

**UPDATE TO
CHADDS FORD TOWNSHIP'S SEWAGE
FACILITIES MANAGEMENT (ACT 537) PLAN**

**CHADDS FORD TOWNSHIP
DELAWARE COUNTY, PENNSYLVANIA**

Draft May 2016

CHADDS FORD TOWNSHIP
10 Ring Road
Chadds Ford, PA 19317-9101

PENNONI
One South Church Street
Second Floor
West Chester, PA 19382
www.pennoni.com

CFTP0570

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

TABLE OF CONTENTS

- I. Previous Wastewater Planning
 - A. Introduction
 - B. Previous Planning
- II. Physical and Demographic Analysis
 - A. Planning areas, municipal boundaries, Sewer Authority/Management Agency service area boundaries
 - B. Physical Characteristics within the Study Area
 - C. Soils within the Study Area
 - D. Geology Features within the Study Area
 - E. Topography within the Study Area
 - F. Potable Water Supplies within the Study Area
 - G. Wetlands within the Study Area
- III. Existing Wastewater Facilities in the Planning Area
 - A. Existing Municipally Owned Wastewater Treatment Plants
 - B. Existing Privately Owned Wastewater Treatment System
 - C. Small Flow Treatment Systems
 - D. OLDS Inventory
 - E. Identify Wastewater Sludge and Septage Generation/Transport/Disposal
- IV. Future Growth and Land Development
 - A. Comprehensive Plan and Zoning
 - B. Build-out Plan
- V. Alternatives Analysis and Evaluation
 - A. Alternative 1 – Continued Operation of Existing Systems
 - B. Alternative 2 – Ridings Conversion / Turner's Mill Expansion
 - C. Analysis of Alternatives
 - D. Implementation Plan / Schedule
- VI. Institutional Evaluation
 - A. Financial and Debt Status
 - B. Available Staff and Administrative Resources
 - C. Existing Legal Authority

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

TABLES

- Table 1 Suitability of Soils for Conventional Septic Systems with Soil Data
- Table 2 Suitability of Soils for Sand Mound Systems with Soil Data
- Table 3 Suitability of Soils for Spray Irrigation Systems with Soil Data
- 2012 Water Data Report – Brandywine Creek at Chadds Ford, Pa

- APPENDIX III Flow Charts
 - F-1 Springhill Farm Service Area
 - F-2 Ridings Service Area
 - F-3 Knight's Bridge Service Area
 - F-4 Turners Mill Service Area

- APPENDIX IV Chadds Ford Township Comprehensive Plan
- APPENDIX V Alternative 1 Sewer Service Map
- APPENDIX VI Alternative 2 Sewer Service Map

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

I. Previous Wastewater Planning

A. Introduction

The Pennsylvania Sewage Facilities Act (Act 537) requires that every municipality within the Commonwealth develop and maintain an up-to-date sewage facilities plan. Chadds Ford Township, Delaware County, Pennsylvania authorized the preparation of this report to serve as its Official Sewage Facilities Plan Update (Plan). The Township retained the services of its engineer, Pennoni Associates, Inc., to assist with preparation of the Plan. This Plan was prepared in accordance with Act 537 as described in the Pennsylvania Department of Environmental Protection's (PADEP's) "Guide for Preparing Act 537 Update Revisions," dated January 2003 this includes the "General Plan Contents Checklist". A completed copy of the PADEP checklist indicating where each required item can be found within the Plan is included in Appendix I.

B. Previous Planning

Chadds Ford Township approved and implemented an Act 537 Plan in 1991. At that time, the majority of the Township utilized on-lot sewage disposal systems for collection and treatment.

The Plan proposed the construction of a waste water treatment plant (WWTP) and sewer collection system to serve a portion of the eastern side of the Township (Route 202 – Route 1 corridor). Three years later, 1994, the Ridings WWTP was constructed on Ridge Road. The facility is permitted for an average daily flow of 80,000 gpd.

The 1991 plan recognized that the Chadds Ford Village area was also in need of public sewers and recommended the construction of sewage facilities to serve this area. (The recommended facilities were constructed in 2008).

Thirteen years later, in 2004 last revised 2005, the Township updated the Act 537 plan. The plan included installation of public sewers in the Chadds Ford Village area and Route 1 corridor which included Painters Crossing Condominiums (removal of the PANTOS WWTP), the Estates at Chadds Ford and residential and commercial properties with frontage on Route 1.

Within three years of plan approval, the Turner's Mill WWTP was constructed and was operational. The permitted capacity of the plant is 140,000 gpd.

The PADEP recommended in the 2005 Plan update that additional studies be completed on the private treatment facilities Knight's Bridge WWTP, Springhill Farm WWTP as well as the Ridings WWTP.

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

II. Physical and Demographic Analysis

A. Planning areas, municipal boundaries, Sewer Authority/Management Agency service area boundaries

1. Planning Area - The planning area for the purposes of this Act 537 Sewage Facilities Plan is the entire Township of Chadds Ford.
2. Municipal Boundaries - Chadds Ford Township is located in Western Delaware County covering an area of approximately 8.8 square miles. Four other municipalities about the Township, namely Concord Township to the east, Thornbury Township to the north east in Delaware County, and Pennsbury Township to the west and Birmingham Township to the north in Chester County.
3. Sewer Authority/Management Agency service area boundaries – the public sewer service area includes the Route 1 and 202 corridors as shown on Appendix II, Map 1.

The Chadds Ford Township Sewer Authority contracts with Delaware County Regional Water Quality Control Authority to operate and maintain both the Ridings and Turner's Mill Wastewater Treatment Plants.

B. Physical Characteristics within the Study Area

Chadds Ford Township is comprised of many natural and cultural resources. These include; farm fields, meadows, woods, streams and historic sites and structures.

The following physical features are found within Chadds Ford Township:

Streams

1. Brandywine Creek – Flows generally in the southern direction and forms the Township's western boundary. PA Code 25 Chapter 93 Designation - Drainage List G, Warm Water Fishes (WWF) and Migratory Fishes (MF).
2. Harvey Run – Flows generally along the Route 1 corridor and is a tributary to Brandywine Creek. PA Code 25 Chapter 93 Designation - Drainage List G, Warm Water Fishes (WWF) and Migratory Fishes (MF).
3. Wilson Run – is located south west of the Route 1 corridor and is a tributary to Brandywine Creek. PA Code 25 Chapter 93 Designation – Not listed.
4. Brinton Run – the majority of Brinton Run Creek is located in Chester County and is a tributary to Brandywine Creek. However, a small portion of the creek is located along the North West boundary line of the Township. PA Code 25 Chapter 93 Designation – Drainage List G, Warm Water Fishes (WWF) and Migratory Fishes (MF).

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

5. Beaver Creek – is located in the southern portion of the Township and is a tributary to Brandywine Creek. PA Code 25 Chapter 93 Designation – Drainage List G, Cold Water Fishes (CWF) and Migratory Fishes (MF).
6. Chester Creek – Flows along the Route 202 corridor. Pa Code Chapter 93 Designation – Drainage List G, Trout Stocking (TSF) and Migratory Fishes (MF).

Lakes and Ponds

There are several unnamed water bodies within Chadds Ford Township as shown on Map 2 of Appendix II.

Watersheds (Drainage Basin)

The majority of Chadds Ford Township is located within the Brandywine Creek Drainage Basin. However, a small portion of the Township (along the Route 202 corridor) is located within the Chester Creek basin. The ridge line delineating the drainage basins is located in close proximity to the Route 202 corridor (see Map 2, Appendix II).

Both the Brandywine Creek and Chester Creek basins discharge into the Delaware River. A named tributary located near Chadds Ford Township to the Chester Creek Basin is West Branch of Chester Creek and Chester Creek. Named tributaries to the Brandywine Creek basin located in Chadds Ford Township are Brandywine Creek, Harvey Run, Wilson Run, Brinton Run and Beaver Creek.

C. Soils within the Study Area

1. Suitability Of Soils For On-Lot Systems

The majority of wastewater disposal systems within Chadds Ford Township is on-lot septic systems. These systems include; conventional, sand mounds and spray irrigation systems. In order to determine if an area will be a good location for an on-lot septic system a soil analysis must be completed. The analysis determines the soils ability to absorb and filter effluent. Soil absorption and filtration removes odors and prevents contamination of ground water.

Measures used to determine if an on lot system will be suitable for a parcel is the permeability rate and a percolation test. Permeability is the rate of water movement through the soil. Slow water movement reduces the capability of soil to absorb and filter sewage. Fast water movement does not allow sufficient time for the soils to absorb and filter the sewage. The rate of water movement is estimated by conducting a percolation test. The recommended percolation rate for underground sewage systems is 1 inch per hour.

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

Map 3 of Appendix II identifies the types of soils within Chadds Ford Township. The suitability of the soils for underground sewage systems are listed in Tables 1 thru 3 of Appendix II. As shown in the Tables, portions of the soils within the Township show some limitations to underground systems.

In addition to determining the site soils characteristics, the Pennsylvania Code Chapter 73 (PA Code), prohibits the construction of absorption areas and spray fields on fill unless the fill has remained in place for a minimum of four years. The PA Code also recommends that absorption and spray fields be located on undisturbed soils.

