

FINAL REPORT

Lehigh County Authority-Allentown Lease Concession Agreement Financial Analysis

Prepared for

Lehigh County Authority

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Acronyms and Abbreviations

AMI	automated meter infrastructure
BOD	biochemical oxygen demand
CAB	capital appreciation bond
CAPEX	capital expenditures
CCRC	capital cost recovery charge
CIP	Capital Improvement Program
CPI (or CPI-U)	Consumer Price Index (All Urban Consumers)
DSCR	Debt Service Coverage Ratio
DSRF	Debt Service Reserve Fund
EPA	U.S. Environmental Protection Agency
FY	fiscal year
LCA	Lehigh County Authority
MCI	Major Capital Improvement
MHI	median household income
MMD	Municipal Market Data
N/A	not applicable
NPV	net present value
OPEX	operating expenditures
PTP	LCA Pretreatment Plant
TKN	total Kjeldahl nitrogen
TSS	total suspended solids
WWTP	wastewater treatment plant

Introduction

1.1 Authorization and Purpose

The Lehigh County Authority (LCA) authorized CH2M HILL (hereafter, “CH2M”), in association with Raftelis Financial Consultants, Inc. (hereafter, “Raftelis”) and Davenport and Company (hereafter, “Davenport”), to conduct an analysis to identify and evaluate options to help LCA address financial challenges associated with its lease agreement with the City of Allentown. McNeese Wallace & Nurick LLC (hereafter, “McNeese”) also participated in the project under a separate contract with LCA. McNeese was LCA’s Legal Counsel in negotiation and preparation of the Lease Concession Agreement, Bond Attorney when the Series 2013 Bonds were issued, prepared the Bond Indenture for the Series 2013 bonds, and has been representing LCA in dispute resolution with the City. McNeese has assisted in interpreting portions of the Bond Indenture and reviewed and commented on other elements of the analysis from a legal perspective. Collectively, the Project Team consists of CH2M, Raftelis, Davenport, and McNeese.

1.2 Scope

This project examined LCA’s financial performance under the lease agreement with Allentown for water and sewer service and provides recommendations for actions to address LCA’s financial needs in the short- and long-term time horizons. The analysis included:

- Development of a financial model to baseline current financial performance and to support the analysis of options for improving LCA’s financial performance under the lease agreement
- Identify and evaluate options for improving LCA’s financial performance within the terms of the existing lease agreement
- Identify and evaluate options to improve the equity and financial performance of LCA’s Allentown water and sewer systems using tools and approaches that fall outside the scope of the lease agreement (for example, alternative financing options, capital project delivery options, etc.)
- Develop a capital improvements analysis and prioritization process that LCA can use for selection of capital improvements, prioritization, and scheduling
- Evaluate options to improve revenue stability and adequacy
- Evaluate rate affordability to LCA’s customers in the City of Allentown under all options, and develop mitigating strategies
- Develop a list of recommendations based on the evaluations listed above for LCA’s consideration and implementation
- Provide a financial model for LCA’s future use

1.3 Report Organization

The remainder of this report is organized as follows:

- Section 2 provides some background and history of the lease concession agreement.
- Section 3 discusses pertinent key provisions of the lease concession agreement and Bond Indenture.
- Section 4 identifies the planning assumptions and metrics that guide the development and evaluation of the financial analysis.

- Section 5 presents a summary of operational savings and revenue enhancements considerations.
- Section 6 discusses debt profile considerations.
- Section 7 describes the Capital Improvement Program prioritization process and results.
- Section 8 presents the financial model results for two sets of scenarios - run to first determine the required revenue baseline to ensure viability of the lease, and to then address strategies that could be employed to increase the short- and long-term success of the lease.
- Section 9 presents the results of the high-level affordability analysis.
- Section 10 presents the study conclusions and recommendations.

The following appendixes are provided:

- Appendix A, Existing Debt Repayment Schedule
- Appendix B, Model Assumptions and Results
- Appendix C, Review of Operating Standards
- Appendix D, CIP Prioritization Details
- Appendix E, Affordability Supporting Analysis
- Appendix F, Debt Profile Considerations
- Appendix G, Operational Savings and Revenue Enhancement Considerations Supporting Information
- Appendix H, Financial Metrics

Lease Concession Agreement Background

2.1 Lease History

In 2013 LCA was the successful bidder on a competitive procurement to lease the water and wastewater systems serving the City of Allentown (hereafter, “the City”) for 50 years (through 2062). LCA operates the City System as a standalone enterprise fund, separate from its water and sewer service to the suburban Lehigh County service area. LCA agreed in compensation to the City for the lease to “front load” the payment to the City. LCA financed the frontloaded lease payment and needed initial capital improvements by issuing its Series 2013 A, B, and C Bonds. LCA took over operation of the City’s water and sewer facilities (the “City System”) in August 2013. Since then, LCA has expended all bond proceeds available for funding the capital improvements. In the short-term, the rates and charges being collected by LCA are forecast to not generate sufficient revenues to meet additional capital outlays required to maintain the City System and lease operating standards.

The City System consists of three major revenue components: City sewer users, Suburban (signatory) sewer users, and City/Suburban water users. The City and Suburban water users are billed on a consumption basis. The City sewer users are based on a combination of fixed charges and flow charges. The sewer Signatory users are billed based on a combination of flows and loads through a complex calculation done each year.

2.2 Sewer Signatories

LCA provides wastewater service to several municipalities on a bulk or wholesale basis through the City sewer system. Rates and charges to these customers are based on provisions that were negotiated between the City and the individual signatories and that were incorporated into the 2013 lease concession agreement between the City and LCA. These sewer signatories own approximately 52 percent of the Kline’s Island Wastewater Treatment Plant (WWTP) capacity and are responsible for a commensurate amount of the capital improvements to the WWTP. It was determined after the lease agreement was in effect that these wholesale users were due a credit on their sewer charges. This credit substantially reduced the revenues to LCA in 2015 from service to these wholesale users.

2.3 Historical Financial Results from Lease Inception through 2017

Table 2-1 shows the water and wastewater operating results for 2013 through 2016, with estimated values for 2017, and budgeted figures for 2018 for the City Division. The Lease Concession Agreement between the City and LCA began in August 2013. Therefore, the total for 2013 represents August through December 31, 2013, only. The decrease in revenues in 2015 resulted from a significant credit adjustment for the signatories (wastewater) noted previously.

LCA issued bonds to finance the upfront obligations per the Lease Agreement, as well as for initial capital projects. Based on the debt structure, there were no principal payments due for the 2013–2017 period.

Revenues in the past 4 years have been flat, while the operating expenses have increased slightly. Capital spending increased significantly in 2015 as capital projects began implementation. Table 2-1 shows that the Project Reserves funded from initial bond proceeds are expected to be depleted by the

end of 2018. The table also shows that the Operating Cash Balance or Unrestricted Net Fund Balance is projected to amount to approximately 79 days of operating expenses at the end of 2018.

Table 2-1. Financial Summary 2013 to 2018 (Thousands of Dollars)

	2013 Actual	2014 Actual	2015 Actual	2016 Actual	2017 Estimated	2018 Budget
Operating Revenues	\$14,167	\$30,588	\$26,964	\$31,673	\$32,031	\$33,569
Operating Expenses (excluding D&A)	(\$5,091)	(\$16,595)	(\$15,200)	(\$15,831)	(\$16,722)	(\$16,802)
Changes in Assets & Liabilities	\$64	(\$2,099)	(\$1,942)	(\$1,030)	\$0	\$0
Interest Income	\$3	\$113	\$424	\$387	\$448	\$348
Non-Operating Revenues(Expenses)	\$264	\$1,684	\$2,089	\$3,458	\$4,440	\$2,932
Annual Lease Payment	\$0	\$0	(\$250)	(\$750)	(\$508)	(\$512)
Net Revenues	\$9,407	\$13,691	\$12,085	\$17,907	\$19,689	\$19,535
Debt Service	(\$4,132)	(\$13,048)	(\$13,048)	(\$13,048)	(\$13,048)	(\$13,748)
Net After Debt Service	\$5,275	\$643	(\$963)	\$4,859	\$6,641	\$5,787
Cash Funded Capital (Pay Go)	\$0	\$0	(\$2,800)	(\$1,501)	(\$5,656)	(\$8,538)
Net Operating Cash Flows	\$5,275	\$643	(\$3,763)	\$3,358	\$985	(\$2,751)
Beginning Operating Cash Balance	\$0	\$5,166	\$5,809	\$2,046	\$5,404	\$6,389
Transfers	(\$109)	\$0	\$0	\$0	\$0	\$0
Ending Operating Cash Balance	\$5,166	\$5,809	\$2,046	\$5,404	\$6,389	\$3,638
Project Reserve Beginning Balance	\$0	\$18,162	\$14,681	\$7,401	\$1,025	\$2,335
Maturities (Investments)	(\$13,689)	\$1,899	(\$86)	\$6,000	\$6,000	\$0
Cash from Operations	\$0	\$0	\$2,800	\$1,501	\$5,656	\$8,538
Borrowing	\$31,851	\$0	\$0	\$0	\$0	\$1,720
Capital Spending	\$0	(\$5,380)	(\$9,994)	(\$13,877)	(\$10,346)	(\$12,593)
Project Reserve Ending Balance	\$18,162	\$14,681	\$7,401	\$1,025	\$2,335	\$0

Source: LCA. "CITY PROJECT - Financial History in Bond Model Format"

Pertinent Lease Concession Agreement and Bond Indenture Provisions

3.1 Lease Concession Agreement

The key provisions in the Concession Agreement between LCA and the City relating to LCA service requirements and service charges are as follows:

- Article 1 – Definitions and Interpretations
- Article 4 – Capital Improvements
- Article 7 – Service Charges, which summarizes the service charge provisions
- Schedule 3 –Original schedule of water and sewer tariffs and rates
- Schedule 4 – Operating Standards of the agreement

The operating standards describe the standards to which LCA is expected to operate the water and sewer system serving the City. These operating standards are too numerous to describe here, but influence LCA’s options for reducing its operating costs or other cost-saving measures. These include both operating and capital requirements that LCA must meet to avoid the risk of being assessed operational liquidated damages. Appendix C provides a discussion of these operating standards and concepts for examining modifications for future use by LCA.

The key provisions relating to the service charges are summarized below:

- The initial rates for service by LCA to customers in the City’s service area are presented in Schedule 3 of the Lease Concession Agreement. These rates are adjusted annually by the change in the Consumer Price Index (CPI) plus 2.5 percent through 2032, and then by the CPI plus 2.0 percent from 2033 through 2062.
- Rate adjustments take effect at the beginning of the calendar year and remain in effect for the entire calendar year.
- In addition to the service charges, LCA may impose a capital cost recovery charge (CCRC) to recover capital costs of Major Capital Improvements (MCIs) greater than \$1 million.
- LCA may impose leasehold tax service charges in addition to other service charges.
- LCA is authorized to collect a Delaware River Basin Commission charge in addition to other service charges.

3.2 Bond Indenture

The 2013 Bonds were issued pursuant to a Trust Indenture that dictates the process and requirements for issuing additional bonds to be secured by the revenues of the City Division. Appendix F summarizes Bond Indenture requirements that LCA has committed to meeting.

3.2.1 Additional Bonds

Before issuing new debt, the par amount of the total outstanding bonds of the City system, including the new debt, cannot exceed 80 percent of the estimated fair market value of the concessionaire interest,

as set forth in a written appraisal at the time of new debt issue.¹ The Indenture does not clearly indicate how the fair market value of the lease is to be determined. This provision is not typical for revenue bond issues.

In the definition of Leasehold Mortgage Debt, there is a provision that waives the written appraisal requirement noted previously if the refinancing bonds do not increase the aggregate amount of Leasehold Mortgage Debt and the sale price of the Additional Bonds does not exceed 110 percent of the amount of the refunded Leasehold Mortgage Debt. This provision should be studied more closely especially as it relates to the 2013C term out, as LCA may be able to use this provision to alleviate the written appraisal requirement for the 2013C term out.

Going forward, LCA should continue to work closely with a financial advisor and bond counsel experienced in working with financially challenged utility systems.

3.2.2 Impacts on LCA's Ability to Issue New Debt

A number of methods can be used to estimate the market value of a water and/or sewer system, including the depreciated replacement cost of the system assets, comparable sales, and capitalized income, or combinations of these methods. The Indenture does not describe how the market value of the lease is to be determined, and because the lease does not hold title to the assets of the system, the market value of the lease does not equate to the value of the water and sewer system. As the lease does not hold title to the assets of the City System, the depreciated replacement cost of the City System assets is not applicable. Similarly, very few sales of leases of water and sewer systems occur that could be used to develop a value based on this approach. Thus, for the purposes of this analysis, it is assumed that the market value of the City System would be based on the capitalized income method.

Based on the forecast net present value of the free cash flow (Operating Revenues + Non-Operating Revenues) - (Operating Expenses + Non-Operating Expenses + Planned Capital Improvements) of the system, the estimated market value of the lease is preliminarily estimated at \$1.07 billion (2018 to 2062). A total of 80 percent of this preliminary estimated value for the Concessionaire's interest is \$857 million. LCA's current outstanding debt on the lease is \$307 million, leaving a difference of \$550 million between the allowable maximum debt amount and current outstanding debt. It should be noted, that as the lease has a limited term, the valuation of the lease will tend to decline as the number of years left in the lease decline.

¹ Per McNees, "Additional Bonds" (the term used in the Trust Indenture) effectively refers to "Leasehold Mortgage Debt".

Financial Planning Assumptions and Metrics

This section summarizes the assumptions that were used in preparation of the Financial Planning Model (hereafter, “the Model”). Appendix B provides a detailed list of assumptions. In most cases, assumptions can be defined for a scenario. In some cases, assumptions are global inputs and apply to all scenarios. Some assumptions were provided by LCA, and are so designated below.

Based on input from LCA and the Project Team, several key financial metrics are included in the Model and summarized in this section. These metrics are contained in the *pro forma* worksheet for each of the scenarios. If there are metric requirements or targets, these are identified in the global inputs.

4.1 Global Model Assumptions

4.1.1 Operating and Maintenance Cost Inflation

Personnel cost are forecast to increase 3.5 percent per year. Purchase of services, materials and supplies, and equipment costs are forecast to increase 2 percent per year.

4.1.2 Capital Expenditures

Inflation rate for capital expenditures (CAPEX) is assumed to be 3 percent per year.

4.1.3 CPI-U

CPI-U used for Schedule 3 rate increases assumes a 1 percent annual inflation rate.

4.2 LCA-provided Information

4.2.1 Additional Operating Expenditures

Additional operating expenditures are included for billing costs associated with monthly billing and automated meter infrastructure (AMI). These additional billing and AMI costs are estimated to be \$990,000 per year starting in 2019. This equates to approximately 35 percent of 2018 water distribution operating expenditures (OPEX). Also, additional costs are included amounting to \$660,000 per year for the 5-year period from 2019 to 2023 to fully fund OPEX needs. This additional cost has been distributed among all City Division departments’ OPEX costs and equates to 3.8 percent of the total City Division OPEX costs.

4.2.2 Capital Cost Recovery Charge

The CCRC is a service charge that LCA can apply to City customers to recover the cost of MCIs as stipulated in the lease agreement. MCI projects are defined in the lease agreement as projects of \$1M or more, indexed for inflation, and that, in the written opinion of an engineering firm, represent a betterment, expansion, renewal, or replacement of the system with a useful life of at least 5 years. The City and LCA are required to collaborate on MCIs including approval of the CCRC to be applied. Provisions in the lease that allow for the City to withhold its approval of a CCRC are a concern for LCA, and are evaluated in the financial modeling scenarios in Section 8 assuming varying levels of cost recovery.

For purposes of the Financial Planning Model, it is assumed that projects \$1 million or greater are approved by City and meet the definition of MCI and can be applied toward the CCRC, unless otherwise noted. The CCRC is based on amortization of projects, either debt-funded or pay-as-you-go funded

(known by LCA as pay-go), and water consumption/sewer flows specific to determining the CCRC. Water consumption assumes the City and prorated portions for Salisbury Township, South Whitehall Township, Hanover Township, and Whitehall Township. Sewer flows assume the City and Hanover Township. Sewer signatories are not included in the CCRC and are charged according to the existing historic agreements with the City for capital work at the WWTP. Depending on the timing of MCI, portions of the CCRC could extend beyond the end of the lease period in 2062. It is assumed that LCA will not be able to recover the amortization of MCI costs beyond 2062.

Major capital investment recovered through CCRC and equity financed assumes a 30-year amortization and rate of return of 8.3 percent. If debt-financed, a 30-year amortization and interest rate of 6.6 percent is assumed. The water CCRC rate is based on water consumption for the City and prorated amounts for Salisbury, South Whitehall, Hanover, and Whitehall Townships. The wastewater CCRC rate is based on sewer flows for the City and for Hanover Township only.

4.2.3 Debt Service

Due to the lease expiring in 2062, the repayment period for any debt that is issued must not extend beyond 2062. Debt service for debt-funded CAPEX is based on a 30-year term for 2018 to 2032, a 25-year term for 2033 to 2037, and a 20-year term for 2038 to 2042. No new debt is assumed after 2042 so that there is no outstanding debt at the end of the lease. An interest of 6.6 percent is assumed for all projected debt. Cost of issuance assumes 1 percent of projected bond issue. Bond reserve assumes 3 percent of bond issue. Based on input from LCA, these are conservative assumptions, and debt service projections are subject to changes based on market conditions and/or regulatory requirements.

4.2.4 Growth and Consumption

The number of metered connections and water consumption are assumed to remain constant at 2017 levels. Based on input from LCA, there is no significant growth anticipated. While communities nationwide have seen a decline in water consumption, consumption is assumed to be constant and is viewed as adequate for planning purposes.

4.3 Financial Metrics

A number of financial metrics were tracked in the financial model to evaluate the financial performance of the City System over the remainder of the lease. The targets listed below were discussed and agreed to with LCA, and should serve as financial metrics to evaluate future lease performance. Table 4-1 lists the required metrics (per lease Indenture) and target metrics to achieve a sound financial position. Appendix H provides a more detailed description of these metrics and their calculation. The two most important metrics to evaluate model scenarios are the Debt Service Coverage Ratio and Days Cash on Hand (Fund balance).

Operations-based DSCR is based on operating revenues less operating expenses divided by total debt service, while Indenture-based DSCR is based on operating revenues plus non-operating revenues less operating expenses divided by total debt service. This analysis primarily focuses on the Indenture-based DSCR.

The range of equity-funded CIP is typical. While there is no requirement, publicly owned utilities often try to keep toward the high end of this range.

Table 4-1. Required and Target Financial Metrics

Financial Metric	Required	Target
Debt Service Coverage Ratio (Operations)	1.2	1.8
Debt Service Coverage Ratio (Indenture)	1.2	1.8
Debt to Operating Ratio	N/A	>50%
Days Cash on Hand	180	270
Operating Ratio	N/A	≤50%
Percent Equity Funded CIP	N/A	30% to 100%
Residential Water and Wastewater Bill as % of MHI	N/A	<4.5%
Outstanding Debt to NPV of Net Revenues	<80%	<80%

Note:

MHI = median household income

N/A = not applicable

NPV = net present value

Operational Savings and Revenue Enhancement Considerations

5.1 Overview

During workshops with LCA, a series of potential concepts that could reduce OPEX or CAPEX or enhance revenues were discussed. Approximately 20 to 25 concepts were discussed, and are listed in Tables 5-1, 5-2, and 5-3. Of these, several are being recommended for additional investigation/implementation because of their positive impact to LCA's City Division. Others are not being recommended for additional work because of their viability, or limited impact to LCA's financials.

It is important to note that any savings from OPEX/CAPEX on the WWTP will result only in an approximate 50 to 60 percent benefit to LCA, as these costs are shared with the sewer signatories on an annualized basis.

Some major concepts discussed, such as potential to purchase the system from the City (buy out the lease), were deferred for the purposes of this study. Major changes like this would require a separate detailed study.

Table 5-1. OPEX Savings Concepts

Description	Details	Potential Cost Impact	Recommend Moving Forward
Modify Indirect Cost Allocation	Current indirect costs split between City and Suburban by payroll costs. Evaluate re-allocation based on other more appropriate and justified methods.	\$0–200K/yr	Yes
Implement Fixed Base Remote Reading of Water Meters	Implement AMI to reduce metering costs and provide more information for reduction of water loss.	\$125 K/yr after upfront cost of \$2M	Yes, assuming availability of funding to support implementation costs
Cost Reductions to Just Meet Regulations	Minimize OPEX costs associated with Lease Concession performance standards (that is, partnership for safe water, enhancements to water quality).	Unknown	No
Renegotiate Annual Payment to City	Adjust payment to settle issues with Lease Concession Agreement	\$0–500K	Yes
Residuals/Biosolids Subcontracting	Hire a 3 rd party to manage hauling and disposal of biosolids.	Unknown	No
Extend Routine Maintenance Frequency of Specific Facilities	Extend routine maintenance where applicable to longer frequency than current operating standards based on current conditions.	Unknown	No

Table 5-2. CAPEX Deferrals or Savings Concepts

Description	Details	Potential Cost or Revenue Impact	Recommend Moving Forward
Reduce Annual Projects for Water System	Reduce annual projects for water system to minimum required.	\$1.25M/yr	Yes, pending discussion and agreement with City
Reduce Annual Projects for Wastewater System	Reduce annual projects for wastewater system to minimum required.	\$500K/yr	No
Defer Water Main Replacement Program	Reduce replacement of water mains required under the concession to zero in the short term to defer CAPEX. Would require potential makeup in future years and incur liquidated damages.	\$2.8M/yr (\$14M over 5 years)	Yes, subject to discussion with City
Defer Major CAPEX	Defer some major CAPEX spending to 2025 or later to increase short-term cash flow.	\$10–\$20M	No, unless short-term relief needed

Table 5-3. City Revenue Enhancement Concepts

Description	Details	Potential Cost or Revenue Impact	Recommend Moving Forward
Implement Monthly Billing	Change from quarterly to monthly billing for residential customers.	\$1.8M (year one); \$4.3M/yr thereafter	Yes
Evaluate LCA Suburban Bulk Water Purchase Rate Calculation	Agreement dated 2009 allows for evaluation of incremental O&M cost components that should be included in the rate paid for treated water.	\$100K/yr	Yes
Adjust Signatory Cost Assignment between flows and loads	Current signatory costs are based on 1979 cost of service study that allocates costs at Kline’s Island WWTP between flow and BOD/TSS/TKN load. Updated cost of service study would be needed.	<\$100K	No
Accurate wastewater signatory flow metering	Recent study showed some meters may underreport flow. Initial evaluation is that there could be risk of increase in OPEX to City division.	Unknown	Yes
Relax PTP Effluent Limits	Relax limits for LCA PTP into the Western Lehigh Interceptor to increase charges from the City to the Suburban System.	Unknown	No
Increase acceptance of hauled waste	Plant can handle additional hauled waste, but lease restricts haulers that can be brought into program	>\$50K/yr	Yes, pending discussion with City
“Selling” unused City capacity at WWTP	City is currently not utilizing full capacity at Kline’s Island WWTP. Possible that capacity could be sold to suburban communities.	Unknown	No
Private Fire Protection Charges	Modify service charges to City customers to match those LCA charges in the Suburban system. Current charges are inequitable as LCA only charges fees to customers with private hydrants, not commercial and industrial customers in City with firelines without private hydrants.	\$200–300K/year	Yes

Table 5-3. City Revenue Enhancement Concepts

Description	Details	Potential Cost or Revenue Impact	Recommend Moving Forward
Miscellaneous Fee Charges	Examine increasing fees to cover actual cost of services being provided.	\$0–\$55K/year	Yes
Increase pay-go assignments to signatories	In the out years of the lease, LCA may be challenged to get complete recovery of CAPEX spending at WWTP. Negotiate suitable cost recovery mechanisms for equity funded capital improvements.	Unknown	Yes, in future years
Repackage some MCIs or annual projects into Pay-Go at WWTP	Put ALL annual projects at WWTP into signatory pay-go calculation, and consider whether any small MCIs should be classified as pay-go for LCA to obtain reimbursement from signatories quicker	Unknown	No

Notes:

BOD = biochemical oxygen demand
O&M = operation and maintenance
PTP = LCA Pretreatment Plant
TKN = total Kjeldahl nitrogen
TSS = total suspended solids

5.2 Recommended Operational Savings and Revenue Enhancements

Some of the recommended items in Tables 5-1 through 5-3 will require negotiations with the City. These include:

- Annual payment to City
- Annual projects for water system
- Reducing water main replacement program requirements
- Increase acceptance of hauled wastes

The sections below detail the recommendations that may have the highest financial value for LCA, and can be implemented within the current term of the Lease Concession Agreement.

5.2.1 Change to Monthly Billing

LCA currently bills its customers that have 1-inch-diameter meters or less each quarter, while customers with larger meters are billed monthly. While some utilities continue to bill their customers quarterly, it is most common for medium to large utilities to bill monthly. Monthly billing can provide users with a smaller bill that many customers find easier to manage rather than a larger quarterly bill. It also provides a more consistent revenue stream to the utility, and allows for the earlier identification of line breaks and leaks. In concert with implementation of AMI, it can also provide the utility additional tools for managing the water system.

The monthly fixed charges for monthly and quarterly billing were provided in Schedule 3 of the Lease Concession Agreement, and have been adjusted annually in accordance with the Agreement provisions. The fixed rates for the City service area for monthly billing generate significant additional revenues per account per year (more than the quarterly rates). Thus, shifting to monthly billing would provide

additional revenue to LCA. This is currently being considered for possible implementation in the summer of 2018.

5.2.2 Implement Fixed Base Remote Reading of Water Meters

LCA has considered implementing AMI, which would provide significant savings in annual operating costs associated with meter reading, as well as an ongoing source of information that could be used to identify leaks in the water system, reduce meter recording errors, and other benefits. Current approximate estimates are of a \$2 million CAPEX cost, with \$125,000 of savings from reduction in meter reading/billing personnel. LCA should complete a more detailed investigation to fully quantify expected costs and savings, availability of funding to support implementation, and barriers to implementation with the City.

5.2.3 Indirect Cost Allocation

LCA has a Consolidated Internal Services Fund that captures LCA's costs that are not directly allocable to either the City or Suburban Systems. For purposes of cost recovery, these costs are currently allocated between the City and Suburban Systems based on each system's respective share of directly allocable payroll costs. While share of payroll costs is considered a reasonable basis for the allocation of these costs, other allocation methods also are considered reasonable. If LCA were to employ a combination of other acceptable methods of allocation of these indirect costs, it may result in a reallocation of some of these indirect costs. LCA should consider completing a detailed indirect cost allocation study that could help determine the most reasonable and cost-justifiable methods of allocation of indirect costs to the City and Suburban Divisions, as well as between the Water and Wastewater Funds within each division.

5.2.4 Private Fire Protection Charges

The Water Rate Schedule for the City Division includes a yearly Fire Hydrant Charge to recover a portion of the cost of providing private fire protection service. The current practice of collecting these charges is inequitable, as the current charges only apply to commercial and industrial customers with private hydrants. However, many customers with private firelines do not have hydrants or are unmetered and, thus, are not billed for the service that LCA provides.

The private fire protection charge in the City Division service area differs from the charge that LCA assesses in the Suburban Division. Additional analysis should be completed to refine and confirm the potential revenue impact for the City Division by increasing the schedule to match the Suburban Division.

The next steps that would be required to further analyze this option include:

1. Completing an investigation to identify and verify the property listings within the City Division that have private fire protection systems, identify the size of the fireline connection, and cross check against the fire hydrant billing locations to eliminate any potential duplicate billing.
2. Complete a cost-of-service evaluation to identify the cost-justified level of private fire protection charges for the City Division.

In lieu of a full investigation as described under item 1 above, LCA could also consider establishing an "unknown" size category based on data from the Suburban Division or other utilities to determine the most typical fireline size to use for the "unknown" category. Using a typical size (perhaps by customer class), while allowing for a customer appeals process for adjustments, could allow LCA to implement the fireline charges without completing a field survey of all customers with firelines. Another approach would be to first send out a letter to potential customers that may have firelines with a request for the line/connection size information, along with some verification, such as a photo. This would give customers the opportunity to provide the information before an assumption is made using a typical size

for billing purposes. If LCA desires to implement this change, an action plan should be developed to identify the implementation approach and to outline the next steps.

5.2.5 Miscellaneous Fees and Charges

The Project Team completed a comparison of the miscellaneous fees charged to customers in LCA's City Division with the miscellaneous fees charged by six other water and wastewater providers in Pennsylvania and in the northeast. The results of the miscellaneous fee comparison indicated that the miscellaneous fees charged by LCA are generally comparable to those charged by the other utility providers that were surveyed. LCA should consider completing a miscellaneous fee cost-of-service evaluation to assess the ability of the existing fees to sufficiently recover the associated cost of completing the activity or providing the service.

In addition, as part of the miscellaneous fee cost-of-service evaluation, LCA should complete a tapping fee evaluation. Tapping fees are fees charged to new customers to connect to the water and wastewater system, and generally compensate the utility for providing system capacity to serve the new customer. The Initial Schedule of Service Charges, Schedule 3 of the Lease Agreement, identifies the Water and Sewer Tapping Fees that can be charged to new customers that connect to LCA's City Division water and wastewater systems. Title 53 of the Commonwealth of Pennsylvania Statutes specifies a required methodology for calculating and updating tapping fees that are assessed by municipalities in Pennsylvania. The City transferred the rights for LCA to charge water and sewer tapping fees in accordance with Schedule 3 of the Lease Agreement, but did not provide supporting information on the method that was used to establish the existing fees. Therefore, an analysis of the tapping fees should be completed to ensure that the current fees follow the Pennsylvania Tapping Fee Statute.

5.2.6 Evaluate LCA Suburban Bulk Water Purchase Rate Calculation

LCA's intentions for executing the Water Supply Agreement with the City in 2009 was to pay only the incremental O&M costs incurred at the water treatment plant (WTP) that are directly related to providing LCA with the water it purchases. Based on a review of the agreement and historical calculations, some O&M cost components that are impacted by increased water production rates are not currently included in the O&M cost calculation, such as any increased frequency of equipment maintenance and filter backwashing operations.

After discussions with plant staff, no significant increase in equipment maintenance can be attributed to increased water treatment production at the WTP. Therefore, this should not be pursued further. However, with increased plant production comes more frequent backwashing of filters to maintain the needed flow rates from the WTP. Using plant data, a unit rate of backwash volume per gallon of water plant production was calculated, and an incremental volume of filter backwash water attributable to providing water to LCA's Suburban Division was also calculated (2.31 million gallons per month). This cost for treatment and disposal of this backwash water should be considered for inclusion in the incremental O&M costs.

An analysis should be conducted annually and after each major capital improvement to help ensure that any new incremental costs are captured in the bulk water rate to the suburban division.

5.2.7 Other Recommendations

Many of the other operational savings and revenue enhancement considerations discussed herein have the potential to reduce LCA's costs or provide additional revenues to the City system. In most cases, the additional revenue or cost savings will be meaningful, but will not be sufficient by themselves to change the financial performance of the City System. The Project Team recommends that these options be considered in combination with the other more significant cost savings and revenue enhancements described herein to help LCA meet its overall goals for the City system.

Debt Profile Considerations

6.1 Introduction

The City Division's outstanding debt is comprised of three series: 2013A (tax exempt), 2013B (capital appreciation bonds ([CABs]), and 2013C (taxable bullet maturity) (together, the "2013 Bonds"). Payments on the existing 2013 Bonds spike in December 2018 as the 2013C Taxable Bullet Maturity comes due in full. Outside of the debt service spike in December 2018, annual payments increase from approximately \$12.9 million in fiscal year (FY) 2019 to a peak of \$38.2 million in FY2043. Figure 6-1 and Appendix A presents these debt service schedules.

- The 2013A Bonds were structured with a 10-year call provision (that is, prepayment provision) that is typical for most long-term, tax-exempt municipal bonds. As a result, this series may provide the future ability to be refinanced and/or restructured.
- The 2013B CABs are generally not prepayable and thus will not provide the opportunity to refinance. This inflexible prepayment provision will likely also limit the effectiveness of the 2013B's in a debt restructuring scenario.
- The 2013C Bonds come due in a bullet maturity on December 1, 2018. This series will need to be termed out prior to final maturity, as the City Division does not have excess cash over and above legal reserve requirements or recommended policy targets with which to pay the bullet maturity.

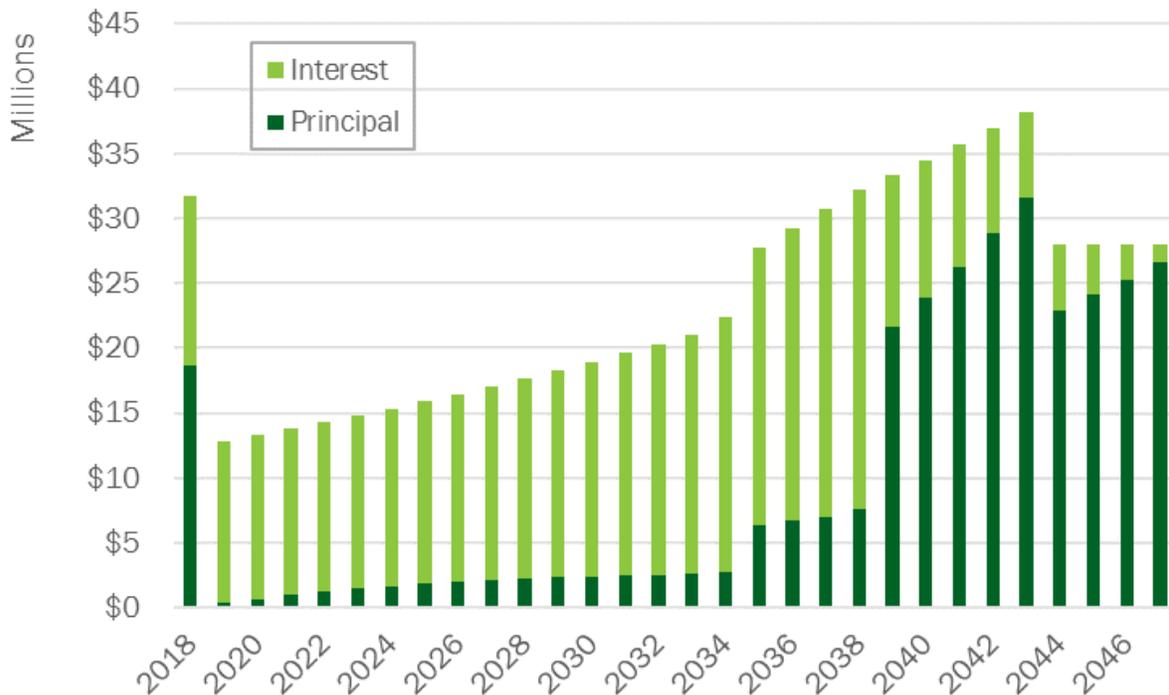


Figure 6-1. City System Current Debt Schedule

6.2 Refinancing/Restructuring Considerations

The 2018 tax law changes eliminated the ability of LCA to advance refund its currently outstanding debt on a tax-exempt basis. Thus, if LCA were to advance refund its 2013A Bonds, the interest income on the new bonds would be taxable, which generally carries a higher interest rate than tax-exempt debt, such as the Series 2013A bonds.

As is noted previously, the 2013A Bonds are the only series that provides the ability to refinance on a conventional basis for interest-rate-savings purposes. However, based on current market interest rates (rates as of January 2018) and without the ability to advance refund on a tax-exempt basis, no opportunity exists to refinance for meaningful economic savings especially considering the City Division's near-term cash flow pressure.

The Project Team recommends that LCA continue to monitor the taxable and tax-exempt markets to explore the opportunity to refinance the 2013A Bonds via a conventional refinancing structure.

Also, given the City Division's cash flow pressures, any refinancing transaction should closely consider not only the long-term economic/interest rate savings but also the near-term cash flow benefit and opportunity cost of executing a refinancing transaction that may have limited impact to near-term cash flows.

6.3 2013C Term Out Considerations

As noted above, the bullet maturity of the 2013C Bonds needs to be termed out because, based on the information provided to the Project Team, LCA does not have the required reserves to pay the \$18+ million that comes due on December 1, 2018. This term out transaction will likely not be a straightforward financing and at the time of this Report, LCA has at most 8 months with which to complete and close on a successful refinancing. Several potential complications are associated with this transaction, which are described in more detail in Appendix F.

6.4 Debt Restructuring Analysis

The Project Team also evaluated opportunities to restructure existing City Division debt for cash flow savings but not necessarily economic savings over the life of the restructured bond(s). Two options were prepared for consideration, but at this time the Project Team is not recommending that LCA pursue either option. The options were prepared to estimate the amount of upfront cash flow savings that could be achieved under a "smaller" restructuring transaction or a "larger" restructuring transaction. These options were viewed as a potential tool to help bolster City Division reserves by reducing debt service in the next 3 to 5 fiscal years. Both options contemplated a present value cost/dissavings over the life of the refunded bonds.

LCA may be able to reduce annual debt service payments or otherwise engage in a more beneficial restructuring if it is able to extend its charter life – which currently governs the final maturity of the existing 2013 Bonds. Extending existing debt service payments beyond the current final maturity may provide a degree of additional upfront cash flow relief if needed by the City Division. Additionally, a restructuring transaction that extends the life of the existing debt may allow LCA to "smooth" the existing debt structure whereby payments ramp up at an increasing rate for the next 25 years.

The Project Team recommends that any future consideration of a restructuring transaction should only be undertaken after a thorough and holistic analysis of the impact to the City Division's critical financial metrics at the time that the restructuring is considered.

Capital Improvement Program Prioritization

7.1 Overview

This section summarizes the capital improvements needed for the City service area water and wastewater systems. The City's water and wastewater system, like many older water and wastewater systems in the U.S. and elsewhere, are faced with significant capital needs to replace their aging lines and other infrastructure. In the U.S., these needs are estimated at approximately \$1 trillion during the next 25 years. For this analysis, the estimated needed improvements exceed \$1.3 billion during the 50-year lease period. Because of the magnitude of these needs, a Capital Improvement Program (CIP) Prioritization Analysis was undertaken to help identify what improvements best meet the system needs and which ones could be postponed or eliminated if CIP funding was restricted in near- or long-term.

The CIP Prioritization Analysis begins with identifying LCA goals and objectives for the City System. These identified goals and objectives are then used as evaluation criteria for the planned capital improvements. The evaluation criteria were then weighted by LCA staff based on their importance to achieving LCA's overall goals and objectives. For each criterion, performance measures were developed to measure the performance of the planned capital improvements toward meeting each of the evaluation criteria. LCA staff familiar with the planned improvements then scored each project on each performance measure. The composite score of each project, weighted by the importance of each criteria to meeting LCA's goals and objectives, were used to determine the overall weighted score for each project. The projects are then prioritized based on the resulting total benefit score for each project.

For the purposes of this analysis, the weightings of LCA's evaluation criteria were originally set assuming an ideal situation with no financial constraints, and a second analysis then conducted where the current City System financial condition were considered for evaluating the projects.

7.2 CIP Sources

The CIP used for this analysis consists of information from various sources or was developed as a part of this project (for the wastewater CAPEX):

- 2018–2022 LCA CIP for City Division Water/Wastewater Systems
- Water Plant and Storage/Pumping beyond 5 years: 2017 Water System Master Plan, Arcadis
- Water Distribution System Piping: 2 miles/year requirement per lease agreement, using LCA actual costs/mile as baseline and escalated by inflation
- Wastewater Treatment Plant beyond 5 years:
 - Asset age registry provided by LCA
 - Estimates of major renewal/replacement costs for aged assets during lease period
 - Estimates for improvements necessary to deal with future regulations
 - \$1M/yr for annual projects at the WWTP (escalated by inflation)
- Wastewater Collection System
 - Existing major interceptor inventory in the City greater than 24-inch diameter
 - 5-year replacement CAPEX based on age/size of major interceptors
 - CAPEX costs exclude projects already funded under Administrative Order program
 - \$300,000/year ongoing annual project for sewer interceptor repairs

Figure 7-1 presents the projected annual capital expenditures by year. Table 7-1 lists the estimated \$1.3 billion CAPEX plan by subsystems and those projects considered annual projects and major capital projects. A total of 95 percent or more of the major capital projects are greater than \$1 million and eligible for consideration in the CCRC calculations. Appendix D includes a detailed listing of the capital projects and the original schedule for their construction.

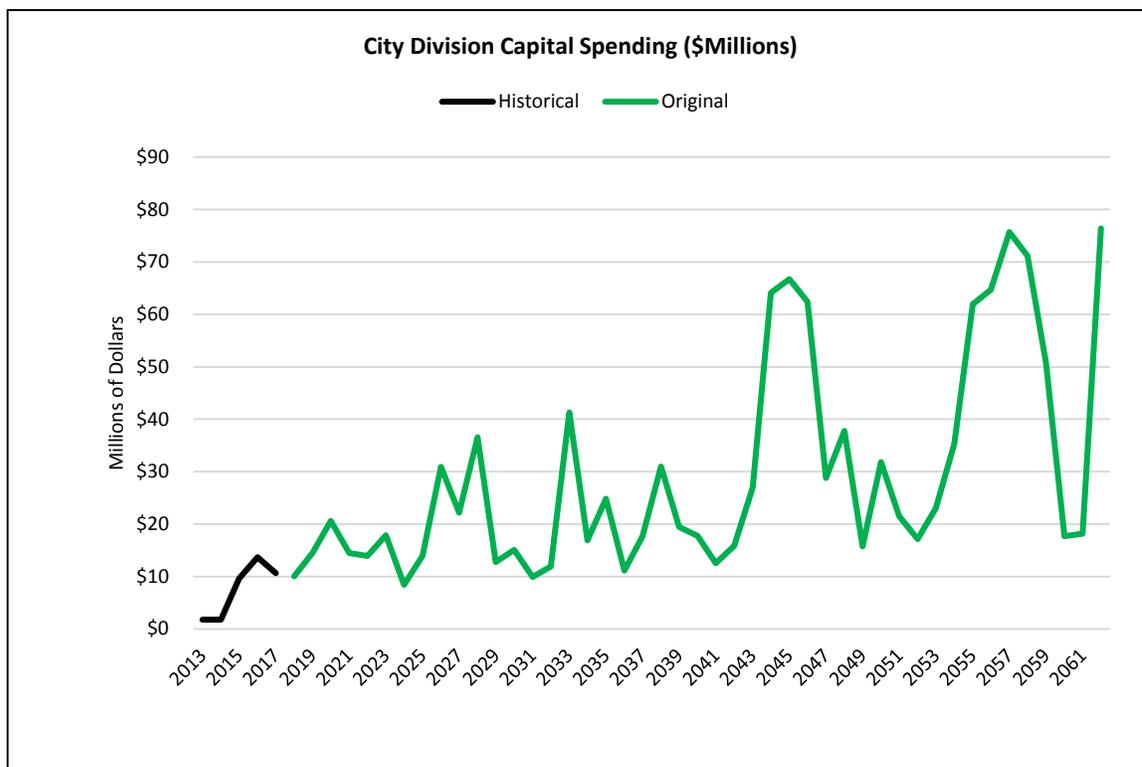


Figure 7-1. CAPEX Schedule

Table 7-1. CAPEX Plan Breakdown (2018 through 2062) in Thousands

System	Subsystem	Annual projects	MCI	Total
Water	Intake/Springs	\$ --	\$ 39,245	\$ 39,245
	Water Treatment Plant	\$ 20,090	\$ 93,340	\$ 113,430
	Storage and Pumping	\$ 7,729	\$ 70,700	\$ 78,429
	Water Distribution	\$ 13,564	\$ 276,234	\$ 289,798
	Other	\$ 85,074	\$ 7,500	\$ 92,574
Total		\$ 126,457	\$ 487,019	\$ 613,476
Wastewater	WWTP	\$ 41,395	\$ 473,194	\$ 514,589
	Collection System	\$ 13,005	\$ 149,568	\$ 162,573
	Other	\$ 39,142	\$ --	\$ 39,142
	Total	\$ 93,542	\$ 622,762	\$ 716,304

7.3 Project Rankings

The scores of the projects for each criterion were multiplied by the weighting of that criteria. The resulting weighted scores for each criterion were then summed for each project to derive their total benefit score. The projects with the highest total benefit score were considered the highest priority.

The resulting rankings of the projects under the first criteria weighting and the changes to those rankings under the second criteria weighting are summarized in Tables 7-2 and 7-3 for the water and wastewater systems, respectively. The top six highest-priority water projects under the “ideal” weighting are the same as the top six under the current financial condition ranking. Similarly, Table 7-3 shows that while the order changes, the top five highest-ranked wastewater projects based on total benefit under the two sets of evaluation criteria weightings are the same.

7.4 Lowest Ranked Projects by Source of Funding

These are the projects that per the results of the two rankings, LCA would likely defer or decide to eliminate from its CIP, should its financial position require it to reduce its planned improvements. Overall, under either weighting, the highest- and lowest-ranked projects were similar.

On the total benefit scale, the lowest-ranked water CCRC-funded projects are the ultraviolet disinfection, roof replacements, pretreatment/sedimentation, and water main replacements, while the lowest-ranked annual water projects were Miscellaneous CW Expenses and capital management under both evaluation criteria weightings.

The lowest-ranked wastewater CCRC-funded projects are screening and grit rehab/replacement under the ideal ranking, and gravity thickener rehab under the financial condition improvement ranking. The lowest-ranked annual wastewater projects were the capital management and collection system development.

7.5 Future Use of Prioritization Process for CIP Adjustments

Beyond its use for this financial modeling/assessment exercise, the prioritization process can be used in future years as the long-term CIP costs become more defined. The model is not intended to draw a firm line between can have and cannot have projects if CIP funds are constrained. LCA staff system knowledge should always be considered, especially for projects that score closely to one another. Care should be taken to re-evaluate projects and rankings in light of the understanding of the system needs at that future time.

Ways that LCA could utilize the CIP prioritization process in the future include:

- -Separating Annual projects from MCIs in the prioritization as these may have different goals and objectives, and could be difficult to compare in some cases versus one another.
- - Use a weighted cost benefit score to determine the highest “value” projects that should be in the “must have” category.
- -For projects grouped closely together, perform a sensitivity analysis on the scoring and weighting of criteria to see what would create more separation and clarity on importance of the projects

Table 7-2. Highest and Lowest Ranked Water System CAPEX Projects

Project Description	Funding Type	Ideal Weighting		Financial Improvement Weighting		Capital Cost
		Rank	Benefit Score	Rank	Benefit Score	
Other Equipment	Annual	1	71.90	1	69.49	\$16.9M
Pump Stations	MCI	2	67.42	6	62.17	\$11.7M
General Water System Replacements	Annual	3	67.24	2	66.87	\$52.1M
WFP General Improvements	Annual	4	65.48	5	62.69	\$16.5M
Electrical Improvements/Pumps	MCI	5	65.31	3	64.62	\$13.2M
High Lift VFDs/Pumps	MCI	6	64.87	4	64.15	\$14.0M
Major Meter replacement program	Non-RE	24	40.17	21	44.24	\$10.0M
Ultraviolet Disinfection	MCI	25	33.97	26	32.76	\$12.0M
Fixed Base Meter Reading System	Non-RE	26	26.72	25	32.79	\$1.7M
Capital Management	Annual	27	25.22	27	24.50	\$2.0M
Misc. CW Expenses/Upsizing/3rd Party	Annual	28	22.08	28	21.77	\$5.3M
Roof Replacements	MCI	23	40.18	24	40.91	\$7.0M

Note:

Non-RE = non-reimbursable project

Table 7-3. Highest and Lowest Wastewater System CAPEX Projects

Project Description	Funding Type	Ideal Weighting		Financial Improvement Weighting		Capital Cost
		Rank	Benefit Score	Rank	Benefit Score	
WWTP Disinfection Upgrade	MCI	1	70.66	1	66.38	\$1.9M
WWTP General Improvements	Annual	2	68.13	3	66.21	\$41.1M
WWTP Electrical Substation Replacements	MCI	3	67.24	2	64.23	\$3.5M
Large diameter sewer main rehabilitation	MCI	4	65.95	4	63.68	\$150M
Other Equipment	Annual	5	63.88	5	61.22	\$18.6M
Screening and Grit rehab/replacement	MCI	20	45.90	17	44.83	\$6.0M
WWTP Dewatering SCADA Upgrades	Annual	21	44.27	16	45.10	\$0.23M
Mobile Equipment	Annual	22	38.81	22	37.66	\$11.4M
Capital Management	Annual	23	30.11	24	32.32	\$2.0M
Collection System - Development	Annual	24	28.58	23	32.14	\$4.8M
Various Wastewater System Related Studies	Annual	18	46.42	20	44.15	\$2.1M
Gravity Thickener Rehab	MCI	19	46.33	21	43.82	\$6.0M

Note:

Non-RE = non-reimbursable projects

Financial Planning Projections

This section describes the scenarios that were evaluated and presents the key results as compared to the financial metrics presented in Section 4.3, specifically the Debt Service Coverage Ratio (DSCR) and the net fund balance/cash on hand. These scenarios were developed jointly with LCA. Two sets of scenarios were developed: first to determine the required revenue baseline to ensure viability of the lease, and then second to address strategies that could be employed to enhance the short- and long-term success of the lease. The first set of scenarios focused on the key issues of monthly billing and relieving the restrictions in the lease on CCRC project acceptance. The second set of scenarios assumed that monthly billing with full CCRC recovery was implemented, and looked at how refinancing and potential restrictions/re-scheduling of CAPEX would affect the City System financial metrics. Details of both sets of scenarios are presented in the following subsections.

