HALIFAX TOWNSHIP

ACT 537 SEWAGE FACILITIES PLAN

Halifax Township,
Dauphin County, Pennsylvania

Prepared For:

Halifax Township Board of Supervisors

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Prepared by:

Kurowski & Wilson, LLC
470 Friendship Road, Suite 100
Harrisburg, PA 17111
Phone 717.635.2835 Fax 717.635.2836

K&W ENGINEERS • CONSULTANTS

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Plan Summary

Act 537 Plan Summary
For
Halifax Township, Dauphin County, Pennsylvania

This Act 537 Plan was completed for the Halifax Township Board of Supervisors at their request to address the sewage needs of the Township. The Board of Supervisors realize the importance of taking a pro-active approach to the issue of sewage management with relationship to the existing conditions within the Halifax Township, while maintaining an eye toward the future of Halifax Township and attempting to preserve its rural nature. There have been no major problems within Halifax Township; and to maintain that condition, the Board of Supervisors has instituted the completion of this Plan.

The Board of Supervisors of Halifax Township has chosen to institute a Sewage Management Plan and extend public sewer to selected portions of the Township. The Management Plan (see Appendix D) will be fully developed upon the approval of this Act 537 Plan, However, the general outline of this Management Plan will follow the sample Plan presented in the Pennsylvania Department of Environmental Protection publication Act 537 Plan Guidance. A key component of any Plan is its schedule. The schedule of implementation of this particular Plan can be found on Page xii.

Resolution of Adoption by the Township

Halifax Township
Act 537 Sewage Facilities Plan

Dauphin County Planning Commission Comments & Response

Halifax Township
Act 537 Sewage Facilities Plan

Proof of Public Notice

Halifax Township
Act 537 Sewage Facilities Plan

Public Response and Related Municipal Comments

Halifax Township
Act 537 Sewage Facilities Plan

Plan Implementation Schedule

Act 537 Plan Schedule
For
Halifax Township, Dauphin County, Pennsylvania

Scheduling of the implementation of an Act 537 Plan is critical for its success. The schedule presented in the Plan Summary section of this document outlines the schedule that will be implemented to insure the success of this Act 537 Plan. Therefore, the schedule is presented below for emphasis and review:

- Within 90 days of the approval of this Plan by the PA DEP, a "Well-Driller's Ordinance" will be adopted.
- Upon approval of this Plan by the PA DEP, the Township officials will continue record keeping of sanitary occurrences.
- Within 90 days of the approval of this Plan by the PA DEP, a Sewage Management Plan will be adopted.
- During the year 2019, work with a Professional Engineering Firm to update the Act 537 Plan.

Concurrence of Plan from Halifax Township Planning Commission

I. Previous Wastewater Planning

The following sections discuss the action which Halifax Township has completed to address sewage management within the Township.

A. Existing Wastewater Planning

Halifax Township has not previously undertaken formal wastewater planning under the Pennsylvania Sewage Facilities Act (Act 537). Since this Plan is the first formal Plan, the Township has not carried out wastewater planning according to an approved implementation schedule in accordance with Act 537. In accordance with this Plan, the Township will be initiating formal wastewater planning in accordance with Act 537.

All wastewater planning to date has been performed on a case by case basis through Sewage Facilities Planning Modules for new development, planning "exceptions", and addenda. The Pennsylvania Department of Environmental Protection (DEP) reviews the planning module and evaluates the proposed on-lot sewage treatment and disposal system based on site conditions.

B. Pennsylvania Municipalities Planning Code Documents

Halifax Township has adopted, or recognized, the following documents pursuant to the Pennsylvania Municipalities Planning Code (Act 247).

1. Dauphin County Comprehensive Plan.

2. The Halifax Township Subdivision and Land Development Ordinance (dated May 12, 2006). An Ordinance regulating the subdivision and development of land within Halifax Township, requiring the submittal of subdivision plans for Township review, prescribing standards of design, plan requirements, plan processing, improvement and construction requirements, and conditions of acceptance of the Public improvements. The Township minimum allowable lot size is 2 acres if on-lot water and sewer is used.

3. The Halifax Township Comprehensive Plan (dated 1996)

4. Holding Tank Ordinance – An Ordinance providing for and regulating the use of holding tanks in the Township of Halifax and imposing fines for the violators of the enactment.

5. Privy Ordinance - An Ordinance providing for and regulating the use of privies in the Township of Halifax and imposing fines for the violators of the enactment.

6. Sewage Facilities Ordinance - An Ordinance amending previous Ordinances, providing for implementation of the Pennsylvania Sewerage Facilities Act (Act 537), applications for Permits for installation of sewage systems, testing and analysis, inspections, fees, administration and enforcement.

II. Physical and Demographic Analysis

Halifax Township is located in the northwest corner of Dauphin County, and has a total area of approximately twenty seven (27) square miles. The Township is bordered to the west by the Susquehanna River, Perry County and Reed Township, to the south by Middle Paxton Township, to the east by Wayne and Jackson Township, and to the north by Upper Paxton Township. The Borough of Halifax is also located within the limits of Halifax Township along the western portion of the Township at the intersection of Peters Mountain Road and Armstrong Valley Road. The municipal boundaries of the Township are shown in Figure 1 – Site Map of Sewage Planning Areas, and are the limits of the planning area for this Act 537 Sewage Facilities Plan.

The Town of Halifax was formed on July 18, 1794, in what was called Upper Paxton Township, organized on August 17, 1729. The Township was first called Peshtank Township (and originally comprised a portion of what is now Lebanon County), later Paxtang, then Paxton. The Township was bordered on the north by Blue or First Mountain. When the Township was formed Lancaster County had been born from Chester County, which was the grandfather to Dauphin County, consisting of two townships, Paxton and Derry. At first only Indians and traders comprised the area. In 1729, the Scots-Irish inhabited parts of the area; later some Irish, then Germans, settled in the region.

Most of the roads we have today were originally Indian paths. A very popular one known as Paxtang Path went through Halifax and Halifax Township. These paths usually followed rivers such as the Susquehanna with the Paxtang Path running from Shamokin (modern Sunbury), the key Indian town located at the forks of the Susquehanna (north branch borders along Northumberland). The path came inland and passed over Peter's Mountain (named for Mr. Peter Allen who lived in a stone house

at the foot of the mountain, south side) which provided a short cut for traveling to Harris Ferry (Harrisburg). Paths became roads and their financing was the responsibility of the Township; later the state and federal Governments shared the cost.

In 1803, the Dauphin County Court called upon commissioners to review the layout of parts of Middle and Upper Paxton Townships. They reported that the boundaries of the new township (Halifax) would be as follows: "Beginning on the west side of the Susquehanna River, opposite the end of Peter's Mountain (Kohtohtoning Hill, 600 ft. high); thence along the top of Peter's Mountain to the Berks and Dauphin County line; thence along said line to Wiconisco Mountain (also called Berry's Mountain); thence along the top of said mountain to the Susquehanna River, and across said river and thence to the place of the beginning." In 1804, the court confirmed this report and declared the new township to be called Halifax.

A. Planning Area and Demographic Analysis

Halifax Township population trends reflect the increased growth being experienced in more rural communities surrounding the Harrisburg metropolitan area. Over the past four decades, the Township experienced a stable population growth that averaged approximately 25 percent per decade. From the period of 1950 to 1980, population totals doubled from 1,424 to 2,943. The largest increase in population occurred from 1970 to 1980 when the Township grew nearly 44 percent. Census figures in 1990 revealed a 17.2 percent population increase. From 1990 to 2000 the population actually decreased 3.5% Table 1 below outlines population data from the Township.

Table 1 – Halifax Township Census Data and Population Projections

Year	1970	1980	1990	2000	2005	2020
Population	2038	2943	3449	3329	3351	4565

Reference: Years 1970, 1980, 1990, 2000 and 2005, U.S. Bureau of the Census. Year 2020 from the PA Department of Environmental Resource 4/18/91.

B. Physical Characteristics

As shown in Figure 1 – Site Map of Sewage Planning Areas, the Township is located between Peters Mountain (south) and Berry Mountain (north) with the Susquehanna River providing the western boundary. The Township ranges in elevation from 1,338 feet on Peters Mountain to 400 along the shores of the Susquehanna River. The highpoint of Berry Mountain is 1267 feet within Halifax

Township. The Township is largely rural, with the majority of land being cultivated and/or wooded. However, several pockets of concentrated housing exist throughout the Township as shown on Figure 1. The individual study areas of this plan were selected based on the location of these areas. Routes 147 and 225 are the two major roads which provide access into the Township from the Harrisburg area.

As shown in Figure 4 – Hydrology Map, the major waterway is the Susquehanna River along the western border of the Township, which is classified as warm water fishery (WWF) and drains south to the Chesapeake Bay. There are three (3) main drainage basins within the Township that drain from east to west between Berry and Peters Mountain to the Susquehanna River. They are Powell Creek, Armstrong Creek, and Gurdy Run. Powell Creek is located in the southern portion of the Township and is classified as a Trout Stocked Fishery (TSF) stream. Armstrong Creek is located in the central portion of the Township and is classified as a Trout Stocked Fishery (TSF). Gurdy Run is located in the northern portion of the Township and is classified as a Warm Water Fishery (WWF). There are no known special protection streams in the Township.

C. Soil Characteristics

Soil Associations – The Township is located within three (3) general soil associations, the Dekalb-Lehew, Calvin-Leck Kill-Klinesville, and Berks-Bedington-Weikert Associations. For general planning purposes, the characteristics of these soils associations, as defined by the Dauphin County Soil Survey are described below:

- *Dekalb-Lehew Association*: Moderately deep, well drained, gently sloping to very steep soils that have channery sandy loam to channery loam subsoil; on upper mountain slopes and ridges.
- *Calvin-Leck Kill-Klinesville Association:* Deep to shallow, dominantly well drained, gently sloping and sloping that has a shaly silt loam subsoil; in upland areas between mountains.
- *Berks-Bedington-Weikert*: Deep to shallow, nearly level to steep soils that have a shaly silt loam to shaly silty clay loam subsoil; on uplands.

Soil Series – Presented in Table 2 – Soil Limitations for On-Lot Sewage Disposal Systems, is a listing from the Dauphin County Soil Survey for each soil series located within the Township, plus a summary of important soil qualities and characteristics. Under the column heading "On-Lot Disposal of Effluent from Septic Tanks", the soils are rated as follows:

- *Slight* – Soils with few or no limitations for use as drainage fields.
- *Moderate* – Soil has one or more properties that limit its use for drainage fields.
- *Severe* – Soil has one or more properties that seriously limit its use as a drainage field.

Table 2 – Soil Limitations for On-Lot Sewage Disposal Systems

Soil Series	Map Symbol	Hydrologic Group	Soil Limitation	Limiting Factor(s)
Albrights	AbA	C	Severe	Moderately slow permeability, seasonal high water table
	AbB2	C	Severe	Moderately slow permeability, seasonal high water table
Andover	AoB	D	Severe	High water table, slow permeability
Atkins	At	D	Severe	Flooding, high water table
Barbour	Bb	B	Severe	Flooding
Basher	Bc	B	Severe	Flooding, seasonal high water table
Berks	BhB2,	C	Severe	2 to 3.5 feet to bedrock
	BhC2,	C	Severe	2 to 3.5 feet to bedrock
	Bkd2	C	Severe	Slope condition
Brinkerton/Armaugh	BtA,	D	Severe	High water table
	BtB2	D	Severe	High water table
Buchanon	BuB,	C	Severe	Seasonal high water table, slow permeability
	BvB	C	Severe	Seasonal high water table, slow permeability
Calvin	CaD	C	Severe	2 to 3.5 feet to bedrock
Calvin-Leck Kill	CaF,	C/D	Severe	Slope condition
	ClA,	C/D	Severe	2 to 3.5 feet to bedrock
	ClB2,	C/D	Severe	2 to 3.5 feet to bedrock
	ClC2	C/D	Severe	2 to 3.5 feet to bedrock
Calvin Klinesville	CkC2,	C/D	Severe	1 to 1.5 feet to bedrock
	CkD2	C/D	Severe	1 to 1.5 feet to bedrock
Captina	CmB2	C	Severe	Seasonal high water table, slow permeability
Chavies	CnA,	B	Slight	Ground water contamination hazard
	CnB2,	B	Slight	Ground water contamination hazard
Comly	CoB2	C	Severe	Moderately slow permeability
Dekalb-Lehew	DcB2,	B	Severe	2 to 3.5 feet to bedrock
	DcC2,	B	Severe	2 to 3.5 feet to bedrock
	DlF	B	Severe	Slope condition
Duncannon	DvA,	B	Slight	
	DvB2	B	Slight	
Klinesville	KaB2,	C	Moderate	Flooding, ground water contamination hazard

	KaC2,	C	Severe	1 to 1.5 feet to bedrock
	KaD2,	C	Severe	Slope condition, 1 to 1.5 feet to bedrock
	KaE2	C	Severe	Slope Condition
Laidig	LaB2,	C	Severe	Moderately slow permeability
	LaC2,	C	Severe	Moderately slow permeability, slope condition
	LdB,	C	Severe	Moderately slow permeability
	LdD	C	Severe	Moderately slow permeability, slope condition
Lawerence	LeB2	C	Severe	Moderately slow permeability, seasonal high water table
Lindside	Lt,	C	Severe	Flooding
	Lw	C	Severe	Flooding
Philo	Ph	B	Severe	Flooding, seasonal high water table
Riverwash	Rv	A	Severe	Flooding
Tioga	Ta,	B	Severe	Flooding
	Tg	B	Severe	Flooding
Urban Land	Us	N/A	N/A	N/A
Very Stony Land	VsF	A	Severe	Stoniness, slope condition
Weikert	WeD2,	C	Severe	Slope condition, 1 to 1.5 feet to bedrock
	WeE2	C	Severe	Slope condition

The soil limitations presented in Table 2 are graphically shown in Figure 8 – On-Lot Septic Suitability Map. As shown in Figure 8, many of the soils identified within the Township have severe limitations for the on-lot disposal of effluent from septic tanks due to a high groundwater table, slow permeability, flooding, steep slopes or shallow depth to bedrock. Soil probe tests and percolation tests must be performed to determine soil suitability for any proposed disposal field site within the Township.

Hydrologic Soil Groups – The U.S. Department of Agriculture (USDA), Soil Conservation Service has developed a hydrologic soil grouping system for indicating the infiltration rate for most soil series found in the United States. A description of the four hydrologic soil groups is as follows:

Group A – Soils having high infiltration rates even when thoroughly wetted, consisting of deep, well to excessively drained sands and/or gravels. These soils have a high rate of water transmission through the soil and have a low runoff potential.

Group B – Soils having moderate infiltration rates when thoroughly wetted, consisting of moderately deep to deep, moderately well to well drained soils, with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission through the soil and have a moderate runoff potential.

Group C – Soils have a slow infiltration when thoroughly wetted, consisting of soils with a layer that impedes the downward movement of water, or soils with moderately

fine to fine texture and slow infiltration rate. These soils have a slow rate of water transmission through the soil and have a high runoff potential.

Group D – Soils having very slow infiltration rates when thoroughly wetted, consisting of clay soils with a high swelling potential, a high permanent groundwater table, a fragipan or clay layer near the surface, and shallow soils over nearly impervious materials. These soils have a very slow rate of water transmission through the soil and have a very high runoff potential.

It is important to note that the USDA Soil Conservation Service hydrologic soil groups were developed for soils in normal natural conditions. When using these hydrologic soil groups for planning, planners and developers should realize that other natural phenomenon and human related activities will affect the soil infiltration rates and runoff characteristics.

As shown in Table 2 – Soil Limitations for On-Lot Sewage Disposal Systems, the predominant hydrologic soil groups are Soil Groups C and D, which require proper investigative procedures at each disposal site to determine the capability of the soil to treat the sewage from an on-lot disposal system.

Prime Agricultural Soils – The prime agricultural soils are best suited for producing food, feed, forage and oilseed crops. This class of soil is also suitable for cropland, pastureland, rangeland and forestland. In general, prime agricultural soil has the quality, growing season and moisture supply needed to produce and sustain high yields of crops economically, when treated and managed, including water management, according to modern farming methods. The prime agricultural soil and the agricultural security areas within the Township are shown in Figure 5– Prime Agricultural Soils Map.

D. Geologic Features

The surface soil drainage patterns, slope, excavation and erosion characteristics are all dependent on the underlying geology. Thus understanding the underlying geology, and integrating its factors with other components of the environment, is important in providing for proper and safe disposal and treatment of sewage for the protection of the groundwater as a drinking water source. It is not the purpose of this section to provide a detailed study of rock types, but to provide a general inventory of engineering characteristics of the Township's rock formations and geology. The Township is underlain by the following seven (7) geologic rock formations:

- *Spechty Kopf Formation*
- *Duncannon Member of the Catskill Formation*
- *Clark's Ferry Member of the Catskill Formation*
- *Shermans Creek Member of the Catskill Formation*

- *Irish Valley Member of the Catskill Formation*
- *Trimmers Rock Formation*
- *Hamilton Group*

The geologic descriptions and characteristics of these formations for sewage planning and general development decisions are presented in Appendix B – Geologic Description. The location and extent of these formations within the Township are shown in Figure 6 – Geology Map.

