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Roof Replacement in the Town of Brant

by: Garrett M. Hacker, Project Engineer

Are your buildings in need of roof attention? In January of 2005, E&M met with the Town of Brant to discuss the need for roof replacement at the Town Highway Garage and at the Town Recreation Building located on Route 249 in the Town of Brant, New York. The Highway Garage (refer to photo below) is a 5,600 square foot masonry building constructed in 1967. The current roof is nearly 20-years old and constructed of a ballasted membrane roof over 1-1/2 inch insulation board all supported by metal decking and bar joists. The original roof structure was built nearly flat with two scuppers located at 1/3 points along the north side of the building. The nearly flat roof construction resulted in numerous ponding areas across the roof.

The project includes the removal of the stone ballast, roof membrane and insulation board. The new roof system will be constructed of a fully adhered ethylene, propylene, diene terpolymer (EPDM) roof membrane 0.060 inches thick over a 1/16-inch per foot tapered polyisocyanurate insulation board. The new tapered roof system will provide positive drainage eliminating the current ponding situation.

The Recreation Building is a 4,112 square foot masonry building constructed in 1984. The current roof is nearly 21-years old and was build similar to the Highway Garage with a ballasted membrane roof supported by metal decking and bar joists. Unlike the Garage roof, the existing Recreation Building roof system included a tapered insulation board to provide positive drainage.

The project includes the removal of the stone ballast, roof membrane, and insulation board. As a result of the roof leaking in recent years, E&M will inspect the condition of the existing metal decking upon tear off and direct the contractor to replace damaged areas. The proposed roof system includes a fully adhered EPDM roof membrane 0.060 inches thick over a ⅛-inch per foot tapered insulation board.

Recently five bids were received for the project with Sahlems Roofing and Siding Inc. the low bidder at $35,665.00 for the Garage and $28,379.00 for the Recreation Building.

Foster Township Builds FEMA Project

by Roy Pedersen, P.E.

Foster Township in McKean County, PA has been granted a FEMA grant to pay 75% of the cost of a $160,000 flood hazard mitigation project.

The project, called Lincolndale Avenue Drainage Improvements, is a joint effort involving Township workers, and contracted work.

Lincolndale Avenue originally was two narrow lanes on either side of a stream. About 40 years ago, the stream was enclosed and the street was paved on top of it. In the last decade, a chronic flooding problem has existed when storms cause heavy runoff. The culvert under East Main Street leading to the Lincolndale culvert becomes partially blocked with debris, causing the stream to flow over East Main Street, and down Lincolndale Avenue on the surface, causing property damage each time.

The project includes a larger precast box culvert under East Main Street and a larger pipe down the center of Lincolndale Avenue. The pipe down Lincolndale is a 83" x 59" x 600' pipe arch which will be installed by Township workers.

The junction boxes will be installed by a contractor, Quality Engineering Solutions, from Conneaut Lake, PA. They will have 2' deep sumps to allow sediment to be captured. This will facilitate easier cleaning and prevent the sedimentation of the new pipe arch culvert.

The box culvert across East Main Street will also be installed by Q.E.S. with traffic control and stream water control provided by the Township. Several utility lines will need to be relocated for this project, including gas, water, electric, telephone, and cable.
The project also includes a trash rack to be installed at the upstream end to capture tree branches prior to their entering the culvert.

Low Impact Design

by Glenn D. Cooley, PE

Low Impact Design (LID) is an new idea in stormwater management with a basic premise to manage rainfall at the source using uniformly distributed decentralized small scale controls. LID's goal is to recreate a site's predevelopment hydrology by using design techniques that infiltrate, store and detain runoff close to its source. Techniques are based on the thought that stormwater management should not be seen as stormwater disposal. Instead of conveying, managing and treating stormwater in large, costly end-of-pipe facilities located at the bottom of drainage basins, LID addresses stormwater through small, cost-effective landscape features located at the lot level. This includes not only open space, but also streetscapes, parking lots, sidewalks, and medians. LID is a convenient approach that can be used equally well to new design and redevelopment projects.

LID has numerous benefits and advantages over conventional stormwater management approaches. In short, it is a more environmentally sound technology and a more economically sustainable approach to addressing the adverse impacts of development. By managing runoff close to its source though intelligent site design, LID can enhance the local environment, protect public health, and improve community livability; all while saving developers and local governments money.

