LOWER FREDERICK TOWNSHIP

ACT 537 PLAN

2013

Prepared by
Carol Schuehler, PE
Urwiler & Walter, Inc.
3126 Main Street
P.O. Box 269
Sumneytown, PA 18084
(215) 234-4562

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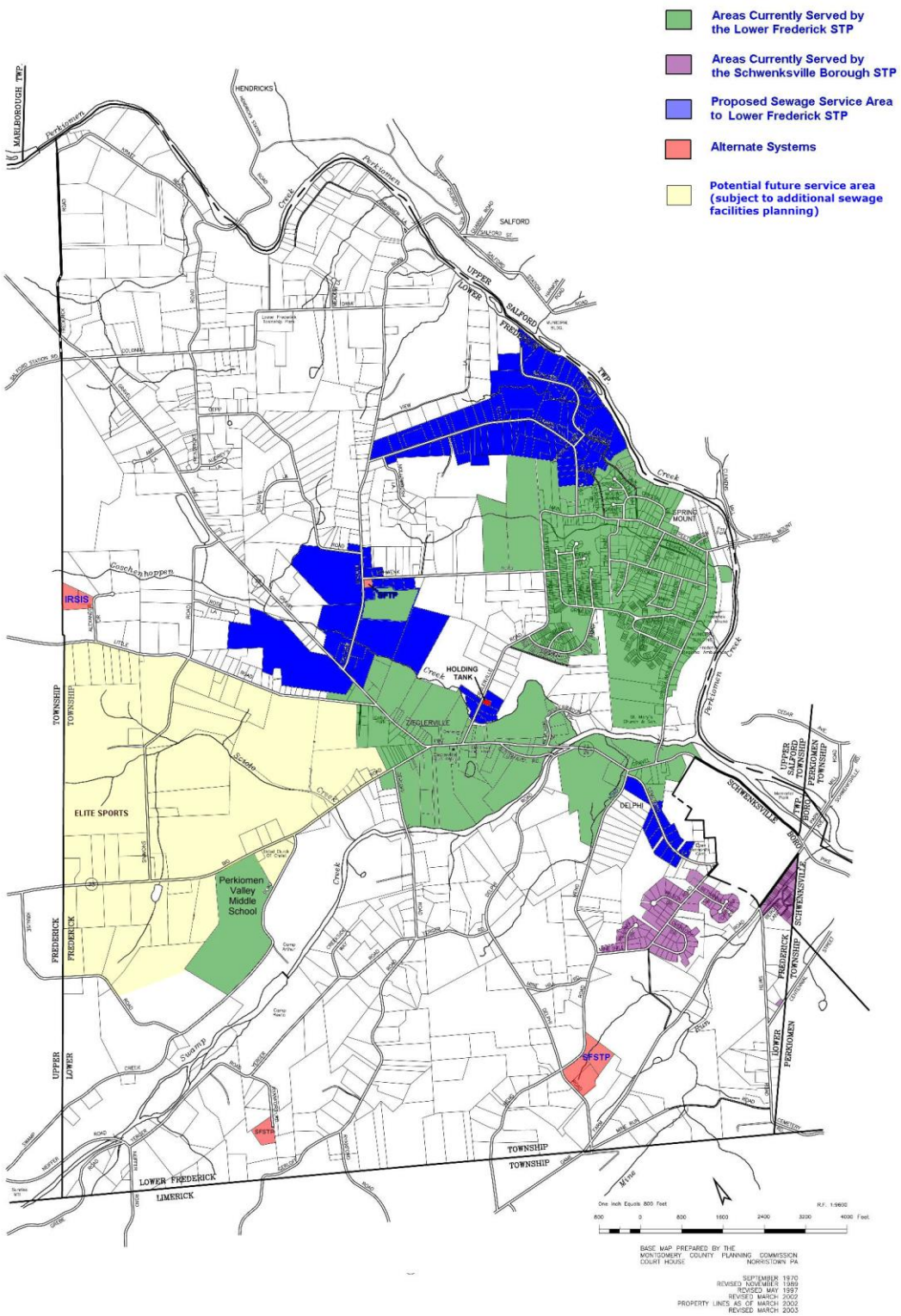
Existing and Proposed Sewer Service Area for the 2013 Act 537 Plan



Contents

Summary

Officials in Lower Frederick Township, Montgomery County, Pennsylvania have seen a pause in growth due to recent economic conditions, and are taking the opportunity to evaluate current wastewater needs and plan for future growth. The resulting plan is comprehensive, and components may not be initiated until the region is again propelled by economic growth and demand for housing and development.

Treatment Plant

The existing sewage treatment plant is aged. With some components more than 30 years of age, steel tanks and other components have exceeded their projected life span. While operations meet the effluent criteria of the current permit, the existing treatment plant processes cannot meet the future NPDES effluent limits anticipated for phosphorus removal or the anticipated future NPDES limits for nitrogen. An upgrade is necessary.

The existing treatment plant is permitted at 200,000 gallons per day (GPD). Six years ago, it was common for flows to exceed the permit volume with each rainfall or saturated ground conditions. A dedicated investment by the township in infiltration reduction measures has significantly reduced this problem, and in 2012 there were only 3 days in the entire year when plant flows were charted over 200,000 GPD. Over this same period of time the number of connections has increased little, from 912 connections to 917 connected customers. Still, there is not much available capacity in this plant, and certainly not enough to accept the future connections anticipated by township officials. So, concurrent with process and equipment upgrades, an increase in capacity must be planned.

The selected alternative is replacement of the existing treatment plant facilities with a 2 basin SBR system on the existing treatment plant site, at a current cost of 6 million dollars with a capacity to treat up to 500,000 GPD. The money would be obtained by the township through loan or bond, repaid by increase in quarterly sewer rates for all customers and a tap-in fee for new connections.

An increase in capacity at the sewage treatment plant must precede expansion of the collection system. Nearly half of the properties in the township use on-lot septic systems to treat wastewater, but the limited permeability of soils and shallow depths to seasonal high water tables common throughout the township make these systems prone to failure. In some areas, small lot sizes exacerbate the potential problems. Areas where adequacy of on-site systems is most suspect are highlighted in this plan.

Goshenhoppen Interceptor

Along Salford Station Road near Schwenk Road, residents have reported concerns about adequacy of existing on-lot systems. One property is currently utilizing a holding tank. On Zieglerville Road near the Goshenhoppen Creek there is also a property utilizing a

holding tank due to a failed system. Holding tanks are a temporary measure, but not a permanent solution, to resolve a failed on-lot system. Both areas are within the watershed of the Goshenhoppen Creek, as is a 40-lot residential development with preliminary subdivision plan approval. An interceptor and pump station along the Goshenhoppen Creek was evaluated and could address these problems concurrently and cost effectively. Project implementation would coincide with construction of the new residential development.

Prior to construction of a Goshenhoppen interceptor and pump station, the municipality would define a new service district to encompass such an expansion. Construction is expected to cost $1.5 million, with some additional costs for easement acquisition, and could be funded by municipal loan, municipal bond or funded by a developer of one of the larger tracts. The loan or bond would be repaid or a developer partially reimbursed through connection assessments, connection fees and sewer billings.

Scioto Creek Watershed

A sewer system servicing the Scioto Creek Watershed would primarily serve new development and would be funded by developers. There is potential for connection of 350 to 400 EDUs in this watershed if fully developed. There is no record of failed systems in this area, and no development plans are currently before the township. The potential to serve this watershed is incorporated when estimating the required capacity of a new sewer treatment plant, but details of the collection system will be developed at a future date. Any solution is expected to include a new municipal pump station to convey flow to the township collection system.

Lots North of Spring Mount

North of Spring Mount, lots along Fulmer Road, Riverside Avenue and Bavington Street consists of small lots on poor soils, and include some suspect systems. Expansion of the collection system into this area by either construction of a pump station along Riverside Avenue or an interceptor up the Perkiomen Creek would cost about 2.1 million dollars, and could add nearly 100 homes to the public sewer system. The construction would be funded by loan or bond, and a portion of it repaid through benefit assessment and tap-in fees. If all is not repaid in this manner, the township may need to establish a separate sewer district with higher quarterly rates to complete repayment of the loan or bond. Note that it may be advantageous to obtain funding for both this project and the treatment plant upgrade with one loan or bond rather than incur separate debts.

Cemetery Lane

An extension of the gravity collection system up Cemetery Lane would permit connection of 13 existing lots. At a construction cost of about $310,000, the expense would be recovered through a benefit assessment fee to connecting property owners.

Meng Road

Extension of the sewer collection system up Meng Road was determined to be cost prohibitive at this time. No action is proposed at this time. Should problems with existing on-lot systems become evident for a small number of parcels in this area, the

township will re-evaluate the feasibility at that time of connecting the homes to the nearby Schwenksville Authority main using a low-pressure system.

Municipal Actions

Township officials must proceed with the following tasks to implement this plan;

- Complete design and obtain permits for treatment plant upgrades.
- Complete design and obtain permits for Riverside Avenue pump station to serve existing lots north of Spring Mount.
- Update municipal tap-in fee.
- Obtain loans, grants or financing for treatment plant upgrades and collection system extension.
- Adjust quarterly sewer rates and establish benefit assessment amounts for collection system extensions.
- Complete design and obtain permits and easements for the Goshenhoppen Interceptor.
- Obtain loans, grants or financing for collection system extension in the Goshenhoppen Watershed.
- Establish sewer service district quarterly rates and establish benefit assessment amount for collection system extension.

Implementation Schedule

Major plan milestones are proposed over the next 10 years;

Target Date for Completion	Milestone
September 2013	Adopt Act 537 Plan and submit to PaDEP
2018	Complete construction of STP upgrades and collection system extension for area north of Spring Mount.
2021	Complete construction of Goshenhoppen interceptor and pump station construction.

Municipal Adoption

A copy of the signed and sealed Resolution of Adoption is included in Appendix G

Planning Commission / Health Department Comments

Lower Frederick Township Planning Commission Comments, first review (March, 2010):

1. The LFTPC requested consistency in terms for "Lots north of Spring Mount", which were addressed in the summary as "Fulmer, Riverside and Bavington." This comment was addressed by revising the title in the summary, and using the term "Perkiomen Interceptor" within the summary text.
2. Under District Zoning and Cluster Development, the LFTPC provided favorable comment on the reference to public trails and connections, and asked that we expand the paragraph to highlight the desire for trail connections concurrent with

construction of a Goshenhoppen Creek Interceptor. A sentence was added stating," Easement acquisition and construction for a Goshenhoppen interceptor should include provisions for trails where possible."

3. The table under Expansion/Upgrade of the Wastewater Treatment Plant was corrected to indicate 10 and 20 year projections rather than 5 and 10 year projections.
4. The LFTPC suggested a survey of the quarterly sewer rates in adjacent municipalities to relate to the numbers detailed under "I. Funding."

Lower Frederick Township Planning Commission recommends plan adoption; May 2013.

Montgomery County Planning Commission Preliminary Comments

5. In response to comment, the description of Zoning under Section II was expanded to note residential densities for certain zoning districts.
6. In response to comment, a sentence was added to "On-Lot Septic Systems" noting that public education is recommended to inform residents of the benefits of the sewage management program.
7. The MCPC commented that a paragraph may be beneficial under the section title "IV Future Growth and Land Development" outlining how public water and sewer should be provided where future land use shows appropriate densities. A paragraph has been added
8. Under "Package Plant for Schwenk Road" the MCPC questioned if we ad considered a Community System. A sentence was added explaining that the soils are not suited for on-lot disposal, and the purchase of 10 acres or more required for a community spray irrigation system is cost prohibitive.
9. The MCPC questioned the maximum extent of service area that would result from the construction of a Goshenhoppen interceptor. The map was expanded to show the entire watershed within the township, including the preserved farm, lot lines, and topography. A paragraph was added to speak to further expansion.

Montgomery County Planning Commission Comments of May 15, 2013,

Comment:

Consistency with the Central Perkiomen Valley Regional Comprehensive Plan.

The existing CVRPC depicts a growth area around Zieglerville, and the Draft Update of the CPVRP shows the same growth area, and a sewer boundary extending along Big Road/Route 73 to the township border. These two areas and the proposed sewer service areas in the Draft 537 Plan do not coincide. While the Draft 537 Plan recognizes the CPVRCP and includes the growth area map, it does not address this discrepancy. The Township may want to add a section to the Draft 537 plan that discusses the regional growth area and sewers, and provides a rational for the difference between the two plans.

Reply:

Exhibit 2 of the plan has been updated to show an excerpt of the map from the draft update of the CPVRPC, and discussion of the Comprehensive Plan in section IV has been expanded.

The Sewer Boundary on the CPVRPC map is derived by drawing a line at a specified distance from the Future Growth Area. The 537 Plan is a specific review of needs, feasibility and commitment to implement solutions to sewage needs.

The CPVRPC map allows for expansion of public sewer along the Route 73 Corridor. We recognize that the Scioto Creek Watershed may develop in coming years, and have planned for the flows in evaluation of potential treatment plant size. However, the path of sewage facilities and location of pump station in this region will likely be driven by the properties that might first proceed to development, and sewage planning for the watershed is best performed once available resources can be assessed. This density in this region of the township is currently quite low, so a need to resolve existing concerns is not evident.

Comment:

Alternatives: There is no section that lists the selected alternative for all the alternatives discussed in the plan. A complete section on Selected Alternatives should be added. It would be helpful for evaluation if the order for the discussion and the cost information was the same as the order in which the alternatives are listed in Section V.

Reply:

The outline of the Act 537 Plan conforms to guidance issued by PADEP. The summary at the front of the document lists the selected alternatives. The order of discussion in the summary has been revised to be consistent with the order in sections V and VI. The order of alternatives and evaluations is the same in section V and VI. However, the word processor numbered "B" differently in these sections. The numbers have been revised to be consistent.

Comment:

A. Zieglerville Road Solutions: The selected alternative for A. Zieglerville Road Solutions appears to be an alternative listed under B. Schwenk Road Solutions. For clarity, the alternative of choice should be one of the specific alternatives listed in

Section V, Alternatives for New or Improved Wastewater Disposal. A third alternative should be added under A. Zieglerville Road Solutions that proposes connection to the Goshenhoppen interceptor.

Reply:

Section 3 was added to V.A. and VI.A to note the Goshenhoppen interceptor as an alternative, to be detailed in the next section.