8.1 Description of Baseline and Pass/Fail Scenarios

The first set of scenarios developed a baseline forecast or scenario and then evaluated the forecast baseline conditions against three pass/fail scenarios. The pass/fail scenarios evaluate the impact that changes to the three key assumptions (monthly billing, varying levels of CCRC project approvals, and debt funding would have on the financial viability of the lease). Table 8-1 shows the differences between the main assumptions that were evaluated. The baseline scenario assumes that the City Division will continue to operate with quarterly billing for its 1-inch-diameter or smaller water connections, and CCRC revenue and approvals maintained. It also assumes that no new debt will be issued. The primary difference between the Baseline and Scenario 1 is billing frequency for metered connections of 1-inch diameter and less. Scenario 1 assumes implementation of monthly billing, whereas the Baseline scenario (along with Scenarios 2 and 3) assumes these users with 1-inch-diameter or smaller water connections will continue to be billed quarterly. The primary difference between the Baseline and Scenario 2 is reduced recovery of MCI through the CCRC based on tighter approvals by the City. Scenario 3 is a modification of the Baseline scenario, where most MCI is recoverable, but billing remains quarterly. This scenario assumes that LCA will issue debt to finance some of the planned CAPEX, provided the City Division's financial metrics allow it, but if it is not able to, the schedule for construction of the planned improvements will be deferred to improve the City Division's financial performance. Additionally, all scenarios assume exhaustion of the CAPEX fund by 2062. Appendix B provides detailed assumptions for each scenario.

Table 8-1. Summary Assumptions for Baseline and Scenarios 1 through 3

	Baseline (CCRC Applied, Quarterly Billing, No New Debt)	Scenario 1 CCRC Applied, Monthly Billing, No New Debt	Scenario 2 CCRC Reduced, Quarterly Billing, No New Debt	Scenario 3 - (Baseline w/ Debt Funding) Quarterly Billing, CCRC Applied, with New Debt
Meter Billing	Quarterly	Monthly	Quarterly	Quarterly
MCI Funding	Most MCI recovered through CCRC, no new debt	Most MCI recovered through CCRC, no new debt	Most MCI non-recoverable, reduced CAPEX, no new debt	Debt Funding considered, Pay-go and CAPEX Fund, Most MCI recovered through CCRC

Table 8-1. Summary Assumptions for Baseline and Scenarios 1 through 3

	Baseline (CCRC Applied, Quarterly Billing, No New Debt)	Scenario 1 CCRC Applied, Monthly Billing, No New Debt	Scenario 2 CCRC Reduced, Quarterly Billing, No New Debt	Scenario 3 - (Baseline w/ Debt Funding) Quarterly Billing, CCRC Applied, with New Debt
Existing Debt Service	Refinance Series 2013C Bonds - \$19M due in 2018	Refinance Series 2013C Bonds - \$19M due in 2018	Refinance Series 2013C Bonds - \$19M due in 2018	Refinance Series 2013C Bonds - \$19M due in 2018
CAPEX Funding ^a	No new debt, CAPEX funded from revenues/reserves and CAPEX Fund	No new debt, CAPEX funded from revenues/reserves and CAPEX Fund	No new debt, CAPEX funded from revenues/reserves and CAPEX Fund	CAPEX may be funded from new debt if metrics allow, and from revenues/reserves and CAPEX Fund

^a The Capex Fund is a fund that is collected over most of the life of the lease intended to fund capital outlays in the later years of the contract that can't be recovered through the CCRC charge.

8.2 Results from Baseline, Scenario 1, and Scenario 2

Table 8-2 and Figures 8-1 and 8-2 summarize the results of the Baseline, Scenario 1, and Scenario 2. Table 8-2 shows that for the Baseline and Scenario 1, it is assumed that all of the planned capital improvements are constructed, but as a result, the net fund balance falls below zero and remains there for several years. Monthly billing significantly improves the results in Scenario 1, as compared to the Baseline scenario, to get to a positive net fund balance by 2031. Figure 8-2 shows that toward the later years of the lease, the fund balance grows rapidly under each of these scenarios, amounting to more than \$600 million for Scenario 2, and approximately \$1.5 billion for Scenario 1.

For Scenario 2, which includes significant reductions in CCRC revenue, the City Division will not be able to construct approximately \$238 million of the \$1.3 billion of needed improvements.

The Baseline and Scenarios 1 and 2 all assume that LCA does not issue new debt, except for refinancing of the 2013C bonds. ***These scenarios are not intended to be realistic depictions of future performance, but rather to illustrate a pass/fail test related to revenue options.***

Table 8-2. Summary CIP Expenditures (2018 – 2062) for Baseline and Scenarios 1 and 2

Total CAPEX 2018–2062 by System	Baseline and Scenario 1	Scenario 2
Water Capital		
Annual Project	\$126.5	\$126.5
Non-reimbursable	\$12.2	\$127.5
Major Capital Investment	\$474.8	\$264.5
Total Water	\$613.5	\$518.5
Wastewater Capital		
Annual Project	\$93.5	\$91.5
Non-reimbursable	\$0.0	\$467.9
Major Capital Investment	\$622.8	\$13.7
Total Wastewater	\$716.3	\$573.1
Total	\$1,329.8	\$1,091.5

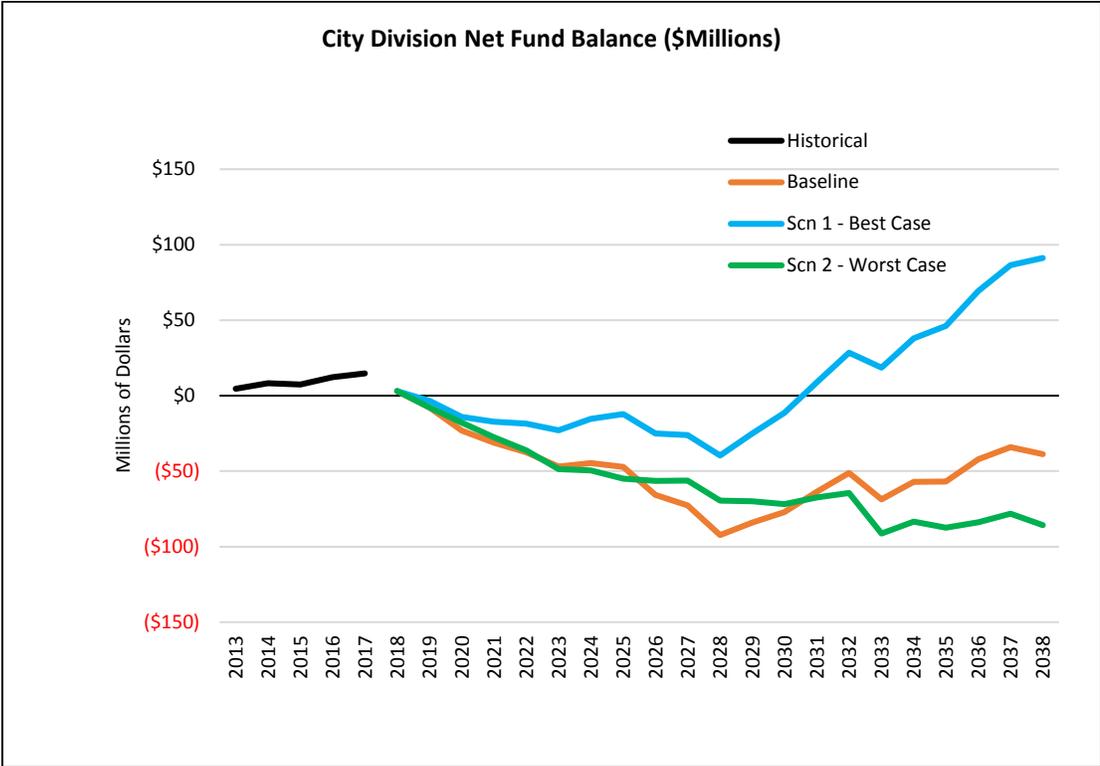


Figure 8-1. Net Fund Balance (20-year) for Baseline, Scenario 1, and Scenario 2 (in Millions)

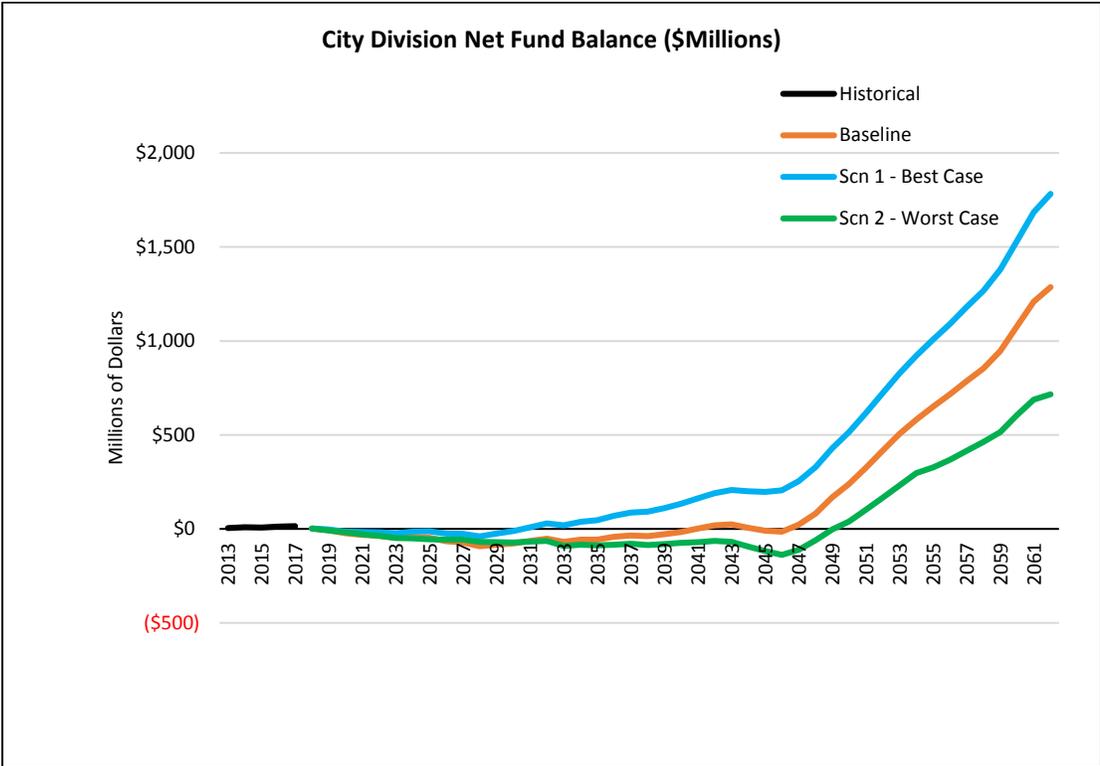


Figure 8-2. Net Fund Balance (50-year) for Baseline, Scenario 1, and Scenario 2 (in Millions)

8.3 Results from Scenario 3 – Baseline with Quarterly Billing and Debt Funding

Scenario 3 (Baseline with debt funding) assumes that LCA 1) will issue new debt to help finance the planned improvements, provided that the financial metrics allow, and 2) captures CCRC revenue on all MCI projects, and 3) continues to bill most of the City Division customers quarterly.

Under Scenario 3 new debt could be used to finance some planned capital improvements. However, because of the lower level of revenues under this scenario, the forecast DSCR remains just above required levels for most of the forecast period, not allowing the Division to support additional debt, and thus the planned capital outlays must be funded from pay-go and the CAPEX Fund only. As a result, many improvements must be deferred until revenues increase during the later years of the lease. All planned improvements could be constructed within the lease period, but would be deferred until late in the lease, well beyond when those improvements are anticipated to be needed. Under Scenario 3, the total capital outlays through 2047 amount to \$322.0 million. This compares to the original CIP schedule whereby \$710.9 million of improvements would be constructed during this same period.

Figures 8-3 and 8-4 show annual capital spending and forecast debt service coverage for Scenario 3. In Figure 8-4, the timescale only extends to 2047, as the debt service would be retired in that year. The results for this scenario clearly show that without monthly billing, the City Division will not generate sufficient revenues to allow the construction of the planned CAPEX when these improvements are expected to be needed. New debt funding, while considered under this scenario, could not be supported, and thus all improvements would need to be funded from pay-go and the CAPEX fund. However, the availability of funding from these sources is limited, forcing a significant portion of the planned improvements to be deferred until late in the forecast period.

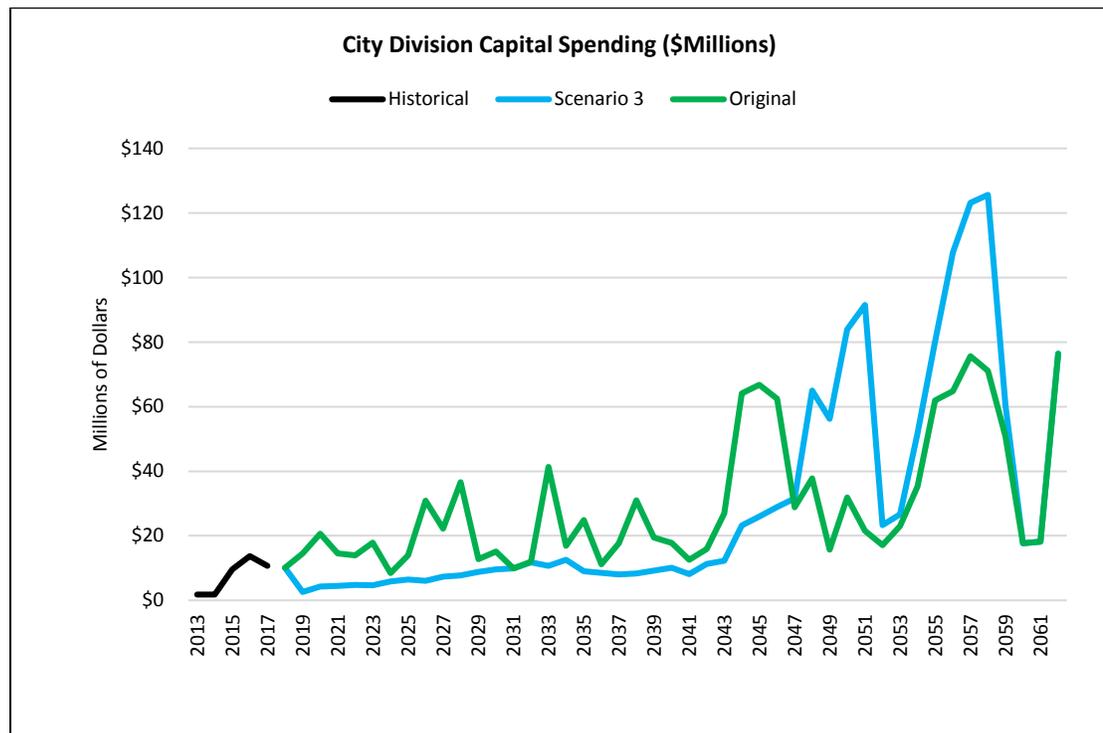


Figure 8-3. Scenario 3 (Baseline with Quarterly Billing, Debt Funding) Annual Capital Spending

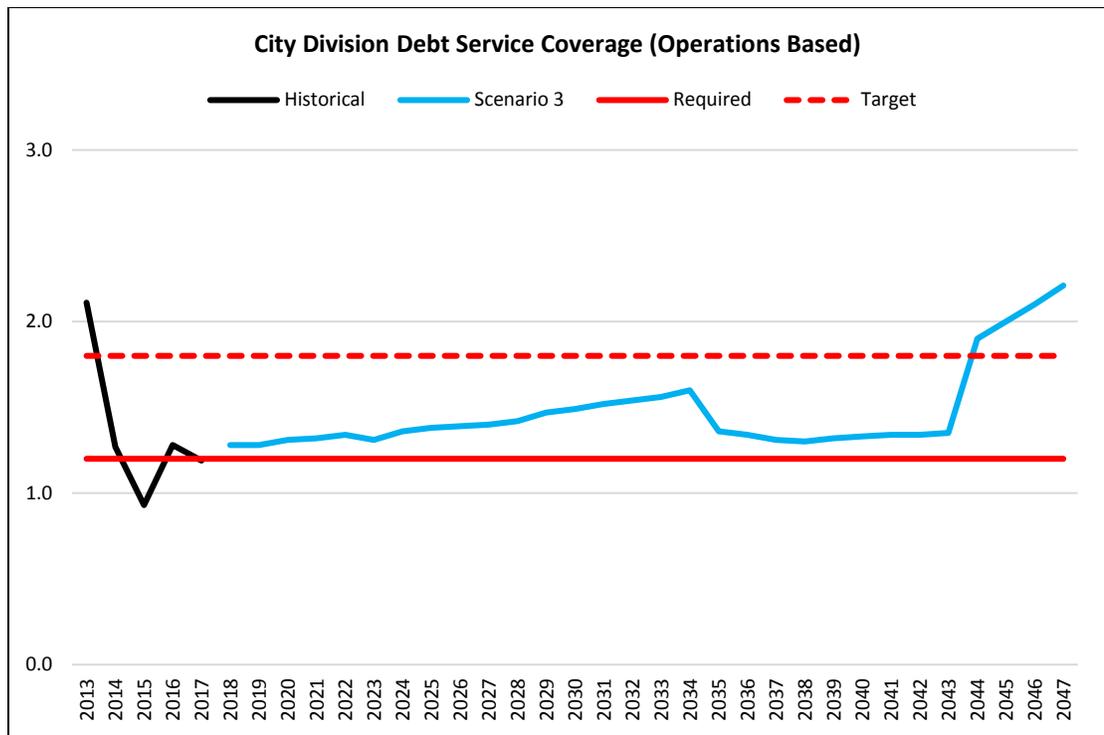


Figure 8-4. Scenario 3 (Baseline with Quarterly Billing, Debt Funding) Forecast Debt Service Coverage through 2047

8.4 Conclusions from Review of Baseline and Scenarios 1–3

Based on these analyses, without the implementation of monthly billing and without more flexibility in recovery of capital improvements through the CCRC, LCA will likely be unable to maintain sufficient net cash flow to position itself for successful operation of the City System and meet Performance Standards required by the lease agreement. Furthermore, without monthly billing and CCRC flexibility, the City System may not meet the required financial metrics that will allow it to refinance the Series 2013C bonds.

8.5 Description of Scenarios A–C

The results of the Baseline and Scenarios 1–3 discussed above show the importance of securing future revenues through the CCRC, and implementation of monthly billing to provide the City Division with a more stable basis for funding its operations. Given this finding, analysis of an additional set of scenarios were developed to examine the financial results with full CCRC funding and monthly billing, but with variations of other assumptions.

Table 8-3 describes the second set of scenarios. Appendix B provides a detailed list of assumptions of these Scenarios. Scenario A assumes that the CIP will be constructed following the original schedule for their implementation. It also assumes that debt will be used to fund some of the MCI and non-MCI improvements. It is assumed for this scenario that as the City Division is currently meeting the DSCR requirement of 1.2, but is significantly less than LCA's target ratio of 1.8, achieving this target will be phased in over several years.

The primary difference between Scenario A and Scenario B is how the DSCR target is achieved, and the option to reschedule the planned capital improvements and change their funding to meet key metrics. Under Scenario B, it is assumed that LCA will take measures to accelerate achieving the 1.8 DSCR as

compared to Scenario A. This may involve rescheduling some of the planned capital improvements or revising how these improvements would be financed or funded. Achieving the 1.8 target coverage factor sooner provides additional protection to the bond holders that LCA will be able to meet the 1.2 coverage factor should an unanticipated adverse financial development arise prior to 2025. The higher coverage factor could also help improve LCA’s financial position with the credit rating agencies.

The primary difference between Scenario B and Scenario C is that Scenario C assumes that the Series 2013A bonds are partially refinanced to gain some reduction in debt service requirements during the next 5 years (through 2022). This results in some higher debt service payments on the refinanced 2013A bonds in later years (year 6 and beyond).

Table 8-3. Key Assumptions for Scenarios A–C

	Scenario A	Scenario B	Scenario C
Meter Billing	Monthly	Monthly	Monthly
MCI Funding	- Debt (2018 to 2042) and pay-go recovered through CCRC - CAPEX Fund	Debt (2018 to 2042) and pay-go recovered through CCRC - CAPEX Fund	Debt (2018 to 2042) and pay-go recovered through CCRC - CAPEX Fund
Non-MCI Funding	Debt (2018 to 2042) and/or pay-go	Debt (2018 to 2042) and/or pay-go	Debt (2018 to 2042) and/or pay-go Refinance Series 2013C
Existing Debt Service	Refinance Series 2013C	Refinance Series 2013C	Refinance portion of Series 2013A
CAPEX Spending Levels	\$1.3 billion as originally scheduled	\$1.3 billion, adjust schedule to maintain key metrics	\$1.3 billion, adjust schedule to maintain key metrics
Fund Balance	90 days unrestricted balance	90 days unrestricted balance	180 days unrestricted balance
DSCR Target	120% minimum, 180% Phase In	180% Achieve ASAP	180% Achieve ASAP

8.6 Results from Scenarios A–C

For Scenarios A–C, the estimated \$1.3 billion in CAPEX spending is achieved. However, under Scenarios B and C, the schedule for constructing many of these improvements is deferred until after 2024.

The analysis assumes that pay-go funding from the unrestricted fund balance is used first to fund the planned improvements. Debt funding is used if using funds in the unrestricted fund balance would fall below the minimum balance of 90 days of operating expenses. However, for all three scenarios, it is assumed no new debt is issued after 2042. The CAPEX Fund is used to fund planned improvements to the extent possible based on fund balance, and as allowed per the Lease Concession Agreement. For all scenarios, all of the CAPEX Fund balance is used by end of 2062.

Figure 8-5 summarizes the unrestricted fund balance. For the period 2019 to 2042, the fund balance is maintained at or above target levels under all three scenarios. Starting in 2043, the balance begins to increase because the debt service on the 2013 A–C bonds matures in 2047.

Scenario A assumes that debt will be issued to finance the planned CAPEX. A total of \$63.4 million of improvements are debt-financed during the study period, with improvements in 2019–2023, and 2026–2028, financed with new debt. Scenario B, with the deferral of some CAPEX improvements, no new debt is issued. For Scenario C, \$41.3 million of CAPEX improvements are debt-financed, with improvements shown for construction in 2023, and 2026–2028 new debt-financed.

Figure 8-7 summarizes the debt service coverage ratio. Under Scenario A, with the monthly billing, CCRC relief, and debt financing, the CIP as originally scheduled can be constructed, provided LCA is willing to wait until 2027 to meet the 1.8 target DSCR. Adjusting the timing of the planned CIP and financing under Scenario B did have a small impact on how quickly the City Division can meet the target 1.8 DSCR (meets target by 2024, instead of 2027). However, partially refinancing the Series 2013A bonds and rescheduling some of the upfront capital outlays allows the City Division to meet the 1.8 target DSCR in 2019 and 2020, but it does decrease slightly below this level in 2021–2025 under Scenario C.

Capital spending fluctuates throughout the study period (see Figure 8-6), mostly because of initial CAPEX schedule, but also annual adjustments made to achieve fund balance targets under Scenarios B and C.

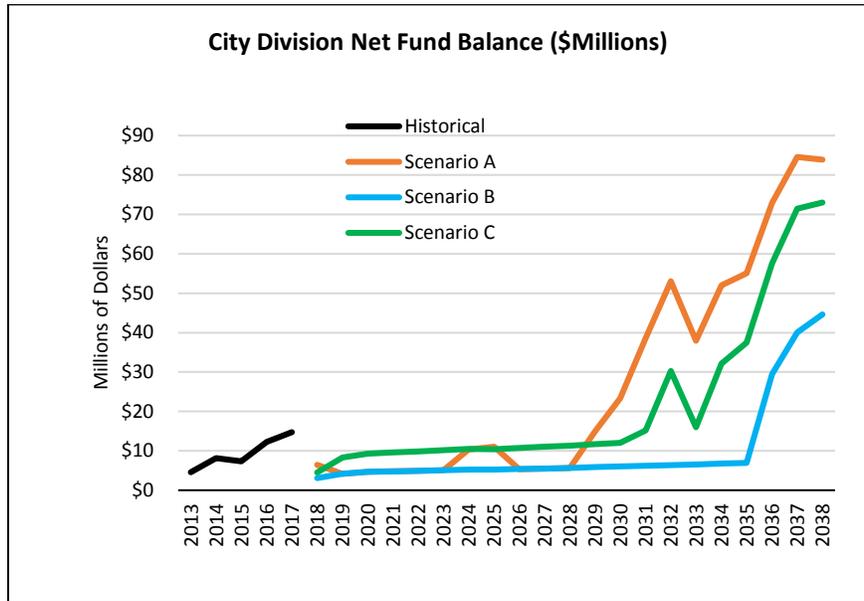


Figure 8-5. Net Fund Balance for Scenarios A–C (in Millions) 20-year Horizon

NOTE: It is possible for lines to overlap, in which case the results are similar for all scenarios.

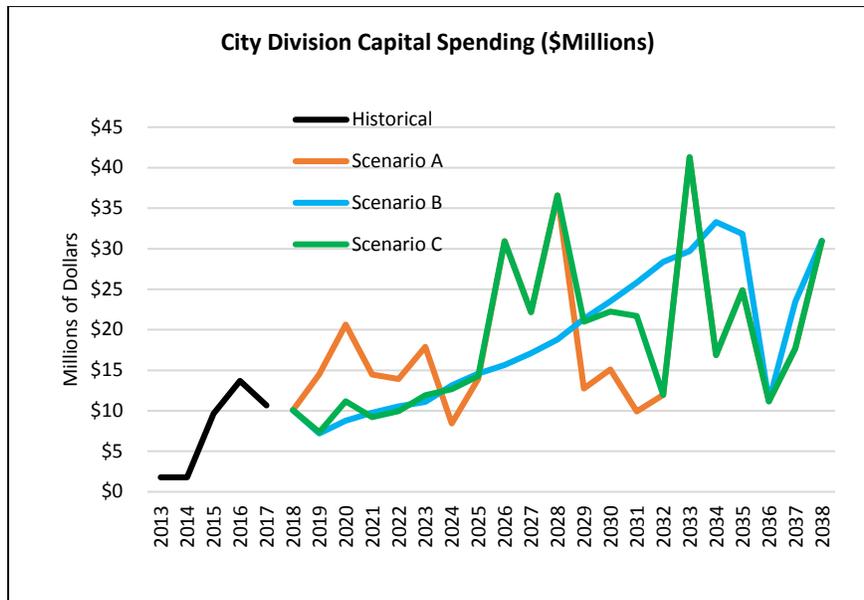


Figure 8-6. Capital Spending for Scenarios A–C (in Millions) 20-year Horizon

NOTE: It is possible for lines to overlap, in which case the results are similar for all scenarios.

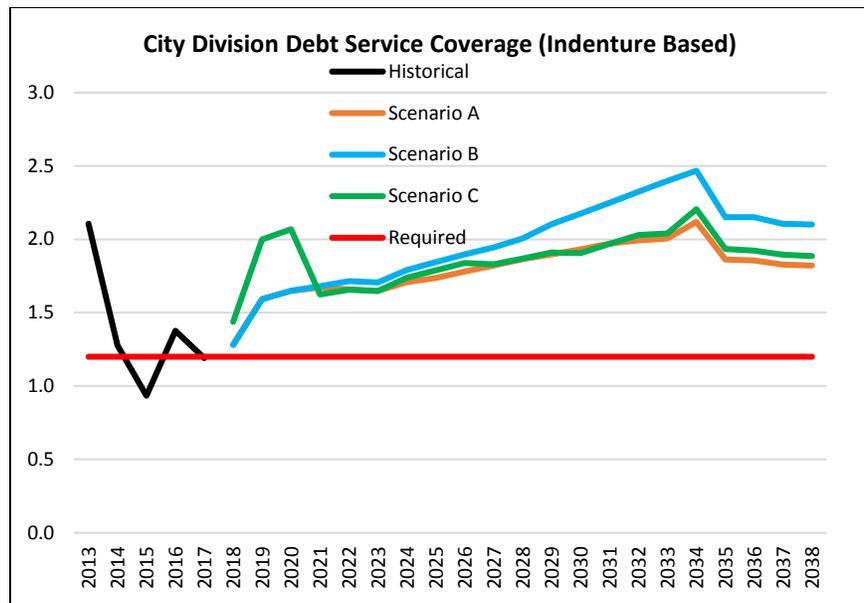


Figure 8-7. Debt Service Coverage Ratio (Indenture) for Scenarios A–C 20-year Horizon
 NOTE: It is possible for lines to overlap, in which case the results are similar for all scenarios.

Water CAPEX is more defined and based on the recent Water Master Plan. The Wastewater CAPEX is less defined and estimated based on age of assets. The decrease in capital spending in 2049 is mostly attributed to timing of wastewater projects. Depending on the types of projects, it is possible that spending could be spread out over a longer period. In addition, the peaks could be lowered to levels that can be realistically implemented.

As shown in Figure 8-6, for Scenarios B and C, some improvements scheduled for 2018–2024 and from 2025–2028 for Scenario A are deferred to a later period. The level of funding for Scenarios B and C are based on the identified needs and available funding for these improvements in each year of the forecast period. It is not based on selection of particular improvements for construction in each year, but rather assumes that LCA will construct improvements based on available funding, the timing of when the improvements are needed, and their priority toward meeting LCA’s goals and objectives, as discussed in Section 7. The fund balance in the later years of the analysis allows for any deferred capital improvements in prior years to be constructed in the later years of the analysis.

As the refunding of the Series 2013A Bonds is not recommended, Scenario C should not be considered further. However, financial markets should be monitored to see if this option could be feasible in the future.

8.7 Conclusions from Review of Scenarios A–C

Scenario A shows that the Capital Improvements can be constructed as originally planned, provided the LCA receives full CCRC cost recovery, implements monthly billing, does debt finance of some of the planned improvements, and that it phases in achievement of the target 1.8 DSCR. Scenario B does not significantly improve the pace by which the target DSCR is achieved, despite adjusting the CIP schedule and its financing, but does avoid debt funding of the planned CAPEX. Partially refinancing the Series 2013A bonds (Scenario C) would allow the City Division to meet the target DSCR sooner, but the partial refinancing of this debt is not recommended at this time.

Based on the results of the iterative financial modeling process, both Scenarios A and B enhance the forecast financial results for the City Division. Key features of these scenarios include:

- Immediate conversion to monthly billing

- Securing all CCRC revenues available
- Maintains 180-day restricted reserves for O&M and 90-day unrestricted reserves
- Both scenarios maintain a DSCR of 120 percent throughout the forecast period as required by the bond covenants. For Scenario A, this metric rises to 180 percent or greater by 2027 and keeps it above this level for the remainder of the forecast period. Scenario B achieves this higher DSCR somewhat earlier than Scenario A (2025 versus 2027).
- Both scenarios fund the full \$1.3 billion CAPEX plan, with Scenario A funding the planned improvements as identified in the initial schedule for when these improvements will be needed. Scenario B postpones approximately \$50 million of the planned improvements in 2018–2027 to the subsequent decade. This is beyond the initial projection of when these improvements will be needed. The initial CAPEX plan is considered preliminary and may need to be adjusted either accelerated or delayed from what was projected in these initial plans.
- Scenario A will require debt funding of approximately \$63.4 million of the planned CAPEX improvements in the 2018–2037 period, whereas Scenario B would not require debt funding.

Based on these results, Scenario B would provide the most advantageous financial results for the system, as it would avoid LCA issuing new debt to finance the needed improvements to the City system, and slightly accelerate the time that would be needed to meet the target DSCR of 1.8. However, the feasibility of this scenario depends on whether the capital needs of the City system will allow some of the needed improvements to be deferred for 5 to 10 years from what was initially forecast. The CAPEX forecast should be considered preliminary, and may be significantly revised based on the results of a wastewater master plan that is currently being conducted. It is likely that the City Division will be able to defer some of its CAPEX needs, but not all. The recommended financial plan is a combination of Scenarios A and B, with the predominant scenario being dictated by the CAPEX needs and their timing. The financial forecast for these scenarios should be updated once the wastewater master plan is completed, and periodically thereafter, to reflect the City Division’s financial position and challenges going forward.

LCA should carefully monitor its capital needs and continue to proactively maintain the water and wastewater system to try to extend the useful life of the water and wastewater facilities, especially those that are initially scheduled to be replaced in the FY 2018–2027 period.

Affordability

The financial evaluation that was completed considered the potential impacts to customer affordability for residential customers located within LCA’s City Division. Affordability of water and wastewater can be examined in several ways. The U.S. Environmental Protection Agency (EPA) uses the residential bill of 2 percent of MHI as a threshold for “high” financial capability impact for wastewater system,² and this measure is often used as a high-level estimate of affordability. While there is no similar guidance for water system affordability, an independent water system affordability study performed by EPA references a water affordability threshold that range from 1.5 to 3.0 percent of MHI.³ Therefore, for the purposes of the financial evaluation, the Project Team assumed an affordability threshold for water and sewer utility service to be 4.5 percent of MHI.

As illustrated in Figure 9-1, the monthly water and sewer bills for residential users in the City Division service area were well below the average of the other communities in the region surveyed in 2017.

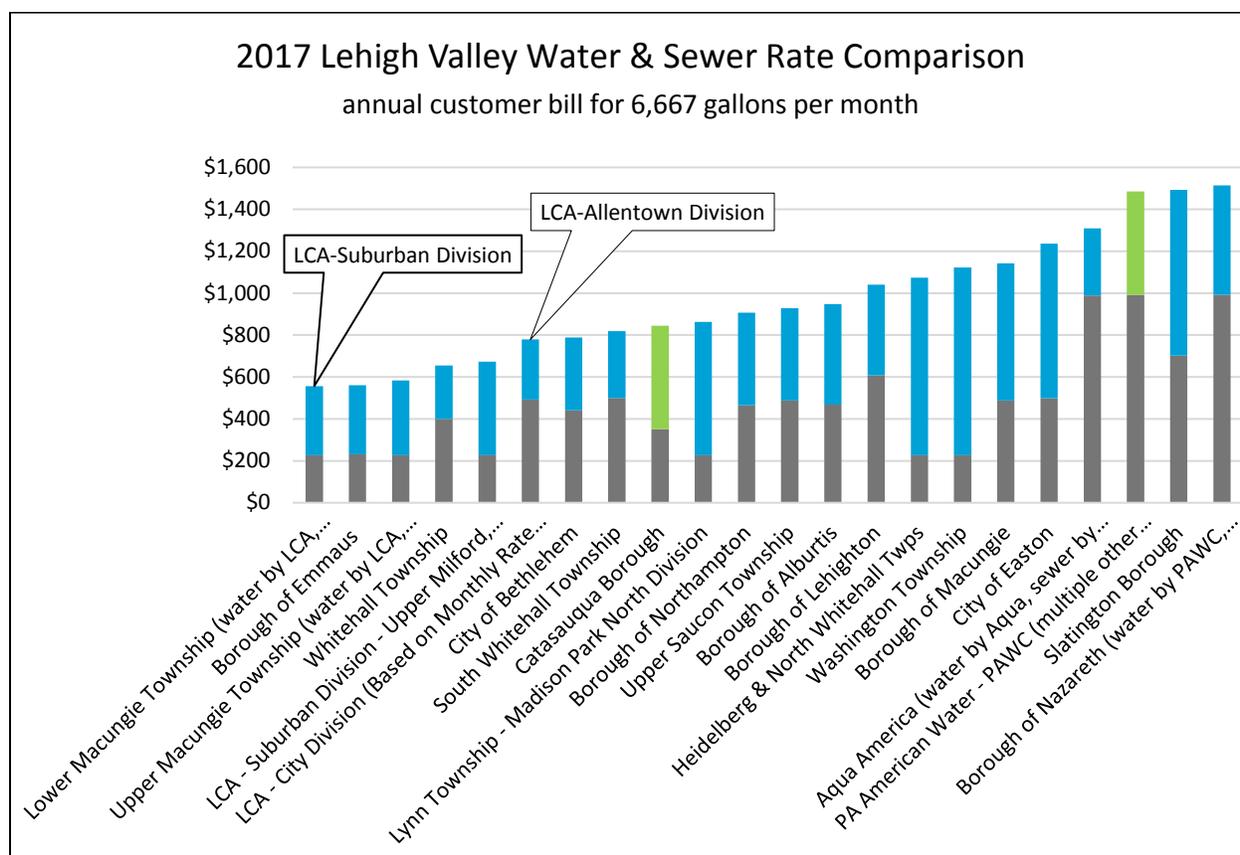


Figure 9-1. Water and Wastewater Bill Comparison with Other Communities

Under the Lease Concession Agreement with the City, LCA can increase water and sewer rates by the CPI plus 2.5 percent each year through 2032, and then by the CPI plus 2.0 percent each year thereafter. LCA also can increase capital cost recovery charges for implementation of City-approved capital projects.

²Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development, EPA 832-B-97-004, February 1997.

³National Affordability Criteria Under the 1996 Amendments to the Safe Drinking Water Act, prepared by International Consultants, Inc. for the USEPA, 1998.

Based on historical changes in the MHI for the City, the Project Team assumed that the MHI would increase by approximately 1.0 percent per year. Therefore, over time, the rate of increase in water and sewer rates will be higher than the rate of increase in the MHI, resulting in the annual residential water and sewer bill as a percentage of MHI to increase over time. Thus, it is expected that customer affordability will become a greater issue for LCA and the City in the future.

9.1 Financial Model Results for Affordability

The results of the financial modeling of Scenarios A, B, and C indicate that the combined City Division residential water and sewer bill as a percentage of MHI will remain less than the assumed affordability threshold of 4.5 percent for at least the next 25 years (from 2018 to 2043), even as LCA is projected to increase water and sewer rates during this period. The results for Scenarios A, B, and C are similar in terms of rate affordability. Under Scenarios A, B, and C, annual residential cost as a percentage of MHI is projected to exceed the affordability threshold beginning in approximately 2046 (see Figure 9-2). While the affordability projections using the MHI for the City indicate that affordability issues may not be widespread within the City for approximately 20 years, examining affordability using median statistics can often mask income differences in a large service area.

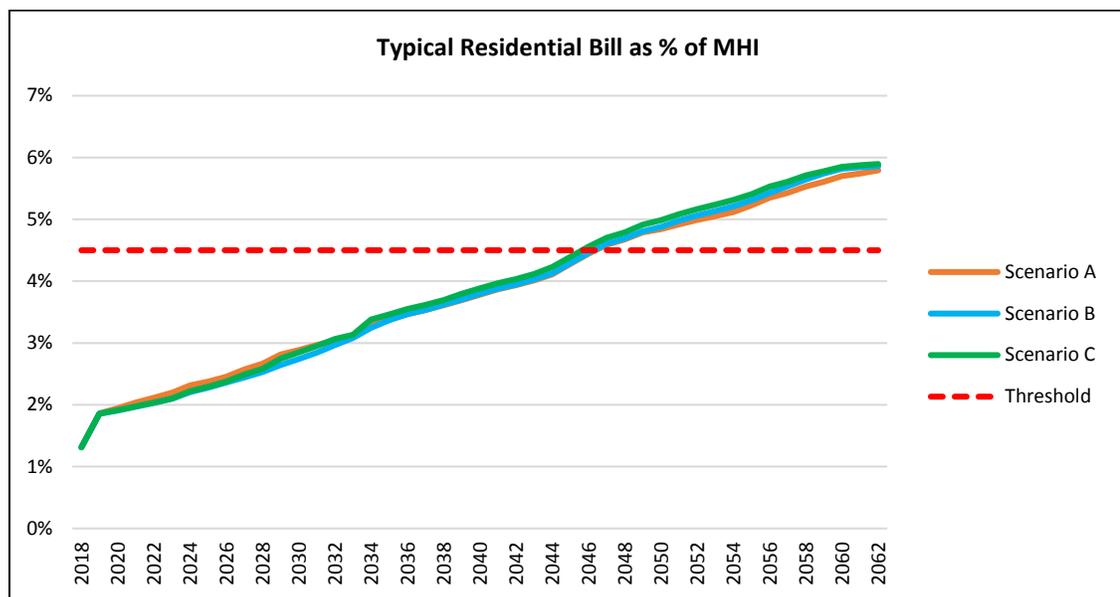


Figure 9-2. Affordability Ratio (Water and Wastewater Bill as Percent of MHI) for Scenarios A, B, and C

A more detailed preliminary affordability assessment was completed for the City Division examining current poverty levels, household income disparity across the service area, and current and projected future annual residential water and sewer bill estimates as a percentage of income for each Census Tract within the City (see Appendix E). The results of the assessment indicated the following:

- There is a wide disparity of household income among residential customers within the City, and a large household population with low income levels. Approximately 26 percent of households in the City Division have income that is below the federal poverty level threshold.
- Due to the relatively low current water and sewer rates, however, affordability issues regarding the LCA water/sewer bill do not appear to be widespread in the City. No Census Tracts exist in the City where the typical residential water and sewer bill as a percentage of MHI exceeds 4.5 percent, assuming monthly billing for residential customers.
- As LCA continues to increase water and sewer rates, affordability issues are expected to become more widespread. Based on the financial model projections (Scenario B), it is anticipated that by

2027, a large number of Census Tracts within the City will approach the 4.5-percent level, and one is projected to exceed 6.0 percent. This indicates that there may be more significant and widespread affordability impacts by 2027.

9.2 Short-term Suggested Affordability Planning

In anticipation of the affordability issues that will likely arise in portions of the service area in the near future, LCA should complete some proactive affordability planning in advance of the 2027 timeframe. This could include completing a more detailed affordability assessment, and monitoring of customer affordability as water and sewer rates continue to rise by updating the affordability assessment every 5 years. In addition, given the affordability projection results presented in Appendix E, LCA should consider developing and implementing a focused affordability and customer assistance program prior to 2027 to help mitigate the anticipated affordability impacts and economic hardship that will likely result from continuing to raise water and sewer rates. Elements of an affordability and customer assistance program that LCA could consider implementing may include the following:

- **Restructuring of water and sewer rates.** This could include modifying fixed charges and volumetric rates by lowering fixed charges or tiering fixed charges and volumetric rates, implementing “life-line” rates, or offering income-based bill discounts to make rates for residential customers more affordable. LCA could also consider implementing an income-based rate structure similar to Philadelphia Water Department’s income-based tiered assistance program for customers with income levels near or below the federal poverty level.
- **Implementation of customer assistance programs,** such as offering financial and crisis counseling, flexible payment terms, debt forgiveness, rebates and subsidies for installation of water efficient fixtures, completing water-use assessments and leak repairs at reduced or no cost to the customer, implementing customer round-up programs, and allowing customers to make donations on their bill to assist customers experiencing economic hardship or distress.
- **Restructuring of LCA debt.** Debt restructuring could assist LCA to more easily meet its debt obligations and cover its operation, maintenance, and capital costs during the lease period. As such, debt restructuring could provide LCA with additional flexibility to provide some rate relief to City customers (if needed) earlier in the forecast period than would be possible otherwise, potentially lowering affordability impacts.
- **Managing and prioritizing system infrastructure reinvestments.** A capital infrastructure prioritization strategy could help keep water and sewer rates at more affordable levels and may be a viable component of an affordability strategy, as projected capital expenditures are anticipated to result in increases to the capital cost recovery charges, and these increases are anticipated to occur at a rate faster than the regular water and sewer rate structure. In addition, working with the City to negotiate modification of lease requirements related to pace of required capital replacements and asset reinvestments, in exchange for lowering of the annual water and sewer rate increases once the financial condition of LCA’s City Division improves, may be another strategy to consider.

9.3 Long-term Suggested Affordability Planning

It is important to consider the results of this modeling in the long-term analysis, as projections and should not be viewed as a firm prediction of what rates will do. In fact, the pace of customer rate inflation will be impacted significantly by LCA’s decisions on phasing and prioritization of capital improvements, inflation factors, and other economic conditions that may impact income levels.

In the long-term, but prior to 2047, LCA should consider affordability as part of its strategy and consider options for the end of the lease term. During the period between 2047 and the end of the lease, the financial projections indicate that LCA may be able to accumulate a significant amount of net cash. However, this excess cash may be needed to make payments to renew the lease, acquire the system, or plan for the termination of service and transfer of operations back to the City. This is also the period where customer affordability impacts are projected to be the greatest (see Appendix E for details). Therefore, in conjunction with its strategic plan for the end of the lease, LCA should develop a water and sewer rate strategy that reduces the burden on rate payers. Such a rate strategy could include the following:

- Significant reductions in rate increases in the last 10 years of the lease.
- Reduction or elimination of capital cost recovery charges before the end of the lease term.
- Dedicating some of the excess cash that has been accumulated to fund or support enhanced customer affordability programs, potentially including income-based rates for low income customers within the City

While it is imperative that LCA address its near-term fiscal challenges, and generate sufficient revenues to meet its obligations under the Lease Concession Agreement, LCA has opportunities to further examine affordability of water and sewer service provided to the citizens of the City, and to work with the City as a partner to help address the affordability impacts to City customers as these impacts increase over time.

Conclusions and Recommendations

10.1 Conclusions

From this study, a detailed financial model was developed that can be used in the future for LCA's planning purposes. In addition, several key conclusions were reached that provide new information, or support LCA's previous assessments of the City system and the Lease Concession Agreement with the City:

- Continuing "business as usual" will put LCA in a vulnerable financial position in the short term based on available cash/net fund balance. This would adversely affect the possibility of not meeting the rate covenant and affect LCA's ability to refinance 2013C bonds due at the end of 2018.
- In the mid-term (10- to 20-year) period, LCA's financial position is forecast to improve. Toward the end of the lease period, it is forecast that LCA will generate a large, unrestricted cash balance, while also potentially exceeding forecast customer affordability guidelines.
- The current Lease Concession Agreement limitations restrict LCA's ability to increase revenue and capital recovery to cover expected OPEX and CAPEX in short and medium term.
- LCA must have flexibility on CCRC and implement monthly billing to begin a path to a sustainable City System.
- Debt refinancing of the 2013C bonds is a must to meet short-term financial commitments and should be started as soon as possible.
- Refinancing or restructuring of 2013A bonds is not recommended at this time.
- With proposed CCRC cap flexibility and monthly billing, LCA will be capable of funding estimated short- and medium-term CAPEX requirements.
- Of the scenarios developed, Scenario A provides LCA full funding of CAPEX according to the original expenditure schedule and meets the financial targets within a reasonable time frame.
- Several options exist for LCA to achieve revenue enhancement or OPEX savings that could increase the financial resiliency of the City System.
- Affordability in the short term will remain less than the threshold of 4.5 percent of MHI through 2043. Long-term water/sewer rates may exceed the 4.5 percent of MHI threshold and may require additional evaluation.

10.2 Recommendations

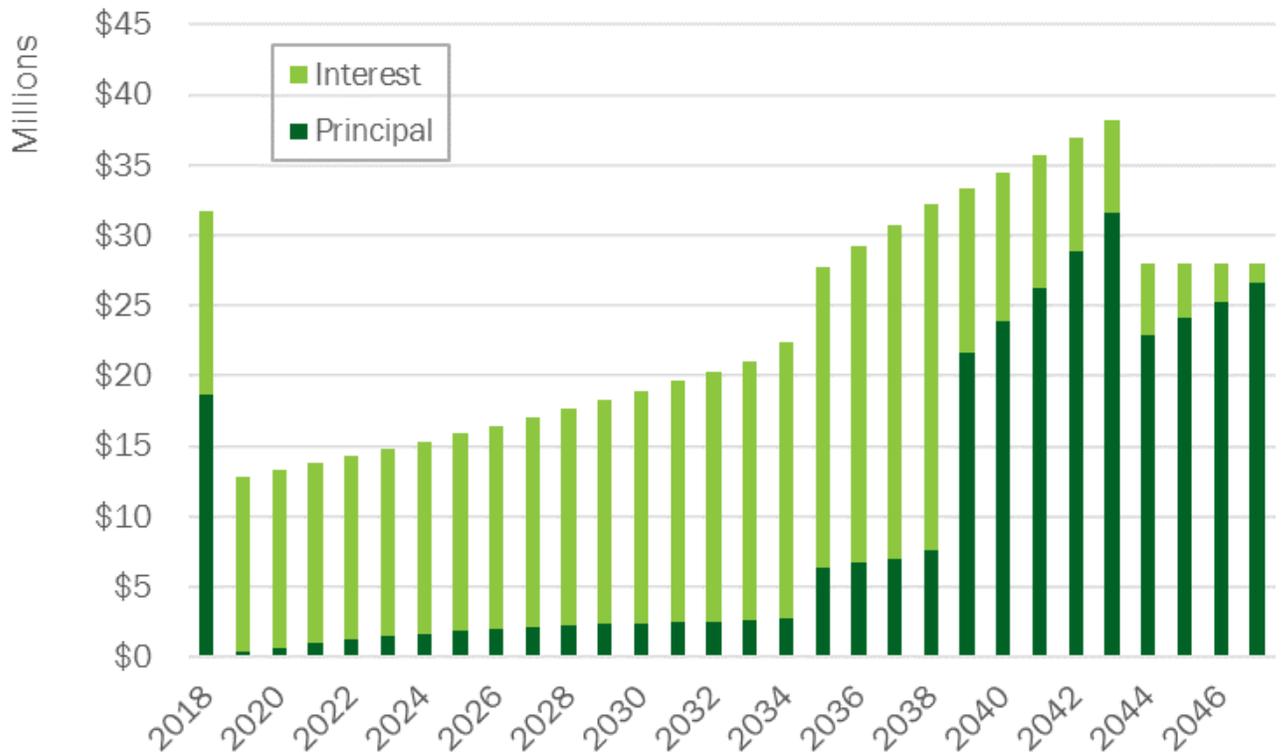
From this study, the Project Team offers the following recommendations for LCA consideration of actions or items for additional study and analysis:

- Begin process of refinancing series 2013C bonds immediately. Advice from the financial advisors is that this process could take 6 months or more to complete, and the balloon payment for the bond is due December 1, 2018.
- Implement monthly billing in its City Division service area as soon as possible. The additional revenue is needed to meet LCA's required and target financial metrics and help support LCA's recommended refunding of the Series 2013C Bonds.

