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23 February 2017

Eve Shapiro Miari
Middletown Coalition for Community Safety

In re: **Potential Impacts of Mariner East II Pipelines on Wetlands, Streams, and Water Supplies in Middletown Township and Delaware County, Pennsylvania**

Dear Ms. Miari:

Your organization requested Schmid & Company to identify potential impacts of construction and normal operation of the proposed Mariner East II pipelines on aquatic resources and water supplies in Middletown Township and its watershed. This letter provides our comments, based on our review of internally inconsistent permit application documents, review agency deficiency letters, permit letters, other relevant information, and field conditions at selected properties where access was authorized along the construction right of way (ROW). The applicant's inventoried corridors and construction plans have changed several times since the initial applications for the Mariner East II pipelines were submitted during 2015. The resulting information is not consistent and is poorly organized. We have sought to utilize the latest information, last amended on 17 January 2017, insofar as it is available to the public.

We first address the proposed construction of pipelines and its potential for impacts. Then we discuss the inventoried resources along the pipelines that are at risk of impacts. Finally, we summarize the potential impacts that can be anticipated in Middletown Township and its watershed. The geographical location of the pipelines is shown in Figures 1 and 2.

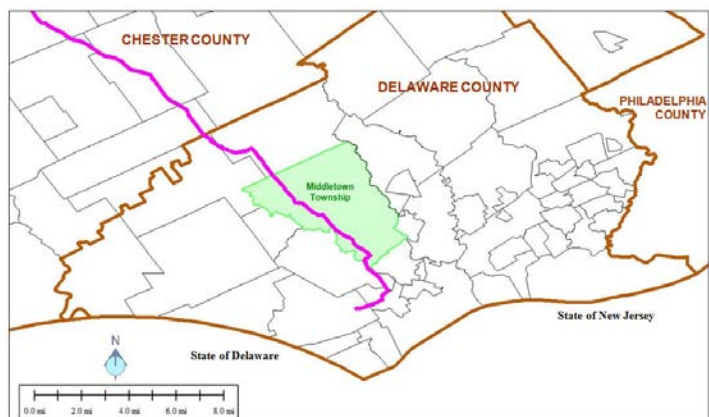


FIGURE 1. Location Map. Identification of the proposed Mariner East II pipeline route (pink) through Middletown Township (green) and nearby areas in Delaware and Chester counties, Pennsylvania



FIGURE 2. Location Map. Identification of the proposed Mariner East II pipeline route (pink) across southern Pennsylvania on a county basemap. Middletown Township, Delaware County is at green dot.

Proposed Mariner East II Pipelines and Potential Pipeline Impacts

Sunoco proposes to construct two welded steel pipelines for the transport of natural gas liquids from Washington County and Westmoreland County to Delaware County, a distance in excess of 300 miles crossing seventeen counties. One of these pipelines is to be 20 inches in diameter and is expected to carry primarily ethane (C₂H₆) for 306 miles; the other, 16 inches in diameter is to carry primarily butane (C₄H₁₀) for 255 miles. Pre-pipeline processing of gas liquids is summarized in Figure 3 (IEA 2010).

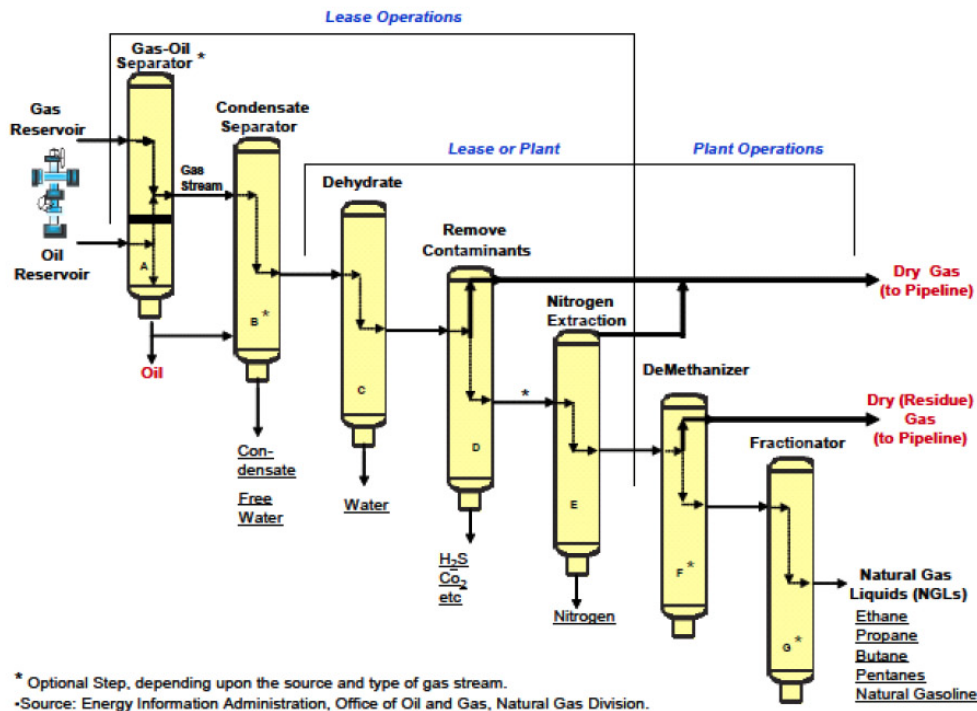


FIGURE 3. Processing of natural gas liquids prior to shipment by pipeline.

Natural gas liquids are considered to be hazardous substances and are highly flammable. Both pipelines are to be capable of handling a maximum operating pressure of 1,480 pounds per square inch, gauge (psig). Parts of the new pipelines will be installed alongside the existing 8-inch diameter Mariner East I pipeline that recently was repurposed and reversed to convey petroleum products eastward rather than westward. Sections of the proposed pipelines will be collocated with Mariner East I, other existing pipelines, or powerline utilities. Other segments of the Mariner East II pipelines will be constructed in new “greenfield” alignments.

As much as 700,000 barrels per day of natural gas liquids will be transported by the two new plus one existing pipeline through the Sunoco system from wells in Ohio, West Virginia, and western Pennsylvania (Figure 4) after removal of water and other impurities. The liquids will be exported from marine terminals in Marcus Hook, Pennsylvania, and in adjoining Claymont, Delaware. Some of the petroleum products may be used locally as raw materials for manufacturing.

