

Public Comments on Eldridge

Report Titles and Labels

The Title of the HDD Re-Evaluation Report is “**Eldridge Drive/North Chester Road Crossing**” which appears to reference two different drill site locations in East Goshen Township, PA. Further, the attached HDD Hydrogeologic Re-Evaluation Report, prepared by GES, simply refers to the location being evaluated as “S3-500 North Chester Road” and makes no reference by name to Eldridge Drive whatsoever. At a recent public meeting in East Goshen Township on September 19, 2019 a map bearing the Energy Transfer logo was presented to the Township Supervisors and audience, and referenced by Energy Transfer representatives, which clearly illustrated one drill site location labeled as Eldridge Drive HDD 500 (20”) and a separate drill site location labeled as North Chester Road HDD 521 (16” & 20”). If the First Report is only referencing the Eldridge Drive location it should be simply and clearly labeled as such. Although maps provided in the attached GES document show what appears to be the Eldridge Drive location, the name of their report clearly refers to an entirely different drill site location.

RECOMMENDATION(S): The Operator needs to clarify which site(s) their report is about. Their contractor, GES, needs to clarify which site their work is about. The DEP website should include a full and complete list of all drill sites, the corresponding HDD number, and clarify the status of each location’s subjectivity to Re-Evaluation reporting under the Settlement because it appears that active drill sites are being combined, renamed, and renumbered in an unofficial manner. The reports generally appear rushed and sloppy.

Geologic and Hydrogeologic Analysis

The Eldridge Drive/North Chester Road Re-Evaluation Report (First Report) states that “based on published mapping the entire HDD profile passes through a quartzofeldspathic granulite facies of the Baltimore Gneiss.” Section 2.2.2 of the attached GES Report includes a map from PA GEODE that illustrates the bedrock lithography of the HDD profile with the symbol “Ybggg” which refers to “**Precambrian age crystalline rocks of the Baltimore Gneiss**. Within some parts of the Baltimore Gneiss the Ybggg unit can include **quartz-rich rocks which also contain minor garnet, biotite, kyanite, and sillimanite** (Bosbyshell, 2006).” In reviewing multiple maps and reports of the geology of Chester County and East Goshen I find no reference to “Baltimore Gneiss”. For reference I am including links to some of those reports.

Chester County Geologic Formations, Chester County Planning Commission

<https://www.chesco.org/DocumentCenter/View/2486/d-geology?bidId=&fbclid=IwAR1iLGCzNGNR19wPLoqAJ2dcyngKYbH9gHC1c5G0mZRreq4qGfqrMF7CFKk>

MacroStrat <https://macrostrat.org/map/#/z=13.6/x=-75.5191/y=39.9842/bedrock/lines/>

Further, the bore samples in the attached GES report appear to only show two bore samples that were taken for site S3-0500. The report also includes Test Borings for a location labeled as **S3-0510** although there is no indication as to what drill site that is referring to either in the written reports or on the map that was presented to the East Goshen Township Supervisors and residents on September 19, 2019 at the public meeting.

Finally, in reviewing the aerial photos labeled as “Test Boring Location Plan” which bear the TerraCon logo, it appears that at least one, and possibly both boring locations are outside of the Eldridge Drive site. One boring location is North of Paoli Pike while the Eldridge Drive HDD site as noted in the report extends southward, from the intersection of 352 & Boot Road to Bancroft/Eldridge Drive.

RECOMMENDATION: More thorough geophysics testing needs to be done, including deeper bore samples, for the entire area along Route 352 to understand exactly what the bedrock composition is. Upon reviewing the HDD Re-Evaluation Reports for other nearby locations, the DEP was clearly unsatisfied with the quality of the bore samples which were taken and urged further more comprehensive testing of the entire area.

