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Village of Brocton Rebuilds

by Garrett M. Hacker, Project Engineer

The Village of Brocton rebuilds after a January 10, 2006, structure fire destroyed the Village's highway, electric and water departments. It was determined by fire investigators that the fire originated in the engine compartment of a Village plow truck. The fire quickly spread throughout the 80' x 50' pre-engineered metal building housing the highway garage / water department and the adjacent 50' x 40' timber column structure housing the electric department.

E&M Engineers and Surveyors became involved in the early stages of the project by meeting with the Village Mayor, Attorney and Insurance Adjuster to determine the scope of the damages and method of repair. The firm then prepared design plans, construction specifications and bid documents for demolition and replacement of the timber column structure and major repairs to the pre-engineered metal building.

The firm designed a new 40' x 50' insulated and heated timber column structure to replace the existing electric department. The new structure was designed with 17' eaves to accommodate 14' high overhead doors and an upper level mezzanine for storage. The building will be utilized to store two trucks, electrical equipment and an office.

The existing 80' x 50' highway / water department was stripped down to the main steel frame and completely rebuilt. New roof purlins, wall girts, insulation, metal siding and standing seam roof were constructed. The electrical, heating and plumbing was replaced and a fire wall was added to separate the adjacent structures.

The project was separated into three divisions; General, Electrical and HVAC. The general contract was awarded to IC Construction Services Inc. of Orchard Park, NY for $416,360.00, electrical was awarded to CIR Electrical Construction Corp of Buffalo, NY for $31,775.00 and HVAC was completed by a shared services agreement with the Town of Portland. The Village anticipates being moved into the new building by the end of July.

Stormwater Treatment Practices

By: Glenn D. Cooley, PE

When stormwater treatment needs first became recognized the only concern was that of attenuation of peak runoff from a site. Engineers design dry stormwater detention basins to reduce post development flows to pre-development flows. These were generally based on 10, 25 and 100 year storms or whatever the local municipality had as a standard.

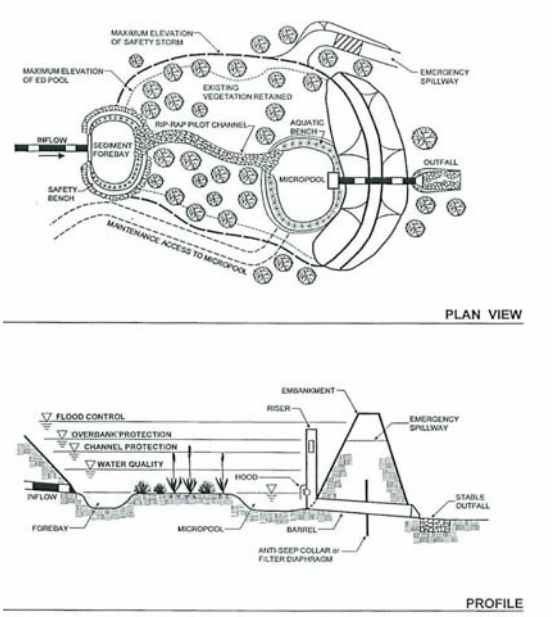
To address the nationwide problem of stormwater pollution, in 1987 Congress broadened the Clean Water Act definition of "point source" to include industrial stormwater discharges and municipal separate storm sewer systems. These facilities were required to obtain NPDES permits. This 1987 expansion was generated in two phases. Phase I required that all municipalities of 100,000 persons or more, industrial dischargers, and construction sites of 5 acres or more have NPDES permits for their stormwater discharges. Phase II required that all municipalities, industrial dischargers, construction sites of 1 acre or more have NPDES permits for their stormwater discharges.

Impervious areas include all the hard or impermeable surfaces in a landscape. As the percent of those areas increases there is a dramatic impact on water quality parameters - runoff coefficient, time of concentration, peak discharge rate, runoff volume, runoff velocity, sediment transport, and nutrient loading - compared to the same amount of pervious area. New York has empowered the Department of Environmental Conservation to administer regulations for control of water quantity and to improve the water quality of surface and ground water resources.

