Resource Report 7
Soils

FERC Docket No. CP22-___-000

Equitrans, L.P.
Ohio Valley Connector Expansion Project
Greene County, Pennsylvania,
Wetzel County, West Virginia,
and Monroe County, Ohio

January 2022

Public Information

RESOURCE REPORT 7 - SOILS	
SUMMARY OF FERC FILING INFORMATION	
Information	**Found In**
Minimum Filing Requirements	
1. Identify, describe, and group by milepost the soil affected by the proposed pipeline and aboveground facilities - Title 18 Code of Federal Regulations (CFR) part (§) 380.12(I)(1)	Section 7.1 Table 7.1-1 (Appendix 7-A) Section 7.2 Table 7.2-1 (Appendix 7-A)
2. For aboveground facilities that would occupy sites over 5 acres, determine the acreage of prime farmland soils that would be affected by construction and operations - 18 CFR § 380.12(I)(2)	Section 7.2 Table 7.2-1 (Appendix 7-A)
3. Describe by milepost potential impacts on soils - 18 CFR § 380.12(I)(3,4)	Section 7.2 Table 7.2-1 (Appendix 7-A)
4. Identify proposed mitigation to minimize impact on soils and compare with the staff's *Upland Erosion Control, Revegetation, and Maintenance Plan* - 18CFR § 380.12(I)(5)	Section 7.4
Additional Information Often Missing and Resulting in Data Requests	
Information	**Found In**
5. If the applicant generally proposes to adopt the Federal Energy Regulatory Commission Staff's *Upland Erosion Control, Revegetation, and Maintenance Plan*, except at certain locations, identify on a site-specific basis locations where alternative measures are proposed and describe the alternative measures that will ensure an equal or greater level of protection.	Resource Report 1
6. Identify invasive species and/or noxious weeds that occur in the area and measures to prevent the introduction or spread of these species (if not addressed in Resource Report 3.)	Resource Report 3
7. Provide documentation of consultation with the U.S. Department of Agriculture's Natural Resources Conservation Service or other applicable agencies regarding seed mixes, erosion control, and invasive species/noxious weeds.	Section 7.3

Table of Contents

Acronyms and Abbreviations

ASA	Agricultural Security Areas
ATWS	Additional Temporary Workspace
BMPs	Best Management Practices
CFR	Code of Federal Regulations
EI	Environmental Inspector
Equitrans	Equitrans, L.P.
ESC	erosion and sediment control
ESCP	Erosion and Sediment Control Plan
FERC	Federal Energy Regulatory Commission
LCC	Land Capability Classification
MP	milepost
OH	Ohio
OHEPA	Ohio Environmental Protection Agency
OVC	Ohio Valley Connector
PA	Pennsylvania
PADA	Pennsylvania Department of Agriculture
PADEP	Pennsylvania Department of Environmental Protection
Plan	FERC's Upland Erosion Control, Revegetation, and Maintenance Plan
Procedures	FERC's Wetland and Waterbody Construction and Mitigation Procedures
Project	Ohio Valley Connector Expansion
ROW	right-of-way
SA	staging/parking area
SPCC Plan	Spill Prevention, Control, and Countermeasure Plan
USDA-NRCS	United States Department of Agriculture Natural-Resources Conservation Service
USEPA	United States Environmental Protection Agency
WEG	Wind Erodibility Group
WV	West Virginia
WVDEP	West Virginia Department of Environmental Protection

7.0 Soils

A detailed description and overview map of Equitrans, L.P.'s (Equitrans') Ohio Valley Connector Expansion (Project) are provided in Resource Report 1, General Project Description.

Resource Report 7 describes the existing physical and interpretive characteristics of soils that will be crossed by the Project, the activities of pipeline and associated facility construction and operations that will affect soils, the impact of construction and operation on soils, and where appropriate, mitigation measures that will be included in pipeline construction and operation to minimize effects on soils.

7.1 Existing Soil Conditions

Soil information for the Project was obtained from the United States Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS) Soil Survey of Monroe County, Ohio (OH); Greene County, Pennsylvania (PA); and Wetzel County, West Virginia (WV); and through custom searches of the USDA-NRCS Web Soil Survey for the Project area (USDA-NRCS, 2021a). Soil descriptions were determined by searching USDA-NRCS Official Soil Series Descriptions (USDA-NRCS, 2021d).

Soils that exhibit similar physical and chemical properties, horizon composition, and depth comprise a soil series. Soil series can be subdivided into map units (i.e., soil phase or soil type). Map unit properties used to divide soil series can include slope, stone components, acidity, water content, and depth to bedrock. The geographic position of a soil series map unit provides useful information such as drainage class and geologic origin, which can be used to plan soil management during design, construction, and restoration phases of the Project. Soil series and map unit designations can also vary by region, state, and county. Physical characteristics for each soil in the Project area, including prime farmland, farmland of state importance, erodibility, hydric soils, depth to bedrock, compaction potential, and revegetation potential are included where applicable (USDA-NRCS, 2021b).

Soils map units crossed by the Project are detailed in Table 7.1-1 (Appendix 7-A). Dominant soil types along the pipeline route are described below. Table 7.2-1 lists soil characteristics by milepost (MP), and Table 7.2-2 (Appendix 7-A) lists acres of soil characteristics affected by the Project. A description of soils crossed by the Project facilities are below, with further discussion regarding construction and operation impacts included in Section 7.2.

- **Greene County, PA**
  - Culleoka-Upshur complex, eight to 25 percent slopes (CkC, CkD) - The Culleoka series is comprised of moderately deep, well-drained soils, formed in colluvium or residuum from siltstone or interbedded shale, limestone, siltstone, and fine-grained sandstone. This series is found on steep upland hillsides and narrow ridge crests with slopes ranging from two to 70 percent. Permeability is moderate to moderately rapid, and depth to bedrock is 20 to 40 inches. The Upshur series consists of deep to very deep, well-drained soils found on hills and slopes ranging from zero to 70 percent. It is formed in residuum from red clayey shale or mudstone; calcareous and/or interbedded with thin layers of siltstone in some pedons. Permeability is slow, and depth to bedrock is greater than 40 inches.
  - Dormont Silt Loam, three to 25 percent slopes (DoB, DoC, DoD) - The Dormont series consists of deep and very deep, moderately well-drained soils formed in fine-loamy residuum weathered from sandstone and shale. This series occurs on uplands, hillslopes, shoulders, and backslopes. These soils are very strongly acid to slightly acid in the upper part of the solum, and strongly acid to slightly alkaline in the lower solum and substratum, except where limed. Lithic bedrock is at depths greater than 40 inches.

- Dormont-Culleoka Complex, 25 to 50 percent slopes (DtD, DtF) - The Dormont-Culleoka complex represents a combination of the Dormont and Culleoka soil series, as described above.
- Fluvaquents, loamy zero to three percent slopes (Fa) - Fluvaquent soils are nearly level, moderately deep hydric silt loams found in floodplains. The soils are comprised of alluvium and have a highly variable texture. The soil is poorly drained with a water table between zero-inch to 12 inches and the hazard for erosion is slight. Depth to the restrictive feature is more than 80 inches below the soil surface.
- Glenford Silt Loam, zero to three percent slopes (GdA) - Very deep, moderately well-drained soils formed in stratified Wisconsinan age glaciolacustrine or stream sediments derived from sandstone and shale comprise the Glenford series. The permeability of the Glenford soils is moderately slow and the availability is high. These soils occur on terraces in valleys, till plains, lake plains, and outwash plains. Saturated hydraulic conductivity is moderately high throughout the soil.
- Matewan channery loam, eight to 15 percent slopes (DaC) - The Matewan series consists of moderately deep, well to somewhat excessively drained soil, formed in residuum from gray or brown acid sandstone, interbedded in places with shale and siltstone. It is found on the crests of hills and mountains on slopes of three to 80 percent. Permeability is moderately rapid to rapid, and depth to bedrock is less than 40 inches.
- Newark Silt Loam, zero to three percent slopes (Nw) - The Newark series consists of nearly level, very deep, somewhat poorly-drained soils formed in mixed alluvium from limestone, shale, siltstone, sandstone, and loess on nearly level floodplains and in depressions. Saturated hydraulic conductivity is moderately high or high in the mineral layer. Runoff is negligible or very low, permeability is moderate, and the available water capacity is high. A seasonal water table is at six to 18 inches and the hazard of erosion is slight; occasional to frequent flooding or ponding is typical.
- Udorthents, smoothed; gently sloping, moderately steep, and steep (UdB, UdD, UdF) - Udorthents are a general classification of soils. These units may consist of very shallow to deep soils on uplands and floodplains. Areas of these soils are typically altered for housing or commercial use because the upper soil material has been removed, filled, or graded.
- Weikert-Culleoka Complex, three to 25 percent slopes (WeB, WeC, WeD) - The Weikert series is comprised of shallow, well-drained soils formed in material weathered from interbedded gray and brown acid shale, siltstone, and fine-grained sandstone. These soils are found on gently sloping to very steep convex, dissected, upland areas. Lithic bedrock depth ranges from 10 to 20 inches below the soil surface. The potential for surface runoff is negligible to high and permeability is moderately-rapid to rapid. The Culleoka series is described above.