Radon Hazard

Additionally, it is my understanding that radon release may be a hazard associated with drilling into the rocks in this region of the Commonwealth, as noted in this USGS document which describes the risk: <https://pubs.usgs.gov/sir/2017/5018/sir20175018.pdf>

“ In a study conducted by the U.S. Geological Survey, in cooperation with the Pennsylvania Department of Health and the Pennsylvania Department of Environmental Protection, radon occurrence was evaluated in 1,041 groundwater samples collected during 1986–2015 from 16 geologic units in Pennsylvania with 25 or more radon in groundwater samples. Radon concentrations in groundwater greater than or equal to the proposed U.S. Environmental Protection Agency (EPA) maximum contaminant level (MCL) of 300 picocuries per liter (pCi/L) were present in 87 percent of the samples, whereas concentrations greater than or equal to the proposed alternative MCL(AMCL) of 4,000 pCi/L were present in 14 percent of the samples. The highest radon concentration in groundwater was 32,280 pCi/L in a sample from the Chickies Formation (Cch) in the Piedmont Physiographic Province of southeastern Pennsylvania. **Overall, the highest radon concentrations measured were in groundwater in the schists, gneisses, and quartzites of geologic units in the Piedmont Physiographic Province of southeastern Pennsylvania.**”

RECOMMENDATION: The DEP should require that radon testing (and remediation if necessary) be provided for all residences within 1,000 feet of any Mariner East HDD location at the cost of the operator.

Additional study on relationship between drilling and elevated radon levels in homes:

<https://ehp.niehs.nih.gov/doi/10.1289/ehp.1409014>

Pipe Information and Pipe Stress Analysis

The First Report discusses pipe stress allowances in relation to the amount of curvature that a length of pipeline can withstand during installation. No discussion is provided about stress or movement that this pipeline may encounter after installation although it is clearly noted in the Geologic and Hydrogeology Analysis section of the same report that the Eldridge Drive location has a possible **21 fracture zones and lies between two 100 year floodplains**.

RECOMMENDATION: Since fracture zones are areas where strike-slip movement occurs it is recommended to adopt the same solutions that are used for other pipelines in areas of seismic risk and increase the pipe wall thickness from 0.456 to 1" to 1.25" and encase the pipe inside a corrugated metal casing that allows for spacing and movement. This casing should then be placed inside a vault with 2-foot-thick reinforced concrete walls and slabs, constructed in segments separated by gaps which will allow it to "articulate" to absorb the compression and rotation from any earth movement. While this mitigating step doesn't have to be required for the entire length of the pipeline, it certainly should be a requirement where geological testing shows elevated fault zone risk. Eldridge Drive, with 21 fault zones, certainly qualifies as one such location, and should trigger more extensive geological testing at adjacent locations as well before any further drilling or installation activities occur.

If this pipeline is classified as critical infrastructure, as Sunoco/ET has repeatedly stated in public forums and claimed in legal cases then protecting it from seismic movement and other hazards, such as flooding, should be a priority. **I see no discussion of specialized engineering construction solutions that have been undertaken to mitigate the risks of the fault zones and flood plains present at this location and the information on "Pipe Information and Pipe Stress Analysis" should be deemed insufficient by the DEP.**

Reference: <https://www.structuremag.org/?p=4073>

Root Cause Analysis for the 16-Inch Pipe Installation IRs

Two IRs occurring during pilot phase drilling. The First Report provides a one paragraph "Root Cause Analysis" that offers a two sentence explanation for the first IR and another two-sentence explanation for the second IR. And finally, a two-sentence finding that assumes the same root cause for both IRs.

RECOMMENDATION: The Department should require a more thorough and substantial Root Cause Analysis response from the Operator, where each IR event is separated from the other, with its own specific timeline, contributing factors, and a root cause is identified for each location. Combining information about separate IR events should not be allowed when reporting or analyzing data.

Hydrogeology, Ground Water, And Well Production Zones

“Attachment 1 provides an extensive discussion on the hydrogeology and results of the geotechnical investigation performed at this location.”

Attachment 1 includes a summary report prepared by GES of the field tests that were performed by two previous contractors: Tetra Tech (in Dec 2015), and Terracon (in September 2017) . GES clearly states in their report that they did not perform or oversee the geotechnical work done in the attached reports, but that they merely reviewed the old reports and have provided their summaries of those studies. As the geotechnical work of these two previous contractors has been submitted by Sunoco/ET numerous times for other locations subject to HDD Re-Evaluation, the DEP knows by now that the boring samples done by these contractors are **insufficient**. In fact, regarding the adjacent site of Bow Tree /Strasburg S3-0520, in a letter dated March 13, 2018 to Mr. Matthew Gordon of Sunoco, the DEP states:

“Five geotechnical borings were drilled along the pipe run to depths of 56 to 105 feet bgs. No analysis was provided describing depths of what could be considered “competent” bedrock in each of the borings. In fact, the borings only encountered highly fractured bedrock down to a depth of 105 feet. The Report suggests that bedrock competency values are poor in some areas of the pipe run. An analysis describing the depths of what could be considered “competent” bedrock should be completed.”