E. Topography

The existing topography within the Township is shown in Figure 7 – Slopes Map. The areas with 25% and greater slope are mainly located along Berry and Peters Mountain with several other small isolated pockets occurring throughout the Township, and are unsuitable for currently available on-site disposal system. The areas with 15% to less than 25% slopes are also located along Berry and Peters Mountain with several other small isolated pockets occurring throughout the Township. These areas are restricted to on-lot spray irrigation systems on wooded lots, and steep slope in-ground systems, due to the slope and limited useable soil depth.

The areas with 8% to less than 15% slopes are also located along Berry and Peters Mountain and other isolated areas within the Township. These areas are restricted to elevated systems, steep slope in-ground systems, and spray irrigation systems, due to the slope and limited useable soil depth.

The remaining areas with slopes of less than 8% are able to employ the use of all conventional systems, depending on testing results.

Please note that on-site soil investigation must be performed by the Township SEO to determine the type and location of the appropriate system for each lot.

F. Potable Water Supplies

Public Water from the Halifax Area Water Authority extends south from Halifax Borough to Matamoras along S.R. 225 as shown in Figure 12 – Public Water Service Area. This water main services Township residents/businesses in the areas of Matamoras, Clover Hills, Hickory Hills, Triangle Manor, Lenker Estates, and other properties along S.R. 225.

Private on-lot wells and springs supply the remaining properties with potable water in the Township. The topography and physical features of the land determine the drainage patterns and the characteristics of surface water flow. The ground water flow is influenced in part by the topography, but is most heavily influenced by the soils and underlying geological

formations. The geologic characteristics of the underlying geological formations, such as bedrock type, intergranular spacing, rock strata inclination, faults and joints, folds and bedding planes, and solution channels, affect groundwater movement, storage and availability.

The groundwater quality is a result of its initial quality as it percolates into the ground and the interaction between the groundwater and the bedrock it contacts. If the bedrock types are more soluble, more compounds may become dissolved in the groundwater. An example of this bedrock influence is groundwater in highly soluble limestone aquifers, which will have increased hardness due to the dissolved minerals from the limestone. As the groundwater percolates out of the ground into surface streams, the surface water quality is then also influenced by the underlying geological formations.

As shown in Figure 6 – Geology Map above, the Township is underlain by seven geologic rock formations. The water bearing quantity and water quality of these geologic formations within the Township was obtained from the Environmental Geology Report 1, prepared by the Pennsylvania Department of Environmental Resources (now the DEP), Bureau of Topographic and Geologic Survey, Office of Resource Management, as follows:

Spechty Kopf Formation – Generally unproductive on ridge crests but favorable for development below ridge crests; median yield is 25 gal/min. from wells between 40 and 350 feet deep; generally good quality; occasional high iron content; salt water may be found in deeper wells.

Duncannon Member of the Catskill Formation - Moderate to good aquifer potential; best yields are expected from sandstone; reported yields are 7 to 40 gal/min. in wells averaging 150 feet deep; quality is generally good except for occasional high sulfur content.

Clark's Ferry Member of the Catskill Formation - Low to moderate aquifer potential; low yields are expected where formation has topographic expression as ridges and hillside benches. Moderate yields are expected where the formation has no topographic expression along ridge flanks. Ground water yields may reach 20 gal/min. in wells approximately 200 feet deep. The iron content may be high.

Shermans Creek Member of the Catskill Formation - Well yields are generally good to excellent. Water quality is generally good, but water may be high in iron.

Irish Valley Member of the Catskill Formation - Well yields are reported to range from 2 to 380 gal/min, with a median of 35 gal/min. Water quality problems include salty water and hydrogen sulfide.

Trimmers Rock Formation - Median well yields are reported as 30 gal/min. Water may be high in total dissolved solids and may contain hydrogen sulfide. Water from. This area is generally characterized as soft.

Hamilton Group - Median well yields are reported as 30 gal/min. Water may be high in iron and sulfur. Hydrogen sulfide gas is also common.

G. Community Sewage Systems

There are currently five (5) municipal or non-municipal community sewage systems in Halifax Township (see Figure 1 – Site Map of Sewage Planning Areas and Figure 11 – Public Sewer Service Area). These are:

1. The Halifax Sewer Authority's sewage treatment plant (STP).
2. The Strohecker Mobile Home Park STP.
3. The Alex Acres Mobile Home Park STP.
4. The Camp Hebron STP
5. The Lenker Estates STP.

H. Wetlands

In addition to surface water and groundwater resources, another important hydrologic component in the Township is wetlands. The wetlands are important since they provide habitats for some threatened and endangered species, and provide food for game fish, animals and nesting birds. In addition, the wetlands reduce flooding by absorbing excess water, slowing the water flow to neighboring creeks and streams, and to provide a buffer to protect creeks and streams from excessive soil erosion and sedimentation.

The wetlands are characterized as having minimal depth to groundwater, hydric soils and certain types of vegetation. The three types of wetlands are as follows:

Emergent – These wetlands are characterized by non-woody vegetation of less than 20 feet tall.

Scrub-Shrub – These wetlands are characterized by smaller ground plants.

Forested – These wetlands are characterized as dominated by trees, 20 feet or more in height.

The known wetlands within the Township, based on the National Wetlands Inventory Map, are shown in Figure 4 – Hydrology Map.

The hydric soils are associated with the Albright, Andover, Atkins, Barbour, Brinkerton, Buchanon, Comly, Klinesville, Lindside, Philo, Riverwash, and Weikert Soil Series, and are shown in Figure 9 – Hydric Soils Map. As previously noted, these soils are severely limited and may not be suitable for currently available on-lot disposal systems.

I. Floodplains

Within the Township, most of the existing development is outside the limits of the floodplain. Most of the land in the floodplain along the Susquehanna River, Powell Creek, Armstrong Creek, and Gurdy Run is undeveloped. The Township is currently in compliance with the Federal Flood Insurance Program, and the State Flood Plain Management Act. The 100-year Flood Elevation hazard areas in the Township are based on the November 23 1982 Flood Insurance Rate Map (FIRM) from the Federal Emergency Management Agency, and are shown in Figure 4 – Hydrology Map.

III. Existing Sewage Facilities in the Planning Area

As mentioned in Section II, Physical and Demographic Analysis, the majority of Halifax Township is rural and agricultural in nature and use; and, therefore, a majority of the properties are served by private On-Lot Sewage Disposal Systems (OLDS). Some of these systems were installed prior to the enactment of Title 25 and are not permitted systems. This, however, does not necessarily indicate that a system is not installed properly or that it is malfunctioning. Some systems installed prior to permitting regulations are functioning properly while a few systems installed after permitting regulations may be malfunctioning. The ability for a system to function properly depends to a great deal on the construction techniques used during the installation of the system and subsequently the preventative maintenance applied to the system throughout its life.

A. Description of Existing Sewerage Systems

Based on the well water and sewage survey performed for the preparation of this Plan, there are several types of on-lot sewage disposal systems in use within the Township, including septic tank with conventional trench or bed system, elevated sand mound, cesspool, and seepage pit. In addition, there are gray water disposal systems in use in the Township, including conventional bed system, seepage pit, bore hole and pipe to surface or ditch.

There are currently five (5) municipal or non-municipal community sewage systems in Halifax Township (see Figure 1 – Site Map of Sewage Planning Areas and Figure 11 – Public Sewer Service Area). These are:

1. The Halifax Sewer Authority's sewage collection and conveyance system conveys wastewater to the Authority's sewage treatment plant (STP) that discharges to the Susquehanna River a short distance to the south of the Borough of Halifax. The Authority's system serves the entire Borough of Halifax and areas in Halifax Township immediately surrounding the Borough including the developed area along Route 147 extending north from the Borough, the Halifax School District facilities located immediately south of the Borough, and Routes 147 and 225 corridor extending south to the Sheetz convenience store. The STP is permitted to treat 210,000 gallons per day.
2. The Strohecker Mobile Home Park sewage collection and conveyance system conveys wastewater from the Strohecker Mobile Home Park and a small hotel to the Strohecker Mobile Home Park STP. The STP discharges into an un-named tributary to the Susquehanna River. The STP is permitted to treat 8,450 gallons per day is currently near capacity.
3. The Alex Acres Mobile Home Park sewage collection and conveyance system conveys wastewater from the Alex Acres Mobile Home Park to the Alex Acres Mobile Home Park STP. This STP discharges to Gurdy Run. The STP is permitted to treat 40,000 gallons per day & is currently near capacity.
4. Camp Hebron, located along Powell Creek in the southeastern corner of Halifax Township, owns and operates sewage collection, conveyance and treatment facilities, which serve Camp Hebron. The STP discharges into Powell Creek. The STP is permitted to treat 20,664 gallons per day & is currently near capacity.
5. The Lenker Estates sewage collection and conveyance system conveys wastewater from the Lenker Estates Subdivision into the Lenker Estates STP. This STP discharges into an un-named tributary of Susquehanna River. The STP is permitted to treat 15,000 gallons per day and began operation in early 2006.

As previously noted, the soil limitations within the Township for the on-lot disposal of effluent from septic tanks is moderate to severe. In addition, based on the limitations of slope and useable soil depth, many of the newer on-lot disposal sites within the Township required elevated sand mound installations.

The Township has ordinances for the periodic maintenance of holding tanks and privies; however, the Township does not have ordinances for the periodic maintenance requirements for the on-lot sewage disposal systems.

A file review was performed at DEP to obtain all sewage planning modules filed with the Department of Environmental Protection within the previously 10 – 12 years. A listing of the approved sewage planning modules is as follows:

Table 3 – Subdivision and Sewage Planning Listing

Owner/Subdivision/Project	Planning Date	Sewage Planning No.
David L. & Dharlys Kaufman	6/29/1994	W3-22917-104-B
Rodney J. Capouillez	6/16/1994	W3-22917-103-B
Emerson G. & Anna F. Hoover	8/10/1994	W3-22917-105-B
Jay T. & Harriet F. Evans	1/9/1995	W3-22197-107-B
Riverview Memorial Gardens	1/9/1995	W3-22917-108-B
William Harmon	6/29/1995	3-22916-006-1
Romberger Extension 3		3-22917-118-3
Lloyd C. Kauffman	4/3/1996	A3-22917-121-E2
Deer Run Phase II	6/11/1996	A3-22917-123-E2
Charles L. Paulvir	11/15/1996	A3-22917-128-3
Riverview Memorial Gardens	5/12/1997	A3-22917-131-3E
Fetterhoff Subdivision	6/13/1997	A3-22917-132-1
Bernice Anderson	8/8/1997	A3-22917-133-2E
Jamie Paul	3/10/1998	A3-22917-136-2E
Bruce Reeher	5/2/1998	A3-22917-137-2E
Tobias Subdivision	8/27/1998	A3-22917-138-2E
Irene Konick		A3-22917-139-2
Jean A. & John R. Lucas II	9/3/1998	A3-22917-140-1
Lynch Subdivision	10/27/1998	A3-22917-142-3E
Frontier Associates	11/10/1998	A3-22917-141-3E
Mortorf Subdivision	3/24/1999	A3-22917-144-2E
Reinhard Subdivision	10/27/1999	A3-22917-145-2E
Riland Subdivision	11/18/1999	A3-22917-146-2E
Flight Source	12/30/1999	A3-22917-147-2E
Camp Hebron	7/9/1999	A3-22917-148-3
Roger A. & Kathy A. Campbell		A3-22917-149-1
Strohecker Mobile Home Park	9/14/2000	A3-22917-150-3
Richard Greene Subdivision	7/3/2000	A3-22917-152-2E
Linda L. Dorman	11/20/2000	A3-22917-154-1
Alex Acres Mobile Home Park	9/14/2000	A3-22917-134-3
Richard Lyter Subdivision	10/5/2000	A3-22917-153-2E
Russell Jury Subdivision	2/12/2001	A3-22917-155-2E
Shumaker Subdivision	4/30/2001	A3-22917-156-3E
Lenker Estates	11/19/2001	A3-22917-151-3
Steve Lenker Development	6/12/2001	A3-22917-157-1
Robert Dahmus Subdivision	2/21/2002	A3-22917-158-2E
Larry R. & Janet A. Strohecker		A3-22917-159-1
Ronald McCleaf Subdivision	5/31/2002	A3-22917-160-2E
Melvin Seiders Subdivision	8/7/2002	A3-22917-163-2E
Deer Run Subdivision	8/7/2002	A3-22917-164-2

Lee Sweigard Subdivision	8/21/2002	A3-22917-165-1
Ernest Shoop Subdivision		A3-22917-167-1
Rex Nightwine Subdivision	4/14/2003	A3-22917-169-1
Thomas Posavec Subdivision	1/30/2003	A3-22917-168-2E
Mid Penn Bank Subdivision	8/28/2003	A3-22917-170-2E
Halifax United Methodist Church	10/15/2003	A3-22917-171-3E
Lenker Estates Phase II	5/23/2003	A3-2917-162-3
Halifax Wooden Nickel Restaurant	2/8/2005	A3-22917-175-3E
Anna Cooper	2/25/2005	Non-Building Declaration
H. Bruce & Eileen Snyder	2/25/2005	Non-Building Declaration
Catharine R. Hoffman Estate	2/25/2005	Non-Building Declaration
Charles Paulvir Subdivision	6/20/2005	A3-22917-197-2E
Harman Stove Factory Subdivision	10/24/2005	A3-22917-183-2E
Halifax Commons Subdivision	4/28/2006	A3-22917-185-3E

B. Results of Sewerage and Water Supply Surveys

An OLDS sanitary survey of 575 (308 door-to-door were completed) individual properties within the Township was conducted during the summer of 2006, for the preparation of this Plan, to identify the possible influence of the malfunctioning on-lot sewage disposal systems on the water supply. At this time approximately 1,002 OLDS were present in the Township. The 308 completed door-to-door OLDS sanitary surveys meet the minimum acceptable survey rate set by DEP as shown in Table 4-OLDS Sanitary Survey Requirements.

Table 4 – OLDS Sanitary Survey Requirements

Well Water Surveys

SFPA	Approximate # of Developed Lots	# of Surveys Sent	% of Total Lots	Surveys Received		*Approximate # of Water Customers		Approximate # of Lots with Wells	# of Water Samples Needed		# of Water Sample Taken	
Matamoras	131	126	96%	42	33%	30	71%	37	50%	19	23	123%
Triangle and Lenker Estates	69	69	100%	31	45%	67	97%	2	50%	1	1	100%
Routes 147 and 225	114	105	92%	47	45%	25	53%	53	35%	19	20	107%
Dusty Trail	18	18	100%	1	6%	0	0%	18	50%	9	9	100%
Fetterhoff Church	74	74	100%	29	39%	0	0%	74	35%	26	27	104%
Hill Top - Round Top	35	35	100%	11	31%	0	0%	35	50%	18	18	103%
Tourist Park	125	125	100%	31	25%	64	51%	52	25%	13	13	100%
147-McClelland Road	58	58	100%	12	21%	0	0%	58	35%	20	20	100%
General	747	747	100%	232	31%	48	21%	592	20%	118	122	103%
		1357		436	32%							
Total	**1371**								**Total**	**243**	253	104%

*The approximate number of sewer customers was calculated by using the survey results

Sewage Sanitary Surveys

SFPA	Approximate # of Developed Lots	# of Surveys Sent	% of Total Lots	Surveys Received		*Approximate # of Sewer Customers		Approximate # of Lots with OLDS	# of Door-to-door Surveys Needed		# of Site Visit Made	
Matamoras	131	126	96%	42	33%	7	17%	109	25%	27	43	158%
Triangle and Lenker Estates	69	69	100%	29	42%	2	7%	64	35%	22	23	102%
Routes 147 and 225	114	105	92%	47	45%	20	43%	65	35%	23	26	113%
Dusty Trail	18	18	100%	1	6%	0	0%	18	50%	9	9	100%
Fetterhoff Church	74	74	100%	29	39%	1	3%	71	35%	25	26	104%
Hill Top - Round Top	35	35	100%	11	31%	0	0%	35	50%	16	18	113%
Tourist Park	125	125	100%	31	25%	64	51%	61	25%	15	15	100%

147-McClelland Road	58	58	100%	12	21%	2	17%	56	35%	20	20	100%
General	747	747	100%	232	31%	70	30%	522	20%	104	128	123%
		1357		434	32%			1002				
Total	**1371**								**Total**	**262**	308	117%

*The approximate number of sewer customers was calculated by using the survey results

PaDEP Sampling/Survey Standards	
# of Wells / OLDS	**% Needed**
1-50	50%
51-100	35%
101-500	25%
501-1000	20%
<1000	15%

The Township was divided into nine (9) Sewage Facility Planning Areas (SFPA) (see Figure 1 – Site Map of Sewage Planning Areas). A brief description of each SFPA and a summary of the sanitary survey and water sample results are as follows:

Matamoras Area – The town of Matamoras is located along the eastern and western side of S.R. 225 between Powell Creek and Matamoras Road. There are approximately 131 developed lots in this area with approximately 69% being served by public water. A summary of the sanitary surveys and well water sampling is as follows:

Matamoras Sanitary Sewer Survey Results Summary				
No Malfunction	Potential Malfunction	Suspected Malfunction	Confirmed Malfunction	Average System Age
34	**15**	**11**	**5**	**33 years**
52%	23%	17%	8%	-

Matamoras Well Water Sample Results Summary					
Nitrates				Total Coliform	e. coli
<1 mg/l	0-5 mg/l	5-10mg/l	>10 mg/l	Detectable >1	Detectable >1
8	**10**	**5**	**0**	**15**	**4**
35%	43%	22%	0%	65%	17%

