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September 1, 2017

VIA ELECTRONIC FILING

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
Commonwealth Keystone Building
400 North Street, 2nd Floor North
P.O. Box 3265
Harrisburg, PA 17105-3265

Re: Petition of Aqua Pennsylvania Wastewater, Inc. for Approval of its Second Long-Term Infrastructure Improvement Plan - Docket No. P-2017-

Dear Secretary Chiavetta:

Enclosed for filing is the Petition of Aqua Pennsylvania Wastewater, Inc. for Approval of its Second Long-Term Infrastructure Improvement Plan. Copies will be provided as indicated on the Certificate of Service.

Respectfully submitted,

Michael W. Hassell

MWH/sr
Enclosures

cc: Certificate of Service

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing has been served upon the following persons, in the manner indicated, in accordance with the requirements of 52 Pa. Code § 1.54 (relating to service by a participant).

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Date: September 1, 2017

Michael W. Hassell

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

Petition of Aqua Pennsylvania Wastewater, Inc. For Approval of its Second Long-Term Infrastructure Improvement Plan	: : :	Docket No. P-2017-_____

PETITION OF AQUA PENNSYLVANIA WASTEWATER, INC. FOR APPROVAL OF ITS SECOND LONG-TERM INFRASTRUCTURE IMPROVEMENT PLAN

To The Pennsylvania Public Utility Commission:

Pursuant to Act 11 of 2012 ("Act 11" or the "Act"), which amended Chapters 3, 13, and 33 of the Pennsylvania Public Utility Code ("Public Utility Code" or the "Code"), and the regulations issued by the Pennsylvania Public Utility Commission ("Commission"), 52 Pa. Code §§ 121.1, et seq., Aqua Pennsylvania Wastewater, Inc. ("Aqua" or the "Company") hereby files this Petition seeking approval of its second Long-Term Infrastructure Improvement Plan ("LTIIP" or the "Plan"). As described in this Petition, the Company has operated a Distribution System Improvement Charge ("DSIC") since the Commission's approval of the Company's petition to establish the DSIC in 2013.[1] The Company's current LTIIP will expire at the end of 2017. Therefore, Aqua files this second LTIIP, which covers the five-year period of 2018 through 2022.

The Company requests that the Commission approve Aqua's proposed second LTIIP, which is attached to this Petition as **Exhibit A**.

[1] Petition of Little Washington Wastewater Company for Approval of a Distribution System Improvement Charge, Docket No. P-2013-2366873, Order Entered September 12, 2013. The Company's DSIC and current LTIIP were approved through the same Commission Order. See id. at 44.

I. INTRODUCTION

1. Aqua is a corporation organized and existing under the laws of the Commonwealth of Pennsylvania and is a wholly-owned subsidiary of Aqua Pennsylvania, Inc. ("Aqua PA"). Aqua is a public utility as defined by the Public Utility Code, 66 Pa. C.S. § 102.

2. Aqua owns and operates wastewater treatment facilities including wastewater treatment plants, pump stations, lift stations, curbstops, lateral cleanouts, service laterals, and collection and transmission systems throughout Pennsylvania serving approximately 21,000 customers in 15 counties. Aqua operates 34 wastewater collection and conveyance systems throughout Pennsylvania.

3. The names, addresses and telephone numbers of Aqua's attorneys for this filing are as follows:

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Aqua's attorneys are authorized to receive all notices and communications regarding this filing.

4. On February 14, 2012, the Governor signed into law Act 11 of 2012 ("Act 11"). Among other things, Act 11 repealed Section 1307(g) and replaced it with new provisions at 66 Pa. C.S. §§ 1350-1360, which authorized DSICs for all fixed utilities.

5. On May 11, 2012, the Commission issued its Tentative Implementation Order at Docket No. M-2012-2293611 and solicited comments and input on its proposed procedures and guidelines to implement Act 11. Aqua PA responded to the Commission's request and filed comments to the Tentative Implementation Order on May 31, 2012.

6. On August 2, 2012, the Commission issued the Final Implementation Order establishing procedures and guidelines necessary to implement Act 11.[2] The Final Implementation Order adopted the requirements established in Section 1352, provided additional standards that each LTIIP must meet, and gave guidance to utilities for meeting the Commission's standards.

7. On May 31, 2013, Little Washington Wastewater Company ("LWWC"), Aqua's predecessor,[3] filed a petition for approval of a DSIC. The Company did not file a separate petition for approval of its current LTIIP. Rather, LWWC attached the LTIIP as an appendix to its DSIC petition.

8. On July 3, 2013, LWWC filed a letter requesting the Commission to consider the Company's May 31, 2013 petition as seeking approval of both the proposed DSIC and LTIIP.

9. This first LTIIP presented the Company's plans for infrastructure improvement for the years 2013-2017.

---

[2] Implementation of Act 11 of 2012, Docket No. M-2012-2293611, Order Entered August 2, 2012 ("Final Implementation Order").

[3] LWWC's name subsequently was changed to Aqua Pennsylvania Wastewater, Inc. effective January 1, 2014. See Supplement No. 86 to Tariff Sewer-Pa. P.U.C. No. 1, Notification of Name Change to Aqua Pennsylvania Wastewater, Inc., Docket No. A-2013-2395509 (Dec. 17, 2013) (Secretarial Letter approving tariff supplement to implement name change).

10. On September 12, 2013, the Commission entered an Order approving LWWC's DSIC and LTIIP.

11. The final Commission regulations concerning the LTIIP became effective on December 20, 2014. See 52 Pa. Code §§ 121.1, et seq; 44 Pa.B. 7856.

12. Act 11 provides utilities with the ability to implement a DSIC to recover reasonable and prudent costs incurred to repair, improve, or replace certain eligible distribution property that is part of the utility's collection system. Eligible property for wastewater utilities is defined in Section 1351 of the Public Utility Code. See 66 Pa. C.S. § 1351(4). Utilities must file an LTIIP with the Commission that is consistent with the provisions of Section 1352 of the statute and Section 121.3 of Title 52 of the Pennsylvania Code. See 66 Pa. C.S. § 1352(a); 52 Pa. Code § 121.3.

13. Specifically, under Section 1352(a) of the Public Utility Code and Section 121.3(a) of Title 52 of the Pennsylvania Code, the LTIIP must include the following eight major elements:

(a) Identification of the types and age of eligible property owned and operated by the utility for which it is seeking recovery under this subchapter.

(b) An initial schedule for planned repair and replacement of eligible property.

(c) A general description of the location of the eligible property.

(d) A reasonable estimate of the quantity of eligible property to be improved or repaired.

(e) Projected annual expenditures to implement the plan and measures taken to ensure the plan is cost effective.

(f) Manner in which replacement of aging infrastructure will be accelerated and how repair, improvement or replacement will ensure and maintain adequate, efficient, safe, reliable, and reasonable service.

(g) A workforce management and training program designed to ensure that the utility will have access to a qualified workforce to perform work in a cost-effective, safe, and reliable manner.

(h) A description of a utility's outreach and coordination activities with other utilities, Department of Transportation, and local governments regarding the planned maintenance/construction projects and roadways that may be impacted by the LTIIP.

14. Aqua's second LTIIP addresses each of these elements, as summarized in this Petition.

15. Pursuant to the Commission's regulations at 52 Pa. Code § 121.5(c), Aqua is filing this second LTIIP at least 120 days before its current LTIIP expires.

II. AQUA'S LONG-TERM INFRASTRUCTURE IMPROVEMENT PLAN

A. BACKGROUND

16. In accordance with the Commission's Final Implementation Order and the Public Utility Code, Aqua's second LTIIP includes only collection system plant that is eligible property as defined in 66 Pa. C.S. § 1351. Final Implementation Order at 18; 66 Pa. C.S. § 1352(a). Since the inception of the DSIC program in late 2013 and projected through the end of 2017, Aqua will have cleaned and performed CCTV inspections of approximately 57.7 miles of sanitary sewer main, repaired and replaced approximately 7.6 miles of sanitary sewer mains, repaired approximately 500 manholes, and made mechanical repairs and improvements to the majority of its 105 pumping stations. Aqua's second LTIIP notes its historic replacement and refurbishment of wastewater infrastructure and its continuation of these efforts going forward.

17. The condition of Aqua's collection systems varies depending upon age, materials employed, and quality of the initial installation. Aqua strives to maintain the collection systems by performing work required to maintain integrity and reliability; however, many systems that have been acquired were in various states of disrepair, exhibiting aged infrastructure and

significant inflow and infiltration ("I&I") of ground and surface waters into the wastewater collection systems.

18. During the period of this second LTIIP, Aqua's primary focus in its accelerated collection system refurbishment program will be to continue the systematic investigation of those sewer systems with moderate to severe I&I, to schedule corrective measures to reduce or eliminate the I&I, and to refurbish and/or replace aged pumping facilities. See LTIIP, pp. 4. The replacement and refurbishment of eligible property will reduce I&I as well as the risk of overflow occurrences. See id.

B. TYPES AND AGE OF ELIGIBLE PROPERTY

19. The Company's collection and conveyance systems vary in age and material type. Aqua's system ranges in age from 1925 to pipe in service since 2011. In Aqua's experience utilizing the DSIC over the last several years, the Company has encountered many different materials used for pipes in wastewater collection systems, including polyvinyl chloride ("PVC"), terra cotta, cement, and ductile iron. Since the inception of the DSIC program, Aqua has primarily used PVC or completed lining projects for its gravity sewer main repair and replacements. Aqua will continue to replace or repair the gravity sewer pipes in its wastewater collection systems primarily using PVC or lining technologies. The preferred methods of sewer rehabilitation are sliplining and cured-in-place liners, as explained on page 14 of the second LTIIP. Low pressure and force mains are generally replaced with the existing pipe material, if the original material is acceptable.

20. Aqua has been utilizing a Geographic Information System ("GIS") to identify and rate the collection mains, manholes, and pump stations on a priority basis for repair and replacement. Aqua developed a GIS for all of its wastewater collection systems within the

Greater Pennsylvania ("GPA") operating division in 2013, with a few exceptions for recently acquired systems. Moreover, the Company is on schedule to complete the surveying for the collection of the GIS data for the Southeastern Pennsylvania ("SEPA") operating division's collection system by the fall of 2017. The Aqua GIS system stores data on sewer mains, manholes, pump stations, etc., and will be updated continually as the collection system changes with the addition of new pipe and the replacement of old pipe. Although a small percentage of data about the type and age of Aqua's eligible property remains unknown, the GIS and other programs will enable the Company to capture such data as its investigatory and repair work continues.

