CHAPTER VI

WASTEWATER ALTERNATIVES

This chapter will identify the range of wastewater alternatives technologically feasible for use in Westtown Township. Each of the considered alternatives has a track record of successful operation, as evidenced by the granting of permits from the Pennsylvania Department of Environmental Protection (DEP). The alternative wastewater components can be classified as treatment and disposal options as well as collection and conveyance options. A range of alternatives will be evaluated for each wastewater component, with the selected alternatives being packaged together to form discrete alternatives for each study area.

A. TREATMENT AND DISPOSAL ALTERNATIVES

There are several treatment and disposal options available to Westtown Township. For the purposes of this Plan, the following options will be evaluated:

- Westtown-Chester Creek WWTP
- West Goshen WWTP
- Borough of West Chester, Goose Creek WWTP
- Lagoon Treatment, Spray Irrigation
- New Community Systems
- Individual On-Lot Systems

1. Westtown-Chester Creek WWTP

Under this alternative, the Westtown-Chester Creek WWTP would be upgraded beyond the currently contemplated upgrade to accommodate the ultimate needs of the Westtown-Chester Creek Study Area. As noted earlier in this Study, the Township is in the process of receiving a Part II permit (Permit to Construct) from DEP to upgrade the treatment plant from 290,000 gpd to 495,000 gpd (A description of the proposed upgrades to the treatment plant can be found in Chapter IV). This upgrade is intended to address basic structural and operational issues. The increase in capacity is also intended to address the current hydraulic overload while allowing for a slight increase in connections. It was intended that these upgrades would have occurred as soon as possible from the date of the 1998 Act 537 Plan approval. Further, it was contemplated that after the plant was re-rated to 495,000 gpd, that future planning would occur to determine the future capacity of the treatment plant needed to address the ultimate needs of the service area.

The alternative to upgrade the existing Westtown-Chester Creek WWTP would involve the following:

- Use of automatic influent screen
- Use of aerated grit removal
- Use of a combined carbon oxidation-nitrification treatment system
- Tankage, piping and pumps to accommodate 900,000 gpd

- Replacement of existing concrete aeration basins with new concrete tanks
- Providing clarification within the new aeration tanks and removal of the existing clarifiers
- Providing flow equalization within portions the new aeration tanks
- Providing sludge storage within portions of the new aeration tanks
- Filtration of effluent prior to disinfection
- Continuation of the ultraviolet disinfection system

Map VI-1 shows the proposed improvements to the treatment plant. Table VI-1 includes the estimated cost of the above-mentioned improvements. Regarding sludge handling, the Township will continue its practice of sludge hauling while the treatment plant is permitted to 495,000 gpd. Prior to requesting the re-rating to 900,000 gpd, the Township will evaluate other options regarding sludge disposal.

2. West Goshen Treatment Plant

Under this alternative, wastewater flows for the West Goshen Study Area and portions of the Route 202 Study Area would be treated at the West Goshen Sewer Authority treatment plant. The treatment plant uses a trickling filtration followed by an activated sludge treatment process. West Goshen Sewer Authority has just completed plant upgrades to increase the capacity from 4.5 mgd to 6.0 mgd. The treatment plant upgrades include the addition of flow equalization, upgrades to the headworks, trickling filter media replacement, addition of an aeration tank, addition of a final clarifier, addition of distribution box and the conversion of chlorine disinfection to ultraviolet disinfection. As a result of the plant upgrade, per the inter-municipal agreement between West Goshen and Westtown Townships, Westtown Township has a reserve capacity of 530,000 gpd. The inter-municipal agreement can be found in Appendix B. Existing flows from Westtown Township to the West Goshen treatment are approximately 355,000 gpd.

3. Borough of West Chester Goose Creek Treatment Plant

Under this alternative, portions of the Study Areas would flow to the Goose Creek treatment plant in the Borough of West Chester. The Goose Creek treatment plant has recently been rerated from an annual average flow of 1.672 mgd to 1.9 mgd. According to the Borough's 1999 Act 537 Plan Revision, the current (March 1999) flow to the treatment plant is approximately 1.0 mgd. This excess capacity is partly due to certain industrial users within the Borough not utilizing their full capacity as allocated per previous agreements.

FIGURE VI-1

W-CC – Wastewater Treatment Plant Upgrades

Table VI-1

In correspondence dated November 3, 2000 the Borough stated that capacity is available to Westtown Township at a treatment tapping fee of approximately $4,500/EDU. (The correspondence can be found as Appendix D.) This fee does not include the cost of a new conveyance system through West Goshen or the cost of a collection tap fee to the extent that the existing West Goshen or Borough collection and conveyance system would be used. Considering the Borough treatment tap fee only, and a flow per EDU at 250 gpd/EDU, the cost to treat future flows from the Westtown-Chester Creek Study Area would be approximately $7,500,000.

Given the existing agreement with West Goshen Sewer Authority, the existence of a centrally located Township-owned treatment plant, and the cost to provide service, the Borough alternative was not further evaluated.

