# OFFICIAL SEWAGE FACILITIES PLAN
# FOR
# WEST CALN TOWNSHIP
# CHESTER COUNTY, PENNSYLVANIA

**PREPARED**
**IN ACCORDANCE WITH**
**PENNSYLVANIA SEWAGE FACILITIES ACT**
**ACT 537, AS AMENDED**

**Revised and Updated**
**January 25, 2011**

**Prepared by**

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## Introduction:

### A. Authority:

"Municipalities are required to develop and implement comprehensive official plans which provide for the resolution of existing sewage disposal problems, provide for the future sewage disposal needs of new land development, and provide for the future sewage disposal needs of the municipality." (Pa Code 25§71.11)

Administration of the Sewage Facilities Planning Program comes under provisions of the PA Code Title 25, Chapter 71, issued under section 1920-A of the Administrative Code of 1929 (71 P.S. § 510-20); sections 5 and 402 of The Clean Streams Law (35 P.S. §§ 691.5 and 691.402); and section 9 of the Pennsylvania Sewage Facilities Act (35 P.S. § 750.9), also known as Act 537.

### B. Goal and Objective:

The goal of this plan is to address the immediate and long-term needs of West Caln Township ("Township"), including both the needs generated by the recent growth in the Township and the existing older communities.

The objective of this plan is first to comply with the requirements as set forth by the Pennsylvania Sewage Facilities Planning Act (Act 537) but, more importantly, to develop a plan that will provide for the safe and effective disposal of wastewater in such a way as to protect and, if possible, enhance the environment. Finally, the plan shall be implemented in a reasonable time at an affordable cost and so as to provide the best service possible for the residents.

### C. Plan Summary:

#### 1. Identification of Service Areas and Major Problems Evaluated:

This is a comprehensive plan to provide adequate sewage facilities for the entire township, with special attention to areas of the township that were impacted by EPA Superfund sites.

**2. Identification of Selected Alternatives and Institutional Arrangements needed for implementation:**

This plan recommends adoption of a sewage management ordinance to assure the proper operation and maintenance of all individual sewerage facilities in the Township. Also this plan provides for the inclusion within Pennsylvania American Water Company's sewer franchise area all properties with a principal dwelling within 150 feet of the public sewer right of way.

No additional institutional arrangements are foreseen or required to implement this plan.

**3. Estimated Costs:**

The estimated annual cost for the individual property owner to properly operate and maintain a conventional onsite sewage disposal system is approximately $150 per year.

The cost for public sewer service will be in accordance with the Tarff as approved by the Pennsylvania Public Utility Commission.

**4. Municipal commitments:**

The Township will adopt a Sewage Management Ordinance for individual sewage systems.

**5. Implementation Schedule:**

The Sewage Management Ordinance is expected to be adopted prior to Pa DEP's approval of this plan. If such adoption has not occurred, the foregoing Ordinance is expected to be adopted within 90 days after this plan is approved by Pa DEP.

## I. Previous Wastewater Planning:

### A. Chester County Master Plan:

The "County 537 Plan" – the Chester County Planning Commission prepared a Comprehensive Area-Wide Sewerage Plan for Chester County in 1968 and then revised this plan as the "Master Sewer Plan Revised Edition 1970 for Chester County Pennsylvania Existing – 1968 to 1978 –

1978 to 1988". Many municipalities in the county adopted this plan as their Official Act 537 Plan while several municipalities conditionally adopted portions of the County 537 Plan. This plan indicated that a gravity sewer service would ultimately be extended up Rock Run along Wagontown Road toward Wagontown Road and along Mineral Spring Road (Valley Township) toward the Coatesville County Club. The County 537 Plan indicated this sewer system would serve a projected population of 1,600 with a sewage flow of 0.06 million gallons per day. Additional capacity will be required.

## B. Municipal Wastewater Planning:

The current official Township plan was first adopted on April 3, 1978 (referred to hereafter as the 1978 Plan) and was amended on February 9, 1987 and November 11, 1996. This plan recommended the following:

- Encourage the use of onsite land application disposal systems as a viable alternative to the County 537 Plan.
- Recognize the need for operation and maintenance agreements with owners of sewage treatment systems.
- Provide current residents information regarding the reduction of flows to the septic tanks and benefits of regular maintenance of their onsite systems.
- Utilize water conservation devices.
- Establish an active policy to review proposed sewage treatment systems.
- Obtain public input for proposed sewage facilities.
- Adopt a policy to annually review the Township Act 537 Plan.

The 1987 and 1996 amendments established that: (i) in the event lots could not be served by conventional on-lot systems such lots could be served by aerobic treatment systems (also known as Small flow treatment facilities) and (ii) "The operation and maintenance of any individually-owned and individually-operated aerobic wastewater treatment system shall be the sole responsibility of the homeowner who applies for the installation of such system."

## C. Major New Land Development Plan Revisions:

Calnshire West and Sandy Hill Subdivisions: Pa DEP Code No. 1-15961-554-3H
Lawrence Goldberg (Country Meadows) Subdivision: Pa Code No. 1-15961-533-3

On January 30, 2002, the Pa DEP approved a revision to the Township Official Sewage Facilities Plan that provided for the development of 124 residential units for the Calnshire West Subdivision and 88 residential units for the Sandy Hill Subdivision. This planning approval also provided for the installation of a sewage collection system and a regional pumping station with conveyance to a manhole near Route 372 and Belvedere Avenue as part of the Sadsbury Township sewer system. The regional pumping station is located on Sandy Way near Sandy Hill and Coffroath Roads in West Caln Township. This pumping station was approved to convey sewage flows from Calnshire West, Sandy Hill and the Lawrence Goldberg (Country Meadows) Subdivision. Separate planning modules will be required for the Lawrence Goldberg (Country Meadows) Subdivision.

On December 4, 2002 (Exhibit E-10), Pa DEP approved a revision to the Sadsbury Township Official Sewage Facilities Plan that that updated the January 30th approval and revised the location of the point of conveyance within Sadsbury Township to a gravity sewer line located near the intersection of Old Wilmington Road and Meeting House Road. Also, this latter plan revision changed the average design flow from 104,737 gallons per day to 100,013 gallons per day for all three subdivisions. Pennsylvania American Water Company ultimately obtained the permit for the construction and operation of the pumping station and force main.

## D. Pennsylvania American Water Company:

On November 19, 2009, Pa DEP approved an Act 537 Plan for the municipalities tributary to the Pennsylvania American Water Company's Coatesville Wastewater Treatment Facility. Approval to use available treatment capacity in the Coatesville Wastewater Treatment Facility is pending Pa DEP's approval of individual Act 537 Plan revisions from the tributary municipalities.

## E. Sadsbury Township Sewer System:

Sadsbury Township owns and operates a sewer collection and conveyance system within its borders. The Sadsbury Township sewer system conveys to the Pennsylvania American Water Company's Coatesville system for further conveyance and treatment at the Coatesville Wastewater Treatment Facility. In accordance with the Wastewater Conveyance Agreement with Sadsbury Township, there is 110,000 gallons per day of conveyance capacity available,-. However, it should be noted that only 100,013 gallons per day was approved on December 4, 2002 (reference: Pa DEP Code No. 1-15961-554-3H).

## II. Physical and Demographic Description:

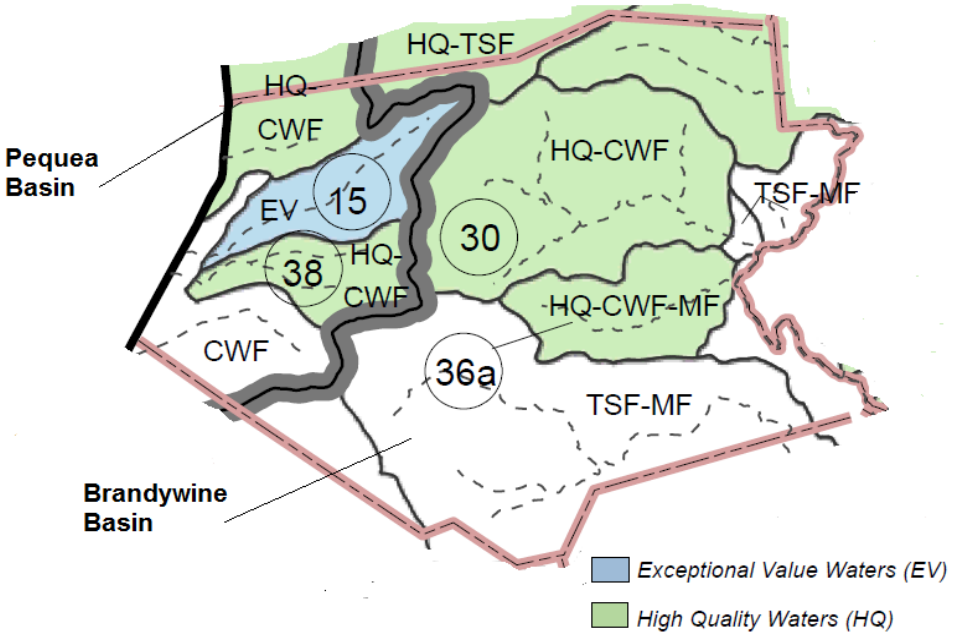
### A. Identification of the Planning Area:

West Caln Township, Chester County is a township of the 2nd class. The Township is located northwest of the City of Coatesville and straddles Route 340 north of the Coatesville Downingtown Bypass (State Route 30). West Caln Township consists of 21.98 square miles and is located in the Coatesville Area School District. Exhibit E-2 “Municipal Zoning Map” serves as the Official Township Map.

