

VI. Evaluation of Alternatives

A. Consistency Requirements

An Act 537 Plan provides the basis for a wide range of decisions, from the construction of regional wastewater treatment plants to the establishment of wastewater management programs. A plan must reflect municipal goals and allow for growth that is compatible with other plans and program objectives. When wastewater facilities are determined to be consistent with other programs at the planning stage, potential problems are resolved before major resources are committed.

Planning involves first screening wastewater facilities alternatives to determine those that are cost-effective. These must then be weighed against planning, environmental, and natural resource goals. If an otherwise acceptable choice is determined to be inconsistent with these objectives, the conflicts must be resolved. Expenses associated with the mitigation of conflicts and inconsistencies may impact an option's cost effectiveness.

1. Clean Streams Law and Clean Water Act

Issue: The Clean Streams Law requires considering:

- Water quality management and pollution control in a watershed as a whole,
- Present and possible future uses of particular waters,
- The feasibility of combined or joint facilities,
- The state of technical knowledge, or state-of-the-art, and
- Economic impacts.

Plans must identify treatment works that would be required to meet the anticipated municipal and industrial waste treatment needs of an area over a twenty-year period, including any land acquisition for treatment purposes, wastewater collection and urban stormwater runoff systems, and financial programs. Open space and recreation opportunities that can be expected to result from improved water quality must be listed, potential use of lands associated with treatment works need to be considered, and access to water-based recreation should be increased where possible.

Comprehensive Water Quality Management Plans have been developed for all areas of the Commonwealth under the Clean Streams Law and the Clean Water Act. Where there are inconsistencies between them and the wastewater facilities plan, the 537 Plan Update must explain the conflict and justify or resolve it. For example, a 537 Plan could propose an individual WWTP to serve an area designated for a regional plant in the Comprehensive Water Quality Management Plan. Resolution could include a discussion why the regional approach is no longer the best alternative and justification for pursuing others.

Resolution: The improvements proposed for Lynn Township are an increase the capacity of the existing public wastewater treatment facility. The Township's discharge into Ontelaunee Creek is regulated by an existing NPDES permit, ensuring compliance with both the Clean Streams Law and Clean Water Act. Increasing the plant's capacity would require the NPDES permit to be modified. The treatment plant would be designed to produce an effluent slightly higher in quality than the limits would require as a safety factor. If DEP were to impose effluent limits for nitrogen and phosphorus the treatment plant should be able to achieve them without modification. As noted in Chapter V, the technology exists to treat the wastewater to a point that it would not harm the receiving stream's quality.

2. Municipal Wasteload Management Plans

Wastewater collection and treatment facilities are designed for specific flows and organic strengths. When they are overloaded either hydraulically or organically, untreated or partially treated wastewater can be discharged into the receiving stream, which may cause both environmental and public health hazards. Because of these risks, municipalities that have wastewater facilities must submit annual reports to the Department, which compare the present flows and loading against the design for their facilities. Flows must also be projected for five years into the future to anticipate future overloads. When an overload exists, the municipality must either limit or ban connections until it is resolved. In addition, a corrective plan and schedule outlining the actions the municipality will take must be developed.

When the alternatives depend on adequate capacity in a municipal wastewater facility (treatment plant, pump station, interceptor, etc.), the plan must evaluate the facility's municipal wasteload management status. Conflicts between the proposed alternative and the Chapter 94 Report must be resolved in the 537 Plan Update before it can be implemented. Where conflicts cannot be resolved, other options must be pursued.

a. Lynn Township Sewer Authority Wastewater Treatment Plant

The Chapter 94 Report filed by ARRO Consulting, inc. for Calendar Year 2005 is included in the appendix along with a preliminary table from the 2006 Chapter 94 Report. The 2006 data noted that the average daily flow (ADF) to Lynn Township was 79,800 gpd, while the plant's permitted flow is 80,000 gpd. The maximum 3 month consecutive average flow was 102,000 gpd. Hydraulically, the plant is at capacity and above capacity during several months out of the year. Peak flows can be produced by institutions or by either the inflow of storm run-off or the infiltration of groundwater into the collection system. The Northwestern Lehigh School District infrastructure could generate such high peak flows, particularly if it has its own inflow and/or infiltration problems. Influent flows in the days before and after these peaks were relatively normal, indicating the collection system most likely has a serious problem with the inflow of storm runoff. If the peaks rose gradually and endured for weeks, the problem would probably be more of groundwater infiltration. Peak flows this high are of concern primarily because of the limited capacity of the current facility.