C. SCHEDULE FOR REPAIR AND REPLACEMENT

21. Aqua's schedule for planned repair and replacement of its wastewater collection and conveyance systems is set forth on pages 13 through 14 of the Company's LTIIP. Aqua has prioritized pumping stations and sewer main renewal/rehabilitation candidates at both a macro and micro level.

D. LOCATION OF ELIGIBLE PROPERTY

22. Aqua's wastewater systems are divided into two operating divisions: GPA and SEPA. The GPA operating division consists of seventeen (17) wastewater systems containing nineteen (19) wastewater treatment plants ("WWTPs"). The SEPA operating division serves seventeen (17) collection and conveyance systems and sixteen (16) WWTPs.

23. Details about the location and condition of these systems can be found on pages 15 through 32 of the LTIIP.

E. QUANTITY OF PROPERTY TO BE IMPROVED

24. The estimated property to be improved under this LTIIP is described on page 33 of the LTIIP.

25. Actual quantities of pipe replacement and manhole repairs will be determined based upon the results of engineering studies, I&I investigations, sewer main inspections and engineering plans.

F. PROJECTED ANNUAL EXPENDITURES AND MEASURES TO ENSURE THAT THE PLAN IS COST-EFFECTIVE

26. Aqua's projected budget for the years 2018 through 2022 is on pages 33 to 34 of its LTIIP in Tables 5.1 and 5.2, and on page 35 in graphic form in Figure 6.1. Tables 5.1 and 5.2 identify, by project type, the collection system capital projects planned to be performed in the upcoming five years, as well as the anticipated expenditure by project type for each year of the five-year term of this second LTIIP.

27. Aqua will perform I&I elimination projects including pipe replacement and manhole repair to those portions of the collection system identified through I&I investigations and inspections. Pipe replacement will be performed utilizing trenchless sewer rehabilitation methods where possible. Trenchless techniques are capable of performing spot repairs as well as manhole-to-manhole lining. For most applications, trenchless sewer rehabilitation techniques require less installation time and therefore less bypass pumping. In addition, trenchless sewer rehabilitation techniques minimize utility conflicts, minimize restoration costs and are less disruptive to business, homeowners and traffic.

28. Through competitive bidding, Aqua is able to secure lower unit costs contracts with various utility contractors. Aqua assigns supervisors and inspectors to each project to ensure the quality and effectiveness of work performed. Additionally, if possible, Aqua

coordinates projects with local municipalities to coincide with other utility and paving projects to reduce restoration costs and minimize customer impacts.

G. ACCELERATED REPLACEMENT

29. Aqua has continuously invested in its wastewater facilities and collection systems to ensure safe and reliable service, public health and environmental protection and intends to continue to maintain an accelerated pace for the repair and refurbishment of its collection system. For the calendar years of 2018 through 2022, Aqua plans to accelerate collection system capital spending to approximately $3.5 million annually (on average) for pipe repair, pump station refurbishment and I&I elimination programs. This represents an increase over the baseline investment pre-DSIC of about $630,000 per year, and a further increase compared with the five-year average from 2013–2017 of $2.36 million per year.

30. Further details on Aqua's acceleration plan are set forth on pages 35 through 36 of Aqua's LTIIP.

H. WORKFORCE MANAGEMENT AND TRAINING PROGRAM

31. A description of the Company's workforce management and training program is on pages 36 through 38 of the Company's LTIIP.

32. Aqua utilizes inspectors to provide numerous services during the installation of mains, service lines, pump stations, and manholes in the collection system. The inspectors are there to perform several tasks, including: (1) monitoring the installation of lines to confirm that they are properly bedded and installed to Aqua specifications; (2) monitoring the backfill of the project for proper compaction as per Aqua specifications; (3) confirming that all materials such as pipe, fittings, backfill, concrete, etc. in the project meet Aqua specifications; and (4) observing contractor's implementation of contractor safety plans and advising contractor of any observed

conditions of imminent danger. Moreover, inspectors can shut down a project until an imminent danger situation is addressed.

33. In addition, the Company requires its employees to have mandatory safety training throughout the year. Aside from the required annual training, additional training takes place, such as confined space, traffic safety, excavation/trenching, general safety hazards, and hazard communications. There are other programs that are required but not on an annual basis including Personal Protection Equipment ("PPE"), electrical hazard, competent person, and others. Further, all wastewater employees are required to wear their PPE whenever they exit their vehicles on a jobsite. The PPE includes hard hat, safety vest, safety glasses, and steel toe shoes. All of this PPE is supplied by the Company.

34. To supplement Aqua's employee workforce, Aqua utilizes outside contractors for all collection system projects. Contractors are required at the Company's request to provide Aqua with their safety policy and documentation of training to their employees, including but not limited to competent person, utility damage prevention, and traffic safety. Aqua also requires contractors to follow all state, federal, and OSHA rules and regulations in the implementation of a project. Contractors also are required to fill out a Job Hazard Awareness form daily, either utilizing the Aqua form or a similar form designated by the contractor. Moreover, contractors must provide the PPE for their employees, including hard hat, work gloves, reflective vest of shirt, safety shoes, and safety eyewear. Furthermore, contractors are responsible for following the requirements of PA One Call, including being responsible for all PA One Call requests for their project.

35. Finally, Aqua requires all employees and contractors to report immediately any injury that takes place to an employee of either party. Aqua also requires employees and

contractors to report any damage to utilities during the excavation process. The damage to utilities is recorded by Aqua, and Aqua also reports them to Common Ground Alliance Damage Information Reporting Tool ("DIRT"), a national database for underground damage reporting.

I. OUTREACH AND COORDINATION ACTIVITIES WITH OTHER UTILITIES, PENNDOT, AND LOCAL GOVERNMENTS

36. Aqua has been updating its GIS to incorporate its wastewater assets. Between the months of May and October, replacement candidates are typically chosen and prioritized for refurbishment in the subsequent budget year. Each potential refurbishment project is vetted by the corresponding construction division's superintendent, i.e., analyzed for feasibility of construction in the coming budget year. As part of the analysis process, Aqua accumulates information from PennDOT, counties, homeowners associations and municipalities as to their intentions to undertake paving and other public works projects during the budget year. Where Aqua chooses to undertake a pipe or manhole refurbishment project on a road pre-scheduled for paving, the project will be coordinated with the state, county or municipality. Aqua and the government agency will work together to insure that the design, permitting and construction of the pipe project will be completed in time to allow for the road to be paved. In some cases, where sewer main projects are large, the government agencies will agree to postpone paving of its roads to the following year. Typically, when Aqua undertakes a project where paving has been pre-planned by the government agency, Aqua and its rate payers will benefit financially through the avoidance of road surface restoration, usually a half-road milling and macadam overlay.

37. Unfortunately, most municipalities do not identify their paving plans in advance of Aqua's project selection. Annual municipal budgets may not be approved until early in the

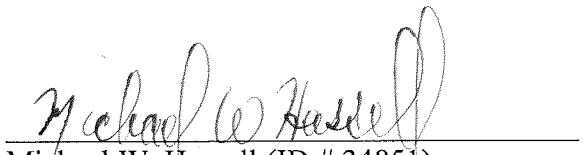
budget year resulting in paving projects not being formalized until well into the budget year. In these instances, Aqua must be proactive in identifying opportunities to coordinate pipe replacement and road paving. Although less frequent, continuous outreach by Aqua has resulted in additional coordination opportunities recently, including a track right of way slope stabilization project by Southeastern Pennsylvania Transportation Authority ("SEPTA") within the Media System.

38.

III. CONCLUSION

WHEREFORE, Aqua Pennsylvania Wastewater, Inc. respectfully requests that the Pennsylvania Public Utility Commission find that Aqua's second Long-Term Infrastructure Improvement Plan, which covers the five-year period of 2018 through 2022, contains all the necessary items identified in 66 Pa. C.S. § 1352(a) and 52 Pa. Code § 121.3(a), and addresses only eligible property, as defined by 66 Pa. C.S. § 1351, and that the Pennsylvania Public Utility Commission approve the Company's second Long-Term Infrastructure Improvement Plan.

Respectfully submitted,



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Of Counsel:
Post & Schell, P.C.

Dated: September 1, 2017

Counsel for Aqua Pennsylvania Wastewater, Inc.

Exhibit "A"

AQUA PENNSYLVANIA WASTEWATER, INC.

Long Term Infrastructure Improvement Plan

For the Period 2018 - 2022

Aqua Pennsylvania Wastewater, Inc. ("Aqua" or the "Company") is submitting this Long Term Infrastructure Improvement Plan ("LTIIP") in accordance with the requirements of Chapter 13 of the Public Utility Code, 66 Pa. C.S. §§ 1350-1360, Chapter 121 of Title 52 of the Pennsylvania Code, and the Pennsylvania Public Utility Commission's ("PUC" or the "Commission") Final Implementation Order entered on August 2, 2011, in Docket No. M-2012-2293611. The Company's LTIIP covers infrastructure investment through its established Distribution System Improvement Charge ("DSIC"). This second LTIIP is for the period of 2018 through 2022.

INTRODUCTION

Aqua Pennsylvania Wastewater, Inc. is the wastewater subsidiary of Aqua Pennsylvania, Inc. ("Aqua Pennsylvania") and was formed in 1996 with the purchase of the Little Washington Drainage Company which owned a wastewater system in East Brandywine Township, Pennsylvania. Since 1996 Aqua has grown steadily and currently owns and operates thirty-four (34) wastewater collection and conveyance systems and serves over 21,000 customers in fifteen (15) counties within Pennsylvania.

The Company has been organized into two operating groups within Pennsylvania, Southeastern Pennsylvania ("SEPA") and Greater Pennsylvania ("GPA").

- The GPA operating division serves approximately 10,700 customers in Adams, Carbon, Clarion, Clearfield, Lackawanna, Luzerne, Monroe, Pike, Schuylkill, Venango and Wyoming counties. The GPA operating division collection and conveyance systems include approximately 305 miles of pipe, approximately 2,979 manholes, and 73 pump stations.

- The SEPA operating division serves approximately 10,600 customers in Bucks, Chester, Delaware, and Montgomery counties. The SEPA operating division

collection and conveyance systems include approximately 67 miles of pipe, 1,567 manholes, and 32 pump stations.

On May 31, 2013, Aqua, then known as the Little Washington Wastewater Company ("LWWC")[1], filed its petition for approval of a DSIC and LTIIP in accordance with Act 11 of 2012.[2] This petition was approved by the Commission on September 12, 2013. Under Aqua's submitted LTIIP, Aqua stated its plans to increase its collection system infrastructure spending from about $630,000 per year to about $1.9 million per year over the course of the 5-year plan. Aqua's annual capital investment in its wastewater collection system was documented in its Annual Asset Optimization Plans ("AAOPs"), filed with the Commission annually each October beginning in 2014. Aqua's annual collection system investments per calendar year broken out by asset type are provided in the table below.