Across Middletown Township the proposed ROW extends 5.5 miles and across the seven affected municipalities---11.7 miles in Delaware County. Statewide the collocated segments are said to

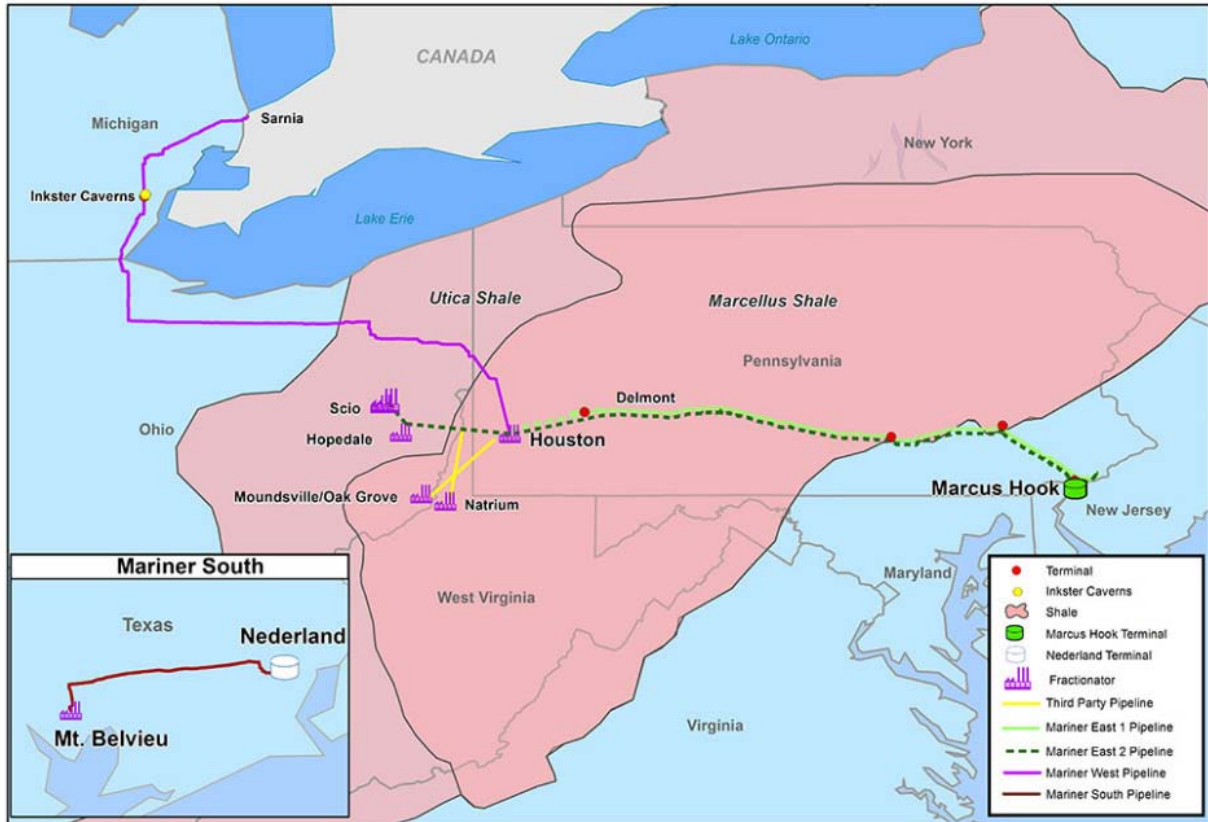


FIGURE 4. Sunoco Mariner pipeline systems as presented on the permittee’s web page.

comprise about two-thirds of the ROW, but collocation has not been broken down by county or municipality. Application drawings do not show the Mariner East I pipeline alongside which the new pipelines are to run. The applicant is aware of the many public recommendations in favor of collocation of new pipelines in Pennsylvania.

Most of the new construction will be performed by clearing a construction corridor, cutting open trenches, installing the pipes, installing trench plugs to prevent dewatering of streams and wetlands, and backfilling and stabilizing the disturbed land. Streams less than 100 feet wide are proposed to be dammed temporarily and the flow bypassed, using sediment control, as necessary to allow trenching “in the dry”. The completed pipelines in upland areas were designed by the applicant to be covered by at least 3 feet of rock, earth, and/or soil backfill material; 4 feet beneath wetlands, and 5 feet (although only 3 feet of cover are required by permit, and only 1 foot in rock) beneath streambeds.

At some locations (10 in Middletown Township and 29 elsewhere in Delaware County), segments of the pipelines are to be installed by subsurface boring, either (a) using short (<390 feet), conventional auger bores (CAB) or direct bores between excavated pits or (b) using horizontal directional drilling (HDD) for longer segments (minimum 1,050 feet for 16-inch and 1,160 feet for 20-inch pipes). In bored segments the pipelines typically are set deeper underground than in segments constructed by open-cut trenching and backfill.

HDD construction and CAB construction involve pressure-injecting a slurry mixture of water, bentonite clay, and approved chemical additives for lubrication into the boring to cool the bit and remove cuttings. Within the Delaware River basin sections of the pipeline, 1.393 million gallons of water will be needed for HDD slurry. This material can escape into streambeds or via cracks and faults into aquifers, causing damage to fish, other organisms, and/or water quality (Lévesque & Dubé 2007). Special conditions of permit approval require monitoring and immediate reporting to the Department of all inadvertent returns of drilling fluid into wetlands and other waters. Isolated construction using borings potentially can result in lesser erosion and sedimentation, unless large total areas are cleared and disturbed for the pullback areas and associated workspaces.

During construction pipeline projects inevitably increase erosion and sedimentation as a result of land clearing and earth disturbance. These impacts are subject to some degree of control by requiring the design and installation of engineering measures such as silt fences and by minimizing time of exposure of raw land. The risk of erosion and sedimentation is greatest in areas of steep topography, where Pennsylvania best management practices, even when properly designed and installed, may not contain runoff from increasingly violent thunderstorms. Sedimentation of streams and wetlands is directly damaging to natural ecosystems. It also can increase the cost of treatment of public water supplies derived from surface sources into which sediment flows. Erosion and sedimentation associated with contaminated soils also can pollute surface waters. Arsenic remaining in the soil from agricultural use at the former Fairhope Orchard in Thornbury Township less than 3 miles north of Middletown, if disturbed by the proposed pipeline, will be carried by stormwater into Chester Creek upstream from the Aqua America public water supply intake. The Department's September deficiency letters questioned many details of the applicant's erosion and sediment control plans, including whether all contaminated soil had been identified along the ROW. The applicant's response was not made public.

Groundwater levels may be reduced locally by pumping in order to keep water more than 2 feet below the planned depth of excavations during pipeline installation, thereby affecting local water supplies at least temporarily. Post construction a cover of vegetation is to be restored across the ROW. Woody plants (trees and shrubs) will not be allowed to regrow directly above the pipelines.

According to the applicant, "*Private and public water supplies may be impacted by hazardous material spills during any of the project activities including, open trenching, HDD and auger bore installation, and block valve and pump station construction and installation, and hydrostatic testing*" (Water Supply Assessment, Preparedness, Prevention and Contingency Plan, pages 2-3). Long-term impacts most commonly are associated with the failure of welds and with the corrosion of pipes, allowing escape of petroleum liquids under high pressure. The leakage of gas liquids is proposed to be minimized by proper construction, careful testing of pipe integrity and welds, cathodic protection to minimize corrosion of the steel pipe, regular maintenance, and the long-term prevention of unauthorized activities such as excavation in ROWs. Installation of numerous shutoff valves, particularly those that respond automatically when unanticipated pressure losses occur, can minimize damage long-term. Sunoco plans to install shutoff valves, either manually or automatically activated, at each railroad crossing, at major river crossings, and at minimum 10-mile intervals in areas of denser human populations along these pipelines. Applicants for permits to cross streams in Pennsylvania are required to provide for "shut off in the event of break or rupture" 25 Pa. Code 105.302(5). Automatic valves can shut off a pipeline and compressors in about 5 minutes; manual shutoff may require considerably longer. Typical loss from a pipeline carrying liquid propane is shown in Figure 5, published by the Oak Ridge National Laboratory (Oland *et al.* 2012). Effective emergency management