Triangle and Lenker Estates Area – The area of Triangle and Lenker Estates is located on the southwestern side of the Route 147 and 225 intersection and is mainly comprised of homes in Triangle Estates. There are approximately 69 developed lots in this area with approximately 97% being served by public water. Currently, the Lenker Estates Subdivision is being constructed along the west side of Triangle Estates and is serviced by public water and a private wastewater treatment facility. A summary of the sanitary surveys and well water sampling is as follows:

Triangle and Lenker Estates Sanitary Sewer Survey Results Summary				
No Malfunction	Potential Malfunction	Suspected Malfunction	Confirmed Malfunction	Average System Age
23	**5**	**3**	**2**	**32 years**
70%	15%	9%	6%	-

Triangle and Lenker Estates Well Water Sample Results Summary					
Nitrates				Total Coliform	e. coli
<1 mg/l	0-5 mg/l	5-10mg/l	>10 mg/l	Detectable >1	Detectable >1
1	**0**	**0**	**0**	**1**	**0**
100%	0%	0%	0%	100%	0%

Route 147 - 225 Area – The area of Route 17 & 225 is located along each side of Route 147 between Halifax Borough and Route 225. There are approximately 114 developed lots in this

area with approximately 53% being served by public water. A summary of the sanitary surveys and well water sampling is as follows:

Route 147 & 225 Sanitary Sewer Survey Results Summary				
No Malfunction	Potential Malfunction	Suspected Malfunction	Confirmed Malfunction	Average System Age
34	**5**	**5**	**2**	**28 years**
74%	11%	11%	4%	-

Route 147 & 225 Well Water Sample Results Summary					
Nitrates				Total Coliform	e. coli
<1 mg/l	0-5 mg/l	5-10mg/l	>10 mg/l	Detectable >1	Detectable >1
0	**6**	**11**	**3**	**10**	**1**
0%	30%	55%	15%	50%	5%

Dusty Trail Area – The area of Dusty Trail is comprised of the homes located along Dusty Trail Road. There are approximately 18 developed lots in this area with all being served by private individual wells. A summary of the sanitary surveys and well water sampling is as follows:

Dusty Trail Sanitary Sewer Survey Results Summary				
No Malfunction	Potential Malfunction	Suspected Malfunction	Confirmed Malfunction	Average System Age
8	**0**	**1**	**0**	**15 years**
89%	0%	11%	0%	-

Dusty Trail Well Water Sample Results Summary					
Nitrates				Total Coliform	e. coli
<1 mg/l	0-5 mg/l	5-10mg/l	>10 mg/l	Detectable >1	Detectable >1
7	**2**	**0**	**0**	**6**	**0**
78%	22%	0%	0%	67%	0%

Fetterhoff Church – The area of Fetterhoff Church is comprised of the homes located along Rutter Road, Kinsinger Road, Hershey Road, and the general vicinity of Fetterhoff Church. There are approximately 74 developed lots in this area with all being served by private individual wells. A summary of the sanitary surveys and well water sampling is as follows:

Fetterhoff Church Sanitary Sewer Survey Results Summary				
No Malfunction	Potential Malfunction	Suspected Malfunction	Confirmed Malfunction	Average System Age
43	**1**	**3**	**2**	**15 years**
88%	2%	6%	4%	-

Fetterhoff Church Well Water Sample Results Summary					
Nitrates				Total Coliform	e. coli
<1 mg/l	0-5 mg/l	5-10mg/l	>10 mg/l	Detectable >1	Detectable >1

15	**11**	**1**	**0**	**10**	**1**
56%	40%	4%	0%	37%	4%

Hill Top – Round Top Area – This area is comprised of homes located in the vicinity of Dunkel Road and Hill Top Road.. There are approximately 35 developed lots in this area with all being served by private individual wells. A summary of the sanitary surveys and well water sampling is as follows:

Hill Top / Round Top Sanitary Sewer Survey Results Summary				
No Malfunction	Potential Malfunction	Suspected Malfunction	Confirmed Malfunction	Average System Age
25	**0**	**0**	**0**	**16 years**
100%	0%	0%	0%	-

Hill Top / Round Top Well Water Sample Results Summary					
Nitrates				Total Coliform	e. coli
<1 mg/l	0-5 mg/l	5-10mg/l	>10 mg/l	Detectable >1	Detectable >1
9	**8**	**1**	**0**	**9**	**1**
50%	44%	6%	0%	50%	6%

Tourist Park Area – The area of Tourist Park is comprised of the homes located in the Alex Acres Mobile Home Park and along Route 147 between Armstrong Run and Ebenezer Road. There are approximately 125 developed lots in this area with 64 being located in the Alex Acres Mobile Home Park. Alex Acres is served by a private wastewater treatment facility and two (2) private wells. The remaining homes within this area are served by private individual wells. A summary of the sanitary surveys and well water sampling is as follows:

Tourist Park Sanitary Sewer Survey Results Summary				
No Malfunction	Potential Malfunction	Suspected Malfunction	Confirmed Malfunction	Average System Age
26	**5**	**4**	**1**	**30 years**
72%	14%	11%	3%	-

Tourist Park Well Water Sample Results Summary					
Nitrates				Total Coliform	e. coli
<1 mg/l	0-5 mg/l	5-10mg/l	>10 mg/l	Detectable >1	Detectable >1
11	**0**	**2**	**0**	**4**	**0**
85%	0%	15%	0%	31%	0%

Route 147 / McClelland Road Area – This area is comprised of the homes located along McClelland Road and Route 147 in the vicinity of the Strohecker Mobile Home Park. There are approximately 58 developed lots in this area not including the Strohecker Mobile Home Park. The Strohecker Mobile Home Park is served by a private wastewater treatment facility

and private wells. The remaining homes within this area are served by private individual wells. A summary of the sanitary surveys and well water sampling is as follows:

Route 147 / McClelland Road Sanitary Sewer Survey Results Summary				
No Malfunction	Potential Malfunction	Suspected Malfunction	Confirmed Malfunction	Average System Age
20	**3**	**1**	**2**	**21 years**
77%	11%	4%	8%	-

Route 147 / McClelland Road Well Water Sample Results Summary					
Nitrates				Total Coliform	e. coli
<1 mg/l	0-5 mg/l	5-10mg/l	>10 mg/l	Detectable >1	Detectable >1
3	**8**	**7**	**2**	**7**	**1**
15%	40%	35%	10%	35%	5%

General Area – This area is comprised of all remaining homes within the Township that are not located within any of the concentrated specific study areas. There are approximately 747 developed lots in this area with approximately 21% being served by public water and approximately 30% being served by public sewer. A summary of the sanitary surveys and well water sampling is as follows:

General Sanitary Sewer Survey Results Summary				
No Malfunction	Potential Malfunction	Suspected Malfunction	Confirmed Malfunction	Average System Age
193	**29**	**16**	**14**	**32 years**
77%	11%	7%	5%	-

General Well Water Sample Results Summary					
Nitrates				Total Coliform	e. coli
<1 mg/l	0-5 mg/l	5-10mg/l	>10 mg/l	Detectable >1	Detectable >1
46	**56**	**18**	**2**	**65**	**8**
38%	46%	14%	2%	53%	6%

Table 5 – Sanitary Survey and Well Sampling Summary

Well Water Surveys

SFPA	# of Water Samples Needed	# of Water Sample Taken	Nitrate Test Results: Non-Detectable <1	Nitrate Test Results: 0-5 mg/l	Nitrate Test Results: 5-10 mg/l	Nitrate Test Results: 10+ mg/l	Total Coliform: Detectable >1	e. coli: Detectable >1
Matamoras	19	23	8	10	5	0	15	4
Triangle and Lenker Estates	1	1	0	1	0	0	1	0
Routes 147 and 225	19	20	0	6	11	3	10	1
Dusty Trail	9	9	7	2	0	0	6	0
Fetterhoff Church	26	27	15	11	1	0	10	1
Hill Top - Round Top	18	18	9	8	1	0	9	1
Tourist Park	13	13	11	0	2	0	4	0
147-McClelland Road	20	20	3	8	7	2	6	1
General	118	122	46	56	18	2	65	8
Total	243	253	**99**	**102**	**45**	**7**	**126**	**16**

Sewage Sanitary Surveys

SFPA	# of Site Visits Needed	# of Site Visit Made	Ave. Age of OLDS (years)	Grey Water Discharge	No Malfunction	Potential Malfunction	Suspected Malfunction	Confirmed Malfunction
Matamoras	27	43	33	4	34	15	11	5
Triangle and Lenker Estates	22	23	32	1	23	5	3	2
Routes 147 and 225	23	26	27	1	34	5	5	2
Dusty Trail	9	9	15	0	8	0	1	0
Fetterhoff Church	25	26	15	0	43	1	3	2
Hill Top - Round Top	16	18	16	0	25	0	0	0
Tourist Park	15	15	30	0	26	5	4	1
147-McClelland Road	20	20	21	2	20	3	1	2
General	104	128	32	10	194	29	16	14
Total	261	308	**25**	**18**	**407**	**63**	**44**	**28**

The OLDS sanitary survey of the randomly selected 308 individual properties is based on an OLDS sanitary survey questionnaire sent to 1,357 property owners, which requested information on water supply source, water treatment systems, testing and results, property description, and septic system description, location, malfunctions, maintenance and repairs. A summary of the results of the OLDS sanitary surveys are shown in Appendix C - Well Water and Sewage Survey Results.

The OLDS sanitary survey was conducted by initially mailing surveys to all property owners. Once the completed surveys were received by the Township, door-to-door visits were performed and water samples were collected. Representatives from K&W Engineers collected the water samples and also conducted an inspection of the OLDS and interviewed the property owners to determine the accuracy of the OLDS sanitary surveys. The OLDS sanitary surveys were revised to reflect these findings when appropriate and new surveys were prepared for homes (where inspections were performed) that did not respond to the mailed survey.

The OLDS sanitary survey revealed that the type and quantity of on-lot disposal systems within the Township is approximately 63% conventional in-ground bed or trench systems, approximately 29% elevated sand mound systems, and approximately 8% seepage pit / cesspool and holding tanks (non-standard) systems. The surveys also showed that a majority of the newer, approved by permit on-lot disposal systems are elevated sand mounds, ranging in age from 2 to 16 years old, with a small amount of in-ground bed systems as well. The majority of the older on-lot disposal systems are conventional in-ground bed or trench systems, ranging in age from 3 to +60-years old, with an average of 25-years. The remaining older on-lot disposal systems are cesspools and septic tanks with unknown on-lot disposal systems, ranging in age from unknown to 90-years old.

The OLDS sanitary survey revealed system malfunctions in 5.2% (including door-to-door and mailed surveys) of the on-lot disposal systems, including odors, water ponding, slow drains and grey water discharges. As shown in Appendix C - Well Water and Sewage Survey Results, a majority of these malfunctions are associated with conventional in-ground bed or trench on-lot disposal systems.

In conjunction with the OLDS sanitary survey, water supply sampling and laboratory testing was performed on 253 water supplies for nitrate-nitrogen (NO_3-N) total coliform and e. coli. The purpose of performing water supply sampling is to determine what effects the existing on-lot septic systems are having on the underlying water supply. The renovation of sewage effluent within the soil can be greatly reduced when underlying

geology exists that can cause effluent to discharge directly into underlying fissures and caverns. Fecal contamination can also arise from sources such as combined sewer overflows, leaking septic tanks, sewer malfunctions, contaminated storm drains, animal feedlots, and other sources. During rainfalls, snow melts, or other types of precipitation, *E. coli* may be washed into creeks, rivers, streams, lakes, or ground water. When these waters are used as sources of drinking water and the water is not treated or inadequately treated, *E. coli* may end up in drinking water. Therefore, the sampling of well water for nitrates (chemical), total coliform, and e. coli is performed.

Total coliforms are a group of closely related bacteria that are (with few exceptions) not harmful to humans. Because total coliforms are common inhabitants of ambient water and may be injured by environmental stresses (e.g., lack of nutrients) and water treatment (e.g., chlorine disinfection) in a manner similar to most bacterial pathogens and many viral enteric pathogens, EPA considers them a useful indicator of these pathogens. The absence of total coliforms minimizes the likelihood that fecal pathogens (such as e. coli) are present. Thus, total coliforms are used to determine the vulnerability of a water supply to fecal contamination. Coliforms are bacteria that live in the intestines of warm-blooded animals (humans, pets, farm animals, and wildlife). Fecal coliform bacteria are a kind of coliform associated with human or animal wastes and Escherichia coli (E. coli) is part of the group of fecal coliforms.

Nitrates are nitrogen-oxygen chemical units that combine with various organic and inorganic compounds. They are essential nutrients for plants, which absorb them from soil. The excess nitrates not used by the plants are carried through the soil to ground water in a process called "leaching." Once in water, they remain there until used by plants or another organism, or removed by water treatment techniques. The greatest source of nitrates is fertilizers that are used to provide nitrates to crops. Animal and human waste also contains nitrogen in the form of ammonia. Decomposing plant and animal materials also generate nitrates.

The U.S. Environmental Protection Agency has a maximum contaminant level for nitrates at 10 parts per million. High levels of nitrates can cause health problems, including methemoglobinemia, commonly known as "blue baby syndrome". Nitrates are very soluble, and do not bind with soil so the potential is high for them to migrate to ground water. This is especially true if your water well system is near agricultural land or animal feed lots. Incidents such as heavy rains, flooding, chemical spills, or failed sewage systems can cause nitrates to enter soil near a private water well.

As shown in Table 5 – Sanitary Survey and Well Sampling Summary, 39% of the water supplies had non-detectable nitrate-nitrogen, 40% ranged from

1.0 to 4.9-milligrams per liter, 18% ranged from 5.0 to 9.9-milligrams, and 3% exceeded 10.0 milligrams per liter. As also shown in Table 5, 49% of the water supplies sampled, tested positive for total coliform, but only 6% (16 samples) of the water supplies tested positive for e. coli.

As shown in Figure 3– Well Water Sample Results Map, the on-lot water supply locations, with positive total coliform and e. coli test results are widely scattered throughout the Township, interspersed with other non-contaminated water supply locations, indicating that the contamination is not in widespread particular areas of the Township. The sixteen (16) samples that tested positive for e. coli occurred at lots with conventional in-ground bed/trench systems as well as sandmounds with system ages ranging from 8-years to +50 years, which indicates that the existing systems are operating effectively and the underlying soils are providing adequate renovation of the effluent.

As shown in Figure 3, the on-lot water supply locations, with nitrate-nitrogen levels above 5 milligrams per liter are widely scattered throughout the Township, interspersed with other non-contaminated water supply locations, indicating that the contamination is not in widespread particular areas of the Township. Of the seven (7) wells showing nitrate-nitrogen levels above 10 milligrams per liter only one (1) sample tested positive for e. coli. , indicating that a majority of the elevated nitrate levels are caused by surface water run-off (agricultural) further reinforcing the conclusion that the existing systems are working correctly

Due to lack of on-lot disposal system malfunctions, it appears that the condition of the existing water supply wells and the agricultural operations adjacent to these wells have a greater impact on the water supply for these lots than the on-lot disposal systems. Implementation of a Well Driller's Ordinance is a relatively easy step to implement that would protect the quality and suitability of the domestic water supply.

C. Preliminary Hydrogeologic Evaluations

The survey of nitrates in the ground water of Halifax Township indicates that 21% (see Table 5) of the wells sampled has nitrate levels in excess of 5 mg/l indicating a general ground water quality problem. Title 25 Chapter 71.620 (C) (2) (iii) requires a preliminary hydrogeologic evaluation when subsurface soil adsorption areas are proposed and the Department of Environmental Protection has documentation that the quality of water supplies within a 0.25 miles of the proposed site exceed five parts per million (p.p.m.) nitrate-nitrogen.

Through well sampling and mapping, it has been found that wells containing nitrate concentrations greater than 5 mg/l are widely scattered throughout Halifax Township. Due to these findings Halifax Township proposes the following action:

In accordance with the Department of Environmental Protection's Policy and Procedures, the Township will require that a preliminary hydrogeologic study be performed for all developments and subdivisions within the Township limits to combat potential impacts of development on a site's current nitrate level and that groundwater be investigated through the completion of the planning module for land development.

As a requirement of the preliminary hydrogeologic evaluation of a tract to be developed, a mass balance equation is used to predict what the nitrate concentration in the ground water will be after development. The nitrates which are generated from the septic bed are assumed to be diluted by precipitation which recharges the ground water in the area. The nitrate concentration existing in the ground water is determined from a recent sample from a well on or near the property in question. The nitrate concentration in the septic tank outflow has been found to average 45 ppm. For residential development, DEP guidelines estimate 262.5 Gallons per Equivalent Dwelling Unit (EDU)

Based upon the recharge rate in gallons per day per acre, ground water nitrate concentration, and the amount of sewage flow in gallons per day, the area needed for the development is calculated using the mass balance equation (see below). The proposed lot size of a development will be sized large enough so that the predicted nitrate concentration of the ground water after development will be less than 10ppm.

As part of the preliminary hydrogeologic evaluation, one must determine with reasonable accuracy the nitrate-nitrogen level of each particular property proposed to be subdivided; the following methods are acceptable and are listed according to descending accuracy.