- Develop strategies to help maintain its financial stability in the mid-term (10- to 20-year) period. In addition, LCA should develop strategies to address the end of the lease and to address the large cash accumulation and corresponding rates and charges that would exceed customer affordability guidelines.
- Examine the impact of the proposed LCA charter extension on the ability for issuing new debt or potential refinancing of the existing 2013A debt in the future.
- Examine the financial impacts of full vs. partial recovery of CAPEX near the end of lease term, specifically with the sewer signatories, including potential negotiation of new agreements.
- Refine, if necessary, the *pro forma*/financial analysis for potential revenue enhancements recommended for implementation.
- Negotiate potential flexibility for lease extension and/or full recovery of CAPEX through CCRC for capital projects implemented after 2033 with the City.
- Examine whether OPEX savings along with CAPEX deferment/adjustment of spending in the first 10 to 15 years of the lease will allow for fully funding the overall CAPEX program without issuing new debt.
- Complete a more detailed affordability analysis by 2019 using metrics beyond MHI to assess any near-term localized affordability issues, along with a potential customer assistance program. Plan to update this analysis every 5 years.
- Use the model to perform some “stress tests” of the financial scenarios that are presented, with less favorable customer demand, customer growth, expense escalation, CAPEX spend, and other key assumptions, to identify the potential impact if unanticipated changes occur.

Appendix A
Existing Debt Repayment Schedule

Existing Debt Repayment Schedule



FY	Principal	Interest	Total
Total	\$307,683,601	\$407,165,376	\$714,848,977
2018	18,735,000	13,047,722	31,782,722
2019	368,001	12,485,237	12,853,238
2020	701,732	12,616,506	13,318,238
2021	996,170	12,802,069	13,798,239
2022	1,258,697	13,039,541	14,298,238
2023	1,493,839	13,319,400	14,813,239
2024	1,693,404	13,654,834	15,348,238
2025	1,868,322	14,029,916	15,898,238
2026	2,015,021	14,453,218	16,468,239
2027	2,143,721	14,914,517	17,058,238
2028	2,249,366	15,418,872	17,668,238
2029	2,339,586	15,963,652	18,303,238

APPENDIX A – EXISTING DEBT REPAYMENT SCHEDULE

FY	Principal	Interest	Total
Total	\$307,683,601	\$407,165,376	\$714,848,977
2030	2,421,339	16,531,900	18,953,239
2031	2,492,253	17,140,985	19,633,238
2032	2,545,451	17,787,787	20,333,238
2033	2,587,129	18,466,110	21,053,239
2034	2,801,952	19,646,286	22,448,238
2035	6,309,798	21,403,440	27,713,238
2036	6,683,505	22,552,733	29,236,238
2037	6,999,285	23,798,703	30,797,988
2038	7,655,030	24,640,708	32,295,738
2039	21,685,000	11,689,988	33,374,988
2040	23,920,000	10,605,738	34,525,738
2041	26,305,000	9,409,738	35,714,738
2042	28,855,000	8,094,488	36,949,488
2043	31,570,000	6,651,738	38,221,738
2044	22,925,000	5,073,238	27,998,238
2045	24,100,000	3,898,331	27,998,331
2046	25,335,000	2,663,206	27,998,206
2047	26,630,000	1,364,788	27,994,788

Appendix B

Model Assumptions and Results

Review of Allentown Water/Sewer Lease Concession Financial Condition Assessment
 LCA Financial Planning Model Summary of Assumptions

03/24/2018

Note: Primary differences in scenarios, from left to right, are highlighted yellow							
Scenario Name:	Baseline	Scenario 1 - Best Case	Scenario 2 - Worst Case	Scenario 3	Scenario A	Scenario B	Scenario C
Scenario Descriptions:	Baseline (Qtrly Billing, full CCRC Recovery, No New Debt)	1. Baseline with Monthly Billing (full CCRC Recovery, No New Debt)	2. Baseline with Reduced CCRC, Qtrly Billing (no new debt)	3. Baseline New Debt considered if metrics allow (Quarterly Billing, Full CCRC Recovery)	A. Monthly Billing, Original CIP Schedule, Debt Funding, Phase in 1.8 Coverage	B. Monthly Billing, debt funding, accelerate 1.8 coverage , adjust CIP schedule	C. Partial Refunding 2013A Bonds, Monthly billing, debt funding, accelerate 1.8 coverage, adjust CIP schedule
Filename:	LCA_fin_plan_2018_March_28_ver5_Baseline_Scn1-2	LCA_fin_plan_2018_March_28_ver5_Baseline_Scn1-2	LCA_fin_plan_2018_March_28_ver5_Baseline_Scn1-2	LCA_fin_plan_2018_March_28_ver5_Scn3	LCA_fin_plan_2018_March_28_ver5_ScnA-C	LCA_fin_plan_2018_March_28_ver5_ScnA-C	LCA_fin_plan_2018_March_28_ver5_ScnA-C
Parameter							
Revenues, adjustment factor	0.98 (7)	0.98 (7)	0.98 (7)	0.98 (7)	0.98 (7)	0.98 (7)	0.98 (7)
Fixed Charge Billing	Quarterly	Monthly	Quarterly	Quarterly	Monthly	Monthly	Monthly
Start year for monthly billing		2019			2019	2019	2019
Additional O&M (6)							
Water Filtration Plant							
Short Term (1 to 5 years)	3.82%	3.82%	3.82%	3.82%	3.82%	3.82%	3.82%
Mid Term (6 to 15 years)							
Long Term (16+ years)							
Water Distribution							
Short Term (1 to 5 years)	3.82%	38.82%	3.82%	3.82%	38.82%	38.82%	38.82%
Mid Term (6 to 15 years)		35.00%			35.00%	35.00%	35.00%
Long Term (16+ years)		35.00%			35.00%	35.00%	35.00%
Kline Island Wastewater Treatment Plant							
Short Term (1 to 5 years)	3.82%	3.82%	3.82%	3.82%	3.82%	3.82%	3.82%
Mid Term (6 to 15 years)							
Long Term (16+ years)							
Wastewater Collection System							
Short Term (1 to 5 years)	3.82%	3.82%	3.82%	3.82%	3.82%	3.82%	3.82%
Mid Term (6 to 15 years)							
Long Term (16+ years)							
Debt Refinancing							
Series 2013A	unchanged	unchanged	unchanged	unchanged	unchanged	unchanged	Refinance (1)
Series 2013C	Refinance (1)	Refinance (1)	Refinance (1)	Refinance (1)	Refinance (1)	Refinance (1)	Refinance (1)
CAPEX spending level	\$1.3 Billion	\$1.3 Billion	\$1.1 Billion (9) (10)	\$1.3 Billion	\$1.3 Billion	\$1.3 Billion (5)	\$1.3 Billion (5)
MCI Funding	PayGo, and/or CAPEX Fund (2)	PayGo, and/or CAPEX Fund (2)	PayGo, and/or CAPEX Fund (2)	Debt (2018 to 2042) if metrics allow, PayGo, and/or CAPEX Fund (2)	Debt (2018 to 2042), PayGo, and/or CAPEX Fund (2)	Debt (2018 to 2042), PayGo, and/or CAPEX Fund (2)	Debt (2018 to 2042), PayGo, and/or CAPEX Fund (2)
Non-MCI Funding	PayGo	PayGo	PayGo	Debt (2018 to 2042) if metrics allow, and/or PayGo	Debt (2018 to 2042) and/or PayGo	Debt (2018 to 2042) and/or PayGo	Debt (2018 to 2042) and/or PayGo
DSCR requirement	>=120%	>=120%	>=120%	>=120%	>=120%	>=120%	>=120%
DSCR target	Phase in 180%	Phase in 180%	Phase in 180%	Phase in 180%	Phase in 180%	>=180% (8)	>=180% (8)
Unrestricted Cash Balance Target	>= 90 days	>= 90 days	>= 90 days	>= 90 days	>= 90 days	>= 90 days	>= 180 days
O&M Reserve Fund	>=180 days (3)	>=180 days (3)	>=180 days (3)	>=180 days (3)	>=180 days (3)	>=180 days (3)	>=180 days (3)
CAPEX Fund	start contributions in 2033 (4)	start contributions in 2033 (4)	start contributions in 2033 (4)	start contributions in 2033 (4)	start contributions in 2033 (4)	start contributions in 2033 (4)	start contributions in 2033 (4)
CAPEX Fund Inflation Rate	1%	1%	1%	1%	1%	1%	1%
Signatory Amortization for PayGo funded CAPEX	6.60%	6.60%	6.60%	6.60%	6.60%	6.60%	6.60%
CCRC Amortization for debt funded MCI	6.60%	6.60%	6.60%	6.60%	6.60%	6.60%	6.60%
CCRC Amortization for PayGo funded MCI	8.30%	8.30%	8.30%	8.30%	8.30%	8.30%	8.30%
Debt Service							
Interest Rate for Debt Service	none	none	none	6.60%	6.60%	6.60%	6.60%
Debt Service Term 2018 to 2032	none	none	none	assume 30 years	assume 30 years	assume 30 years	assume 30 years
Debt Service Term 2033 to 2037	none	none	none	assume 25 years	assume 25 years	assume 25 years	assume 25 years
Debt Service Term 2038 to 2042	none	none	none	assume 20 years	assume 20 years	assume 20 years	assume 20 years
Debt Service 2043 to 2062	none	none	none	none	none	none	none
OPEX Inflation Rate							
Personnel	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%
Purchase Of Services	2%	2%	2%	2%	2%	2%	2%
Materials And Supplies	2%	2%	2%	2%	2%	2%	2%
Equipment	2%	2%	2%	2%	2%	2%	2%
CAPEX Inflation Rate	3%	3%	3%	3%	3%	3%	3%
CPI-U inflation	1%	1%	1%	1%	1%	1%	1%
MHI inflation	1%	1%	1%	1%	1%	1%	1%

Notes

- (1) debt service schedules prepared by Davenport week of 2/26/18 for partial refunding Series 2013A and term-out of 2013C.
- (2) 30 year amortization, for debt funded projects assume 6.6% and for PayGo funded projects assume 8.3%
- (3) Requirement is 6 months of actual O&M for preceding Fiscal Year, therefore contributions in out years are needed as O&M increases.
- (4) Requirement is \$1M annual contribution 2033-2042, \$2M annual contribution 2043-2052, \$3M annual contribution 2053-2062, adjusted for inflation
- (5) Target full CAPEX spending levels, but adjust CIP schedule/spending levels to maintain DSCR and Unrestricted Cash Balance targets.
- (6) 3.82% for each category, equates to \$660M additional O&M in 2019 - 2023 for catchup on some of the recent cutbacks. 35% Water Distribution costs equates to \$990M additional O&M for billing.
- (7) adjustment to calculations using rates and customer data to account for 'revenue timing' and delays related to change in rates. Also, FY18 budget/forecast is conservative.
- (8) defer the near term CIP and make other changes so that we get to the 1.8 factor in the next few years
- (9) The following projects are assumed not be approved as MCI projects and are non-reimbursable (i.e., projects are constructed, but costs are not recovered by CCRC).

Water

WFP - Emergency Power, Schantz & Crystal Springs
Schantz Spring Main Replacement & Leak Rehabilitation
Fixed Base Meter Reading System
Filter Upgrades
Intake Upgrades
Elec Improvements/Pumps
Auxiliary Generator
Ultraviolet Disinfection
Security Improvements
Pump Stations
Rehab Tanks and Reservoirs
Roof Replacements
Major Meter replacement program

Wastewater

Replace Secondary Clarifiers 7-8
Boiler Replacements
Sludge Collection Mechanism Replacement-PCs
Sludge Collection Mechanism replacement - SCs
Screening and Grit rehab/replacement
Gravity Thickener Rehab
Long Term Plant Upgrades
Large diameter sewer main rehabilitation
Capital Management

The following projects are assumed not to be completed.

Water Project Not Completed

Pretreatment / Sedimentation	\$23,000,000
High Lift VFDs/Pumps	\$14,000,000
Ultraviolet Disinfection	\$12,000,000
Rehab Buried Concrete Reservoirs	<u>\$46,000,000</u>
	\$95,000,000

Wastewater Not Completed

WWTP Nutrient Upgrade	\$69,381,000
New Digesters (three)	<u>\$73,863,000</u>
	<u>\$143,244,000</u>
Total Water and Wastewater Not Completed	\$238,244,000

Total CAPEX Plan	<u>\$1,329,780,000</u>
CAPEX Plan assumed for Worst Case Scenario	\$1,091,536,000

Lehigh County Authority
Review of Allentown Water/Sewer Lease Concession Financial Condition Assessment

Global Inputs and Assumptions
 LCA Financial Planning Model Version 5

Scenario (enter short title)

Baseline	Scn 1 - Best Case	Scn 2 - Worst Case
----------	-------------------	--------------------

Rate Schedule

Meter Sizes 1" and less

Fixed Charge Monthly
 Fixed Charge Quarterly

No	Yes	No
Yes	No	Yes

Start Year of Monthly Billing for 1" and less meters

2019		
------	--	--

Penalties (non-payment, AR recovery, etc.)

2%	2%	2%
----	----	----

New Additional Operating Revenues (not including existing Fixed/Volume Charges, Signatory, Fire, CCRC, Septic Hauler, IPP, or

Water

Amount
 Start Year
 Annual Increase

Wastewater

Amount
 Start Year
 Annual Increase

New Additional Non-Operating Revenues (allocation fees, inspection/review, tapping, meter sales)

Water

Amount
 Start Year
 Annual Increase

Wastewater

Amount
 Start Year
 Annual Increase

Growth

Connections (meters)

1" and less
 Greater than 1"

0.00%	0.00%	0.00%
0.00%	0.00%	0.00%

Consumption

Residential
 Commercial
 Industrial
 Institutional

0.00%	0.00%	0.00%
0.00%	0.00%	0.00%
0.00%	0.00%	0.00%
0.00%	0.00%	0.00%

Interest on Investments

Discount Rate

1.00%	1.00%	1.00%
3.00%	3.00%	3.00%

Inflation

CAPEX

Annual Lease Payment

3.00%	3.00%	3.00%
1.00%	1.00%	1.00%

OPEX

Personnel
 Purchase Of Services
 Materials And Supplies
 Equipment

3.50%	3.50%	3.50%
2.00%	2.00%	2.00%
2.00%	2.00%	2.00%
2.00%	2.00%	2.00%

Capital Recovery Fees

PayGo ROE Rate

Bond Interest Rate

Term

8.30%	8.30%	8.30%
6.60%	6.60%	6.60%
30	30	30

Signatory

PayGo CAPEX Trigger Amount
 PayGo Amortization Rate
 Term

\$1,000,000	\$1,000,000	\$1,000,000
6.60%	6.60%	6.60%
30	30	30

Lehigh County Authority
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Scenario (enter short title)

Baseline	Scn 1 - Best Case	Scn 2 - Worst Case
----------	-------------------	--------------------

Debt Service

Interest Rate	6.60%	6.60%	6.60%
Term (2018 to 2032)	30	30	30
Term (2033 to 2037)	25	25	25
Term (2038 to 2042)	20	20	20
COI (% of bond issue)	1.00%	1.00%	1.00%
Reserve (% of bond issue)	3.00%	3.00%	3.00%

OPEX Adjustments

Water Filtration Plant			
Short Term (1 to 5 years)	3.82%	3.82%	3.82%
Mid Term (6 to 15 years)			
Long Term (16+ years)			
Water Distribution System			
Short Term (1 to 5 years)	3.82%	38.82%	3.82%
Mid Term (6 to 15 years)		35.00%	
Long Term (16+ years)		35.00%	
Kline Island Wastewater Treatment Plant			
Short Term (1 to 5 years)	3.82%	3.82%	3.82%
Mid Term (6 to 15 years)			
Long Term (16+ years)			
Wastewater Collection System			
Short Term (1 to 5 years)	3.82%	3.82%	3.82%
Mid Term (6 to 15 years)			
Long Term (16+ years)			

OPEX Share of Support Services

Kline Island Wastewater Treatment Plant	67.00%	67.00%	67.00%
Water Filtration Plant	33.00%	33.00%	33.00%
Total	100.00%	100.00%	100.00%

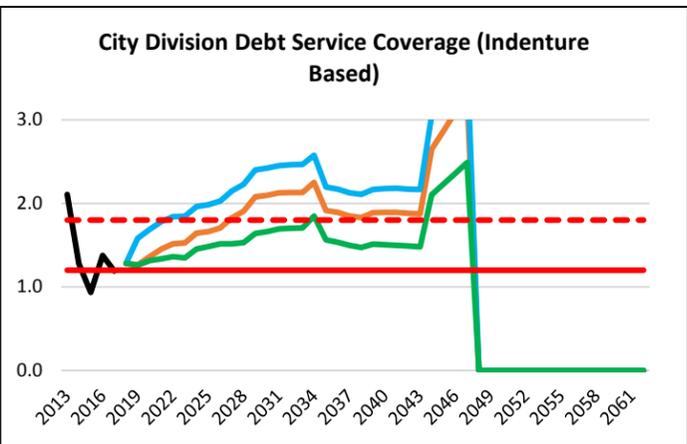
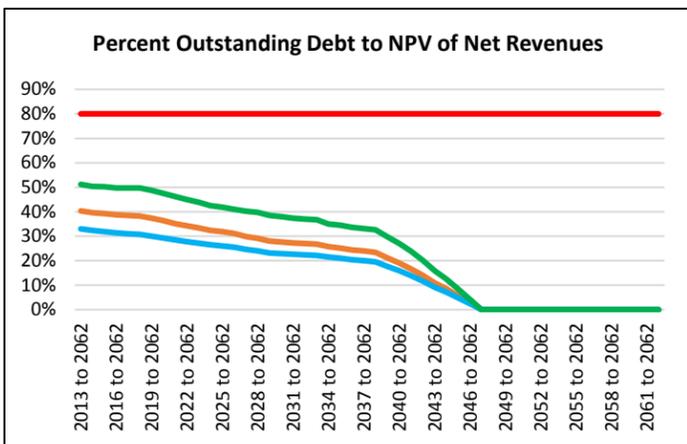
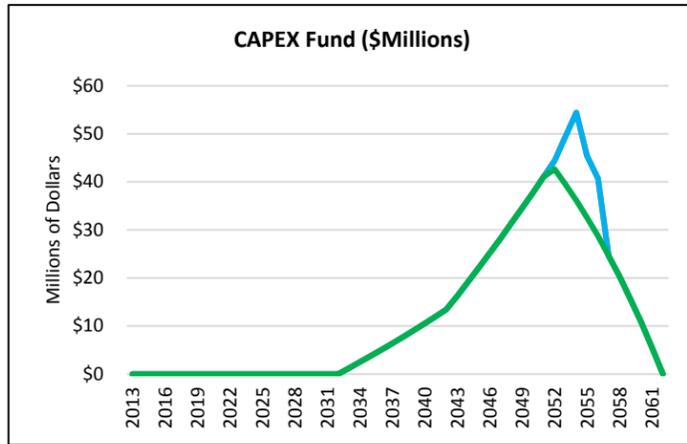
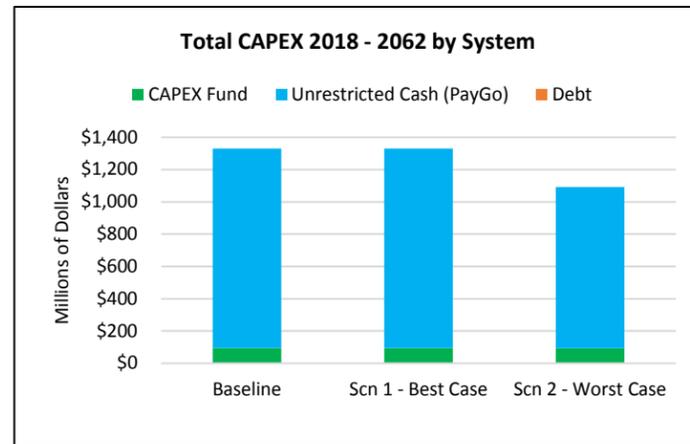
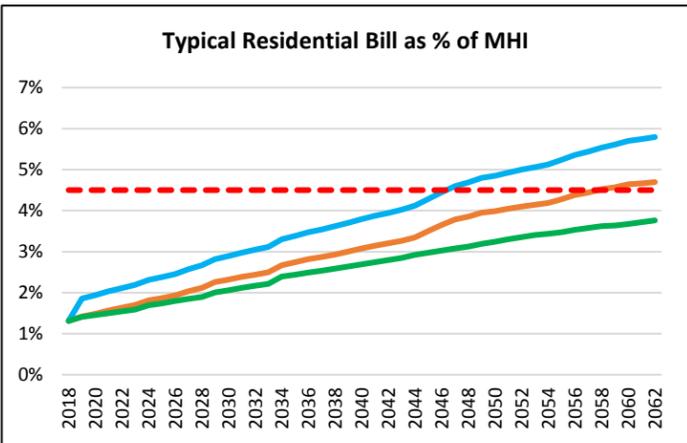
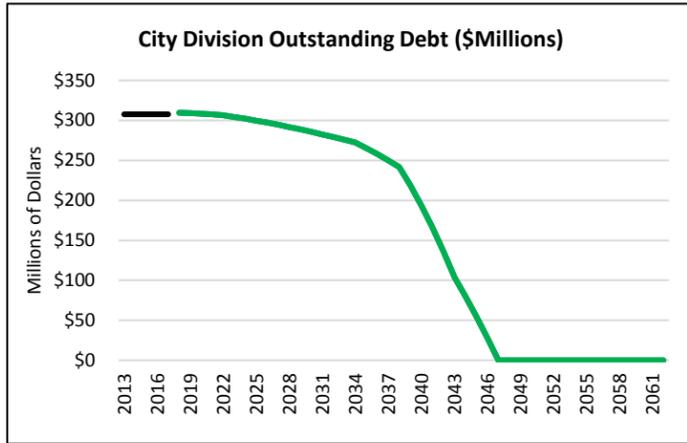
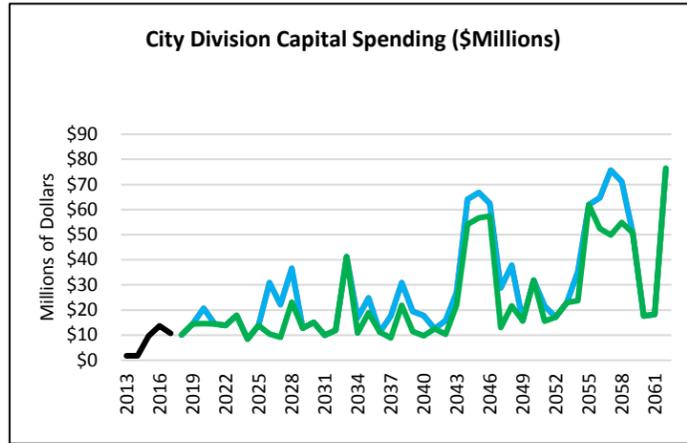
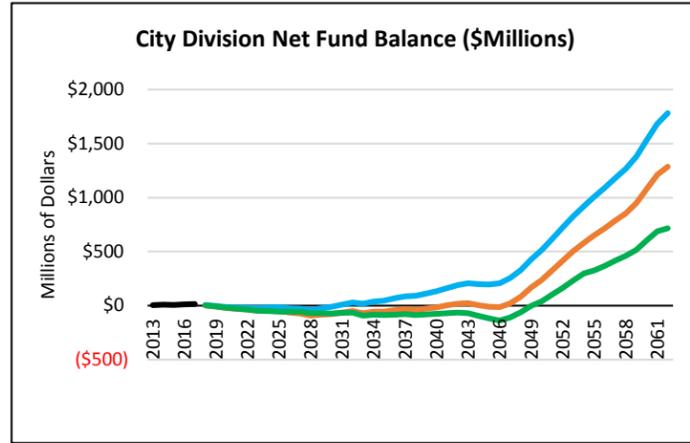
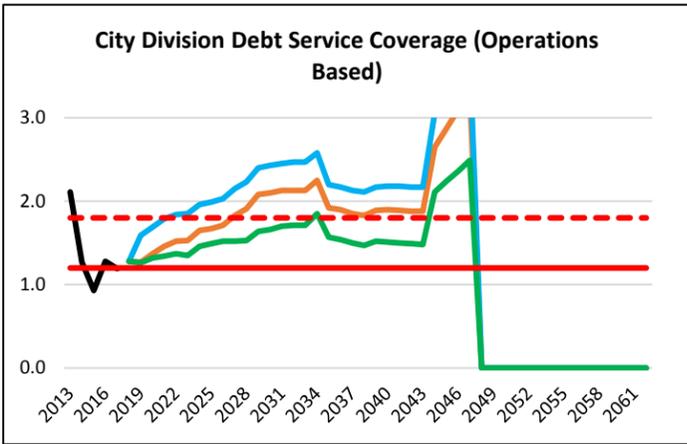
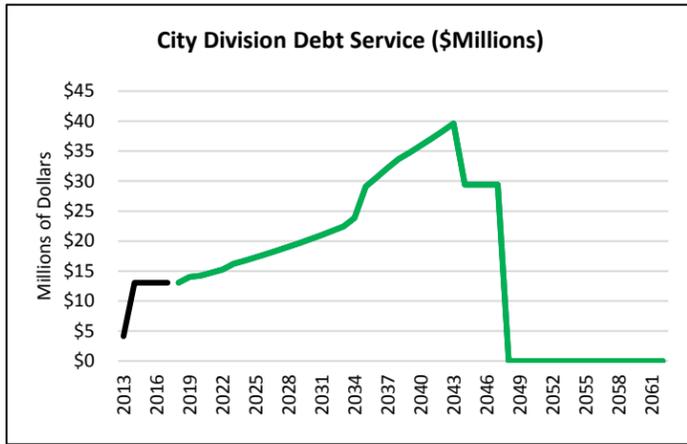
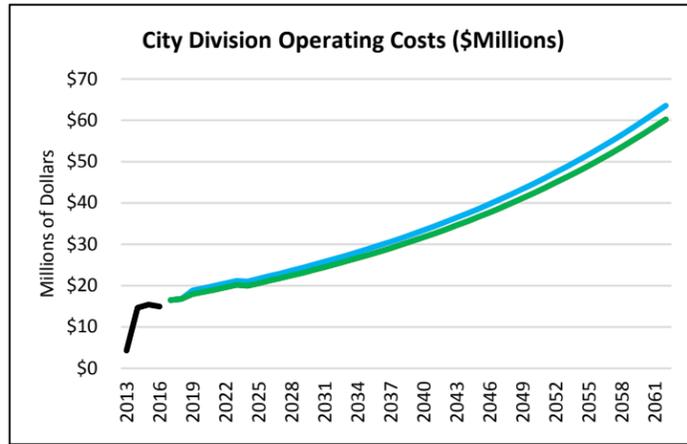
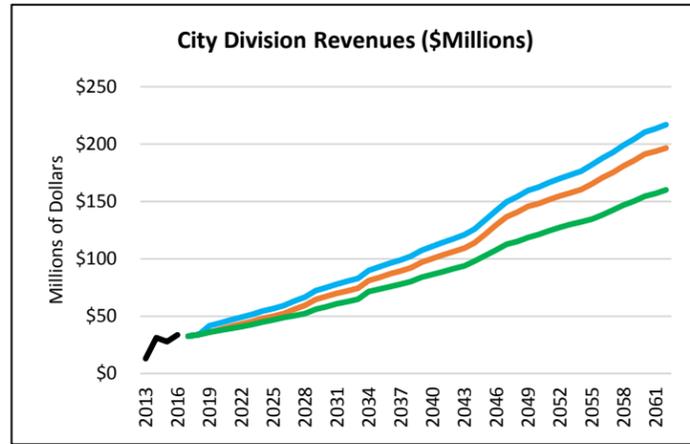
CAPEX Additions Not Included in Planned CIP

Water			
Unidentified CIP every year			
Start Year			
Unidentified CIP every 5 years			
Start Year			
Unidentified CIP every 10 years			
Start Year			
Wastewater			
Unidentified CIP every year			
Start Year			
Unidentified CIP every 5 years			
Start Year			
Unidentified CIP every 10 years			
Start Year			

Global Assumptions

Covert Daily to Quarterly Rate	91.31	
Covert Daily to Monthly Rate	30.44	
Typical residential monthly consumption (gallons)	4,600	LCA. 2017. "Water Volume by Class & Meter Size"
Median Household Income (MHI)	\$37,256	US Census. 2016. "S1901 INCOME IN THE PAST 12 MONTHS (II
CPI - U annual increase (percent)	1.0	T=historical CPI trend, 1%, 1.5%, 2%, 2.5%, 3%

	Required	Target	
Debt Service Coverage Ratio (Operations)	1.20	1.80	Requirement set forth in Series 2013 Rate Covenant
Debt Service Coverage Ratio (Indenture)	1.20	1.80	
Days Cash on Hand	180	270	180 days O&M Reserve, 90 days unrestricted fund balance.
Residential Water and Wastewater Bill as % of MHI		4.5%	2.5% for water and 2% wastewater
Debt to Operating Ratio			Financial Policy target TBD
Operating Ratio			Financial Policy target TBD
Percent Equity Funded CIP			Financial Policy target TBD



Legend

- Historical
- Baseline
- Scn 1 - Best Case
- Scn 2 - Worst Case
- Required
- - - Target

Lehigh County Authority
Review of Allentown Water/Sewer Lease Concession Financial Condition Assessment
City Division Pro forma - Baseline
LCA Financial Planning Model Version 5

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Operating Revenues																	
Water	\$6,748,381	\$16,507,523	\$16,725,712	\$16,987,167	\$17,364,832	\$17,771,000	\$20,129,000	\$21,669,000	\$23,645,000	\$25,153,000	\$26,689,000	\$27,868,000	\$28,892,000	\$30,271,000	\$31,867,000	\$33,224,000	\$34,618,000
Wastewater	\$6,244,922	\$14,771,776	\$10,794,690	\$14,686,290	\$14,666,662	\$15,731,734	\$15,559,000	\$16,278,000	\$16,874,000	\$17,556,000	\$18,272,000	\$19,699,000	\$20,526,000	\$21,490,000	\$23,740,000	\$25,616,000	\$29,489,000
Total Operating Revenues	\$12,993,303	\$31,279,299	\$27,520,402	\$31,673,457	\$32,031,494	\$33,502,734	\$35,688,000	\$37,947,000	\$40,519,000	\$42,709,000	\$44,961,000	\$47,567,000	\$49,418,000	\$51,761,000	\$55,607,000	\$58,840,000	\$64,107,000
Operating Expenses																	
Water	\$2,260,972	\$7,007,850	\$6,773,471	\$6,226,015	\$6,548,687	\$6,970,098	\$7,461,000	\$7,682,000	\$7,911,000	\$8,149,000	\$8,395,000	\$8,330,000	\$8,577,000	\$8,834,000	\$9,097,000	\$9,363,000	\$9,639,000
Wastewater	\$2,028,198	\$7,638,389	\$8,646,549	\$8,751,484	\$9,947,544	\$9,831,891	\$10,493,000	\$10,801,000	\$11,117,000	\$11,440,000	\$11,775,000	\$11,672,000	\$12,014,000	\$12,363,000	\$12,721,000	\$13,092,000	\$13,472,000
Total Operating Expenses	\$4,289,170	\$14,646,239	\$15,420,020	\$14,977,499	\$16,496,231	\$16,801,989	\$17,954,000	\$18,483,000	\$19,028,000	\$19,589,000	\$20,170,000	\$20,002,000	\$20,591,000	\$21,197,000	\$21,818,000	\$22,455,000	\$23,111,000
Operating Income (Loss)	\$8,704,133	\$16,633,060	\$12,100,382	\$16,695,958	\$15,535,263	\$16,700,745	\$17,734,000	\$19,464,000	\$21,491,000	\$23,120,000	\$24,791,000	\$27,565,000	\$28,827,000	\$30,564,000	\$33,789,000	\$36,385,000	\$40,996,000
Interest Income						\$63,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Net Available For Debt Service	\$8,704,133	\$16,633,060	\$12,100,382	\$16,695,958	\$15,535,263	\$16,763,745	\$17,734,000	\$19,464,000	\$21,491,000	\$23,120,000	\$24,791,000	\$27,565,000	\$28,827,000	\$30,564,000	\$33,789,000	\$36,385,000	\$40,996,000
Debt Service																	
Existing	\$4,131,779	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$14,008,453	\$14,248,613	\$14,728,614	\$15,228,613	\$16,208,614	\$16,742,688	\$17,290,863	\$17,863,139	\$18,454,288	\$19,064,313	\$19,698,213
Projected	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Debt Service	\$4,131,779	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$14,008,453	\$14,248,613	\$14,728,614	\$15,228,613	\$16,208,614	\$16,742,688	\$17,290,863	\$17,863,139	\$18,454,288	\$19,064,313	\$19,698,213
Net After Debt Service	\$4,572,354	\$3,585,338	(\$947,340)	\$3,648,236	\$2,487,541	\$3,716,024	\$3,725,547	\$5,215,388	\$6,762,387	\$7,891,388	\$8,582,387	\$10,822,313	\$11,536,138	\$12,700,862	\$15,334,713	\$17,320,688	\$21,297,788
Non-Operating Revenues																	
TBD Reimbursement (AO and Non-AO) Exclude from Indenture Ratio																	
Water	\$0	\$0	\$226,040	\$1,325,289	\$240,146	\$259,000	\$261,400	\$263,800	\$266,200	\$268,600	\$271,000	\$273,400	\$275,800	\$278,200	\$280,600	\$283,000	\$285,400
Wastewater	\$0	\$26,429	\$115,292	\$708,649	\$252,750	\$193,000	\$195,000	\$197,000	\$199,000	\$201,000	\$203,000	\$205,000	\$207,000	\$209,000	\$211,000	\$213,000	\$215,000
Total Non-Operating Revenues	\$0	\$26,429	\$341,332	\$2,033,938	\$492,896	\$452,000	\$456,400	\$460,800	\$465,200	\$469,600	\$474,000	\$478,400	\$482,800	\$487,200	\$491,600	\$496,000	\$500,400
Non-Operating Expenses																	
Contribution to Operations and Maintenance Reserve Fund		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$119,939	\$195,024	\$201,668	\$0	\$28,562	\$210,991	\$214,849	\$220,033	\$226,624
Contribution to CAPEX Fund	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Deposit to Annual Lease Payment Fund			\$250,000	\$250,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Lease Payment				\$500,000	\$504,000	\$509,100	\$514,200	\$519,400	\$524,600	\$529,900	\$535,200	\$540,600	\$546,100	\$551,600	\$557,200	\$562,800	\$568,500
Total Non-Operating Expenses	\$0	\$0	\$250,000	\$750,000	\$504,000	\$509,100	\$514,200	\$519,400	\$644,539	\$724,924	\$736,868	\$540,600	\$574,662	\$762,591	\$772,049	\$782,833	\$795,124
Available for Capital	\$4,572,354	\$3,611,767	(\$856,008)	\$4,932,174	\$2,476,437	\$3,658,924	\$3,667,747	\$5,156,788	\$6,583,047	\$7,636,063	\$8,319,518	\$10,760,113	\$11,444,275	\$12,425,471	\$15,054,264	\$17,033,855	\$21,003,063
Equity Funded CAPEX																	
TBD Reimbursable Costs (AO and Non-AO) Project LCA completes and gets reimbursed																	
PayGo	\$0	\$0	\$0	\$0	\$0	\$10,070,000	\$14,515,000	\$20,642,000	\$14,476,000	\$13,941,000	\$17,872,000	\$8,438,000	\$13,923,000	\$30,924,000	\$22,163,000	\$36,598,000	\$12,764,000
Reserved 1																	
Total Capex	\$0	\$0	\$0	\$0	\$0	\$10,070,000	\$14,515,000	\$20,642,000	\$14,476,000	\$13,941,000	\$17,872,000	\$8,438,000	\$13,923,000	\$30,924,000	\$22,163,000	\$36,598,000	\$12,764,000
Net Fund Surplus (deficit)	\$4,572,354	\$3,611,767	(\$856,008)	\$4,932,174	\$2,476,437	(\$6,411,076)	(\$10,847,253)	(\$15,485,213)	(\$7,892,953)	(\$6,304,937)	(\$9,552,482)	\$2,322,113	(\$2,478,725)	(\$18,498,529)	(\$7,108,736)	(\$19,564,145)	\$8,239,063
Beginning Balance (unrestricted)	\$0	\$4,572,354	\$8,184,121	\$7,328,113	\$12,260,287	\$9,488,776	\$3,077,700	(\$7,769,554)	(\$23,254,766)	(\$31,147,719)	(\$37,452,656)	(\$47,005,138)	(\$44,683,025)	(\$47,161,750)	(\$65,660,279)	(\$72,769,015)	(\$92,333,161)
Ending Balance	\$4,572,354	\$8,184,121	\$7,328,113	\$12,260,287	\$14,736,724	\$3,077,700	(\$7,769,554)	(\$23,254,766)	(\$31,147,719)	(\$37,452,656)	(\$47,005,138)	(\$44,683,025)	(\$47,161,750)	(\$65,660,279)	(\$72,769,015)	(\$92,333,161)	(\$84,094,097)
Financial Metrics																	
Debt Service Coverage Ratio (Operations)	2.11	1.27	0.93	1.28	1.19	1.28	1.27	1.37	1.46	1.52	1.53	1.65	1.67	1.71	1.83	1.91	2.08
Debt Service Coverage Ratio (Indenture)	2.11	1.28	0.93	1.38	1.19	1.28	1.26	1.36	1.46	1.51	1.53	1.64	1.66	1.71	1.83	1.91	2.08
Days Cash on Hand (target 90 days, un-restricted)						68	-169	-473	-615	-718	-876	-809	-861	-1,164	-1,253	-1,545	-1,367
Days Cash on Hand (180 days, restricted O&M Fund)						212	210	199	197	197	197	194	198	198	198	198	198
Residential Water and Wastewater Bill as % of MHI						1.31%	1.41%	1.48%	1.57%	1.64%	1.70%	1.81%	1.86%	1.93%	2.03%	2.12%	2.26%
Outstanding Debt to NPV of Net Revenues	40%	40%	39%	39%	38%	38%	37%	36%	35%	34%	33%	32%	32%	31%	30%	29%	28%
Operating Ratio						0.50	0.50	0.49	0.47	0.46	0.45	0.42	0.42	0.41	0.39	0.38	0.36
Debt to Operating Ratio						0.78	0.79	0.73	0.69	0.66	0.65	0.61	0.60	0.58	0.55	0.52	0.48
Percent Equity Funded CIP						100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Lehigh County Authority
Review of Allentown Water/Sewer Lease Co
City Division Pro forma - Baseline
LCA Financial Planning Model Version 5

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046
Operating Revenues																	
Water	\$35,841,000	\$37,084,000	\$38,461,000	\$39,851,000	\$41,136,000	\$42,965,000	\$44,920,000	\$46,502,000	\$47,899,000	\$49,427,000	\$51,819,000	\$54,073,000	\$55,871,000	\$57,992,000	\$60,115,000	\$62,743,000	\$65,348,000
Wastewater	\$30,713,000	\$32,174,000	\$33,064,000	\$33,982,000	\$39,320,000	\$40,321,000	\$41,416,000	\$42,137,000	\$43,767,000	\$47,097,000	\$47,964,000	\$48,859,000	\$49,777,000	\$50,727,000	\$53,289,000	\$58,303,000	\$63,466,000
Total Operating Revenues	\$66,554,000	\$69,258,000	\$71,525,000	\$73,833,000	\$80,456,000	\$83,286,000	\$86,336,000	\$88,639,000	\$91,666,000	\$96,524,000	\$99,783,000	\$102,932,000	\$105,648,000	\$108,719,000	\$113,404,000	\$121,046,000	\$128,814,000
Operating Expenses																	
Water	\$9,924,000	\$10,216,000	\$10,514,000	\$10,821,000	\$11,138,000	\$11,462,000	\$11,796,000	\$12,139,000	\$12,493,000	\$12,859,000	\$13,237,000	\$13,625,000	\$14,025,000	\$14,439,000	\$14,863,000	\$15,302,000	\$15,753,000
Wastewater	\$13,864,000	\$14,268,000	\$14,682,000	\$15,109,000	\$15,549,000	\$16,000,000	\$16,465,000	\$16,946,000	\$17,438,000	\$17,946,000	\$18,469,000	\$19,010,000	\$19,567,000	\$20,142,000	\$20,733,000	\$21,341,000	\$21,969,000
Total Operating Expenses	\$23,788,000	\$24,484,000	\$25,196,000	\$25,930,000	\$26,687,000	\$27,462,000	\$28,261,000	\$29,085,000	\$29,931,000	\$30,805,000	\$31,706,000	\$32,635,000	\$33,592,000	\$34,581,000	\$35,596,000	\$36,643,000	\$37,722,000
Operating Income (Loss)	\$42,766,000	\$44,774,000	\$46,329,000	\$47,903,000	\$53,769,000	\$55,824,000	\$58,075,000	\$59,554,000	\$61,735,000	\$65,719,000	\$68,077,000	\$70,297,000	\$72,056,000	\$74,138,000	\$77,808,000	\$84,403,000	\$91,092,000
Interest Income	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$108,000	\$212,000	\$141,000	\$0	\$0
Net Available For Debt Service	\$42,766,000	\$44,774,000	\$46,329,000	\$47,903,000	\$53,769,000	\$55,824,000	\$58,075,000	\$59,554,000	\$61,735,000	\$65,719,000	\$68,077,000	\$70,297,000	\$72,164,000	\$74,350,000	\$77,949,000	\$84,403,000	\$91,092,000
Debt Service																	
Existing	\$20,345,989	\$21,027,638	\$21,727,938	\$22,446,889	\$23,844,488	\$29,105,513	\$30,628,188	\$32,193,038	\$33,687,088	\$34,771,063	\$35,919,513	\$37,109,413	\$38,343,038	\$39,617,138	\$29,393,238	\$29,390,681	\$29,390,656
Projected	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Debt Service	\$20,345,989	\$21,027,638	\$21,727,938	\$22,446,889	\$23,844,488	\$29,105,513	\$30,628,188	\$32,193,038	\$33,687,088	\$34,771,063	\$35,919,513	\$37,109,413	\$38,343,038	\$39,617,138	\$29,393,238	\$29,390,681	\$29,390,656
Net After Debt Service	\$22,420,012	\$23,746,363	\$24,601,063	\$25,456,112	\$29,924,513	\$26,718,488	\$27,446,813	\$27,360,963	\$28,047,913	\$30,947,938	\$32,157,488	\$33,187,588	\$33,820,963	\$34,732,863	\$48,555,763	\$55,012,319	\$61,701,344
Non-Operating Revenues																	
TBD Reimbursement (AO and Non-AO) Exclude from Ind																	
Water	\$287,800	\$290,200	\$292,600	\$295,000	\$297,400	\$299,800	\$302,200	\$304,600	\$307,000	\$309,400	\$312,800	\$316,200	\$319,600	\$323,000	\$326,400	\$329,800	\$333,200
Wastewater	\$217,000	\$219,000	\$221,000	\$223,000	\$225,000	\$227,000	\$229,000	\$231,000	\$233,000	\$235,000	\$237,000	\$239,000	\$241,000	\$243,000	\$245,000	\$247,000	\$249,000
Total Non-Operating Revenues	\$504,800	\$509,200	\$513,600	\$518,000	\$522,400	\$526,800	\$531,200	\$535,600	\$540,000	\$544,400	\$549,800	\$555,200	\$560,600	\$566,000	\$571,400	\$576,800	\$582,200
Non-Operating Expenses																	
Contribution to Operations and Maintenance Reserve Fu	\$234,109	\$240,478	\$245,252	\$252,949	\$261,015	\$266,959	\$275,313	\$284,030	\$291,614	\$301,583	\$311,394	\$321,560	\$331,074	\$342,945	\$351,634	\$363,198	\$374,576
Contribution to CAPEX Fund	\$0	\$0	\$0	\$1,220,190	\$1,232,392	\$1,244,716	\$1,257,163	\$1,269,735	\$1,282,432	\$1,295,256	\$1,308,209	\$1,321,291	\$1,334,504	\$2,695,698	\$2,722,655	\$2,749,881	\$2,777,380
Deposit to Annual Lease Payment Fund	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Lease Payment	\$574,200	\$580,000	\$585,800	\$591,700	\$597,700	\$603,700	\$609,800	\$615,900	\$622,100	\$628,400	\$634,700	\$641,100	\$647,600	\$654,100	\$660,700	\$667,400	\$674,100
Total Non-Operating Expenses	\$808,309	\$820,478	\$831,052	\$2,064,839	\$2,091,107	\$2,115,375	\$2,142,276	\$2,169,664	\$2,196,146	\$2,225,239	\$2,254,303	\$2,283,951	\$2,313,178	\$3,692,743	\$3,734,989	\$3,780,479	\$3,826,056
Available for Capital	\$22,116,503	\$23,435,085	\$24,283,611	\$23,909,273	\$28,355,805	\$25,129,913	\$25,835,736	\$25,726,898	\$26,391,767	\$29,267,098	\$30,452,985	\$31,458,836	\$32,068,385	\$31,606,119	\$45,392,174	\$51,808,640	\$58,457,487
Equity Funded CAPEX																	
TBD Reimbursable Costs (AO and Non-AO) Project LCA ca																	
PayGo	\$15,082,000	\$9,930,000	\$11,957,000	\$41,292,000	\$16,884,000	\$24,872,000	\$11,156,000	\$17,687,000	\$30,960,000	\$19,470,000	\$17,758,000	\$12,553,000	\$15,857,000	\$26,975,000	\$64,123,000	\$66,750,000	\$62,424,000
Reserved 1																	
Total Capex	\$15,082,000	\$9,930,000	\$11,957,000	\$41,292,000	\$16,884,000	\$24,872,000	\$11,156,000	\$17,687,000	\$30,960,000	\$19,470,000	\$17,758,000	\$12,553,000	\$15,857,000	\$26,975,000	\$64,123,000	\$66,750,000	\$62,424,000
Net Fund Surplus (deficit)	\$7,034,503	\$13,505,085	\$12,326,611	(\$17,382,727)	\$11,471,805	\$257,913	\$14,679,736	\$8,039,898	(\$4,568,233)	\$9,797,098	\$12,694,985	\$18,905,836	\$16,211,385	\$4,631,119	(\$18,730,826)	(\$14,941,360)	(\$3,966,513)
Beginning Balance (unrestricted)	(\$84,094,097)	(\$77,059,594)	(\$63,554,510)	(\$51,227,899)	(\$68,610,626)	(\$57,138,821)	(\$56,880,908)	(\$42,201,172)	(\$34,161,274)	(\$38,729,507)	(\$28,932,408)	(\$16,237,424)	\$2,668,413	\$18,879,797	\$23,510,917	\$4,780,091	(\$10,161,270)
Ending Balance	(\$77,059,594)	(\$63,554,510)	(\$51,227,899)	(\$68,610,626)	(\$57,138,821)	(\$56,880,908)	(\$42,201,172)	(\$34,161,274)	(\$38,729,507)	(\$28,932,408)	(\$16,237,424)	\$2,668,413	\$18,879,797	\$23,510,917	\$4,780,091	(\$10,161,270)	(\$14,127,782)
Financial Metrics																	
Debt Service Coverage Ratio (Operations)	2.10	2.13	2.13	2.13	2.25	1.92	1.90	1.85	1.83	1.89	1.90	1.89	1.88	1.88	2.65	2.87	3.10
Debt Service Coverage Ratio (Indenture)	2.10	2.13	2.13	2.13	2.25	1.92	1.89	1.85	1.83	1.89	1.89	1.89	1.88	1.87	2.65	2.87	3.10
Days Cash on Hand (target 90 days, un-restricted)	-1,217	-975	-764	-994	-804	-778	-561	-441	-486	-353	-192	31	211	255	50	-104	-141
Days Cash on Hand (180 days, restricted O&M Fund)	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
Residential Water and Wastewater Bill as % of MHI	2.32%	2.38%	2.44%	2.50%	2.67%	2.74%	2.82%	2.87%	2.93%	3.00%	3.08%	3.15%	3.20%	3.27%	3.35%	3.50%	3.65%
Outstanding Debt to NPV of Net Revenues	28%	27%	27%	27%	26%	25%	24%	24%	23%	21%	19%	17%	14%	11%	9%	6%	3%
Operating Ratio	0.36	0.35	0.35	0.35	0.33	0.33	0.33	0.33	0.33	0.32	0.32	0.32	0.32	0.32	0.31	0.30	0.29
Debt to Operating Ratio	0.48	0.47	0.47	0.47	0.44	0.52	0.53	0.54	0.55	0.53	0.53	0.53	0.53	0.53	0.38	0.35	0.32
Percent Equity Funded CIP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Lehigh County Authority
Review of Allentown Water/Sewer Lease Co
City Division Pro forma - Baseline
LCA Financial Planning Model Version 5