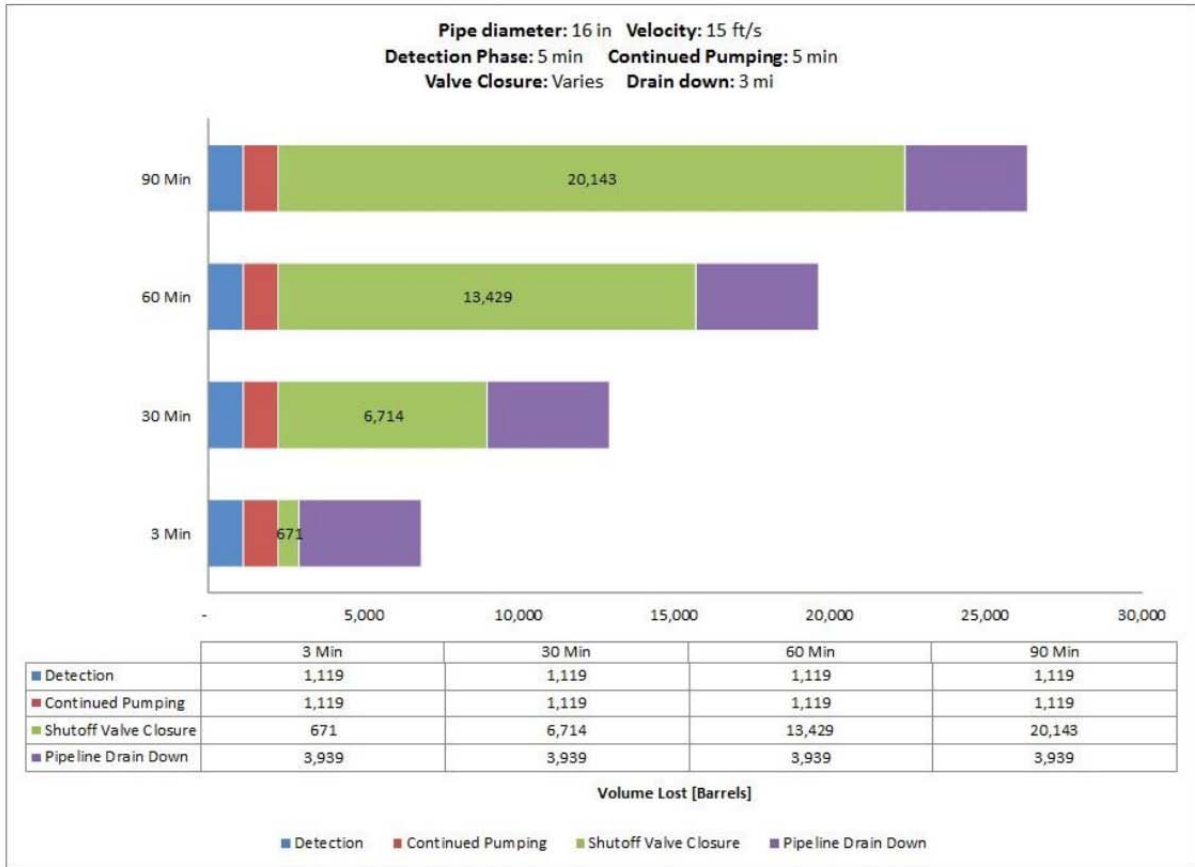


FIGURE 5. Leakage from a pipeline carrying liquid propane following leak detection. This pipeline is of 16-inch diameter, at 1,480 psi pressure providing liquid movement at 15 feet per second, with 100 feet local elevation change within 3 miles of the shutoff valve (Oland *et al.* 2012).

requires that shutoff valves be installed and that redundant sensors be kept operational over the lifetime of the pipelines.

Accidental pipeline releases can result from a variety of causes, including third-party excavation, metal corrosion, mechanical failure, control system failure, and operator error. Natural forces, such as floods and earthquakes, can also damage pipelines. Apart from injury to people, some accidents may cause environmental damage or other physical impacts which may be significant—particularly in the case of spills or fires. In addition to their vulnerability to accidents, pipelines may also be intentionally damaged by vandals or terrorists.

Ethane, butane, and other natural gas liquids in water are not generally regarded as acutely toxic to organisms. If released into the atmosphere in large enough concentrations, natural gas liquids gasify and pose a risk of asphyxiation to people, if not dispersed by wind. There is a potential for liquids that leak from the pipelines to move with groundwater into public or private water wells and to pose a risk of flammability in water supplies.

The Pennsylvania Department of Environmental Protection deficiency letter for Delaware County applications noted the potential for short-term construction damage to water wells as extending 500 feet outward from the pipelines and a potential for long-term damage to wells within 0.5 mile. The

applicant asserts that it will provide notice to owners of all wells within 150 feet of the pipelines, and that it will test well water quality and quantity prior to construction if requested by well owners. It is not clear how the applicant plans to perform its inventory and notification, inasmuch as this information was not included in the permit applications. Numerous landowners with wells close to the pipelines apparently have not yet been contacted by the permittee. In consequence of this oversight by the applicant, wetlands that qualify as Exceptional Value [per 25 Pa. Code 105.17(1)(iv)] are not identified in the applications, and there are users of private wells along the ROW still unaware of the proposed pipeline construction and its short-term and long-term potential for impact.

Of the 139 wetlands that the applicant determined were EV Wetlands, only 9 of them qualified due to the water supply criterion. All of those 9, however, qualified as EV Wetlands due to an association with public water supplies; none on the basis of private water supplies.

Permit special conditions require notification to some landowners with “identified” wells along an corridor of unspecified width, as well as users with surface water intakes within one mile downstream, no less than 72 hours before construction begins. Where the permittee notices pollution of any public or private water supply, it is to notify the Department and the user of the water supply immediately and restore or replace the impacted water supply. Water supplies “discovered” by the permittee during construction within some unspecified distance along the pipeline are to be reported immediately to the user and to the Department. Whether landowners will be notified of the possibility for, and for each occurrence of, spills of fuel for vehicles and equipment (as would be required by the Federal Energy Regulatory Commission for interstate pipelines) is not clear. Spilled fuel is acknowledged to be the most likely type of water pollution occurring along the pipelines during construction and poses the greatest threat to wells and streams closest to the construction corridor.

The other principal long-term impact on surface aquatic resources, both streams and wetlands, is the permanent conversion of forest ecosystems into herbaceous ecosystems as a result of long-term, repeated mowing of ROW atop the pipelines to facilitate observation by airborne and pedestrian inspectors. As a result, water temperatures will increase, and the cycling of dead leaves and other detritus into food webs will be reduced.

For pre-installation testing of pipelines in the Delaware River basin 1.115 million gallons of water will be needed. The sources from which testing and slurry water will be withdrawn must be identified to the Delaware River Basin Commission at least 14 days in advance of planned withdrawal. The applicant must provide for treatment of such waters after use prior to discharge to streams, with drilling mud placed in authorized landfills.

Aquatic Resources at Risk

The applicant inventoried some of the surface aquatic resources, including nearly 600 wetlands and more than 1,200 streams, within a 200-foot wide corridor along its proposed route and localized alternatives during preparation of its applications and amendments. Neither the Department nor the Army Corps of Engineers has made a full site inspection or issued a Jurisdictional Determination confirming the extent or description of wetlands or other waters along the ROW. We pointed out numerous inconsistencies, omissions, and erroneous descriptions in the Mariner East II applications in our correspondence last August (Kunz 2016). We note that several corrections have been made, but not all. The permittee has not added all Corps-confirmed jurisdictional boundaries along the ROW to

its drawings, despite the Department's directive to do so in its September 2016 deficiency letters. Consequently, the extent of proposed impacts to streams, ponds, and wetlands along the ROW is not complete, and implementation of the applicant's approved plans will exceed the Department's authorized limits on disturbance of aquatic resources.

