Dear Residents;

The Fallowfield Board of Supervisors would like to call your attention to the impact the Combined Sewer Overflow Project that Authority Borough of Charleroi has developed at the direction of the Department of Environmental Protection under Act 537. The design of this plan was developed by KLH Engineering. Estimated cost will be $32,500,000.00 and will impact your sewerage monthly bill.

ABC has meet with the Supervisors at the July and August agenda meetings. Briefly I will list the impacts proposed and have attached a reference to ABC Plan Summary consisting of 60 pages.

- CSO Plan costs will increase your monthly bill an additional $38.00 for first six (6) years; then $45.00 for remainder of the financing terms;
- ABC intends to refinance Fallowfield existing debt service. This reduction will reduce the current monthly debt service from current $26.50 per month through 2022 to a new monthly debt service rate of $8.00 per month through 2040.
- Pricing information is located on pages 4,5,50,51,52 & 53;

We strongly suggest that you review the attachments to gain a better understanding of the project and attend the public meeting.

PUBLIC MEETING TO BE SETEMBER 7, 2016 AT CHARLEROI HIGH SCHOOL AUDITORIUM 7; 00PM;

QUESTIONS PLEASE CONTACT ABC DIRECTLY; 724-483-3585

On behalf of the Board of Supervisors

Wilbur Caldwell Chairman

AUTHORITY OF THE BOROUGH OF CHARLEROI
WASHINGTON COUNTY, PENNSYLVANIA

ACT 537 SEWAGE FACILITIES PLAN UPDATE

PLAN SUMMARY

The Pennsylvania Sewage Facilities Act (Act 537) was enacted by the Pennsylvania Legislature in 1966 and requires every municipality in the Commonwealth of Pennsylvania (Commonwealth) to develop and maintain an up-to-date Act 537 Sewage Facilities Plan. The purpose of the Act 537 planning process is to protect the health, safety and welfare of the citizens living in a municipality, to prevent future sewage disposal problems from occurring, and to provide protection for the groundwater and surface waters of the Commonwealth. An Act 537 Plan should be updated when the existing Plan is out of date, is inconsistent with other municipal planning, does not provide adequate solutions to resolve existing sewage disposal problems, or is needed to provide for planned growth.

This Act 537 Sewage Facilities Plan Update was developed by the Authority of the Borough of Charleroi (Authority or ABC) according to the Pennsylvania Department of Environmental Protection (PADEP) guidelines set forth in the PADEP document entitled, *A Guide for Preparing Act 537 Update Revisions*. The Plan includes all applicable information to provide adequate planning, as outlined on the PADEP document entitled, *Act 537 Plan Content and Environmental Assessment Checklist*, provided herein as Appendix B.

The Authority owns, operates and maintains a 3.0 million gallon per day (MGD) wastewater treatment plant (WWTP) located in the Borough of Charleroi, Washington County, Pennsylvania. The Authority provides for treatment of wastewater flows from Fallowfield Township and the Boroughs of Charleroi, North Charleroi, Dunlevy, Speers and Twilight. Treated effluent is discharged to the Monongahela River.

The Authority also owns and maintains interceptor sewers, eight (8) sewage pumping stations, one (1) ejector station and the sanitary collector sewers serving Fallowfield Township. The Boroughs of Charleroi, North Charleroi, Dunlevy, Speers and Twilight own and maintain their respective collector sewer systems. The sewers serving Fallowfield Township and a small portion of Speers Borough located in the Maple View area are separate sanitary sewers. The remainder of the collection system is a combined sewer system (CSS).

The WWTP is neither hydraulically nor organically overloaded as defined by the Chapter 94 regulations of the Pennsylvania Code. However, the conveyance system is hydraulically overloaded, causing peak flows to exceed the carrying capacity of certain portions of the system resulting in combined sewer overflows (CSOs) and a sanitary sewer overflow (SSO).

The PADEP has required elimination of CSO-009 and CSO-013 given their proximity to the water treatment plant raw water intake. Additionally, elimination of Maple Creek Pump Station SSO-010 is required in accordance with PA Code Chapter 94 Regulations.

This Act 537 Sewage Facilities Plan Update was developed to evaluate alternative sewer system upgrades required to control CSOs and eliminate the SSO under existing and projected future wastewater loadings. It was prepared in conjunction with the Long Term Control Plan (LTCP) as part of the Authority's CSO Program. The Authority utilized the United States Environmental Protection Agency (EPA) CSO Control Policy "presumption" approach criteria ii through the LTCP process. The criteria are as follows:

> *"The elimination or capture for treatment of no less than 85% by volume of combined sewage collected in the CSS during precipitation events on a system-wide annual average basis."*

Based on the requirements established above, the following LTCP objectives were established:

1. Eliminate all Maple Creek Pump Station SSO events at SSO-010 for at least a 2-year, 24-hour storm.
2. Eliminate all CSO events for the typical year at CSO-009 and CSO-013.
3. Meet EPA CSO Control Policy Presumptive Approach by reducing CSO volumes such that 85% of CSS flow (during rainfall dependent time periods) is captured and treated, on an annual average basis.

In order to assess the overflow volumes relative to total CSS conveyance capacity on an annual average basis, the Authority completed a system characterization survey, a comprehensive flow monitoring study, and computer modeling of the conveyance system, including the CSOs and the pump stations, utilizing InfoSWMM. The results of the flow monitoring and hydraulic modeling efforts were utilized to develop the alternatives identified and evaluated herein. The 2-year, 5-year and 10-year storm events were modeled. Design peak flows were selected on the basis of the highest return period that is practically feasible without manhole overflows while maintaining greater than 85% capture of all combined flow during a typical year. Given the proposed system improvements, rainfall dependent CSS flow percent capture, for the typical year rainfall, is 94.77%. The SSO will be eliminated.

The following wet weather flow control facilities, identified herein as Alternative 1, are recommended to control CSOs and eliminate the SSO to meet the LTCP objectives:

<u>Phase 1 – Elimination of CSO-009 and CSO-013</u>

1. Construct new Dunlevy Pump Station with submersible pumps. Pump all flow up to 350% of dry weather flow to Speers Pump Station through existing force main and gravity sewer.

3. Dunlevy Pump Station to include CSO pumping capacity in addition to dry weather flow. CSO-013 overflows to be conveyed directly to this pump station and pumped to the on-site WWETCO Bio-FlexFilter CSO treatment facility.
4. Construct a CSO pump station at the Speers Pump Station site. CSO-009 overflows to be conveyed directly to this wet well. Construct a new force main from the Speers CSO Pump Station to the WWETCO Bio-FlexFilter CSO treatment facility at the Dunlevy Pump Station site.
5. Construct a WWETCO Bio-FlexFilter CSO treatment facility at the Dunlevy Pump Station site.
6. CSO treatment facility to include screening and ultraviolet (UV) disinfection.

Phase 2 – Eliminate Maple Creek Pump Station SSO and Achieve 85% Capture

1. Convert existing Maple Creek Pump Station wet well into a submersible pump station.
2. Construct Maple Creek SSO Pump Station at the Western Flour site.
3. Replace approximately 1,400 lineal feet of existing 10-inch Maple Creek Interceptor with 15-inch gravity sewer upstream of new Maple Creek SSO Pump Station.
4. Construct new force main from both pump stations to the existing WWTP.
5. Construct new WWTP influent box with sluice gate. Maple Creek Pump Station force main to connect to the box downstream of the sluice gate, such that throttling of the gate will back up and overflow only CSS flow.
6. Construct a CSO pump station at the WWTP. This pump station will pump CSS flow, backed up due to WWTP acceptance of Maple Creek SSO flow, to a CSO treatment facility.
7. Construct a WWETCO Bio-FlexFilter CSO treatment facility on the existing WWTP site (near CSO-007).
8. CSO treatment facility to include screening and UV disinfection.
9. Convert existing North Charleroi Pump Station wet well into a submersible pump station.
10. North Charleroi Pump Station to include screening.

The proposed project phasing is necessary to allow the Authority to move forward with the Speers and Dunlevy portions of the project in order to utilize a Local Share Account (LSA) grant in the amount of $500,000.00, which has been acquired by the Authority for a CSO project in those communities. In order to utilize those funds, however, the Speers and Dunlevy projects must be constructed and the contracts closed by June 2019. Therefore, the overall project will be phased in order to allow that deadline to be met. Design of the Phase 1 project is underway. Construction is anticipated to begin in the fall of 2017. Design of the Phase 2 project will begin in the fall of 2017 and construction is anticipated to begin in the spring of 2019. All facilities are anticipated to be constructed by the summer of 2021.

It is the Authority's intent to conduct post construction flow monitoring throughout the system upon completion of construction. The post construction flow monitoring will be conducted after each phase of the project.

It is the Authority's intent to conduct post construction flow monitoring throughout the system upon completion of construction. The post construction flow monitoring will be conducted after each phase of the project.

The anticipated project cost for construction of the Alternative 1 wet weather flow control facilities is estimated to be $32.5 Million. The costs will result in a monthly CSO Program user fee charged to all of the Authority's customers. The Authority has elected to phase in the projected user charges by discounting the first six years in order to decrease the initial burden to its rate payers. The Authority intends to refinance the Borough of Charleroi's remaining debt associated with its separation project. The separation project resulted in reduced flows entering the WWTP, and thus has an inherent impact on the CSO Program as a whole.

The estimated monthly CSO Program user rate is approximately $38.00 per customer for the first six years and approximately $45.00 per customer for the remainder of the financing term. It is anticipated that bonds will be the primary financing option. However, in order to minimize user rates to the greatest extent possible, the Authority will apply for various federal, state and county level grants. Ultimately, the financing method will be selected based upon eligibility, availability and in the best interest of the Authority and its customers.

It should also be noted that the Authority intends to refinance Fallowfield Township's existing debt services related to the construction of its sanitary sewer system. This will ease the initial burden to the Fallowfield rate payers. The refinancing will reduce the monthly debt service to Fallowfield customers from the current $26.50 per month through 2022 to approximately $8.00 per month through 2040. This rate will be paid by Fallowfield customers in addition to the CSO Program user rates described above.

In addition to the above mentioned wet weather flow control infrastructure improvements, the Authority is committed to undergoing the following efforts to reduce flows and maintain the conveyance system, as source reduction is a key component of the LTCP:

- Cleaning and closed circuit television (CCTV) inspection of interceptors. This work is underway and is anticipated to be complete by the end of 2016. The Authority will complete this work every 10 years as required.
- Cleaning and CCTV of the Fallowfield collection system. The Authority will complete this work every 10 years as required.
- Conducting a Flow Isolation Study in the Fallowfield collection system to identify problems areas heavily impacted by wet weather.
- Adoption of a Time of Sale Ordinance requiring dye testing during any real estate transaction to identify and remove illegal downspout connections to the sanitary sewer system. The Authority currently requires this in Fallowfield. Speers and Dunlevy also require dye testing at time of sale. The Authority intends to encourage and assist Charleroi and North Charleroi with implementation of time of sale dye testing.

- Investigate the need for solids/floatable control improvements in existing CSO diversion chambers.

The communities tributary to the Authority of the Borough of Charleroi will also be encouraged to continually monitor and improve their respective systems as well. While a great deal of work remains, the following efforts have already been completed by the communities.

- The Borough of Charleroi completed a storm sewer separation project during which the Borough expended nearly $8.0 Million to separate storm and sanitary sewers throughout the Borough. These efforts provided a noticeable impact on the flows entering the WWTP.
- The Borough of Dunlevy has completed flow monitoring within its collection system and has performed repairs in identified problem areas.

The anticipated schedule of implementation of the Act 537 Sewage Facilities Plan Update, contingent upon receiving favorable funding, is included in Table 1 in the Implementation Schedule section below.

MUNICIPAL ADOPTION

Original signed and sealed Resolutions of Adoption of the Act 537 Sewage Facilities Plan Update by the Authority of the Borough of Charleroi, Fallowfield Township, and the Boroughs of Charleroi, North Charleroi, Dunlevy, Speers and Twilight are included in Appendix C.

PLANNING AGENCY CORRESPONDENCE

General correspondence with the Washington County Planning Commission, Fallowfield Township, and the Boroughs of Charleroi, North Charleroi, Dunlevy, Speers and Twilight is included in Appendix D. All applicable planning agency comments have been addressed within the Plan Update as necessary.

PUBLICATION

Proof of Public Notice, which documents the adoption and summary of the Act 537 Sewage Facilities Plan Update, and the establishment and conduct of a 30-day public comment period, is included in Appendix E.

COMMENTS AND RESPONSES

Copies of all written comments received as a result of the public comment period are included in Appendix F. All applicable comments have been addressed within the Plan Update as necessary.

IMPLEMENTATION SCHEDULE

The anticipated schedule of implementation of the Act 537 Sewage Facilities Plan Update, contingent upon receiving favorable funding, is included in Table 1.

Table 1: Schedule of Implementation

Activity	Completion Date
Begin Phase 1 Design	July 2016
Submit the Act 537 Plan Update and LTCP to the PADEP	October 2016
PADEP Review and Approval of the Act 537 Plan Update and LTCP	January 2017
Submit Phase 1 Part II Construction Permit	January 2017
Acquire Phase 1 Part II Construction Permit	July 2017
Complete Phase 1 Design	July 2017
Begin Phase 1 Construction	September 2017
Begin Phase 2 Design	September 2017
Submit Phase 2 Part II Construction Permit	September 2018
Complete Phase 1 Construction	February 2019
Begin Phase 1 Post Construction Flow Monitoring	March 2019
Acquire Phase 2 Part II Construction Permit	March 2019
Complete Phase 2 Design	March 2019
Begin Phase 2 Construction	May 2019
Complete Phase 2 Construction	May 2021
Begin Phase 2 Post Construction Flow Monitoring	June 2021

CONSISTENCY DETERMINATION

According to Act 537, all technically feasible sewage facility alternatives must be evaluated for consistency with certain acts, programs and policies. There are no expected inconsistencies associated with the wet weather flow control facilities evaluated herein. The alternatives are consistent with the following Acts, programs and policies, and do not require resolution during this planning phase of the project:

- Sections 4 and 5 of the Clean Streams Law
- Section 208 of the Clean Water Act
- Municipal Wasteload Management Under PA Code, Title 25, Chapter 94
- Title II of the Clean Water Act
- Titles II and VI of the Water Quality Act of 1987
- Comprehensive Plans developed under the Pennsylvania Municipalities Planning Code

- Antidegradation requirements as contained in PA Code, Title 25, Chapters 93, 95 and 102
- State Water Plan developed under the Water Resources Planning Act
- Pennsylvania Prime Agricultural Land Policy
- Washington County Stormwater Management Plan
- Wetlands Protection
- Protection of rare, endangered or threatened plant and animal species as identified by the Pennsylvania Natural Diversity Inventory (PNDI)
- Historical and archaeological resource protection relating to cooperation with public officials with the Pennsylvania Historical and Museum Commission (PMHC)

Additional action may be required to demonstrate consistency with the above named acts, programs and policies. This will occur during the design and permitting phases upon implementation of the selected sewage facilities alternatives. For more information, refer to Section VI.A of the Plan Update.

I. PREVIOUS WASTEWATER PLANNING

I.A. IMPACT OF PAST WASTEWATER PLANNING ON THE CURRENT PLANNING EFFORT

I.A.1. Previous Wastewater Planning Undertaken Under the Sewage Facilities Act

Previous wastewater planning has occurred within the Authority's service area under the Act 537 regulations. The existing official plans of each tributary community and their PADEP approval dates are as follows:

- Borough of Charleroi — March 10, 1972
- Borough of North Charleroi — March 10, 1972
- Borough of Dunlevy — March 10, 1972
- Borough of Speers — March 10, 1972
- Borough of Twilight — March 10, 1972
- Fallowfield Township — February 26, 1999

I.A.2. Previous Wastewater Planning Which Has Not Been Carried Out According to an Approved Implementation Schedule

The Authority prepared and submitted a Long Term Control Plan (LTCP) to the PADEP in December 2006 with a proposed implementation schedule ending in 2017. The 2006 LTCP proposed new sanitary sewers and a pump station in Dunlevy to eliminate CSO-013, a pump station and force main in Speers to eliminate CSO-009, a sewer separation project in Charleroi to eliminate CSOs-002, 003, 004, 005, 006, 007 and 008, monitoring of CSOs-011 and 012 in North Charleroi, removal of obvious storm water connections to the sanitary sewers in the Maple

View area, and the upgrading of the existing Maple Creek Pump Station to eliminate SSO-010. The projects were never completed.