Comment:

B. Schwenk Road Solutions: This alternative will provide service to proposed development, areas with malfunctioning systems, and future development. However, the plan does not describe the specific service area for the interceptor. The map on page 25 indicates specific properties with dark green shading. The text makes reference to large tracts in the immediate vicinity, lighter green shaded parcels, and the limits of the upstream watershed. The plan should clearly state the relationship of these parcels and boundaries to future sewer provision. Are the light green parcels a future sewer growth area, since they were considered for sizing the sewage treatment plant? Does the line delineating the upstream watershed limits indicate a future intent to serve that area? The description of the selected alternative in Section VII, Municipal Actions and Implementation Schedule refers to serving existing and proposed homes in the Goshenhoppen Watershed from Zieglerville Road north. Is that entire area to be served? Given low density zoning, and the presence of a preserved farm within the limits, we would recommend clarification of these points in the plan.

Reply:

The text in the paragraph above Figure 5 describes the significance of the shadings and provides answer to much of this comment. The map was expanded to delineate the entire watershed at the request of the MCPC in a prior review. A sentence has been added to specifically state that the pale yellow areas "are not included in this sewage planning". The words "(shaded in dark green)" have been added to the page. You will note that only those areas shaded in dark green are brought forward to the Sewer Service Area Map. The numbers 116 and 43 are brought forward to the table of Section V.G (where flows are tabulated for the treatment plant sizing) representing 10-year and 20-year projections.

Comment:

C. *Serving the Scioto Creek Watershed:* The alternatives listed for serving this area are either limited in their feasibility, or developer dependent. As the plan points out, this portion of the township has seen significant development proposals, and it is likely to see them again if the economy turns around. If the township is in favor of seeing development in this area, then including it on the sewer service area map

may facilitate such development, by avoiding the need for a plan revision in the future.

Reply:

The path of sewage facilities and location of pump station in this region will be driven by the properties that first proceed to development, and sewage planning for the watershed is best performed once available resources can be assessed. This density in this region of the township is currently quite low, so a need to resolve existing concerns is not evident.

Comment:

F. Serving Lots on Meng Road: Several alternatives are discussed for this area, but none are selected. It may be that in the future, flows from this area could be accepted at the Schwenksville STP, although this is not currently feasible, or a COLDS system could be installed to alleviate malfunctioning systems. The plan should indicate the township's intent for this area in the Municipal Actions Section, even if it is only to say that the township will reinitiate contact with Schwenksville at a later date to discuss this issue, or to lay out a process for investigating the feasibility of using a COLDS.

Reply:

Subsection 4 has been added to VI.F. as follows:

4. No Action

The township has implemented an On-Lot System Management Program in the past three years, so existing systems in this area are more likely to be properly maintained and managed. A no action alternative is recommended at this time for Meng Road. Should problems become evident in the future, the township should re-visit the feasibility of connection to the Schwenksville Borough Authority system at that time.

Montgomery County Health Department Comments of May 8, 2013

Comment:

The Montgomery County Health Department (MCHD) has reviewed the Lower Frederick Township Act 537 Sewage Facilities Plan for Lower Frederick Township, Montgomery County. MCHD has no objections at this time to the proposed revision of this official plan. Due to limitations in lot size and soils, it

may be worthwhile to consider portions of Centennial Street in the future Act 537 Sewage Facilities Planning.

Reply:

There are four existing homes on small lots on Centennial Street, very near the municipal boundary with Schwenksville Borough. One of those homes had a suspect system many years ago, and resolved the problem by installing a grinder pump and approximately 300 feet of force main to connect to the Schwenksville Borough Authority (SBA) collection system. The adequacy of the existing system of another lot in this area was recently investigated by the MCHD. Should it be necessary to address a failed system in this area, connection of lots to the SBA system would be sought at that time. This has not been inserted into the planning documents, as we anticipate SBA could only accept these flows to resolve a failed system unless or until the current moratorium is resolved.

A copy of the comments received is included in Appendix H

Publication

Proof of Publication is included in Appendix I.

Public Comment

Written comments received during the public notice period and responses provided are included in Appendix J.

Consistency Documentation

Documentation of inconsistency resolutions are attached in Appendix K.

Implementation Schedule

Target Date for Completion	Milestone
September 2013	Adopt Act 537 Plan and submit to PaDEP
8 months after submission	DEP approval of Act 537 Plan
6 months after DEP approval of Act 537 plan	Complete design and submit application for permitting of treatment plant upgrades.
8 months after DEP approval of Act 537 plan	Update municipal tap-in fee.
3 months after application for STP permit	Complete design for pump station to serve existing lots north of Spring Mount, apply for permit.
6 months after application	Obtain permit for treatment plant upgrades.
3 months after application	Obtain permit for pump station to serve existing lots north of Spring Mount.
Upon receipt of both permits	Apply for loans, grants or financing for treatment plant upgrades and collection system extension.
4 months after receiving permits	Adjust quarterly sewer rates and establish benefit assessment amount for collection system extension.
1 year after receiving permits	Accept bids for construction.
2 years after bid award	Complete construction of STP upgrades and collection system extension for area north of Spring Mount.
1 year after completion of STP	Complete design for the Goshenhoppen Interceptor and submit permit applications.
8 months after permit application	Obtain permits and easements for the Goshenhoppen Interceptor.
Immediately following permit receipt	Obtain loans, grants or financing for collection system extension in the Goshenhoppen Watershed.
Upon receipt of financing	Accept bids for Goshenhoppen interceptor and pump station construction.
9 months after bid award	Complete construction of Goshenhoppen interceptor and pump station construction.
3 years after completion of STP	Obtain necessary permits or approvals for construction of Cemetery Lane Collection Line Extension
6 months after permits or approvals are obtained	Accept Bids for construction of Cemetery Lane Collection Line Extension
6 months after bid award	Complete Construction of Cemetery Lane Collection Line Extension

Introduction

Lower Frederick Township has undertaken this plan update to develop comprehensive solutions to existing problems with on-site systems and to plan for future anticipated development. The existing sewer treatment plant is operating near capacity, and plant expansion may be necessary to address these concerns.

I. Previous Wastewater Planning

Lower Frederick approved and implemented an Act 537 Plan in 1977. The plan proposed immediate construction of a sewer treatment plant and collection system to serve the Spring Mount area of the township. The treatment plant and collection system were subsequently constructed. The 1977 plan recognized that the Zieglerville area was also in need of public sewers, and recommended it be the next area prioritized for collection system construction.

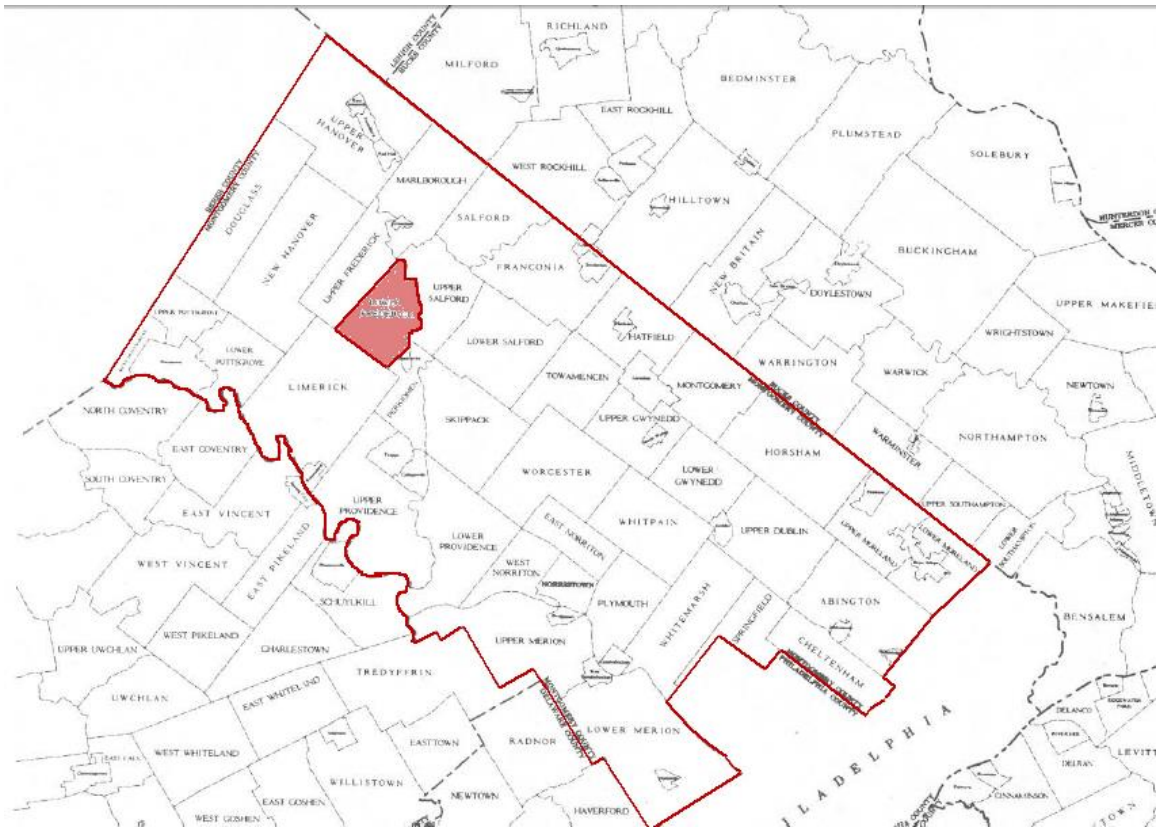
Twenty years later, in 1997, the township updated the Act 537 plan. The plan included installation of public sewers in the Zieglerville and Delphi areas. Within two years of plan approval, the Zieglerville and Delphi collection system was constructed and operational.

In 2002, the plan was again updated to include service to a school constructed by the Perkiomen Valley School District. Within a year of approval, a force main was constructed to serve the school, with a pump station placed on the school district property.

There have been numerous revisions to the Act 537 Plan since the original plan was adopted;

- Those revisions which connected properties to public sewer are included within the "Areas Currently Served" on the Sewer Service are map.
- Three revisions supported Small Flow Sewage Treatment Facilities were since installed;
    - Residential stream discharge installed on the Russell Property on Delphi Road to support a 1994 subdivision.
    - Small Flow Sewage Treatment Facility and Stream Discharge was approved for the Sabatine property in 1999 to replace a failed on-site system at Schwenk and Salford Station Roads.
    - The Boyle Residence was approved for installation of a Small Flow Sewage Treatment Facility to replace a failed cesspool on Ryanford Road.
- The Long Property has planning approval for a Small Flow Sewage Treatment Facility to address a suspect system at 1359 North Gravel Pike, but design has not been completed and accepted.
- Spray irrigation systems for the Demeno and Sterrett Properties on Alexander Drive were approved in 1996.

II. Physical and Demographic Analysis



Demographics

Lower Frederick Township is located in western Montgomery County. Land uses are mostly rural and agricultural, with an influx of residential development in the past two decades. Population statistics presented below were obtained from the Central Perkiomen Valley Regional Comprehensive Plan of June 2005 and updated with data from the U.S. Census Bureau.

Lower Frederick Township Population Statistics:

Year	1950	1960	1970	1980	1990	2000	2010
Population	1,620	2,108	2,515	2,379	3,396	4,795	4,840

Based upon the 2010 census, Lower Frederick Township is a mature community, with a median age of 35. Forty-one percent of households included children under 18.
In the township the population was spread out with 29.4% under the age of 18, 5.8% from 18 to 24, 37.7% from 25 to 44, 19.7% from 45 to 64, and 7.4% who were 65 years of age or older. The average household size in 2010 was documented at 2.77.

Zoning

Lower Frederick Township first adopted zoning and land development ordinances in 1958. The ordinances and districts have been amended over the years. The current zoning ordinance, adopted July 7, 1999 and titled The Lower Frederick Township Zoning Ordinance of 1999, has been further amended to provide consistency with the Central Perkiomen Valley Regional Comprehensive Plan of June 2005.

Much of the township is Zoned R-1 Rural Residential with a maximum allowable density of 1 home per 2 acres. Districts that allow more density (up to 6 dwelling units per acre) or more intense uses are located along street corridors and current population centers, with some R-2 Low Density Residential (1 home per acre) providing transition. Exhibit 1 depicts the current township zoning districts and boundaries.

Regional Comprehensive Plan

Lower Frederick Township pooled resources with 5 other area municipalities to develop the Central Perkiomen Valley Regional Comprehensive Plan of June 2005. The plan designates areas for growth and revitalization, and areas for conservation and preservation. Within Lower Frederick, the plan directs future growth in and around the established communities of Spring Mount, Zieglerville and Delphi. The remainder of the township is designated Rural Resource Area. Exhibit 2 depicts the delineation of these areas within the municipality.

Sewage Management Districts

The Lower Frederick Township collection system currently serves the communities of Spring Mount, Delphi, and Zieglerville. This is currently treated as one management district.

The southern corner of the township is served by Schwenksville Borough Authority. Flow to the Schwenksville Borough Authority Collection system is treated at the Schwenksville Borough treatment plant. The properties contributing flow to Schwenskville Borough Authority are included in their sewage facilities planning, and are not further considered in this analysis.

Establishment of additional Sewage Management Districts within the township collection system is considered in this plan, as delineation of management districts may be necessary to manage project funding.

Drainage Basins

Lower Frederick Township is bounded on the east by the Perkiomen Creek, and all runoff ultimately reaches the Perkiomen. The Swamp Creek, Goshenhoppen Creek, Scioto Creek and Mine Creek traverse the township.

The distribution of the basins in the township is shown in the drainage basin map, Exhibit 3. Spring Mount, the area originally served by a centralized sewage collection system, is located within the Perkiomen Creek watershed. The extension of the collection system to serve the areas of Delphi and Zieglerville expanded the collection system into the Swamp Creek watershed and a portion of the Goshenhoppen Creek watershed.

The Swamp Creek and its tributaries have a current Act 167 Plan in place. Ordinances have been adopted by Lower Frederick Township to support the Act 167 Stormwater Management Plan of the Swamp Creek Watershed. The Goshenhoppen and the Scioto Creeks are both tributaries to the Swamp Creek.

Soils

The soils of Lower Frederick Township consist of silty, shaley loam soils of the Neshaminy, Mount Lucas, Klinesville, Lehigh, Brecknock, Reaville, and Readington series, and small areas of the Croton and Abbottstowns series.

The soils of Lower Frederick Township depicted graphically in Exhibit 4, are generally silty loam and shaley. Most of the soils in the township are classified as having severe limitations to the installation and function of on-site wastewater systems. The factors which contribute to the determination of severe limitations for On-Site Systems, for these soils, are as follows;

1. Moderately slow or slow permeability
2. Seasonal High Water table
3. Steep Slopes
4. Shallow depth to bedrock.

Geologic features

Diabase geology underlies a portion of the township, in a boomerang shape centered over the village of Spring Mount. Diabase dikes and sills have limited capacity to yield well water. The hilltops of Stone Mountain, the villages of Delphi and Spring Mount, and Fulmer and much of Cepp Roads are in the diabase regions. The diabase formation is composed of dark gray, medium to coarse grained plagioclase feldspar, and black or green augite.