1. Obtain a water sample from an existing well from an area that has similar soils and geological conditions, either on an adjoining property or on a property located up to a maximum distance of ¼ mile from the proposed well, and have the water tested.
2. Use water sampling data from a site that has similar soils and geological conditions that is within ¼ mile of the proposed well as long as that water sampling is less than 2 years old.

A copy of the water testing data must be provided to the Township as a part of sewage planning approval. The report should identify the laboratory conducting the water testing and specify that a qualified individual obtained the water sample.

The completed preliminary hydrogeologic study must show that after development containing on-lot septic systems, the nitrate-nitrogen concentration in the ground water is less than 10 ppm. This may require lots to be larger than required by the current lot size requirement stated in the Halifax Township Subdivision and Land Development Ordinance.

Groundwater recharge easements for dilution of subsurface sewage flows may be utilized rather than large lots, provided they fulfill all of the criteria listed below.

1. The easement is located in the downgradient direction of each individual lot. The determination of downgradient can be achieved either by water level measurements or by use of the topography.
2. The easement is clearly located on the plot plan.
3. The plot plan, the narrative and future deed conveyances note the following:
    a. The easement is to provide groundwater recharge for diluting sewage flows on lots.
    b. The easement will exist until the lot is served by a community sewage system.
    c. The easement will not be covered with impermeable surfaces.
    d. The easement area cannot be used to provide diluting groundwater recharge for other sewage flows.
    e. No drinking water well may be drilled in the area of the groundwater easement. Nor may any well that provides for the removal of groundwater.

One easement is acceptable for multiple lots as long as the downgradient requirement can be met for each individual lot proposed and is written into each deed.

In the case where adjacent land owners are impacted, all subject property owners must be notified and in agreement with said easement. This agreement will be a requirement of the planning module submission.

Mass Balance Equation

The following mass balance equation calculation is for determining the minimum groundwater recharge area for the predicted average groundwater nitrate-nitrogen concentration to be within the EPA drinking water standard after development is as follows:

$$\frac{\{(\text{Area})(\text{Recharge Rate}) - (\text{WU})\}\ (N - NO_3) + (\text{WU})(45\ \text{ppm})}{(\text{Area})(\text{Recharge Rate})} = (N - NO_3)$$

where:

(Area) = acres
(Recharge Rate) = gpd/acre
$(N - NO_3)$ = ppm groundwater sample
(WU) = (Water Useage) = 258.8 gpd/EDU
(45 ppm) = $(N - NO_3)$ concentration of sewage

The Nitrate loading is due to proposed on-lot septic systems (includes groundwater easement area)
$(NO_3 - N)$ ppm is:

$$= \frac{(\text{Area})(\text{Recharge Rate}) - (\text{WU})(\text{EDU's})(N - NO_3) + (45\ \text{ppm})(\text{WU})(\text{EDU's})}{(\text{Area})(\text{Recharge Rate})}$$

D. Description of Septic Generation and Disposal

Each on-lot sewage disposal system in the Township generates approximately 200 to 500 gallons of septage (sludge) every 2 to 3 years. The septic tanks are emptied periodically and hauled by truck, by local septic pumping companies, to Wastewater Treatment Facilities permitted to accept and treat septage.

Sewage which is conveyed to the five (5) public/non-public wastewater treatment facilities located throughout the Township is treated and then discharged to the local waterways in accordance with the facilities NPDES permit. Sludge generated at each facility is disposed of off-site in accordance with DEP's rules and regulations.

IV. Future Growth and Land Development

The land use patterns in the Township are typical of rural communities in south central Pennsylvania, where agriculture is the primary land use activity in the Township. In accordance with the existing Township Sub-Division and Land Development Ordinances, the minimum allowed residential building lot size is 2-acres with **on-lot** water and sewer and 1.5 acres with either **public** water or public sewer. Existing residential lots are generally situated along the Route 147 and Route 225 corridor in pockets consisting of medium density housing, with other pockets consisting of low-medium density housing randomly located throughout the Township. The type and distribution of land uses is shown in Table 6 – Existing Land Use by Parcel.

Table 6 – Existing Land Use by Parcel

Land Use	% of Total Land Parcels	Estimated % of Land Area	Estimated Total Acres
Residential	60.5	4.5	894.5
Commercial	1.7	0.7	145.7
Industrial	0.9	0.3	53.8
Agriculture	8.8	39.5	7868.0
Public & Semi-Public	1.9	3.7	735.0
Misc. Other Parcels	0.6		
Vacant	25.8	51.3	10207.0
Total	100.0	100.0	19904.0

Source: The Halifax Township Comprehensive Plan, 1996.

There is currently one large residential subdivision (Lenker Estates) under construction within the Township which is slated for 155 homes. This subdivision is served by public water and a new private wastewater treatment facility. Currently, approximately 10 homes have been constructed within the subdivision.

V. Wastewater Disposal Alternatives

There are various alternatives to the challenge of wastewater disposal for Halifax Township (Township). The Township may opt for a central collection and treatment system. Most densely populated areas requiring public sewers utilize this alternative.

The Township could consider the continued use of On-Lot Disposal Systems (OLDS). Most rural townships utilize this alternative in conjunction with the Sewage Management Plan mentioned below. The Township may review the technology of small-flow treatment facilities or package plants. Sparsely populated municipalities with a large school serving the surrounding municipalities, or with an isolated commercial or industrial area, often utilize this alternative. Villages most often utilize this technology, where lot sizes preclude the use of individual OLDS but soil and topography will allow the use of on-lot disposal. The Township may consider the use of retaining (holding) tanks. The Township may implement a Sewage Management Plan. The Township may pursue non-structural planning alternatives to assist with meeting the sewerage needs of the residents. And, lastly, the Township may "do nothing." All of these alternatives present unique opportunities and responsibilities for the Township which will be discussed in the following paragraphs.

A. Conventional Collection, Conveyance, Treatment, and Disposal

Expansion of Existing Collection and Treatment System – The nearest existing public sewage collection system and wastewater treatment plant is located in Halifax Borough (Borough), which currently provides public sewer service to Township residences located immediately north of the Borough and residences along Route 147 from the Borough to the existing Sheetz convenience store just north of the Route 147/225 intersection. The existing Halifax Borough Wastewater Treatment Plant has a capacity of 210,000 gallons per day, with approximately 110,000 gallons per day available for new connections. Assuming 250 GPD/EDU, this equates to 440 available EDUs. The expansion of the Borough sewage collection system to serve additional portions of Halifax Township would require the addition of gravity sewers and potentially multiple sewage pumping stations and force main to convey wastewater from the low areas south of the Route 147/225 intersection. Per our conversation with the Halifax Municipal Authority (Authority) wastewater treatment plant engineer excess capacity is available to handle additional sewage flow from Halifax Township.

A preliminary sanitary sewer extension plan has been prepared outlining the proposed areas to be provided with public sewer service (see Figure 14a, 14b, & 14c). A summary of each area to be serviced is as follows:

1. Accu Mold System – This area is located along the east side of Route 147 and includes proposed Manhole 100 – 103. This system will service 10 properties on the east side of Route 147 which include the existing Accu Mold business and several other small business and homes. Currently, public sewer is located on the west side of Route 147 along the frontage of these properties, but connections were never made as a boring under Route 147 would be required. However, an existing manhole is located on the east side of Route 147 just north of Leisure Lane at the Halifax Plaza shopping center. This system would be extended behind the subject properties. A sanitary sewer easement from each owner will be required to install such a system.

2. Powells Valley Road - This area consists of approximately 25 properties located along the north and south side of Powells Valley Road and includes proposed Manhole 200 – 205. A majority of these properties are single-family residential homes. In order to construct this sanitary sewer extension, the Accu Mold system must be installed to provide a point of connection. The entire system can be installed within the Powells Valley Road right-of-way eliminating the need for easement acquisition.

3. Triangle Manor - This area consists of approximately 62 properties located within the Triangle Manor subdivision and several properties located along the Route 147 (River Road) and includes Manhole 300 - 320. The system will consist of gravity sewers and a pump station located along the east side of Route 225 (Peters Mountain Road). The pump station will convey sanitary sewer along Peters Mountain Road to a proposed manhole which will be connected to the existing collection system in front of Sheetz. A majority of these properties are single-family residential homes with several commercial properties scattered throughout. The system (except the pump station) can be installed within the public right-of-way; however land must be purchased to construct the proposed pump station.

4. Parmer / Galli / Lauren – This area is located on the east side of River Road and consists of properties along Parmer Drive, Fellowship Road, Galli Road, and Lauren Lane. Gravity sewers (Manhole 400 – 420) will convey sewage to Pump Station No. 2 and Manhole 301. If existing grade does not allow for the layout as shown, the system along Parmer Drive can be connected to Galli Road (Manhole 413) and the system along Fellowship Road could be connected to Powells Valley Road (Manhole 201) if easements can be obtained. This area is dominated by single-family residential homes and much of the system can be installed within the public right-of-way. And easement will be required to construct the portion of the system from Manhole 400 to Pump Station 2.

5. Parmer Drive Grinder System – In order to extend the proposed system along Parmer Drive, grinder pumps would be required to overcome the existing grade of the road. Approximately 10 houses can be served by this system. The forcemain can be installed within the public right-of-way and the grinder units will be installed on the property of each user.

6. Route 225 - This area consists of approximately 28 residential properties located along the east and west side of Route 225 (Peters Mountain Road) between Maple Avenue and Matamoras Road (Manhole 600 – 605). The entire system will be tributary to Pump Station No. 2 and can be installed within the Peters Mountain Road right-of-way eliminating the need for easement acquisition.

7. Matamoras - This area consists of approximately 126 properties located within Matamoras and the immediate surrounding area. The system will consist of gravity sewers and a pump station (No. 1) located along the east side of Route 225 (Peters Mountain Road). Pump Station No. 1 will convey sanitary sewer along Peters Mountain Road to Pump Station No. 2. A majority of these properties are single-family residential homes with several commercial/institutional properties scattered throughout. The system (except the pump station) can be installed within the public right-of-way; however land must be purchased to construct the proposed pump station.

8. Lenker Estates - This area consists of a large 155 lot subdivision, which is currently under construction. The development is served by a private wastewater treatment facility constructed by the developer. The proposed system within Lenker Estates consists of gravity sewers and a few grinder pumps to serve a down slope cul-de-sac. In order to connect Lenker Estates to the proposed public sewer extension, a pump station (No. 3) would be required to convey sanitary sewer to Route 225 (Peters Mountain Road). The forcemain can be installed within future street right-of-ways and land owned by Lenker Estates. **Please note the connection of Lenker Estates to the proposed public sewer extension would only be considered if sufficient capacity is available after the connection of all properties listed under Options 1 through 7 above.** Also, considering that Lenker Estates currently has a private sewer system, additional future extensions to un-sewered portions of the Township may be deemed more appropriate. Also, it is unknown at this time when all future phases of Lenker Estates will be completed.

Publicize Existing Private Wastewater Treatment System – There are currently four (4) private wastewater treatment facilities located within the Township as discussed. The Township could elect to purchase and/or take over one of the existing facilities and expand the sewer service area. This alternative would likely require upgrades and renovations to the facility for use as a municipal system and to provide increased capacity for additional connections. Also, additional collection and conveyance facilities would be required to expand the sewer service area.

Community On-Lot Sewage Systems – The community on-lot sewage system is one of two community sewage systems available, and can be privately or publicly owned, operated and maintained. The community on-lot sewage system is for two or more homes or dwelling units, and is used for collecting, treating and disposing of sewage into a soil absorption area or a retaining tank. The community on-lot systems can be used throughout the Township, in areas with a cluster of homes and a suitable soil absorption area; however, the required land disposal area increases as more homes or dwelling units are connected to the system. The community on-lot systems typically serve two to twenty dwelling units, and are located in areas where a surface water discharge is not feasible. The soils would have to be suitable for on-lot disposal system as outlined in Section II.C. of this Act 537 Plan. Each home or dwelling unit would have a septic tank,

to reduce the loading on the soil absorption area, and a connection to the community collection system. The complexity of the community collection and on-lot disposal system will depend upon the number and location of homes or dwelling units connected to the system.

Community Sewerage System – The community sewerage system is the second of two alternative community sewage systems available, and can be privately or publicly owned, operated and maintained. The community sewerage system is a system for two or more homes or dwelling units, and is used for sewage collection, conveyance and treatment, and disposal methods other than on-lot soil absorption. The community sewage systems can be used throughout the Township in areas, where there is a cluster of homes or dwelling units, and a location for a surface water discharge. The capacity and complexity of the community sewerage system and the collection system would be dependent on the number and location of the homes or dwelling units served. The community sewerage systems typically serve mobiles home parks and small subdivisions, and land would have to be acquired for the community wastewater treatment plant site and surface water discharge. The surface water discharge will also require obtaining NPDES Part I and Part II Permits. Currently, four (4) privately owned community sewerage systems exist within the Township, with each serving mobile home parks and residential subdivisions.

B. Individual On-Lot Disposal Systems

Individual on-lot disposal systems can continue to be used throughout the Township in areas where the soils and ground slopes are suitable as outlined in Section II.C., of this Act 537 Plan. Due to the moderate to severe soil limitations in the Township, conventional in-ground trench and bed on-lot disposal systems may not be suitable alternative for new installations, without an extensive site soils evaluation. Depending on the site soils evaluation and the ground slope, an elevated sand mound or an individual residential spray irrigation system will most likely have to be implemented.

A potential problem with on-lot disposal systems is nitrate-nitrogen and fecal coliform contamination of the groundwater supply. If future water supply well testing within 1/4 mile of a proposed on-lot disposal site or a new land developed exceeds 5 milligrams per liter nitrate-nitrogen, which is equivalent to 5 parts per million, a preliminary hydrogeologic evaluation is required.

The preliminary hydrogeologic evaluation is required to determine if denitrification pre-treatment of the septic tank effluent is necessary prior to on-lot disposal. The preliminary hydrogeologic evaluation report for denitrification pretreatment of the septic tank effluent must include the following:

1. Topographic mapping showing the location of the proposed on-lot disposal systems in relation to the groundwater flow or to the surface water flow, or both.

2. The estimated on-lot disposal wastewater dispersion plume using an average daily flow rate of 262.5 gallons per home or equivalent dwelling unit per day, or other documented daily flow rate.

3. Identification and location of existing and potential groundwater uses in the estimated area of impacted groundwater.

An alternative to the preparation of a preliminary hydrogeologic evaluation report for denitrification pretreatment of the septic tank effluent is to implement the use of denitrification pretreatment units prior to on-lot disposal. Approved denitrification pretreatment units are not currently readily available for homes, commercial and institutional facilities, for reliable denitrification of domestic sewage septic tank effluent prior to disposal using an on-lot system.

The Pennsylvania Department of Environmental Protection (DEP) will consider the use of previously approved denitrification pretreatment units as part of the Sewage Facilities Planning Module submittal for new land development. The Sewage Facilities Planning Module submittal, in addition to the other requirements of the module must include:

1. A request from the applicant to implement the use of DEP approved denitrification pretreatment units in lieu of conducting a preliminary or detailed hydrogeologic evaluation report for denitrification.

2. A notation on the site plan showing that all of the proposed lots in the development are to be served by denitrification pretreatment units.

3. A commitment by the applicant that each sales contract shall contain language warning the property purchaser that the on-lot system serving the property will require a denitrification pretreatment unit as a condition of issuance of the on-lot sewage disposal system permit. The warning will include the estimated additional installation and annual maintenance costs to the property owner for the denitrification pretreatment unit.

If DEP determines that the use of denitrification pretreatment units for the proposed on-lot disposal systems will protect the groundwater from potential excess nitrate-nitrogen contamination, DEP will conditionally approve the Sewerage Facilities Planning Module. The DEP approval of the Module will require the installation of a denitrification pretreatment unit which was previously approved by DEP as a condition for the issuance of the permit for the on-lot sewage disposal system. After DEP approval, the Township Sewage Enforcement Officer will, as part of the permit for the installation of an on-lot sewage disposal system, issue the permits for the installation of the denitrification pretreatment units. In new land developments, no permits can be issued unless denitrification pretreatment units which were previously approved by DEP are included in the design of the on-lot disposal system. The DEP lists manufacturers which make denitrification pretreatment units that meet the criteria of the National Sanitary Foundation (NSF) Standard 40, November 1997, and the DEP performance standards listed in the DEP, Bureau of Water Quality Protection, Wastewater Management,

Alternative and Experimental Systems Guidance Supplement, July 1997 and October 1997 Supplement, Alternative Systems No. 12 – Denitrification Units. Township Ordinance 95-2 – Sewage Facilities Ordinance and amendments thereto controls the implementation of the on-lot disposal systems; however, the Township via ordinance will need to control the operation and maintenance of these on-lot disposal systems.

C. Small Flow Wastewater Treatment Facilities

Small flow, wastewater treatment facilities can be used to correct an existing malfunctioning system for an individual home, a cluster of homes or dwelling units, and commercial and institutional facilities with domestic only and no industrial wastewater discharge, where other treatment systems cannot be implemented. The small, wastewater treatment facilities can be package treatment facilities and can be privately or publicly owned, operated and maintained. In accordance with the Pennsylvania Code, Title 25 – Environmental Protection, Chapter 71 – Administration of Sewage Facilities Planning Program, Section 71.64 – Small Flow Treatment Facilities, the small flow wastewater treatment facilities are limited to a treatment capacity of 2,000 gallons per day, which is approximately 5 single family, 3-bedroom homes or dwelling units. The small flow, wastewater treatment facilities, which use land disposal or surface discharge to a dry stream channel, will require a preliminary hydrogeologic evaluation report and documentation that the site soils are not suitable for on-lot sewage disposal systems, and that drinking water supplies will be protected. The small flow, wastewater treatment facilities, which use a surface water discharge, will require obtaining NPDES Part I and Part II Permits. A privately or a publicly owned small flows wastewater treatment facility is subject to the same regulatory discharge requirements as a regional wastewater treatment facility. Therefore, a publicly owned small flow wastewater treatment facility could require a sewer authority to be established by the Township to manage the administration, financing, construction, operation and maintenance of the small flow wastewater treatment facility.