A Flow Equalization Tank Sizing Study was completed in October 2009 for Speers and Dunlevy. The study recommended the construction of a 2.5 million gallon (MG) flow equalization tank near the Speers Pump Station and specialized dry weather/overflow pumping facilities with enlarged wet wells at the Speers and Dunlevy Pump Stations. The study was later revised in October 2010 based on EPA CSO control requirements allowing up to four overflows per year. A 1.0 MG flow equalization tank, dry weather and overflow pumping facilities with enlarged wet wells at the Speers and Dunlevy Pump Stations, as well as screening and disinfection at the CSO discharge points were recommended in the revised study. These upgrades were never completed after the PADEP informed the Authority that an Act 537 Sewage Facilities Plan update was required for the project. Subsequently, an Act 537 Plan Special Study was prepared in November 2013 for the Speers and Dunlevy project. However, the project was never completed due to site restraints issued by the railroad.

This Act 537 Sewage Facilities Plan Update was prepared as a system-wide review to adequately address the deficiencies throughout the system as a whole. The LTCP was updated in conjunction with this Plan Update.

I.A.3. Anticipated or Planned Wastewater Planning

The only wastewater projects anticipated at this time are those proposed within this Act 537 Plan Update and the LTCP.

I.A.4. Wastewater Planning Through Planning Modules, Planning "Exemptions" and Addenda

There have been no approved planning modules within the past five years.

II. PHYSICAL AND DEMOGRAPHIC ANALYSIS

II.A. IDENTIFICATION OF THE PLANNING AREA

The Authority of the Borough of Charleroi provides treatment of wastewater flows from Fallowfield Township and the Boroughs of Charleroi, North Charleroi, Dunlevy, Speers and Twilight in Washington County, Pennsylvania. The tributary communities represent the planning area for this Act 537 Plan Update, as shown on Exhibit 1 in Appendix G.

II.B. PHYSICAL CHARACTERISTICS OF THE PLANNING AREA

Consideration must be given to the environmental impacts of land development activities throughout a watershed. Urbanization has the potential to degrade environmental values of watersheds with protected streams. For this reason, it is important to identify the physical characteristics of the planning area to provide protection for important environmental resources.

The Pennsylvania Code, Title 25, Chapter 93 (Water Quality Standards) contains classifications of every stream in Pennsylvania and orders and promotes their protection. The waters located within the planning area include the Monongahela River, to which the Authority's WWTP discharges treated effluent, Maple Creek, and several other tributaries to the Monongahela River. Overall, the planning area is located within the Lower Monongahela Watershed in the Ohio River Basin. The drainage basins and the Chapter 93 designated uses are shown on Exhibit 2 in Appendix G.

The waters in the planning area are classified as warm water fisheries (WWF) under Chapter 93 regulations. Chapter 93 defines a WWF as a stream used for the maintenance and propagation of fish species and additional flora and fauna that are indigenous to a warm water habitat. Additional protection measures exist for waters classified as high quality (HQ) or exceptional value (EV). HQ and EV waters or watersheds have excellent quality and features that require special water quality protection measures. It is important to note that there are no HQ or EV classified streams located within the planning area, but a major goal of this Plan Update is to protect the waters of the Commonwealth through the preservation of the overall drainage basin to support aquatic life.

II.C. SOILS ANALYSIS

Soils play a key role in determining the appropriateness of various on-lot and community sewage disposal systems. They often pose limitations for construction in various areas due to slope, geologic composition, depth to the restrictive layer, depth to the water table and the drainage characteristics. The distribution of general soil classifications for the soil types found in the planning area is shown on Exhibit 3 in Appendix G. The types and characteristics of the soils were obtained from the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS).

Agricultural areas, as defined by the Pennsylvania Code, are areas used primarily for the production of crops and where the soil is without vegetative cover during certain periods of the year. Prime farmland is land that has the best physical and chemical characteristics for the production of food, feed and forage, fiber, and oil seed crops. Pennsylvania's Prime Agricultural Land Policy orders and directs the prevention of irreversible conversion of prime agricultural land to uses that result in its loss as an environmental or essential food production resource. Prime farmlands are important to examine for scenarios in which future development is expected to occur because of the protective measures in existence to preserve this important resource. It is important to note that there are soil areas classified as prime farmland and farmland of statewide importance in the planning area, as shown on Exhibit 3 in Appendix G. While some of the soils are classified as prime farmlands, all construction resulting from the recommendations of this Plan Update will occur in previously developed and maintained sites which are not used for agricultural purposes. There will be no impacts on prime agricultural lands through the implementation of this Plan Update.

Discussion of areas suitable for in-ground on-lot systems, elevated sand mounds, individual residential spray irrigation systems, and areas unsuitable for soil dependent systems is irrelevant. Those types of sewage disposal systems are not considered in this Plan Update, as it was developed for sewer system upgrades to control CSOs and eliminate the SSO.

II.D. GEOLOGIC FEATURES

Geologic features impact the ability to install and properly operate on-lot or community sewage disposal facilities. Sinkholes and solution channels provide direct conduits through which sewage may travel and cause contamination of groundwater. Inadequate depth to the water table may indicate that the unsaturated soil zone is too thin to adequately treat wastewater in on-lot system applications. These limitations must be avoided when implementing sewage disposal technologies and necessitate an investigation of geologic features.

Mapping of the most dominant underlying geologic features in the planning area is shown on Exhibit 4 in Appendix G. These formations are not considered to adversely affect the area and there are no known geologic features in relation to existing or potential nitrate-nitrogen pollution and drinking water sources. The various geologic formations and descriptions of each, obtained from the United States Geological Survey (USGS), are as follows:

- Casselman Formation – Characterized by cyclic sequences of shale, siltstone, sandstone, red beds, thin, impure limestone, and thin, nonpersistent coal. Red beds are associated with landslides. The base is at top of Ames limestone.

- Monongahela Group – Characterized by cyclic sequences of limestone, shale, sandstone, and coal. Commercial coals are present. The base is at the bottom of the Pittsburgh coal.

- Waynesburg Formation – Characterized by cyclic sequences of sandstone, shale, limestone and coal. Commercial coals are present. The base is at the bottom of the Waynesburg coal.

- Washington Formation – Characterized by cyclic sequences of sandstone, shale, limestone and coal. It includes some red shale. The base is at the bottom of the Washington coal.

II.E. TOPOGRAPHY

Discussion of areas with slopes that are suitable for conventional systems or elevated sand mounds, and areas with slopes that are unsuitable for on-lot systems is irrelevant. Those types of sewage disposal systems are not considered in this Plan Update, as it was developed for sewer system upgrades to control CSOs and eliminate the SSO.

II.F. POTABLE WATER SUPPLIES

Potable water service is provided to the Boroughs of Charleroi, North Charleroi, Dunlevy, Speers, Twilight, Donora and Monessen, as well as Fallowfield and Somerset Townships by the Authority of the Borough of Charleroi. The Monongahela River is the source of supply. Residences and businesses located outside of the existing service area obtain potable water from private wells.

II.G. WETLANDS

Wetlands are areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions including swamps, marshes, bogs and similar areas. Wetland areas are considered to be a valuable public water resource and are subject to strict conservation regulations. They provide an environment and habitat for aquatic life including fish, amphibians and waterfowl. Additionally, many endangered plant species are thought to exist in wetlands, and wetlands are essential for the maintenance of surface water quality and quantity. National Wetlands Inventory (NWI) mapping of the planning area is shown on Exhibit 5 in Appendix G. The only wetlands in the proximity of the planning area where the alternatives evaluated herein would be constructed are along the Monongahela River, which is classified as riverine.

Hydric soils are formed in conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. These soils contain the characteristics necessary for potential wetland existence and may indicate a wetland area. Hydric soils mapping is also shown on Exhibit 5 in Appendix G. The mapping indicates that some of the soil types in the planning area are classified as partially hydric.

There are no expected impacts on wetlands. All proposed facilities will be constructed outside of wetlands as much as possible. The Authority will make all attempts to minimize the impact on any ecologically sensitive areas during any construction activities. A detailed wetlands evaluation may be required. Appropriate PADEP or Army Corps of Engineers (ACoE) permitting will be performed if necessary. All work associated with the chosen alternative will be consistent with all applicable state and federal regulations regarding wetlands.

III. EXISTING SEWAGE FACILITIES IN THE PLANNING AREA

III.A. SEWERAGE SYSTEMS IN THE PLANNING AREA

III.A.1 Location, Size and Ownership of Sewerage Facilities in the Planning Area

The Authority of the Borough of Charleroi owns, operates and maintains a wastewater treatment plant (WWTP) which provides treatment of wastewater flows from Fallowfield Township and the Boroughs of Charleroi, North Charleroi, Dunlevy, Speers and Twilight. The

sewer system tributary to the WWTP contains collector and interceptor sewers, pump stations, force mains, an SSO and multiple CSO outfalls. The locations of all major components of the sewer system are displayed on Exhibit 6 in Appendix G.

Collector Sewers

The Authority of the Borough of Charleroi owns and maintains the sanitary collector sewers serving Fallowfield Township. The Fallowfield collection system was installed between the late 1990s and the early 2000s. The Boroughs of Charleroi, North Charleroi, Dunlevy, Speers and Twilight own and maintain their respective collector sewer systems. The sewers serving Fallowfield Township and a small portion of Speers Borough located in the Maple View area are separate sanitary sewers. The remainder of the collection system is a combined sewer system (CSS).

Interceptor Sewers

The Authority of the Borough of Charleroi owns and maintains over five miles of force main and interceptor sewers ranging in size from 6-inch to 32-inch that convey wastewater flows to the WWTP. There are five (5) major interceptors within the system, described as follows:

- Dunlevy Interceptor – The existing Dunlevy Interceptor is a 6-inch diameter asbestos concrete force main measuring 2,100 linear feet. It conveys wastewater discharged from the Dunlevy Pump Station to the Speers Interceptor.

- Speers Interceptor – The Speers Interceptor conveys wastewater from the Dunlevy Pump Station, the Speers Pump Station, and the Maple View area in Speers to the Maple Creek Pump Station. The Speers Interceptor contains 300 linear feet of 6-inch diameter asbestos-cement force main, 3,650 linear feet of 8-inch diameter asbestos cement gravity sewer, and 3,900 linear feet of 10-inch diameter asbestos cement gravity sewer.

- Maple Creek Interceptor – The Maple Creek Interceptor is a 10-inch PVC gravity sewer measuring approximately 9,000 linear feet. It conveys wastewater from Fallowfield Township to the Maple Creek Pump Station.

- Charleroi Interceptor – The Charleroi Interceptor conveys wastewater from the Maple Creek Pump Station, the Water Treatment Plant (WTP) sludge pump station and the Borough of Charleroi to the WWTP. Flows also come from portions of Fallowfield Township and the Borough of North Charleroi. The Charleroi Interceptor consists of approximately 1,650 linear feet of 8-inch diameter asbestos cement force main, 3,450 linear feet of 18-inch diameter reinforced concrete gravity sewer, and 1,050 linear feet of 32-inch diameter reinforced concrete gravity sewer.

- North Charleroi Interceptor – The North Charleroi Interceptor is a 6-inch diameter fused high density polyethylene (HDPE) force main measuring 2,425 linear feet. It conveys the pump station discharge from the North Charleroi Pump Station to the WWTP.

Combined Sewer Overflows

The Authority owns and maintains eleven (11) permitted CSOs within the service area. CSO 008 was closed on August 20, 2012, so there are ten (10) active CSOs but only nine (9) outfalls as CSOs-004 and 005 combined into a single outfall. All of the CSOs discharge directly to the Monongahela River. Table 2 lists the CSOs. Pertinent CSO data is included in Appendix H.

Table 2: CSO Locations

CSO	Location	Latitude/Longitude
002	Second Street and Railroad	40°08'9"/79°53'37"
003	Third Street and Railroad	40°08'12"/79°53'42"
004[1]	Fourth Street and Railroad	40°08'18"/79°53'47"
005[1]	Chamber Parking Lot	40°08'19"/79°53'46"
006	Seventh Street and Bossun	40°08'28"/79°53'58"
007	Tenth Street and Railroad near WWTP	40°08'38"/79°54'10"
008[2]	Twelfth Street and Railroad	40°08'44"/79°54'15"
009	Speers Pump Station	40°07'32"/79°52'45"
011	Seventh Street and Center	40°08'58"/79°54'21"
012	Fifth Street and Monongahela (North Charleroi Pump Station)	40°09'02"/79°54'20"
013	Dunlevy Pump Station	40°07'1"/79°51'48"

[1]Separate diversion structures combine into a single outfall pipe.
[2]CSO 008 was closed on August 20, 2012.

Sanitary Sewer Overflows

The Authority of the Borough of Charleroi owns and maintains one (1) SSO. SSO 010 is located at the Maple Creek Pump Station and discharges into Maple Creek, which is a tributary to the Monongahela River. Pertinent SSO data is included in Appendix H.

Pump Stations

The Authority owns, operates and maintains eight (8) sewage pumping stations and one (1) ejector station. The Maple Creek, North Charleroi and Speers Pump Stations are equipped with flow meters and record flow daily on circular charts. The Dunlevy, Grange Road, Kennedy Road, Pleasant Road and Dairy Road Pump Stations are not equipped with flow meters. Table 3 contains pump station details, including existing pump station flows during the operating year 2015.

Table 3: 2015 Pump Station Information

Pump Station	No. of Pumps	Annual Average Flow (MGD)	Maximum Daily Flow (MGD)	Design Flow (MGD)
Speers	2	0.183	0.592	0.576
Maple Creek	2	0.367	1.307	1.152
North Charleroi	2	0.211	0.714	0.936
Dunlevy	2	N/A	N/A	0.432
Water Treatment Plant		0.381	1.153	
Grange Road	2	N/A	N/A	0.058
Kennedy Road	3	N/A	N/A	0.058
Pleasant Valley Road	2	N/A	N/A	0.072
Dairy Road	2	N/A	N/A	0.360

Wastewater Treatment Facility

The Authority of the Borough of Charleroi owns, operates and maintains a wastewater treatment plant (WWTP) which provides treatment of wastewater flows from Fallowfield Township and the Boroughs of Charleroi, North Charleroi, Dunlevy, Twilight and Speers. The WWTP treats both separate and combined sewage. The WWTP operates under National Pollutant Discharge Elimination System (NPDES) Permit No. PA0026891, which became effective on December 1, 2013, and expires on November 30, 2018. The permitted average and peak hydraulic capacities of the plant are 3.0 and 9.0 MGD, respectively. The permitted organic capacity of the plant is 5,004 lbs BOD_5/day. The WWTP discharges treated effluent to the Monongahela River. The NPDES permitted effluent discharge limits for the WWTP are listed in Table 4.

Table 4: NPDES Permitted Effluent Limits of the WWTP

PARAMETER	CONCENTRATION (mg/l)			
	Average Monthly	Average Weekly	Instantaneous Maximum	Units
FLOW	Monitor and Report			-
TOTAL RESIDUAL CHLORINE	0.5		1.6	mg/l
$CBOD_5$	25	38	50	mg/l
TOTAL SUSPENDED SOLIDS	30	45	60	mg/l
AMMONIA NITROGEN	Report			-
FECAL COLIFORM				
May 1 through September 30	200/100 ml as a Geometric Mean			#/100 ml
October 1 through April 30	2,000/100 ml as a Geometric Mean			#/100 ml
TOTAL NITROGEN	Report Daily Maximum			-
PHOSPHORUS	Report Daily Maximum			-
DISSOLVED OXYGEN	4.0 mg/l minimum			mg/l
pH	Not less than 6.0 nor greater than 9.0			Standard Units

III.A.2 Narrative & Schematic Diagram of the Facility's Basic Treatment Processes

The WWTP is a secondary treatment facility which utilizes the activated sludge process for biological treatment. The overall treatment process involves preliminary treatment consisting of screening and grit removal, primary settling, activated sludge, final settling, dewatering through the use of a belt filter press, and chlorine disinfection. Treated effluent is discharged into Monongahela River through the 24-inch outfall sewer. A schematic diagram of the basic treatment process of the WWTP is shown on Exhibit 7 in Appendix G.

III.A.3 Problems with Existing Facilities

In accordance with the Chapter 94 regulations of the Pennsylvania Code relating to municipal wasteload management, the Authority submits an annual Chapter 94 Report summarizing the influent hydraulic and organic loadings at the WWTP during the previous five-year period and projecting loadings for the next five years. The report indicates if an overload condition exists or if an overload may occur within the next five years due to increased loading projections.