2. Prime Agricultural Soils

Prime agricultural soils are defined as those soils that are the most productive for food and feed crops. In general, these soils are deep, not prone to erosion, nearly level, well drained and generally devoid of rocks and stones. In accordance with the Chadds Ford Township Open Space Plan and the Brandywine Conservancy, the township contains approximately 1,780 acres of prime agricultural soils (see Map 4 of Appendix II).

3. Archeological and Historic Resources

Within Chadds Ford Township there are several historic and archeological landmark areas. Per Chadds Ford Township Open Space plan and the Brandywine Conservancy, these areas include; the Act 167 Historic District (Village of Chadds Ford and the Village of Dilworthtown), the Natural Register District, the Brandywine Battlefield Natural Historic Landmark, Gilpin House as well as areas along the Columbia Gas Line, as shown on Map 5 and 6 of Appendix II.

D. Geology Features within the Study Area

The underlying geology of an area can affect the suitability of a site for the successful operation of an underground wastewater disposal system. In accordance with the PA Code, the primary concern with geology and wastewater disposal is restrictive rock areas and areas underlain by limestone.

1. Restrictive Rock Layers:

Chadds Ford Township is located in the Wissahickon Formation of the Piedmont Upland Section of the Piedmont Physiographic Province of Pennsylvania (see Map 7, Appendix II). This area consists of broad, gently rolling hills and valleys. The geology of the area consists of metamorphic and igneous rocks (see Map 8, Appendix II). Table 1, Appendix II indicates limitations of the Township's soils due to the depth of underlying restrictive layers. As shown on Table I, 48% of the Township's is very limited for the use of conventional onlot sewer systems due to the location of the restrictive rock layer. (It is recommended that restrictive rock layers be located

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

more than four feet below the bottom of trenches or beds. Four feet of soil is required to provide adequate soil to provide filtration of the sewage).

2. Limestone and Dolomite Areas:

Map 9, Appendix II, shows the limestone and dolomite distribution in Pennsylvania. These rock types can present potential hazards due to the presence of cavities and bedrock irregularities (Karst areas). These cavities can collapse or create sinkholes which can cause damage to underground systems. Map 10, Appendix II, shows the location of Karst features in south-central and south-eastern Pennsylvania.

An additional requirement of the Act 537 Plan Checklist for Geologic Features is to include areas where existing nitrate-nitrogen levels are in excess of 5mg/l. Appendix II includes the 2012 Water Data Report for Brandywine Creek at Chadds Ford as well as the west branch of the Chester Creek upstream from the Springhill Farm WWTP. As shown in Appendix II, for Brandywine Creek, the measured nitrate level was 3.59 mg/l, the nitrite measurement was less than 0.040 mg/l. For the west branch of Chester Creek the nitrate level was 2.0 mg/l.

E. Topography within the Study Area

The topography or slope of the land is another important consideration when determining the suitability of a site for a wastewater disposal system. Areas with slopes in excess of 15% are not recommended for soil absorption systems as the downhill flow may reach the soil surface before the sewage has been properly filtered. In addition, the PA Code prohibits the construction of an absorption area or spray fields in areas with slopes greater than 25%. 8% of the Township has slopes exceeding 25% and 19% of the Township has slopes between 15 and 25%. Tables 1 thru 3 of Appendix II indicate limitations of the soils within the Township due to their slope. As shown on Table I-III, 76.3% of the Township is very limited for conventional onlot sewer systems, 33% is very limited for sand mounds and 20% is very limited for spray irrigation systems due to the slope of the land.

Appendix II, map 11, contains the USGS map for Chadds Ford Township. This map indicates the slope and general topography of the area.

F. Potable Water Supplies within the Study Area

The Township's public water service area is shown on Appendix II, Map I. (The public water service area is the same as the public sewer service area). There are no water storage tanks located within the Township.

Chester Water Authority (CWA) operates and maintains the public water system. CWA participates in the Partnership for Safe Water which is a voluntary cooperative effort among the Environmental Protection Agency (EPA), the Pennsylvania Department of Environmental Protection (PA DEP), the American Water Works Association (AWWA),

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

and other drinking-water organizations and water suppliers across the nation. The goal of the Partnership is to enhance the quality of drinking-water safety by optimizing treatment plant performance. In accordance with the EPA and the PA DEP regulations, CWA completes and posts online an annual water quality report.

The remaining parcels outside of the public water service area are served by private wells. The wells are installed in accordance with PA DEP guidelines. Chapter 73 of the PA Code establishes the minimum separation distances between an individual water supply and a septic system. Prior to construction, the location of the well and septic system are determined based on the recommended separation distance.

G. Wetlands within the Study Area

A wetland is defined as a low lying area such as a marsh or swamp that is saturated with moisture. The soils in these areas are saturated and have no additional space available for the absorption of sewage. According to the National Wetlands Inventory, approximately 2% of the Township is covered by wetlands. Map 12 of Appendix II, shows wetland areas located within Chadds Ford Township.

In addition, the PA Code prohibits the construction of an absorption area or spray field in floodways or within 50 feet of a stream. The primary water bodies associated with floodplains are Brandywine Creek and Harvey Run. Appendix II contains FEMA maps for Chadds Ford Township. The maps indicate floodplain areas within the Township as well as stream locations. Tables 1 thru 3 of Appendix II indicate the soil limitations for septic systems due to high water table and or flooding. As shown on Tables I-III, 21.5% of the Township is very limited for conventional onlot sewer systems, 22% is very limited for sand mounds and 11% is very limited for spray irrigation systems due to the flooding and/or the location of the water table.

III. Existing Wastewater Facilities in the Planning Area

There are two municipally owned sewage treatment plants (WWTP's) in Chadds Ford Township, Delaware County. The Ridings WWTP (NPDES Permit PA0055476) is located at the intersection of Ridge Road and Ridings Boulevard. The Turners Mill WWTP (NPDES Permit PA0244031) is located adjacent to the Township Building at the intersection of Baltimore Pike (Route 1) and Ring Road.

There are currently no tributary municipalities that send sewage to either of the wastewater treatment facilities in the Township. However, there are two private WWTP's in the Township. The Springhill Farm WWTP (NPDES Permit No. PA0052230) serves the Springhill Farms Development and Glen Eagle Shopping Center at Wilmington-West Chester Pike (Route 202) and Ridge Road in the south east corner of the Township (see Flow Chart F-1 located in Appendix III). The Knights Bridge WWTP (NPDES Permit No. PA0052663) serves properties owned by the Henderson Group at the intersection of Routes 202 and Route 1 (see Flow Chart F-3 located in Appendix III).

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

Operation and maintenance responsibilities for the Ridings and Turners Mill WWTPs as well as the municipally owned sewage pump stations are provided on a contract basis by the Delaware County Regional Water Quality Control Authority (DELCORA). Management and administrative duties are carried out by the Board of Directors of the Chadds Ford Township Sewer Authority (“Authority”), the Authority Manager, and an administrative manager.

A. Existing Municipally Owned Wastewater Treatment Plants

1. Ridings WWTP

The Ridings WWTP started operation in October 1994 in accordance with National Pollution Discharge Elimination System (NPDES) Permit No. PA0055476. The current permit has an expiration date of September 30, 2017. The facility discharges treated wastewater to an unnamed tributary of Harvey Run in the Brandywine Creek watershed.

The Ridings WWTP is permitted for an average daily flow of 80,000 gpd. The treatment plant consists of an influent lift station, a fine screen, an influent equalization tank, a dual basin sequencing batch reactor, post treatment equalization basin, tertiary filtration of the effluent, chlorination, and then de-chlorination prior to release to the receiving stream. Removed bio-solids are aerobically digested and periodically hauled offsite to an approved disposal facility.

The Ridings WWTP is regularly maintained by DELCORA. The pumps, tanks, and other mechanical equipment are functioning properly. In an effort to reduce the effluent Total Suspended Solids (TSS), the Authority installed a Siemens Forty-X disc filter in February 2008 to replace an existing sand filter. The disc filter is intended to improve the effluent quality of the WWTP through the use of removable filter panels that can be replaced with minimal filter down time. While the unit initially suffered start-up issues, the Authority worked with the filter manufacturer until the unit performed in accordance with the required discharge parameters. The Authority has installed a polymer injection system to aid the disc filter operation on an as needed basis to ensure optimal performance. Other improvements to the treatment plant were completed in early 2011 which included influent wastewater screening and flow equalization through the installation of a Lakeside Fine Screen and concrete equalization tank, respectively. The Authority has found solutions that are providing reliable tertiary treatment that have maintained the Authority's compliance with the NPDES Permit.

Since 2011, peak influent flows have been substantially mitigated. The treatment facility was designed such that during high flows the treatment process accelerates by allowing the tanks to fill from the bottom while partially treated effluent is decanted from the surface. Once decanted, the effluent is screened and chlorinated/dechlorinated to ensure partial treatment and disinfection prior to

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

discharge (Storm Mode). The treatment plant did not experience a Storm Mode condition in 2015.

As per the Water Quality Management Permit No. 2393404 Amendment 2, the Ridings Treatment Plant has a Hydraulic Design (Annual Average) Capacity of 0.080 MGD. The Annual Average Flow in 2015 at the Ridings Plant was 0.0399 MGD. These flows are within the permitted Annual Average Capacity of the treatment facility. The treatment plant did not experience a hydraulic overload condition in 2015.