The Brunswick formation underlies other portions of the township, including the Limited Industrial Zoning District along Route 73, and the area along the Mine Run Creek. The Brunswick formation consists of red to brown, fine to coarse grained quartzose sandstone with red shale interbeds, interbedded shale with limestone conglomerate. The base generally yields sufficient water for municipal uses, median reported yield is 75 gpm.

In between these formations is a transition area of dark hornfels, also considered part of the Brunswick formation. Red massive argillite near the base grades to dark hornfels as the formation approaches diabase intrusives and basalt. Red, brown and purple calcareous fanglomerate and a few beds of quartzite fanglomerate are present within. These formations are of the uppermost portion or late Triassic Period. They comprise the parent materials of the residual silty, shaley loam series of the A and B horizons. The water bearing properties of the transition areas are unknown.

Underlying geology for Lower Frederick Township is graphically depicted in Exhibit 5.

Topography

Lower Frederick Township's hills, slopes and cliffs contribute to the beauty of the township, but challenge land development and limit the feasibility of on-site systems in many locations. The Steep Slopes Map highlights areas of slopes in excess of 15%, but even slopes of 10% or more inhibit the use of on-site systems.

The hilly terrain also challenges expansion of the collection system. Many areas where sewer service is desired will require installation of new pump stations to conquer the topography and convey flows to the existing treatment plant along the Perkiomen Creek.

Potable Water Supply

Portions of the township receive their water from the Schwenksville Water Authority. Locations receiving public water are similar but not entirely coincident with areas that are currently connected to the sewer collection system. The remaining properties rely on well water from on-site wells. Exhibit 6 shows the extent of the public water service network in Lower Frederick Township.

The Schwenksville Borough Authority operates two wells within Lower Frederick Township. One is located along the Goshenhoppen Creek at Zieglerville Road. This well is closely monitored, as a plume of TCE is known to exist to the west of this well on the other side of the Goshenhoppen Creek.

Another well is located along Swamp Creek Road just south of Route 73. This well was constructed in recent years, concurrent with construction of the Perkiomen Valley Middle School.

In the mid to late 1990's, the authority had difficulty meeting service demands for its subscribers. They have since entered agreements with other regional authorities to acquire additional water. Drilling of additional wells within Lower Frederick Township

along the Scioto was considered in recent years, particularly if new developments were to be constructed. The economic downturn of 2009 halted progress of those developments and, consequently, of well development.

On-site wells serve much of the rural community. During drought conditions in the late 1990's, some wells were reported dry in the diabase region near Stone Hill. As a result, underlying diabase geology was included in the environmental adjustment factors of the current zoning ordinance. If a proposed subdivision or development proposes on-site wells for development in the diabase areas, the allowable density is limited to reflect a concern for adequate groundwater supply. Aside from those diabase zone problems noted a decade ago, on-lot well water supply has consistently been adequate for residential uses.

Wetlands

The National Wetlands Inventory maps areas along the Perkiomen Creek and the Swamp Creek, and a number of known ponds, as depicted in Exhibit 7A. Hydric Soils as mapped by the National Cooperative Soils Survey are depicted graphically in Exhibit 7B. A detailed wetlands investigation will be required concurrent with design of an interceptor line along the Perkiomen and the Goshenhoppen Creeks to minimize impacts.

III. Existing Sewage Facilities in the Planning Area

Most sewage generated in Lower Frederick Township is treated in one of three ways. Sewage is treated at the Lower Frederick Township Sewer Treatment Plant, the Schwenksville Borough Authority Sewer Treatment Plant, or by on-lot septic systems.

The Collection Systems

The Spring Mount area has the highest population density, and has a collection system that conveys flow from the Perkiomen Creek drainage basin to the township sewer treatment plant along the Perkiomen Creek that was constructed in 1981. The townhouse developments drain by gravity directly to the treatment plant. The older homes in the community and the single family homes along Crystal and Boulder Drives drain to a pump station at the treatment plant, and are pumped into the treatment plant. That pump station, constructed in 2005, has a design flow rate of 320 GPM. Utilizing run time records, the station was estimated to convey an average flow of 100,320 GPD during calendar year 2008. Average flow rates of up to 153,600 GPD could be easily handled by this station, assuming the pumps run ⅓ of each day. Under continuous run, the station could pump 460,800 GPD. The pump station capacity can be increased by changing impellers or pumps if needed.

The Zeiglerville and Delphi areas contain much of the retail and commercial properties in the township. The areas are served by a collection system constructed in 1999 that drains flow from the Swamp Creek drainage basin to the Delphi pump station along the Swamp

Creek. The Delphi station pumps flow east to Spring Mount road where it then flows by gravity to the pump station at the township sewer treatment plant. The pump station at Delphi has a design flow rate of 175 GPM. Utilizing run time records, the station was estimated to convey an average flow of 26,130 GPD during calendar year 2008. Average flow rates of up to 84,000 GPD could be easily handled by this station, assuming the pumps run ⅓ of each day. Under continuous run, the station could pump 252,000 GPD. The pump station capacity can be increased by changing impellers or pumps if needed.

The Middle School, constructed in 2004, is located atop a hill on the opposite side of the Scioto Creek from Zieglerville. It is located in the Swamp Creek drainage basin. The majority of the property drains directly to the Swamp Creek, though the front of the property drains to the Scioto Creek sub-basin. Sewage flows generated at the Perkiomen Valley Middle School are collected in an on-site pump station, and then conveyed through a narrow force main to the collection system in Zieglerville. The pump station is owned and operated by the school district. The design flow of the pump station is 40 GPM. Expansion capacity is limited in part by the 2-inch diameter of the constructed force main.

The extent of the existing collection system is graphically depicted in Exhibit 8.

The Existing Treatment Plant

The existing Lower Frederick Township Sewer Treatment Plant is currently permitted for 200,000 Gallons per Day (GPD). The plant aeration volume is sufficient to treat this volume. Aeration occurs in two PureStream plants. One has a design volume of 100,000 GPD, the other a design volume of 120,000 GPD. We note that these are original manufacturer design volumes, and do not account for strength of sewage.

The plant was constructed in 1980, under NPDES permit numbers 4678422, 4679422 and 4679429, to accommodate 80,000 GDP flow. A PureStream tank provided 80,000 GPD aeration capacity. In 2001, following cleaning and painting, the 80,000 GPD tank was converted to use as a sludge holding/thickening tank to reduce pumping and hauling costs.

The 120,000 GPD center tank was installed in 1987, and was scraped and painted in 2001, and was cleaned, inspected and one location spot painted during 2009.

The 100,000 GPD tank is the unit nearest the Perkiomen Creek. It was installed in 2000 and was also cleaned and inspected in 2009.

The PureStream plants include clarifiers, which are complemented by a circular clarifier, installed in 2005. Flow exiting the PureStream plants is piped to a well where a 20" diameter tube mounted screw pump carries flow to the 25-foot diameter circular clarifier. According to the manufacturer, Schreiber LLC, the tube mounted screw pump has a design capacity of 250 GPM. A submersible pump is provided as back-up to the Screw

pump, and also has a design pump rate of 250 GPM, which corresponds to a flow of 360,000 GPD.

The circular clarifier has an inside diameter of 25 feet, a tank depth of 15 feet, and a sidewater depth of 13 feet. More than 6 hours retention time is provided at the permitted flow rate of 200,000 GPD. The design flow for the structure is 150,000 GPD and the peak design flow for the structure is 300,000 GPD.

The average daily flow rates at the Lower Frederick Township Sewer Treatment plant have actually decreased in recent years, due in part to an aggressive I & I program. Manhole repairs and re-linings were initiated in 2006, and each year more structures have been improved. The resulting reductions are detailed in the Chapter 94 report, with the annual average day flow in 2003 of 181,427 GPD down in 2012 to 126,262 GPD. Still, there were 3 days documented in 2012 where the flow to the plant exceeded the 200,000 GPD permitted rate.

The Lower Frederick Township Sewage Treatment Plant (STP) is currently operating under NPDES permit number PA0050105, issued October 13, 2011, effective May 1, 2011 and expiring April 30, 2016. The permit allows discharge to the Perkiomen Creek for an effluent discharge rate of 0.2 million gallons per day with the following effluent limitations;

	Effluent Limitations					
	Mass Units (lbs/day)		Concentrations (mg/L)			
Discharge Parameter	Average Monthly	Average Weekly	Inst. Min.	Average Monthly	Average Weekly	Int. Max.
$CBOD_5$	25	37.5		15	22.5	30
Total Suspended Solids	33	50		20	30	40
Ammonia as N	5			3		6
Phosphorus as P	3.3			2		4
Fecal Coliform				200#/100ml		1000
pH			6.0			9.0
Total Residual Chlorine				0.5		1.2
Dissolved Oxygen			5.0			

Flow enters the Lower Frederick Township STP via a manhole immediately upstream of an Equalization (EQ) Tank. Ferric Chloride is added at a predetermined rate to the

inflow at a manhole upstream of the EQ tank, from a 5,000 Gallon tank and pump that was installed in 2006.

The flow drops by gravity from the manhole through a grate or large screen into the EQ tank. The EQ tank is a steel tank of roughly 35,000 gallon capacity. The tank was recently cleaned, and was found to be in very poor condition.

Flow is pumped from the EQ tank by shredder pumps to a distribution box, which divides the flow into the two PureStream plants. These plants provide biological treatment by aeration, and discharge through end unit weir clarifiers. Sludge is returned to the head of each plant, and wasted regularly to the adjacent sludge thickening tank. The Sludge thickening tank is a former 80,000 GPD PureStream plant that was converted for sludge holding, and is pumped as needed.

Treated flow discharged from the clarifiers of the PureStream plants is piped to the base of a screw pump, where it is pumped up hill to a circular clarifier for further clarification. The resulting treated effluent is then routed through the control building, where chlorine is added as a pre-determined rate which varies with the measured discharge rate. The chlorine treatment will soon be replaced with UV disinfection, consistent with a permit recently obtained for the modification. Following this treatment, flow or effluent is discharged to the Perkiomen Creek. The layout of plant facilities is shown in plan view in Exhibit 9.

The Lower Frederick Township Treatment Plant is currently operating within permit limits with no noted violations. However, the plant facilities are aging. Both concerns for ongoing service life and a perceived need for additional treatment capacity have prompted the township to pursue this study and evaluate the future of this facility.

Schwenksville Borough Authority Collection System

Homes in the Mine Run Drainage basin that are connected to public sewer are served by the Schwenksville Borough Authority collection system and treated by the Schwenksville Borough Authority Sewer Treatment Plant. Schwenksville has included this area in their Act 537 planning, and accordingly this area is not considered or factored into the estimates for future expansion of the Lower Frederick Township Sewer Treatment Plant.

On-Lot Septic Systems

Nearly half the township population is served by the Lower Frederick Township STP. Less than 10% of the population is served by the Schwenksville Borough STP, and the remainder is using on-lot systems to treat wastewater.

Following completion of the 2002 plan update, a survey was issued to township residents with on-lot systems. A list of 751 addresses was developed by using the school district taxation list and removing those that appeared on the public sewer list. This was done as

an anonymous survey to encourage honest replies. The township had an impressive 39% response rate. Detailed results are included in Appendix B.

94% of respondents believed the property owner should be responsible for management of on-site systems. 67% indicated they were not willing to pay an annual septic system management for regular inspection and pumping as part of a township program. The results indicated the residents did not support a permitting or management program for on-lot systems at the time of survey. Since this time, a sewage management program has been initiated in neighboring Upper Frederick Township.

If we presume the 39% of respondents is a reasonable cross-section of property owners with on-lot systems, the primary types of on-lot systems are Septic Tanks with Drain Fields or Sand Mounds, approximately distributed as follows;

Type of On-lot System	
Cesspool or pit	7%
Septic Tank with Seepage Pit	6%
Septic Tank with Drain Field	51%
Septic Tank with Sand Mound	29%

An analysis of soils within the township using the Web Soil Survey from the USDA Natural Resources Conservation Service indicates that 92% of the entire township is composed of soils that are rated as "Very Limited" for use with In-ground septic systems. The remaining 8% is classified as Urban Land and "Not Rated." The urban land is generally comprised of the same soils rated very limited in the USDA soil analysis. 65% is composed of soils that are also "Very Limited" for use with Sand Mound septic systems, 26% are moderately limited for use with Sand Mound septic systems.

Two-thirds of the systems were constructed before 1990, and are therefore now more than 20 years in service. An impressive seventy percent of respondents indicated they had pumped their system in the 2 years prior to the survey.

Despite the reluctance expressed by residents toward an on-lot sewage system management program, the Township adopted an ordinance in March of 2011 to initiate such a program to satisfy recommendations from the Pennsylvania Department of Environmental Protection. This ordinance requires regular pumping of on-lot sewage system tanks. In light of the opinions reflected in the survey results, the township must make every effort to inform residents of the benefits for proper maintenance and the potential costs of system replacement if not maintained. A copy of the adopted on-lot system management ordinance is included in Appendix C

There are a handful of locations where alternate systems have been constructed. A/B systems were installed in two locations; on the west side of Gravel Pike just north of Salford Station Road, and on a property along Schwenk Road. A spray irrigation system serves a lot on Alexander Drive, and Single Family Small Treatment Plants (SFSTP) are located at the southeast corner of Meng and Delphi Roads, and the corner of Salford

Station and Schwenk Roads. An Operations and Maintenance Agreement was executed and recorded for each of these systems, requiring inspection reports be submitted annually to the township and posting escrow monies for each system should it be necessary for the township to intervene.

Holdings tanks are a last resort, but they are a necessity in some situations. A residential property on Zieglerville Road and also a residential property on Salford Station Road are currently utilizing holding tanks for sewage.

Sludge Disposal

Sludge generated by the township sewage treatment plant is removed by an approved hauler and disposed of at the Pottstown Wastewater Treatment Plant. In 2001, one of the aeration tanks was converted to a sludge thickening tank to dewater sludge and reduce the hauling quantities.

Sludge hauling from 2010 thru 2014 is contracted to Franc Environmental. In 2012, they removed an average of 26,375 gallons of sludge per month. The same company that pumps the sewer treatment plant also pumps clean the pump stations 4 to 5 times per year.

Pumping and hauling for on-lot systems in arranged by the property owner, and there are a number of private companies that perform this service.

IV. Future Growth and Land Development

Historically, on-lot sewage systems have not adequately served areas in the township with lot sizes of less than an acre. Collection systems were constructed in the Spring Mount area and the Zieglerville area to solve the wastewater problems experienced in these higher density regions. Where planning includes higher density development, planning should also include public sewer services

Land Uses

Land use and development in Lower Frederick Township is regulated by the "Lower Frederick Township Zoning Ordinance of 1999" as last amended. The zoning ordinance has been amended in recent years to be consistent with the Central Perkiomen Valley Regional Comprehensive Plan of June, 2005.

