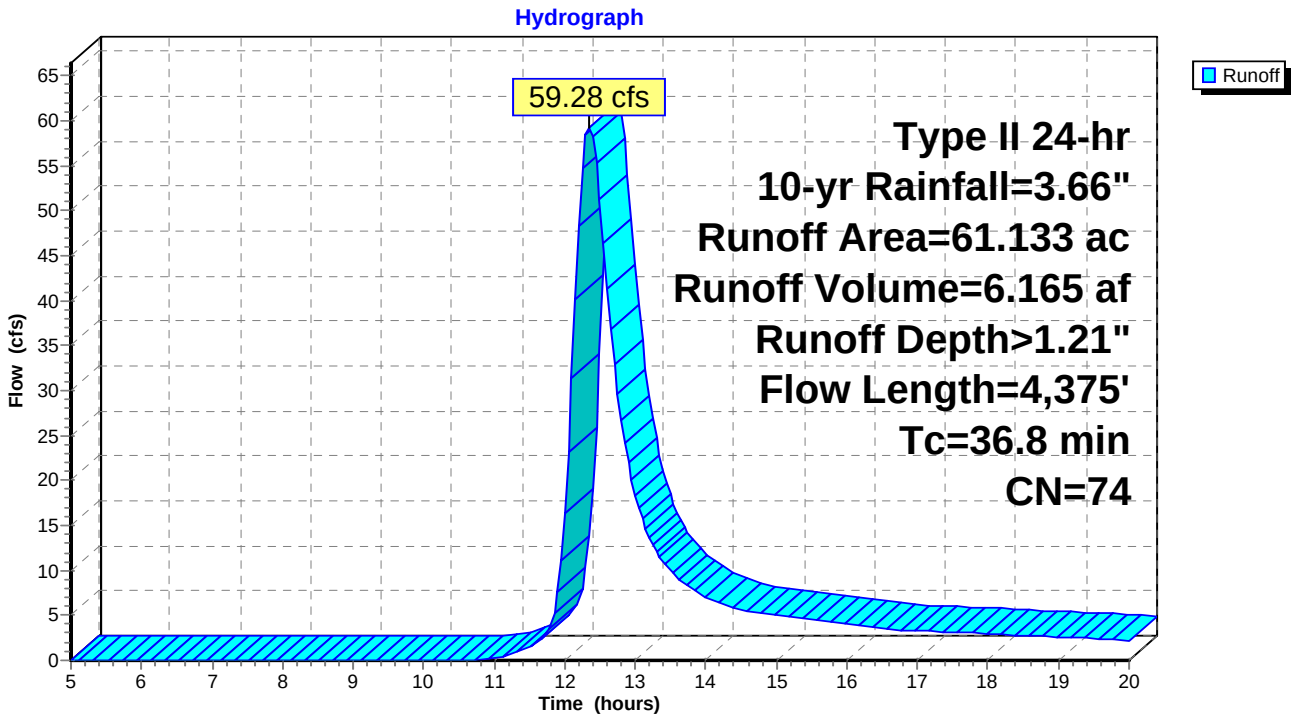
Runoff = 59.28 cfs @ 12.35 hrs, Volume= 6.165 af, Depth> 1.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

Area (ac)	CN	Description
45.221	79	Woods, Fair, HSG D
15.912	60	Woods, Fair, HSG B
61.133	74	Weighted Average
61.133		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	100	0.0520	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
20.5	4,275	0.4830	3.47		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
36.8	4,375	Total			

Subcatchment 2S: DA-H1-2



Summary for Subcatchment H2: DA-H2

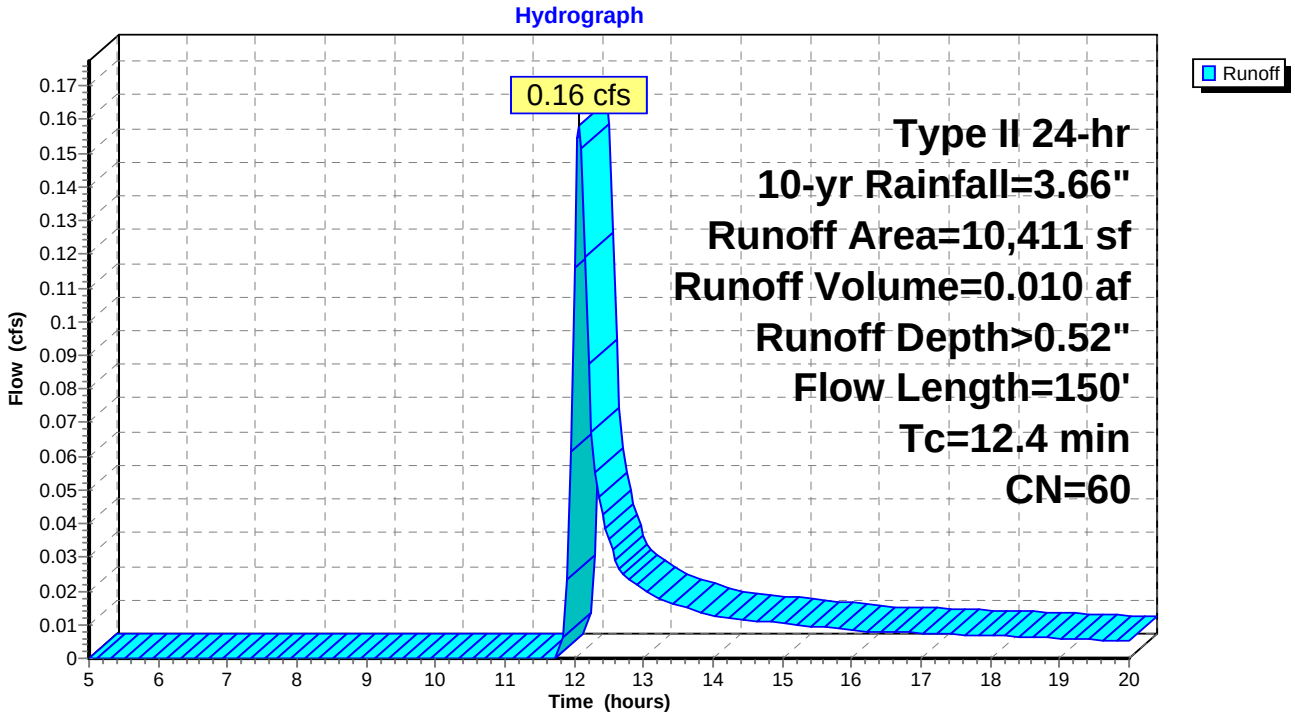
Runoff = 0.16 cfs @ 12.07 hrs, Volume= 0.010 af, Depth> 0.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

Area (sf)	CN	Description
10,411	60	Woods, Fair, HSG B
10,411		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.1200	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
0.7	50	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.4	150	Total			

Subcatchment H2: DA-H2



Summary for Subcatchment 7S: DA-H3-1

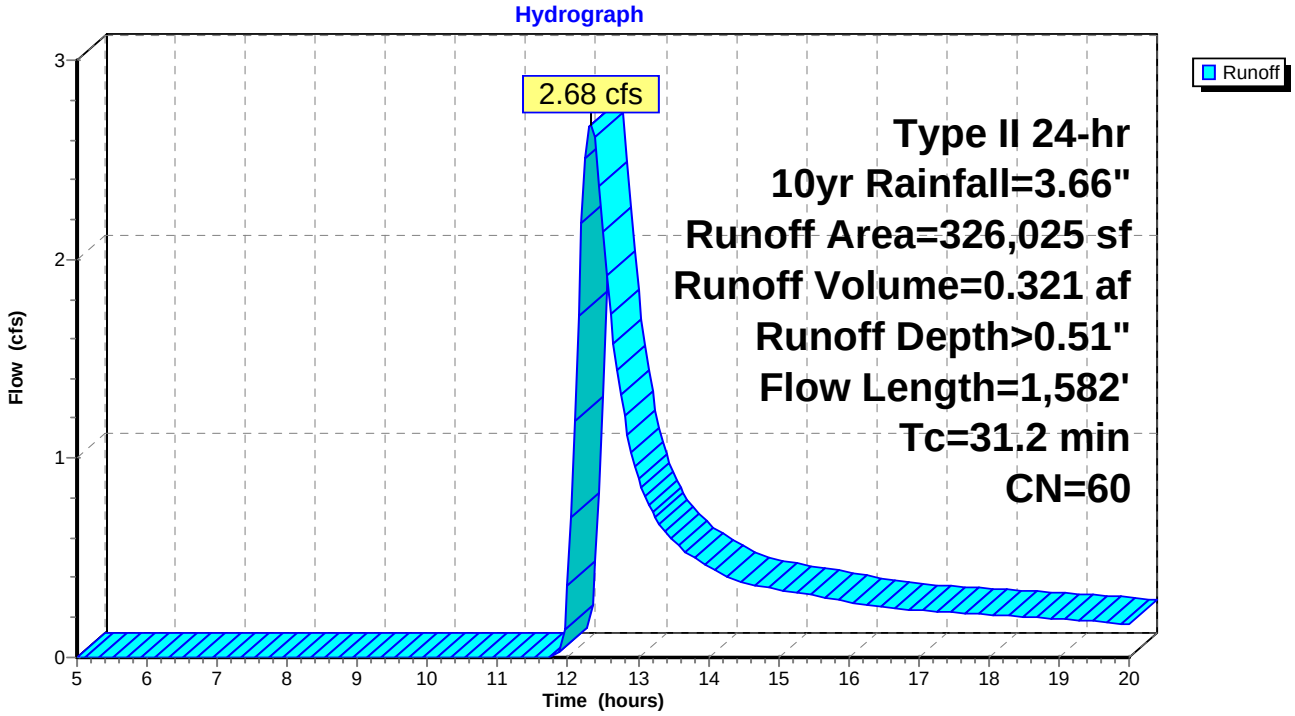
Runoff = 2.68 cfs @ 12.33 hrs, Volume= 0.321 af, Depth> 0.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=3.66"

Area (sf)	CN	Description
318,730	60	Woods, Fair, HSG B
7,295	79	Woods, Fair, HSG D
326,025	60	Weighted Average
326,025		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	100	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
7.8	633	0.0727	1.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.9	309	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.8	540	0.0704	1.33		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
31.2	1,582	Total			

Subcatchment 7S: DA-H3-1



Summary for Subcatchment 8S: DA-H3-2

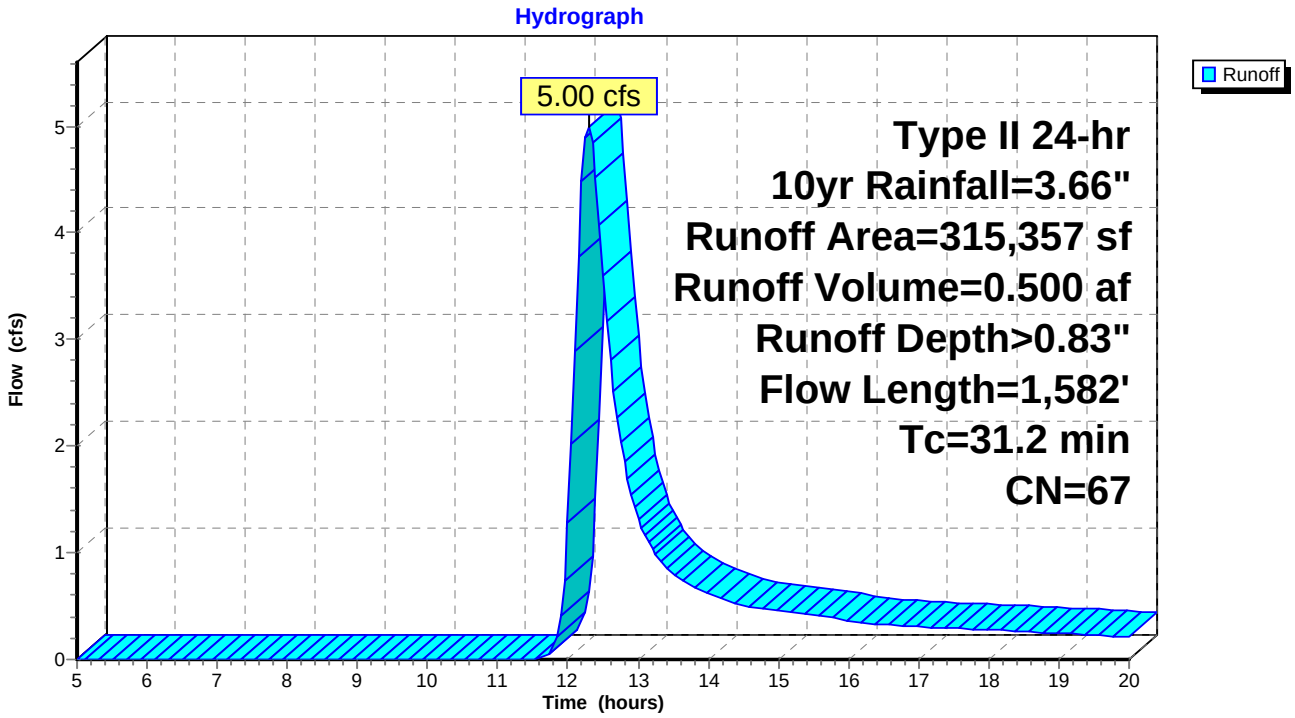
Runoff = 5.00 cfs @ 12.29 hrs, Volume= 0.500 af, Depth> 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=3.66"

Area (sf)	CN	Description
205,341	60	Woods, Fair, HSG B
110,016	79	Woods, Fair, HSG D
315,357	67	Weighted Average
315,357		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	100	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
7.8	633	0.0727	1.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.9	309	0.1300	1.80		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.8	540	0.0704	1.33		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
31.2	1,582	Total			

Subcatchment 8S: DA-H3-2



Summary for Subcatchment H4: DA-H4

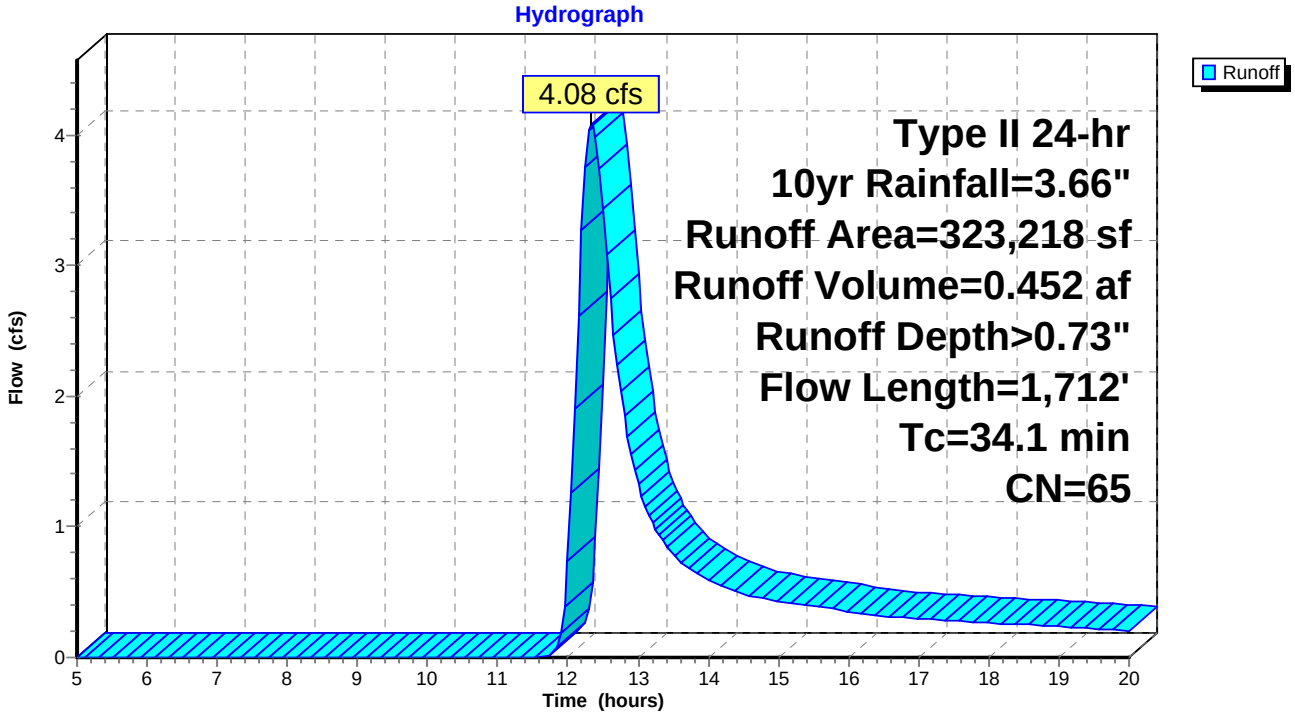
Runoff = 4.08 cfs @ 12.34 hrs, Volume= 0.452 af, Depth> 0.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=3.66"

Area (sf)	CN	Description
233,198	60	Woods, Fair, HSG B
90,020	79	Woods, Fair, HSG D
323,218	65	Weighted Average
323,218		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	100	0.0700	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
6.2	471	0.0637	1.26		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.4	344	0.1160	1.70		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
10.0	797	0.0703	1.33		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
34.1	1,712	Total			

Subcatchment H4: DA-H4



Summary for Subcatchment 2S: DA-H5-1

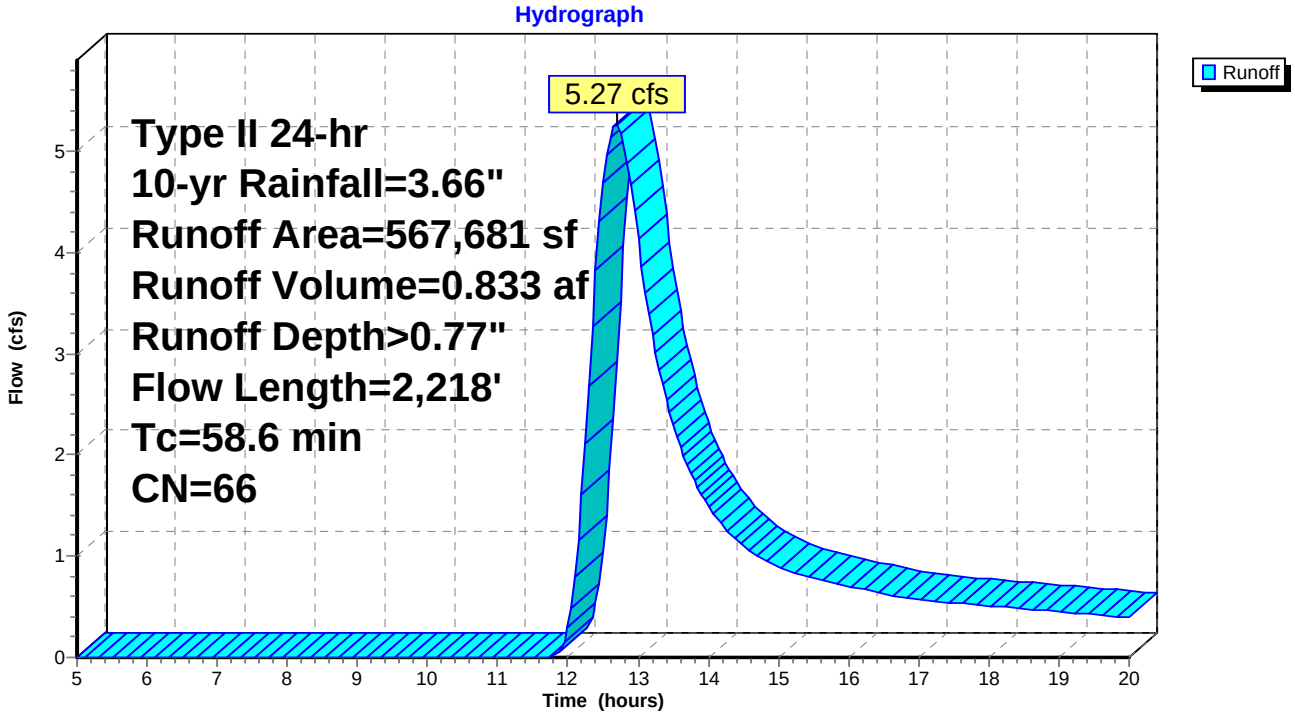
Runoff = 5.27 cfs @ 12.69 hrs, Volume= 0.833 af, Depth> 0.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

Area (sf)	CN	Description
398,465	60	Woods, Fair, HSG B
169,216	79	Woods, Fair, HSG D
567,681	66	Weighted Average
567,681		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.6	100	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
23.2	1,745	0.0630	1.25		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.8	373	0.1070	1.64		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
58.6	2,218	Total			

Subcatchment 2S: DA-H5-1



Summary for Subcatchment 3S: DA-H5-2

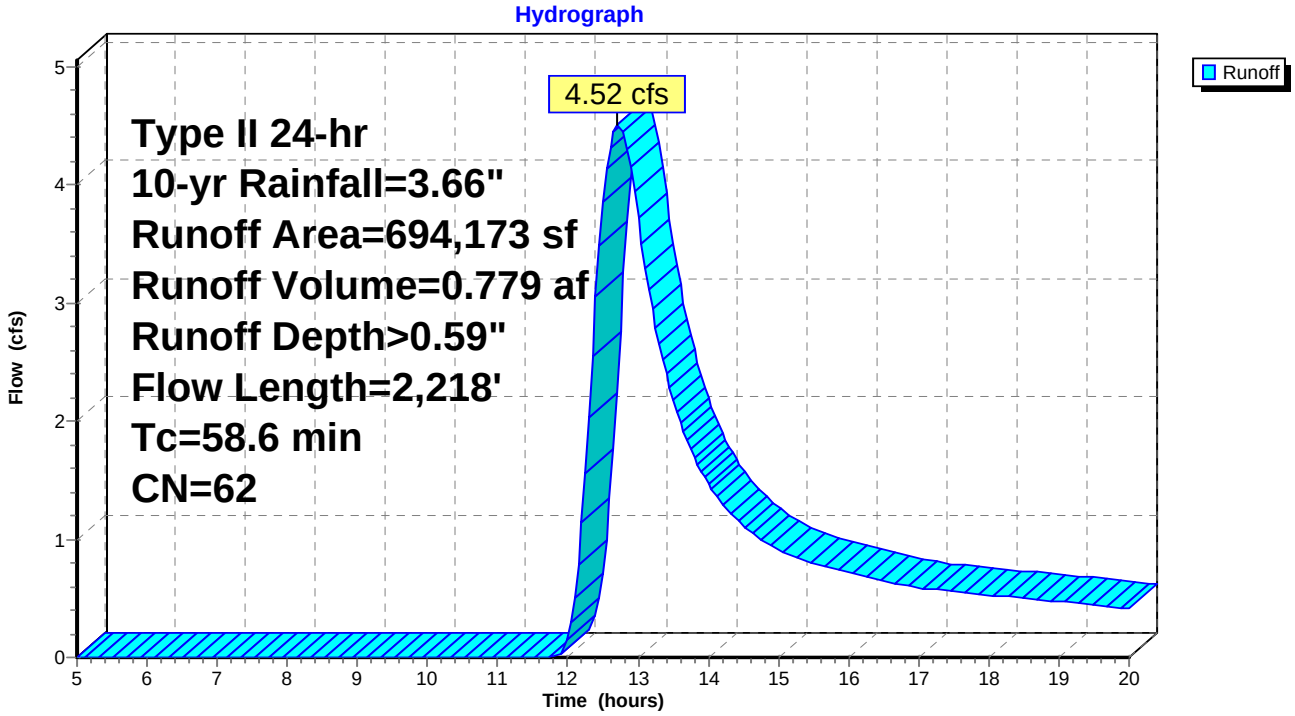
Runoff = 4.52 cfs @ 12.71 hrs, Volume= 0.779 af, Depth> 0.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