### B. Stream Drainage Basins:

West Caln Township has two major drainage basins: Pequea Creek and the West Branch of the Brandywine Creek. The Pequea Creek is a part of the Susquehanna River Basin which, in turn, is part of the Chesapeake Bay Watershed. The West Branch of the Brandywine Creek is part of the Delaware River Basin, which is also known as the Delaware Bay. Many of the sub-basins within the major basins of West Caln Township are protected waters of the Commonwealth. The protected uses are for migratory fish and trout stocking streams. Many of the streams in the Township are also designated as high quality waters. High quality waters are those streams and watersheds which have excellent quality waters and have environmental or other features that require special water quality protection. Permits for stream discharge sewage treatment plants are often quite difficult to obtain in high quality water basins. Stream discharge plants serving new individual homes or small commercial establishments are not permitted under the current regulations in high quality water basins.

**Water Protected Use Designations for Streams in West Caln Township**




**(Ref: Water Resources Map 15 – Chester County Water Resources Authority - 12/21/2005)**

## C. Soils:

*(Reference source: Township Comprehensive Plan, March 25, 1998)*

The Township's geology consists of two predominate soil types, the Edgemont Association and the Neshaminy- Glenelg Association. A soil association is a pattern of soils that contain a limited number of major and minor soil kinds.

A soil association does not indicate uniformity. In fact the soils in an association can vary greatly from one another; however, they are often similar in pattern. The Chester and Delaware County Soil Survey (1963) is the main source of information on local soils. It describes the Edgemont Association as comprised of soils which are generally moderately deep, channery soils on grayish quartzite and phyllite. These soils are found on ridges and slopes in the northwest quadrant of the Township extending from Compass, northeast to Brandywine Manor in West Brandywine Township.

Agricultural uses are found in some parts of the Edgemont Association, but many areas, particularly those that are steeply sloped, remain wooded. Most of the remaining soils are of the Neshaminy-Glenelg Association. These soils tend to be moderately deep to deep, silty and well drained.

These soils are usually gently to moderately sloping with only limited areas of steep, stony soils, and are mainly wooded. These soils are found throughout the eastern parts of the Township and throughout the valley of the West Branch of the Brandywine Creek. These soils are also appropriate for agricultural activity.

Because both the Edgemont and the Neshaminy-Glenelg soil associations are moderately deep and well drained, they are generally suitable for on-lot sewage disposal systems. Since most residents of the Township are dependent on individual on-lot disposal systems, and will likely continue to be dependent on them, this factor is an important planning consideration. The soils within the Neshaminy-Glenelg Association are somewhat more varied refarding their suitability for this use, with different limitations based on the specific characteristics of individual soils. Several soils within this association are not as well drained as others, limiting their use for septic systems.

Soils are classified by the U.S. Department of Agriculture in terms of their suitability for various agricultural purposes.

This information is intended to assist the agricultural community in making decisions on the types of crops that can be successfully raised in a given area. The soils are rated on several characteristics and then classified from I to VIII, with each soil class having a different set of values indicating its level of appropriateness for certain uses. Those that have the fewest limitations and the greatest range of uses are Class I soils, while those with the greatest number of natural limitations and the fewest uses are Class VIII soils. The soils that are dominant throughout West Caln Township are primarily Class I, II or III, with most of the Class I and II soils extending throughout the central regions of the Township. *(Exhibit E-6 Map-4-2 "Land Resources" from the Township Comprehensive Plan.)*

Farm Lands - The Zoning Map of West Caln Township identifies large areas zoned within the 'Agricultural Preservation District'. The intent of this zoning district is to preserve areas where agriculture is the primary land use. It is the desire of the Township's Board of Supervisors to preserve the rural character of West Caln Township and to discourage the development of these areas.

## D. Geology and Topography:

*(Reference source: Township Comprehensive Plan, March 25, 1998)*

Land regions are classified by common landscape characteristics while geologic formations are described in terms of physiographic provinces.

Chester County lies within the Piedmont Province. This province consists of three sections, the Piedmont Upland, the Triassic Lowland and the Conestoga Valley, each of which has distinct bedrock characteristics. The Piedmont Upland comprises the majority or about 85 percent of the County, and all of West Caln Township. The underlying bedrock in the Piedmont Upland is predominately schist, gneiss, quartzite and gabbro. The Triassic Lowland comprises most of the remaining area of the County with the underlying bedrock consisting of shale and sandstone. A very small section of the Conestoga Valley is located in West Caln Township in the Compass vicinity and extending toward Brandywine Manor in West Brandywine Township. This area is underlain by schist and quartzite.

The geology of a region is a primary determinant of the types of land uses that can take place and the degree of development that can occur. The geology determines the types of soils present, the groundwater available, the stability of bedrock, and often, the types of naturally occurring vegetation. The topography is mostly determined by geology as well. The origin, age, and rock types which make up the geology also determine the hardness of the underlying rock and their resistance to erosion. The erodibility and weathering of the underlying rock determines the slope and the extent to which hills and valleys and formed. The regional geology is directly related to water resources.

The topography of West Caln Township is comprised of gently rolling uplands with low hills, and low to moderate slopes, typical characteristics of the Piedmont Province. The highest ridges are found in the region of the Barren Hills (central and north-central West Caln) and the State Hills (south and West Caln). The harder, more erosion resistant quartzite rock formed the ridges of these two ranges. The Chester Valley, a primary geological feature of Chester County, traverses Chester County in an east-west direction just south of West Caln's southern boundary. This Valley ranges in width from one to two miles, is underlain by limestone, and is responsible for the formation of some of the best agricultural soils in the country. Although the Chester Valley does not traverse West Caln, its proximity directly affects the Township and should be recognized in planning for land use.

Several areas of steep slopes are found in West Caln. Most are associated with the ridges of the State Hills and Barren Hills. The corridor of the West Branch of the Brandywine Creek also contains some steep slopes. Steep slopes are a particular environmental concern because inappropriate development of these areas can result in uncontrolled stormwater runoff and severe erosion. The slopes most susceptible to erosion are those 15 percent and over.

Exhibit E-6 (Map 4-2 “Land Resources” from the Township Comprehensive Plan) also depicts those areas containing steep slopes (15% to 25%) and

very steep slopes (greater than 25%). Slopes greater than 15% have some limitations on the types of wastewater land applications that are available. Surface land applications on slopes greater than 25% are generally not advisable.

## E. Potable Water Supplies:

### 1. Groundwater:

*(Reference source: Township Comprehensive Plan, March 25, 1998)*

Groundwater is closely related to and highly dependent on the regional geology. The geological formations and the underlying bedrock determine both water quality and quantity. The porosity and density of the bedrock, and the number of cracks and fissures present, dictate the amount of groundwater that can be stored and how easily the water can be extracted via a well. Bedrock also varies significantly in terms of the ability to filter pollutants. When surface water seeps to the aquifer, it is cleansed of many pollutants as it filters downward. Sediment and chemicals are then trapped in the rock. Limestone, for instance, does not provide good filtration because the rock is highly soluble and large channels tend to form, which can rapidly convey pollutants, leading to groundwater contamination.

West Caln Township has three distinct hydro geologic areas as indicated on Exhibit E-5 (Map 4-1 of the Township Comprehensive Plan). The majority of the Township, which lies in the Brandywine Creek Basin, is underlain by bedrock with moderate water yields. The northwestern region of the Township, that area in the Pequea Creek sub-basin, is underlain by different bedrock with lower yields of groundwater. The most sensitive area in terms of groundwater is the Compass vicinity which is underlain by limestone. Limestone is highly soluble and the resulting larger cracks and fissures do not provide a high level of filtration. Also, the dissolving of the limestone can result in channels which can readily carry contaminants leading to groundwater contamination. Although limestone can yield high amounts of groundwater, caution should be used in tapping limestone as a source for potable water.

Exhibit E-4, prepared by the Chester County Health Department, shows the areas of groundwater contamination, affected by three EPA Superfund sites within the Township.

### 2. Public Water Supplies:

Public Water Service is provided to limited areas of the Township by the Pennsylvania American Water Company Coatesville Division.
The water company withdraws its source water from three surface water intakes. Two of these water sources are located in West Caln Township; these are the Rock Run Reservoir and the West Branch of the Brandywine Creek intakes.

Both watersheds, Rock Run Basin and the West Branch of the Brandywine Creek (Main Stem, T 437 to Dam at Valley Station downstream of the intake), are designated for protection of Trout Stocked Fish (TSF) and Migratory Fish (MF). The West Branch of the Brandywine Creek, as well as its unnamed tributaries, is listed as being impaired from agricultural activities resulting in high nutrients and siltation.

## F. Wetlands:

*(Reference source: Township Comprehensive Plan, March 25, 1998)*

Although wetlands are not extensive in Chester County, those that are present are environmentally important. Wetlands are defined by the U.S. Corps of Engineers as areas inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands are determined by three different parameters: the periodic presence of water or wet conditions, the presence of hydric (wet) soils, and the presence of wetland vegetation. (Reference Exhibit E-7 Map 4-3 Water Resources of the Township Comprehensive Plan for Wetland and Hydric Soils)

Probably the most important function of wetlands is flood control. Stormwater runoff flows into wetlands and is naturally detained, and then released at a slow rate into adjacent rivers and streams. This detainment combined with a slow release reduces the erosion caused by rapid runoff and also reduces the amount of sediment reaching surface waters. Wetlands also filter storm runoff, preventing potential pollutants from entering streams and rivers. Depending on the type, wetlands can serve as groundwater recharge areas and provide important natural habitat.

The National Wetlands Inventory Maps, prepared by the U.S. Army Corp of Engineers, indicate that wetlands are found throughout West Caln Township. Most of the wetlands in Chester County are palustrine wetlands characterized by trees, shrubs and emergent plants such as cattails. The Township contains palustrine wetlands as well as a high number of riverine

wetlands, or those typically associated with creeks and streams. Lacustrine wetlands are those found adjacent to lakes, but are too deep to support the characteristic vegetation; this type of wetland is found near the Coatesville Reservoir and Chambers Lake.

## III. Existing Sewage Facilities:

### A. Individual Sewage Systems:

Consistent with previous planning, most of the building lots within West Caln Township are served by Individual Sewage Systems, with onlot systems (those systems that rely on renovation through the natural soils) being the most prominent. There are several Small Flow Treatment Facilities serving homes and small commercial establishments where the soils are unsuitable for an onlot sewer system.