- **Monroe County, OH**
  - Gilpin-Upshur complex, 18 to 35 percent slopes, moderately eroded; very steep, benched (GkE2, GlG) - Gilpin series soils are moderately deep, moderately permeable, well-drained soils. They are formed in residuum from interbedded gray and brown acid siltstone, shale, and sandstone. They are found in upland areas on ridges, hills, and hillslopes with a depth of 20 to 40 inches. These complexes refer to mixtures of Gilpin and Upshur series soils

located within the geographic settings of this Project area. The Upshur series is described above.

- Gilpin-Westmoreland silt loams, six to 12 and 18 to 35 percent slopes, moderately eroded (GoC2, GoE2) - The Gilpin series is described above. The Westmoreland series is comprised of deep to very deep, well-drained soils formed in residuum from weathered, interbedded siltstone, sandstone, and limestone. Westmoreland soils are found on hills and hillslopes from zero to 70 percent grades.
- Guernsey-Westmore silt loams, 12 to 18 percent slopes, moderately eroded (GwD2) - The Guernsey series consists of deep, moderately well-drained soils formed in colluvium and residuum from interbedded siltstone, shale, and limestone. These upland soils have moderately slow or slow permeability. Slopes range from two to 70 percent. The Westmore series is comprised of deep, well-drained soils that formed in a mantle of silty material and the underlying residuum weathered from interbedded siltstone, shale, sandstone, and limestone. Permeability is moderate in the silty material and moderately slow or slow in the underlying material. These upland soils have slopes ranging from one to 70 percent.
- Westmoreland silt loam, 12 to 18 percent slopes, eroded (Wml1D2) - The Westmoreland series is described above.
- Westmoreland-Woodsfield silt loams, 12 to 18 percent slopes, eroded (WmW1D2) - The Westmoreland series is described above. The Woodsfield series consists of deep or very deep, well-drained soils formed in a silty mantle 14 to 26 inches thick and in the underlying reddish clayey residuum weathered from interbedded shale, siltstone, and sandstone. Permeability is moderate in the silty material and slow in the underlying material. These soils are on summits and benches and have slopes ranging from one to 25 percent. These mixtures are present on hills in this region.

- **Wetzel County, WV**
  - Elk silt loam, three to eight percent slopes (EkB) - The Elk series consists of very deep, well-drained, moderately permeable soils formed in mixed alluvium from limestone, siltstone, shale, sandstone, and loess. Slopes commonly range from zero to 12 percent, but the range extends to 40 percent. Elk soils are found on stream terraces and are moderately permeable.
  - Gilpin-Peabody complex, 15 to 70 percent slopes (GpD, GpE, GpF) - The Gilpin series is described above. The Peabody series is comprised of moderately deep, moderately slow to slow, well-drained soils that are found on hillslopes at grades of three to 70 percent. They are formed in residuum from interbedded clay shale and siltstone. The Gilpin-Peabody complex refers to a mixture of these soils present in the hilly terrain of this region.
  - Nolin loam (No) - The Nolin series consists of very deep, well-drained soils formed in alluvium derived from limestones, sandstones, siltstones, shales, and loess. These nearly level to moderately steep soils are on flood plains, in depressions which receive runoff from surrounding slopes, or on natural levees of major streams and rivers. Slope ranges from zero to 25 percent but is dominantly zero to three percent.
  - Skidmore gravelly loam, occasionally flooded (Sk) - The Skidmore series consists of deep and very deep, well-drained to somewhat excessively drained soils formed in gravelly, cobbly, or channery alluvium on narrow flood plains. Slopes range from zero to four percent.

- Udorthents, smoothed (Us) - Udorthents are a general classification of soils. These units may consist of very shallow to deep soils on uplands and floodplains. Areas of these soils are typically altered for housing or commercial use because the upper soil material has been removed, filled, or graded.

7.1.1 Pipeline

Proposed pipelines H-327 and H-328 and their easements will traverse approximately 0.5-mile in Greene County, PA. The pipeline will cross Dormont silt loam (DoC), Fluvaquents (Fa), Culleoka-Upshur complex (CkC), and Matewan channery loam (DaC). These soils range from poorly to somewhat excessively drained, with slopes from zero to 25 percent.

Proposed pipeline H-326 will extend approximately 3.7 miles through Wetzel County, WV. It will cross Gilpin-Peabody complexes (GpD, GpE, GpF), Skidmore gravelly loam (Sk), and open water. The H-330 Pipeline in WV crosses the same soil units as the H-326 Pipeline for more than approximately 0.7-mile. The Logansport Spur in WV is located within an existing gravel facility situated over Skidmore gravelly loam (Sk) and Us - Udorthents, smoothed and is approximately 0.03-mile. The H-329 Pipeline, also in WV, as it is proposed, would be approximately 0.02-mile and contained within one map unit of Gilpin-Peabody soil complex (GpD). These soils range from well-drained, to somewhat excessively drained, with slopes from zero to 70 percent.

Most of the soil map units within the Project right-of-way (ROW) are silt loams and silty clay loams. Some include a channery texture modifier, and one soil is gravelly. Certain soils crossed by the pipeline are also classified as Prime Farmland, Farmland of Statewide Importance, or Farmland of Local Importance; these soil classifications are discussed further in Section 7.2.7. Soil series characteristics are detailed further in Table 7.1-1, and soil crossings by pipeline MP are included in Table 7.2-1.

7.1.1.1 Additional Temporary Workspaces (ATWS) and Staging/Parking Areas (SAs)

ATWS and SAs are proposed to support pipeline construction at wetland, stream, and road crossings, as well as within areas where space is required for topsoil segregation, parking, and staging of equipment and materials. ATWS and SAs will cross the same soil units as described for the pipelines above.

Certain soils crossed by ATWS and SAs are classified as Farmland of Statewide Importance. No permanent impacts are proposed as a result of ATWS and SAs, as these areas would be restored following construction.

7.1.1.2 Contractor Yards

Several existing contractor yards will be utilized for pipeline construction (CY-PA221-East, CY-PA221-West, CY-PA18-South and CY-WV20). New temporary contractor yard CY-PA18-North may temporarily disturb soils classified as Newark silt loam, which is Farmland of Statewide Importance. New temporary contractor yard CY-WV19 may disturb soils classified as Nolin loam, which is also considered Prime Farmland. However, this contractor yard is located within a previously disturbed, majority open land area (existing utility ROW) that had been used previously as a contractor and has been recently restored.

As discussed in Resource Report 1, Equitrans will add gravel within existing contractor yards, as needed, and return to pre-construction conditions, or better, following construction. Where present within new/temporary contractor yards, topsoil will be segregated and stored along the edge of the contractor yards. The contractor yards will then be covered with geotextile fabric and gravel will be installed. After construction has been completed, the gravel and geotextile fabric will be removed, topsoil redistributed, and the contractor yards will be returned to pre-existing conditions. Therefore, no impacts to soils considered Prime Farmland are anticipated.

7.1.1.3 Access Roads

Equitrans plans to use existing and new access roads for construction of the Project, including two new permanent access roads (PAR-327-328-02 and PAR-330-01) that will be maintained for operation of the Project as discussed in Resource Report 8. These two new permanent access roads will cross Dormont silt loam and Skidmore gravelly loam. Both soils are considered Farmland of Statewide Importance. Temporary Project access roads will be up to 40 feet wide and will temporarily impact soil types similar to that of their associated pipelines.

7.1.2 Aboveground Facilities

Aboveground facilities for the Project include modifications at existing compressor stations, interconnects, valve yards, and tap sites. Additional information about these facilities can be found in Resource Report 1. Permanent aboveground facilities have been located within previously disturbed areas to the extent possible to minimize impacts to soils.

The Cygrymus Compressor Station workspace sits atop Culleoka-Upshur complex (CkD), Matewan channery loam (DaC), Dormont-Culleoka complex (DtF), and Weikert-Culleoka complex (WeC). Permanent impacts to soils at the Cygrymus Compressor Station expansion area accounts for 60 percent Matewan channery loam (DaC) and 40 percent Culleoka-Upshur complex (CkD). Matewan channery loam (DaC) is considered a Farmland of Statewide Importance.

The Plasma Compressor Station workspace is situated in Guernsey-Westmore silt loams (GwD2), Gilpin-Upshur complex (GkE2, GlG), Gilpin-Westmoreland silt loams (GoE2), and Westmoreland-Woodsfield silt loams (WmW1D2). Permanent impacts to soils at the Plasma Compressor Station expansion area accounts for 100 percent Westmoreland-Woodsfield silt loam (WmW1D2), which does not have a critical farmland designation.