A hydraulic overload, as defined by Chapter 94, occurs when the monthly average flow entering a plant exceeds the hydraulic design capacity for three consecutive months out of the preceding twelve months or when the flow in a portion of the sewer system exceeds its hydraulic carrying capacity. An organic overload, as defined by Chapter 94, occurs when the average daily organic load exceeds the organic design capacity upon which the permit and the plant design are based.

A review of the 2015 Chapter 94 Report indicates that the annual average influent flow at the WWTP from 2011 through 2015 varied from 1.630 MGD to 1.908 MGD, and averaged 1.713 MGD. The annual average flow in 2015 was 1.669 MGD, well below the permitted hydraulic capacity of 3.0 MGD. Monthly average flows at the treatment plant did not exceed the permitted hydraulic design capacity of the plant between 2011 and 2015. Therefore, the plant is not hydraulically overloaded and is not projected to be overloaded within the next five years.

Organic loadings at the treatment plant during the same five year period averaged 1,701 lb BOD_5/day, and ranged from 1,588 lb BOD_5/day to 1,790 lb BOD_5/day. The average organic loading in 2015 was 1,691 lb BOD_5/day, well below the permitted organic capacity of 5,004 lb BOD_5/day. Monthly average organic loading at the WWTP did not exceed the permitted organic loading capacity of the plant between 2011 and 2015. Therefore, the plant is not organically overloaded and is not projected to be overloaded within the next five years.

While the WWTP is neither hydraulically nor organically overloaded as defined by Chapter 94 regulations of the Pennsylvania Code, the conveyance system is hydraulically overloaded, causing peak flows to exceed the carrying capacity of certain portions of the system resulting in combined sewer overflows (CSOs) and sanitary sewer overflows (SSOs). It should be noted that the Borough of Charleroi has expended nearly $8.0 Million on a sewer separation project. While the rehabilitation work did not eliminate CSOs in the system, it did reduce overflows. The motive behind preparation of this Act 537 Plan Update was to control the CSOs and eliminate the SSO.

In 2015, an estimated 45.4 MG of untreated wastewater were discharged to the Monongahela River from the CSOs and the SSO during periods of wet weather. A summary of overflow events in 2015 is shown in Table 5.

Table 5: 2015 Overflow Summary

Outfall Number	No. of Overflow Events	Total Duration (hours)	Total Volume (MG)
CSO-002	39	138.75	1.2
CSO-003	2	0.50	0.0007
CSO-004	108	825.50	2.8
CSO-005	22	18.75	0.4
CSO-006	58	60.00	1.4
CSO-007	117	560.00	7.9
CSO-009	110	839.25	6.7
CSO-011	64	100.50	0.8
CSO-012	106	514.00	10.1
CSO-013	64	444.50	9.4
SSO-010	32	256.75	4.7
Total			45.4

In order to assess the overflow volumes relative to total CSS conveyance capacity on an annual average basis, the Authority completed a system characterization survey, a comprehensive flow monitoring study, and computer modeling of the conveyance system, including the CSOs and the pump stations, utilizing InfoSWMM. Flow monitoring site locations were selected based on their importance in the collection system. Meters were installed and maintained by Drnach Environmental. Site selection included all outlet flows and most of the inlet flows of CSO diversion chambers. Site selection also included the main collectors in Fallowfield Township and Speers Borough. The meter locations are shown on Exhibit 8 in Appendix G. Using the information collected during the system characterization study and the flow monitoring study, the 2-year, 5-year and 10-year storm events were modeled. A detailed model report is included as Appendix I.

The InfoSWMM model indicates flooding in several manholes within the existing system under the various design storms, as shown in Figures 1 through 6 below.

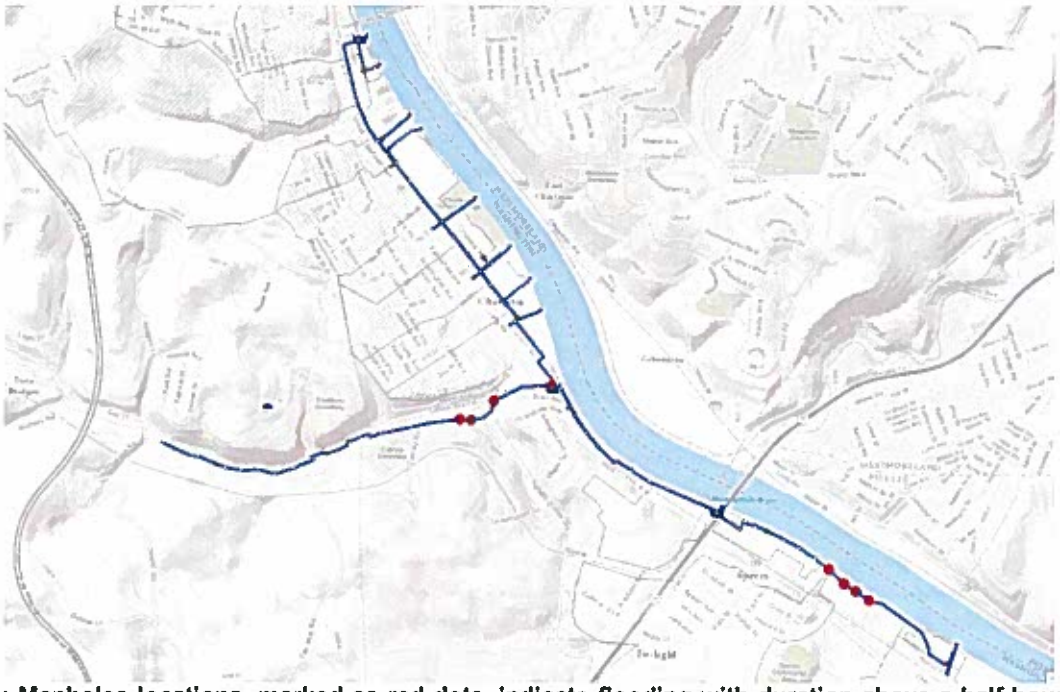

Figure 1: Manholes locations, marked as red dots, indicate flooding with duration above a half hour for the existing system under summer design storm with 2 years return period.

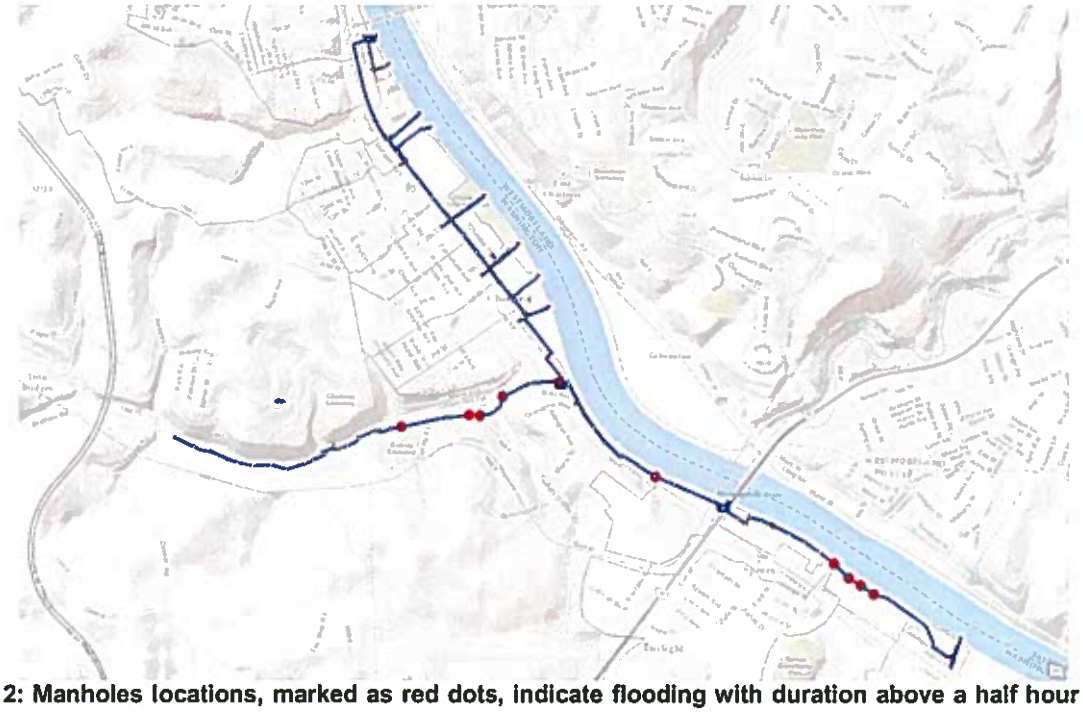

Figure 2: Manholes locations, marked as red dots, indicate flooding with duration above a half hour for the existing system under winter design storm with 2 years return period.

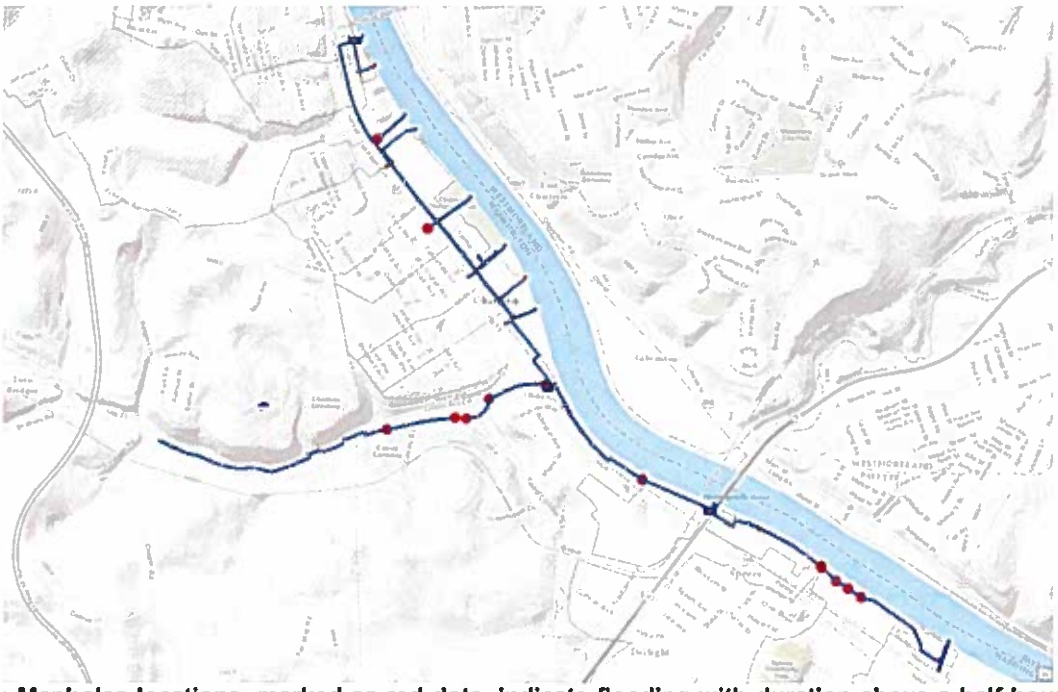

Figure 3: Manholes locations, marked as red dots, indicate flooding with duration above a half hour for the existing system under summer design storm with 5 years return period.

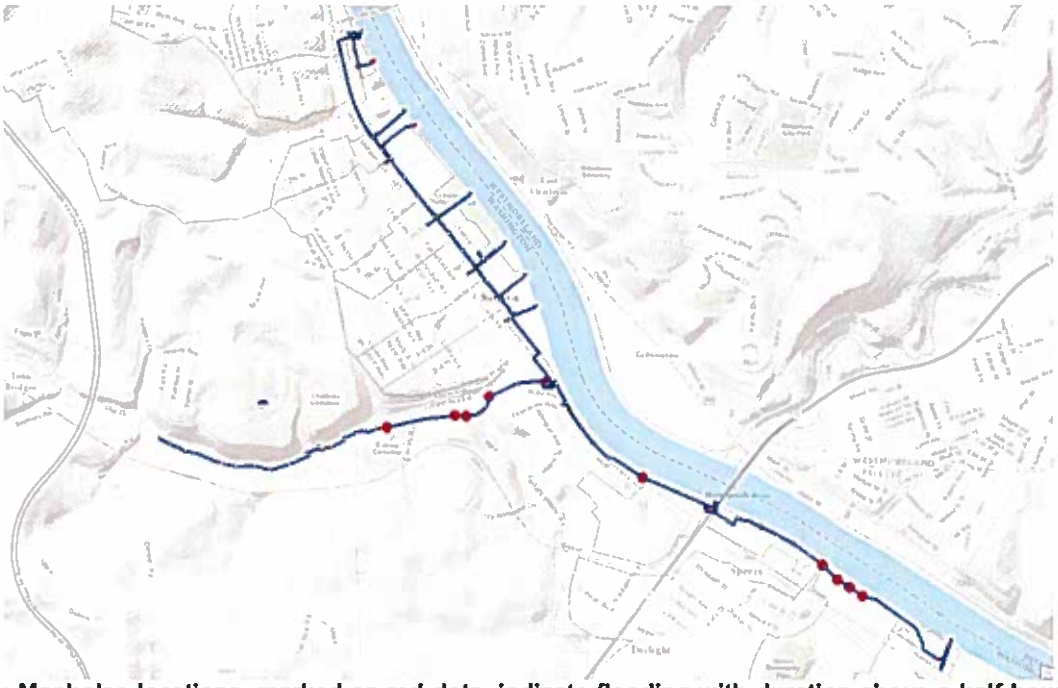

Figure 4: Manholes locations, marked as red dots, indicate flooding with duration above a half hour for the existing system under winter design storm with 5 years return period.

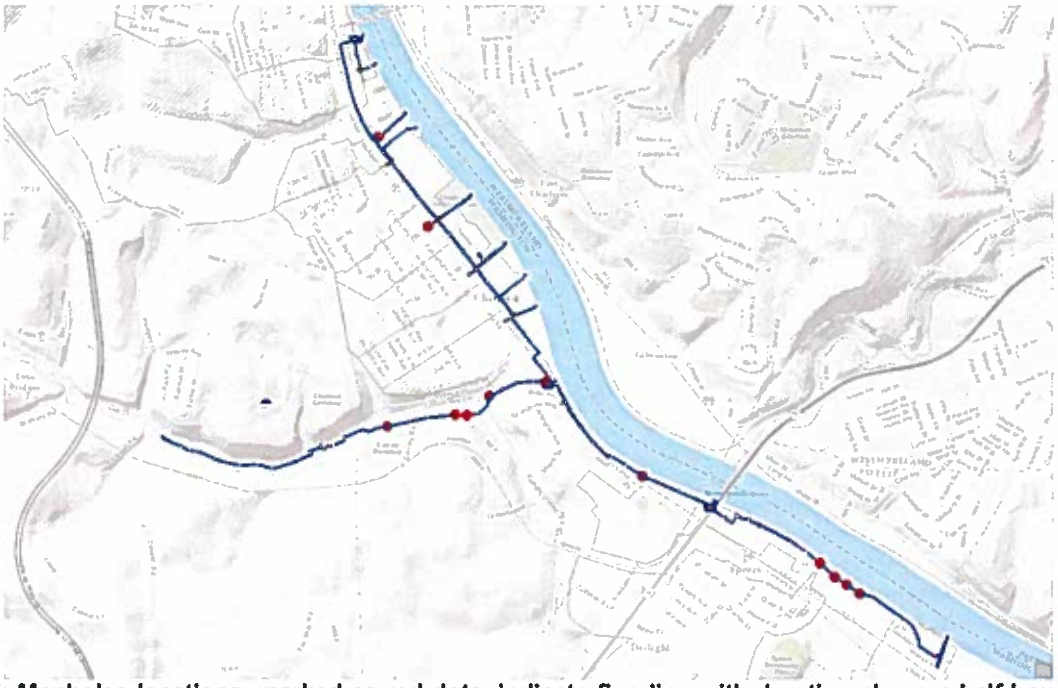

Figure 5: Manholes locations, marked as red dots, indicate flooding with duration above a half hour for the existing system under summer design storm with 10 years return period.