### B. Existing Community/Public Sewage Systems:

#### 1. Valley Township Municipal Authority:

a) Country Ridge Development:

Country Ridge Development is a residential development situated mostly in Valley Township of which 16 homes are within West Caln Township. This development is served by Valley Township's municipal authority. Valley Township conveys its sewage to the Pennsylvania American Water Company's Coatesville Sewage Treatment Plant in South Coatesville (NPDES No. PA0026859).

b) Highlands Corporate Center:

Valley Township Municipal Authority also serves the Highlands Corporate Center which is located mostly in Valley Township between West Caln Township's southern boundary and the Route 30 Bypass. Five parcels are located within West Caln Township; only one parcel on Cheshire Court has been developed at the present time.

**2. Pennsylvania American Water Company:**

The Pennsylvania American Water Company's Coatesville Division owns and operates a sanitary sewer collection and conveyance system which currently serves the Calnshire West and Sandy Hill subdivisions; there are 124 and 88 approved building lots respectively. The Pennsylvania American Water Company is an investor owned public utility company regulated by the Pennsylvania Public Utilities Commission.

Calnshire West and Sandy Hill subdivisions have traditional gravity sewers. The collected sewage flows to the Sandy Hill Pumping Station (WQM No. 1502412), near the intersection of Sandy Hill and Coffroath Road, where a force main conveys to a gravity manhole within Sadsbury Township near the intersection of Old Wilmington Road and Meeting House Road. The sewage is then conveyed through Sadsbury Township to a point where Sadsbury's collection system (WQM. No. 1599404) reconnects to the Parksburg interceptor for ultimate treatment and disposal at the Coatesville Wastewater Treatment Facility located in South Coatesville (NPDES No. PA0026859).

An agreement (Exhibit E-11) with Sadsbury Township limits the current conveyance capacity through Sadsbury to 110,000 gallons per day with a peak pumping flow rate of 290 gallons per minute.

Planning approval granted on December 4, 2002 (Exhibit E-10) reduced capacity of the Sandy Hill Pumping Station from 104,737 gallons per day (which was previously approved on January 30, 2002) to an "average design flows of 100,013 gallons per day for all three subdivisions" (Calnshire West, Sandy Hill and Lawrence).

In 2010, the average daily flow through the Sandy Hill Pumping Station was 23,262 gallons per day. This flow was for 180 homes that were completed and occupied (88 homes in the Sandy Hill development and 92 homes in the Calnshire development). There are 32 homes remaining to be completed in the Calnshire development. The average daily flow per completed homes was 129 gallons per day.

Pennsylvania American also provides sewer service for the Coatesville County Club, which conveys through Valley Township. In 2010 the average flow was 2,880 gallons per day.

### 3. Mobile/Manufactured Home Communities:

There are several mobile/manufactured home communities in the Township, four of which are served by community onlot sewage systems while the others are served with individual onlot sewage systems. The Township Comprehensive plan indicates the mobile home and trailer park communities represent a significant percentage of the population due to higher densities. A listing of the mobile home communities is presented in Table 1.

**Table 1 – Mobile/Manufactured Home Communities**
**West Caln Township, Chester County**

| | Number of Units | Type of Sewage System | Type of Permit |
|---|---|---|---|
| Baldwin's MHP | 5 | Individual Onlot | Chapter 73 |
| Beacon Lite TP | 8 | Individual Onlot | Chapter 73 |
| Beech Tree Village MHP | 17 | Individual Onlot | Chapter 73 |
| Hideaway MHP | 32 | Large Volume Onlot | WQM 1599415 |
| High Point Estates MHP | 16 | Individual Onlot | Chapter 73 |
| Imperial Courts MHP | 53 | Community Onlot | Chapter 73 |
| Phillips MHP | 20 | Community Onlot | Chapter 73 |
| Shady Oak Terrace MHP | 15 | Community Onlot | Chapter 73 |
| Spring Hill Estates MHP | 238 | Community Sewerage | NPDES PA0055697 |
| Stoltzfus MHP | 8 | Individual Onlot | Chapter 73 |
| Taggart's TP | 6 | Individual Onlot | Chapter 73 |
| West Caln Estates MHP | 4 | Individual Onlot | Chapter 73 |

**4. Campgrounds:**

There are two active campgrounds in the Township, Birchview Farm and Hidden Acres. Each of these campgrounds provides full water/electric/sewer hookups for a large number of the camp sites in addition to central bathhouse facilities. A listing of these Campgrounds is presented in Table 2.

**Table 2 – Campgrounds**
**West Caln Township, Chester County**

| | | Type of Sewage System | Type of Permit |
|---|---|---|---|
| Birchview Farm | Aprox. 200 camp sites | Community Onlot | Chapter 73 |
| Hidden Acres | Aprox. 338 camp sites | Community Onlot | Chapter 73 |

## C. Sewage Disposal Needs:

The Chester County Health Department has recommended that the following areas be considered for public sewer (listed from most to least important):

- Toby Road – Baldwin Subdivision
- Baldwin Road & Hidden Acres Road – Camp Ground
- High Point Lane - Trailer Park
- East Mattson Road & parts of South Bonsall Road

Additional studies will need to be done to determine the exact condition of the systems in these areas. Individual systems may need maintenance while others can be repaired. If it is later determined that an extension of the public sewers is needed the Township will need to take further action.

Since 2005 the County Health Department has been tracking septic system pump activity (see Exhibit E-3). A review of this Exhibit shows that there are very few parcels that have pumped their septic systems more than annually, a possible indicator of a malfunctioning system. However, there are a fair number of parcels that have not pumped their septic systems in the five

years since this data has been compiled. This is an indicator of a possible lack of proper maintenance.

### D. Wastewater Sludge and Septage Generation, Transport and Disposal:

The Chester County Health Department has established minimum standards for the handling, transporting, storage and disposal of solid and liquid waste materials. All haulers of such materials are licensed by Chester County and are required to document and report all pumping activity to the County's database.

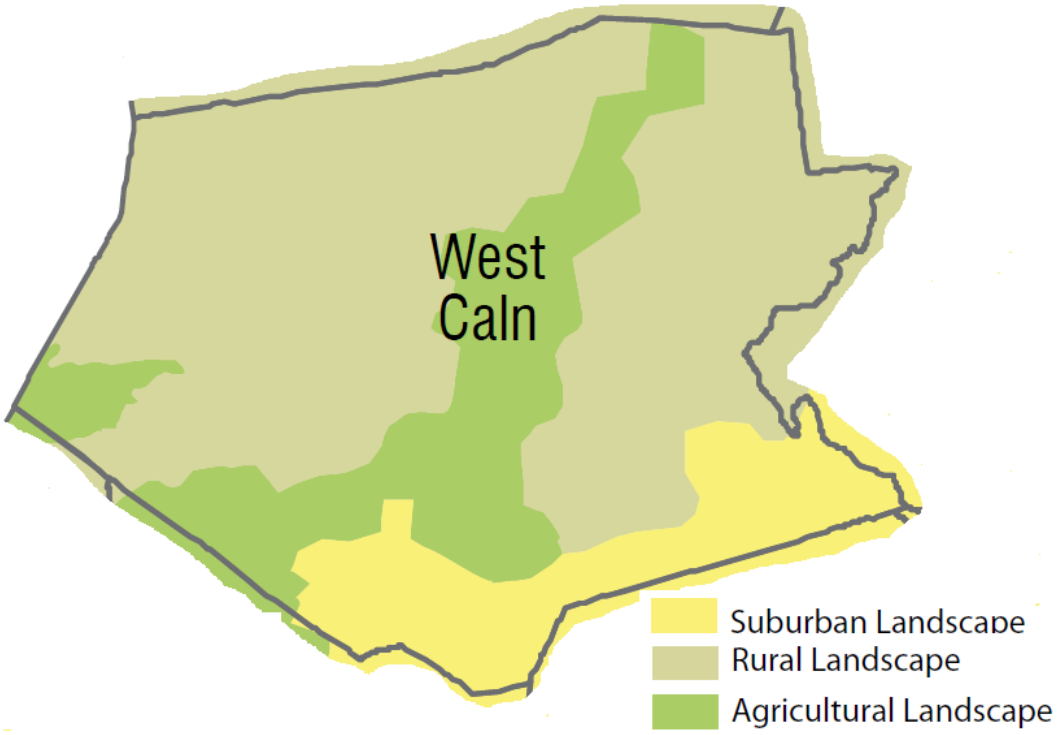
## IV. Future Growth and Land Development:

### A. Municipal and County Planning Documents:

#### 1. Chester County Comprehensive Plan, "Landscapes2", adopted by Chester County November 9, 2009:

The County plan identifies West Caln Township as mostly a Rural Landscape with the objective to "Preserve the open, rural character of Chester County, enhance villages within their historic settings, and accommodate appropriate development in rural centers." The County plan identifies the portion of the Township zoned Agricultural Preservation, as Agricultural Landscape with the objective to "Preserve the agricultural industry and cultural heritage of Chester County by supporting a productive agricultural network and preserving prime soil resources." The County plan identifies the southern portions of the Township as Suburban Landscape with the objective to "Promote new development in suburban landscapes to accommodate anticipated population and employment growth, using appropriate density, sustainable design, and smart transportation principles."

**Livable Landscapes of West Caln Township (taken from Landscapes2)**




**(Ref: Chester County Comprehensive Plan – "Landscapes2" – 11/9/2009)**

With respect to wastewater and water facilities planning, the County plan objectives are to "Promote the integration of local, state and regional planning efforts with those of utility provider water supply and wastewater facility plants in order to provide a safe, sustainable drinking water supply and protect ground water and other natural resources." Policy UI 2.5 of Landscapes2 states, "Maintain, upgrade, or expand existing public sewer and water facilities to support redevelopment and new development in designated growth areas, where consistent with local land use planning, while discouraging the extension of those facilities in the rural, agricultural and natural landscapes."

The Township intends to use the Chester County Comprehensive Plan as a guide during the review of development proposals, infrastructure improvements, and other public improvements and programs.