Although the Ridings WWTP is currently working within current permit effluent parameters, due to the age of the technology and limitations of the treatment process and inability to expand, the Township believes that potential future effluent requirements and the commitments to the capacity of the plant make continued operations of the plant unsustainable.

a. Ridings Collection System

The Ridings Collection System is generally in good condition. System flows are monitored and have been operating within the design and permitted capacity.

The Ridings Collection System is a relatively small collection system and consists of 8-inch PVC gravity collection sewers and a low pressure sewer system.

There are approximately 241 connections to the Ridings Collection System yielding an annual average flow of 0.0399 MGD.

1) Low Pressure Sewers

There is a low pressure sewer system serving the Raven Crest Development and certain properties along Heyburn Road south of Ridge Road. The low pressure force main discharges into a gravity sewer along Ridge Road to the west of the Ridings WWTP. This gravity sewer enters the treatment plant lift station independent of the gravity collection system from the Ridings Development described above.

b. Ridings Conveyance Systems

The Ridings Conveyance System includes three (3) sewage pumping stations and a small low pressure sewer system (see Flow Chart F-2 located in Appendix III). The pump stations are continuously monitored and regularly inspected and maintained by DELCORA. The following table summarizes the permitted, present and projected flows for each station.

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

RIDINGS WWTP – PUMP STATIONS								
PUMP STATION NAME	NUMBER OF PUMPS	NUMBER OF EDU's	PERMITTED CAPACITIES		PRESENT FLOWS			PROJECTED FLOWS
			AVERAGE ANNUAL PERMITTED CAPACITY (GPD)	HYDRAULIC DESIGN CAPACITY (GPM)	ANNUAL AVERAGE FLOWS (GPD)	PEAK DAY FLOW (GPD)	PEAK HOURLY FLOW * (GPM)	2-YEAR PROJECTED MAX FLOW (GPD)
REMOTE PS	2	6	1,400	38	1,603	3,420	10	3,420
INTERMEDIATE PS	2	17	5,950	35	4,356	9,660	28	9,660
WOODLAND PS	2	82	27,500	120	6,790	16,200	45	16,200

*Peak hourly flows are estimated based on a peaking factor applied to the Peak Day Flow. For Smith Bridge and Eckmen, a factor of 4.2 was used and a factor of 4.0 was used for Woodland PS. Additional capacity and attenuation of the peak flows is provided in the storage volume of the wetwells of both the Smith Bridge and Eckman pump stations. Both pump stations were designed to hold a minimum of 24 hours of flow providing adequate attenuation of the peak instantaneous flows.

1) Remote (Smith Bridge) Pump Station

The Remote Pump Station is located at the southern end of the Ridings System off of Smith Bridge Road. The station services 6 single family residences. It has 2 submersible pumps rated at 38 gpm each. The force main from the pump station discharges to the Intermediate Pump Station.

The Smith Bridge pump station is in good condition. The Remote Pump Station does not have an emergency generator for back-up power, however it does have added storage capacity intended to provide emergency wastewater storage for a minimum of 24 hours. The extra storage capacity in the wetwell provides adequate attenuation of any peak flows and ensures that the pump station has adequate capacity with only one pump in operation.

2) Intermediate (Eckman) Pump Station

The Intermediate Pump Station is located at the southern end of the Ridings neighborhood in an easement on the south side of Ridings Way. The pump station receives flow via gravity from 17 single family homes in the Ridings Development in addition to the flow from the Remote Pump Station. The Intermediate Pump Station is equipped with 2 submersible pumps rated at 35 gpm each. The force main from the pump station discharges into a manhole (MH 11) in Ridings Way and then flows by gravity to the Ridings WWTP.

The Intermediate Pump Station is in good condition. The Intermediate Pump Station does not have an emergency generator for back-up power, however it does have added storage capacity intended to provide emergency wastewater storage for a minimum of 24 hours. The extra storage capacity in the wetwell provides adequate attenuation of any peak flows and ensures that the pump station has adequate capacity with only one pump in operation.

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

3) Woodland Pump Station

The Woodland Pump Station is located on Woodland Drive on the east side of Route 202. The Woodland Pump Station services approximately 82 EDU's, including approximately 35 single family homes on Woodland Drive, Summit Drive, and Longview Road as well as a number of commercial facilities on Route 202. The pump station consists of two aboveground Smith & Loveless pumps rated at 120 gpm each. The force main from the pump station discharges into a terminal gravity manhole in Longview Road and then flows via gravity to the Ridings WWTP.

The Woodland Pump Station is in good condition with only routine maintenance required. It has an emergency generator for back-up power which is regularly inspected and exercised.

2. Turners Mill WWTP

The Turners Mill WWTP started treatment operations in 2008 in accordance with NPDES Permit PA0244031. The current permit has an expiration date of December 31, 2017. The facility discharges treated wastewater to an unnamed tributary of Harvey Run in the Brandywine Creek watershed.

The Turners Mill WWTP is permitted for an average daily flow of 0.140 MGD with a design hydraulic capacity of 0.150 MGD with a peak design flow of 0.403 MGD

The treatment process utilized at the Turners Mill WWTP is extended aeration. The plant incorporates a mechanical screen with manual bar screen by-pass, concrete tanks with package treatment units, and ultraviolet disinfection.

The Turners Mill WWTP is in relatively new condition. Regular maintenance is provided by DELCORA to ensure that the pumps, tanks, and other mechanical equipment are functioning properly.

As per the Water Quality Management Permit No. 2305404 T1, the Turners Mill Treatment Plant has a permitted Annual Average Flow Capacity of 0.140 MGD and a Design Hydraulic Capacity of 0.403 MGD (Peak Flow). The Annual Average Flow in 2015 at the Turners Mill Plant was 0.0713 MGD. These flows are within the permitted Annual Average Capacity of the treatment facility. The treatment plant did not experience a hydraulic overload condition in 2015.

a. Turners Mill Collection System

The Turners Mill Collection System is generally in excellent condition, currently operating within its design and permitted capacity. There are no hydraulic

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

overloads projected or known areas with surcharging within the Turners Mill Collection System.

Because the Turners Mill Collection System is relatively new and primarily consists of low pressure sewers, the plant experiences little increases in flow during wet weather.

The Turners Mill Collection System is relatively small and is substantially comprised of low pressure sewers. There are two privately owned gravity collection systems that contribute flow to Turners Mill. The gravity collection system that serves the Estates at Chadds Ford dedicated to Chadds Ford Township Sewer Authority (CFTSA) and a gravity collection that serves the Painters Crossing Condominiums owned by the condominiums association. Two pump stations individually owned and maintained by the CFTSA and Painters Crossing HOA convey flow from the gravity systems to Turners Mill sewage treatment plant.

The municipally owned portions of the Turners Mill Collection System are relatively new with the oldest portions being constructed in 2008. There are no known portions of the system that are in need of repair, replacement, or rehabilitation. The existing low pressure sewer lines are designed and sized properly for the current and projected connections within the system.

The Turners Mill Wastewater Treatment Plant currently has a permitted hydraulic capacity of 0.140 MGD. There were approximately 460 connections to the Turners Mill Collection System through 2015 yielding an annual average flow of 0.0713 MGD.

b. Turner's Mill Conveyance System

The Turner's Mill Conveyance System is comprised of the Estates at Chadds Ford (EACF) Pump Station and the Painters Crossing Pump Station (PANTOS) (see Flow Chart F-4 located in Appendix III). The Authority owns and maintains the Estates at Chadds Ford (EACF) Pump Station and the Painters Crossing Pump Station is owned and maintained by a Home Owners Association. There have been no issues or problems reported by or to the Authority regarding these pump stations.

The EACF Pump Station has an influent flow meter; the PANTOS Pump Station does not; however, it is equipped with effluent flow meters that record the total flow.

1) Painters Crossing Pump Station (PANTOS)

The Painters Crossing pump station is located adjacent to the Painters Crossing Condominiums at 1300 Baltimore Pike. The Station serves 242

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

Condominium units (170 equivalent EDUs). There are no future connections proposed for this pump station. The pump station consists of two aboveground Smith & Loveless pumps rated at 220 gpm each, resulting in a peak design flow of 316,800 gpd. The force main from the pump station discharges into a combined forcemain that conveys the sewage directly to the Turners Mill WWTP.

The Painters Crossing Pump Station is in relatively good condition. No upgrades to the station are currently planned. The Painters Crossing Pump Station has an emergency generator for back-up power which is reportedly inspected and exercised on a regular basis.

2) Estates at Chadds Ford Pump Station

The Estates at Chadds Ford pump station is located at 3 Evergreen Place and serves the 120 single family detached residences in the Estates at Chadds Ford subdivision. There are no future connections proposed for this pump station as the subdivision is built out. The pump station consists of two aboveground Smith & Loveless pumps rated at 100 gpm each, resulting in a peak design flow of 144,000 gpd. The force main from the pump station discharges into a combined forcemain that conveys the sewage directly to the Turners Mill WWTP.

The EACF Pump Station is in relatively good condition. The pump station has an emergency generator for back-up power which is reportedly inspected and exercised on a regular basis.