4. Lagoon Treatment/Spray Irrigation

As mentioned earlier in this Plan, the Township's 1992 Act 537 Plan indicated the use of a lagoon treatment spray irrigation system to accommodate flows in the eastern portion of the Township. The Township was unable to reach a suitable agreement with the owner's of land on which the lagoon and spray systems would be constructed. Due to the nearly built-out nature of the Township, and the lack of suitably large parcels, the Township anticipates similar obstacles in finding a willing participant to assist in implementing a spray irrigation alternative under this Plan (approximately 150 well-drained "wet" acres would be needed to accommodate the future flows of the Westtown-Chester Creek Study Area. Roughly 100-150 additional acres would be needed in consideration of buffers and pockets of unsuitable soils).

Subsequent to the 1992 Act 537 Plan, the Township purchased the Westtown-Chester Creek treatment plant.

In consideration of the above, a lagoon treatment and spray irrigation alternative was not further investigated. As will be discussed below, the Township does wish to require lagoon treatment and spray irrigation in those areas suitable for new community systems.

5. Community Systems

Given that the Township is nearly built-out, there are few areas available that could be developed that would support a new community system. The Jones Tract is the subject of a pending Planned Unit Development Conditional Use application and has been included in the future flow projections to the Westtown-Chester Creek treatment plant. The Westtown School has no immediate or long term plans for new development.

The Crebilly Farm, in the southern portion of the Route 202 Study Area, has been the subject of recent planning efforts by the Township to create a Comprehensive

Plan land use classification that would permit cluster residential and office development with approximately 70% open space. The majority of the open space could be a golf course with the balance of the open space being made available for public active and passive recreational amenities. This combination of uses could support a new community wastewater system. Although the Crebilly Farm could be served by the West Goshen Sewer Authority treatment plant, (the reserved capacity to Westtown Township would possibly need to be revised depending on the extent of other contributing flows) the Township prefers a wastewater option that compliments the open space scenario while also providing other environmental benefits. In order to maintain control over the type of community systems that would be considered for the Crebilly Farm, while also allowing for the flexibility to react to site specific conditions and constraints, the Township will require that a Community System Selection Strategy be used for the Crebilly Farm. That is, when considering wastewater treatment and disposal alternatives for the Crebilly Farm, certain technologies must be considered first. Only if a certain technology is proven unfeasible, can the applicant consider the next technology. Table VI-2 shows the Community System Selection Strategy. As can be seen in Table VI-2 the preferred wastewater technology for the Crebilly Farm is use of lagoon system, slow rate land application system. Such a system is compatible with the land use scenario provided in the Comprehensive Plan while also providing groundwater recharge.

6. On-Lot Systems

Under this scenario, those areas unable to be served by the existing or planned capacity in the West Goshen or Westtown-Chester Creek treatment plants, would continue to rely on on-lot systems. Similar to the Community System objectives, the Township wishes to encourage the use of certain systems while also maintaining a flexibility to react to various site characteristics. Table VI-3 shows the On-Lot System Selection Strategy to be used for those areas not to be served by a centralized system. This Selection Strategy would also apply to those areas that will be in need of a new or replacement on-lot system pending future centralized wastewater service being provided as dictated in this Plan.

B. COLLECTION AND CONVEYANCE ALTERNATIVES

Although portions of the Township are currently served with a conventional gravity/pump station system, a full range of collection and conveyance system alternatives are available to address the unsewered portions of the Township. The collection and conveyance system alternatives discussed below will be reduced to those alternatives technically feasible within Westtown Township. That narrowed set of collection and conveyance alternatives will be packaged with the above-mentioned treatment and disposal options to form discrete alternatives for each study area.

TABLE VI-2

COMMUNITY SYSTEM SELECTION STRATEGY

{PRIVATE }

COMMUNITY ON-LOT DISPOSAL SYSTEMS (COLDS) SELECTION

POLICY

This selection strategy only applies to the southern portion of the Route 202 Study Area.

METHODOLOGY

Evaluate the following wastewater technologies in sequence, beginning with Technology G. This technology evaluation sequence establishes a hierarchy of system preference. This hierarchy is intended to direct applicants proposing wastewater systems in the Township to utilize the technology most desired by the municipality.

The intent of this hierarchy is to place the responsibility of demonstrating the feasibility of a particular technology upon the applicant. If the applicant can prove, to the satisfaction of the Township, that a more preferred technology cannot be utilized then the next technology on the list is evaluated. This evaluation of technologies will be conducted under close scrutiny of the Township and its consultants and must fully comply with the DEP wastewater regulations.