This Plan Revision certainly addresses many of the objectives and policies of the County's Comprehensive Plan. However the 2005 West Caln Zoning Ordinance requires "In areas impacted by a Superfund Site, public water shall be provided."

## 2. West Caln Township Comprehensive Plan, March 25, 1998

The Township Comprehensive Plan recommends that the Township "Review the current sewage disposal practices and evaluate methods that could improve efficiency and reduce the potential for contamination."

Further the Township Comprehensive plan recommends addressing treatment approaches as defined in the 1978 Act 537 Plan as follows:

- Encourage the use of on-site disposal systems in suitable soils. In addition to conventional septic tank/soil absorption systems and the alternatives listed, consider other systems where permitted by the State and by the County.

- In areas of concentrated development, encourage land application or marsh-pond-meadow systems.

- Maintain thorough management/control procedures with regard to private sewage treatment systems within the borders of West Caln by requiring and entering into binding agreements with the owners.

- Provide information to current residents regarding the benefit of reducing the daily liquid volume entering their septic tanks.

- Enact an ordinance or amend the appropriate existing ordinance to require water conservation devices.

- Establish an active policy of wastewater treatment system applications review to ensure that developers are designing systems which will promote and serve orderly and reasonable growth.

- Adopt a policy of annual review of the Township 537 Plan including a continuing application of water management and wastewater treatment techniques.

## 3. West Caln Township Zoning Ordinance, 2005, as amended:

Purpose: "This Ordinance is enacted under and pursuant to the Pennsylvania Municipalities Planning Code, Act 247 of 1968, as amended, and in accordance with the West Caln Township Comprehensive Plan (1998), and in accordance with an overall program and with consideration for the character of the Township, its various parts and the suitability of the

various parts for particular uses and structures, in order to promote, protect, and facilitate general public health, safety, and welfare, and coordinated and practical community development and proper density of population through regulations including but not limited to provision of adequate light and air; adequate parking and loading, safe and efficient travel by vehicles, bicycles and pedestrians; safe, reliable, and adequate water and sewer facilities through a balance between development and facilities; adequate recreational facilities, open space, and other public facilities; protection of prime agricultural areas and farmland; preservation of natural, scenic and historic resources; and opportunities for development of a variety of residential dwelling types and non-residential uses."

**4. West Caln Township Subdivision and Land Development Ordinance, September 2010:**

Purpose:

- To further the goals and objectives of the 1998 West Caln Township Comprehensive Plan.
- To promote the health, safety, and general welfare of the residents of the municipality.
- To promote the conservation and enhancement of the rural character of the Township.
- To ensure the development of land will be conducted with due regard to topography, geologic conditions, and natural, scenic and cultural resources, so that the highest quality environment is obtained.
- To ensure that proper provision shall be made for pedestrian and vehicular access and circulation, stormwater management, water supply, wastewater treatment and disposal, public utilities and other community services and facilities, and to provide for adequate coordination of existing and new facilities.
- To provide for adequate light, air, open space, recreation, street trees, and landscape quality.
- To encourage and promote flexibility, economy and ingenuity in the layout and design of subdivisions and land developments to facilitate realization of these purposes.
- To establish procedures and standards for observance by applicants, the Planning Commission and the Board of Supervisors.

## B. Identification of Service Areas:

### 1. Villages:

The Township Comprehensive Plan dated March 25, 1998 identifies three "villages" in West Caln Township. These villages evolved as service centers to the agricultural regions of the Township. The village setting exhibits shallow set-back and narrow side yards often making installation of replacement onsite sewage disposal systems more difficult.

a) Martin's Corner:

The Village of Martin's Corner is located the north of Hibernia Park. Martin's Corner consists mostly of low density residential units, with very little non-residential use except for the Martin's Corner Volunteer Fire Department.

b) Compass:

The Village of Compass is located on the western extreme of the Township near the crossroads of Route 340 (Kings Highway) and Route 10 (Compass Road to the north and Octoraro Trail to the south). The Village of Compass is within the watershed of the Pequea Creek which ultimately discharges to the Susquehanna River and the Chesapeake Bay. Within the village are commercial facilities and medium and low density residential units. The land surrounding Compass consists of either vacant land or farms. To the east and the north along Rts 10 and 340 are a number of single family homes many of which are modular or manufactured homes.

c) Wagontown:

The Village of Wagontown is both the largest village and the closest to the City of Coatesville. Located along Kings Highway (Rt 340) it serves as the eastern entrance to the Township. The Wagontown Post Office and Wagontown Fire Company are located within the village area. The Fire Company also has a social hall with banquet facilities. Along Kings Highway there are a several commercial properties, but the area consists mainly of low and medium density residential units at the present time.

### 2. Existing Development Areas:

a) Phillipsville:

The Phillipsville area is generally east of the intersection of Ash Road and Old Wilmington Road. There are several small residential developments and a mobile home community within the Phillipsville area. The pressure sewer force main within the right of way of Old Wilmington Road and Ash Road from the Sandy Hill Pumping Station passes through the area.

b) Valley Green:

The Valley Green Subdivision is west of Old Wilmington Road along the boundary of Sadsbury Township. There have been a few problematic malfunctioning onsite sewage disposal systems in this subdivision. Individual Small Flow Treatment Facilities now serve five homes on Valley Green Drive.

**3. Proposed Development Areas:**

a) County Meadows (aka Lawrence Goldberg Tract):

The County Meadows project was given Preliminary Land Development approval on April 22, 2002 for 171 residential units (38,475 gallons per day @ 225 gpd/unit). Approval of Sewage Facilities Planning Modules is pending Pa DEP Code No. 1-15961-533-3. There are also 15 residential units proposed in Honeybrook Township (Pa DEP Code No. 1-15932-412-3) (3,375 gallons per day @ 225 gpd/unit). The project proposes a gravity sewer collection system and a single pumping station conveying to the gravity sewer system in Sandy Hill Road, which conveys to the Sandy Hill Pumping Station.

b) Paul Lapp Subdivision:

Paul Lapp, the owner of a 61 acre tract, proposes to subdivide three one acre building lots (675 gallons per day @ 225 gpd/unit) and to connect these lots to a proposed sewer extension from the Calnshire Subdivision, which conveys to the Sandy Hill Pumping Station. A “Planning Waiver and Non-Building Declaration” is proposed for the residual portion of the tract. Approval of Sewage Facilities Planning Modules is pending (Pa DEP Code No. 1-15961-695-3J).

c) Crane Tract (Heritage Development):

The Heritage/Crane project was given Final Conditional Use approval on December 17, 2007 for 573 residential units (128,825 gallons per day @ 225 gpd/unit). Approval of Sewage Facilities Planning Modules is pending (Pa DEP Code No. 1-15961-624-3). This plan proposes to construct two new pumping stations, one internal to the development and a second on

an easement from the Wagontown Fire Company with conveyance to the Coatesville Sewer System.

d) Sands Tract:

The Sands project was given Conditional Use approval on April 21, 2010 for 237 Townhouses and 72 Apartments (69,525 gallons per day @ 225 gpd/unit) This project borders Valley Township and proposes to convey sewage through Valley Township. Approval of Sewage Facilities Planning Modules is pending (Pa DEP Code No. 1-15961-694-3, 5).

## 4. Areas Identified with Existing Environmental Contamination:

US EPA has listed three Superfund sites that are within the borders of West Caln Township. These sites have had a major impact on the quality of the groundwater and sewage facility planning, particularly in the northern central area of the Township. Exhibit E-4, prepared by the Chester County Health Department, shows these three Superfund sites with contamination plumes and the surrounding areas of concern.

a) William Dick Lagoons:

The William Dick Lagoons are comprised of a 4½ acre tract of land west of Sandy Hill Road and south of Telegraph Road. This area was contaminated from the late 1950s to 1970 by the use of three unlined lagoons for the disposal of final rinse water from the interior cleaning of tank trailers. The lagoons, about two acres in total area, contained more than four million gallons of wastewater over the years. Site soils are contaminated and are moderately permeable, resulting in the contamination of groundwater. The lagoons were not adequately diked, and two were breached in 1970, releasing about 300,000 gallons into a local stream. In 1971, an initial cleanup was conducted. The remaining liquid from the lagoons was sprayed over the adjacent land surface and the lagoon pits were filled with soil. The filled areas were then vegetated. In 1987, the EPA sampled private wells and springs used by local residents and found several to be contaminated with trichloroethylene (TCE). The site owner subsequently agreed to provide carbon filters to the affected homes. The aquifer is the source of water for private wells serving approximately 1,400 people within three miles of the site. Numerous residential wells surround the site, the nearest lying 400 feet to the north. A campground and a trailer park are located within one mile of the site. While cleanup of the site is

ongoing it will be many years before clean up of the site is complete. (EPA ID # PAD980537773)

b) Blosenski Landfill:

The Blosenski Landfill covers approximately eight acres of a 13½ acre tract along Cambridge Road. The landfill operated between the 1940s to the 1970s when in 1971 was ordered to cease operation by the Chester County Health Department. Approximately 75 residences were provided with public water. Cleanup of the site began in 1992 removing approximately 1,300 buried drums and approximately 350 cubic yards of contaminated materials and soil. A groundwater treatment system was completed in September 1998 to repair contamination of the area aquifer. (EPA ID # PAD980539985)

c) Old Wilmington Road Groundwater Contamination site:

The Old Wilmington Road Groundwater Contamination site is an area where groundwater is contaminated with various volatile organic compounds (VOCs) located in the vicinity of Old Wilmington Road in West Caln Township, Pennsylvania. The groundwater contamination plume was discovered during an EPA site inspection of the Perry Phillips Landfill site located along Old Wilmington Road. During EPA's investigation, 11 home wells were sampled. Laboratory results indicated that a home well located on the site and other wells in the vicinity were contaminated with VOCs and manganese at significantly high levels. A well that provided water to the 60 residents of Phillips Mobile Home Park was found to be contaminated with elevated trichloroethane (TCE). Subsequent sampling conducted by EPA, the Pennsylvania Department of Environmental Protection (PADEP), and the Chester County Health Department confirmed that VOCs were present at elevated levels. EPA is currently completing a vapor intrusion study at the site. (EPA ID# PAD0000198390)

It was recommended to the Township by Federal officials that future projects should not add water to or withdraw water from the area surrounding these superfund sites as any potential change in the water balance could change the direction and concentration of the contaminate dispersion plume. This recommendation was also shared by the Pa DEP.