	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062
Operating Revenues																
Water	\$67,424,000	\$69,302,000	\$71,314,000	\$72,640,000	\$74,342,000	\$76,316,000	\$77,913,000	\$80,026,000	\$82,381,000	\$85,243,000	\$86,051,000	\$87,175,000	\$88,337,000	\$89,751,000	\$91,227,000	\$92,657,000
Wastewater	\$68,750,000	\$70,860,000	\$73,908,000	\$74,944,000	\$76,751,000	\$77,796,000	\$78,885,000	\$79,607,000	\$82,226,000	\$84,921,000	\$88,543,000	\$93,172,000	\$96,775,000	\$100,898,000	\$101,731,000	\$103,204,000
Total Operating Revenues	\$136,174,000	\$140,162,000	\$145,222,000	\$147,584,000	\$151,093,000	\$154,112,000	\$156,798,000	\$159,633,000	\$164,607,000	\$170,164,000	\$174,594,000	\$180,347,000	\$185,112,000	\$190,649,000	\$192,958,000	\$195,861,000
Operating Expenses																
Water	\$16,221,000	\$16,701,000	\$17,194,000	\$17,703,000	\$18,227,000	\$18,767,000	\$19,322,000	\$19,895,000	\$20,485,000	\$21,094,000	\$21,723,000	\$22,367,000	\$23,029,000	\$23,713,000	\$24,419,000	\$25,147,000
Wastewater	\$22,616,000	\$23,280,000	\$23,965,000	\$24,672,000	\$25,400,000	\$26,151,000	\$26,925,000	\$27,723,000	\$28,547,000	\$29,397,000	\$30,275,000	\$31,177,000	\$32,105,000	\$33,062,000	\$34,051,000	\$35,071,000
Total Operating Expenses	\$38,837,000	\$39,981,000	\$41,159,000	\$42,375,000	\$43,627,000	\$44,918,000	\$46,247,000	\$47,618,000	\$49,032,000	\$50,491,000	\$51,998,000	\$53,544,000	\$55,134,000	\$56,775,000	\$58,470,000	\$60,218,000
Operating Income (Loss)	\$97,337,000	\$100,181,000	\$104,063,000	\$105,209,000	\$107,466,000	\$109,194,000	\$110,551,000	\$112,015,000	\$115,575,000	\$119,673,000	\$122,596,000	\$126,803,000	\$129,978,000	\$133,874,000	\$134,488,000	\$135,643,000
Interest Income	\$38,000	\$516,000	\$1,244,000	\$2,035,000	\$2,822,000	\$3,710,000	\$4,607,000	\$5,428,000	\$6,157,000	\$6,832,000	\$7,514,000	\$8,204,000	\$9,005,000	\$10,120,000	\$11,435,000	\$12,479,000
Net Available For Debt Service	\$97,375,000	\$100,697,000	\$105,307,000	\$107,244,000	\$110,288,000	\$112,904,000	\$115,158,000	\$117,443,000	\$121,732,000	\$126,505,000	\$130,110,000	\$135,007,000	\$138,983,000	\$143,994,000	\$145,923,000	\$148,122,000
Debt Service																
Existing	\$29,389,863	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Projected	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Debt Service	\$29,389,863	\$0	\$0	\$0												
Net After Debt Service	\$67,985,138	\$100,697,000	\$105,307,000	\$107,244,000	\$110,288,000	\$112,904,000	\$115,158,000	\$117,443,000	\$121,732,000	\$126,505,000	\$130,110,000	\$135,007,000	\$138,983,000	\$143,994,000	\$145,923,000	\$148,122,000
Non-Operating Revenues																
TBD Reimbursement (AO and Non-AO) Exclude from Ind																
Water	\$336,600	\$340,000	\$343,400	\$346,800	\$350,200	\$353,600	\$357,000	\$360,400	\$363,800	\$367,200	\$370,600	\$374,000	\$377,400	\$380,800	\$384,200	\$387,600
Wastewater	\$251,000	\$254,000	\$257,000	\$260,000	\$263,000	\$266,000	\$269,000	\$272,000	\$275,000	\$278,000	\$281,000	\$284,000	\$287,000	\$290,000	\$293,000	\$296,000
Total Non-Operating Revenues	\$587,600	\$594,000	\$600,400	\$606,800	\$613,200	\$619,600	\$626,000	\$632,400	\$638,800	\$645,200	\$651,600	\$658,000	\$664,400	\$670,800	\$677,200	\$683,600
Non-Operating Expenses																
Contribution to Operations and Maintenance Reserve Fu	\$387,785	\$397,293	\$409,164	\$422,843	\$435,311	\$449,595	\$462,658	\$477,526	\$493,164	\$509,067	\$526,233	\$539,141	\$553,859	\$572,337	\$592,025	\$611,420
Contribution to CAPEX Fund	\$2,805,154	\$2,833,206	\$2,861,538	\$2,890,153	\$2,919,054	\$2,948,245	\$4,466,591	\$4,511,257	\$4,556,370	\$4,601,933	\$4,647,953	\$4,694,432	\$4,741,377	\$4,788,790	\$4,836,678	\$4,885,045
Deposit to Annual Lease Payment Fund	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Lease Payment	\$680,900	\$687,800	\$694,700	\$701,700	\$708,800	\$715,900	\$723,100	\$730,400	\$737,800	\$745,200	\$752,700	\$760,300	\$768,000	\$775,700	\$783,500	\$791,400
Total Non-Operating Expenses	\$3,873,839	\$3,918,299	\$3,965,402	\$4,014,696	\$4,063,166	\$4,113,740	\$5,652,349	\$5,719,183	\$5,787,334	\$5,856,201	\$5,926,885	\$5,993,873	\$6,063,236	\$6,136,827	\$6,212,203	\$6,287,865
Available for Capital	\$64,698,899	\$97,372,701	\$101,941,998	\$103,836,104	\$106,838,034	\$109,409,860	\$110,131,651	\$112,356,217	\$116,583,466	\$121,293,999	\$124,834,715	\$129,671,127	\$133,584,164	\$138,527,973	\$140,387,997	\$142,517,735
Equity Funded CAPEX																
TBD Reimbursable Costs (AO and Non-AO) Project LCA cr																
PayGo	\$28,797,000	\$37,795,000	\$15,749,000	\$31,859,000	\$21,528,000	\$17,133,000	\$23,010,000	\$35,305,000	\$47,845,239	\$55,002,000	\$54,672,000	\$61,860,000	\$41,207,000	\$7,840,000	\$8,077,000	\$65,962,000
Reserved 1																
Total Capex	\$28,797,000	\$37,795,000	\$15,749,000	\$31,859,000	\$21,528,000	\$17,133,000	\$23,010,000	\$35,305,000	\$47,845,239	\$55,002,000	\$54,672,000	\$61,860,000	\$41,207,000	\$7,840,000	\$8,077,000	\$65,962,000
Net Fund Surplus (deficit)	\$35,901,899	\$59,577,701	\$86,192,998	\$71,977,104	\$85,310,034	\$92,276,860	\$87,121,651	\$77,051,217	\$68,738,227	\$66,291,999	\$70,162,715	\$67,811,127	\$92,377,164	\$130,687,973	\$132,310,997	\$76,555,735
Beginning Balance (unrestricted)	(\$14,127,782)	\$21,774,117	\$81,351,818	\$167,544,816	\$239,521,920	\$324,831,955	\$417,108,815	\$504,230,466	\$581,281,683	\$650,019,910	\$716,311,910	\$786,474,624	\$854,285,751	\$946,662,916	\$1,077,350,888	\$1,209,661,886
Ending Balance	\$21,774,117	\$81,351,818	\$167,544,816	\$239,521,920	\$324,831,955	\$417,108,815	\$504,230,466	\$581,281,683	\$650,019,910	\$716,311,910	\$786,474,624	\$854,285,751	\$946,662,916	\$1,077,350,888	\$1,209,661,886	\$1,286,217,621
Financial Metrics																
Debt Service Coverage Ratio (Operations)	3.31															
Debt Service Coverage Ratio (Indenture)	3.31															
Days Cash on Hand (target 90 days, un-restricted)	211	765	1,530	2,124	2,798	3,490	4,097	4,588	4,983	5,332	5,685	5,997	6,453	7,132	7,777	8,029
Days Cash on Hand (180 days, restricted O&M Fund)	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
Residential Water and Wastewater Bill as % of MHI	3.78%	3.85%	3.95%	3.99%	4.04%	4.10%	4.14%	4.19%	4.28%	4.38%	4.44%	4.52%	4.57%	4.64%	4.66%	4.70%
Outstanding Debt to NPV of Net Revenues	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Operating Ratio	0.29	0.28	0.28	0.28	0.28	0.28	0.29	0.29	0.29	0.29	0.29	0.28	0.28	0.28	0.29	0.29
Debt to Operating Ratio	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Percent Equity Funded CIP	100%	100%	100%	100%	100%	100%	100%	100%	77%	85%	72%	87%	81%	44%	44%	86%

Lehigh County Authority
Review of Allentown Water/Sewer Lease Concession Financial Condition Assessment
City Division Pro forma - Scn 1 - Best Case
LCA Financial Planning Model Version 5

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Operating Revenues																			
Water	\$6,748,381	\$16,507,523	\$16,725,712	\$16,987,167	\$17,364,832	\$17,771,000	\$24,109,000	\$25,790,000	\$27,911,000	\$29,569,000	\$31,256,000	\$32,595,000	\$33,786,000	\$35,335,000	\$37,111,000	\$38,651,000	\$40,237,000	\$41,655,000	\$43,101,000
Wastewater	\$6,244,922	\$14,771,776	\$10,794,690	\$14,686,290	\$14,666,662	\$15,731,734	\$16,945,000	\$17,712,000	\$18,356,000	\$19,092,000	\$19,862,000	\$21,346,000	\$22,231,000	\$23,252,000	\$25,565,000	\$27,506,000	\$31,446,000	\$32,736,000	\$34,270,000
Total Operating Revenues	\$12,993,303	\$31,279,299	\$27,520,402	\$31,673,457	\$32,031,494	\$33,502,734	\$41,054,000	\$43,502,000	\$46,267,000	\$48,661,000	\$51,118,000	\$53,941,000	\$56,017,000	\$58,587,000	\$62,676,000	\$66,157,000	\$71,683,000	\$74,391,000	\$77,371,000
Operating Expenses																			
Water	\$2,260,972	\$7,007,850	\$6,773,471	\$6,226,015	\$6,548,687	\$6,970,098	\$8,348,000	\$8,597,000	\$8,856,000	\$9,125,000	\$9,402,000	\$9,370,000	\$9,650,000	\$9,941,000	\$10,239,000	\$10,541,000	\$10,854,000	\$11,177,000	\$11,508,000
Wastewater	\$2,028,198	\$7,638,389	\$8,646,549	\$8,751,484	\$9,947,544	\$9,831,891	\$10,493,000	\$10,801,000	\$11,117,000	\$11,440,000	\$11,775,000	\$11,672,000	\$12,014,000	\$12,363,000	\$12,721,000	\$13,092,000	\$13,472,000	\$13,864,000	\$14,268,000
Total Operating Expenses	\$4,289,170	\$14,646,239	\$15,420,020	\$14,977,499	\$16,496,231	\$16,801,989	\$18,841,000	\$19,398,000	\$19,973,000	\$20,565,000	\$21,177,000	\$21,042,000	\$21,664,000	\$22,304,000	\$22,960,000	\$23,633,000	\$24,326,000	\$25,041,000	\$25,776,000
Operating Income (Loss)	\$8,704,133	\$16,633,060	\$12,100,382	\$16,695,958	\$15,535,263	\$16,700,745	\$22,213,000	\$24,104,000	\$26,294,000	\$28,096,000	\$29,941,000	\$32,899,000	\$34,353,000	\$36,283,000	\$39,716,000	\$42,524,000	\$47,357,000	\$49,350,000	\$51,595,000
Interest Income						\$63,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Net Available For Debt Service	\$8,704,133	\$16,633,060	\$12,100,382	\$16,695,958	\$15,535,263	\$16,763,745	\$22,213,000	\$24,104,000	\$26,294,000	\$28,096,000	\$29,941,000	\$32,899,000	\$34,353,000	\$36,283,000	\$39,716,000	\$42,524,000	\$47,357,000	\$49,350,000	\$51,595,000
Debt Service																			
Existing	\$4,131,779	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$14,008,453	\$14,248,613	\$14,728,614	\$15,228,613	\$16,208,614	\$16,742,688	\$17,290,863	\$17,863,139	\$18,454,288	\$19,064,313	\$19,698,213	\$20,345,989	\$21,027,638
Projected	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Debt Service	\$4,131,779	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$14,008,453	\$14,248,613	\$14,728,614	\$15,228,613	\$16,208,614	\$16,742,688	\$17,290,863	\$17,863,139	\$18,454,288	\$19,064,313	\$19,698,213	\$20,345,989	\$21,027,638
Net After Debt Service	\$4,572,354	\$3,585,338	(\$947,340)	\$3,648,236	\$2,487,541	\$3,716,024	\$8,204,547	\$9,855,388	\$11,565,387	\$12,867,388	\$13,732,387	\$16,156,313	\$17,062,138	\$18,419,862	\$21,261,713	\$23,459,688	\$27,658,788	\$29,004,012	\$30,567,363
Non-Operating Revenues																			
Reimbursement (AO and Non-AO) Exclude from Indenture Ratio																			
Water	\$0	\$0	\$226,040	\$1,325,289	\$240,146	\$259,000	\$261,400	\$263,800	\$266,200	\$268,600	\$271,000	\$273,400	\$275,800	\$278,200	\$280,600	\$283,000	\$285,400	\$287,800	\$290,200
Wastewater	\$0	\$26,429	\$115,292	\$708,649	\$252,750	\$193,000	\$195,000	\$197,000	\$199,000	\$201,000	\$203,000	\$205,000	\$207,000	\$209,000	\$211,000	\$213,000	\$215,000	\$217,000	\$219,000
Total Non-Operating Revenues	\$0	\$26,429	\$341,332	\$2,033,938	\$492,896	\$452,000	\$456,400	\$460,800	\$465,200	\$469,600	\$474,000	\$478,400	\$482,800	\$487,200	\$491,600	\$496,000	\$500,400	\$504,800	\$509,200
Non-Operating Expenses																			
Contribution to Operations and Maintenance Reserve Fund		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$119,939	\$195,024	\$201,668	\$0	\$28,562	\$210,991	\$214,849	\$220,033	\$226,624	\$234,109	\$240,478
Contribution to CAPEX Fund	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Deposit to Annual Lease Payment Fund			\$250,000	\$250,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Lease Payment			\$500,000	\$500,000	\$504,000	\$509,100	\$514,200	\$519,400	\$524,600	\$529,900	\$535,200	\$540,600	\$546,100	\$551,600	\$557,200	\$562,800	\$568,500	\$574,200	\$580,000
Total Non-Operating Expenses	\$0	\$0	\$250,000	\$750,000	\$504,000	\$509,100	\$514,200	\$519,400	\$644,539	\$724,924	\$736,868	\$540,600	\$574,662	\$762,591	\$772,049	\$782,833	\$795,124	\$808,309	\$820,478
Available for Capital	\$4,572,354	\$3,611,767	(\$856,008)	\$4,932,174	\$2,476,437	\$3,658,924	\$8,146,747	\$9,796,788	\$11,386,047	\$12,612,063	\$13,469,518	\$16,094,113	\$16,970,275	\$18,144,471	\$20,981,264	\$23,172,855	\$27,364,063	\$28,700,503	\$30,256,085
Equity Funded CAPEX																			
Reimbursable Costs (AO and Non-AO) Project LCA completes and gets reimbursed																			
PayGo	\$0	\$0	\$0	\$0	\$0	\$10,070,000	\$14,515,000	\$20,642,000	\$14,476,000	\$13,941,000	\$17,872,000	\$8,438,000	\$13,923,000	\$30,924,000	\$22,163,000	\$36,598,000	\$12,764,000	\$15,082,000	\$9,930,000
Reserved 1																			
Total Capex	\$0	\$0	\$0	\$0	\$0	\$10,070,000	\$14,515,000	\$20,642,000	\$14,476,000	\$13,941,000	\$17,872,000	\$8,438,000	\$13,923,000	\$30,924,000	\$22,163,000	\$36,598,000	\$12,764,000	\$15,082,000	\$9,930,000
Net Fund Surplus (deficit)	\$4,572,354	\$3,611,767	(\$856,008)	\$4,932,174	\$2,476,437	(\$6,411,076)	(\$6,368,253)	(\$10,845,213)	(\$3,089,953)	(\$1,328,937)	(\$4,402,482)	\$7,656,113	\$3,047,275	(\$12,779,529)	(\$1,181,736)	(\$13,425,145)	\$14,600,063	\$13,618,503	\$20,326,085
Beginning Balance	\$0	\$4,572,354	\$8,184,121	\$7,328,113	\$12,260,287	\$9,488,776	\$3,077,700	(\$3,290,554)	(\$14,135,766)	(\$17,225,719)	(\$18,554,656)	(\$22,957,138)	(\$15,301,025)	(\$12,253,750)	(\$25,033,279)	(\$26,215,015)	(\$39,640,161)	(\$25,040,097)	(\$11,421,594)
Ending Balance	\$4,572,354	\$8,184,121	\$7,328,113	\$12,260,287	\$14,736,724	\$3,077,700	(\$3,290,554)	(\$14,135,766)	(\$17,225,719)	(\$18,554,656)	(\$22,957,138)	(\$15,301,025)	(\$12,253,750)	(\$25,033,279)	(\$26,215,015)	(\$39,640,161)	(\$25,040,097)	(\$11,421,594)	\$8,904,490
Financial Metrics																			
Debt Service Coverage Ratio	2.11	1.27	0.93	1.28	1.19	1.28	1.59	1.69	1.79	1.84	1.85	1.96	1.99	2.03	2.15	2.23	2.40	2.43	2.45
Debt Service Coverage Ratio (Indenture)	2.11	1.28	0.93	1.38	1.19	1.28	1.58	1.69	1.78	1.84	1.84	1.96	1.98	2.03	2.15	2.23	2.40	2.42	2.45
Days Cash on Hand (target 90 days, un-restricted)						67	-71	-274	-324	-339	-407	-264	-213	-422	-429	-630	-387	-171	130
Days Cash on Hand (180 days, restricted O&M Fund)						212	210	189	188	188	188	184	188	188	188	188	188	188	188
Residential Water and Wastewater Bill as % of MHI						1.31%	1.41%	1.46%	1.50%	1.54%	1.59%	1.69%	1.74%	1.80%	1.85%	1.90%	2.00%	2.06%	2.12%
Outstanding Debt to NPV of Net Revenues	33%	32%	32%	31%	31%	31%	30%	29%	28%	28%	27%	26%	26%	25%	25%	24%	23%	23%	23%
Operating Ratio						0.50	0.46	0.45	0.43	0.42	0.41	0.39	0.39	0.38	0.37	0.36	0.34	0.34	0.33
Debt to Operating Ratio						0.78	0.63	0.59	0.56	0.54	0.54	0.51	0.50	0.49	0.46	0.45	0.42	0.41	0.41
Percent Equity Funded CIP						100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Lehigh County Authority
Review of Allentown Water/Sewer Lease Co
City Division Pro forma - Scn 1 - Best Case

LCA Financial Planning Model Version 5

	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Operating Revenues																		
Water	\$44,688,000	\$46,262,000	\$47,745,000	\$49,769,000	\$51,929,000	\$53,721,000	\$55,333,000	\$57,087,000	\$59,706,000	\$62,199,000	\$64,243,000	\$66,612,000	\$68,993,000	\$71,890,000	\$74,767,000	\$77,126,000	\$79,294,000	\$81,604,000
Wastewater	\$35,232,000	\$36,216,000	\$41,619,000	\$42,688,000	\$43,856,000	\$44,648,000	\$46,357,000	\$49,763,000	\$50,711,000	\$51,685,000	\$52,690,000	\$53,727,000	\$56,380,000	\$61,486,000	\$66,747,000	\$72,128,000	\$74,337,000	\$77,492,000
Total Operating Revenues	\$79,920,000	\$82,478,000	\$89,364,000	\$92,457,000	\$95,785,000	\$98,369,000	\$101,690,000	\$106,850,000	\$110,417,000	\$113,884,000	\$116,933,000	\$120,339,000	\$125,373,000	\$133,376,000	\$141,514,000	\$149,254,000	\$153,631,000	\$159,096,000
Operating Expenses																		
Water	\$11,846,000	\$12,194,000	\$12,553,000	\$12,921,000	\$13,300,000	\$13,689,000	\$14,091,000	\$14,506,000	\$14,935,000	\$15,376,000	\$15,830,000	\$16,300,000	\$16,782,000	\$17,281,000	\$17,794,000	\$18,326,000	\$18,872,000	\$19,433,000
Wastewater	\$14,682,000	\$15,109,000	\$15,549,000	\$16,000,000	\$16,465,000	\$16,946,000	\$17,438,000	\$17,946,000	\$18,469,000	\$19,010,000	\$19,567,000	\$20,142,000	\$20,733,000	\$21,341,000	\$21,969,000	\$22,616,000	\$23,280,000	\$23,965,000
Total Operating Expenses	\$26,528,000	\$27,303,000	\$28,102,000	\$28,921,000	\$29,765,000	\$30,635,000	\$31,529,000	\$32,452,000	\$33,404,000	\$34,386,000	\$35,397,000	\$36,442,000	\$37,515,000	\$38,622,000	\$39,763,000	\$40,942,000	\$42,152,000	\$43,398,000
Operating Income (Loss)	\$53,392,000	\$55,175,000	\$61,262,000	\$63,536,000	\$66,020,000	\$67,734,000	\$70,161,000	\$74,398,000	\$77,013,000	\$79,498,000	\$81,536,000	\$83,897,000	\$87,858,000	\$94,754,000	\$101,751,000	\$108,312,000	\$111,479,000	\$115,698,000
Interest Income	\$187,000	\$235,000	\$282,000	\$420,000	\$578,000	\$779,000	\$888,000	\$1,009,000	\$1,221,000	\$1,483,000	\$1,768,000	\$1,985,000	\$2,032,000	\$1,985,000	\$2,016,000	\$2,305,000	\$2,917,000	\$3,785,000
Net Available For Debt Service	\$53,579,000	\$55,410,000	\$61,544,000	\$63,956,000	\$66,598,000	\$68,513,000	\$71,049,000	\$75,407,000	\$78,234,000	\$80,981,000	\$83,304,000	\$85,882,000	\$89,890,000	\$96,739,000	\$103,767,000	\$110,617,000	\$114,396,000	\$119,483,000
Debt Service																		
Existing	\$21,727,938	\$22,446,889	\$23,844,488	\$29,105,513	\$30,628,188	\$32,193,038	\$33,687,088	\$34,771,063	\$35,919,513	\$37,109,413	\$38,343,038	\$39,617,138	\$29,393,238	\$29,390,681	\$29,390,656	\$29,389,863	\$0	\$0
Projected	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Debt Service	\$21,727,938	\$22,446,889	\$23,844,488	\$29,105,513	\$30,628,188	\$32,193,038	\$33,687,088	\$34,771,063	\$35,919,513	\$37,109,413	\$38,343,038	\$39,617,138	\$29,393,238	\$29,390,681	\$29,390,656	\$29,389,863	\$0	\$0
Net After Debt Service	\$31,851,063	\$32,963,112	\$37,699,513	\$34,850,488	\$35,969,813	\$36,319,963	\$37,361,913	\$40,635,938	\$42,314,488	\$43,871,588	\$44,960,963	\$46,264,863	\$60,496,763	\$67,348,319	\$74,376,344	\$81,227,138	\$114,396,000	\$119,483,000
Non-Operating Revenues																		
Reimbursement (AO and Non-AO) Exclude from Indenture																		
Water	\$292,600	\$295,000	\$297,400	\$299,800	\$302,200	\$304,600	\$307,000	\$309,400	\$312,800	\$316,200	\$319,600	\$323,000	\$326,400	\$329,800	\$333,200	\$336,600	\$340,000	\$343,400
Wastewater	\$221,000	\$223,000	\$225,000	\$227,000	\$229,000	\$231,000	\$233,000	\$235,000	\$237,000	\$239,000	\$241,000	\$243,000	\$245,000	\$247,000	\$249,000	\$251,000	\$254,000	\$257,000
Total Non-Operating Revenues	\$513,600	\$518,000	\$522,400	\$526,800	\$531,200	\$535,600	\$540,000	\$544,400	\$549,800	\$555,200	\$560,600	\$566,000	\$571,400	\$576,800	\$582,200	\$587,600	\$594,000	\$600,400
Non-Operating Expenses																		
Contribution to Operations and Maintenance Reserve Fu	\$245,252	\$252,949	\$261,015	\$266,959	\$275,313	\$284,030	\$291,614	\$301,583	\$311,394	\$321,560	\$331,074	\$342,945	\$351,634	\$363,198	\$374,576	\$387,785	\$397,293	\$409,164
Contribution to CAPEX Fund	\$0	\$1,220,190	\$1,232,392	\$1,244,716	\$1,257,163	\$1,269,735	\$1,282,432	\$1,295,256	\$1,308,209	\$1,321,291	\$1,334,504	\$2,695,698	\$2,722,655	\$2,749,881	\$2,777,380	\$2,805,154	\$2,833,206	\$2,861,538
Deposit to Annual Lease Payment Fund	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Lease Payment	\$585,800	\$591,700	\$597,700	\$603,700	\$609,800	\$615,900	\$622,100	\$628,400	\$634,700	\$641,100	\$647,600	\$654,100	\$660,700	\$667,400	\$674,100	\$680,900	\$687,800	\$694,700
Total Non-Operating Expenses	\$831,052	\$2,064,839	\$2,091,107	\$2,115,375	\$2,142,276	\$2,169,664	\$2,196,146	\$2,225,239	\$2,254,303	\$2,283,951	\$2,313,178	\$3,692,743	\$3,734,989	\$3,780,479	\$3,826,056	\$3,873,839	\$3,918,299	\$3,965,402
Available for Capital	\$31,533,611	\$31,416,273	\$36,130,805	\$33,261,913	\$34,358,736	\$34,685,898	\$35,705,767	\$38,955,098	\$40,609,985	\$42,142,836	\$43,208,385	\$43,138,119	\$57,333,174	\$64,144,640	\$71,132,487	\$77,940,899	\$111,071,701	\$116,117,998
Equity Funded CAPEX																		
Reimbursable Costs (AO and Non-AO) Project LCA compl																		
PayGo	\$11,957,000	\$41,292,000	\$16,884,000	\$24,872,000	\$11,156,000	\$17,687,000	\$30,960,000	\$19,470,000	\$17,758,000	\$12,553,000	\$15,857,000	\$26,975,000	\$64,123,000	\$66,750,000	\$62,424,000	\$28,797,000	\$37,795,000	\$15,749,000
Reserved 1																		
Total Capex	\$11,957,000	\$41,292,000	\$16,884,000	\$24,872,000	\$11,156,000	\$17,687,000	\$30,960,000	\$19,470,000	\$17,758,000	\$12,553,000	\$15,857,000	\$26,975,000	\$64,123,000	\$66,750,000	\$62,424,000	\$28,797,000	\$37,795,000	\$15,749,000
Net Fund Surplus (deficit)	\$19,576,611	(\$9,875,727)	\$19,246,805	\$8,389,913	\$23,202,736	\$16,998,898	\$4,745,767	\$19,485,098	\$22,851,985	\$29,589,836	\$27,351,385	\$16,163,119	(\$6,789,826)	(\$2,605,360)	\$8,708,487	\$49,143,899	\$73,276,701	\$100,368,998
Beginning Balance	\$8,904,490	\$28,481,101	\$18,605,374	\$37,852,179	\$46,242,092	\$69,444,828	\$86,443,726	\$91,189,493	\$110,674,592	\$133,526,576	\$163,116,413	\$190,467,797	\$206,630,917	\$199,841,091	\$197,235,730	\$205,944,218	\$255,088,117	\$328,364,818
Ending Balance	\$28,481,101	\$18,605,374	\$37,852,179	\$46,242,092	\$69,444,828	\$86,443,726	\$91,189,493	\$110,674,592	\$133,526,576	\$163,116,413	\$190,467,797	\$206,630,917	\$199,841,091	\$197,235,730	\$205,944,218	\$255,088,117	\$328,364,818	\$428,733,816
Financial Metrics																		
Debt Service Coverage Ratio	2.47	2.47	2.58	2.20	2.17	2.13	2.11	2.17	2.18	2.18	2.17	2.17	3.06	3.29	3.53	3.76		
Debt Service Coverage Ratio (Indenture)	2.46	2.47	2.58	2.19	2.17	2.13	2.11	2.17	2.18	2.18	2.17	2.17	3.06	3.29	3.53	3.76		
Days Cash on Hand (target 90 days, un-restricted)	403	256	506	601	876	1,060	1,086	1,281	1,502	1,782	2,022	2,131	2,002	1,919	1,946	2,342	2,927	3,712
Days Cash on Hand (180 days, restricted O&M Fund)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Residential Water and Wastewater Bill as % of MHI	2.17%	2.22%	2.39%	2.44%	2.49%	2.54%	2.59%	2.64%	2.69%	2.74%	2.79%	2.85%	2.92%	2.97%	3.03%	3.08%	3.12%	3.19%
Outstanding Debt to NPV of Net Revenues	22%	22%	22%	21%	20%	20%	20%	18%	16%	14%	12%	9%	7%	5%	2%	0%	0%	0%
Operating Ratio	0.33	0.33	0.31	0.31	0.31	0.31	0.31	0.30	0.30	0.30	0.30	0.30	0.29	0.29	0.28	0.27	0.27	0.27
Debt to Operating Ratio	0.41	0.41	0.39	0.46	0.46	0.48	0.48	0.47	0.47	0.47	0.47	0.47	0.33	0.31	0.29	0.27	0.00	0.00
Percent Equity Funded CIP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Lehigh County Authority
Review of Allentown Water/Sewer Lease Co
City Division Pro forma - Scn 1 - Best Case

LCA Financial Planning Model Version 5

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062
Operating Revenues													
Water	\$83,242,000	\$85,261,000	\$87,561,000	\$89,498,000	\$91,959,000	\$94,672,000	\$97,903,000	\$99,090,000	\$100,604,000	\$102,171,000	\$103,998,000	\$105,901,000	\$107,770,000
Wastewater	\$78,633,000	\$80,552,000	\$81,710,000	\$82,918,000	\$83,757,000	\$86,505,000	\$89,327,000	\$93,083,000	\$97,847,000	\$101,592,000	\$105,858,000	\$106,838,000	\$108,467,000
Total Operating Revenues	\$161,875,000	\$165,813,000	\$169,271,000	\$172,416,000	\$175,716,000	\$181,177,000	\$187,230,000	\$192,173,000	\$198,451,000	\$203,763,000	\$209,856,000	\$212,739,000	\$216,237,000
Operating Expenses													
Water	\$20,012,000	\$20,608,000	\$21,223,000	\$21,855,000	\$22,507,000	\$23,179,000	\$23,872,000	\$24,587,000	\$25,320,000	\$26,073,000	\$26,851,000	\$27,654,000	\$28,483,000
Wastewater	\$24,672,000	\$25,400,000	\$26,151,000	\$26,925,000	\$27,723,000	\$28,547,000	\$29,397,000	\$30,275,000	\$31,177,000	\$32,105,000	\$33,062,000	\$34,051,000	\$35,071,000
Total Operating Expenses	\$44,684,000	\$46,008,000	\$47,374,000	\$48,780,000	\$50,230,000	\$51,726,000	\$53,269,000	\$54,862,000	\$56,497,000	\$58,178,000	\$59,913,000	\$61,705,000	\$63,554,000
Operating Income (Loss)	\$117,191,000	\$119,805,000	\$121,897,000	\$123,636,000	\$125,486,000	\$129,451,000	\$133,961,000	\$137,311,000	\$141,954,000	\$145,585,000	\$149,943,000	\$151,034,000	\$152,683,000
Interest Income	\$4,721,000	\$5,656,000	\$6,698,000	\$7,755,000	\$8,741,000	\$9,641,000	\$10,492,000	\$11,357,000	\$12,236,000	\$13,232,000	\$14,549,000	\$16,072,000	\$17,332,000
Net Available For Debt Service	\$121,912,000	\$125,461,000	\$128,595,000	\$131,391,000	\$134,227,000	\$139,092,000	\$144,453,000	\$148,668,000	\$154,190,000	\$158,817,000	\$164,492,000	\$167,106,000	\$170,015,000
Debt Service													
Existing	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Projected	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Debt Service	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Net After Debt Service	\$121,912,000	\$125,461,000	\$128,595,000	\$131,391,000	\$134,227,000	\$139,092,000	\$144,453,000	\$148,668,000	\$154,190,000	\$158,817,000	\$164,492,000	\$167,106,000	\$170,015,000
Non-Operating Revenues													
Reimbursement (AO and Non-AO) Exclude from Indenture													
Water	\$346,800	\$350,200	\$353,600	\$357,000	\$360,400	\$363,800	\$367,200	\$370,600	\$374,000	\$377,400	\$380,800	\$384,200	\$387,600
Wastewater	\$260,000	\$263,000	\$266,000	\$269,000	\$272,000	\$275,000	\$278,000	\$281,000	\$284,000	\$287,000	\$290,000	\$293,000	\$296,000
Total Non-Operating Revenues	\$606,800	\$613,200	\$619,600	\$626,000	\$632,400	\$638,800	\$645,200	\$651,600	\$658,000	\$664,400	\$670,800	\$677,200	\$683,600
Non-Operating Expenses													
Contribution to Operations and Maintenance Reserve Fu	\$422,843	\$435,311	\$449,595	\$462,658	\$477,526	\$493,164	\$509,067	\$526,233	\$539,141	\$553,859	\$572,337	\$592,025	\$611,420
Contribution to CAPEX Fund	\$2,890,153	\$2,919,054	\$2,948,245	\$4,466,591	\$4,511,257	\$4,556,370	\$4,601,933	\$4,647,953	\$4,694,432	\$4,741,377	\$4,788,790	\$4,836,678	\$4,885,045
Deposit to Annual Lease Payment Fund	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Lease Payment	\$701,700	\$708,800	\$715,900	\$723,100	\$730,400	\$737,800	\$745,200	\$752,700	\$760,300	\$768,000	\$775,700	\$783,500	\$791,400
Total Non-Operating Expenses	\$4,014,696	\$4,063,166	\$4,113,740	\$5,652,349	\$5,719,183	\$5,787,334	\$5,856,201	\$5,926,885	\$5,993,873	\$6,063,236	\$6,136,827	\$6,212,203	\$6,287,865
Available for Capital	\$118,504,104	\$122,011,034	\$125,100,860	\$126,364,651	\$129,140,217	\$133,943,466	\$139,241,999	\$143,392,715	\$148,854,127	\$153,418,164	\$159,025,973	\$161,570,997	\$164,410,735
Equity Funded CAPEX													
Reimbursable Costs (AO and Non-AO) Project LCA compl													
PayGo	\$31,859,000	\$21,528,000	\$17,133,000	\$23,010,000	\$35,305,000	\$47,845,239	\$55,002,000	\$54,672,000	\$61,860,000	\$41,207,000	\$7,840,000	\$8,077,000	\$65,962,000
Reserved 1													
Total Capex	\$31,859,000	\$21,528,000	\$17,133,000	\$23,010,000	\$35,305,000	\$47,845,239	\$55,002,000	\$54,672,000	\$61,860,000	\$41,207,000	\$7,840,000	\$8,077,000	\$65,962,000
Net Fund Surplus (deficit)	\$86,645,104	\$100,483,034	\$107,967,860	\$103,354,651	\$93,835,217	\$86,098,227	\$84,239,999	\$88,720,715	\$86,994,127	\$112,211,164	\$151,185,973	\$153,493,997	\$98,448,735
Beginning Balance	\$428,733,816	\$515,378,920	\$615,861,955	\$723,829,815	\$827,184,466	\$921,019,683	\$1,007,117,910	\$1,091,357,910	\$1,180,078,624	\$1,267,072,751	\$1,379,283,916	\$1,530,469,888	\$1,683,963,886
Ending Balance	\$515,378,920	\$615,861,955	\$723,829,815	\$827,184,466	\$921,019,683	\$1,007,117,910	\$1,091,357,910	\$1,180,078,624	\$1,267,072,751	\$1,379,283,916	\$1,530,469,888	\$1,683,963,886	\$1,782,412,621
Financial Metrics													
Debt Service Coverage Ratio													
Debt Service Coverage Ratio (Indenture)													
Days Cash on Hand (target 90 days, un-restricted)	4,335	5,031	5,742	6,373	6,892	7,318	7,701	8,086	8,430	8,911	9,602	10,259	10,543
Days Cash on Hand (180 days, restricted O&M Fund)	188	188	188	188	188	188	188	188	188	188	188	188	188
Residential Water and Wastewater Bill as % of MHI	3.24%	3.30%	3.35%	3.41%	3.44%	3.48%	3.53%	3.57%	3.62%	3.64%	3.68%	3.72%	3.76%
Outstanding Debt to NPV of Net Revenues	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Operating Ratio	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Debt to Operating Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Percent Equity Funded CIP	100%	100%	100%	100%	100%	77%	85%	72%	87%	81%	44%	44%	86%

Lehigh County Authority
Review of Allentown Water/Sewer Lease Concession Financial Condition Assessment
City Division Pro forma - Scn 2 - Worst Case
LCA Financial Planning Model Version 5

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Operating Revenues																				
Water	\$6,748,381	\$16,507,523	\$16,725,712	\$16,987,167	\$17,364,832	\$17,771,000	\$20,099,000	\$20,997,000	\$21,917,000	\$22,856,000	\$23,822,000	\$24,727,000	\$25,751,000	\$26,811,000	\$27,904,000	\$29,033,000	\$30,198,000	\$31,402,000	\$32,646,000	\$33,931,000
Wastewater	\$6,244,922	\$14,771,776	\$10,794,690	\$14,686,290	\$14,666,662	\$15,731,734	\$15,559,000	\$16,278,000	\$16,874,000	\$17,556,000	\$18,272,000	\$19,699,000	\$20,526,000	\$21,490,000	\$21,975,000	\$22,638,000	\$25,263,000	\$26,242,000	\$27,515,000	\$28,340,000
Total Operating Revenues	\$12,993,303	\$31,279,299	\$27,520,402	\$31,673,457	\$32,031,494	\$33,502,734	\$35,658,000	\$37,275,000	\$38,791,000	\$40,412,000	\$42,094,000	\$44,426,000	\$46,277,000	\$48,301,000	\$49,879,000	\$51,671,000	\$55,461,000	\$57,644,000	\$60,161,000	\$62,271,000
Operating Expenses																				
Water	\$2,260,972	\$7,007,850	\$6,773,471	\$6,226,015	\$6,548,687	\$6,970,098	\$7,461,000	\$7,682,000	\$7,911,000	\$8,149,000	\$8,395,000	\$8,330,000	\$8,577,000	\$8,834,000	\$9,097,000	\$9,363,000	\$9,639,000	\$9,924,000	\$10,216,000	\$10,514,000
Wastewater	\$2,028,198	\$7,638,389	\$8,646,549	\$8,751,484	\$9,947,544	\$9,831,891	\$10,493,000	\$10,801,000	\$11,117,000	\$11,440,000	\$11,775,000	\$11,672,000	\$12,014,000	\$12,363,000	\$12,721,000	\$13,092,000	\$13,472,000	\$13,864,000	\$14,268,000	\$14,682,000
Total Operating Expenses	\$4,289,170	\$14,646,239	\$15,420,020	\$14,977,499	\$16,496,231	\$16,801,989	\$17,954,000	\$18,483,000	\$19,028,000	\$19,589,000	\$20,170,000	\$20,002,000	\$20,591,000	\$21,197,000	\$21,818,000	\$22,455,000	\$23,111,000	\$23,788,000	\$24,484,000	\$25,196,000
Operating Income (Loss)	\$8,704,133	\$16,633,060	\$12,100,382	\$16,695,958	\$15,535,263	\$16,700,745	\$17,704,000	\$18,792,000	\$19,763,000	\$20,823,000	\$21,924,000	\$24,424,000	\$25,686,000	\$27,104,000	\$28,061,000	\$29,216,000	\$32,350,000	\$33,856,000	\$35,677,000	\$37,075,000
Interest Income						\$63,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Net Available For Debt Service	\$8,704,133	\$16,633,060	\$12,100,382	\$16,695,958	\$15,535,263	\$16,763,745	\$17,704,000	\$18,792,000	\$19,763,000	\$20,823,000	\$21,924,000	\$24,424,000	\$25,686,000	\$27,104,000	\$28,061,000	\$29,216,000	\$32,350,000	\$33,856,000	\$35,677,000	\$37,075,000
Debt Service																				
Existing	\$4,131,779	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$14,008,453	\$14,248,613	\$14,728,614	\$15,228,613	\$16,208,614	\$16,742,688	\$17,290,863	\$17,863,139	\$18,454,288	\$19,064,313	\$19,698,213	\$20,345,989	\$21,027,638	\$21,727,938
Projected	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Debt Service	\$4,131,779	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$14,008,453	\$14,248,613	\$14,728,614	\$15,228,613	\$16,208,614	\$16,742,688	\$17,290,863	\$17,863,139	\$18,454,288	\$19,064,313	\$19,698,213	\$20,345,989	\$21,027,638	\$21,727,938
Net After Debt Service	\$4,572,354	\$3,585,338	(\$947,340)	\$3,648,236	\$2,487,541	\$3,716,024	\$3,695,547	\$4,543,388	\$5,034,387	\$5,594,388	\$5,715,387	\$7,681,313	\$8,395,138	\$9,240,862	\$9,606,713	\$10,151,688	\$12,651,788	\$13,510,012	\$14,649,363	\$15,347,063
Non-Operating Revenues																				
Reimbursement (AO and Non-AO) Exclude from Indenture Ratio																				
Water	\$0	\$0	\$226,040	\$1,325,289	\$240,146	\$259,000	\$261,400	\$263,800	\$266,200	\$268,600	\$271,000	\$273,400	\$275,800	\$278,200	\$280,600	\$283,000	\$285,400	\$287,800	\$290,200	\$292,600
Wastewater	\$0	\$26,429	\$115,292	\$708,649	\$252,750	\$193,000	\$195,000	\$197,000	\$199,000	\$201,000	\$203,000	\$205,000	\$207,000	\$209,000	\$211,000	\$213,000	\$215,000	\$217,000	\$219,000	\$221,000
Total Non-Operating Revenues	\$0	\$26,429	\$341,332	\$2,033,938	\$492,896	\$452,000	\$456,400	\$460,800	\$465,200	\$469,600	\$474,000	\$478,400	\$482,800	\$487,200	\$491,600	\$496,000	\$500,400	\$504,800	\$509,200	\$513,600
Non-Operating Expenses																				
Contribution to Operations and Maintenance Reserve Fund		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$119,939	\$195,024	\$201,668	\$0	\$28,562	\$210,991	\$214,849	\$220,033	\$226,624	\$234,109	\$240,478	\$245,252
Contribution to CAPEX Fund	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Deposit to Annual Lease Payment Fund			\$250,000	\$250,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Lease Payment				\$500,000	\$504,000	\$509,100	\$514,200	\$519,400	\$524,600	\$529,900	\$535,200	\$540,600	\$546,100	\$551,600	\$557,200	\$562,800	\$568,500	\$574,200	\$580,000	\$585,800
Total Non-Operating Expenses	\$0	\$0	\$250,000	\$750,000	\$504,000	\$509,100	\$514,200	\$519,400	\$644,539	\$724,924	\$736,868	\$540,600	\$574,662	\$762,591	\$772,049	\$782,833	\$795,124	\$808,309	\$820,478	\$831,052
Available for Capital	\$4,572,354	\$3,611,767	(\$856,008)	\$4,932,174	\$2,476,437	\$3,658,924	\$3,637,747	\$4,484,788	\$4,855,047	\$5,339,063	\$5,452,518	\$7,619,113	\$8,303,275	\$8,965,471	\$9,326,264	\$9,864,855	\$12,357,063	\$13,206,503	\$14,338,085	\$15,029,611
Equity Funded CAPEX																				
Reimbursable Costs (AO and Non-AO) Project LCA completes and gets reimbursed																				
PayGo	\$0	\$0	\$0	\$0	\$0	\$10,070,000	\$14,515,000	\$14,642,000	\$14,476,000	\$13,941,000	\$17,872,000	\$8,438,000	\$13,923,000	\$10,422,000	\$9,115,000	\$23,159,000	\$12,764,000	\$15,082,000	\$9,930,000	\$11,957,000
Reserved 1						\$10,070,000	\$14,515,000	\$14,642,000	\$14,476,000	\$13,941,000	\$17,872,000	\$8,438,000	\$13,923,000	\$10,422,000	\$9,115,000	\$23,159,000	\$12,764,000	\$15,082,000	\$9,930,000	\$11,957,000
Total Capex	\$0	\$0	\$0	\$0	\$0	\$10,070,000	\$14,515,000	\$14,642,000	\$14,476,000	\$13,941,000	\$17,872,000	\$8,438,000	\$13,923,000	\$10,422,000	\$9,115,000	\$23,159,000	\$12,764,000	\$15,082,000	\$9,930,000	\$11,957,000
Net Fund Surplus (deficit)	\$4,572,354	\$3,611,767	(\$856,008)	\$4,932,174	\$2,476,437	(\$6,411,076)	(\$10,877,253)	(\$10,157,213)	(\$9,620,953)	(\$8,601,937)	(\$12,419,482)	(\$818,888)	(\$5,619,725)	(\$1,456,529)	\$211,264	(\$13,294,145)	(\$406,937)	(\$1,875,497)	\$4,408,085	\$3,072,611
Beginning Balance	\$0	\$4,572,354	\$8,184,121	\$7,328,113	\$12,260,287	\$9,488,776	\$3,077,700	(\$7,799,554)	(\$17,956,766)	(\$27,577,719)	(\$36,179,656)	(\$48,599,138)	(\$49,418,025)	(\$55,037,750)	(\$56,494,279)	(\$56,283,015)	(\$69,577,161)	(\$69,984,097)	(\$71,859,594)	(\$67,451,510)
Ending Balance	\$4,572,354	\$8,184,121	\$7,328,113	\$12,260,287	\$14,736,724	\$3,077,700	(\$7,799,554)	(\$17,956,766)	(\$27,577,719)	(\$36,179,656)	(\$48,599,138)	(\$49,418,025)	(\$55,037,750)	(\$56,494,279)	(\$56,283,015)	(\$69,577,161)	(\$69,984,097)	(\$71,859,594)	(\$67,451,510)	(\$64,378,899)
Financial Metrics																				
Debt Service Coverage Ratio	2.11	1.27	0.93	1.28	1.19	1.28	1.26	1.32	1.34	1.37	1.35	1.46	1.49	1.52	1.52	1.53	1.64	1.66	1.70	1.71
Debt Service Coverage Ratio (Indenture)	2.11	1.28	0.93	1.38	1.19	1.28	1.26	1.31	1.34	1.36	1.35	1.46	1.48	1.51	1.52	1.53	1.64	1.66	1.69	1.70
Days Cash on Hand (target 90 days, un-restricted)						68	-169	-365	-545	-694	-906	-894	-1,004	-1,001	-969	-1,164	-1,138	-1,135	-1,035	-960
Days Cash on Hand (180 days, restricted O&M Fund)						212	210	199	197	197	197	194	198	198	198	198	198	198	198	198
Residential Water and Wastewater Bill as % of MHI						1.31%	1.86%	1.94%	2.03%	2.11%	2.19%	2.31%	2.37%	2.45%	2.57%	2.67%	2.82%	2.90%	2.98%	3.05%
Outstanding Debt to NPV of Net Revenues	51%	50%	50%	50%	50%	50%	49%	47%	46%	45%	44%	43%	42%	41%	40%	40%	39%	38%	37%	37%
Operating Ratio						0.50	0.50	0.50	0.49	0.48	0.48	0.45	0.44	0.44	0.44	0.43	0.42	0.41	0.41	0.40
Debt to Operating Ratio						0.78	0.79	0.76	0.75	0.73	0.74	0.69	0.67	0.66	0.66	0.65	0.61	0.60	0.59	0.59
Percent Equity Funded CIP						100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Lehigh County Authority
Review of Allentown Water/Sewer Lease Co
City Division Pro forma - Scn 2 - Worst Case
LCA Financial Planning Model Version 5