The applicant's Table 6 identifies the number of instances statewide where impacts to all wetlands, to Exceptional Value wetlands, and to EV streams have been minimized by its proposed use of trenchless CAD or HDD methods. It shows that only a small percentage of Exceptional Value Wetlands (and no EV streams) will be protected by the use of methods that are likely to cause the least disturbance. Clearly, Sunoco could have done more to minimize impacts:

- only 129 of 646 (20%) wetland crossings will have impacts minimized by HDD/boring methods, 3 of 4 in Delaware County,

- only 37 of 129 (29%) crossings of Exceptional Value Wetlands have been minimized in this way, 2 of 3 in Delaware County, and

- none of the 19 proposed crossings of EV streams is to be done by HDD Methods (no EV streams crossed in Delaware County).

Because a pipeline is not a water-dependent activity, and does not need to be located in a watercourse or wetland, the applicant has not adequately explained or justified how the 92 open cut crossings of Exceptional Value Wetlands or the 19 crossings of EV streams will not result in any degradation of their existing water quality. The applicant's tally of wetlands acknowledged to be of Exceptional Value within its study corridor also is significantly under-reported statewide. In particular, the permittee did not identify any wetlands protective of the quantity or quality of private water supplies, as the Department had directed in its September 2016 deficiency letters.

The applicant delineated but did not acknowledge or tally indirect impacts to more than 300 study-corridor wetlands near, but not within, the construction ROW statewide. No buffers between wetlands and "unimpacted" wetlands were proposed or required by permit condition. In Delaware County we counted 9 wetlands (2 EV) closer than 10 feet to proposed construction and five (2 EV) between 26 and 50 feet. The existing functions of these wetlands are likely to experience short-term and long-term reduction in value. Permit conditions do not address these impacts.

No springs and few private wells were inventoried statewide, although the presence of nearby public water supplies was noted in two counties, one of which is Delaware County. The applicant claims to have relied on the Pennsylvania Groundwater Information System (PA-GWIS) database to identify private water wells along the proposed route. According to the PA-GWIS, there is but one private water well within 150 feet of the ROW in Delaware County.¹ That well is not in Middletown Township, where the database reports 4 wells within 500 feet and 7 wells within 1,000 feet of the pipelines. Yet hundreds of Delaware County landowners along the proposed pipelines rely upon private wells and springs for potable water. We have not found an authoritative source for private well locations in

¹ According to draft guidelines prepared by FERC (2015), Section 4.2.1.1 (Water Supply Wells), an applicant is to "[i]dentify by milepost all water supply wells, including private, community, irrigation, livestock, and municipal/public wells, and springs within 150 feet of any area that would be disturbed by construction". As an intrastate pipeline project, the Mariner East II project is not subject to FERC review.

Delaware County, but we did find credible information for nearby Westtown Township, Chester County, in the Chester Creek watershed. The proposed Mariner East II pipelines pass through the northeastern section of Westtown Township.

We obtained a portion of a map entitled "Well and Cesspool Map", prepared for Westtown Township, Chester County, by Carroll Engineering Corporation (dated 5/26/16). Among other things this map identifies the specific tax parcels in the northeastern section of Westtown Township which are served by private water wells. Westtown Township shares a boundary with Edgemont Township, Delaware County, and Edgemont Township, in turn shares a boundary with Middletown Township. Residential patterns in these three townships are remarkably similar.

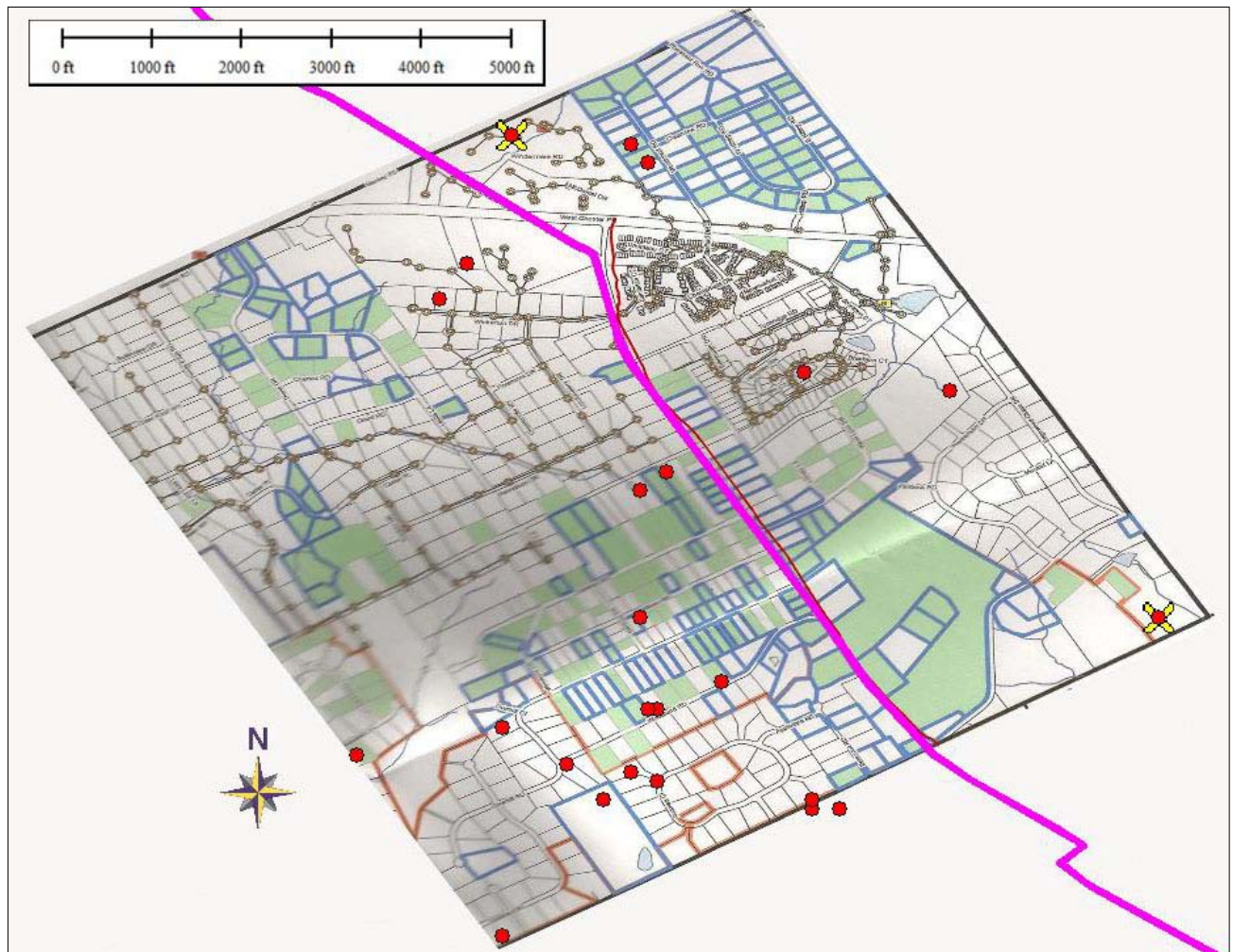


FIGURE 6. Water well information prepared for northeastern Westtown Township, Chester County (Carroll Engineering 2016), near the proposed Mariner East II pipeline (purple line). Red dots indicate the location of water wells according to the PA-GWIS database. The two dots with yellow Xs are listed as being in adjacent municipalities on the attribute data. About 180 parcels outlined in heavy blue lines are served by water wells. Four of the PA-GWIS wells appear to be correctly shown as sited within a blue-outlined well parcel.