TECHNOLOGY EVALUATION

G. Lagoon/pond system/slow rate land application (i.e., spray irrigation)
H. Community septic tank/intermittent sand filter/sub-surface disposal
I. Lagoon/pond system/10 days storage/Rapid Sand Filtration/drip irrigation
J. Community septic tank/intermittent sand filter/drip irrigation
K. Community aerobic unit/sand filter/sub-surface disposal
L. Community aerobic unit/slow rate land application.
M. Community septic tank/alternate system.
N. Community aerobic unit/alternate systems.
O. Community aerobic unit/stream discharge.
P. Central holding tank (temporary)

NOTES:

1. Sand filters shall be intermittent sand filters, recirculating intermittent sand filters, or rapid sand filters. Rapid sand filters shall have flow equalization and sufficient storage capacity for treatment upsets.

TABLE VI-3

INDIVIDUAL ON-LOT DISPOSAL SYSTEMS (OLDS) SELECTION

POLICY

New or replacement OLDS shall follow the selection process as described below. This strategy only applies to those areas where centralized sewer service is not available. Any new or replacement OLDS shall be considered temporary until such time as centralized service is available.

METHODOLOGY

Evaluate the following wastewater technologies in sequence, beginning with Technology A. This technology evaluation sequence establishes a hierarchy of system preference. This hierarchy is intended to direct applicants proposing wastewater systems in the Township to utilize the technology most desired by the municipality.

The intent of this hierarchy is to place the responsibility of demonstrating the feasibility of a particular technology upon the applicant. If the applicant can prove, to the satisfaction of the Township, that a more preferred technology cannot be utilized then the next technology on the list is evaluated. The Township shall consider physical limitations, but not costs, in its evaluation of the feasibility of a preferred technology. This evaluation of technologies will be conducted under close scrutiny of the Township and its consultants and must fully comply with the DEP wastewater regulations.

TECHNOLOGY EVALUATION

A. Septic tank/subsurface disposal system.
   1. Standard trench
   2. Seepage bed
   3. Drip Irrigation
   4. Elevated Sand Mound

B. Aerobic tank or septic tank/intermittent sand filter with subsurface disposal.

C. Aerobic tank/slow rate land application (i.e. spray irrigation).

D. Aerobic tank or septic tank and sand filter with stream discharge.

E. Septic tank, aerobic or septic tank/sand filter treatment with alternative disposal area (e.g., oversized bed or evapotranspiration system).

F. Individual holding tank.

The collection and conveyance system alternatives considered for Westtown Township include the following:

1. Gravity Sewers

   - Conventional
   - Small Diameter Effluent Sewers

2. Pressure Sewers

   - Grinder Pump Sewers
   - Septic Tank Effluent Pump Sewers

3. Vacuum Sewers

   a. Gravity Sewers

      Conventional

      The conventional gravity sewer, today most commonly constructed of PVC pipe, has historically been the most popular method used for the collection and conveyance of wastewater. The pipe is installed on a slope to enable the wastewater to flow from the house site to the treatment facility. Pipes are usually 8" in diameter and must be installed below the frost line. Manholes are located a maximum of 400' apart or at changes of direction or significant changes in elevation. In areas of excessively hilly or flat terrain, sewage flow is assisted by pump stations.

      Small Diameter Effluent Sewers

      A small diameter effluent sewer (SDES) collects effluent from septic tanks at each service connection and transports it by gravity to a treatment plant or a conventional sewer. Synonyms include small diameter gravity sewers, septic tank effluent drains, and small bore sewers. The volume of septic tanks is often 1,000 gallons, but varies widely. Septic tanks remove grit, settleable solids, and grease, and they attenuate peak flows. Both the horizontal and vertical alignments of the pipes can be curvilinear. The pipe network contains no closed loops. Uphill sections can be used, provided that there is enough elevation head upstream to maintain flow in the desired direction, and that there is no backflow into any service connection.

      Minimum diameters can be approximately two inches. Plastic pipe is typically used since it is economical in small sizes, and it resists corrosion by the septic wastewater. Cleanouts are used to provide access for flushing. Manholes are used infrequently, usually at major junctions of main lines. Air release risers are required at summits in the sewer profile. Because of the small diameters and flexible slope and alignment of the SDES, excavation depths and volumes are typically much smaller than with conventional sewers, sometimes requiring only a chain trencher.

Two varieties of SDES systems have been used: the variable grade effluent sewer (VGES) and the minimum grade effluent sewer (MGES). The VGES allows flexibility of horizontal and vertical alignment, provided that there is enough elevation head to maintain flow in the desired direction and that there is no backflow into any service connection at design flow. In the MGES, minimum downward slopes are imposed. In some cases, horizontal alignments have been required to be straight and larger minimum diameter constraints have been imposed. Therefore, the MGES is more conservative and more costly than VGES.

In both the MGES and the VGES, individual service connections can be equipped with a septic tank effluent pump unit, creating a hybrid with the septic tank effluent pump (STEP) pressure sewer. The use of STEP connections is advantageous when excavation costs can be reduced enough to offset pumping costs. Hybrid designs are common in current practice. In-line lift stations can also be used if required by the terrain or for cost-effectiveness.