D. Retaining Tanks

The utilization of temporary or permanent, retaining or holding tanks for residential, commercial and industrial use within the Township should be avoided if possible; however, this may be the only viable alternative, when all other methods cannot be implemented, or it is necessary to immediately correct a nuisance or public health hazard. An existing Township Holding Tank Ordinance controls the implementation, operation and maintenance requirements for holding tanks.

E. Sewage Management Programs

The Sewage Management Program is a non-structural alternative for the Township to control the operation and the maintenance of existing and proposed, publicly and privately owned sewage facilities, including on-lot disposal systems, community systems, and small flow wastewater treatment facilities. The Sewage Management Program would provide the Township with the legal, administrative and financial mechanisms needed to

ensure the scheduled inspection and required maintenance of the sewage disposal facilities within the Township, and to ensure proper operation and long term use of the sewage disposal facilities. The Sewage Management Program would establish enforcement procedures and penalties for non-compliance.

Through the Sewage Management Program, the Township would promote the repair, the replacement or the upgrading of malfunctioning on-lot sewage disposal systems through aggressive pro-active enforcement of the Township ordinances. In addition, the Township can provide educational programs encouraging proper operation, maintenance and repair of sewage disposal systems, which would be made available to the property owners and the residents. The Sewage Management Program would provide for bonding, escrow accounts, management agencies or associations to assure operation and maintenance for privately owned sewage disposal facilities.

The Sewage Management Program can be administered and enforced through a Sewage Disposal System Maintenance Permit, or by scheduled Township inspection every 5 years. The Sewage Disposal System Maintenance Permit requires the property owner and the septic hauler to perform the periodic inspection coincident with the pump-out of the septic tank and submit a report to the Township for the permit renewal. The Township inspection requires that an Authorized Agent conduct inspections of the on-lot sewage disposal systems. During the periodic inspections, illegal surface discharges would be identified and the property owner would be required to comply with Title 25 – Environmental Protection requirements.

To reduce the costs to the Township for the Sewage Management Program, a joint municipal Sewage Management program with one or more municipalities should be considered. This would allow for the costs for the Sewage Enforcement Officer service to be shared with several other municipalities, and cost would qualify the Township for grant money from the DEP.

F. Comprehensive Planning Based on Sewage Needs

The Township currently has a Comprehensive Plan to assist the Township in identifying and managing land use designations and densities, with regard to existing and future sewage disposal needs, while considering sound economic development. Currently, the Township is preparing a new Joint Comprehensive Plan with Halifax Borough, Wayne Township, Jefferson Township, and Rush Township. Low and moderate density residential areas will be strategically located in areas most likely to have sanitary sewage service in the future. The Township planning alternatives such as the Sewage Management program would further assist in meeting sewage disposal needs, while protecting ground water sources.

G. No Action

The no action alternative would consist of continuing with the current Township ordinances and permitting process through the Township for new on-lot sewage disposal

systems. There is potential for a short term and long-term negative impact on water quality, drinking water sources, and consequently, public health; therefore, the no-action alternative is not a good option. Without a coordinated management approach to periodic inspection and maintenance for on-lot disposal systems, a sewage facilities plan solely dependent on-lot systems for long term use to serve existing homes or new land developments may create long term sewage problems.

VI. Evaluation of Alternatives

In accordance with the Pennsylvania Code, Title 25 – Environmental Protection, Chapter 71 – Administration of Sewage Facilities Planning Program, Section 71.21 – Content of Official Plans, Paragraph a.5.i.A, the alternatives identified in Section V – Wastewater Disposal Alternatives of this Act 537 Plan, must be evaluated for technical feasibility and consistency for proposed implementation with other planning documents, and the Township, County, Commonwealth and Federal Laws.

A. Consistency of Technically Feasible Alternatives

Although all of the alternatives presented in Section V are technically feasible, they are not all feasible to implement in the near future due to the Township ordinances encouraging low-density development and the tremendous financial burden to implement. Due to the aforementioned reasons, it is unlikely that the construction of a new wastewater treatment facility, in addition to the facility in Halifax Borough, could be implemented in the near future. In addition, the technical and financial requirements to obtain and to maintain compliance with the Commonwealth and Federal surface water discharge permits will discourage and preclude the implementation of other alternatives, such as community sewerage systems and small flow wastewater treatment facilities. Therefore, the feasible alternatives that can be implemented and that will be evaluated hereafter are individual and community on-lot disposal systems, a Sewage Management Program, and an extension to the existing collection and conveyance system.

Plan Developed and Approved under the Pennsylvania Clean Streams Law, Section 4 and 5 of the Federal Clean Water Act, Section 208 – The objective of these laws is for the preservation, protection and improvement of both surface and ground waters. The intent of the proposed feasible alternatives in this Act 537 Plan is to meet these objectives; therefore, the proposed alternatives are consistent with the laws.

Pennsylvania Municipal Wasteload Management – The Pennsylvania Code, Title 25 – Environmental Protection, Chapter 94 – Municipal Wasteload Management, is not applicable to this Act 537 Plan, since the Township has no existing publicly owned wastewater treatment facilities.

Previous Plans Developed under the Federal Clean Water Act, Title II, or the Federal Water Quality Act of 1987, Titles II and IV – There are no known plans, which specifically apply to the Township.

Comprehensive Plans Developed Pursuant to the Pennsylvania Municipalities Code – The Township has a Comprehensive Plan which was prepared by the Halifax Planning Commission and the Tri-County Regional Planning Commission in 1996.

Antidegradation Requirements under the Pennsylvania Code, Title 25 – Environmental Protection, Chapters 93, 95 and 102 – Chapter 93, - Water Quality Standards defines and regulates the water use and quality standards for the waters of the Commonwealth, including wetlands. These standards are based upon water uses that are to be protected and are considered by the Department of Environmental Protection in its regulation of surface water discharges. Chapter 95 – Wastewater Treatment Requirements defines the effluent discharge limits to comply with the water use and quality standards in Chapter 93. Chapter 102 – Erosion Control, imposes requirements on earthmoving activities which create accelerated erosion or a danger of accelerated erosion, and which require planning and implementation of effective soil conservation measures.

The requirements of Chapters 93, 95 and 102 apply to the alternatives of expanding the existing sewage collection system, installing a community sewage systems, and small flow treatment facilities. In addition, Chapters 93, 95, and 102 are not applicable for individual and community on-lot sewage disposal systems, retaining or holding tanks, Sewage Management Program and comprehensive planning alternatives, since these alternatives would not result in a surface water discharge and/or significant earthmoving activities.

Chapter 102 does not apply; however, Chapters 93 and 95 do apply to the no action alternative, which is inconsistent with these regulations. The no action alternative will eventually result in an increasing number of failing on-lot sewage disposal systems, and possible illegal sewage discharges to the waters of the Commonwealth.

State Water Plans under Federal Water Resources Planning Act – The State Water Plan has been superceded by Chapter 93 of the Commonwealth of Pennsylvania Code.

Pennsylvania Code, Title 4, Chapter 7, Subchapter W – Prime Agricultural Land Policy – The feasible to implement on-lot sewage disposal and non-structural alternatives are consistent with the Policy. The locations of these lands are shown in Figure 5 – Prime Agricultural Soils of this Act 537 Plan.

County Stormwater Management Plan the Pennsylvania Storm Water Management Act – Stormwater is regulated within the Township by the Mid-Dauphin Basins Act 167 Plan, prepared by the Dauphin County Conservation District, and the Township's Sub-Division and land Development Ordinance. The feasible to implement alternatives are consistent with this Ordinance.

Wetland Protection under Pennsylvania Code, Title 25 – Environmental Protection, Chapter 105 – Dam Safety and Waterway Management – The feasible to implement on-site sewage disposal alternatives are not permitted to be located within wetlands, and the

non-structural alternatives do not impact wetlands; therefore, the alternatives are consistent with the requirements of Chapter 105.

Protection of Rare, Endangered or Threatened Plant and Animal Species in the Pennsylvania Natural Diversity Inventory – Any proposed facilities, whose construction will impact these habitats, will require a field survey of the proposed site by the Pennsylvania Department of Conservation and Natural Resources, Bureau of Forestry. The siting of any proposed facility would require protection of the species. **PNDI** is not applicable to on-lot sewage disposal systems, since such systems are prohibited from being sited in the listed type of habitat, in addition non-structural sewage management programs and comprehensive planning do not require the siting of new facilities. However, a PNDI search was performed for the entire Township and the results are as follows:

- U.S. Fish and Wildlife Service – The federally listed ***Northeastern Bulrush*** occurs in or near the project area. However, no adverse effects to this species are likely to occur if no wetlands are directly or indirectly impacted.
- DCNR – Potential Project Impact - A survey of the following areas should be conducted if work is to be performed:
    - Tourist Park/Alex Acres Mobile Home Park and Hill Top and Round Top Planning Areas – ***Penstemon canescens*** (Bear Tongue) on dry rocky wooded slopes
    - Dusty Trail and Camp Hebron Planning Areas – (1) ***Eupatorium godfreyanum*** (Vasey's Eupatorium) on wooded roadsides, stream banks; flowers August – October (2) ***Stylosanthes biflora*** (Pencil Flower) on sandy fields, river banks, and dry or shaly slopes; flowers July – September (3) ***Leucothoe racemosa*** (Swamp dog hobble) on wet woods and thickets; flowers May – early June
- PA Game Commission – No adverse impacts to any special concern species of bird or mammals.
- PA Fish and Boat Commission – Rare or protected fresh water mussel species are know from the vicinity of the project area. No erosion, sediment, or toxic or harmful chemicals shall be allowed to enter into the creek.

The Pennsylvania Historical Preservation Act of 1978 – The Act as regulated under the Pennsylvania Code, Title 37, Section 507, requires Commonwealth agencies and political subdivisions such as the Township, to cooperate fully with the Pennsylvania Historical and Museum Commission in the preservation, protection, and investigation of archaeological resources. The Act lists specific activities that must be completed to meet this obligation. One activity requires the Commission be notified, when either the Township becomes aware of any Commonwealth assisted, permitted or contracted project, activity or program, which affects, or may affect, an archaeological or historical site.

The technically feasible to implement on-site sewage disposal alternatives do not include major construction or demolition activities, nor are suitable for siting on such sites; therefore, and prior notification of the Commission is not necessary. However, the Township will notify and cooperate with the Commission if such sites are discovered

during the site soils probing and evaluation. The non-structural Sewage Management Plan and comprehensive planning alternatives are consistent with the Title 37, Section 507, since they do not require the siting of new facilities.

B. Inconsistency Resolution

There are no inconsistency issues to resolve.

C. Alternatives Evaluation

Refer to Paragraph VI.A., above.

D. Cost Estimates

The costs for implementing the technically feasible alternatives are as follows:

Individual and Community On-Lot Sewage Disposal Systems and Holding Tanks – The costs associated with construction, operation and maintenance of the on-lot sewage disposal systems and holding tanks is the responsibility of the owner of the system. The costs incurred by the Township are for the services of a Sewage Enforcement Officer (SEO) to enforce Township the existing Sewage Facilities Ordinance, which may be partially reimbursed by grants from the Pennsylvania Department of Environmental Protection (DEP). If the SEO serves the Township for 1,200 or more hours per year, the Township would qualify for 85% reimbursement of the cost for the SEO from the DEP. The Township may also share the services of the SEO with another municipality needing the similar services in order to qualify for the DEP reimbursement.

Sewage Management Program – A Township Sewage Management Program would require all system owners to schedule their on-lot sewage systems septic tanks to be regularly pumped-out and inspected every 3 to 5 years. The cost for the periodic maintenance is the responsibility of the system owner. The cost to the Township will be for the services of a Sewage Enforcement Officer (SEO) to enforce the program.

Extension to the Existing Collection and Conveyance System – The costs associated with construction, operation and maintenance of the expanded collection and conveyance system will be the responsibility of the Authority. Preliminary cost opinions (see Appendix J for detailed cost opinions) have been prepared outing the estimated construction/design related costs in order to determine the feasibility of extending public sewer into new areas of Halifax Township. The total estimated cost is $4.6 million including construction, design, and legal fees.

No Action – The no action alternative has no immediate associated costs; however, a lack of action could potentially significantly cost the Township in the future as on-lot systems deteriorate and fail due to a lack of maintenance. The Township is legally responsible for finding solutions to public health hazards or pollution problems; therefore, the Township should take action to prevent future costs.

E. Funding Methods

Pennsylvania Infrastructure Investment Authority (PENNVEST) – Loans may be available for the construction of Township owned sewage treatment facilities and collection/conveyance systems. The loan terms are usually 20 years, with a few at 30 years. Interest rates range between 1 and 4.5 percent and average about 2 percent. The PENNVEST board meets three times a year, and the deadline for applying for funds is about two months before each meeting.

Representatives from Halifax Township, DEP, K&W Engineers, and the Authority met with PENNVEST on January 3, 2008 to discuss funding options for expanding the existing sanitary sewer collection system. Per our discussion, it is unlikely that a funding offer would be received due to a low public health and safety and economic development rating. However, PENNVEST recommended using a term of 20 years @ 1% interest for planning purposes. Also, PENNVEST stated that grant funding would not be available for this project.

U.S. Department of Agriculture, Rural Utilities Service – Since the population is less than 10,000 people, the Township can obtain financial assistance for sewage projects from the U.S. Department of Agriculture, Rural Development program, Rural Utilities Service (RUS). The Program provides loans and/or grants through RUS, formerly known as the Farmers Home Administration, to enhance the ability of rural communities to develop, grow, and improve their quality of life, by targeting financial and technical resources in areas of greatest need, through activities of greatest potential. To apply for a loan or grant, the township can call the area RUS office, where representatives will guide them through the application procedure.

Representatives from Halifax Township, DEP, K&W Engineers, and the Authority met with RUS on January 17, 2008 to discuss funding options for expanding the existing sanitary sewer collection system. Per our discussion, the project would qualify for a loan through RUS, however grant funding is very unlikely. RUS recommended using a term of 40 years @ 4.375% interest for planning purposes.

The financial analysis of the two above funding options is outlined in the following table:

Table 7 - Public Sewer Extension Cost Analysis

Construction Cost		
Service Area	**Construction Cost**	**App. # of Properties**
Accu Mold System	$95,500	10
Powells Valley Road	$199,600	25
Triangle Manor Area	$736,750	62
Parmer/Galli/Lauren to PS #2	$503,875	64
Parmer Drive Grinder System	$91,990	10
Rte 225 - Triangle to Matamoras	$189,250	28
Matamoras Area	$1,144,000	126

Subtotal	**$2,960,965**	**325**
Contingency (20%)	$592,193	
Mobilization (5%)	$148,048	
Engineering/Legal/ROW (25%)	$740,241	
Bonding & Insurance (2%)	$59,219	
Maintenance of Traffic (1%)	$29,610	
Testing & Misc (2%)	$59,219	
Total	**$4,589,496**	
Lenker Estates (total cost)	**$496,000**	155
Total (w/ Lenker Estates)	**$5,085,496**	**480**

Operation & Maintenance Cost				
Service Area	**EDUs**	**Annual Treatment Cost***	**Collection/Conveyance Cost**	**Total Cost**
Accu Mold System	10	$542	$500	$1,042
Powells Valley Road	25	$1,355	$1,000	$2,355
Triangle Manor Area	62	$3,360	$7,500	$10,860
Parmer/Galli/Lauren to PS #2	64	$3,468	$2,000	$5,468
Parmer Drive Grinder System	10	$542	$1,000	$1,542
Rte 225 - Triangle to Matamoras	28	$1,517	$1,000	$2,517
Matamoras Area	126	$6,828	$7,500	$14,328
Total	**325**	**$17,612**	**$20,500**	**$38,112**
Lenker Estates	155	$8,399	$7,500	$15,899
Total (w/ Lenker Estates)	**480**	**$26,011**	**$28,000**	**$54,011**

*based on $54.19 per EDU per year, as provided by Authority

User Rate Evaluation w/o Lenker Estates		
Funding Alternatives:	PENNVEST 20 yrs @ 1%	USDA 40 yrs @ 4.375%
Total Estimated Design/Construction Cost	$4,589,496	$4,589,496
Existing Tapping Fee ($3264/EDU)	$1,060,800	$1,060,800
Total Cost	**$3,528,696**	**$3,528,696**
Estimated # of Users/EDUs	325	325
Amount Financed	$3,528,696	$3,528,696
Interest Rate	1.000%	4.375%
Term (years)	20	40
Annual Loan Payment	($195,544)	($188,352)
Annual Operation & Maintenance Cost	($38,112)	($38,112)
Total Annual Cost	**($233,656)**	**($226,463)**
User Fee Calculations Considering New Customers Only		
Add'l. User Fees @ Ex. Rate of $75/Q	$97,500	$97,500
Net annual Cost	**($136,156)**	**($128,963)**
User Fee Increase per Quarter	(104.74)	(99.20)
Total Quarterly User Fee (new customers)	**($179.74)**	**($174.20)**
User Fee Calculations Considering Existing and New Customers		
Existing EDU's	736	736
Total EDU's	**1061**	**1061**