B. Existing Privately Owned Wastewater Treatment System

a. Springhill Farm Wastewater Treatment Plant

Springhill Farm WWTP is located in eastern portion of Township near the intersection of Springhill Road and Springhill Drive. The treatment plant serves a 276 townhome community, a commercial shopping center, a restaurant and several residential properties. The Plant was constructed in 1985 (WQM Permit #2387434 and NPDES Permit # PA0052230). The Plant has a permitted hydraulic design capacity of 100,000 gallons/day. The Table below summarizes the results of Springhill Farms 2013 Discharge Monitoring Reports (DMRs).

At this time, Springhill Farm's Home Owner Association (SHFHOA) is negotiating with Concord Township to connect to their sewage system. If SHFHOA obtains all necessary approvals to connect to Concord's system, they would be required to submit a special study/planning module to the PA DEP for review and approval.

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

SPRINGHILL FARMS WWTP																
MONTH	DISSOLVED OXYGEN (mg/L)		pH (Instantaneous Maximum) (S.U.)		pH (Instantaneous Minimum) (S.U.)		Total Suspended Solids Average Monthly (lbs/day)		Total Suspended Solids Average Monthly (mg/L)		Ammonia-Nitrogen (Average Monthly) (lbs/day)		Ammonia-Nitrogen (Average Monthly) (mg/L)		Total Phosphorus (Average Monthly) (mg/L)	
	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT
JANUARY	6	5	7.5	9	6.6	6	7	25	15	30	0.2	5	0.5	6	3.5	---
FEBRUARY	6.3	5	7.6	9	6.6	6	9.2	25	20	30	0.1	5	0.1	6	3.2	---
MARCH	6.2	5	7.6	9	6.7	6	4	25	10	30	0.05	5	0.1	6	3.5	---
APRIL	5.7	5	7.2	9	6.7	6	4	25	10	30	0.1	5	0.1	6	3.8	---
MAY	6	5	7.6	9	6.7	6	3	25	7	30	0.04	5	0.1	6	3.6	---
JUNE	5.6	5	7.5	9	6.6	6	3	25	6	30	0.2	5	0.5	6	3.8	---
JULY	5.5	5	7.7	9	6.8	6	1	25	4	30	0.2	5	0.5	6	2.9	---
AUGUST	5	5	7.7	9	7	6	2	25	5	30	0.2	5	0.5	6	4.7	---
SEPTEMBER	5.8	5	7.6	9	7	6	3	25	8	30	0.2	5	0.5	6	3.7	---
OCTOBER	6.5	5	7.6	9	6.8	6	5	25	13	30	0.2	5	0.5	6	4.1	---
NOVEMBER	6.3	5	7.9	9	6.6	6	4	25	13	30	0.3	5	0.9	6	4.6	---
DECEMBER	6.5	5	7.5	9	6.5	6	7	25	18	30	0.2	5	0.5	6	4	---

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

SPRINGHILL FARMS WWTP																
MONTH	Flow (Average Monthly) (mgd)		Flow (Daily Maximum) (mgd)		Total Residual Chlorine (TRC) (Average Monthly) (mg/L)		Total Residual Chlorine (TRC) (Instantaneous Maximum) (mg/L)		Fecal Coliform (Average Monthly) (CFU/100mL)		Fecal Coliform (Instantaneous Maximum) (CFU/100mL)		CBOD5 (Average Monthly) (lbs/day)		CBOD5 (Average Monthly) (mg/L)	
	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT
JANUARY	0.05452	---	0.06571	---	0.04	0.06	0.08	0.14	25	200	640	1000	7	21	16	25
FEBRUARY	0.05746	---	0.06555	---	0.04	0.06	0.12	0.14	32	200	87	1000	8	21	18	25
MARCH	0.05594	---	0.06554	---	0.02	0.06	0.08	0.14	10	200	17	1000	9	21	21	25
APRIL	0.05575	---	0.06826	---	0.03	0.06	0.09	0.14	29	200	63	1000	7	21	16	25
MAY	0.05527	---	0.09435	---	0.03	0.06	0.07	0.14	12	200	52	1000	7	21	17	25
JUNE	0.05894	---	0.09174	---	0.03	0.06	0.08	0.14	11	200	19	1000	6	21	13	25
JULY	0.05082	---	0.07134	---	0.03	0.06	0.08	0.14	8	200	25	1000	2	21	6	25
AUGUST	0.04862	---	0.05581	---	0.03	0.06	0.09	0.14	26	200	55	1000	1	21	4	25
SEPTEMBER	0.04695	---	0.06126	---	0.03	0.06	0.06	0.14	87	200	580	1000	1	21	4	25
OCTOBER	0.04903	---	0.07719	---	0.04	0.06	0.13	0.14	35	200	61	1000	2	21	5	25
NOVEMBER	0.04793	---	0.07724	---	0.03	0.06	0.07	0.14	88	200	188	1000	2	21	6	25
DECEMBER	0.04716	---	0.06796	---	0.04	0.06	0.11	0.14	7	200	12	1000	2	21	6	25

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

b. Knight's Bridge Wastewater Treatment Plant

Knight's Bridge WWTP is located in the eastern portion of the Township north of Baltimore Pike (Route 1) near the intersection of Brandywine Drive and Endo Boulevard. The WWTP serves the Henderson Business Park as well as adjacent commercial buildings. Sewage from the Henderson Business Park is collected by a gravity sewer system which flows to a pump station. Flows collected at the pump station are pumped by a force main to a gravity system located on the northwest side of Route 1 which conveys the flows to the WWTP.

The WWTP is permitted for 90,000 gpd (NPDES PA0052663 and WQM 2307401). However, the permitted capacity is based on a plant expansion which to date has not been constructed. As shown in the Table below, the weekly average daily flow to the plant is 31,500 gpd.

**UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN**

KNIGHTSBRIDGE WWTP																			
MONTH	DISSOLVED OXYGEN (mg/L)		pH (Instantaneous Maximum) (S.U.)		pH (Instantaneous Minimum) (S.U.)		Total Suspended Solids Average Monthly (lbs/day)		Total Suspended Solids Average Monthly (mg/L)		Total Suspended Solids Instantaneous Maximum (mg/L)		Ammonia-Nitrogen (Average Monthly) (lbs/day)(5-1 to 10-31)		Ammonia-Nitrogen (Average Monthly) (mg/L) (5-1 to 10-31)		Ammonia-Nitrogen (Instantaneous Maximum) (mg/L) (5-1 to 5-31)		
	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE
JANUARY	8	5	8.6	9	7	6	0.5	7.5	6.4	10	7.6	20	----	0.8	----	1	----	----	2
FEBRUARY	6.2	5	8.8	9	6.8	6	0.2	7.5	3.6	10	3.6	20	----	0.8	----	1	----	----	2
MARCH	6.1	5	8.6	9	6	6	0.2	7.5	1.8	10	2.8	20	----	0.8	----	1	----	----	2
APRIL	6.1	5	7.9	9	6.2	6	0.1	7.5	0.6	10	0.8	20	----	0.8	----	1	----	----	2
MAY	6.1	5	7.8	9	6.3	6	0.2	7.5	1.2	10	1.2	20	0	0.8	0.1	1	0.2	2	
JUNE	5.2	5	8	9	6.3	6	1.1	7.5	7.2	10	9.6	20	0.1	0.8	0.3	1	0.8	2	
JULY	6.1	5	8.1	9	6.6	6	1.4	7.5	7.6	10	24	20	0.1	0.8	0.3	1	0.4	2	
AUGUST	6	5	8.8	9	6.5	6	1.1	7.5	6.3	10	15	20	0.1	0.8	0.4	1	0.6	2	
SEPTEMBER	6.1	5	8.8	9	6.1	6	0.5	7.5	3.3	10	15	20	0.1	0.8	0.6	1	1.5	2	

KNIGHTSBRIDGE WWTP																			
MONTH	Ammonia-Nitrogen (Average Monthly) (lbs/day) (11-1 to 4-30)		Ammonia-Nitrogen (Average Monthly) (mg/L) (11-1 to 4-30)		Ammonia-Nitrogen (Instantaneous Maximum) (mg/L) (11-1 to 4-30)		Nitrite + Nitrate (Monthly Average) (lbs/day)		Nitrite + Nitrate (Monthly Average) (mg/l)		Nitrite + Nitrate (Instantaneous Maximum) (mg/l)		Total Phosphorus (Average Monthly) (lbs/day)		Total Phosphorus (Average Monthly) (mg/L)		Total Phosphorus (Instantaneous Maximum) (mg/L)		
	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE
JANUARY	0	2.3	0.2	3	0.3	6	0.5	7.5	4.9	10	19.1	20	0.1	1.5	0.8	2	1.1	4	
FEBRUARY	0.1	2.3	0.7	3	1	6	0.6	7.5	7.7	10	13.1	20	0	1.5	0.4	2	0.5	4	
MARCH	0.1	2.3	1.2	3	3.2	6	0.9	7.5	8.3	10	12.1	20	0	1.5	0.2	2	0.3	4	
APRIL	0	2.3	0.3	3	0.5	6	0.5	7.5	4.6	10	10.1	20	0	1.5	0.2	2	0.3	4	
MAY	----	2.3	----	3	----	6	0.9	7.5	5.3	10	8	20	0.1	1.5	0.3	2	0.4	4	
JUNE	----	2.3	----	3	----	6	1.2	7.5	7.4	10	10.1	20	0.1	1.5	0.4	2	0.6	4	
JULY	----	2.3	----	3	----	6	1.6	7.5	7.5	10	8.3	20	0.1	1.5	0.7	2	1.1	4	
AUGUST	----	2.3	----	3	----	6	1.6	7.5	8.9	10	15.2	20	0	1.5	0.3	2	0.3	4	
SEPTEMBER	----	2.3	----	3	----	6	1.1	7.5	7.1	10	15.1	20	0.2	1.5	1.8	2	4.7	4	