Area (sf)	CN	Description
610,610	60	Woods, Fair, HSG B
83,563	79	Woods, Fair, HSG D
694,173	62	Weighted Average
694,173		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.6	100	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
23.2	1,745	0.0630	1.25		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.8	373	0.1070	1.64		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
58.6	2,218	Total			

Subcatchment 3S: DA-H5-2



Summary for Subcatchment H6: DA-H6

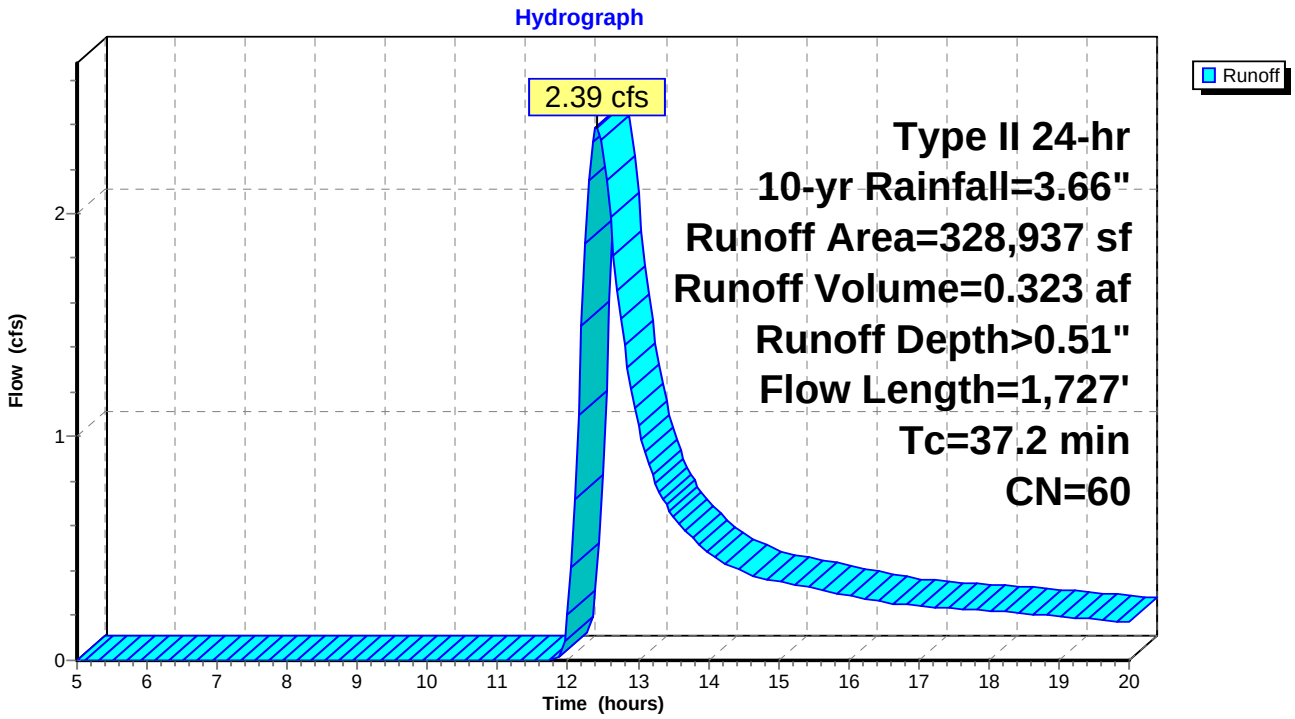
Runoff = 2.39 cfs @ 12.42 hrs, Volume= 0.323 af, Depth> 0.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

Area (sf)	CN	Description
328,937	60	Woods, Fair, HSG B
328,937		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.6	100	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
18.2	1,369	0.0628	1.25		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.4	258	0.1320	1.82		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
37.2	1,727	Total			

Subcatchment H6: DA-H6



Summary for Subcatchment H7: DA-H7

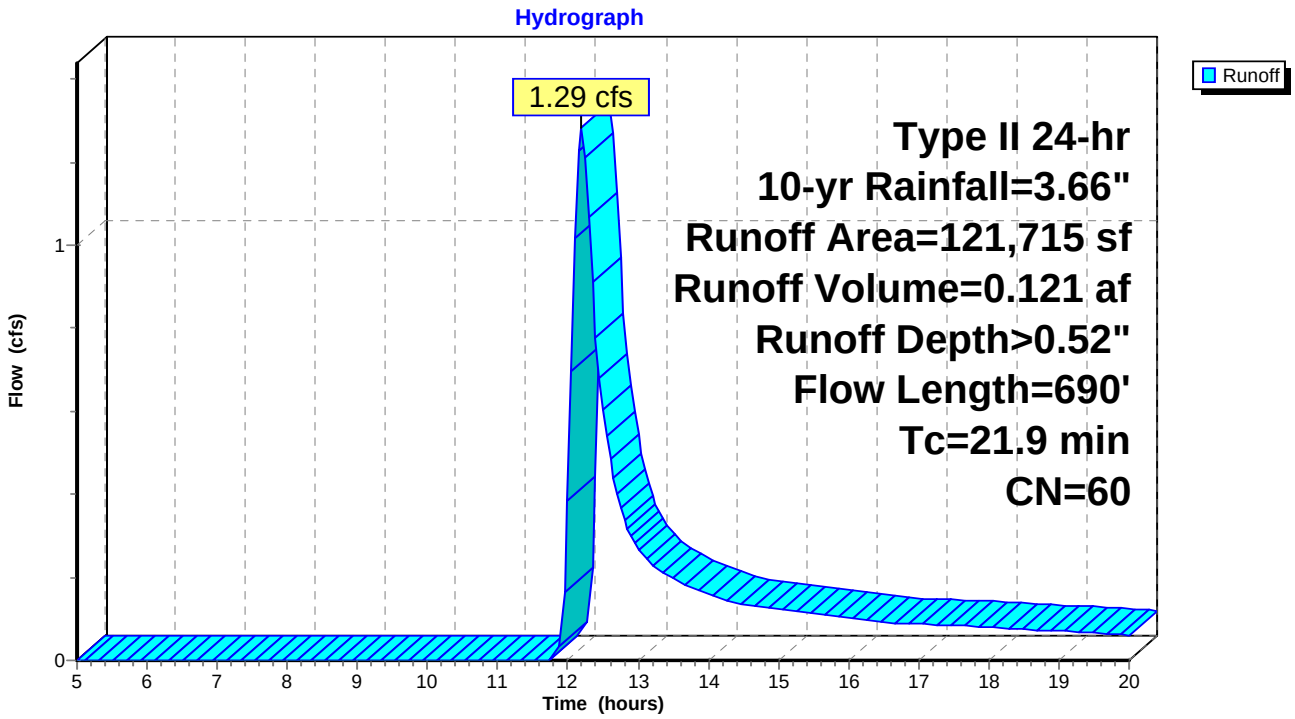
Runoff = 1.29 cfs @ 12.20 hrs, Volume= 0.121 af, Depth> 0.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

Area (sf)	CN	Description
121,715	60	Woods, Fair, HSG B
121,715		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0600	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
5.4	445	0.0764	1.38		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.1	145	0.1790	2.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
21.9	690	Total			

Subcatchment H7: DA-H7



Summary for Subcatchment H8: DA-H8

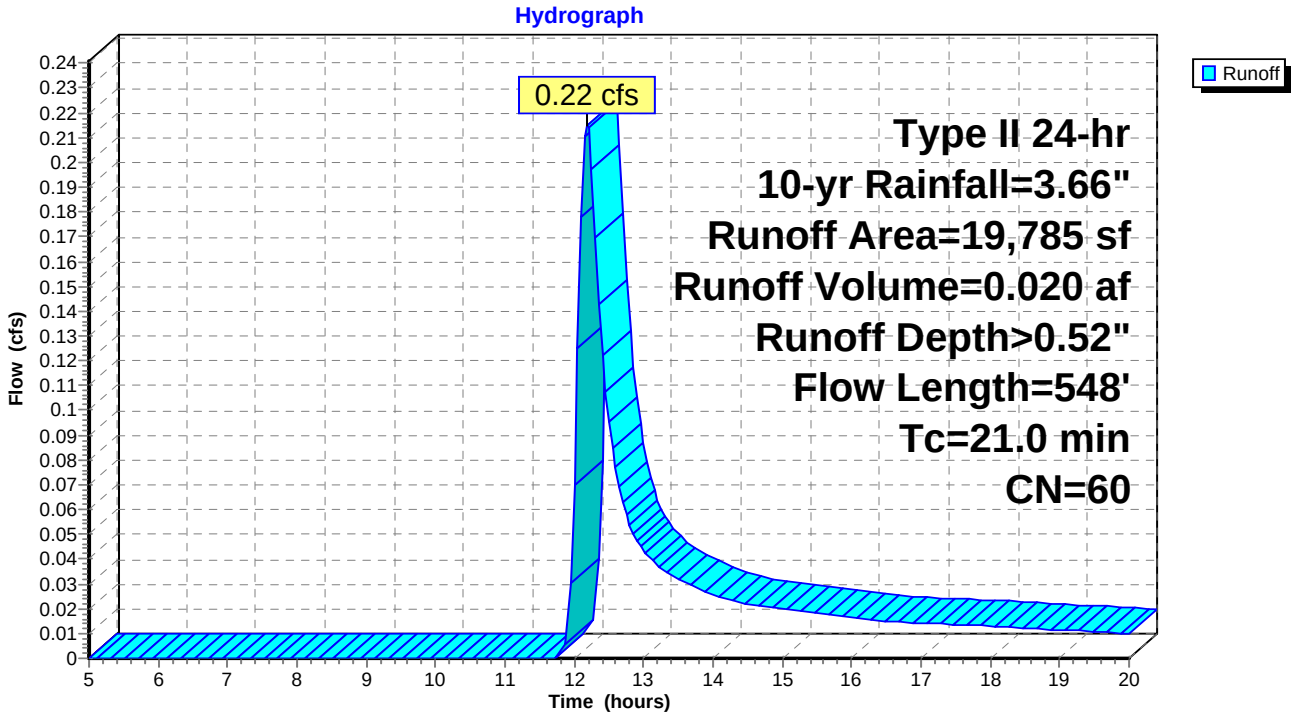
Runoff = 0.22 cfs @ 12.18 hrs, Volume= 0.020 af, Depth> 0.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

Area (sf)	CN	Description
19,785	60	Woods, Fair, HSG B
19,785		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.6	100	0.0500	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
4.4	448	0.1160	1.70		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
21.0	548	Total			

Subcatchment H8: DA-H8



Summary for Subcatchment H9: DA-H9

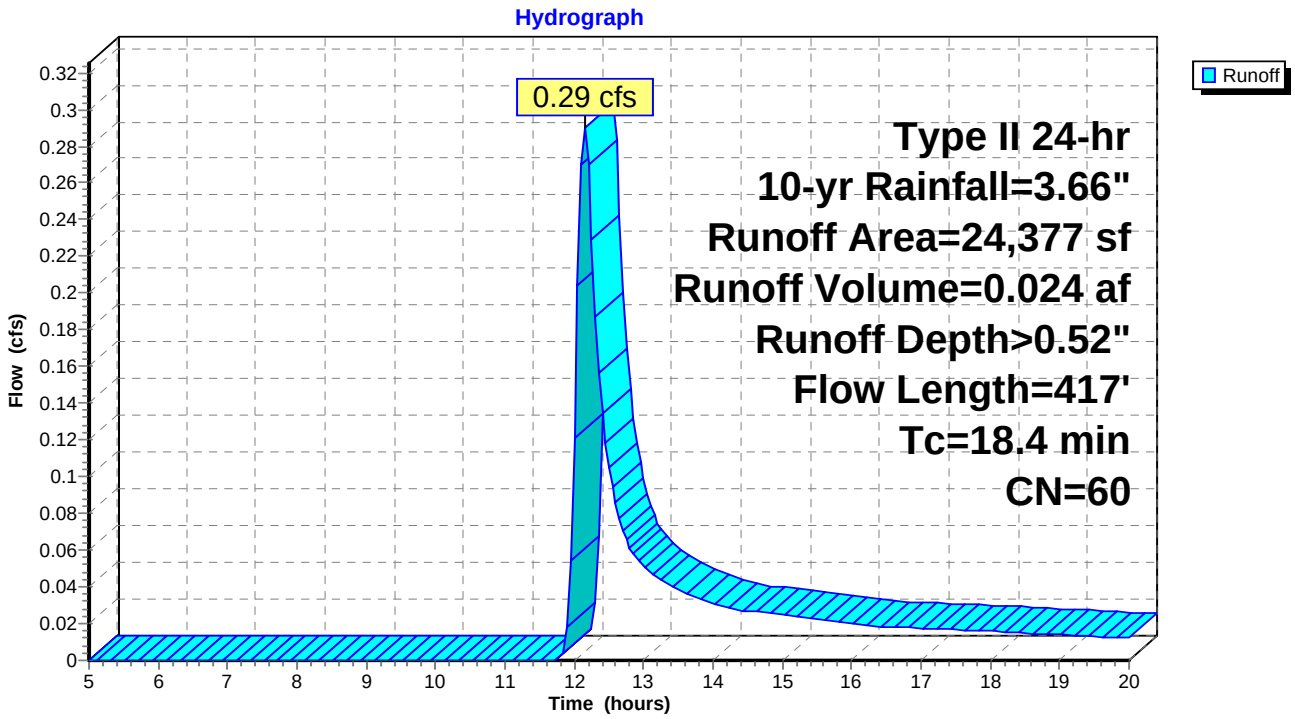
Runoff = 0.29 cfs @ 12.15 hrs, Volume= 0.024 af, Depth> 0.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

Area (sf)	CN	Description
24,377	60	Woods, Fair, HSG B
24,377		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0600	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
2.8	286	0.1190	1.72		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	31	0.3870	3.11		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.4	417	Total			

Subcatchment H9: DA-H9



Summary for Subcatchment H10: DA-H10

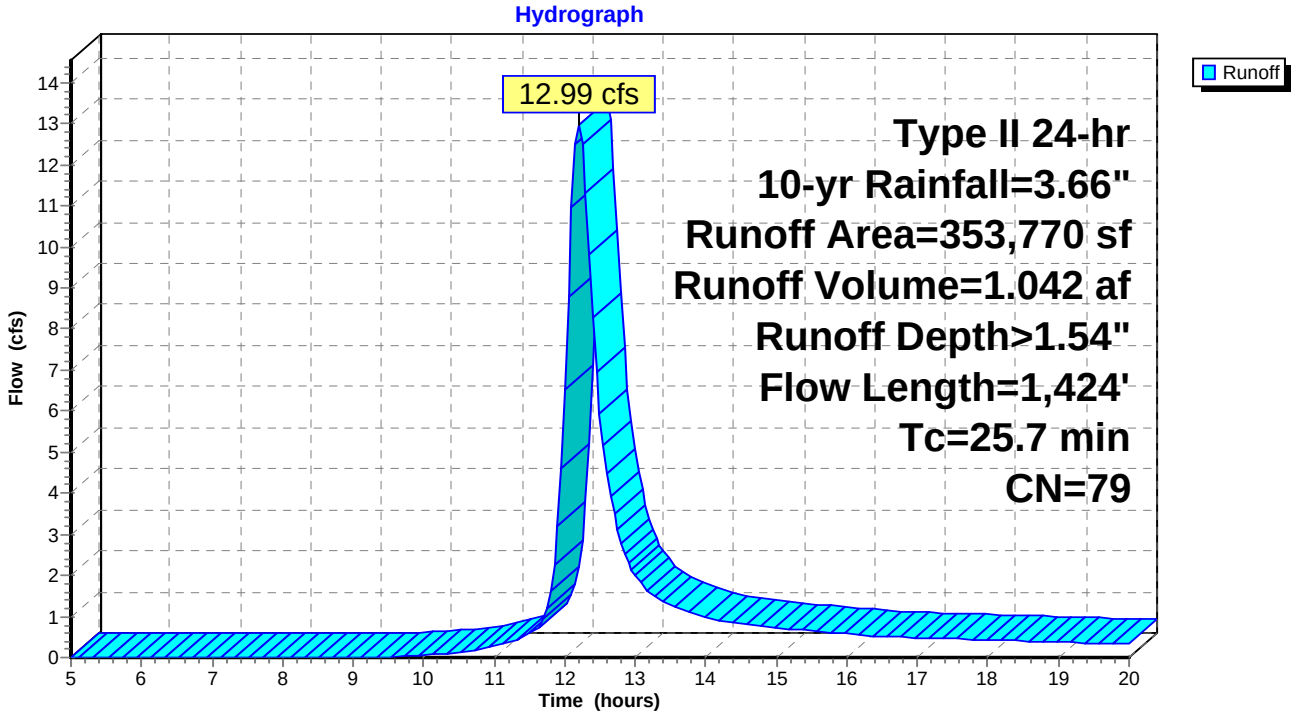
Runoff = 12.99 cfs @ 12.20 hrs, Volume= 1.042 af, Depth> 1.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

Area (sf)	CN	Description
353,770	79	Woods, Fair, HSG D
353,770		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0600	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
3.9	417	0.1250	1.77		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.9	117	0.1710	2.07		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.6	107	0.3740	3.06		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.8	435	0.1430	1.89		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.1	248	0.5650	3.76		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
25.7	1,424	Total			

Subcatchment H10: DA-H10



Summary for Subcatchment H11: DA-H11

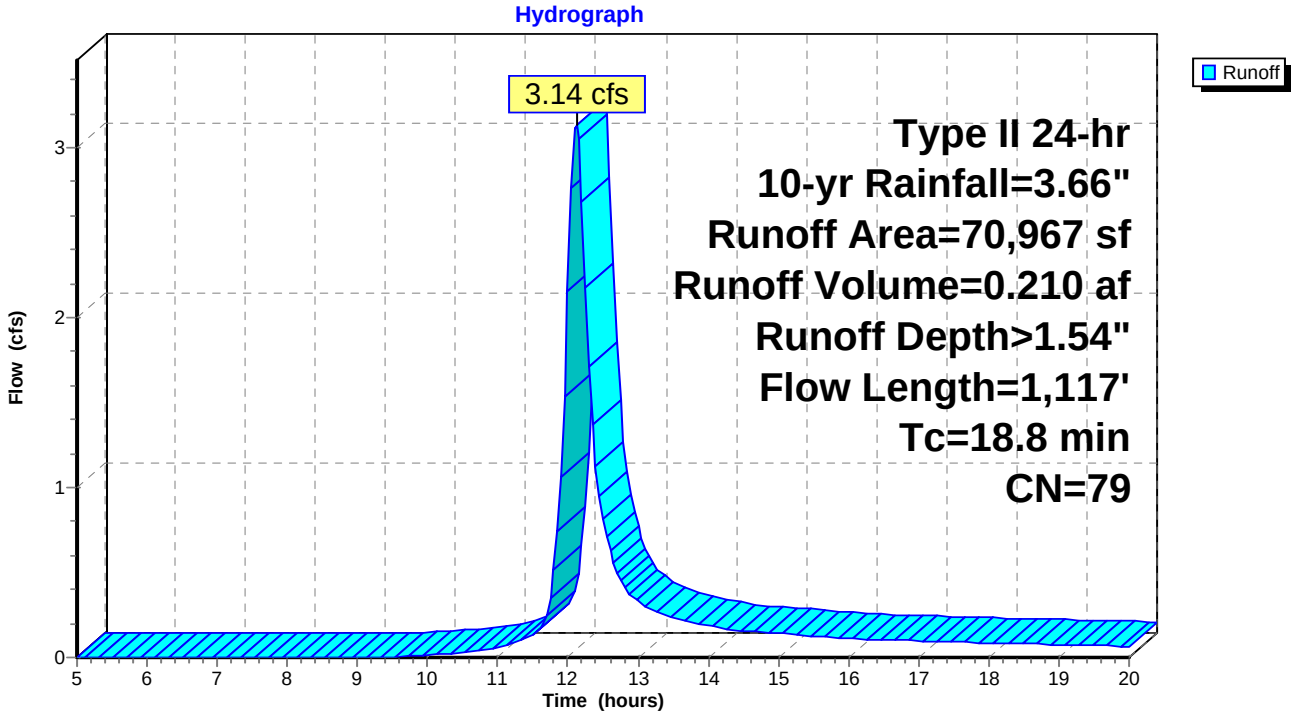
Runoff = 3.14 cfs @ 12.12 hrs, Volume= 0.210 af, Depth> 1.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

Area (sf)	CN	Description
70,967	79	Woods, Fair, HSG D
70,967		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.1200	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
1.0	122	0.1800	2.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	167	0.2990	2.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.0	466	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.1	262	0.5880	3.83		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
18.8	1,117	Total			

Subcatchment H11: DA-H11



Summary for Subcatchment H12: DA-H12

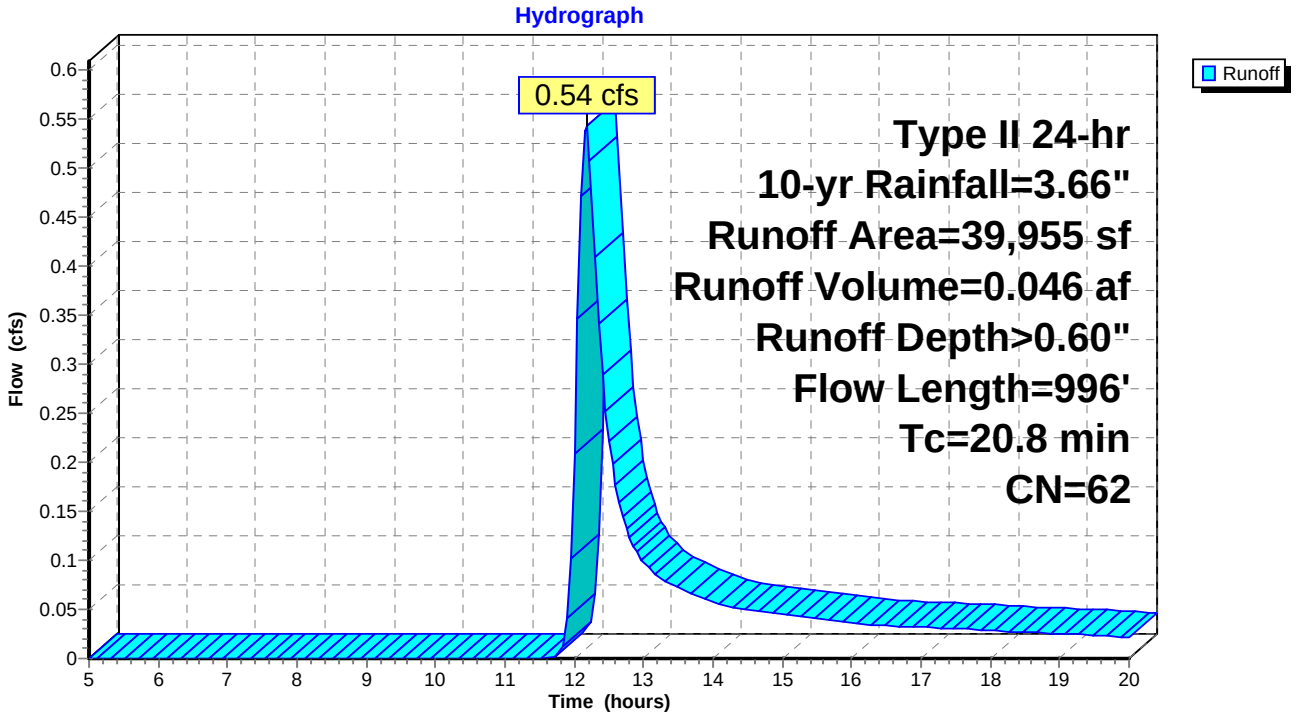
Runoff = 0.54 cfs @ 12.17 hrs, Volume= 0.046 af, Depth> 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