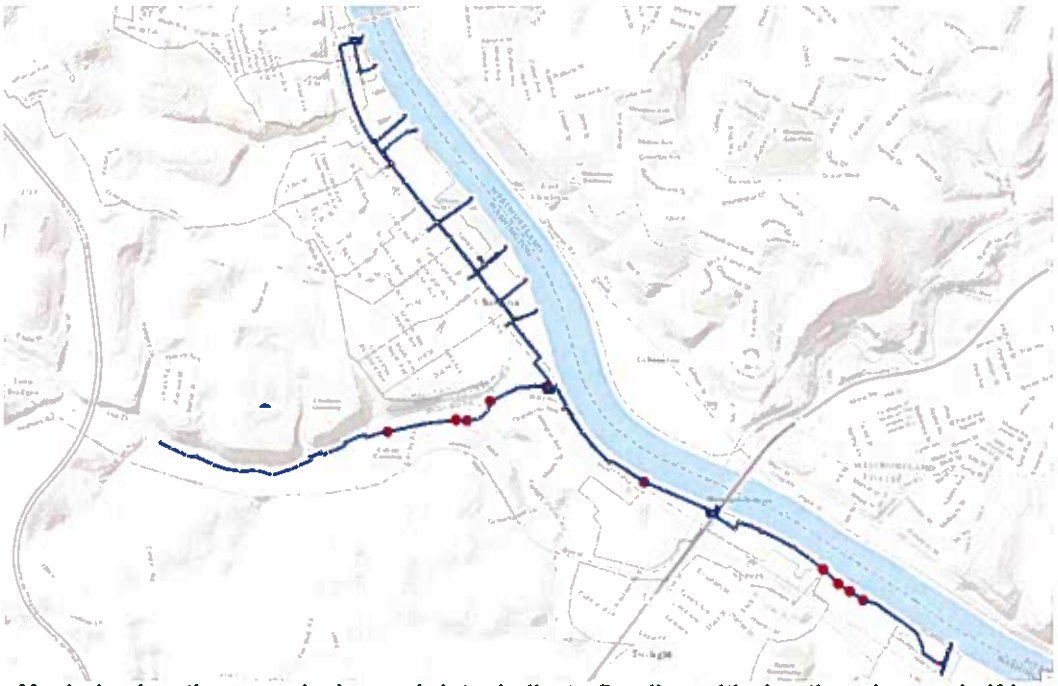

Figure 6: Manholes locations, marked as red dots, indicate flooding with duration above a half hour for the existing system under winter design storm with 10 years return period.

III.A.4 Scheduled or In-progress Upgrading or Expansion of Treatment Facilities

There are no scheduled or in-progress upgrades planned for the existing Authority of the Borough of Charleroi WWTP. It is the goal of this Act 537 Plan to alleviate CSO and SSO discharges, which will result in the construction of CSO treatment facilities.

III.A.5 Operation & Maintenance Requirements for Small Flow Treatment Facility Systems

There are no small flow sewage treatment facilities located in the Authority of the Borough of Charleroi service area. Therefore, the municipalities do not have any operation and maintenance requirements for such facilities.

III.A.6 Disposal Areas

The WWTP, the CSOs and the SSO discharge to the Monongahela River.

III.B. ON-LOT SEWAGE DISPOSAL SYSTEMS IN THE PLANNING AREA

Discussion of individual or community on-lot sewage treatment facilities is not included in this Act 537 Plan Update. Discussion of on-lot systems does not pertain to the planning required for alleviating CSO and SSO discharges.

III.C. WASTEWATER SLUDGE AND SEPTAGE GENERATION, TRANSPORT AND DISPOSAL METHODS

III.C.1 Location of Sources of Wastewater Sludge or Septage

Sludge is generated by the wastewater treatment process at the WWTP. The Authority does not accept septage.

III.C.2 Quantities of the Types of Sludges or Septage Generated

The WWTP dewaters sludge on-site using a belt filter press. Dewatered sludge is sent to a landfill for disposal. Table 6 presents the total annual biosolids production at the WWTP for the five year period from 2011 through 2015.

Table 6: WWTP Biosolids Production (2011-2015)

Year	Total Sludge Sent to Landfill (tons)
2011	307.17
2012	390.58
2013	328.39
2014	280.93
2015	308.24

III.C.3 Present Disposal Methods, Locations, Capacities and Transportation Methods

Illegal or improper sludge disposal methods have the potential to cause environmental damage and introduce public health hazards. Sludge must be deposited at sites approved and permitted by the PADEP or at permitted sewage treatment plants capable of receiving sludge. Dewatered sludge from the WWTP is hauled by trucks to the Greenridge Reclamation Landfill in Scottdale, PA for disposal. The dewatered sludge typically contains approximately 21 percent solids.

IV. FUTURE GROWTH AND LAND DEVELOPMENT

IV.A. MUNICIPAL AND COUNTY PLANNING DOCUMENTS ADOPTED PURSUANT TO THE PENNSYLVANIA MUNICIPALITIES PLANNING CODE (ACT 247)

IV.A.1 Land Use Plans and Zoning Maps

As previously discussed, the Authority of the Borough of Charleroi provides regional wastewater treatment service to residents in Fallowfield Township and the Boroughs of Charleroi, North Charleroi, Dunlevy, Twilight and Speers in Washington County, Pennsylvania. The zoning districts and land uses in each of the tributary communities are discussed within this section of the Act 537 Plan. All proposed sewer system upgrades will follow the provisions set forth in the zoning and land use classifications and ordinances of each community. The municipal zoning maps are included in Appendix J.

Fallowfield Township

A portion of Fallowfield Township is located within the Authority's service area. The Township's zoning districts are as follows:

- A-1 Agricultural
- R-1 Single Family Residential
- R-2 Multiple Family Residential
- B-1 Business
- I-1 Industrial

Fallowfield Township is primarily agricultural and single family residential. Some light industrial and business areas exist along Kennedy Road. The largest business area is along SR 0481.

Charleroi Borough

The entirety of Charleroi Borough is located within the Authority's service area. The Borough has a zoning ordinance with the following classifications:

- S Conservancy
- R1-C One-Family Residence District
- R2 Two-Family Residence District
- R3 Multiple-Family Residence District
- C3 Community Business District
- M2 Light Industrial District
- M3 Heavy Industrial District

Business zoned areas are primarily located downtown and along the Monongahela River. A large industrial area exists along the Monongahela River. Residential areas are primarily west of downtown and a small portion downtown.

North Charleroi Borough

The entirety of North Charleroi Borough is located within the Authority's service area. No zoning information was available from North Charleroi.

Dunlevy Borough

The entirety of Dunlevy Borough is serviced by the Authority. Dunlevy Borough does not have a zoning ordinance. However, the Borough is part of the Mid Mon Valley Regional Comprehensive Plan with Allenport, Coal Center, Elco, Roscoe and Stockdale Boroughs. Dunlevy Borough adopted the Comprehensive Plan in 2003. The following land uses are identified in the Comprehensive Plan:

- Single Family Residential
- Multi-Family Residential
- Commercial
- Light Industrial
- Heavy Industrial
- Open Space and Recreational

Open Space and recreational are the largest in the southern portion of the Borough and along the Monongahela River. A single Family residential area exists along SR 88. There are also commercial, light industrial, heavy industrial and multi-family areas.

Twilight Borough

A small portion of Twilight Borough is located within the Authority's service area and is tributary to the Maple Creek Interceptor. The land use classifications in Twilight Borough are as follows:

- Rural Residential District
- Primary Residential District
- Restricted Development District
- Light Commercial District
- Flood Plain District

Speers Borough

The entirety of Speers Borough is located within the Authority's service area. The Borough has a zoning ordinance with the following classifications:

- S Conservancy
- R Residential
- C-1 Commercial
- M-1 Planned Light Industrial
- M-2 Heavy Industrial

The residential area is the largest in the Maple View and Speers Hill areas. A heavy industrial area is located adjacent to the Monongahela River. A commercial area exists in the northeast corner of the Borough near Twilight Hollow Road.

IV.A.2 Zoning & Subdivision Regulations

Zoning and subdivision regulations that establish lot sizes predicated on sewage disposal methods is not discussed in this Act 537 Plan Update, because on-lot systems are not a concern of the Plan Update. The Plan Update was developed for the alleviation of CSO and SSO discharges.

IV.A.3 Limitations Related to Floodplain, Stormwater Management and Special Protection Areas

Certain regulations exist in regards to floodplains, stormwater management, and special protection (Chapter 93) areas for the protection of citizen health, safety and welfare, as well as the surrounding environment. Floodplain regulations, stormwater management planning requirements and special protection area regulations are identified below.

Floodplain Regulations

A flood occurs when the capacity of a stream channel to convey flow within its banks is exceeded and water flows out of the main channel onto and over the adjacent land. This adjacent land is known as the floodplain. In regulating floodplains, the standard is the 100-year flood, the flood that is defined as having a 1% chance of being equaled or exceeded during a given year. Pennsylvania Code regulations set forth limitations related to floodplains. These regulations prohibit encroachments and obstructions, including structures, in the regulated floodway without first obtaining a state Water Obstruction and Encroachment permit. The floodway is the portion of the floodplain adjoining the stream required to carry the 100-year flood event with no more than one (1) foot increase in the 100-year flood level due to encroachment in the floodplain outside the floodway. Floodplain regulations, such as elevating a first floor level above the 100-year floodplain and obtaining necessary local, state and federal permits for construction in these areas, exist for the preservation of citizen well being. Floodplain resources are of significant importance and are vital for maintaining the floodplain ecosystem, and the primary environmental policy in regards to floodplains is the protection of floodplain resource values. Floodplain management focuses on preventative and corrective measures to reduce flood damage.

A review of the floodplain mapping on Exhibit 9 in Appendix G reveals that there are floodplains located within the planning area. Design requirements for wastewater facilities are contained in the PADEP's *Domestic Wastewater Facilities Manual*. All design requirements in regards to flood protection will be met during design of the facility improvements proposed in this Act 537 Plan Update. Impacts on floodplains will be minimized to the greatest extent possible, and all construction activities will follow all local, state, and federal regulations regarding floodplains during any proposed upgrades.

Stormwater Management Regulations

Stormwater runoff is the result of precipitation from rain or melting snow that does not soak into the ground where it falls. It then flows over impervious surfaces (i.e., building, parking lots, driveways, sidewalks, streets, etc.), carrying silt and sediment, litter and debris, and non-point source pollutants such as insecticide, pesticides, solvents, motor oil and other automotive fluids which can degrade ecosystems. Stormwater can result in flooding, property damage and environmental degradation. The Stormwater Management Act of 1978, Act 167, as amended, encourages planning and management of stormwater runoff throughout a watershed which is consistent with sound water and land use practices. Stormwater management has been traditionally defined as measures used by property owners and local governments to limit the amount of stormwater runoff from urban development and control the path of runoff. Stormwater management has also recently included water quality considerations. Concerns of flooding and accelerated erosion are introduced through land development from a permeable, vegetated condition to an impervious, paved condition. The major goal of stormwater management is to protect health, safety, the environment and property from damage. Pursuant

to Act 167, the Washington County Stormwater Management Plan was developed to outline methods to control the flow of stormwater throughout the County.

The wastewater facility improvements proposed in this Act 537 Plan Update may result in an increase in impervious surface area in the planning area. Construction of the improvements identified herein will follow all applicable local, state and federal stormwater regulations.

Special Protection Areas

The waters in the planning area are classified as warm water fisheries (WWF) under Chapter 93 regulations. Chapter 93 defines a WWF as a stream used for the maintenance and propagation of fish species and additional flora and fauna that are indigenous to a warm water habitat. Additional protection measures exist for waters classified as high quality (HQ) or exceptional value (EV). HQ and EV waters or watersheds have excellent quality and features that require special water quality protection measures. It is important to note that there are no HQ or EV classified streams located within the planning area, but a major goal of this Plan Update is to protect the waters of the Commonwealth through the preservation of the overall drainage basin to support aquatic life through the control of SSO and CSO events. All attempts will be made to minimize the impact on any ecologically sensitive areas during any construction activities.

IV.B. LAND USE AND FUTURE GROWTH

IV.B.1 Existing Development

The Authority of the Borough of Charleroi serves a total of 4,221 customers in Fallowfield Township and the Boroughs of Charleroi, North Charleroi, Dunlevy, Speers and Twilight. A breakdown of the customers in each community is provided in Table 7.

Table 7: Customer Counts

Community	Customer Count
Charleroi	1,804
North Charleroi	542
Dunlevy	129
Fallowfield	1,159
Speers	582
Twilight	5
Total	4,221

IV.B.2 Land Use Designations Established Under the Pennsylvania Municipalities Planning Code

The land use designations within the tributary municipalities are discussed in Section IV.A.1 of this Act 537 Plan Update.

IV.B.3 Future Growth Areas and Population Projections

A review of the Authority's 2015 Chapter 94 Wasteload Management Report indicates negligible growth for the next five years. This trend is anticipated to continue into the future.

IV.B.4 Limitations for Use of Land and Water Resources

There are no expected impacts on land use and water resources including public ground or surface water supplies, recreational water use areas, groundwater recharge areas, industrial water use, and wetlands. All proposed sewer system upgrades will follow the provisions set forth in the land use classifications, comprehensive plans and ordinances of each community, including those set forth in the Washington County Comprehensive Plan and the Mid Mon Valley Regional Comprehensive Plan.

IV.B.5 Sewage Planning for Future Growth

Future growth affects design flows which contain capacity to serve future development throughout a planning area. Design flows must incorporate flows from existing development, planned development and future growth. Because no growth is anticipated in the Authority's service area, only existing flows were considered in development of this Plan Update. The largest impact on wastewater loadings within this system results from wet weather events, as was reflected in the InfoSWMM model used to evaluate the selected alternatives.

V. IDENTIFICATION OF ALTERNATIVES TO PROVIDE NEW OR IMPROVED WASTEWATER DISPOSAL FACILITIES

V.A. CONVENTIONAL COLLECTION, CONVEYANCE, TREATMENT AND DISCHARGE ALTERNATIVES

V.A.1 Potential for Regional Wastewater Treatment

The Authority of the Borough of Charleroi owns, operates and maintains a regional wastewater treatment facility that serves all or portions of Fallowfield Township and the Boroughs of Charleroi, North Charleroi, Dunlevy, Speers and Twilight in Washington County, Pennsylvania. Regional wastewater treatment will continue into the future.

V.A.2 Potential for Extension of Existing Sewage Facilities

The capacity of the Authority's WWTP is such that it could accept additional flows from new customers in areas of need under dry weather flow conditions. However, the conveyance system is hydraulically overloaded, causing peak flows to exceed the carrying capacity of certain portions of the system resulting in CSOs and SSOs. Additionally, the Authority does not own or operate the majority of the collector sewers, as these are owned by the individual tributary municipalities. This Act 537 Plan Update recommends facility improvements to address the capacity limitations in the conveyance system through a combination of upgrades throughout the system. Once completed, the sewer system could be extended to provide public sewer service to areas of need, but that is not a goal of this Plan Update.

V.A.3 Potential for Continued Use of Existing Municipal or Non-Municipal Sewage Facilities

The Authority staff continuously monitors the condition of the WWTP equipment and structures and will periodically provide recommendations to the Board for justifiable improvement projects. Because of these ongoing efforts, the WWTP has been historically well maintained and is not in need of any major upgrades at this time.

The conveyance sewer system is hydraulically overloaded, causing peak flows to exceed the carrying capacity of certain portions of the system resulting in CSOs and SSOs. Various efforts have been made towards reduction of hydraulic loadings in the conveyance system. The Borough of Charleroi completed a sewer separation project and the Borough of Dunlevy has conducted extensive flow monitoring and various system repairs. The Authority will continue efforts to reduce hydraulic loading in the system through the following activities as part of the LTCP, as source reduction is a key component of the LTCP:

- Cleaning and closed circuit television (CCTV) inspection of interceptors. This work is underway and is anticipated to be complete by the end of 2016. The Authority will complete this work every 10 years as required.
- Cleaning and CCTV of the Fallowfield collection system. The Authority will complete this work every 10 years as required.
- Conducting a Flow Isolation Study in the Fallowfield collection system to identify problems areas heavily impacted by wet weather.
- Adoption of a Time of Sale Ordinance requiring dye testing during any real estate transaction to identify and remove illegal downspout connections to the sanitary sewer system. The Authority currently requires this in Fallowfield. Speers and Dunlevy also require dye testing at time of sale. The Authority intends to encourage and assist Charleroi and North Charleroi with implementation of time of sale dye testing.
- Implementation of a Private Lateral Program for residents connected to the Fallowfield collection system which would offer incentives for homeowners to repair/replace aging and leaking sewers laterals.

- Investigate the need for solids/floatable control improvements in existing CSO diversion chambers.

It is not anticipated that improved operation and maintenance (O&M) or other actions will offer significant potential to reduce peak flow rates. This Act 537 Plan Update was developed to evaluate alternative wastewater facility improvement projects which will address these issues to control CSO events and eliminate the SSO.

V.A.4 Repair or Replacement of Existing Collection and Conveyance System Components

Various sewer system upgrades are necessary to increase the conveyance capacity in certain portions of the system. These improvements are discussed in the following section of the Act 537 Plan Update.