Division	Pump Stations	Manholes	Mains	Total
GPA 2013	133,524	-	3,865	137,389
SEPA 2013	189,538	-	-	189,538
Subtotal	**$323,062**	**$**	**$3,865**	**$326,927**
GPA 2014	366,581	86,048	275,795	728,425
SEPA 2014	136,331	-	580,936	717,268
Subtotal	**$502,913**	**$86,048**	**$856,732**	**$1,445,692**
GPA 2015	422,354	610,409	1,345,136	2,377,899
SEPA 2015	83,453	-	566,576	650,029
Subtotal	**$505,808**	**$610,409**	**$1,911,712**	**$3,027,928**
GPA 2016	146,397	237,494	234,593	618,484
SEPA 2016	69,889	-	486,162	556,051
Subtotal	**$216,286**	**$237,494**	**$720,755**	**$1,174,535**
GPA 2017*	*1,361,410*	*539,000*	*3,533,465*	*5,433,875*
SEPA 2017*	*69,700*		*307,335*	*377,035*
Subtotal	**$1,431,110**	**$539,000**	**$3,840,800**	**$5,810,910**
Total	**$2,979,178**	**$1,472,950**	**$7,333,864**	**$11,785,992**

* Note: Figures presented for 2017 are budgetary only. Final expenditures will vary.

[1] LWWC's name was changed to Aqua Pennsylvania Wastewater, Inc. effective January 1 2014. See Supplement No. 86 to Tariff Sewer-Pa. P.U.C. No. 1, Notification of Name Change to Aqua Pennsylvania Wastewater, Inc., Docket No. A-2013-2395509 (Dec. 17, 2013) (Secretarial Letter approving tariff supplement to implement name change).

[2] The Company did not file a separate petition for approval of its current LTIIP. Rather, Aqua attached the LTIIP, as an appendix to its DSIC petition. On July 3, 2013, LWWC filed a letter requesting the Commission to consider the Company's May 31, 2013 petition as seeking approval of both the proposed DSIC and LTIIP.

Since the inception of the DSIC program in late 2013 and projected through the end of 2017, Aqua will have cleaned and performed CCTV inspections of approximately 57.7 miles of sanitary sewer main, repaired and replaced approximately 7.6 miles of sanitary sewer mains, repaired approximately 500 manholes, and made mechanical repairs and improvements to the majority of its 105 pumping stations. While Aqua continues to improve the condition of its collection systems, substantial work remains on its infrastructure for some of the recent and new acquisitions which exhibit substantial inflow and infiltration ("I&I") problems as further discussed in this document.

A significant portion of the capital to be spent in this LTIIP will be focused on troubled systems that have been acquired. These newer acquisitions, Emlenton and Tobyhanna, will be the focus of our collection system rehabilitation efforts along with the GPA systems such as Treasure Lake, Lake Harmony, Mast Hope and Eagle Rock, and the SEPA Media system. Additionally, Aqua will concentrate on replacing pumping station control panels. In many of the Company's acquisitions, the original control panels were not fabricated in compliance with current electrical standards, particularly arc flash standards. Aqua is embarking on a program to replace these pumping station control panels with panels that will meet current electrical safety standards and that will provide safe access to the Company's operators by eliminating the need for operators to open and access the panels to operate these facilities.

The condition of Aqua's collection systems varies depending upon age, materials employed, and quality of the initial installation. Aqua strives to maintain the collection systems by performing work required to maintain integrity and reliability; however, many systems that have been acquired were in various states of disrepair, exhibiting aged infrastructure and significant I&I of ground and surface waters into the wastewater collection systems. Infiltration is groundwater that enters sanitary sewer systems through cracks and/or leaks in the sanitary sewer pipes, manholes and customer lateral connections. Cracks or leaks in sanitary sewer pipes and manholes have been observed to be caused by age-related deterioration, loose joints, improper installation and tree root intrusion. Groundwater can enter these cracks or leaks where the sanitary sewer systems lie beneath the water table and where the soil

above the sewer systems becomes saturated. Additionally, sanitary laterals servicing households and businesses were found to be improperly connected to the sewer main with significant groundwater infiltration.

During dry weather the impact of I&I can vary from minimal impact to affecting a significant portion of the sewer capacity. Wet weather magnifies existing I&I sources. As a rain or snow melt event begins the I&I sources start filling the sewer systems with clear water, eventually filling the sewer systems above the sewer pipe. Once the sanitary sewer systems have exceeded capacity or become overloaded, wastewater flows at a much higher water level than normal and sanitary fixtures located below this overload level may cause households to flood and manhole lids to pop off and release raw wastewater into the environment, possibly causing Clean Water Act violations.

I&I reduces the ability of sanitary sewer systems and treatment facilities to transport and treat domestic and industrial wastewater. As a result of the I&I, wastewater treatment processes are disrupted and poorly treated wastewater may be discharged to the environment.

Overflow occurrences put public health and safety at risk and may violate state and federal environmental regulations. Sanitary sewer overflows release wastewater and potential pathogens onto streets, into waterways, and basements increasing potential health risks. As wastewater overflows into creeks, rivers, lakes, and streams it can contaminate bodies of water fed by the waterways and all creatures/plants coming in contact with the polluted water. Additionally, to the extent the affected water bodies are used as a source of water supply by downstream water suppliers, it can result in the need to provide additional treatment to insure proper disinfection.

During the period of this second LTIIP, Aqua's primary focus in its accelerated collection system refurbishment program will be to continue the systematic investigation of those sewer systems with moderate to severe I&I, to schedule corrective measures to reduce or eliminate the I&I, and to refurbish and/or replace aged pumping facilities.

1 – Type and Age of Eligible Property

Aqua developed a Geographic Information System ("GIS") for all of its wastewater collection systems within the GPA operating division in 2013 with the exception of the Tobyhanna system (acquired in July 2017) and the Emlenton system (acquired in December 2016). Data concerning these two recently-acquired systems will be included in the GIS as it becomes available. Additionally, Aqua is on schedule to complete the surveying for the collection of the GIS data for the SEPA operating division's collection system by the fall of 2017. The Aqua GIS system stores data on sewer mains, manholes, valves, pump stations, etc., and will be updated continually as the collection system changes with the addition of new pipe and the replacement of old pipe. Aqua utilizes, among other things, the GIS to identify and rate the mains, manholes, and pump stations on a priority basis for repair and replacement.

The following tables describe Aqua's collection system inventory in terms of asset category (gravity main, force main, manhole, pump station, etc.) and includes information on material, diameter, and age. It is likely that some small percentage of data will remain "unknown", as occasionally data simply does not exist for older or acquired facilities. However, by implementing GIS and similar programs, procedures will be established to capture the required data as continuing investigatory and repair work proceeds.

Types of sewer main

Gravity: Piping that conveys wastewater by gravity with access manholes placed at set intervals along the sewer pipe, at pipe intersections and changes in pipeline direction.
Force Main: The discharge pipeline from a pumping station integral to the collection system.
Low Pressure: A sewer system designed to transport sewage by means of pressure derived from individual pumping units located on each parcel of land being served by the sewer.

Table 1.1 depicts the breakdown of mains, including gravity, low pressure, and force main for all of the wastewater collection systems within the operating divisions.

Table 1.1 – Pipe Type and Quantity by Region

Type	Length (feet)	Percent of Total
SEPA Operating Division		
Gravity	275,316	78%
Force Main	73,388	21%
Low Pressure	5,707	2%
Total	**354,411**	**100%**
GPA Operating Division		
Gravity	693,653	43%
Force Main	213,265	13%
Low Pressure	697,713	43%
Unknown	5,541	0.3%
Total	**1,610,172**	**100%**
Total All Operating Divisions		
Gravity	968,969	49%
Force Main	286,653	15%
Low Pressure	703,420	36%
Unknown	5,541	0.3%
Total	**1,964,583**	**100%**

Table 1.2 breaks down the collection system by material for all of the wastewater collection systems within the operating divisions.

Table 1.2 – Pipe Material by Region

Type	Length (feet)	Percent of Total
SEPA Operating Division		
Polyvinyl Chloride ("PVC")	202,046	57%
Terra Cotta ("TC")	85,000	24%
Asbestos Cement ("AC")	8,490	2%
HD Polyethylene ("HDPE")	2,220	0.6%
Ductile Iron ("DI")	13,938	4%
Unknown	42,717	12%
Total	**354,411**	**100%**
GPA Operating Division		
Polyvinyl Chloride ("PVC")	1,293,502	80%
Terra Cotta ("TC")	64,539	4%

Asbestos Cement ("AC")	18,949	1%
Truss Pipe ("T")	584	0.04%
Cast Iron ("CI")	4,916	0.3%
Ductile Iron ("DI")	1,377	0.09%
ABS ("ABS")	76,900	5%
Unknown	149,405	9%
Total	**1,610,172**	**100%**
Total All Operating Divisions		
Polyvinyl Chloride ("PVC")	1,495,548	76%
Terra Cotta ("TC")	149,539	8%
Asbestos Cement ("AC")	27,439	1%
Truss Pipe ("T")	584	0.03%
ABS ("ABS")	76,900	4%
HD Polyethylene ("HDPE")	2,220	0.1%
Cast Iron ("CI")	4,916	0.3%
Ductile Iron ("DI")	15,315	0.8%
Unknown	192,122	10%
Total	**1,964,583**	**100%**

Tables 1.3A-C provide a breakdown of the pipe inventory by size for all of the wastewater collection systems within the operating divisions.

Table 1.3A – Pipe Diameter for SEPA Operating Division

Type	Diameter	Length (Feet)	Percent of Total
Gravity	8"	264,622	96%
	10"	6,280	2%
	12"	3,320	1%
	16"	1,040	0.4%
	18"	54	0.02%
	Total	**275,316**	**100%**
Low Pressure	1.5"	80	1%
	2"	957	17%
	2.5"	720	13%
	3"	3,950	69%
	Total	**5,707**	**100%**
Force Main	2"	13,884	19%
	2.5"	594	0.8%
	3"	7,751	11%

	4"	35,547	48%
	6"	6345	9%
	8"	8,606	12%
	12"	661	0.9%
	Total	**73,388**	**100%**

Table 1.3B – Pipe Diameter for GPA Operating Division

Type	Diameter	Length (Feet)	Percent of Total
Gravity	3"	60	0.009%
	4"	2,478	0.4%
	6"	14,383	2%
	8"	515,396	74%
	10"	33,675	5%
	12"	28,901	4%
	15"	33,268	5%
	18"	16,910	2%
	21"	550	0.08%
	24"	3,903	0.6%
	Unknown	44,129	6%
	Total	**693,653**	**100%**
Low Pressure	1.25"	4,924	0.7%
	1.5"	15,613	2%
	2"	80,088	11%
	2.5"	55,506	8%
	3"	134,250	19%
	4"	353,914	51%
	6"	19,775	3%
	Unknown	33,643	5%
	Total	**697,713**	**100%**
Force Main	2"	34,600	16%
	3"	21,172	10%
	4"	72,179	34%
	6"	39,491	19%
	8"	2,784	1%
	Unknown	43,039	20%
	Total	**213,265**	**100%**
Unknown[3]	Unknown	**5,541**	**100%**
	Total	**5,541**	**100%**

[3] Unknown as to the type or diameter of pipe.