	Area (sf)	CN	Description
*	34,169	60	Woods, Fair, HSG B (*HSG A")
	1,501	60	Woods, Fair, HSG B
	4,285	79	Woods, Fair, HSG D
	39,955	62	Weighted Average
	39,955		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0640	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
2.1	270	0.1770	2.10		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.9	162	0.0830	1.44		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	141	0.3150	2.81		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	323	0.0880	5.46	2.73	**Channel Flow,** Area= 0.5 sf Perim= 2.9' r= 0.17' n= 0.025
20.8	996	Total			

Subcatchment H12: DA-H12



Summary for Subcatchment H13: DA-H13

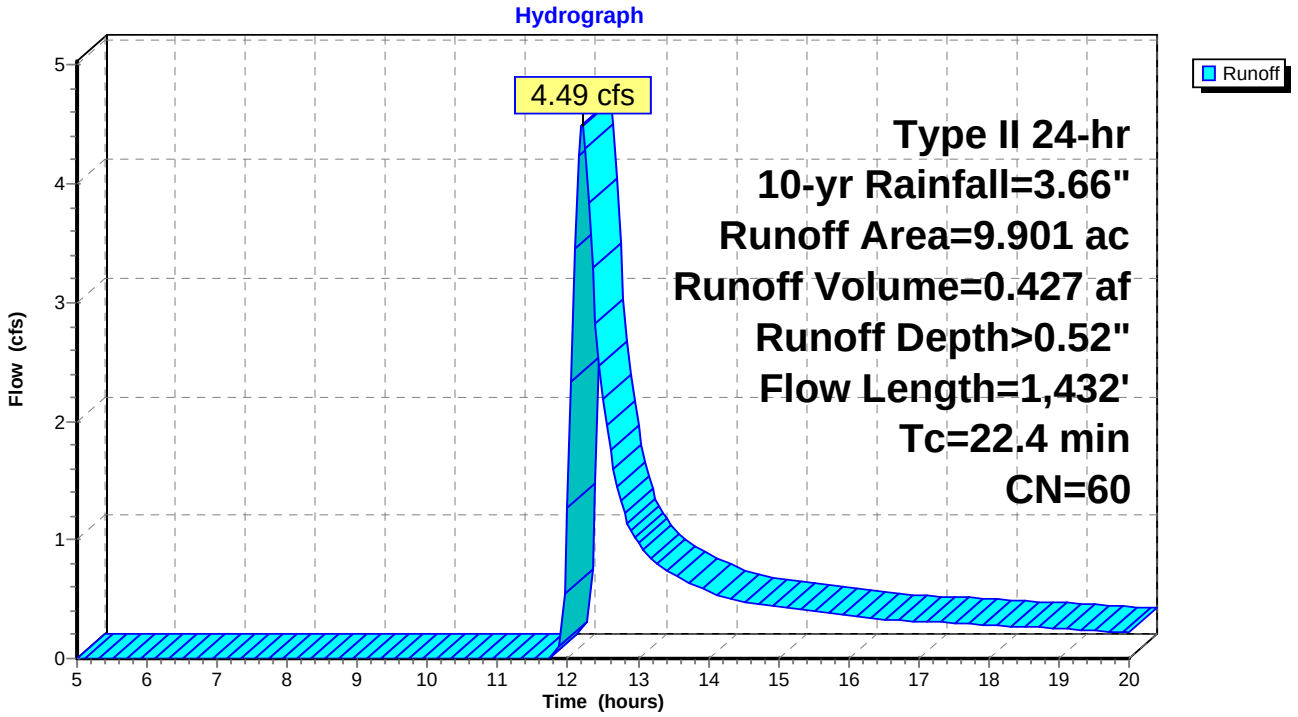
Runoff = 4.49 cfs @ 12.20 hrs, Volume= 0.427 af, Depth> 0.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

	Area (ac)	CN	Description
	0.197	79	Woods, Fair, HSG D
	1.947	60	Woods, Fair, HSG B
*	7.757	60	Woods, Fair, HSG B ("HSG A")
	9.901	60	Weighted Average
	9.901		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0	100	0.0640	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
2.1	270	0.1770	2.10		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.9	162	0.0830	1.44		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	141	0.3150	2.81		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.6	759	0.0260	4.82	7.24	**Channel Flow,** Area= 1.5 sf Perim= 4.2' r= 0.36' n= 0.025
22.4	1,432	Total			

Subcatchment H13: DA-H13



Summary for Subcatchment H14: DA-H14

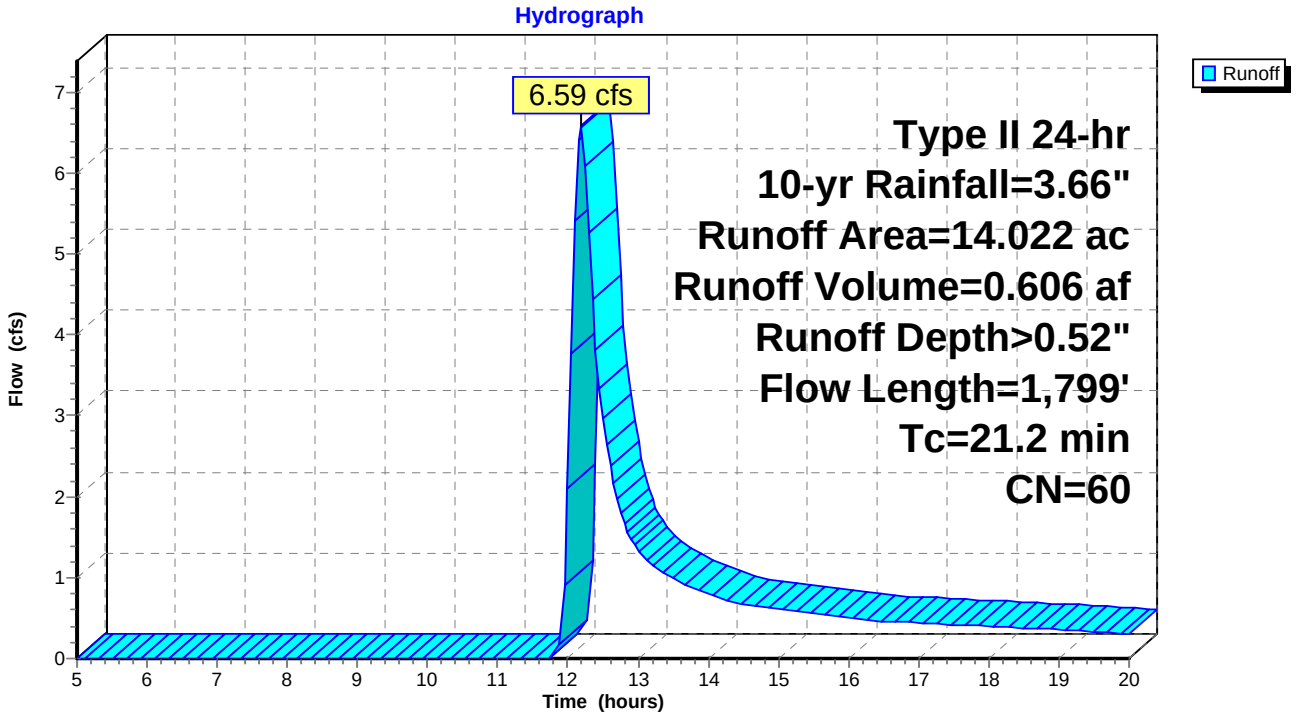
Runoff = 6.59 cfs @ 12.19 hrs, Volume= 0.606 af, Depth> 0.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

	Area (ac)	CN	Description
	3.302	60	Woods, Fair, HSG B
*	10.720	60	Woods, Fair, HSG B ("HSG A")
	14.022	60	Weighted Average
	14.022		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	100	0.1200	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
1.0	122	0.1800	2.12		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.0	167	0.2990	2.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.0	466	0.1500	1.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.1	262	0.5880	3.83		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.4	682	0.0250	4.73	7.10	**Channel Flow,** Area= 1.5 sf Perim= 4.2' r= 0.36' n= 0.025
21.2	1,799	Total			

Subcatchment H14: DA-H14



Summary for Subcatchment H15: DA-H15

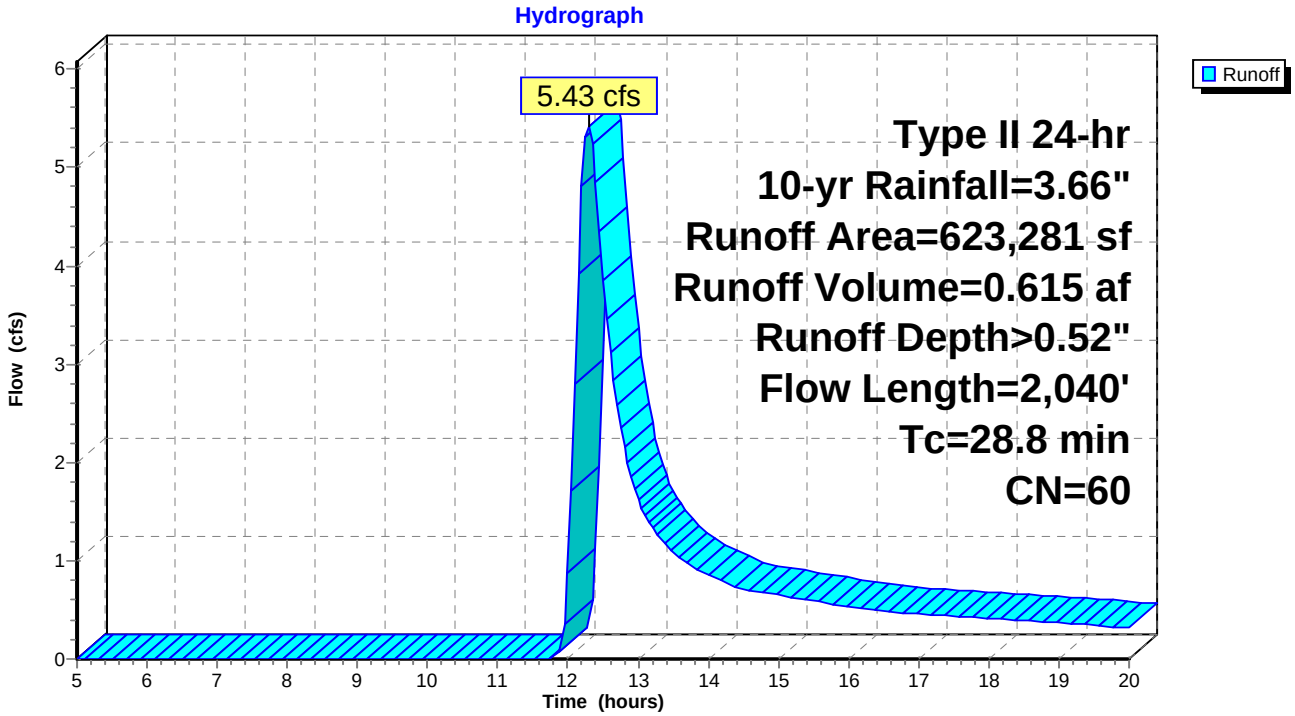
Runoff = 5.43 cfs @ 12.29 hrs, Volume= 0.615 af, Depth> 0.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

	Area (sf)	CN	Description
*	536,021	60	Woods, Fair, HSG B (*HSG A")
	82,354	60	Woods, Fair, HSG B
	4,906	79	Woods, Fair, HSG D
	623,281	60	Weighted Average
	623,281		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.3	100	0.0520	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
5.3	455	0.0831	1.44		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.3	698	0.2890	2.69		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.9	787	0.0490	4.60	6.90	**Channel Flow,** Area= 1.5 sf Perim= 4.2' r= 0.36' n= 0.036
28.8	2,040	Total			

Subcatchment H15: DA-H15



Summary for Subcatchment H16-1: DA-H16-1

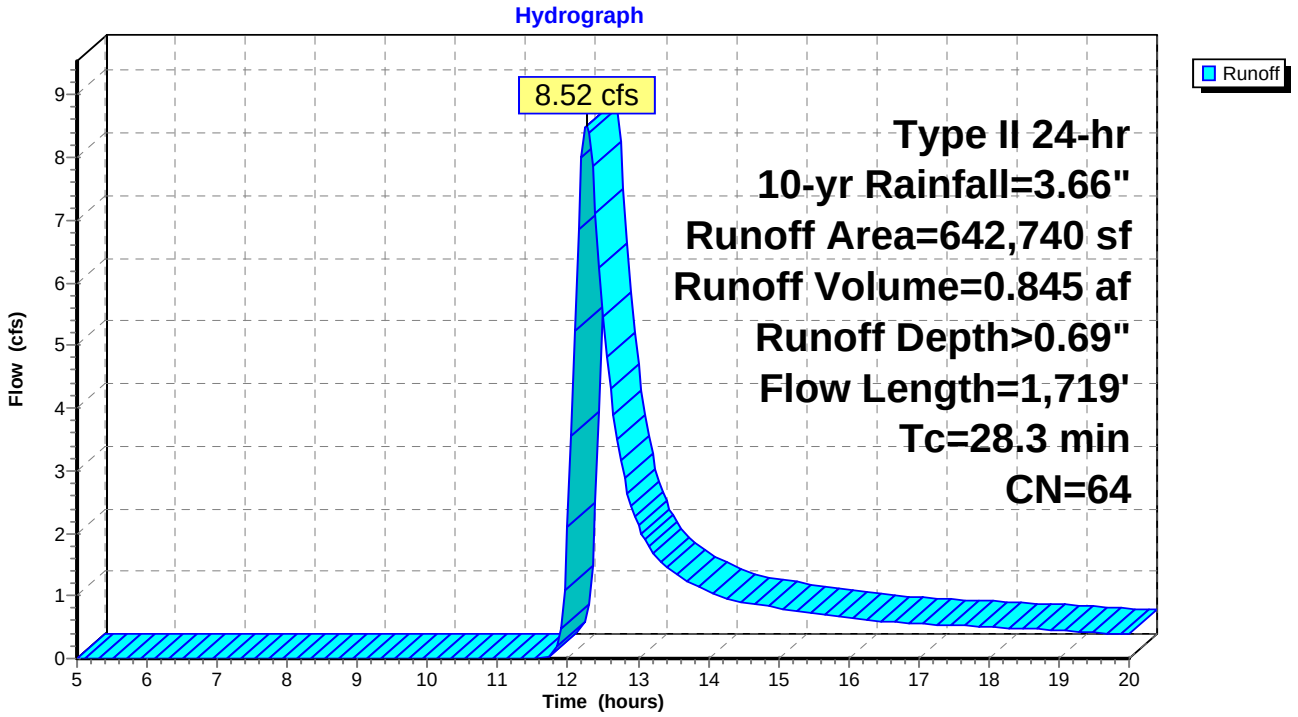
Runoff = 8.52 cfs @ 12.27 hrs, Volume= 0.845 af, Depth> 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

	Area (sf)	CN	Description
	132,467	79	Woods, Fair, HSG D
	255,070	60	Woods, Fair, HSG B
*	255,203	60	Woods, Fair, HSG B ("HSG A")
	642,740	64	Weighted Average
	642,740		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	100	0.0440	0.10		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
1.4	117	0.0829	1.44		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.8	252	0.2220	2.36		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.2	263	0.0745	1.36		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.0	544	0.3760	3.07		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	443	0.0160	4.95	15.35	**Channel Flow,** Area= 3.1 sf Perim= 5.8' r= 0.53' n= 0.025
28.3	1,719	Total			

Subcatchment H16-1: DA-H16-1



Summary for Subcatchment H16-2: DA-H16-2

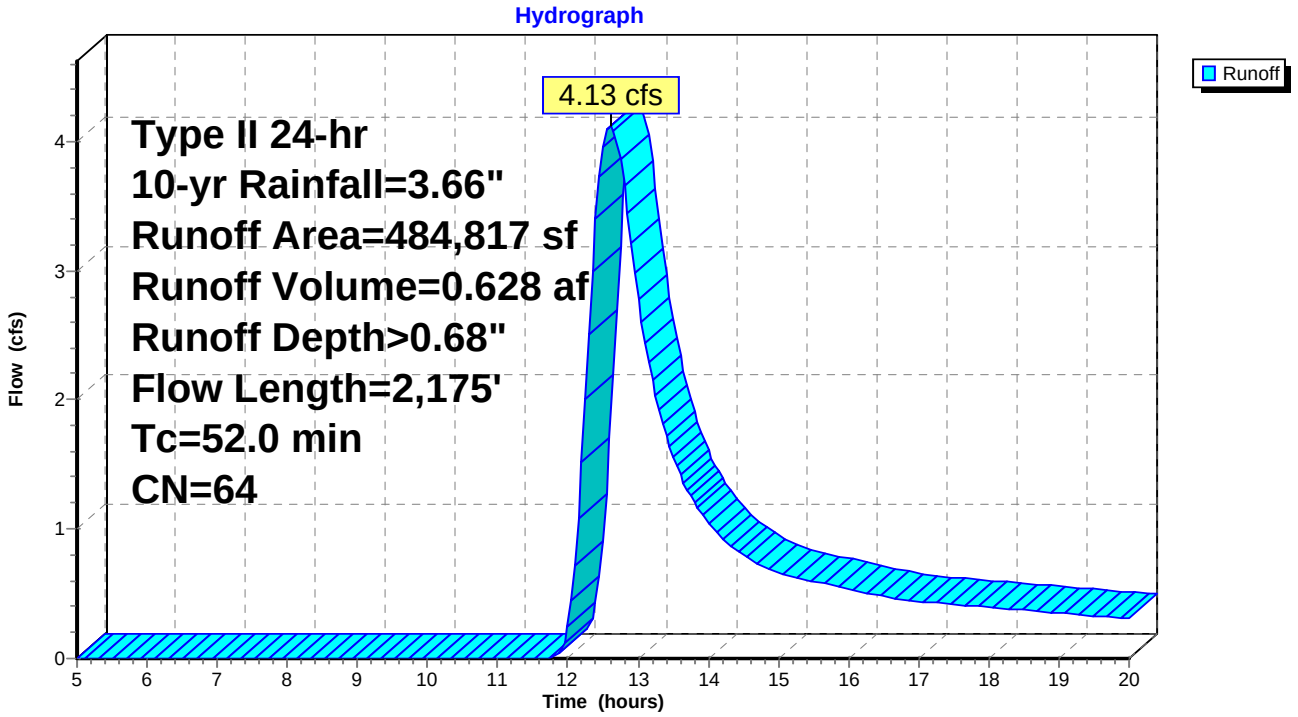
Runoff = 4.13 cfs @ 12.61 hrs, Volume= 0.628 af, Depth> 0.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

	Area (sf)	CN	Description
	94,092	79	Woods, Fair, HSG D
	30,009	60	Woods, Fair, HSG B
*	360,716	60	Woods, Fair, HSG B ("HSG A")
	484,817	64	Weighted Average
	484,817		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.6	100	0.0100	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
6.7	360	0.0320	0.89		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.7	230	0.0810	1.42		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.4	230	0.3000	2.74		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.7	176	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.8	1,066	0.2100	2.29		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.1	13	0.0092	3.75	11.64	**Channel Flow,** Area= 3.1 sf Perim= 5.8' r= 0.53' n= 0.025
52.0	2,175	Total			

Subcatchment H16-2: DA-H16-2



Summary for Subcatchment H17: DA-H17

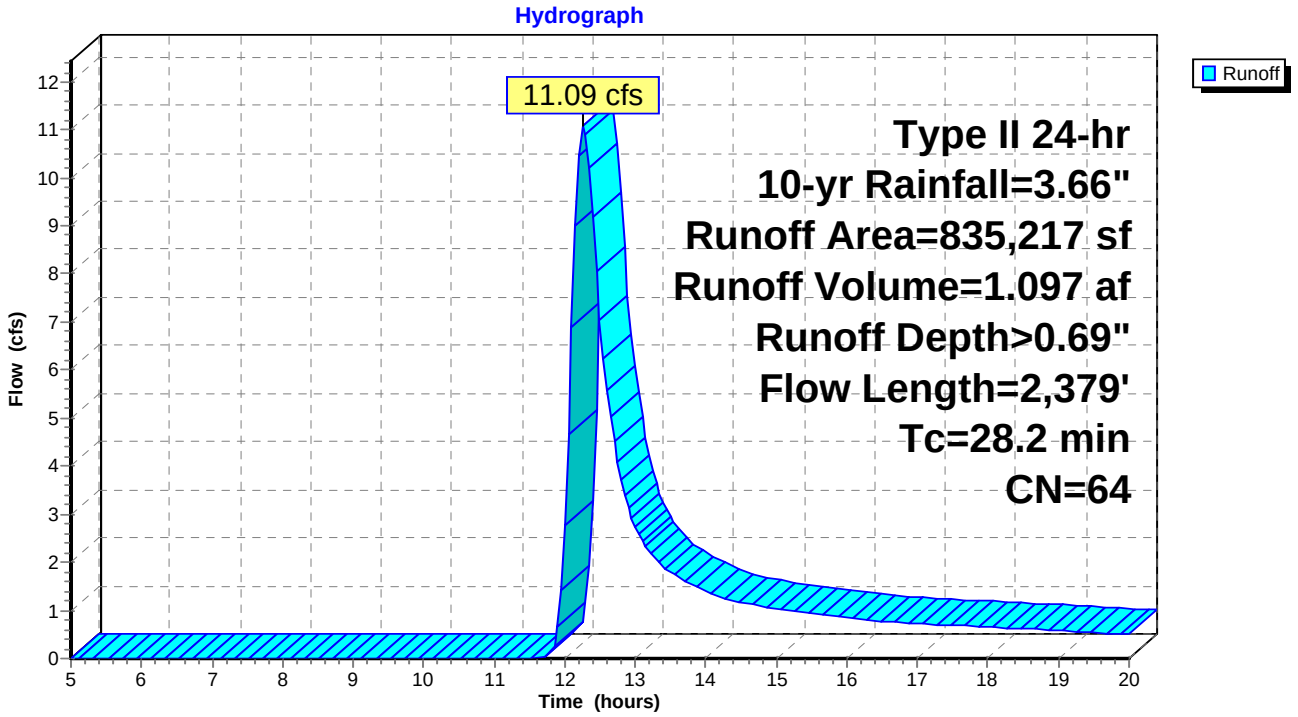
Runoff = 11.09 cfs @ 12.26 hrs, Volume= 1.097 af, Depth> 0.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

	Area (sf)	CN	Description
	124,871	60	Woods, Fair, HSG B
*	546,876	60	Woods, Fair, HSG B ("HSG A")
	163,470	79	Woods, Fair, HSG D
	835,217	64	Weighted Average
	835,217		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	100	0.0920	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
3.7	446	0.1610	2.01		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.4	221	0.0475	1.09		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.7	829	0.2360	2.43		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	180	0.2360	2.43		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	603	0.0730	8.39	16.77	**Channel Flow,** Area= 2.0 sf Perim= 5.3' r= 0.38' n= 0.025
28.2	2,379	Total			