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

KNIGHTSBRIDGE WWTP (CONTINUED)																					
MONTH	Flow (Average Monthly) (mgd)		Flow (Weekly Average) (mgd)		Total Residual Chlorine (TRC) (Average Monthly) (mg/L)		Total Residual Chlorine (TRC) (Instantaneous Maximum) (mg/L)		Fecal Coliform (Average Monthly) (CFU/100mL)		Fecal Coliform (Instantaneous Maximum) (CFU/100mL)		CBOD5 (Average Monthly) (lbs/day) (11-1 to 4-30)		CBOD5 (Average Monthly) (mg/L) (11-1 to 4-30)		CBOD5 (Average Monthly) (lbs/day) (5-1 to 10-31)		CBOD5 (Average Monthly) (mg/L) (5-1 to 5-31)		
	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE	PERMIT LIMIT	DMR VALUE
JANUARY	0.0121	---	0.0348	---	0.42	0.6	0.58	1.5	6	200	2310	1000	0.2	15	2.1	20	---	7.5	---	10	
FEBRUARY	0.0104	---	0.0153	---	0.34	0.6	0.49	1.5	15	200	218	1000	0.1	15	2.5	20	---	7.5	---	10	
MARCH	0.014	---	0.0244	---	0.35	0.6	0.49	1.5	4	200	8	1000	0.2	15	2.2	20	---	7.5	---	10	
APRIL	0.0157	---	0.0305	---	0.35	0.6	0.49	1.5	3	200	9	1000	0.2	15	2	20	---	7.5	---	10	
MAY	0.0187	---	0.03	---	0.27	0.6	0.48	1.5	25	200	27	1000	---	15	---	20	0.4	7.5	2.5	10	
JUNE	0.0213	---	0.0483	---	0.16	0.6	0.49	1.5	1	200	1	1000	---	15	---	20	0.3	7.5	2	10	
JULY	0.0219	---	0.044	---	0.11	0.6	0.44	1.5	1	200	1	1000	---	15	---	20	0.8	7.5	4	10	
AUGUST	0.0178	---	0.028	---	0.2	0.6	0.48	1.5	6	200	33	1000	---	15	---	20	0.4	7.5	2	10	
SEPTEMBER	0.0178	---	0.028	---	0.32	0.6	0.49	1.5	1	200	1	1000	---	15	---	20	0.3	7.5	2.1	10	

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

C. Small Flow Treatment Systems

Small flow treatment systems are for areas where underlying soils do not support the use of on lot subsurface disposal systems. The locations of these areas are too remote for economical extensions to public sewers. Therefore a small treatment system is constructed to treat the sewage flows.

There is one small flow treatment system, Ringfield Development, located within Chadds Ford Township. In this development, each cluster of homes is serviced by 1 system. There are 4 on-lot systems in total in the development, each system serving 2-4 homes.

D. OLDS Inventory

1. Types of On-lot systems in use

In accordance with Chadds Ford Township's Comprehensive Plan, 63% of the Township's land is occupied by single-family detached residential dwellings. The sewage system utilized for these dwellings is on-lot systems. The following types of in-lot systems are used:

- a. Conventional Systems – this system includes a septic tank, distribution box and absorption area. In this system, the tank retains the solids while allowing the wastewater to flow to the distribution box which evenly distributes flow to the absorption area. The absorption area is where the soil absorbs and treats the liquid effluent.
- b. Elevated Sand Mound Systems – this system is utilized in areas with restrictive zones within the top 60-inches of soil. The system is comprised of a septic tank, pump, dose tank and sand mound. In this system, wastewater flows from the house to the septic tank. The solids sink to the bottom of the tank and the wastewater is discharged to the dose tank. When the effluent level reaches a certain elevation, the pump turns on and pumps the effluent to the elevated sand mound area which acts as the absorption area.
- c. Spray Irrigation Systems – this system is utilized in areas with restrictive zones and or high water tables. The system is comprised of a septic tank, filtration unit, chlorine contact unit, storage tank/dose tank and spray field. In this system, sewage flows from the house to the septic tank. The solids settle to the bottom of the tank and the effluent flows to the filtration unit which filters out all of the remaining solids. The effluent then flows to the chlorine unit where chlorine is added. It then flows to the storage tank where it is stored until it is sprayed onto the spray field.

Tables 1 thru 3 of Appendix II, lists the suitability of soils within the Township for underground sewage systems. As shown in the Tables, portions of the soils within the Township show some limitations to underground systems.

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

2. Comparison – Types of On-Lot Sewage Systems in Use vs. Types that are Appropriate

Selection and regulation of OLDS type utilized within the Township is the responsibility of the Sewage Enforcement Officer (SEO). The SEO utilizes soil data to determine the suitability of the system for the parcel of land being developed. New developments are required to test for both a primary and alternate location. Existing failing systems are not malfunctioning but fail the certification process required when a house is sold. Systems are typically replaced following a certification failure.

3. Description of On-Lot O&M Requirements

Chadds Ford Township has adopted an ordinance governing the management of individual on-lot sewage disposal systems.

This ordinance has been adopted to promote public health, safety, welfare as well as protect the environment. The ordinance applies to both existing and future on-lot systems. It defines the requirements for on-lot system installation, operation and maintenance.

All individual on-lot systems are to be owned and maintained by the property owner. The property owner is responsible for having septic systems containing a tank pumped. All sewage haulers must be a DEP licensed hauler and approved by the Township.

E. Identify Wastewater Sludge and Septage Generation/Transport/Disposal

1. Location of Sources

Septage is the partially treated waste that is stored in septic tanks. This waste must be periodically pumped and/or removed from the tank in order to ensure the proper operation of the system. Septage is located in every conventional on-lot system within the Township.

2. Quantities and Types

63% of the parcels within the Township have on-lot sewer system. Septage is located in all of the conventional on-lot systems.

3. Present Disposal Method's, Locations, Capacities

The septage that is pumped out of the tanks of the conventional on-lot systems is hauled by a licensed by the DEP Contractor that is also approved by the Township.

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

IV. Future Growth and Land Development

A. Comprehensive Plan and Zoning

1. Comprehensive Plan

Chadds Ford Township's Comprehensive Plan was adopted May 5, 2010. The goal of the plan is *"to be consistent with the goals and objectives included in the Delaware County policies, provide Chadds Ford Township with the opportunity to proactively implement policy objectives that positively influence its future and seek to promote responsible land use and environmental stewardship"*. A copy of the Comprehensive Plan is located in Appendix IV.

a. Existing Land Use

A summary of the existing land uses and a percentage of each use within the Township is shown in the Table below.

LAND USE	PARCELS	ACRES	PERCENT	AVG. LOT SIZE (ACRES)
Single Family Attached	387	15.92	0.3%	0.04
Single Family Detached	1,069	3,349.41	63.1%	3.13
Apartment	2	0.49	0.0%	0.25
Agricultural	1	141.2	2.7%	141.2
Commercial – Retail & Service	78	176.13	3.3%	2.26
Office & Storage	11	30.13	0.6%	2.74
Institutional	4	53.67	1.0%	13.42
Recreation	3	48.6	0.9%	16.2
Open Space	101	1,119.73	21.1%	11.09
Utility	6	5.54	0.1%	0.92
Vacant	172	370.61	7.0%	2.15

Sources: Delaware County Planning Department and the Chadds Ford Township Comprehensive Plan

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

2. Zoning

Chadds Ford Township (formerly Birmingham Township) adopted its Zoning Ordinance in 1951. The current Zoning Ordinance is known as the "Chadds Ford Township Zoning Ordinance" was adopted in 2009 which amended the 1951 Ordinance in its entirety. The Zoning Ordinance is Chapter 135 of the Code of Chadds Ford Township.