	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
Operating Revenues																			
Water	\$35,139,000	\$36,378,000	\$37,658,000	\$38,974,000	\$40,328,000	\$41,725,000	\$43,162,000	\$44,640,000	\$46,163,000	\$47,732,000	\$49,351,000	\$51,017,000	\$52,732,000	\$54,332,000	\$55,951,000	\$57,373,000	\$58,867,000	\$60,561,000	\$62,313,000
Wastewater	\$29,158,000	\$34,496,000	\$35,377,000	\$36,318,000	\$37,039,000	\$37,855,000	\$40,345,000	\$41,212,000	\$42,108,000	\$43,026,000	\$43,976,000	\$46,537,000	\$49,648,000	\$52,852,000	\$56,116,000	\$57,131,000	\$59,051,000	\$60,087,000	\$61,553,000
Total Operating Revenues	\$64,297,000	\$70,874,000	\$73,035,000	\$75,292,000	\$77,367,000	\$79,580,000	\$83,507,000	\$85,852,000	\$88,271,000	\$90,758,000	\$93,327,000	\$97,554,000	\$102,380,000	\$107,184,000	\$112,067,000	\$114,504,000	\$117,918,000	\$120,648,000	\$123,866,000
Operating Expenses																			
Water	\$10,821,000	\$11,138,000	\$11,462,000	\$11,796,000	\$12,139,000	\$12,493,000	\$12,859,000	\$13,237,000	\$13,625,000	\$14,025,000	\$14,439,000	\$14,863,000	\$15,302,000	\$15,753,000	\$16,221,000	\$16,701,000	\$17,194,000	\$17,703,000	\$18,227,000
Wastewater	\$15,109,000	\$15,549,000	\$16,000,000	\$16,465,000	\$16,946,000	\$17,438,000	\$17,946,000	\$18,469,000	\$19,010,000	\$19,567,000	\$20,142,000	\$20,733,000	\$21,341,000	\$21,969,000	\$22,616,000	\$23,280,000	\$23,965,000	\$24,672,000	\$25,400,000
Total Operating Expenses	\$25,930,000	\$26,687,000	\$27,462,000	\$28,261,000	\$29,085,000	\$29,931,000	\$30,805,000	\$31,706,000	\$32,635,000	\$33,592,000	\$34,581,000	\$35,596,000	\$36,643,000	\$37,722,000	\$38,837,000	\$39,981,000	\$41,159,000	\$42,375,000	\$43,627,000
Operating Income (Loss)	\$38,367,000	\$44,187,000	\$45,573,000	\$47,031,000	\$48,282,000	\$49,649,000	\$52,702,000	\$54,146,000	\$55,636,000	\$57,166,000	\$58,746,000	\$61,958,000	\$65,737,000	\$69,462,000	\$73,230,000	\$74,523,000	\$76,759,000	\$78,273,000	\$80,239,000
Interest Income	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$181,000	\$706,000
Net Available For Debt Service	\$38,367,000	\$44,187,000	\$45,573,000	\$47,031,000	\$48,282,000	\$49,649,000	\$52,702,000	\$54,146,000	\$55,636,000	\$57,166,000	\$58,746,000	\$61,958,000	\$65,737,000	\$69,462,000	\$73,230,000	\$74,523,000	\$76,759,000	\$78,454,000	\$80,945,000
Debt Service																			
Existing	\$22,446,889	\$23,844,488	\$29,105,513	\$30,628,188	\$32,193,038	\$33,687,088	\$34,771,063	\$35,919,513	\$37,109,413	\$38,343,038	\$39,617,138	\$29,393,238	\$29,390,681	\$29,390,656	\$29,389,863	\$0	\$0	\$0	\$0
Projected	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Debt Service	\$22,446,889	\$23,844,488	\$29,105,513	\$30,628,188	\$32,193,038	\$33,687,088	\$34,771,063	\$35,919,513	\$37,109,413	\$38,343,038	\$39,617,138	\$29,393,238	\$29,390,681	\$29,390,656	\$29,389,863	\$0	\$0	\$0	\$0
Net After Debt Service	\$15,920,112	\$20,342,513	\$16,467,488	\$16,402,813	\$16,088,963	\$15,961,913	\$17,930,938	\$18,226,488	\$18,526,588	\$18,822,963	\$19,128,863	\$32,564,763	\$36,346,319	\$40,071,344	\$43,840,138	\$74,523,000	\$76,759,000	\$78,454,000	\$80,945,000
Non-Operating Revenues																			
Reimbursement (AO and Non-AO) Exclude from Indenture																			
Water	\$295,000	\$297,400	\$299,800	\$302,200	\$304,600	\$307,000	\$309,400	\$312,800	\$316,200	\$319,600	\$323,000	\$326,400	\$329,800	\$333,200	\$336,600	\$340,000	\$343,400	\$346,800	\$350,200
Wastewater	\$223,000	\$225,000	\$227,000	\$229,000	\$231,000	\$233,000	\$235,000	\$237,000	\$239,000	\$241,000	\$243,000	\$245,000	\$247,000	\$249,000	\$251,000	\$254,000	\$257,000	\$260,000	\$263,000
Total Non-Operating Revenues	\$518,000	\$522,400	\$526,800	\$531,200	\$535,600	\$540,000	\$544,400	\$549,800	\$555,200	\$560,600	\$566,000	\$571,400	\$576,800	\$582,200	\$587,600	\$594,000	\$600,400	\$606,800	\$613,200
Non-Operating Expenses																			
Contribution to Operations and Maintenance Reserve Fu	\$252,949	\$261,015	\$266,959	\$275,313	\$284,030	\$291,614	\$301,583	\$311,394	\$321,560	\$331,074	\$342,945	\$351,634	\$363,198	\$374,576	\$387,785	\$397,293	\$409,164	\$422,843	\$435,311
Contribution to CAPEX Fund	\$1,220,190	\$1,232,392	\$1,244,716	\$1,257,163	\$1,269,735	\$1,282,432	\$1,295,256	\$1,308,209	\$1,321,291	\$1,334,504	\$2,695,698	\$2,722,655	\$2,749,881	\$2,777,380	\$2,805,154	\$2,833,206	\$2,861,538	\$2,890,153	\$2,919,054
Deposit to Annual Lease Payment Fund	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Lease Payment	\$591,700	\$597,700	\$603,700	\$609,800	\$615,900	\$622,100	\$628,400	\$634,700	\$641,100	\$647,600	\$654,100	\$660,700	\$667,400	\$674,100	\$680,900	\$687,800	\$694,700	\$701,700	\$708,800
Total Non-Operating Expenses	\$2,064,839	\$2,091,107	\$2,115,375	\$2,142,276	\$2,169,664	\$2,196,146	\$2,225,239	\$2,254,303	\$2,283,951	\$2,313,178	\$3,692,743	\$3,734,989	\$3,780,479	\$3,826,056	\$3,873,839	\$3,918,299	\$3,965,402	\$4,014,696	\$4,063,166
Available for Capital	\$14,373,273	\$18,773,805	\$14,878,913	\$14,791,736	\$14,454,898	\$14,305,767	\$16,250,098	\$16,521,985	\$16,797,836	\$17,070,385	\$16,002,119	\$29,401,174	\$33,142,640	\$36,827,487	\$40,553,899	\$71,198,701	\$73,393,998	\$75,046,104	\$77,495,034
Equity Funded CAPEX																			
Reimbursable Costs (AO and Non-AO) Project LCA compl																			
PayGo	\$41,292,000	\$10,884,000	\$18,872,000	\$11,156,000	\$8,919,000	\$21,929,000	\$11,470,000	\$9,758,000	\$12,553,000	\$10,357,000	\$21,975,000	\$54,123,000	\$56,750,000	\$57,424,000	\$13,014,000	\$21,659,000	\$15,749,000	\$31,859,000	\$15,528,000
Reserved 1																			
Total Capex	\$41,292,000	\$10,884,000	\$18,872,000	\$11,156,000	\$8,919,000	\$21,929,000	\$11,470,000	\$9,758,000	\$12,553,000	\$10,357,000	\$21,975,000	\$54,123,000	\$56,750,000	\$57,424,000	\$13,014,000	\$21,659,000	\$15,749,000	\$31,859,000	\$15,528,000
Net Fund Surplus (deficit)	(\$26,918,727)	\$7,889,805	(\$3,993,087)	\$3,635,736	\$5,535,898	(\$7,623,233)	\$4,780,098	\$6,763,985	\$4,244,836	\$6,713,385	(\$5,972,881)	(\$24,721,826)	(\$23,607,360)	(\$20,596,513)	\$27,539,899	\$49,539,701	\$57,644,998	\$43,187,104	\$61,967,034
Beginning Balance	(\$64,378,899)	(\$91,297,626)	(\$83,407,821)	(\$87,400,908)	(\$83,765,172)	(\$78,229,274)	(\$85,852,507)	(\$81,072,408)	(\$74,308,424)	(\$70,063,587)	(\$63,350,203)	(\$69,323,083)	(\$94,044,909)	(\$117,652,270)	(\$138,248,782)	(\$110,708,883)	(\$61,169,182)	(\$3,524,184)	\$39,662,920
Ending Balance	(\$91,297,626)	(\$83,407,821)	(\$87,400,908)	(\$83,765,172)	(\$78,229,274)	(\$85,852,507)	(\$81,072,408)	(\$74,308,424)	(\$70,063,587)	(\$63,350,203)	(\$69,323,083)	(\$94,044,909)	(\$117,652,270)	(\$138,248,782)	(\$110,708,883)	(\$61,169,182)	(\$3,524,184)	\$39,662,920	\$101,629,955
Financial Metrics																			
Debt Service Coverage Ratio	1.71	1.85	1.57	1.54	1.50	1.47	1.52	1.51	1.50	1.49	1.48	2.11	2.24	2.36	2.49				
Debt Service Coverage Ratio (Indenture)	1.71	1.85	1.56	1.53	1.50	1.47	1.51	1.51	1.50	1.49	1.48	2.10	2.23	2.36	2.49				
Days Cash on Hand (target 90 days, un-restricted)	-1,323	-1,174	-1,195	-1,113	-1,010	-1,077	-989	-880	-807	-709	-753	-993	-1,206	-1,377	-1,071	-575	-32	352	875
Days Cash on Hand (180 days, restricted O&M Fund)	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
Residential Water and Wastewater Bill as % of MHI	3.12%	3.30%	3.39%	3.48%	3.54%	3.62%	3.70%	3.79%	3.87%	3.94%	4.02%	4.12%	4.29%	4.45%	4.60%	4.69%	4.80%	4.85%	4.93%
Outstanding Debt to NPV of Net Revenues	37%	35%	34%	34%	33%	33%	30%	27%	24%	20%	16%	13%	8%	4%	0%	0%	0%	0%	0%
Operating Ratio	0.40	0.38	0.38	0.38	0.38	0.38	0.37	0.37	0.37	0.37	0.37	0.36	0.36	0.35	0.35	0.35	0.35	0.35	0.35
Debt to Operating Ratio	0.59	0.54	0.64	0.65	0.67	0.68	0.66	0.66	0.67	0.67	0.67	0.47	0.45	0.42	0.40	0.00	0.00	0.00	0.00
Percent Equity Funded CIP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Lehigh County Authority
Review of Allentown Water/Sewer Lease Co
City Division Pro forma - Scn 2 - Worst Case

LCA Financial Planning Model Version 5

	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062
Operating Revenues											
Water	\$64,126,000	\$65,834,000	\$67,033,000	\$68,270,000	\$69,544,000	\$70,854,000	\$72,207,000	\$73,596,000	\$75,029,000	\$76,506,000	\$78,026,000
Wastewater	\$62,599,000	\$63,687,000	\$64,410,000	\$65,734,000	\$68,152,000	\$71,040,000	\$74,013,000	\$75,911,000	\$78,796,000	\$79,817,000	\$81,354,000
Total Operating Revenues	\$126,725,000	\$129,521,000	\$131,443,000	\$134,004,000	\$137,696,000	\$141,894,000	\$146,220,000	\$149,507,000	\$153,825,000	\$156,323,000	\$159,380,000
Operating Expenses											
Water	\$18,767,000	\$19,322,000	\$19,895,000	\$20,485,000	\$21,094,000	\$21,723,000	\$22,367,000	\$23,029,000	\$23,713,000	\$24,419,000	\$25,147,000
Wastewater	\$26,151,000	\$26,925,000	\$27,723,000	\$28,547,000	\$29,397,000	\$30,275,000	\$31,177,000	\$32,105,000	\$33,062,000	\$34,051,000	\$35,071,000
Total Operating Expenses	\$44,918,000	\$46,247,000	\$47,618,000	\$49,032,000	\$50,491,000	\$51,998,000	\$53,544,000	\$55,134,000	\$56,775,000	\$58,470,000	\$60,218,000
Operating Income (Loss)	\$81,807,000	\$83,274,000	\$83,825,000	\$84,972,000	\$87,205,000	\$89,896,000	\$92,676,000	\$94,373,000	\$97,050,000	\$97,853,000	\$99,162,000
Interest Income	\$1,338,000	\$1,986,000	\$2,642,000	\$3,118,000	\$3,475,000	\$3,922,000	\$4,392,000	\$4,886,000	\$5,596,000		
Net Available For Debt Service	\$83,145,000	\$85,260,000	\$86,467,000	\$88,090,000	\$90,680,000	\$93,818,000	\$97,068,000	\$99,259,000	\$102,646,000	\$97,853,000	\$99,162,000
Debt Service											
Existing	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Projected	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Debt Service	\$0										
Net After Debt Service	\$83,145,000	\$85,260,000	\$86,467,000	\$88,090,000	\$90,680,000	\$93,818,000	\$97,068,000	\$99,259,000	\$102,646,000	\$97,853,000	\$99,162,000
Non-Operating Revenues											
Reimbursement (AO and Non-AO) Exclude from Indenture											
Water	\$353,600	\$357,000	\$360,400	\$363,800	\$367,200	\$370,600	\$374,000	\$377,400	\$380,800	\$384,200	\$387,600
Wastewater	\$266,000	\$269,000	\$272,000	\$275,000	\$278,000	\$281,000	\$284,000	\$287,000	\$290,000	\$293,000	\$296,000
Total Non-Operating Revenues	\$619,600	\$626,000	\$632,400	\$638,800	\$645,200	\$651,600	\$658,000	\$664,400	\$670,800	\$677,200	\$683,600
Non-Operating Expenses											
Contribution to Operations and Maintenance Reserve Fu	\$449,595	\$462,658	\$477,526	\$493,164	\$509,067	\$526,233	\$539,141	\$553,859	\$572,337	\$592,025	\$611,420
Contribution to CAPEX Fund	\$2,948,245	\$4,466,591	\$4,511,257	\$4,556,370	\$4,601,933	\$4,647,953	\$4,694,432	\$4,741,377	\$4,788,790	\$4,836,678	\$4,885,045
Deposit to Annual Lease Payment Fund	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Lease Payment	\$715,900	\$723,100	\$730,400	\$737,800	\$745,200	\$752,700	\$760,300	\$768,000	\$775,700	\$783,500	\$791,400
Total Non-Operating Expenses	\$4,113,740	\$5,652,349	\$5,719,183	\$5,787,334	\$5,856,201	\$5,926,885	\$5,993,873	\$6,063,236	\$6,136,827	\$6,212,203	\$6,287,865
Available for Capital	\$79,650,860	\$80,233,651	\$81,380,217	\$82,941,466	\$85,468,999	\$88,542,715	\$91,732,127	\$93,860,164	\$97,179,973	\$92,317,997	\$93,557,735
Equity Funded CAPEX											
Reimbursable Costs (AO and Non-AO) Project LCA compl											
PayGo	\$15,307,755	\$15,010,000	\$15,472,000	\$53,458,000	\$43,703,000	\$40,837,000	\$45,550,000	\$41,207,000	\$7,840,000	\$8,077,000	\$65,962,000
Reserved 1											
Total Capex	\$15,307,755	\$15,010,000	\$15,472,000	\$53,458,000	\$43,703,000	\$40,837,000	\$45,550,000	\$41,207,000	\$7,840,000	\$8,077,000	\$65,962,000
Net Fund Surplus (deficit)	\$64,343,105	\$65,223,651	\$65,908,217	\$29,483,466	\$41,765,999	\$47,705,715	\$46,182,127	\$52,653,164	\$89,339,973	\$84,240,997	\$27,595,735
Beginning Balance	\$101,629,955	\$165,973,060	\$231,196,711	\$297,104,928	\$326,588,394	\$368,354,394	\$416,060,108	\$462,242,235	\$514,895,400	\$604,235,372	\$688,476,370
Ending Balance	\$165,973,060	\$231,196,711	\$297,104,928	\$326,588,394	\$368,354,394	\$416,060,108	\$462,242,235	\$514,895,400	\$604,235,372	\$688,476,370	\$716,072,105
Financial Metrics											
Debt Service Coverage Ratio											
Debt Service Coverage Ratio (Indenture)											
Days Cash on Hand (target 90 days, un-restricted)	1,389	1,879	2,345	2,503	2,742	3,008	3,245	3,510	4,000	4,426	4,470
Days Cash on Hand (180 days, restricted O&M Fund)	198	198	198	198	198	198	198	198	198	198	198
Residential Water and Wastewater Bill as % of MHI	5.00%	5.06%	5.13%	5.24%	5.36%	5.44%	5.54%	5.61%	5.70%	5.74%	5.79%
Outstanding Debt to NPV of Net Revenues	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Operating Ratio	0.35	0.35	0.36	0.36	0.36	0.36	0.36	0.36	0.36	0.37	0.38
Debt to Operating Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Percent Equity Funded CIP	89%	65%	65%	86%	83%	82%	83%	81%	44%	44%	86%

Lehigh County Authority
Review of Allentown Water/Sewer Lease Concession Financial Condi

Global Inputs and Assumptions
 LCA Financial Planning Model Version 5

Scenario (enter short title) Scenario 3

Rate Schedule

Meter Sizes 1" and less
 Fixed Charge Monthly No
 Fixed Charge Quarterly Yes

Start Year of Monthly Billing for 1" and less meters

Penalties (non-payment, AR recovery, etc.) 2%

New Additional Operating Revenues (not including existing Fixed/Volume Ch

Water
 Amount
 Start Year
 Annual Increase

Wastewater
 Amount
 Start Year
 Annual Increase

New Additional Non-Operating Revenues (allocation fees, inspection/review

Water
 Amount
 Start Year
 Annual Increase

Wastewater
 Amount
 Start Year
 Annual Increase

Growth

Connections (meters)
 1" and less 0.00%
 Greater than 1" 0.00%

Consumption
 Residential 0.00%
 Commercial 0.00%
 Industrial 0.00%
 Institutional 0.00%

Interest on Investments 1.00%
Discount Rate 3.00%

Inflation

CAPEX 3.00%
Annual Lease Payment 1.00%

OPEX

Personnel 3.50%
 Purchase Of Services 2.00%
 Materials And Supplies 2.00%
 Equipment 2.00%

Capital Recovery Fees

PayGo ROE Rate 8.30%
Bond Interest Rate 6.60%
Term 30

Signatory

PayGo CAPEX Trigger Amount \$1,000,000
 PayGo Amortization Rate 6.60%
 Term 30

Lehigh County Authority
Review of Allentown Water/Sewer Lease Concession Financial Condi

Global Inputs and Assumptions
 LCA Financial Planning Model Version 5

Scenario (enter short title)	Scenario 3
Debt Service	
Interest Rate	6.60%
Term (2018 to 2032)	30
Term (2033 to 2037)	25
Term (2038 to 2042)	20
COI (% of bond issue)	1.00%
Reserve (% of bond issue)	3.00%

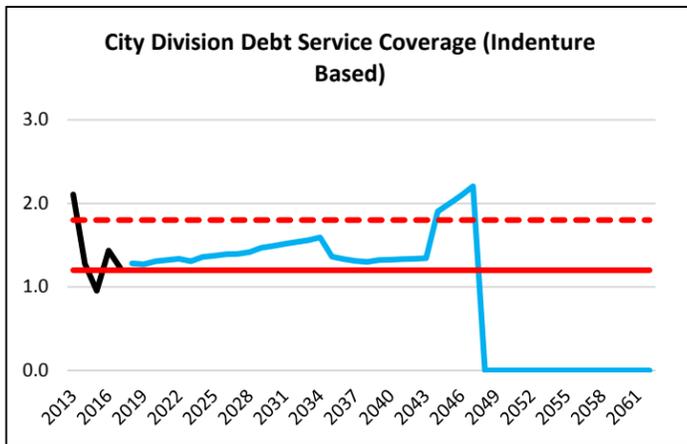
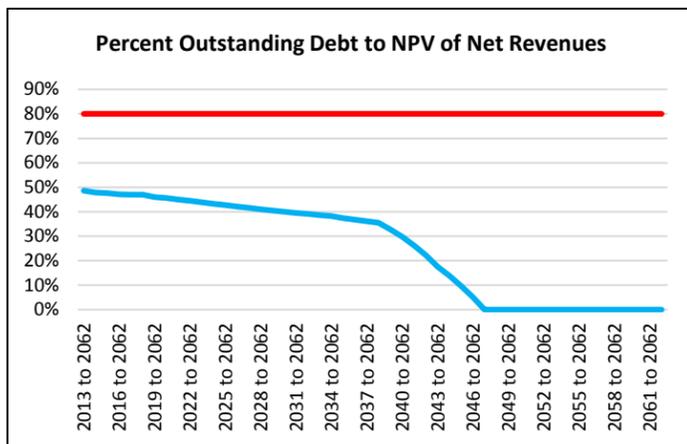
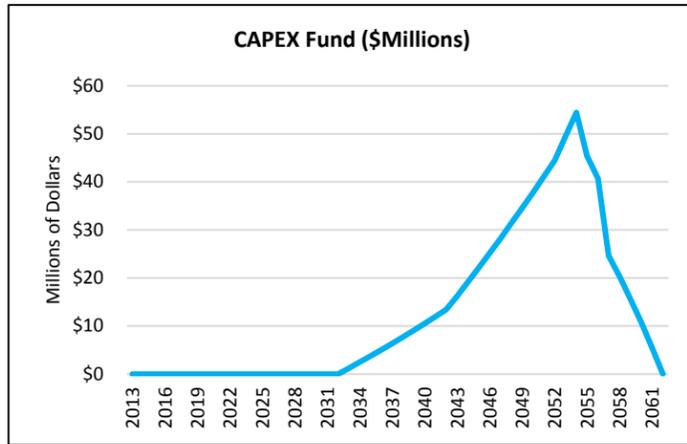
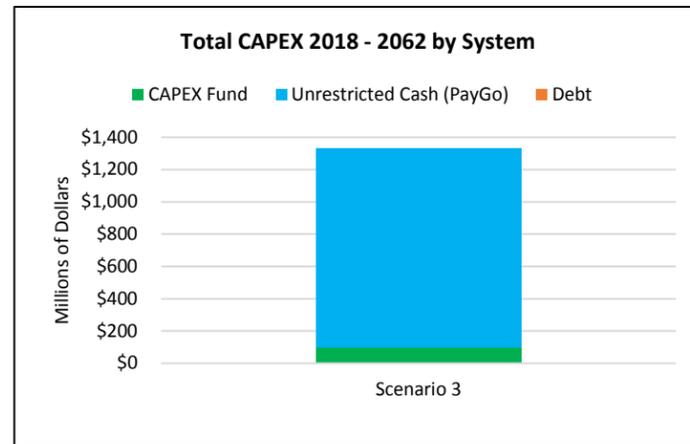
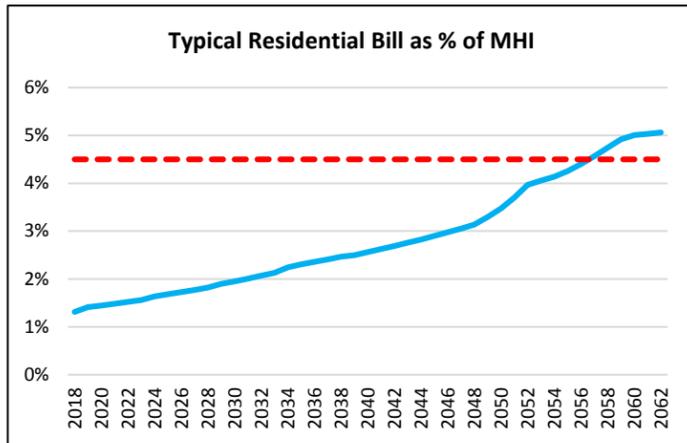
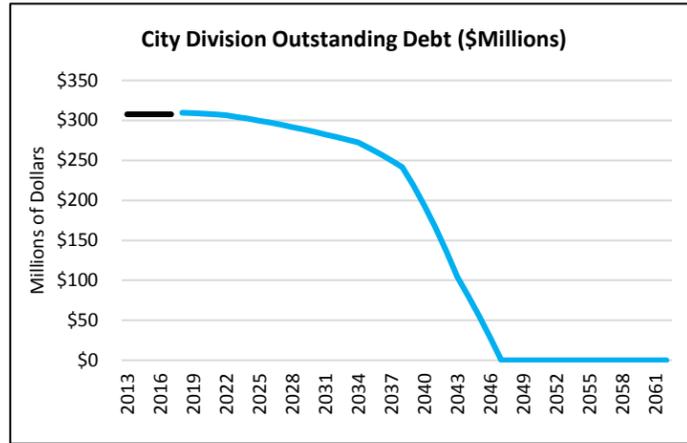
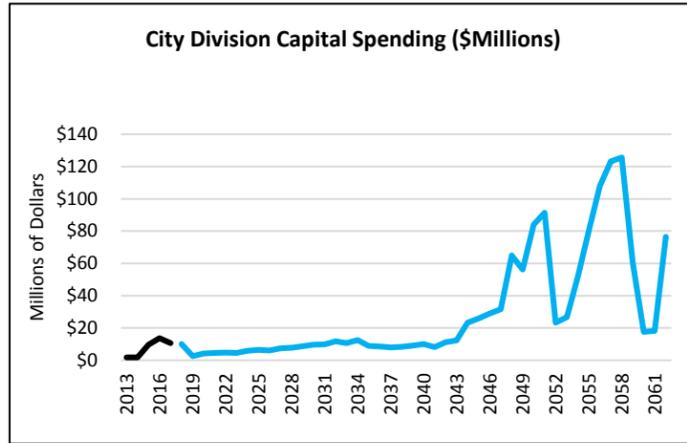
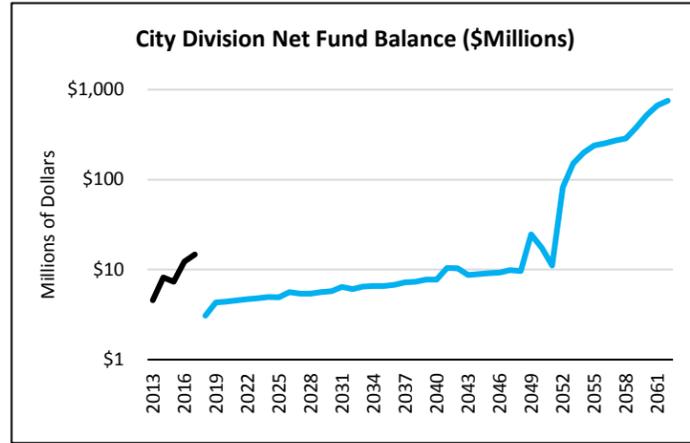
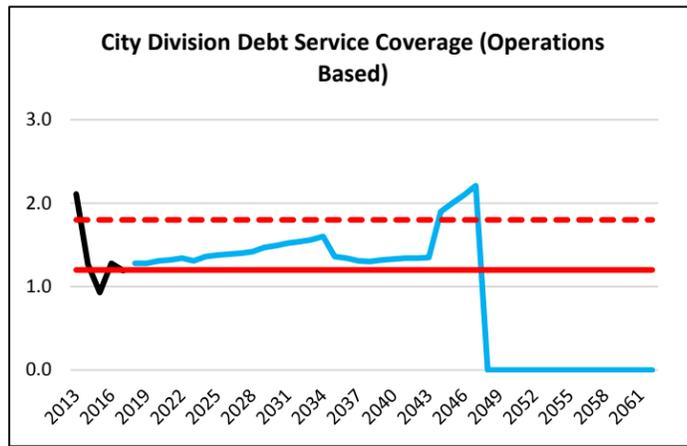
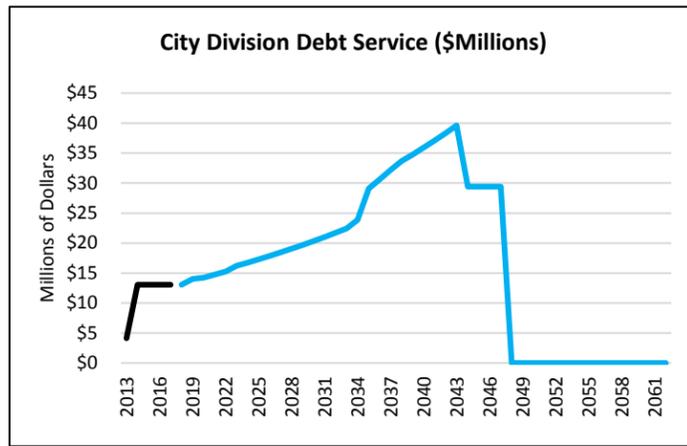
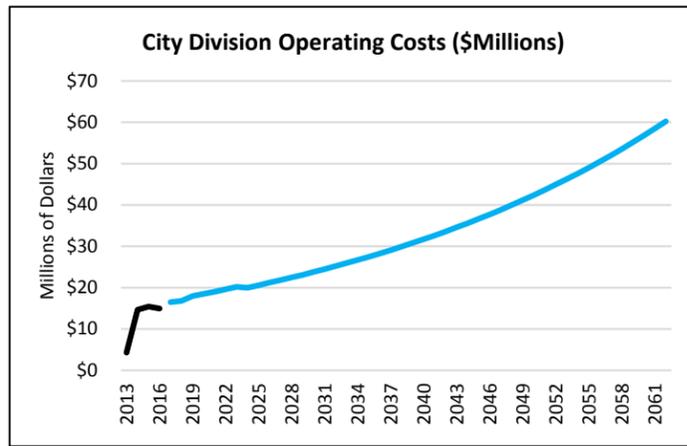
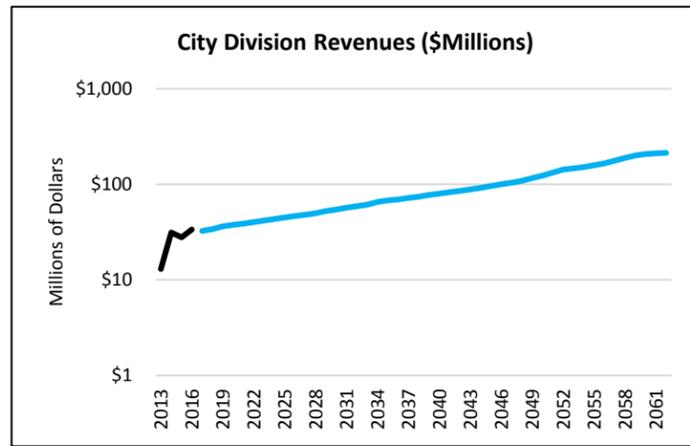
OPEX Adjustments	
Water Filtration Plant	
Short Term (1 to 5 years)	3.82%
Mid Term (6 to 15 years)	
Long Term (16+ years)	
Water Distribution System	
Short Term (1 to 5 years)	3.82%
Mid Term (6 to 15 years)	
Long Term (16+ years)	
Kline Island Wastewater Treatment Plant	
Short Term (1 to 5 years)	3.82%
Mid Term (6 to 15 years)	
Long Term (16+ years)	
Wastewater Collection System	
Short Term (1 to 5 years)	3.82%
Mid Term (6 to 15 years)	
Long Term (16+ years)	

OPEX Share of Support Services	
Kline Island Wastewater Treatment Plant	67.00%
Water Filtration Plant	33.00%
Total	100.00%

CAPEX Additions Not Included in Planned CIP	
Water	
Unidentified CIP every year	
Start Year	
Unidentified CIP every 5 years	
Start Year	
Unidentified CIP every 10 years	
Start Year	
Wastewater	
Unidentified CIP every year	
Start Year	
Unidentified CIP every 5 years	
Start Year	
Unidentified CIP every 10 years	
Start Year	

Global Assumptions	
Covert Daily to Quarterly Rate	
Covert Daily to Monthly Rate	
Typical residential monthly consumption (gallons)	LCA. 2017. "Water Volume by (
Median Household Income (MHI)	US Census. 2016. "S1901 INCOI
CPI - U annual increase (percent)	T=historical CPI trend, 1%, 1.5%

	Required
Debt Service Coverage Ratio (Operations)	1.20
Debt Service Coverage Ratio (Indenture)	1.20
Days Cash on Hand	180
Residential Water and Wastewater Bill as % of MHI	
Debt to Operating Ratio	
Operating Ratio	
Percent Equity Funded CIP	



Legend

— Historical — Scenario 3 — Required - - - Target

Lehigh County Authority
Review of Allentown Water/Sewer Lease Concession Financial Condition Assessment
City Division Pro forma - Scenario 3
LCA Financial Planning Model Version 5

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Operating Revenues																			
Water	\$6,748,381	\$16,507,523	\$16,725,712	\$16,987,167	\$17,364,832	\$17,771,000	\$20,233,000	\$20,841,000	\$21,621,000	\$22,443,000	\$23,226,000	\$23,876,000	\$24,766,000	\$25,723,000	\$26,585,000	\$27,510,000	\$28,411,000	\$29,484,000	\$30,562,000
Wastewater	\$6,244,922	\$14,771,776	\$10,794,690	\$14,686,290	\$14,666,662	\$15,731,734	\$15,559,000	\$16,278,000	\$16,874,000	\$17,487,000	\$18,122,000	\$18,859,000	\$19,586,000	\$20,321,000	\$21,009,000	\$21,952,000	\$23,646,000	\$24,658,000	\$25,784,000
Total Operating Revenues	\$12,993,303	\$31,279,299	\$27,520,402	\$31,673,457	\$32,031,494	\$33,502,734	\$35,792,000	\$37,119,000	\$38,495,000	\$39,930,000	\$41,348,000	\$42,735,000	\$44,352,000	\$46,044,000	\$47,594,000	\$49,462,000	\$52,057,000	\$54,142,000	\$56,346,000
Operating Expenses																			
Water	\$2,260,972	\$7,007,850	\$6,773,471	\$6,226,015	\$6,548,687	\$6,970,098	\$7,461,000	\$7,682,000	\$7,911,000	\$8,149,000	\$8,395,000	\$8,330,000	\$8,577,000	\$8,834,000	\$9,097,000	\$9,363,000	\$9,639,000	\$9,924,000	\$10,216,000
Wastewater	\$2,028,198	\$7,638,389	\$8,646,549	\$8,751,484	\$9,947,544	\$9,831,891	\$10,493,000	\$10,801,000	\$11,117,000	\$11,440,000	\$11,775,000	\$11,672,000	\$12,014,000	\$12,363,000	\$12,721,000	\$13,092,000	\$13,472,000	\$13,864,000	\$14,268,000
Total Operating Expenses	\$4,289,170	\$14,646,239	\$15,420,020	\$14,977,499	\$16,496,231	\$16,801,989	\$17,954,000	\$18,483,000	\$19,028,000	\$19,589,000	\$20,170,000	\$20,002,000	\$20,591,000	\$21,197,000	\$21,818,000	\$22,455,000	\$23,111,000	\$23,788,000	\$24,484,000
Operating Income (Loss)	\$8,704,133	\$16,633,060	\$12,100,382	\$16,695,958	\$15,535,263	\$16,700,745	\$17,838,000	\$18,636,000	\$19,467,000	\$20,341,000	\$21,178,000	\$22,733,000	\$23,761,000	\$24,847,000	\$25,776,000	\$27,007,000	\$28,946,000	\$30,354,000	\$31,862,000
Interest Income						\$63,000	\$37,000	\$44,000	\$45,000	\$46,000	\$48,000	\$49,000	\$50,000	\$53,000	\$55,000	\$54,000	\$55,000	\$57,000	\$61,000
Net Available For Debt Service	\$8,704,133	\$16,633,060	\$12,100,382	\$16,695,958	\$15,535,263	\$16,763,745	\$17,875,000	\$18,680,000	\$19,512,000	\$20,387,000	\$21,226,000	\$22,782,000	\$23,811,000	\$24,900,000	\$25,831,000	\$27,061,000	\$29,001,000	\$30,411,000	\$31,923,000
Debt Service																			
Existing	\$4,131,779	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$14,008,453	\$14,248,613	\$14,728,614	\$15,228,613	\$16,208,614	\$16,742,688	\$17,290,863	\$17,863,139	\$18,454,288	\$19,064,313	\$19,698,213	\$20,345,989	\$21,027,638
Projected	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Debt Service	\$4,131,779	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$14,008,453	\$14,248,613	\$14,728,614	\$15,228,613	\$16,208,614	\$16,742,688	\$17,290,863	\$17,863,139	\$18,454,288	\$19,064,313	\$19,698,213	\$20,345,989	\$21,027,638
Net After Debt Service	\$4,572,354	\$3,585,338	(\$947,340)	\$3,648,236	\$2,487,541	\$3,716,024	\$3,866,547	\$4,431,388	\$4,783,387	\$5,158,388	\$5,017,387	\$6,039,313	\$6,520,138	\$7,036,862	\$7,376,713	\$7,996,688	\$9,302,788	\$10,065,012	\$10,895,363
Non-Operating Revenues																			
Reimbursement (AO and Non-AO) Exclude from Indenture Ratio																			
Water	\$0	\$0	\$226,040	\$1,325,289	\$240,146	\$259,000	\$261,400	\$263,800	\$266,200	\$268,600	\$271,000	\$273,400	\$275,800	\$278,200	\$280,600	\$283,000	\$285,400	\$287,800	\$290,200
Wastewater	\$0	\$26,429	\$115,292	\$708,649	\$252,750	\$193,000	\$195,000	\$197,000	\$199,000	\$201,000	\$203,000	\$205,000	\$207,000	\$209,000	\$211,000	\$213,000	\$215,000	\$217,000	\$219,000
Total Non-Operating Revenues	\$0	\$26,429	\$341,332	\$2,033,938	\$492,896	\$452,000	\$456,400	\$460,800	\$465,200	\$469,600	\$474,000	\$478,400	\$482,800	\$487,200	\$491,600	\$496,000	\$500,400	\$504,800	\$509,200
Non-Operating Expenses																			
Contribution to Operations and Maintenance Reserve Fund		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$119,939	\$195,024	\$201,668	\$0	\$28,562	\$210,991	\$214,849	\$220,033	\$226,624	\$234,109	\$240,478
Contribution to CAPEX Fund	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Deposit to Annual Lease Payment Fund			\$250,000	\$250,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Lease Payment			\$500,000	\$500,000	\$504,000	\$509,100	\$514,200	\$519,400	\$524,600	\$529,900	\$535,200	\$540,600	\$546,100	\$551,600	\$557,200	\$562,800	\$568,500	\$574,200	\$580,000
Total Non-Operating Expenses	\$0	\$0	\$250,000	\$750,000	\$504,000	\$509,100	\$514,200	\$519,400	\$644,539	\$724,924	\$736,868	\$540,600	\$574,662	\$762,591	\$772,049	\$782,833	\$795,124	\$808,309	\$820,478
Available for Capital	\$4,572,354	\$3,611,767	(\$856,008)	\$4,932,174	\$2,476,437	\$3,658,924	\$3,808,747	\$4,372,788	\$4,604,047	\$4,903,063	\$4,754,518	\$5,977,113	\$6,428,275	\$6,761,471	\$7,096,264	\$7,709,855	\$9,008,063	\$9,761,503	\$10,584,085
Equity Funded CAPEX																			
Reimbursable Costs (AO and Non-AO) Project LCA completes and gets reimbursed																			
PayGo	\$0	\$0	\$0	\$0	\$0	\$10,070,000	\$2,577,000	\$4,255,207	\$4,473,605	\$4,768,694	\$4,616,170	\$5,833,862	\$6,469,702	\$6,051,960	\$7,334,340	\$7,700,280	\$8,798,070	\$9,609,840	\$9,930,000
Reserved 1																			
Total Capex	\$0	\$0	\$0	\$0	\$0	\$10,070,000	\$2,577,000	\$4,255,207	\$4,473,605	\$4,768,694	\$4,616,170	\$5,833,862	\$6,469,702	\$6,051,960	\$7,334,340	\$7,700,280	\$8,798,070	\$9,609,840	\$9,930,000
Net Fund Surplus (deficit)	\$4,572,354	\$3,611,767	(\$856,008)	\$4,932,174	\$2,476,437	(\$6,411,076)	\$1,231,747	\$117,580	\$130,443	\$134,369	\$138,348	\$143,251	(\$41,427)	\$709,511	(\$238,076)	\$9,575	\$209,993	\$151,663	\$654,085
Beginning Balance	\$0	\$4,572,354	\$8,184,121	\$7,328,113	\$12,260,287	\$9,488,776	\$3,077,700	\$4,309,446	\$4,427,027	\$4,557,469	\$4,691,838	\$4,830,186	\$4,973,437	\$4,932,010	\$5,641,521	\$5,403,445	\$5,413,020	\$5,623,013	\$5,774,676
Ending Balance	\$4,572,354	\$8,184,121	\$7,328,113	\$12,260,287	\$14,736,724	\$3,077,700	\$4,309,446	\$4,427,027	\$4,557,469	\$4,691,838	\$4,830,186	\$4,973,437	\$4,932,010	\$5,641,521	\$5,403,445	\$5,413,020	\$5,623,013	\$5,774,676	\$6,428,761
Financial Metrics																			
Debt Service Coverage Ratio	2.11	1.27	0.93	1.28	1.19	1.28	1.28	1.31	1.32	1.34	1.31	1.36	1.38	1.39	1.40	1.42	1.47	1.49	1.52
Debt Service Coverage Ratio (Indenture)	2.11	1.28	0.93	1.38	1.19	1.28	1.27	1.31	1.32	1.33	1.31	1.36	1.37	1.39	1.40	1.42	1.47	1.49	1.51
Days Cash on Hand (target 90 days, un-restricted)						67	94	90	90	90	90	90	90	100	93	91	91	91	99
Days Cash on Hand (180 days, restricted O&M Fund)						212	210	199	197	197	197	194	198	198	198	198	198	198	198
Residential Water and Wastewater Bill as % of MHI						1.31%	1.86%	1.94%	2.03%	2.11%	2.19%	2.32%	2.38%	2.46%	2.57%	2.67%	2.83%	2.90%	2.98%
Outstanding Debt to NPV of Net Revenues	49%	48%	48%	47%	47%	47%	46%	46%	45%	44%	44%	43%	43%	42%	42%	41%	40%	40%	39%
Operating Ratio						0.50	0.50	0.50	0.49	0.49	0.49	0.47	0.46	0.46	0.46	0.45	0.44	0.44	0.43
Debt to Operating Ratio						0.78	0.79	0.76	0.76	0.75	0.77	0.74	0.73	0.72	0.72	0.71	0.68	0.67	0.66
Percent Equity Funded CIP						100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Lehigh County Authority
Review of Allentown Water/Sewer Lease Co
City Division Pro forma - Scenario 3
LCA Financial Planning Model Version 5

	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Operating Revenues																		
Water	\$31,942,000	\$33,325,000	\$34,252,000	\$35,939,000	\$37,205,000	\$38,695,000	\$39,904,000	\$41,051,000	\$42,890,000	\$44,842,000	\$46,645,000	\$48,776,000	\$50,453,000	\$52,072,000	\$53,639,000	\$55,108,000	\$57,122,000	\$60,132,000
Wastewater	\$26,674,000	\$27,588,000	\$30,451,000	\$31,186,000	\$31,894,000	\$32,548,000	\$33,769,000	\$35,695,000	\$36,490,000	\$37,310,000	\$38,151,000	\$39,022,000	\$41,047,000	\$43,296,000	\$45,736,000	\$48,532,000	\$50,773,000	\$55,336,000
Total Operating Revenues	\$58,616,000	\$60,913,000	\$64,703,000	\$67,125,000	\$69,099,000	\$71,243,000	\$73,673,000	\$76,746,000	\$79,380,000	\$82,152,000	\$84,796,000	\$87,798,000	\$91,500,000	\$95,368,000	\$99,375,000	\$103,640,000	\$107,895,000	\$115,468,000
Operating Expenses																		
Water	\$10,514,000	\$10,821,000	\$11,138,000	\$11,462,000	\$11,796,000	\$12,139,000	\$12,493,000	\$12,859,000	\$13,237,000	\$13,625,000	\$14,025,000	\$14,439,000	\$14,863,000	\$15,302,000	\$15,753,000	\$16,221,000	\$16,701,000	\$17,194,000
Wastewater	\$14,682,000	\$15,109,000	\$15,549,000	\$16,000,000	\$16,465,000	\$16,946,000	\$17,438,000	\$17,946,000	\$18,469,000	\$19,010,000	\$19,567,000	\$20,142,000	\$20,733,000	\$21,341,000	\$21,969,000	\$22,616,000	\$23,280,000	\$23,965,000
Total Operating Expenses	\$25,196,000	\$25,930,000	\$26,687,000	\$27,462,000	\$28,261,000	\$29,085,000	\$29,931,000	\$30,805,000	\$31,706,000	\$32,635,000	\$33,592,000	\$34,581,000	\$35,596,000	\$36,643,000	\$37,722,000	\$38,837,000	\$39,981,000	\$41,159,000
Operating Income (Loss)	\$33,420,000	\$34,983,000	\$38,016,000	\$39,663,000	\$40,838,000	\$42,158,000	\$43,742,000	\$45,941,000	\$47,674,000	\$49,517,000	\$51,204,000	\$53,217,000	\$55,904,000	\$58,725,000	\$61,653,000	\$64,803,000	\$67,914,000	\$74,309,000
Interest Income	\$63,000	\$63,000	\$65,000	\$66,000	\$67,000	\$70,000	\$73,000	\$75,000	\$78,000	\$91,000	\$104,000	\$95,000	\$88,000	\$90,000	\$92,000	\$96,000	\$98,000	\$171,000
Net Available For Debt Service	\$33,483,000	\$35,046,000	\$38,081,000	\$39,729,000	\$40,905,000	\$42,228,000	\$43,815,000	\$46,016,000	\$47,752,000	\$49,608,000	\$51,308,000	\$53,312,000	\$55,992,000	\$58,815,000	\$61,745,000	\$64,899,000	\$68,012,000	\$74,480,000
Debt Service																		
Existing	\$21,727,938	\$22,446,889	\$23,844,488	\$29,105,513	\$30,628,188	\$32,193,038	\$33,687,088	\$34,771,063	\$35,919,513	\$37,109,413	\$38,343,038	\$39,617,138	\$29,393,238	\$29,390,681	\$29,390,656	\$29,389,863	\$0	\$0
Projected	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Debt Service	\$21,727,938	\$22,446,889	\$23,844,488	\$29,105,513	\$30,628,188	\$32,193,038	\$33,687,088	\$34,771,063	\$35,919,513	\$37,109,413	\$38,343,038	\$39,617,138	\$29,393,238	\$29,390,681	\$29,390,656	\$29,389,863	\$0	\$0
Net After Debt Service	\$11,755,063	\$12,599,112	\$14,236,513	\$10,623,488	\$10,276,813	\$10,034,963	\$10,127,913	\$11,244,938	\$11,832,488	\$12,498,588	\$12,964,963	\$13,694,863	\$26,598,763	\$29,424,319	\$32,354,344	\$35,509,138	\$68,012,000	\$74,480,000
Non-Operating Revenues																		
Reimbursement (AO and Non-AO) Exclude from Indenture																		
Water	\$292,600	\$295,000	\$297,400	\$299,800	\$302,200	\$304,600	\$307,000	\$309,400	\$312,800	\$316,200	\$319,600	\$323,000	\$326,400	\$329,800	\$333,200	\$336,600	\$340,000	\$343,400
Wastewater	\$221,000	\$223,000	\$225,000	\$227,000	\$229,000	\$231,000	\$233,000	\$235,000	\$237,000	\$239,000	\$241,000	\$243,000	\$245,000	\$247,000	\$249,000	\$251,000	\$254,000	\$257,000
Total Non-Operating Revenues	\$513,600	\$518,000	\$522,400	\$526,800	\$531,200	\$535,600	\$540,000	\$544,400	\$549,800	\$555,200	\$560,600	\$566,000	\$571,400	\$576,800	\$582,200	\$587,600	\$594,000	\$600,400
Non-Operating Expenses																		
Contribution to Operations and Maintenance Reserve Fu	\$245,252	\$252,949	\$261,015	\$266,959	\$275,313	\$284,030	\$291,614	\$301,583	\$311,394	\$321,560	\$331,074	\$342,945	\$351,634	\$363,198	\$374,576	\$387,785	\$397,293	\$409,164
Contribution to CAPEX Fund	\$0	\$1,220,190	\$1,232,392	\$1,244,716	\$1,257,163	\$1,269,735	\$1,282,432	\$1,295,256	\$1,308,209	\$1,321,291	\$1,334,504	\$2,695,698	\$2,722,655	\$2,749,881	\$2,777,380	\$2,805,154	\$2,833,206	\$2,861,538
Deposit to Annual Lease Payment Fund	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Lease Payment	\$585,800	\$591,700	\$597,700	\$603,700	\$609,800	\$615,900	\$622,100	\$628,400	\$634,700	\$641,100	\$647,600	\$654,100	\$660,700	\$667,400	\$674,100	\$680,900	\$687,800	\$694,700
Total Non-Operating Expenses	\$831,052	\$2,064,839	\$2,091,107	\$2,115,375	\$2,142,276	\$2,169,664	\$2,196,146	\$2,225,239	\$2,254,303	\$2,283,951	\$2,313,178	\$3,692,743	\$3,734,989	\$3,780,479	\$3,826,056	\$3,873,839	\$3,918,299	\$3,965,402
Available for Capital	\$11,437,611	\$11,052,273	\$12,667,805	\$9,034,913	\$8,665,736	\$8,400,898	\$8,471,767	\$9,564,098	\$10,127,985	\$10,769,836	\$11,212,385	\$10,568,119	\$23,435,174	\$26,220,640	\$29,110,487	\$32,222,899	\$64,687,701	\$71,114,998
Equity Funded CAPEX																		
Reimbursable Costs (AO and Non-AO) Project LCA compl																		
PayGo	\$11,785,600	\$10,671,570	\$12,571,550	\$9,004,000	\$8,465,850	\$7,977,320	\$8,341,170	\$9,174,000	\$10,086,750	\$8,112,000	\$11,280,000	\$12,242,450	\$23,230,840	\$26,000,280	\$28,924,560	\$31,614,960	\$64,942,960	\$56,181,000
Reserved 1																		
Total Capex	\$11,785,600	\$10,671,570	\$12,571,550	\$9,004,000	\$8,465,850	\$7,977,320	\$8,341,170	\$9,174,000	\$10,086,750	\$8,112,000	\$11,280,000	\$12,242,450	\$23,230,840	\$26,000,280	\$28,924,560	\$31,614,960	\$64,942,960	\$56,181,000
Net Fund Surplus (deficit)	(\$347,989)	\$380,703	\$96,255	\$30,913	\$199,886	\$423,578	\$130,597	\$390,098	\$41,235	\$2,657,836	(\$67,615)	(\$1,674,331)	\$204,334	\$220,360	\$185,927	\$607,939	(\$255,259)	\$14,933,998
Beginning Balance	\$6,428,761	\$6,080,771	\$6,461,474	\$6,557,730	\$6,588,642	\$6,788,528	\$7,212,106	\$7,342,703	\$7,732,802	\$7,774,036	\$10,431,873	\$10,364,258	\$8,689,927	\$8,894,261	\$9,114,621	\$9,300,548	\$9,908,487	\$9,653,228
Ending Balance	\$6,080,771	\$6,461,474	\$6,557,730	\$6,588,642	\$6,788,528	\$7,212,106	\$7,342,703	\$7,732,802	\$7,774,036	\$10,431,873	\$10,364,258	\$8,689,927	\$8,894,261	\$9,114,621	\$9,300,548	\$9,908,487	\$9,653,228	\$24,587,226
Financial Metrics																		
Debt Service Coverage Ratio	1.54	1.56	1.60	1.36	1.34	1.31	1.30	1.32	1.33	1.34	1.34	1.35	1.90	2.00	2.10	2.21		
Debt Service Coverage Ratio (Indenture)	1.54	1.56	1.59	1.36	1.33	1.31	1.30	1.32	1.33	1.33	1.34	1.34	1.90	2.00	2.10	2.21		
Days Cash on Hand (target 90 days, un-restricted)	91	94	92	90	90	93	92	94	92	120	116	94	94	93	93	96	91	224
Days Cash on Hand (180 days, restricted O&M Fund)	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
Residential Water and Wastewater Bill as % of MHI	3.05%	3.12%	3.37%	3.45%	3.54%	3.60%	3.68%	3.79%	3.87%	3.96%	4.02%	4.10%	4.22%	4.38%	4.55%	4.69%	4.78%	4.90%
Outstanding Debt to NPV of Net Revenues	39%	39%	38%	37%	37%	36%	35%	33%	30%	26%	22%	18%	14%	10%	5%	0%	0%	0%
Operating Ratio	0.43	0.43	0.41	0.41	0.41	0.41	0.41	0.40	0.40	0.40	0.40	0.39	0.39	0.38	0.38	0.37	0.37	0.36
Debt to Operating Ratio	0.65	0.64	0.63	0.73	0.75	0.76	0.77	0.76	0.75	0.75	0.75	0.74	0.53	0.50	0.48	0.45	0.00	0.00
Percent Equity Funded CIP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Lehigh County Authority
Review of Allentown Water/Sewer Lease Co
City Division Pro forma - Scenario 3
LCA Financial Planning Model Version 5

