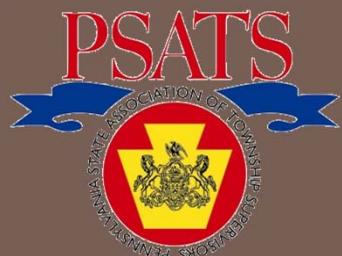


IMPACT OF NATURAL GAS DRILLING ON INFRASTRUCTURE

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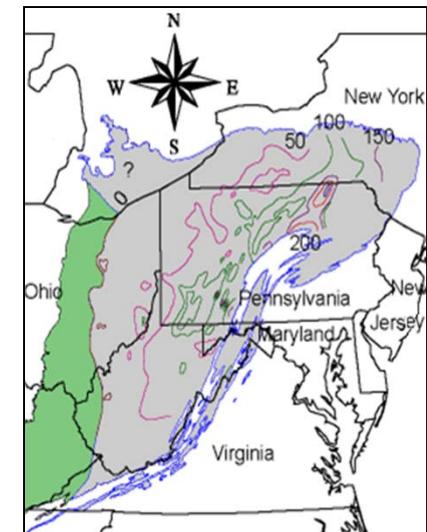


Infrastructure Impacts

Infrastructure Impacts

Transportation

- In areas with heavy natural gas extraction activity, municipalities have reported a sharp increase in labor costs, particularly for skilled employees.
- Municipalities have had to increase hours or hire additional employees to keep up with the pace of development through road inspections and rebuilding and zoning and building code administration and enforcement.



Infrastructure Impacts

Transportation

- Many municipalities do not receive prior notice before a company begins construction on a new well site.
 - Often the first notice has been the sudden arrival of heavy truck traffic.
- Municipalities receive little, if any, increased tax revenues due to this activity.
 - Natural gas not subject to property tax.
 - Royalties not subject to local earned income tax.

Infrastructure Impacts

Transportation

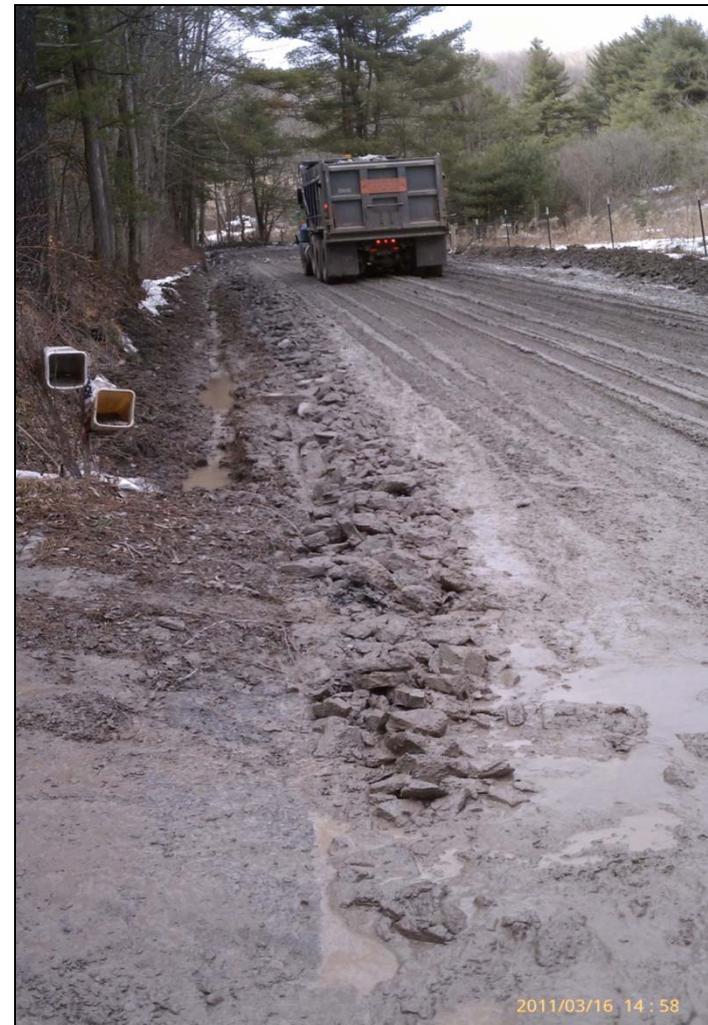
- There are approximately 122,000 miles of highways, roads, and bridges in Pennsylvania
- PennDOT and other state agencies own 44,000 miles of roads and 25,000 bridges
- Municipalities own 78,000 miles of roads and more than 10,000 bridges
- Almost three-quarters of all roadways in Pennsylvania are considered rural.



Infrastructure Impacts

Transportation

Most drilling takes place in mountainous, rural areas, accessible only by low-volume roads, many of which are dirt and gravel.



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Infrastructure Impacts

Transportation



These roads were not constructed to handle significant amounts of heavy truck traffic.

Infrastructure Impacts

Transportation

- These roads must also endure extreme seasonal fluctuations over the course of the year.
- The constant freezing, unfreezing, and re-refreezing during the frost/thaw cycle can see a road deteriorate from good condition to impassable within hours if it is being travelled by heavy truck traffic.
- When roads are damaged, total reconstruction is frequently required.