On the section of the map we obtained (Figure 6), there are approximately 180 parcels identified as being served by water wells. According to the PA-GWIS database relied upon by the applicant, there are only 22 water wells in that same area of Westtown Township (2 of those are listed as being in adjacent Townships, but 2 others shown in adjacent townships are listed as being in Westtown Township). Of the 22 wells, only 4 are shown as being within one of the 180 tax parcels that reportedly have water wells, a PA-GWIS database accuracy of about 2%. All of the proposed MEII pipeline installation through this section of Westtown Township will be by HDD. Within 150 feet of the proposed pipeline in this area there are 27 properties served by wells, and of those, 9 are entirely within 150 feet, so their wells necessarily would be, also. The applicant's private well data are not credible, and their use during permit review necessarily must present an incorrect description of potential impacts. Nearby landowners with springs or wells would be prudent to obtain copies of full preconstruction analyses of the existing quality and quantity of their potable water supplies prior to the beginning of pipeline construction.

The applicant made widely spaced borings at potential HDD areas in an effort to identify areas of unfavorable geology for drilling and has prepared a contingency plan for cleaning up inadvertent returns of drilling fluids. During construction drilling muds can be lost into underground aquifers and springhouses or into the beds of streams. Muds spilled onto the land surface can erode into streams and wetlands, or the mud can flow upward into a streambed or wetland directly. The higher the quality of stream crossed, the greater potential for damage, should drilling muds be spilled. The probability of streambed or wetland damage declines with the increasing depth of a boring. The inadvertent return of drilling muds typically represents an acute impact of sediment that exceeds the natural ability of the streambed or wetland ecosystem to assimilate it. Fish kills may occur. Stream invertebrates may be smothered and displaced. The productivity of algae and other organisms at the base of the food web can be disrupted. The flow of water through rocks and cobbles is prevented. Fish spawning sites can be eliminated, and suspended sediments can damage fish gills and impair feeding activities. Dissolved solids concentrations can increase, as well as biochemical oxygen demand. Inadvertent returns can involve thousands of gallons of liquid, and are not uncommon during pipeline construction in Pennsylvania. The success of mud removal efforts is influenced by many local environmental factors. Litigation initiated by private parties damaged by inadvertent returns typically are settled, with non-disclosure provisions preventing the publication of terms of settlement. In Pennsylvania the Department's recordkeeping to date has failed to report the incidence of inadvertent returns accurately to the public, but incidents have occurred by the hundreds (Kiviat 2016). As noted in the Department's September 2016 deficiency letters, there were incidents of inadvertent returns during construction of the Mariner East I pipeline.

No macroinvertebrate stream assessments were conducted, so there will be no way of determining how quickly or completely the existing aquatic biota in the 17 regulated streams to be crossed by open-cut construction in Delaware County (11 in Middletown Township) actually recover after pipeline installation. The Department requires by special permit condition that the permittee collect additional photographic documentation along the ROW. Such photographs are intended to facilitate visual comparison with post-restoration photographs of the same areas. Eight CAB and HDD stream crossings are proposed in the Middletown Township (Table B). Ten separate wetlands are to be impacted in Delaware County (4 in Middletown Township), 3 of which are acknowledged as Exceptional Value wetlands (Table A).

Special permit conditions require that all stream and wetland crossings be documented photographically just prior to construction, with this documentation submitted to the Department

TABLE A. Wetland Impacts --- Delaware County
 (based on Delaware County Chapter 105 Application, Environmental Assessment,
 Aquatic Resources Table 2, 1 December 2016)

Wetland ID	Municipality	USFWS Cowardin Classification	Crossing Method	Length of Centerline Crossing (feet)	PADEP Permanent Impact	PADEP Temporary Impact	Conversion Impact (acre)	Exceptional Value
C10	Middletown	PEM	HDD	51	0.004	-	-	PuWS
	Middletown	PSS	HDD	51	0.003	-	-	PuWS
C21	Middletown	PFO	HDD	14	0.001	-	-	-
C23	Middletown	PEM	Open Cut	243	0.276	-	-	Wild Trout
I1	Middletown	PEM	HDD	200	0.014	-	-	PuWS
BA5	Chester	PFO	HDD	6	0.001	-	-	-
BA6	Chester	PFO	HDD	26	0.002	-	-	-
H41	Chester	PEM	Open Cut	-	0.001	-	-	-
I5	Chester	PEM	Open Cut	113	0.129	0.830	-	-
I16	Chester	PEM	HDD	58	0.004	-	-	-
I16	Chester	PFO	HDD	295	0.020	-	-	-

Wetlands in Middletown Township are highlighted in **bold**.

within 90 days. Wetlands in the project area are to be prominently delineated and visibly flagged in the field during construction. Watercourses with drainage area less than 100 acres, although waived from regulation under 25 Pa. Code Chapter 105, are required by Chapter 102 permit condition to be monitored for hydrology loss twice yearly for two years and annually for three additional years after pipeline installation. Restoration is to be attempted for pipeline-related loss of wetland hydrology, and compensatory mitigation is required for irremediable loss. Permit conditions require that existing forested riparian areas within the temporary (construction) ROW along streams be reestablished with replanted with nursery-grown stock of native trees for at least 50 feet from the top of both banks of warm water and trout stocked fisheries, 100 feet from cold water fisheries, and 150 feet from High Quality or Exceptional Value (Special Protection) streams. No establishment of new forested buffers is required where there currently is no riparian forest along Special Protection or other streams. Wetland and riparian forest plantings are to be monitored and reported twice yearly for two years and annually for four years thereafter, with additional restoration and monitoring if initial efforts do not meet minimum 85% survival requirements. Streambed channels are to be restored using native streambed material.

TABLE B. Waterbody Impacts --- Middletown Township
 (based on Delaware County Chapter 105 Application, Environmental Assessment,
 Aquatic Resources Table 3; 1 December 2016)