The average organic loading for the past five years was 143 pounds of BOD₅ per day (lbs./d), an average concentration of 215 mg/l. This is typical for a municipal WWTP that receives wastewater diluted by inflow and/or infiltration. The maximum permitted organic load is 162 lbs./d. In the month of April 2005, the plant experienced an organic overload coinciding with a high flow condition of 174,000 gallons. The influent BOD₅ had a concentration of 148 mg/L on the day of that high flow. This exceedance was only recorded this one time, but the likelihood is that it occurs more frequently than recorded. Therefore, organically, the plant is at its capacity and at times exceeding its capacity. This 537 Plan Update is consistent with Lynn Township's Chapter 94 Report because it proposes (as the long-term solution) constructing an expansion of the wastewater treatment plant and an upgrade in the treatment process.

3. Clean Water Act Plans

All plans of the upgrade and expansion of the Lynn Township Wastewater Treatment facility will be developed in accordance with all laws in the Clean Water Act and the Water Quality Act of 1987.

4. Comprehensive Plan

Issue: A comprehensive plan includes the governing body's objectives relative to the location, character and timing of future development, and a plan for community facilities and utilities. It also may cover a wide range of related issues including housing, transportation and municipal services. The plan assesses the relationship of existing and proposed development in the municipality to its neighboring municipalities, countywide objectives, development plans and regional trends.

When a 537 Plan is being updated, the comprehensive plan must be closely evaluated to assure the proposed wastewater facilities are consistent with the land uses shown in it. The local and County Planning Commissions must be allowed to review, and conflicts must be resolved, before the municipality commits to implementing the 537 Plan.

Resolution: The Township's Comprehensive Plan is being developed under the Pennsylvania Municipalities Planning Code, which is a regional plan with multiple municipalities. The Township's proposed comprehensive plan would be examined and updated as needed to make sure all wastewater disposal alternatives and options would be consistent with land use and other requirements stated in the regional comprehensive plan. This 537 Plan proposes to upgrade to the existing wastewater treatment plant with more modern technology.

5. Anti-Degradation Requirements

Issue: The Department of Environmental Protection has developed the Pennsylvania Water Quality Standards to classify all surface waters according to water uses to be protected and water quality criteria (levels or parameters) which need to be maintained in order to prevent or eliminate pollution. They are implemented through the Clean Streams Law and the National Pollutant Discharge Elimination System (NPDES) permitting process.

Pennsylvania's Standards are important in the assessment of wastewater facilities alternatives because they set general and specific goals for the quality of the state's water and are used to control wastewater pollution. Effluent limits are established based on them. When a 537 Plan proposes discharging treated effluent, the water quality standards for the receiving stream must be known because they influence the level, and thereby the type, of treatment facilities required to meet the effluent limitations.

In addition, certain watersheds classified as High Quality or Exceptional Value are under special protection. Any proposed wastewater discharge to them would require additional justification, including comparing it against all available non-discharge alternatives. If the discharge is selected, it must be justified by documenting that its social and economic benefits outweigh the potential environmental harm caused by the discharge.

Resolution: The recommended alternative proposes the upgrade of an existing treatment plant. The Lynn Township WWTP discharges to Ontelaunee Creek, a cold water fishery. Only secondary treatment is required with limits on BOD, TSS, pH, chlorine, and coliform bacteria. Because of the rural character of the Ontelaunee Creek valley, the ratio of WWTP effluent to river flow is very low, so more advanced treatment is not needed. The increased flow to the receiving WWTP from this Plan would require it to be expanded, but even with the added flow the effluent would not degrade the Creek.

6. State Water Plan

Issue: The State Water Plan was developed to guide the conservation, development and administration of the Commonwealth's water and related land resources. It recommends solutions to water quantity and quality problems, as well as addresses short and long-term water needs. The Plan may influence the alternative analysis in a 537 Update. If it identifies either water quantity or quality problems in a wastewater planning area, the municipality must consider them when they evaluate options. Land treatment may be better than a stream discharge where the Plan shows groundwater quantity problems and/or where groundwater recharge is critical. A surface discharge may, in this case, further deplete groundwater and thus could be inconsistent.

Resolution: State Water Plans will be investigated for applicability as part of the project design stage of the plant expansion and upgrade.