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062
Operating Revenues													
Water	\$66,093,000	\$72,350,000	\$81,409,000	\$84,334,000	\$86,989,000	\$89,494,000	\$92,789,000	\$94,345,000	\$95,916,000	\$97,584,000	\$99,165,000	\$100,822,000	\$102,263,000
Wastewater	\$56,372,000	\$59,614,000	\$60,729,000	\$61,899,000	\$63,650,000	\$67,905,000	\$72,520,000	\$81,704,000	\$91,681,000	\$102,525,000	\$107,761,000	\$108,929,000	\$110,401,000
Total Operating Revenues	\$122,465,000	\$131,964,000	\$142,138,000	\$146,233,000	\$150,639,000	\$157,399,000	\$165,309,000	\$176,049,000	\$187,597,000	\$200,109,000	\$206,926,000	\$209,751,000	\$212,664,000
Operating Expenses													
Water	\$17,703,000	\$18,227,000	\$18,767,000	\$19,322,000	\$19,895,000	\$20,485,000	\$21,094,000	\$21,723,000	\$22,367,000	\$23,029,000	\$23,713,000	\$24,419,000	\$25,147,000
Wastewater	\$24,672,000	\$25,400,000	\$26,151,000	\$26,925,000	\$27,723,000	\$28,547,000	\$29,397,000	\$30,275,000	\$31,177,000	\$32,105,000	\$33,062,000	\$34,051,000	\$35,071,000
Total Operating Expenses	\$42,375,000	\$43,627,000	\$44,918,000	\$46,247,000	\$47,618,000	\$49,032,000	\$50,491,000	\$51,998,000	\$53,544,000	\$55,134,000	\$56,775,000	\$58,470,000	\$60,218,000
Operating Income (Loss)	\$80,090,000	\$88,337,000	\$97,220,000	\$99,986,000	\$103,021,000	\$108,367,000	\$114,818,000	\$124,051,000	\$134,053,000	\$144,975,000	\$150,151,000	\$151,281,000	\$152,446,000
Interest Income	\$211,000	\$143,000	\$466,000	\$1,167,000	\$1,754,000	\$2,190,000	\$2,457,000	\$2,623,000	\$2,795,000	\$3,331,000	\$4,498,000	\$5,922,000	\$7,080,000
Net Available For Debt Service	\$80,301,000	\$88,480,000	\$97,686,000	\$101,153,000	\$104,775,000	\$110,557,000	\$117,275,000	\$126,674,000	\$136,848,000	\$148,306,000	\$154,649,000	\$157,203,000	\$159,526,000
Debt Service													
Existing	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Projected	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Debt Service	\$0												
Net After Debt Service	\$80,301,000	\$88,480,000	\$97,686,000	\$101,153,000	\$104,775,000	\$110,557,000	\$117,275,000	\$126,674,000	\$136,848,000	\$148,306,000	\$154,649,000	\$157,203,000	\$159,526,000
Non-Operating Revenues													
Reimbursement (AO and Non-AO) Exclude from Indenture													
Water	\$346,800	\$350,200	\$353,600	\$357,000	\$360,400	\$363,800	\$367,200	\$370,600	\$374,000	\$377,400	\$380,800	\$384,200	\$387,600
Wastewater	\$260,000	\$263,000	\$266,000	\$269,000	\$272,000	\$275,000	\$278,000	\$281,000	\$284,000	\$287,000	\$290,000	\$293,000	\$296,000
Total Non-Operating Revenues	\$606,800	\$613,200	\$619,600	\$626,000	\$632,400	\$638,800	\$645,200	\$651,600	\$658,000	\$664,400	\$670,800	\$677,200	\$683,600
Non-Operating Expenses													
Contribution to Operations and Maintenance Reserve Fu	\$422,843	\$435,311	\$449,595	\$462,658	\$477,526	\$493,164	\$509,067	\$526,233	\$539,141	\$553,859	\$572,337	\$592,025	\$611,420
Contribution to CAPEX Fund	\$2,890,153	\$2,919,054	\$2,948,245	\$4,466,591	\$4,511,257	\$4,556,370	\$4,601,933	\$4,647,953	\$4,694,432	\$4,741,377	\$4,788,790	\$4,836,678	\$4,885,045
Deposit to Annual Lease Payment Fund	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Lease Payment	\$701,700	\$708,800	\$715,900	\$723,100	\$730,400	\$737,800	\$745,200	\$752,700	\$760,300	\$768,000	\$775,700	\$783,500	\$791,400
Total Non-Operating Expenses	\$4,014,696	\$4,063,166	\$4,113,740	\$5,652,349	\$5,719,183	\$5,787,334	\$5,856,201	\$5,926,885	\$5,993,873	\$6,063,236	\$6,136,827	\$6,212,203	\$6,287,865
Available for Capital	\$76,893,104	\$85,030,034	\$94,191,860	\$96,126,651	\$99,688,217	\$105,408,466	\$112,063,999	\$121,398,715	\$131,512,127	\$142,907,164	\$149,182,973	\$151,667,997	\$153,921,735
Equity Funded CAPEX													
Reimbursable Costs (AO and Non-AO) Project LCA compl													
PayGo	\$83,953,000	\$91,462,500	\$23,280,014	\$26,668,000	\$51,825,000	\$66,055,239	\$98,049,000	\$102,177,000	\$116,335,000	\$50,917,897	\$7,840,000	\$8,077,000	\$65,962,000
Reserved 1													
Total Capex	\$83,953,000	\$91,462,500	\$23,280,014	\$26,668,000	\$51,825,000	\$66,055,239	\$98,049,000	\$102,177,000	\$116,335,000	\$50,917,897	\$7,840,000	\$8,077,000	\$65,962,000
Net Fund Surplus (deficit)	(\$7,059,896)	(\$6,432,466)	\$70,911,847	\$69,458,651	\$47,863,217	\$39,353,227	\$14,014,999	\$19,221,715	\$15,177,127	\$91,989,268	\$141,342,973	\$143,590,997	\$87,959,735
Beginning Balance	\$24,587,226	\$17,527,331	\$11,094,865	\$82,006,712	\$151,465,363	\$199,328,580	\$238,681,807	\$252,696,806	\$271,918,521	\$287,095,648	\$379,084,916	\$520,427,888	\$664,018,886
Ending Balance	\$17,527,331	\$11,094,865	\$82,006,712	\$151,465,363	\$199,328,580	\$238,681,807	\$252,696,806	\$271,918,521	\$287,095,648	\$379,084,916	\$520,427,888	\$664,018,886	\$751,978,621
Financial Metrics													
Debt Service Coverage Ratio													
Debt Service Coverage Ratio (Indenture)													
Days Cash on Hand (target 90 days, un-restricted)	155	96	686	1,231	1,573	1,830	1,881	1,966	2,015	2,584	3,445	4,269	4,694
Days Cash on Hand (180 days, restricted O&M Fund)	198	198	198	198	198	198	198	198	198	198	198	198	198
Residential Water and Wastewater Bill as % of MHI	4.96%	5.03%	5.10%	5.16%	5.23%	5.34%	5.46%	5.54%	5.64%	5.71%	5.80%	5.84%	5.89%
Outstanding Debt to NPV of Net Revenues	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Operating Ratio	0.35	0.33	0.31	0.31	0.31	0.31	0.30	0.29	0.28	0.27	0.27	0.27	0.27
Debt to Operating Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Percent Equity Funded CIP	100%	100%	100%	100%	100%	82%	91%	83%	93%	84%	44%	44%	86%

Lehigh County Authority
Review of Allentown Water/Sewer Lease Concession Financial Condition Assessment

Global Inputs and Assumptions
 LCA Financial Planning Model Version 5.1

Scenario (enter short title)

Scenario A	Scenario B	Scenario C
------------	------------	------------

Rate Schedule

Meter Sizes 1" and less

Fixed Charge Monthly
 Fixed Charge Quarterly

Yes	Yes	Yes
No	No	No

Start Year of Monthly Billing for 1" and less meters

2019	2019	2019
------	------	------

Penalties (non-payment, AR recovery, etc.)

2%	2%	2%
----	----	----

New Additional Operating Revenues (not including existing Fixed/Volume Charges, Signatory, Fire, CCRC, Septic Hauler, IPP, or

Water

Amount
 Start Year
 Annual Increase

Wastewater

Amount
 Start Year
 Annual Increase

New Additional Non-Operating Revenues (allocation fees, inspection/review, tapping, meter sales)

Water

Amount
 Start Year
 Annual Increase

Wastewater

Amount
 Start Year
 Annual Increase

Growth

Connections (meters)

1" and less
 Greater than 1"

0.00%	0.00%	0.00%
0.00%	0.00%	0.00%

Consumption

Residential
 Commercial
 Industrial
 Institutional

0.00%	0.00%	0.00%
0.00%	0.00%	0.00%
0.00%	0.00%	0.00%
0.00%	0.00%	0.00%

Interest on Investments

Discount Rate

1.00%	1.00%	1.00%
6.60%	6.60%	6.60%

Inflation

CAPEX

Annual Lease Payment

3.00%	3.00%	3.00%
1.00%	1.00%	1.00%

OPEX

Personnel
 Purchase Of Services
 Materials And Supplies
 Equipment

3.50%	3.50%	3.50%
2.00%	2.00%	2.00%
2.00%	2.00%	2.00%
2.00%	2.00%	2.00%

Capital Recovery Fees

PayGo ROE Rate

Bond Interest Rate

Term

8.30%	8.30%	8.30%
6.60%	6.60%	6.60%
30	30	30

Signatory

PayGo CAPEX Trigger Amount
 PayGo Amortization Rate
 Term

\$1,000,000	\$1,000,000	\$1,000,000
6.60%	6.60%	6.60%
30	30	30

Lehigh County Authority
Review of Allentown Water/Sewer Lease Concession Financial Condition Assessment

Global Inputs and Assumptions
 LCA Financial Planning Model Version 5.1

Scenario (enter short title)

Scenario A	Scenario B	Scenario C
------------	------------	------------

Debt Service

Interest Rate	6.60%	6.60%	6.60%
Term (2018 to 2032)	30	30	30
Term (2033 to 2037)	25	25	25
Term (2038 to 2042)	20	20	20
COI (% of bond issue)	1.00%	1.00%	1.00%
Reserve (% of bond issue)	3.00%	3.00%	3.00%

OPEX Adjustments

Water Filtration Plant			
Short Term (1 to 5 years)	3.82%	3.82%	3.82%
Mid Term (6 to 15 years)			
Long Term (16+ years)			
Water Distribution System			
Short Term (1 to 5 years)	38.82%	38.82%	38.82%
Mid Term (6 to 15 years)	35.00%	35.00%	35.00%
Long Term (16+ years)	35.00%	35.00%	35.00%
Kline Island Wastewater Treatment Plant			
Short Term (1 to 5 years)	3.82%	3.82%	3.82%
Mid Term (6 to 15 years)			
Long Term (16+ years)			
Wastewater Collection System			
Short Term (1 to 5 years)	3.82%	3.82%	3.82%
Mid Term (6 to 15 years)			
Long Term (16+ years)			

OPEX Share of Support Services

Kline Island Wastewater Treatment Plant	67.00%	67.00%	67.00%
Water Filtration Plant	33.00%	33.00%	33.00%
Total	100.00%	100.00%	100.00%

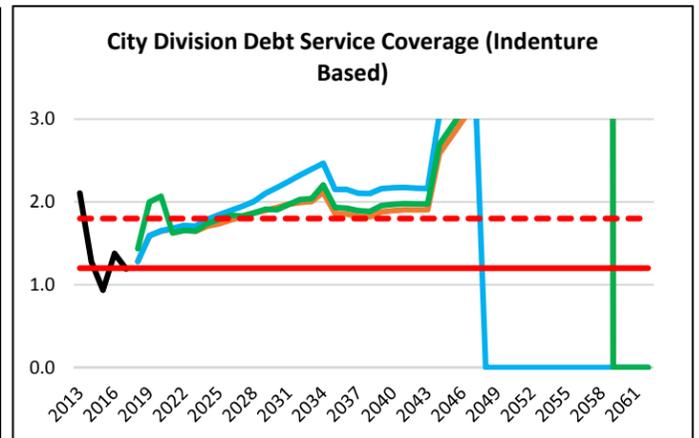
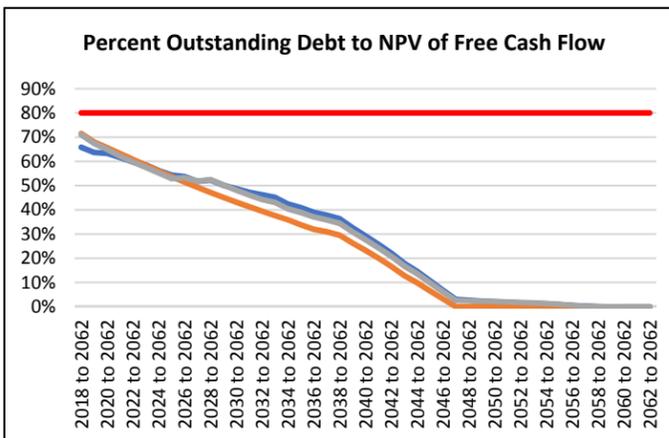
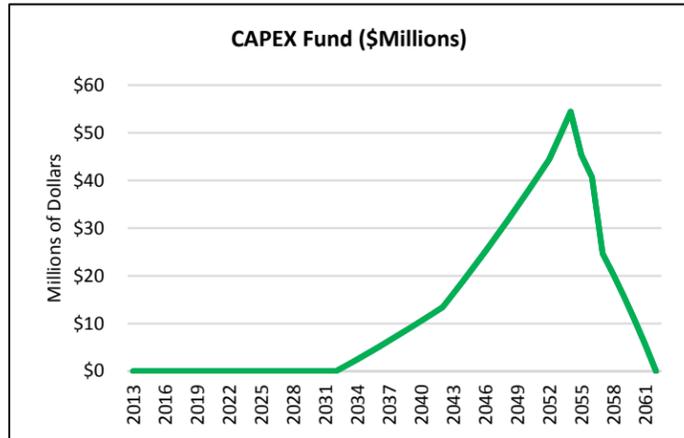
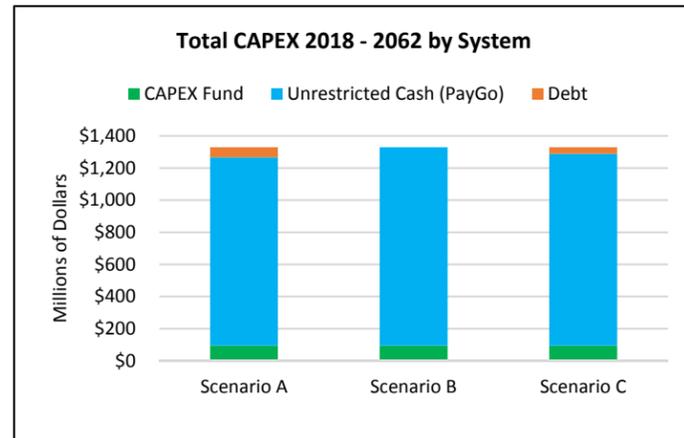
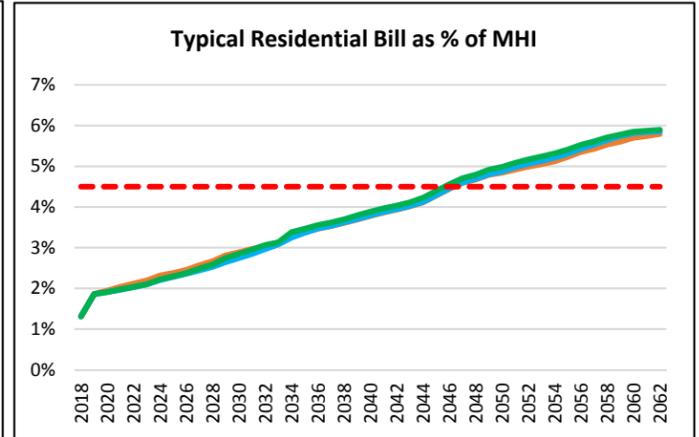
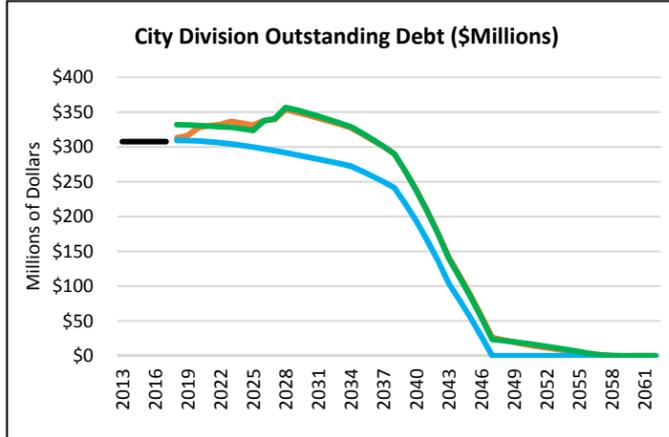
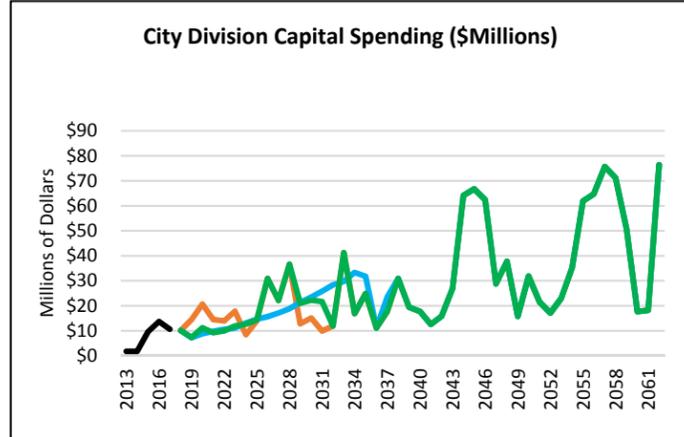
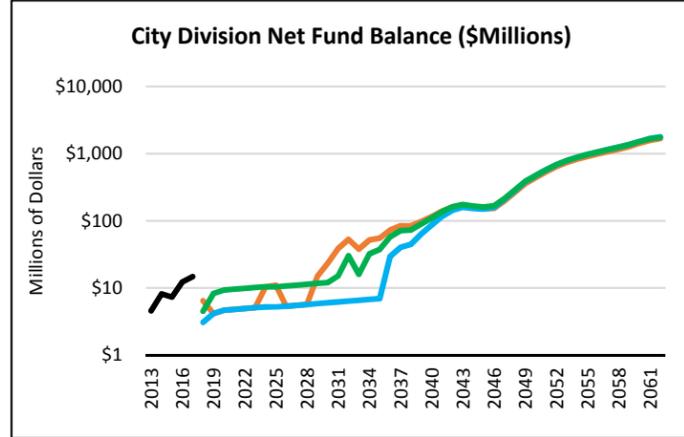
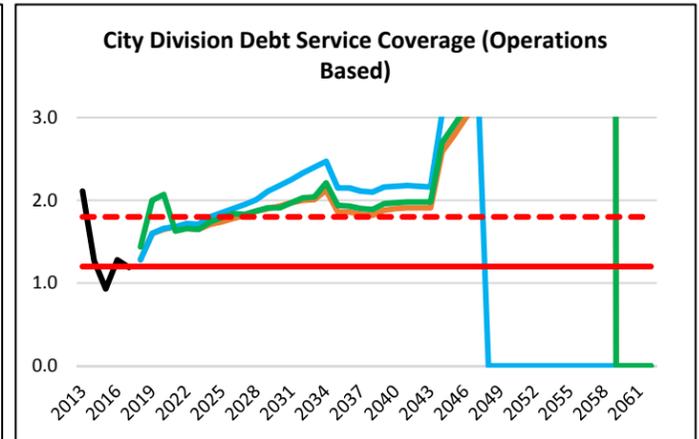
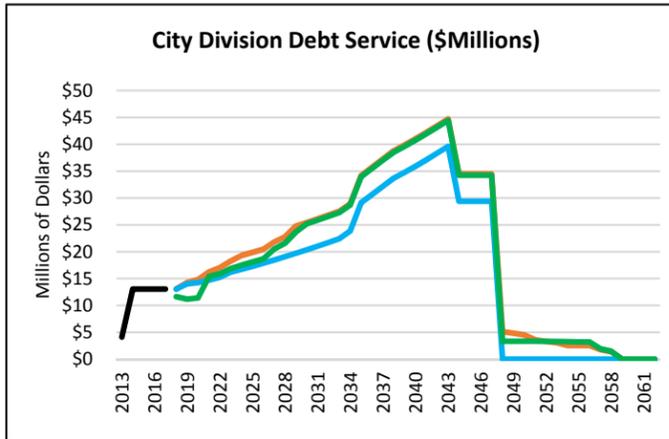
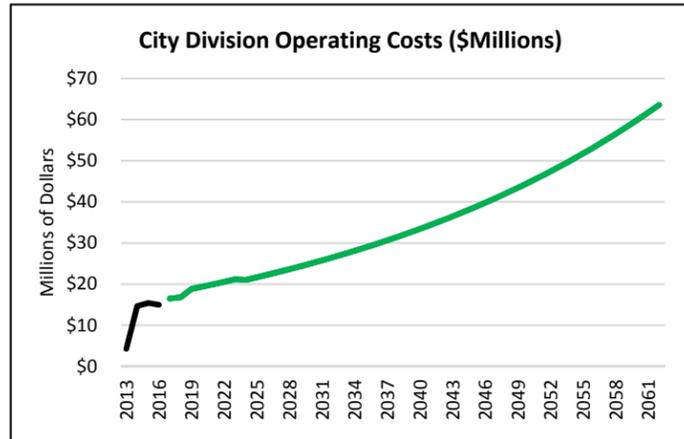
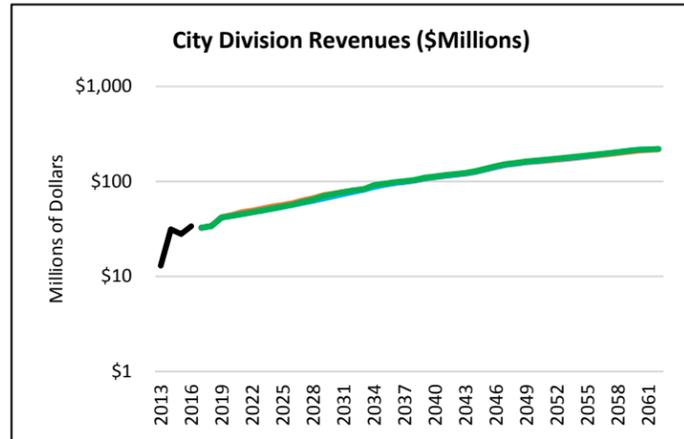
CAPEX Additions Not Included in Planned CIP

Water			
Unidentified CIP every year			
Start Year			
Unidentified CIP every 5 years			
Start Year			
Unidentified CIP every 10 years			
Start Year			
Wastewater			
Unidentified CIP every year			
Start Year			
Unidentified CIP every 5 years			
Start Year			
Unidentified CIP every 10 years			
Start Year			

Global Assumptions

Covert Daily to Quarterly Rate	91.31	
Covert Daily to Monthly Rate	30.44	
Typical residential monthly consumption (gallons)	4,600	LCA. 2017. "Water Volume by Class & Meter Size"
Median Household Income (MHI)	\$37,256	US Census. 2016. "S1901 INCOME IN THE PAST 12 MONTHS (II
CPI - U annual increase (percent)	1.0	T=historical CPI trend, 1%, 1.5%, 2%, 2.5%, 3%

	Required	Target	
Debt Service Coverage Ratio (Operations)	1.20	1.80	Requirement set forth in Series 2013 Rate Covenant
Debt Service Coverage Ratio (Indenture)	1.20	1.80	
Days Cash on Hand	180	270	180 days O&M Reserve, 90 days unrestricted fund balance.
Residential Water and Wastewater Bill as % of MHI		4.5%	2.5% for water and 2% wastewater
Debt to Operating Ratio			Financial Policy target TBD
Operating Ratio			Financial Policy target TBD
Percent Equity Funded CIP			Financial Policy target TBD



Legend

- Historical
- Scenario A
- Scenario B
- Scenario C
- Required
- - - Target

Lehigh County Authority
Review of Allentown Water/Sewer Lease Concession Financial Condition Assessment
City Division Pro forma - Scenario A
LCA Financial Planning Model Version 5.1

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Operating Revenues															
Water	\$6,748,381	\$16,507,523	\$16,725,712	\$16,987,167	\$17,364,832	\$17,771,000	\$24,213,000	\$25,896,000	\$27,939,000	\$29,598,000	\$31,290,000	\$32,614,000	\$33,811,000	\$35,364,000	\$37,107,000
Wastewater	\$6,244,922	\$14,771,776	\$10,794,690	\$14,686,290	\$14,666,662	\$15,731,734	\$17,388,000	\$17,939,000	\$19,191,000	\$19,232,000	\$19,987,000	\$21,419,000	\$22,304,000	\$23,324,000	\$25,555,000
Total Operating Revenues	\$12,993,303	\$31,279,299	\$27,520,402	\$31,673,457	\$32,031,494	\$33,502,734	\$41,601,000	\$43,835,000	\$47,130,000	\$48,830,000	\$51,277,000	\$54,033,000	\$56,115,000	\$58,688,000	\$62,662,000
Operating Expenses															
Water	\$2,260,972	\$7,007,850	\$6,773,471	\$6,226,015	\$6,548,687	\$6,970,098	\$8,348,000	\$8,597,000	\$8,856,000	\$9,125,000	\$9,402,000	\$9,370,000	\$9,650,000	\$9,941,000	\$10,239,000
Wastewater	\$2,028,198	\$7,638,389	\$8,646,549	\$8,751,484	\$9,947,544	\$9,831,891	\$10,493,000	\$10,801,000	\$11,117,000	\$11,440,000	\$11,775,000	\$11,672,000	\$12,014,000	\$12,363,000	\$12,721,000
Total Operating Expenses	\$4,289,170	\$14,646,239	\$15,420,020	\$14,977,499	\$16,496,231	\$16,801,989	\$18,841,000	\$19,398,000	\$19,973,000	\$20,565,000	\$21,177,000	\$21,042,000	\$21,664,000	\$22,304,000	\$22,960,000
Operating Income (Loss)	\$8,704,133	\$16,633,060	\$12,100,382	\$16,695,958	\$15,535,263	\$16,700,745	\$22,760,000	\$24,437,000	\$27,157,000	\$28,265,000	\$30,100,000	\$32,991,000	\$34,451,000	\$36,384,000	\$39,702,000
Interest Income						\$80,000	\$53,000	\$44,000	\$47,000	\$49,000	\$50,000	\$77,000	\$107,000	\$82,000	\$54,000
Net Available For Debt Service	\$8,704,133	\$16,633,060	\$12,100,382	\$16,695,958	\$15,535,263	\$16,780,745	\$22,813,000	\$24,481,000	\$27,204,000	\$28,314,000	\$30,150,000	\$33,068,000	\$34,558,000	\$36,466,000	\$39,756,000
Debt Service															
Existing	\$4,131,779	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$14,008,453	\$14,248,613	\$14,728,614	\$15,228,613	\$16,208,614	\$16,742,688	\$17,290,863	\$17,863,139	\$18,454,288
Projected	\$0	\$0	\$0	\$0	\$0	\$0	\$270,805	\$571,675	\$1,502,039	\$1,811,706	\$2,056,745	\$2,572,698	\$2,572,698	\$2,572,698	\$3,339,023
Total Debt Service	\$4,131,779	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$14,279,258	\$14,820,287	\$16,230,653	\$17,040,319	\$18,265,359	\$19,315,386	\$19,863,561	\$20,435,837	\$21,793,310
Net After Debt Service	\$4,572,354	\$3,585,338	(\$947,340)	\$3,648,236	\$2,487,541	\$3,733,024	\$8,533,742	\$9,660,713	\$10,973,347	\$11,273,681	\$11,884,641	\$13,752,614	\$14,694,439	\$16,030,163	\$17,962,690
Non-Operating Revenues															
TBD Reimbursement (AO and Non-AO) Exclude from Indenture Ratio															
Water	\$0	\$0	\$226,040	\$1,325,289	\$240,146	\$259,000	\$261,400	\$263,800	\$266,200	\$268,600	\$271,000	\$273,400	\$275,800	\$278,200	\$280,600
Wastewater	\$0	\$26,429	\$115,292	\$708,649	\$252,750	\$193,000	\$195,000	\$197,000	\$199,000	\$201,000	\$203,000	\$205,000	\$207,000	\$209,000	\$211,000
Total Non-Operating Revenues	\$0	\$26,429	\$341,332	\$2,033,938	\$492,896	\$452,000	\$456,400	\$460,800	\$465,200	\$469,600	\$474,000	\$478,400	\$482,800	\$487,200	\$491,600
Non-Operating Expenses															
Contribution to Operations and Maintenance Reserve Fund		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$119,939	\$195,024	\$201,668	\$0	\$28,562	\$210,991	\$214,849
Contribution to CAPEX Fund	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Deposit to Annual Lease Payment Fund			\$250,000	\$250,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Lease Payment				\$500,000	\$504,000	\$509,100	\$514,200	\$519,400	\$524,600	\$529,900	\$535,200	\$540,600	\$546,100	\$551,600	\$557,200
Total Non-Operating Expenses	\$0	\$0	\$250,000	\$750,000	\$504,000	\$509,100	\$514,200	\$519,400	\$644,539	\$724,924	\$736,868	\$540,600	\$574,662	\$762,591	\$772,049
Available for Capital	\$4,572,354	\$3,611,767	(\$856,008)	\$4,932,174	\$2,476,437	\$3,675,924	\$8,475,942	\$9,602,113	\$10,794,008	\$11,018,357	\$11,621,773	\$13,690,414	\$14,602,577	\$15,754,772	\$17,682,241
Equity Funded CAPEX															
TBD Reimbursable Costs (AO and Non-AO) Project LCA completes and gets reimbursed															
PayGo	\$0	\$0	\$0	\$0	\$0	\$6,710,000	\$10,781,980	\$9,098,560	\$10,633,830	\$10,900,690	\$11,470,345	\$8,438,000	\$13,923,000	\$21,415,880	\$17,515,200
Reserved 1															
Total Capex	\$0	\$0	\$0	\$0	\$0	\$6,710,000	\$10,781,980	\$9,098,560	\$10,633,830	\$10,900,690	\$11,470,345	\$8,438,000	\$13,923,000	\$21,415,880	\$17,515,200
Net Fund Surplus (deficit)	\$4,572,354	\$3,611,767	(\$856,008)	\$4,932,174	\$2,476,437	(\$3,034,076)	(\$2,306,038)	\$503,553	\$160,178	\$117,667	\$151,428	\$5,252,414	\$679,577	(\$5,661,108)	\$167,041
Beginning Balance (unrestricted)	\$0	\$4,572,354	\$8,184,121	\$7,328,113	\$12,260,287	\$9,488,776	\$6,454,700	\$4,148,661	\$4,652,214	\$4,812,392	\$4,930,059	\$5,081,486	\$10,333,900	\$11,013,477	\$5,352,369
Ending Balance	\$4,572,354	\$8,184,121	\$7,328,113	\$12,260,287	\$14,736,724	\$6,454,700	\$4,148,661	\$4,652,214	\$4,812,392	\$4,930,059	\$5,081,486	\$10,333,900	\$11,013,477	\$5,352,369	\$5,519,411
Financial Metrics															
Debt Service Coverage Ratio (Operations)	2.11	1.27	0.93	1.28	1.19	1.29	1.60	1.65	1.68	1.66	1.65	1.71	1.74	1.78	1.82
Debt Service Coverage Ratio (Indenture)	2.11	1.28	0.93	1.38	1.19	1.28	1.59	1.65	1.67	1.66	1.65	1.71	1.74	1.78	1.82
Days Cash on Hand (target 90 days, un-restricted)						143	90	90	91	90	90	178	191	90	90
Days Cash on Hand (180 days, restricted O&M Fund)						212	210	189	188	188	188	184	188	188	188
Residential Water and Wastewater Bill as % of MHI						1.31%	1.86%	1.94%	2.04%	2.11%	2.19%	2.31%	2.38%	2.45%	2.57%
Outstanding Debt to NPV of Free Cash Flow						66%	64%	63%	62%	60%	59%	56%	54%	54%	52%
Operating Ratio						0.50	0.45	0.44	0.42	0.42	0.41	0.39	0.39	0.38	0.37
Debt to Operating Ratio						0.78	0.63	0.61	0.60	0.60	0.61	0.59	0.58	0.56	0.55
Percent Equity Funded CIP						67%	74%	44%	73%	78%	64%	100%	100%	69%	79%

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	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
Operating Revenues															
Water	\$38,642,000	\$40,194,000	\$41,616,000	\$43,068,000	\$44,658,000	\$46,236,000	\$47,727,000	\$49,754,000	\$51,918,000	\$53,719,000	\$55,335,000	\$57,094,000	\$59,719,000	\$62,218,000	\$64,267,000
Wastewater	\$27,467,000	\$31,173,000	\$32,462,000	\$33,996,000	\$34,957,000	\$35,942,000	\$41,344,000	\$42,414,000	\$43,582,000	\$44,374,000	\$46,084,000	\$49,489,000	\$50,437,000	\$51,412,000	\$52,417,000
Total Operating Revenues	\$66,109,000	\$71,367,000	\$74,078,000	\$77,064,000	\$79,615,000	\$82,178,000	\$89,071,000	\$92,168,000	\$95,500,000	\$98,093,000	\$101,419,000	\$106,583,000	\$110,156,000	\$113,630,000	\$116,684,000
Operating Expenses															
Water	\$10,541,000	\$10,854,000	\$11,177,000	\$11,508,000	\$11,846,000	\$12,194,000	\$12,553,000	\$12,921,000	\$13,300,000	\$13,689,000	\$14,091,000	\$14,506,000	\$14,935,000	\$15,376,000	\$15,830,000
Wastewater	\$13,092,000	\$13,472,000	\$13,864,000	\$14,268,000	\$14,682,000	\$15,109,000	\$15,549,000	\$16,000,000	\$16,465,000	\$16,946,000	\$17,438,000	\$17,946,000	\$18,469,000	\$19,010,000	\$19,567,000
Total Operating Expenses	\$23,633,000	\$24,326,000	\$25,041,000	\$25,776,000	\$26,528,000	\$27,303,000	\$28,102,000	\$28,921,000	\$29,765,000	\$30,635,000	\$31,529,000	\$32,452,000	\$33,404,000	\$34,386,000	\$35,397,000
Operating Income (Loss)	\$42,476,000	\$47,041,000	\$49,037,000	\$51,288,000	\$53,087,000	\$54,875,000	\$60,969,000	\$63,247,000	\$65,735,000	\$67,458,000	\$69,890,000	\$74,131,000	\$76,752,000	\$79,244,000	\$81,287,000
Interest Income	\$56,000	\$103,000	\$192,000	\$310,000	\$458,000	\$455,000	\$450,000	\$535,000	\$640,000	\$788,000	\$842,000	\$909,000	\$1,066,000	\$1,272,000	\$1,501,000
Net Available For Debt Service	\$42,532,000	\$47,144,000	\$49,229,000	\$51,598,000	\$53,545,000	\$55,330,000	\$61,419,000	\$63,782,000	\$66,375,000	\$68,246,000	\$70,732,000	\$75,040,000	\$77,818,000	\$80,516,000	\$82,788,000
Debt Service															
Existing	\$19,064,313	\$19,698,213	\$20,345,989	\$21,027,638	\$21,727,938	\$22,446,889	\$23,844,488	\$29,105,513	\$30,628,188	\$32,193,038	\$33,687,088	\$34,771,063	\$35,919,513	\$37,109,413	\$38,343,038
Projected	\$3,713,621	\$5,107,177	\$5,107,177	\$5,107,177	\$5,107,177	\$5,107,177	\$5,107,177	\$5,107,177	\$5,107,177	\$5,107,177	\$5,107,177	\$5,107,177	\$5,107,177	\$5,107,177	\$5,107,177
Total Debt Service	\$22,777,933	\$24,805,389	\$25,453,165	\$26,134,814	\$26,835,114	\$27,554,065	\$28,951,664	\$34,212,689	\$35,735,364	\$37,300,214	\$38,794,264	\$39,878,239	\$41,026,689	\$42,216,589	\$43,450,214
Net After Debt Service	\$19,754,067	\$22,338,611	\$23,775,835	\$25,463,186	\$26,709,886	\$27,775,935	\$32,467,336	\$29,569,311	\$30,639,636	\$30,945,786	\$31,937,736	\$35,161,761	\$36,791,311	\$38,299,411	\$39,337,786
Non-Operating Revenues															
TBD Reimbursable Costs (AO and Non-AO) Exclude from Indenture Ratio															
Water	\$283,000	\$285,400	\$287,800	\$290,200	\$292,600	\$295,000	\$297,400	\$299,800	\$302,200	\$304,600	\$307,000	\$309,400	\$312,800	\$316,200	\$319,600
Wastewater	\$213,000	\$215,000	\$217,000	\$219,000	\$221,000	\$223,000	\$225,000	\$227,000	\$229,000	\$231,000	\$233,000	\$235,000	\$237,000	\$239,000	\$241,000
Total Non-Operating Revenues	\$496,000	\$500,400	\$504,800	\$509,200	\$513,600	\$518,000	\$522,400	\$526,800	\$531,200	\$535,600	\$540,000	\$544,400	\$549,800	\$555,200	\$560,600
Non-Operating Expenses															
Contribution to Operations and Maintenance Reserve Fund	\$220,033	\$226,624	\$234,109	\$240,478	\$245,252	\$252,949	\$261,015	\$266,959	\$275,313	\$284,030	\$291,614	\$301,583	\$311,394	\$321,560	\$331,074
Contribution to CAPEX Fund	\$0	\$0	\$0	\$0	\$0	\$1,220,190	\$1,232,392	\$1,244,716	\$1,257,163	\$1,269,735	\$1,282,432	\$1,295,256	\$1,308,209	\$1,321,291	\$1,334,504
Deposit to Annual Lease Payment Fund	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Lease Payment	\$562,800	\$568,500	\$574,200	\$580,000	\$585,800	\$591,700	\$597,700	\$603,700	\$609,800	\$615,900	\$622,100	\$628,400	\$634,700	\$641,100	\$647,600
Total Non-Operating Expenses	\$782,833	\$795,124	\$808,309	\$820,478	\$831,052	\$2,064,839	\$2,091,107	\$2,115,375	\$2,142,276	\$2,169,664	\$2,196,146	\$2,225,239	\$2,254,303	\$2,283,951	\$2,313,178
Available for Capital	\$19,467,234	\$22,043,886	\$23,472,326	\$25,151,908	\$26,392,434	\$26,229,096	\$30,898,629	\$27,980,736	\$29,028,559	\$29,311,721	\$30,281,590	\$33,480,922	\$35,086,808	\$36,570,660	\$37,585,208
Equity Funded CAPEX															
TBD Reimbursable Costs (AO and Non-AO) Project LCA completes and gets reimbursed															
PayGo	\$19,307,538	\$12,764,000	\$15,082,000	\$9,930,000	\$11,957,000	\$41,292,000	\$16,884,000	\$24,872,000	\$11,156,000	\$17,687,000	\$30,960,000	\$19,470,000	\$17,758,000	\$12,553,000	\$15,857,000
Reserved 1															
Total Capex	\$19,307,538	\$12,764,000	\$15,082,000	\$9,930,000	\$11,957,000	\$41,292,000	\$16,884,000	\$24,872,000	\$11,156,000	\$17,687,000	\$30,960,000	\$19,470,000	\$17,758,000	\$12,553,000	\$15,857,000
Net Fund Surplus (deficit)	\$159,696	\$9,279,886	\$8,390,326	\$15,221,908	\$14,435,434	(\$15,062,904)	\$14,014,629	\$3,108,736	\$17,872,559	\$11,624,721	(\$678,410)	\$14,010,922	\$17,328,808	\$24,017,660	\$21,728,208
Beginning Balance (unrestricted)	\$5,519,411	\$5,679,107	\$14,958,993	\$23,349,319	\$38,571,228	\$53,006,661	\$37,943,757	\$51,958,386	\$55,067,122	\$72,939,681	\$84,564,403	\$83,885,993	\$97,896,914	\$115,225,722	\$139,243,382
Ending Balance	\$5,679,107	\$14,958,993	\$23,349,319	\$38,571,228	\$53,006,661	\$37,943,757	\$51,958,386	\$55,067,122	\$72,939,681	\$84,564,403	\$83,885,993	\$97,896,914	\$115,225,722	\$139,243,382	\$160,971,590
Financial Metrics															
Debt Service Coverage Ratio (Operations)	1.87	1.90	1.93	1.97	2.00	2.01	2.12	1.86	1.86	1.83	1.82	1.88	1.90	1.91	1.91
Debt Service Coverage Ratio (Indenture)	1.86	1.90	1.93	1.97	1.99	2.01	2.12	1.86	1.86	1.83	1.82	1.88	1.89	1.91	1.90
Days Cash on Hand (target 90 days, un-restricted)	90	231	350	562	751	522	695	715	921	1,037	999	1,133	1,296	1,521	1,709
Days Cash on Hand (180 days, restricted O&M Fund)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Residential Water and Wastewater Bill as % of MHI	2.67%	2.81%	2.89%	2.97%	3.04%	3.11%	3.29%	3.38%	3.47%	3.53%	3.61%	3.69%	3.78%	3.87%	3.94%
Outstanding Debt to NPV of Free Cash Flow	52%	50%	49%	47%	46%	45%	42%	41%	39%	38%	36%	33%	29%	26%	22%
Operating Ratio	0.36	0.34	0.34	0.33	0.33	0.33	0.31	0.31	0.31	0.31	0.31	0.30	0.30	0.30	0.30
Debt to Operating Ratio	0.54	0.53	0.52	0.51	0.51	0.50	0.47	0.54	0.54	0.55	0.56	0.54	0.53	0.53	0.53
Percent Equity Funded CIP	53%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

