

VI. THE EVALUATION OF ALTERNATIVES

A. Consistency Determination for Technically Feasible Alternatives

Title 25, Chapter 71.21(a)(5) of the Pennsylvania Code requires that each alternative proposed to provide for new or improved sewage facilities for each area of need be evaluated for consistency with the objectives and policies of:

- Comprehensive Plans;
- State Water Plans;
- Plans developed under Chapter 94;
- Plans developed under the Water Quality Act;
- Antidegradation Requirements;
- Pennsylvania's prime agricultural land policy;
- Plans adopted by the County and approved by the Department (PADEP) under the Storm Water Management Act;
- Wetland protection;
- Protection of rare, endangered, or threatened plant and animal species as identified by the Pennsylvania Natural Diversity Inventory; and
- The Historical and Museum Commission.

The viable alternative identified to serve the sewage planning needs of Amity Township, Oley Township, Union township, Earl Township, and Douglass Township involves treatment facility upgrades and collection/conveyance capacity modifications. The consistency determination is as follows for these alternatives:

1. Clean Streams Law

Planned improvements to the WWTP do not conflict with the objectives of the Clean Streams Law.

2. Chapter 94 Report

A review of the Township's Chapter 94 Wasteload Management Report indicates that the wastewater treatment plant is operating satisfactorily and is in good repair. Facility upgrades would take projected flow needs into consideration in an effort to eliminate potential future hydraulic and organic overloads.

3. Federal Water Quality Act

The Federal Water Quality Act of 1987 establishes specific planning requirements for wastewater facilities planning. These requirements apply only to municipalities intending to apply for financial assistance from the Federal government for the construction of sewerage facilities.

Consideration of applications for financial assistance from these municipalities depends on compliance with these planning requirements, several of which are beyond the scope of the plan content requirements for sewage facilities planning under Act 537.

A significant provision of the Federal Water Quality Act of 1987 provides for the capitalization of state revolving fund programs in the states. In Pennsylvania, this fund is a separate component of the PennVest program. Communities that propose to implement their official sewage plan updates with these funds must meet several specific planning requirements in order to be eligible to receive funding. While many of these requirements may be met through the normal plan content of the Act 537 planning process, several are outside the scope of Act 537.

4. Comprehensive Planning

The Berks County Comprehensive Plan (Berks Vision 2020 in Chapter III, “Future Land Use”, Section 4, Subsection A), addresses sewer and water facilities. Amity Township’s land development plans are generally consistent with the County’s comprehensive plan and map. Most of the area currently sewered is either in existing developed areas or future growth areas as identified in the Comprehensive Plan. The Comprehensive Plan shows areas that are appropriate for limited development, which generally corresponds to the corridor surrounding most of the existing or future growth areas.

The Municipal Joint Comprehensive Plan of which Amity Township is a part, states that the availability of public sanitary sewer facilities is important, and the use of such facilities should be encouraged when consistent with the Future Land Use Plan. This is stated as such due to the general unsuitability of soils in St. Lawrence, Exeter, and Amity areas for on-site sewage disposal.

5. Antidegradation Requirements

Effluent quality limits are set by the PA DEP. Under the proposed technical alternatives as presented in this Plan, the preliminary effluent requirements for an average daily flow of 2.9 MGD are contained in Section V.A.3. of this Plan.

6. State Water Plans

No known conflicts with State water plans are anticipated due to expansion or new construction.

7. Prime Agricultural Policy

The alternatives presented for expansion of the existing wastewater treatment facility will not have an impact on prime agricultural land. Within the Township most of planned growth is expected to be in areas where prime farm land is limited, thus remaining consistent with prime agricultural policies.

8. Stormwater Management

Amity Township has a stormwater management ordinance that was enacted in March of 2008. This ordinance is very comprehensive and covers the requirements set forth in the MS4 program. Implementation of the selected technical alternative will require compliance with this ordinance. As part of the design for the selected alternative, stormwater management will be addressed so as to minimize impacts of new facilities that might cause accelerated erosion and impacts on natural resources.

