

APPLICANT: POCONO TOWNSHIP

PROJECT: SR 0611 POCONO AND HAMILTON TOWNSHIPS SEWERAGE SYSTEM PROJECT – PHASE III

PENNVEST PROJECT NO.: 45036031008-CS

Response to Guidance Manual, Infrastructure Health, Green Project Business Case.

It is our understanding that for the Regional Wastewater Treatment Plant, the Green Project Business Case Criteria had been addressed under a previous submittal by Pennoni Associates. The Pocono Township share of the capital contribution to the Regional Wastewater Treatment Plant is estimated at \$26.6 Million.

The green project business case as discussed below, pertains only to the remaining three pump stations (Pump Station No. 3, No. 4 and No. 5), proposed under the PennVEST Application for the aforementioned sewer project. The total cost associated with the three (3) pump stations (combined) is estimated at \$7.2 Million.

The purpose of this memo is to identify project components for the SR 0611 Pocono and Hamilton Townships Sewerage System Project – Phase III that may be eligible for funding through the Green Project Reserve (GPR) of the American Recovery and Reinvestment Act, and present the case for the eligibility of these components. The project is identified by the PENNVEST Project Number above and described in the PENNVEST Application dated August 30, 2010.

The following categories of components from the CWSRF Green Project Reserve Technical Guidance apply to the SR 0611 Pocono and Hamilton Townships Sewerage System Project – Phase III:

1.0 - Components of the project that should be considered for GPR Funding relating to GREEN INFRASTRUCTURE include:

1. Subsurface Infiltration Systems on the Pump Station No 3 and No 5 sites.
2. Rooftop Disconnection for the Pump Station No 4 and No 5 sites.
3. Vegetative Filter Strip on the Pump Station No 4 site.

Subsurface Infiltration Systems: These systems are located downgradient of building and parking areas, and are designed to capture the first 1.5 inches of a rain event and infiltrate that volume. All larger storms will overtop the basin section of the infiltration system and sheet flow over vegetated lands to the downstream tributary. The 2-year storm event volume requirements of PADEP have been met by considering all five (5) pump stations as one project, which PADEP has accepted.

Rooftop Disconnection: Roof top runoff from the Pump Station No 3 Control Building will be directed to the subsurface infiltration bed, allowing for the management of storm water on-site. The Pump Station No 4 Control Building will direct roof top runoff to both the east and west. The roof top runoff directed to the west will be to a vegetative

swale and the runoff directed to the east will be to a vegetative filter strip. Both locations discharge into a Tributary to the Pocono Creek. The Pump Station No 5 Control Building will direct roof top runoff thru a riparian buffer prior to discharging into the Pocono Creek. Surface runoff from the Pump Station No 5 Equalization Tank, which is to be provided with a cover, will drain to both the east and west. The rooftop runoff draining to the west will be directly to the infiltration basin via overland flow and the runoff directed to the east will be to a vegetative swale which eventually discharges to the infiltration basin. The capturing of the Equalization Tank rooftop runoff allows for the management of storm water on-site.

Vegetative Filter Strip: The vegetative filter strip is proposed to mimic natural hydrology and reduce effective imperviousness, as noted in the PADEP Stormwater Best Management Practices Manual, dated December 2006. In addition, it is designed to remove or mitigate the effects of non-point source pollutants.

2.0 - Components of the project that should be considered for GPR Funding relating to WATER EFFICIENCY include:

1. Water Meter and Backflow Preventer for Pump Station No 3 and No 5.

Water Meter with Backflow Preventer: These two pump stations are proposed to connect to the Brodhead Creek Regional Authority (BCRA) public water system for their service water needs. BCRA Rules and Regulations require that each service connection to their system be provided with a water meter and appropriate backflow preventer. These backflow prevention devices are used to protect water supplies from contamination or pollution. The devices are designed to prevent potentially contaminated water from the ground, chemical mix tanks or other areas, from entering the water system if the pressure is suddenly reduced in the watermain.