Two-compartment septic tanks may be more efficient at retaining solids, but single-compartment tanks have performed well. Screens with outlet orifices have also shown reduced solids discharge.

Several dwelling units or other service locations can be clustered to a single septic tank, which should have an increased volume depending on the total population equivalent it serves.

SDES systems may not be as cost effective as pressure sewers if the treatment location is at a higher elevation than the service area or if there is topographic undulation between the service area and treatment location. Both instances would require lift stations.

b. Pressure Sewers

Grinder Pump Pressure Sewers

A grinder pump (GP) pressure sewer has a pump at each service connection. The pumps are one horsepower (0.75 kilowatt) or more, typically require 220 volts, and are equipped with a grinding mechanism that macerates the solids. The head and flow rate provided by the pumps are usually about 50 to 100 feet and 10 to 15 gallons per minute (gpm) but vary widely. The pumps discharge into a completely pressurized pipe system terminating at a treatment plant or conventional sewer.

Because the mains are pressurized, there will be no infiltration into them, but infiltration and inflow into the house sewers and the pump wells can occur. In areas where the GP sewer system has replaced septic tank and leaching field systems, the abandoned systems may be retained for emergency

overflow, but they should be separated from the pump well by a valve that is opened only when emergency overflow is needed. Otherwise, the septic tank and leaching field system can become sources of large volumes of infiltration.

The discharge line from the pump is equipped with at least one check valve and one manual valve. Electrical service is required at each service connection. The sewer profile usually parallels the ground surface profile. Horizontal alignment can be curvilinear. Plastic pipe is typically used since it is economical in small sizes, and it resists corrosion. The minimum diameter is 1-1/4 inches for service connections and the smallest mains. Cleanouts are used to provide access for flushing. Automatic air release valves are required at summits in the sewer profile.

Because of the small diameters, curvilinear horizontal alignment, and profile paralleling the ground surface, excavation depths and volumes are typically much smaller for a GP pressure sewer than for conventional sewers. The pipes are installed slightly below the frost line.

Several dwelling units or other service locations have been clustered to a single pump well, which would have an increased working volume depending on the total population equivalent it services. However, clustered service connections have often led to disputes over billing and responsibility for nuisance conditions and service calls. Duplex pump wells are often used on clustered, commercial, institutional, or other larger services.

Because GP systems do not have the large excess capacity typical of conventional gravity sewers, they must be designed with an adequate allowance for desired future growth.

Septic Tank Effluent Pump Pressure Sewer (STEP)

A septic tank effluent pump (STEP) pressure sewer has a septic tank and a pump at each service connection. The pumps discharge septic tank effluent into a completely pressurized pipe system terminating at a treatment plant or a gravity sewer. Because the mains are pressurized, there will be no infiltration into them, but infiltration and inflow into the house sewers and the septic tanks can occur. The volume of the septic tanks is often 1,000 gallons but varies widely. Septic tanks remove grit, settleable solids and grease.

The pumps, which can be part of the septic tank or in a separate well, typically are smaller than GP's. They are designed to pump septic tank effluent and have larger clearances but will not pump raw sewage solids. The head and flow rate provided by the pumps are generally about 50 feet and 15 gallons per minute (gpm) but vary widely. The working volume of the pump well is usually about 40 gallons but this also can vary widely. The discharge line from the pump is equipped with at least one check valve and one manual valve. Electrical service is required at each service connection.

The pipe network can contain closed loops but usually does not. The sewer profile normally parallels the ground surface profile, and the horizontal alignment can be curvilinear. Plastic pipe is generally used since it is economical in small sizes, and it resists corrosion by the septic wastewater. The minimum diameter is typically 1-1/4" for service connections and the smallest mains; although 2-3" inches is generally recommended. Cleanouts are used to provide access for flushing, and automatic air release valves are required at or slightly downstream of summits in the sewer profile. Air release points should have odor control facilities.

Because of the small diameters, curvilinear horizontal alignment, and profile paralleling the ground surface, excavation depths and volumes are usually much smaller for a STEP pressure sewer than for conventional sewers, sometimes requiring only a chain trencher. The frost line normally determines the depth of the sewer.

Two-compartment septic tanks may be more efficient at retaining solids, but single-compartment tanks have performed well. Septic tanks with integral pump vaults are available and reduce excavation on-lot.

Several dwelling units or other service locations can be clustered through a small diameter effluent sewer to a single septic tank, which should have an increased volume depending on the total population equivalent it serves. Clustered service connections have led to disputes over billing and responsibility for nuisance conditions and service calls.

STEP systems do not have the large built-in excess capacity typical of conventional gravity sewers. Therefore, they must be designed with an adequate allowance for future growth if that is desired.