The Corona Compressor Station sits atop Gilpin-Peabody complex soils with slopes of 15 to 35 percent (GpD and GpE). The area is previously disturbed, and the current facility boundary will not be expanded. Workspace associated with the station is located within the existing gravel yard; therefore, no additional impacts to soils will occur.

Ancillary aboveground facilities are situated within previously disturbed areas. Operational impacts at these facilities will result in permanent impacts to soils. As discussed in Resource Report 1, Shough Creek Valve Yard (PA) and Liberty Valve Yard (WV) will utilize vegetated geoweb at their facility areas. Additional information on soil characteristics affected by the ancillary aboveground facilities is provided in Table 7.2-2.

7.2 Construction/Operation Impacts

Construction and operation impacts resulting from the Project could include disturbance of vegetation from clearing, grading, excavation, machinery travel within the ROW, erosion, soil compaction, rutting of poorly drained or hydric soils, soil contamination from unanticipated sources, and the introduction of rocky material into the topsoil. Additionally, the Project will impact soils classified as Prime Farmland or Farmland of Statewide Importance; however, as detailed in Resource Report 8, only minor components of agricultural land will be affected by the Project.

Tables 7.2-1 and 7.2-2 provide information regarding soil limitations for the Project. The primary potential soil limitations identified along the Project route are erosion hazard, slip hazard, and shallow bedrock. A discussion of proposed measures to mitigate these potential impacts is included in Section 7.4. Equitrans will adhere to the measures in the Federal Energy Regulatory Commission's (FERC's) *Upland Erosion Control, Revegetation, and Maintenance Plan* (Plan) and *Wetland and Waterbody Construction and Mitigation Procedures* (Procedures) to minimize impacts to soils resulting from construction of the Project. In addition, Equitrans has located permanent aboveground facilities

within previously disturbed land to the extent possible, which will minimize permanent impacts to soils. Land use within the Project area is further discussed in Resource Report 8.

7.2.1 Soil Erosion

Erosion is the displacement or downslope movement of sediment or topsoil by wind, water, ice, or biological organisms. Flowing water may erode or scour a surface and carry away that material either in dissolved or suspended load. Wind erosion may result in suspension, creep, and saltation of airborne particles (Geological Society of London, 2012). Soils with a high potential for water erosion generally have steep slopes, poor aggregate stability, poor infiltration, poor vegetative cover, and are located in areas that experience intense rainfall or irrigation events. Soils with a high potential for wind erosion are generally located in areas that experience wind velocities that are sufficient to lift individual soil particles (USDA-NRCS, 1996). Removal of vegetation associated with construction activities, whether by direct stripping or by other mechanical means, greatly increases water and wind erosion potential.

Wind Erodibility Groups (WEGs) are based primarily on soil texture, clay content, and rock fragment content. WEGs range from 1 to 8, with 1 being the highest potential for wind erosion, and 8 the lowest. WEG data were obtained from the USDA-NRCS Web Soil Survey (USDA-NRCS, 2021a).

Land Capability Classifications (LCCs) provide a system that defines the capability of soils to produce common cultivated crops and pasture plants without deteriorating. The LCCs are I (1), soils with a slight limitation to their use, through VIII (8), soils with extensive limitations that preclude their use, and the subclasses are *e* (erosion limitations), *w* (excess water limitations), *s* (rooting zone limitations), and *c* (climate limitations) (USDA-NRCS, 2017). The potential for soils to be eroded by water was evaluated based on soils with a LCC from 4e to 8e, and an average slope greater than or equal to nine percent. Erosion potential in areas affected by construction will increase due to clearing, grading, trenching, and backfilling.

No soils crossed by the Project are categorized as susceptible to wind erosion. As summarized in Table 7.2-2, portions of the Project are categorically susceptible to water erosion. These soils have the potential to erode during rain or snow events and periods of surface water runoff.

As discussed in Resource Report 6, measures may be implemented to minimize the potential risk of landslides and soil erosion. These measures may include: installing temporary erosion control measures at closer intervals; benching the construction ROW to allow for a level surface for operation of construction equipment and return to previous contours to the extent practicable during ROW restoration; using additional temporary workspace downslope to accommodate the storage of excavated material during construction; completing more frequent maintenance of erosion control measures until post-construction erosion controls can be established; and diverting surface and groundwater from the construction ROW via horizontal drains or free-draining rock to stabilize subsoil, where appropriate. Trench breakers, which may be used to slow the flow of subsurface water along the trench, and permanent slope breakers, intended to reduce runoff velocity and divert water off the construction ROW, may be used to prevent erosion, as outlined in the FERC Plan and Procedures.

Restoring the construction ROW to original contours to the extent practicable, reestablishing vegetation and existing drainage patterns (as prescribed by the Erosion and Sediment Control Plans), as well as implementing FERC's Plan and Procedures will minimize the potential for human-induced landslides and erosion in the Project area. For discussion of landslide potential and mitigation, please see Resource Report 6.

7.2.2 Soil Compaction

Soil compaction may occur during construction as a direct result of the movements of heavy machinery over wet soils, including hydric soils and poorly drained non-hydric soils. Water is unable to permeate down through compacted soils, resulting in a high volume of surface runoff, which can lead to standing water and flash flooding. Erosion due to flooding can exacerbate the problem, as highly eroded soils have limited organic matter and oxygen content which further inhibits infiltration of water (USDA-NRCS, 2003). Soil structure and compaction can inhibit a particular soil type's ability to hold water and the ability for vegetation to root. Soils that are poorly drained or very poorly drained have a high compaction value, soils that are somewhat poorly drained to moderately well-drained have a moderate compaction value, and soils that are well-drained to excessively drained have low compaction values. Soils crossed by the Project that are poorly drained and thus may be susceptible to compaction are summarized in Table 7.2-2.

7.2.3 Introduction of Rock into Topsoil

Rocky material emplaced within the topsoil, or the vertical mixing of soils may reduce soil fertility and impact drainage patterns and hydrology in the soils. Soils with bedrock (lithic or paralithic) within 60 inches of the soils surface are considered to have shallow bedrock and have a higher likelihood of rock getting into the backfill soil and topsoil. Soils with a rocky profile include a surface or subsurface layer with a cobbly, stony, bouldery, channery, or flaggy modifier to the textural class and/or contain greater than five percent by weight rocks larger than three inches. USDA-NRCS data were used to identify soil map units where depth to bedrock generally is anticipated to be less than 60 inches from the soil surface and where a rocky soil profile is present (USDA-NRCS, 2021a).

The Project crosses soils characterized as stony or rocky and soils characterized as shallow to bedrock, as summarized in Table 7.2-2.

7.2.4 Contaminated Soils

A substance that poses a health risk and exceeds naturally occurring levels is considered a contaminant. Contaminated soils result from human activity including urban development, agriculture, and industrial processes. Soils may also become contaminated during events such as intentional releases and accidental spills. Contaminants in soil may include pesticides, petroleum products, arsenic, radon, asbestos, lead, creosote, and hexavalent chromium among other substances (Soil Science Society of America, 2021). Potential sources of contamination proximal to the Project (hazardous waste sites, landfills, mine tailings, etc.) were reviewed. Equitrans reviewed the PA Department of Environmental Protection (PADEP) Activity and Use Limitations Registry (PADEP, 2021a), the PADEP Open Data Portal (PADEP, 2021b), the WV Department of Environmental Protection (WVDEP) Database of Leaking Underground Storage Tanks (WVDEP, 2021a) and GIS database (WVDEP, 2021b), the OH Environmental Protection Agency (OHEPA), Division of Environmental Response and Revitalization (DERR) database (OHEPA, 2021), and the United States Environmental Protection Agency (USEPA) Cleanups In My Community database (USEPA, 2021) to identify, to the extent feasible, potentially contaminated soils within 0.5-mile of the Project area. Based on this desktop review, no known area of contaminated soils has been identified within 0.5-mile of the Project area. A discussion of potential contaminated groundwater is provided in Resource Report 2 and hazardous waste sites are discussed in Resource Report 8. No concerns regarding groundwater contamination or hazardous waste sites have been identified within the Project area. As discussed in Resource Report 6, mine lands are crossed by the Project in PA and WV. For construction within or adjacent to abandoned or reclaimed mines, Equitrans will implement a Spill Prevention, Control, and Countermeasure (SPCC) Plan which will include measures to prevent contamination and procedures if unanticipated contamination

is discovered. In accordance with the FERC Procedures, construction workers will have supplies of absorbent and barrier materials available during construction and cleanup to rapidly contain and recover spilled materials, should they occur. The SPCC Plan is included in Resource Report 2.