For this site of Eldridge Drive S3-0500, Sunoco/ET has submitted two bore samples, (although the reports include bore samples for a third un-named site S3-510 as well.)

The two borings are referenced in a letter from Terracon Consultants dated October 18, 2017, labeled as B6-12W and B6-12E, drilled to depths of 139.5 and 172 feet respectively. **Sample B6-12W appears to have been at a location that is not even near the Eldridge Drive location, according to the map provided in the report and should be disregarded entirely.**

Further, according to the data in the Tetra Tech reports, none of the core samples appear to exceed depths of 30 feet. Notes on the report state that “Core hole collapsed due to soil content. Unable to core past 31’. The Tetra Tech reports appear to be the least competent reports submitted as part of the Geology attachments and should not be allowed to be continuously re-submitted by the Operator for multiple HDD sites.

RECOMMENDATION: The DEP should reject the following content of the Geology and Hydrology Reports:

- All TetraTech 2015 Borings (December 2015)
Reason: No boring samples were taken below depths of 30 feet; notes state core hole collapsed; unable to core past 31’; insufficient to determine bedrock data.
- Terracon Test Borings **B6-12W**
Reason: Sample Taken Outside of Eldridge Drive Drill Site Area

- Tetra Tech Test Boring SB-01, SB-01A for HDD **S3-0510**
Reason: Not Applicable to HDD S3-0500 Eldridge Drive

Adjacent Feature Analysis

The First Report states that “No Waters of the Commonwealth occur along the HDD alignment.”

The following report titled The Natural & Historic Environment of East Goshen Township states that “East Goshen Township is bisected by watershed boundaries that parallel Paoli Pike and Route 352.”

The report also states that “A 100 year floodplain encompasses each of East Goshen’s two waterways. 100-year floodplains are areas that adjoin streams, ponds, or lakes which are subject to inundation by 100-year floods. Floodplain areas are important considerations because they carry the floodwaters that pose potential threats to lives and property. Development in and around these areas may reduce water quality and increase erosion, as well as threatening wildlife and their habitats. The 100-year floodplains are shown on the accompanying map.”

This is important because **no reference is made to the adjacent floodplain risks** in the Operator’s report of *Adjacent Feature Analysis* and the operator has offered no solutions to mitigate the risks of pipeline development, increased erosion, threats to the public, property, or wildlife and habitat.

RECOMMENDATION: The “Adjacent Feature Analysis” is incomplete in insufficient. The DEP should not allow development in an area with 21 fracture traces, floodplain risk, substantial nearby wetlands and watersheds. No permit should be issued for work in this area.

References:

Natural & Historic Environment, East Goshen Township

<http://eastgoshen.org/wp-content/uploads/2014/08/EGT-OS-1993-OS-PLAN-3-Nat-and-Hist.pdf>

East Goshen Township Wetland Vegetation Inventory and Management Recommendations

https://repository.upenn.edu/cgi/viewcontent.cgi?article=1030&context=morrisarboretum_botany_works