Infrastructure Impacts

Transportation

- In many cases, gas companies are working well with municipalities to promptly rebuild these damaged or completely destroyed roads.

However...

- There are concerns that non-state certified materials are being used and it unknown how these materials will respond to wear.
- The speed at which the work is performed has not allowed for adequate stormwater planning.



Infrastructure Impacts

Transportation

- Municipalities may use posting and bonding to ensure that the entity damaging the roads pays for the damage.

However...

- The maximum bond is limited to \$12,500 per mile for a paved road and \$6,000 per mile for an unpaved road.
- The cost of reconstruction can approach several hundred thousand dollars per mile.



Infrastructure Impacts

Transportation

- Cost to convert dirt and gravel road to pavement:
 - Minimum standards in PennDOT Publication 70 for local roads and streets.
 - One mile, two-lane roadway, 12 ft travel way with 4 ft aggregate shoulders, materials in-place by contractor.
 - Total does NOT including geo-textile cloth, drain tile, drain pipes or culverts, curbing, or inlets.

Infrastructure Impacts

Transportation

- Cost to Convert Dirt and Gravel Road to Pavement in accordance with PennDOT minimum standards:
 - Sub-base: \$135,200
 - BCBC: \$202,800
 - Blinder Course: \$178,500
 - Wearing Course: \$101,600
 - Shoulder Stone: \$50,000
- Total: \$668,100

Infrastructure Impacts

Pipeline Safety

- Owners of gathering lines and compressor stations should be required to communicate the location of their pipelines with local officials.
 - ▣ Not currently required to join Pennsylvania One Call as facility owners.
- While federal regulations exist for gathering lines, there is no state or federal enforcement mechanism to minimize danger from leaks and ensure that these regulations are followed.



Infrastructure Impacts

Water and Sewer

- Modern drilling techniques use large quantities of water that is treated with industrial chemicals.
- Residents in most rural areas depend on wells and groundwater as their primary source of drinking water.
- Rural communities are concerned that chemicals used in the fracing process may contaminate local water supplies.

Infrastructure Impacts

Water and Sewer



- Public water providers have concerns over the potential for negative impacts on both water quality, water quantity, or both.
- Careful monitoring is necessary to ensure that public water supplies are not negatively impacted by site preparation, road construction, drilling, or related activities.

Infrastructure Impacts

Water and Sewer

- Loss of access to potable water is a concern for those that rely on private wells and drinking water providers.
- The development occurring as part of the current play is likely to lead to water supply issues.
 - The cost to build and operate the necessary water supply and treatment infrastructure is extremely expensive in sparsely-populated areas.
- The loss of a potable water supply could have a negative influence on an area's economic development potential.



Infrastructure Impacts

Water and Sewer

- Due to its high salinity, wastewater from drilling activity is highly toxic to aquatic life and very difficult to treat.
- Current wastewater treatment capacity for this waste product is limited and without treatment, water supplies may become limited.
- However, many natural gas companies are now recycling fracing water to reduce the amount of water withdrawals and wastewater treatment needed.

Infrastructure Impacts

Water and Sewer

- Early on, some sewage treatment plants accepted raw frac water for treatment.
- Problems ensued and DEP no longer recognizes the treatment of raw frac water by sewage treatment plants as a viable option.
 - Currently, only pre-treated frac water may be discharged to sewage treatment plants for final processing and only a handful are engaged in this activity.

Infrastructure Impacts

Water and Sewer

- There is the potential for residual impacts to sewer plants from drilling activity.
- EPA's Chesapeake Bay TMDL has set limits on nutrient and sediment flowing into the Bay from Pennsylvania and identified point and non-point sources were given reduction goals by DEP.
 - However, natural gas activities, including forest-clearing and site preparation were not originally included in Pennsylvania's Bay projections.
- There is some concern that these newly created sources may be offset by required reductions from sewage treatment plants or non-point sources.

Recommendations

Recommendations:

Infrastructure

- Enact an impact fee provided that the majority of the revenues are retained in the affected communities to offset costs and avoid the need for property tax increases.
- Require natural gas companies to provide the host municipality, as well as those communities along the primary traffic route, with a 30-day advance notice prior to construction at the well site.

Recommendations:

Transportation

- An impact fee on natural gas extraction should be levied to provide funding to mediate the impacts of gas drilling on local roads.
- The maximum bonding amounts should be increased to reflect today's actual costs for road repairs and reconstruction.
- Amend regulations or statute to strengthen the authority for excess maintenance agreements as effective tools to administer and enforce weight limits.



Recommendations:

Pipeline Safety

- Owners of gathering lines and compressor stations should be required to communicate the location of their pipelines with local officials.
 - Owners of gathering lines should be required to register with Pennsylvania One Call as a facility owner.
- The PUC should be given oversight of gathering lines to ensure that these lines comply with federal regulations.

Recommendations:

Water and Sewer

- Continued oversight, permitting, and inspection from DEP and the Susquehanna and Delaware Basin Commissions will be critical to protecting Pennsylvania's water resources.
- An impact fee on natural gas extraction could assist communities impacted by lack of available water due to contamination or reduced supply.
- Amend Oil and Gas Act to increase natural gas well minimum setback from water wells and buildings to 500 feet from current 200 feet.