Compliance will be with Township Ordinance 243, dated March 19, 2008.

9. Wetlands

A review of potential conflicts with wetlands was completed. Existing wetlands, shown on the plan in Appendix F, are not too extensive aside from the existing creeks and streams. Routing of any proposed collection system upgrades can be adjusted to avoid noted wetlands and the appropriate environmental considerations will be taken into account for all creek and stream crossings. Upgrades to the wastewater treatment facility are expected to be contained within the existing plant site and not encroach upon any natural wetlands. There is one wetland designation

note for the plant site. This is PuBHx (Palustrine Unconsolidated Bottom Flooded Excavated). However, this appears to be the man-made equalization lagoon at the wastewater treatment plant.

10. Protection of Plant and Animal Species of Concern

A Pennsylvania Natural Diversity Inventory (PNDI) review has been completed for the presence of natural resources of special concern. The search indicated that the PA Fish and Boat Commission needed to be notified so that they could complete a review for species of special concern. Upon completion of their review, it was determined that there would be no environmental conflict or conflict with known species of concern. See correspondence in Appendix Z.

11. Pennsylvania Historical and Museum Commission (PHMC)

PHMC regulations state that if a project is being funded by either State or Federal funds and/or required a PADEP permit, a Bureau of Historic Preservation Site Assessment form must be completed.

A PHMC search, completed for this project, indicated that there may be historic buildings, structures, and/or archaeological resources located in the project area. However, it is their opinion that the activities that are being proposed should have no effect on these resources.

B. Resolutions of Inconsistencies

Upon review of the “consistency determination” broached in this section, it has been determined that there are no inconsistencies relative to the proposed treatment alternatives.

C. Alternative Evaluation with Respect to Water Quality Standards and Effluent Limitations

The planned alternatives to upgrade the wastewater treatment facility to meet the future hydraulic loadings will meet or exceed the planned NPDES requirements set forth in Section V.A.3. of this Plan.

D. Cost Opinions

Each of the three alternatives evaluated share a number of common process upgrades.

Headworks: Evaluation of the existing headworks indicated that the capacity of the grit system matches that of the current rated peak influent flow.

Consequently, a new headworks building, containing both screening and grit removal systems are required to handle the additional hydraulic capacity.

Disinfection: The existing facility utilizes chlorine gas for disinfection of the clarified effluent, with subsequent chemical dechlorination. The proposed UV disinfection system provides a number of significant benefits relative to the existing system.

- Significant reduction in risks associated with operation of the existing chlorine system.
- Provide more effective inactivation of protozoa in the treated effluent, particularly Cryptosporidium and Giardia (which are chlorine resistant).
- Reducing the impact that chlorine and dechlorination chemical(s) have on aquatic life in the receiving waters.
- A present worth analysis of the costs associated with both systems (Appendix BB) shows a potential for reduced costs with the UV system.

Sludge Digestion and Dewatering: Each alternative proposes to convert the existing anaerobic reactors to aerated sludge holding tanks, providing increased sludge digestion/stabilization as well as holding capacity for subsequent disposal. The existing anaerobic digesters are approaching their effective operating life and have not performed as hoped in recent years. A present worth analysis of the costs associated with a new centrifuge dewatering system, relative to the existing belt filter press (Appendix BB) show a potential for reduced cost with a new centrifuge system (primarily due to a reduction in the amount of time required to operate the process). In this case, the filter press would remain as a backup or redundant dewatering system.

Each alternative provides a number of advantages and disadvantages, both in terms of projected costs as well as in terms of process efficiency and performance.