A widespread concern is that LID-based projects will be more expensive because they could require higher design and construction costs and a longer time to receive project approval. This may or may not be true, depending on the experience of the engineer and contractors with these new techniques and the receptiveness of local government officials to innovative practices. These potential cost increases are not inherent in the concept of LID but of inexperienced agencies and individuals that remain unaware of the great necessity for and benefits of a new approach.

Experience has shown that LID saves money over conventional approaches through reduced infrastructure and site preparation work. This savings is achieved by reductions in clearing, grading, pipes, ponds, inlets, curbs and paving. Far outweighing any of the cost increases due to the use of LID, these infrastructure reduction savings enable builders to add value-enhancing features to the property, to be more flexible and competitive in pricing their products, or even to recover more developable space since there is no need to waste land for large stormwater basins.

Critics of the use of LID have tried to simplify the approach by characterizing it as only relying on rain gardens and swales that will not be maintained by the property owner. LID is much more than this. It is a comprehensive approach that has safety factors which greatly reduce the possibility of failure. Many LID techniques have nothing to do with nor can they be significantly influenced by the behavior of the property owner. These include basic subdivision and infrastructure design features such as reducing the use of pipes, ponds, curbs and gutters; maintaining buffer zones, and open drainage courses; using infiltration swales, and grading strategies; reducing impervious surfaces and disconnecting those that must be used and conserving open space. If LID practices are viewed as assets, the primary motivation for their long-term maintenance is that of property owners protecting their economic interests. In actuality, LID site source controls reduce maintenance burdens for property owners and local governments.

Web sites that have additional information on LID can be found at:
www.wbdg.org/design/lidtech.php &
www.landdevelopmenttoday.com/Article211.htm

Our Land - Joseph Ellicott and the Grand Survey

by James A. Nearhood, P.L.S.

In my last article I described the beginning of the survey of Western New York, called the Holland Purchase, in the Fall of 1797 and the start of the 1798 surveying expedition which began in March. Joseph Ellicott had been hired by the Holland Land Company as their chief surveyor.
During the winter of 1797-1798 Joseph Ellicott had spent the months in detailed preparation and planning. He was particularly cautious concerning quality control. The foot was not standardized in the early American time period. Joseph took an average of several rulers and had brass 12 inch rulers made and attached them to each of the surveyors field books.

The surveyors measuring chain was also a source of error because of its many wearing surfaces of the loops at the end of each wire link and the three rings which connected the links together. Plus the loops and rings could be stretched in use and when dragging through the forest. He had his chain men carry the chain horizontally and after each six miles were measured the chain was compared to a standard chain.

The contents of the surveyors field notebooks also shows his attention to detail. His system was to add more information than just distance and angles. Topographical information included the location of bodies of water, streams and rivers. Other data, such as types of trees and vegetation, wildlife, and most importantly the quality of the soil, were included. These notes were to be written down at the time the measurements were taken.

The surveying instruments of the time period were the simple compass or more “modern” circumferator, both of which relied upon a magnetic needle. Joseph felt that they were too inaccurate for the lines which were many miles in length that his crews had to run. Andrew Ellicott, Joseph’s brother, had a new type of transit instrument made for his survey at Natchez on the Mississippi River. It became Joseph’s brother Benjamin’s duty to build a similar transit instrument that winter. The instrument would provide the stability and accuracy needed to project the astronomically derived North and South Meridian lines.

Originally Joseph thought the survey could be completed in one full season. That first spring in
1798 showed him that surveying in this virgin forest
of Western New York would take much longer, in fact it took three years. In March of 1798 Benjamin Ellicott led one group at Williamsburg near Genesee Falls. John Tompson was in charge of the survey of the bounds of the Indian reservations. These included the Allegany, Cattaraugus, Tonawanta (now called Tonawanda), Buffalo Creek, and several other smaller places. Benjamin Ellicott assisted with the reservation surveys until mid June when he started the survey of the East Meridian line, which is the eastern boundary of the Holland Purchase.

The progress was slow but a great amount of wilderness surveying was accomplished during that first full season from March to October. After many negotiations between Joseph Ellicott and Major Adam Hoops, who represented Robert Morris, the eastern boundary line of 94 miles between Pennsylvania and Lake Ontario was completed. Stone monuments were set as mile markers on this line.