Based upon this recommendation, the Township made certain land development considerations and permitted public water and public sewer service to be extended into and though the center of the Township. In addition, several land development projects changed their plans from sewage disposal systems that would promote groundwater recharge to the

local watershed to a system that would collect and convey the sewage out of the local watershed to the public sewer system in Coatesville.

It has been over 20 years since cleanup efforts began and the Township has enquired of the EPA if there continues to be a concern with the land application of treated domestic wastewater. The Chester County Health Department has compiled information received by the EPA, Pa DEP and water quality results from their records of groundwater wells within the Township. The direction of the contaminate dispersion plume appears to be different than early records indicated. It cannot be determined at the present time if the plume is changing or that the area is different because of additional information indicating that a larger area was affected. Future projects will be reviewed on a case by case basis to determine whether land application of treated domestic wastewater is a viable alternative.

## 5. Projected Public/Community Sewer Service Area:

a) Current Sewer Service Area:

Pennsylvania American Water Company's current sewer service area is limited to providing sewer service to the Calnshire West and Sandy Hill subdivisions and the Coatesville Country Club. The 2010 flows for Calnshire West and Sandy Hill averaged 23,262 gallons per day and the Coatesville Country Club averaged 2,880 gallons per day.

Valley Township Municipal Authority currently serves the Country Ridge Subdivision and the Highlands Corporate Center.

b) Future Sewer Service Area:

This Plan provides for a limited expansion of the Pennsylvania American Water Company sewer service area. If will be necessary for the Pennsylvania American Water Company to apply to the Pennsylvania Public Utilities Commission to expand its franchise area.

- Country Meadows/Lawrence Goldberg Development[1]
  Number of EDU's 171 at 225 gpd/EDU for 38,475 gpd

- Paul Lapp Subdivision
  Number of EDU's 3 at 225 gpd/EDU for 675 gpd

[1] Note: not included are 15 residential units proposed in Honeybrook Township.

- Crane Tract (Heritage Development)
  Number of EDU's 573 at 225 gpd/EDU for 128,925 gpd

- Sands Tract
  Number of EDU's 309 at 225 gpd/EDU for 69,525 gpd

**Total projected future capacity needs for 1,056 EDU is 237,600 gpd**

c) Existing properties along existing and proposed sewer lines:

There are a number of existing properties along the existing and proposed force mains and gravity sewer lines that could someday benefit from a public sewer alternative. It is recommended that Pennsylvania American Water Company consider including all existing properties with a principal building or dwelling within 150 feet of the force main or gravity sewer in the expanded franchise area.

Actual connection of these existing properties would also be subject to additional investigation including evaluation of other onsite alternatives and the availability of conveyance and treatment capacity.

## V. Wastewater Treatment System Alternatives:

### A. Background:

Official plans shall evaluate various alternatives to provide for adequate sewage facilities. Each alternative shall be evaluated for its technical feasibility and the feasibility of implementation of its administrative and institutional requirements. One alternative shall be selected in each area of the Township to provide for the long-term collection, treatment, and disposal of sewage.

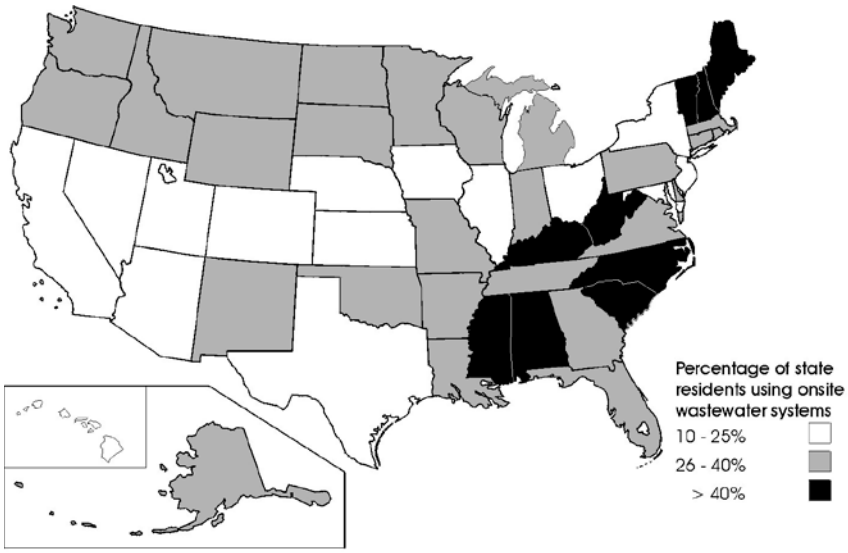
Our modern wastewater systems use, for the most part, potable (drinkable) water as a vehicle to transport human and household wastes from our homes and businesses to a local or remote treatment facility, where these wastes are treated and ultimately removed from the water so that this water can be returned into the environment for reuse.

Regardless of which alternative is selected for wastewater management, the primary goals are the same: 1) protect the public health, 2) minimize any negative impact on the environment, and 3) protect the rights of others from malfunctioning onsite systems, overloaded treatment facilities, and wildcat sewers (sewers that dump raw sewage directly into a stream or ditch).

The secondary goal of the wastewater management alternative is to ensure that the alternative selected can be implemented in a reasonable time at an affordable cost. Without implementation, the primary goals will never be achieved. While timing and cost are secondary, they are certainly essential and practical elements of any successful alternative.

## B. Decentralized Wastewater Treatment Systems:

In the April 1997 Response to Congress on use of Decentralized Wastewater Treatment Systems, the United States Environmental Protection Agency reported that, “Decentralized systems serve approximately 25 percent of the U.S. population, and approximately 37 percent of new land development.” Decentralized systems included individual onsite systems and small cluster wastewater systems used to treat and dispose of relatively small volumes of wastewater, generally from dwellings and businesses that are located relatively close together.

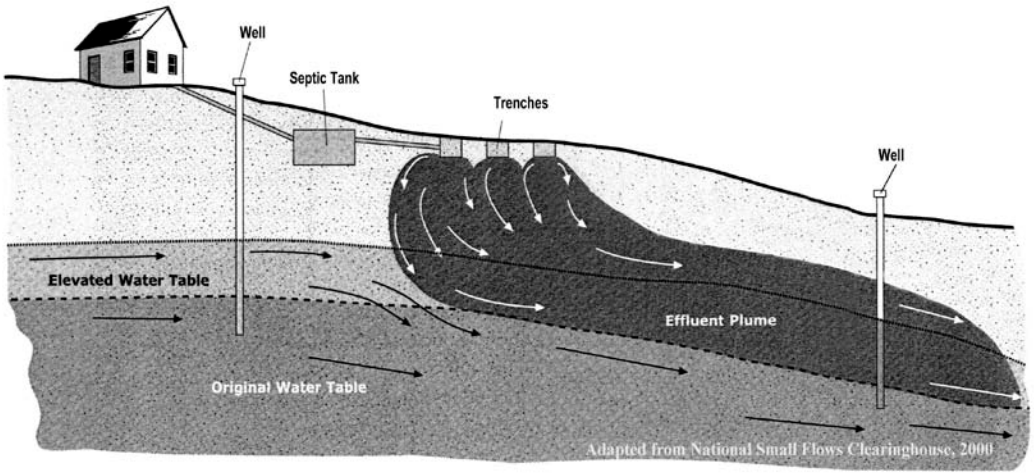



Source: U.S. Census Bureau, 1990

Properly managed decentralized wastewater treatment systems offer many benefits over centralized (regional) systems. Decentralized systems can provide the same protection of public health and the environment as centralized systems. Often decentralized systems are more cost effective in communities with low population densities (less than one dwelling per acre). In areas with cluster development, decentralized systems can overcome the problem by constructing large conveyance systems between developments. In addition, the construction of decentralized systems can be more

ecologically sensitive and provide additional benefits such as recharging local aquifers and the direct reuse of treated water for irrigation.

The management of decentralized wastewater treatment systems should be done on a regional basis and include requirements for the placement of drinking water wells and septage waste disposal.




**1. Onsite systems:**

Onsite systems typically have three major components, a collection system, a treatment system, and a dispersal system.

a) Collection System:

The collection system consists of plastic and cast iron pipe and fittings, cleanouts, and manholes. The pipe between the house and the first treatment unit is typically called the building sewer. Similar piping materials are used to convey treated and partially treated liquids between units.

b) Treatment System:

Treatment systems typically consist of a primary tank and sometimes are followed by an advanced treatment unit. In accordance with current regulations to sufficiently renovate the sewage a minimum thickness of 48 inches of soil is needed between the bottom of dispersal system and any limiting condition such as a seasonal water table.

i. Primary Treatment Systems:

A septic tank is a buried watertight tank designed and constructed to receive and pretreat wastewater by separating settleable and floatable solids from the wastewater. Grease and other light solids (scum) float to the top. Gases are normally vented through the building sewer. Inside the tank is an inlet baffle to help diffuse the incoming liquid and an outlet baffle to keep scum from exiting the tank. Septic tanks can be made of steel, plastic and concrete products. The septic tank must have access ports for routine inspections and pumping. Proper operation of the system requires that the non-biodegradable solids be pumped out of the septic tank every few years. While not currently required, providing septic tank effluent filters and tank access extensions are recommended.

ii. Advanced treatment systems:

These systems include aerobic treatment units (ATUs), packed bed filters (PBFs), intermittent sand filters, recirculating sand filters, and disinfection systems. Pre-engineered and packaged advanced treatment systems approved for use in Pennsylvania are required to meet NSF, International standards (Standard Number 40, NSF, 1996).

c) Dispersal Systems:

Dispersal systems include many surface and subsurface options that provide additional treatment or polishing after the treatment component.

i. Subsurface Dispersal Systems:

A typical subsurface soil absorption system consists of perforated piping and gravel in a field or trench. The pipes uniformly distribute the wastewater by gravity throughout the gravel over the absorption field. Void space in the gravel provides air for the aerobic treatment of the wastewater and room to store effluent during peak flows. Ventilation is provided through the plumbing stack of the house and through the soil covering the absorption field. There are also systems that use plastic chambers in place of the gravel. In the conventional system, most of the actual treatment of the wastewater occurs in the absorption field. A properly operating system relies on leaching of the wastewater into the soil and adequate aeration of the bed. Malfunctioning systems are usually a result of the failure of one or both elements. Soil suitability is a major factor affecting the percolation of effluent. Soils with low permeability, impervious strata, and shallow depth to bedrock will inhibit percolation of the wastewater. High water table conditions that saturate the soil horizon during the wet weather season, inadequate design, and improper operation are other factors that can cause a system to fail.