7.2.5 Revegetation

The drainage class, surface texture, and slope percentage of each soil type within the study area were evaluated to determine revegetation potential. Soils with a coarse texture (sandy loams or coarser) and which are moderately well to excessively drained, and soils with an average slope greater than or equal to nine percent have potential revegetation concerns. Some highly acidic soils will also resist revegetation efforts (WVDEP, 2016). Soils within the Project area that have steep slopes are expected to have lower revegetation potential and are summarized in Table 7.2-2.

7.2.6 Hydric Soils

Hydric soils include soils which formed in saturated conditions for a sufficient period during the growing season to develop anaerobic conditions in the upper section of the soil column. Hydric soils include naturally hydric soils, soils which have been artificially saturated to the point where they become hydric, and those soils that would be naturally hydric but have been artificially modified to be non-hydric. Although a soil may be hydric, this does not necessarily indicate the area is a wetland. Some series designated as hydric have phases that are not hydric, depending on water table, flooding, and ponding characteristics (USDA-NRCS, 2021e). Hydric soils may be susceptible to compaction due to poor drainage, rutting, ponding, and inundation. Additionally, impacts to hydric soils may affect wetland vegetation communities. The Project crosses hydric soils as summarized in Table 7.2-2.

7.2.7 Prime Farmland and Farmland of Statewide Importance Soils

The Project will cross soils that are considered Prime Farmland, Farmland of Statewide Importance, and Farmland of Local Importance. Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pastureland, rangeland, forest land, or other land, but not urban built-up land or water). Farmland of Statewide Importance is defined by state agencies, but generally this land includes soils that almost meet the requirements for prime farmland and produce high yields of crops when properly managed. This may include state designated agricultural land. Soil units may also be designated as Farmland of Local Importance at the county or municipal level (USDA-NRCS, 2005).

A summary of Project impacts to Prime Farmland and Farmland of Statewide Importance soils is included in Table 7.2-2. Aboveground facilities are within soils designated as prime farmland; however, these areas are not currently being utilized for agricultural practices. Additionally, because the facilities are located primarily in areas of previous disturbance, impacts are expected to be minimal.

Agricultural Security Areas (ASA) protect farmland in PA from non-agricultural uses and provide the farms within them protection from some local ordinances and state/local review of farmland condemnation. An ASA must be at least 250 acres total to be established [PA Department of Agriculture (PADA), 2021]. The Project crosses through Gilmore, Jackson, Center, and Washington Townships in Greene County, PA. Center Township contains 1,678 acres of ASA, and Washington Township contains 2,991 acres (PADA, 2016). Equitrans has coordinated with landowners crossed by the Project to identify conservation easements. Equitrans in coordination with landowners identified a conservation easement approximate to MP 0.0 of the H-330 pipeline which resulted in route adjustment and the addition of the H-330

Spur to avoid the easement. The easement is administered by the WVDEP and the United States Army Corps of Engineers and restricts new construction, earth disturbance, topography changes, and vegetation removal unless maintaining existing utilities along an area of floodplain to North Fork Fishing Creek in Wetzel County, WV. Through coordination with the landowner and route adjustment, no effects to the easement are proposed. At this time, no other conservation easements have been identified on the Project conservation easements or ASAs have been identified on the Project.

The Voluntary Farmland Protection Act in 2000 was passed in WV to protect farmlands at the county level. However, Wetzel County has not established a Farmland Protection Board, and is not currently participating in the program (WV Farmland Protection, 2021).

7.3 Consultations

Revegetation of disturbed areas following construction will be achieved using seed mixes and soil amendments in accordance with FERC's Plan, and where applicable, FERC's Procedures or landowner stipulations. As applicable, Equitrans is preparing Project-specific Erosion and Sediment Control Plans (ESCPs) according to the guidelines from the PADEP *Erosion and Sediment Pollution Control Program Manual* for the portions of the Project within PA, the WVDEP *Erosion and Sediment Control Best Management Practice Manual* for the portions of the Project within WV, and the OH Department of Transportation (ODOT) *Handbook for Sediment and Erosion Control*. Erosion controls, seed mixes, seeding requirements and fertilizer application will be consistent with the manual for each state. Typically, PA ESCP will be reviewed by PADEP and the Greene County Conservation District, the WV ESCP will be reviewed by WVDEP, and the OH ESCP will be reviewed by OHEPA.

7.4 Mitigation

Equitrans has designed the Project to minimize the limits of disturbance required during construction and operation and will restore soils to preconstruction grades to the extent practical. To mitigate impacts where disturbances are required, Equitrans will implement FERC's Plan and Procedures, as well as requirements or guidance provided by applicable agencies. Equitrans has also developed Project-specific ESCP that will be implemented during construction and operation. Grading and clearing of vegetation will be conducted to accommodate safe construction, operational staging, and access to the Project area. To the extent possible, grading will be conducted in such a way as to limit soil disturbance and conserve existing vegetation. Proposed Alternative Measures from FERC's Plan or Procedures to support complex field conditions and safe construction are discussed in Resource Report 1.

7.4.1 Soil Erosion

The Project will cross soils susceptible to water driven erosion, but no soils susceptible to wind driven erosion. Equitrans will implement applicable provisions of FERC's Plan and Procedures to reduce soil erosion. FERC requires that best management practices (BMPs) be installed immediately after initial disturbance of the soil. Accordingly, BMPs will be constructed immediately after initial disturbance of the soil and maintained during construction of the Project. To reduce the potential for erosion, the ESCP includes standard erosion control measures and the use of temporary erosion control measures including but not limited to slope breakers, trench breakers, sediment barriers, and re-establishment of stabilizing vegetation commensurate with the FERC Plan and Procedures. Temporary sediment barriers, as defined in Section IV.F.3a of the Plan, will be immediately installed after the initial disturbance of a waterbody or adjacent upland area and will be maintained and reinstalled, as necessary, throughout construction to prevent erosion until permanent erosion controls or restoration of adjacent upland areas is complete.

As an additional measure to reduce the potential for erosion, denuding of vegetation will be performed only when necessary for safe construction conditions. During operation of the

pipeline and aboveground facilities, proven ROW management practices, implementation of appropriate controls, and monitoring will be used to prevent or control soil erosion.

Major rainfall events could result in significant runoff. Equitrans will minimize these impacts by implementing the provisions of FERC's Plan and by adhering to the stipulations of state or local stormwater permits that may be required. Measures will typically include installation of sediment filtration devices and permanent revegetation of disturbed areas.

Once construction has been completed, Equitrans will minimize erosion by implementing permanent restoration measures within the construction workspaces which will be monitored until final successful revegetation has been attained in accordance with applicable regulatory approvals.

Equitrans will detail various techniques to control soil erosion in the ESCP including, but not limited to:

- minimizing the area and duration of soil exposure;
- protecting critical areas by controlling runoff and reducing its velocity;
- installing and maintaining erosion and sediment control (ESC) measures; and
- inspecting the ROW and maintaining ESCs, as necessary, until final restoration is complete.

Construction staff will undergo environmental training for techniques detailed in the ESCP, and an Environmental Inspector (EI) will monitor compliance with the ESCP to minimize soil erosion impacts. Additional prevention and mitigation measures for soil erosion are described in Section 7.2.1.

As discussed in Resource Report 6, restoring the construction ROW to original contours to the extent practicable, reestablishing vegetation and existing drainage patterns (as prescribed by the Erosion and Sediment Control Plans), as well as implementing FERC's Plan and Procedures will minimize the potential for human-induced landslides and erosion in the Project area.

Prior to commencement of construction, Project personnel will be trained for the identification and management of potential landslides. The training will provide the appropriate protocol for work stoppage if a landslide occurs and a communication plan to alert appropriate company personnel and agencies. Landslide mitigation is discussed further in Resource Report 6.

7.4.2 Soil Compaction

The majority of the soils within the Project area are classified as moderately well-drained to well-drained. Therefore, issues related to soil compaction are not expected for most construction.

In locations where the Project is not adjacent to roads, highways, or other linear facilities where compaction may pre-exist, construction will result in new soil disturbance and may increase the potential for compaction. Construction of the Project could result in loss of soil productivity due to compaction or damage to soil structure from heavy equipment. Soil structural damage and compaction also could result from pipeline construction during excessively wet periods. To minimize soil compaction, Equitrans will limit construction traffic within the Project ROW as practicable to only that which is required to complete construction. Additionally, mats or geo-textile fabric will be used, where appropriate, to reduce the potential for compaction or rutting in saturated soils.