Where pressure sewers are indicated, the choice between STEP and GP (grinder pump) systems depends on two main factors. First, the costs of on-lot facilities will generally be over 75% - perhaps well over 90% - of the total system cost. Therefore, the system with the lower average on-lot cost will ordinarily have the lower total cost. In some cases, STEP systems have the advantage of allowing some service connections to be gravity connections, thus lowering on-lot costs. GP systems usually have the pumps (and grinders) at all service connections. The second factor is the relevance of design velocities. GP systems require a higher velocity because they carry macerated sewage solids and grease. STEP systems will better tolerate the low-flow conditions that occur in locations with a highly fluctuating seasonal occupancy and in locations with slow buildout from a relatively small initial population to the ultimate design population. Finally, a collection system totally created by STEP's decreases preliminary treatment needs at the wastewater facility, but the septic tanks at each dwelling must be pumped regularly.

c. Vacuum Sewers

A vacuum sewer system has three major subsystems: the central collection station, the collection network, and the on-site facilities. Vacuum is generated at the central collection station and is transmitted by the collection network throughout the area being served. Sewage from conventional plumbing fixtures flows by gravity to an on-site holding tank. When about 10 gallons of sewage has been collected, the "vacuum interface" valve, which operates automatically using pneumatic controls, opens for a few seconds allowing the sewage and a volume of air to be sucked through the service pipe and into the main. The difference between the atmospheric pressure behind the sewage and the vacuum ahead provides the primary propulsive force. The fact that both air and sewage flow simultaneously produces high velocities and prevents blockages. Following the valve closure, the system returns to equilibrium and the sewage comes to rest at the low points of the collection network. After several valve cycles, the sewage reaches the central collection tank, which is under vacuum. When the sewage in the central collection tanks reaches a certain level, a conventional non-clog sewage pump discharges it through a force main to a treatment plant or gravity interceptor.

C. APPLICABLE COLLECTION AND CONVEYANCE ALTERNATIVES

Table VI-4 below describes the wastewater collection and conveyance system alternatives applicable to Westtown Township. Using Table VI-4, two alternatives have been investigated to provide wastewater collection service to the three study areas; a mostly conventional gravity collection system - Alternative #1, a solely grinder pump force main system - Alternative #2, and a solely gravity alternative - Alternative #3. The three alternatives are described as follows:

Alternative #1

The mostly conventional gravity collection system will rely primarily on conventional gravity sewers to convey wastewater from individual lots to a pump station, or directly to a treatment plant. Existing on-lot systems will be discontinued and one of two on-lot methods will be used to convey sewage from the home to the sewer main, as follows:

1. Most individual homes will be retrofitted with a 4" diameter conventional gravity lateral, or

2. If topography prevents flow from the home to the gravity sewer main by gravity, then a grinder pump and 1¼" diameter grinder pump force main lateral will be used to reach gravity sewer main.

TABLE VI-4

APPLICABILITY OF COLLECTION AND CONVEYANCE ALTERNATIVES

Alternatives Considered	Applicable Yes	Applicable No	Comments
Gravity Sewers			
Conventional	X		Topography suitable for gravity flow with several pump stations
Small Diameter Effluent Sewer		X	With existing centralized wastewater treatment plants, would cause redundant treatment and management
Pressure Sewers			
Grinder Pump	X		Topography suitable for grinder pump system
Septic Tank Effluent Pumps		X	With existing centralized wastewater treatment plants, would cause redundant treatment and management
Vacuum Sewers		X	Topography suitable for conventional gravity or grinder pump system

Further, on roads where topography prohibits use of conventional gravity sewer main, grinder pump force mains will be used to convey flow from individual homes up to where the wastewater can meet a gravity sewer main. Conventional gravity sewer systems typically use sloped 8" diameter or larger pipe aligned under the roadway between manholes spaced no more than 400' apart.

Alternative #2

The grinder pump force main system will rely completely on grinder pumps and grinder pump force mains to convey wastewater from individual lots to a pump station, or directly to a treatment plant. Existing on-lot systems will be discontinued and grinder pumps and 1¼" diameter grinder pump force main laterals will be used to reach the grinder pump force main. Grinder pump force mains typically utilize 2-4" diameter force main laid 3' deep along the side of a road.

Alternative #3

Similar to Alternative #1, under this alternative, all individual homes would be served by a conventional gravity sewer system. Force mains would only be utilized to convey wastewater from central pump stations.

D. ALTERNATIVE WASTEWATER FACILITIES FOR STUDY AREAS

Using the above-described collection and conveyance alternatives and the centralized treatment and disposal options available to Westtown Township, the wastewater system alternatives for each study area can be described as follows:

1. Chester Creek Study Area

This alternative includes construction of two new collection systems, the Route 926 Collection System and the Shiloh Road Collection System, and renovation and expansion of the existing Main Trunk Collection System.

a. Mostly Gravity Collection/Central Pump Stations, Treatment and Disposal at Westtown-Chester Creek Wastewater Treatment Plant

Flow from homes using the Route 926 Collection System will flow by gravity or grinder pump through conventional gravity or grinder pump force main to a pump station located near the intersection of Westtown Way and Route 926. The flow will then be pumped to a pump station located on the Jones Tract property. The Jones Tract Pump Station will pump this flow and flow from the proposed 200 EDU Regional School to the Westtown-Chester Creek treatment plant through an 8" diameter force main. This force main will be routed across the Jones Tract, to Shiloh Road, along Shiloh Road to Ashley Road, and along Ashley Road to the plant.