Net annual Cost (from above)	**($136,156)**	**($128,963)**
Project Cost per EDU per Quarter	($32.08)	($30.39)
System-Wide Use Fee per Quarter	**($107.08)**	**($105.39)**
System-Wide Use Fee Net Increase	**42.78%**	**40.52%**

User Rate Evaluation w/ Lenker Estates		
Funding Alternatives:	PENNVEST 20 yrs @ 1%	USDA 40 yrs @ 4.375%
Total Estimated Design/Construction Cost	$5,085,496	$5,085,496
Existing Tapping Fee ($3264/EDU)	$1,060,800	$1,060,800
Total Cost	**$4,024,696**	**$4,024,696**
Estimated # of Users/EDUs	480	480
Amount Financed	$4,024,696	$4,024,696
Interest Rate	1.000%	4.375%
Term (years)	20	40
Annual Loan Payment	($223,030)	($214,827)
Annual Operation & Maintenance Cost	($54,011)	($54,011)
Total Annual Cost	**($277,041)**	**($268,838)**
User Fee Calculations Considering New Customers Only		
Add'l. User Fees @ Ex. Rate of $75/Q	$144,000	$144,000
Net annual Cost	**($133,041)**	**($124,838)**
User Fee Increase per Quarter	(102.34)	(96.03)
Total Quarterly User Fee (new customers)	**($177.34)**	**($171.03)**
User Fee Calculations Considering Existing and New Customers		
Existing EDU's	736	736
Total EDU's	**1216**	**1216**
Net annual Cost (from above)	**($133,041)**	**($124,838)**
Project Cost per EDU per Quarter	($27.35)	($25.67)
System-Wide Use Fee per Quarter	**($102.35)**	**($100.67)**
System-Wide Use Fee Net Increase	**36.47%**	**34.22%**

As shown in Table 7 two (2) scenarios are being considering with these being with or without Lenker Estates. The USDA funding alternative has the lowest annual cost in each scenario, which varies from approximately $7,200 - $8,200 lower than PENNVEST. However, this equates to a minimal decrease in quarterly user rates of approximately $5.54 - $6.31 per quarter. Also, Table 7 considers blending the existing and future user rates in order to create one (1) rate district. This significantly reduces the rates (approximately 40%) for new users. However, existing users will in turn experience an increase of approximately 40%. The Township will investigate alternative financing methods and available grants in order to reduce the proposed user rate to acceptable levels. This may require the blending of the user rates (existing and proposed customers) or phasing of construction if possible.

Municipal Bonds – Financing may be available for expanding the existing collection system via municipal bonds. Municipal bonds are interest bearing obligations issued by state or local governments to finance operating or capital costs. The principal

characteristic that has traditionally set municipal bonds apart from other capital market securities is the exemption of interest income from Federal income tax.

Department of Environmental Protection – Sewage Program Enforcement Grants are available to reimburse the Township for 50 to 85 percent of eligible expenses for enforcing their Sewage Management Plans. The Grants help municipalities whose costs to enforce the Program exceed the revenues generated. The application deadline for Sewage Program Enforcement Grants is March 1 each year.

F. Implementation Schedule

The Township will begin the Sewage Management Program within the first six months after completion of the Sewage Facilities Plan. The Township will adopt the On-lot Sewage Management Program Ordinance within 90 days of approval of this Plan by DEP. The Sewage Enforcement Officer will develop and implement an evenly paced schedule with the on-lot sewage disposal system owners, for the inspection and pumping of systems evenly over the course of a 5 year period.

The Township (along with the Authority) will begin exploring detailed funding options for the proposed expansion of the collection system within six months after approval of the Sewage Facilities Plan. If the Township and Authority determine that the project is financially feasible, design and permitting of the system will begin upon securing the proper financing.

G. Administrative Organizations and Legal Authority Necessary

The administrative organizations and legal authority necessary for the Plan implementation are outlined in Section VII.B.

VII. Institutional Evaluation

A. Existing Wastewater Treatment Authorities

The Township currently is part of a joint municipal authority with Halifax Borough. The Authority has jurisdiction over the existing sewage collection and conveyance facilities. The Authority oversees the operation and maintenance of the existing public wastewater treatment facility and associated collection and conveyance facilities located within Halifax Borough and Halifax Township. Considering this and the alternatives presented in Sections V and VI of the Act 537 Plan, an additional Township Sewer Authority will not be required in the near future.

The Township Board of Supervisors currently retains the services of a Sewage Enforcement Officer (SEO). The SEO assists in the permitting and enforcement of the implementation of on-lot sewage disposal systems. The current arrangement between the Board and SEO is adequate for on-lot disposal systems throughout the Township.

B. Institutional Alternatives

Two institutional alternatives could be considered as feasible for the Township. The first alternative would be to continue charging the existing Authority with the responsibility of overseeing the public sewage collection and conveyance facilities within the Township.

The second alternative would be to establish a new Township Sewer Authority. A new Authority would be responsible for the ownership, administration, financing, construction, operation and maintenance of a publicly owned sewage collection system or wastewater treatment plant within the limits of the Township. At this time, the establishment of a new authority is not justified as a joint municipal authority exists between Halifax Township and Borough.

C. Administrative and Legal Activities

The Pennsylvania Municipality Authorities Act of 1945 describes the steps that must be taken by Halifax Township to form a Sewer Authority. The method of incorporating an Authority is briefly described in the following paragraphs.

If the Township would choose to implement an Authority, the Township should adopt a resolution or ordinance signifying their intention. A public hearing, having at least thirty (30) day's notice, should be held prior to adopting the resolution or ordinance. Following adoption of the resolution or ordinance, another notice should be provided in a legal periodical (Pennsylvania Bulletin) and also in a newspaper with general circulation in the County.

Any Authority which may be implemented, would be governed by its Board. The Authority Board would have at least five members and be appointed by the Halifax Township Board of Supervisors. The Authority Board members will serve for a term of five years.

The resolution or ordinance adopted to form the Authority, along with the names of the first Authority Board members, are required to be filed with the Secretary of the Commonwealth. If found acceptable by the Secretary, a Certificate of Incorporation will be issued.

The adoption of an Authority should be complete at least one-year prior to the Township taking on any aspects (such as purchase, design, construction, etc.) of a public sewage facility.

D. Best Alternative

The best alternative for sewage management in Halifax Township, Dauphin County is the implementation of an official **Sewage Management Program** and the potential **Expansion of the Existing Collection System.**

A draft of the On-Lot Sewage Management Program Ordinance can be found in Appendix D. The Township will be split into five (5) OLDS Management Districts (see Figure 13) so that on-lot sewage disposal systems are placed on a regular schedule for tank pumping and inspection by the Township SEO. The current Board of Supervisors is capable of handling those tasks associated with private, on-lot sewage disposal systems.

The Township (along with the Authority) intends to expand the existing collection system if the project is found to be financially feasible and appropriate financing can be secured. Preliminary cost opinions (see Appendix J for detailed cost opinions) have been prepared outing the estimated construction/design related costs expanding the existing collection system to serve new areas of Halifax Township. The existing Authority will be able to effectively manage these sewage facilities and is the preferred alternative when comparing it to the option of creating a new authority for Halifax Township.

VIII. Justification for Selected Technical Alternatives

A. Best Alternative

Based on the results of this study, the recommended method of sewage management for the next 10 years is (1) the use of on-lot sewage disposal along with the adoption of a Sewage Management Plan and subsequent Ordinance (See Appendix D) and (2) expansion of the existing collection system.

This sewage management program will include provisions for the legal, administrative and financial mechanisms needed to ensure long term use of sewage facilities. It will require inspections and maintenance of sewage disposal systems including septic and aerobic treatment tanks and other system components on a 5 year schedule. In addition, the program will establish penalties necessary for enforcement. The adoption of a Sewage Management Program Ordinance will allow the Township to track the operation and maintenance of on-lot sewage disposal systems. The program will provide public education to encourage proper operations and maintenance. Township officials will coordinate and maintain the program with the help of the Sewage Enforcement Officer. During the first five years, it is anticipated that most residents will be properly educated on system maintenance and all systems will be inspected. On-lot sewage disposal systems that are not in compliance with Title 25 Chapter 73 will be evaluated to determine if adequate sewage treatment is being performed. Systems that are not functioning properly will be upgraded.

All systems shown as malfunctions or found to be malfunctioning during the SEO inspection shall obtain a repair permit from the SEO and perform the necessary repairs and/or replacement the system. The system malfunctions, including grey water discharges, listed in this plan have not been repaired but, will be issued repair permits upon completion of the SEO inspection as outlined in the Sewage Management Program Ordinance.

The Township currently has a Holding Tank and Privy Ordinance in place to be used in conjunction with the proposed Sewage Management Program Ordinance.

Halifax Township intends to extend public sewer to southern portions of the Township to provide public sewer to homes that may not be able to maintain/replace their existing on-lot sewage disposal systems due to geology and lot size. The Authority will own, operate, and maintain the proposed collection system along with the existing treatment and collection/conveyance system. It should be noted that the on-lot sewage disposal systems located within the proposed expansion area have a low malfunction rate and generally are operating effectively. The Township is proposing the extension of public sewer as a proactive approach to long term sewage disposal.

B. Capital Financing Plan

The cost of properly maintaining on-lot disposal systems is far less expensive than the other alternatives. Residents will be responsible for the cost of pumping their own septic tanks on a schedule defined by the Township. The expense to administer and enforce the program is eligible for reimbursement of 50% to 85% through the Sewage Program Enforcement Grant.

See Section VI.D and VI.E for discussion of cost estimates and funding methods for the extension of public sewer.

Halifax Township
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APPENDIX A
SOILS SERIES DESCRIPTIONS

SOIL SERIES DESCRIPTION

The Dauphin County Soil Survey graphically delineates and defines the soil series categories found in the County. The following is a listing of those soils found in Halifax Township along with their corresponding map symbol. Each soil type and symbol is provided with a brief description of its general characteristics.

Albright Series (AbA, AbB2): The Albright Series consists of deep, moderately well drained soils that developed in rock fragments and eroded materials that were derived from red shale and sandstone. These soils are categorized as gently sloping or sloping and occur at the base of steeper slopes. Albright soils have moderately rapid surface drainage and moderately slow permeability with its available moisture capacity also being moderate. Although not extensive in the Township, these soils are important to farming and are used mostly as croplands.

Andover Series (AoB): The Andover Series consists of deep, poorly drained, gently sloping soils on foot slopes. These soils formed in materials weathered from sandstone, conglomerate, and quartzite. Because of seepage from higher slopes, the water table in these slowly permeable soils is near the surface for long periods. The native vegetation on Andover soils consists of mixed hardwoods.

Atkins Series (At): The Atkins Series consists of deep, poorly drained soils on flood plains which are formed in sediments washed mainly from gray, noncalcareous shale and sandstone. They occupy nearly level areas along streams and are subject to occasional flooding. Although Atkins soils have moderate permeability, the subsoil frequently is saturated for long periods because of the high water table. Due to flooding hazards and general wetness, these soils are used mostly for pasture and hay.

Berks Series (BhB2, BhC2, BkD2): The Berks Series consists of moderately deep, well-drained soils on uplands. These soils are gently sloping to moderately steep. Where these soils are moderately steep, slopes are short. Berks soils have a moderately rapid permeability and a moderate level of available moisture capacity. The native vegetation on these soils consists of mixed hardwoods. Most areas have been cleared and are used for general farm crops.

Basher Series (Bc): The Basher series consists of deep, moderately well drained, nearly level soils on flood plains. They are formed in sediments washed from red shale and sandstone and deposited in areas along streams. Basher soils permeability are moderate. The internal drainage of these soils is limited due to the seasonal high water table. Native vegetation on these soils consists of hardwoods. Cleared areas are not used for pasture and hay. Some areas are plowed and used for crops.

Brinkerton-Armaugh Complex Series (BtB2, BtA): The Brinkerton-Armaugh Series consists of deep and moderately deep soils located on nearly level to gently sloping upland areas and at the heads of streams and in seepage spots. Poorly drained, these soils were formed partly in material that weathered from gray shale, sandstone, rock

fragment and eroded materials. These soils have slow permeability, slow surface drainage and a high water table. In general, these soils are used for pasture and hay.

Buchanan Series (BuB, BvB): This Series consists of deep, nearly level to sloping soils that are moderately well drained. These soils occupy lower mountain slopes. Permeability of these soils is slow. Runoff is medium, but internal drainage is restricted by the compact lower part of the subsoil. Native vegetation on these soils consists of hard woods and a few scattered pines and hemlock. These soils are generally used for pasture and hay. Some are used for crops.

Calvin Series (CaD): This Series consists of moderately deep, well drained soils on uplands. Calvin soils are nearly level. Permeability of these soils is moderate, while moisture capacity is moderate to low. Native vegetation on these soils consists of mixed hardwoods. Most areas have been cleared and are used for general farm crops.

Calvin-Klinesville Complex (CkC2, CkD2): Found in very intricate patterns in close proximity, these soils are moderately deep and well drained soils. However, in steeper areas, soils of this series become shallow. Normally located in uplands and along floodplains these soils range from moderate permeability to rapid permeability. Soils in these complexes that are more characteristic of Calvin soils have been cleared and used for general crops, while Klinesville soils have a low availability of moisture capacity and have limited use for crops.

Calvin_Leck Kill Complex (CaF, ClA, ClB2, ClC2): These complexes, formed in materials weathered from acid red shale and sandstone, consist of moderately deep well drained soils on uplands and are found on nearly level to steep areas. Found extensively in the northern portion of Dauphin County, these soils have moderate permeability and moderate to low available moisture capacity. Most areas are cleared and used for general farm crops.

Comly Series (CoB2): The Comly Soils consists of deep, nearly level to gently sloping, moderately well drained soils on uplands. These soils formed in areas around the heads of streams, in colluvium at the base of slopes, and in seepage areas that are underlain by gray shale and sandstone. Comly soils have moderately slow permeability and a seasonal high water table. The native vegetation on these soils consisted of hardwoods. Most areas have been cleared and are used for tilled crops, hay, and pasture.

Dekalb_Lehew Series (DlF, DcB2, DcD2): The Dekalb series consists of moderately deep, nearly level to very steep soils that are well drained. These soils formed in material weathered from gray sandstone. Dekalb soils have moderately rapid permeability and low available moisture capacity. They are very strongly acidic and low in clay content. Most areas of these soils are wooded. Areas that have been cleared of trees and stones are used for pasture and hay.

Klinesville Series (KaB2, KaC2, KaD2, KaE2): The Klinesville Series consists of shallow, gently sloping to very steep, well drained soils of the uplands. Where these soils are steep, they generally occur in flood plains. Klinesville soils have moderately rapid permeability, low available moisture capacity and organic matter content. Cleared areas have limited use for crops and development.

Laidig Series (LaB2, LaC2, LdB, LdD): The Laidig Series consists of deep, gently sloping to moderately steep, well drained soils on uplands. Laiding soils have moderate permeability above the loamy soil B horizon, while low permeability within this area. Much of the acreage of these soils is very stone and is best suited to trees. However, some areas are useful for general farm crops and pasture.

Lawerence Series (LeB2): The Lawerence Series consists of deep, nearly level to gently sloping soils that are moderately well drained. These soils formed in windblown silt and sand deposits on high terraces. Lawerence soils have moderate permeability above a depth of 25 inches and moderately slow below that depth. The native vegetation on these soils consisted of mixed hardwoods. Most areas have been cleared and are used for general farm crops and truck crops.

Lindside Series (Lt, Lw): The Lindside Series consists of deep, nearly level, moderately well drained soils on flood plains. These soils are subject to flooding. They occupy areas along the Susquehanna River and are formed in sediments washed mainly from limestone but also from shale and sandstone. Lindside soils have moderately slow permeability and high water table. Mixed hardwoods were the native vegetation on these soils. These soils are cleared and used for general farm crops, hay and pasture.

Philo Series (Ph): The Philo Series consists of deep, nearly level, moderately well drained soils in flood plains. These soils mainly occupy narrow strips adjacent to streams in gray shale and sandstone areas of the southern part of the county. Philo soils formed in sediments washed from shale and sandstone and deposited near stream channels by floodwater. Philo soils have a seasonal high water table. They have moderate permeability and high available moisture capacity. Native vegetation on these soils consists of mixed hardwoods. Most areas have been cleared for hay and pasture.

Riverwash (Rv): Riverwash consists mostly of coal screening, or culm, that have been deposited along streams by floodwater. They occur mainly along Wiconisco Creek. Small areas are also found on islands in the Susquehanna River.

Tioga Series (Ta, Tg): The Tioga Series consists of deep, nearly level, well drained soils of floodplains and high bottoms along the Susquehanna River. These soils formed in alluvial deposits from various rocks such as sandstone, limestone, and shale. These soils have moderate permeability. Most areas have been cleared and are used for all general farm crops and truck crops.

Weikert Series (WeC2, WeD2, WeE2): The Weikert Series consists of shallow, sloping to steep, well-drained, shaly soils on uplands. Weikert soils have moderately rapid permeability and low available moisture capacity. The native vegetation in these soils consisted of mixed hardwoods. Most cleared areas are used for pasture and hay, but in many places use is determined by use of the adjacent soils.