7. Pennsylvania's Prime Agricultural Land Policy

Issue: Pennsylvania's Prime Agricultural Land Policy orders the prevention of the irreversible conversion of prime agricultural land to uses that cause its loss as an environmental or essential food production resource.

State agencies are required to [prohibit the use of state and federal funds from encouraging the conversion of prime agricultural land] when feasible alternatives are available. The policy specifies the definition of prime agricultural land as:

- "prime", "unique", or "of State or local importance" designated by the United States Department of Agriculture Soil Conservation Service (SCS),
- land "characterized by active agricultural use", or
- soils within the bounds of an agricultural preservation area established under Section 604(3) of the Pennsylvania Municipalities Planning Code.

The municipality must locate these classifications using the SCS inventory. Plan Updates must identify and map prime agricultural land, relating them to proposed wastewater service areas and the 5 and 10 year projected growth areas.

In addition, the Alternatives Analysis must identify local prime agricultural land preservation efforts through zoning, land use planning or other provisions of the Pennsylvania Municipalities Planning Code. Agricultural Security Areas under Act 43 or Agricultural Preservation Areas under Act 149 must also be identified.

Resolution: The 537 Plan Update is impacted when the plan establishes service areas or future growth areas to be served by either sewerage facilities or other means of wastewater disposal (on-lot systems) where the municipality has acted to protect prime agricultural land. When this occurs, the plan update must evaluate the potential adverse primary impacts from [any proposed irreversible conversion of use of the land] and secondary impacts caused by [the extension of sewer service to areas adjacent to prime agricultural preservation areas]. The plan must compare local efforts to protect this land against the proposed alternative. The Alternatives Analysis must show how this conflict will be resolved. Where it cannot be, other alternatives must be evaluated or local agricultural land preservation efforts must be modified. The municipality must resolve these conflicts prior to adoption of the Update.

The Pennsylvania Prime Agriculture Land Policy would not apply to construction at the current facility. All construction would be contained within the existing wastewater treatment plant property.

8. Stormwater Management

Issue: Inadequate management of stormwater resulting from development throughout a watershed:

- increases flood flows and velocities,
- contributes to erosion and sedimentation,
- over-taxes the carrying capacity of streams and storm sewers,
- greatly increases the cost of public facilities to carry and control stormwater,
- undermines floodplain management and flood control efforts in downstream communities,
- reduces ground-water recharge, and
- threatens public health and safety.

Stormwater plans may influence the areas of the municipality that are being scheduled for centralized sewer service or other methods of wastewater treatment and disposal, which would allow high density growth. Where there are conflicts, the wastewater facilities plan must resolve them or pursue other alternatives.

Resolution: The upgrading of the Lynn Township Wastewater Facility would not conflict in any way with the County Storm Water Management Plans approved by DEP under the Storm water Management Act. The only existing storm water management area in the Township is related to the Jordan Creek Watershed located in the southern portion of Lynn Township.

The high peaking factors in the wastewater flows during wet weather events indicate that the treatment plant itself is receiving a large amount of storm water through the sanitary sewers. The secondary clarifiers are very conservatively sized; so the storm water that passes through the plant will not degrade the effluent quality. The plant should safely operate within its permit limits even during peak flows. In addition, the Authority and Township are developing a Corrective Action Plan (CAP), which will include an aggressive effort to locate and eliminate inflow sources.

9. Wetland Protection

Issue: Each alternative proposed in a 537 Plan must be evaluated to determine if it would impact wetland areas. If so, options to eliminate the impact need to be assessed, including other choices having no impact, along with mitigating impacts caused by the selected option. National Wetlands Inventory Maps and U.S. Soil Conservation Service hydric soils must be used to show the relationship between the proposed wastewater facilities alternative and potential wetlands.

Resolution: When the current wastewater facility was constructed in the late 1970's, it was mapped for wetlands. Modern day definitions of what defines a wetland have changed since the time that this plant was built and the wetland assessment conducted. Therefore, any expansion or upgrade of the plant that would go outside of the current boundaries of the facility, in particular, the proposed expansion of the reed beds would require a new wetland assessment and identification by a wetlands scientist who would delineate the existing wetlands if they are in existence. The results of this wetland study would dictate what permits and other measures would need to be taken and the Authority would obtain the necessary permits such as the encroachment permit if it was needed.