Table 1.3C – Total Pipe Diameter for All Operating Divisions

Type	Diameter	Length (Feet)	Percent of Total
Gravity	3"	60	0.006%
	4"	2,478	0.3%
	6"	14,383	1%
	8"	780,018	80%
	10"	39,955	4%
	12"	32,221	3%
	15"	33,268	3%
	16"	1,040	0.1%
	18"	16,964	2%
	21"	550	0.06%
	24"	3,903	0.4%
	Unknown	44,129	5%
	Total	**968,969**	**100%**
Low Pressure	1.25"	4,924	0.7%
	1.5"	15,693	2%
	2"	81,045	12%
	2.5"	56,226	8%
	3"	138,200	20%
	4"	353,914	50%
	6"	19,775	3%
	Unknown	33,643	5%
	Total	**703,420**	**100%**
Force Main	2"	48,484	17%
	2.5"	594	0.2%
	3"	28,923	10%
	4"	107,726	38%
	6"	45,836	16%
	8"	11,390	4%
	12"	661	0.2%
	Unknown	43,039	15%
	Total	**286,653**	**100%**
Unknown[4]	Unknown	5,541	100%
	Total	**5,541**	**100%**
All	**Total**	**1,964,583**	

[4] Unknown as to the type or diameter of pipe.

Table 1.4 provides a breakdown of pipe age for all of the wastewater collection systems within the operating divisions.

Table 1.4 – Pipe Vintage by Region

Installation Year	Length (feet)	Percent of Total
GPA Operating Division		
1951-1975	69,524	4%
1976-2000	1,207,824	75%
2001-2010	276,529	17%
<= 2011	56,295	4%
Total	**1,610,172**	**100%**
SEPA Operating Division		
1925-1950	89,491	25%
1976-2000	147,941	42%
2001-2010	116,979	33%
Total	**354,411**	**100%**
All Operating Divisions		
1925-1950	89,491	4.6%
1951-1975	69,524	3.5%
1976-2000	1,355,765	69%
2001-2010	393,508	20%
<= 2011	56,295	3%
Total	**1,964,583**	**100%**

Table 1.5 provides a breakdown of manholes for all of the wastewater collection systems within the operating divisions.

Table 1.5 – Manholes for All Operating Divisions

Division	# of precast manholes	# of brick manholes	# of unknown manholes	Total manholes	Percent of Total
GPA	2,792	49	138	2,979	66%
SEPA	1,113	454	0	1,567	34%
Total	**3,905**	**503**	**138**	**4,546**	**100%**

Tables 1.6A-B provide a breakdown of intermediate pump stations for all of the wastewater collection systems within the two operating divisions.

Table 1.6A – Pump Stations for GPA Operating Division

System	# of pump stations	Percent of Total	Material	Installation Year
Eagle Rock	27	37%	Steel/Precast/Fiberglass	1976-2012
Mast Hope	9	12%	Precast	1976-2000
Woodloch Springs	7	10%	Precast	1976-2000
Pinecrest	6	8%	Precast	1976-2000
Cove Village	5	7%	Precast	1976-2000
White Haven	5	7%	Precast	1951-2010
Links at Gettysburg	2	3%	Precast	2000-2010
Lake Harmony[5]	0	0%	N/A	N/A
Laurel Lakes	1	1%	Precast	1980
Beech Mountain	0	0%	N/A	N/A
Rivercrest	0	0%	N/A	N/A
Thornhurst	0	0%	N/A	N/A
Washington Park	0	0%	N/A	N/A
Bunker Hill	0	0%	N/A	N/A
Tobyhanna	4	6%	Precast	2000-2010
Treasure Lake	6	8%	Steel	1976-2000
Emlenton	1	1%	Cast-in-Place	1976-2000
Total	**73**	**100%**		

[5] Lake Harmony, aka Kidder Township.

Table 1.6B – Pump Stations for SEPA Operating Division

System	# of pump stations	Percent of Total	Material	Installation Year
Brandywine River	4	13%	Precast	1997
Stony Creek	3	9%	Precast	2007-2013
Willistown Woods	3	9%	Precast	1982-2003
Bridlewood	2	6%	Precast	1996
Media	2	6%	Cast-in-Place, Precast	1925-1973
Twin Hills	2	6%	Precast	1992-2003
Deerfield	1	3%	Precast	1980-1982
Villages Valley Forge	1	3%	Precast	2010-2012
East Brandwine	1	3%	Precast	1973-1997
New Daleville	1	3%	Precast	2005-2008
Peddler's View	1	3%	Precast	1994-1997
Penn Township	7	22%	Precast	1990-2000
Penn Oaks	1	3%	Precast	1998
Plumsock	1	3%	Precast	1991
Sage Hill	1	3%	Precast	2008
Newlin Green	0	0%	Precast	2004
Honeycroft	1	3%	Precast	2013
Total	**32**	**100%**		

2 – Schedule for planned repair and replacement of eligible property

Recognizing the need for continual renewal of the Company's collection and conveyance systems to maintain quality and reliable service to its customers, Aqua has been rehabilitating and replacing system components since acquiring each of its sewer systems. Looking forward, Aqua has prioritized pumping stations and sewer main renewal/rehabilitation candidates at both a macro and micro level.

Macro Planning

At the macro level, general categories of sewer components (for example, old and broken terra cotta mains, deteriorating manholes, and aging pump stations) and geographic areas within a system have been identified as areas of concern. Any sewer features fitting these criteria are considered potential candidates for near-term replacement. The macro examination also eliminates certain pipe from consideration for replacement. For example, PVC less than 20 years old and systems known to have only minor I&I issues are unlikely to need current repair and replacement.

At this level, it is useful to define the pool of "potential" candidate sewer collection system components for replacement. There are several sewer collection and conveyance categories that will be used to determine the major areas of concern. Past sewer investigations have identified pipes and manholes that require repair/replacement and systems with significant I&I issues will also be targeted for inspection and assessment. Additionally, older pump stations will be identified for evaluation and refurbishment. Systems with PVC pipe less than 20 years old that have only minor I&I issues will not be targeted for rehabilitation.

I&I analyses are to be performed to demonstrate the degree of excessive I&I in each sewer system tributary to the treatment works. Systematic investigations of the sewer systems will identify the presence, flow rate, and type of I&I conditions that exist in each sewer system. The systematic investigation will include the following: video inspections of pipes, estimates of average residential, industrial, commercial and institutional wastewater flows, continuous flow monitoring, in some cases flow isolation monitoring and determination of I&I flow rates, and rainfall monitoring.

Micro Planning

At the micro level, main replacement planning addresses the priority in which specific pipes and manholes within the broader categories are replaced or rehabilitated. This requires taking into account the results of I&I elimination investigations and existing performance characteristics of the main such as cracks, sags and other performance criteria that are to be incorporated into the GIS data.

The results of I&I investigations and main inspections will be utilized to target specific pipe segments and structures requiring rehabilitation. The schedule of repair and replacement projects are prioritized based upon environmental impact, public health, severity and capacity needs of the area. Digging up and replacing defective sewer pipes is no longer the only solution available for eliminating I&I. Today, this method is reserved for cases in which the structural integrity of the pipe is severely degraded beyond repair, the pipe is seriously misaligned, or when other rehabilitation methods are not deemed practical or cost effective. The cost effectiveness of new trenchless or in-place rehabilitation technologies has eliminated much of the need to excavate and replace sewer piping. Sewer mains determined to require repair will be evaluated to determine the most cost effective approach. Repair methods to be utilized for gravity sewers include sliplining with HDPE pipe and cured-in-place lining (inversion lining). If it is determined that an existing line cannot be repaired, complete replacement with PVC pipe for gravity mains is the likely approach. Bypass pumping measures are required when necessary to maintain the serviceability of the collection system.

Aqua's preferred methods of sewer rehabilitation are sliplining and cured-in-place pipe liners ("CIPP"). When sliplining, a slightly smaller diameter HDPE pipe is installed inside the existing pipe. CIPP is formed by inserting a flexible polyester or epoxy resin-filled felt tube into a pipe, which is inverted against the inner wall of the existing pipe and then allowed to cure.

3 – Location of Eligible Property and Regional Characteristics

The GPA operating division consists of seventeen (17) wastewater systems containing nineteen (19) wastewater treatment plants ("WWTPs"). In general, these systems are in "fair" to "poor" condition, with moderate to severe I&I issues and structural defects. Corrective measures are needed, including but not limited to I&I and structural investigation/rehabilitation and replacement of aged pump station components.

Table 3.1 – GPA Operating Division Systems

Name	County	Sewer Customers	Acquisition Date
Beech Mountain	Luzerne	954	May 4, 2012
Bunker Hill	Wyoming	66	August 11, 2016
Cove Village	Schuylkill	155	August 5, 2009
Eagle Rock	Luzerne and Schuylkill	1,015	June 24, 2004
Emlenton	Venango & Clarion	431	December 30, 2016
Lake Harmony	Carbon	1,004	September 28, 2012
Laurel Lakes	Luzerne	199	July 1, 2005
Links at Gettysburg	Adams	171	September 1, 2004
Mast Hope	Pike	1,318	January 26, 2006
Pinecrest	Monroe	346	December 18, 2003
Rivercrest	Wyoming	221	June 28, 2002
Thornhurst	Lackawanna	307	August 6, 2004
Washington Park	Wyoming	134	March 31, 2009
White Haven	Luzerne	759	March 12, 2002
Woodloch Springs	Pike	649	December 1, 2003

Tobyhanna	Monroe	740	June 30, 2017
Treasure Lake	Clearfield	2200	March 1, 2013
TOTAL		**10,669**	

The SEPA operating division serves seventeen (17) collection and conveyance systems and contains sixteen (16) WWTPs. In general, these systems are in "fair" to "good" condition and have minor I&I issues and structural defects, with the exception of the Media system. Corrective measures are needed within the Media system, including but not limited to I&I and structural investigation/rehabilitation and system component replacement.

