

# Ludgate Loop

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**FROM THE DESK OF  
BOB LUDGATE SR.**

**“Opportunity is  
where you find it,  
not necessarily  
where you look.”**



A view from the parking lot as the Exeter Library enters the final stage of construction.

## Controlling the Rage of the Stormwater

For 40 years drainage and flooding problems plagued the Mountain Home Road area in the Sinking Spring Borough, Berks County. At least 4 previous borough engineers had attempted to solve the problem without success.

The Mountain Home Road stormwater drainage problem was caused by a gap between two existing storm drainage systems comprised of larger upstream pipes carrying collected flows to smaller downstream pipes.

Ludgate Engineering Corporation (LEC) was the first borough engineer to take the solution out of the conceptualization phase.

Teaming a solution from engineers at LEC, funding from PENNVEST and permission from property owners and the borough, LEC was able to persevere because we understood the human element.

Shortly after construction was completed it was challenged by the significant storms that rattled Berks County in late June. Residents and businesses in the area were thrilled as there was no flooding reported!



Mountain Home Road: (the before picture) firefighters pump water out of local businesses after a rain storm.

## Stretching Dollars through Site Design

When selecting a site, factors to consider include zoning, traffic, access, soil, flooding, grading and stormwater management.

Another one of Ludgate's stormwater success stories can be found at the new Exeter Library. Ludgate engineers were focused on reducing the number of structural stormwater controls to keep site costs low. They were challenged by the possibility of sink holes due to the geology of the site. Also of concern were the slopes on the site, especially the entrance driveway which traversed the steepest slope.

LEC's design only required three stormwater structures on site, two of which fall in the access road and were required by the steep slope. All runoff from the parking lot is directed into swales that drain directly to the lined detention ponds. By minimizing the use of structural stormwater controls (ie. detention or infiltration facilities) the site design saved money.

LEC is also responsible for the stormwater management plans at the new St. Joseph's Medical Center off of Rt. 183 in Berks County. The hospital site located in the Tulpehocken Watershed had many challenges. The Ludgate design again limited onsite structural stormwater controls to minimize cost while addressing watershed ordinances. This was achieved by draining a significant portion of the parking area via breaks in the curb that direct the water to bioswales.

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# Innovations in On-Lot Sewage Disposal Systems Technology Increases Options for Builders and Home-Buyers

For many years there were only two types of on-lot sewage disposal systems in use in Pennsylvania:

- The Standard In-Ground, gravity fed or pressure dosed beds or trenches
- The Elevated Sand Mound or ESM, a pressure dosed bed or trench system constructed on top of the existing grade of a site.

While the standard in-ground systems are considered by most builders and homebuyers to be the choice in septic systems, the ESM is usually thought of as a last resort. In fact, there are many builders and homebuyers who would walk away from lots where an ESM was required. They are not only expensive, costing \$10,000 to \$15,000 for a three to four bedroom home, but also aesthetically unpleasing as they leave a man-made hill on the lot. Early ESM technology failures also contributed to public distrust of these systems.

Given these factors (costly construction, aesthetically unpleasing and the shadow of unreliability) it is no wonder that people repeatedly choose the in-ground septic system. However over time regulations have tightened and the Pennsylvania Department of Environmental Protection (PA DEP) soil testing criteria has become more and more stringent consequently further limiting the number of lots where standard in-ground systems can be used. To address the limitations in sewage disposal system technologies, the PA DEP standardized three formerly “alternative technologies”. As a result builders and homebuyers now have increased options for on-lot septic systems. These systems include:

- Spray Irrigation Systems – This option requires approximately 3 acres in order to meet the setback criteria. Soils must be evaluated by a Certified Soils Scientist to determine site suitability. The cost of a spray irrigation system ranges from \$20,000-\$25,000 for a three to four bedroom home.
- Drip Emitter or Drip Irrigation Systems – Using small diameter, flexible, plastic tubing with numerous drip emitters the system disperses effluent into the ground. Although no percolation test is required, the soils must be evaluated by a Certified Soils Scientist to determine site suitability. This type of system is typically more costly than an ESM ranging in price from \$20,000 to \$25,000 for a three to four bedroom home, yet many homebuyers are selecting this technology because they like that it is buried under the ground similar to the standard in-ground system.
- Sand Filter and Peat Moss Filter Systems – Depending upon the type of filter system chosen there may be one peat moss system per bedroom or one larger filter system. These filters are buried under the ground with an access hatchway that can be opened up at ground level. Sewage effluent passes through the filter media and is dispersed to a seepage bed. Slightly less expensive than the other two, this system costs approximately \$15,000 to \$20,000 for a three to four bedroom home. The soils must be evaluated by the municipality’s Sewage Enforcement Officer or a Certified Soils Scientist to determine suitability.