10. Pennsylvania Natural Diversity Inventory

Issue: The Department of Conservation and Natural Resources (DCNR), Bureau of Forestry maintains the "Pennsylvania Natural Diversity Inventory" (PNDI), a database containing site-specific information about the Commonwealth's most uncommon natural resources. Included are plant species regulated by the Bureau of Forestry, animal species regulated by the Pennsylvania Fish and Boat Commission and Pennsylvania Game Commission, outstanding geologic features, and significant natural communities.

Local, state and federal governments have increased their efforts to protect the habitat of rare, endangered and threatened species through laws and regulations administered by numerous agencies. Municipalities must assess an alternative's impacts on protected species at collection, conveyance and treatment facility locations, as well as identify ways to reduce them. They must, therefore, resolve any conflict before submitting the Plan to the Department for review.

Resolution: A PNDI search will be requested from the PA DCNR as part of the permitting process for the expansion's design.

11. The Pennsylvania Historic Preservation Act

Issue: The Pennsylvania Historic Preservation Act of 1978 requires municipalities to cooperate fully with the Pennsylvania Historical and Museum Commission in the preservation, protection and investigation of archaeological resources. 537 Plan Updates that may impact archaeological or historical resources fall under these general requirements. When a Plan has been developed and an alternative has been selected, the municipality must notify the Commission to determine what impact it would have on archaeological or historical resources.

If the Commission requires the municipality to initiate an archaeological survey, it must carefully evaluate its potential impact on implementation. Surveys, which can be very expensive and time consuming, must be included in the cost estimates and project schedule. The alternative of choice may no longer be viable because of the time and/or expense. Because these factors impact the Plan's implementation, any inconsistencies between the alternative and the Pennsylvania Historic Preservation Act must be resolved before the plan is submitted.

Where significant known resources would be impacted by a proposed alternative and the impact cannot be mitigated, the municipality must complete any survey, recovery or preservation work required to the Commission's satisfaction prior to construction.

Resolution: The Pennsylvania Historical and Museum Commission will be notified and the Cultural Resource Notice Request will be completed as part of the permitting process for the expansion's design. All work would be confined within the treatment plant site and this ground is most likely to be considered disturbed. PHMC should not require an archaeological investigation.

12. Air Quality

This project will not permanently alter air pollution levels. Temporary emissions from the project construction should last approximately twelve months. No permanent degradation of the ambient air quality standards for any air pollutant will result from the project either directly or indirectly.

This project is limited to upgrading a wastewater treatment facility. As such, its actual construction will have a moderate *temporary* impact on air quality, considering the aesthetics of the neighborhoods where it will be placed. The disturbance will be due to construction vehicle traffic noise, dust, mud, and other inevitabilities

13. Fish and Wildlife

The habitat in the study area is generally accommodating to PA wildlife. The rural and rural residential areas included in the sewer service area are developed with roads, houses, and a few small businesses. The farms that are not still in existence, were gradually converted to small residential subdivisions and individual building lots, a process that continues (although at a slow pace) to this day. As a result the majority of the plants present are domestic grasses, trees, and ornamental shrubs. The majority of mammals are domesticated such as cows, pigs, chickens, dogs and cats, etc.

Birds include typical suburban types such as crows, jays, robins, starlings, wrens, and sparrows. Residential back yards provide much of the viable habitat space. The outskirts of the project area consist of open fields, and second-growth timber on the mountains. They provide habitat for squirrels, rabbits, foxes, skunks, opossums, raccoons, deer, bear, turkeys, and other wildlife.

Construction of the upgraded wastewater treatment plant will not by itself impact fish and wildlife. Nonetheless the Township should see an improvement in aquatic and fish habitat due to a reduction in BOD, coliform bacteria and a lower amount of TSS.

14. Wild and Scenic Rivers

Neither the state or federal government has designated Ontelaunee Creek as a wild or scenic river; also, no other rivers in close proximity carry such a listing. The closest scenic river is the northern portion of the Lehigh River, located in the Carbon County and Southern Luzerne County.

15. Coastal Zone Management

Coastal Zone Management is not applicable to Lynn Township.

16. Socio-Economic Impacts

Wastewater collection currently serves the village of New Tripoli and the areas immediately adjacent. Housing consists predominantly of small and medium sized detached single-family homes, townhouses, and small apartment buildings.

17. Other Environmentally Sensitive Areas

Development is concentrated in the New Tripoli center, making the project area a fairly rural setting.