Wastewater may be delivered to the distribution piping by a pump should the absorption area be at a higher elevation than the treatment unit.

ii. Elevated Sand Mounds:

Elevated Sand Mounds can overcome some of the problems created by shallow rock and groundwater conditions. An approved sand mixture, of a sufficient thickness, is added on the prepared ground surface to make up for the lack of suitable parent soil. All elevated sand mound designs are now required to include a pressure dosed distribution system.

iii. Pressure Dosed Distribution:

Pressure Dosed Distribution systems provide a more uniform distribution of the effluent over the absorption area. This is advantageous in soils with high percolation rates. Effluent from the treatment unit is retained in a Dosing Tank and is dosed by an effluent pump or a dosing siphon to distribution system of 1½ inch diameter piping. This piping is placed along a gravel lined trench or arranged across a seepage bed. Drilled holes in the piping between ¼ and ½ inch are spaced up to 8 to 10 feet apart. The minimum size dose is a function of the internal liquid volume of the piping system. In the past, systems were dosed by demand - the liquid level rises to a certain level, activates the pump, and doses the system. Timed dosing is quite similar; however, dosing is controlled by a timer, which activates the pump and doses the system at regular intervals. Because flows into the system occur in peaks or surges, the advantage of timed dosing is that the flow is dosed to the absorption area over a longer period of time. This is particularly important when homeowners have large social gatherings. The entire hydraulic load of a single event can be spread out over several days.

iv. Individual Residential Spray Irrigation Systems:

Individual Residential Spray Irrigation Systems (IRSIS)are alternative dispersal systems that can be used to serve individual residences with shallow water table limitations (10 inches below grade), a minimum depth to rock of 16 inches, and slopes up to 25% in forested areas. IRSIS require a secondary treatment unit after the primary treatment unit. The primary treatment unit may be either a standard septic tank or aerobic treatment unit. The secondary treatment unit shall be either a free access or buried type Intermittent Sand Filter. These sand filters are single pass packed bed filters, also known as fixed film media units. Due to the increase in system complexity, IRSIS require periodic maintenance by the property owner; otherwise the system will fail and pollute the environment or cause a public health hazard.

v. Drip distribution systems:

Drip distribution, also known as “drip or trickle irrigation,” is another alternative dispersal system that can be used to serve individual residences. Drip distribution has been extremely successful for many years in other states that have frequent water restrictions. Drip distribution has two major environmental advantages over other land application systems. First, it applies water directly into the most biologically active zone of the soil, just below the surface. Second, because the water is applied below the surface and into the plant root zone, there is no evaporation loss. Drip distribution is a very effective process for water reuse. For the homeowner, drip distribution eliminates the need to consider unsightly sand mounds. On restricted sites, drip distribution can also be installed on steeper slopes and in wooded areas.

## C. Retaining tanks:

Retaining tanks more commonly called holding tanks are temporary holding facilities used to retain wastewater before it is transported by truck to an authorized treatment facility. Under West Caln Township *Ordinance # 1 of 2008* (Exhibit E-8), the Township designates who is responsible for the proper operation and maintenance of all retaining tanks.

Holding tanks can be permitted by the local Sewage Enforcement Officer or, in Chester County, by the Health Department when they determine there is a health hazard. In the past, Townships were not directly informed of these permits. Therefore, the Township needs to perform an inventory of all systems to locate these holding tanks and then ensure they are being properly maintained. The use of all holding tank systems should be carefully monitored to ensure proper operation and maintenance.

Holding tanks are very useful during the initial stages of a project while the permanent system is being constructed. Holding tanks have also been used to aid a marginal system. By installing a holding tank between the septic tank and the absorption bed, the holding tank can serve as an emergency storage tank. Rather than having the system back up into the septic tank and then into the house, the wastewater overflows into the holding tank. The effluent can later be pumped out or returned to the septic system, giving the absorption area time to rest.

In addition to Holding Tanks, other sewage facilities classified as Retaining Tanks may be:

- Privies (outhouses): Still permitted but are limited to sites where there is no potable water under pressure on site.

- Chemical or portable toilets: Usually used on a temporary basis at such places as construction sites, fairs, concerts, or camping events.

- Recycling, incinerating, or composting toilets: Used in new or existing residences or establishments.

## D. Small Flow Sewage Treatment Facilities:

Small Flow systems are used where onsite soils are completely unsuitable for any form of land dispersal and public sewers are not foreseen in the reasonable future. Small Flow systems often discharge treated water into a local stream, storm sewer, or dry ditch. Small Flow systems require a NPDES and a Water Quality Management Permit. Often a general permit can be issued, however in HQ or EV watersheds an individual permit will be required. Small Flow systems are very expensive to permit, install, operate, and maintain. Because all other reasonable alternatives are to be exhausted first, Small Flow systems often take at least one year to process the necessary permits for the installation. Small Flow systems require a commitment from the property owner to properly operate and maintain the facilities for the life of the system. The Township and the property owner should enter into an agreement outlining the duties and responsibilities associated with this system.

## E. Community Onsite Disposal Systems (COLDS):

COLDS (also known as Community On Lot Disposal Systems) are those systems that serve more than one lot or dwelling. COLDS can be municipally or privately owned. Privately owned systems can serve a single development or several developments. In the latter case, a Public Utility Commission (PUC) regulated company often owns such systems. Otherwise, COLDS are owned and operated by condominium/homeowners associations or by private businesses servicing their own facilities. An example of a private business may be an apartment house, mobile home park, or shopping center. For the purpose of discussion in this plan, public systems include both those systems owned by a municipality and PUC regulated companies. Community systems are those systems owned by condominium/homeowner associations or another private entity.

## F. Collection and Conveyance Systems:

All public/community systems require a means of collecting and conveying wastewater from the individual users to the treatment facility. Traditionally, the collection of sewage is by gravity sewers that generally follow the natural contours of the land. However, there are several other alternative more modern means of collecting and conveying sewage.

### 1. Gravity Sewer Systems:

Traditional gravity sewer collection systems will be used wherever practical, particularly in new construction. Pumping stations will be necessary when crossing from one drainage basin to another. Careful planning will be required to foresee the reasonable future needs of the drainage basin.

Gravity collection systems become expensive due to rock excavation or length of sewer lines required to serve less populated areas, in such cases pressure sewers should be considered.

### 2. Pressure Sewer Systems:

The two major types of pressure sewer systems are Grinder Pump systems and Septic Tank Effluent Pump (STEP) systems. The major differences between them are in the onsite equipment and layout. Neither type of pressure sewer system requires any modification to conventional household plumbing.

a) Grinder Pump systems:

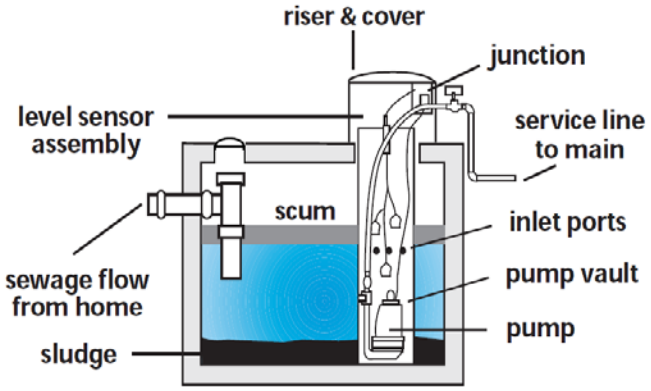
In Grinder Pump systems, household wastes are collected and conveyed by gravity to a small buried vault or basin containing the grinder pump station. Waste solids in the sewage are macerated into a slurry then pumped through a small diameter pipe to either a larger network of pressure sewers or a traditional gravity sewer collection system. The onsite piping arrangement includes at least one check valve and one gate valve to allow isolation of each pump from the main sewer. Grinder pumps are generally not installed in the basements of homes because access through the home necessary to maintain the pump is more difficult than when the system is installed outside the home.

There are two types of grinder pumps: centrifugal and semi-positive displacement type. Both of these pump types have certain advantages and they can in many cases be intermixed.

b) STEP systems:

In traditional STEP systems, wastes flow by gravity to a conventional septic tank. The septic tank provides 5 to 10 days of hydraulic retention time and permits most solids to either settle to the bottom or float to the top of the tank. After the septic tank, the effluent then flows to a dosing pump tank, which houses the pump and level control sensors to control the pump. Normally, small centrifugal pumps are employed for the STEP system. These pumps are submersible and range in size from ¼ to ½ horsepower.

In the more contemporary STEP system, a single compartment tank is used in combination with a pump vault. The pump vault contains internal filters which permits the use of high head turbine pumps very similar to drinking water well pumps. These turbine pumps are very energy efficient and can pump very long distances.