The Township's land area is divided into sixteen (16) districts as shown on Map 1 in Appendix IV and as listed below:

- a. Business (B)
 - 1) Minimum Lot Area – 1 Acre
 - 2) Sewage Facilities – On-Site or Off-Site, If public sewer is accessible, the Use shall tie into such systems.
- b. Business (B-1)
 - 1) Minimum Lot Area – 1 Acre
 - 2) Sewage Facilities – On-Site or Off-Site, If public sewer is accessible, the Use shall tie into such systems.
- c. Light Industrial (LI)
 - 1) Minimum Lot Area – 3 Acres
 - 2) Sewage Facilities – Per Board of Supervisors Approval
- d. Planned Business Center (PBC)
 - 1) Minimum Lot Area – 4 Acres
 - 2) Sewage Facilities – Individual or Community Sewage Disposal Systems, Where public sewer is accessible, the Use shall tie-into such systems.
- e. Planned Business Center (PBC-1)
 - 1) Minimum Lot Area – 4 Acres
 - 2) Sewage Facilities – Individual or Community Sewage Disposal Systems, Where public sewer is accessible, the Use shall tie-into such systems.
- f. Planned Office Center (POC)
 - 1) Minimum Lot Area – 4 Acres
 - 2) Sewage Facilities – Individual or Community Sewage Disposal Systems, Where public sewer is accessible, the Use shall tie-into such systems.
- g. Residence (R-1)
 - 1) Minimum Lot Area – 2 Acres

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

- 2) Sewage Facilities – On-lot
- h. Residence – (R-2)
 - 1) Minimum Lot Area – 1 Acre
 - 2) Sewage Facilities – On-lot
- i. Residence/Apartment – (R-A)
 - 1) Minimum Lot Area – 2 Acres
 - 2) Sewage Facilities – Off-Site Sewage Facilities May be Required
- j. Residence/Multi-Family (R-M)
 - 1) Minimum Lot Area – 2 Acres
 - 2) Sewage Facilities – Off-site sewage facilities may be required. A sewage treatment plant may be installed on-site.
- k. Planned Residential Development (PRD-1)
 - 1) Minimum Lot Area – 1 acre
 - 2) Sewage Facilities – Off-site Sewage facilities may be required. A sewage treatment plant may be installed on-site.
- l. Planned Residential Development (PRD-2)
 - 1) Minimum Lot area – 1 Acre
 - 2) Sewage Facilities - Off-site Sewage facilities may be required. A sewage treatment plant may be installed on-site.
- m. Towers & Cellular & Wireless Towers (T)
- n. Flood Plain (F-P)
 - 1) Sewage Facilities – Systems shall be designed minimize or eliminate flood damages and to prevent the discharge of untreated sewage into flood waters.
- o. Historic (H)
 - 1) Sewage Facilities - Individual or Community Sewage Disposal Systems May be Used. Where Public Sewer is Accessible, the Use shall Tie Into such Systems.
- p. Baltimore Pike Overlay District (BPO)
 - 1) Sewage Facilities – On-lot. On-lot systems shall not be located on one-hundred year floodplains, watercourses, surface water bodies, wetlands, wetland margins and slopes 25% and greater.
- q. Steep Slope Conservation
 - 1) Sewage Facilities – On-lot. On-lot systems are not permitted in areas of very steep slopes (25% and greater). On-lot systems are permitted as a conditional use in areas of steep slopes (15% to 25%).

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

3. Environmental Resources and Stormwater Management Plans and Limitations

a. Environmental Resources

Chadds Ford Township adopted an Open Space Plan in 2007. The purpose of this Plan is to protect areas of natural resources including; woodlands, stream valleys and riparian areas, surface water and open space/meadow areas.

b. Floodplain Conservation District

The Floodplain District is shown on the Township Zoning Map is those areas of the Township which are subject to the one-hundred year flood as identified by the Federal Emergency Management Agency (FEMA). The Township code divides the floodplain district into three areas:

- 1) Floodway Area – this includes the areas identified in the FIS and the FIRM as “Floodway”. In this area no new construction is allowed unless a permit is obtained from the PA DEP.
- 2) The AE Area/District – this shall be those areas identified as an AE Zone on the FIRM included in the FIS prepared by FEMA for which base flood elevations have been provided. In this area any new construction shall have the lowest floor elevated up to, or above, the regulatory flood elevation. No new construction or development shall be located within the area measured 50 feet landward from the top of bank of any watercourse.
- 3) The A Area/District –this shall be those areas identified as an A Zone on the FIRM included in the FIS prepared by FEMA for which no base flood elevations have been provided. In this area any new construction shall have the lowest floor elevated up to, or above, the regulatory flood elevation. No new construction or development shall be located within the area measured 50 feet landward from the top of bank of any watercourse.

c. Stormwater Management

Chadds Ford Township adopted an updated Stormwater Management Ordinance in 2015. Stormwater management is required by Act 167 for all new development projects. The Township's ordinance requires that all proposed stormwater systems be designed provide a 50 percent reduction in the rate of runoff over the present existing conditions at the site. The ordinance also includes water quality, infiltration, stream bank erosion and operation and maintenance requirements.

d. Steep Slope Conservation District

Chadds Ford Township added a Steep Slope Conservation District to the zoning ordinance in 2015. The code regulates use and disturbance within areas of steep and very steep slopes.

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

B. Build-out Plan

1. Projected Future Population

The following are population estimates for Chadds Ford Township (data has been obtained from 2025 Municipal Population Forecasts, Published by the Delaware Valley Planning Commission)

2000 Population	3,170
2010 Population	3,640
Estimated 2015 Population	3,920
Estimated 2025 Population	<u>4,760</u>
<i>Increase 2010- 2025</i>	<i>1,120</i>

As shown above, the Township's population is anticipated to grow over the next several years. Based on the population estimates and using the US. Census average for the Township of 2.4 persons per household, this equates to an estimated future number of new EDU's of 467 (1,120/2.4). *(Please note, the future population projections do not govern the estimated number of EDU's. The Future Land Use Plan as described below establishes the estimated number of future EDU's).*

2. Future Land Use

a. Known Projects

The Tables below indicate known future developments that will create growth within the sewer service areas of the Turners Mill and Ridings WWTP in the next 5 to 10 years.

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

TURNERS MILL WWTP SERVICE AREA							
CONNECTIONS	EDUs						
		2016	2017	2018	2019	2020	2021+
Currently Connected							
Other residential	324						
Non-Residential	136						
Total Currently Connected	460						
Properties Assessed but not Connected							
Residential							
3 Upper Bank Road	1						1
89 Ring Road	1						1
1386 Baltimore Pike (Chadds Ford One)	1						1
Non Residential							
1392 Baltimore Pike (New Horizens)	1	1					
Total Assessd but not Connected	4	1	0	0	0	0	3
Dedicated Connections							
1361 Baltimore Pike	1	1					
E3 Ventures	45		45				
Total Dedicated Connections	46	1	0	0	0	0	0
TOTAL COMMITTED CAPACITY	510						
NEW CONNECTIONS		2	45	0	0	0	3
TOTAL CONNECTIONS	460	462	507	507	507	507	510

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

RIDINGS WWTP SERVICE AREA							
CONNECTIONS	EDUs						
		2016	2017	2018	2019	2020	2020+
Currently Connected							
Residential	165						
Non-Residential	76						
Total Currently Connected	241						
Future EDU's							
Residential							
205 Heyburn Road	1				1		
183 Ridge Road	1	1					
191Ridge Road	1	1					
182 Ridge Road	1			1			
Coopers Hawk Lane	5						5
Non-Residential							
1792, 1794, 1796, 1798 Wilmington Pike	19		11	8			
Ridge Associates	21		10	11			
Joann Toanone to Varriale	4	4					
Pileggi Option from Grace	59						59
Grace Left Capacity	8						8
TOTAL PROJECTED CAPACITY	361						
PROJECTED NEW CONNECTIONS		6	21	20	1		72
TOTAL CONNECTIONS	241	247	268	288	289	289	361

b. Estimated number of Future EDU's

The projected number of future EDU's was estimated by analyzing the remaining vacant parcels within the Township. The Table below summarizes the number of estimated future EDU's within the Township:

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

LAND USE	GROSS ACRES	AVAILABLE ACRES	RECOMMENDED DENSITY		FUTURE EDU's	NON-RESIDENTIAL FLOOR AREA (S.F.)
			UNITS/ACRE	IMPERVIOUS COVERAGE (%)		
GROWTH AREA	650	193	1		193	
COMMERCIAL/HIGH DENSITY RESIDENTIAL	502	45	10	70	149	435,000
HISTORIC VILLAGE	305	60	5	40	200	175,000
SCENIC AREAS	650	213	0.5		0	
SCENIC AREAS WITHIN THE GROWTH AREA	158	36	0.5		18	
OPEN SPACE	1,149	1,274	0.1		127	
LOW DENSITY RESIDENTIAL	1,299	283	0.5		142	
EXISTING CONSERVATION EASEMENTS	899	-	0		0	
TOTAL ANTICIPATED FUTURE DEVELOPMENT					829	610,000

Source: Township of Chadds Ford Comprehensive Plan

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

c. Evaluation of Existing Public Sewer System Capacity

WWTP	PERMITTED CAPACITY (GPD)	CURRENT AVERAGE DAILY FLOW (GPD) ¹	COMMITTED USAGE BASED ON KNOWN PROJECTS (GPD) ²	REMAINING AVAILABLE CAPACITY (GPD)	REMAINING AVAILABLE NUMBER OF EDU's	BUILD OUT PER FUTURE LAND USE		
						DWELLING UNITS	NON-RESIDENTIAL FLOOR AREA ₃	PROJECTED NUMBER OF FUTURE EDU's
TURNERS MILL	140,000	71,300	9,982	73,059	270	420	175,000	501
RIDINGS	80,000	39,900	26,040	14,060	65	122	435,000	322

1. Current Average Daily Flow taken from the 2015 Chapter 94 Report
2. 1 EDU = 217 GPD
3. Non-residential EDU = 100 gpd/1,000 s.f. of floor area (0.46 EDU's per 1,000 s.f of floor area)

As shown in the Table above, the projected number of EDU's for the Turners Mill and Ridings WWTP is 501 and 322 EDU's respectively. The remaining available capacity for Turners Mill and Ridings WWTP is 270 and 65 EDU's respectively.