Subcatchment H17: DA-H17



Summary for Subcatchment H18-1: DA-H18-1

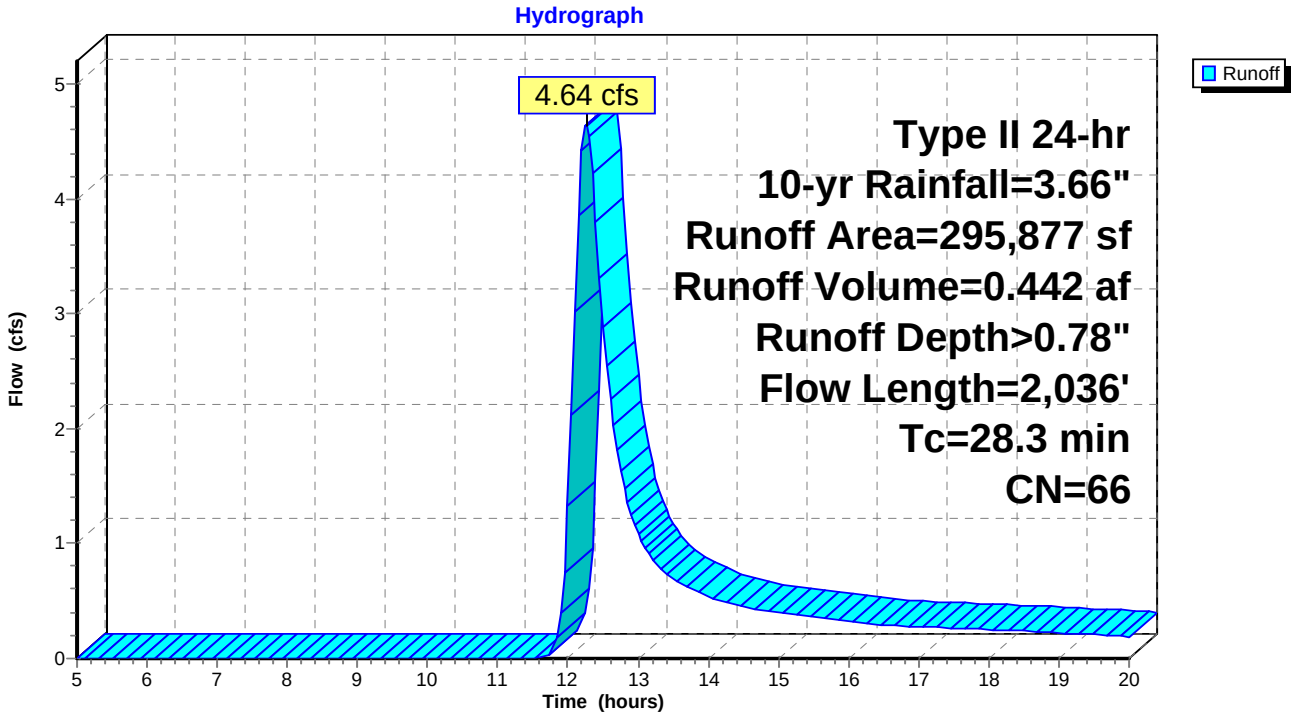
Runoff = 4.64 cfs @ 12.26 hrs, Volume= 0.442 af, Depth> 0.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

	Area (sf)	CN	Description
*	15,896	60	Woods, Fair, HSG B (*HSG A")
	183,946	60	Woods, Fair, HSG B
	96,035	79	Woods, Fair, HSG D
	295,877	66	Weighted Average
	295,877		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	100	0.0920	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
3.7	446	0.1610	2.01		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
3.4	221	0.0475	1.09		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.7	829	0.2360	2.43		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.8	180	0.1060	1.63		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.7	260	0.0490	6.62	9.93	**Channel Flow,** Area= 1.5 sf Perim= 4.2' r= 0.36' n= 0.025
28.3	2,036	Total			

Subcatchment H18-1: DA-H18-1



Summary for Subcatchment H18-2: DA-H18-2

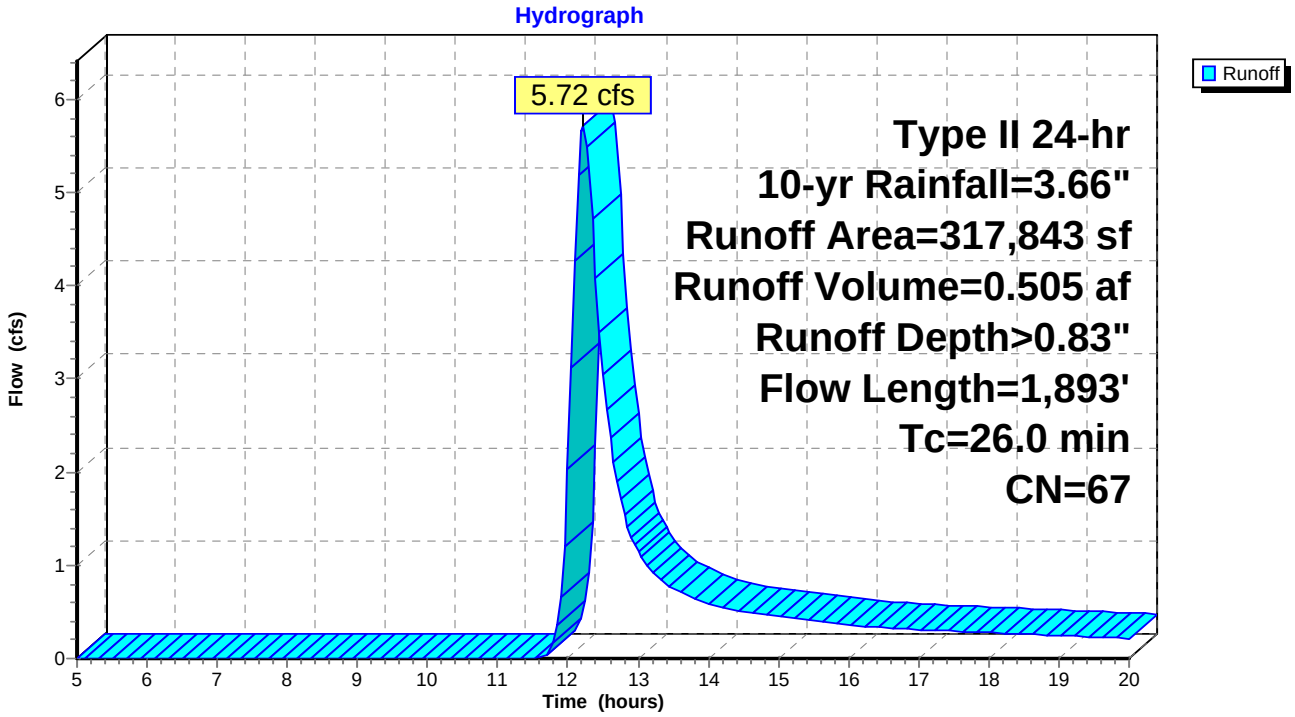
Runoff = 5.72 cfs @ 12.22 hrs, Volume= 0.505 af, Depth> 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

	Area (sf)	CN	Description
*	160,312	60	Woods, Fair, HSG B (*HSG A")
	37,067	60	Woods, Fair, HSG B
	120,464	79	Woods, Fair, HSG D
	317,843	67	Weighted Average
	317,843		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	100	0.1100	0.14		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
1.8	241	0.2030	2.25		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.0	317	0.0713	1.34		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.7	1,074	0.2180	2.33		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	161	0.0500	6.69	10.04	**Channel Flow,** Area= 1.5 sf Perim= 4.2' r= 0.36' n= 0.025
26.0	1,893	Total			

Subcatchment H18-2: DA-H18-2



Summary for Subcatchment H19: H-19

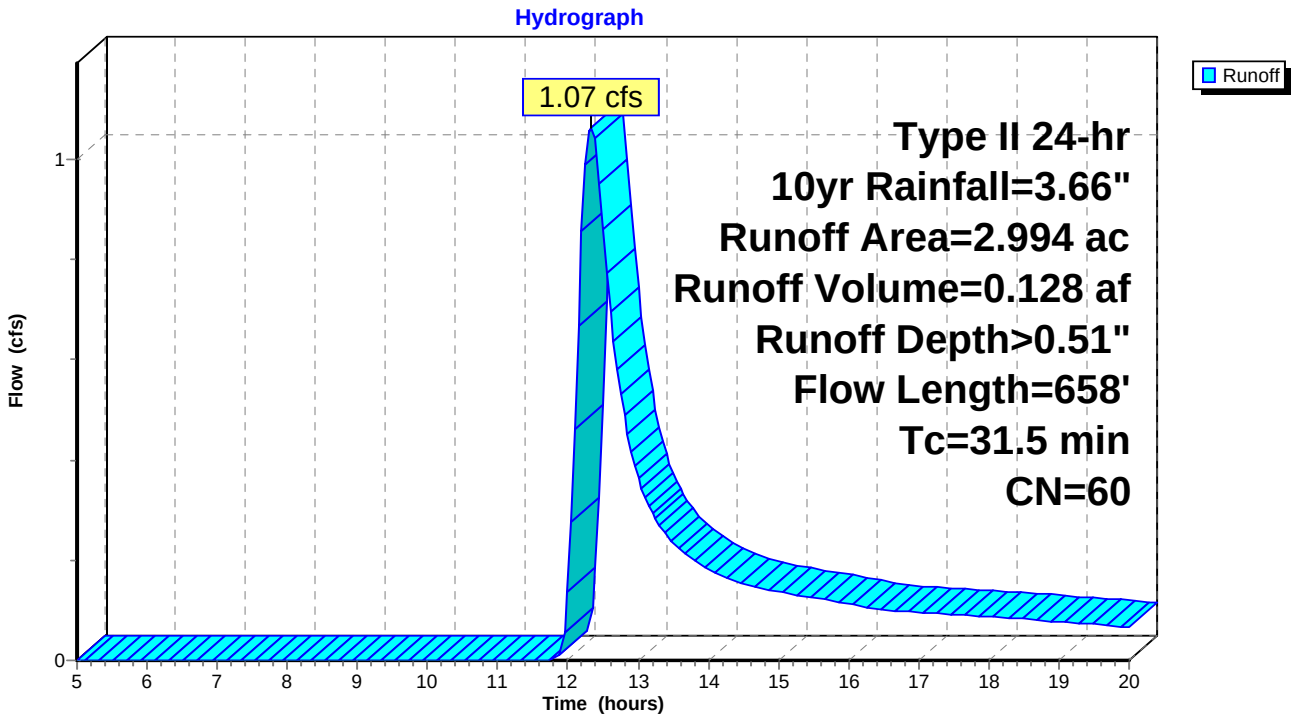
Runoff = 1.07 cfs @ 12.33 hrs, Volume= 0.128 af, Depth> 0.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=3.66"

Area (ac)	CN	Description
2.994	60	Woods, Fair, HSG B
2.994		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.9	100	0.0200	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
6.1	360	0.0390	0.99		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.5	198	0.2020	2.25		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
31.5	658	Total			

Subcatchment H19: H-19



Summary for Subcatchment H20: H-20

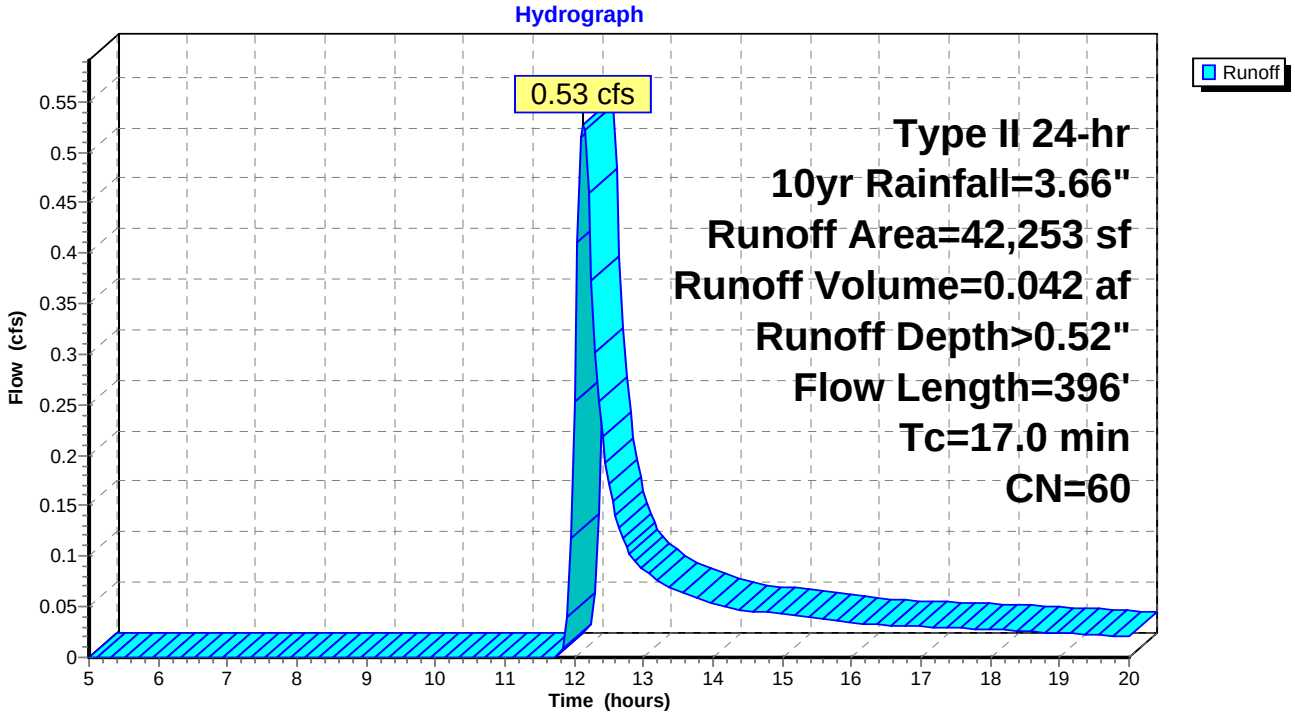
Runoff = 0.53 cfs @ 12.13 hrs, Volume= 0.042 af, Depth> 0.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10yr Rainfall=3.66"

Area (sf)	CN	Description
42,253	60	Woods, Fair, HSG B
42,253		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	100	0.0700	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
1.3	120	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.8	116	0.2590	2.54		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	60	0.2330	2.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.0	396	Total			

Subcatchment H20: H-20



Summary for Subcatchment H21-1: H21-1

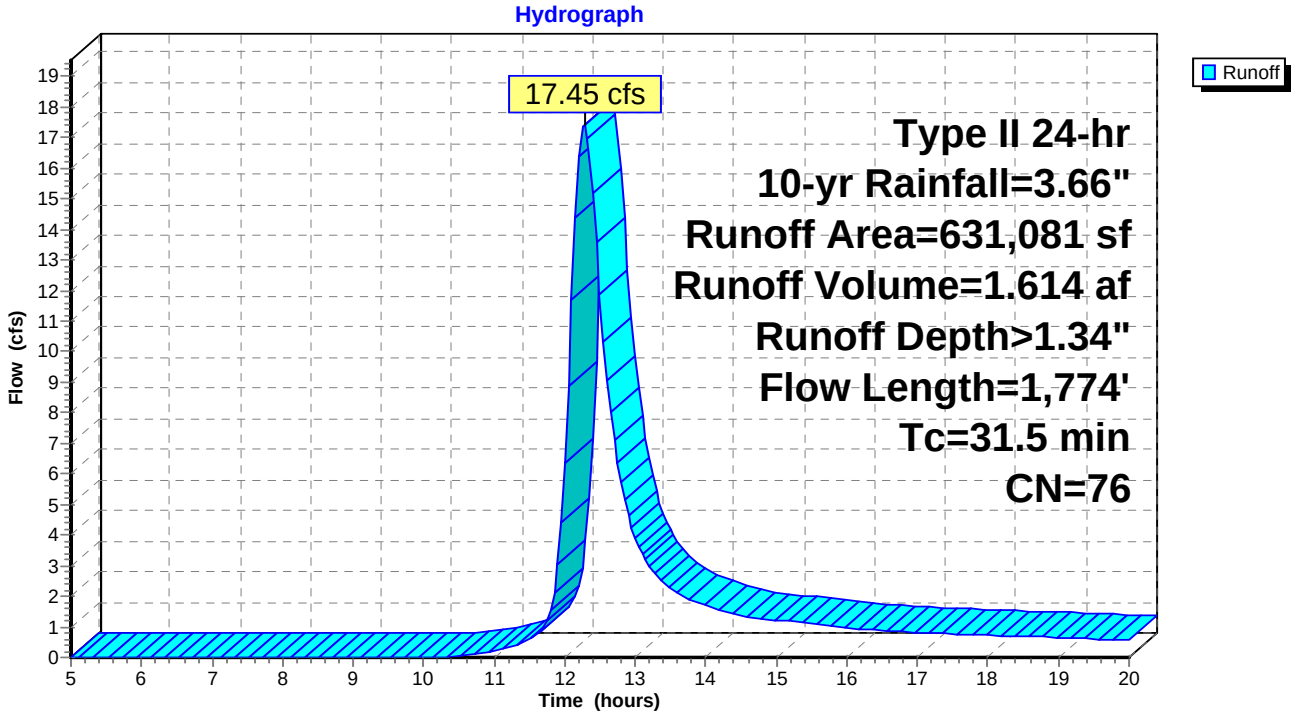
Runoff = 17.45 cfs @ 12.28 hrs, Volume= 1.614 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

Area (sf)	CN	Description
586,595	79	Woods, Fair, HSG D
44,486	36	Woods, Fair, HSG A
631,081	76	Weighted Average
631,081		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.0	100	0.1400	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
10.6	912	0.0820	1.43		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
9.9	762	0.0100	1.28	0.64	**Channel Flow,** Area= 0.5 sf Perim= 2.9' r= 0.17' n= 0.036
31.5	1,774	Total			

Subcatchment H21-1: H21-1



Summary for Subcatchment H21-2: H21-2

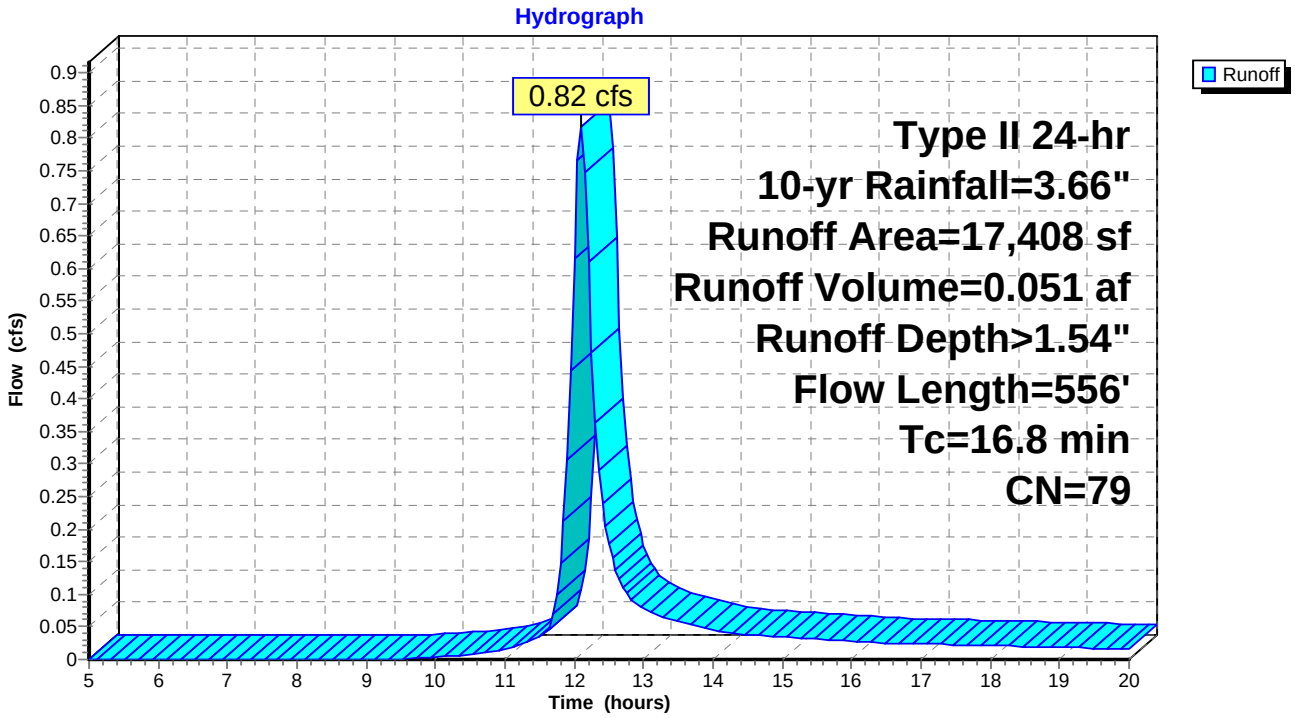
Runoff = 0.82 cfs @ 12.10 hrs, Volume= 0.051 af, Depth> 1.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

Area (sf)	CN	Description
17,408	79	Woods, Fair, HSG D
17,408		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.1030	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
2.5	234	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	95	0.0740	1.36		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	60	0.2330	2.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	67	0.0750	3.50	1.75	**Channel Flow,** Area= 0.5 sf Perim= 2.9' r= 0.17' n= 0.036
16.8	556	Total			

Subcatchment H21-2: H21-2



Summary for Subcatchment H22: DA-H22

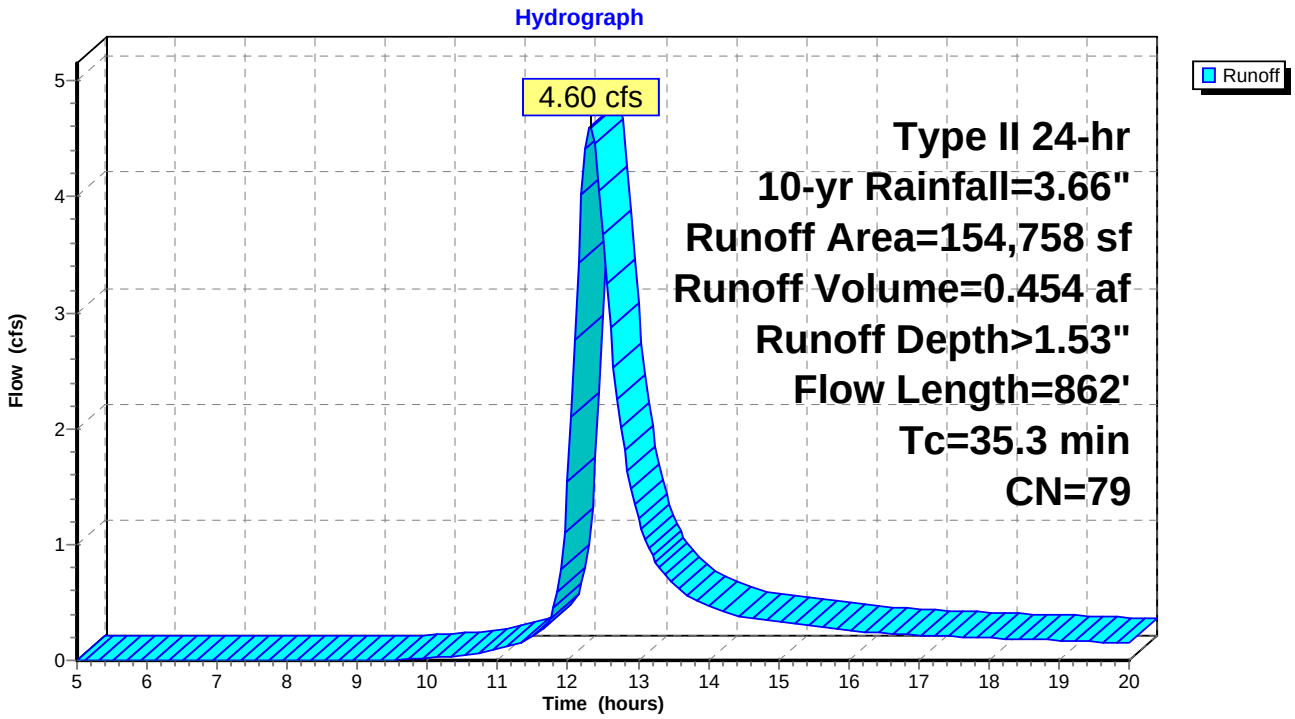
Runoff = 4.60 cfs @ 12.32 hrs, Volume= 0.454 af, Depth> 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