The land use map in Exhibit 10 demonstrates the township is composed primarily of rural, open areas and single family residences.

Comprehensive Plan

In the Comprehensive Plan, the population centers of Spring Mount, Delphi and Zieglerville are designated as Future Growth Area. The remainder of the township is designated as Rural Resource Area. The zoning map is reflective of these designations, as the Rural Resource Area is generally outlined by the R-1 Rural Residential Zoning District. (See Exhibit 2 – CVRPC Growth Area Map)

The Future Growth Areas are characterized by a mix of old and new development along primary roads. Most are served by public sewer and water. It is anticipated that future development in these areas will be to the scale and intensity characteristic of a rural village. Improvements to public infrastructure in these areas are consistent with the comprehensive plan.

The Rural Resource Areas are intended to preserve natural and cultural resources. Expansion of public infrastructure into these areas is prohibited in the Comprehensive Plan. Two exceptions to this prohibition are when extension of public sewer and water is necessary to protect public safety, and limited extensions within ¼ mile of the Future Growth Area to allow for transitions between growth and no-growth areas.

The Central Perkiomen Valley Regional Planning Commission (CPVRPC) map allows for expansion of public sewer along the Route 73 Corridor. We recognize that the Scioto Creek Watershed may develop in coming years, and have planned for the flows in evaluation of potential treatment plant size. However, the path of sewage facilities and location of pump station in this region will likely be driven by the properties that might first proceed to development, and sewage planning for the watershed is best performed once available resources can be assessed.

The comprehensive plan recommends giving precedence to sewage facility alternatives that utilize land application of the effluent to encourage groundwater recharge, such as in-ground, sand mound or spray irrigation systems. It recommends all member municipalities investigate the establishment of an On-lot Disposal Systems Management Program (OLDS) to encourage public education and requiring pumping of septic tanks. An OLDs program and supporting ordinance were adopted by Lower Frederick Township in 2011.

Zoning Regulations

The Lower Frederick Township Zoning Ordinance addresses wastewater both with development capacity calculations and within individual district regulations.

Environmental Adjustment Factors

Each application must determine the development capacity of the subject tract of land by applying Environmental Adjustment Factors (EAFs). Application of the EAFs reduces the development capacity of a tract based upon natural features that affect water supply, sewage disposal and building construction. The formula is as follows;

Feature	Portion counted as Developable
Seasonal High Water Table* less than 18"	0.33
Seasonal High Water Table* 18" to 36"	0.67
Depth to Bedrock* less than 42"	0.67
Diabase Bedrock**	0.33
Slopes 15% to 24%	0.33
Slopes greater than 24%	0
Floodplain	0
Wetlands	0
Watercourses	0
Waterbodies	0
Unconstrained net acreage	1

Where public sewer is proposed, the items marked with * are counted as fully developable (multiplier of 1.0). Where public water is proposed, the item marked with ** is counted as fully developable (multiplier of 1.0).

The EAFs effectively reduce allowable density where on-site sewage disposal is proposed and site conditions are not well-suited for standard on-site systems.

District Zoning and Cluster Development

Sewage disposal is further addressed by the Zoning Ordinance within the individual Districts. Zoning Districts are delineated on the Zoning Map included as Exhibit 1. In the R-1 and R-2 Districts, any lot less than one acre in size shall be served by centralized or public sewer. This would include proposals developed under Neighborhood Lotting or cluster development.

The ordinance requires all development in the R-3 and R-4 Districts be served by public water and sewer. All developments in the VC, LI, IR and OI Districts are to be served by public water and sewer if available.

Open space planning in Lower Frederick Township has consistently included development of trails and connections along the stream corridors. There is a possibility that trail easements and sewer easements could complement each other in future proposals. Easement acquisition and construction for a Goshenhoppen interceptor should include provisions for trails where possible.

Stormwater Ordinance

A portion of the township lies within the Swamp Creek Watershed. An Act 167 plan was completed for the watershed, and the township was required to adopt stormwater ordinances in compliance with that plan. Concurrently, as a municipality with a current MS4 (Municipal Separate Storm Sewer) permit, the Township was required to update stormwater management ordinances in a manner consistent with MS4 permit regulations. These requirements resulted in adoption of a new township stormwater management ordinance in August of 2007, with stringent peak rate controls in the Swamp Creek Watershed. The ordinance encourages groundwater recharge, and requires developments to address water quality and stream bank erosion criteria in new proposals. While the ordinance may increase development costs, it is not expected to have a significant effect on future development rates and densities.

Flood Plain and Steep Slopes

The township Zoning Ordinance restricts development in flood plains, wetlands, and steep slope areas. These areas are subtracted from developable lot area as described above. In addition, the ordinance does not permit construction of buildings in the Flood Plain Conservation District, and limits construction in the Steep Slope Conservation District. These regulations will impact density of development in certain areas, and will be considered in potential growth estimates.

Proposed or Probable Developments

A number of residential developments have been proposed in Lower Frederick Township. The lands proposed for development are mapped relative to the Existing and Proposed Sewer Service Area Map on Exhibit 14. They include

- "Greenway" , a 38 lot residential subdivision has been conditionally approved along Zieglerville Road near Main Street. The plans include public sewer, but concerns about available treatment plant capacity have delayed this subdivision. As ongoing I & I work decreases both the average daily flow and the frequency and severity of flow spikes, the ability of the plant to accept these flows is being

continually reevaluated. The proposed development would connect to the existing collection system in Spring Mount and drain by gravity to the sewer treatment plant pump station. The subdivision is located in the future growth area of the comprehensive plan.

- "Melbourne Hill", a 47 lot subdivision located on Gravel Pike north of Little Road, has conditional preliminary approval. The developer originally contemplated construction of a new sewer treatment plant to support this and other developments, but the planning and funding was not completed. This Subdivision is within the Goshenhoppen Creek watershed. The subdivision is located in the future growth area of the comprehensive plan.

- "Parkside Village" was a 58 lot subdivision proposed along Little Road just west of Gravel Pike. The plans were well developed, but the applicant withdrew their application when housing market conditions changed. The subdivision is located in the Scioto Creek Watershed, but as it is along the boundary between watersheds it is possible to direct wastewater flow from the front of the property to the Goshenhoppen Watershed. The subdivision is located in the future growth area of the comprehensive plan.

- "DiSanto" is the owner of a tract of land along Big Road, opposite Simmons Road. A plan submitted prior to a zoning map revision calls for 77 apartments on this site. The owner and the township have discussed utilizing this property instead for age-restricted housing. However, the property is located in the area designated by the Comprehensive Plan as Rural Resource Area. An age-restricted development would require changes to the Zoning Ordinance and also changes to the extent of the future growth areas of the Comprehensive Plan.

- A plan was conditionally approved for construction of a sports facility on a 103 acre farm on the north side of Simmons Road. The farm is bisected by the Sciotto Creek. To the west of the creek, the land is zoned LI. To the east of the creek, the land is zoned R-1. The original developer appears to have abandoned the project, but the owner is still interested in selling the property for development. The residential side of the property is roughly 50 acres, so has a theoretical potential for up to 25 homes if public water and sewer were to be made available. The other 50 acres on the LI side could be developed to a density of 25% building area and 50% impervious area.

Application of allowable density to acreages of parcels as obtained through tax map data, we have populated the maps in Figures 5 and 6 to show the potential EDU's associated with each larger parcel. Such analysis of proposed and potential development indicates expansion of the collection system into the Goshenhoppen watershed could add over 150 EDU's to the system. Further expansion of the collection system into the Scioto watershed has the potential to add more than 350 more EDU's to the system, assuming the age-restricted development were to be permitted.

V. Alternatives for New or Improved Wastewater Disposal

A. Ziegerville Road Solutions

There is one residence on Zieglerville Road with a failed system, and the family is using a holding tank. Surrounding that lot are approximately 7 properties with older, in ground systems on small parcels, and those property owners have indicated a desire to connect to public sewer. We looked at the following two scenarios for low pressure force main systems;

1. East Route: Force Main Low pressure system up the hill on Zieglerville Road

Install a force main low pressure system to serve the 7 properties at the bottom of the hill and allow optional connection of the 8 properties along the hill with larger, more recent sand mound systems. Connect to an existing manhole near the townhouses, which drains by gravity to the sewer treatment plant.

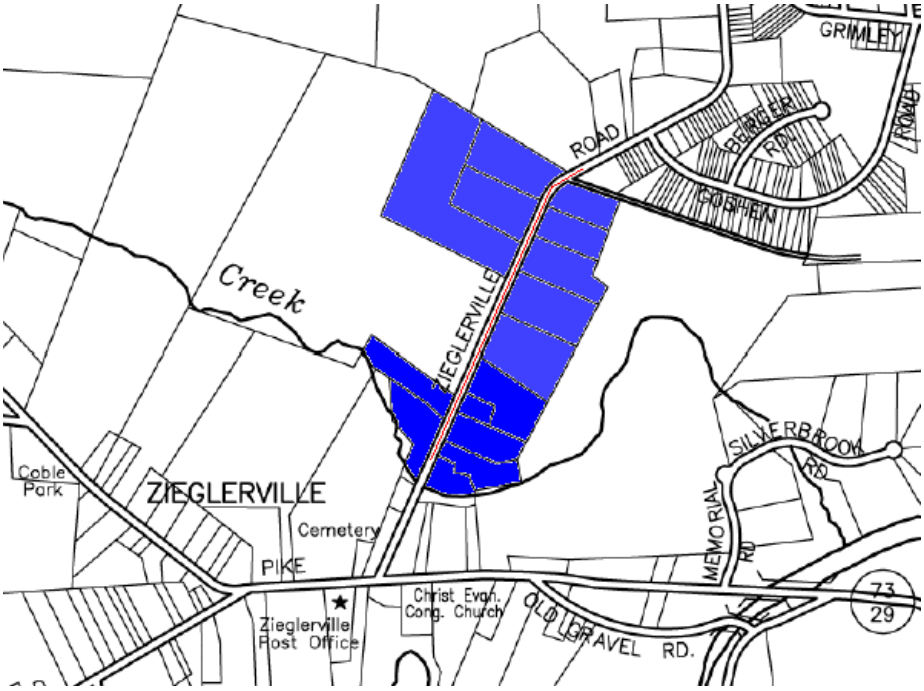


Figure 1 - Force Main Low Pressure System Uphill

2. West Route: Force Main Low Pressure System on Zieglerville Road Crossing Goshenhoppen Creek to Gravel Pike

Install a force main low pressure system to serve the 7 properties at the bottom of the hill, cross the Goshenhoppen Creek, Connect to an existing manhole in Gravel Pike, which drains to the Delphi pump station, which then flows to the pump station at the sewer treatment plant.

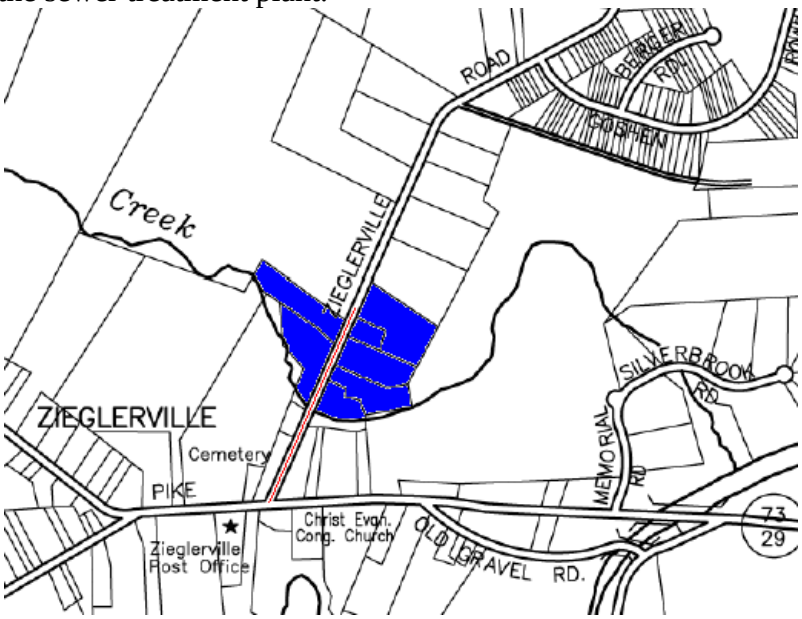


Figure 2 - Force Main Low Pressure System Across Creek

3. Goshenhoppen Creek Interceptor

Serving these 7 properties as part of a more comprehensive solution; see Section V.B.4.

B. Schwenk Road Solutions

An inground system at the intersection of Schwenk and Salford Station is problematic, and must be pumped monthly to prevent discharge of sewage. The Montgomery County Health Department evaluated the property to determine feasibility of installing a replacement on-lot sewage system. Inadequate soil limiting zones were found, precluding installation of a conventional or alternate sewage system. The limiting zones are common to the immediate region, raising suspicions about the adequacy of other systems on surrounding lots. Across the street, an SFSTP was installed at 210 Schwenk Road over a decade ago to address a failed system.

Poor soil conditions and resident complaints regarding this area prompt the township's consideration of wastewater solutions for this area.

1. Gravity Sewer On Schwenk Road

Gravity sewer installed to extend the existing collection system from Zieglerville Road up the cartway of Schwenk Road to Salford Station Road. Schwenk Road rises in elevation from Zieglerville Road, then levels off, and actually drops a bit at the intersection of Salford Station Road. For this reason portions of the gravity sewer line will need to be quite deep. Homes on larger lots along this road are generally set back over 150 feet from the road, and therefore would not be required to connect. A gravity sewer system extension would conceivably serve 9 or 10 lots.

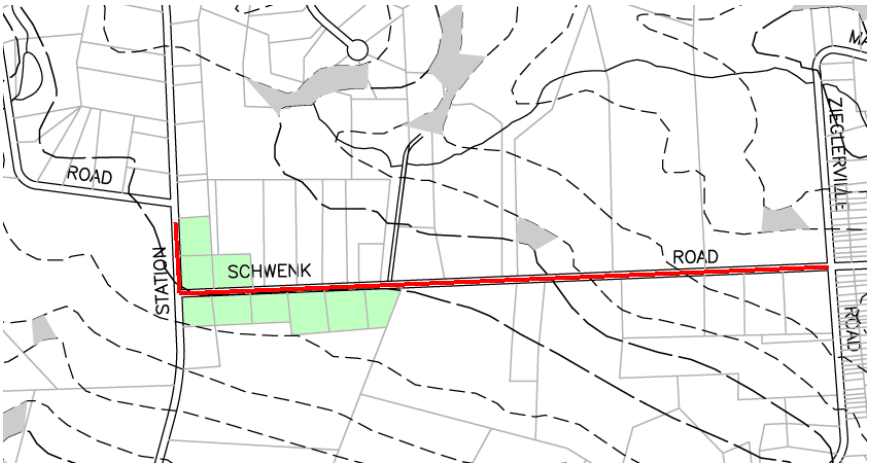


Figure 3 - Gravity Sewer on Schwenk Road

2. Low Pressure Force Main to Gravity Sewer in Schwenk Road

Install gravity sewer in Schwenk Road to the top of the rise. Construct a low flow pressure system to serve the homes near the intersection of Schwenk and Salford Station Roads, draining to the gravity sewer line. This option avoids the deep sewer noted in option 1 above. Each homeowner would purchase and maintain their own pump. As in Option 1 above, the system extension would conceivably serve 9 or 10 lots.