V.A.5 Need for Construction of New Community Sewage Systems

The goal of this Act 537 Plan Update is to evaluate conveyance system improvements to control CSO events and eliminate the SSO at the Maple Creek Pump Station under existing and projected future wastewater loadings. The PADEP has required elimination of CSO-009 and CSO-013 given their proximity to the water treatment plant raw water intake. Additionally, elimination of Maple Creek Pump Station SSO-010 is required in accordance with PA Code Chapter 94 Regulations.

The Act 537 Plan Update was prepared in conjunction with the LTCP as part of the Authority's CSO Program. The Authority utilized the United States Environmental Protection Agency (EPA) CSO Control Policy "presumption" approach criteria ii through the LTCP process. The criteria are as follows:

> *"The elimination or capture for treatment of no less than 85% by volume of combined sewage collected in the CSS during precipitation events on a system-wide annual average basis."*

Based on the requirements established above, the following LTCP objectives were established:

1. Eliminate all Maple Creek Pump Station SSO events at SSO-010 for at least a 2-year, 24-hour storm.
2. Eliminate all CSO events for the typical year at CSO-009 and CSO-013.
3. Meet EPA CSO Control Policy Presumptive Approach by reducing CSO volumes such that 85% of CSS flow (during rainfall dependent time periods) is captured and treated, on an annual average basis.

The alternatives are identified and evaluated as follows:

Alternative 1 – End of Pipe Treatment of CSOs

Alternative 1 was developed on the basis of utilizing end of pipe treatment to treat CSO flows using the WWETCO Bio-FlexFilter. Alternative 1 achieves 85% capture and eliminates CSO-009, CSO-013 and SSO-010. Alternative 1 is conceptually shown on Exhibit 10 in Appendix G and is generally discussed as follows:

1. Construct new Dunlevy Pump Station with submersible pumps. Pump all flow up to 350% of dry weather flow to Speers Pump Station through existing force main and gravity sewer.
2. Convert existing Speers Pump Station wet well into a submersible pump station. Pump all flow up to 350% of dry weather flow to Maple Creek Pump Station through existing force main and gravity sewer.
3. Dunlevy Pump Station to include CSO pumping capacity in addition to dry weather flow. CSO-013 overflows to be conveyed directly to this pump station and pumped to the on-site WWETCO Bio-FlexFilter CSO treatment facility.
4. Construct a CSO pump station at the Speers Pump Station site. CSO-009 overflows to be conveyed directly to this wet well. Construct a new force main from the Speers CSO Pump Station to the WWETCO Bio-FlexFilter CSO treatment facility at the Dunlevy Pump Station site.
5. Construct a WWETCO Bio-FlexFilter CSO treatment facility at the Dunlevy Pump Station site.
6. CSO treatment facility to include screening and ultraviolet (UV) disinfection.
7. Convert existing Maple Creek Pump Station wet well into a submersible pump station.
8. Construct Maple Creek SSO Pump Station at the Western Flour site.
9. Replace approximately 1,400 lineal feet of existing 10-inch Maple Creek Interceptor with 15-inch gravity sewer upstream of new Maple Creek SSO Pump Station.
10. Construct new force main from both Maple Creek Pump Stations to the existing WWTP.
11. Construct new WWTP influent box with sluice gate. Maple Creek Pump Station force main to connect to the box downstream of the sluice gate, such that throttling of the gate will back up and overflow only CSS flow.
12. Construct a CSO pump station at the WWTP. This pump station will pump CSS flow, backed up due to WWTP acceptance of Maple Creek SSO flow, to a CSO treatment facility.
13. Construct a WWETCO Bio-FlexFilter CSO treatment facility on the existing WWTP site (near CSO-007).
14. CSO treatment facility to include screening and UV disinfection.
15. Convert existing North Charleroi Pump Station wet well into a submersible pump station.
16. North Charleroi Pump Station to include screening.

In order to assess the overflow volumes relative to total CSS conveyance capacity on an annual average basis, the Authority completed a system characterization survey, a comprehensive flow monitoring study, and computer modeling of the conveyance system, including the interceptor, CSOs and the pump stations, utilizing InfoSWMM. The results of the flow monitoring and hydraulic modeling efforts were utilized to evaluate Alternative 1. The 2-year, 5-year and 10-year storm events were modeled (both SCS and ALCOSAN winter distribution). Design peak flows were selected on the basis of the highest return period that is practically feasible without manhole overflows while maintaining greater than 85% capture of all combined flow during a typical year. The SSO will be eliminated. A report detailing the modeling efforts is included in Appendix I, and preliminary design conditions are discussed as follows:

Design Peak Flows

The PADEP typically requires that at least 350% of CSS dry weather flow be conveyed to the WWTP for full treatment. Given this standard, the following minimum peak CSS flows were established for conveyance to the WWTP.

Dunlevy Pump Station peak = 0.052 MGD x 3.5 = 0.182 MGD
Speers Pump Station peak = 0.252 MGD x 3.5 = 0.882 MGD
Charleroi and North Charleroi peak flow to WWTP = 0.680 MGD x 3.5 = 2.38 MGD

The peak sanitary sewer flow tributary by gravity to the WWTP from Fallowfield is 0.802 MGD under a 2-year, 24-hour storm event.

The existing WWTP peak flow capacity is 9.0 MGD. Given site constraints, significant increase in WWTP peak capacity is not feasible. Therefore, available capacity for the Maple Creek Pump Station is:

Maple Creek Pump Station peak = 9.0 MGD – 2.38 MGD – 0.802 MGD = 5.82 MGD

Total peak flow pumped from the Speers Pump Station to Maple Creek is 0.882 MGD, as defined above. Therefore, total Maple Creek Pump Station upgrade capacity available for gravity flow to the station is:

Maple Creek Pump Station gravity tributary peak = 5.82 MGD – 0.882 MGD = 4.94 MGD

Total modeled peak flow tributary by gravity to the Maple Creek Pump Station, with SSOs eliminated, is summarized in Table 8 below. For comparison, the largest peak SSO, observed through flow monitoring, was 2.64 MGD and the existing Pump Station capacity is 1.15 MGD.

Table 8: Maple Creek Pump Station Gravity Tributary Flow

Storm Event	SCS, Type II Rainfall (MGD)	ALCOSAN Winter Rainfall (MGD)
2-yr, 24-hr	3.016	4.918
5-yr, 24-hr	4.237	5.714
10-yr, 24-hr	5.084	6.212

The total peak flow from the Maple Creek Pump Station (5.82 MGD) will be split between the two pump stations, the main Pump Station and the SSO Pump Station. Dry weather flow tributary to the Maple Creek Pump Station by gravity, is 0.0996 MGD. Therefore, total average dry weather flow to the Pump Station is 0.0996 MGD + 0.882 MGD = 0.982 MGD. Based on evaluation of the model for the various design storms, the Maple Creek Pump Station should have a pumping capacity of at least 1.80 MGD in order to prevent manhole overflows. Given this pumping capacity, the Maple Creek SSO Pump Station would have a pumping capacity of 4.02 MGD.

Total peak flow tributary to the CSO-013 (Dunlevy Pump Station) diversion chamber is summarized in Table 9 below. For comparison, the largest peak CSO observed through flow monitoring was 2.41 MGD (total tributary peak = CSO + Dunlevy Pump Station capacity = 2.41 MGD + 0.432 MGD = 2.84 MGD).

Table 9: CSO-013 Total Tributary Influent Flow

Storm Event	SCS, Type II Rainfall (MGD)	ALCOSAN Winter Rainfall (MGD)
2-yr, 24-hr	2.218	1.191
5-yr, 24-hr	3.023	1.446
10-yr, 24-hr	3.779	1.636

Total peak flow tributary to the CSO-009 (Speers Pump Station) diversion chamber is summarized in Table 10 below. For comparison, the largest peak CSO observed through flow monitoring was 4.11 MGD (total tributary peak = CSO + Speers Pump Station capacity = 4.11 MGD + 0.576 MGD = 4.69 MGD).

Table 10: CSO-009 Total Tributary Influent Flow

Storm Event	SCS, Type II Rainfall (MGD)	ALCOSAN Winter Rainfall (MGD)
2-yr, 24-hr	5.429	2.945
5-yr, 24-hr	7.380	3.559
10-yr, 24-hr	9.146	4.017

Peak flow capacity of the WWTP (CSO-007) CSO treatment facility must be at least equal to the additional peak that will be backed up and overflowed due to additional pumping from Maple Creek Pump Station.

> Additional pumping = WWTP peak – CSS peak – Fallowfield SSS peak = 9.0 MGD – 2.38 MGD – 0.802 MGD = 5.82 MGD

The effect of additional system surcharge results in manhole overflows (based on system modeling) with flows less than 6.0 MGD being pumped to CSO treatment.

A minimum of the 1-yr, 24-hr storm (associated with the typical year rain event) must be accommodated by the CSO treatment facilities. A minimum of the 2-yr, 24-hr storm must be used for Maple Creek Pump Station design basis.

In summary, the following design peak flows are recommended:

- Speers CSO Pump Station and force main = 6.00 MGD (between 2-yr and 5-yr storm, above flow monitoring peak overflow of 4.11 MGD)
- Dunlevy CSO gravity flow to Dunlevy Pump Station = 3.00 MGD (between 2-yr and 5-yr storm, above flow monitoring peak of 2.41 MGD)
- Dunlevy Pump Station capacity for CSO flow and CSO treatment facility = 10.0 MGD (9.0 MGD CSO overflow from Speers and Dunlevy + 1.0 MGD WWETCO backwash flow)
- Maple Creek main Pump Station = 1.80 MGD
- Maple Creek SSO Pump Station = 5.82 MGD – 1.80 MGD = 4.02 MGD
- WWTP (CSO-007) treatment facility = 7.0 MGD (6.0 MGD influent gravity CSS flow + 1.0 MGD WWETCO backwash flow)

Percent Capture Calculation

ABC year 2013 rainfall data was used for the typical year. A total of 41.52 inches rainfall fell during 2013. This rainfall distribution is believed to be conservative. Typical year for the closest NOAA rain gage is 38.37 inches, and typical year for the closest ALCOSAN rain gage is

36.61 inches. The typical year rainfall distribution was applied to the calibrated model, and percent captured was calculated based on the following considerations:

- 100% capture for CSO-013 and CSO-009 (CSO treatment facility capacity is in excess of the 2-yr, 24-hr storm).
- 100% capture for CSO-007, up to overflow of 6.0 MGD (CSO treatment facility capacity).
- Only flow from the CSS was considered (100% of all sanitary sewer system flow is captured and conveyed to the WWTP for full treatment).
- A conservative base flow threshold was established for what constitutes rainfall dependent CSS flow. The highest observed dry weather flow peak was selected as the minimum for rainfall dependent CSS flow.

Given the proposed system improvements, rainfall dependent CSS flow percent capture, for the typical year rainfall, is 94.77%. Since both the typical year rainfall selected and the base flow threshold are conservative, as well as the fact that calculated percent capture is higher than the 85% minimum required by the EPA CSO Control Policy Presumptive Approach, the proposed improvements will meet the LTCP objectives to achieve 85% capture and eliminate CSO-009 (typical year), CSO-013 (typical year) and SSO-010.

The InfoSWMM model reports manhole flooding for durations of a half hour or more only for design storms with a 10-year return period (see Figures 7 and 7 below) with the proposed system improvements. No manhole flooding conditions exist during the 2 and 5-year storm events after construction of the proposed system improvements.

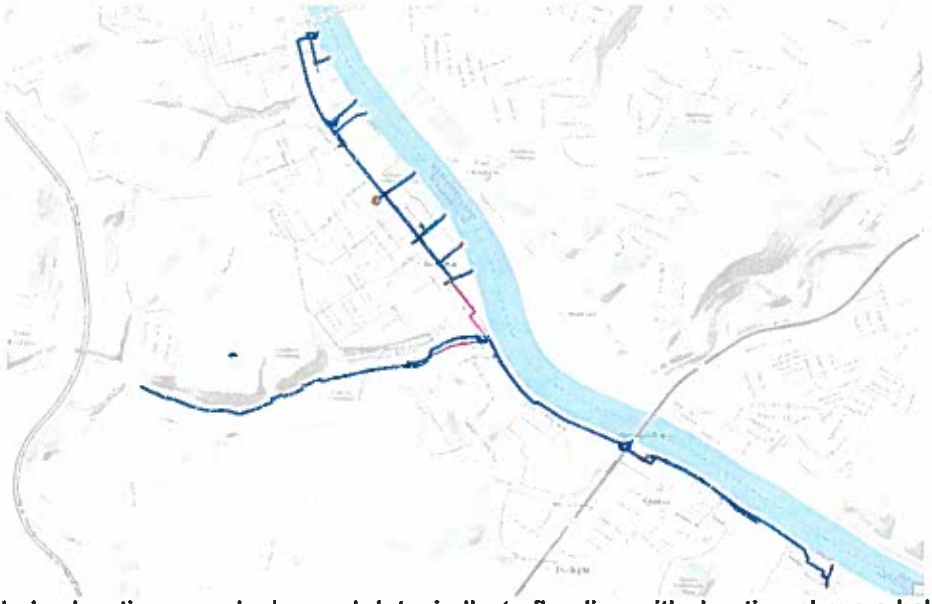

Figure 7: Manholes locations, marked as red dots, indicate flooding with duration above a half hour for the system with proposed upgrades under summer design storm with 10 years return period.

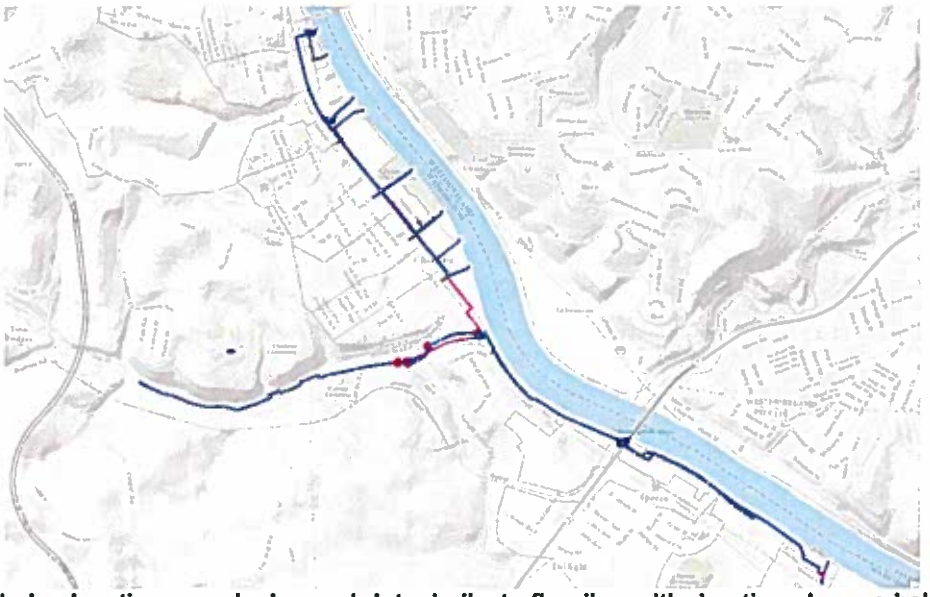

Figure 8: Manholes locations, marked as red dots, indicate flooding with duration above a half hour for the system with proposed upgrades under winter design storm with 10 years return period.

A detailed discussion regarding the proposed improvements at each site follows:

Dunlevy Pump Station

A new Dunlevy Pump Station will be constructed for dry weather and CSO flows. Dry weather flow will be pumped to the Speers Pump Station through the existing force main, and CSO flow will be pumped directly to the CSO treatment facility located at the Dunlevy Pump Station site. The existing dry well and ejectors will be removed. Two dry weather submersible pumps are proposed, one duty and one backup. Each pump's design capacity will be 300 gpm (to match existing). A minimum of 126 gpm (0.182 MGD) is required for 350% of dry weather flow, as described above. Three CSO pumps will be provided, two duty and one backup. CSO pump capacity will be 3,500 gpm each. An automatic bar screen (1/4" clear openings) will be provided prior to the wet well, with a by-pass channel and manual bar screen (3/4" clear openings). A backup power generator will be installed.

Speers Pump Station

The existing Speers Pump Station wet well will be converted into a submersible pump station capable of handling dry weather flow from the Speers and Dunlevy sewersheds. Two submersible pumps are proposed, one duty and one backup. Each pump's design capacity will be 613 gpm (0.882 MGD). A sewage grinder is proposed.

The Speers Pump Station will pump through the existing force main to the Maple Creek Pump Station. A backup power generator will be installed.