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

V. Alternatives Analysis and Evaluation

In order to provide collection and treatment options for current and future needs within Chadds Ford Township, following two alternatives were identified:

- Do nothing – Continue to maintain and operate existing sewage collection, conveyance and treatment systems.
- Ridings Conversion / Turners Mill Expansion – this option involves decommissioning the Ridings WWTP by converting the treatment plant to a pump station that conveys sewage flow to the Turner's Mill WWTP. The Turner's Mill WWTP would be expanded to accommodate the additional flow.

A. Alternative 1 – Continued Operation and Maintenance of Existing Public Sewer Collection, Conveyance and Treatment Systems (graphic representation provided in Appendix V)

1. Turner's Mill WWTP

The service area to Turner's Mill WWTP would remain relatively unchanged with the exception of removing a number of parcels along Baltimore Pike where collection/conveyance systems are not in place. An expansion of the Turner's Mill WWTP would not be required under this alternative. Turners Mill WWTP will continue to be maintained and repaired as required to meet the PA DEP permitting requirements.

2. Ridings WWTP

The service area to Ridings WWTP would remain relatively unchanged with the exception of removing 364 Wilmington-West Chester Pike which is expected to be treated in Concord Township. Ridings WWTP will continue to be maintained and repaired as required to meet the PA DEP permitting requirements.

3. Knight's Bridge WWTP (Private)

The service area to Knight's Bridge WWTP would be limited to properties currently connected to the plant, and properties under ownership of the Henderson Group (owner of the treatment plant).

4. Springhill Farm WWTP (Private)

At this time, the Springhill Farms development Homeowners Association (SHFHOA) and the Springhill Farms Sewer Authority is in the process of negotiating an Agreement with Concord Township allowing them to connect to their public sewer

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

system. For the purposes of this report, it is assumed that Springhill Farms will connect to Concord Township's system. Once SHFHOA obtains all of the necessary approvals, a separate special study/planning module will be submitted to the PA DEP for their review and approval.

5. Concord

A Concord Township service area has been established as a number of properties within Chadds Ford Township have connected, or plan to connect to the Concord Township WWTP.

B. Alternative 2 – Ridings Conversion / Turners Mill Expansion (graphic representation provided in Appendix VI)

1. Turner's Mill WWTP

The service area to Turner's Mill WWTP would be expanded to include the Ridings service area. Sewage flowing to the Ridings WWTP would be pumped to Turners Mill WWTP for treatment and disposal. A force main would be installed to convey sewage from the Ridings pump station to a gravity sewer system in the Estates at Chadds Ford Development (approximately 1,100 feet of force main). The existing gravity sewer system in the Estates of Chadds Ford development flows to the Estates pump station where the sanitary sewage is conveyed by force main to Turners Mill WWTP (approximately 2,600 feet of existing 4-inch diameter and 6,800 feet of existing 6-inch diameter force main).

Ridings WWTP's existing tank, equipment and influent pump station would be utilized to pump sewage flows to Turners Mill WWTP. The existing influent pump station pumps and controls would be upgraded and the existing wet well would be lined or epoxy coated to extent its useful life. The wet well will act as a tank and will equalize flow to the pump station at the Estates of Chadds Ford development. Flow equalization will create a consistent pump rate and will allow the existing 4-inch diameter force main from the Estates pump to Turners Mill WWTP to be used.

The Estates pump station is currently owned and maintained by the Chadds Ford Sewer Authority. In order to accept the increased flows (existing and estimated future) from Ridings pump station, the station's pumping capacity will need to be increased from 100 gpm to approximately 225 gpm. The capacity of the wet well would also need to be increased, this can be accomplished through the installation of a new larger diameter wet well on site.

The combined hydraulic loading projection thru 2030 from the Ridings and Turners Mill WWTP is 871 EDU's. Using a value of 217 GPD/EDU this equates to approximately 189,007 gpd. Turners Mill WWTP is permitted for 140,000 gpd. Therefore, the WWTP will need to be upgraded to increase the permitted capacity of

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

the plant. The Turners Mill plant was constructed with the ability to add a third treatment train to accommodate an additional 70,000 gallons per day of treatment. The plant's modular design will allow expansion using available space on site with the construction of additional concrete compartments and piping, pumps, and controls.

The combined annual average organic loading projections for 2016 thru 2020 from the Ridings and Turners Mill WWTP are 265.2 lbs/day with a projected maximum monthly loading of 373.9 lbs/day. This value was calculated by using Turners Mill WWTP 2015 Chapter 94 Report as follows:

- a. Average 2015 Loading – 180.91lbs/day
- b. Total EDU's – 460
- c. Average Loading - 0.39 lbs/day/EDU
- d. 5 Year Avg. Ratio – 1.51
- e. Projected new EDU's – 411
- f. Increase Loading (lbs/day) – $(411 \text{ EDU's} * 0.39\text{lbs/day/EDU}) = 160.29 \text{ lbs/day}$
- g. Projected Loading (lbs/day) – $(180.91 + 160.29) = 341.2 \text{ lbs/day}$
- h. Projected Peak Loading (lbs/day) – $(341.2 * 1.51) = 515.2 \text{ lbs/day}$

Turners Mill WWTP has a current permitted organic loading capacity of 280.22 lbs BOD₅/day.

The Turners Mill WWTP was constructed with the ability to add a third treatment train that can accept an additional 50% of flows from the system. Based on the ability to expand and with a more detailed analysis of the plant loading, the Turners Mill WWTP should be able to accept the future projections.

2. Ridings WWTP

The service area to Ridings WWTP would be removed as the plant would be converted to a pump station with sewage flows sent to Turner's Mill WWTP for treatment and disposal.

3. Knight's Bridge WWTP (Private)

The service area to Knight's Bridge WWTP would be limited to properties currently connected to the plant, and properties under ownership of the Henderson Group (owners of the treatment plant).

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

4. Springhill Farm WWTP (Private)

At this time, the Springhill Farms development Homeowners Association (SHFHOA) and the Springhill Farms Sewer Authority is in the process of negotiating an Agreement with Concord Township allowing them to connect to their public sewer system. For the purposes of this report, it is assumed that Springhill Farms will connect to Concord Township's system. Once SHFHOA obtains all of the necessary approvals, a separate special study/planning module will be submitted to the PA DEP for their review and approval.

5. Concord

A Concord Township service area has been established as a number of properties within Chadds Ford Township have connected, or plan to connect to the Concord Township WWTP.

C. Analysis of Alternatives

A cost analysis was completed to evaluate the feasibility of the Alternatives, specifically for the Ridings Service Area.

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

CAPITAL COST – RIDINGS WWTP CONVERSION TO PUMP STATION TO
TURNER'S MILL WWTP AND EXPANSION OF TURNER'S MILL WWTP

Item No.	Item (Sub-Item) Description	Sub-Item Cost	Item Cost
1	Influent Pump Station Rehabilitation		
	New Pumps	\$ 20,000.00	
	New Pump Controls	\$ 15,000.00	
	Rehabilitation of Wet Well	\$ 40,000.00	
	New Valve Chamber	\$ 30,000.00	
	Valves	\$ 15,000.00	
	Accessories	\$ 30,000.00	
	Piping modifications	\$ 20,000.00	
	Emergency Generator	\$ 50,000.00	
	Gen. Auto Transfer Switch	\$ 17,500.00	
	Generator Electrical installation	\$ 35,000.00	
			\$ 272,500.00
2	Force Main		
	1,100 LF of 6" F.M. @ \$125/LF	\$ 137,500.00	
	Misc. (Easements, etc).	\$ 15,000.00	
			\$ 152,500.00
3	Existing Facility		
	Demolition/Decommissioning	\$ 100,000.00	
			\$ 100,000.00
4	Civil Site Work		
	Upgrades to Estates Pump Station	\$ 400,000.00	
	Upgrades to Painters Crossing PS	\$ 25,000.00	
			\$ 425,000.00
5	Subtotal 1		\$ 950,000.00
6	Bonds and Insurance	2.0%	\$ 19,000.00
7	Traffic Control	0.2%	\$ 1,900.00
8	Construction layout	0.5%	\$ 4,750.00
9	As-builts	0.5%	\$ 4,750.00
10	Testing	1.0%	\$ 9,500.00
11	Mobilization/ Demobilization	2.0%	\$ 19,000.00
12	Subtotal 2		\$ 1,008,900.00
13	Contingency	10%	\$ 101,000.00
14	Subtotal 3 (Probable Construction Cost)		\$ 1,109,900.00
15	Legal, Admin., Engineering, Construction Review	15%	\$ 167,000.00
16	Probable Project Cost		\$ 1,276,900.00
17	Turners Mill Expansion Cost		\$ 750,000.00
18	Total Project Cost Including Capacity Purchase		\$ 2,026,900.00