Map VI-2 (return to the Act 537 Plan page to view this map)

The Shiloh Road Collection System will collect flow from the Carolyn Drive area by both conventional gravity and grinder pump force main and convey it to a pump station as shown on Map VI-2. This pump station will pump flow to the conventional gravity main located in Tyson Drive West. From here flow will be conveyed by conventional gravity to the Westtown-Chester Creek treatment plant.

According to the current Act 537 Plan update, the existing main trunk flows with hydraulic deficiencies including excess infiltration and inflow (I&I). Results of a limited hydraulic analysis of the existing collection system indicate that replacement of the existing main trunk from a point approximately 1800' east of Walnut Hill Rd to the Westtown-Chester Creek treatment plant with a 15" diameter main is appropriate. However, an I&I reduction program is currently being implemented and if successful, could eliminate the need to replace the main trunk. In addition, recent televisions of the main trunk on the Westtown School property indicate the pipe is in fairly good condition. Two additional areas are to be served by the Main Trunk Collection System. Both West Wynn I and Westtown Farms will be served by new conventional gravity and grinder pump force main as shown on Map VI-2. These conventional gravity and grinder pump force mains will convey flow to the existing gravity collection system, which flows directly to the Westtown-Chester Creek treatment plant.

b. Grinder Pump Collection/Conveyance, Treatment and Disposal at Westtown-Chester Creek Wastewater Treatment Plant

Flow from homes using the Route 926 Collection System will flow by grinder pump through grinder pump force main to a pump station located on the Jones Tract property. The Jones Tract Pump Station will pump this flow and flow from the proposed 200 EDU Regional School to the Westtown-Chester Creek plant through a 6" diameter force main. This force main will be routed across the Jones Tract, to Shiloh Rd, along Shiloh Rd to Ashley Rd, and along Ashley Rd to the plant, as indicated on Map VI-3.

The Shiloh Road Collection System will collect and convey flow by grinder pump force main directly to the Westtown-Chester Creak treatment plant as shown on Map VI-3.

According to the current Act 537 Plan update, the existing main trunk flows with hydraulic deficiencies including excess infiltration and inflow (I&I). Results of a limited hydraulic analysis of the existing collection system indicate that replacement of the existing main trunk from a point approximately 1800' east of Walnut Hill Road to the Westtown-Chester Creek treatment plant with a 15" diameter main is appropriate. However,

Map VI-3 (return to the Act 537 Plan page to view this map)

an I&I reduction program is currently being implemented and if successful, could eliminate the need to replace the main trunk. Two additional areas are to be served by the Main Trunk Collection System. Both West Wynn I and Westtown Farms will be served by new grinder pump force main as indicated on Map VI-3. These grinder pump force mains will convey flow to the existing gravity collection system, which flows directly to the Westtown-Chester Creek treatment plant.

c. All Gravity Collection/Central Pump Stations, Treatment and Disposal at Westtown-Chester Creek Wastewater Treatment Plant

New flow from homes would flow by gravity laterals to a gravity collection system to a series of new or existing central pump stations. Seven (7) new pump stations are required to serve the Westtown-Chester Creek Study Area under this alternative. (It should be noted that a small portion of an area shown as being included in West Goshen Study Area in Chapter III would be conveyed to the Westtown-Chester Creek treatment plant under this alternative).

The All Gravity Alternative can be found on Map VI-4.

d. No Action, Continued Use of OLDS

Under this scenario, the study area would continue to use on-lot treatment and disposal systems. Existing systems would be repaired or replaced if possible.

2. West Goshen Study Area

Alternatives to service The West Goshen Study Area include construction of two new collection systems, the S. Concord Road Collection System and the Oakbourne Road Collection System.

a. Gravity Collection/Central Pump Stations, Treatment and Disposal at West Goshen Wastewater Treatment Plant

New flow from homes using the S. Concord Road Collection System will flow by gravity or grinder pump through conventional gravity or grinder pump force main to the Westbourne Road Pump Station as indicated on Map VI-2. The Westbourne Road Pump Station will pump this flow to the existing Pleasant Grove Pump Station Force Main, which pumps flow directly to the West Goshen wastewater treatment plant. The Pleasant Grove Pump Station Force Main is located along S. Concord Road.

The Oakbourne Road Collection System will collect flow from the Oakbourne Road area by both conventional gravity and grinder pump force main as shown on Map VI-2. Generally, the northeast portion of the

Map VI-4 (return to the Act 537 Plan page to view this map)

collection system will flow to an existing conventional gravity main located at the intersection of Coventry Lane and Matlack Street. This conventional gravity main will flow directly to the West Goshen wastewater treatment plant. Flow from the southeast portion of the collection system will flow to the existing collection system, which flows to the Pleasant Grove Pump Station. This flow is then pumped directly to the West Goshen Township wastewater treatment plant through a force main along S. Concord Road.