Table 3.2 – SEPA Operating Division Systems

Name	County	Sewer Customers	Acquisition Date
Brandywine River Estates	Chester	81	March 11, 1999
Bridlewood	Chester	510	December 16, 2002
Deerfield Knoll	Chester	119	July 18, 1995
East Brandywine	Chester	349	November 22, 1996
Honeycroft	Chester	108	October 31, 2016
Media Borough	Delaware	6,770	April 5, 2001
New Daleville	Chester	111	October 30, 2008
Newlin Green	Chester	49	August 9, 2007
Peddler's View	Bucks	214	September 24, 1997
Penn Township	Chester	803	March 28, 2014
The Greens at Pen Oaks	Chester	71	June 29, 2007
Plumsock	Chester	38	October 13, 2000
Sage Hill	Chester	21	December 21, 2012

Stony Creek	Montgomery	209	April 30, 2010
Twin Hills	Chester	330	April 13, 2000
Village at Valley Forge	Chester & Montgomery	21	March 30, 2012
Willistown Woods	Chester	782	November 17, 1999
TOTAL		**10,586**	

GPA Operating Division

Beech Mountain – The Beech Mountain collection and conveyance system is a low pressure sewer system that conveys wastewater to the Butler Township owned WWTP. This collection and conveyance system has no known I&I issues or hydraulic overload conditions however periodic main breaks have occurred.

Bunker Hill – The Bunker Hill collection and conveyance system consists of gravity sewer mains with a few grinder pumps. The majority of the collection system conveying flow to the WWTP can be generally classified as being in fair to good condition. Detailed collection system mapping is currently underway and mapping will be updated on a regular basis as additional information regarding the system becomes available.

The average daily wastewater flow conveyed to the treatment facility in 2016 was 0.015 million gallons daily ("MGD") (15,000 gallons per day ("gpd")). The average daily maximum flow for 2016 was 0.045 MGD (45,000 gpd). Aqua will continue to seek out sources of extraneous flow to reduce the susceptibility to wet weather induced flows.

Cove Village – The Cove Village collection and conveyance system consists of sections of low pressure sewer mains, gravity sewer, manholes, and five (5) pump stations. The collection and conveyance system conveys flow to the Aqua owned WWTP, which has a permitted hydraulic capacity of 0.10 MGD.

- In 2016, the annual average daily flow being conveyed through the system and received at the WWTP was 0.02 MGD (20,000 gpd).

- In 2016, the annual average daily flow per connection was 124.2 gpd/Equivalent Dwelling Unit ("EDU") based upon 161 EDUs. This is less than the 2012 average of 143 gpd per EDU.

This system experiences significant I&I flows during heavy rain events and snow melts with flows measured in excess of six times the average daily flow. Therefore, Aqua has deemed this system to have significant I&I issues which will need to be addressed to prevent future hydraulic overload conditions at the WWTP and at the pump stations.

Eagle Rock – The Eagle Rock collection and conveyance system consists of sections of low pressure sewer mains, gravity sewer, manholes, and twenty-seven (27) pump stations. The collection and conveyance system conveys flow to the Aqua owned WWTP, which has a permitted hydraulic capacity of 0.350 MGD.

- In 2016, the annual average daily flow being conveyed through the system and received at the WWTP was 0.1225 MGD (122,500 gpd), down from 0.163 MGD (163,000 gpd) in 2012.

- In 2016, the annual average daily flow per connection was 121 gpd/EDU based upon 1,024 EDUs. This is down from 179 gpd/EDU in 2012.

This system still experiences significant I&I flows during heavy rain events and snow melts with flows measured in excess of four times the average daily flow. Flows during rain events, however, have been reduced as a result of the Company's collection system work at Eagle Rock as evidenced by the reduction in the daily flow rate despite the increase in the number of connections in the system. Aqua continues to deem this system having significant I&I issues that will be addressed in upcoming projects to correct deficiencies within the collection and conveyance system.

Additionally, Aqua has worked through its DSIC program to improve the pumping stations at Eagle Rock. Major work to improve the reliability of several key pumping stations is being planned. The Bella Coola pumping station in particular is planned to be upgraded to improve capacity and reliability in addition to eliminating surcharging of the low influent main that serves the homes adjacent to the pumping station. That influent pipe is prone to surcharging and, due to the influent pipe's deep wet well

connection, significantly restricts the wet well operating volume of the pumping station.

Emlenton – The Emlenton system consists of three (3) collection and conveyance systems that serve three (3) wastewater treatment facilities, namely, the Emlenton system, the Mariasville system, and the Lamertine system. The Emlenton system consists of 127 manholes and gravity mains that convey wastewater to the treatment facility rated at 0.2 MGD (200,000 gpd). In 2016 the average daily flow was 0.11 MGD (110,000 gpd) with an average maximum flow of 0.236 (236,000 gpd). The 2016 average flow per connection was 242 gpd/EDU, which is high and indicates significant I&I issues with the collection system. Mitigating I&I in the Emlenton System will be a priority for Aqua.

The Mariasville system, also part of the Emlenton acquisition, consists of a low pressure sewer system connected to residential grinder pump stations that convey wastewater to the treatment facility which has a rated hydraulic capacity of 0.008 MGD (8,000 gpd). In 2016, the average daily flow at Mariasville was 0.026 MGD (26,000 gpd). The three-month maximum average flow for 2016 was 0.033 MGD (16,000 gpd).

The Mariasville collection system is in good condition. The collection system consists entirely of pressurized mains and is maintained on an as-needed basis. Every EDU has a grinder pump that pumps directly to the WWTP.

Lake Harmony (Kidder Township) – The Lake Harmony collection and conveyance system serves the Lake Harmony area of Kidder Township and the Split Rock residential community, and consists of 790 individual on-lot grinder pumps owned by Aqua, low pressure sewer mains, gravity sewer, and manholes. Flows are conveyed to the Aqua owned WWTP which has a permitted hydraulic capacity of 0.400 MGD.

In 2016, the annual average daily flow being conveyed through the system and received at the WWTP was 0.1825 MGD (182,500 gpd), down from 0.195 MGD (195,000 gpd) as reported in 2012.

- The average flow per EDU at Lake Harmony was 121.5 gpd/EDU for 2016 based upon 1,515 EDUs. This is slightly below the 130 gpd/EDU measured in 2012.

This collection and conveyance system has significant I&I issues, which will need to be addressed to prevent hydraulic overload conditions at the WWTP during peak events. Peak instantaneous flows measured at the treatment facility during rain events and snow melts have been recorded greater than three to four times the average daily flow which greatly exceeds the hydraulic capacity of the WWTP. Aqua is currently in the design phase of an upgrade project to the treatment facility to improve its ability to handle peak flow conditions at the plant. Additionally, the residential grinder pumping stations were inspected to identify units subject to inflow and in need of repair. Aqua is currently evaluating its options to remediate I&I at the grinder pumping stations.

Laurel Lakes – The Laurel Lakes collection and conveyance system consists of sections of low pressure sewer mains, gravity sewer, and manholes. The collection and conveyance system conveys flow to the Aqua owned WWTP, which has a permitted hydraulic capacity of 0.0875 MGD.

- In 2016, the annual average daily flow being conveyed through the system and received at the WWTP was 0.0447 MGD (44,500 gpd), down from 0.047 MGD (47,000 gpd) in 2012.

- In 2016, the annual average daily flow per connection was 228.6 gpd/EDU. This is down from 241 gpd/EDU reported in 2012.

Flows measured at the WWTP during rain events and snow melts have been measured in excess of two times the average daily flow. Therefore, the Company has deemed this system to have moderate I&I issues that will need to be addressed in the near future to prevent future hydraulic overload conditions at the WWTP.

Links at Gettysburg – The Links at Gettysburg collection and conveyance system consists of sections of gravity sewer, manholes, and two (2) pump stations. The collection and conveyance system conveys flow to the Aqua owned WWTP, which has a permitted hydraulic capacity of 0.06 MGD.

- In 2016, the annual average daily flow being conveyed through the system and received at the WWTP was 0.0213 MGD (21,300 gpd). This reported flow rate is above the reported 2012 flow rate of 0.015 MGD (15,000 gpd) and is attributed

to the 48 additional dwelling units connected since 2012.

- In 2016, the annual average daily flow per connection was 124 gpd/EDU which was approximately the same as reported in 2012.

The figures for 2016 do not depict significant issues with I&I and wastewater flows are well within the WWTP hydraulic capacity. Accordingly, the Company has deemed that this system does not have notable I&I issues and, therefore, is a low priority.

Mast Hope – The Mast Hope collection and conveyance system consists of sections of low pressure sewer mains, gravity sewer, manholes, and nine (9) pump stations. The collection and conveyance system serves the Mast Hope residential community and conveys flow to the Aqua owned WWTP, which has a permitted hydraulic capacity of 0.10 MGD.

- In 2016, the annual average daily flow being conveyed through the system and received at the WWTP was 0.064 MGD which was slightly above the reported 2012 average of 0.063 MGD (63,000 gpd). The increase in flow was due to the connection of an additional 50 EDUs.

- In 2016, the annual average daily flow per connection was 48.7 gpd/EDU based upon 1,314 EDUs. This is down from 50 gpd/EDU in 2012.

This collection and conveyance system has significant I&I issues that will need to be addressed in the near future with additional projects. Peak flows associated with rain events have been measured at the treatment facility exceeding four times the average daily flow.

Pinecrest – The Pinecrest collection and conveyance system consists of sections of low pressure sewer mains, gravity sewer, manholes, and six (6) pump stations. The collection and conveyance system conveys flow to the Aqua owned WWTP, which has a permitted hydraulic capacity of 0.10 MGD.

- In 2016, the annual average daily flow being conveyed through the system and received at the WWTP was 0.0304 MGD (30,400 gpd), down from 0.034 MGD (34,000 gpd) reported in 2012.

- In 2012, the annual average daily flow per connection was 87.9 gpd/EDU based upon 346 EDUs. This is reduced from 101 gpd/EDU reported for 2012.

This collection and conveyance system has minor I&I issues, which are envisioned to be addressed through the Company's long term maintenance program.

Rivercrest – The Rivercrest collection and conveyance system consists of gravity sewer and manholes. The collection and conveyance system serves the Rivercrest residential community and conveys flow to the Aqua owned WWTP, which has a permitted hydraulic capacity of 0.087 MGD.

- In 2016, the annual average daily flow being conveyed through the system and received at the WWTP was 0.0189 MGD (18,900 gpd), down from 0.021 MGD (21,000 gpd) reported for 2012.

- In 2016, the annual average daily flow per connection was 85.5 gpd/EDU, down from 97 gpd/EDU reported for 2012.