Once construction has been completed, heavily compacted areas, if present, will be identified by EIs and will be tilled or otherwise addressed when soil moisture conditions are suitable. To determine compaction of the soils and establish approximate pre-construction conditions, a qualified EI will perform tests using a penetrometer or similar device on the same soil types

crossed by the Project under similar moisture conditions in undisturbed areas which will then be compared to tests within the Project ROW. Since impacts related to mechanical compaction are expected to be limited to the upper soil horizon or the contact between the upper horizons, tiling is expected to effectively mitigate the impact. If tilling is not effective, Equitrans will identify additional mechanical methods to restore the area to meet the desired land use. In agricultural and residential areas where topsoil has been segregated, the subsoil will be decompacted before replacing the segregated topsoil. In areas of severely compacted soils, paraplows or other deep tillage implantation will be used to plow and till the ground in order to reduce soil compaction, as outlined in the FERC Plan and Procedures. If subsequent construction and cleanup activities result in further compaction, additional tilling will be conducted.

Impacts on soils due to soil compaction during construction activities will be temporary. The Project does not expect compaction of soils due to operation of Project facilities, so the impacts during operation would be negligible.

7.4.3 Introduction of Rock into Topsoil

As shown in Table 7.2-1, soils with shallow bedrock or a rocky soil profile may be encountered during Project construction activities. Where residential, actively cultivated, or rotated agricultural land will be crossed by the pipeline facilities, several measures to prevent incorporation of rock into the topsoil will be implemented if excessive rock material is encountered within the trench depth. These measures include segregation and protection of topsoil along the trench line, rock backfill only to the top of bedrock, and placement of excess rock fragments in an approved manner to limit incorporation of rock fragments into topsoil layers. By adhering to these measures, no significant increase to the rock content of the topsoil is anticipated.

Rock encountered during trenching will be removed using one of the techniques detailed below. The technique selected is dependent on relative hardness, fracture susceptibility, expected volume, and location. Techniques include:

- conventional excavation with a backhoe;
- ripping with a bulldozer followed by backhoe excavation;
- hammering with a pointed backhoe attachment or a pneumatic rock hammer, followed by backhoe excavation;
- blasting followed by backhoe excavation; and
- blasting surface rock prior to excavation.

Equitrans does not currently anticipate blasting on the Project. In the event that blasting becomes necessary, Equitrans will identify those areas and adhere to the General Blasting Plan included as Appendix 6-B.

Trenching through rock can result in excess rock after backfilling. Excess rock is defined as rock that cannot be returned to the existing rock profile in the trench or graded cuts or is not needed to restore the ROW surface to a condition comparable to that found adjacent to the ROW. In accordance with FERC's Plan, rock excavated from the trench may be used to backfill the trench to the top of the existing bedrock profile. Excess rock will be removed from at least the top 12 inches of soil in all cultivated and/or rotated cropland, managed pastures, hayfields, and residential areas. Excess rock will be hauled off the ROW and disposed of at an approved landfill or recycling facility unless approved for use as slope stabilization, windrowing, or for other use on the construction areas as approved by the landowner. In areas where rock is predominant and little suitable backfill material is available, Equitrans may import certified contaminant free soil suitable for backfill to fill voids remaining after the rock is removed.

7.4.4 Contaminated Soils

If pre-existing, previously undetermined contaminated or suspect soils are identified during trenching operations, Equitrans will be notified and work surrounding the suspected contamination will be halted until the type and extent of contamination is determined. The response action will be identified based on the type and extent of contamination, the responsible party, and local, state, and federal regulations. In most cases, Equitrans will visually evaluate soils for oil sheen, discolored vegetation or soil, and other signs of contamination upon approach for construction. Any contaminated soils will be removed to a permitted facility or landfill.

In accordance with the FERC Procedures, construction workers will have supplies of absorbent and barrier materials available during construction and cleanup to rapidly contain and recover spilled materials, should they occur. Equitrans has developed a SPCC Plan, included in Resource Report 2, to minimize accidental spills of materials that may contaminate soils, and to ensure inadvertent spills are contained, cleaned up, and disposed of quickly and appropriately. This plan also includes a discussion of the measures to be taken by personnel if there are unanticipated contamination discoveries during pipeline construction and operation.

7.4.5 Revegetation

The Project will affect soils on steep slopes with revegetation concerns (Table 7.2-1). Cleanup and restoration will be performed in accordance with FERC's Plan and Procedures and the BMPs guidance for each state. Revegetation will be implemented according to FERC's Plan and Procedures, directions by individual landowners, and other applicable federal, state, and local requirements. Soils that have been disturbed will be revegetated in accordance with the requirements of permitting agencies. Equitrans will utilize the PADEP *Erosion and Sediment Pollution Control Program Manual*, ODOT *Handbook for Sediment and Erosion Control*, and WVDEP *Erosion and Sediment Control Best Management Practice Manual* to determine the optimal seed mixture, lime volume, and application rates to use within the Project area (PADEP, 2012; ODOT, 2000; and WVDEP, 2016).

Topsoil will be segregated, as described in Section 7.2.7, to optimize revegetation potential of areas disturbed by construction activities.

The construction ROW will be graded to restore pre-construction contours, to the extent practicable, leaving the soil in the proper condition for planting. Equitrans may also utilize hydroseeding and scarify the seedbed to facilitate lodging and germination of seed, as outlined by the FERC Plan and Procedures, to prevent and/or mitigate landslides. Permanent vegetation seeding will be performed within the recommended seeding dates, or appropriate temporary erosion control measures, discussed in the FERC Plan Section IV.F, will be used until the next recommended seeding season. Revegetation in disturbed riparian areas will consist of native species similar in density to adjacent undisturbed lands. Steep slopes and potential landslide areas are further discussed in Resource Report 6.

Several measures designed to maximize revegetation success in all construction areas are provided in the ESCP. Standard measures will include spreading grass seed, weed-free straw or hay, and wood-fiber hydromulch. Where necessary, erosion control fabric or matting will be used on steep slopes to promote successful revegetation. The Project will not use soil additives or fertilizers within 100 feet of wetlands or waterbodies unless required to do so in writing by the relevant regulatory agency. To address areas where vegetation cover has not met the success criteria in accordance with regulatory requirements, Equitrans will develop a corrective action plan and these areas will be corrected to meet the requirements. Revegetation efforts will continue until regulatory performance standards for revegetation have been met or exceeded.

Non-cultivated lands will be reseeded as soon as possible to minimize erosion. If seasonable or weather conditions are not favorable, revegetation will be delayed until favorable conditions exist. Cultivated croplands will be restored at the direction of landowners or lessees. Reseeding will not be performed where surface facilities require the site to be maintained in a vegetation-free condition, such as pavement or gravel.

Equitrans will operate and maintain the Project and aboveground facilities in compliance with United States Department of Transportation regulations provided in 49 Code of Federal Regulations (CFR) § 192, FERC's regulations in 18 CFR § 380.15, and maintenance provisions of FERC's Plan and Procedures. Revegetation will be accomplished in a manner compatible with preconstruction and adjacent vegetation patterns in accordance with 18 CFR Section 380.15.

Equitrans observed locations of noxious weed populations within the Project study corridor during field surveys. Equitrans will implement avoidance and minimization measures in accordance with the Project's Noxious Weeds/Invasive Plant Species Control and Mitigation Plan, included in Resource Report 3.

7.4.6 Hydric Soils

The proposed Project facilities will cross isolated areas of hydric soils. Due to extended periods of saturation, hydric soils can be susceptible to compaction and rutting. Most of the impacts on hydric soils during construction activities would be temporary. Measures to mitigate compaction are addressed in Section 7.4.2, above. Timber mats will be used to minimize rutting and compaction within saturated wetlands. Grading to restore original contour and repair of rutting areas will be completed prior to final revegetation. Within wetland areas, the mixing of topsoil with subsoil will be minimized by using topsoil segregation construction methods over the pipeline trench (except when standing water or saturated soils are present). Construction will be executed strategically to minimize the extent and time that equipment operates in wetland areas. Adhering to FERC's Plan and Procedures will avoid and minimize significant impacts on hydric soils where they occur. In areas where standing water is present or soils are saturated, topsoil will not be segregated. Soil disturbance and mitigation procedures associated with grading and trenching in wetland crossing areas are described in Resource Report 2.

7.4.7 Prime Farmland and Farmland of Statewide and Local Importance

Pipeline construction will impact soils designated as Farmland of Statewide Importance in PA. In WV, the Project will cross Prime Farmland in addition to Statewide and Local Farmlands of Importance. No designated farmland will be affected by the Project in OH. Although a soil series may be listed as prime farmland, it may not be currently in agricultural use. Some farmland soils are located in forested or open uncultivated, non-pasture areas. Impacts on these areas due to pipeline construction will be mitigated using standard BMPs from FERC's Plan and Procedures. Equitrans will coordinate with landowners regarding construction and operation across active agricultural operations. Because agricultural activities are not precluded within the permanent pipeline ROW, impacts on prime farmland crossed by the pipeline and within temporary workspace will be limited to the construction phase and will be minor and temporary.