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	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055
Operating Revenues													
Water	\$66,645,000	\$69,031,000	\$71,935,000	\$74,818,000	\$77,186,000	\$79,361,000	\$81,680,000	\$83,325,000	\$85,433,000	\$87,742,000	\$89,689,000	\$92,177,000	\$94,900,000
Wastewater	\$53,454,000	\$56,105,000	\$61,212,000	\$66,474,000	\$71,854,000	\$73,937,000	\$77,075,000	\$78,131,000	\$80,071,000	\$81,297,000	\$82,518,000	\$83,409,000	\$86,158,000
Total Operating Revenues	\$120,099,000	\$125,136,000	\$133,147,000	\$141,292,000	\$149,040,000	\$153,298,000	\$158,755,000	\$161,456,000	\$165,504,000	\$169,039,000	\$172,207,000	\$175,586,000	\$181,058,000
Operating Expenses													
Water	\$16,300,000	\$16,782,000	\$17,281,000	\$17,794,000	\$18,326,000	\$18,872,000	\$19,433,000	\$20,012,000	\$20,608,000	\$21,223,000	\$21,855,000	\$22,507,000	\$23,179,000
Wastewater	\$20,142,000	\$20,733,000	\$21,341,000	\$21,969,000	\$22,616,000	\$23,280,000	\$23,965,000	\$24,672,000	\$25,400,000	\$26,151,000	\$26,925,000	\$27,723,000	\$28,547,000
Total Operating Expenses	\$36,442,000	\$37,515,000	\$38,622,000	\$39,763,000	\$40,942,000	\$42,152,000	\$43,398,000	\$44,684,000	\$46,008,000	\$47,374,000	\$48,780,000	\$50,230,000	\$51,726,000
Operating Income (Loss)	\$83,657,000	\$87,621,000	\$94,525,000	\$101,529,000	\$108,098,000	\$111,146,000	\$115,357,000	\$116,772,000	\$119,496,000	\$121,665,000	\$123,427,000	\$125,356,000	\$129,332,000
Interest Income	\$1,662,000	\$1,652,000	\$1,548,000	\$1,520,000	\$1,751,000	\$2,303,000	\$3,112,000	\$3,989,000	\$4,873,000	\$5,870,000	\$6,884,000	\$7,832,000	\$8,696,000
Net Available For Debt Service	\$85,319,000	\$89,273,000	\$96,073,000	\$103,049,000	\$109,849,000	\$113,449,000	\$118,469,000	\$120,761,000	\$124,369,000	\$127,535,000	\$130,311,000	\$133,188,000	\$138,028,000
Debt Service													
Existing	\$39,617,138	\$29,393,238	\$29,390,681	\$29,390,656	\$29,389,863	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Projected	\$5,107,177	\$5,107,177	\$5,107,177	\$5,107,177	\$5,107,177	\$5,107,177	\$4,836,371	\$4,535,502	\$3,605,137	\$3,295,471	\$3,050,431	\$2,534,478	\$2,534,478
Total Debt Service	\$44,724,314	\$34,500,414	\$34,497,858	\$34,497,833	\$34,497,039	\$5,107,177	\$4,836,371	\$4,535,502	\$3,605,137	\$3,295,471	\$3,050,431	\$2,534,478	\$2,534,478
Net After Debt Service	\$40,594,686	\$54,772,586	\$61,575,142	\$68,551,167	\$75,351,961	\$108,341,823	\$113,632,629	\$116,225,498	\$120,763,863	\$124,239,529	\$127,260,569	\$130,653,522	\$135,493,522
Non-Operating Revenues													
TBD Reimbursable Costs (AO and Non-AO) Exclude from Indenture Ratio													
Water	\$323,000	\$326,400	\$329,800	\$333,200	\$336,600	\$340,000	\$343,400	\$346,800	\$350,200	\$353,600	\$357,000	\$360,400	\$363,800
Wastewater	\$243,000	\$245,000	\$247,000	\$249,000	\$251,000	\$254,000	\$257,000	\$260,000	\$263,000	\$266,000	\$272,000	\$275,000	\$275,000
Total Non-Operating Revenues	\$566,000	\$571,400	\$576,800	\$582,200	\$587,600	\$594,000	\$600,400	\$606,800	\$613,200	\$619,600	\$626,000	\$632,400	\$638,800
Non-Operating Expenses													
Contribution to Operations and Maintenance Reserve Fund	\$342,945	\$351,634	\$363,198	\$374,576	\$387,785	\$397,293	\$409,164	\$422,843	\$435,311	\$449,595	\$462,658	\$477,526	\$493,164
Contribution to CAPEX Fund	\$2,695,698	\$2,722,655	\$2,749,881	\$2,777,380	\$2,805,154	\$2,833,206	\$2,861,538	\$2,890,153	\$2,919,054	\$2,948,245	\$4,466,591	\$4,511,257	\$4,556,370
Deposit to Annual Lease Payment Fund	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Lease Payment	\$654,100	\$660,700	\$667,400	\$674,100	\$680,900	\$687,800	\$694,700	\$701,700	\$708,800	\$715,900	\$723,100	\$730,400	\$737,800
Total Non-Operating Expenses	\$3,692,743	\$3,734,989	\$3,780,479	\$3,826,056	\$3,873,839	\$3,918,299	\$3,965,402	\$4,014,696	\$4,063,166	\$4,113,740	\$5,652,349	\$5,719,183	\$5,787,334
Available for Capital	\$37,467,943	\$51,608,997	\$58,371,463	\$65,307,311	\$72,065,722	\$105,017,525	\$110,267,627	\$112,817,602	\$117,313,897	\$120,745,390	\$122,234,220	\$125,566,738	\$130,344,988
Equity Funded CAPEX													
TBD Reimbursable Costs (AO and Non-AO) Project LCA completes and gets reimbursed													
PayGo	\$26,975,000	\$64,123,000	\$66,750,000	\$62,424,000	\$28,797,000	\$37,795,000	\$15,749,000	\$31,859,000	\$21,528,000	\$17,133,000	\$23,010,000	\$35,305,000	\$47,845,239
Reserved 1													
Total Capex	\$26,975,000	\$64,123,000	\$66,750,000	\$62,424,000	\$28,797,000	\$37,795,000	\$15,749,000	\$31,859,000	\$21,528,000	\$17,133,000	\$23,010,000	\$35,305,000	\$47,845,239
Net Fund Surplus (deficit)	\$10,492,943	(\$12,514,003)	(\$8,378,537)	\$2,883,311	\$43,268,722	\$67,222,525	\$94,518,627	\$80,958,602	\$95,785,897	\$103,612,390	\$99,224,220	\$90,261,738	\$82,499,749
Beginning Balance (unrestricted)	\$160,971,590	\$171,464,532	\$158,950,530	\$150,571,993	\$153,455,303	\$196,724,025	\$263,946,550	\$358,465,176	\$439,423,779	\$535,209,676	\$638,822,065	\$738,046,285	\$828,308,024
Ending Balance	\$171,464,532	\$158,950,530	\$150,571,993	\$153,455,303	\$196,724,025	\$263,946,550	\$358,465,176	\$439,423,779	\$535,209,676	\$638,822,065	\$738,046,285	\$828,308,024	\$910,807,772
Financial Metrics													
Debt Service Coverage Ratio (Operations)	1.91	2.59	2.78	2.99	3.18	22.21	24.50	26.63	34.50	38.70	42.72	52.55	54.46
Debt Service Coverage Ratio (Indenture)	1.91	2.59	2.78	2.98	3.18	22.20	24.48	26.60	34.47	38.67	42.69	52.51	54.42
Days Cash on Hand (target 90 days, un-restricted)	1,768	1,592	1,465	1,450	1,806	2,353	3,104	3,696	4,372	5,068	5,686	6,198	6,618
Days Cash on Hand (180 days, restricted O&M Fund)	188	188	188	188	188	188	188	188	188	188	188	188	188
Residential Water and Wastewater Bill as % of MHI	4.01%	4.11%	4.28%	4.44%	4.59%	4.67%	4.79%	4.84%	4.92%	4.99%	5.05%	5.12%	5.23%
Outstanding Debt to NPV of Free Cash Flow	18%	15%	11%	7%	3%	3%	2%	2%	2%	2%	1%	1%	1%
Operating Ratio	0.30	0.30	0.29	0.28	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Debt to Operating Ratio	0.53	0.39	0.36	0.34	0.32	0.05	0.04	0.04	0.03	0.03	0.02	0.02	0.02
Percent Equity Funded CIP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	77%

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	2056	2057	2058	2059	2060	2061	2062
Operating Revenues							
Water	\$98,138,000	\$99,373,000	\$100,906,000	\$102,520,000	\$104,359,000	\$106,272,000	\$108,153,000
Wastewater	\$88,980,000	\$92,818,000	\$97,613,000	\$101,592,000	\$105,858,000	\$106,838,000	\$108,467,000
Total Operating Revenues	\$187,118,000	\$192,191,000	\$198,519,000	\$204,112,000	\$210,217,000	\$213,110,000	\$216,620,000
Operating Expenses							
Water	\$23,872,000	\$24,587,000	\$25,320,000	\$26,073,000	\$26,851,000	\$27,654,000	\$28,483,000
Wastewater	\$29,397,000	\$30,275,000	\$31,177,000	\$32,105,000	\$33,062,000	\$34,051,000	\$35,071,000
Total Operating Expenses	\$53,269,000	\$54,862,000	\$56,497,000	\$58,178,000	\$59,913,000	\$61,705,000	\$63,554,000
Operating Income (Loss)	\$133,849,000	\$137,329,000	\$142,022,000	\$145,934,000	\$150,304,000	\$151,405,000	\$153,066,000
Interest Income	\$9,511,000	\$10,344,000	\$11,197,000	\$12,178,000	\$13,488,000	\$15,004,000	\$16,257,000
Net Available For Debt Service	\$143,360,000	\$147,673,000	\$153,219,000	\$158,112,000	\$163,792,000	\$166,409,000	\$169,323,000
Debt Service							
Existing	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Projected	\$2,534,478	\$1,768,154	\$1,393,556	\$0	\$0	\$0	\$0
Total Debt Service	\$2,534,478	\$1,768,154	\$1,393,556	\$0	\$0	\$0	\$0
Net After Debt Service	\$140,825,522	\$145,904,846	\$151,825,444	\$158,112,000	\$163,792,000	\$166,409,000	\$169,323,000
Non-Operating Revenues							
TBD Reimbursement (AO and Non-AO) Exclude from Indenture Ratio							
Water	\$367,200	\$370,600	\$374,000	\$377,400	\$380,800	\$384,200	\$387,600
Wastewater	\$278,000	\$281,000	\$284,000	\$287,000	\$290,000	\$293,000	\$296,000
Total Non-Operating Revenues	\$645,200	\$651,600	\$658,000	\$664,400	\$670,800	\$677,200	\$683,600
Non-Operating Expenses							
Contribution to Operations and Maintenance Reserve Fund	\$509,067	\$526,233	\$539,141	\$553,859	\$572,337	\$592,025	\$611,420
Contribution to CAPEX Fund	\$4,601,933	\$4,647,953	\$4,694,432	\$4,741,377	\$4,788,790	\$4,836,678	\$4,885,045
Deposit to Annual Lease Payment Fund	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Lease Payment	\$745,200	\$752,700	\$760,300	\$768,000	\$775,700	\$783,500	\$791,400
Total Non-Operating Expenses	\$5,856,201	\$5,926,885	\$5,993,873	\$6,063,236	\$6,136,827	\$6,212,203	\$6,287,865
Available for Capital	\$135,614,521	\$140,629,560	\$146,489,571	\$152,713,164	\$158,325,973	\$160,873,997	\$163,718,735
Equity Funded CAPEX							
TBD Reimbursable Costs (AO and Non-AO) Project LCA completes and gets reimbursed							
PayGo	\$55,002,000	\$54,672,000	\$61,860,000	\$41,207,000	\$7,840,000	\$8,077,000	\$65,962,000
Reserved 1							
Total Capex	\$55,002,000	\$54,672,000	\$61,860,000	\$41,207,000	\$7,840,000	\$8,077,000	\$65,962,000
Net Fund Surplus (deficit)	\$80,612,521	\$85,957,560	\$84,629,571	\$111,506,164	\$150,485,973	\$152,796,997	\$97,756,735
Beginning Balance (unrestricted)	\$910,807,772	\$991,420,293	\$1,077,377,854	\$1,162,007,425	\$1,273,513,589	\$1,423,999,562	\$1,576,796,559
Ending Balance	\$991,420,293	\$1,077,377,854	\$1,162,007,425	\$1,273,513,589	\$1,423,999,562	\$1,576,796,559	\$1,674,553,294
Financial Metrics							
Debt Service Coverage Ratio (Operations)	56.56	83.52	109.95				
Debt Service Coverage Ratio (Indenture)	56.52	83.46	109.87				
Days Cash on Hand (target 90 days, un-restricted)	6,996	7,382	7,731	8,228	8,934	9,606	9,905
Days Cash on Hand (180 days, restricted O&M Fund)	188	188	188	188	188	188	188
Residential Water and Wastewater Bill as % of MHI	5.35%	5.43%	5.53%	5.61%	5.70%	5.74%	5.79%
Outstanding Debt to NPV of Free Cash Flow	1%	0%	0%	0%	0%	0%	0%
Operating Ratio	0.27	0.27	0.27	0.27	0.27	0.27	0.27
Debt to Operating Ratio	0.02	0.01	0.01	0.00	0.00	0.00	0.00
Percent Equity Funded CIP	85%	72%	87%	81%	44%	44%	86%

Lehigh County Authority
Review of Allentown Water/Sewer Lease Concession Financial Condition Assessment
City Division Pro forma - Scenario B
LCA Financial Planning Model Version 5.1

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Operating Revenues																			
Water	\$6,748,381	\$16,507,523	\$16,725,712	\$16,987,167	\$17,364,832	\$17,771,000	\$24,213,000	\$25,233,000	\$26,386,000	\$27,658,000	\$29,087,000	\$30,177,000	\$31,624,000	\$33,216,000	\$34,545,000	\$35,936,000	\$37,234,000	\$38,989,000	\$40,700,000
Wastewater	\$6,244,922	\$14,771,776	\$10,794,690	\$14,686,290	\$14,666,662	\$15,731,734	\$16,945,000	\$17,706,000	\$18,350,000	\$19,043,000	\$19,767,000	\$20,879,000	\$21,943,000	\$22,985,000	\$24,335,000	\$25,961,000	\$28,546,000	\$30,294,000	\$32,344,000
Total Operating Revenues	\$12,993,303	\$31,279,299	\$27,520,402	\$31,673,457	\$32,031,494	\$33,502,734	\$41,158,000	\$42,939,000	\$44,736,000	\$46,701,000	\$48,854,000	\$51,056,000	\$53,567,000	\$56,201,000	\$58,880,000	\$61,897,000	\$65,780,000	\$69,283,000	\$73,044,000
Operating Expenses																			
Water	\$2,260,972	\$7,007,850	\$6,773,471	\$6,226,015	\$6,548,687	\$6,970,098	\$8,348,000	\$8,597,000	\$8,856,000	\$9,125,000	\$9,402,000	\$9,370,000	\$9,650,000	\$9,941,000	\$10,239,000	\$10,541,000	\$10,854,000	\$11,177,000	\$11,508,000
Wastewater	\$2,028,198	\$7,638,389	\$8,646,549	\$8,751,484	\$9,947,544	\$9,831,891	\$10,493,000	\$10,801,000	\$11,117,000	\$11,440,000	\$11,775,000	\$11,672,000	\$12,014,000	\$12,363,000	\$12,721,000	\$13,092,000	\$13,472,000	\$13,864,000	\$14,268,000
Total Operating Expenses	\$4,289,170	\$14,646,239	\$15,420,020	\$14,977,499	\$16,496,231	\$16,801,989	\$18,841,000	\$19,398,000	\$19,973,000	\$20,565,000	\$21,177,000	\$21,042,000	\$21,664,000	\$22,304,000	\$22,960,000	\$23,633,000	\$24,326,000	\$25,041,000	\$25,776,000
Operating Income (Loss)	\$8,704,133	\$16,633,060	\$12,100,382	\$16,695,958	\$15,535,263	\$16,700,745	\$22,317,000	\$23,541,000	\$24,763,000	\$26,136,000	\$27,677,000	\$30,014,000	\$31,903,000	\$33,897,000	\$35,920,000	\$38,264,000	\$41,454,000	\$44,242,000	\$47,268,000
Interest Income						\$63,000	\$36,000	\$44,000	\$47,000	\$49,000	\$50,000	\$52,000	\$52,000	\$53,000	\$54,000	\$56,000	\$58,000	\$59,000	\$61,000
Net Available For Debt Service	\$8,704,133	\$16,633,060	\$12,100,382	\$16,695,958	\$15,535,263	\$16,763,745	\$22,353,000	\$23,585,000	\$24,810,000	\$26,185,000	\$27,727,000	\$30,066,000	\$31,955,000	\$33,950,000	\$35,974,000	\$38,320,000	\$41,512,000	\$44,301,000	\$47,329,000
Debt Service																			
Existing	\$4,131,779	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$14,008,453	\$14,248,613	\$14,728,614	\$15,228,613	\$16,208,614	\$16,742,688	\$17,290,863	\$17,863,139	\$18,454,288	\$19,064,313	\$19,698,213	\$20,345,989	\$21,027,638
Projected	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Debt Service	\$4,131,779	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$14,008,453	\$14,248,613	\$14,728,614	\$15,228,613	\$16,208,614	\$16,742,688	\$17,290,863	\$17,863,139	\$18,454,288	\$19,064,313	\$19,698,213	\$20,345,989	\$21,027,638
Net After Debt Service	\$4,572,354	\$3,585,338	(\$947,340)	\$3,648,236	\$2,487,541	\$3,716,024	\$8,344,547	\$9,336,388	\$10,081,387	\$10,956,388	\$11,518,387	\$13,323,313	\$14,664,138	\$16,086,862	\$17,519,713	\$19,255,688	\$21,813,788	\$23,955,012	\$26,301,363
Non-Operating Revenues																			
Reimbursement (AO and Non-AO) Exclude from Indenture Ratio																			
Water	\$0	\$0	\$226,040	\$1,325,289	\$240,146	\$259,000	\$261,400	\$263,800	\$266,200	\$268,600	\$271,000	\$273,400	\$275,800	\$278,200	\$280,600	\$283,000	\$285,400	\$287,800	\$290,200
Wastewater	\$0	\$26,429	\$115,292	\$708,649	\$252,750	\$193,000	\$195,000	\$197,000	\$199,000	\$201,000	\$203,000	\$205,000	\$207,000	\$209,000	\$211,000	\$213,000	\$215,000	\$217,000	\$219,000
Total Non-Operating Revenues	\$0	\$26,429	\$341,332	\$2,033,938	\$492,896	\$452,000	\$456,400	\$460,800	\$465,200	\$469,600	\$474,000	\$478,400	\$482,800	\$487,200	\$491,600	\$496,000	\$500,400	\$504,800	\$509,200
Non-Operating Expenses																			
Contribution to Operations and Maintenance Reserve Fund		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$119,939	\$195,024	\$201,668	\$0	\$28,562	\$210,991	\$214,849	\$220,033	\$226,624	\$234,109	\$240,478
Contribution to CAPEX Fund	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Deposit to Annual Lease Payment Fund			\$250,000	\$250,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Lease Payment			\$500,000	\$500,000	\$504,000	\$509,100	\$514,200	\$519,400	\$524,600	\$529,900	\$535,200	\$540,600	\$546,100	\$551,600	\$557,200	\$562,800	\$568,500	\$574,200	\$580,000
Total Non-Operating Expenses	\$0	\$0	\$250,000	\$750,000	\$504,000	\$509,100	\$514,200	\$519,400	\$644,539	\$724,924	\$736,868	\$540,600	\$574,662	\$762,591	\$772,049	\$782,833	\$795,124	\$808,309	\$820,478
Available for Capital	\$4,572,354	\$3,611,767	(\$856,008)	\$4,932,174	\$2,476,437	\$3,658,924	\$8,286,747	\$9,277,788	\$9,902,047	\$10,701,063	\$11,255,518	\$13,261,113	\$14,572,275	\$15,811,471	\$17,239,264	\$18,968,855	\$21,519,063	\$23,651,503	\$25,990,085
Equity Funded CAPEX																			
Reimbursable Costs (AO and Non-AO) Project LCA completes and gets reimbursed																			
PayGo	\$0	\$0	\$0	\$0	\$0	\$10,070,000	\$7,194,300	\$8,787,200	\$9,768,000	\$10,560,800	\$11,102,260	\$13,122,230	\$14,594,220	\$15,652,830	\$17,093,820	\$18,810,560	\$21,331,610	\$23,487,620	\$25,811,550
Reserved 1																			
Total Capex	\$0	\$0	\$0	\$0	\$0	\$10,070,000	\$7,194,300	\$8,787,200	\$9,768,000	\$10,560,800	\$11,102,260	\$13,122,230	\$14,594,220	\$15,652,830	\$17,093,820	\$18,810,560	\$21,331,610	\$23,487,620	\$25,811,550
Net Fund Surplus (deficit)	\$4,572,354	\$3,611,767	(\$856,008)	\$4,932,174	\$2,476,437	(\$6,411,076)	\$1,092,447	\$490,588	\$134,047	\$140,263	\$153,258	\$138,883	(\$21,945)	\$158,641	\$145,444	\$158,295	\$187,453	\$163,883	\$178,535
Beginning Balance	\$0	\$4,572,354	\$8,184,121	\$7,328,113	\$12,260,287	\$9,488,776	\$3,077,700	\$4,170,146	\$4,660,734	\$4,794,781	\$4,935,044	\$5,088,302	\$5,227,185	\$5,205,240	\$5,363,881	\$5,509,325	\$5,667,619	\$5,855,073	\$6,018,956
Ending Balance	\$4,572,354	\$8,184,121	\$7,328,113	\$12,260,287	\$14,736,724	\$3,077,700	\$4,170,146	\$4,660,734	\$4,794,781	\$4,935,044	\$5,088,302	\$5,227,185	\$5,205,240	\$5,363,881	\$5,509,325	\$5,667,619	\$5,855,073	\$6,018,956	\$6,197,490
Financial Metrics																			
Debt Service Coverage Ratio	2.11	1.27	0.93	1.28	1.19	1.28	1.60	1.66	1.68	1.72	1.71	1.80	1.85	1.90	1.95	2.01	2.11	2.18	2.25
Debt Service Coverage Ratio (Indenture)	2.11	1.28	0.93	1.38	1.19	1.28	1.59	1.65	1.68	1.72	1.71	1.79	1.84	1.90	1.95	2.01	2.10	2.17	2.25
Days Cash on Hand (target 90 days, un-restricted)						67	91	90	90	90	90	90	90	90	90	90	90	90	90
Days Cash on Hand (180 days, restricted O&M Fund)						212	210	189	188	188	188	184	188	188	188	188	188	188	188
Residential Water and Wastewater Bill as % of MHI						1.31%	1.86%	1.91%	1.98%	2.04%	2.10%	2.22%	2.29%	2.37%	2.49%	2.58%	2.75%	2.85%	2.95%
Outstanding Debt to NPV of Free Cash Flow						71%	68%	66%	63%	61%	58%	56%	54%	51%	49%	47%	45%	43%	41%
Operating Ratio						0.50	0.46	0.45	0.45	0.44	0.43	0.41	0.40	0.40	0.39	0.38	0.37	0.36	0.35
Debt to Operating Ratio						0.78	0.63	0.61	0.59	0.58	0.59	0.56	0.54	0.53	0.51	0.50	0.48	0.46	0.44
Percent Equity Funded CIP						100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Lehigh County Authority
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	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049
Operating Revenues																		
Water	\$43,420,000	\$46,101,000	\$47,453,000	\$50,045,000	\$52,210,000	\$54,011,000	\$55,626,000	\$57,386,000	\$60,010,000	\$62,509,000	\$64,558,000	\$66,937,000	\$69,322,000	\$72,227,000	\$75,110,000	\$77,477,000	\$79,652,000	\$81,971,000
Wastewater	\$33,632,000	\$35,021,000	\$39,487,000	\$41,507,000	\$43,320,000	\$44,112,000	\$46,357,000	\$49,763,000	\$50,711,000	\$51,685,000	\$52,690,000	\$53,727,000	\$56,380,000	\$61,486,000	\$66,747,000	\$72,128,000	\$74,337,000	\$77,495,000
Total Operating Revenues	\$77,052,000	\$81,122,000	\$86,940,000	\$91,552,000	\$95,530,000	\$98,123,000	\$101,983,000	\$107,149,000	\$110,721,000	\$114,194,000	\$117,248,000	\$120,664,000	\$125,702,000	\$133,713,000	\$141,857,000	\$149,605,000	\$153,989,000	\$159,466,000
Operating Expenses																		
Water	\$11,846,000	\$12,194,000	\$12,553,000	\$12,921,000	\$13,300,000	\$13,689,000	\$14,091,000	\$14,506,000	\$14,935,000	\$15,376,000	\$15,830,000	\$16,300,000	\$16,782,000	\$17,281,000	\$17,794,000	\$18,326,000	\$18,872,000	\$19,433,000
Wastewater	\$14,682,000	\$15,109,000	\$15,549,000	\$16,000,000	\$16,465,000	\$16,946,000	\$17,438,000	\$17,946,000	\$18,469,000	\$19,010,000	\$19,567,000	\$20,142,000	\$20,733,000	\$21,341,000	\$21,969,000	\$22,616,000	\$23,280,000	\$23,965,000
Total Operating Expenses	\$26,528,000	\$27,303,000	\$28,102,000	\$28,921,000	\$29,765,000	\$30,635,000	\$31,529,000	\$32,452,000	\$33,404,000	\$34,386,000	\$35,397,000	\$36,442,000	\$37,515,000	\$38,622,000	\$39,763,000	\$40,942,000	\$42,152,000	\$43,398,000
Operating Income (Loss)	\$50,524,000	\$53,819,000	\$58,838,000	\$62,631,000	\$65,765,000	\$67,488,000	\$70,454,000	\$74,697,000	\$77,317,000	\$79,808,000	\$81,851,000	\$84,222,000	\$88,187,000	\$95,091,000	\$102,094,000	\$108,663,000	\$111,837,000	\$116,068,000
Interest Income	\$63,000	\$65,000	\$67,000	\$68,000	\$182,000	\$348,000	\$423,000	\$543,000	\$753,000	\$1,013,000	\$1,297,000	\$1,513,000	\$1,558,000	\$1,510,000	\$1,539,000	\$1,827,000	\$2,438,000	\$3,305,000
Net Available For Debt Service	\$50,587,000	\$53,884,000	\$58,905,000	\$62,699,000	\$65,947,000	\$67,836,000	\$70,877,000	\$75,240,000	\$78,070,000	\$80,821,000	\$83,148,000	\$85,735,000	\$89,745,000	\$96,601,000	\$103,633,000	\$110,490,000	\$114,275,000	\$119,373,000
Debt Service																		
Existing	\$21,727,938	\$22,446,889	\$23,844,488	\$29,105,513	\$30,628,188	\$32,193,038	\$33,687,088	\$34,771,063	\$35,919,513	\$37,109,413	\$38,343,038	\$39,617,138	\$29,393,238	\$29,390,681	\$29,390,656	\$29,389,863	\$0	\$0
Projected	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Debt Service	\$21,727,938	\$22,446,889	\$23,844,488	\$29,105,513	\$30,628,188	\$32,193,038	\$33,687,088	\$34,771,063	\$35,919,513	\$37,109,413	\$38,343,038	\$39,617,138	\$29,393,238	\$29,390,681	\$29,390,656	\$29,389,863	\$0	\$0
Net After Debt Service	\$28,859,063	\$31,437,112	\$35,060,513	\$33,593,488	\$35,318,813	\$35,642,963	\$37,189,913	\$40,468,938	\$42,150,488	\$43,711,588	\$44,804,963	\$46,117,863	\$60,351,763	\$67,210,319	\$74,242,344	\$81,100,138	\$114,275,000	\$119,373,000
Non-Operating Revenues																		
Reimbursement (AO and Non-AO) Exclude from Indenture																		
Water	\$292,600	\$295,000	\$297,400	\$299,800	\$302,200	\$304,600	\$307,000	\$309,400	\$312,800	\$316,200	\$319,600	\$323,000	\$326,400	\$329,800	\$333,200	\$336,600	\$340,000	\$343,400
Wastewater	\$221,000	\$223,000	\$225,000	\$227,000	\$229,000	\$231,000	\$233,000	\$235,000	\$237,000	\$239,000	\$241,000	\$243,000	\$245,000	\$247,000	\$249,000	\$251,000	\$254,000	\$257,000
Total Non-Operating Revenues	\$513,600	\$518,000	\$522,400	\$526,800	\$531,200	\$535,600	\$540,000	\$544,400	\$549,800	\$555,200	\$560,600	\$566,000	\$571,400	\$576,800	\$582,200	\$587,600	\$594,000	\$600,400
Non-Operating Expenses																		
Contribution to Operations and Maintenance Reserve Fu	\$245,252	\$252,949	\$261,015	\$266,959	\$275,313	\$284,030	\$291,614	\$301,583	\$311,394	\$321,560	\$331,074	\$342,945	\$351,634	\$363,198	\$374,576	\$387,785	\$397,293	\$409,164
Contribution to CAPEX Fund	\$0	\$1,220,190	\$1,232,392	\$1,244,716	\$1,257,163	\$1,269,735	\$1,282,432	\$1,295,256	\$1,308,209	\$1,321,291	\$1,334,504	\$2,695,698	\$2,722,655	\$2,749,881	\$2,777,380	\$2,805,154	\$2,833,206	\$2,861,538
Deposit to Annual Lease Payment Fund	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Lease Payment	\$585,800	\$591,700	\$597,700	\$603,700	\$609,800	\$615,900	\$622,100	\$628,400	\$634,700	\$641,100	\$647,600	\$654,100	\$660,700	\$667,400	\$674,100	\$680,900	\$687,800	\$694,700
Total Non-Operating Expenses	\$831,052	\$2,064,839	\$2,091,107	\$2,115,375	\$2,142,276	\$2,169,664	\$2,196,146	\$2,225,239	\$2,254,303	\$2,283,951	\$2,313,178	\$3,692,743	\$3,734,989	\$3,780,479	\$3,826,056	\$3,873,839	\$3,918,299	\$3,965,402
Available for Capital	\$28,541,611	\$29,890,273	\$33,491,805	\$32,004,913	\$33,707,736	\$34,008,898	\$35,533,767	\$38,788,098	\$40,445,985	\$41,982,836	\$43,052,385	\$42,991,119	\$57,188,174	\$64,006,640	\$70,998,487	\$77,813,899	\$110,950,701	\$116,007,998
Equity Funded CAPEX																		
Reimbursable Costs (AO and Non-AO) Project LCA compl																		
PayGo	\$28,368,550	\$29,707,846	\$33,296,100	\$31,814,000	\$11,156,000	\$23,456,505	\$30,960,000	\$19,470,000	\$17,758,000	\$12,553,000	\$15,857,000	\$26,975,000	\$64,123,000	\$66,750,000	\$62,424,000	\$28,797,000	\$37,795,000	\$15,749,000
Reserved 1																		
Total Capex	\$28,368,550	\$29,707,846	\$33,296,100	\$31,814,000	\$11,156,000	\$23,456,505	\$30,960,000	\$19,470,000	\$17,758,000	\$12,553,000	\$15,857,000	\$26,975,000	\$64,123,000	\$66,750,000	\$62,424,000	\$28,797,000	\$37,795,000	\$15,749,000
Net Fund Surplus (deficit)	\$173,061	\$182,427	\$195,705	\$190,913	\$22,551,736	\$10,552,394	\$4,573,767	\$19,318,098	\$22,687,985	\$29,429,836	\$27,195,385	\$16,016,119	(\$6,934,826)	(\$2,743,360)	\$8,574,487	\$49,016,899	\$73,155,701	\$100,258,998
Beginning Balance	\$6,197,490	\$6,370,551	\$6,552,978	\$6,748,684	\$6,939,596	\$29,491,333	\$40,043,726	\$44,617,493	\$63,935,592	\$86,623,576	\$116,053,413	\$143,248,797	\$159,264,917	\$152,330,091	\$149,586,730	\$158,161,218	\$207,178,117	\$280,333,818
Ending Balance	\$6,370,551	\$6,552,978	\$6,748,684	\$6,939,596	\$29,491,333	\$40,043,726	\$44,617,493	\$63,935,592	\$86,623,576	\$116,053,413	\$143,248,797	\$159,264,917	\$152,330,091	\$149,586,730	\$158,161,218	\$207,178,117	\$280,333,818	\$380,592,816
Financial Metrics																		
Debt Service Coverage Ratio	2.33	2.40	2.47	2.15	2.15	2.11	2.10	2.16	2.17	2.18	2.17	2.16	3.05	3.29	3.53	3.76		
Debt Service Coverage Ratio (Indenture)	2.32	2.40	2.47	2.15	2.15	2.10	2.10	2.16	2.17	2.18	2.17	2.16	3.05	3.28	3.52	3.76		
Days Cash on Hand (target 90 days, un-restricted)	90	90	90	90	372	491	532	740	974	1,268	1,521	1,642	1,526	1,455	1,495	1,902	2,499	3,296
Days Cash on Hand (180 days, restricted O&M Fund)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Residential Water and Wastewater Bill as % of MHI	3.07%	3.13%	3.38%	3.46%	3.55%	3.62%	3.69%	3.80%	3.88%	3.97%	4.03%	4.11%	4.23%	4.39%	4.56%	4.70%	4.79%	4.91%
Outstanding Debt to NPV of Free Cash Flow	39%	38%	36%	34%	32%	31%	30%	26%	23%	20%	17%	13%	10%	6%	3%	0%	0%	0%
Operating Ratio	0.34	0.34	0.32	0.32	0.31	0.31	0.31	0.30	0.30	0.30	0.30	0.30	0.29	0.29	0.28	0.27	0.27	0.27
Debt to Operating Ratio	0.43	0.42	0.41	0.46	0.47	0.48	0.48	0.47	0.46	0.46	0.46	0.47	0.47	0.33	0.31	0.29	0.27	0.27
Percent Equity Funded CIP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Lehigh County Authority
Review of Allentown Water/Sewer Lease Co
City Division Pro forma - Scenario B
LCA Financial Planning Model Version 5.1

	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062
Operating Revenues													
Water	\$84,280,000	\$87,277,000	\$89,974,000	\$92,183,000	\$94,906,000	\$97,378,000	\$100,578,000	\$102,226,000	\$103,904,000	\$105,771,000	\$107,277,000	\$108,932,000	\$109,682,000
Wastewater	\$78,639,000	\$80,558,000	\$81,759,000	\$83,013,000	\$84,223,000	\$86,793,000	\$89,594,000	\$94,312,000	\$99,392,000	\$104,493,000	\$108,301,000	\$108,764,000	\$110,066,000
Total Operating Revenues	\$162,919,000	\$167,835,000	\$171,733,000	\$175,196,000	\$179,129,000	\$184,171,000	\$190,172,000	\$196,538,000	\$203,296,000	\$210,264,000	\$215,578,000	\$217,696,000	\$219,748,000
Operating Expenses													
Water	\$20,012,000	\$20,608,000	\$21,223,000	\$21,855,000	\$22,507,000	\$23,179,000	\$23,872,000	\$24,587,000	\$25,320,000	\$26,073,000	\$26,851,000	\$27,654,000	\$28,483,000
Wastewater	\$24,672,000	\$25,400,000	\$26,151,000	\$26,925,000	\$27,723,000	\$28,547,000	\$29,397,000	\$30,275,000	\$31,177,000	\$32,105,000	\$33,062,000	\$34,051,000	\$35,071,000
Total Operating Expenses	\$44,684,000	\$46,008,000	\$47,374,000	\$48,780,000	\$50,230,000	\$51,726,000	\$53,269,000	\$54,862,000	\$56,497,000	\$58,178,000	\$59,913,000	\$61,705,000	\$63,554,000
Operating Income (Loss)	\$118,235,000	\$121,827,000	\$124,359,000	\$126,416,000	\$128,899,000	\$132,445,000	\$136,903,000	\$141,676,000	\$146,799,000	\$152,086,000	\$155,665,000	\$155,991,000	\$156,194,000
Interest Income	\$4,242,000	\$5,188,000	\$6,248,000	\$7,327,000	\$8,339,000	\$9,267,000	\$10,145,000	\$11,043,000	\$11,965,000	\$13,015,000	\$14,391,000	\$15,967,000	\$17,268,000
Net Available For Debt Service	\$122,477,000	\$127,015,000	\$130,607,000	\$133,743,000	\$137,238,000	\$141,712,000	\$147,048,000	\$152,719,000	\$158,764,000	\$165,101,000	\$170,056,000	\$171,958,000	\$173,462,000
Debt Service													
Existing	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Projected	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Debt Service	\$0	\$0	\$0	\$0	\$0	\$0	\$0						
Net After Debt Service	\$122,477,000	\$127,015,000	\$130,607,000	\$133,743,000	\$137,238,000	\$141,712,000	\$147,048,000	\$152,719,000	\$158,764,000	\$165,101,000	\$170,056,000	\$171,958,000	\$173,462,000
Non-Operating Revenues													
Reimbursement (AO and Non-AO) Exclude from Indenture													
Water	\$346,800	\$350,200	\$353,600	\$357,000	\$360,400	\$363,800	\$367,200	\$370,600	\$374,000	\$377,400	\$380,800	\$384,200	\$387,600
Wastewater	\$260,000	\$263,000	\$266,000	\$269,000	\$272,000	\$275,000	\$278,000	\$281,000	\$284,000	\$287,000	\$290,000	\$293,000	\$296,000
Total Non-Operating Revenues	\$606,800	\$613,200	\$619,600	\$626,000	\$632,400	\$638,800	\$645,200	\$651,600	\$658,000	\$664,400	\$670,800	\$677,200	\$683,600
Non-Operating Expenses													
Contribution to Operations and Maintenance Reserve Fu	\$422,843	\$435,311	\$449,595	\$462,658	\$477,526	\$493,164	\$509,067	\$526,233	\$539,141	\$553,859	\$572,337	\$592,025	\$611,420
Contribution to CAPEX Fund	\$2,890,153	\$2,919,054	\$2,948,245	\$4,466,591	\$4,511,257	\$4,556,370	\$4,601,933	\$4,647,953	\$4,694,432	\$4,741,377	\$4,788,790	\$4,836,678	\$4,885,045
Deposit to Annual Lease Payment Fund	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Lease Payment	\$701,700	\$708,800	\$715,900	\$723,100	\$730,400	\$737,800	\$745,200	\$752,700	\$760,300	\$768,000	\$775,700	\$783,500	\$791,400
Total Non-Operating Expenses	\$4,014,696	\$4,063,166	\$4,113,740	\$5,652,349	\$5,719,183	\$5,787,334	\$5,856,201	\$5,926,885	\$5,993,873	\$6,063,236	\$6,136,827	\$6,212,203	\$6,287,865
Available for Capital	\$119,069,104	\$123,565,034	\$127,112,860	\$128,716,651	\$132,151,217	\$136,563,466	\$141,836,999	\$147,443,715	\$153,428,127	\$159,702,164	\$164,589,973	\$166,422,997	\$167,857,735
Equity Funded CAPEX													
Reimbursable Costs (AO and Non-AO) Project LCA compl													
PayGo	\$31,859,000	\$21,528,000	\$17,133,000	\$23,010,000	\$35,305,000	\$47,845,239	\$55,002,000	\$54,672,000	\$61,860,000	\$41,207,000	\$7,840,000	\$8,077,000	\$65,962,000
Reserved 1													
Total Capex	\$31,859,000	\$21,528,000	\$17,133,000	\$23,010,000	\$35,305,000	\$47,845,239	\$55,002,000	\$54,672,000	\$61,860,000	\$41,207,000	\$7,840,000	\$8,077,000	\$65,962,000
Net Fund Surplus (deficit)	\$87,210,104	\$102,037,034	\$109,979,860	\$105,706,651	\$96,846,217	\$88,718,227	\$86,834,999	\$92,771,715	\$91,568,127	\$118,495,164	\$156,749,973	\$158,345,997	\$101,895,735
Beginning Balance	\$380,592,816	\$467,802,920	\$569,839,955	\$679,819,815	\$785,526,466	\$882,372,683	\$971,090,910	\$1,057,925,910	\$1,150,697,624	\$1,242,265,751	\$1,360,760,916	\$1,517,510,888	\$1,675,856,886
Ending Balance	\$467,802,920	\$569,839,955	\$679,819,815	\$785,526,466	\$882,372,683	\$971,090,910	\$1,057,925,910	\$1,150,697,624	\$1,242,265,751	\$1,360,760,916	\$1,517,510,888	\$1,675,856,886	\$1,777,752,621
Financial Metrics													
Debt Service Coverage Ratio													
Debt Service Coverage Ratio (Indenture)													
Days Cash on Hand (target 90 days, un-restricted)	3,934	4,655	5,393	6,052	6,602	7,057	7,465	7,885	8,265	8,791	9,521	10,210	10,516
Days Cash on Hand (180 days, restricted O&M Fund)	188	188	188	188	188	188	188	188	188	188	188	188	188
Residential Water and Wastewater Bill as % of MHI	4.99%	5.08%	5.17%	5.24%	5.31%	5.41%	5.53%	5.61%	5.71%	5.78%	5.85%	5.87%	5.89%
Outstanding Debt to NPV of Free Cash Flow	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Operating Ratio	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.26	0.26	0.26	0.26	0.26	0.27
Debt to Operating Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Percent Equity Funded CIP	100%	100%	100%	100%	100%	77%	85%	72%	87%	81%	44%	44%	86%

Lehigh County Authority
Review of Allentown Water/Sewer Lease Concession Financial Condition Assessment
City Division Pro forma - Scenario C
LCA Financial Planning Model Version 5.1

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Operating Revenues																				
Water	\$6,748,381	\$16,507,523	\$16,725,712	\$16,987,167	\$17,364,832	\$17,771,000	\$24,213,000	\$25,242,000	\$26,591,000	\$27,771,000	\$29,099,000	\$30,207,000	\$31,630,000	\$33,183,000	\$34,834,000	\$36,365,000	\$37,866,000	\$39,927,000	\$42,034,000	\$44,700,000
Wastewater	\$6,244,922	\$14,771,776	\$10,794,690	\$14,686,290	\$14,666,662	\$15,731,734	\$16,945,000	\$17,712,000	\$18,356,000	\$19,092,000	\$19,862,000	\$21,284,000	\$22,331,000	\$23,386,000	\$25,628,000	\$27,530,000	\$31,686,000	\$33,091,000	\$34,625,000	\$35,586,000
Total Operating Revenues	\$12,993,303	\$31,279,299	\$27,520,402	\$31,673,457	\$32,031,494	\$33,502,734	\$41,158,000	\$42,954,000	\$44,947,000	\$46,863,000	\$48,961,000	\$51,491,000	\$53,961,000	\$56,569,000	\$60,462,000	\$63,895,000	\$69,552,000	\$73,018,000	\$76,659,000	\$80,286,000
Operating Expenses																				
Water	\$2,260,972	\$7,007,850	\$6,773,471	\$6,226,015	\$6,548,687	\$6,970,098	\$8,348,000	\$8,597,000	\$8,856,000	\$9,125,000	\$9,402,000	\$9,370,000	\$9,650,000	\$9,941,000	\$10,239,000	\$10,541,000	\$10,854,000	\$11,177,000	\$11,508,000	\$11,846,000
Wastewater	\$2,028,198	\$7,638,389	\$8,646,549	\$8,751,484	\$9,947,544	\$9,831,891	\$10,493,000	\$10,801,000	\$11,117,000	\$11,440,000	\$11,775,000	\$11,672,000	\$12,014,000	\$12,363,000	\$12,721,000	\$13,092,000	\$13,472,000	\$13,864,000	\$14,268,000	\$14,682,000
Total Operating Expenses	\$4,289,170	\$14,646,239	\$15,420,020	\$14,977,499	\$16,496,231	\$16,801,989	\$18,841,000	\$19,398,000	\$19,973,000	\$20,565,000	\$21,177,000	\$21,042,000	\$21,664,000	\$22,304,000	\$22,960,000	\$23,633,000	\$24,326,000	\$25,041,000	\$25,776,000	\$26,528,000
Operating Income (Loss)	\$8,704,133	\$16,633,060	\$12,100,382	\$16,695,958	\$15,535,263	\$16,700,745	\$22,317,000	\$23,556,000	\$24,974,000	\$26,298,000	\$27,784,000	\$30,449,000	\$32,297,000	\$34,265,000	\$37,502,000	\$40,262,000	\$45,226,000	\$47,977,000	\$50,883,000	\$53,758,000
Interest Income						\$70,000	\$64,000	\$88,000	\$94,000	\$97,000	\$100,000	\$103,000	\$104,000	\$106,000	\$109,000	\$112,000	\$115,000	\$119,000	\$136,000	\$227,000
Net Available For Debt Service	\$8,704,133	\$16,633,060	\$12,100,382	\$16,695,958	\$15,535,263	\$16,770,745	\$22,381,000	\$23,644,000	\$25,068,000	\$26,395,000	\$27,884,000	\$30,552,000	\$32,401,000	\$34,371,000	\$37,611,000	\$40,374,000	\$45,341,000	\$48,096,000	\$51,019,000	\$53,985,000
Debt Service																				
Existing	\$4,131,779	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$11,626,431	\$11,165,872	\$11,406,031	\$15,393,557	\$15,893,556	\$16,873,557	\$17,407,631	\$17,955,806	\$18,528,082	\$19,119,231	\$19,729,256	\$20,363,156	\$21,855,932	\$22,539,556	\$23,240,031
Projected	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$120,653	\$120,653	\$120,653	\$1,393,392	\$1,848,099	\$3,331,447	\$3,331,447	\$3,331,447	\$3,331,447
Total Debt Service	\$4,131,779	\$13,047,722	\$13,047,722	\$13,047,722	\$13,047,722	\$11,626,431	\$11,165,872	\$11,406,031	\$15,393,557	\$15,893,556	\$16,873,557	\$17,528,285	\$18,076,460	\$18,648,736	\$20,512,623	\$21,577,355	\$23,694,603	\$25,187,379	\$25,871,003	\$26,571,478
Net After Debt Service	\$4,572,354	\$3,585,338	(\$947,340)	\$3,648,236	\$2,487,541	\$5,144,314	\$11,215,128	\$12,237,969	\$9,674,443	\$10,501,444	\$11,010,443	\$13,023,715	\$14,324,540	\$15,722,264	\$17,098,377	\$18,796,645	\$21,646,397	\$22,908,621	\$25,147,997	\$27,413,522
Non-Operating Revenues																				
Reimbursement (AO and Non-AO) Exclude from Indenture Ratio																				
Water	\$0	\$0	\$226,040	\$1,325,289	\$240,146	\$259,000	\$261,400	\$263,800	\$266,200	\$268,600	\$271,000	\$273,400	\$275,800	\$278,200	\$280,600	\$283,000	\$285,400	\$287,800	\$290,200	\$292,600
Wastewater	\$0	\$26,429	\$115,292	\$708,649	\$252,750	\$193,000	\$195,000	\$197,000	\$199,000	\$201,000	\$203,000	\$205,000	\$207,000	\$209,000	\$211,000	\$213,000	\$215,000	\$217,000	\$219,000	\$221,000
Total Non-Operating Revenues	\$0	\$26,429	\$341,332	\$2,033,938	\$492,896	\$452,000	\$456,400	\$460,800	\$465,200	\$469,600	\$474,000	\$478,400	\$482,800	\$487,200	\$491,600	\$496,000	\$500,400	\$504,800	\$509,200	\$513,600
Non-Operating Expenses																				
Contribution to Operations and Maintenance Reserve Fund		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$119,939	\$195,024	\$201,668	\$0	\$28,562	\$210,991	\$214,849	\$220,033	\$226,624	\$234,109	\$240,478	\$245,252
Contribution to CAPEX Fund	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Deposit to Annual Lease Payment Fund			\$250,000	\$250,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Lease Payment				\$500,000	\$504,000	\$509,100	\$514,200	\$519,400	\$524,600	\$529,900	\$535,200	\$540,600	\$546,100	\$551,600	\$557,200	\$562,800	\$568,500	\$574,200	\$580,000	\$585,800
Total Non-Operating Expenses	\$0	\$0	\$250,000	\$750,000	\$504,000	\$509,100	\$514,200	\$519,400	\$644,539	\$724,924	\$736,868	\$540,600	\$574,662	\$762,591	\$772,049	\$782,833	\$795,124	\$808,309	\$820,478	\$831,052
Available for Capital	\$4,572,354	\$3,611,767	(\$856,008)	\$4,932,174	\$2,476,437	\$5,087,214	\$11,157,328	\$12,179,369	\$9,495,104	\$10,246,119	\$10,747,574	\$12,961,515	\$14,232,678	\$15,446,874	\$16,817,928	\$18,509,812	\$21,351,673	\$22,605,113	\$24,836,720	\$27,096,070
Equity Funded CAPEX																				
Reimbursable Costs (AO and Non-AO) Project LCA completes and gets reimbursed																				
PayGo	\$0	\$0	\$0	\$0	\$0	\$10,070,000	\$7,361,000	\$11,174,625	\$9,223,490	\$9,966,760	\$10,440,356	\$12,659,590	\$14,292,000	\$15,132,574	\$16,521,250	\$18,193,460	\$21,001,180	\$22,257,580	\$21,709,419	\$11,957,000
Reserved 1																				
Total Capex	\$0	\$0	\$0	\$0	\$0	\$10,070,000	\$7,361,000	\$11,174,625	\$9,223,490	\$9,966,760	\$10,440,356	\$12,659,590	\$14,292,000	\$15,132,574	\$16,521,250	\$18,193,460	\$21,001,180	\$22,257,580	\$21,709,419	\$11,957,000
Net Fund Surplus (deficit)	\$4,572,354	\$3,611,767	(\$856,008)	\$4,932,174	\$2,476,437	(\$4,982,786)	\$3,796,328	\$1,004,744	\$271,614	\$279,359	\$307,218	\$301,925	(\$59,322)	\$314,300	\$296,678	\$316,352	\$350,493	\$347,533	\$3,127,301	\$15,139,070
Beginning Balance	\$0	\$4,572,354	\$8,184,121	\$7,328,113	\$12,260,287	\$9,488,776	\$4,505,990	\$8,302,318	\$9,307,062	\$9,578,676	\$9,858,035	\$10,165,253	\$10,467,179	\$10,407,857	\$10,722,156	\$11,018,834	\$11,335,186	\$11,685,679	\$12,033,211	\$15,160,512
Ending Balance	\$4,572,354	\$8,184,121	\$7,328,113	\$12,260,287	\$14,736,724	\$4,505,990	\$8,302,318	\$9,307,062	\$9,578,676	\$9,858,035	\$10,165,253	\$10,467,179	\$10,407,857	\$10,722,156	\$11,018,834	\$11,335,186	\$11,685,679	\$12,033,211	\$15,160,512	\$30,299,582
Financial Metrics																				
Debt Service Coverage Ratio	2.11	1.27	0.93	1.28	1.19	1.44	2.00	2.07	1.63	1.66	1.65	1.74	1.79	1.84	1.83	1.87	1.91	1.91	1.97	2.03
Debt Service Coverage Ratio (Indenture)	2.11	1.28	0.93	1.38	1.19	1.44	2.00	2.07	1.62	1.66	1.65	1.74	1.79	1.84	1.83	1.87	1.91	1.91	1.97	2.03
Days Cash on Hand (target 90 days, un-restricted)						100	180	180	180	180	180	180	181	181	180	180	180	181	221	429
Days Cash on Hand (180 days, restricted O&M Fund)						212	210	189	188	188	188	184	188	188	188	188	188	188	188	188
Residential Water and Wastewater Bill as % of MHI						1.31%	1.86%	1.91%	1.97%	2.03%	2.10%	2.20%	2.28%	2.36%	2.44%	2.53%	2.64%	2.74%	2.84%	2.97%
Outstanding Debt to NPV of Free Cash Flow						71%	67%	65%	62%	60%	58%	55%	53%	53%	52%	52%	50%	48%	46%	44%
Operating Ratio						0.50	0.46	0.45	0.44	0.44	0.43	0.41	0.40	0.39	0.38	0.37	0.35	0.34	0.34	0.33
Debt to Operating Ratio						0.70	0.50	0.48	0.62	0.60	0.61	0.58	0.56	0.54	0.55	0.54	0.52	0.52	0.51	0.49
Percent Equity Funded CIP						100%	100%	100%	100%	100%	87%	100%	100%	49%	75%	50%	100%	100%	100%	100%