Speers CSO Pump Station

For wet weather flow in excess of the 0.882 MGD pumping capacity, a new CSO pump station will be constructed. CSO-009 overflow will be conveyed to the CSO pump station wet well and then pumped to the WWETCO Bio-FlexFilter CSO treatment facility at the Dunlevy Pump Station site. Three submersible pumps are proposed, two duty and one backup. Each pump will have capacity of 2,083 gpm. A removable basket screen, with 2" clear openings, is proposed.

A new force main will be constructed from the Speers CSO Pump Station to the WWETCO Bio-FlexFilter CSO treatment facility at the Dunlevy Pump Station site. A backup power generator will be installed.

Dunlevy/Speers CSO Treatment Facility

A 9.0 MGD WWETCO Bio-FlexFilter CSO treatment facility is proposed for treatment of CSO flow from CSO-009 and CSO-013. The treatment system will include screening, BOD and TSS removal at efficiencies higher than primary treatment (see pilot test results below), and UV disinfection prior to discharge to the Monongahela River. The filter and pump system will be designed for 10.0 MGD in order to accommodate 1.0 MGD of filter backwash recycle. A backup power generator will be installed.

North Charleroi Pump Station

The existing North Charleroi Pump Station wet well will be converted into a submersible pump station capable of handling dry weather flow from the North Charleroi CSS. Two submersible pumps are proposed, one duty and one backup. Each pump's design capacity will be 650 gpm (0.936 MGD) (to match existing). An automatic bar screen (5/8" clear openings) will be provided prior to the wet well, with a by-pass channel and manual bar screen (3/4" clear openings).

The North Charleroi Pump Station will pump through the existing force main to the WWTP. A backup power generator will be installed.

Maple Creek Pump Station

The existing Maple Creek Pump Station wet well will be converted into a submersible pump station capable of handling dry weather flow which is tributary by gravity to the station as well as Speers Pump Station peak discharge.

Peak dry weather flow = 0.0996 MGD x 4.0 + 0.882 MGD = 1.28 MGD

System hydraulics dictate that the capacity of the Maple Creek Pump Station needs to be at least 1.80 MGD to prevent manhole overflows. Therefore, the larger capacity of 1.80 MGD was selected for design.

Two submersible pumps are proposed, one duty and one backup. Each pump's design capacity will be 1,250 gpm (1.80 MGD). A removable basket screen, with 2" clear openings, is proposed. A backup power generator is proposed.

Maple Creek Pump Station force main to combine with Maple Creek SSO Pump Station force main and connect to the influent box at the WWTP downstream of the sluice gate, such that throttling of the gate will back up and overflow only CSS flow.

Maple Creek SSO Pump Station

A new submersible pump station will be constructed upstream of the existing Pump Station on the Western Flour site. During periods of wet weather flow, as tributary flow beings to exceed the capacity of the interceptor, excess flow will be directed to the Maple Creek SSO Pump Station. This Pump Station will have pumping capacity of 4.02 MGD. Three submersible pumps will be installed, two duty and one backup. Each pump will have capacity of 1,396 gpm (2.01 MGD). A backup power generator is proposed.

Maple Creek Pump Station force main to combine with Maple Creek SSO Pump Station force main and connect to the influent box at the WWTP downstream of the sluice gate, such that throttling of the gate will back up and overflow only CSS flow.

Maple Creek Interceptor

Approximately 1,400 lineal feet of the existing 10-inch Maple Creek Interceptor will be replaced with a 15-inch gravity sewer upstream of the proposed Maple Creek SSO Pump Station.

CSO-007 Treatment Facility

A 6.0 MGD WWETCO Bio-FlexFilter CSO treatment facility is proposed for treatment of CSO flow pumped back from the proposed WWTP influent flow regulator. The proposed flow regulator will include a new WWTP influent box with sluice gate and will limit WWTP influent flow to 9.0 MGD. Maple Creek Pump Station force main to combine with Maple Creek SSO Pump Station force main and connect to the influent box at the WWTP downstream of the sluice gate, such that throttling of the gate will back up and overflow only CSS flow. With the addition of Maple Creek SSO Pump Station flow, additional flow will need to be backed up via the regulator sluice gate. The CSS sewer flow that is being offset by Maple Creek SSO Pump Station flow will overflow to a Pump Station. This Pump Station will include influent bar screen with 1/4" clear openings, a by-pass channel and manual bar screen with 3/4" clear openings, and three submersible pumps (two duty and one backup). Each pump will have a

rated capacity of 2,431 gpm (3.5 MGD). The WWETCO treatment system will include BOD and TSS removal at efficiencies higher than primary treatment (see pilot test results below) and UV disinfection prior to discharge to the Monongahela River. The filter and pump system will be designed for 7.0 MGD in order to accommodate 1.0 MGD of filter backwash recycle. Consideration will be given to use of the filter for phosphorus removal, during periods of dry weather, should ABC receive Total Phosphorus (TP) limits in the future. A backup power generator is proposed.

WWETCO Bio-FlexFilter Pilot Test Results

The EPA CSO Control Policy allows for CSO by-pass treatment. CSO by-pass treatment requirements include: screening, primary treatment and disinfection. For both of the proposed CSO treatment facilities, automatic bar screens and UV disinfection will be provided. Primary treatment will be achieved via the WWETCO Bio-FlexFilter. The WWETCO Bio-FlexFilter, highlighted in EPA's Emerging Technologies guidance, combines a fixed film biological treatment with physical straining of particles producing an effluent capable of meeting NPDES permit limits. A detailed report on the WWETCO Bio-FlexFilter system is included in Appendix K.

Primary treatment BOD and TSS removal efficiencies are typically around 40% and 60% respectively. ABC conducted a WWETCO Bio-FlexFilter pilot test from December 2015 through June 2016. The pilot plant was setup at the WWTP. Primary clarifier influent flow was diverted through the pilot unit, and performance was monitored. BOD removal efficiencies were 70% on average, and TSS removal efficiencies were 87% on average. The detailed test results are included in Table 11 below.

Table 11: WWETCO Bio-FlexFilter Pilot Test Results

Event No.	Date	CBOD			TSS		
		Influent (mg/L)	Effluent (mg/L)	Removal (%)	Influent (mg/L)	Effluent (mg/L)	Removal (%)
1	12/17/2015	120	40	66.67	230	59	74.35
2	12/17/2015	71.6	26.1	63.55	142	19	86.62
3	12/22/2015	63.6	16.2	74.53	160	15	90.63
4	12/29/2015	77.4	38	50.90	136	30	77.94
5	1/27/2016	92.3	18.6	79.85	162	12	92.59
6	3/2/2016	74.6	31.6	57.64	196	25	87.24
7	3/11/2016	120.9	24.7	79.57	216	18	91.67
8	3/15/2016	90.4	18.1	79.98	312	20	93.59
9	3/28/2016	68.6	22.9	66.62	176	35	80.11
10	4/12/2016	48.8	15.6	68.03	144	36	75.00
11	4/26/2016	97.3	28.6	70.61	230	25	89.13
12	4/28/2016	97.3	32.8	66.29	340	18	94.71
13	5/13/2016	114.9	34.9	69.63	232	18	92.24
14	5/18/2016	79.5	21.7	72.70	224	15	93.30
15	6/7/2016	47.1	10.7	77.28	104	12	88.46
AVERAGE				69.59			87.17

Alternative 2 – End of Pipe Treatment of SSOs

Alternative 2 was developed on the basis of utilizing end of pipe treatment to treat SSO flows. Alternative 2 also achieves 85% capture and eliminates CSO-009 (typical year), CSO-013 (typical year) and SSO-010. Alternative 2 is conceptually shown on Exhibit 11 in Appendix G and is generally discussed as follows:

1. End-of-pipe SSO treatment facility located at the WTP
    a. Approx. 4,700 LF of 8" force main for backwash flow from the end-of-pipe SSO treatment facility to the WWTP
2. Dunlevy diversion, pumping and conveyance facilities
    a. Approx. 2,100 LF of 12" diameter wet weather force main from Dunlevy wet weather pump station to Dunlevy interceptor
    b. Approx. 3,800 LF of combination 24" and 18" gravity interceptor
    c. New diversion structure
    d. New dry/wet weather Dunlevy Pump Station

e. New manholes

3. Speers diversion, pumping and conveyance facilities
    a. Approx. 6,500 LF of 18" diameter wet weather force main connecting Speers Wet Weather Pump Station to the interceptor
    b. Approx. 600 LF of 18" gravity sewer from Maple View connection point to the Maple Creek Pump Station
    c. New diversion structure
    d. New dry/wet weather Speers Pump Station
    e. New manholes
4. Maple Creek diversion, pumping and conveyance facilities
    a. Approx. 3,600 LF of a combination 15" and 18" diameter gravity interceptor
    b. Approx. 1,700 LF of 12" dry weather force main connecting Maple Creek Pump Station and interceptor
    c. New Maple Creek Pump Station
    d. New manholes
5. Charleroi Interceptor
    a. New diversion structures at CSO-002, 003, 004, 005, 006 and 007
6. End-of-pipe CSO treatment facility located at CSO-007

The PADEP has never permitted an SSO treatment facility in Pennsylvania. Due to the difficulty in permitting as well as the additional capital costs associated with Alternative 2, it was discounted and was not evaluated any further.

Alternative 3 – Wet Weather Flow Storage

Alternative 3 was developed on the basis of utilizing wet weather flow storage to controls wet weather flows within the system in order to achieve 85% capture. Alternative 3 eliminates CSO-009 (typical year), CSO-013 (typical year) and SSO-010. Alternative 3 is conceptually shown on Exhibit 12 in Appendix G and is generally discussed as follows:

1. Dunlevy diversion, pumping and conveyance facilities
    a. Approx. 2,100 LF of 12" diameter wet weather force main from Dunlevy wet weather pump station to Dunlevy interceptor
    b. Approx. 3,800 LF of combination 24" and 18" gravity interceptor
    c. New diversion structure
    d. New dry/wet weather Dunlevy Pump Station
    e. New manholes
2. Speers diversion, pumping and conveyance facilities
    a. Approx. 6,500 LF of 18" diameter wet weather force main connecting Speers Wet Weather Pump Station to the interceptor
    b. Approx. 600 LF of 18" gravity sewer from Maple View connection point to the Maple Creek Pump Station
    c. New diversion structure

d. New dry/wet weather Speers Pump Station
e. New manholes

3. Maple Creek diversion, pumping and conveyance facilities
    a. Approx. 3,600 LF of a combination 15" and 18" diameter gravity interceptor
    b. Approx. 1,700 LF of 12" dry weather force main connecting Maple Creek Pump Station and interceptor
    c. New Maple Creek Pump Station
    d. New manholes
4. Charleroi Interceptor
    a. Approx. 4,500 LF of a combination of 24" and 36" parallel relief interceptor from CSO-002 to WWTP
    b. Approx. 1,200 LF of 16" diameter force main from the wet weather pump station to the new storage tank
    c. New diversion structures at CSO-002, 003, 004, 005, 006 and 007
5. Wet Weather Flow Storage
    a. Construct a 4-6 MG storage tank at the Latchem site
6. CSO-011 and CSO-012 gravity interconnect

Alternative 3 was discounted due to the immediate capital costs estimated to be nearly double the costs of Alternative 1. Additionally, the PADEP indicated that flow equalization would be considered a temporary solution and no further evaluation of Alternative 3 was completed.

V.A.6 Use of Innovative or Alternative Methods of Collection and Conveyance

There exists a need to develop alternative wastewater systems in areas where the implementation of conventional systems is impractical, uneconomical or unfeasible. Most wastewater collection systems rely on conventional gravity sewers. However, certain areas contain hilly terrain or shallow bedrock, resulting in high construction costs or limiting the feasibility of gravity sewer systems. These issues justify the need for alternative wastewater collection and conveyance systems in certain areas. Pressure sewers and vacuum sewers are often feasible alternatives.

However, extension of sewage service into areas of need is not a goal of this Act 537 Plan Update. Rather, this Plan was developed to evaluate conveyance system improvements to control CSO events and eliminate the SSO. This will likely be accomplished through gravity sewer improvements or the installation of force main sewers and pumping facilities.

V.B. USE OF INDIVIDUAL SEWAGE DISPOSAL SYSTEMS

The Pennsylvania Code defines an individual sewage system as a system of piping, tanks or other facilities serving a single lot and collecting and disposing of sewage in whole or in part into the soil or into waters of the Commonwealth or by means of conveyance to another site for final disposal. Individual onsite wastewater treatment/disposal systems have evolved to

provide installations that are capable of producing a disinfected effluent. Onsite system technologies are able to remove settleable solids, floatable grease and scum, nutrients and pathogens from wastewater. This capability outlines the importance of such systems to protect human health and environmental resources. However, system owners are often not likely to repair or replace older on-lot systems if sewage pollution is not evident on the property. This is a key concern of individual on-lot system installations.

The installation or repair of on-lot systems is not a goal of this Act 537 Plan Update, as it was developed to evaluate conveyance system improvements to control CSO events and eliminate the SSO.

V.C. USE OF SMALL FLOW SEWAGE TREATMENT FACILITIES

A small flow sewage treatment facility (SFSTF) is designed to treat wastewater from a single-family residence. Like a full scale, community wide sewage treatment facility, SFSTF systems require an NPDES permit and must meet the limits of the permit before discharging treated effluent into a stream or other discharge point. They can treat up to 2,000 gpd. Small flow treatment facilities may only be used when on-lot disposal systems do not and cannot be expected to function satisfactorily because of soil, geologic and groundwater conditions, or there is no public sanitary sewage service availability in a municipality.

The use of small flow sewage treatment facilities was not considered in this Act 537 Plan Update, as it was developed to evaluate conveyance system improvements to control CSO events and eliminate the SSO.

V.D. USE OF COMMUNITY LAND DISPOSAL ALTERNATIVES

Community land disposal alternatives are similar to individual on-lot sewage disposal systems, in that many of the same technologies exist on a larger scale to serve several homes or an entire community. They allow for primary settling in a community septic tank or tanks for the removal or solids and grit from the wastewater. However, when disposal beds become plugged by solids, there may be little or no room for expansion. Many of the same restrictions apply to community wide systems as they do to individual systems. Soil and site suitability must be met and hydrogeologic characteristics must be evaluated. Site suitability is an important factor in the consideration of a community land disposal alternative. It is often based on many soil, geologic, and topographic limitations. The majority of the areas are limited in size and not sufficiently large enough to serve an entire community's sewage disposal needs.

The use of community land disposal alternatives was not considered in this Act 537 Plan Update, as it was developed to evaluate conveyance system improvements to control CSO events and eliminate the SSO.

V.E. USE OF RETAINING TANK ALTERNATIVES

Retaining tanks or holding tanks are designed and maintained on the basis of ultimate disposal of sewage at another site and can be installed as a short term solution to malfunctioning on-lot systems in either residential or commercial applications. They require a permit issued by a municipality's sewage enforcement officer (SEO) and require specified operation and maintenance activities to prevent public health or environmental hazards. The tanks require frequent pumping and cleaning, requiring property owners to contract with septage hauling companies to periodically pump their tanks. These companies use pumper trucks to haul the waste from the property and dispose of it at a site approved by the PADEP. Holding tanks must only be used when the construction of a municipal system is imminent and no other alternative exists to correct malfunctioning systems.

The use of retaining tank alternatives was not considered in this Act 537 Plan Update, as it was developed to evaluate conveyance system improvements to control CSO events and eliminate the SSO.

V.F. SEWAGE MANAGEMENT PROGRAMS

Sewage Management Programs are developed for use in communities where on-lot sewage disposal systems are installed and regularly maintained. They set guidelines for the operation and maintenance requirements for on-lot systems to ensure the future operational ability of such systems. A sewage management program was not considered in this Act 537 Plan Update, as it was developed to evaluate conveyance system improvements to control CSO events and eliminate the SSO.

V.G. NON-STRUCTURAL COMPREHENSIVE PLANNING ALTERNATIVES

Non-structural comprehensive planning alternatives that can be undertaken to assist in meeting existing and future sewage disposal needs were not considered in this Act 537 Plan Update.

V.H. NO ACTION ALTERNATIVE

It can be assumed that the likelihood of contamination of the waters of the Commonwealth and the associated public health risks and environmental impacts will increase if a no-action alternative is undertaken. A no-action alternative would not address current conveyance system deficiencies that cause SSOs and CSOs within the sewer system. This lack of action would have negative short and long-term impacts on water quality because illegal overflows would continue to occur during peak wet weather conditions and pollute surface waters. The pollutants emitted by untreated discharges reduce recreational opportunities and potentially impact downstream drinking water sources. No action in addressing the identified problems would also adversely affect growth potential and economic conditions in local communities because a ban on new taps to the public sewer system would continue in the Authority's service area until the overload condition is addressed. Finally, no action in addressing the current SSO

and CSO problem would be in direct violation of the NPDES Permit No. PA0026891 and would lead to additional fines and legal actions. A "No Action Alternative" is not available for consideration.