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

MAINTENANCE COST – RIDINGS PUMP STATION

Client:	Chadds Ford Township Sewer Authority		
Job No.:	CFTP 0570		
Project:	Ridings Conversion to Pumping Station		
Location:	Chadds Ford Township		
Description:	Ridings Pumping Station Annual Costs		
Item No.	Item (Sub-Item) Description	Sub-Item Cost	Item Cost
1	Operations		
	DELCORA Operations	\$ 12,500.00	
	DELCORA Additional Support	\$ 1,500.00	
			\$ 14,000.00
2	Maintenance, Supplies and Grounds		
	Equipment & Supplies	\$ 5,000.00	
	Grounds	\$ 500.00	
			Maintenance and Grounds Costs: \$ 5,500.00
4	Utilities		
	Electric	\$ 5,000.00	
	Water	\$ 100.00	
	Communications	\$ 2,500.00	
	Fuel (Emergency Generator)	\$ 500.00	
			Utilities Costs: \$ 8,100.00
5	Chemicals and Laboratory Analysis		
	Chemicals	\$ -	
	Additional Lab Analysis	\$ -	
			\$ -
6	Disposal		
	Sludge	\$ -	
	Grit and Screenings	\$ 1,500.00	
			\$ 1,500.00
7	Professional Services		
	Engineering	\$ 2,500.00	
	Legal	\$ 500.00	
	Financial	\$ -	
			Professional Services Costs: \$ 3,000.00
8	Subtotal 1		\$ 32,100.00
9	Contingency	10.0%	\$ 3,210.00
10	Probable Project Operation & Maintenance Cost		\$ 35,310.00
		Use	\$ 35,400.00

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

ANNUAL COST DIFFERENCE FOR OPERATION AND MAINTENANCE OF RIDINGS
PUMP STATION IN LIEU OF RIDINGS WWTP

Client:	Chadds Ford Township Sewer Authority			
Job No.:	CFTP 0570			
Project:	Ridings Conversion to Pumping Station			
Location:	Chadds Ford Township			
Description:	Ridings Pumping Station Annual Costs vs. STP			
Year	STP O&M Cost⁽¹⁾	Pumping Station O & M	Annual Savings	Accumulated Savings
1	\$180,064.00	\$35,400.00	\$144,664.00	\$144,664.00
2	\$185,465.92	\$36,462.00	\$149,003.92	\$293,667.92
3	\$189,175.24	\$37,191.24	\$151,984.00	\$445,651.92
4	\$192,958.74	\$37,935.06	\$155,023.68	\$600,675.60
5	\$196,817.92	\$38,693.77	\$158,124.15	\$758,799.75
6	\$200,754.28	\$39,467.64	\$161,286.63	\$920,086.38
7	\$204,769.36	\$40,256.99	\$164,512.37	\$1,084,598.75
8	\$208,864.75	\$41,062.13	\$167,802.62	\$1,252,401.37
9	\$213,042.04	\$41,883.38	\$171,158.67	\$1,423,560.03
10	\$217,302.89	\$42,721.04	\$174,581.84	\$1,598,141.87
11	\$221,648.94	\$43,575.47	\$178,073.48	\$1,776,215.35
12	\$226,081.92	\$44,446.97	\$181,634.95	\$1,957,850.30
13	\$230,603.56	\$45,335.91	\$185,267.65	\$2,143,117.94
14	\$235,215.63	\$46,242.63	\$188,973.00	\$2,332,090.94
15	\$239,919.94	\$47,167.48	\$192,752.46	\$2,524,843.40
16	\$244,718.34	\$48,110.83	\$196,607.51	\$2,721,450.91
17	\$249,612.71	\$49,073.05	\$200,539.66	\$2,921,990.57
18	\$254,604.96	\$50,054.51	\$204,550.45	\$3,126,541.02
19	\$259,697.06	\$51,055.60	\$208,641.46	\$3,335,182.48
20	\$264,891.00	\$52,076.71	\$212,814.29	\$3,547,996.77
⁽¹⁾ O&M Cost taken from most recent Authority Budget. Annual increases are calculated at 3%				

The capital cost of converting Ridings WWTP to a pump station can potentially be recovered in 13 years. Should the Township/Authority receive grant funding or developer support for the conversion and construction of the conveyance force main and the Turner's Mill WWTP expansion, the return period would decrease.

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

D. Implementation Plan / Schedule

Due to the analysis of the current and future operations as indicated in Section III.A.1, the only viable alternative based on the feasibility and economics is the conversion of the Ridings WWTP to a Pumping Station and expansion of the Turners Mill WWTP to accommodate the additional flows and avoid anticipated operational issues at the Ridings WWTP.

The Act 537 Plan will be implemented in various stages. Prior to implementation of any construction projects, the Township will require approval of the overall Act 537 Plan Revision. Once the Act 537 Plan Revision has been approved, the Township will be able to begin implementation of projects to meet the wastewater needs as outlined in this study.

The following schedule will be used to implement the Act 537 planning phase of the project:

Phase of Project	Months from Start
• Submit draft Act 537 Plan Revision to PADEP for Review and Comment	0
• Receive initial comments from PADEP	1
• Adopt Act 537 Plan Revision by Township	3
• Receive PADEP Approval of Act 537 Revision	4
• Submit Final Act 537 Plan Revision to PADEP	5

Upon receipt of approval of the Act 537 Plan Revision, the Township will be able to proceed with implementing the various construction projects associated with meeting the wastewater treatment needs of the Township.

The implementation schedule for construction of the improvements to convert the Ridings WWTP and to expand the Turners Mill WWTP is as follows:

Phase of Project	Months from Start
• Approval of Act 537 Plan Revision	0
• Submit Plans and Specifications of the Plant Conversion and Expansion for PADEP Review	12
• Obtain PADEP Construction Permits and Local Approvals	16
• Submit Project for Bids	18
• Award Contract	20
• Start Construction	22
• Complete Construction	32

The Capital Financing Plan would consist of the Township borrowing the funds in conjunction with Developer associated contributions to finance the improvements. The Sewer Authority would be able to utilize the cost savings from the operations of the conversion of the WWTP to Pumping Station to fund the debt service. No increase in current Township fees are anticipated with the completion of these improvements.

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

VI. Institutional Evaluation

A. Financial and Debt Status

A summary of the Chadds Ford Township's 2014 wastewater budget is summarized as follows:

Operating Income:	
Sewer Fees	\$206,000.00
Certifications/ Finance Charges	<u>\$2,000.00</u>
Total	\$208,000.00
Operating Cost:	
Salaries	\$75,900.00
Sludge Hauling/Disposal	\$28,000.00
Chemicals/Lab fees	\$14,000.00
Equip O & M	\$25,000.00
Elect/ Fuel/ Water/ Tele/ etc.	<u>\$37,164.00</u>
Total	\$180,064.00
Expenses (Admin/Legal/Engineering)	\$13,010.00
Net Income	\$14,926.00

The Chadds Ford Township Sewer Authority budget has been set to ensure the Operating Income exceeds the Operating Cost. These funds are set aside to cover costs associated with anticipated wastewater collection system maintenance and major capital expenditures. It also establishes budgets for meeting future obligations associated with collection and conveyance system operations, maintenance, and improvements.

B. Available Staff and Administrative Resources

Chadds Ford Township has an established Sewer Authority. The sewer Authority is made up of five (5) residents of the Township and includes a sewer authority solicitor and a sewer authority engineer. The sewer authority engineer is a Professional Engineer, registered in the State of Pennsylvania. The Township Manger is also the Sewer Authority Manager. The Manager reports to the three-person Board of Supervisors. The Board of Supervisors meets twice per month. The sewer Authority meets every other month or more frequently, if necessary. The sewer Authority meets to discuss only sewer issues that affect the Township and its residents. The Board of Supervisors meets to discuss all Township business and municipal wastewater needs as they arise or are forwarded to them by the Sewer Authority.

The existing sewage collection and conveyance systems are owned and operated by the Chadds Ford Township or the neighborhood association in which they are located. Each owner utilizes a private contractor to maintain their respective waste water treatment plant,

UPDATE REVISION TO CHADDS FORD TOWNSHIP'S
SEWAGE FACILITIES MANAGEMENT (ACT 537) PLAN

pump station, or collection system. At the present time DELCORA is the contractor who is maintaining the public and private systems in Chadds Ford Township.

DELCORA has the necessary staff, training, and resources to maintain the sanitary sewer infrastructure within Chadds Ford Township.

C. Existing Legal Authority

Each owner of its respective sewage collection, conveyance, and/or treatment system has the obligation to maintain their respective system. Only the Township has the ability to set user fees and take actions against ordinance violations. The individual private owners have the ability to levy assessments against their residents to make capital expenditure/upgrades. However, Chadds Ford Township understands ultimately they are responsible for the health, safety, and welfare of their residents. If any private system is not functioning properly or the appropriate maintenance is not being done as required, the health, safety, and welfare of their residents is jeopardized.

Section § 95-29 of the Township Code (Individual and community sewerage systems and appurtenances) states the following...

1. This § 95-29 applies to all individual and community sewerage facilities for collecting, pumping, transporting, treating and disposing of sanitary sewage and industrial wastes, situate in or adjacent to the Township of Chadds Ford, whether or not owned, maintained, operated or controlled by the Township or the Chadds Ford Township Sewer Authority.
2. Any and all individual and community sewerage systems and appurtenances in the Township of Chadds Ford shall be designed, installed, operated and maintained in accordance with and pursuant to rules and regulations adopted, from time to time, by the Chadds Ford Township Sewer Authority and the Pennsylvania Department of Environmental Protection, or its successors.
3. A certified copy of all such rules and regulations adopted by the Chadds Ford Township Sewer Authority shall be filed with the Township, for informational purposes, within 30 days after adoption.