B. Resolution of Inconsistencies

Addressed in Sections 1-17 as needed.

C. Water Quality Standards and Effluent Limitations

The evaluation of Alternatives presented in Chapter V provided our anticipated effluent limitations for the WWTP expansion. It is believed the effluent would only have to meet the advanced secondary treatment limits currently in place.

D. Present Worth Analysis

The operation and maintenance of collection, conveyance, and treatment facilities are significant components in the present worth costs of public wastewater systems. This analysis will develop the annual costs for the options, convert them to a present worth, and add it to the capital costs developed in Chapter V to establish the total present worth for each alternative. The present worth will be a major factor in recommending alternatives for implementation, but it will not be the sole determinant. All estimated annual costs were converted to the present worth using a 5% interest rate and a 20-year life cycle. We have prepared a simple projection of the present worth of the treatment plant using the following assumptions:

1. Treatment Plant Annual Costs

The major annual costs for any properly designed and well-run treatment plant are:

- Electricity, which normally represents 20-45% of total O&M costs,
- Manpower, which usually represents another 20-45%,
- Residuals (sludge) disposal, costing up to 20% of the total, and
- Chemicals, which range up to 10% of annual outlays.

The Lynn Township Sewer Authority's enclosed 2006 Budget identifies a number of additional O&M costs that every system incurs. Focusing on the operating costs of the expanded plant, and comparing it to the cost of the existing plant simplified this analysis. We assumed that the majority of operating expenses would remain the same, such as professional fees, Education/Training, Insurance, advertising, Office Expenses, Salaries and Benefits, etc. would remain the same as those figures from the 2006 budget.

The upgrade to an activated sludge process from the existing extended aeration processes would contain much of the same equipment; an influent pump station, biological reactors, clarifiers, return sludge, and reed bed sludge dewatering. The expansion would provide additional treatment stages that will require more work, such as influent screening, grit removal (optional), UV disinfection, and aerobic sludge digestion. This review will quantify the subtle differences between the existing and proposed treatment plants.

a. Electricity

The motor horsepower for each major equipment system was estimated. Horsepower was converted to Kilowatts and the average time of operation was used to develop kilowatt-hours. Only a few systems, such as aeration blowers and return sludge pumps run continuously, while the majority run intermittently.

Major equipment items for the expanded treatment plant are an influent screen, influent pumps, anaerobic and anoxic zone mixers, return sludge, mixed liquor and nitrate recycle pumps, aeration blowers for the reactors and aerobic digesters, clarifier sludge collectors, and the UV disinfection system. Sludge collectors, mixers, return sludge and recycle pumps all have small motors, but they run continuously. The conversion from chlorine to ultraviolet light disinfection will be an additional electrical cost to the system that does not exist currently. The expanded treatment plant's electric costs were estimated to be \$25,400 initially, and \$38,400 when flows increase to the design capacity for the VIP process. Electric costs for the VLR process were estimated to be \$42,000 initially and \$56,300 at design capacity. The electric cost for the VLR process is higher due to the brush aerators, which require more horsepower to operate. The electric costs for the existing plant were \$15,600 in 2006.

b. Manpower and Laboratory Services

On a plant this size, the operator time does not depend on flow or the wastewater strength, but mainly on the type of systems provided. In the first year, more time will be needed by the operators to familiarize themselves with the components. In the next few years, operator time should be lower than present, because the new systems should require less maintenance. In later years, as equipment ages the O&M time would increase. Increases in flow volume would also increase the amount of time that equipment runs thereby raising O&M costs. Laboratory services will increase slightly with the new treatment processes, due to testing of nutrient removal. In terms of comparing the VIP to the VLR, they have different equipment and thereby slight differences in operator demands will exist, but the differences are not significant enough to impact the process selection. As a practical matter, the expansion itself should not change Authority staffing. Regardless of which process is implemented, manpower should not need to be changed. The operators would be expected to need to spend more time for the first year learning the new process, as well as conducting additional tests. The following years more time would be available to correct collection system deficiencies. The 2006 budget included wages and salaries totaling \$65,030 for the Lynn Township Sewer Authority.

c. Chemicals

The existing treatment plant utilizes a minimal amount of chemicals: chlorine for disinfection. The effluent permit includes a discharge limit for chlorine, which the operators have been reliably able to achieve. The expanded plant is proposed to use ultraviolet light disinfection, so chlorination would cease. The VIP process does not require any chemicals.