1. Alternative 1: Parallel Oxidation Ditch Treatment Train

The operating costs associated with this alternative are comparable to those in Alternatives 2 and 3, however, the Opinion of Probable Construction Cost (see Appendix BB) at \$9,688,000, is the highest of all the alternatives. However, the upgrades associated with this alternative provide a number of important advantages:

- The entire existing Equalization Basin would remain for handling of peak flows through the system (equalization).
- Both trains would utilize the same effective process – this would reduce the burden on the operators in terms of maintaining the performance of the system as a whole. It would also allow the facility to maintain commonality in spare parts.
- The proposed oxidation ditch process provides increased flexibility in operation and with operational upgrades or expansion to a third

channel, provides a ready alternative for future expansion or treatment upgrades (e.g. biological nutrient removal).

- The proposed oxidation ditch process has proven performance for the WWTP.
- The anticipated effluent quality out of the combined oxidation ditch trains is better than those through the secondary treatment trains proposed in the remaining alternatives.
- No additional effluent pumping requirements resulting in a reduction in the O&M costs associated with the lagoon in Alternatives 2 and 3.

2. Alternative 2: Parallel Activated Sludge Lagoon Train

The Opinion of Probable Construction cost (see Appendix BB) for this upgrade is \$8,082,000. There are several advantages to be noted with the upgrades proposed in this alternative:

- Reed beds remain for sludge dewatering and storage.
- Elimination of the primary clarifiers would mean a reduction in the costs associated with operation of this process.
- Additional digester volume would preclude the need for sludge thickening.
- Better anticipated effluent quality than anticipated for Alternative 3 (though less than Alternative 1).

3. Alternative 3: Aerated Lagoon in Series with Existing Oxidation Ditch

The Opinion of Probable Construction Cost (see Appendix BB) for this upgrade is the least of the three alternatives evaluated at \$7,869,000. It is important to note that, even with the anticipated 40% reduction in BOD through the aerated lagoon process, the loading on the oxidation ditch is

significantly higher than those recommended for conventional oxidation ditches. Although oxidation ditches have been shown to operate at significantly higher loading rates than those noted in design guidelines, this does place a significant burden on the WWTP operators to maintain the quality of the effluent through the secondary treatment process.

E. Financing Alternatives

This section of the plan addresses financing alternatives that could be applicable for expansion and upgrade of the wastewater collection/conveyance system and the wastewater treatment plant. Three financing alternatives exist: municipal bond financing, bank loans, and direct capital funding. The selected financing alternative is addressed in Section VIII.B.

1. Municipal Bond Issue

a. General

There are several types of bonds, both taxable and tax-exempt. However, the general classification of municipal bonds usually refers to tax-exempt bonds. There are three types of municipal bonds generally used in financing public works.

- ◆ General Obligation Bonds are tax-free bonds that are secured by the pledge of the full faith, credit, and taxing power of the issuing agency. This means that this type of bond is backed by all of the taxes on real estates and personal property within the jurisdiction of the issuing agency. It involves minimum risk to the investor and therefore requires a lower rate of interest than other types of bonds.

- ◆ Dedicated Tax Bonds are payable only from the proceeds from a special tax and are not guaranteed by the full faith, credit, and taxing power of the issuing agency. Examples of special dedicated taxes are the special assessments against property which is adjacent to and the principal beneficiary of the improvement, and gasoline taxes used to finance highway construction.

- ◆ Revenue Bonds are payable from revenues derived from the use of the improvement such as tolls, sewer bills, or rents paid by the users of the improvement and do not otherwise represent an obligation of the issuing agency. Revenue bonds are not ordinarily subject to statutory or constitutional debt limitations. They are often issued by commissions, authorities, and other public agencies created for the specific purpose of financing, constructing, and operating essential public projects.

Typically, municipal bonds are sold to an investment-banking firm which then resells the bonds to individual investors. The advantage of municipal bonds to the investor is their tax-free status. A bond discount (a percentage of the total bond issue) serves as the investment banker's commission. Before bonds are sold, they must be rated on the basis of risk to the investor by a rating agency such as Standard and Poor's or Moody's. The higher the rating, the lower the risk to the investor and, consequently, the lower the interest rate paid on the bond.

