E&M Engineers and Surveyors, PC

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Springville, New York 14141
(716) 592-2851

Bradford, Pennsylvania 16701
(814) 362-5546

www.emengineers.com

Stormwater and Green Infrastructure

by Glenn D. Cooley, PE

Handling and treatment of stormwater runoff has evolved over the last decade from getting it off-site as quickly as possible to actually minimizing its generation on-site. The 2010 edition of the NYSDEC Stormwater Management Manual mandates that new stormwater facilities design incorporate features that limit stormwater runoff at its source.

This is most commonly done using the practice of "green infrastructure". As NYSDEC defines it, "In the context of stormwater management, the term green infrastructure includes a wide array of practices at multiple scales to manage and treat stormwater, maintain and restore natural hydrology and ecological function by infiltration, evapotranspiration, capture and reuse of stormwater, and establishment of natural vegetative features."

The practice begins by minimizing impervious surfaces such as roadways, parking lots, roofs, etc. Reduction in the size and extent of sidewalks, eliminating roadway curbs and gutters as well as making smaller cul-de-sacs and reducing building footprints all help to minimize impervious surfaces. Roof gutters should not be connected to storm drains, but allowed to flow across grassed areas.

A second aspect is to create a spread flow of stormwater rather than put it in gutters or storm sewers. This allows for a more natural absorption of rainwater into the ground. The stormwater has a better chance of infiltration, use by vegetation, or even trans-evaporation using this method. The water can then flow to buffer areas along streams or to grassed "filter strips", grassed open ditches or swales. Reducing stormwater volume near its source is an important aspect of green infrastructure.

Vegetated Swales

Bioretention Cell

This can be accomplished by the use of: rain gardens, green roofs, stormwater planters, porous pavement or underground cisterns for irrigation water. Ultimately, the stormwater does need to be conveyed to treatment prior to discharge off site. However, the treatment volume needed will be reduced by implementation of the above mentioned practices.

Town of Portland, Burr Road Culvert Replacement

By: Garrett M. Hacker PE

During the Summer of 2010, the Town of Portland, Chautauqua County, New York replaced the Burr Road culvert on Slippery Rock Creek in the Town of Portland. The project involved replacing a partially collapsed 6-feet diameter steel culvert pipe located at the inlet to the Village of Brocton municipal water storage reservoir.

E&M Engineers and Surveyors involvement in the project included securing a $95,000.00 grant from the NYSDEC Round 9 Water Quality Improvement Projects program. E&M prepared a topographic survey of the site to determine the new culvert alignment and analyzed the upstream watershed to calculate the peak flows for sizing the proposed crossing. A complete set of plans, specifications and contract documents were prepared for 80 linear feet of 7' diameter corrugated, 12 gauge aluminized steel culvert.

To qualify for the funding through the Water Quality Improvement program, E&M proved the project would reduce sediment loading and increase the raw water oxygen content to the adjacent reservoir. To accomplish this the firm designing a 4-feet deep sump constructed out of 2' x 2' x 6' concrete blocks at the inlet end of the culvert. The sump reduced the velocity of the water entering the culvert and therefore allows suspended sediments to settle. The outfall end of the culvert was designed to increase the raw water oxygen content of the reservoir by installing a 6-feet high tiered outfall constructed from concrete blocks. This innovative design enabled the Town to fund the project through the NYSDEC Water Quality Improvement grant. Construction of the crossing was completed by the Town of Portland Highway Department.

Kennedy Street Bridge Replaced

By: Chris Ernst, P.E.

The replacement of the Kennedy Street Bridge over the West Branch Tunungwant (Tuna) Creek in the City of Bradford was completed during the summer of 2011. The old bridge was restricted to one lane only and a 3 ton weight limit due to the failing condition of the existing superstructure. The weight limit and lane closure created a safety issue and an inconvenience to the businesses and residents near this bridge. The existing superstructure (prestressed adjacent box beams with an asphalt deck and reinforced concrete sidewalks and steel handrails) was removed, the existing masonry and reinforced concrete abutments were rehabilitated and a new superstructure was installed. The existing abutments were rehabilitated by adjusting and placing a new

surface on the reinforced concrete beam seats and by repairing the cracked and spalled areas of the reinforced concrete portions of the abutments.

Before

The new superstructure consists of 6 prestressed spread box beams with a reinforced concrete deck, raised reinforced concrete sidewalks on each side and reinforced concrete barriers. The new superstructure maintained the preconstruction span length and roadway with of 83 ft. and 24 ft., respectively. The new raised concrete sidewalks are each 5 ft. wide. The drainage on the uphill (north) approach to the bridge was improved with the installation of 2 new storm inlets near the bridge, thus, minimizing the amount of uphill stormwater that will cross the bridge. A waterline attached to the east side of the bridge was replaced during the project.

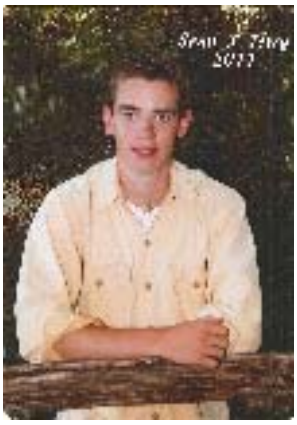
The design of the bridge project was completed by E&M Engineers and Surveyors, P.C. and their subconsultant, American Geotechnical & Environmental Services, Inc. (AGES). AGES was responsible for the geotechnical review of the existing abutments and the soils beneath them. The design was completed using PennDOT standards and under the direction of the PennDOT Engineering District 2-0 located in Clearfield, PA.

The construction of the bridge project was let for bids in December 2010 and the low bidder for the project was the L.C. Whitford Company, Inc. of Wellsville, NY with a price of $444,436. The Federal Government contributed 80% of the funding for the design and construction of the bridge, the State of Pennsylvania contributed 15% and the local share was 5%. The L.C. Whitford Company began construction at the site in early May 2011. The prestressed spread box beams were manufactured by Whitford and the cast-in-place concrete for the entire project was provided by the Bisett Building Center of Bradford, PA. The pavement for the necessary approach work was provided by Interstate Amesite of Lafayette, PA and installed by Whitford. The bridge was reopened for traffic on September 2, 2011.

After

The project was completed approximately one month ahead of schedule and essentially on-budget much to the credit of the contractor, under the direction of Superintendent Dana Bradley, and to the E&M Inspector-in-Charge, Mike Reed. The bridge replacement project was also successfully completed due to the hard work of Debbie Huston and the other staff of the Bradford City Office of Economic and Community Development, the Bradford City Dept. of Public Works, The Bradford Water Authority, the Bradford Sanitary Authority and the PennDOT Engineering District 2-0.

New York Scholarship Winner Announced



E&M Engineers and Surveyors, PC in Springville is pleased to announce the winner of its annual college scholarship. The winner of the $1,000 scholarship is Sean Terry of Castile, N.Y.

Sean graduated from Letchworth Central School District and is attending the University at Buffalo. He is pursuing a Bachelor's degree in Civil and Environmental Engineering. The purpose of the scholarship is to encourage High School students to pursue a career in the field of Civil Engineering or Land Surveying

Pennsylvania Scholarship Winner Announced

E&M Engineers and Surveyors, PC in Bradford has awarded its annual $1,000 college scholarship to Dakota Cornell of Eldred, PA.

Dakota graduated from Otto Eldred High School and is attending Alfred State College to pursue a degree in Surveying-Engineering Technology.

E&M ENGINEERS AND SURVEYORS PC
482 S. CASCADE DRIVE
PO BOX 159
SPRINGVILLE, NY 14141-0159

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