The VLR would require aluminum sulfate to remove phosphorus chemically, and methanol for denitrification. The annual chemical cost was estimated to be \$45,900 for the VLR Process when flows increase to the design capacity.

d. Residuals Disposal

The annual cost to process and dispose of residuals would be the same for the VIP process and the VLR process, estimated at \$48,100 when flows increase to the design capacity. This is based on continued use of reed beds, which would be expanded, and the present pattern of hauling sludge in cooler months. Increased use of the reed beds could lower costs.

2. Summary

The present worth of the annual costs were summed up and added with the capital costs to represent the present worth costs of the two alternatives. Table VI-1 below presents the results of the Treatment System Present Worth Analysis.

Table VI-1

Lynn Township Sewer Authority Present Worth Cost Analysis

Annual Costs Item	VIP		VLR	
	Initial	Final	Initial	Final
Treatment Plant				
Electricity	\$ 25,400	\$ 38,400	\$ 42,000	\$ 56,300
Chemicals	\$ -	\$ -	\$ 22,900	\$ 45,900
Manpower/Lab Tests	\$ 82,000	\$ 86,300	\$ 82,000	\$ 86,300
Residuals Disposal	\$ 18,000	\$ 48,100	\$ 18,000	\$ 48,100
Total Treatment Costs	\$ 125,400	\$ 172,800	\$ 164,900	\$ 236,600
Present Worth of Annual O&M Costs	\$1,562,800	\$2,153,500	\$2,055,000	\$2,948,600
Construction Costs	\$ 1,985,000	\$ 1,985,000	\$ 2,507,000	\$ 2,507,000
Total Present Worth	\$3,547,800	\$4,138,500	\$4,562,000	\$5,455,600
No. of EDU's	634	634	634	634
Present Worth Cost per EDU	5,600	6,500	7,200	8,600

The present worth cost analysis for the VIP treatment system indicated that the present worth cost of the WWTP Replacement at design capacity would be approximately \$4,138,500, or \$6,500 per EDU, based on the 634 EDU's that the system would serve. The VLR treatment system would have a present worth cost of \$5,455,600, or \$8,610 per EDU. The present worth cost analysis factors in the capital costs and O&M costs for the system(s) over a period of 20-years. Lower O&M costs for the VIP process result from this process not needing chemicals, such as alum and methanol to meet effluent limitations. Other factors include lower electricity usage as mentioned above.

E. Analysis of Funding Methods

This report recommends the expanding of the current wastewater treatment plant to accommodate excessive flows and growth. Funding alternatives include loans from state, bank and other quasi-governmental sources, as described below.

1. PENNVEST - Loan

PENNVEST: The state revolving loan program provides low-interest loans ranging from 1% to 3.5% for public water and wastewater projects. The loan terms are 20-year and 30-year payoffs. DEP serves as the technical advisor to PENNVEST, reviewing designs and assigning priority ratings.

PENNVEST applies the funding amount needed to obtain their target monthly user rate (can range from \$50 to \$70 or more), but they allow tap-in-fees of \$4,000 and up. PENNVEST also provides grant funds as needed to make a project's monthly user rates and tap-in-fees fall within their guidelines. Projects are selected several times per year, currently in March, July and November, although that can change. PENNVEST requires the design to be complete before awarding funds.

2. Pennsylvania's Local Government Investment Trust – Bond Pool

Pennsylvania's Local Government Investment Trust (PLGIT) is an agency started in 1981 by a group of local governments that wanted to provide themselves with a way to better control their assets, get a better return from investments and to have a safe place for their money. Today, this agency serves the funding and investment needs of local governments and schools using bond pools. A bond pool is a program that enables local governments and public entities to borrow money by issuing a large bond; for any given credit risk the larger the bond, the lower the interest rate. Once this large bond is issued, the issuer allows government entities to borrow smaller amounts against the original bond. The interest rates on Bond Pools from PLGIT have averaged 3.15% since 1997. Bond Pools from PLGIT have a minimum loan amount of \$1 million. However, PLGIT has been contacted about this project. Current loan rates average between 4.25% and 4.5%. If PENNVEST financing fails, PLGIT is available as a tertiary method to finance the project.