This collection and conveyance system has minor I&I issues that are envisioned to be addressed through the Company's long term maintenance program.

Thornhurst – The Thornhurst collection and conveyance system consists of sections of low pressure sewer mains, gravity sewer, and manholes. The collection and conveyance system serves the Thornhurst residential community and conveys flow to the Aqua-owned WWTP, which has a permitted hydraulic capacity of 0.070 MGD.

- In 2016, the annual average daily flow being conveyed through the system and received at the WWTP was 0.0345 MGD (34,500 gpd), slightly greater than the 0.033 MGD (33,000 gpd) reported for 2012.

- In 2016, the annual average daily flow per connection was 113 gpd/EDU based upon 305 EDUs. This slightly exceeds the 109 gpd/EDU reported for 2012.

This collection and conveyance system has moderate I&I issues, which will need to be addressed to prevent hydraulic overload conditions at the WWTP during peak events.

Tobyhanna – The Tobyhanna collection and conveyance system encompasses an approximate two-mile radius surrounding Blakeslee corners in the western section of Tobyhanna Township, Monroe County, Pennsylvania. The collection system is made up of approximately 5,700 linear feet of 12-inch gravity main, 62,200 linear feet of 8-inch gravity main, and 12,000 linear feet of 2 inch pressurized main. The facility design, construction and operation were approved by Water Quality Management Permit #4596402.

- The wastewater treatment facility's design monthly average flow is 0.300 MGD (300,000 gpd) and the maximum monthly design flow is 0.375 MGD (375,000 gpd).

- In 2016, the average daily flow received at the treatment facility was 0.0938 MGD (93,800 gpd) and the average maximum flow was 0.2535 MGD (253,500 gpd).

The general condition of the collection system is good structurally, however, the system experiences very significant I&I during wet weather conditions. Aqua is aware of this issue and will be working to control the volume of I&I over the next few years.

Washington Park – The Washington Park collection and conveyance system consists of gravity sewer and manholes. The collection and conveyance system serves the Washington Park residential community and conveys flow to the Aqua owned WWTP, which has a permitted hydraulic capacity of 0.070 MGD.

- In 2016, the annual average daily flow being conveyed through the system and received at the WWTP was 0.0232 MGD (23,200 gpd), down from 0.030 MGD (30,000 gpd) reported for 2012.

- In 2016, the annual average daily flow per connection was 173 gpd/EDU based upon 134 EDUs. This is down from the 222 gpd/EDU reported for 2012.

This collection and conveyance system has significant I&I issues with flows during rain events and snow melts greater than six times the average daily flow. This collection system requires rehabilitation as soon as possible to prevent hydraulic overload

conditions at the WWTP during peak events.

White Haven – The White Haven collection and conveyance system consists of sections of gravity sewer, manholes, and four (4) pump stations. The collection and conveyance system serves the Borough of White Haven, East Side Borough, Penn Lake Borough, Dennison Township and a portion of Foster Township. Flow is conveyed to the Aqua owned WWTP, which has a permitted hydraulic capacity of 0.60 MGD.

- In 2016, the annual average daily flow being conveyed through the system and received at the WWTP was 0.3738 MGD (373,800 gpd), which is higher than the 0.328 MGD (328,000 gpd) reported for 2012. The increase in received flow is due to an increase in the number of connections within the system as reported below.

- In 2016, the annual average daily flow per connection was 269.7 gpd/EDU based upon 1,386 connections. This is down from the 290 gpd/EDU reported for 2012.

The collection system serving the Borough of White Haven consists of approximately 49,300 feet of 8-inch, 10-inch, and 12-inch diameter sanitary sewers, 135 manholes, and 14 cleanouts. About two-thirds of the system is vitrified clay pipe and the remainder is PVC. The older manholes are of brick and mortar construction. The condition of the sanitary sewer system ranges from acceptable to poor.

In 1998, the Dennison Township Collection System was added to the service area of Aqua. This area, contiguous to White Haven Borough along Route SR 2041 to the north, consists of approximately 10,000 lineal feet of 8" diameter sewers, 55 pre-cast manholes, 1,600 feet of 4-inch force main, and a submersible pumping station owned by Dennison Township, serviced by Aqua.

A sewer extension to the collection system was constructed in 2000 along SR 940 in Kidder Township from the White Haven WWTP to the Ramada Inn located east of the Pocono Interchange of the Pennsylvania Turnpike, approximately 4.5 miles from the Borough of White Haven. East Side Borough has also been connected to Aqua's collection system during the same construction project. The sewer extensions consist of approximately 30,000 lineal feet of 2-inch, 6-inch, 8-inch and 10-inch diameter (force

main and gravity) sanitary sewers, 112 manholes, 6 cleanouts, 2 air release manholes and 1 meter pit.

In 2006, Penn Lake Park Borough completed construction on a low pressure sewer system, which consists of varying diameter HDPE piping, air release valves, isolation valves, and numerous cleanouts. This system connects into the gravity sewer in Dennison Township, which is located on Route SR 2041.

In March 2010, the Foster Township Hickory Hills and Ag-Mar WWTPs were abandoned and a new submersible pump station was installed at each location. The Hickory Hills pump station collects wastewater from the Hickory Hills development and conveys wastewater to the Ag-Mar pump station. The Ag-Mar pump station then conveys wastewater collected from the Ag-Mar development and Hickory Hills to the White Haven collection system. The Hickory Hills Development collection system serves 323 residential EDU's and is comprised of approximately 34,000 linear feet of 8-inch asbestos cement, terra cotta, and PVC gravity sewers. The system also includes approximately 115 pre-cast concrete manholes.

The Ag-Mar collection system serves 91 residential EDU's and is comprised of approximately 12,600 linear feet of 6 to 8-inch diameter sewer lines and approximately 25 manholes.

Wastewater flows received at the WWTP during rain events in 2016 averaged 2 times the average daily flow. This collection system has I&I issues and hydraulic "bottlenecks" that will need to be addressed in the near future. A project to relieve hydraulically overloaded mains is currently being designed.

Woodloch Springs – The Woodloch Springs collection and conveyance system consists of sections of low pressure sewer mains, gravity sewer, manholes, and seven (7) pump stations. The collection and conveyance system conveys flow to the Aqua owned WWTP, which has a permitted hydraulic capacity of 0.15 MGD.

- In 2016, the annual average daily flow being conveyed through the system and received at the WWTP was 0.077 MGD (77,000 gpd). This is greater than the 0.064 MGD (64,000 gpd) reported for 2012.

- In 2016, the annual average daily flow per connection was 118.6 gpd/EDU based upon 649 EDUs. This is greater than the 100 gpd/EDU reported for 2012.

This collection and conveyance system has moderate I&I issues which will need to be evaluated and addressed.

The Woodloch Springs portion of the collection system and treatment plant has been in operation for 15 years, while the Woodloch Pines portion of the collection system has been in operation for over 30 years. The entire collection system and wastewater treatment plant are classified as being in stable condition. In 2013, Aqua completed a full upgrade of Pump Stations 1 and 3, which includes new rails, chains, pumps, and controllers. No significant repairs or upgrades were performed in 2014 and 2015. In 2016, approximately 400 LF of new 6-inch force main was installed from Pump Station 2 under a creek. In 2017, a stationary emergency generator is proposed at Pump Station 2.

Treasure Lake East – The Treasure Lake East ("TLE") collection and conveyance system consists of sections of low pressure sewer mains with 156 Aqua owned on-lot grinder pumps, gravity sewer, manholes, and one pump station. The collection and conveyance system conveys flow to the Aqua owned WWTP, which has a permitted hydraulic capacity of 0.740 MGD.

- In 2016, the annual average daily flow being conveyed through the system and received at the WWTP was 0.221 MGD (221,000 gpd) and the maximum average daily flow was 0.467 MGD (467,000 gpd). These figures equate to a peak to average flow ratio of 2.11.

- In 2016, the annual average daily flow per connection was 278.7 gpd/EDU based upon 793 EDUs. This is high and suggests significant I&I into the collection system.

The TLE collection and conveyance system has experienced significant I&I issues that are currently being addressed to prevent wet weather related hydraulic overload conditions at the WWTP. At this time, there are no known hydraulic or operational problems with the collection system. There have been no wastewater overflows due to surcharging of the

mains. This demonstrates the system's overall ability to convey the wastewater. Portions of the collection system, however, have significant I&I issues.

Treasure Lake West – The Treasure Lake West ("TLW") collection and conveyance system consists of sections of low pressure sewer mains with 219 Aqua owned on-lot grinder pumps, gravity sewer, manholes, and four pump stations. The collection and conveyance system conveys flow to the Aqua-owned WWTP, which has a permitted hydraulic capacity of 1.0 MGD.

- In 2016, the annual average daily flow being conveyed through the system and received at the WWTP was 0.341 MGD (341,000 gpd) and the maximum average monthly flow was 0.642 MGD (642,000 gpd). These figures equate to a ratio of 1.88.
- In 2016, the annual average daily flow per connection was 225.7 gpd/EDU.

This collection and conveyance system has I&I issues, which will need to be addressed in the near future to prevent wet weather related hydraulic overloading of the WWTP.

Wastewater is adequately conveyed to the WWTP with no known hydraulic or operational problems. There have been no wastewater overflows within this collection system due to surcharging of the system, which demonstrates the system's overall ability to convey the wastewater. As noted previously, however, portions of the collection system have had significant I&I issues.

Southeast Operating Division

Brandywine River Estates – The Brandywine River Estates collection and conveyance consists of gravity sewer, manholes and four (4) pumping stations. The collection and conveyance system conveys flow to the Aqua owned WWTP which has a permitted hydraulic capacity of 0.0185 MGD.

- In 2016, the annual average daily flow received at the WWTP was 0.0111 MGD (11,100 gpd). This is less than the 0.0118 MGD (11,800 gpd) reported in 2012.
- In 2016, the annual average daily flow per connection was 137 gpd/EDU based

upon 81 EDUs. This is slightly down from the 139.5 gpd/EDU reported for 2012.

Wastewater flows during rain events averaged 1.7 times the average daily flow. This system has moderate I&I issues.

Bridlewood – The Bridlewood collection and conveyance system consists of gravity sewer, manholes and two (2) pump stations. The collection and conveyance system conveys flow to the Aqua owned WWTP which has a permitted hydraulic capacity of 0.1030 MGD.

- In 2016, the annual average daily flow received at the WWTP was 0.0589 MGD (58,900 gpd). This is somewhat below the 0.0684 MGD (68,400 gpd) reported for 2012.

- In 2016, the annual average daily flow per connection was 115.5 gpd/EDU based upon 510 EDUs. This is below the 134 gpd/EDU reported for 2012.