Area (sf)	CN	Description
154,758	79	Woods, Fair, HSG D
154,758		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.4	100	0.1030	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
2.4	234	0.1030	1.60		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
20.5	528	0.0100	0.43	1.72	**Channel Flow,** Area= 4.0 sf Perim= 6.5' r= 0.62' n= 0.250
35.3	862	Total			

Subcatchment H22: DA-H22



Summary for Subcatchment H23: DA-H23

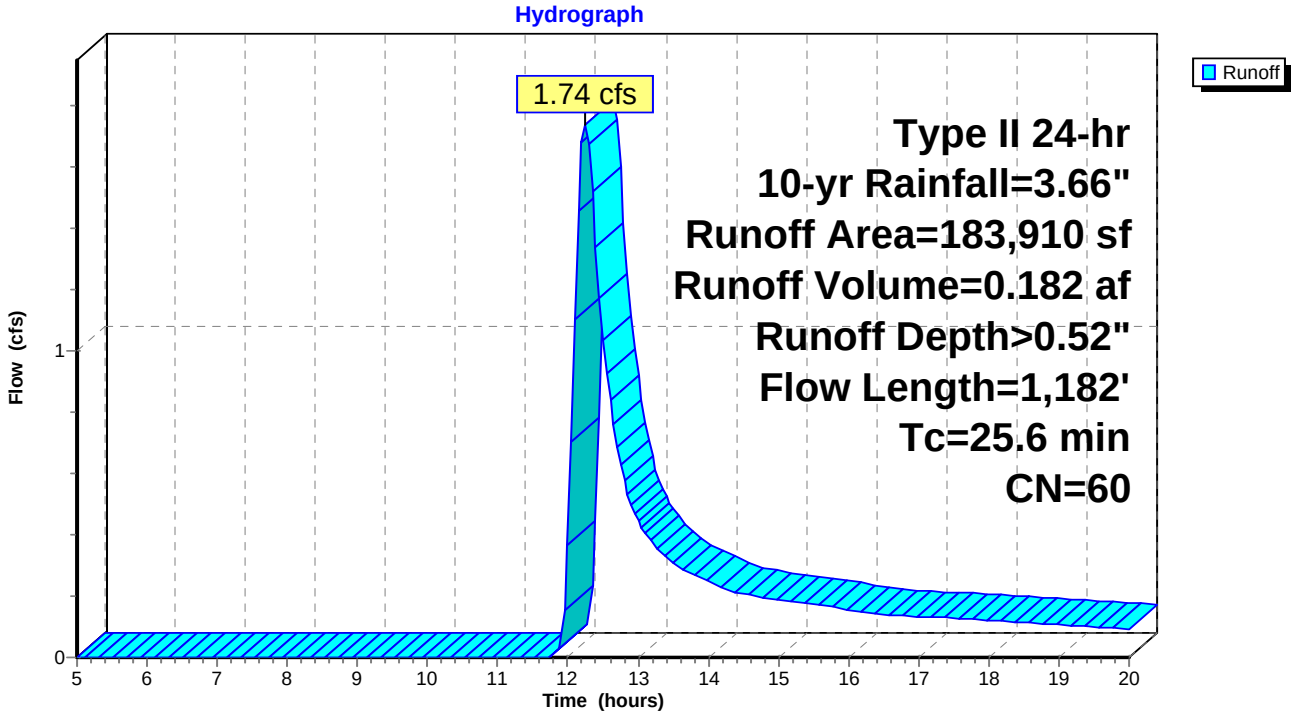
Runoff = 1.74 cfs @ 12.25 hrs, Volume= 0.182 af, Depth> 0.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

Area (sf)	CN	Description
183,910	60	Woods, Fair, HSG B
183,910		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	100	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
2.5	335	0.1980	2.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
7.3	374	0.0294	0.86		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.1	373	0.0340	3.02	2.72	**Channel Flow,** Area= 0.9 sf Perim= 3.6' r= 0.25' n= 0.036
25.6	1,182	Total			

Subcatchment H23: DA-H23



Summary for Subcatchment H24: DA-H24

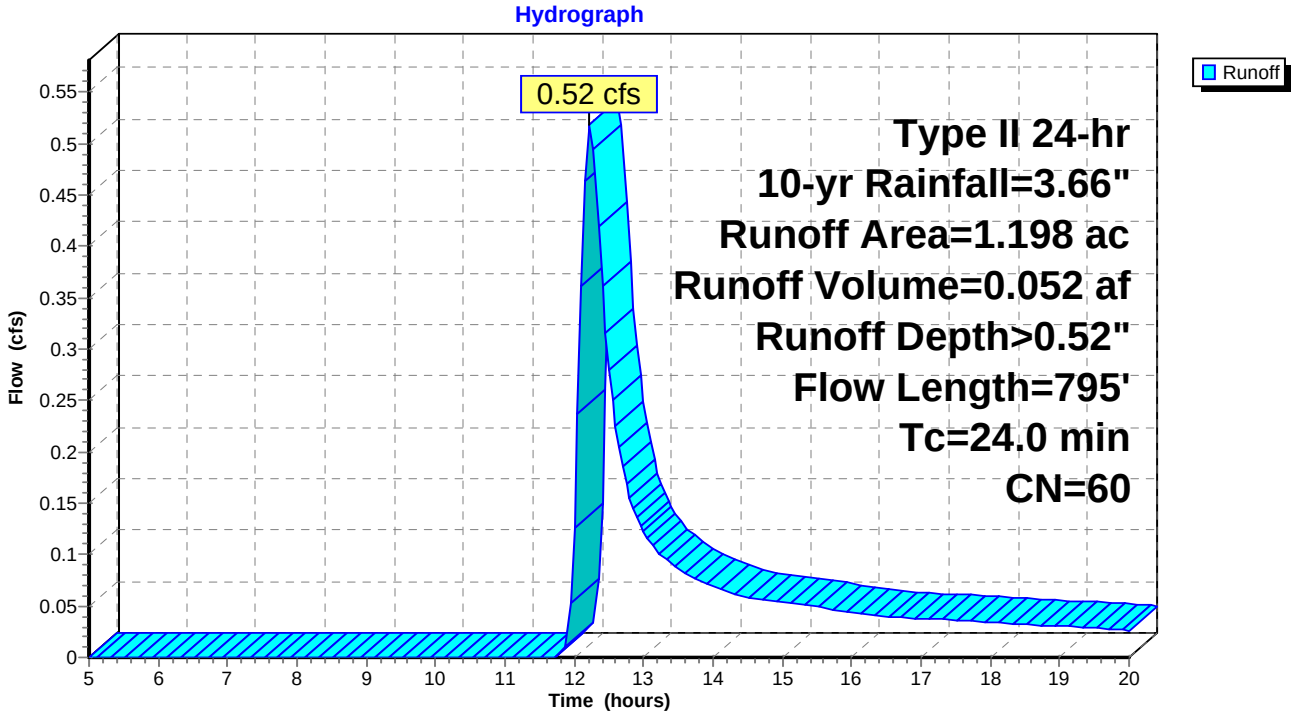
Runoff = 0.52 cfs @ 12.22 hrs, Volume= 0.052 af, Depth> 0.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

Area (ac)	CN	Description
1.198	60	Woods, Fair, HSG B
1.198		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.7	100	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
2.5	335	0.1980	2.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.0	180	0.0100	0.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.8	180	0.0110	1.68	1.35	**Channel Flow,** Area= 0.8 sf Perim= 3.3' r= 0.24' n= 0.036
24.0	795	Total			

Subcatchment H24: DA-H24



Summary for Subcatchment H25: DA-H25

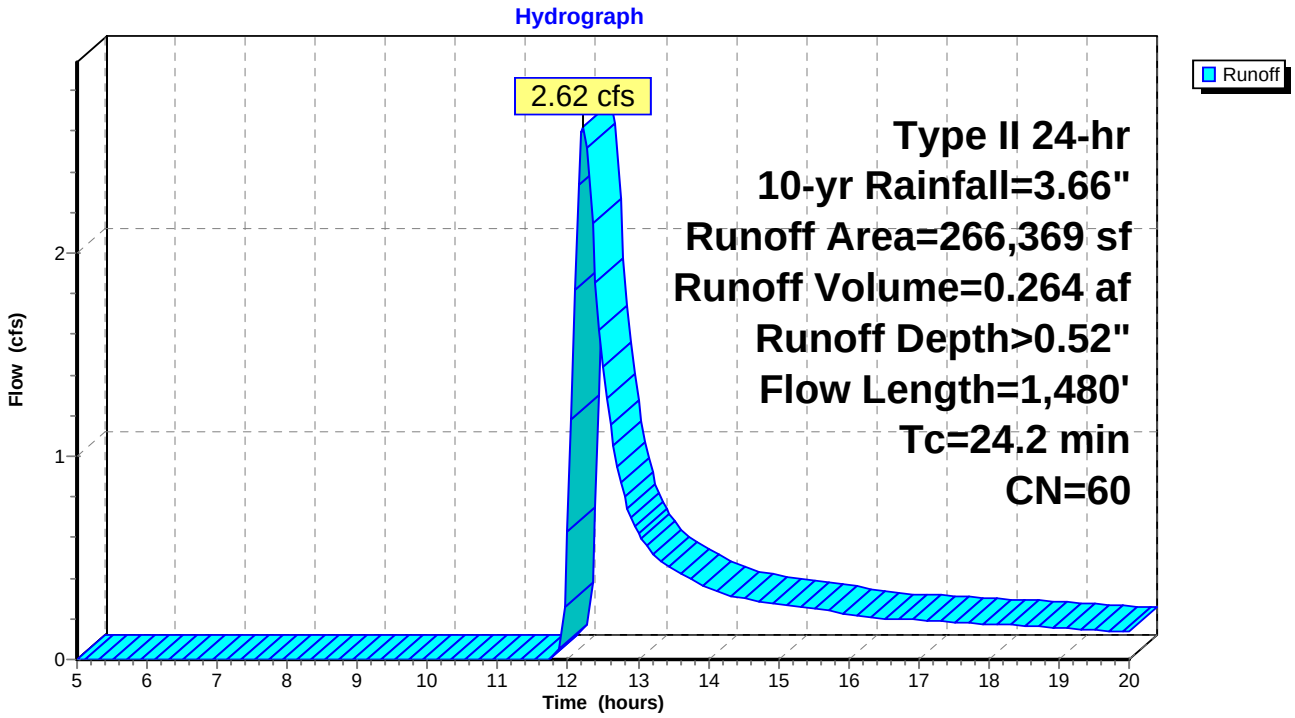
Runoff = 2.62 cfs @ 12.23 hrs, Volume= 0.264 af, Depth> 0.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

Area (sf)	CN	Description
5,619	73	Woods, Fair, HSG C
260,750	60	Woods, Fair, HSG B
266,369	60	Weighted Average
266,369		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.7	100	0.0680	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
2.9	364	0.1710	2.07		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
4.6	497	0.1270	1.78		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.0	519	0.0970	4.30	2.58	**Channel Flow,** Area= 0.6 sf Perim= 3.1' r= 0.19' n= 0.036
24.2	1,480	Total			

Subcatchment H25: DA-H25



Summary for Subcatchment H26: DA-H26

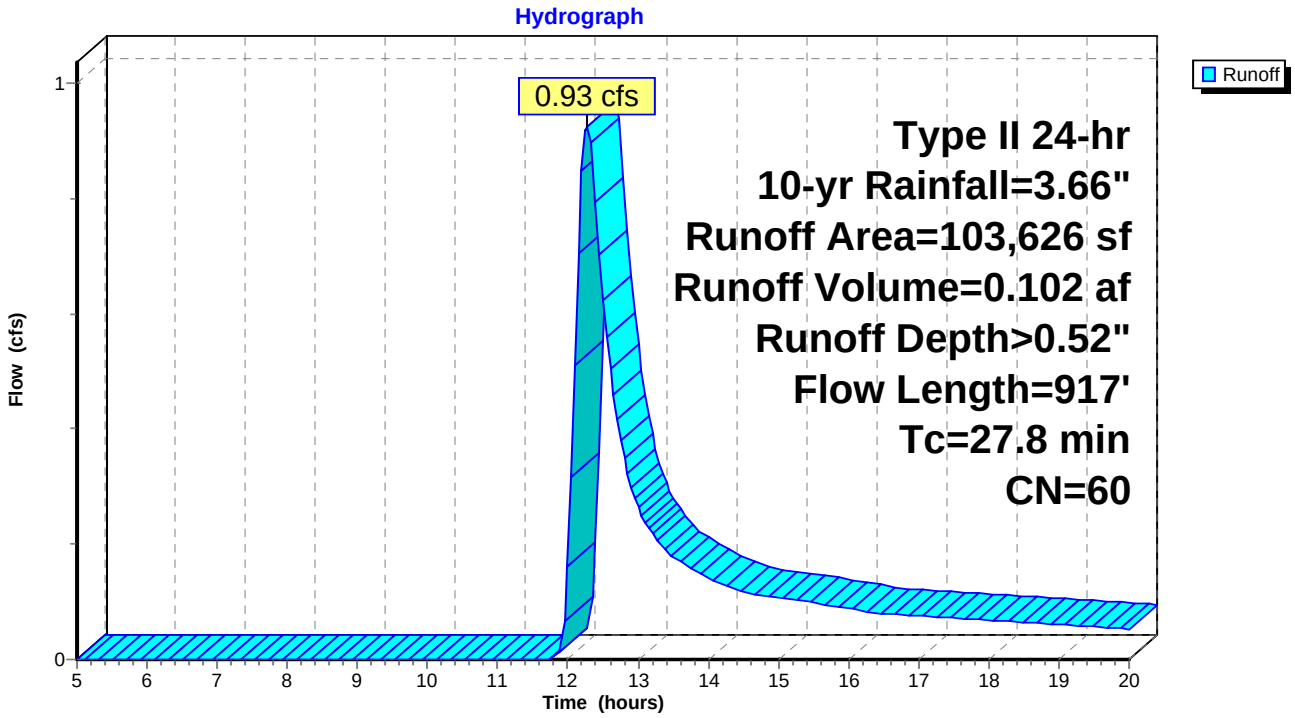
Runoff = 0.93 cfs @ 12.28 hrs, Volume= 0.102 af, Depth> 0.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

Area (sf)	CN	Description
103,626	60	Woods, Fair, HSG B
103,626		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.6	100	0.0290	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
1.8	132	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	121	0.1100	1.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.8	194	0.1350	1.84		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.4	370	0.0340	2.55	1.53	**Channel Flow,** Area= 0.6 sf Perim= 3.1' r= 0.19' n= 0.036
27.8	917	Total			

Subcatchment H26: DA-H26



Summary for Subcatchment H27: DA-H27

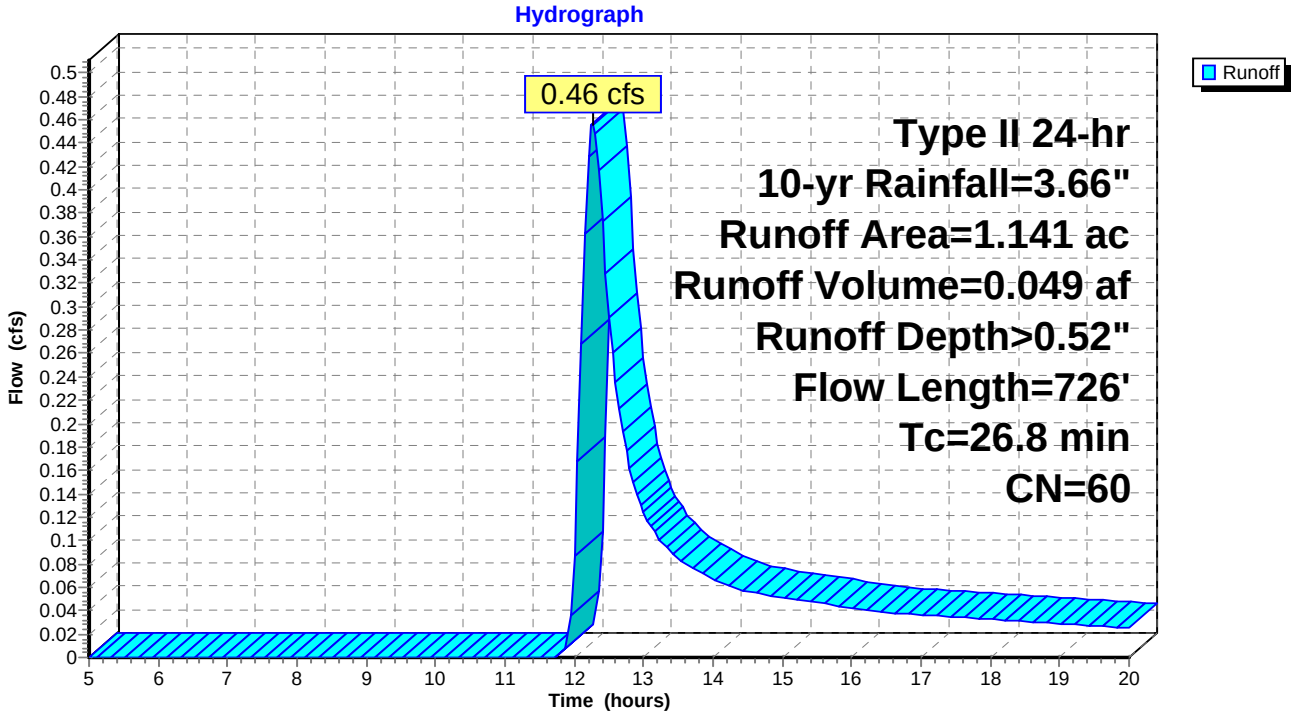
Runoff = 0.46 cfs @ 12.26 hrs, Volume= 0.049 af, Depth> 0.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

Area (ac)	CN	Description
1.141	60	Woods, Fair, HSG B
1.141		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.6	100	0.0290	0.08		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
1.8	132	0.0600	1.22		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.2	121	0.1100	1.66		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.8	194	0.1350	1.84		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
1.4	179	0.0250	2.18	1.31	**Channel Flow,** Area= 0.6 sf Perim= 3.1' r= 0.19' n= 0.036
26.8	726	Total			

Subcatchment H27: DA-H27



Time span=4.00-20.00 hrs, dt=0.05 hrs, 321 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 7S: HL-28 Runoff Area=37,554 sf 0.00% Impervious Runoff Depth>0.74"
Flow Length=471' Tc=17.4 min CN=65 Runoff=0.75 cfs 2,308 cf

Subcatchment 8S: HL-29 Runoff Area=19,203 sf 0.00% Impervious Runoff Depth>1.54"
Flow Length=471' Tc=17.4 min CN=79 Runoff=0.89 cfs 2,472 cf

Subcatchment 9S: HL-30 Runoff Area=6,000 sf 0.00% Impervious Runoff Depth>2.34"
Flow Length=25' Slope=0.0500 '/' Tc=0.1 min CN=89 Runoff=0.67 cfs 1,172 cf

Total Runoff Area = 62,757 sf Runoff Volume = 5,952 cf Average Runoff Depth = 1.14"
100.00% Pervious = 62,757 sf 0.00% Impervious = 0 sf

Summary for Subcatchment 7S: HL-28

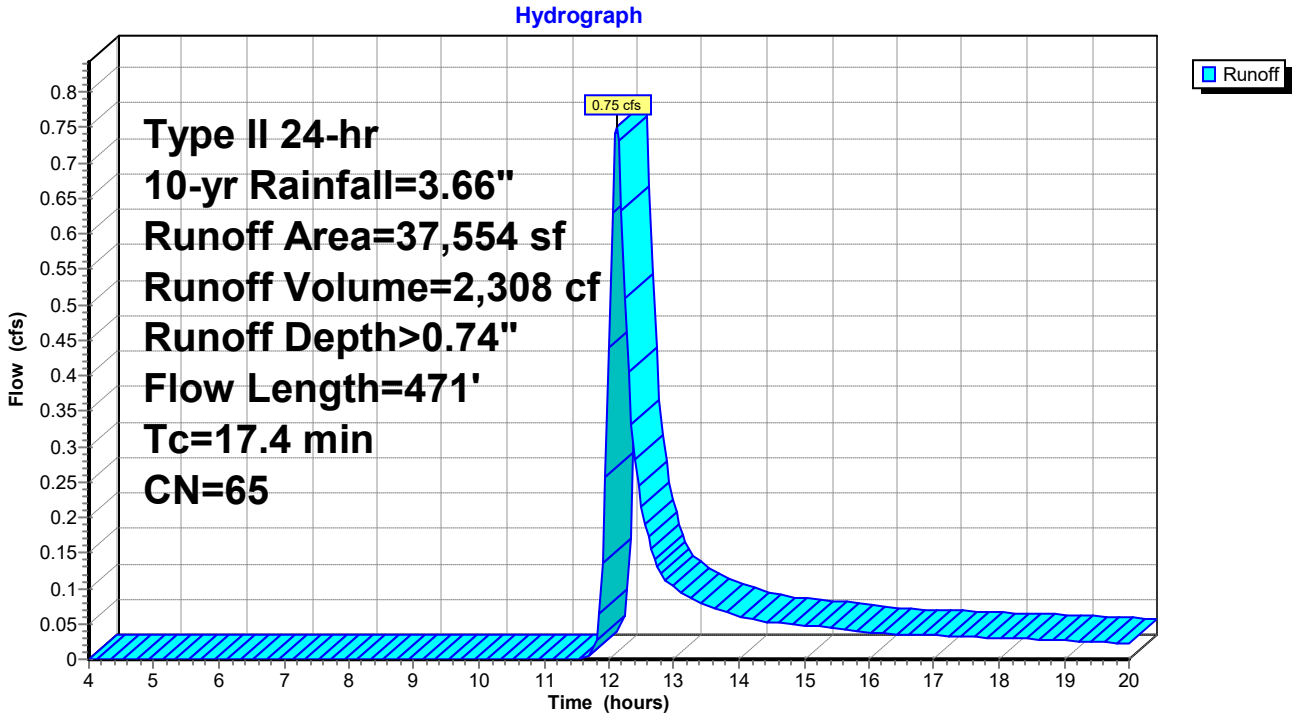
Runoff = 0.75 cfs @ 12.12 hrs, Volume= 2,308 cf, Depth> 0.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

Area (sf)	CN	Description
7,087	89	Gravel roads, HSG C
23,217	60	Woods, Fair, HSG B
7,250	58	Meadow, non-grazed, HSG B
37,554	65	Weighted Average
37,554		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	52	0.0300	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
0.8	121	0.1300	2.52		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	87	0.0570	4.85		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.2	211	0.0280	0.84		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.4	471	Total			