During construction, Equitrans will segregate topsoil over the full ROW in agricultural lands and pasture. For Project land use categorization, agricultural lands include cultivated or rotated croplands and hayfields. Where topsoil is segregated, at least the top 12 inches of topsoil will be segregated and stored separately from subsoil during construction. If the topsoil is not 12 inches deep, the entire depth of topsoil will be segregated. Equitrans will stockpile topsoil separately from subsoil and will replace these soil horizons in the proper order during backfill and final grading.

Prior to commencing construction, Equitrans will coordinate with landowners regarding the potential presence of drain tiles and irrigation systems in affected agricultural fields. In addition, observations will be made before and during construction for evidence of the presence of drain tiles and irrigation systems. If drain tiles and irrigation systems are located during construction, pipeline construction will be conducted in accordance with FERC's Plan and Procedures. The pipe will be installed below agricultural drainage lines, except in the rare circumstance of a deep main drainage line. Agricultural drainage features will be repositioned in a manner consistent with drainage orientation. Following construction, active drain tiles damaged during construction will be repaired or replaced. Please refer to Resource Report 8 for additional information regarding agricultural land crossed by the Project.

7.4.8 Conclusions

Equitrans will implement FERC's Plan and Procedures during construction and operation of the Project, as well as the ESC measures and BMPs included in the Project-specific ESCPs. Through implementation of the mitigation measures described herein, and adherence to FERC's Plan and Procedures in conjunction with the Project-specific ESCPs, the Project is not expected to have significant impacts on soils.

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Appendix 7-A
Tables

Table 7.1-1

Selected Physical and Interpretive Characteristics of the Soil Map Units Within the Project Area

County and Map Symbol	Map Unit Name	Component Name	Component Percent	Percent Slope		Surface Texture[1]	Drainage Class[2]	Permeability[3]	Taxonomic Classification	Parent Material	Landforms
				Low	High						
Greene County, PA											
PA611 542142	CkC - Culleoka-Upshur complex	Culleoka	45	8	15	ChSiL	W	MR to M	Fine-loamy, mixed, active, mesic Ultic Hapludalfs;	Residuum weathered from nonacid siltstone, fine-grained sandstone, and shale	Hillslopes
		Upshur	40			SiCL	W	S	Fine, mixed, superactive, mesic Typic Hapludalfs	Residuum weathered from calcareous red shale	Hillslopes
PA611 542143	CkD - Culleoka Upshur complex	Culleoka	55	15	25	ChSiL	W	MR to M	Fine-loamy, mixed, active, mesic Ultic Hapludalfs	Residuum weathered from nonacid siltstone, fine-grained sandstone, and shale	Hillslopes
		Upshur	30			SiCL	W	S	Fine, mixed, superactive, mesic Typic Hapludalfs	Residuum weathered from calcareous red shale	Hillslopes
PA611 542145	DaC - Matewan channery loam	Matewan	85	8	15	ChL	W	R to MR	Loamy-skeletal, mixed, active, mesic Typic Dystrudepts	Sandy residuum weathered from sandstone	Ridges
PA611 542150	DoC - Dormont silt loam	Dormont	70	8	15	SiL	MW	M	Fine-loamy, mixed, superactive, mesic Oxyaquic Hapludalfs	Fine-loamy residuum weathered from limestone, sandstone, and shale	Hills
PA611 542153	DtF - Dormont-Culleoka complex	Dormont	50	25	50	SiL	MW	M	Fine-loamy, mixed, superactive, mesic Oxyaquic Hapludalfs	Fine-loamy residuum weathered from limestone, sandstone, and shale	Hills
		Culleoka	35			ChSiL	W	MR to M	Fine-loamy, mixed, active, mesic Ultic Hapludalfs	Fine-loamy residuum weathered from sandstone and shale	Hills
PA611 542155	Fa - Fluvaquents, loamy	Fluvaquents	85	0	3	SiL	P	N/A	N/A	Alluvium	Floodplains
PA611 542166	Nw - Newark silt loam	Newark	85	0	3	SiL	SP	M	Fine-silty, mixed, active, nonacid, mesic Fluventic Endoaquepts	Fine-silty alluvium derived from sedimentary rock	Floodplains
PA611 542177	WeC - Weikert-Culleoka complex	Weikert	50	8	15	ChSiL	SE			Residuum weathered from siltstone	Hillslopes
		Culleoka	40			ChSiL	W	MR to M	Fine-loamy, mixed, active, mesic Ultic Hapludalfs	Residuum weathered from nonacid siltstone, fine-grained sandstone, and shale	Hillslopes
Wetzel County, WV											
WV103 513708	GpD - Gilpin-Peabody complex	Gilpin	40	15	25	SiL	W	M	Fine-loamy, mixed, active, mesic Typic Hapludults	Fine-loamy residuum from sandstone and siltstone	Hillslopes
		Peabody	30			SiCL	W	MS to S	Fine, mixed, active, mesic Ultic Hapludalfs	Residuum weathered from shale and siltstone	Hillslopes
WV103 513709	GpE - Gilpin-Peabody complex, moderately eroded	Gilpin	45	25	35	SiL	W	M	Fine-loamy, mixed, active, mesic Typic Hapludults	Fine-loamy residuum from sandstone and siltstone	Ridges and hillslopes
		Peabody	35			SiCL	W	MS to S	Fine, mixed, active, mesic Ultic Hapludalfs	Residuum weathered from shale and siltstone	Ridges and hillslopes
WV103 513710	GpF - Gilpin-Peabody complex	Gilpin	50	35	70	SiL	W	M	Fine-loamy, mixed, active, mesic Typic Hapludults	Fine-loamy residuum from sandstone and siltstone	Hillslopes
		Peabody	30			SiCL	W	MS to S	Fine, mixed, active, mesic Ultic Hapludalfs	Residuum weathered from shale and siltstone	Hillslopes
WV103 513715	No - Nolin loam	Nolin	80	0	3	L	W	M	Fine-silty, mixed, active, mesic Dystric Fluventic Eutrudepts	Fine-silty alluvium	Floodplains
WV103 513717	Sk - Skidmore gravelly loam, occasionally flooded	Skidmore	80	0	3	GL	W	MR	Loamy-skeletal, mixed, semiactive, mesic Dystric Fluventic Eutrudepts	Loamy-skeletal alluvium	Floodplains
WV103 513718	Us - Udorthents, smoothed	Udorthents	100	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Uplands and floodplains
Monroe County, OH											
OH111 2452377	WmW1D2 - Westmoreland-Woodsfield complex	Westmoreland	45	12	18	SiL	W	M	Fine-loamy, mixed, active, mesic Ultic Hapludalfs	Fine-loamy residuum weathered from interbedded sedimentary rock	Hills
		Woodsfield	40			SiL	W	M to S	Fine, mixed, superactive, mesic Typic Hapludalfs	Fine-silty loess over clayey residuum	Hills

Notes:

[1] Surface textures include: channery silt loam (ChSiL), silty clay loam (SiCL), channery loam (ChL), silt loam (SiL), loam (L), and gravelly loam (GL).

[2] Drainage classes include: very poorly (VP), poorly (P), somewhat poorly (SP), moderately well (MW), well (W), somewhat excessively (SE), and excessively (E) drained.

[3] Permeability rates include: very rapid (VR), rapid (R), moderately rapid (MR), moderate (M), moderately slow (MS), and slow (S).

Table 7.2-1

Soil Characteristics by Milepost Segment for Each Soil Map Unit Along the Proposed Pipeline Route