Stream ID	Stream Name	Flow Regime	Bank to Bank Width (feet)	Stream Disturbance Length in ROW (feet)			Crossing Method	Stream Permanent Impact (square feet)	Stream Temporary Impact (square feet)	Ch. 93 Designated Use	PAFBC Stream Designation
				Perm	Temp	Total					
S-C16	UNT to Chester Creek	Perennial	8	57	-	57	Dry Crossing/ Temporary Bridge	456	-	Drains to TSF, MF	Drains to ATW, STS
S-C23	UNT to Chester Creek	Perennial	10	-	-	-	HDD	30	-	TSF, MF	Drains to ATW, STS
S-C24	UNT to Chester Creek	Ephemeral	2	-	-	-	HDD	6	-	Drains to TSF, MF	Drains to ATW, STS
S-C25	UNT to Chester Creek	Ephemeral	1	-	-	-	HDD	3	-	Drains to TSF, MF	Drains to ATW, STS
S-C26	UNT to Rocky Run	Ephemeral	4	-	-	-	HDD	12	-	Drains to HQ-CWF, MF	Drains to TNR
S-C40	UNT to Chester Creek	Intermittent	3	-	-	-	HDD	9	-	Drains to TSF, MF	Drains to ATW, STS
S-C42	UNT to Chester Creek	Intermittent	5	-	-	-	HDD	15	-	Drains to TSF, MF	Drains to ATW, STS
S-C44	Rocky Run	Perennial	27	50	-	50	Dry Crossing	1,350	-	HQ-CWF, MF	TNR
S-H27	UNT to Crum Run	Perennial	12	54	-	54	Dry Crossing	648	-	Drains to TSF, MF	n/a
S-H28	Crum Run	Perennial	27	51	-	51	Dry Crossing	1,377	-	TSF, MF	n/a
S-H29	Chrome Run	Perennial	32	52	-	52	Dry Crossing	1,664	-	TSF, MF	n/a
S-H34	UNT to Chester Creek	Intermittent	8	50	62	112	Dry Crossing	400	496	Drains to TSF, MF	n/a
S-H35	UNT to Chester Creek	Perennial	7	51	-	51	Dry Crossing	357	-	TSF, MF	n/a
S-H36	UNT to Chester Creek	Intermittent	3	36	-	36	Dry Crossing	108	-	Drains to TSF, MF	n/a
S-H37	Chester Creek	Perennial	100	-	-	-	HDD	300	-	TSF, MF	ATW, STS
S-I1	UNT to Chester Creek	Ephemeral	2	14	-	14	Temporary Bridge	28	-	Drains to TSF, MF	Drains to ATW, STS
S-I2	UNT to Chester Creek	Perennial	7	154	-	154	HDD/ Temporary Bridge	1,078	-	TSF, MF	Drains to ATW, STS
S-I5	UNT to Chester Creek	Intermittent	25	54	-	54	Dry Crossing/ Temporary Bridge	1,350	-	Drains to TSF, MF	Drains to ATW, STS
S-I6	UNT to Chester Creek	Ephemeral	6	51	-	51	Dry Crossing/ Temporary Bridge	306	-	Drains to TSF, MF	Drains to ATW, STS

Note: the 4 most significant open cut stream impacts (more than 1,000 square feet each) are highlighted in red.

The 13 February 2017 Waterway and Obstruction Permit E23-524 recites the following authorized pipeline construction impacts on aquatic resources in Delaware County:

- 62 linear feet of temporary impacts to 1 unnamed tributary of Chester Creek
- 1,306 linear feet of permanent impacts to Chester Creek (TSF, MF), 13 unnamed tributaries to Chester Creek (TSF, MF), Chrome Run (TSF), Crum Run (TSF), 1 unnamed tributary to Crum Run (TSF), and Rocky Run (HQ-CWF), combined
- 4.028 acres of permanent floodway impacts along those watercourses
- 1.926 acres of temporary floodway impacts along those watercourses
- 0.455 acre of permanent impacts to palustrine emergent herbaceous (PEM), forested (PFO), and scrub (PSS) wetlands, combined
- 0.830 acre of temporary impacts to palustrine emergent wetlands.

According to the permit, no compensatory mitigation is proposed for permanent impacts in “Chester County” (and, presumably, none in Delaware County as well). The existing uses of all streams along the ROW apparently have been reported as uses designated by 35 *Pa. Code* Chapter 93. The applicant did not submit with its applications, and the Department did not require or itself collect, supplemental field information on macroinvertebrates that would enable identification of currently existing uses of streams. Such determinations are to be made prior to any final permit approval by the Department [25 *Pa. Code* 93.4c(a)(1)(i)]. Thus some waters qualifying for Special Protection are likely to have been overlooked. Some, but not all, overlooked waters that we identified in our August 2016 correspondence have been added to the applicant’s drawings. The Department in its September 2016 deficiency letters directed the applicant to verify the Chapter 93 classification of streams crossed by the pipeline. No data from such “verification” have been made public.

In Middletown Township 10 streams (6 perennial, 3 intermittent, 1 ephemeral) are to be crossed by open-cut trench. Eight streams (3 perennial, 2 intermittent, 3 ephemeral) are to be crossed by HDD. One ephemeral stream is to be crossed by a temporary bridge, and temporary bridging also is to be used at 2 perennial, 1 intermittent, and 1 ephemeral streams in conjunction with open-cut trenching (Aquatic Resources Table 3, Environmental Assessment, December 2016).

In Middletown Township there are to be six individual conventional bore crossings of roads and railroads totaling 750 linear feet plus four individual lengths of HDD totaling 10,314 linear feet (one of these continues another 4,122 feet into Aston Township). It is clear from inspection of the drawings that most of the HDD borings also are designed beneath roads and railroads and only incidentally pass beneath streams and wetlands. It is not clear why proposed HDDs end just at the edge of a sensitive wetland or stream. For example, the open cut at the end of HDD PA-DE-0046.0000-RD-16 will impact 1,350 square feet of perennial Rocky Run, a High Quality cold water fishery and wild trout stream, along with 0.276 acre of EV wetland C-23. This is the single largest wetland mapped by the applicant crossed by proposed construction in Delaware County. It is not clear why the HDD could not have been extended another 700 feet to avoid impacts on Special Protection, Clean Water Act Tier 3 Outstanding National Resource waters on public land (Figure 7).

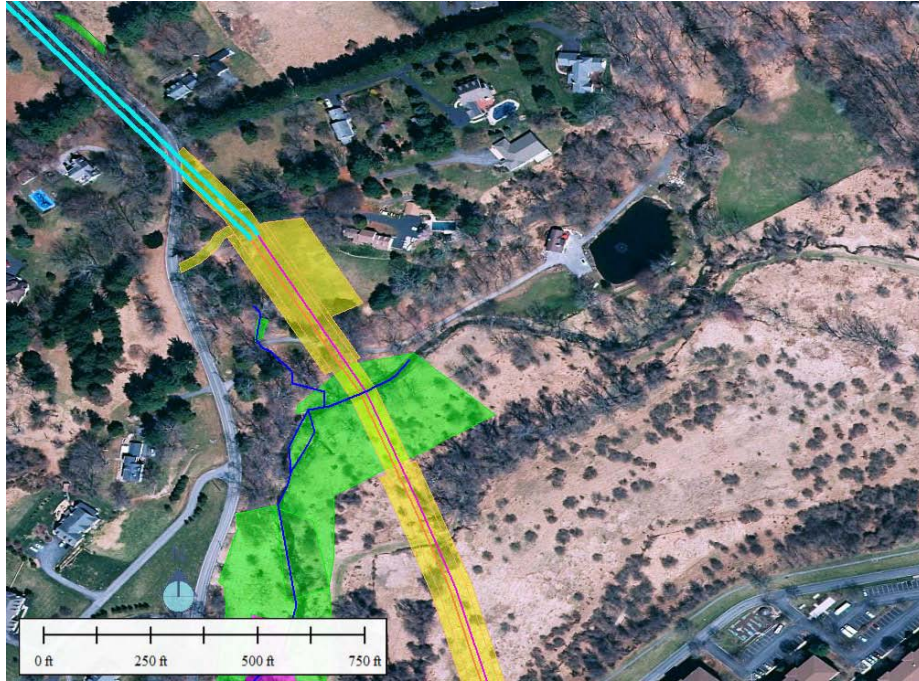


FIGURE 7. Example of avoidable open cut impact to an EV Wetland (C-23, green) along Rocky Run just east of Valley Road and north of the Granite Farm Estates Retirement Community and US Route 1, Middletown Township, Delaware County PA. Light blue parallel lines in upper left are where HDD installation is proposed. Yellow shading denotes proposed surface disturbance for pipeline construction including HDD pullback workspace and access roadway.