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APPENDIX B
GEOLOGIC DESCRIPTION

Geologic Description

The Environmental Geology Report #1, developed by the Pennsylvania Department of Environmental Resources Office of Resource Management, Bureau of Topographic and Geologic Survey, describes characteristics for all geologic formations in the State. Figure 6 graphically delineates the various geologic formations of the Township.

1. **Spechty Kopf Formation (Mdsk)**

   The Spechty Kopf Formation is a narrow band of rock located along the top of Peters Mountain and on the western top of Berry Mountain.

   Description: The Spechty Kopf Formation is a light to olive-gray, fine to medium sandstone containing interbeds of olive-gray to dark-gray shale and siltstone; locally has grayish-red shale near top and conglomerate at base and in the middle; contains minor thin coal and coalified plant fragments; the formation has a depth of up to 575 feet.

   Bedding: This formation is well bedded. It contains planar bedding and some crossbedding. These beds are usually 2 inches to 5 feet thick.

   Fracturing: Highly developed joints; irregular spacing, generally 2 inches to 3 feet thick, open 10 to 50 millimeters.

   Weathering: The formation is highly resistant to weathering; slightly weathered to a shallow to moderate depth; fragments are blocky to tabular, 1 inch to 10 feet in diameter; overlying mantle is thin to moderately thick in boulder colluvium on some slopes.

   Topography: This formation forms mountains of high relief; topographic expression is approximately 800 to 900 feet; natural slopes are moderate to steep and stable.

   Drainage: Good surface drainage.

   Porosity and Permeability: The formation's joint, fault, and bedding-plane openings provide a moderate to low secondary porosity and moderate permeability.

   Groundwater: Generally unproductive on ridge crests but favorable for development below ridge crests; median yield is 25 gal/min. from wells between 40 and 350 feet deep; generally good quality; occasional high iron content; salt water may be found in deeper wells.

   Ease of Excavation: Excavation in the formation is difficult to moderately difficult in shale. Drilling rates in this area are slow to moderate.

Cut_Slope Stability: Generally good; poor where cut slope parallels strike and dip of bedding; rockfall occurs in steep cuts, notably where sandstone overhangs easily eroded shale beds.

Foundation Stability: Excellent after removal of unconsolidated mantle.

Construction Material: Quarried for crushed stone and aggregate for road construction; good source of riprap, rock protection, and rock fill.

2. **Duncannon Member of Catskill Formation (Dcd)**

This geologic formation is a narrow band that runs along the southern face of Berry Mountain and the northern face of Peters Mountain.

Description: The formation is interbedded red and gray sandstone, red siltstone, and red mudstone. The sandstone is generally fine and very fine grained, silty, poorly sorted, micaceous, and locally congolmeratic. The formation's thickness is from 560 to 3,000 feet.

Bedding: Well bedded; medium to massive; crossbedded; mudstone is thick to massive bed.

Fracturing: Joints are well developed in blocky and tabular pattern; generally closely spaced (2 inches to 2 feet), except widely spaced in mudstone; open, narrow and steeply inclined to bedding.

Weathering: Slightly weathered to shallow depth; weathered surface is hackly, except on mudstone, where it is smooth; fragments are blocky, 2 inches to 4 feet in diameter. The overlaying mantle is moderately thick, often made up of boulder colluvium from the Pottsville Formation above.

Topography: The formation forms hills and ridges of moderate to high relief and lower slopes of mountains capped by the Pocono Formation; moderate to very steep natural slopes on which overlying mantle can be subject to land slides.

Drainage: Good surface drainage.

Porosity and Permeability: The joint and bedding plane openings provide a secondary porosity; low in massive mudstone; moderate permeability except in mudstone, which has low permeability.

Groundwater: Moderate to good aquifer potential; best yields are expected from sandstone; reported yields are 7 to 40 gal/min. in wells averaging 150 feet deep; quality is generally good except for occasional high sulfur content.

Ease of Excavation: Moderately difficult; moderate drilling rate, except in conglomerate zones, which have slower drilling rate.

Cut_Slope Stability: Fair to good; mantle and weathered bedrock are subject to landslides; unweathered rock stands well in near vertical cuts; some rockfall.

Foundation Stability: Excellent after excavation of overlying mantle..

Construction Material: Good for rock fill and riprap.

3. **Clark's Ferry Member, Catskill Formation (Dccf)**

This geologic formation is a narrow band that runs along portions of the southern face of Berry Mountain and the northern face of Peters Mountain.

Description: The Clark's Ferry Member of the Catskill Formation is grayish-purple and lightly gray to olive-gray, medium-to-course-grained, micaceous, conglomeratic sandstone and conglomeratic with thin interbeds of dark-gray shaly claystone. Its thickness is from 140 to 225 feet.

Bedding: This formation is characterized as being well bedded and cross bedded. The bedding ranges from 6 inches to 4 feet deep.

Fracturing: Joints of this formation have a blocky pattern. They are highly developed, having irregular spacing, less than 2 inches to 3 feet. Joints are open in surface exposure and steeply dipping.

Weathering: The Clark's Ferry Member is moderately weathered to a shallow depth, except in shaly claystone, which is more deeply weathered. Weathered surface is rough, yielding blocky and tabular fragments; chippy fragments weather from shaly claystone. The overlying mantle is thin to moderately thick.

Topography: This formation underlies a distinct ridge of moderate relief or forms a bench along the flanks of higher ridges. The formation show no expression along some hillsides.

Drainage: In general, the Clark's Ferry Member is characterized as having good surface drainage.

Porosity and Permeability: The formation is characterized by a moderate secondary porosity in joint- and bedding-plane openings, except in shaly claystone, which has low secondary porosity. The permeability of this formation is moderate.

Groundwater: Low to moderate aquifer potential; low yields are expected where formation has topographic expression as ridges and hillside benches. Moderate yields are expected where the formation has no topographic expression along ridge flanks.

Ground water yields may reach 20 gal/min. in wells approximately 200 feet deep. The iron content may be high.

Ease of Excavation: The ease of excavating this rock formation is generally characterized as moderately difficult. Excavating is easier in shaly claystone interbeds. The formation has a moderate drilling rate which is faster in shaly claystone.

Cut_Slope Stability: This characteristic is rated good in the Clark's Ferry Member. There may be some blocky rock fall and accumulation of shaly rubble at toe of slopes. Weathered shale in this formation leaves some overhanging sandstone beds above, which contribute to rockfall.

Foundation Stability: Excellent support after removal of loose overhanging mantle, while areas of steep slope require special design.

Construction Material: Good source of random rock and rock fill and rock protection; sandstone has been used for decorative building stone.

4. **Sherman's Creek Member of the Catskill Formation (Dcsc)**

This formation is the largest geologic formation in the Township. One large band of rocks is situated near the base of Berry Mountain. The other large areas comprise most of the Armstrong and Powell Creek watersheds.

Description: This formation generally consists of interbedded grayish-red silty mudstone, sandy silt stone, and reddish-gray to light-olive-gray, very fine to medium grained silty, micaceous sandstone. The formation is crossbedded with a thickness of about 1,200 feet.

Bedding: The mudstone of this formation is thick bedded to massive, siltstone is medium to thick bedded and sandstone is thin to very thick bedded. The formation is extensively cross bedded. This formation is characterized as being well bedded and crossbedded in most places.

Fracturing: Joints of this formation are well developed, unevenly spaced, highly abundant, steeply dipping and open.
Weathering: The Sherman's Creek Member is moderately resistant to weathering. It is moderately weathered to a moderate depth. Fragmentation of this formation is tabular with fragments having rough hackly surfaces. The overlying mantle is thick in most places.

Topography: This formation underlies a rolling topography characterized by moderate to moderately steep slopes. Natural slopes within this area are stable.

Drainage: In general, the Sherman's Creek Member is characterized as having good surface drainage.

Porosity and Permeability: The formation is characterized by a moderate secondary porosity in joint- and bedding-plane openings. The permeability of this formation is moderate.

Groundwater: Well yields are generally good to excellent. Water quality is generally good, but water may be high in iron.

Ease of Excavation: The ease of excavating this rock formation is generally characterized as difficult. Excavating highly fractured rock is moderately easy. The drilling rate within the formation is fast.

Cut_Slope Stability: This characteristic is rated poor to good. Where rocks are highly weathered and fractured, cut-slope stability is only poor.

Foundation Stability: Foundation stability is generally good. Foundations should be excavated to sound bedrock.

Construction Material: Good source of road material and random fill.

5. **<u>Irish Valley Member of the Catskill Formation (Dciv)</u>**

This formation is the second largest geologic area in the Township. In two sections, this formation is located parallel to Berry Mountain and folds back toward the Borough of Halifax. A second band of rock is located at the southwestern corner of the Township under Powell Creek and south of Million Dollar Road.

Description: This formation generally consists of alternating beds of olive-gray sandstone, siltstone and shale with red siltstone, mudstone and shale. The olive-gray sandstone of this formation commonly contains fossils. The formation has an approximate maximum thickness of 250 feet.

Bedding: The siltstone of this formation is thin to very thin bedded, while shale is very thin to medium bedded and the mudstone and sandstones are medium to very thick bedded. The formation is extensively cross bedded. This formation is characterized as being well bedded and crossbedded in most places.

Fracturing: Joints of this formation are well developed, unevenly spaced, highly abundant, steeply dipping, and open.

Weathering: The Irish Valley Member is slightly to moderately resistant to weathering. It is deeply weathered. Fragments of this formation are blocky to pencil shaped, rough surfaced. The overlying mantle is moderate to thick in most places.

Topography: This formation forms hills and ridges of moderate relief. Slopes are generally fairly steep to steep. Natural slopes within this area are generally stable.

Drainage: In general this member has good surface drainage.

Porosity and Permeability: The formation is characterized by a low secondary porosity in joint- and bedding-plane openings. The permeability of this formation is also low.

Groundwater: Well yields are reported to range from 2 to 380 gal/min, with a median of 35 gal/min. Water quality problems include salty water and hydrogen sulfide.

Ease of Excavation: The ease of excavating this rock formation is generally characterized as moderately easy. Excavating deeply weathered shale and siltstone is generally easy. Sandstone and mudstone are generally broken by fractures.

Cut_Slope Stability: This characteristic is rated poor to fair due to the rapid disintegration of shale and siltstone and fractured sandstone and mudstone.

Foundation Stability: Foundation stability is generally good. Foundations should be excavated to sound bedrock.

Construction Material: Good source of road material and random fill.

6. **Trimmers Rock Formation (Dtr)**

This formation is located with the "V" shaped fold of the Irish Valley Member north of the Borough of Halifax.

Description: This Formation generally consists of light-gray to olive, fine-grained sandstone and siltstone with olive to gray shale interbeds. The formation has an approximate maximum thickness of 3,000 feet.

Bedding: The bedding of this formation is well developed and massive to flaggy.

Fracturing: Joints of this formation are well developed. They are moderately to closely spaced and steeply dipping. The also have a blocky and platy pattern and are regularly spaced.

Weathering: The Trimmers Rock Formation is slightly to moderately resistant to weathering. It is moderately weathered at a moderate depth. Medium to small blocks result from the disintegration of sandstone beds. Small, flat, plate-like fragments accumulate at the base of shale units. The overlying mantle is moderate to thick in most places and is composed of glacial till in northeastern Pennsylvania.

Topography: This formation forms rolling ridges of medium relief. Slopes are generally fairly steep to steep. Natural slopes within this area are generally steep and stable.

Drainage: In general this member has good surface drainage.

Porosity and Permeability: The formation is characterized by a moderate secondary porosity in joint- and bedding-plane openings. The permeability of this formation is also moderate to low.

Groundwater: Median well yields are reported as 30 gal/min. Water may be high in total dissolved solids and may contain hydrogen sulfide. Water from. This area is generally characterized as soft.

Ease of Excavation: The ease of excavating this rock formation is generally characterized as moderately difficult. A moderate drilling rate can be expected in this formation.

Cut_Slope Stability: This characteristic is rated fair in siltstone and shale, and good in sandstone.

Foundation Stability: Foundation stability is generally good. Foundations should be excavated to sound material.

Construction Material: Good source of road material and random fill.

7. **Hamilton Group (Dh)**

The Hamilton Group is a small formation located within the Trimmers Rock formation and is situated almost entirely in the Susquehanna River. A small portion of this formation stretches across Route 147.

Description: This formation generally consists of olive-gray to medium-olive gray, fossiliferous siltstone and shale inter-bedded with fine-grained, medium-dark-gray sandstone. The formation has an approximate maximum thickness of 2,200 feet.

Bedding: The bedding of this formation is well developed. Shale in this formation is thin to fissile, while sandstone is thin flaggy and medium bedded.

Fracturing: Joints of this formation are well developed, closely spaced, mostly open, and steeply dipping. Joints produce smooth, even-faced, sharp-edged rectangular blocks in sandstone.

Weathering: This formation is moderately to poorly resistant to weathering. Fissile shale weathers to light gray and disintegrates relatively easy into this plates.

Sandstone withers to light olive-gray and yellowish brown and is moderately to highly resistant. The overlying mantle is thin.

Topography: Sandstone of this formation form conspicuous ridges, while shale underlies hills of medium height having stable slopes.

Drainage: In general this formation has good surface drainage.

Porosity and Permeability: The formation is characterized by a low to moderate secondary porosity in joint- and bedding-plane openings. The permeability of this formation is also moderate.

Groundwater: Median well yields are reported as 30 gal/min. Water may be high in iron and sulfur. Hydrogen sulfide gas is also common.

Ease of Excavation: The ease of excavating this rock formation is generally characterized as moderately easy to difficult. A fast to moderate drilling rate can be expected in this formation.

Cut_Slope Stability: This characteristic is rated fair in shale, and good in sandstone.

Foundation Stability: Foundation stability is generally good. Foundations should be excavated to fresh bedrock. There may be a need for underdrainage.

Construction Material: Good source of road material, rip rap, building stone, and fill. Shale may be good source of light weight aggregrate.

Halifax Township
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APPENDIX C
WELL WATER & SEWAGE SURVEY RESULTS SUMMARY

Halifax Township
Act 537 Sewage Facilities Plan

APPENDIX D
ON-LOT SEWAGE MANAGEMENT PROGRAM ORDINANCE

ON-LOT SEWAGE MANAGEMENT PROGRAM ORDINANCE

AN ORDINANCE GOVERNING MUNICIPAL MANAGEMENT OF ON-LOT SUBSURFACE SEWAGE DISPOSAL FACILITIES THE TOWNSHIP OF HALIFAX, DAUPHIN COUNTY, PA

The Board of Supervisors of the Township of Halifax, in the County of Dauphin and the Commonwealth of Pennsylvania, hereby ordains:

Section I. Short Title: Introduction; Purpose

A. This ordinance shall be known and may be cited as "An ordinance providing for a Sewage Management Program for Halifax Township."

B. In accordance with municipal codes, the Clean Streams Law (Act of June 27, 1937, P.L. 1987, No. 394 as amended, 35 P.S. §§691.1 to 691.1001), and the Pennsylvania Sewage Facilities Act (Act of January 24, 1966, P.L. 1535 as amended, 35 P.S. §750.1 *et seq.* known as Act 537), it is the power and the duty of Halifax Township to provide for adequate sewage treatment facilities and for the protection of the public health by preventing the discharge of untreated or inadequately treated sewage. The Official Sewage Facilities Plan for Halifax Township indicates that it is necessary to formulate and implement a sewage management program to effectively prevent and abate water pollution and hazards to the public health caused by improper treatment and disposal of sewage.

C. The purpose of this ordinance is to provide for the regulation, inspection, maintenance and rehabilitation of on-lot sewage disposal systems; to further permit intervention in situations which may constitute a public nuisance or hazard to the public health; and to establish penalties and appeal procedures necessary for the proper administration of a sewage management program.

Section II. Definitions

A. "Authorized Agent" shall mean a sewage enforcement officer, employee of the Township, professional engineer, plumbing inspector, or any other qualified or licensed person who is authorized to function within specified limits as an agent of Halifax Township to administer or enforce the provisions of this ordinance.

B. "Board" shall mean the Board of Supervisors, Halifax Township, Dauphin County, Pennsylvania.

C. "Community Sewage System" shall mean any system, whether publicly or privately owned, for the collection of sewage from two or more lots, and the treatment and/or disposal of the sewage on one or more lots or at any other site.

D. "Department" shall mean the Department of Environmental Protection of the Commonwealth of Pennsylvania (DEP).

E. "Individual Sewage System:" shall mean a system of piping, tanks or other facilities serving a single lot and collecting and disposing of sewage in whole or in part into the soil or into any waters of this Commonwealth.

F. "Malfunction" shall mean a condition which occurs when an on-lot sewage disposal system discharges sewage onto the surface of the ground, into ground waters of this Commonwealth, into surface waters of this Commonwealth, backs up into a building connected to the system or in any manner causes a nuisance or hazard to the public health or pollution of ground or surface water or contamination of public or private drinking water wells. Systems shall be considered to be malfunctioning if any condition noted above occurs for any length of time during any period of the year.

G. "Official Sewage Facilities Plan" shall mean a comprehensive plan for the provision of adequate sewage disposal systems, adopted by the Board of Supervisors and approved by the Pennsylvania Department of Environmental Protection, pursuant to the Pennsylvania Sewage Facilities Act.