(Pipeline Fall 1996, Vol. 7, No. 4)

Pressure sewer systems are particularly suitable for extending sewer service into existing residential communities. Traditional gravity sewers can be very costly and disruptive to the local environment. STEP systems are advantageous when used in combination with Decentralized and Small Community Sewage Disposal systems and Community Land Application systems. STEP systems with high head turbine pumps can also be used when connecting to an existing force main.

## G. Final Disposal of Treated Wastewater:

### 1. Land Application Options:

In the Chester County region there are three prominent dispersal methods for a community land application system: Large Volume Subsurface, Spray Irrigation, and Drip Distribution.

a) Large Volume Subsurface:

Large Volume Subsurface systems are effluent dispersal systems that are constructed and operated very similarly to pressure dosed systems except that these systems generally do not depend on the soil for any renovation of the applied effluent. With these systems, the designer considers soil permeability (hydraulic conductivity), depth to perched or seasonal high water table, hydrology, and hydrogeology to disperse the effluent into the ground water. Typically an advanced secondary treatment system precedes the dispersal system. Treatment requirements vary depending on the specific site conditions.

b) Spray Irrigation:

Spray Irrigation involves applying treated or partially treated sewage effluent to the land surface. Hydraulic application rates vary for the site-specific soil types and climatic conditions. Application during and shortly after rain events is typically stopped to reduce the possibly of runoff. Additional treatment of the effluent can also be accomplished by plant uptake and through the soil matrix. Application rates vary based on plant nutrient absorption rates at that time of year. For systems that depend on the soils and plants for renovation, Spray Irrigation has been a popular land application technique and is generally accepted as a very reliable system by local regulating agencies.

Among the factors that affect the feasibility of Spray Irrigation are topography, soil conditions, weather conditions, agricultural practices, and economics. Spraying involves the application of effluent above the ground either through nozzles or sprinkler heads. Other elements of the system include effluent storage lagoons, pumps, supply mains, laterals, and risers. Design of the system can be quite variable; it can be portable or permanent, moving or stationary. The use of fixed kicker type spray nozzles is the prominent design in the Chester County area. These systems provide an efficient and uniform flow distribution.

High wind, a problem common to spray irrigation systems, adversely affects efficiency of distribution and can spread aerosol mists (fine sprays of effluent carried by the wind). Systems are easily designed to control this

problem by providing large setbacks to other properties, installing high earthen berms with dense landscaping to shield the misting, or including an anemometer (an instrument for measuring wind velocities) in the pump control circuit to delay spraying until the wind has diminished.

Freezing weather can be a problem with Spray Irrigation. If the effluent is applied when the air temperature is below freezing, the effluent will freeze as it leaves the sprayer. The frozen effluent will then accumulate on the ground surface. This of itself is not a problem. However, if additional applications are made, the frozen effluent continues to accumulate, and when the air temperature rises, the melting rate of the effluent may exceed the rate at which the soil can absorb the effluent and runoff may occur.

While the control of the spray system can be automated, common practice in Chester County is to operate the spray system manually. Designing a control system that can consider all of the variables for when spraying could occur would be very complicated.

Spray Irrigation systems in Chester County most often use lagoon treatment systems and depend on crop uptake for Total Nitrogen removal. During the cooler seasons and particularly during the winter months, application rates are reduced to keep pace with the reduced nitrogen uptake. Because the nitrogen is bound up in the crop plant matter, the crop must be harvested and removed at least annually.

c) Drip Distribution:

Drip Distribution as a land application system for highly treated wastewater was first installed in Pennsylvania at Bridlewood Treatment Plant in Thornbury Township Chester County in the fall of 1998 after being demonstrated at Delaware Valley College. Drip distribution systems have been extremely successful for many years for disposing Septic Tank Effluent under US Patent No. 5,200,065. Drip distribution has two major advantages over other land applications systems: first, it applies water directly into the most biologically active zone of the soil, just below the surface; and second, when properly designed and installed, it has "better distribution of effluent over a larger area."[2] Drip Distribution is a very effective process for water reuse. For wastewater application systems, Drip Distribution's principal advantage over Spray Irrigation is that the wastewater daily application rates are more uniform and are not as affected by climatic changes. Spray Irrigation has practical limitations during rainy, windy, and freezing weather; requiring large volumes of

[2] Drip Irrigation Workbook Course #312, Prepared by the Pennsylvania State Association of Township Supervisors in conjunction with Delaware Valley College for the Department of Environmental Protection (Pa DEP), p 1-2

effluent to be stored during days when spraying is not recommended or permitted. Storage requirements for Drip Distribution are minimal.

Drip Distribution delivers the effluent in small frequent doses, leaving the soil near the surface in an unsaturated state. This is accomplished by the use of tubing with specially designed emitters that allow the effluent to leave the tubing in small droplets. Because the soil is unsaturated, leaving a large portion of the void spaces still filled with air, the soil remains in an aerobic condition, providing for improved renovation of the effluent.

During freezing weather, if the soil moisture at the ground surface freezes, the air and void spaces remain, permitting continued movement of the effluent as it is applied below the surface. As long as the effluent is applied in small doses, the soil will remain unsaturated and water continues to move downward and away from the colder surface. When the ambient air temperature is less than the soil temperature the heat flux is upward and assists in the downward movement of the water. Drip systems perform quite well in a cold climate provided proper attention to design details is made.

Treatment requirements for drip systems vary from primary treatment (septic tank effluent) to advanced secondary treatment with denitrification. Because there is no potential for human contact with drip, disinfection is not needed.

Drip systems are easily automated and are very suitable to being monitored and controlled by a programmable logical controller (PLC), increasing its reliability.

d) Land Requirements:

The land requirements for onsite disposal systems vary greatly. Individual onsite systems have required setbacks from property lines, wells, and other uses to the absorption field. Community systems require greater setbacks, with these setbacks based on site evaluations, studies, and other information provided about the site. Systems that will process 5,000 gallons per day or more may require additional field studies beyond the standard deep hole and percolation tests. These hydrogeological studies may determine that the proposed soil absorption field may affect a much larger area than the actual area of the absorption field. Installing a soil absorption system may require that portions of land within the dispersion plume area be restricted against the drilling of wells for drinking water. Absorption areas can serve as passive open space and, with certain limitations, continue to be farmed or used for recreational activities.

## H. Centralized Public Sewer Systems:

The Coatesville Sewage Treatment Plant (NPDES No. PA0026859) is located in South Coatesville and is owned by the Pennsylvania American Water Company. Pennsylvania American also owns and operates the collection system serving the Calnshire West and Sandy Hill subdivisions in addition to owning and operating the Sandy Hill Pumping Station and force main to the Sadsbury Township Sewer System.

### 1. Valley Township:

On the eastern side of West Caln Township there are presently 16 homes, part of the Country Ridge subdivision (Ridge View Drive). This subdivision is located mostly in Valley Township, which maintains the sewage collection system.

The Highlands Corporate Center located along the southern boundary with Valley Township is served by Valley Township.

Valley Township is a bulk rate customer of the Pennsylvania American Water Company.

Coatesville County Club is a customer of the Pennsylvania American Water Company. This facility connects to the Valley Township Sewer System. Pennsylvania American pays Valley Township a fee for conveyance.

### 2. Sadsbury Township:

Sadsbury Township provides conveyance through their sewer system for Pennsylvania American from the Sandy Hill Pumping Station. The conveyance agreement with Sadsbury Township limits flow to 110,000 gallons per day. In 2010 the annual average flow was 23,262 gallons per day.

## I. Sewage Management Programs:

The purpose of a Sewage Management Program is to assure that the existing and all proposed sewage facilities properly function and serve the property for many years to come. At one time it was perceived that all “Septic Systems” will eventually fail and have to be replaced. This is not the case for systems that are properly operated and maintained.

**1. Ownership:**

It is the Township's intent that the individual property owners shall retain ownership of all sewerage facilities on their properties and also shall be responsible for the proper operation and maintenance of their sewerage facilities. For properties connected to a public or a community sewage facility, the individual property owners ultimately are the parties responsible for the sewerage facilities on their properties and to see that they do not dispose of anything that would cause harm to the proper functioning of the systems.

**2. Required inspections:**

The Township will establish a recommended schedule for inspection of individual sewerage facilities. At a minimum, property owners should be familiar with the location of all the major components of their system and perform visual inspections of these components whenever they are performing other outside maintenance of their property.

**3. Required maintenance:**

The Township will establish a recommended maintenance schedule for the major components of typical system. For systems with electro-mechanical components the property owner will be required to follow the maintenance recommendations of the component manufacturer.

**4. Repair, Replacement, Upgrades:**

Repair, replacement, or upgrading of malfunctioning systems generally requires a permit from the Local Agency (the Chester County Health Department). Failure to promptly address a malfunction often results in a more costly repair and possible violations of several municipal, state and federal statutes.

a) Draft Individual Sewage System Management Ordinance:

A draft Ordinance is attached that is being considered by the Board of Supervisors [that would establish minimum operation and maintenance requirements for individual sewage systems.

b) Public education:

The Township will explore the use of its Website and Township Newsletter to share information and encourage the proper operation, maintenance and repair of sewage systems.

**5. Joint Municipal Sewage System Management Programs:**

The Township is willing to discuss the possibility of joining with other municipalities to establish a regional sewage management program. Chester County Comprehensive Plan "Landscapes2", action plan item CS-6a provides that: "Chester County will…Inspect individual on-lot sewage systems to ensure proper installation and maintenance and provide outreach to the public about the importance of maintaining these systems." The Chester County Health Department currently provides installation/construction inspections of systems permitted under Pa Code 25 §73, but does not perform maintenance or operation inspections at the present time.

**6. Financial Assurances of Non-Municipal Facilities:**

At the present time, the only non-municipal facility owner is the Pennsylvania American Water Company, an investor owned public utility company. Such companies are regulated by the Pennsylvania Public Utilities Commission. No additional financial assurances are needed.

**J. Non-Structural Comprehensive Planning:**

With the exception of the possible adoption of the Individual Sewage System Management Ordinance, no other modifications to the Township's Comprehensive Plan, Subdivision and Land Development Ordinance can be foreseen. Township staffing requirements will be evaluated as the new ordinance is implemented.