Subcatchment 7S: HL-28



Hydrograph for Subcatchment 7S: HL-28

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
4.00	0.18	0.00	0.00
4.25	0.19	0.00	0.00
4.50	0.20	0.00	0.00
4.75	0.22	0.00	0.00
5.00	0.23	0.00	0.00
5.25	0.25	0.00	0.00
5.50	0.26	0.00	0.00
5.75	0.28	0.00	0.00
6.00	0.29	0.00	0.00
6.25	0.31	0.00	0.00
6.50	0.33	0.00	0.00
6.75	0.34	0.00	0.00
7.00	0.36	0.00	0.00
7.25	0.38	0.00	0.00
7.50	0.40	0.00	0.00
7.75	0.42	0.00	0.00
8.00	0.44	0.00	0.00
8.25	0.46	0.00	0.00
8.50	0.48	0.00	0.00
8.75	0.51	0.00	0.00
9.00	0.54	0.00	0.00
9.25	0.57	0.00	0.00
9.50	0.60	0.00	0.00
9.75	0.63	0.00	0.00
10.00	0.66	0.00	0.00
10.25	0.70	0.00	0.00
10.50	0.75	0.00	0.00
10.75	0.80	0.00	0.00
11.00	0.86	0.00	0.00
11.25	0.94	0.00	0.00
11.50	1.04	0.00	0.00
11.75	1.42	0.02	0.01
12.00	2.43	0.27	**0.44**
12.25	2.58	0.33	**0.51**
12.50	2.69	0.37	0.21
12.75	2.76	0.40	0.13
13.00	2.83	0.43	0.10
13.25	2.88	0.45	0.09
13.50	2.92	0.47	0.08
13.75	2.97	0.49	0.07
14.00	3.00	0.51	0.06
14.25	3.03	0.52	0.06
14.50	3.07	0.54	0.05
14.75	3.10	0.55	0.05
15.00	3.12	0.56	0.05
15.25	3.15	0.58	0.05
15.50	3.18	0.59	0.04
15.75	3.20	0.60	0.04
16.00	3.22	0.61	0.04
16.25	3.24	0.62	0.04
16.50	3.26	0.63	0.04
16.75	3.28	0.64	0.03
17.00	3.30	0.65	0.03
17.25	3.32	0.66	0.03
17.50	3.34	0.67	0.03
17.75	3.35	0.68	0.03
18.00	3.37	0.69	0.03
18.25	3.39	0.69	0.03
18.50	3.40	0.70	0.03
18.75	3.42	0.71	0.03
19.00	3.43	0.72	0.03
19.25	3.45	0.72	0.03
19.50	3.46	0.73	0.02
19.75	3.47	0.74	0.02
20.00	**3.48**	**0.74**	0.02

Summary for Subcatchment 8S: HL-29

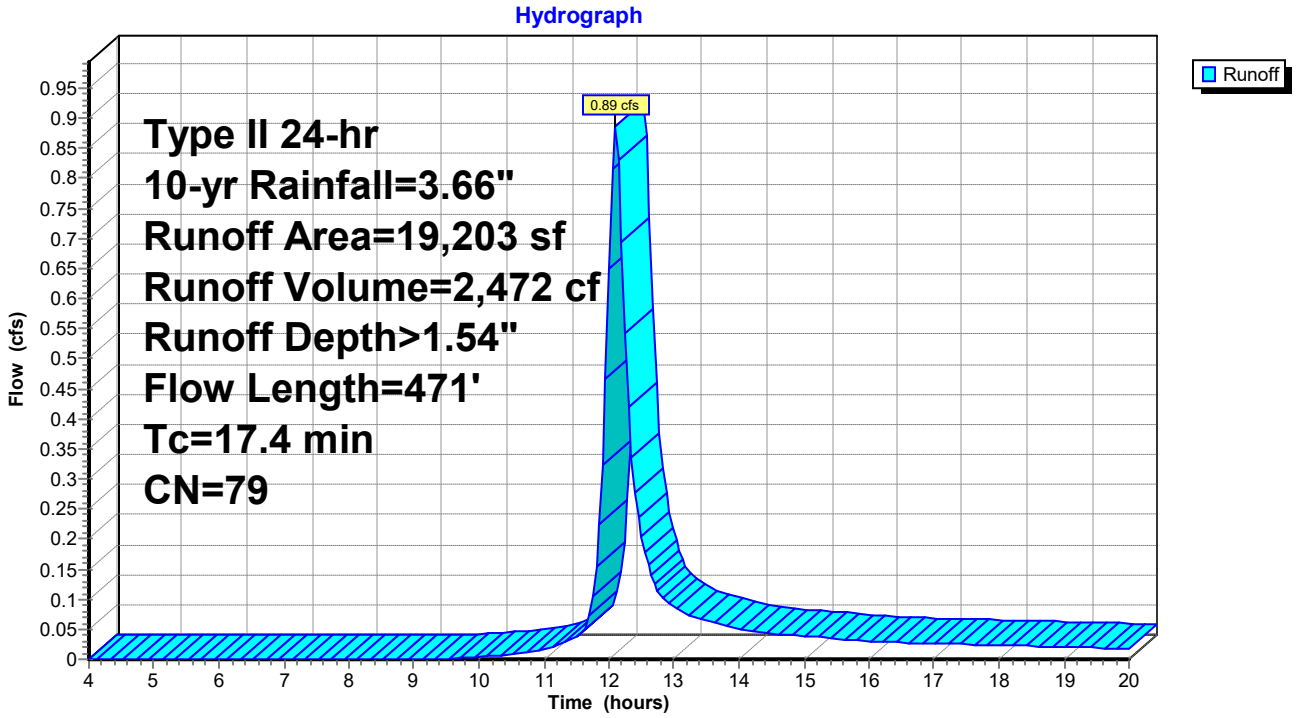
Runoff = 0.89 cfs @ 12.10 hrs, Volume= 2,472 cf, Depth> 1.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

Area (sf)	CN	Description
12,683	89	Gravel roads, HSG C
3,773	60	Woods, Fair, HSG B
2,747	58	Meadow, non-grazed, HSG B
19,203	79	Weighted Average
19,203		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	52	0.0300	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 2.58"
0.8	121	0.1300	2.52		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	87	0.0570	4.85		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
4.2	211	0.0280	0.84		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
17.4	471	Total			

Subcatchment 8S: HL-29



Hydrograph for Subcatchment 8S: HL-29

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
4.00	0.18	0.00	0.00
4.25	0.19	0.00	0.00
4.50	0.20	0.00	0.00
4.75	0.22	0.00	0.00
5.00	0.23	0.00	0.00
5.25	0.25	0.00	0.00
5.50	0.26	0.00	0.00
5.75	0.28	0.00	0.00
6.00	0.29	0.00	0.00
6.25	0.31	0.00	0.00
6.50	0.33	0.00	0.00
6.75	0.34	0.00	0.00
7.00	0.36	0.00	0.00
7.25	0.38	0.00	0.00
7.50	0.40	0.00	0.00
7.75	0.42	0.00	0.00
8.00	0.44	0.00	0.00
8.25	0.46	0.00	0.00
8.50	0.48	0.00	0.00
8.75	0.51	0.00	0.00
9.00	0.54	0.00	0.00
9.25	0.57	0.00	0.00
9.50	0.60	0.00	0.00
9.75	0.63	0.00	0.00
10.00	0.66	0.01	0.00
10.25	0.70	0.01	0.01
10.50	0.75	0.02	0.01
10.75	0.80	0.02	0.01
11.00	0.86	0.04	0.02
11.25	0.94	0.05	0.02
11.50	1.04	0.08	0.04
11.75	1.42	0.22	0.11
12.00	2.43	0.79	**0.65**
12.25	2.58	0.89	**0.54**
12.50	2.69	0.97	0.20
12.75	2.76	1.02	0.12
13.00	2.83	1.06	0.09
13.25	2.88	1.10	0.07
13.50	2.92	1.13	0.06
13.75	2.97	1.16	0.06
14.00	3.00	1.19	0.05
14.25	3.03	1.21	0.05
14.50	3.07	1.24	0.04
14.75	3.10	1.26	0.04
15.00	3.12	1.28	0.04
15.25	3.15	1.30	0.04
15.50	3.18	1.32	0.03
15.75	3.20	1.34	0.03
16.00	3.22	1.35	0.03
16.25	3.24	1.37	0.03
16.50	3.26	1.38	0.03
16.75	3.28	1.40	0.03
17.00	3.30	1.41	0.03
17.25	3.32	1.43	0.03
17.50	3.34	1.44	0.02
17.75	3.35	1.45	0.02
18.00	3.37	1.47	0.02
18.25	3.39	1.48	0.02
18.50	3.40	1.49	0.02
18.75	3.42	1.50	0.02
19.00	3.43	1.51	0.02
19.25	3.45	1.52	0.02
19.50	3.46	1.53	0.02
19.75	3.47	1.54	0.02
20.00	**3.48**	**1.55**	0.02

Summary for Subcatchment 9S: HL-30

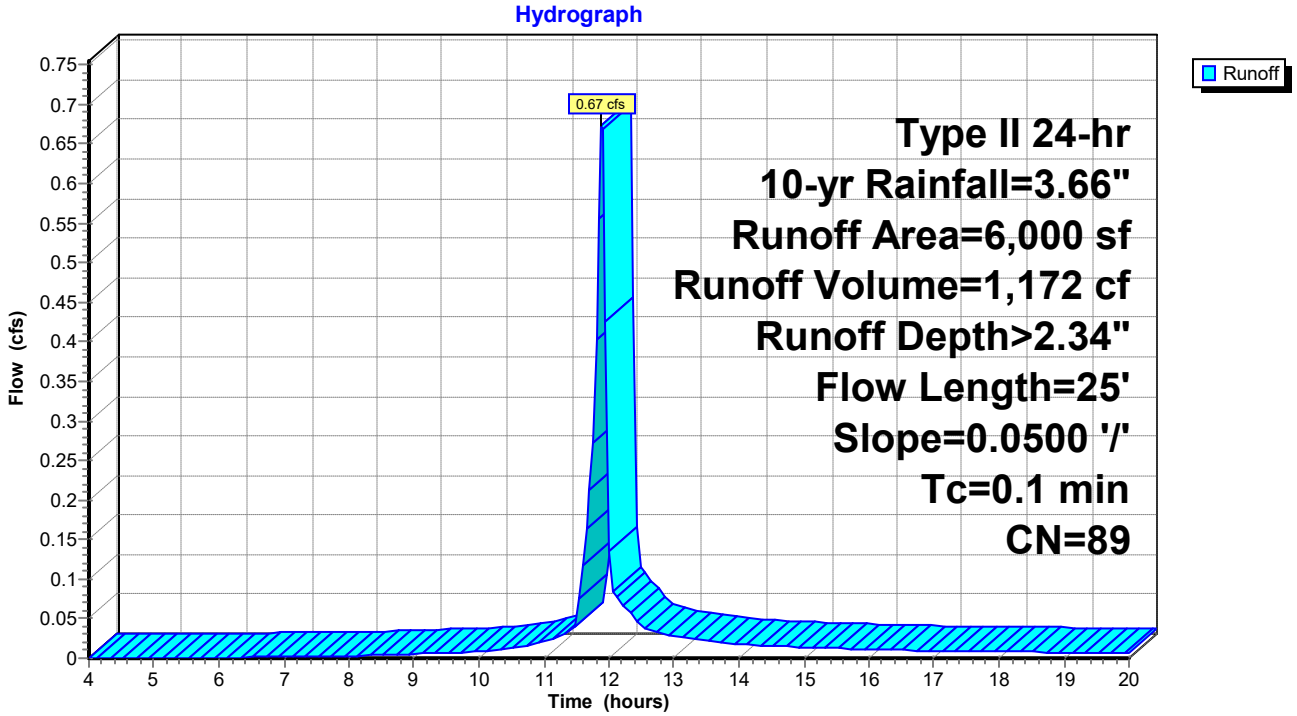
Runoff = 0.67 cfs @ 11.89 hrs, Volume= 1,172 cf, Depth> 2.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 4.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=3.66"

Area (sf)	CN	Description
6,000	89	Gravel roads, HSG C
6,000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.1	25	0.0500	4.54		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps

Subcatchment 9S: HL-30



Hydrograph for Subcatchment 9S: HL-30

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
4.00	0.18	0.00	0.00
4.25	0.19	0.00	0.00
4.50	0.20	0.00	0.00
4.75	0.22	0.00	0.00
5.00	0.23	0.00	0.00
5.25	0.25	0.00	0.00
5.50	0.26	0.00	0.00
5.75	0.28	0.00	0.00
6.00	0.29	0.00	0.00
6.25	0.31	0.00	0.00
6.50	0.33	0.00	0.00
6.75	0.34	0.01	0.00
7.00	0.36	0.01	0.00
7.25	0.38	0.01	0.00
7.50	0.40	0.02	0.00
7.75	0.42	0.02	0.00
8.00	0.44	0.03	0.00
8.25	0.46	0.03	0.00
8.50	0.48	0.04	0.00
8.75	0.51	0.05	0.00
9.00	0.54	0.06	0.01
9.25	0.57	0.07	0.01
9.50	0.60	0.08	0.01
9.75	0.63	0.09	0.01
10.00	0.66	0.10	0.01
10.25	0.70	0.12	0.01
10.50	0.75	0.14	0.01
10.75	0.80	0.17	0.02
11.00	0.86	0.20	0.02
11.25	0.94	0.25	0.03
11.50	1.04	0.31	0.04
11.75	1.42	0.57	**0.27**
12.00	2.43	1.39	**0.13**
12.25	2.58	1.53	0.06
12.50	2.69	1.62	0.04
12.75	2.76	1.69	0.03
13.00	2.83	1.74	0.03
13.25	2.88	1.79	0.02
13.50	2.92	1.83	0.02
13.75	2.97	1.87	0.02
14.00	3.00	1.90	0.02
14.25	3.03	1.93	0.02
14.50	3.07	1.96	0.02
14.75	3.10	1.99	0.01
15.00	3.12	2.01	0.01
15.25	3.15	2.04	0.01
15.50	3.18	2.06	0.01
15.75	3.20	2.08	0.01
16.00	3.22	2.10	0.01
16.25	3.24	2.12	0.01
16.50	3.26	2.14	0.01
16.75	3.28	2.16	0.01
17.00	3.30	2.17	0.01
17.25	3.32	2.19	0.01
17.50	3.34	2.21	0.01
17.75	3.35	2.22	0.01
18.00	3.37	2.24	0.01
18.25	3.39	2.25	0.01
18.50	3.40	2.27	0.01
18.75	3.42	2.28	0.01
19.00	3.43	2.29	0.01
19.25	3.45	2.31	0.01
19.50	3.46	2.32	0.01
19.75	3.47	2.33	0.01
20.00	**3.48**	**2.34**	0.01

CHANNEL LINING-
MANUFACTURER'S SPECIFICATIONS

ROLLMAX™
ROLLED EROSION CONTROL

ROLLED
EROSION CONTROL

SYSTEMS BROCHURE

Tensar®

When It Rains (or Blows, Flows or Washes), It Pours

Erosion not only wears away slopes, degrades shorelines and steals precious topsoil, it can also threaten water sources, damage man-made structures, reconfigure landscapes and disrupt wildlife habitats. Add the stiff penalties at stake for violating Environmental Protection Agency (EPA) or local enforcement agency regulations, and the costs of erosion can quickly climb out of control.

WE ROLL AGAINST THE FLOW

Tensar International Corporation (Tensar) is the world's leading provider of performance-guaranteed erosion control solutions. For more than 25 years, the Tensar® North American Green® line of erosion and sediment control products has kept our customers on solid ground.

The RollMax™ Systems' family of Rolled Erosion Control Products (RECPs) is solid evidence of Tensar's ongoing investment in innovation. Our short-term and long-term erosion control blankets and turf reinforcement mats keep you one step ahead of just about any erosion challenge.

ALL THE HELP YOU NEED

Of all the RECP manufacturers out there, none can match Tensar's customer service and technical knowhow. Our support team will assist with project design and product specification or, if you'd rather do it yourself, use our Erosion Control Materials Design Software (ECMDS®) (the industry's first) for selecting material, and planning your project.

Tensar products are sold exclusively through nearly 200 Tensar Erosion Control authorized distributors worldwide. The Tensar Erosion Solutions Specialist program certifies our distributors and their sales representatives to design erosion control measures that comply with the EPA's National Pollutant Discharge Elimination System (NPDES) and other industry regulations.

Tensar is a proud member of the Erosion Control Technology Council (ECTC) and the International Erosion Control Association (IECA).

NEW NAME – SAME GREAT PERFORMANCE AND SERVICE

Tensar International Corporation acquired North American Green (NAG) in 2004 to enhance our position as the premier provider of technology-driven site solutions. We are proud to continue offering the same NAG level of service, quality and high-performance erosion control products under the name of Tensar.

Site erosion can be costly, with the RollMax Systems full line of rolled erosion control products we can keep you in compliance.

For more than 25 years, our Tensar North American Green line of products has kept our customers on solid ground.

Applications Welcome

For nearly every erosion application, there's a RollMax™ Systems solution. Permanent turf reinforcement mats provide long-term protection and vegetation establishment; temporary Erosion Control Blankets (ECBs) give immediate protection and assist with vegetation establishment before degrading naturally. Tensar's extensive selection of RollMax products almost guarantees you'll find the answer to your erosion problems.

Typical erosion control applications include these and many more:

- Highway and other DOT projects
- Commercial and residential developments
- Shorelines and waterways
- Golf course turf management
- Oil and gas pipeline restoration
- Mine and fire reclamation
- Military base construction

AND SPEAKING OF GUARANTEES . . .

Tensar's Ultimate Assurance Guarantee is the most comprehensive in the industry. It says if any properly specified and installed Tensar® North American Green® rolled erosion control product designed by a qualified engineer or Tensar technical representative in accordance with our Erosion Control Materials Design Software (ECMDS®) fails to perform under the conditions in the Guarantee, then we will replace the failed product with our next higher-performance RECP product, along with the cost of seed, fertilizer, topsoil and other amendments lost due to such product failure. Our Guarantee warrants in accordance with its terms and conditions all registered projects designed with the latest version of our ECMDS and properly installed.

Tensar turf reinforcement mats are also guaranteed to reinforce vegetation for five years after installation, and the functional longevity of these products' permanent structures is warranted for a minimum of 10 years after installation, subject to the terms and conditions set forth in the Guarantee.

From challenging roadway improvements to concentrated flow channels, there is a RollMax product ready to handle the job – and it's guaranteed.

Permanent RollMax™ Solutions

Back in the day, rock riprap, articulated concrete blocks and poured concrete were the only way to deal with erosion in high-flow channels, on shorelines and other areas where water and/or wind exceed the shear limits of unreinforced vegetation.

Not anymore. Tensar's permanent Turf Reinforcement Mats (TRMs) use 100% synthetic components or a composite of synthetic and natural materials for long-term erosion protection and vegetation establishment. Whether compared to rock riprap or concrete, the RollMax™ Systems' permanent TRMs offer a number of significant advantages:

- Prevent loss of precious topsoil to wind and water erosion
- Permanently reinforce vegetation root and stem structures
- Provide excellent conditions for quick, healthy vegetation growth
- Stabilize slopes from erosion to keep roadways safe and clean
- Protect water quality in lakes, rivers and streams
- Protect dormant seeding during winter months
- Easily conform to landscape features
- Lightweight for easy handling and transportation

VMAX® COMPOSITE TURF REINFORCEMENT MATS

VMax® C-TRMs combine three-dimensional matting with fiber matrix material for permanent erosion control on severe slopes, spillways, stream banks, shorelines and in high- to extreme-flow channels. These extensively tested products provide maximum performance through all three phases of reinforced vegetative lining development: unvegetated, establishment, and maturity. Incorporating the best performance features of temporary and permanent Tensar erosion control products, VMax C-TRMs deliver these tangible benefits:

- Surface-applied for the highest level of immediate soil protection
- Less than one third of the installed cost of rock or concrete
- No heavy equipment needed to install
- More attractive and effective "Green" alternative than rock riprap or concrete
- Exceeds FHWA and ECTC standards for TRMs
- An EPA Best Management Practice (BMP) for National Pollutant Discharge Elimination System (NPDES) regulations
- No threat to pedestrians or automobiles when used near travel routes
- Naturally filters runoff water

The TRMs easily conform to various landscape features to prevent the loss of precious topsoil.

The RollMax TRMs are installed in a one-step operation directly over the prepared seedbed saving time and money and ensuring the highest level of erosion control and vegetation reinforcement.

VMax® P550® Permanent TRM

Our top of the line P550® TRM has a polypropylene fiber matrix augmenting the permanent netting structure with permanent mulching and erosion control performance. Unvegetated, the P550 TRM reduces soil loss to less than 0.5 in. (12.7 mm) under shear stress up to 4.0 lbs/ft^2 (191 Pa). The ultra-strong structure drives the vegetated shear resistance up to 14 lbs/ft^2 (672 Pa), establishing a new maximum for vegetation reinforcement. The P550 TRM may be used as an alternative for poured concrete or articulated concrete blocks in extreme erosion control projects.

VMax® C350® Permanent TRM

A 100% coconut fiber matrix supplements the C350's permanent three-dimensional netting structure with initial mulching and erosion control performance for up to 36 months. Unvegetated, the C350® TRM reduces soil loss to less than 0.5 in. (12.7 mm) under shear stress up to 3.2 lbs/ft^2 (153 Pa) and boosts permanent vegetation performance up to 12 lbs/ft^2 (576 Pa). This environmentally friendly alternative to 30 in. (76 cm) or larger rock riprap is ideal for severe erosion control projects.

VMax® SC250® Permanent TRM

The SC250® permanent TRM has a 70% straw/30% coconut fiber matrix to enhance initial mulching and erosion control performance for up to 24 months. Unvegetated, SC250 TRMs reduce soil loss to less than 0.5 in. (12.7 mm) under shear stress up to 3.0 lbs/ft^2, and increases permanent vegetation performance up to 10 lbs/ft^2 (480 Pa) for a green alternative to rock riprap.

ERONET™ PERMANENT EROSION CONTROL BLANKETS

The EroNet™ Permanent ECB provides immediate erosion protection and vegetation establishment assistance until vegetation roots and stems mature.

EroNet™ P300® Permanent Erosion Control Blankets

The P300® permanent erosion control blanket consists of UV-stabilized polypropylene fiber stitched between heavy-weight UV-stabilized polypropylene top and bottom nets. These mats reduce soil loss and protect vegetation from being washed away or uprooted, even under high stress. Unvegetated, they reduce soil loss to less than 0.5 in. (12.7 mm) under shear stress up to 3.0 lbs/ft^2 (144 Pa), and protect vegetation from being washed away or uprooted when exposed to shear stresses up to 8 lbs/ft^2 (383 Pa).

To boost performance of the VMax turf reinforcement mats in critical applications, combine with our ShoreMax® flexible transition mat to create a system that can dramatically elevate the permissible shear stress and velocity protection beyond many hard armor solutions.

VMax Mats are perfect for pipe outlets, channel bottoms, shoreline transition zones, and other areas subjected to highly turbulent water flows.

Temporary RollMax™ Solutions

Erosion control has never been so simple yet effective. Tensar's RollMax™ temporary Erosion Control Blankets (ECBs) provide immediate erosion protection and vegetation establishment assistance, then degrade once the vegetation's root and stem systems are mature enough to stabilize the soil.

Our high-quality temporary solutions are available in varying functional longevities and materials:

- Short-term photodegradable blankets with a functional longevity of 45 days up to 12 months
- Extended-term and long-term photodegradable blankets for protection up to 36 months
- Short-term biodegradable blankets for protection up to 12 months
- Extended-term and long-term biodegradable products for protection and mulching from 18 to 24 months

ERONET™ EROSION CONTROL BLANKETS

Tensar's EroNet™ ECBs incorporate photodegradable nettings, which means they are broken down by the ultraviolet rays in sunlight. These temporary products can be used in a variety of scenarios, including moderate to steep slopes, medium- to high-flow channels, shorelines and other areas needing protection until permanent vegetation establishment.