H. "On-Lot Sewage Disposal System (OLDS)" shall mean any system for disposal of domestic sewage involving pretreatment and subsequent disposal of the clarified sewage into a subsurface soil absorption area or retaining tank; this term includes both individual sewage systems and community sewage systems.

I. "Person" shall mean any individual, association, public or private corporation for profit or not for profit, partnership, firm, trust, estate, department, board, bureau or agency of the Commonwealth, political subdivision, municipality, district, authority, or any other legal entity whatsoever which is recognized by law as the subject of rights and duties. Whenever used in any clause prescribing and imposing a penalty or imposing a fine or imprisonment, the term person shall include the members of an association, partnership or firm and the officers of any local agency or municipal, public or private corporation for profit or not for profit.

J. "Pumper/Hauler" Any person, company, partnership or corporation which engages in cleaning community or individual sewage systems and transports the septage cleaned from these systems. All Pumper/Haulers must also be certified through DEP.

K. "Pumpers Report/Receipt" Form which shall be used by all licensed Pumper/Haulers to report each pumping of community or on-lot sewage disposal systems in the Township.

L. "Rehabilitation" shall mean work done to modify, alter, repair, enlarge or replace an existing on-lot sewage disposal system.

M. "Sewage" shall mean any substance that contains any of the waste products or excrement or other discharge from the bodies of human beings or animals and any noxious or deleterious substances being harmful or inimical too the public health, or to animal or aquatic life, or to the use of water for domestic water supply or for recreation or which constitutes pollution under the Act of June 22, 1937 (P.L. 1987, No. 394), known as "The Clean Streams Law," as amended.

N. "Sewage Enforcement Office (SEO)" shall mean a person certified by DEP who is employed by the Township of Halifax. Such person is authorized to conduct investigations and inspections, review permit applications, issue or deny permits and do all other activities as may be provided for such person in the Sewage Facilities Act, the rules and regulations promulgated thereunder and this or any other ordinance adopted by the Township.

O. "Sewage Management District" shall mean any area of areas of the Township designated in the Official Sewage Facilities Plan adopted by the Board as an area for which a Sewage Management program is to be implemented.

P. "Sewage Management Program" shall mean a comprehensive set of legal and administrative requirements encompassing the requirements of this ordinance, the Sewage Facilities Act, the Clean Streams Law, the regulations promulgated thereunder and such other requirements adopted by the Board to effectively enforce and administer this ordinance.

Q. "Subdivision" shall mean the division or redivision of a lot, tract or other parcel of land into two or more lots, tracts, parcels or other division of land, including changes in existing lot lines. The enumerating of lots shall include as a lot that portion of the original tract or tracts remaining after other lots have been subdivided therefrom.

R. "Township" shall mean the township of Halifax, Dauphin County, Pennsylvania.

S. For the purposes of this ordinance, any term which is not defined herein shall have that meaning attributed to it under the Sewage Facilities Act and Regulations promulgated thereto.

Section III. Applicability

A. From the effective date of this ordinance, its provisions shall apply in any portion of the Township of Halifax identified in the Official Sewage Facilities Plan as a sewage management district. Within such as area or areas, the provisions of this ordinance shall apply to all persons owning any property serviced by an on-lot sewage disposal system and to all persons installing or rehabilitating on-lot sewage disposal systems.

Section IV. Permit Requirements

A. No person shall install, construct or request bid proposals for construction, or alter an individual sewage system or community sewage system or construct or request bid proposals for construction or install or occupy any building or structure for which an individual sewage system or community sewage system is to be installed without first obtaining a permit from the Sewage Enforcement Officer which permit shall indicate that the site and the plans and specifications of such system are in compliance with the provisions of the Clean Streams Law (35 P.S. §§691.1-691.1001) and the Pennsylvania Sewage Facilities Act (35 P.S. 750.1 *et seq.*) and the regulations adopted pursuant to those Acts.

B. No system or structure designed to provide individual or community sewage disposal shall be covered from view until approval to cover the same has been given by a sewage enforcement officer. If 72 hours have elapsed, excepting Sundays and Holidays, since the sewage enforcement office issuing the permit received notification of completion of construction, the applicant may cover said system or structure unless permission has been specifically refused by the sewage enforcement officer.

C. Applicants for sewage permits may be required to notify the sewage enforcement officer of the schedule for construction of the permitted on-lot sewage disposal system so that inspection(s) in addition to the final inspection required by the Sewage Facilities Act may be scheduled and performed by a sewage enforcement officer.

D. No building or occupancy permit shall be issued for a new building which will contain sewage generating facilities until a valid sewage permit has been obtained from a sewage enforcement officer.

E. No building or occupancy permit shall be issued and no work shall begin on any alteration or conversion of any existing structure, if said alteration or conversion shall result in the increase or potential increase in sewage flows from the structure, until either the structure's owner receives a permit for alteration or replacement of the existing sewage disposal system or until the structure's owner and the appropriate officials of the Township receive written notification from a sewage enforcement officer that such a permit will not be required. The sewage

enforcement officer shall determine whether the proposed alteration or conversion of the structure will result in increased sewage flows.

F. Sewage permits may be issued only by a sewage enforcement officer employed by the Township. DEP shall be notified as to the identity of each sewage enforcement officer employed by the Township.

Section V. Inspections

A. Any on-lot sewage disposal system may be inspected by an authorized agent at any reasonable times after the effective date of this ordinance.

B. Such inspection may include a physical tour of the property, the taking of samples from surface water, wells, other groundwater sources, the sampling of the contents of the sewage disposal system itself and/or the introduction of a traceable substance into the interior plumbing of the structure served to ascertain the path and ultimate destination of wastewater generated in the structure.

C. An authorized agent shall have the right to enter upon land for the purposes of inspections described in this section.

D. A schedule of routine inspections may be established to assure the proper functioning of the sewage systems in the sewage management district.

E. An authorized agent shall inspect systems known to be, or alleged to be, malfunctioning. Should said inspection reveal that the system is indeed malfunctioning, the authorized agent shall order action to be taken to correct the malfunction. If total correction cannot be done in accordance with the regulations of DEP including, but not limited to, those outlined in Chapter 73 of Title 25 of Pennsylvania Code; or, is not technically feasible in the opinion of the authorized agent and a representative of DEP; then action by the property owner to mitigate the malfunction shall be required.

F. If a geographic area arises where numerous on-lot sewage disposal systems are malfunctioning, a resolution of these areawide problems may necessitate detailed planning and a revision to the portion of the Sewage Facilities Plan pertaining to areas affected by such malfunctions. If a DEP authorized Official Sewage Facilities Plan Revision has been undertaken, repair or replacement of individual malfunctioning sewage disposal systems within the area affected by the revision may be delayed, pending the outcome of the plan revision process. However, immediate corrective action will be compelled whenever a malfunction, as determined by the Township Officials and/or the Department, represents a serious public health or environmental threat.

Section VI. Operation

A. Only normal domestic wastes shall be discharged into any on-lot sewage disposal system. The following shall not be discharged into the system.

1. Industrial waste.

2. Automobile oil and other non-domestic oil.

3. Toxic or hazardous substances or chemicals, including but not limited to, pesticides, disinfectants (excluding household cleaners), acids, paints, paint thinners, herbicides, gasoline and other solvents.

4. Clean surface or ground water, including water from roof or cellar drains, springs, basement sump pumps and french drains.

Section VII. Maintenance

A. Any person owning a building served by an on-lot sewage disposal system which contains a septic tank shall have the septic tank pumped by a qualified Pumper/Hauler, which is pre-approved by the Township, and inspected in accordance with Section V by an Authorized Agent after the effective date of this ordinance based on the following:

- Properties located in Halifax Township OLDS District #1: Within one (1) year of the effective date of this ordinance
- Properties located in Halifax Township OLDS District #2: Within two (2) years of the effective date of this ordinance
- Properties located in Halifax Township OLDS District #3: Within three (3) years of the effective date of this ordinance
- Properties located in Halifax Township OLDS District #4: Within four (4) years of the effective date of this ordinance
- Properties located in Halifax Township OLDS District #5: Within five (5) years of the effective date of this ordinance

Thereafter that person shall have the tank pumped and inspected at least once every five years or whenever an inspection reveals that the septic tank is filled with solids or with scum in excess of 1/3 of the liquid depth of the tank.

B. Any person providing a receipt or other written evidence showing that their tank had been pumped within one year of the notification by the Township will be considered to be in compliance with the pumping requirements of paragraph A, but shall still be required to have the septic tank inspected by the Township S.E.O.

C. Each time a septic tank or other subsurface waste disposal system tank is pumped out, the Authorized Agent, or a private septage Pumper/Hauler, whichever provides the service, shall provide to the owner of the subsurface waste disposal system a signed pumpers report/receipt containing at a minimum the following information.

a. Date of pumping.
b. Name and address of system owner.
c. Address of tank's location, if different from owner.
d. Description and diagrams of the location of the tank, including the location of any markers, risers, and access hatches and size of the tank.
e. The date existing system was installed.
f. Last date of pump out.
g. List of other maintenance performed.
h. Any indications of system malfunction observed.
i. Amount of septage or other solid or semi-solid material removed.
j. List of recommendations.
k. Destination of the septage (name of the treatment facility).
l. Manifest Number for approved destination.
l. Sketch of OLDS system and lot layout.

D. Any person owning a building served by an on-lot sewage disposal system which contains an aerobic treatment tank shall follow the operation and maintenance recommendations of the equipment manufacturer. A copy of the manufacturer's recommendations and a copy of the service agreement shall be submitted to the Township within six months of the effective date of this ordinance. Thereafter, service receipts shall be submitted to the Township at the intervals specified by the manufacturer's recommendations. In no case may the service or pumping intervals for aerobic treatment tanks exceed those required for septic tanks.

E. Additional maintenance activity may be required as needed including, but not necessarily limited to, cleaning and unclogging of piping, servicing and the repair of mechanical equipment, leveling of distribution boxes, tanks and lines, removal of obstructing roots or trees, the diversion of surface water away from the disposal area, etc.

Section VIII. System Rehabilitation

A. No person shall operate or maintain an on-lot sewage disposal system in such a manner that it malfunctions. All liquid wastes, including kitchen and laundry wastes and water softener backwash, shall be discharged to a treatment tank. No sewage system shall discharge untreated or partially treated sewage to the surface of the ground or into the water of the Commonwealth unless a permit for such discharge has been obtained from DEP.

B. A written notice of violation shall be issued to any person who is the owner of any property which is found to be served by a malfunctioning on-lot sewage disposal system or which is discharging sewage without a permit.

C. Within seven (7) days of notification by the Township or its Authorized Agent that a malfunction has been identified, the property owner shall make application to the sewage enforcement officer for a permit to repair or replace the malfunctioning system. Within sixty (60) days of initial notification by the Township, construction of the permitted repair or replacement shall commence. Within ninety (90) days of the original notification by the Township, the construction shall be completed unless seasonal or unique conditions mandate a longer period, in which case the Township shall set an extended completion date.

D. A sewage enforcement officer shall have the authority to require the repair of any malfunction by the following methods: cleaning, repair or replacement of components of the existing system, adding capacity or otherwise altering or replacing the system's treatment tank, expanding the existing disposal areas, replacing the existing disposal area, replacing a gravity distribution system with a pressurized system, replacing the system with a holding tank, or any other alternative appropriate for the specific site.

E. In lieu of, or in combination with, the remedies described in Subsection D above, a sewage enforcement officer may require the installation of water conservation equipment and the institution of water conservation practices in structures served. Water using devices and appliances in the structure may be required to be retrofitted with water saving appurtenances or they may be required to be replaced by water conserving devices.

F. In the event that the rehabilitation measures in Subsections A through E are not feasible or effective, the owner may be required to apply for a permit to install a currently accepted regulatory alternate system or to DEP for a single residence treatment and discharge system. Upon receipt of said permit the owner shall complete construction of the system within thirty (30) days.

G. Should none of the remedies described in this Section be totally effective in eliminating the malfunction of an existing on-lot sewage disposal system, the property owner is not absolved of responsibility for that malfunction. The Township may require whatever action is necessary to lesson or mitigate the malfunction to the extent necessary.

Section IX. Liens

The Township, upon written notice from a sewage enforcement officer that an imminent health hazard exists due to failure of property owner to maintain, repair or replace an on-lot sewage disposal system as provided under the terms of this

ordinance, shall have the authority to perform, or contract to have performed, the work required by the sewage enforcement officer. The owner shall be charged for the work performed and, if necessary, a lien shall be entered therefore in accordance with law.

Section X. Disposal of Septage

A. All PADEP certified septage Pumper/Haulers who wish to operate within the Township, shall first receive approval from the Township and shall comply with all reporting requirements established by the Township.

B. Pumper/Haulers of septage operating within the sewage management district shall operate in a manner consistent with the provisions of the Pennsylvania Solid Waste Management Act (Act 97 of 1980, 35 P.S. Section 6018.101-6018.1003) and all other applicable laws. Any septage Pumper/Hauler who violates any of the provisions of this Part of regulations of Halifax Township, the conditions of its State permit, or any State or local law governing its operations, shall, upon conviction thereof, be sentenced to pay a fine not exceeding one thousand dollars ($1,000.00) and costs, and in default of payment thereof, shall be subject to imprisonment for a term not to exceed thirty days. If any Pumper/Hauler shall have been convicted on two occasions of any violation of the Part, or for violating the conditions of its State permit, or of any State of local law governing its operation, the Board shall have the power to suspend said Pumper/Hauler from operating within the Township for a period of not less than six (6) months or more than two (2) years for each violation, as determined by the Township. Each day the violation continues shall constitute a separate offense.

C. All septage originating within the sewage management district shall be disposed of in accordance with the requirements of the Solid Waste Management Act (Act 97 or 1980, 35 P.S. Section 6018.101 et. sec.) and all other applicable laws and at sites or facilities approved by DEP. Approved sites or facilities shall include the following: septage treatment facilities, wastewater treatment plants, composting sites, and approved farm lands.

Section XI. Administration

A. The Township shall fully utilize those powers it possesses through enabling statutes and ordinances to effect the purposes of this ordinance.

B. The Township shall employ qualified individuals to carry out the provisions of this ordinance. Those employees shall include a sewage enforcement officer and may include an administrator and such other persons as may be necessary. The Township may also contract with private qualified persons or firms as necessary to carry out the provisions of this ordinance.

C. All permits, records, reports, files and other written material relating to the installation, operation and maintenance and malfunction of on-lot sewage disposal systems in the sewage management district shall become the property of, and be maintained by, the Township. Existing and future records shall be available for public inspection during regular business hours at the official office of the Township. All records pertaining to sewage permits, building permits, occupancy permits and all other aspects of the sewage management program shall be made available, upon request, for inspection by representatives of the Pennsylvania Department of Environmental Protection.

D. The Township Board shall establish all administrative procedures necessary to properly carry out the provisions of this ordinance.

E. The Township Board may establish a fee schedule, and authorize the collection of fees, to cover the cost of the Township of administering this program.

Section XII. Appeals

A. Appeals from final decisions of the Township or any of its authorized agents under this ordinance shall be made to the Board of Supervisors in writing within thirty (30) days from the date of written notification of the decision in question.

B. The appellant shall be entitled to a hearing before the Board of Supervisors at its next regularly scheduled meeting, if a written appeal is received at least fourteen (14) days prior to that meeting. If the appeal is not received within fourteen (14) days of the next regularly scheduled meeting, the appeal shall be heard at the next regularly schedule meeting. The municipality shall thereafter affirm, modify, or reverse the aforesaid decision. The hearing may be postponed for a good cause shown by the appellant or the Township. Additional evidence may be introduced at the hearing provided that it is submitted with the written notice of appeal.

C. A decision shall be rendered in writing within thirty (30) days of the date of the hearing.

Section XIII. Penalties

Any person failing to comply with any provision of this ordinance shall be subject to a fine of not less than Five-hundred dollars ($500) and costs, and not more than Five-Thousand dollars ($5,000) and costs, or in default thereof shall be confined in the county jail for a period of not more than ninety (90) days. Each day of noncompliance shall constitute a separate offense.

Section XIV. Repealer

All ordinances or parts of ordinances inconsistent with the provisions of this ordinance are hereby repealed to the extent of such inconsistency.

Section XV. Severability

If any section or clause of this ordinance shall be adjudged invalid, such adjudication shall not affect the validity of the remaining provisions which shall be deemed severable therefrom.

Duly Enacted and Ordained this _____ day of _____ _____

20___ by the Board of Supervisors of the Township of Halifax, Dauphin County, Pennsylvania, in lawful sessions duly assembled.

ATTEST:

Halifax Township
Board of Supervisors

_____
Secretary

_____

_____

_____

(Seal)

Halifax Township
Act 537 Sewage Facilities Plan

APPENDIX E
HOLDING TANK ORDINANCE

Halifax Township
Act 537 Sewage Facilities Plan

APPENDIX F
PRIVY ORDINANCE

Halifax Township
Act 537 Sewage Facilities Plan

APPENDIX G
AN ORDINANCE REGULATING THE ISSUANCE OF SEWER PERMITS

Halifax Township
Act 537 Sewage Facilities Plan

APPENDIX H
SEWER SERVICE AGREEMENT

Halifax Township
Act 537 Sewage Facilities Plan

APPENDIX I
WATER SERVICE AGREEMENT

Halifax Township
Act 537 Sewage Facilities Plan

APPENDIX J
DETAILED PUBLIC SEWER COST ESTIMATES