The legal instrument that sets forth the rules to be observed by the issuing agency is the Trust Indenture. The Trust Indenture is prepared by the Bond Counsel and must be printed along with the bonds. Due to specific requirements as to the denominations of the bonds and methods and materials for printing, printing costs can be substantial. A Trustee is required to administer the bond issue and

insure the terms of the Trust Indenture are observed. This results in an Annual Trustee fee.

The longer the term, the lower the annual debt service (repayment) and the higher the total amount of interest that must be paid. Investment bankers indicate that it does not pay to extend the terms beyond 25 years because the interest rate increases dramatically.

A trend in financing has been towards the use of a capitalized debt service reserve fund. This fund is capitalized at the beginning of the project by using the capital recovery factor for the interest rate and loan period associated with the project. A “cover” may also be used for this program. The cover, a percentage that is added to the annual debt service, is usually capitalized with the bond issue. The cover percentage could range from 0 to 20 percent.

b. Advantages of Municipal Bond Issue Funding

- ◆ This program affords long-term fixed rate financing.
- ◆ Tax-exempt municipal bonds are in high demand.
- ◆ There is local investment opportunity.
- ◆ Third party review is by PADEP, but its approval is not influenced by the dual role PADEP has with regard to PennVest of issuing a permit to construct and of approving the program for financing.
- ◆ Municipal Credit is established.
- ◆ It retains flexibility for future borrowing.
- ◆ Financing approval period is shorter than with PennVest.

c. ***Disadvantages of Municipal Bond Issue Funding***

- ◆ Market interest rates are usually higher than maximum PennVest interest rates.
- ◆ A cover may be required.
- ◆ A Debt Service Reserve Fund is generally required.
- ◆ There are trustee fees and costs of preparing a Trust Indenture.
- ◆ Issuance costs are higher than with PennVest program.

2. ***Bank Loans***

There are four basic categories of bank loans. These are:

- Real Estate Loans (Mortgage)
- Participations and Interbank Loans
- Installment Loans (Personal)
- Commercial and Industrial Loans

Of the four types, a commercial and industrial loan would be the most applicable to this project.

Commercial and industrial loans may be made on a demand or time basis. A demand basis loan allows the bank to call for repayment at any time, or the borrower can repay when convenient. A time basis loan provides for a specific loan maturity date.

Most commercial and industrial loans are unsecured. The credit is extended on the basis of an analysis of all available information pertaining to the customer and the bank's confidence in that customer's ability and willingness to repay.

For a wastewater treatment plant expansion, it appears that it would be prudent to seek a time basis loan. An interest rate offering would be established, and an amortization schedule set. Interest rates may range from 5% to 10%.

Advantages of the Bank Loan Financing

- Ability to shop around for a loan structure that best fits the customer's needs.
- Flexibility in establishing repayment schedules.
- Working with and through a local financial institution.
- Municipal credit is established.
- Ability to obtain fixed rate financing.

Disadvantages of Bank Loan Financing

- Interest rates are charged for loan repayment.
- Processing fees may be required.
- Processing and issuance fees may be expensive.

3. *Direct Capital Funding*

Another financing option for the implementation of the chosen alternatives is direct funding by the participating municipalities. This would involve capital expenditures by the participating municipalities from its own capital funds.

Advantages of Direct Financing

- Avoid third party involvement. Payment for services can be made directly to the manufacturer or contractor.
- There is no interest charged to your expenditures.
- Bank processing and issuance fees are avoided.

Disadvantages of Direct Financing

- Reduces the amount of construction capital in the annual budget, thus reducing the ability to fund other construction projects during the fiscal year.

F. Need for Immediate or Phased Implementation

Phased construction of the proposed alternative will be predicated upon fiscal and intermunicipal issues. It appears, at this time, however, that phased implementation will not be necessary.

G. Ability of the Township to Implement the Alternative

The Township with the support of their personnel and technical staff, and the assistance of outside technical support, has the ability to implement the selected alternative.