MP Begin	MP End	Map Unit Symbol	Component Name	Crossing Length (miles)	Component Percent	Prime Farmland[1, 2]	Hydric Soils[1]	Compaction Prone[3]	Highly Erodible (Water)[4]	Highly Erodible (Wind)[5]	Revegetation Concerns[6]	Stony/ Rocky[7]	Shallow to Bedrock[8]
H-327 and H-328 Pipelines, Green County, PA													
0.00	0.07	DaC	Matewan channery loam, 8 to 15 percent slopes	0.07	Matewan - 85	State	No	No	Yes	No	Yes	Yes	Yes
0.07	0.23	CkC	Culleoka-Upshur complex, 8 to 15 percent slopes	0.16	Culleoka - 45 Upshur - 40	State	No	No	Yes	No	Yes	Yes	Yes
0.23	0.35	DtF	Dormont-Culleoka complex, 25 to 50 percent slopes	0.12	Dormont - 50 Culleoka - 35	No	No	No	Yes	No	Yes	Yes	Yes
0.35	0.39	Fa	Fluvaquents, loamy	0.04	Fluvaquents - 85	No	Yes	Yes	Yes	No	No	No	No
0.39	0.46	DoC	Dormont silt loam, 8 to 15 percent slopes	0.07	Dormont - 70	State	No	No	Yes	No	Yes	Yes	No
H-326 Pipeline, Wetzel County, WV[9]													
0.00	0.08	GpE	Gilpin-Peabody complex, 25 to 35 percent slopes, moderately eroded	0.08	Gilpin - 45 Peabody - 35	Local	No	No	Yes	No	Yes	No	Yes
0.08	0.17	GpF	Gilpin-Peabody complex, 35 to 70 percent slopes	0.10	Gilpin - 50 Peabody - 30	No	No	No	Yes	No	Yes	Yes	Yes
0.17	0.91	GpD	Gilpin-Peabody complex, 15 to 25 percent slopes	0.74	Gilpin - 40 Peabody - 30	State	No	No	Yes	No	Yes	No	Yes
0.91	1.06	GpE	Gilpin-Peabody complex, 25 to 35 percent slopes, moderately eroded	0.14	Gilpin - 45 Peabody - 35	Local	No	No	Yes	No	Yes	No	Yes
1.06	1.14	GpF	Gilpin-Peabody complex, 35 to 70 percent slopes	0.08	Gilpin - 50 Peabody - 30	No	No	No	Yes	No	Yes	Yes	Yes
1.14	1.24	Sk	Skidmore gravelly loam, occasionally flooded	0.10	Skidmore - 80	State	No	No	No	No	Yes	No	No
1.24	1.33	GpF	Gilpin-Peabody complex, 35 to 70 percent slopes	0.09	Gilpin - 50 Peabody - 30	No	No	No	Yes	No	Yes	Yes	Yes
1.33	1.48	GpE	Gilpin-Peabody complex, 25 to 35 percent slopes, moderately eroded	0.15	Gilpin - 45 Peabody - 35	Local	No	No	Yes	No	Yes	No	Yes
1.48	2.04	GpD	Gilpin-Peabody complex, 15 to 25 percent slopes	0.57	Gilpin - 40 Peabody - 30	State	No	No	Yes	No	Yes	No	Yes
2.04	2.14	GpF	Gilpin-Peabody complex, 35 to 70 percent slopes	0.10	Gilpin - 50 Peabody - 30	No	No	No	Yes	No	Yes	Yes	Yes
2.14	2.23	Sk	Skidmore gravelly loam, occasionally flooded	0.09	Skidmore - 80	State	No	No	No	No	Yes	No	No
2.23	2.27	GpF	Gilpin-Peabody complex, 35 to 70 percent slopes	0.04	Gilpin - 50 Peabody - 30	No	No	No	Yes	No	Yes	Yes	Yes
2.27	2.38	GpE	Gilpin-Peabody complex, 25 to 35 percent slopes, moderately eroded	0.10	Gilpin - 45 Peabody - 35	Local	No	No	Yes	No	Yes	No	Yes
2.38	2.65	GpD	Gilpin-Peabody complex, 15 to 25 percent slopes	0.27	Gilpin - 40 Peabody - 30	State	No	No	Yes	No	Yes	No	Yes
2.65	2.74	GpE	Gilpin-Peabody complex, 25 to 35 percent slopes, moderately eroded	0.09	Gilpin - 45 Peabody - 35	Local	No	No	Yes	No	Yes	No	Yes
2.74	2.85	GpF	Gilpin-Peabody complex, 35 to 70 percent slopes	0.11	Gilpin - 50 Peabody - 30	No	No	No	Yes	No	Yes	Yes	Yes
2.85	2.89	Sk	Skidmore gravelly loam, occasionally flooded	0.04	Skidmore - 80	State	No	No	No	No	Yes	No	No

Table 7.2-1 (Continued)

MP Begin	MP End	Map Unit Symbol	Component Name	Crossing Length (miles)	Component Percent	Prime Farmland[1, 2]	Hydric Soils[1]	Compaction Prone[3]	Highly Erodible (Water)[4]	Highly Erodible (Wind)[5]	Revegetation Concerns[6]	Stony/ Rocky[7]	Shallow to Bedrock[8]
H-326 Pipeline, Wetzel County, WV (continued)													
2.89	3.03	GpF	Gilpin-Peabody complex, 35 to 70 percent slopes	0.14	Gilpin - 50 Peabody - 30	No	No	No	Yes	No	Yes	Yes	Yes
3.03	3.51	GpD	Gilpin-Peabody complex, 15 to 25 percent slopes	0.48	Gilpin - 40 Peabody - 30	State	No	No	Yes	No	Yes	No	Yes
H-329 Pipeline, Wetzel County, WV													
0.00	0.02	GpD	Gilpin-Peabody complex, 15 to 25 percent slopes	0.02	Gilpin - 40 Peabody - 30	State	No	No	Yes	No	Yes	No	Yes
H-330 Pipeline, Wetzel County, WV[9]													
0.00	0.04	Sk	Skidmore gravelly loam, occasionally flooded	0.04	Skidmore - 80	State	No	No	No	No	Yes	No	No
0.04	0.09	GpF	Gilpin-Peabody complex, 35 to 70 percent slopes	0.05	Gilpin - 50 Peabody - 30	No	No	No	Yes	No	Yes	Yes	Yes
0.09	0.20	GpE	Gilpin-Peabody complex, 25 to 35 percent slopes, moderately eroded	0.11	Gilpin - 45 Peabody - 35	Local	No	No	Yes	No	Yes	No	Yes
0.20	0.26	GpF	Gilpin-Peabody complex, 35 to 70 percent slopes	0.05	Gilpin - 50 Peabody - 30	No	No	No	Yes	No	Yes	Yes	Yes
0.26	0.48	GpD	Gilpin-Peabody complex, 15 to 25 percent slopes	0.22	Gilpin - 40 Peabody - 30	State	No	No	Yes	No	Yes	No	Yes
0.48	0.63	GpF	Gilpin-Peabody complex, 35 to 70 percent slopes	0.15	Gilpin - 50 Peabody - 30	No	No	No	Yes	No	Yes	Yes	Yes
0.63	0.69	Sk	Skidmore gravelly loam, occasionally flooded	0.07	Skidmore - 80	State	No	No	No	No	Yes	No	No
H-330 Spur, Wetzel County, WV													
0.00	0.01	Sk	Skidmore gravelly loam, occasionally flooded	0.01	Skidmore - 80	State	No	No	No	No	Yes	No	No
0.01	0.05	Us	Udorthents, smoothed	0.04	Udorthents - 100	No	No	No	No	No	Yes	No	No
0.05	0.09	Sk	Skidmore gravelly loam, occasionally flooded	0.04	Skidmore - 80	State	No	No	No	No	Yes	No	No
Logansport Spur, Wetzel County, WV													
0	0.03	Us and Sk	Us - Udorthents, smoothed and Skidmore gravelly loam, occasionally flooded	0.03	Udorthents - 100 /Skidmore - 80	No/State	No/No	No/No	No/No	No/No	Yes/Yes	No/No	No/No

Notes:

1 As designated by the NRCS.

2 Prime = Prime farmland; State = Farmland of statewide importance; Local = Farmland of local importance.

3 Includes soils that have clay loam or finer textures in somewhat poor, poor, and very poor drainage classes.

4 Includes land in capability subclasses 4E through 8E and soils with an average slope greater than or equal to nine percent.

5 Includes soils with WEG classification of one or two.

6 Includes coarse-textured soils (sandy loams and coarser) that are moderately well to excessively drained and soils with an average slope greater than or equal to nine percent.

7 Includes soils that have either: 1) a very gravelly, extremely gravelly, cobbley, stony, bouldery, flaggy, or channery modifier to the textural class, or 2) have greater than five percent (weight basis) rock fragments larger than three inches in any layer within the profile.

8 Includes soils that have bedrock within 60 inches of the soil surface. Paralithic refers to "soft" bedrock that will not likely require blasting during construction. Lithic refers to "hard" bedrock that may require blasting or other special construction techniques during installation of the proposed pipeline segments.