3.0 - Components of the project that should be considered for GPR Funding relating to ENERGY EFFICIENCY include:

1. An aeration system with a solid state controller/timer system for the 100,000 Gallon Equalization Tank at Pump Station No 5.
2. VFDs (*Variable Frequency Drives*) for sewage pumps at Pump Station No 3, Pump Station No 4 and Pump Station No 5.

An Aeration System with a Solid State Controller/Timer System: This system will allow the operator to make seasonal or diurnal adjustments to the air supply for the Equalization Tank in response to changes in temperature and sewage flow rates. This controller will provide the operator enough flexibility to reduce power consumption by the blower during periods when less dissolved oxygen is required.

Variable Frequency Drives:

- Variable frequency drives will be used for the sewage pumps to optimize motor speed to the required demand based upon incoming sewage flow. The VFD systems will modulate two (2) 30 HP pumps on Pump Station No 3, two (2) 35 HP pumps on Pump Station No 4 and three (3) 121 HP pumps on Pump Station No 5.

- Submersible pumps that will be equipped with Mechanical Seals. Each pump shall be provided with a tandem mechanical shaft seal system consisting of two totally independent seal assemblies, or Engineer approved equivalent.

In order to maintain the energy efficiency designed into Pocono's Pump Stations Nos. 3-5, an aggressive preventative maintenance program will be developed to, among other things, maximize the operating life and performance of motorized equipment. The Township is also still looking into the possibility of having the Brodhead Creek Regional Authority (BCRA) operate these pump stations via an operational agreement. The BCRA currently has a rigorous maintenance program in place for the facilities it operates.

The proposed VFD's operate more efficiently when compared to a conventional drive. A conventional system requires the pump motors to run at 100% of their rated capacity, regardless of the system demands. For a conventional system, when demand increases, a second submersible pump is started (also at its maximum rated capacity). Conversely, a VFD operated system is able to vary the operating power draw, in response to changing system demand, thus using less energy and resulting in a more efficient operation.

The attached Table A provides a comparison of the estimated Annual Power Load and Annual Electrical Operating Costs between a Conventional Pump System vs. a VFD Pump System.

Compliance With Business Case Development Requirements - The SR 0611 Pocono and Hamilton Townships Sewerage System Project – Phase III, in accordance with the Attachment 2 of the Green Project Reserve, meets the business case development requirements for the three (3) pump stations.

To summarize the project costs associated with Phase III of the SR 0611 Pocono and Hamilton Townships Sewerage System Project:

Pocono Twp. Capital Contribution to Regional WWTP (GPR Business Case) = \$26.6 M
 Pocono Twp. Pump Station Nos. 3-5 (GPR Business Case) = \$7.2 M
 Pocono Twp. Forcemain thru Stroud Twp/Stroudsburg Boro to Reg. WWTP (Not eligible as a GPR Business Case) = \$10.5 M

Total Phase III Project Cost (as presented in the PennVEST Application) = \$44.3 M

TABLE A

Comparison of Estimated Annual Power Load and Electrical Power Operating Costs - Conventional Pumps vs. VFD Pumps

SR 0611 Pocono and Hamilton Twps Sewerage System Project - Phase III (PennVEST No.: 45036031008-CS)

September 30, 2010

	Run Time (Hrs./day)	Power Factor Correction	Conventional Pump Operation				VFD Pump Operation			
			Power Required (Bhp)	Load Required (kWh)	Annual Load (kWh/yr.)	Annual Power Cost (\$)	Power Required (Bhp)	Load Required (kWh)	Annual Load (kWh/yr.)	Annual Power Cost (\$)
Pump Station #3	10.63	0.83	28	267.4	97,605	\$9,760	19.1	182.4	66,580	\$6,658
Pump Station #4	8.76	0.92	24	170.4	62,199	\$6,220	17.5	124.3	45,354	\$4,535
Pump Station #5	10.40	0.87	112	1996.8	728,818	\$72,882	60.1	1607.2	586,633	\$58,663

Assumptions:

1. Power Supply Costs = \$0.10/kWh
2. All figures based upon average flow daily flow at buildout of sewer system (i.e. 10 year flow from Act 537 Plan).
3. Pump Station #5 Calculations assume two (2) pumps operating simulataneously.