3. Package Plant for Schwenk Road

In considering a system to serve this immediate area, we noted an open parcel between the homes and the Goshenhoppen Creek where a package plant could be placed. A half acre easement or acquisition would be required to place the plant in an open area along Salford Station Road. The plant would discharge to the Goshenhoppen creek.

A community system was not considered for his location, as the soils between the highlighted lots and the Goshenhoppen Creek are all rated as "Very Limited" for various on-lot disposal methods in the Web Soil Survey, excepting spray irrigation, which would require a spray field sized at 40,000 square feet per home, or 10 acres. The cost of acquisition for 10 acres or more is cost prohibitive.

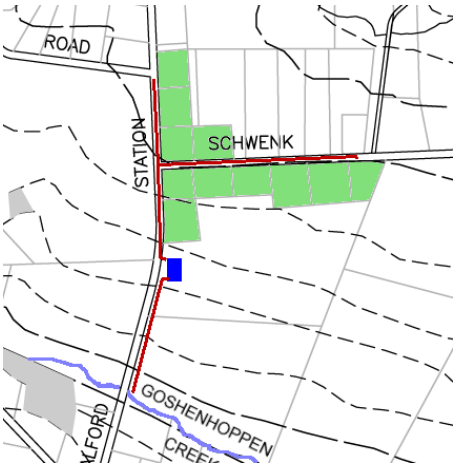


Figure 4 - Package Plant for Schwenk Road

4. Goshenhoppen Interceptor

An interceptor and pump station along the Goshenhoppen Creek was next considered as a potential solution to servicing both existing and proposed residential properties in the watershed. The Schwenksville Borough Authority owns a large tract of land along the Goshenhoppen Creek just upstream of Zieglerville Road. An easement could be negotiated with the Authority to allow construction of a pump station on their land adjacent to the creek.

A gravity collection system would connect the 6 or 7 homes on Zieglerville Road described in section V.A. A gravity interceptor along the creek could drain a collection system for the properties of concern in the vicinity of Salford Station and Schwenk Roads. A gravity interceptor could also serve the proposed Melbourne Hill Development proposed in this watershed. If existing large tracts in the immediate vicinity (shaded dark green) were developed to potential in accordance with current zoning it is estimated that 116 EDU's could be connected to such an interceptor. Further extension of the collection system could serve another 43 homes in this watershed (shown in lighter green shade) and, though not included in the current collection system plan, are considered for sizing of the sewer treatment plant.

Remaining portions of the Goshenhoppen watershed within the township limits are not expected to experience significant development as they are in the R-1 zoning district and might require construction of a pump station to access the collection system. They are not included in this sewage planning. The limits of the watershed upstream from a suggested pump station location are indicated below (pale yellow with a green boundary.)

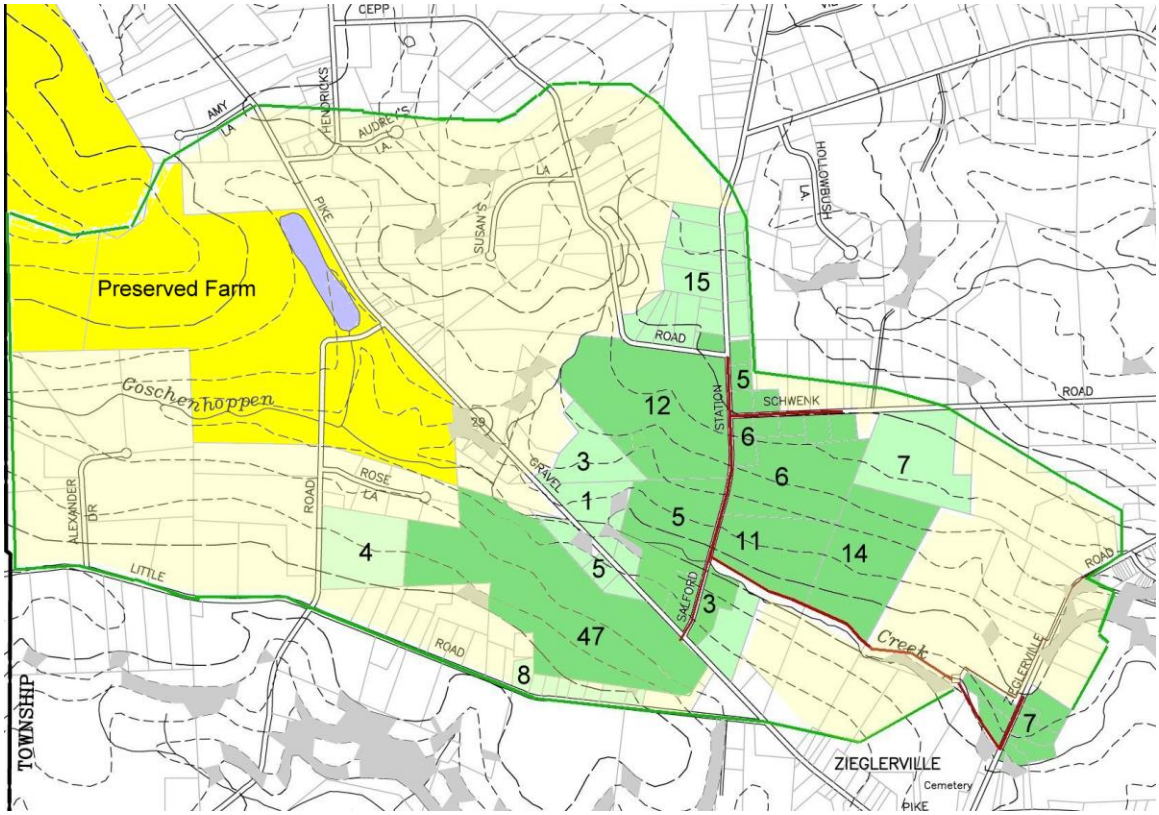


Figure 5 - Goshenhoppen Interceptor

C. Serving the Scioto Creek Watershed

The Scioto Creek watershed contains large parcels where development is anticipated. The owner of some large lots along Big Road opposite the intersection of Simmons Road has proposed a retirement community of 200 units. Tracts were combined along Little Road to form the proposed 58 lot Parkside subdivision, which was withdrawn when sewer could not be obtained. A 103 acre tract along Simmons Road has previously proposed development and sketch plans have been submitted for lots on the opposite side of Simmons Road. Servicing the Scioto Creek watershed will require a pump station.

1. PVSD Pump Station

There is an existing pump station located on the grounds of the Perkiomen Valley Middle School West. The pump station is owned by the School District, and is located well above the elevation of the Scioto Creek. It discharges through a 2-inch force main to a manhole in Big Road just west of Gerloff Road.

2. Pump Station Along Big Road

The Scioto Creek wraps through the western side of the township and crossed under Big Road before emptying into the Swamp Creek. An interceptor could be constructed along the Scioto Creek from Simons Road to a pump station that would be located on the south side of Big Road, and pumped up to the Zeiglerville Collection system.

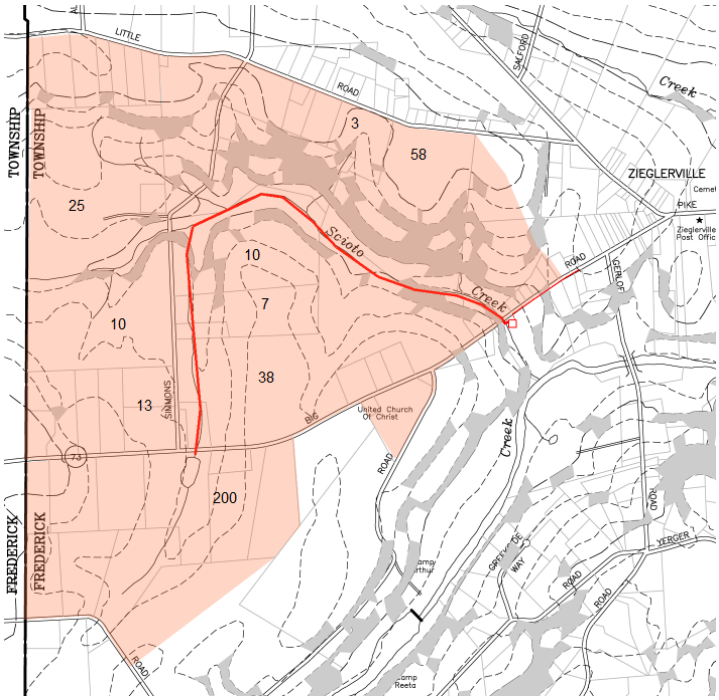


Figure 6 - Pump Station along Big Road

3. Pump Station Along the Scioto Creek

A pump station and interceptor line along the Scioto Creek could serve the proposed developments. Topography is conducive to placement of a pump station along the Scioto Creek to the rear of the former Parkside development. A force main could discharge through or along a proposed development to the proposed Goshenhoppen collection system.

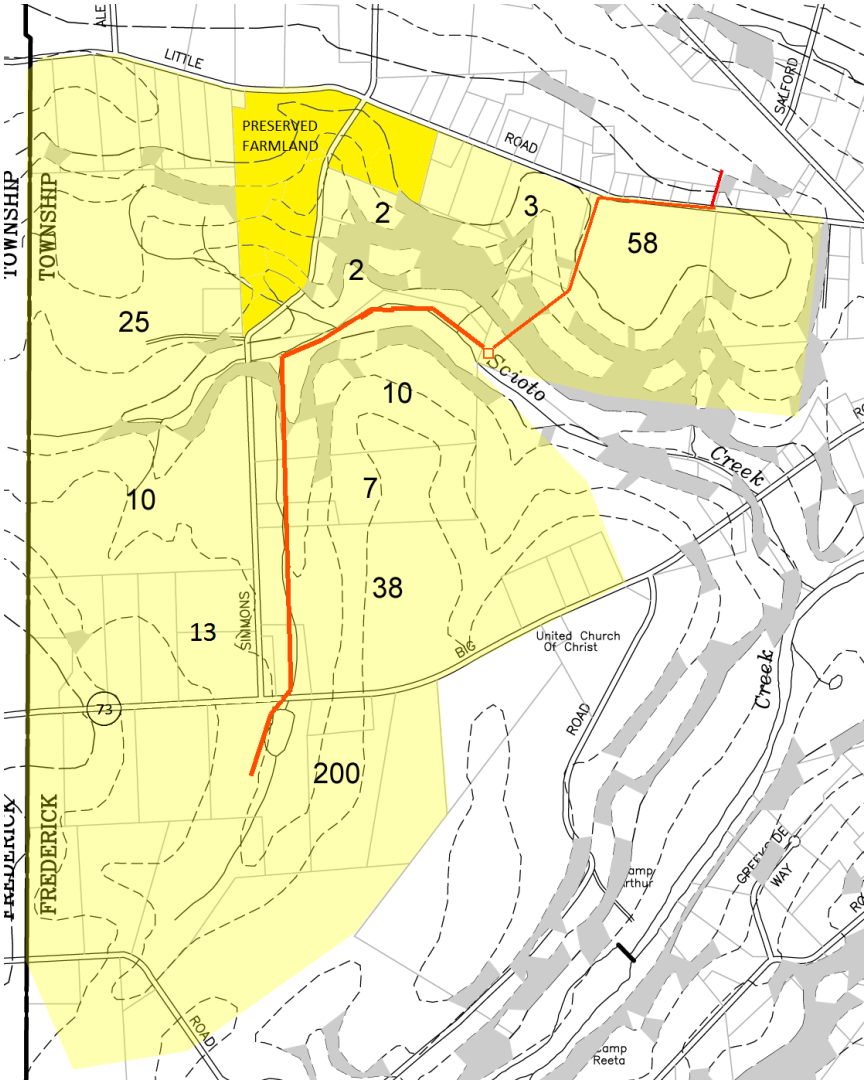


Figure 7 - Pump Station Along the Scioto Creek

4. Pump Station Along Simmons Road at the Scioto Creek

A pump station installed along Simmons Road could serve many of these parcels, with a force main extended up Simmons Road to Little Road, along Little Road to a high point, then drain by gravity lines installed along Little Road, which could serve existing homes on Little Road and connect to the proposed Goshenhoppen interceptor through the Melbourne Hill Development.

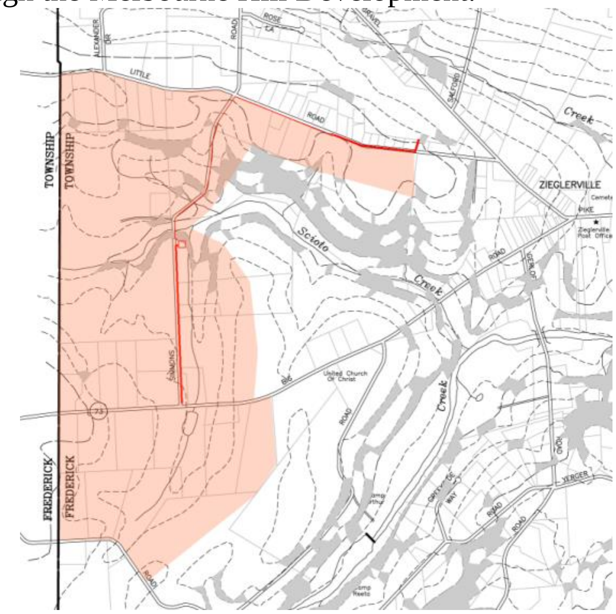


Figure 8 - Pump Station along Simmons Road

5. New Sewage Treatment Plant/Package Plant

A new treatment plant could be constructed along the Scioto Creek or the Swamp Creek to serve this watershed

D. Serving Existing Lots North of Spring Mount

The area of Fulmer Road, Riverside Avenue and Bavington Street consists of small lots on poor soils, and contains some suspect systems. For these reasons, continued use of on-site treatment was not considered in the following alternatives review.