VI. EVALUATION OF ALTERNATIVES

VI.A. CONSISTENCY DETERMINATION

According to Act 537, all technically feasible sewage facility alternatives must be evaluated for consistency with certain acts, programs and policies. The alternatives identified here are evaluated for the necessary consistency areas in the following sections.

1. Consistency with Sections 4 and 5 of the Clean Streams Law or Section 208 of the Clean Water Act

The primary purpose of the Clean Streams Law is, "to preserve and improve the purity of the waters of the Commonwealth for the protection of public health, animal and aquatic life, and for industrial consumption and recreation." Sections 4 and 5 of the Clean Streams Law require that consideration be given to the following:

- Water quality management in a watershed as a whole
- Present and possible future uses of particular waters
- The feasibility of combined or joint facilities
- The state of scientific and technical knowledge
- Immediate and long-term economic impacts

Section 208 of the Clean Water Act requires the development of plans for the identification of treatment works necessary to meet anticipated municipal and industrial waste treatment needs of an area over a 20-year period. This includes the following:

- Requirements for the acquisition of land for treatment purposes
- Necessary wastewater collection and urban storm water runoff systems
- Programs to provide the necessary financial arrangements for the development of such treatment works
- Identification of open space and recreation opportunities that can be expected to result from improved water quality
- Consideration of potential use of lands associated with treatment works
- Increased access to water-based recreation

Through implementation of this Act 537 Plan Update, the objectives of Sections 4 and 5 of the Clean Streams Law and Section 208 of the Clean Water Act will be achieved. A major goal of this Plan is to promote water quality in the watershed and maintain the regional treatment capabilities of the WWTP. Evaluation of the technical alternatives discussed herein considers economic impacts on the communities served. There are no proposed changes to existing water

use based on the recommendations of this Plan Update. Potential for pollution of the waters of the Commonwealth will be diminished by providing the necessary control measures for CSOs and elimination of the SSO. Implementation of the proposed upgrades provides a means for continued positive long-term economic growth and development throughout the planning area. The water quality of the planning area will be improved and be protected for recreational activities for years to come. The system upgrades are consistent with Sections 4 and 5 of the Clean Streams Law and Section 208 of the Clean Water Act.

2. Consistency with Municipal Wasteload Management Corrective Action Plans or Annual Reports Under PA Code, Title 25, Chapter 94

A review of the 2015 Chapter 94 Wasteload Management Report for the Authority of the Borough of Charleroi WWTP indicates that the WWTP was neither hydraulically nor organically overloaded during the operating year 2014, and is not projected to be overloaded within the next five years. However, the sewer system as a whole is considered overloaded because there are active sanitary and permitted combined sewer overflow structures located before the headworks of the WWTP. In the future, sanitary sewer overflows will be eliminated and subsequently treated rather than being released to Maple Creek and the Monongahela River. The CSOs will be reduced and flows will be captured for treatment during wet weather periods. This Act 537 Plan is consistent with Chapter 94 Wasteload Management.

3. Consistency with Title II of the Clean Water Act or Titles II and VI of the Water Quality Act of 1987

Plans developed under Title II of the Clean Water Act contain information of waste treatment management plans and practices providing the following:

- The application of the best practicable waste treatment technology
- The confined disposal of pollutants so they will not migrate to cause water or other environmental pollution
- The consideration of advanced waste treatment techniques

The Clean Water Act requires restoration and maintenance of the chemical, physical and biological integrity of the Nation's water quality for the protection and propagation of fish, shellfish, wildlife and recreation in and on the water. The alternatives identified herein were developed with these goals in mind. This Act 537 Plan Update is consistent with the objectives of the Clean Water Act and the Water Quality Act of 1987.

4. Consistency with Comprehensive Plans Developed Under the Pennsylvania Municipalities Planning Code

There is a very close relationship between the content of a municipality's Comprehensive Plan developed under the Pennsylvania Municipalities Planning Code and the official Sewage Facilities Plan in regards to the provision of adequate sewage service. When an official Sewage

Facilities Plan update is being developed, the Comprehensive Plan must be closely evaluated to assure the sewage facilities being proposed are consistent with the land uses contained in the Comprehensive Plan. Comprehensive planning in the Authority's service area is summarized as follows:

- The Washington County Comprehensive Plan was adopted in November 2005. The proposed alternatives are consistent with the goals, objectives and other requirements of the Washington County Comprehensive Plan.

- The Mid Mon Valley Regional Comprehensive Plan was adopted by Dunlevy Borough in 2003. The proposed alternatives are consistent with the goals, objectives and other requirements of the Mid Mon Valley Regional Comprehensive Plan.

- A "Comprehensive Water Quality Management Plan (COWAMP) for the Ohio Valley Study Area" was prepared for the PADEP in October 1979, by Green International. This plan determined the facilities, costs and institutional arrangements to meet existing and future water quality needs of the area and was prepared as part of the overall State Water Plan. A recommendation of that plan was for wastewater generated in Authority's service area to be collected and treated at the Authority's WWTP. As a result, the proposed alternatives are consistent with the recommendations of the COWAMP study.

This Act 537 Plan Update is consistent with comprehensive plans developed under the Pennsylvania Municipalities Planning Code.

5. Consistency with Antidegradation Requirements as Contained in PA Code, Title 25, Chapters 93, 95 and 102

Proposed wastewater alternatives must be consistent with the water quality criteria established in Chapter 93 of the Pennsylvania Code, the wastewater treatment requirements of Chapter 95, and the erosion and sedimentation pollution controls regulations of Chapter 102.

Chapter 93 sets forth water quality standards for surface waters of the Commonwealth. These standards are based upon water uses which are to be protected and will be considered by the PADEP in implementing its authority under the Clean Streams Law and other statutes that authorize protection of surface water quality. The water quality standards are implemented through the provisions of Chapter 93 and Chapter 95 under the Clean Streams Law and the National Pollutant Discharge Elimination System (NPDES) permitting process.

Sewage overflows resulting from CSO and SSO events result in degradation of the receiving waters. Inadequately treated sewage which enters surface waters increases oxygen demand and nutrient loadings in the watercourse and causes the stream to be uninhabitable to aquatic life. Lower dissolved oxygen content and undesirable algae blooms may result due to the

increased oxygen demand and nutrient loadings. These characteristics leave the watercourses uninhabitable to aquatic life, further depleting dissolved oxygen levels, impeding stream flow, producing odors, and lowering the overall aesthetic value of the waterway. Elimination of the SSO and controlling CSO events will provide major benefits to the environment of the planning area. It will also eliminate the associated public health threats resulting from the discharges.

The purpose of Chapter 102 is to meet the objectives of the Clean Streams Law. The Clean Streams Law prohibits the discharge of any substance which creates a nuisance, such as sediment, into the waters of the Commonwealth. Sediment is rated the number one pollutant by volume to Pennsylvania's waters. The objective of Chapter 102 regulations is to eliminate or limit sediment pollution created as a result of earth disturbance activities. Construction projects include temporary negative impacts including noise pollution, temporary traffic disruptions and the potential creation of dust, litter and stream siltation. Sound construction practices and soil erosion and sediment control procedures will be required by the construction contract specifications and through the acquisition of all necessary permits to minimize these problems and comply with Chapter 102 regulations.

The alternatives identified herein are consistent with the antidegradation requirements set forth in Chapter 93 (Water Quality Standards), Chapter 95 (Wastewater Treatment Requirements) and Chapter 102 (Soil Erosion and Sedimentation Control).

6. Consistency with State Water Plans Developed Under the Water Resources Planning Act

The State Water Plan, last revised in January 2009, was developed to guide conservation, development and administration of the Commonwealth's water and related land resources. The goal of the State Water Plan is to enhance and protect the waters of the Commonwealth of Pennsylvania.

Agriculture, mining, development, stormwater runoff and wastewater treatment facilities result in pollution of the waters of the Commonwealth. Siltation, sedimentation, metals and increases in nutrient levels are major polluters. The goal of this Act 537 Plan Update is to improve and protect the waters of the Commonwealth through the control and/or elimination of CSOs and the SSO. This Plan Update is consistent with the State Water Plan.

7. Consistency with the Pennsylvania Prime Agricultural Land Policy

Pennsylvania's Prime Agricultural Land Policy orders and directs the prevention of irreversible conversion of prime agricultural land to uses that result in its loss as an environmental or essential food production resource. Prime farmlands are important to examine for scenarios in which development is expected to occur because of the protective measures in existence to preserve this important resource.

It is important to note that there are soil areas classified as prime farmland and farmland of statewide importance within the planning area. While the soils are classified as prime farmlands, work will occur in previously developed sites that are not used for agricultural purposes. There will be no impacts on prime agricultural lands through the implementation of this Act 537 Plan Update. This Plan Update is consistent with the Pennsylvania Prime Agricultural Land Policy.

8. Consistency with County Stormwater Management Plans Approved by the PADEP Under the Stormwater Management Act

Inadequate management of accelerated runoff of stormwater resulting from development throughout a watershed increases flood flows and velocities, contributes to erosion and sedimentation overloads the carrying capacity of streams and storm sewers, greatly increases the cost of public facilities to manage and control stormwater, undermines flood plain management and flood control efforts in downstream communities, reduces groundwater recharge, and threatens public health and safety.

The Washington County Stormwater Management Plan was developed under Act 167 for the control of stormwater runoff throughout the county. Fallowfield Township and the Boroughs of Charleroi, Speers, Dunlevy and Twilight have adopted the county plan. North Charleroi has not adopted the county plan. The recommendations of this Act 537 Plan Update are consistent with the Washington County Act 167 Stormwater Management Plan.

9. Consistency with Wetlands Protection

Wetland areas are considered to be a valuable public water resource and are subjected to strict conservative practices. They provide an environment for valuable aquatic, waterfowl and wildlife habitat. Many endangered plant species are thought to exist in wetlands, and wetlands are essential for the maintenance of surface water quality and quantity. The Commonwealth has established an intensified effort to protect these natural resources.

Minimal wetland areas classified as riverine exist along the Monongahela River. The implementation of this Act 537 Plan is not expected to affect wetlands in any way. Although there are no expected impacts on wetlands, all attempts will still be made to minimize the impact on any ecologically sensitive areas during construction activities. The Act 537 Plan Update is consistent with wetlands protection regulations.

10. Consistency with Protection of Rare, Endangered or Threatened Plant and Animal Species as Identified by the Pennsylvania Natural Diversity Inventory (PNDI)

There is an increasing effort to protect the habitat of rare, endangered and threatened species. As per the Pennsylvania Natural Heritage Program, the Act 537 process requires review by applicable environmental agencies in an effort to identify and protect environmental values within the project area. These agencies include the following:

- Department of Conservation and Natural Resources – Bureau of Forestry
- Pennsylvania Game Commission
- Pennsylvania Fish and Boat Commission
- U.S. Fish and Wildlife Service

The PNDI Project Environmental Review Receipt for the planning area is included in Appendix L and indicates that there are no known impacts associated with the proposed projects. There is however, an avoidance measure required by the U.S. Fish and Wildlife Service. Any tree cutting required for the project must be conducted between November 15 and March 31. This Act 537 Plan Update is consistent with the protection of rare, endangered or threatened plant and animal species.

11. Consistency with Historical and Archaeological Resource Protection in Conjunction with the Pennsylvania Historical and Museum Commission (PHMC)

The Pennsylvania Historical Preservation Act of 1978 requires full cooperation with the Pennsylvania Historical and Museum Commission (PHMC) for the preservation, protection and investigation of archaeological resources. We are currently awaiting a final review letter from PHMC. The proposed projects are consistent with historical and archaeological resource protection. General correspondence with PHMC is included in Appendix M.

VI.B. RESOLUTION OF INCONSISTENCIES

The alternatives identified within this Act 537 Plan Update are consistent with the following Acts, programs and policies, and do not require resolution:

- Sections 4 and 5 of the Clean Streams Law
- Section 208 of the Clean Water Act
- Municipal Wasteload Management Under PA Code, Title 25, Chapter 94
- Title II of the Clean Water Act
- Titles II and VI of the Water Quality Act of 1987
- Comprehensive Plans developed under the Pennsylvania Municipalities Planning Code
- Antidegradation requirements as contained in PA Code, Title 25, Chapters 93, 95 and 102
- State Water Plan developed under the Water Resources Planning Act
- Pennsylvania Prime Agricultural Land Policy
- Washington County Stormwater Management Plan
- Wetlands Protection
- Protection of rare, endangered or threatened plant and animal species as identified by the Pennsylvania Natural Diversity Inventory (PNDI)
- Historical and archaeological resource protection relating to cooperation with public officials with the Pennsylvania Historical and Museum Commission (PMHC)

Additional action may also be required to demonstrate consistency with the above named acts, programs and policies. This will occur during the design and permitting phases upon implementation of the selected sewage facilities alternative. The flowing actions may be required:

- Preparation of Erosion and Sedimentation (E&S) Pollution Control Plans for construction activities. These plans will be reviewed by the Washington County Conservation District. In the event that construction will require more than one (1) acre of earth disturbance, the issuance of a General NPDES Permit will be required. E&S plans will be required to incorporate Best Management Practices to demonstrate compliance with Chapter 102.

- The submission of the Part II Permit will require the preparation of a Design Engineer's Report documenting compliance with applicable PADEP design standards.

- A detailed wetlands evaluation may be required. Appropriate PADEP or Army Corps of Engineers (ACoE) permitting will be performed as necessary. However, this may not be required if it is determined that there are no wetlands within the vicinity of the project areas, as was determined during the preliminary investigation within this Act 537 Plan.

VI.C. EVALUATION OF ALTERNATIVES WITH RESPECT TO APPLICABLE WATER QUALITY STANDARDS, EFFLUENT LIMITATIONS OR OTHER TECHNICAL, LEGISLATIVE OR LEGAL REQUIREMENTS

The alternatives identified in this report address conveyance capacity limitations and untreated discharges resulting from SSOs and CSOs, which will greatly improve and protect the quality of the waters of the Commonwealth. The alternatives presented within this Plan Update were developed on the basis of achieving compliance with all applicable water quality standards, effluent limitations or other technical, legislative or legal requirements.

VI.D. COST ESTIMATES, PRESENT WORTH & USER RATE ANALYSIS

Cost estimates were developed for the alternatives identified herein. The cost estimates are included in Appendix N. A summary of the estimated project costs for each of the alternatives is included in Table 12.

Table 12: Estimated Alternative Project Costs

Alternative	Estimated Project Cost
1	$32.5 Million
2	$45.0 Million
3	$66.0 Million

A 30-year present worth analysis was completed for ongoing administration, operation and maintenance, as well as annual debt service, for each of the alternatives identified and evaluated herein. The present worth analysis, included in Appendix O, was developed assuming bond financing over 30 years at and interest rate of 3.5%. The Authority intends to refinance the Borough of Charleroi's remaining debt associated with its separation project. The separation project resulted in reduced flows entering the WWTP, and thus has an inherent impact on the CSO Program as a whole. These costs were included in the present worth analysis. The present worth of each alternative is shown in Table 13.

Table 13: Alternative Present Worth

Alternative	Present Worth
1	$64.6 Million
2	$85.9 Million
3	$121.6 Million

A user rate analysis was also completed for each alternative. The user rate analysis is included in Appendix P. The projected rates were calculated based on annual debt service for payment of the bonds (assuming bond financing over 30 years at and interest rate of 3.5%) and projected operation and maintenance (O&M) costs. In order to be conservative, the projected rates also assume a 5% payment delinquency. The Authority has elected to phase in the user charges by discounting the first six years in order to decrease the initial burden to its rate payers. The analysis also includes the refinancing of Charleroi's existing debt service related to its separation project. The following is a summary of the monthly CSO Program user rates per customer for each alternative:

- Alternative 1 $38.00 (years 1-6) $45.00 (years 7-30)
- Alternative 2 $51.00 (years 1-6) $60.00 (years 7-30)
- Alternative 3 $73.00 (years 1-6) $84.00 (years 7-30)

It should also be noted that the Authority intends to refinance Fallowfield Township's existing debt services related to the construction of its sanitary sewer system. This will ease the initial burden to the Fallowfield rate payers. The refinancing will reduce the monthly debt service to Fallowfield customers from the current $26.50 per month trough 2022 to approximately $8.00 per month through 2040. This rate will be paid by Fallowfield customers in addition to the CSO Program user rates described above.