Service to a portion of the West Goshen Study Area is currently provided by a gravity and force main system, which utilize both the Wild Goose and Cobblefield pump stations.

b. Grinder Pump Collection/Conveyance, Treatment and Disposal at West Goshen Wastewater Treatment Plant

New flow from homes using the S. Concord Road Collection System will flow by grinder pump through grinder pump force main to the Pleasant Grove Pump Station as indicated on Map VI-3. The Pleasant Grove Pump Station will pump this flow directly to the West Goshen wastewater treatment plant. The Pleasant Grove Pump Station Force Main is located along S. Concord Road.

The Oakbourne Road Collection System will collect flow from the Oakbourne Road area by grinder pump force main as shown on Map VI-3. This grinder pump force main collection system will flow to an existing conventional gravity main located at the intersection of Coventry Lane and Matlack Street. This conventional gravity main will flow directly to the West Goshen wastewater treatment plant.

Service to a portion of the West Goshen Study Area is currently provided by a gravity and force main system, which utilize both the Wild Goose and Cobblefield pump stations.

c. All Gravity Collection/Central Pump Stations, Treatment and Disposal at West Goshen Wastewater Treatment Plant

Under this alternative, new flow from homes would flow by gravity laterals to a gravity collection system to existing central pump stations. No new pump stations would be required in the West Goshen Study Area to convey the sewage to the West Goshen wastewater treatment plant.

The All Gravity Alternative can be found on Map VI-4.

d. No Action, Continued Use of OLDS

Under this scenario, the study area would continue to use on-lot treatment and disposal systems. Existing systems would be repaired or replaced if possible.

3. Route 202 Study Area

Alternatives to service the Route 202 Study Area include construction of the West Route 202 Collection System.

a. Gravity Collection/Central Pump Stations, Treatment and Disposal at West Goshen Wastewater Treatment Plant

New flow from homes using the southern portion of the Route 202 Collection System will flow by gravity or grinder pump through conventional gravity or grinder pump force main to the New Street Pump Station #2 as indicated on Map VI-2. The New Street Pump Station #2 will pump this flow to New Street Pump Station #1.

New flow from homes in the northern portion of the Route 202 Collection System will flow by gravity or grinder pump through conventional gravity or grinder pump force main to the New Street Pump Station #1. This flow and flow from the New Street Pump Station #2 will be pumped through a force main to the existing gravity collection system located on the east side of Route 202 near to where Jaqueline Rd intersects with Route 202. The New Street Pump Station #2 force main will be located along Jaqueline Road. The existing gravity collection system located on the east side of Route 202 will convey the sewage to the West Goshen WWTP via an existing gravity line located in West Goshen Township. According to the West Goshen WWTP operator, the capacity of the existing line is capable of accommodating the flows from the West Side of Route 202 Study Area.

b. Grinder Pump Collection/Conveyance, Treatment and Disposal at West Goshen Wastewater Treatment Plant

New flow from homes using the Route 202 Collection System will flow by grinder pump through grinder pump force main to the New Street Pump Station #1. From this pump station flow will be pumped through a force main to the existing gravity collection system located on the east side of Route 202 just south of Ridge Road. The existing gravity collection system located on the east side of Route 202 will convey the sewage to the West Goshen WWTP via an existing gravity line located in West Goshen Township. According to the West Goshen WWTP operator, the capacity of the existing line is capable of accommodating the flows from the West Side of Route 202 Study Area. This alternative is depicted on Map VI-3.

c. All Gravity Collection/Central Pump Stations and Disposal at West Goshen Wastewater Treatment Plant

Flows from homes in the Route 202 Study Area would flow by gravity laterals to a gravity collection system to new pump stations. Two (2) new pump stations are required to convey the sewage to the West Goshen wastewater treatment plant.

The All Gravity Alternative can be found on Map VI-4.

d. New Community System

Under this alternative the Crebilly Farm located on the west side of Route 202 will be served by a new community system. The Crebilly Farm has been subject of a special comprehensive planning study that evaluated various mixed-use alternatives for the site. Due to the range of uses that would be permitted under a mixed land use scenario, a future wastewater flow cannot be assigned to the Crebilly Farm at this time. The use of a community system to serve the Crebilly Farm is an integral part of other alternatives for the Route 202 Study Area, since the future flows from the Crebilly Farm have not been accounted for in these other alternatives.

e. No Action, Continued Use of OLDS

Under this scenario, the study area would continue to use on-lot treatment and disposal systems. Existing systems would be repaired or replaced if possible.