The area was included in the previous 537 Plan as Future Service Area. Although there are few large lots with potential for subdivision, there are some empty lots where single family homes may be constructed if sewer were available. Expansion of the collection system to serve existing properties in Springmount along Fulmer Road, Riverside and Bavington would potentially add approximately 100 more homes to the collection system.

1. Municipal Pump Station

A gravity collection system could be installed throughout these roads to drain to the low point on Riverside Avenue near the Perkiomen Creek. A pump station would be installed at the low point, and discharge through a force main to the existing gravity collection system in Boulder Lane. Such a system could serve roughly 110 existing and potential properties.

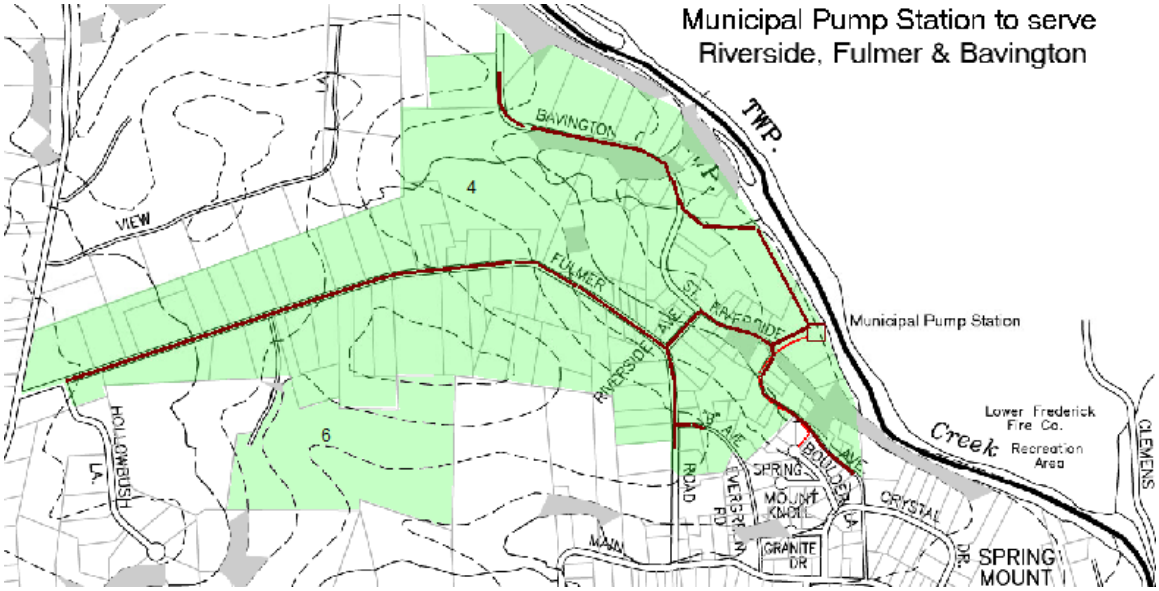


Figure 9 - Pump Station along Perkiomen Creek

2. Perkiomen Creek Interceptor

A gravity collection system could be installed throughout these roads to drain to the low point on Riverside Avenue near the Perkiomen Creek. From that point, an interceptor would be installed along the creek and connect to the existing collection system below Spring Mount Road. There is a steep cliff along the south side of the Perkiomen Creek, so an easement would be required from Montgomery County to install the interceptor on their land on the north side of the creek upstream of the former railroad bridge. A pump station includes mechanical parts to maintain and replace, ongoing electricity consumption, and regular staff time, whereas an interceptor does not.

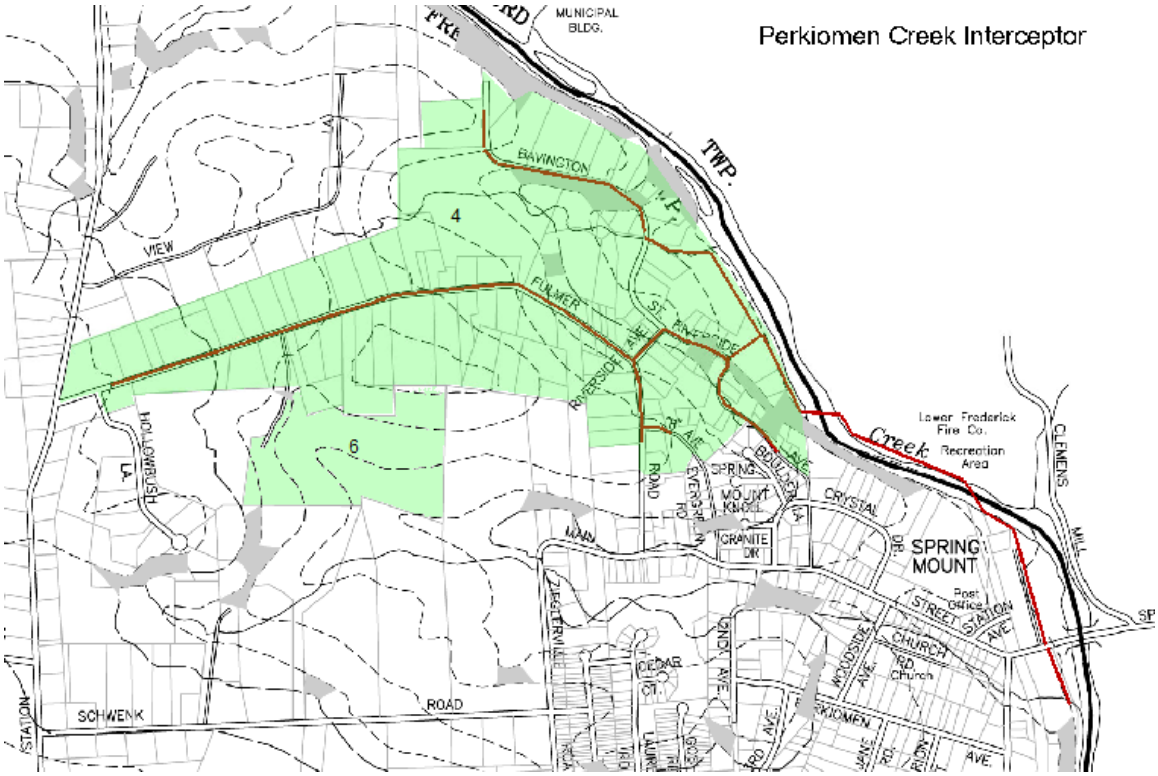


Figure 10 - Perkiomen Creek Interceptor

E. Serving Lots on Cemetery Lane

An extension of the gravity collection system up Cemetery Lane would permit connection of 13 existing lots. This addition would not overtax the Delphi Pump Station.

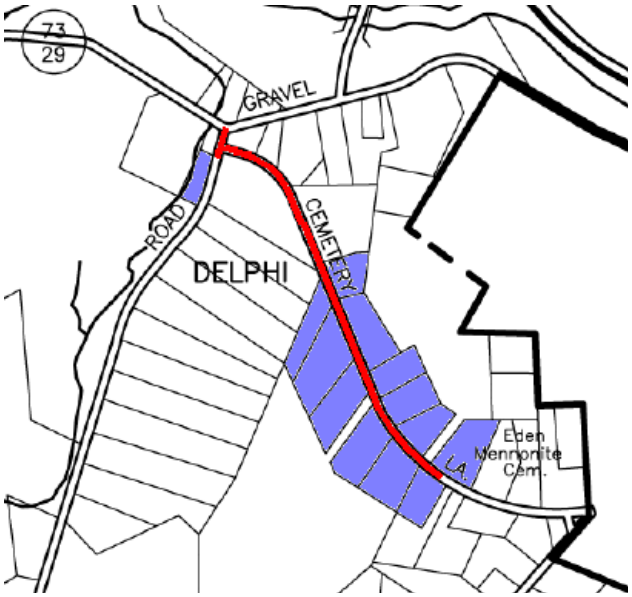


Figure 11 - Serving Lots on Cemetery Lane

F. Lots on Meng Road

Properties on Meng Road are served by on-lot systems. Nearest the Cemetery Lane intersection, the homes on the lots on the south side of Meng Road are set back at least 150 feet from the street. The north side includes an unnamed stream and steep topography. It remains largely undeveloped and wooded, with the exception of one small parcel near the intersection with Cemetery Lane that could be served by a Cemetery Lane extension.

Travel uphill on Meng Road toward Mine Hill Road, and the homes and structures are situated closer to the street. There is anecdotal evidence of a holding tank being used on one of these properties, but its installation predates the Holding Tank Ordinance of 1999 and is not under permit with the SEO.

Service to the highlighted parcels at the top of the hill might be achieved with extension of sewer main in Meng Road, or construction of a force main to a community system on existing open space lands, or connection via force main to the Schwenksville Borough Collection system that serves Williams Circle, Wilson Drive and homes along Mine Hill Road.

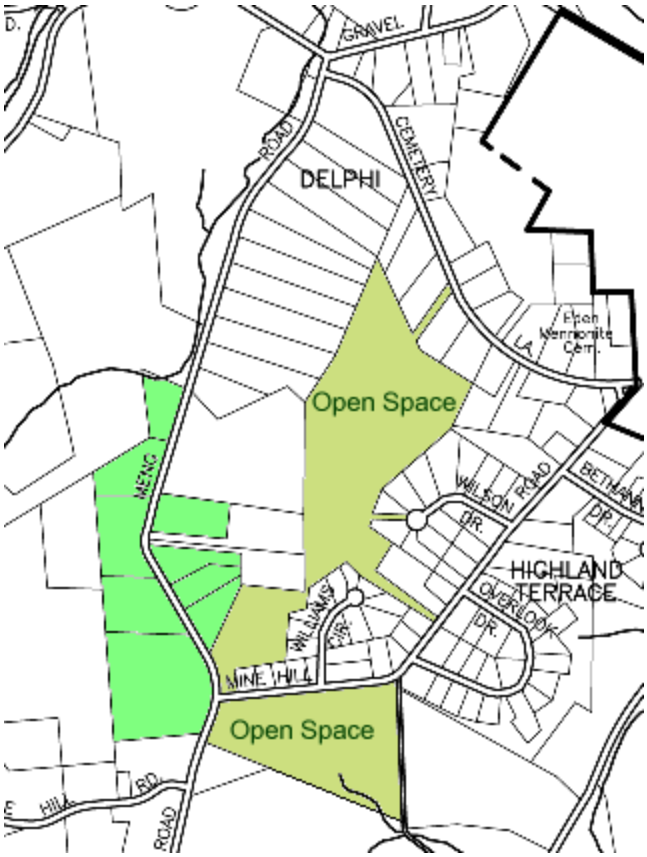


Figure 12: Lots on Meng Road

G. Expansion/Upgrade of the Wastewater Treatment Plant

The wastewater treatment plant must be expanded or upgraded to accept the additional flows anticipated in this sewage planning. The plant is currently permitted to treat 200,000 GPD, and is accepting an average of 126,262 GPD. However, on 3 days of the 2012 calendar year the plant flow exceeded the permitted limit.

Cumulative EDU Increases

Origin	10-year EDU Projection	20-year EDU Projection	
Goshenhoppen Watershed	116	43	
Scioto Watershed		380	
Bavington, Fulmer, Riverside	100	10	
Cemetery Lane	13		
Greenway Development	38		
Totals	267	433	700

To treat flows from areas where the existing on-lot systems are suspect and areas with approved development plans, capacity must be provided for an additional

267 EDU's. Using planning numbers of 280 GPD per EDU, this correlates to 74,760 GPD.

To treat flows for the foreseeable potential growth in the community, capacity must be provided for a total additional 700 EDU's. Using planning numbers of 280 GPD per EDU, this correlates to an added 196,000 GPD.

Ideally, a plant expansion would more than double the capacity of the existing treatment plant from 0.2 MGD to 0.5 MGD. Please see Appendix A "Process Alternates Analysis" for further discussion of treatment plant expansion.

H. Construction of Community Land Disposal Systems

Construct community land disposal systems to serve existing lots with failed systems or proposed developments. This will be evaluated in the alternative analysis for appropriate areas.

I. No-Action Alternative

Do not build extensions to the collection system or increase treatment capacity of the public sewage system.

Failure to proceed with wastewater planning and implementation of selected solutions would have numerous adverse consequences, including;

1. Failing on-lot systems are potential sources of pollution to surface and ground waters.
2. Homeowners who must pump holding tanks and cisterns weekly and monthly face and economic hardship.
3. Real estate values will be impacted and home sales halted by on-lot systems that are not adequate.
4. Growth and development of the proposed regional growth area will be hindered by lack of wastewater solutions.
5. Developers may force acceptance of numerous package plants throughout the township to proceed with their projects. This would increase the liabilities and responsibilities of the township.

VI. Evaluation of Alternatives

A. Zieglerville Road Solutions

1. East Route: Force Main Low pressure system up the hill on Zieglerville Road

a. Consistency analysis:
    i. Zieglerville Road is within the future growth area of the regional comprehensive plan.
    ii. This solution would not impact wetlands.
    iii. This solution would involve construction within an existing cartway, therefore no adverse impacts to rare, endangered or threatened species are anticipated.
    iv. This solution does not conflict with the Swamp Creek Act 167 plan.
    v. This solution does not promote development, and would not impact Pennsylvania Prime Agricultural Land.

b. Construction Cost Estimate
   A preliminary estimate of cost for this force main construction is $246,000. This estimate does not include the cost of grinder pumps and lines on private property. If seven parcels are served, the cost per parcel is $35,000 per lot served. If fourteen parcels are connected, the cost per parcel served is $18,000, plus grinder pump costs of about $5,000 and tap-in fees.

2. West Route: Force Main Low Pressure System on Zieglerville Road Crossing Goshenhoppen Creek to Gravel Pike

a. Consistency analysis:
    i. Zieglerville Road is within the future growth area of the regional comprehensive plan.
    ii. This solution will impact the waterway known as the Goshenhoppen Creek with a utility crossing. A previous study indicates no wetlands in the proposed crossing area adjacent to the bridge.
    iii. This solution would involve construction within an existing cartway, excepting the stream crossing. If selected, it must be further evaluated for potential impacts to rare, endangered or threatened species.
    iv. This solution does not conflict with the Swamp Creek Act 167 plan.
    v. This solution does not promote development, and would not impact Pennsylvania Prime Agricultural Land.

b. Construction Cost Estimate
   A preliminary estimate of cost for the force main construction is $136,000. This estimate does not include the cost of grinder pumps

and lines on private property. If seven parcels are connected, the cost per parcel is $20,000 per lot served, plus grinder pump costs of about $5,000 and tap-in fees.

3. Goshenhoppen Creek Interceptor

See section B.4 below.