WATER RESOURCES

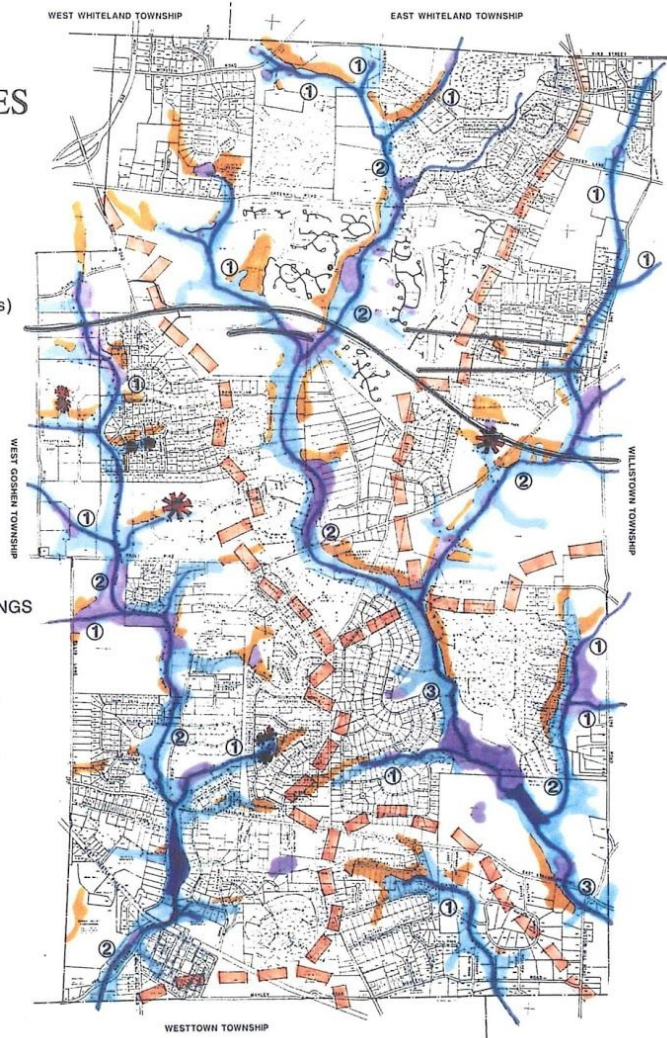
-  WATERSHED BOUNDARIES
-  STREAM CORRIDORS
-  ① FIRST ORDER (Small Streams)
-  ② SECOND ORDER (Small Streams)
-  ③ THIRD ORDER AND HIGHER
(Large Streams)
-  100-YEAR FLOODPLAINS
-  WETLANDS
-  HYDRIC/SEASONAL HIGH
WATER SOILS
-  AQUIFERS
-  HEADWATER AREAS AND SPRINGS

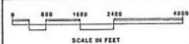

NOTES:

- The PA Department of Environmental Resources Has Designated Ridley Creek as a High Quality Waterway
- The PA Department of Environmental Resources Has Designated both Ridley Creek and Chester Creek as Trout Stocked Fisheries

SOURCES:

- USGS
- Soil Survey of Chester County
- PA DER
- "Flood Plains Maps" Federal Emergency Management Agency
- National Wetland Inventory
- "Ground Water Resources of Chester County" Chester County Planning Commission



EAST GOSHEN TOWNSHIP CHESTER COUNTY, PENNSYLVANIA	 SCALE IN FEET	 NORTH	Planning Consultant URBAN RESEARCH & DEVELOPMENT CORPORATION 55 BETHLEHEM PLAZA BETHLEHEM, PENNSYLVANIA
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NATURAL AND HISTORIC RESOURCES AND PROTECTED LANDS

- CRITICAL RESOURCES**
 - SLOPES >15%
 - GEOLOGICAL FRACTURES
 - ALLUVIAL SOILS
 - STREAM CORRIDORS
 - 100 YEAR FLOODPLAINS
 - WETLANDS