By using one of these abovementioned technologies many builders and homebuyers are now able to build a home on a lot that in the past might have been deemed unsuitable for construction. As the use of these systems becomes more common the higher installation costs are expected to decrease.

Anyone interested in learning more about these innovative technologies for on-lot sewage disposal systems can contact Ludgate Engineering and/or log onto PA DEP’s website at [www.dep.state.pa.us](http://www.dep.state.pa.us).

*Written by Bob Ludgate, Jr. SEO*

**Photos: Ludgate Sewage Enforcement Officer, Wayne Bowen, is shown evaluating soil probes.**

**Also pictured is an Elevated Sand Mound, a favored type of on-lot sewage disposal systems.**



## Ludgate's New Sewage Enforcement Officer

The PA DEP has named Adam Bender as a state certified Sewage Enforcement Officer. Adam joined Ludgate Engineering Corporation (LEC) in June 2004. Bender holds a bachelor of science degree in Geography from Penn State.

Outside of LEC, Adam serves as secretary of the Planning Commission in Alsace Township, Berks County. He also plays for the Reading Rugby team and has strong interests in many sports, music concerts and camping.



## Municipal Watch: Land Development Controls

Northern Berks County and Southern Schuylkill County municipal officials met at the West Brunswick Township building in Orwigsburg, PA to hear a presentation by Bob Ludgate Jr., Vice President of Municipal Services.

The presentation titled "Land Development Controls: Herding Development to the Path of Growth" covered Act 247, Comprehensive Planning, Zoning, SALDOs, Stormwater Management and Impact Fees

The presentation highlighted Ludgate Engineering's work with Eastern Schuylkill Planning, a union of five municipalities for which Ludgate is preparing three joint planning documents: Comprehensive Plan, Zoning Ordinance and Subdivision and Land Development Ordinances (SALDO).

*"Anyone who missed this presentation missed out!"*

*- Milton Kern,  
Kutztown Borough,  
Planning Commission*



Even the back row of attendees was listening!

**TO RECEIVE A COPY OF THIS PRESENTATION OR TO REQUEST A LIVE PRESENTATION FOR YOUR BOROUGH COUNCIL, TOWNSHIP SUPERVISORS OR PLANNING COMMISSIONS CONTACT:**

**Kirsten Deysher  
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## Ludgate Engineering exhibits at PA Energy Fest

The second annual Pennsylvania Renewable Energy and Sustainable Living Festival was held September 22nd and 23rd on the Kempton Fairgrounds in Berks County. This is the first event in the Northeast US to address renewable energy, energy efficiency and sustainable living.

Ludgate Engineering was one of over 60 exhibitors. Ludgate's display featured information on low impact development and storm water management. Attendees who visited the booth learned how they could use storm water management practices such as rain gardens and barrels on their own properties.

They also learned about local land development controls through comprehensive planning and zoning.

To learn more about the Festival visit [www.paenergyfest.com](http://www.paenergyfest.com).





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## **PA Recycled Glass Economic Development Forum**

Wayne Bowen, Environmental and Municipal Consultant for Ludgate Engineering Corporation addressed members of the Recycling Markets Center the PA Recycled Glass Economic Development Forum held in September in Harrisburg. At the forum participants discussed new technologies being considered to improve marketability of recycled glass. Today over 60% of glass collected from recycling programs is unmarketable.

During the late 1990s, Wayne, a practicing Sewage Enforcement Officer (SEO) and former Schuylkill County recycling coordinator, saw the potential of using recycled glass as a viable substitute for certified crushed stone or sand aggregate from quarries. Despite the ability to achieve an identical product specification to quarry stone/sand, the regulatory scheme precluded its use. Wayne petitioned DEP to change the regulation that required sand mound sand to be from PennDOT certified stock piles. In September 2003, DEP approved the use of crushed recycled glass for use in sand mounds as well as other on-lot system applications provided third party certification of the conformation of the material to specified aggregate requirements is obtained by an AASHTO/ASTM certified laboratory. Wayne updated the panel on the current opportunities and constraints of using recycled glass in on-lot sand mound sewage disposal systems and encouraged the group to prepare educational materials to reduce the reluctance among those in his profession. He also addressed uses for glass now deemed “unmarketable” in engineering applications, such as highway construction aggregate and wastewater treatment systems.

In the present market, crushed recycled glass is an estimated 40-50% cheaper than quarry stone/sand on a per ton basis. The glass alternative is also less dense, therefore reducing hauling costs. Local sources for crushed recycled glass include Cogle's Recycling in Hamburg, PA and Todd Heller, Inc. in Northampton, PA.