3. Bank Loan

The Lynn Township Sewer Authority could apply for a governmental bank loan from any bank willing to make it. New Tripoli Bank has been contacted as a possible financing option. They indicated that current bank rates average between 4.5% and 5.25% for this type of borrowing. If PENNVEST does not extend a funding offer, a local bank loan is available as another option to finance the project. Local banks often have greater flexibility with interest rates and terms than larger institutions.

4. Pennsylvania Rural Water Association (PRWA)

Pennsylvania Rural Water Association is able to offer a competitively priced loan capable of financing Lynn Township's wastewater treatment plant upgrade. PRWA offers construction loans, pre-construction loans designed to finance engineering and soft costs, working capital lines of credit, and equipment loans. PRWA has been contacted about this project. Loan rates average between 4.25% and 4.5%. If PENNVEST financing fails, we recommend PRWA as the secondary method to finance the project.

5. Municipal Bond Issue

The Lynn Township Sewer Authority could issue municipal revenue bonds to finance the project. Municipal bonds are sold to investors seeking a tax-free fixed rate of return. The interest rate is based on current market conditions and the credit worthiness of the municipality. Smaller communities typically are charged higher rates because they normally are a higher credit risk. A bond issue is only cost-effective if the interest rate is lower than other options, and the lower rate offsets the higher costs of issuing the bond.

Bonds have considerably higher up-front costs than PENNVEST and PRWA, primarily for bond counsel work including establishing a credit rating. They typically are not cost effective for projects in this price range. However, they have no strings attached such as state and federal government dictating how a municipality proceeds with its project. Be advised that State Prevailing Wage Rates would apply regardless of which funding source is applied.

At this time, municipal bonds were not considered as a financing source for these projects because their costs would be significantly higher than all other options.

6. Tap-In Fees

Nearly all wastewater collection and treatment system projects now include a one-time up-front capital charge to the residents, known as a tap-in fee. Projects are so expensive that a variety of sources must be packaged together in order to fund them. The tap-in fee reduces the amount to be financed, and it has a significant impact on the monthly user rates. The Lynn Township Sewer Authority currently assesses a one-time tap-in-fee of \$4,000/EDU. As mentioned above, 634 EDU's are projected for the project, with 549 current EDU's contributing flows to the WWTP and an additional 85 projected. Twenty-four of the projected EDU's have already paid the one-time tap-in-fee. Table VI-2 below shows \$244,000 being contributed to the project from tap-in-fees.

7. Summary of Financing Plans

a. PENNVEST Financing Plan

Costs were developed for all known project components; the costs are presented in two tables. Table VI-2 identifies all capital costs, funding sources, and the number of Equivalent Dwelling Units (EDU's). Table VI-3 estimates a monthly user charge per EDU, taking into account debt service, annual costs, and a replacement fund for system improvements.

All estimates have a 15% contingency factor for unforeseen costs. We consider 15% to be minimal at this phase of the project given the design has not been started and permits have not been acquired. If the estimates are reasonable, the actual costs should be closer to what is identified as the Subtotal Project Costs.

Table VI-2 presents a PENNVEST loan package as the primary funding mechanism for the project. The estimate includes a \$2,620,300 PENNVEST loan. The estimate also includes a \$4,000 per EDU tap-in-fee from the 85 EDU's expected to connect from Subdivisions already being planned.

Table VI-2
Lynn Township Sewer Authority Treatment Plant Expansion
Primary Funding Source Matrix - PennVest

Item	Estimated Cost	PennVest Loan	Tap Fee
Construction	\$ 1,985,000	\$ 1,741,000	\$ 244,000
Legal	\$ 11,500	\$ 11,500	
Finance/Accounting	\$ 20,000	\$ 20,000	
Interest - First Year	\$ 24,000	\$ 24,000	
Engineering	\$ 432,800	\$ 432,800	
Permits	\$ 8,500	\$ 8,500	
Wetlands Study	\$ 10,500	\$ 10,500	
Contingency	<u>\$ 372,000</u>	<u>\$ 372,000</u>	
Total Project Costs	\$ 2,864,300	\$ 2,620,300	\$ 244,000

The monthly user rates for this funding plan are included in Table VI-3. Table VI-2 focuses on capital costs, but debt service typically only represents 30-60% of the monthly user charges. The current user rate the Lynn Township Sewer Authority has set for sewer service is \$33 per residential unit and \$48 per commercial unit. The funding package results in a \$23 per month user rate increase. The new rates for residential unites would be \$56 per month for residential and \$71 per month for commercial units. DEP would consider this to be affordable by their current standards, meaning they would expect the project to proceed. PENNVEST rates for the Lehigh Valley are 1.8% for the first five years and 2.7% for years six through 20. The PENNVEST loan package uses a blended rate of 2.588% to determine the debt service.