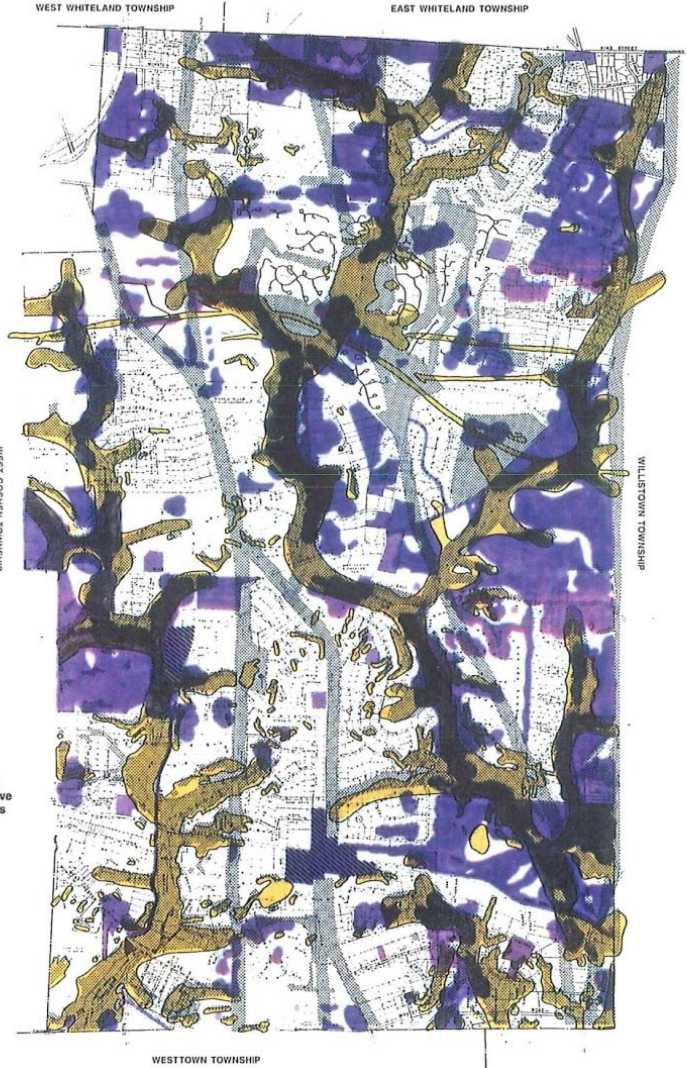
- SENSITIVE RESOURCES**
 - HISTORIC SITES
 - WOODED AREAS
 - SCENIC ROADS & VISTAS
 - PRIME AGRICULTURAL SOILS (CLASS I & II)

- OTHER AREAS / UNPROTECTED**
 - INCLUDES NON-RESOURCE AREAS AND RESOURCES SECONDARY IN IMPORTANCE

- PERMANENTLY PROTECTED LAND**
 - PUBLIC LANDS
 - RESERVED LANDS
 - UTILITY EASEMENTS
 - 100 YEAR FLOODPLAINS
 - ALLUVIAL SOILS
 - STREAM CORRIDORS
 - HIGH WATER TABLE SOILS
 - SLOPES >15%

- RESTRICTED LAND**
 - HISTORIC SITES AND DISTRICTS

NOTE: This map is a culmination of the Protected Lands Map and the Resource Priorities Map. Its objective is to determine important environmental resources that are vulnerable to disturbance.



<p>EAST GOSHEN TOWNSHIP CHESTER COUNTY, PENNSYLVANIA</p>		<p>SCALE IN FEET</p>	<p>NORTH</p>	<p style="font-size: small;">Planning Consultant URBAN RESEARCH & DEVELOPMENT CORPORATION 28 BETHLEHEM PLAZA BETHLEHEM, PENNSYLVANIA</p>
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Alternative Analysis

The Operator has stated that an evaluation of alternative routes has been conducted and no viable alternative route exists. This determination was made based on factors described as “cost, existing technology, and logistics.”

No discussion is offered as to consideration of public safety or efforts to identify routes with low population densities. No mapped alternatives are provided as is typical with other permitted projects in other regions of the country, by reputable operators. I have reviewed numerous other permitted pipeline projects where one can clearly see mapped Alternate Route 1, Alternate Route 2. I have never seen any such document related to MarinerEast because they use the same recycled language about how no alternate route exists.

RECOMMENDATION: The DEP should require a more substantial Alternative Route Analysis surrounding the process to determine alternate routes and require the Operator to submit supporting documentation, including but not limited to, actual maps.

Drilling Crew, Inspectors, Contractors

In the First Report section titled **Conclusion**, the Operator states they will provide the drilling crew and Inspectors who will monitor the drilling process, employ best practices, and use Loss of Control Materials if an IR is noted. There is no discussion of how IRs or any other event such as a suspected subsidence will be reported.

RECOMMENDATION: SPLP/ET must immediately report all IRs and any suspected subsidence to the DEP, the PUC, and the East Goshen Township immediately. In many cases where Notices of Violations have been issued by the DEP it was a resident-reported incident that was not reported by the Operator. This needs to be remedied.