As we have encountered in several other locations, the kinds of wetlands mapped and impacts tabulated by the permittee do not always comport with the design drawings or field conditions. In Middletown Township, for example, the pipelines are to cross herbaceous wetlands labeled C-23 along Rocky Run. Sheet ES 6.14 of the drawings, however, shows tree lines in conflict with the designation of vegetation. Trees can be seen in Figure 7 beneath the green transparency along Rocky Run. Figure 8 is a view looking northwest across Rocky Run in the center of the proposed pipeline ROW. The Department, however, did not point out the permittee's oversight here, where less riparian forest is to be reestablished after construction than required by permit condition. The permittee does not plan to restore forest vegetation in the temporarily disturbed wetlands here or to compensate for the permanent conversion of wetlands from forest to herbaceous wetland above the pipelines themselves.



FIGURE 8. View northwest showing the central section of the Pipeline ROW at Wetland C-23 along Rocky Run in Middletown Township, Delaware County. At present this forested riparian wetland below the slope and the watercourse are fully shaded by large trees and receive input of leaves and other detritus.

Three other significant disturbances of streams (more than 1,000 square feet) in Middletown Township similarly have not been avoided by the use of trenchless methods: Chrome Run, Crum Run, and UNT to Chester Creek (Figure 9). None of the applicant's "justifications" in its December 2016 Antidegradation table gives any reason whatsoever why HDDs could not be used here.

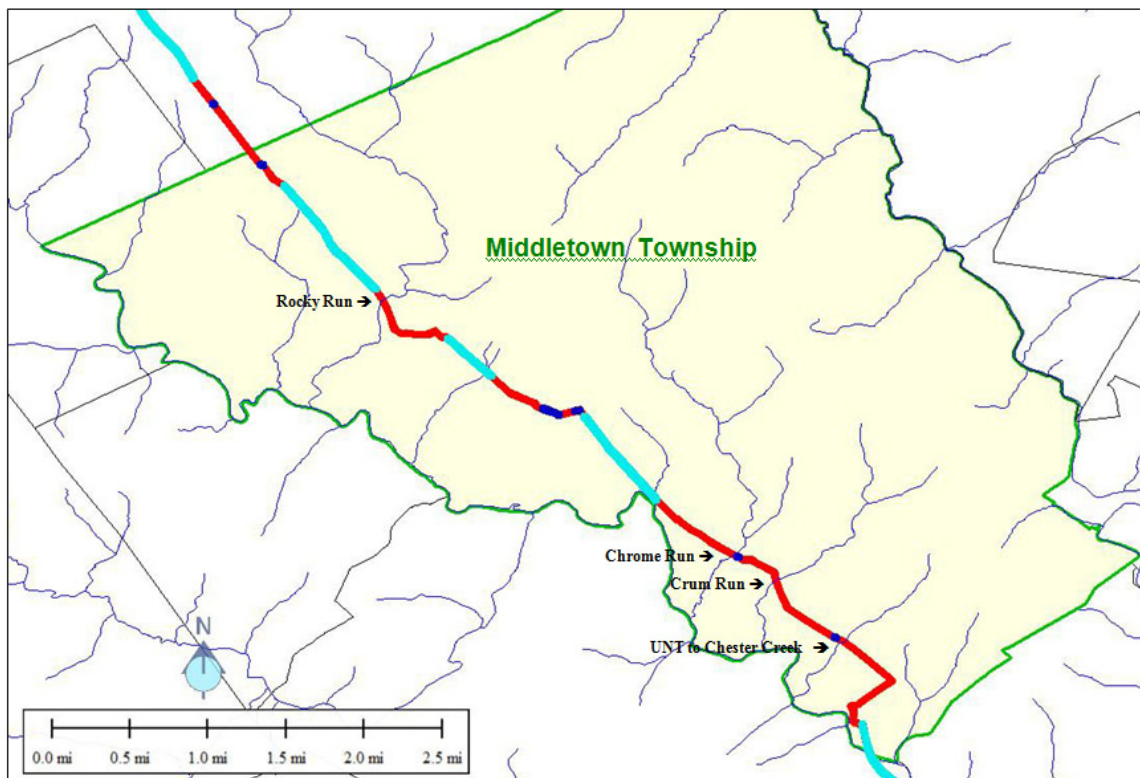


FIGURE 9. The proposed Mariner East II pipeline route through Middletown Township (yellow shading), by installation method: light blue is HDD, dark blue is conventional bore (CAD), and red is open-cut trench. Specific streams identified on the National Hydrography Database where significant impacts are proposed are identified at arrows. The applicant properly identifies all bed-and-banks streams in its application, not merely those shown on the Department’s database.

The number of Exceptional Value wetlands appears to have been underreported, inasmuch as wetlands that protect the quality or quantity of private water supplies are not identified in Delaware County or elsewhere statewide. Five impacts to four separate wetlands are proposed in Middletown Township (the other six impacted wetlands in Delaware County are in Chester Township). Three of the four Middletown wetlands are acknowledged as EV (Aquatic Resources Table, Environmental Assessment, December 2016). HDD methods will be used to cross beneath two of the three EV wetlands, which are Tier 3 Outstanding National Resource waters. It is not clear why EV Wetland C-23 along Rocky Run could not be avoided by a small extension of the nearby HDD (Figure 7).

According to the applicant 19 streams are to be crossed in Middletown Township and 57 streams in Delaware County. According to the applicant, 18 are permanent, 11 intermittent, and 28 ephemeral. Of these, only the three crossings of Rocky Run or its tributaries (HQ-CWF) are to affect a Special Protection water. Three acknowledged Exceptional Value wetlands (all in Middletown Township) are to be crossed, as well as 7 "Other" wetlands (1 of which is in Middletown Township).

Public water supplies in parts of Middletown Township and Delaware County are provided by Aqua Pennsylvania, a licensed public utility. The utility maintains raw water intakes in Chester Creek (Figure

9). The intake in Chester Creek mainstem is a short distance downstream from the proposed MEII pipeline crossings of several recognized tributaries. Its water is pumped to Ridley Creek and treated at a plant in Media Borough at the edge of Middletown Township for potable distribution. North of Middletown Township the pipelines are to pass along the ridgeline separating the Chester Creek and Ridley Creek watersheds. Another public water supply intake is operated in East Branch Chester Creek downstream from the proposed pipelines.