9 Portions of H-326 and H-330 that share ROW are accounted for under H-330.

Table 7.2-2

Acres of Soil Characteristics Affected by the Project[1]

Facility/County	Total Acres of Impacted Soils[1]		Prime Farmland (acres)[2]		Farmland of Statewide Importance (acres)[2]		Hydric Soils (acres)[2]		Compaction Prone (acres)[3]		Highly Erodible (Water acres)[4]		Highly Erodible (Wind acres)[5]		Revegetation Concerns (acres)[6]		Stony/Rocky (acres)[7]		Shallow to Bedrock (acres)[8]	
	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.
Pipeline Facilities																				
H-327 and H-328 Pipelines, Green County, PA																				
Pipeline[9]	2.71	2.81	0.00	0.00	1.70	1.82	0.14	0.23	0.14	0.23	2.71	2.81	0.00	0.00	2.57	2.58	2.57	2.58	2.21	2.14
Access Road	0.00	0.65	0.00	0.00	0.00	0.28	0.00	0.00	0.00	0.00	0.00	0.65	0.00	0.00	0.00	0.65	0.00	0.65	0.00	0.39
SAs	0.05	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.05	0.00	0.05	0.00	0.00	0.00
Contractor Yards	3.50	0.00	0.00	0.00	3.50	0.00	0.00	0.00	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subtotals	***6.26***	***3.47***	***0.00***	***0.00***	***5.25***	***2.10***	***0.14***	***0.23***	***3.64***	***0.23***	***2.76***	***3.47***	***0.00***	***0.00***	***2.62***	***3.23***	***2.62***	***3.23***	***2.21***	***2.52***
H-326 Pipeline, Wetzel County, WV[10]																				
Pipeline	26.75	21.33	0.00	0.00	22.01	17.28	0.00	0.00	0.00	0.00	24.11	19.94	0.00	0.00	26.75	21.33	4.74	4.06	24.11	19.94
Access Road	8.88	0.25	0.00	0.00	5.34	0.25	0.00	0.00	0.00	0.00	7.82	0.25	0.00	0.00	8.88	0.25	3.54	0.00	7.82	0.25
SAs	1.87	0.00	0.00	0.00	1.80	0.00	0.00	0.00	0.00	0.00	1.72	0.00	0.00	0.00	1.87	0.00	0.07	0.00	1.72	0.00
Contractor Yards	4.33	0.00	4.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Subtotals	***41.82***	***21.58***	***4.33***	***0.00***	***29.15***	***17.52***	***0.00***	***0.00***	***0.00***	***0.00***	***33.65***	***20.19***	***0.00***	***0.00***	***37.50***	***21.58***	***8.34***	***4.06***	***33.65***	***20.19***
H-329 Pipeline, Wetzel County, WV																				
Pipeline	0.06	0.09	0.00	0.00	0.06	0.09	0.00	0.00	0.00	0.00	0.06	0.09	0.00	0.00	0.06	0.09	0.00	0.00	0.06	0.09
Access Road	0.00	0.26	0.00	0.00	0.00	0.26	0.00	0.00	0.00	0.00	0.00	0.26	0.00	0.00	0.00	0.26	0.00	0.00	0.00	0.26
SAs	*None*																			
Contractor Yards	*None*																			
Subtotals	***0.06***	***0.35***	***0.00***	***0.00***	***0.06***	***0.35***	***0.00***	***0.00***	***0.00***	***0.00***	***0.06***	***0.35***	***0.00***	***0.00***	***0.06***	***0.35***	***0.00***	***0.00***	***0.06***	***0.35***
H-330 Pipeline, Wetzel County, WV[10]																				
Pipeline	4.42	4.11	0.00	0.00	2.85	2.62	0.00	0.00	0.00	0.00	3.84	3.52	0.00	0.00	4.42	4.11	1.57	1.50	3.84	3.52
Access Road	0.57	0.42	0.00	0.00	0.21	0.22	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0.00	0.57	0.22	0.36	0.00	0.56	0.00
SAs	0.32	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00	0.00	0.00
Contractor Yards	*None*																			
Subtotals	***5.31***	***4.53***	***0.00***	***0.00***	***3.22***	***2.84***	***0.00***	***0.00***	***0.00***	***0.00***	***4.40***	***3.52***	***0.00***	***0.00***	***5.16***	***4.34***	***1.94***	***1.50***	***4.40***	***3.52***
H-330 Spur, Wetzel County, WV																				
Pipelines	0.35	0.21	0.00	0.00	0.30	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.09	0.00	0.00	0.00	0.00
Access Road	*None*																			
SAs	*None*																			
Contractor Yards	*None*																			
Subtotals	***0.35***	***0.21***	***0.00***	***0.00***	***0.30***	***0.09***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.30***	***0.09***	***0.00***	***0.00***	***0.00***	***0.00***
Logansport Spur, Wetzel County, WV																				
Pipeline[11]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Access Roads	*None*																			
SAs	*None*																			
Contractor Yards	*None*																			
Subtotals	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**
Pipeline Facilities Subtotals	***53.80***	***30.14***	***4.33***	***0.00***	***37.98***	***22.91***	***0.14***	***0.23***	***3.64***	***0.23***	***40.87***	***27.53***	***0.00***	***0.00***	***45.63***	***29.59***	***12.90***	***8.79***	***40.32***	***26.59***
Aboveground Facilities																				
PA																				
Shough Creek Valve Yard, Green County, PA	0.00	0.06	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.06	0.00	0.06	0.00	0.00

Table 7.2-2 (Continued)

Facility/County	Total Acres of Impacted Soils[1]		Prime Farmland (acres)[2]		Farmland of Statewide Importance (acres)[2]		Hydric Soils (acres)[2]		Compaction Prone (acres)[3]		Highly Erodible (Water acres)[4]		Highly Erodible (Wind acres)[5]		Revegetation Concerns (acres)[6]		Stony/Rocky (acres)[7]		Shallow to Bedrock (acres)[8]	
	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.
Aboveground Facilities (continued)																				
Cygrymus Compressor Station, Green County, PA	7.24	0.80	0.00	0.00	1.77	0.45	0.00	0.00	0.00	0.00	7.24	0.80	0.00	0.00	7.24	0.80	7.24	0.80	7.24	0.80
Subtotals	**7.24**	**0.85**	**0.00**	**0.00**	**1.77**	**0.50**	**0.00**	**0.00**	**0.00**	**0.00**	**7.24**	**0.85**	**0.00**	**0.00**	**7.24**	**0.85**	**7.24**	**0.85**	**7.24**	**0.80**
WV																				
Corona Compressor Station, Wetzel County, WV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pickenpaw Interconnect, Wetzel County, WV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OVC Interconnect, Wetzel County, WV	0.00	0.22	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00
Mobley Run Tap Site, Wetzel County, WV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Liberty Valve Yard, Wetzel County, WV	0.00	0.02	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00
Subtotals	***0.00***	***0.24***	***0.00***	***0.00***	***0.00***	***0.24***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.24***	***0.00***	***0.00***	***0.00***	***0.00***
Plasma Compressor Station																				
Plasma Compressor Station, Monroe County, OH	1.48	1.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.48	1.14	0.00	0.00	1.48	1.14	0.00	0.00	1.48	1.14
Subtotals	**1.48**	**1.14**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.48**	**1.14**	**0.00**	**0.00**	**1.48**	**1.14**	**0.00**	**0.00**	**1.48**	**1.14**
Aboveground Facilities Subtotals	**8.72**	**2.23**	**0.00**	**0.00**	**1.77**	**0.74**	**0.00**	**0.00**	**0.00**	**0.00**	**8.72**	**1.99**	**0.00**	**0.00**	**8.72**	**2.23**	**7.24**	**0.85**	**8.72**	**1.94**
Project Totals	**62.52**	**32.38**	**4.33**	**0.00**	**39.75**	**23.65**	**0.14**	**0.23**	**3.64**	**0.23**	**49.59**	**29.52**	**0.00**	**0.00**	**54.35**	**31.83**	**20.14**	**9.64**	**49.04**	**28.53**

Notes:

1 The numbers in this table have been rounded for presentation purposes. Soil characteristic values in each row do not add up to the total Project acreage because soils may occur in more than one characteristic class, or may not occur in any class listed in the table. The temporary impacts column represents temporary workspace impacts and permanent impacts represents permanent workspace impacts and combined will not add up to the total Project acreage as existing aboveground facilities and existing contractor yards are not included as soils would have already been permanently impacted. Additionally, areas of open water are not included in this table.

2 As designated by the NRCS. Prime farmland does not include those soils that are considered prime if artificial drainage is implemented due to the lack of drain tile use in the Project area.

3 Includes soils in somewhat poor to very poor drainage classes with surface textures of sandy clay loam and finer.

4 Land in capability subclasses 4E through 8E and soils with an average slope greater than or equal to nine percent.

5 Soils with a WEG classification of 1 or 2.

6 Soils with a surface texture of sandy loam or coarser that are moderately well to excessively drained, and soils with an average slope greater than or equal to nine percent.

7 This group includes soils with a cobbley, stony, bouldery, shaly, very gravelly, or extremely gravelly modifier to the textural class of the surface layer, with a surface layer that contains greater than five percent by weight stones larger than 3 inches, and/or with a layer in the subsoil that meets one of the preceding criteria.

8 Soils identified as containing bedrock at a depth of five feet or less from the surface; bedrock is lithic or paralithic and may be rippable with standard construction equipment, or blasting may be required.

9 H-327 and H-328 Pipelines include pipeline permanent workspace, temporary workspace, and ATWS.

10 Portions of H-326 and H-330 that share ROW are accounted for under H-330.

11 Logansport Spur consists of 0.03-mile of pipeline located within existing fenced facility area.