B. Schwenk Road Solutions

1. Gravity Sewer On Schwenk Road

c. Consistency analysis:
   i. Schwenk Road is not within the future growth area of the regional comprehensive plan, but is within ¼ mile of the future growth area, therefore extension of sewer is permitted.
   ii. This solution would not impact wetlands.
   iii. This solution would involve construction within an existing cartway, therefore no adverse impacts to rare, endangered or threatened species are anticipated.
   iv. This solution does not conflict with the Swamp Creek Act 167 plan.
   v. The area of this intersection is mapped as Pennsylvania Prime Farmland. However, the proposal would serve existing homes and the zoning does not permit further division of the parcels that could drain *by gravity* to this system.

d. Construction Cost Estimate:
Schwenk Road rises in elevation from Zieglerville Road, then levels off, and drops a bit at the intersection of Salford Station Road. For this reason portions of the gravity sewer line will need to be quite deep. The depth of trenching, additional quantities of backfill materials and depth of manholes increases costs. Homes on larger lots along this road are generally set back over 150 feet from the road, and therefore would not be required to connect. A gravity sewer system extension would conceivably serve 9 or 10 lots. Preliminary cost estimates for construction of the gravity sewer line extension is $1,100,000 for a cost of roughly $122,000 per lot served. This is financially infeasible.

2. Low Pressure Force Main to Gravity Sewer in Schwenk Road

e. Consistency analysis:
   i. Schwenk Road is not within the future growth area of the regional comprehensive plan, but is within ¼ mile of the future growth area, therefore extension of sewer is permitted.
   ii. This solution would not impact wetlands.

iii. This solution would involve construction within an existing cartway, therefore no adverse impacts to rare, endangered or threatened species are anticipated.
iv. This solution does not conflict with the Swamp Creek Act 167 plan.
v. The area of this intersection is mapped as Pennsylvania Prime Farmland. However, the proposal would serve existing homes and the zoning does not permit further division of the parcels that could drain *by gravity* to this system.

f. Construction Cost Estimate:
Schwenk Road rises in elevation from Zieglerville Road, then levels off, and drops a bit at the intersection of Salford Station Road. The gravity sewer would be constructed on the rise, so that the gravity sewer would not be much more than 4 feet deep. The terminal manhole would be installed where the road levels, and a low pressure force main installed to connect properties near and on Salford Station Road to the system. The low pressure system extension would conceivably serve 9 or 10 lots. Preliminary cost estimates for construction of the gravity sewer line extension is $450,000 for a cost of roughly $50,000 per lot served. This does not include the direct cost to the homeowner of the individual grinder pump, about $5,000, and any tap in fees.

3. Package Plant for Schwenk Road

g. Consistency analysis:
i. Schwenk Road is not within the future growth area of the regional comprehensive plan, but is within ¼ mile of the future growth area, therefore extension of sewer is permitted.
ii. This solution may impact wetlands at the point of discharge along the Goshenhoppen Creek.
iii. This solution would involve construction within an existing cartway, and also within an existing farm field. If selected an evaluation of adverse impacts to rare, endangered or threatened species would be necessary.
iv. This solution does not conflict with the Swamp Creek Act 167 plan.
v. The area of this intersection is mapped as Pennsylvania Prime Farmland. Although the proposal would primarily serve existing homes, the zoning does permit further division of two larger parcels that could drain up to 29 additional homes to such a system.

h. Construction Cost Estimate:
Preliminary costs estimates for construction of a package plant and associated collection system are $508,000 but this does not include costs of land or easement acquisition. It also does not account for the additional maintenance expenses and staff time required to run another

plant. The system would serve 10 to 11 properties, for a construction cost of $46,000 per lot served.

4. Goshenhoppen Interceptor

i. Consistency analysis:
   i. Many of the lots that would be served by this proposal are within the future growth area of the regional comprehensive plan. Schwenk Road is not within the future growth area of the regional comprehensive plan, but is within ¼ mile of the future growth area; therefore extension of sewer is permitted. A few of the homes on Salford Station Road north of Cepp Road are beyond the ¼ mile limit, but with suspect systems it is probable they could also be connected if necessary.
   ii. This solution may impact wetlands along the Goshenhoppen Creek. Wetlands delineation would be required prior to design, and appropriate state and federal permits must be obtained.
   iii. This solution would involve construction along the Goshenhoppen Creek. In addition to preliminary PNDI screening, a field survey was performed to address questions from the DCNR. As a result, all agencies associated with the PNDI screening have provided notification that no impact is anticipated to threatened or endangered species and/or special concern species or resources.
   iv. This solution does not conflict with the Swamp Creek Act 167 plan.
   v. Much of this watershed is mapped as Prime Farmland or Farmland of State Importance. Some of the open fields are harvested for hay or silage. No other crops are cultivated on these lands at this time.
   vi. Prior to initiating design, it is necessary to meet with the PHMC to determine the need for an archeological survey.

j. Construction Cost Estimate:
   Construction costs for such an interceptor are estimated to be $2.1 million. Further extension of the collection system could serve another 35 homes in this watershed. Although the initial costs are significant, when distributed across 116 homes the construction cost per lot served is $18,000.
   The costs evaluated above are only for collection system expansion and do not include expenses associated with expansion of the capacity of the sewer treatment plant.

k. Funding:

Prior to construction of an interceptor and pump station, the municipality should define a new service district to encompass such an expansion. Initial construction could be funded by municipal loan, municipal bond or funded by a developer of one of the larger tracts. Loans would be repaid or developers partially reimbursed through fees and sewer billings.

l. Implementation Needs:
An interceptor and pump station along the Goshenhoppen would provide solution to ongoing problems requiring regular pumping of holding tank systems on Zieglerville Road and Schwenk Road. An interceptor would also address the sewage needs for the Melbourne Hill development that is already conditionally approved.

The interceptor may also serve future development of other large tracts in and along the edge of the future growth area, and could ultimately serve the Scioto watershed with addition of another pump station.

m. Authority and approvals
To accomplish installation of an interceptor along the Goshenhoppen Creek would require;
   i. Authorization from the Township Board of Supervisors.
   ii. A resolution or ordinance from the Board of Supervisors establishing a new sanitary sewer district.
   iii. A legal agreement with developers or other action by the municipality to secure financing.
   iv. Easements and/or land from the Schwenksville Borough Authority.
   v. Sewer easements from private property owners along the Goshenhoppen Creek.
   vi. Necessary permits and approvals for pump station and interceptor construction from the Pennsylvania Department of Environmental Protection (DEP) and the Montgomery County Conservation District.
   vii. Permits and approvals as required for increased capacity of the sewer treatment plant, as discussed further in Appendix A of this document.

An interceptor along the Goshenhoppen Creek is selected as the most cost effective and comprehensive solution to serving properties with suspect systems along Zieglerville Road and Salford Station Road, while providing service to the preliminarily approved development along Gravel Pike.

C. Serving the Scioto Creek Watershed

The Scioto Creek watershed contains large parcels where development is anticipated. The owner of some large lots along Big Road opposite the intersection of Simmons Road has proposed a retirement community of 200 units. Tracts were combined along Little Road to form the proposed 58 lot Parkside subdivision, which was withdrawn when sewer could not be obtained. A 103 acre tract along Simmons Road has previously proposed development and sketch plans have been submitted for lots on the opposite side of Simmons Road. Servicing the Scioto Creek watershed will require a pump station.

Within this watershed, only those parcels east of the Scioto Creek are within the designated Future Growth area of the Regional Comprehensive Plan. Most are within the mapped area of "Potential Sewer Extension" in the Plan.

1. PVSD Pump Station

There is an existing pump station located on the grounds of the Perkiomen Valley Middle School West. The pump station is owned by the School District, and is located well above the elevation of the Scioto Creek. It discharges through a 2-inch force main to a manhole in Big Road just west of Gerloff Road. Ownership by the school, the location atop a hill, and the size of the force main limit the feasibility of connecting other properties to this existing pump station.

2. Pump Station Along Big Road

The Scioto Creek wraps through the western side of the township and crossed under Big Road before emptying into the Swamp Creek. An interceptor could be constructed along the Scioto Creek from Simons Road to a pump station that would be located on the south side of Big Road, and pumped up to the Zeiglerville Collection system. The length of interceptor between Simmons Road and Big Road would be 0.8 miles, and the steep slopes along the creek may factor into construction costs. Significant land or easement acquisition is required to effect this solution.

3. Pump Station Along the Scioto Creek

A pump station and interceptor line along the Scioto Creek would serve the proposed developments. The topography is conducive to placement of a pump station along the Scioto Creek to the rear of the former Parkside development. A force main could discharge through or along a proposed development to the proposed Goshenhoppen collection system. This solution is dependent upon the construction of the Melbourne Hill Development, the Parkside Development, and the Goshenhoppen interceptor.

4. Pump Station Along Simmons Road at the Scioto Creek

A pump station installed along Simmons Road could serve many of these parcels, with a force main extended up Simmons Road to Little Road, then drain by

gravity lines installed along Little Road, which would then serve existing homes on Little Road and connect to the proposed Goshenhoppen interceptor through the Melbourne Hill Development. This solution is dependent upon the construction of the Melbourne Hill Developmentand the Goshenhoppen interceptor.

5. New Sewage Treatment Plant/Package Plant

A treatment plant constructed to serve this watershed was briefly considered. However, the anticipated difficulty of obtaining an NPDES permit to discharge to the Scioto or Swamp Creeks, the cost and complexity of land acquisition, the additional staff to run another treatment plant, existing topography constraints, and the initial construction cost of a plant of this magnitude combined to make this idea infeasible. As described in the Process Alternative Analysis within this plan, construction of a new treatment plant can cost over 6 million dollars, not including costs of land acquisition. Township officials have determined that consolidation of treatment in one plant provides the most cost-effective and environmentally sensitive solution.

A sewer system servicing the Scioto Watershed would primarily serve new development and would be funded by developers. There is potential for connection of 350 to 400 EDU's in this watershed if fully developed. These solutions remain conceptual. Construction cost estimates have not been prepared for these solutions. The pump station at the rear of the proposed Parkside project was initially considered a preferred solution, but that development plan has since been withdrawn. There is no record of failed systems in this area, and no development plans are currently before the township. The potential to serve this watershed will be considered while evaluating the required capacity of a new sewer treatment plant, but details of the collection system will be developed at a future date.

D. Serving Existing Lots North of Spring Mount

Properties along Fulmer Road, Riverside Avenue, and Bavington Street are generally small lots with older systems.

1. Municipal Pump Station

a. Consistency analysis:
    i. Much of this area was included in the previous 537 Plan as Future Service Area. Many of the lots that would be served by this proposal are also within the future growth area of the Regional Comprehensive Plan, excepting the westernmost lots along Fulmer and Bavington.
    ii. This solution may impact wetlands along the Perkiomen Creek. Wetlands delineation would be required prior to design, and appropriate state and federal permits must be obtained.

iii. This solution would involve construction along the Perkiomen Creek. In addition to preliminary PNDI screening, a field survey was performed to address questions from the DCNR. As a result, all agencies associated with the PNDI screening have provided notification that no impact is anticipated to threatened or endangered species and/or special concern species or resources.
iv. There is no Act 167 plan for the Perkiomen Creek at this time.
v. This area is not mapped as prime farmland.
i. Prior to initiating design, it is necessary to meet with the PHMC to determine the need for an archeological survey.

b. Construction Cost Estimate:
A collection system and pump station in this area could serve roughly 100 existing properties. Construction costs are estimated at 2.8 million, or about $28,000 per lot served. These costs are only for collection system expansion and do not include expenses associated with property or easement acquisition, or expansion of the capacity of the sewer treatment plant.

c. Funding:
Prior to construction, the municipality should define a new service district to encompass such an expansion. Initial construction could be funded by municipal loan or municipal bond.

d. Implementation Needs:
A collection system and pump station at Riverside Avenue along the Perkiomen would provide solution to suspected problems of existing systems in this area, and allow development of remaining parcels in this growth area.

e. Authority and approvals
To accomplish installation of a pump station along the Riverside Avenue would require;
vi. Authorization from the Township Board of Supervisors.
vii. A resolution or ordinance from the Board of Supervisors establishing a new sanitary sewer district.
viii. Acquisition of land for a municipal pump station.
ix. Indebting the municipality with a Bond or Loan to fund the construction.
x. Sewer easements from private property owners as required.
xi. Necessary permits and approvals for pump station and sewer main construction from the Pennsylvania Department of Environmental Protection (DEP) and the Montgomery County Conservation District.
xii. Permits and approvals as required for increased capacity of the sewer treatment plant, as discussed further in Appendix A of this document.

2. Perkiomen Creek Interceptor

A gravity collection system could be installed throughout these roads to drain to the low point on Riverside Avenue near the Perkiomen Creek. From that point, an interceptor would be installed along the creek and connect to the existing collection system below Spring Mount Road. There is a steep cliff along the south side of the Perkiomen Creek, so an easement would be required from Montgomery County to install the interceptor on their land on the north side of the creek upstream of the former railroad bridge. A pump station includes mechanical parts to maintain and replace, ongoing electricity consumption, and regular staff time, whereas an interceptor does not.

a. Consistency analysis:
    i. Much of this area was included in the previous 537 Plan as Future Service Area. Many of the lots that would be served by this proposal are also within the future growth area of the Regional Comprehensive Plan, excepting the westernmost lots along Fulmer and Bavington.
    ii. This solution may impact wetlands and the waterways along the Perkiomen Creek. Wetlands delineation would be required prior to design, and appropriate state and federal permits must be obtained.
    iii. This solution would involve construction along and across the Perkiomen Creek. When evaluated using a preliminary PNDI screening, the DCNR indicated such a project may impact the Juniper Hairstreak and Mulberry Wing butterfly species, and Sedge grass, each a Special Concern Species. If the project goes to design, the location of wetlands will be delineated and the project must be resubmitted for further PNDI evaluation.
    iv. There is no Act 167 plan for the Perkiomen Creek at this time.
    v. This area is not mapped as prime farmland.
    i. Prior to initiating design, it is necessary to meet with the PHMC to determine the need for an archeological survey.

b. Construction Cost Estimate:
    A collection system and interceptor along the Perkiomen could serve roughly 100 existing properties. Construction costs are estimated at 2.9 million, or about $29,000 per lot served. These costs are only for collection system expansion and do not include expenses associated with property or easement acquisition, or expansion of the capacity of the sewer treatment plant.

c. Funding:
Prior to construction of an interceptor, the municipality should define a new service district to encompass such an expansion. Initial construction could be funded by municipal loan or municipal bond.

d. Implementation Needs:
An interceptor along the Perkiomen would provide solution to suspected problems of existing systems in this area, and allow development of remaining parcels in this growth area.

e. Authority and approvals
To accomplish installation of a pump station along the Riverside Avenue would require;
   vi. Authorization from the Township Board of Supervisors.
   vii. A resolution or ordinance from the Board of Supervisors establishing a new sanitary sewer district.
   viii. Acquisition of an easement along the east side of the creek from Montgomery County.
   ix. Indebting the municipality with a Bond or Loan to fund the construction.
   x. Sewer easements from private property owners as required.
   xi. Necessary permits and approvals for sewer main and interceptor construction from the Pennsylvania Department of Environmental Protection (DEP) and the Montgomery County Conservation District.
   xii. Permits and approvals as required for increased capacity of the sewer treatment plant, as discussed further in Appendix A of this document.