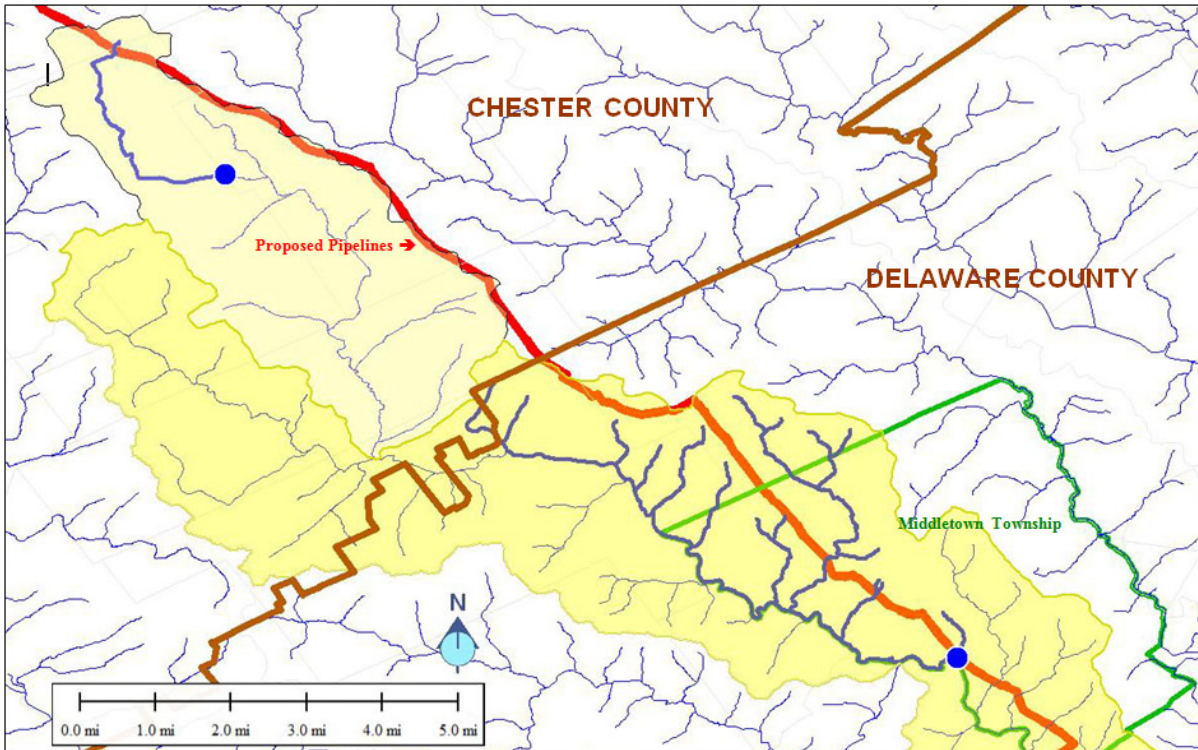


FIGURE 9. Location of Chester Creek watershed (dark yellow) and East Branch Chester Creek watershed (light yellow) and public water supply surface intakes (blue dots) in Chester and Delaware counties. Proposed Mariner East II pipeline is solid red line. Middletown Township is outlined in green. Waterways upstream from the water supply intakes which are vulnerable to impacts are highlighted in darker blue.

Impact Summary

The construction in Delaware County, according to the applicant, will disturb 101 acres of land, including 1.285 acres of wetlands and 1,368 linear feet of streams. The authorized permanent impacts to streams total 1,306 linear feet in 18 streams and to wetlands total 0.455 acre. The applicant’s justification for impacting the most sensitive streams and wetlands is nonexistent. The applicant proposes and is required to restore in-place 62 linear feet of temporary impacts to an unnamed tributary of Chester Creek and 0.83 acre of temporary impacts to palustrine emergent wetlands.

According to the page 1 of the permit, no compensation for permanent impacts is proposed for impacts [in Delaware County]. But on page 10 a special condition requires that the permittee create palustrine forested wetlands in Cumberland County to compensate for permanently converting 0.405 acre of forested wetlands to herbaceous wetlands [presumably a statewide total, not a Delaware County

total]. The permittee is to plant 0.58 acres of seasonally saturated land in Cumberland County as set forth in a compensatory mitigation plan.

Given the permittee’s practice of labeling forested (PFO) and scrub (PSS) wetlands as herbaceous (PEM), the proposed permanent conversion of wooded wetlands into herbaceous wetlands has been under-reported along the pipelines (Schmid 2017). The precise extent of this under-reporting is not readily quantified from existing information. Based on the applicant’s conflicting data in tables and drawings and our limited field inspections, it is evident that the under-reporting is significant.

Numerous landowners in Middletown Township and nearby municipalities in Delaware and Chester Counties along the pipeline ROW rely upon private wells or springs for potable water supply. These users have not been identified by the permittee. Thus the permittee not only does not know what landowners must be contacted to satisfy permit requirements, but also has under-reported and incorrectly assessed the number of EV wetlands along the ROW that protect quantity and quality of private water supplies. All EV wetlands, like other EV waters in Pennsylvania, are Tier 3 Outstanding National Resource waters in the terminology of the federal Clean Water Act, and thus warrant the highest attainable level of protection against degradation. Users of private water supplies along the pipeline would be prudent to secure full water quantity and quality analyses of their sources prior to the start of construction.

This last recommendation is especially warranted inasmuch as the permittee has experienced numerous inadvertent returns of drilling mud and other leaks along the Mariner East I and other pipelines. The applicant admitted violations of permits within the last 5 years in its permit applications. The locations of soil and groundwater contamination issues associated with Sunoco and reported by the Department are shown in Figure 10.

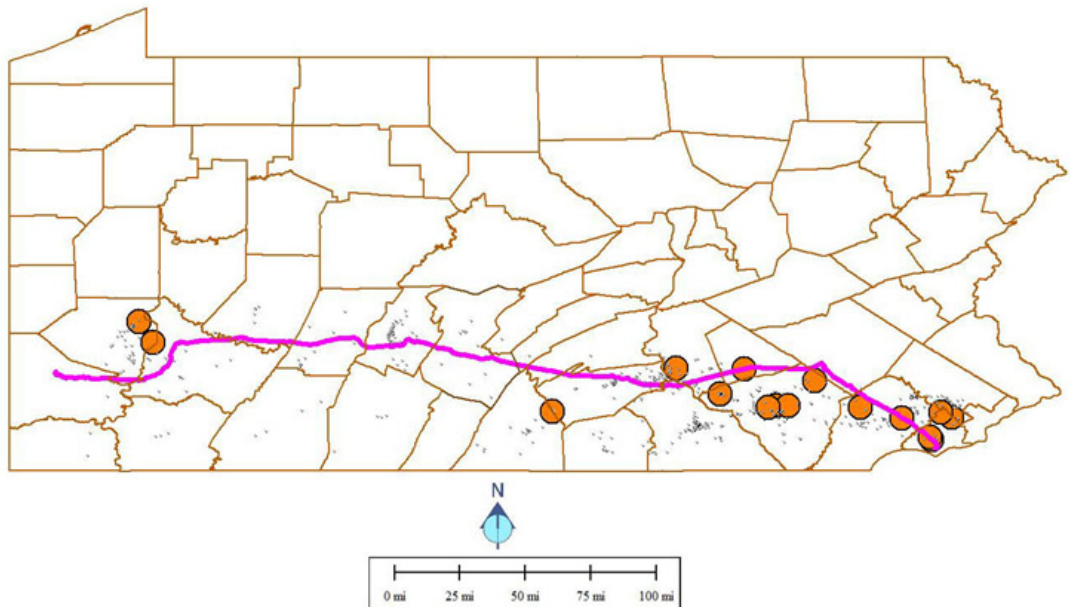

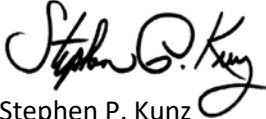


FIGURE 10. Reported issues with soil or groundwater contamination associated with "Sunoco" (orange dots), according to PADEP data available from PASDA. Shown in purple is proposed Mariner East II, which reportedly is largely co-located with Mariner East I.

Please let us know if you have any questions about any of the above.

Yours truly,


James A. Schmid, Ph.D.
President


Stephen P. Kunz
Senior Ecologist

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Note: The Department provides extensive information on the Mariner East II pipeline online at <http://www.dep.pa.gov/Business/ProgramIntegration/Pennsylvania-Pipeline-Portal/Pages/Mariner-East-II.aspx>