EroNet™ C125® Long-Term Photodegradable Double-Net Coconut Blanket

The C125® ECB is made of 100% coconut fiber stitched between heavyweight UV-stabilized polypropylene nets. It offers excellent durability, erosion control and longevity for severe slopes, steep embankments, high-flow channels and other areas where vegetation may take up to 36 months to grow in.

The EroNet temporary ECBs are designed to provide immediate erosion protection and vegetation establishment assistance, and then degrade after the vegetation is mature enough to permanently stabilize the underlying soil. Both short-term and extended-term ECBs are available.

EroNet™ SC150® Extended-Term Photodegradable Double-Net Straw/Coconut Blanket

With a layer of 70% straw and 30% coconut fiber stitched between a heavyweight UV-stabilized polypropylene top net and a lightweight photodegradable polypropylene bottom net, the SC150® ECB has increased durability, erosion control capabilities and longevity. It is suitable for steeper slopes, medium-flow channels and other areas where it may take vegetation up to 24 months to grow in.

EroNet™ S150® Short-Term Photodegradable Double-Net Straw Blanket

The S150 ECB is made with a 100% straw fiber matrix stitched between lightweight photodegradable polypropylene top and bottom nets. The S150 ECB's double-net construction has greater structural integrity than single net blankets for use on steeper slopes and in channels with moderate water flow. It provides erosion protection and mulching for up to 12 months.

EroNet™ DS150™ Ultra Short-Term Photodegradable Double-Net Straw Blanket

The DS150™ ECB is suitable for high maintenance areas where close mowing will occur soon after installation. Special additives in the thread and top and bottom net ensure it degrades in adequate sunlight within 60 days.

EroNet™ S75® Short-Term Photodegradable Single-Net Straw Blanket

The S75® ECB protects and mulches moderate slopes and low-flow channels in low maintenance areas for up to 12 months. It is constructed of 100% straw fiber stitched with degradable thread to a lightweight photodegradable polypropylene top net.

EroNet™ DS75™ Ultra Short-Term Photodegradable Single-Net Straw Blanket

Designed for high maintenance areas where close mowing will occur soon after installation, the DS75™ ECB degrades within 45 days because of special additives in the thread and top net that facilitate rapid breakdown in adequate sunlight.

Every site has its own unique characteristics and challenges. EroNet Erosion Control Blankets are available in varying longevities to suit a variety of scenarios and conditions.

With our Erosion Control Materials Design Software (ECMDS), you can select either short-term, extended-term or long-term EroNet blankets based on your specific design needs.

Temporary RollMax™ Solutions

BIONET® EROSION CONTROL BLANKETS

BioNet® 100% biodegradable ECBs provide effective and all-natural erosion control and vegetation establishment in an environmentally and wildlife friendly manner. All products in the line are made of organic, biodegradable materials perfect for bioengineering applications, environmentally sensitive sites, shaded areas, stream banks and shorelines. Other advantages are:

- Little to no risk of wildlife entrapment
- Easy to sprig or plant through
- High durability, fiber retention and mechanical stability with Leno weave technology
- Increased water absorption with jute netting vs. polypropylene netting
- Improved blanket conformance and adherence to soil vs. polypropylene netting
- Enhanced erosion protection and mulching capabilities vs. polypropylene netting
- Durable, flexible and 100% biodegradable
- Lightweight jute netting requires no direct sunlight exposure to initiate degradation

BioNet® C125BN™ Long-Term Biodegradable Double-Net Coconut Blanket

A dense layer of coconut fiber stitched between jute nettings allows the C125BN™ ECB to provide more effective erosion protection and mulch than open weave coir nettings. This product performs in critical applications for up to 24 months.

BioNet® SC150BN™ Extended-Term Biodegradable Double-Net Straw/Coconut Blanket

The SC150BN™ ECB features a layer of 70% straw and 30% coconut fiber stitched between biodegradable jute top and bottom nettings. It provides erosion protection and mulching for up to 18 months in applications requiring extra strength and erosion control properties.

BioNet® S150BN™ Short-Term Biodegradable Double-Net Straw Blanket

The S150BN™ ECB is used for applications requiring greater durability and performance than a single-net biodegradable ECB can provide. Made with a 100% straw fiber matrix stitched between biodegradable jute top and bottom nettings, it offers up to 12 months of erosion protection and mulching action.

BioNet® S75BN™ Short-Term Biodegradable Single-Net Straw Blanket

Consisting of a 100% straw fiber matrix stitched to a biodegradable jute top nettings, the S75BN™ ECB provides better erosion protection and mulching action than conventional open weave jute nettings alone. The S75BN ECB provides up to 12 months of erosion control and vegetation growth support.

Design and Installation Tools

SHIFT, CONTROL, ENTER

Professional guidance on RECP selection, design and project planning is at your fingertips with Tensar's proprietary Erosion Control Materials Design Software (ECMDS®). This web-based program incorporates design methodologies from the Federal Highway Administration and United States Department of Agriculture to analyze your specific site conditions, and make quantified recommendations based on data from controlled laboratory and field research. ECMDS is a must-have if you face tough erosion and sediment control regulations. Best of all, it's free of charge, compliments of Tensar. To learn more and access the software directly, go to **www.ECMDS.com**.

INSTRUCTIONS INCLUDED

Proper anchoring patterns and rates must be used to achieve optimal results in RECP installation. View our installation guides for stapling patterns. Site specific staple pattern recommendations based on soil type and severity of application may be acquired through our ECMDS.

HOLD ON TIGHT

When under the pressure of severe conditions, even the best erosion control products can't function to their full potential without proper installation and anchoring. Tensar supplies a wide variety of fastener options for nearly every application and soil type.

For use in cohesive soils, wire staples are a cost-effective means to fasten RECPs. Available in 6 in., 8 in., 10 in. and 12 in. lengths, our U-shaped staples can reach to various depths to ensure adequate pull-out resistance. For installation using our handy Pin Pounder installation tool, 6 in. V-top staples or 6 in. circle top pins are available.

Our biodegradable BioStakes® are available in 4 in. and 6 in. lengths and provide an environmentally friendly alternative to metal staples. For an even more durable, deeper reaching yet all-natural anchoring option, our wood EcoStakes® are available in 6 in., 12 in., 18 in. and 24 in. lengths.

For severe applications needing the ultimate, long-lasting hold, try our 12 and 18 in. rebar staples, our 12 in. plastic ShoreMax® stakes, or our complete line of percussion earth anchors. The Tensar earth anchors reach deep into the soil strata to offer enhanced anchoring in the worst conditions. Our variety of earth anchors are designed for durability and holding power under extreme hydraulic stresses and adverse soil conditions *(Table 1)*.

For more information on the RollMax Systems or other systems within the Tensar Erosion Control Solutions, call **800-TENSAR-1** or visit **www.tensarcorp.com**.

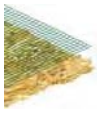
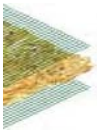
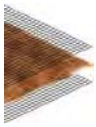
Earth Anchor Options

					EA 400		EA 680	
	Tendon Type (3/32 in. x 36 in.)	**Assembly Description**	**Fast Install**	**Economic Anchor**	**Stainless**	**Galvanized**	**Stainless**	**Galvanized**
End Piece Options with a PVC Face Plate	**Copper Stop Sleeve** with Stainless Steel Washer	Manually crimped to the stainless steel cable to secure the face plate.		X	X		X	
	Grip End Piece with Stainless Steel Washer	Three-dimensional, self-securing metal end piece that does not require manual crimping for tendon tensioning.	X	X	X	X	X	X
	Wedge Grip Piece	Self-securing end piece that installs flush to the face plate. Does not require manual crimping for tendon tensioning.	X		X	X	X	X
	Aluminum Stop Sleeve with Stainless Steel Washer	Manually crimped to the galvanized cable to secure the face plate.		X		X		X

TABLE 1

The complete line of RollMax™ products offers a variety of options for both short-term and permanent erosion control needs. Reference the RollMax Products Chart below to find the right solution for your next project.

RollMax Product Selection Chart

	TEMPORARY						
	ERONET						BIONET
							
	DS75	**DS150**	**S75**	**S150**	**SC150**	**C125**	**S75BN**
Longevity	45 days	60 days	12 mo.	12 mo.	24 mo.	36 mo.	12 mo.
Applications	Low Flow Channels 4:1-3:1 Slopes	Moderate Flow Channels 3:1-2:1 Slopes	Low Flow Channels 4:1-3:1 Slopes	Moderate Flow Channels 3:1-2:1 Slopes	Medium Flow Channels 2:1-1:1 Slopes	High-Flow Channels 1:1 and Greater Slopes	Low Flow Channels 4:1-3:1 Slopes
Design Permissible Shear Stress lbs/ft² (Pa)	Unvegetated 1.55 (74)	Unvegetated 1.75 (84)	Unvegetated 1.55 (74)	Unvegetated 1.75 (84)	Unvegetated 2.00 (96)	Unvegetated 2.25 (108)	Unvegetated 1.60 (76)
Design Permissible Velocity ft/s (m/s)	Unvegetated 5.00 (1.52)	Unvegetated 6.00 (1.52)	Unvegetated 5.00 (1.2)	Unvegetated 6.00 (1.83)	Unvegetated 8.00 (2.44)	Unvegetated 10.00 (3.05)	Unvegetated 5.00 (1.52)
Top Net	Lightweight accelerated photodegradable polypropylene 1.50 lbs/1000 ft² (0.73 kg/100 m²) approx wt	Lightweight accelerated photodegradable polypropylene 1.50 lbs/1000 ft² (0.73 kg/100 m²) approx wt	Lightweight photodegradable polypropylene 1.50 lbs/1000 ft² (0.73 kg/100 m²) approx wt	Lightweight photodegradable polypropylene 1.50 lbs/1000 ft² (0.73 kg/100 m²) approx wt	Heavyweight UV-stabilized polypropylene 2.9 lbs/1000 ft² (1.47 kg/100 m²) approx wt	Heavyweight UV-stabilized polypropylene 2.9 lbs/1000 ft² (1.47 kg/100 m²) approx wt	Leno woven. 100% biodegradable jute fiber 9.30 lbs/1000 ft² (4.53 kg/100 m²) approx wt
Center Net	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Fiber Matrix	Straw fiber 0.50 lbs/yd² (0.27 kg/m²)	Straw fiber 0.50 lbs/yd² (0.27 kg/m²)	Straw fiber 0.50 lbs/yd² (0.27 kg/m²)	Straw fiber 0.50 lbs/yd² (0.27 kg/m²)	Straw/coconut matrix 70% Straw 0.35 lbs/yd² (0.19 kg/m²) 30% Coconut 0.15 lbs/yd² (0.08 kg/m²)	Coconut fiber 0.50 lbs/yd² (0.27 kg/m²)	Straw fiber 0.50 lbs/yd² (0.27 kg/m²)
Bottom Net	N/A	Lightweight accelerated photodegradable polypropylene 1.50 lbs/1000 ft² (0.73 kg/100 m²) approx wt	N/A	Lightweight photodegradable polypropylene 1.50 lbs/1000 ft² (0.73 kg/100 m²) approx wt	Lightweight photodegradable polypropylene 1.50 lbs/1000 ft² (0.73 kg/100 m²) approx wt	Heavyweight UV-stabilized polypropylene 2.9 lbs/1000 ft² (1.47 kg/100 m²) approx wt	N/A
Thread	Accelerated degradable	Accelerated degradable	Degradable	Degradable	Degradable	UV-stabilized polypropylene	Biodegradable

	TEMPORARY			PERMANENT			
	BIONET			ERONET	VMAX		
	S150BN	**SC150BN**	**C125BN**	**P300**	**SC250**	**C350**	**P550**
Longevity	12 mo.	18 mo.	24 mo.	Permanent	Permanent	Permanent	Permanent
Applications	Moderate Flow Channels 3:1-2:1 Slopes	Medium Flow Channels 2:1-1:1 Slopes	High-Flow Channels 1:1 and Greater Slopes	High-Flow Channels 1:1 Slopes	High-Flow Channels 1:1 and Greater Slopes	High-Flow Channels 1:1 and Greater Slopes	Extreme High-Flow Channels 1:1 and Greater Slopes
Design Permissible Shear Stress lbs/ft^2 (Pa)	Unvegetated 1.85 (88)	Unvegetated 2.10 (100)	Unvegetated 2.35 (112)	Unvegetated 3.0 (144) Vegetated 8.0 (383)	Unvegetated 3.0 (144) Vegetated 10.0 (480)	Unvegetated 3.2 (153) Vegetated 12.0 (576)	Unvegetated 4.0 (191) Vegetated 14.0 (672)
Design Permissible Velocity ft/s (m/s)	Unvegetated 6.00 (1.83)	Unvegetated 8.00 (2.44)	Unvegetated 10.00 (3.05)	Unvegetated 9.00 (2.7) Vegetated 16.0 (4.9)	Unvegetated 9.5 (2.9) Vegetated 15.0 (4.6)	Unvegetated 10.5 (3.2) Vegetated 20.0 (6.0)	Unvegetated 12.5 (3.8) Vegetated 25.0 (7.6)
Top Net	Leno woven. 100% biodegradable jute fiber 9.30 lbs/1000 ft^2 (4.53 kg/100 m^2) approx wt	Leno woven. 100% biodegradable jute fiber 9.30 lbs/1000 ft^2 (4.53 kg/100 m^2) approx wt	Leno woven. 100% biodegradable jute fiber 9.30 lbs/1000 ft^2 (4.53 kg/100 m^2) approx wt	Heavyweight UV-stabilized polypropylene 5.0 lbs/1000 ft^2 (2.44 kg/100 m^2) approx wt	Heavyweight polypropylene 5.0 lbs/1000 ft^2 (2.44 kg/100 m^2) approx wt	Extra heavyweight polypropylene 8.0 lbs/1000 ft^2 (3.91 kg/100 m^2) approx wt	Ultra heavyweight polypropylene 24.0 lbs/1000 ft^2 (11.7 kg/100 m^2) approx wt
Center Net	N/A	N/A	N/A	N/A	Ultra heavyweight polypropylene – corrugated 24.0 lbs/1000 ft^2 (11.7 kg/100 m^2)	Ultra heavyweight polypropylene – corrugated 24.0 lbs/1000 ft^2 (11.7 kg/100 m^2)	Ultra heavyweight polypropylene – corrugated 24.0 lbs/1000 ft^2 (11.7 kg/100 m^2)
Fiber Matrix	Straw fiber 0.50 lbs/yd^2 (0.27 kg/m^2)	Straw/coconut matrix 70% Straw 0.35 lbs/yd^2 (0.19 kg/m^2) 30% Coconut 0.15 lbs/yd^2 (0.08 kg/m^2)	Coconut fiber 0.50 lbs/yd^2 (0.27 kg/m^2)	UV-stabilized polypropylene fiber 0.70 lbs/yd^2 (0.38 kg/m^2)	Straw/coconut matrix 70% Straw 0.35 lbs/yd^2 (0.19 kg/m^2) 30% Coconut 0.15 lbs/yd^2 (0.08 kg/m^2)	Coconut fiber 0.50 lbs/yd^2 (0.27 kg/m^2)	UV-stabilized polypropylene fiber 0.50 lbs/yd^2 (0.27 kg/m^2)
Bottom Net	Woven. 100% biodegradable jute fiber 7.70 lbs/1000 ft^2 (3.76 kg/100 m^2) approx wt	Woven. 100% biodegradable jute fiber 7.70 lbs/1000 ft^2 (3.76 kg/100 m^2) approx wt	Woven. 100% biodegradable jute fiber 7.70 lbs/1000 ft^2 (3.76 kg/100 m^2) approx wt	Heavyweight UV-stabilized polypropylene 3.0 lbs/1000 ft^2 (1.47 kg/100 m^2) approx wt	Heavyweight UV-stabilized polypropylene 5.0 lbs/1000 ft^2 (2.44 kg/100 m^2) approx wt	Extra heavyweight polypropylene 8.0 lbs/1000 ft^2 (3.91 kg/100 m^2) approx wt	Ultra heavyweight polypropylene 24.0 lbs/1000 ft^2 (11.7 kg/100 m^2) approx wt
Thread	Biodegradable	Biodegradable	Biodegradable	UV-stabilized polypropylene	UV-stabilized polypropylene	UV-stabilized polypropylene fiber	UV-stabilized polypropylene

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ROLLMAX™
ROLLED EROSION CONTROL

Specification Sheet – EroNet™ DS75™ Erosion Control Blanket

DESCRIPTION

The ultra short-term single net erosion control blanket shall be a machine-produced mat of 100% agricultural straw with a functional longevity of up to 45 days. (NOTE: functional longevity may vary depending upon climatic conditions, soil, geographical location, and elevation). The blanket shall be of consistent thickness with the straw evenly distributed over the entire area of the mat. The blanket shall be covered on the top side with a polypropylene netting having an approximate 0.50 x 0.50 (1.27 x 1.27 cm) mesh with photodegradable accelerators to provide breakdown of the netting within approximately 45 days, depending upon geographical location and elevation. The blanket shall be sewn together on 1.50 inch (3.81 cm) centers with degradable thread. The blanket shall be manufactured with a colored thread stitched along both outer edges (approximately 2-5 inches [5-12.5 cm] from the edge) as an overlap guide for adjacent mats.

The DS75 shall meet Type 1.C specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FP-03 Section 713.17

Material Content		
Matrix	100% Straw Fiber	0.5 lbs/sq yd (0.27 kg/sm)
Netting	Top side only, lightweight photodegradable with photo accelerators	1.5 lb/1000 sq ft (0.73 g/sm)
Thread	Degradable	

Standard Roll Sizes			
Width	6.67 (2.03 m)	8.0 ft (2.4 m)	16 ft (4.87 m)
Length	108 ft (32.92 m)	112 ft (34.14 m)	108 ft (32.92 m)
Weight ± 10%	40 lbs (18.14 kg)	50 lbs (22.68 kg)	96 lbs (43.54 kg)
Area	80 sq yd (66.9 sm)	100 sq yd (83.61 sm)	192 sq yd (165.5 sm)

Index Property	Test Method	Typical
Thickness	ASTM D6525	0.45 in. (11.43 mm)
Resiliency	ECTC Guidelines	78.8%
Water Absorbency	ASTM D1117	375%
Mass/Unit Area	ASTM 6475	8.57 oz/sy (291 g/sm)
Swell	ECTC Guidelines	15%
Smolder Resistance	ECTC Guidelines	Yes
Stiffness	ASTM D1388	6.31 oz-in
Light Penetration	ASTM D6567	10%
Tensile Strength - MD	ASTM D6818	105.6 lbs/ft (1.57 kN/m)
Elongation - MD	ASTM D6818	34%
Tensile Strength - TD	ASTM D6818	42.0 lbs/ft (0.62 kN/m)
Elongation - TD	ASTM D6818	25.2%
Biomass Improvement	ASTM D7322	286%

Design Permissible Shear Stress	
Unvegetated Shear Stress	1.55 psf (74 Pa)
Unvegetated Velocity	5.00 fps (1.52 m/s)

Slope Design Data: C Factors			
	Slope Gradients (S)		
Slope Length (L)	≤ 3:1	3:1 – 2.1	≥ 2:1
≤ 20 ft (6 m)	0.029	N/A	N/A
20-50 ft	0.11	N/A	N/A
≥ 50 ft (15.2 m)	0.19	N/A	N/A

Roughness Coefficients – Unveg.	
Flow Depth	Manning's n
≤ 0.50 ft (0.15 m)	0.055
0.50 – 2.0 ft	0.055-0.021
≥ 2.0 ft (0.60 m)	0.021

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Specification Sheet – EroNet™ C125® Erosion Control Blanket

DESCRIPTION

The long-term double net erosion control blanket shall be a machine-produced mat of 100% coconut fiber with a functional longevity of up to 36 months. (NOTE: functional longevity may vary depending upon climatic conditions, soil, geographical location, and elevation). The blanket shall be of consistent thickness with the coconut evenly distributed over the entire area of the mat. The blanket shall be covered on the top and bottom sides with a heavyweight photodegradable polypropylene netting having ultraviolet additives to delay breakdown and an approximate 0.63 x 0.63 in (1.59 x 1.59 cm) mesh. The blanket shall be sewn together on 1.50 inch (3.81 cm) centers with degradable thread. The blanket shall be manufactured with a colored thread stitched along both outer edges (approximately 2-5 inches [5-12.5 cm] from the edge) as an overlap guide for adjacent mats.

The C125 shall meet Type 4 specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FP-03 Section 713.17

Material Content		
Matrix	100% Coconut Fiber	0.5 lbs/sq yd (0.27 kg/sm)
Netting	Heavyweight photodegradable with UV additives	3 lbs/1000 sq ft (1.47 g/sm)
Thread	Black polypropylene	

Standard Roll Sizes		
Width	6.67 (2.03 m)	8 ft (2.44 m)
Length	108 ft (32.92 m)	112 ft (35.14 m)
Weight ± 10%	44 lbs (19.95 kg)	56.25 (25.5 kg)
Area	80 sq yd (66.9 sm)	100 sq yd (83.61 sm)

Index Property	Test Method	Typical
Thickness	ASTM D6525	0.22 in. (5.59 mm)
Resiliency	ECTC Guidelines	82%
Water Absorbency	ASTM D1117	167%
Mass/Unit Area	ASTM 6475	7.73 oz/sy (262.8 g/sm)
Swell	ECTC Guidelines	13%
Smolder Resistance	ECTC Guidelines	Yes
Stiffness	ASTM D1388	0.75 oz-in
Light Penetration	ASTM D6567	16.6%
Tensile Strength - MD	ASTM D6818	472.8 lbs/ft (7.01 kN/m)
Elongation - MD	ASTM D6818	25.6%
Tensile Strength - TD	ASTM D6818	225.6 lbs/ft (3.35 kN/m)
Elongation - TD	ASTM D6818	33.9%
Biomass Improvement	ASTM 7322	257%

Design Permissible Shear Stress	
Unvegetated Shear Stress	2.25 psf (108 Pa)
Unvegetated Velocity	10.0 fps (3.05 m/s)

Slope Design Data: C Factors			
	Slope Gradients (S)		
Slope Length (L)	≤ 3:1	3:1 – 2.1	≥ 2:1
≤ 20 ft (6 m)	0.001	0.029	0.082
20-50 ft	0.036	0.060	0.096
≥ 50 ft (15.2 m)	0.070	0.090	0.110

Roughness Coefficients – Unveg.	
Flow Depth	Manning's n
≤ 0.50 ft (0.15 m)	0.022
0.50 – 2.0 ft	0.022-0.014
≥ 2.0 ft (0.60 m)	0.014

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Specification Sheet – VMax® C350® Turf Reinforcement Mat

DESCRIPTION

The composite turf reinforcement mat (C-TRM) shall be a machine-produced mat of 100% coconut fiber matrix incorporated into permanent three-dimensional turf reinforcement matting. The matrix shall be evenly distributed across the entire width of the matting and stitch bonded between super heavy duty UV-stabilized nettings with 0.50 x 0.50 in. (1.27 x 1.27 cm) openings, an ultra heavy duty UV-stabilized, dramatically corrugated (crimped) intermediate netting with 0.5 x 0.5 in. (1.27 x 1.27 cm) openings, and covered by a super heavy duty UV-stabilized nettings with 0.50 x 0.50 in. (1.27 x 1.27 cm) openings. The middle corrugated netting shall form prominent closely spaced ridges across the entire width of the mat. The three nettings shall be stitched together on 1.50 in. (3.81 cm) centers with UV-stabilized polypropylene thread to form permanent three-dimensional turf reinforcement matting. All mats shall be manufactured with colored thread stitched along both outer edges as an overlap guide for adjacent mats.