**Table VI-3
Lynn Township Sewer Authority
Monthly User Rate Analysis - PennVest Funding**

Item	Estimated Cost				
Total Project Costs	\$ 2,864,300	Existing	Proposed		
exist Twp. residents (no. of EDU's)	634	549	85		
Tap Fees	\$ 244,000		\$ 4,000		
PennVest Loan (Long Term Financing)	\$ 2,620,300				
Annual Costs Increase from Project					
PennVest Debt Service (20 yr. @ 2.588%)	\$169,500				
Annual O & M Expenses for NRT Process	<u>\$ 8,170</u>				
Total Annual Costs Increase from WWTP Expansion	\$ 177,670				
Cost Increase / EDU		\$280 Annual Annual	\$23 /month Monthly		
Monthly User Charges		Current	Projected	Current	Projected
Cost / EDU / Residential		\$400	\$680	\$33	\$57
Cost / EDU / Commercial		\$576	\$856	\$48	\$71

b. PRWA Financing Plan

The alternate financing plan for Lynn Township will be to pursue PRWA funding, including a \$2,620,300 loan at 4.25% interest for a 20-year-term. A \$4,000/EDU tap-in-fee was assumed. This funding plan produces a \$27/month user rate increase, as detailed in Table VI-4. The PRWA plan's rate is \$4/month higher than the PENNVEST plan's.

**Table VI-4
Lynn Township Sewer Authority
Monthly User Rate Analysis - PRWA Funding**

Item	Estimated Cost			
	Existing	Proposed	Existing	Proposed
Total Project Costs	\$ 2,864,300			
exist Twp. residents (no. of EDU's)	634	549	85	
Tap Fees	\$ 244,000		\$ 4,000	
PRWA Loan (Long Term Financing)	\$ 2,620,300			
Annual Costs Increase from Project				
PennVest Debt Service (20 yr. @ 4.25%)	\$197,100			
Annual O&M Expenses for NRT Process	\$ 8,170			
Total Annual Costs Increase from	\$ 205,270			
WWTP Expansion				
Cost Increase / EDU	\$324 Annual		\$27 /month	
	Annual		Monthly	
Monthly User Charges	Current	Projected	Current	Projected
Cost / EDU / Residential	\$400	\$724	\$33	\$60
Cost / EDU / Commercial	\$576	\$900	\$48	\$75

The above comparison highlights the fact that the project will be most affordable using PENNVEST funding due to the smaller loan interest rate. We recommend PENNVEST as the primary funding source because it corresponds to a lower monthly sewer bill, a lower interest rate, a shorter payback period and less restrictive oversight of the design, construction and operation. If the project does not receive a favorable PENNVEST loan package, we advise the Township to pursue PRWA funding. We have already made preliminary inquiries to both sources as part of our planning efforts; the grant amounts and loan rates we have presented are based on their responses.

F. Phased Implementation

Expanding a treatment plant by building new structures and piping adjacent to existing tanks, buildings, and pipes is a complicated venture compared to building an entirely plant. There would have to be numerous tie-ins between the new and the old. While the construction would be bid as a single project, it would require a precise, carefully prepared construction-phasing plan to make the changes while ensuring permit compliance.

Immediate Measures: DEP has mandated that no additional customers be connected to the wastewater system until Lynn Township acts to alleviate the current hydraulic overloads that it experiences. The first major effort towards that goal is a Corrective Action Plan that ARRO has drafted to address improvements to the collection system. The CAP is expected to provide some relief, but it is not a stand-alone permanent solution. Lynn Township also needs to expand its treatment plant and increase capacity. While the treatment plant is hydraulically and organically overloaded, it continues to meet its NPDES permit limits for effluent quality. As a result there are no public health concerns at the moment for the township relating to collection, conveyance and treatment of wastewater.

G. Administrative Organizations and Legal Authority

The Board of Supervisors holds the responsibility for Lynn Township's compliance with Act 537. The Lynn Township Sewer Authority is the existing sewage authority within the Township, and it is an operating Authority responsible for day-to-day operations. There will be no need to create a new organization or authority to implement this plan update because the current Authority has the administrative and legal authority to do so.