Wastewater flows during rain events averaged 1.6 times the average daily flow. This system has moderate I&I issues which are envisioned to be addressed through our long term maintenance program.

Deerfield Knoll – The Deerfield Knoll collection and conveyance system consists of gravity sewer, manholes and one (1) pump station. The collection and conveyance system conveys flow to the Aqua owned WWTP which has a permitted hydraulic capacity of 0.025 MGD.

- In 2016, the annual average daily flow received at the WWTP was 0.0108 MGD (10,800 gpd). This is less than the 0.0123 MGD (12,300 gpd) reported for 2012.

- In 2016, the annual average daily flow per connection was 104 gpd/EDU. This is the same value reported for 2012.

Wastewater flows during rain events averaged 1.6 times the average daily flow. This system has moderate I&I issues which are envisioned to be addressed through the Company's long term maintenance program.

East Brandywine – The East Brandywine wastewater collection and conveyance system consists of gravity sewer, manholes and one (1) pump station. The collection and conveyance system serves the Hedgerow residential development and a portion of East Brandywine Township and conveys flow to the Aqua-owned WWTP that has a permitted hydraulic capacity of 0.155 MGD.

- In 2016, the annual average daily flow received at the WWTP was 0.0661 MGD (66,100 gpd). This is below the 0.0776 MGD reported for 2012.

- In 2016, the annual average daily flow per customer was 128.6 gpd/EDU based upon 514 EDUs. A comparison to 2012 flow per EDU is not possible due to changes in bulk sewer service to East Brandywine Township.

Wastewater flows during rain events averaged 1.6 times the average daily flow. This system has moderate I&I issues which are envisioned to be addressed through the Company's long term maintenance program.

Honeycroft – The Honeycroft collection and conveyance system consists of gravity sewer, manholes and one (1) collection system pump station that conveys flow to the treatment facility. The Aqua owned WWTP has a permitted capacity of 0.04951 MGD (49,510 gpd) and has an average discharge daily flow of 0.009471 MGD (9,471 gpd) which is substantially less than the rated capacity despite the system being fully built out. The average flow per connection was 87.7 gpd/EDU. The Honeycroft collection system was fully inspected by Aqua during its construction and was determined to be well constructed and exhibits no evidence of I&I issues.

Media Borough – The Media Borough collection and conveyance system consists of gravity sewer, manholes and two (2) pumping stations serving Media Borough and conveying flow to the Aqua-owned WWTP which has a permitted hydraulic capacity of 1.8 MGD. The sanitary system serves the entire Borough of Media and portions of Upper Providence Township. In 2016, the average daily flow discharged at the Media wastewater treatment facility was 1.29 MGD (1,290,000 gpd) which was 13% less than the reported 2012 annual average flow of 1.49 MGD (1,490,000 gpd).

The Media collection system has improved as a result of capital projects on the

collection and conveyance system as evidenced by the reduction of flow received at the facility. The Lincoln basin is no longer under a Pennsylvania Department of Environmental Protection ("PADEP") enforced connection management plan after the pump station was upgraded. Additionally, the Lemon drainage basin, while still under a PADEP connection management plan, is no longer hydraulically overloaded. An upgrade to the Lemon pump station has been designed and permitted by PADEP and will be constructed in 2018. This improvement to the pumping station will ultimately remove the Lemon basin from the connection management plan and will be the final project of the corrective action plan at the Media collection and conveyance system.

New Daleville – The New Daleville collection and conveyance system consists of gravity sewer, manholes and one (1) pumping station serving the New Daleville community and conveying flow to the Aqua-owned WWTP which has a permitted hydraulic capacity of 0.0343 MGD. In 2016 the average daily flow received at the WWTP was 0.0181 MGD (18,100 gpd) which is slightly higher than the 0.016 MGD (16,000 gpd) reported for 2012. This system does not have notable I&I issues. The average daily flow per connection is approximately 150 gpd/EDU.

Newlin Green – The Newlin Green collection and conveyance system consists of a low-pressure sanitary collection system and customer owned residential grinder pumps that convey flow to the Aqua-owned WWTP which has a permitted capacity of 0.0113 MGD. In 2016 the average daily flow received at the WWTP was 0.0053 MGD (5,300 gpd) which is less than the 0.0060 MGD (6,000 gpd) reported for 2012. This system does not have notable I&I issues.

Peddler's View – The Peddler's View collection and conveyance system consists of gravity sewer, manholes and one (1) pumping station serving the Peddler's View community and conveying flow to the Aqua-owned WWTP which has a permitted hydraulic capacity of 0.0395 MGD. The average daily flow to the facility reported in 2016 was 0.0306 MGD (30,600 gpd) compared to 0.035 MGD (35,000 gpd) reported for 2012. This system does not have notable I&I issues.

Penn Oaks – The Penn Oaks collection and conveyance system consists of gravity sewer, manholes and one (1) pumping station serving the Penn Oaks community and

conveying flow to the Aqua-owned WWTP which has a permitted hydraulic capacity of 0.0152 MGD. In 2016, the average daily flow received at the WWTP was 0.101 MGD (10,100 gpd) which was slightly less than 0.012 MGD (12,000 gpd) reported for 2012. The average daily flow per connection was 142 gpd/EDU. This system does not have notable I&I issues.

Plumsock – The Plumsock collection and conveyance system consists of gravity sewer, manholes and one (1) pumping station serving the Plumsock community and conveying flow to the Aqua-owned WWTP which has a permitted capacity of 0.0099 MGD. The 2016 average daily flow received at the WWTP was 0.005 MGD which was the same as reported for 2012. The average flow per EDU was 133 gpd/EDU. This system does not have notable I&I issues.

Sage Hill – The Sage Hill collection and conveyance system consists of gravity sewer, manholes and one (1) pumping station serving the Sage Hill community and conveying flow to the Aqua-owned WWTP which has a permitted hydraulic capacity of 0.0075 MGD. In 2016 the average daily flow received at the WWTP was 0.004 MGD (4,000 gpd) compared with 0.0034 MGD (3,400 gpd) reported for 2012. This system does not have notable I&I issues.

Stony Creek – The Stony Creek collection and conveyance system consists of gravity sewer, manholes and three (3) pumping stations serving the Stony Creek Farm community and conveying flows to the Aqua-owned WWTP which has a permitted capacity of 0.0429 MGD. In 2016, the average daily flow received at the WWTP was 0.0175 MGD (17,500 gpd) compared to 0.0105 MGD (10,500 gpd) reported for 2012. The increase in flow to the facility is associated with the build-out of the development and the connection of additional homes. This system does not have notable I&I issues. In 2018, Aqua will upgrade the existing two pumping stations with emergency generator systems to provide standby power.

Twin Hills – The Twin Hills collection and conveyance system consists of gravity sewer, manholes and two (2) pumping stations serving the Twin Hills community conveying flows to the Aqua-owned WWTP which has a permitted hydraulic capacity of 0.059 MGD. In 2016 the average daily flow received at the WWTP was 0.0507 MGD (50,700

gpd) compared to 0.059 MGD (59,000 gpd) reported for 2012. This system has minor I&I issues that are handled by flow equalization tanks at the headworks of the treatment facility. Monthly flow data through wet and dry months exhibits a low standard deviation indicative of fairly uniform flows month to month.

Valley Forge – The Valley Forge collection and conveyance system consists of gravity sewer, manholes and one (1) pump station serving the Valley Forge commercial development and conveying flows to the Upper Merion Township wastewater collection system. This system is new and has no known or observed I&I issues.

Willistown Woods – The Willistown Woods collection and conveyance system consists of gravity sewer, manholes and three (3) pumping stations that convey flow to the Aqua-owned WWTP which has a permitted capacity of 0.175 MGD. This system serves the residential communities of Willistown Woods, Willistown Knoll and Willistown Hunt.

- In 2016 the average daily flow received at the WWTP was 0.1055 (105,500 gpd) compared to 0.117 MGD (117,000 gpd) reported for 2012.

- In 2016, the annual average daily flow per connection was 134.9 gpd/EDU compared to 157 gpd/EDU reported for 2012.

This system has minor I&I issues with peak flows during rain events averaging 1.43 Peak/Average for 2016 compared to a value of 1.7 Peak/Average reported for 2012. While Aqua's maintenance program has improved the performance of the collection system, additional work is required.

4 – Reasonable estimate of the quantity of property to be improved

Quantities below are approximations based upon a general assessment of overall needs and historical costs. Actual quantities of pipe replacement and manhole repairs will be determined based upon the results of I&I investigations and sewer main inspections.

2018 – 2022 Planned Capital Projects

Item	Quantities (Total 5-Year Plan)
CCTV Main Inspections	150,000-250,000 LF
Refurbish Pumping Stations	50-80
Estimated sewer main repair	30,000 – 70,000 LF
Estimated manhole repairs	200-400
New Generators at Pumping Stations	10-16
New Collection System Meter Stations	3

5 – Projected annual expenditures and measures to ensure cost-effectiveness

As previously stated, Aqua will perform I&I elimination projects including pipe replacement and manhole repair to only those portions of the collection system identified through I&I investigations and inspections. Pipe replacement will be performed utilizing trenchless sewer rehabilitation methods where possible. Trenchless techniques are capable of performing spot repairs as well as manhole-to-manhole lining. For most applications, trenchless sewer rehabilitation techniques require less installation time and therefore less bypass pumping. In addition trenchless sewer rehabilitation techniques minimize utility conflicts, minimize restoration costs and are less disruptive to business, homeowners and traffic. Aqua is able through competitive bidding to secure lower unit costs contracts with various utility contractors. Aqua assigns supervisors and inspectors to each project to

ensure the quality and effectiveness of work performed. Additionally, Aqua coordinates projects with local municipalities to coincide with other utility and paving projects to reduce restoration costs and minimize customer impacts.

Table 5.1 identifies, by project type, the collection system capital projects planned to be performed in the upcoming five years, as well as the anticipated expenditure by project type for each year of the five-year term of this second LTIIP. The specified projects are subject to change based upon updated information and changes in priority that may occur during the five-year period. Cost estimates are subject to change as specific projects are designed and built.