The C350 shall meet Type 5A, B and C specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) *FP-03 Section 713.18*.

Material Content		
Matrix	100% Coconut Fiber	0.5 lb/sy (0.27 kg/sm)
Netting	Top and Bottom, UV-Stabilized Polypropylene	8 lb/1000 sf (3.91 kg/100 sm)
	Middle, Corrugated UV-Stabilized Polypropylene	24 lb/1000 sf (11.7 kg/100 sm)
Thread	Polypropylene, UV Stable	

Standard Roll Sizes	
Width	6.5 ft (2.0 m)
Length	55.5 ft (16.9 m)
Weight ± 10%	37 lbs (16.8 kg)
Thread	40 sy (33.4 sm)

Index Property	Test Method	Typical
Thickness	ASTM D6525	0.73 in. (18.54 mm)
Resiliency	ASTM D6524	90%
Density	ASTM D792	0.917 g/cm^3
Mass/Unit Area	ASTM D6566	18.36 oz/sy (624 g/sm)
UV Stability	ASTM D4355/ 1000 HR	86%
Porosity	ECTC Guidelines	99%
Stiffness	ASTM D1388	0.24 in.-lb (275990 mg-cm)
Light Penetration	ASTM D6567	7.2%
Tensile Strength – MD	ASTM D6818	585.8 lbs/ft (8.70 kN/m)
Elongation – MD	ASTM D6818	45.3%
Tensile Strength – TD	ASTM D6818	687.6 lbs/ft (10.20 kN/m)
Elongation – TD	ASTM D6818	19.5%
Biomass Improvement	ASTM D7322	380%

Design Permissible Shear Stress		
	Short Duration	**Long Duration**
Phase 1 Unvegetated	3.2 psf (153 Pa)	3.0 psf (144 Pa)
Phase 2 Partially Veg.	10.0 psf (480 Pa)	10.0 psf (480 Pa)
Phase 3 Fully Veg.	12.0 psf (576 Pa)	10.0 psf (480 Pa)
Unvegetated Velocity	10.5 fps (3.2 m/s)	
Vegetated Velocity	20 fps (6.0 m/s)	

Slope Design Data: C Factors			
	Slope Gradients (S)		
Slope Length (L)	≤ 3:1	3:1 – 2:1	≥ 2:1
≤ 20 ft (6 m)	0.0005	0.015	0.043
20-50 ft	0.018	0.031	0.050
≥ 50 ft (15.2 m)	0.035	0.047	0.057

Roughness Coefficients – Unveg.	
Flow Depth	Manning's n
≤ 0.50 ft (0.15 m)	0.041
0.50 – 2.0 ft	0.040-0.013
≥ 2.0 ft (0.60 m)	0.012

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Specification Sheet – EroNet™ SC150® Erosion Control Blanket

DESCRIPTION

The extended-term double net erosion control blanket shall be a machine-produced mat of 70% agricultural straw and 30% coconut fiber with a functional longevity of up to 24 months. (NOTE: functional longevity may vary depending upon climatic conditions, soil, geographical location, and elevation). The blanket shall be of consistent thickness with the straw and coconut evenly distributed over the entire area of the mat. The blanket shall be covered on the top side with a heavyweight photodegradable polypropylene netting having ultraviolet additives to delay breakdown and an approximate 0.63 x 0.63 in (1.59 x 1.59 cm) mesh, and on the bottom side with a lightweight photodegradable polypropylene netting with an approximate 0.50 x 0.50 (1.27 x 1.27 cm) mesh. The blanket shall be sewn together on 1.50 inch (3.81 cm) centers with degradable thread. The blanket shall be manufactured with a colored thread stitched along both outer edges (approximately 2-5 inches [5-12.5 cm] from the edge) as an overlap guide for adjacent mats.

The SC150 shall meet Type 3.B specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FP-03 Section 713.17

Material Content		
Matrix	70% Straw Fiber 30% Coconut Fiber	0.35 lbs/sq yd (0.19 kg/sm) 0.15 lbs/sq yd (0.08 kg/sm)
Netting	Top: Heavyweight photodegradable with UV additives	3 lbs/1000 sq ft (1.47 kg/100 sm)
	Bottom: lighweight photodegradable	1.5 lb/1000 sq ft (0.73 kg/100 sm)
Thread	Degradable	

Standard Roll Sizes			
Width	6.67 ft (2.03 m)	8 ft (2.4 m)	16.0 ft (4.87 m)
Length	108 ft (32.92 m)	112 ft (34.14 m)	108 ft (32.92 m)
Weight ± 10%	44 lbs (19.95 kg)	55 lbs (24.95 kg)	105.6 lbs (47.9 kg)
Area	80 sq yd (66.9 sm)	100 sq yd (83.61 sm)	192 sq yd (165.6 sm)

Index Property	Test Method	Typical
Thickness	ASTM D6525	0.35 in. (8.89 mm)
Resiliency	ECTC Guidelines	75%
Water Absorbency	ASTM D1117	342%
Mass/Unit Area	ASTM D6475	7.87 oz/sy (267.6 g/sm)
Swell	ECTC Guidelines	30%
Smolder Resistance	ECTC Guidelines	Yes
Stiffness	ASTM D1388	1.11 oz-in
Light Penetration	ASTM D6567	6.2%
Tensile Strength - MD	ASTM D6818	362.4 lbs/ft (5.37 kN/m)
Elongation - MD	ASTM D6818	29.4%
Tensile Strength - TD	ASTM D6818	136.8 lbs/ft (2.03 kN/m)
Elongation - TD	ASTM D6818	27.6%
Biomass Improvement	ASTM D7322	481%

Design Permissible Shear Stress	
Unvegetated Shear Stress	2.00 psf (96 Pa)
Unvegetated Velocity	8.0 fps (2.44 m/s)

Slope Design Data: C Factors			
	Slope Gradients (S)		
Slope Length (L)	≤ 3:1	3:1 – 2:1	≥ 2:1
≤ 20 ft (6 m)	0.001	0.048	0.100
20-50 ft	0.051	0.079	0.145
≥ 50 ft (15.2 m)	0.10	0.110	0.190

NTPEP Large-Scale Slope
ASTM D6459 - C-factor = 0.031

Roughness Coefficients – Unveg.	
Flow Depth	Manning's n
≤ 0.50 ft (0.15 m)	0.050
0.50 – 2.0 ft	0.050-0.018
≥ 2.0 ft (0.60 m)	0.018

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Specification Sheet – VMax® SC250® Turf Reinforcement Mat

DESCRIPTION

The composite turf reinforcement mat (C-TRM) shall be a machine-produced mat of 70% straw and 30% coconut fiber matrix incorporated into permanent three-dimensional turf reinforcement matting. The matrix shall be evenly distributed across the entire width of the matting and stitch bonded between a heavy duty UV stabilized nettings with 0.50 x 0.50 inch (1.27 x 1.27 cm) openings, an ultra heavy UV stabilized, dramatically corrugated (crimped) intermediate netting with 0.5 x 0.5 inch (1.27 x 1.27 cm) openings, and covered by an heavy duty UV stabilized nettings with 0.50 x 0.50 inch (1.27 x 1.27 cm) openings. The middle corrugated netting shall form prominent closely spaced ridges across the entire width of the mat. The three nettings shall be stitched together on 1.50 inch (3.81cm) centers with UV stabilized polypropylene thread to form permanent three-dimensional turf reinforcement matting. All mats shall be manufactured with a colored thread stitched along both outer edges as an overlap guide for adjacent mats.

The SC250 shall meet Type 5A, 5B, and 5C specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FP-03 Section 713.18

Material Content		
Matrix	70% Straw Fiber	0.35 lb/sq yd (0.19 kg/sm)
	30% Coconut Fiber	0.15 lbs/sq yd (0.08 kg/sm)
Netting	Top and Bottom, UV-Stabilized Polypropylene	5 lb/1000 sq ft (2.44 kg/100 sm)
	Middle, Corrugated UV-Stabilized Polypropylene	24 lb/1000 sf (11.7 kg/100 sm)
Thread	Polypropylene, UV Stable	

Standard Roll Sizes	
Width	6.5 ft (2.0 m)
Length	55.5 ft (16.9 m)
Weight ± 10%	34 lbs (15.42 kg)
Area	40 sq yd (33.4 sm)

Index Property	Test Method	Typical
Thickness	ASTM D6525	0.62 in. (15.75 mm)
Resiliency	ASTM 6524	95.2%
Density	ASTM D792	0.891 g/cm^3
Mass/Unit Area	ASTM 6566	16.13 oz/sy (548 g/sm)
UV Stability	ASTM D4355/ 1000 HR	100%
Porosity	ECTC Guidelines	99%
Stiffness	ASTM D1388	222.65 oz-in.
Light Penetration	ASTM D6567	4.1%
Tensile Strength – MD	ASTM D6818	709 lbs/ft (10.51 kN/m)
Elongation – MD	ASTM D6818	23.9%
Tensile Strength – TD	ASTM D6818	712 lbs/ft (10.56 kN/m)
Elongation – TD	ASTM D6818	36.9%
Biomass Improvement	ASTM D7322	441%

Design Permissible Shear Stress		
	Short Duration	**Long Duration**
Phase 1: Unvegetated	3.0 psf (144 Pa)	2.5 psf (120 Pa)
Phase 2: Partially Veg.	8.0 psf (383 Pa)	8.0 psf (383 Pa)
Phase 3: Fully Veg.	10.0 psf (480 Pa)	8.0 psf (383 Pa)
Unvegetated Velocity	9.5 fps (2.9 m/s)	
Vegetated Velocity	15 fps (4.6 m/s)	

Slope Design Data: C Factors			
	Slope Gradients (S)		
Slope Length (L)	≤ 3:1	3:1 – 2.1	≥ 2:1
≤ 20 ft (6 m)	0.0010	0.0209	0.0507
20-50 ft	0.0081	0.0266	0.0574
≥ 50 ft (15.2 m)	0.0455	0.0555	0.081

Roughness Coefficients – Unveg.	
Flow Depth	Manning's n
≤ 0.50 ft (0.15 m)	0.040
0.50 – 2.0 ft	0.040-0.012
≥ 2.0 ft (0.60 m)	0.011

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Specification Sheet – VMax® P550® Turf Reinforcement Mat

DESCRIPTION

The composite turf reinforcement mat (C-TRM) shall be a machine-produced mat of 100% UV stable polypropylene fiber matrix incorporated into permanent three-dimensional turf reinforcement matting. The matrix shall be evenly distributed across the entire width of the matting and stitch bonded between a ultra heavy duty UV stabilized nettings with 0.50 x 0.50 inch (1.27 x 1.27 cm) openings, an ultra heavy UV stabilized, dramatically corrugated (crimped) intermediate netting with 0.5 x 0.5 inch (1.27 x 1.27 cm) openings, and covered by an ultra heavy duty UV stabilized nettings with 0.50 x 0.50 inch (1.27 x 1.27 cm) openings. The middle corrugated netting shall form prominent closely spaced ridges across the entire width of the mat. The three nettings shall be stitched together on 1.50 inch (3.81cm) centers with UV stabilized polypropylene thread to form permanent three-dimensional turf reinforcement matting. All mats shall be manufactured with a colored thread stitched along both outer edges as an overlap guide for adjacent mats.

The P550 shall meet Type 5A, 5B, and 5C specification requirements established by the Erosion Control Technology Council (ECTC) and Federal Highway Administration's (FHWA) FP-03 Section 713.18

Material Content		
Matrix	100% UV stable polypropylene fiber	0.5 lb/sy (0.27 kg/sm)
Netting	Top and Bottom, UV-Stabilized Polypropylene	24 lb/1000 sf (11.7 kg/100 sm)
	Middle, Corrugated UV-Stabilized Polypropylene	24 lb/1000 sf (11.7 kg/100 sm)
Thread	Polypropylene, UV Stable	

Standard Roll Sizes	
Width	6.5 ft (2.0 m)
Length	55.5 ft (16.9 m)
Weight ± 10%	52 lbs (23.59 kg)
Area	40 sy (33.4 sm)

Index Property	Test Method	Typical
Thickness	ASTM D6525	0.72 in. (18.29 mm)
Resiliency	ASTM 6524	95%
Density	ASTM D792	0.892 g/cm^3
Mass/Unit Area	ASTM 6566	21.25 oz/sy (723 g/sm)
UV Stability	ASTM D4355/ 1000 HR	100%
Porosity	ECTC Guidelines	96%
Stiffness	ASTM D1388	366.3 oz-in.
Light Penetration	ASTM D6567	16.5%
Tensile Strength – MD	ASTM D6818	1421 lbs/ft (21.07 kN/m)
Elongation – MD	ASTM D6818	40.5%
Tensile Strength – TD	ASTM D6818	1191.6 lbs/ft (17.67 kN/m)
Elongation – TD	ASTM D6818	28.8%
Biomass Improvement	ASTM D7322	378%

Design Permissible Shear Stress		
	Short Duration	**Long Duration**
Phase 1: Unvegetated	4.0 psf (191 Pa)	3.25 psf (156 Pa)
Phase 2: Partially Veg.	12.0 psf (576 Pa)	12.0 psf (576 Pa)
Phase 3: Fully Veg.	14.0 psf (672 Pa)	12.0 psf (576 Pa)
Unvegetated Velocity	12.5 fps (3.8 m/s)	
Vegetated Velocity	25 fps (7.6 m/s)	

NTPEP ASTM D6460 Large Scale Channel	
Vegetated Shear Stress	>13.2 psf (632 Pa)
Vegetated Velocity	>24.5 fps (7.47 m/s)

Slope Design Data: C Factors			
	Slope Gradients (S)		
Slope Length (L)	≤ 3:1	3:1 – 2.1	≥ 2:1
≤ 20 ft (6 m)	0.0005	0.015	0.043
20-50 ft	0.0173	0.031	0.050
≥ 50 ft (15.2 m)	0.035	0.047	0.057

Roughness Coefficients – Unveg.	
Flow Depth	Manning's n
≤ 0.50 ft (0.15 m)	0.041
0.50 – 2.0 ft	0.040-0.013
≥ 2.0 ft (0.60 m)	0.013

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Specification Sheet – VMax® W3000™ High-Performance Turf Reinforcement Mat

DESCRIPTION

The VMax® W3000™ high performance turf reinforcement mat (HPTRM) is a machine-produced mat of 100% UV-stabilized high denier poly yarns woven into permanent, high strength three-dimensional turf reinforcement matting. The mat consists of a woven bottom layer integrally interlaced into a woven corrugated middle layer, with poly tendons on the top side spanning the entire machine direction. The mat is designed to provide sufficient thickness, optimum open area and three-dimensionality for effective erosion control and vegetation reinforcement against high flow induced shear forces. The mat has high tensile strength providing excellent damage resistance and increased bearing capacity of vegetated soils subject to heavy loads from maintenance equipment and other vehicular traffic. The corrugated structure provides a highly frictional surface to prevent sod slippage when sod is installed over the mat. When used as surface protection without sod overlay, the corrugated structure encapsulates the seed and soil in place while promoting self-soil infilling of the system.

Material Content		
Bottom	100% UV stable poly fiber weave	Black/Green
Corrugated Middle	100% UV stable poly fiber weave	Black/Green
Top	100% UV stable Poly Tendons	Green

Standard Roll Sizes	
Width	10 ft (3.05 m)
Length	90 ft (27.4 m)
Weight ± 10%	90 lbs (41.0 kg)
Area	100 sy (83.6 sm)

Index Property	Test Method	Typical
Thickness	ASTM D6525	0.40 in. (10.2 mm)
Resiliency	ASTM D6524	98%
Mass/Unit Area	ASTM 6566	14.7oz/sy (495 g/m2)
Tensile Strength - MD	ASTM D6818	3600 lbs/ft (52.6 kN/m)
Elongation - MD	ASTM D6818	35%*
Tensile Strength - TD	ASTM D6818	3800 lbs/ft (55.5 kN/m)
Elongation - TD	ASTM D6818	20%*
Light Penetration	ASTM D6567	12%
UV Stability	ASTM D4355	>80% @3000 hrs

** Measured on fabric prior to corrugation for true measurement of base fabric elongation*

Design Permissible Shear Stress*	
Vegetated Shear Stress	16 psf (766 Pa)
Vegetated Velocity	25 fps (7.6 m/s)

**Values extrapolated through ASTM D6460 testing*

ASTM D6460 Large Scale Channel	
Vegetated Shear Stress	>13.2 psf (632 Pa)
Vegetated Velocity	>24.5 fps (7.47 m/s)

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800-TENSAR-1
tensarcorp.com

Tensar International Corporation warrants that at the time of delivery the product furnished hereunder shall conform to the specification stated herein. Any other warranty including merchantability and fitness for a particular purpose, are hereby executed. If the product does not meet specifications on this page and Tensar is notified prior to installation, Tensar will replace the product at no cost to the customer. **This product specification supersedes all prior specifications for the product described above and is not applicable to any products shipped prior to January 1, 2012.**

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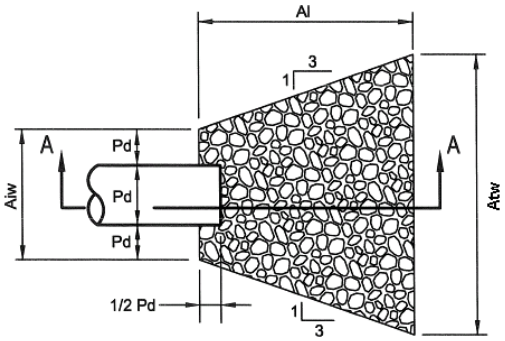
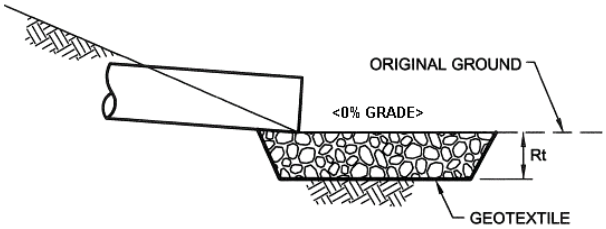
ATTACHMENT 3.3
RIPRAP APRON WORKSHEET

STANDARD E&S WORKSHEET # 20
Riprap Apron Outlet Protection

PROJECT NAME: Leidy South – Hensel Replacement
LOCATION: Hensel Replacement – Eastern Terminus Main Line Valve
PREPARED BY: FPV DATE: 05/12/2020
CHECKED BY: KCC DATE: 05/12/2020



PLAN VIEW

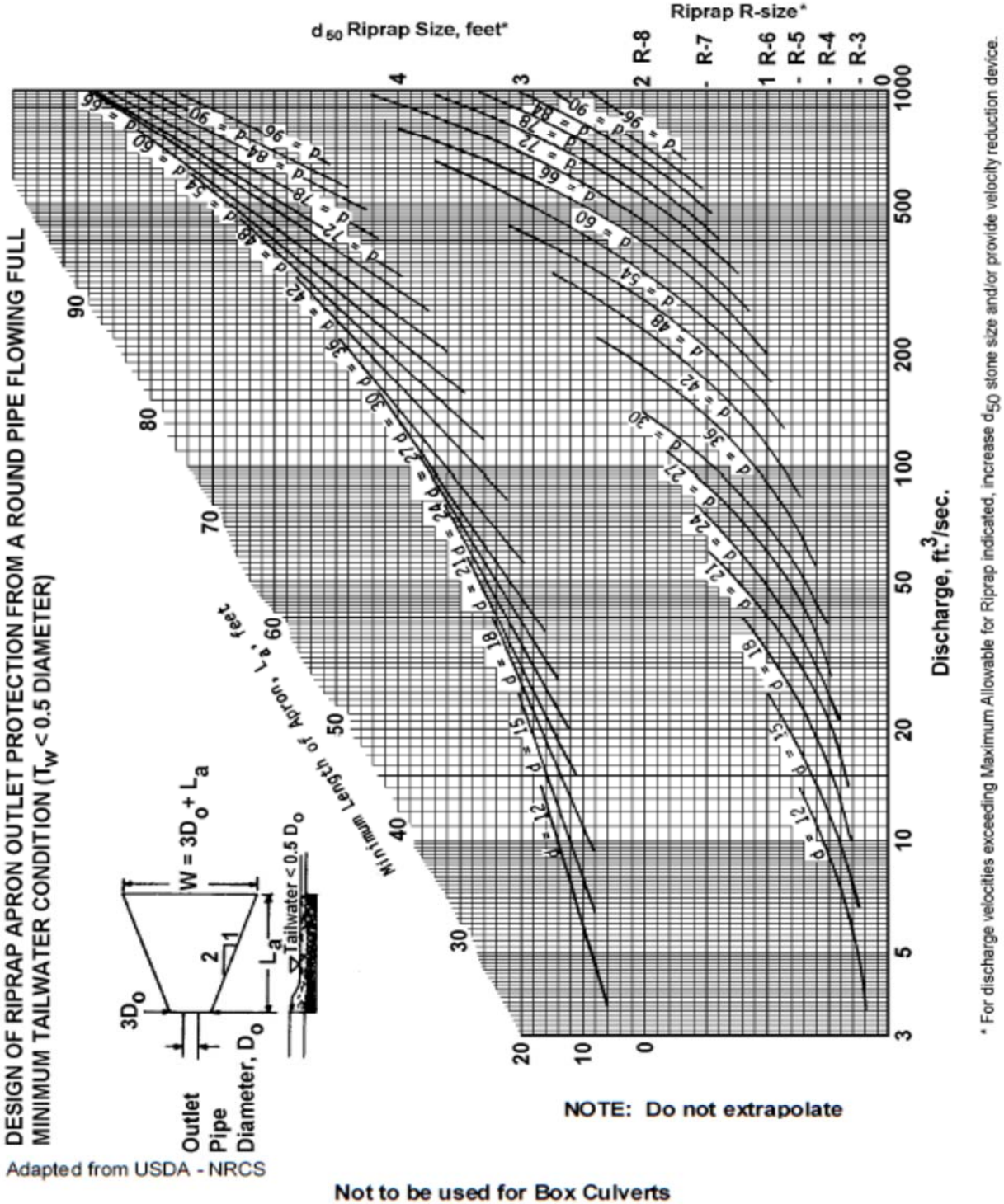


SECTION A - A

NO.	PIPE DIA. Do (in.)	TAIL WATER COND. (Max or Min)	MAN. "n" FOR PIPE	PIPE SLOPE (FT/FT)	Q (CFS)	V* (FPS)	RIPRAP SIZE	Rt (in)	Al (ft)	Aiw (ft)	Atw (ft)
Culvert #1 Outlet	12	Min	0.012	0.048	0.67	0.85	R-3	9	6	3	9

***:The anticipated velocity (V) should not exceed the maximum permissible shown in Table 6.6 for the proposed riprap protection. Adjust for less than full pipe flow. Use Manning's equation to calculate velocity for pipe slopes ≥ 0.05 ft/ft.**

FIGURE 9.3
Riprap Apron Design, Minimum Tailwater Condition



* For discharge velocities exceeding Maximum Allowable for Riprap indicated, increase d_{50} stone size and/or provide velocity reduction device.

Adapted from USDA - NRCS

Not to be used for Box Culverts

ATTACHMENT 3.4
CULVERT SCHEDULE

Hensel Replacement Culvert Schedule

I.D.	Drainage Area [ac]	Req'd Flow [cfs]	Length (ft)	Inlet Invert (ft)	Outlet Invert (ft)	Slope [ft/ft]	No. of Pipes	Pipe Diameter [in]
CULVERT #1	0.14	0.67	37.0	1686.2	1686.0	0.005	1	12