Either a pump station or an interceptor would be a cost effective solution to service the area north on Spring Mount. At this time the township has been unable to secure an easement commitment from Montgomery County necessary for interceptor construction. For this reason, the pump station is the selected solution. Until this solution can be implemented, it is hoped that the on-lot sewage system management program will benefit existing systems.

E. Serving Lots on Cemetery Lane

An extension of the gravity collection system up Cemetery Lane would permit connection of 13 existing lots.

a. Consistency analysis:
    i. Cemetery Lane is located within the future growth area of the regional comprehensive plan.
    ii. This solution would not impact wetlands.
    iii. This solution would involve construction within an existing cartway, therefore no adverse impacts to rare, endangered or threatened species are anticipated.
    iv. This solution does not conflict with the Swamp Creek Act 167 plan.
    v. The area of Cemetery Lane is not mapped as Pennsylvania Prime Farmland.

b. Construction Cost Estimate:
    Construction costs for extension of the collection system up the hill on Cemetery Lane are estimated at $450,000, which is $34,500 per lot. This addition would not overtax the Delphi Pump Station. These costs are only for collection system expansion and do not include expenses associated with expansion of the capacity of the sewer treatment plant.

c. Funding:
    The cost of construction of an extension would be paid by the property owners benefiting from such a connection.

d. Implementation Needs:
    An extension would eliminate reliance on existing on-lot systems in this area, and allow development of remaining parcels in this growth area.

e. Authority and approvals
    To accomplish extension of the collection system along the Cemetery Lane would require;
    i. Authorization from the Township Board of Supervisors.
    ii. Necessary permits and approvals for sewer main extension construction from the Pennsylvania Department of Environmental Protection (DEP) and the Montgomery County Conservation District.
    iii. Permits and approvals as may be required for increased capacity of the sewer treatment plant, as discussed further in Appendix A of this document.

F. Serving Lots on Meng Road

An extension of the gravity collection system up Meng Road would mandate connection of 9 existing lots and allow connection of additional lots where homes are located more than 150 feet from the street if desired by property owners.

1. Extension of Township Collection System

a. Consistency analysis:
   i. The south side of Meng Road is located within the future growth area of the regional comprehensive plan.
   ii. This solution would not impact wetlands.
   iii. This solution would involve construction within an existing cartway, therefore no adverse impacts to rare, endangered or threatened species are anticipated.
   iv. This solution does not conflict with the Swamp Creek Act 167 plan.
   v. The Lehigh Soils, portions of the Neshaminy Soils and some of the Mount Lucas Soils along Meng Road are mapped as Pennsylvania Prime Farmland. The designation NhC is for Neshaminy Silt Loam at 8 to 15%, listed as "farmland of statewide importance."

b. Construction Cost Estimate:
   Construction costs for extension of the collection system up the hill of Meng Road from Gravel Pike to Mine Hill Road are estimated at $830,000, which is just over $92,000 per lot. This addition would not overtax the Delphi Pump Station. These costs are only for collection system expansion and do not include expenses associated with expansion of the capacity of the sewer treatment plant. This solution is not financially feasible.

c. Funding:
   The cost of construction of an extension would be paid by the property owners benefiting from such a connection.

d. Implementation Needs:
   An extension would eliminate reliance on existing on-lot systems in this area, and allow development of remaining parcels in this growth area.

e. Authority and approvals
   To accomplish construction of a collection system extension on Meng Road would require;
   iv. Authorization from the Township Board of Supervisors.

v. Necessary permits and approvals for sewer main extension construction from the Pennsylvania Department of Environmental Protection (DEP) and the Montgomery County Conservation District.
vi. Permits and approvals as may be required for increased capacity of the sewer treatment plant, as discussed further in Appendix A of this document.

2. Connection to SBA Collection System

The Schwenksville Borough Authority (SBA) Collection system serves properties on Mine Hill Road and the new cul-de-sacs of Williams Circle and Wilson Drive. A low-pressure system could be constructed to connect the homes highlighted on Meng Road to the SBA collection system, either along public roads or through open space. However, the SBA treatment plant is overtaxed, and we have been informed there is a moratorium on new connections. The SBA is not interested in expanding their service area at this time to accept these additional lots. The Township and the Authority remain open to further review of potential connection at a future date.

3. Community System

Should problems with existing on-lot systems become evident for a small number of parcels in this area, a community system on the nearby open space parcels may be an option.

b. Consistency analysis:
   i. The south side of Meng Road is located within the future growth area of the regional comprehensive plan.
   ii. The solution would be designed to not impact wetlands.
   iii. The location and dimensions of a system would be determined following soils testing and negotiations with a homeowners association. A preliminary PNDI analysis of the open space areas suggest that there would be no adverse impacts to rare, endangered or threatened species, but a wetlands delineation is necessary to confirm.
   iv. This solution does not conflict with the Swamp Creek Act 167 plan.
   v. The Lehigh Soils, portions of the Neshaminy Soils and some of the Mount Lucas Soils along Meng Road are mapped as Pennsylvania Prime Farmland. The designation NhC is for Neshaminy Silt Loam at 8 to 15%, listed as “farmland of statewide importance.”

c. Construction Cost Estimate:

No construction cost estimate has been prepared at this time. Further survey of number of lots that require or desire connection is necessary, and discussions must be initiated with the homeowners association to determine feasibility and cost of utilizing their lands. Other costs would include construction of shared lines for a low-pressure collection system, and individual pumps in each connecting property. An escrow account and agreement for facility maintenance would be required.

d. Funding:

The cost of construction of an extension would be paid by the property owners benefiting from such a connection.

e. Implementation Needs:

The community system is proposed to present alternatives other than extension of public sewer should problems become apparent with the existing on-lot systems.

f. Authority and approvals

To accomplish construction of a community system to serve properties on Meng Road would require;

i. Soils testing.
ii. System design.
iii. Authorization from the Township Board of Supervisors.
iv. Agreement and escrow from connecting property owners.
v. Agreement and authorization from homeowners association.
vi. Necessary permits and approvals from the Pennsylvania Department of Environmental Protection (DEP) and the Montgomery County Conservation District.

4. No Action

The township has implemented an On-Lot System Management Program in the past three years, so existing systems in this area are more likely to be properly maintained and managed. A no action alternative is recommended at this time for Meng Road. Should problems become evident in the future, the township should re-visit the feasibility of connection to the Schwenksville Borough Authority system.

G Expansion/Upgrade of the Wastewater Treatment Plant

A detailed analysis of potential treatment plant expansion is provided in Appendix A "Process Alternates Analysis".

H. Construction of Community Land Disposal Systems

Construction of community land disposal systems has been considered and rejected as an alternative to serve the lots nearest the intersection of Salford Station and Schwenk Roads due to the "very limited" rating of the soils in this region for conventional land disposal systems. A community land disposal system may be an alternative to serve lots on Meng Road, and would be further evaluated should the need arise.

I. Funding

In 2005, there were multiple developers with subdivision proposals under review that were willing to invest millions of dollars in sewer treatment plant construction or expansion so that their projects would be served. With the current economic downturn, this is no longer the case.

1 Treatment Plant Upgrade

The treatment plant today can absorb a small number of additional connections, particularly where connections are necessary to abate public health hazards. The operators have successfully met current permitted effluent standards. However, the existing treatment plant cannot meet the coming NPDES effluent limits for phosphorus removal or the anticipated future NPDES limits for nitrogen. Further, while the existing plant facilities range in age, some facilities, including tanks, are now 30 years old. This time period meets or exceeds the standard life expectancy of a metal tank.

The long term planning undertaken in this document proposes extension of public sewer into new service areas within the township. These extensions cannot be undertaken until the existing treatment plant is upgraded and capacity increased. Upgrades to the sewer treatment plant are estimated to cost 6 million dollars. The township will need to consider financing options, including;

A Pennsylvania Infrastructure Investment Authority (PENNVEST)

PENNVEST provides twenty year construction loans at subsidized interest rates, PENNVEST will issue loans up to $11 million per project, with interest rates of 1% to 4%. There is also limited (up to $250,000) grant funding available through PENNVEST.

PENNVEST generally will not consider an application for approval until the Act 537 plan is approved, project design is complete, and DEP permits are issued or pending.

The current terms for a PENNVEST loan in Montgomery County include a 1.499% interest rate for five years, and 1.882% over the remaining years. A 20 year loan of 6 million dollars would require a monthly payment of $29,750. Divided among the 920 existing connections to the collection

system, this translates to $32 a month per customer, or $97 per quarter that would be added to the quarterly rental fee. The existing quarterly rental fee is $87.50.

B The Water Supply and Wastewater Infrastructure Program (PennWorks)

The Water Supply and Wastewater Infrastructure Program ("PennWorks") was established by the General Assembly, subsequent to the over whelming approval by the electorate of a referendum in May of 2004. The program provides grants and loans to municipalities for projects which construct, expand or improve water and wastewater infrastructure which are related to economic development.

Grants do not exceed 75% of the total cost of the project. A 25% cash match may come from any source other than the PennWorks grant, except that the match may not be a grant from any Common wealth agency. All recipients of PennWorks funding are required to demonstrate that they have secured planning and permit approvals for the sewer project from the Department of Environmental Protection prior to any funds being disbursed.
The applicant is required to have a firm commitment from a user of the water or sewer project that will provide a positive economic development impact in the host community as a result of the project.

C H_2O Program

The H_2O Program provides grants for up to 50% of project costs for a wastewater project such as the one proposed. Again, all planning approvals and permits must be obtained before an application will be processed.

The programs listed above, particularly the grant programs, are very competitive. In light of recent Commonwealth budget constraints, these programs may not be well funded in the coming fiscal year.

D Bonds

The township could issue a bond to pay for the sewer treatment plant reconstruction and expansion. It would be necessary to hire a bond underwriting firm and likely a financial advisor to aid the township in issuing such a bond. Alternately, the township could join a bond pool such as the PLIGIT/Emmaus Bond Pool. The bond pool can lower issuance costs as compared to the costs associated with the township issuing a bond.

2 Funding of Collection System Extensions

Once the sewer treatment plan has been upgraded to accept additional flows and provide treatment processes to meet coming regulations and requirements, the township will be able to consider collection system expansion.

A **The Goshenhoppen Interceptor** described in this document would benefit proposed development in addition to serving existing lots where on-lot disposal systems are suspect. It is hoped that a significant portion of the

construction would be performed by developers, who would recover a fraction of their construction costs from existing homes that connect to the system. By completing this planning and upgrading the sewage treatment plant, it is hoped the township will be in position to negotiate such an agreement when economic growth and development returns. Without proposed development, the work would need to be funded by loan or bond, and is not likely to occur for many years.

B **A Perkiomen Interceptor or Municipal Pump Station** to serve Fulmer, Riverside and Bavington is estimated to cost 2.8 million dollars to design and construct. The project would primarily serve existing homes. Such a project would be funded by loan or grant. The township may wish to consider combining the cost of this expansion with the plant upgrades and taking one loan rather than two.

C **Collection system extension on Cemetery Lane** would be a much smaller project, and construction costs could be paid by the property owners along that road using a benefit assessment.

VII. Institutional Evaluation

The township collection and treatment system is owned and operated by Lower Frederick Township. Three township employees perform daily maintenance and plant operations in addition to their other public works duties, and another township employee devotes the majority of her time to sewer billing and collections. The township employs an environmental consulting firm to assist with plant testing and operations compliance, and the township engineer prepares the annual Chapter 94 report.

Income and expenses for the collection, conveyance and wastewater treatment system are tabulated separately in the township budget. The revenue in 2013 is projected at was $374,000, generated primarily by quarterly sewer rental fees. Sewer account expenditures in 2013 are budgeted at $350,250. There are no current debts, and the township has developed a capital reserve of $612,094.

Municipal Actions and Implementation Schedule

The alternative selected for treatment plant upgrade is replacement of the existing treatment plant facilities with a 2 basin SBR system on the existing treatment plant site, at a current cost of 6 million dollars with a capacity to treat up to 500,000 GPD. See Appendix A “Process Alternative Analysis” for further discussion.

The selected alternative for addressing wastewater from existing lots north of Spring Mount is expansion of the collection system through a pump station along the Perkiomen Creek to convey flow to the wastewater treatment plant.

An interceptor line and pump station along the Goshenhoppen Creek is the alternative selected as the most cost effective comprehensive solution to serving existing and proposed homes in the Goshenhoppen Watershed from Zieglerville Road north.

A gravity sewer line extension is a simple and cost effective solution to address concerns regarding suspect systems along Cemetery Lane. The solution could be implemented after capacity becomes available at the wastewater treatment plant.

Following receipt of Act 537, it will take many years to implement this plan. A potential implementation schedule is provided below.

Target Date for Completion	Milestone
September 2013	Adopt Act 537 Plan and submit to PaDEP
8 months after submission	DEP approval of Act 537 Plan
6 months after DEP approval of Act 537 plan	Complete design and submit application for permitting of treatment plant upgrades.
8 months after DEP approval of Act 537 plan	Update municipal tap-in fee.
3 months after application for STP permit	Complete design for pump station to serve existing lots north of Spring Mount, apply for permit.
6 months after application	Obtain permit for treatment plant upgrades.
3 months after application	Obtain permit for pump station to serve existing lots north of Spring Mount.
Upon receipt of both permits	Apply for loans, grants or financing for treatment plant upgrades and collection system extension.
4 months after receiving permits	Adjust quarterly sewer rates and establish benefit assessment amount for collection system extension.
1 year after receiving permits	Accept bids for construction.
2 years after bid award	Complete construction of STP upgrades and collection system extension for area north of Spring Mount.
1 year after completion of STP	Complete design for the Goshenhoppen Interceptor and submit permit applications.
8 months after permit application	Obtain permits and easements for the Goshenhoppen Interceptor.
Immediately following permit receipt	Obtain loans, grants or financing for collection system extension in the Goshenhoppen Watershed.
Upon receipt of financing	Accept bids for Goshenhoppen interceptor and pump station construction.
9 months after bid award	Complete construction of Goshenhoppen interceptor and pump station construction.
3 years after completion of STP	Obtain necessary permits or approvals for construction of Cemetery Lane Collection Line Extension
6 months after permits or approvals are obtained	Accept Bids for construction of Cemetery Lane Collection Line Extension
6 months after bid award	Complete Construction of Cemetery Lane Collection Line Extension