Table 5.1 – GPA Collection System Capital Improvement Schedule

Description	2018	2019	2020	2021	2022	Total
Sewer Mains	3,056,000	2,200,000	1,770,000	1,465,000	1,165,000	9,656,000
Manholes	435,000	160,000	20,000	20,000	20,000	655,000
Pump Stations	2,045,000	250,000	380,000	380,000	380,000	3,435,000
GIS	0	0	0	0	0	0
Clean & Televise	230,000	30,000	60,000	60,000	60,000	440,000
Engineering Studies	0	25,000	0	0	0	25,000
Total	**5,766,000**	**2,665,000**	**2,230,000**	**1,925,000**	**1,625,000**	**14,211,000**

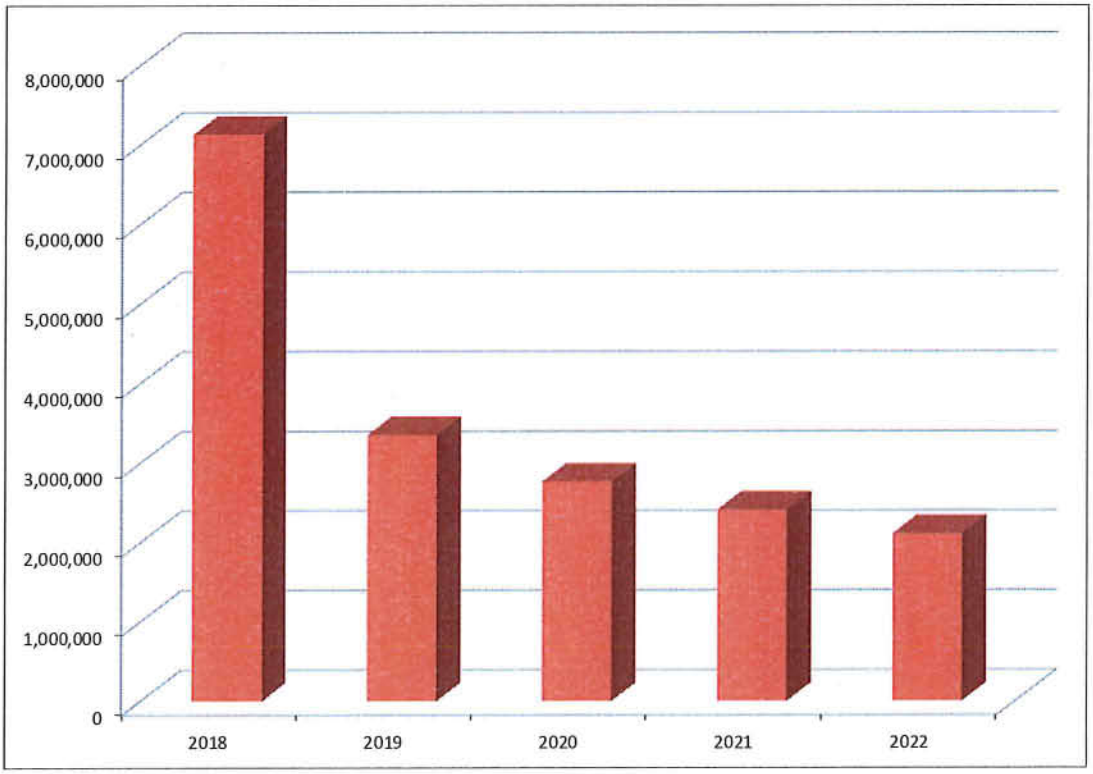
Table 5.2 – SEPA Collection System Capital Improvement Schedule

Description	2018	2019	2020	2021	2022	Total
Sewer Mains	475,000	250,000	180,000	480,000	480,000	1,865,000
Manholes	0	0	0	0	0	0
Pump Stations	884,000	434,000	354,000	4,000	4,000	1,680,000
GIS	0	0	0	0	0	0
Clean & Televise	0	0	0	0	0	0
Total	**1,359,000**	**684,000**	**534,000**	**484,000**	**484,000**	**3,545,000**

6 – Acceleration Plan and Maintenance of Safe and Reliable Service

Aqua has continuously invested in its wastewater facilities and collection systems to ensure safe and reliable service, public health and environmental protection, and intends to continue to maintain the accelerated refurbishment of its collection system. For the calendar years of 2018 through 2022, Aqua plans to accelerate collection system capital spending to approximately $3.5 million annually (on average) for pipe repair, pump station refurbishment and I&I elimination programs. This represents an increase over the baseline investment pre-DSIC of about $630,000 per year, and a further increase compared with the 5-year average of $2.36 million per year during the period of 2013–2017.

Figure 6.1 – Aqua Collection System Capital Expenditure Chart



Refurbishment of dated and/or deteriorating assets improves the safety and reliability of the entire system while improving service to Aqua's customers and

protecting the environment. Construction methods that minimize service interruptions will be utilized to minimize impacts to customers while ensuring cost effectiveness. Serviceability of mains and pumping facilities during construction projects must be maintained at all times. This is accomplished by the project specifications, work plans and oversight of work being performed. These standards are enforced and monitored by inspectors, operations management and the licensed operators with additional inspection and oversight by in-house safety administration personnel. Prior to starting work within a community, information letters and door to door notifications will be provided to affected customers and property owner associations by Aqua employees.

7 – Workforce Management

The Commission requires a utility that utilizes a DSIC to have a workforce management and training program designed to ensure that the utility has access to a qualified workforce to perform work in a cost-effective, safe and reliable manner.

Inspectors

Aqua utilizes construction inspectors to provide numerous services during the installation of mains, service lines, pump stations, and manholes in the collection system. The inspectors are there to perform the following tasks, as well as any other work that may be necessary:

- Monitor the installation of the lines to confirm that they are properly bedded and installed to Aqua specifications.
- Monitor the backfill of the project for proper compaction as per Aqua specifications.
- Confirm that all materials such as pipe, fittings, backfill, concrete, etc. in the project meet the Aqua specifications.
- Capture the quantities of pipe and other materials for proper record keeping, plans, etc.
- Capture the quantities of pipe and other materials, labor, etc. for accurate billing and payments.

- Document all locations of pipe, laterals, etc. for accurate mapping and recordkeeping.

- Work with residential customers to lessen the impact of the project and answer or address any issues that occur within the project.

- Work with businesses that are impacted by the project to insure deliveries, access, and service outages do not disrupt business.

- Coordinate contractors with school districts, municipalities, and emergency services so that bus routes, trash pick-up, mail delivery, and emergency response are not impacted.

- Monitor the temporary restoration during the project to make certain that roads are safely traveled.

- Monitor the restoration required in projects to make certain they are done to state or municipal specifications, and insure that proper payment is achieved.

- Observe contractor's implementation of contractor safety plans and advise contractor of any observed conditions of imminent danger. Inspectors can shut down a project until an imminent danger situation is addressed.

Safety and Training

Aqua requires its employees in the wastewater company to have mandatory safety training throughout the year. Aside from the required annual training there is additional training that also takes place. Examples of the required annual training are confined space, traffic safety, excavation/trenching, general safety hazards, and hazard communications. In addition, there are other programs that are required but not on an annual basis including Personal Protection Equipment ("PPE"), electrical hazard, competent person, and others. In 2016, every employee, whether or not they operate a Company vehicle, was required to take a defensive driving course, which entailed approximately 5-6 hours of computer based training and testing.

All wastewater employees are required to wear their PPE whenever they exit their vehicles on a jobsite. The PPE includes hard hat, safety vest, safety glasses, and steel toe shoes. All of this PPE is supplied by the Company.

Aqua requires all employees and contractors to report immediately any injury that takes place to an employee of either party. Aqua also requires employees and

contractors to report any damage to utilities during the excavation process. The damage to utilities is recorded by Aqua, and Aqua also reports them to Common Ground Alliance Damage Information Reporting Tool ("DIRT"), a national database for underground damage reporting.

Contractors

To supplement Aqua's employee workforce, Aqua utilizes outside contractors for all collection system projects. Contractors are required at the Company's request to provide Aqua with their safety policy and documentation of training to their employees, including but not limited to competent person, utility damage prevention, and traffic safety.

Aqua requires contractors to follow all state, federal, and OSHA rules and regulations in the implementation of a project. This is required in all contract documents for construction. In the contract documents, it is mandated that contractors have a minimum of four safety checks per month on their projects. These may be done by the contractor's safety professional or a third party safety consultant. Contractors are also required to fill out a Job Hazard Awareness form daily, either utilizing the Aqua form or a similar form designated by the contractor.

Contractors are also required to provide the PPE for their employees, including hard hat, work gloves, reflective vest of shirt, safety shoes, and safety eyewear.

Contractors are also responsible for reporting to Aqua any injuries sustained on an Aqua project. They are also required to report any utility damage that occurs on the jobsite, and Aqua then enters it into the DIRT database as well as records it for the Company's documentation. Contractors are responsible for following the requirements of PA One Call, including being responsible for all PA One Call requests for their project.

8 – Outreach and Coordination Activities with Other Utilities, PENNDOT, Homeowners Associations, and Local Governments

Aqua has been updating its GIS to incorporate its wastewater assets. Between the months of May and October replacement candidates are typically chosen and prioritized for refurbishment in the subsequent budget year. Each potential refurbishment project is vetted by the corresponding construction division's superintendent, i.e., analyzed for feasibility of construction in the coming budget year. As part of the analysis process, Aqua accumulates information from PennDOT, counties, homeowners associations and municipalities as to their intentions to undertake paving and other public works projects during the budget year. Where Aqua chooses to undertake a pipe or manhole refurbishment project on a road pre-scheduled for paving, the project will be coordinated with the state, county or municipality. Aqua and the government agency will work together to insure that the design, permitting and construction of the pipe project will be completed in time to allow for the road to be paved. In some cases, where sewer main projects are large, the government agencies will agree to postpone paving of its roads to the following year. Typically, when Aqua undertakes a project where paving has been pre-planned by the government agency, Aqua and its rate payers will benefit financially through the avoidance of road surface restoration, usually a half-road milling and macadam overlay.

Unfortunately, most municipalities do not identify their paving plans in advance of Aqua's project selection. Annual municipal budgets may not be approved until early in the budget year resulting in paving projects not being formalized until well into the budget year. In these instances, Aqua must be proactive in identifying opportunities to coordinate pipe replacement and road paving. Although less frequent, continuous outreach by Aqua has resulted in additional coordination opportunities recently, including a track right of way slope stabilization project by Southeastern Pennsylvania Transportation Authority ("SEPTA") within the Media System.

VERIFICATION

I, Gordon H. Miller, Assistant Manager of Wastewater Operations of Aqua Pennsylvania, Inc., hereby state that the facts set forth in Aqua Pennsylvania Wastewater, Inc.'s Long-Term Infrastructure Improvement Plan are true and correct to the best of my knowledge, information and belief and that I expect to be able to prove the same at a hearing held in this matter. I understand that the statements herein are made subject to the penalties of 18 Pa. C.S. § 4904 (relating to unsworn falsification to authorities).

Gordon H. Miller
Assistant Manager of Wastewater Operations
Aqua Pennsylvania, Inc.