Stormwater Management Practices, by definition, include all stormwater treatment methods from wet detention ponds to sweeping parking lots. Some practices are more effective than others in specific conditions. Given the importance of treating stormwater runoff, new methods are in development at all times and could also be considered as they become available. Methods include:

Ponds-Stormwater ponds are practices that have a combination of a permanent pool, extended detention or shallow marsh. Design variants include: Micropool Extended Detention Pond, Wet Pond, Wet Extended Detention Pond, Multiple Pond System and "Pocket" Pond.

Typical Micropool Extended Detention Pond



Wetlands-Stormwater wetlands are practices that create shallow marsh areas to treat stormwater and often incorporate small permanent pools and/or extended detention storage. Design variants include: Shallow Wetland, Extended Detention Shallow Wetland, Pond/Wetland System and "Pocket" Wetland.

Infiltration Systems-Stormwater infiltration practices capture and temporarily store the stormwater before allowing it to infiltrate into the soil. Design variants include: Infiltration Trench and Infiltration Basin.

Filtering Systems-Stormwater filtering systems capture and temporarily store the excess flow and pass it through a filter bed of sand, organic matter, soil or other media. Filtered runoff may be collected and returned to the conveyance system, or allowed to partially exfiltrate into the soil. Design variants include: Surface Sand Filter, Underground Sand Filter, Perimeter Sand Filter, Organic Filter and Bioretention.

Open Channel Systems-Open channel systems are vegetated open channels that are explicitly designed to capture and treat the excess storm flow within dry or wet cells formed by check dams or other means. Design variants include:Dry Swale, Wet Swale and Grass Channels.

Trenchless Sewers

By: Roy R. Pedersen, P.E.

There is an alternative to digging a sometimes deep trench in the ground to install a sewer, water, gas, or other small utility line. Not surprisingly, it is called trenchless technology. This can be advantageous in certain instances when digging down from the surface interferes with traffic, or a busy sidewalk, or a well manicured property that would be difficult and expensive to repair after digging it up.

Various issues revolve around the subject of the trenchless pipe installation such as safety, cost, interference with other underground utilities, and locating underground utilities.

When we think about the safety issue, trenchless technology can eliminate the danger of working in an open trench. Trench collapses are very dangerous to workers. To prevent these contractors need to use trench boxes which are heavy and expensive and require heavy equipment to lift. With trenchless pipe line installation no trenching or backfilling is required.

When doing trenchless installation of new utility lines, extra care must be taken to get the existing utilities located so they are not drilled into accidentally.

If a new pipe is drilled into, or through an existing gas line, a very dangerous situation can arise. This is known as a cross bore.

Contractors and engineers are very aware of the requirement to call before you dig laws. In Pennsylvania it's called the PA One Call Law whereby a person or company planning to dig places one call and all utilities that have pipelines in that area are required to mark them within a few days.

A new phone number, 811 is now being used across the country as a universal "call before you dig" number which eliminates the need for different numbers in different states (www.call811.com).

Some utility location specialists use ground penetrating radar (GPR) which gives very precise locations and depths of buried lines. A picture of a typical GPR unit is shown here.

Another acronym being used for locating underground utilities during the project design phase is SUE, which stands for subsurface utility engineering. Depending on the project, there are 4 levels of information provided by SUE from A-D, with D being the most basic based on existing records, and A being the most precise which provides 3-D mapping of facilities.

There is a type of excavation called vacumn excavating which uses 10% water and 90% high pressure air to loosen soil which is then vacumned out of a hole. This can be used instead of digging when it is necessary to work close to buried pipelines because it will not damage a buried pipe, and allow the pipe to be safely exposed. The beauty of this is that the soil removed from the hole can be reused to rebackfill the hole.

Trenchless technology can be used to rehabilitate existing pipe lines as well. Lines can be pulled through the old pipe and inflated and hardened providing a leak free, strong new pipe without the need to excavate the old pipe.

Typically, installing new pipes with trenchless technology requires a pit at each end to start and finish the installation and also specialized equipment to drill the hole and install the pipe. However, there are many instances when this will be the more economical option.

To conclude, if the pipe, cable, or conduit is to be installed in non congested non traffic area when compaction requirements for the backfill are minimal, traditional cut and cover methods are still the best choice. But if the area is difficult for any reason, trenchless technology should be considered.

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