E. MANAGEMENT SYSTEM FOR INDIVIDUAL OLDS

A management program must be considered for those areas of Westtown Township not to be served by centralized wastewater facilities or those areas not to be served for some time. In the management of individual on-lot systems, the Township proposes to become a more involved party than it has been to this point with the primary responsibility for the continued functioning of these systems remaining with the individual property owner.

Table VI-5 outlines five options for Township involvement in the management of individual wastewater systems. In each option, the Township administers a public education program for property owners, advising them of the need for system maintenance and water conservation. Beyond that, the options move from 1 to 5 in the direction of increasingly active participation by the Township in system ownership and maintenance.

For Westtown Township, Option 3 is selected. This calls for continued ownership and operation of individual OLDS by the property owner, a public education program, and a program that requires homeowners to provide proof to the Township that their system is pumped-out at least once every two (2) years. The proof of pump-out must be in the form

TABLE VI-5

INDIVIDUAL OLDS MANAGEMENT PROGRAM OPTIONS

1.	**PRIVATE OWNERSHIP/PRIVATE OPERATION AND MAINTENANCE** A. OLDS ownership by property owner; B. Property owner has sole responsibility for OLDS operation and maintenance; and C. Township administers Public Education Program to inform residents of need for OLDS maintenance and water conservation.
2.	**PRIVATE OWNERSHIP/PRIVATE OPERATION AND MAINTENANCE WITH PROOF-OF-PUMP OUT** A. OLDS ownership by property owner; B. Property owner responsible for OLDS operation and maintenance; C. Township requires proof-of-pump out of septage once every three years from all parcels (or other specified period); and D. Township administers Public Education Program (as in 1C above).
3.	**PRIVATE OWNERSHIP/PRIVATE OPERATION AND CERTIFICATION PROGRAM** A. OLDS ownership by property owner; B. Property owner responsible for OLDS operations and maintenance; C. Township monitors OLDS operation by requiring annual certification (or other specified period); D. Township requires proof-of-pump out of septage at least once every two years or at the direction of the certifier; and E. Township administers Public Education Program (as in 1C above).
4.	**PRIVATE OWNERSHIP/PUBLIC OPERATION AND MAINTENANCE** A. OLDS ownership by property owner; B. Township responsible for OLDS operation and maintenance through structured program; C. Property owner becomes a customer and pays a user fee; and D. Township administers Public Education Program (as in 1C above).
5.	**PUBLIC OWNERSHIP/PUBLIC OPERATION AND MAINTENANCE** A. Township owns all OLDS; B. Township responsible for OLDS operation and maintenance as in #4 above. C. Property owner becomes a customer and pays a user fee; and D. Township administers Public Education Program (as in 1C above).

of a receipt from a licensed hauler. Option 3 also involves a certification component whereby a homeowner will be required to provide proof to the Township that the on-lot system is functioning properly. The specific certification protocol and methodology will be established in a management ordinance to be adopted by the Township.

In the case of Westtown Township, the management program, in conjunction with a Township-wide inventory of on-lot systems, will also be used to determine the need to provide centralized sewer service to particular communities.

1. Alternative Individual Systems

In some cases where the certification process does not justify centralized sewer service being provided to a particular community, failures of individual systems would still need to be addressed.

For new or replacement individual systems using land application or stream discharge technology, the Township's policies will be the same as those it applies to conventional systems, i.e., required routine maintenance, certification and a public education program. Because such systems tend to require more maintenance than conventional individual OLDS, the Township will implement additional policies enabling it to:

a. Review the system design and supervise construction activities.

b. Require financial assurances satisfactory to the Township, to be held for 18 months after the date of initial operation, for all new or repaired systems that require a DEP permit.

c. Require a maintenance agreement with the property owner that provides for regular Township inspection of the system and the payment of a fee by the property owner to cover inspection costs.

d. Require immediate connection to a central wastewater facility when available.

F. MANAGEMENT OF COMMUNITY SYSTEMS

As mentioned earlier, a new community system in the southern portion of the Route 202 Study Area may be a viable option to meet the long-term wastewater needs for all or a portion of that study area. The Township intends to own and operate any privately constructed community systems, either by requiring a continuing offer of dedication or stipulating the transfer of ownership at a prescribed level of build-out or occupancy of the development being served. On this basis, the Township will be the responsible party for the management of community systems. The roles of the Chester County Health Department and the Pennsylvania Department of Environmental Protection will be in the areas of design approval, permitting, monitoring, and enforcement.

The Township will demand a high level of quality in the design and construction of any community system built in Westtown, perhaps exceeding those of DEP. For example, intermittent sand filtration may be required for all systems. The choice of community systems shall be done in accordance with the COLDS selection strategy.

Specific Township policies concerning the management of community systems will include:

1. The Township shall review and approve the system design and shall review construction of all community systems.

2. There shall be financial assurances satisfactory to the Township to be held for 18 months following the date of occupancy of the last house.

3. Prior to the transfer of ownership, routine maintenance shall be required and the Township will perform routine inspections of the community system on a regular basis.

4. All new community systems will be covered by the management program.