VI.E. ANALYSIS OF FUNDING METHODS

Various funding methods must be examined to determine which is most appropriate and cost effective for a project. The following paragraphs discuss the funding methods considered.

- **Pennsylvania Infrastructure Investment Authority (PENNVEST)**

  PENNVEST funding is available for financing costs associated with capital projects, engineering fees, legal fees and right-of-way acquisitions. However, prior to receiving any loan or grant money, all permits necessary for construction activities must be approved by the associated regulatory agency. All fees associated with the permitting and design phase must be financed upfront by the municipality.

  The typical life of a PENNVEST loan is 20 years. Total project funding is capped at $11.0 Million per project if one municipality is served, and may rise to as much as $20.0 Million if more than one municipality is served. In the event the total project cost is above the PENNVEST cap, additional financing alternatives will be necessary. The interest rate of the loan ranges from 1.055% in years 1 through 5 to 1.835% in years 6 through 20 in Washington County. In some cases the term of the loan may be extended beyond 20 years to as long as 30 years if needed to keep the user fees in line with other similar system user rates. The construction period is added to this term in order to allow for an interest only period. Principal and interest repayments begin after final inspection.

  The first step in the PENNVEST application process is to participate in a planning consultation meeting. At the meeting, the financial status of the client will be evaluated to determine if any grant funding may be issued in the funding package available for the potential client. A grant will be considered only when the PENNVEST Board determines that the applicant's financial condition indicates that the loan repayment is unlikely. If no grant funding can be issued, the potential funding package will be given based upon certain information provided at the meeting.

- **Bond Issuance**

  Bond financing is a form of borrowing that involves an interest-bearing certificate for sale to prospective investors. System owners with taxing power, for example, are

authorized to issue general obligation bonds to fund their projects. Secured by the capacity to raise taxes or user fees to meet payment obligation, this class of bonds is capable of attracting investors at lower costs to the borrower. The appeal of a general obligation bond as a financing instrument is offset, to some degree, by stipulations governing their use. Their issuance may require voter and/or legislative approval and, given the existence of state-established debt limits for most governmental units, the issuance of bonds for other purpose projects may be substantially reduced.

All tax exempt bond issuers, as in the case of an Authority, are encouraged to consider loans from bond pools as a source of funding for capital projects for amounts greater than $2 Million. Bond pools that contain funds created from tax-exempt revenue bonds are issued for the purpose of third-party borrowing. Advantages of pool loans are that the application consists of standardized forms, there are moderate up-front financing costs, they offer lower interest rates with flexible terms, they allow a finance term length of 10 to 30 years, and they permit projects to progress more rapidly by providing variable rate start-up financing that may be converted to a fixed permanent rate. Pool loans generally require the credit enhancement of bond issuance or a letter of credit from a qualified bank.

Bond proceeds, if selected as the primary financing alternative, will be used for construction costs, capitalized interest on bonds, and paying all costs and expenses incident to the issuance and sale of the bonds. This Act 537 Plan Update assumes an interest rate of 3.5% over a 30-year term for bond financing.

- **Rural Utilities Service (RUS)**

The Rural Utilities Service (RUS), an agency of the United States Department of Agriculture (USDA) under the Rural Development Utilities Program, is authorized to provide financial assistance for water and wastewater disposal systems in rural areas. To be eligible to receive assistance, the applicant must be a public municipal entity and meet the following criteria:

  - Be unable to obtain needed funds from commercial sources at reasonable rates and terms
  - Have legal authority to borrow, repay loans and be financially sound
  - Have ability to operate and maintain the facility or services
  - The project should be consistent with the development plans of the State, County or local municipality in which the proposed project is located

Funds may be used to acquire, construct, expand or improve water or waste disposal systems and facilities. Other reasonable project costs, such as land acquisition and rights-of-way, legal and engineering fees and equipment are eligible for funding when these costs are related to the development of such facilities.

The maximum financing term under RUS is 40 years. However, no repayment term will exceed the useful life of the improvement or facility to be financed. The interest rate charge is adjusted on a quarterly basis and is assigned when funds are obligated for each component of the project. The rate will vary in accordance with the average of the Bond Buyers Index and is based on the income level of the individuals served by a project. However, after the loan is closed for the project, the rate will remain unchanged for the term of the loan. The loan can be closed at the interest rate at the time of obligation of funds or the rate at the time of closing. Grant funds may be available for projects serving the most financially needy communities for the development of water and wastewater disposal facilities to reduce the user costs to a reasonable rate.

There are three possible interest rates for a project including poverty line, intermediate and market rate. The poverty interest rate will not exceed 5 per centum per annum. The poverty interest rate is set at 60% of the market rate but will not exceed 5%. The intermediate rate is the poverty rate plus one half of the difference between the poverty rate and the market rate, not to exceed 7% per annum. The market interest rate will be set using as guidance the average of the Bond Buyer Index for the four weeks prior to the first Friday of the last month before the beginning of the quarter. Grant eligibility is determined by the median household income for the service area per the 2010 US Census. Projects that will serve areas having an income level greater than the state median household income are not grant eligible. However, a maximum 75 percent grant funding is available for projects in areas where income levels are at or below the Poverty Line.

- **Grants (Federal, State, and County)**

In effort to receive adequate funding for the identified projects, the Authority will apply for various federal, state, and county level construction grants. It should be noted that the Authority has already acquired a Washington County Local Share Account (LSA) grant in the amount of $500,000.00. This money can only be applied to the Speers and Dunlevy projects, but requires these projects to be complete and the contract closed by June 2019.

VI.F. ANALYSIS OF NEED FOR IMMEDIATE OR PHASED IMPLEMENTATION OF ALTERNATIVES

The wet weather flow control facilities identified herein as Alternative 1 are recommended to control CSOs and eliminate the SSO to meet the LTCP objectives. The Authority has acquired a Local Share Account (LSA) grant in the amount of $500,000.00 for a CSO project in Speers and Dunlevy. In order to utilize those funds, however, the Speers and Dunlevy projects must be constructed and the contracts closed by June 2019. Therefore, the overall project will be phased in order to allow that deadline to be met.

The Phase 1 project will involve the Speers and Dunlevy portions of the project in order to achieve the objective of elimination of CSO-009 and CSO-013 and to utilize the LSA grant. The Phase 2 project will involve the remainder of the project which will eliminate the Maple Creek Pump Station SSO-010 and achieve the 85% capture.

Design of the Phase 1 project is underway. Construction is anticipated to begin in the fall of 2017. Design of the Phase 2 project will begin in the fall of 2017 and construction is anticipated to begin in the spring of 2019. All facilities are anticipated to be constructed by the summer of 2021.

VI.G. EVALUATION OF ADMINISTRATIVE ORGANIZATIONS AND LEGAL AUTHORITY NECESSARY FOR PLAN IMPLEMENTATION

The Authority of the Borough of Charleroi has the legal authority necessary for financing, permitting and construction of the proposed improvements.

VII. INSTITUTIONAL EVALUATION

VII.A. ANALYSIS OF EXISTING WASTEWATER TREATMENT AUTHORITIES

VII.A.1 Financial and Debt Status

The Authority of the Borough of Charleroi is in good financial standing. The Authority is responsible for setting the user rates in order to support debt service and O&M costs. Rates charged by the Authority currently generate sufficient revenue to cover operating expenses, other expenses, and budgeted capital expenditures.

The Authority's only existing debt is the result of a bond issuance (Series of 2012) which will expire in 2017. The Authority plans to refinance both Charleroi's and Fallowfield's existing debt services related to the Charleroi separation project and the construction of Fallowfield's sanitary sewer system, respectively. This will ease the initial burden to the Charleroi and Fallowfield rate payers.

VII.A.2 Available Staff and Administrative Resources

The Authority currently employs 40 individuals who are responsible for the day-to-day operation and maintenance of the system, customer relations, billing and other necessary activities. The Authority has sufficient staff and resources available to implement the proposed capital improvement projects.

VII.A.3 Existing Legal Authority

The Authority has the legal authority to implement the wastewater planning recommendations, including carrying out system-wide operation and maintenance activities, setting user fees, purchasing equipment and supplies, enforcing sewer ordinances, negotiating agreements with other parties, and raising capital for normal system operations and periodic improvement projects. The Authority can finance the improvements and pay off the debt using tapping fee revenue from new sewer customers, as well as sewer service charge revenues from new and existing system users. The legal authority to take enforcement actions against ordinance violators is the responsibility of each individual municipality.

VII.B. ANALYSIS OF INSTITUTIONAL ALTERNATIVES NECESSARY FOR IMPLEMENTATION

VII.B.1 Need for New Municipal Departments or Municipal Authorities

There is no need for new municipal department or municipal Authorities. The Authority has the full capability to implement the alternatives proposed herein.

VII.B.2 Functions of Existing and Proposed Organizations

The Authority and the tributary municipalities will continue to own, operate and maintain their respective facilities upon completion of the improvement projects.

VII.B.3 Cost of Administration, Implementability and the Capability to React to Future Needs

The implementation of the technical alternatives proposed in this Act 537 Plan will not affect the Authority's administrative costs. The Authority has the full capability to implement the proposed alternatives and react to future needs of its regional customer base.

VII.C. ADMINISTRATIVE AND LEGAL ACTIVITIES NECESSARY FOR IMPLEMENTATION

VII.C.1 Incorporation of Authorities or Agencies

There are no activities requiring the incorporation of authorities or agencies as part of this Plan Update.

VII.C.2 Development of Ordinances, Regulations, Standards and Inter-municipal Agreements

The Authority will to continue requiring dye testing in Fallowfield during any real estate transaction to identify and remove illegal downspout connections to the sanitary sewer system. Speers and Dunlevy will also continue dye testing at time of sale. The Authority intends to

encourage and assist Charleroi and North Charleroi with implementation of time of sale dye testing.

The Authority will consider implementation of a Private Lateral Program for residents connected to the Fallowfield collection system which would offer incentives for homeowners to repair/replace aging and leaking sewers laterals.

VII.C.3 Activities Required to Provide Rights-of-way, Easements and Land Transfers

The construction and improvements proposed in this Act 537 Plan Update may occur on private property. Rights-of-way, easements or land transfers may be required for implementation. This will occur during the design phase of the improvement projects.

It should be noted that the Authority has already acquired property at the former Western Flour site. This is the proposed site for construction of the Maple Creek SSO Pump Station. In addition, the Authority may need to revise existing easements to include an additional pipe, acquire new easements, or purchase land from private property owners. Land acquisition will likely be required at the Speers and Dunlevy Pump Station sites.

VII.C.4 Adoption of Other Municipal Sewage Facilities Plans

No additional Municipal Sewage Facilities Plans are required to be adopted under this Plan Update.

VII.D. PROPOSED INSTITUTIONAL ALTERNATIVE

There are no significant administrative issues, organizational needs or deficiencies in legal authority. Therefore, the improvements proposed within this Plan Update will be implemented under the existing authority of the Authority of the Borough of Charleroi. All exiting service agreements will remain.

The Authority may need to revise existing easements to include an additional pipe, acquire new easements, or purchase land from private property owners. Land acquisition will likely be required at the Speers and Dunlevy Pump Station sites.

The Authority will to continue requiring dye testing in Fallowfield during any real estate transaction to identify and remove illegal downspout connections to the sanitary sewer system. Speers and Dunlevy will also continue dye testing at time of sale. The Authority intends to encourage and assist Charleroi and North Charleroi with implementation of time of sale dye testing. The Authority will also consider implementation of a Private Lateral Program for residents connected to the Fallowfield collection system which would offer incentives for homeowners to repair/replace aging and leaking sewers laterals.

VIII. IMPLEMENTATION SCHEDULE AND JUSTIFICATION FOR SELECTED TECHNICAL & INSTITUTIONAL ALTERNATIVES

VIII.A. BEST TECHNICAL ALTERNATIVE

Alternative 1 was selected as the best technical alternative primarily due to the lowest immediate capital cost. However, Alternative 1 offers many advantages over the other alternatives considered. Those advantages are as follows:

- Allows for reuse of existing wet wells at the Speers and Maple Creek Pump Station sites.
- Allows for reuse of existing gas well water tanks that were decommissioned at the site of the existing WWTP. The tank can be repurposed and retrofitted with the WWETCO filter units.
- Lowest capital cost.
- Ease of permitting. The PADEP has already permitted similar satellite CSO treatment facilities in Pennsylvania.
- Existing rights-of-way and easements can be utilized for construction of the new force mains. This will result in minimal land acquisition and utility impacts.
- Can be designed around existing property owned by the Authority, again requiring minimal land acquisition and utility impacts.
- More desirable from a constructability aspect.
- Minimal additional O&M associated with the proposed facilities.

The proposed project phasing will allow the Authority to move forward with the Speers and Dunlevy portions of the project in order to utilize a Local Share Account (LSA) grant in the amount of $500,000.00, which has been acquired by the Authority for a CSO project in those communities. In order to utilize those funds, however, the Speers and Dunlevy projects must be constructed and the contracts closed by June 2019. Therefore, the overall project will be phased in order to allow that deadline to be met. Design of the Phase 1 project is underway. Construction is anticipated to begin in the fall of 2017. Design of the Phase 2 project will begin in the fall of 2017 and construction is anticipated to begin in the spring of 2019. All facilities are anticipated to be constructed by the summer of 2021.

It is the Authority's intent to conduct post construction flow monitoring throughout the system upon completion of construction. The post construction flow monitoring will be conducted after both phases of the project.

VIII.B. CAPITAL FINANCING PLAN CHOSEN FOR IMPLEMENTATION

The Authority intends to refinance the Borough of Charleroi's remaining debt associated with its separation project. The separation project resulted in reduced flows entering the WWTP, and thus has an inherent impact on the CSO Program as a whole. In order to cover the costs of the refinancing, as well as the debt service and O&M costs of the proposed wet weather control facilities, it is anticipated that bonds will be the primary financing option. However, in order to

minimize user rates to the greatest extent possible, the Authority will apply for various federal, state and county level grants. Ultimately, the financing method will be selected based upon eligibility, availability and in the best interest of the Authority and its customers.

It should also be noted that the Authority intends to refinance Fallowfield Township's existing debt services related to the construction of its sanitary sewer system. This will ease the initial burden to the Fallowfield rate payers. This refinancing will result in a reduced monthly debt service for the Fallowfield customer related to the construction of the Fallowfield sanitary sewer system that will be paid by the Fallowfield customers in addition to the CSO Program user rates.

VIII.C. IMPLEMENTATION SCHEDULE

The anticipated schedule of implementation of the Act 537 Plan Update, contingent upon receiving favorable funding, is included in Table 14.

Table 14: Schedule of Implementation

Activity	Completion Date
Begin Phase 1 Design	July 2016
Submit the Act 537 Plan Update and LTCP to the PADEP	October 2016
PADEP Review and Approval of the Act 537 Plan Update and LTCP	January 2017
Submit Phase 1 Part II Construction Permit	January 2017
Acquire Phase 1 Part II Construction Permit	July 2017
Complete Phase 1 Design	July 2017
Begin Phase 1 Construction	September 2017
Begin Phase 2 Design	September 2017
Submit Phase 2 Part II Construction Permit	September 2018
Complete Phase 1 Construction	February 2019
Begin Phase 1 Post Construction Flow Monitoring	March 2019
Acquire Phase 2 Part II Construction Permit	March 2019
Complete Phase 2 Design	March 2019
Begin Phase 2 Construction	May 2019
Complete Phase 2 Construction	May 2021
Begin Phase 2 Post Construction Flow Monitoring	June 2021

IX. ENVIRONMENTAL REPORT GENERATED FROM THE UNIFORM ENVIRONMENTAL REVIEW (UER) PROCESS

The Uniform Environmental Review (UER) process is intended to standardize the process for documenting the environmental impacts of proposed drinking water and wastewater infrastructure projects requesting financial assistance from various federal funding sources in the Commonwealth of Pennsylvania. The UER is intended to streamline and coordinate the environmental review of proposed projects to avoid major inconsistencies or duplication of effort. The UER can be utilized by the following specific financial assistance programs and agencies:

- The Clean Water Revolving Fund (PENNVEST, DEP, EPA)
- The Drinking Water State Revolving Fund (PENNVEST, DEP, EPA)
- The RUS Water and Waste Disposal Grant and Loan Program (USDA-RD)
- The Community Development Block Grant Program (DCED, HUD)
- Other Federal Funding Efforts (EPA)

The UER contains a project description and identifies the need for the project. It identifies and compares the technical alternatives considered. It also discusses the various environmental consequences of the selected alternative. Finally, the UER provides a summary of mitigation, if necessary, and discusses efforts for public participation. The UER is included in Appendix A.