**K. No-Action Alternatives:**

The no-action alternative is the continued use of existing sewage facilities without addressing the short and long term impacts as they relate to public health, growth within the community, the local economy, recreational opportunities, drinking water supplies and other environmental concerns.

Most of the discussion within this plan has addressed growth within the community and the public health impact of several environmental cleanup sites within the central region of the Township. A number of properties are within the impacted and affected areas of EPA Superfund sites. The obvious no-action impact is the inability for these areas to grow. A secondary impact consists of limitations on suitable onsite sewage system replacement absorption areas that do not impair cleanup efforts of the Superfund sites or affect the direction or size of contamination plumes.

## VI. Evaluation of Alternatives:

### A. Consistency with other programs and policies:

Technically feasible alternatives discussed above under item V. “Wastewater Treatment System Alternatives” must be evaluated for consistency with the following:

**1. Pennsylvania Clean Streams Law and the Federal Clean Water Act:**

- No inconsistencies are foreseen**.**

**2. Municipal Wasteload Management under Chapter 94:**

- While there are no “municipally” owned facilities within the Township, it is recognized that the Township needs to cooperate with public utility companies by providing status information regarding subdivisions under development.

**3. Township Comprehensive Plan:**

- The Township will review the Township Comprehensive Plan and this plan to assure that wastewater alternatives are consistent with Township land use goals**.**

**4. Antidegradation Requirements of Chapter 93, 95 and 102**:

- Conventional individual onsite sewage facilities within protected watersheds (High Quality and Exceptional Value) and in particular within the Pequea Basin, may not provide adequate environmental protection and meet the water quality goals of these protected watersheds. Treatment systems that provide additional nutrient removal for Nitrogen and Phosphorus may be required. With the exception of those areas impacted by the EPA Superfund sites, small community systems or minor extensions to the existing public sewer system may be a practical alternative, until nutrient removal technologies are developed for individual onsite sewage facilities.

- Areas affected by the EPA Superfund sites will require public water (2005 West Caln Zoning Ordinance). In order to maintain the water balance and reduce the possibility of further impact within these affected areas, extensions to public sewer may need to be evaluated on a case by case basis.

*The West Brandywine and Rock Run watersheds within West Caln Township are two of the surface water sources for the Pennsylvania American Water Company, discharges to these surface waters could assist in maintaining the water balance of the region. However, surface water discharges to High Quality Waters maybe cost prohibitive even if permitted by the Pa DEP.*

- Areas outside of the Protected Watersheds and not affected by the EPA Superfund sites should be able to continue to rely on conventional onsite sewage facilities using land application technologies. Lot sizes generally greater than 1.5 to 2 acres in areas where there are no existing issues with ground water Nitrate-Nitrogen should consider individual onlot sewage disposal systems as the preferred disposal method. New land developments proposing smaller lot sizes may require community systems. New projects in areas with an elevated groundwater or a Nitrate-Nitrogen concern may require a Water Quality Management permit. For existing properties presently served with onsite sewage disposal systems on small lots less than 1.5 acres, replacement systems may present a problem. In such cases connection to or a minor extension of public sewers may be the only practical alternative other than a Small Flow Treatment Facility with a discharge to surface waters.

**5. Prime Agricultural Land Policy:**

- Refer to the Township Comprehensive Plan and the Township Zoning Ordinance for land use requirements and recommendations.

**6. Stormwater Management:**

- Refer to the Township Zoning Ordinance and Subdivision and Land Development Ordinance for Stormwater Management requirements.

**7. Wetland Protection:**

- Wetlands and Hydric Soils information is provided on Exhibit E-7 (Map 4-3 Water Resources of the Township Comprehensive Plan) No mitigation measures are foreseen.

8. **Protection of Rare, Endangered, or Threatened Plant and Animal Species:**
    - Alternatives will need to be evaluated through the Pennsylvania Natural Diversity Inventory (PNDI) on a case by case basis. Clearances are valid for only 12 months.

9. **Historical and Archaeological Resource Protection:**
    - Alternatives will need to be evaluated through the Pennsylvania Historic and Museum Commission (PHMC) on a case by case basis.

## B. Resolution of Inconsistencies:

This plan is inconsistent with the County Comprehensive Plan "Landscape2" policy UI 2.5 as it provides for the extension of public sewer facilities into the County's designated "Rural Landscapes" districts. The concern is that extension of public sewer facilities into such rural areas will "likely open up" such areas to development. However, all development within the Township must comply with the Township's Zoning, Subdivision and Land Development Ordinances which is generally in accordance with County's Land Development goals and policies.

## C. Application of Water Quality and Effluent Limitations:

The Chapter 93 antidegradation regulations require that existing uses and the water quality necessary to protect those uses, including High Quality (HQ) and Exceptional Value (EV) uses, shall be protected and maintained [25 Pa. Code § 93.4a]. The antidegradation regulations further require that all persons proposing new, additional, or increased discharges to HQ waters "shall evaluate non-discharge alternatives to the proposed discharge and use an alternative that is environmentally sound and cost-effective when compared with the cost of the proposed discharge." [25 Pa. Code § 93.4c(b)(i)(A)].

Until recently, non-discharge alternatives included subsurface sewage disposal systems. Such systems were thought of as non-discharge alternative because there was no "point source" discharge (no actual pipe discharging directly to surface waters). Even surface land application systems, such as Spray Irrigation were thought of as a non-discharge alternative. Pa DEP now requires an evaluation of the impact of all sewage system discharges in these protected watersheds.

## D. Cost Estimates:

### 1. Conventional Onsite Sewage Treatment and Disposal Systems:

There are several cost components to consider. First is testing and planning, then design and permitting, followed by the actual construction of the system. All systems then require maintenance and have operational costs. Typical costs (2010) for an individual residential system range as follows:

| | |
|---|---|
| Initial site testing (Test Pits & Percolation Tests) - per lot | $1,500 to $2,500 |
| Health Dept Witnessing of testing and permit review | $1,700 per lot |
| Design of system per lot | $1,000 to $2,000 |
| Installation of system per lot | $10,000 to $25,000 |
| Total system per lot | $14,200 to 29,500 |
| | |
| Annual cost for Operation and Maintenance | $150 to $375 per lot |

### 2. Public Sewer Connections:

This plan provides for the expansion of Pennsylvania American Water Company's ("PAWC's") franchise area to include all homes within 150 feet of existing and proposed gravity sewer lines and force mains. Homes are not required to connect unless there is no other reasonable option available. Estimated costs (2010) for homes that do connect to public sewer can be expected to pay the following:

| | |
|---|---|
| Permitting and Planning | $2,500 per EDU |
| Capacity Reservation Fee (PAWC Tarff 11/14/2008) | $2,000 per EDU |
| Grinder Pump furnish and installation | $10,000 per EDU |
| Total system $14,500 per EDU | |
| | |
| Annual Sewer Usage Fee (PAWC Tarff 11/14/2008) | $335.52 per EDU |
| Annual cost for Operation and Maintenance | $350.00 per EDU |

*[PAWC fees and charges are subject to Pa PUC approval.]*

## E. Funding Methods:

### 1. Individual On-Lot Sewage System Loans:

The Pennsylvania Infrastructure Investment Authority (PENNVEST) has a special funding program for eligible homeowners who do not have access to a public sewage system and need to repair or replace their individual on-lot sewage disposal system. Assistance is in the form of loan at an interest rate of one percent. The monthly payment also includes a ¾ percent servicing and insurance fee. Loans will be secured by a mortgage on the borrower's home. The maximum loan is $25,000 with a maximum term of 20 years. A loan must be immediately repaid in full if the property is either sold or transferred. The property has to be the primary residence of the owner. Family income may not exceed $75,800. Other requirements may also apply. Contact PENNVEST for additional details.

### 2. Individual Public Sewer Connection Loans:

The Pennsylvania Infrastructure Investment Authority (PENNVEST) does not have a specific funding program for individual property owners who need to connect to public sewers; however it is still recommended that PENNVEST be contacted for special arrangements. Otherwise, local banks are a possible source for financing.

## F. Phase Implementation:

No critical public health hazards have been identified, so phase implementation is not foreseen.

## G. Administrative Organizations and Legal Authority for Implementation:

West Caln Township administrative staff with assistance from their consultants will manage the Township's Sewage Management program in accordance with the proposed Individual Sewage System Maintenance Ordinance. Pennsylvania American Water Company is an investor owned public utility company. Public utility companies are regulated by the Pennsylvania Public Utility Commission.

## VII. Institutional Evaluation:

### A. Existing Wastewater Treatment Authorities:

West Caln Township does not have a Municipal Authority, all wastewater treatment facilities are owned either by the property owner, homeowner/condominium associations or by public utility company.

### B. Proposed Institutional Alternatives:

No new institutional alternatives are proposed.

### C. Additional Administrative and Legal Activities Required:

No additional administrative or legal activities can be foreseen.

### D. Selected/Recommended Institutional Alternatives:

All wastewater treatment facilities will continue to be owned by the property owner, a homeowner/condominium association or a public utility company. The facilities owners will be responsible for proper operation and maintenance.

## I. Implementation Schedule and Justification for Selected Technical & Institutional Alternatives:

### A. Selected Alternative:

The primary method for sewage disposal for new building lots will be the use of individual onsite sewage disposal systems. These systems will be owned, operated and maintained by the individual property owner.

Where the building lot density is less than 2 acres per lot, community onsite sewage disposal facilities may be considered. Community facilities shall be owned either by a homeowner/condominium association or a public utility company. Community facilities serving Manufactured Home Communities and Campgrounds will be owned by common ground property owner, a homeowner/condominium association or a public utility company. The facilities owners will be responsible for proper operation and maintenance.

In areas impacted by EPA Superfund sites connection to public sewer will need to be evaluated.

**B. Financing Plan:**

No actual construction of facilities is proposed therefore no financing plan is required.

**C. Implementation Schedule:**

This plan will be implemented when approved.