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	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051
Operating Revenues																			
Water	\$46,279,000	\$47,769,000	\$49,796,000	\$51,961,000	\$53,762,000	\$55,377,000	\$57,137,000	\$59,761,000	\$62,260,000	\$64,309,000	\$66,688,000	\$69,073,000	\$71,978,000	\$74,861,000	\$77,228,000	\$79,404,000	\$81,722,000	\$84,021,000	\$86,823,000
Wastewater	\$36,571,000	\$43,425,000	\$44,493,000	\$45,661,000	\$46,453,000	\$48,163,000	\$52,086,000	\$53,034,000	\$54,009,000	\$55,014,000	\$56,051,000	\$59,202,000	\$64,308,000	\$69,570,000	\$74,950,000	\$77,159,000	\$80,635,000	\$81,776,000	\$83,695,000
Total Operating Revenues	\$82,850,000	\$91,194,000	\$94,289,000	\$97,622,000	\$100,215,000	\$103,540,000	\$109,223,000	\$112,795,000	\$116,269,000	\$119,323,000	\$122,739,000	\$128,275,000	\$136,286,000	\$144,431,000	\$152,178,000	\$156,563,000	\$162,357,000	\$165,797,000	\$170,518,000
Operating Expenses																			
Water	\$12,194,000	\$12,553,000	\$12,921,000	\$13,300,000	\$13,689,000	\$14,091,000	\$14,506,000	\$14,935,000	\$15,376,000	\$15,830,000	\$16,300,000	\$16,782,000	\$17,281,000	\$17,794,000	\$18,326,000	\$18,872,000	\$19,433,000	\$20,012,000	\$20,608,000
Wastewater	\$15,109,000	\$15,549,000	\$16,000,000	\$16,465,000	\$16,946,000	\$17,438,000	\$17,946,000	\$18,469,000	\$19,010,000	\$19,567,000	\$20,142,000	\$20,733,000	\$21,341,000	\$21,969,000	\$22,616,000	\$23,280,000	\$23,965,000	\$24,672,000	\$25,400,000
Total Operating Expenses	\$27,303,000	\$28,102,000	\$28,921,000	\$29,765,000	\$30,635,000	\$31,529,000	\$32,452,000	\$33,404,000	\$34,386,000	\$35,397,000	\$36,442,000	\$37,515,000	\$38,622,000	\$39,763,000	\$40,942,000	\$42,152,000	\$43,398,000	\$44,684,000	\$46,008,000
Operating Income (Loss)	\$55,547,000	\$63,092,000	\$65,368,000	\$67,857,000	\$69,580,000	\$72,011,000	\$76,771,000	\$79,391,000	\$81,883,000	\$83,926,000	\$86,297,000	\$90,760,000	\$97,664,000	\$104,668,000	\$111,236,000	\$114,411,000	\$118,959,000	\$121,113,000	\$124,510,000
Interest Income	\$231,000	\$240,000	\$348,000	\$475,000	\$645,000	\$722,000	\$814,000	\$999,000	\$1,234,000	\$1,492,000	\$1,682,000	\$1,704,000	\$1,634,000	\$1,642,000	\$1,908,000	\$2,505,000	\$3,366,000	\$4,300,000	\$5,241,000
Net Available For Debt Service	\$55,778,000	\$63,332,000	\$65,716,000	\$68,332,000	\$70,225,000	\$72,733,000	\$77,585,000	\$80,390,000	\$83,117,000	\$85,418,000	\$87,979,000	\$92,464,000	\$99,298,000	\$106,310,000	\$113,144,000	\$116,916,000	\$122,325,000	\$125,413,000	\$129,751,000
Debt Service																			
Existing	\$23,957,357	\$25,351,531	\$30,617,331	\$32,137,531	\$33,702,881	\$35,195,181	\$36,280,156	\$37,427,131	\$38,618,081	\$39,850,056	\$41,124,806	\$30,903,631	\$30,900,650	\$30,898,925	\$30,900,650	\$0	\$0	\$0	\$0
Projected	\$3,331,447	\$3,331,447	\$3,331,447	\$3,331,447	\$3,331,447	\$3,331,447	\$3,331,447	\$3,331,447	\$3,331,447	\$3,331,447	\$3,331,447	\$3,331,447	\$3,331,447	\$3,331,447	\$3,331,447	\$3,331,447	\$3,331,447	\$3,331,447	\$3,331,447
Total Debt Service	\$27,288,804	\$28,682,978	\$33,948,778	\$35,468,978	\$37,034,328	\$38,526,628	\$39,611,603	\$40,758,578	\$41,949,528	\$43,181,503	\$44,456,253	\$34,235,078	\$34,232,097	\$34,230,372	\$34,232,097	\$3,331,447	\$3,331,447	\$3,331,447	\$3,331,447
Net After Debt Service	\$28,489,196	\$34,649,022	\$31,767,222	\$32,863,022	\$33,190,672	\$34,206,372	\$37,973,397	\$39,631,422	\$41,167,472	\$42,236,497	\$43,522,747	\$58,228,922	\$65,065,903	\$72,079,628	\$78,911,903	\$113,584,553	\$118,993,553	\$122,081,553	\$126,419,553
Non-Operating Revenues																			
Reimbursement (AO and Non-AO) Exclude from Indenture																			
Water	\$295,000	\$297,400	\$299,800	\$302,200	\$304,600	\$307,000	\$309,400	\$312,800	\$316,200	\$319,600	\$323,000	\$326,400	\$329,800	\$333,200	\$336,600	\$340,000	\$343,400	\$346,800	\$350,200
Wastewater	\$223,000	\$225,000	\$227,000	\$229,000	\$231,000	\$233,000	\$235,000	\$237,000	\$239,000	\$241,000	\$243,000	\$245,000	\$247,000	\$249,000	\$251,000	\$254,000	\$257,000	\$260,000	\$263,000
Total Non-Operating Revenues	\$518,000	\$522,400	\$526,800	\$531,200	\$535,600	\$540,000	\$544,400	\$549,800	\$555,200	\$560,600	\$566,000	\$571,400	\$576,800	\$582,200	\$587,600	\$594,000	\$600,400	\$606,800	\$613,200
Non-Operating Expenses																			
Contribution to Operations and Maintenance Reserve Fu	\$252,949	\$261,015	\$266,959	\$275,313	\$284,030	\$291,614	\$301,583	\$311,394	\$321,560	\$331,074	\$342,945	\$351,634	\$363,198	\$374,576	\$387,785	\$397,293	\$409,164	\$422,843	\$435,311
Contribution to CAPEX Fund	\$1,220,190	\$1,232,392	\$1,244,716	\$1,257,163	\$1,269,735	\$1,282,432	\$1,295,256	\$1,308,209	\$1,321,291	\$1,334,504	\$2,695,698	\$2,722,655	\$2,749,881	\$2,777,380	\$2,805,154	\$2,833,206	\$2,861,538	\$2,890,153	\$2,919,054
Deposit to Annual Lease Payment Fund	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Lease Payment	\$591,700	\$597,700	\$603,700	\$609,800	\$615,900	\$622,100	\$628,400	\$634,700	\$641,100	\$647,600	\$654,100	\$660,700	\$667,400	\$674,100	\$680,900	\$687,800	\$694,700	\$701,700	\$708,800
Total Non-Operating Expenses	\$2,064,839	\$2,091,107	\$2,115,375	\$2,142,276	\$2,169,664	\$2,196,146	\$2,225,239	\$2,254,303	\$2,283,951	\$2,313,178	\$3,692,743	\$3,734,989	\$3,780,479	\$3,826,056	\$3,873,839	\$3,918,299	\$3,965,402	\$4,014,696	\$4,063,166
Available for Capital	\$26,942,357	\$33,080,315	\$30,178,647	\$31,251,946	\$31,556,608	\$32,550,226	\$36,292,558	\$37,926,919	\$39,438,721	\$40,483,919	\$40,396,004	\$55,065,334	\$61,862,224	\$68,835,772	\$75,625,665	\$110,260,255	\$115,628,551	\$118,673,658	\$122,969,588
Equity Funded CAPEX																			
Reimbursable Costs (AO and Non-AO) Project LCA compl																			
PayGo	\$41,292,000	\$16,884,000	\$24,872,000	\$11,156,000	\$17,687,000	\$30,960,000	\$19,470,000	\$17,758,000	\$12,553,000	\$15,857,000	\$26,975,000	\$64,123,000	\$66,750,000	\$62,424,000	\$28,797,000	\$37,795,000	\$15,749,000	\$31,859,000	\$21,528,000
Reserved 1																			
Total Capex	\$41,292,000	\$16,884,000	\$24,872,000	\$11,156,000	\$17,687,000	\$30,960,000	\$19,470,000	\$17,758,000	\$12,553,000	\$15,857,000	\$26,975,000	\$64,123,000	\$66,750,000	\$62,424,000	\$28,797,000	\$37,795,000	\$15,749,000	\$31,859,000	\$21,528,000
Net Fund Surplus (deficit)	(\$14,349,643)	\$16,196,315	\$5,306,647	\$20,095,946	\$13,869,608	\$1,590,226	\$16,822,558	\$20,168,919	\$26,885,721	\$24,626,919	\$13,421,004	(\$9,057,666)	(\$4,887,776)	\$6,411,772	\$46,828,665	\$72,465,255	\$99,879,551	\$86,814,658	\$101,441,588
Beginning Balance	\$30,299,582	\$15,949,940	\$32,146,255	\$37,452,902	\$57,548,848	\$71,418,455	\$73,008,682	\$89,831,240	\$110,000,159	\$136,885,880	\$161,512,800	\$174,933,804	\$165,876,137	\$160,988,362	\$167,400,134	\$214,228,798	\$286,694,053	\$386,573,605	\$473,388,262
Ending Balance	\$15,949,940	\$32,146,255	\$37,452,902	\$57,548,848	\$71,418,455	\$73,008,682	\$89,831,240	\$110,000,159	\$136,885,880	\$161,512,800	\$174,933,804	\$165,876,137	\$160,988,362	\$167,400,134	\$214,228,798	\$286,694,053	\$386,573,605	\$473,388,262	\$574,829,850
Financial Metrics																			
Debt Service Coverage Ratio	2.04	2.21	1.94	1.93	1.90	1.89	1.96	1.97	1.98	1.98	1.98	2.70	2.90	3.11	3.31	35.09	36.72	37.65	38.95
Debt Service Coverage Ratio (Indenture)	2.04	2.21	1.93	1.92	1.89	1.89	1.96	1.97	1.98	1.98	1.98	2.70	2.90	3.10	3.30	35.07	36.69	37.62	38.92
Days Cash on Hand (target 90 days, un-restricted)	219	430	486	726	876	870	1,040	1,237	1,496	1,714	1,804	1,661	1,566	1,582	1,966	2,556	3,347	3,981	4,695
Days Cash on Hand (180 days, restricted O&M Fund)	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
Residential Water and Wastewater Bill as % of MHI	3.08%	3.24%	3.37%	3.47%	3.53%	3.62%	3.71%	3.79%	3.88%	3.95%	4.03%	4.12%	4.29%	4.46%	4.60%	4.69%	4.80%	4.88%	4.98%
Outstanding Debt to NPV of Free Cash Flow	43%	40%	39%	37%	36%	34%	31%	28%	24%	21%	17%	14%	10%	6%	3%	2%	2%	2%	2%
Operating Ratio	0.33	0.31	0.31	0.30	0.30	0.30	0.29	0.29	0.29	0.29	0.29	0.29	0.28	0.27	0.27	0.26	0.26	0.26	0.26
Debt to Operating Ratio	0.49	0.45	0.52	0.52	0.53	0.54	0.52	0.51	0.51	0.51	0.52	0.38	0.35	0.33	0.31	0.03	0.03	0.03	0.03
Percent Equity Funded CIP	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

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	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062
Operating Revenues											
Water	\$89,612,000	\$91,922,000	\$94,626,000	\$97,123,000	\$100,362,000	\$101,688,000	\$103,226,000	\$104,890,000	\$106,090,000	\$107,349,000	\$108,153,000
Wastewater	\$84,854,000	\$86,061,000	\$87,124,000	\$89,710,000	\$92,497,000	\$96,325,000	\$101,129,000	\$104,903,000	\$109,053,000	\$110,033,000	\$111,661,000
Total Operating Revenues	\$174,466,000	\$177,983,000	\$181,750,000	\$186,833,000	\$192,859,000	\$198,013,000	\$204,355,000	\$209,793,000	\$215,143,000	\$217,382,000	\$219,814,000
Operating Expenses											
Water	\$21,223,000	\$21,855,000	\$22,507,000	\$23,179,000	\$23,872,000	\$24,587,000	\$25,320,000	\$26,073,000	\$26,851,000	\$27,654,000	\$28,483,000
Wastewater	\$26,151,000	\$26,925,000	\$27,723,000	\$28,547,000	\$29,397,000	\$30,275,000	\$31,177,000	\$32,105,000	\$33,062,000	\$34,051,000	\$35,071,000
Total Operating Expenses	\$47,374,000	\$48,780,000	\$50,230,000	\$51,726,000	\$53,269,000	\$54,862,000	\$56,497,000	\$58,178,000	\$59,913,000	\$61,705,000	\$63,554,000
Operating Income (Loss)	\$127,092,000	\$129,203,000	\$131,520,000	\$135,107,000	\$139,590,000	\$143,151,000	\$147,858,000	\$151,615,000	\$155,230,000	\$155,677,000	\$156,260,000
Interest Income	\$6,295,000	\$7,369,000	\$8,376,000	\$9,299,000	\$10,171,000	\$11,065,000	\$11,982,000	\$13,028,000	\$14,400,000		
Net Available For Debt Service	\$133,387,000	\$136,572,000	\$139,896,000	\$144,406,000	\$149,761,000	\$154,216,000	\$159,840,000	\$164,643,000	\$169,630,000	\$155,677,000	\$156,260,000
Debt Service											
Existing	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Projected	\$3,331,447	\$3,331,447	\$3,210,793	\$3,210,793	\$3,210,793	\$1,938,054	\$1,483,347	\$0	\$0	\$0	\$0
Total Debt Service	\$3,331,447	\$3,331,447	\$3,210,793	\$3,210,793	\$3,210,793	\$1,938,054	\$1,483,347	\$0	\$0	\$0	\$0
Net After Debt Service	\$130,055,553	\$133,240,553	\$136,685,207	\$141,195,207	\$146,550,207	\$152,277,946	\$158,356,653	\$164,643,000	\$169,630,000	\$155,677,000	\$156,260,000
Non-Operating Revenues											
Reimbursement (AO and Non-AO) Exclude from Indenture											
Water	\$353,600	\$357,000	\$360,400	\$363,800	\$367,200	\$370,600	\$374,000	\$377,400	\$380,800	\$384,200	\$387,600
Wastewater	\$266,000	\$269,000	\$272,000	\$275,000	\$278,000	\$281,000	\$284,000	\$287,000	\$290,000	\$293,000	\$296,000
Total Non-Operating Revenues	\$619,600	\$626,000	\$632,400	\$638,800	\$645,200	\$651,600	\$658,000	\$664,400	\$670,800	\$677,200	\$683,600
Non-Operating Expenses											
Contribution to Operations and Maintenance Reserve Fu	\$449,595	\$462,658	\$477,526	\$493,164	\$509,067	\$526,233	\$539,141	\$553,859	\$572,337	\$592,025	\$611,420
Contribution to CAPEX Fund	\$2,948,245	\$4,466,591	\$4,511,257	\$4,556,370	\$4,601,933	\$4,647,953	\$4,694,432	\$4,741,377	\$4,788,790	\$4,836,678	\$4,885,045
Deposit to Annual Lease Payment Fund	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Lease Payment	\$715,900	\$723,100	\$730,400	\$737,800	\$745,200	\$752,700	\$760,300	\$768,000	\$775,700	\$783,500	\$791,400
Total Non-Operating Expenses	\$4,113,740	\$5,652,349	\$5,719,183	\$5,787,334	\$5,856,201	\$5,926,885	\$5,993,873	\$6,063,236	\$6,136,827	\$6,212,203	\$6,287,865
Available for Capital	\$126,561,414	\$128,214,204	\$131,598,424	\$136,046,673	\$141,339,206	\$147,002,660	\$153,020,780	\$159,244,164	\$164,163,973	\$150,141,997	\$150,655,735
Equity Funded CAPEX											
Reimbursable Costs (AO and Non-AO) Project LCA compl											
PayGo	\$17,133,000	\$23,010,000	\$35,305,000	\$47,845,239	\$55,002,000	\$54,672,000	\$61,860,000	\$41,207,000	\$7,840,000	\$8,077,000	\$65,962,000
Reserved 1											
Total Capex	\$17,133,000	\$23,010,000	\$35,305,000	\$47,845,239	\$55,002,000	\$54,672,000	\$61,860,000	\$41,207,000	\$7,840,000	\$8,077,000	\$65,962,000
Net Fund Surplus (deficit)	\$109,428,414	\$105,204,204	\$96,293,424	\$88,201,434	\$86,337,206	\$92,330,660	\$91,160,780	\$118,037,164	\$156,323,973	\$142,064,997	\$84,693,735
Beginning Balance	\$574,829,850	\$684,258,264	\$789,462,468	\$885,755,892	\$973,957,326	#####	\$1,152,625,192	\$1,243,785,972	\$1,361,823,136	\$1,518,147,109	\$1,660,212,106
Ending Balance	\$684,258,264	\$789,462,468	\$885,755,892	\$973,957,326	#####	#####	\$1,243,785,972	\$1,361,823,136	\$1,518,147,109	\$1,660,212,106	\$1,744,905,841
Financial Metrics											
Debt Service Coverage Ratio	40.04	40.99	43.57	44.98	46.64	79.57	107.76				
Debt Service Coverage Ratio (Indenture)	40.01	40.97	43.54	44.94	46.61	79.52	107.69				
Days Cash on Hand (target 90 days, un-restricted)	5,428	6,083	6,628	7,077	7,482	7,898	8,275	8,798	9,525	10,114	10,322
Days Cash on Hand (180 days, restricted O&M Fund)	188	188	188	188	188	188	188	188	188	188	188
Residential Water and Wastewater Bill as % of MHI	5.06%	5.13%	5.21%	5.31%	5.43%	5.53%	5.64%	5.74%	5.82%	5.84%	5.86%
Outstanding Debt to NPV of Free Cash Flow	2%	2%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Operating Ratio	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.28	0.29
Debt to Operating Ratio	0.03	0.03	0.02	0.02	0.02	0.01	0.01	0.00	0.00	0.00	0.00
Percent Equity Funded CIP	100%	100%	100%	77%	85%	72%	87%	81%	44%	44%	86%

Appendix C
Review of Operating Standards

Review of Operating Standards for Lease Agreement- Potential Opportunities for Financial Modeling

PREPARED FOR: LCA Financial Assessment Team
PREPARED BY: Joe Nattress/CH2M
DATE: March 23, 2018
PROJECT NUMBER: 699193
REVISION NO.: Rev. 0

A detailed review of the “Allentown Water and Sewer Utility System Concession and Lease Agreement- Operating Standards- Revised Feb 23, 2013” was completed with the intent to understand specific lease operating standards and the potential financial impacts of achieving or not achieving specific measurable goals/requirements. To date, LCA has not been in violation of any operating standards in the lease and has not been assessed liquidated damages.

Based on the review, there appears to be several opportunities for LCA to consider for potential financial modeling alternatives, along with some additional follow-up questions that should be explored. Any potential “alternative approaches” that could be investigated to meet operating standards (allowed for in section 17 of Part A on water system, and section 13 in Part B for the wastewater system) are identified in this memorandum.

Water System Opportunities

Part A for the document establishes the water system operating standards for treatment, property management, distribution system, laboratory, customer service, and other miscellaneous areas of the operation.

Water Treatment

- **Part 4.1.1-** Opportunity: Meet only regulatory standards for Disinfection by products (DBPs). Potential Benefit: OPEX-Reduction in coagulant use at WTP. Potential Risk: LDs- \$6000 year 1, \$12,000 year 2.
- **Part 4.1.3** – Opportunity: Eliminate fluoride addition at WTP. Suburban division does not add fluoride. Potential Benefit: OPEX- eliminate use of fluoride chemical. Potential Risk: Need City approval, regulatory violation, LDs- \$5,000/month.

Water Distribution

- **Part 6.1** – Opportunity: Discontinue involvement in Partnership for Safe Water Distribution System Optimization program. Potential Benefit: less OPEX costs – administration, recordkeeping. Potential Risk: None? No LDs associated with subsection
- **Part 6.3.2** – Opportunity: Change/reduce distribution system sampling, potentially use on-line monitoring for meeting requirements of lease/PADEP. Potential benefits: Less sampling labor and expenses for lab. Potential Risk: CAPEX for on-line equipment, OPEX for on-line equipment maintenance costs as much or more than lab and manual samplers.

- **Part 6.4** – Opportunity: Recent change in PA disinfection requirements, Change in Law provision for recouping reasonable OPEX and CAPEX costs to implement if needed. Potential Risk: LDs of \$5000 for first violation, \$8000 for second violation, \$10K for third violation
- **Part 6.10** – Opportunity: Reduce leak detection efforts when LCA achieves industry acceptable leakage indices (ILI or other % water loss metric). Reduce or eliminate 110 miles of pipe leak detection efforts per year, at cost of **XXX/year**. Potential Risk: \$3000 for initial occurrence, \$1000 additional for not achieving after first year with \$1000 every three months thereafter. After 2 years, \$6000 LD with \$2000 per quarter.
- **Part 6.12** – Opportunity: Reduce hydrant testing frequency from 900/year (whole system every two years). Reduce operational costs by **X/year**. Potential Risk: More reactive maintenance, \$3000 for initial occurrence, \$1000 additional for not achieving after first year with \$1000 every three months thereafter. After 2 years, \$6000 LD with \$2000 per quarter.
- **Part 6.17.3** – Opportunity: More cell towers on tanks, etc. Gain yearly revenue stream. Potential Risk/Downside: May not be allowed by lease, or City may retain rights and all revenue from new cell tower installations?
- **Part 6.19.2** – Opportunity: Reduce water main annual replacement requirement from 2 miles to something less (or zero). Reduction in CAPEX expenditure of up to \$3.2M per year. Potential Risk: City may not accept reduction and implement LDs, may increase reactive maintenance costs, LDs: \$5000 initial, \$1000 every quarter, then \$8000 in 2nd year, \$2000 every quarter. ***If deferred for 3 years, estimate that LDs would total \$41,000 vs \$9.6M in capital savings.***
- **Part 9.5.2**- Opportunity: Review construction standards vs industry accepted practices for saving in capital costs. For example, HDPE or PVC pipe vs ductile iron. Potential Risk: City may not accept substitutions.
- **Part 18** – Opportunity: Use previous year exceedance credits to minimize LDs/defer additional CAPEX/OPEX spending

Wastewater System Opportunities

Part B for the document establishes the wastewater system operating standards for treatment, property management, collection system, laboratory, customer service, and other miscellaneous areas of the operation. Of note is the arrangement between the City and the Sewer Signatories, where OPEX costs are split yearly, at approximately 52% to the City and 48% to the Signatories. Therefore any OPEX cost savings only would net LCA City division 52% of the savings amount.

- **Part 1.1** – Opportunity: Combine off-shift water/wastewater operations to a single facility with remote monitoring. Reduce OPEX costs. Potential Risk: City not accepting this as 24/7 staffing of the WWTP (or WTP), loss of plant control during transient event on off-shift (i.e. wet weather).
- **Part 3.2** – Opportunity: Meet NPDES Effluent Permit Standards but not Performance Standards. Reduced OPEX costs. Potential Risk: Running plant near its limits risks violations, LDs: \$1000 per parameter per month, \$5000 per parameter for annual average exceedance.
- **Part 3.6** – Opportunity: Examine odor generation and control at WWTP to determine if current odor control systems are needed. Reduction in OPEX costs. Potential Risk: Generation of odors, LDs @ \$2000/occurrence.
- **Part 5.2.2** – Opportunity: Reduce CCTV/flushing quantity of sewer from 55,000 linear feet to a lower value. Reduction in OPEX costs. Potential Risk: Additional reactive maintenance, LDs: \$3000/first year then \$1000 per quarter, \$6000 for second year and \$2000/quarter.

- **Part 5.2.6** – Opportunity: Charge fees in association with inspection of rehab construction of sewer laterals for private properties.
- **Part 6.1-** Opportunity: Contract with outside laboratory for WWTP lab analyses and only do process monitoring on-site. OPEX cost reduction of staff, equipment, and certifications.
Potential Risk: Loss of knowledge/capacity for troubleshooting at WWTP.

Appendix D
CIP Prioritization Details

Lehigh County Authority

Review of Allentown Water/Sewer Lease Concession Financial Condition Assessment

City Division Capital Requirements - Baseline

LCA Financial Planning Model Version 5

Water Capital	Total 2018 - 2062	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
General Water System Replacements	\$52,114,000	\$705,000	\$630,000	\$630,000	\$630,000	\$630,000	\$649,000	\$668,000	\$688,000	\$709,000	\$730,000	\$752,000	\$775,000
Mobile Equipment	\$6,922,500	\$54,500	\$110,000	\$230,000	\$230,000	\$80,000	\$82,000	\$84,000	\$87,000	\$90,000	\$93,000	\$96,000	\$99,000
New & Replacements Meter Installations	\$8,233,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$103,000	\$106,000	\$109,000	\$112,000	\$115,000	\$118,000	\$122,000
Other Equipment	\$16,884,500	\$212,500	\$200,000	\$350,000	\$350,000	\$200,000	\$206,000	\$212,000	\$218,000	\$225,000	\$232,000	\$239,000	\$246,000
Various Water System Related Studies	\$1,796,000	\$40,000	\$21,000	\$20,000	\$20,000	\$20,000	\$21,000	\$22,000	\$23,000	\$24,000	\$25,000	\$26,000	\$27,000
WFP General Improvements	\$16,522,000	\$175,000	\$175,000	\$200,000	\$200,000	\$200,000	\$206,000	\$212,000	\$218,000	\$225,000	\$232,000	\$239,000	\$246,000
WFP SCADA Upgrades	\$3,568,000	\$284,000	\$284,000				\$0	\$0	\$0	\$0	\$0	\$0	\$0
Capital Management	\$2,026,000	\$15,000	\$16,000	\$17,000	\$18,000	\$19,000	\$20,000	\$21,000	\$22,000	\$23,000	\$24,000	\$25,000	\$26,000
Distribution System- Development	\$5,331,000	\$50,000	\$52,000	\$54,000	\$56,000	\$58,000	\$60,000	\$62,000	\$64,000	\$66,000	\$68,000	\$71,000	\$74,000
Reservoir Rehab/Maintenance	\$7,729,000	\$75,000	\$78,000	\$81,000	\$84,000	\$87,000	\$90,000	\$93,000	\$96,000	\$99,000	\$102,000	\$106,000	\$110,000
Misc CW Expenses/Upsizing/3rd Party	\$5,331,000	\$50,000	\$52,000	\$54,000	\$56,000	\$58,000	\$60,000	\$62,000	\$64,000	\$66,000	\$68,000	\$71,000	\$74,000
Water Main Replacements	\$264,529,000	\$3,200,000	\$3,200,000	\$3,200,000	\$3,200,000	\$3,200,000	\$3,296,000	\$3,395,000	\$3,497,000	\$3,602,000	\$3,710,000	\$3,821,000	\$3,936,000
WFP - Emergency Power, Schantz & Crystal Springs	\$1,790,000				\$890,000	\$900,000							
Schantz Spring Main Replacement & Leak Rehabilitation	\$335,000	\$335,000											
Fixed Base Meter Reading System	\$1,705,000			\$1,705,000									
Filter Upgrades	\$28,140,000		\$7,020,000	\$5,120,000									
Intake Upgrades	\$37,120,000			\$440,000	\$5,340,000	\$5,340,000			\$3,500,000	\$4,000,000			
Pretreatment / Sedimentation	\$23,000,000									\$1,500,000			
High Lift VFDs/Pumps	\$14,000,000			\$6,000,000									
Elec Improvements/Pumps	\$13,200,000										\$2,500,000	\$2,500,000	\$200,000
Auxiliary Generator	\$3,000,000												
Ultraviolet Disinfection	\$12,000,000												
Security Improvements	\$500,000								\$500,000				
Pump Stations	\$11,700,000												
Rehab Buried Concrete Reservoirs	\$46,000,000												
Rehab Tanks and Reservoirs	\$13,000,000						\$3,000,000						
Roof Replacements	\$7,000,000												
Major Meter replacement program	\$10,000,000												
Unidentified CIP every year	\$0						\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unidentified CIP every 5 years	\$0						\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unidentified CIP every 10 years	\$0						\$0	\$0	\$0	\$0	\$0	\$0	\$0
	\$0												
Total Water	\$613,476,000	\$5,296,000	\$11,938,000	\$18,201,000	\$11,174,000	\$10,892,000	\$7,793,000	\$4,937,000	\$9,086,000	\$10,741,000	\$7,899,000	\$8,064,000	\$5,935,000
Water CAPEX by Project Type (used for CAPEX Funding Worksheet)													
MCI	\$474,814,000	\$3,535,000	\$10,220,000	\$14,760,000	\$9,430,000	\$9,440,000	\$6,296,000	\$3,395,000	\$6,997,000	\$9,102,000	\$6,210,000	\$6,321,000	\$4,136,000
Annual Project	\$126,457,000	\$1,761,000	\$1,718,000	\$1,736,000	\$1,744,000	\$1,452,000	\$1,497,000	\$1,542,000	\$1,589,000	\$1,639,000	\$1,689,000	\$1,743,000	\$1,799,000
Non-reimbursable	\$12,205,000	\$0	\$0	\$1,705,000	\$0	\$0	\$0	\$0	\$500,000	\$0	\$0	\$0	\$0
Total	\$613,476,000	\$5,296,000	\$11,938,000	\$18,201,000	\$11,174,000	\$10,892,000	\$7,793,000	\$4,937,000	\$9,086,000	\$10,741,000	\$7,899,000	\$8,064,000	\$5,935,000

Lehigh County Authority

Review of Allentown Water/Sewer Lease Concession Financial Condition Assessment

City Division Capital Requirements - Baseline

LCA Financial Planning Model Version 5

Wastewater Capital	Total 2018 - 2062	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Belt Filter Press Replacements	\$0												
WWTP Motor Control Centers	\$0												
Digester Cover Replacements	\$0												
Roof Replacement	\$0												
Other Equipment	\$18,628,000	\$360,000	\$360,000	\$350,000	\$220,000	\$220,000	\$227,000	\$234,000	\$241,000	\$248,000	\$255,000	\$263,000	\$271,000
WWTP General Improvements	\$41,165,000	\$400,000	\$500,000	\$500,000	\$500,000	\$500,000	\$515,000	\$530,000	\$546,000	\$562,000	\$579,000	\$596,000	\$614,000
Sanitary Sewer Main Replacements & Rehab	\$8,233,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$103,000	\$106,000	\$109,000	\$112,000	\$115,000	\$118,000	\$122,000
Mobile Equipment	\$11,433,000	\$189,000	\$400,000	\$400,000	\$229,000	\$130,000	\$134,000	\$138,000	\$142,000	\$146,000	\$150,000	\$155,000	\$160,000
Various Wastewater System Related Studies	\$2,055,000	\$300,000	\$20,000	\$20,000	\$20,000	\$20,000	\$21,000	\$22,000	\$23,000	\$24,000	\$25,000	\$26,000	\$27,000
WWTP Dewatering SCADA Upgrades	\$230,000	\$0	\$0	\$0	\$230,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Indenture Report Improvements	\$5,000,000		\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000						
Collection System - Development	\$4,772,000	\$50,000	\$52,000	\$54,000	\$56,000	\$58,000	\$60,000	\$62,000	\$64,000	\$66,000	\$68,000	\$70,000	\$72,000
WWTP Electrical Substation Replacements	\$3,489,000	\$3,360,000	\$129,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
WWTP Disinfection Upgrade	\$1,931,000	\$0	\$0	\$0	\$929,000	\$1,002,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
WWTP Nutrient Upgrade	\$69,381,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$19,002,000	\$13,048,000	\$13,439,000	\$0
Replace Secondary Clarifiers 1-4	\$3,564,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
WWTP Electrical MCC Replacements	\$15,631,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,690,000	\$0	\$0	\$0	\$0
New Digesters (three)	\$73,863,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Rehab PMTF towers	\$4,707,000	\$0	\$0	\$0	\$0	\$0	\$2,319,000	\$2,388,000	\$0	\$0	\$0	\$0	\$0
Replace Secondary Clarifiers 7-8	\$5,537,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$5,537,000
Boiler Replacements	\$3,738,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Sludge Collection Mechanism Replacement-PCs	\$7,655,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Sludge Collection Mechanism replacement - SCs	\$9,740,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Screening and Grit rehab/replacement	\$6,002,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Gravity Thickener Rehab	\$6,002,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Long Term Plant Upgrades	\$261,954,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Large diameter sewer main rehabilitation	\$149,568,000	\$0	\$0	\$0	\$0	\$0	\$5,680,000	\$0	\$0	\$0	\$0	\$13,842,000	\$0
Capital Management	\$2,026,000	\$15,000	\$16,000	\$17,000	\$18,000	\$19,000	\$20,000	\$21,000	\$22,000	\$23,000	\$24,000	\$25,000	\$26,000
Unidentified CIP every year	\$0						\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unidentified CIP every 5 years	\$0						\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unidentified CIP every 10 years	\$0						\$0	\$0	\$0	\$0	\$0	\$0	\$0
	\$0												
Total Wastewater	\$716,304,000	\$4,774,000	\$2,577,000	\$2,441,000	\$3,302,000	\$3,049,000	\$10,079,000	\$3,501,000	\$4,837,000	\$20,183,000	\$14,264,000	\$28,534,000	\$6,829,000

Lehigh County Authority
Review of Allentown Water/Sewer Lease Concession
City Division Capital Requirements - Baseline
LCA Financial Planning Model Version 5

Water Capital	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
General Water System Replacements	\$798,000	\$822,000	\$847,000	\$872,000	\$898,000	\$925,000	\$953,000	\$982,000	\$1,011,000	\$1,041,000	\$1,072,000	\$1,104,000	\$1,137,000
Mobile Equipment	\$102,000	\$105,000	\$108,000	\$111,000	\$114,000	\$117,000	\$121,000	\$125,000	\$129,000	\$133,000	\$137,000	\$141,000	\$145,000
New & Replacements Meter Installations	\$126,000	\$130,000	\$134,000	\$138,000	\$142,000	\$146,000	\$150,000	\$155,000	\$160,000	\$165,000	\$170,000	\$175,000	\$180,000
Other Equipment	\$253,000	\$261,000	\$269,000	\$277,000	\$285,000	\$294,000	\$303,000	\$312,000	\$321,000	\$331,000	\$341,000	\$351,000	\$362,000
Various Water System Related Studies	\$28,000	\$29,000	\$30,000	\$31,000	\$32,000	\$33,000	\$34,000	\$35,000	\$36,000	\$37,000	\$38,000	\$39,000	\$40,000
WFP General Improvements	\$253,000	\$261,000	\$269,000	\$277,000	\$285,000	\$294,000	\$303,000	\$312,000	\$321,000	\$331,000	\$341,000	\$351,000	\$362,000
WFP SCADA Upgrades	\$0	\$0	\$0	\$0	\$0	\$1,000,000							
Capital Management	\$27,000	\$28,000	\$29,000	\$30,000	\$31,000	\$32,000	\$33,000	\$34,000	\$36,000	\$38,000	\$40,000	\$42,000	\$44,000
Distribution System- Development	\$77,000	\$80,000	\$83,000	\$86,000	\$89,000	\$92,000	\$95,000	\$98,000	\$101,000	\$105,000	\$109,000	\$113,000	\$117,000
Reservoir Rehab/Maintenance	\$114,000	\$118,000	\$122,000	\$126,000	\$130,000	\$134,000	\$139,000	\$144,000	\$149,000	\$154,000	\$159,000	\$164,000	\$169,000
Misc CW Expenses/Upsizing/3rd Party	\$77,000	\$80,000	\$83,000	\$86,000	\$89,000	\$92,000	\$95,000	\$98,000	\$101,000	\$105,000	\$109,000	\$113,000	\$117,000
Water Main Replacements	\$4,054,000	\$4,176,000	\$4,301,000	\$4,430,000	\$4,563,000	\$4,700,000	\$4,841,000	\$4,986,000	\$5,136,000	\$5,290,000	\$5,449,000	\$5,612,000	\$5,780,000
WFP - Emergency Power, Schantz & Crystal Springs													
Schantz Spring Main Replacement & Leak Rehabilitation													
Fixed Base Meter Reading System													
Filter Upgrades													
Intake Upgrades													
Pretreatment / Sedimentation										\$8,000,000	\$8,000,000		\$5,500,000
High Lift VFDs/Pumps													
Elec Improvements/Pumps													
Auxiliary Generator													
Ultraviolet Disinfection					\$6,000,000	\$6,000,000							
Security Improvements													
Pump Stations			\$2,000,000				\$2,000,000			\$2,000,000		\$1,500,000	
Rehab Buried Concrete Reservoirs													
Rehab Tanks and Reservoirs		\$1,000,000				\$1,000,000			\$1,000,000			\$1,000,000	
Roof Replacements				\$500,000			\$500,000						
Major Meter replacement program						\$5,000,000							
Unidentified CIP every year	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unidentified CIP every 5 years	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unidentified CIP every 10 years	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Water	\$5,909,000	\$7,090,000	\$8,275,000	\$6,964,000	\$12,658,000	\$19,859,000	\$9,567,000	\$7,281,000	\$8,501,000	\$17,730,000	\$15,965,000	\$10,705,000	\$13,953,000
Water CAPEX by Project Type (used for CAPEX Funding Worksheet)													
MCI	\$4,054,000	\$5,176,000	\$6,301,000	\$4,930,000	\$10,563,000	\$11,700,000	\$7,341,000	\$4,986,000	\$6,136,000	\$15,290,000	\$13,449,000	\$8,112,000	\$11,280,000
Annual Project	\$1,855,000	\$1,914,000	\$1,974,000	\$2,034,000	\$2,095,000	\$3,159,000	\$2,226,000	\$2,295,000	\$2,365,000	\$2,440,000	\$2,516,000	\$2,593,000	\$2,673,000
Non-reimbursable	\$0	\$0	\$0	\$0	\$0	\$5,000,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$5,909,000	\$7,090,000	\$8,275,000	\$6,964,000	\$12,658,000	\$19,859,000	\$9,567,000	\$7,281,000	\$8,501,000	\$17,730,000	\$15,965,000	\$10,705,000	\$13,953,000

Lehigh County Authority
Review of Allentown Water/Sewer Lease Concession
City Division Capital Requirements - Baseline
LCA Financial Planning Model Version 5

Wastewater Capital	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
Belt Filter Press Replacements													
WWTP Motor Control Centers													
Digester Cover Replacements													
Roof Replacement													
Other Equipment	\$279,000	\$287,000	\$296,000	\$305,000	\$314,000	\$323,000	\$333,000	\$343,000	\$353,000	\$364,000	\$375,000	\$386,000	\$398,000
WWTP General Improvements	\$632,000	\$651,000	\$671,000	\$691,000	\$712,000	\$733,000	\$755,000	\$778,000	\$801,000	\$825,000	\$850,000	\$876,000	\$902,000
Sanitary Sewer Main Replacements & Rehab	\$126,000	\$130,000	\$134,000	\$138,000	\$142,000	\$146,000	\$150,000	\$155,000	\$160,000	\$165,000	\$170,000	\$175,000	\$180,000
Mobile Equipment	\$165,000	\$170,000	\$175,000	\$180,000	\$185,000	\$191,000	\$197,000	\$203,000	\$209,000	\$215,000	\$221,000	\$228,000	\$235,000
Various Wastewater System Related Studies	\$28,000	\$29,000	\$30,000	\$31,000	\$32,000	\$33,000	\$34,000	\$35,000	\$36,000	\$37,000	\$38,000	\$39,000	\$40,000
WWTP Dewatering SCADA Upgrades	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Indenture Report Improvements													
Collection System - Development	\$74,000	\$76,000	\$78,000	\$80,000	\$82,000	\$84,000	\$87,000	\$90,000	\$93,000	\$96,000	\$99,000	\$102,000	\$105,000
WWTP Electrical Substation Replacements	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
WWTP Disinfection Upgrade	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
WWTP Nutrient Upgrade	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Replace Secondary Clarifiers 1-4	\$3,564,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
WWTP Electrical MCC Replacements	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
New Digesters (three)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$8,768,000	\$9,031,000	\$0	\$0	\$0	\$0
Rehab PMTF towers	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Replace Secondary Clarifiers 7-8	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Boiler Replacements	\$0	\$1,469,000	\$2,269,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Sludge Collection Mechanism Replacement-PCs	\$0	\$0	\$0	\$0	\$2,728,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Sludge Collection Mechanism replacement - SCs	\$0	\$0	\$0	\$0	\$0	\$3,471,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Screening and Grit rehab/replacement	\$2,139,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Gravity Thickener Rehab	\$2,139,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Long Term Plant Upgrades	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Large diameter sewer main rehabilitation	\$0	\$0	\$0	\$32,873,000	\$0	\$0	\$0	\$0	\$11,740,000	\$0	\$0	\$0	\$0
Capital Management	\$27,000	\$28,000	\$29,000	\$30,000	\$31,000	\$32,000	\$33,000	\$34,000	\$36,000	\$38,000	\$40,000	\$42,000	\$44,000
Unidentified CIP every year	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unidentified CIP every 5 years	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unidentified CIP every 10 years	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Wastewater	\$9,173,000	\$2,840,000	\$3,682,000	\$34,328,000	\$4,226,000	\$5,013,000	\$1,589,000	\$10,406,000	\$22,459,000	\$1,740,000	\$1,793,000	\$1,848,000	\$1,904,000

Lehigh County Authority
Review of Allentown Water/Sewer Lease Concession
City Division Capital Requirements - Baseline
LCA Financial Planning Model Version 5

Water Capital	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055
General Water System Replacements	\$1,171,000	\$1,206,000	\$1,242,000	\$1,279,000	\$1,317,000	\$1,357,000	\$1,398,000	\$1,440,000	\$1,483,000	\$1,527,000	\$1,573,000	\$1,620,000	\$1,669,000
Mobile Equipment	\$149,000	\$153,000	\$158,000	\$163,000	\$168,000	\$173,000	\$178,000	\$183,000	\$188,000	\$194,000	\$200,000	\$206,000	\$212,000
New & Replacements Meter Installations	\$185,000	\$191,000	\$197,000	\$203,000	\$209,000	\$215,000	\$221,000	\$228,000	\$235,000	\$242,000	\$249,000	\$256,000	\$264,000
Other Equipment	\$373,000	\$384,000	\$396,000	\$408,000	\$420,000	\$433,000	\$446,000	\$459,000	\$473,000	\$487,000	\$502,000	\$517,000	\$533,000
Various Water System Related Studies	\$41,000	\$42,000	\$43,000	\$44,000	\$45,000	\$46,000	\$47,000	\$48,000	\$49,000	\$50,000	\$52,000	\$54,000	\$56,000
WFP General Improvements	\$373,000	\$384,000	\$396,000	\$408,000	\$420,000	\$433,000	\$446,000	\$459,000	\$473,000	\$487,000	\$502,000	\$517,000	\$533,000
WFP SCADA Upgrades													\$2,000,000
Capital Management	\$46,000	\$48,000	\$50,000	\$52,000	\$54,000	\$56,000	\$58,000	\$60,000	\$62,000	\$64,000	\$66,000	\$68,000	\$71,000
Distribution System- Development	\$121,000	\$125,000	\$129,000	\$133,000	\$137,000	\$142,000	\$147,000	\$152,000	\$157,000	\$162,000	\$167,000	\$173,000	\$179,000
Reservoir Rehab/Maintenance	\$175,000	\$181,000	\$187,000	\$193,000	\$199,000	\$205,000	\$212,000	\$219,000	\$226,000	\$233,000	\$240,000	\$248,000	\$256,000
Misc CW Expenses/Upsizing/3rd Party	\$121,000	\$125,000	\$129,000	\$133,000	\$137,000	\$142,000	\$147,000	\$152,000	\$157,000	\$162,000	\$167,000	\$173,000	\$179,000
Water Main Replacements	\$5,953,000	\$6,132,000	\$6,316,000	\$6,505,000	\$6,700,000	\$6,901,000	\$7,108,000	\$7,321,000	\$7,541,000	\$7,767,000	\$8,000,000	\$8,240,000	\$8,487,000
WFP - Emergency Power, Schantz & Crystal Springs													
Schantz Spring Main Replacement & Leak Rehabilitation													
Fixed Base Meter Reading System													
Filter Upgrades								\$8,000,000					\$8,000,000
Intake Upgrades													\$18,500,000
Pretreatment / Sedimentation													
High Lift VFDs/Pumps					\$4,000,000	\$4,000,000							
Elec Improvements/Pumps							\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000			
Auxiliary Generator											\$3,000,000		
Ultraviolet Disinfection													
Security Improvements													
Pump Stations										\$200,000	\$2,000,000	\$2,000,000	
Rehab Buried Concrete Reservoirs	\$5,000,000	\$10,000,000	\$10,000,000	\$5,000,000					\$6,000,000				
Rehab Tanks and Reservoirs						\$2,000,000	\$1,000,000					\$1,000,000	
Roof Replacements			\$1,000,000		\$1,000,000			\$1,000,000		\$1,000,000		\$1,000,000	
Major Meter replacement program													
Unidentified CIP every year	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unidentified CIP every 5 years	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unidentified CIP every 10 years	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Water	\$13,708,000	\$18,971,000	\$20,243,000	\$14,521,000	\$14,806,000	\$16,103,000	\$13,408,000	\$21,721,000	\$19,044,000	\$14,575,000	\$16,718,000	\$16,072,000	\$40,939,000
Water CAPEX by Project Type (used for CAPEX Funding Worksheet)													
MCI	\$10,953,000	\$16,132,000	\$17,316,000	\$11,505,000	\$11,700,000	\$12,901,000	\$10,108,000	\$18,321,000	\$15,541,000	\$10,967,000	\$13,000,000	\$12,240,000	\$34,987,000
Annual Project	\$2,755,000	\$2,839,000	\$2,927,000	\$3,016,000	\$3,106,000	\$3,202,000	\$3,300,000	\$3,400,000	\$3,503,000	\$3,608,000	\$3,718,000	\$3,832,000	\$5,952,000
Non-reimbursable	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$13,708,000	\$18,971,000	\$20,243,000	\$14,521,000	\$14,806,000	\$16,103,000	\$13,408,000	\$21,721,000	\$19,044,000	\$14,575,000	\$16,718,000	\$16,072,000	\$40,939,000

Lehigh County Authority
Review of Allentown Water/Sewer Lease Concession
City Division Capital Requirements - Baseline
LCA Financial Planning Model Version 5

Wastewater Capital	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055
Belt Filter Press Replacements													
WWTP Motor Control Centers													
Digester Cover Replacements													
Roof Replacement													
Other Equipment	\$410,000	\$422,000	\$435,000	\$448,000	\$461,000	\$475,000	\$489,000	\$504,000	\$519,000	\$535,000	\$551,000	\$568,000	\$585,000
WWTP General Improvements	\$929,000	\$957,000	\$986,000	\$1,016,000	\$1,046,000	\$1,077,000	\$1,109,000	\$1,142,000	\$1,176,000	\$1,211,000	\$1,247,000	\$1,284,000	\$1,323,000
Sanitary Sewer Main Replacements & Rehab	\$185,000	\$191,000	\$197,000	\$203,000	\$209,000	\$215,000	\$221,000	\$228,000	\$235,000	\$242,000	\$249,000	\$256,000	\$264,000
Mobile Equipment	\$242,000	\$249,000	\$256,000	\$264,000	\$272,000	\$280,000	\$288,000	\$297,000	\$306,000	\$315,000	\$324,000	\$334,000	\$344,000
Various Wastewater System Related Studies	\$41,000	\$42,000	\$43,000	\$44,000	\$45,000	\$46,000	\$47,000	\$48,000	\$49,000	\$50,000	\$52,000	\$54,000	\$56,000
WWTP Dewatering SCADA Upgrades	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Indenture Report Improvements													
Collection System - Development	\$108,000	\$111,000	\$114,000	\$117,000	\$121,000	\$125,000	\$129,000	\$133,000	\$137,000	\$141,000	\$145,000	\$149,000	\$153,000
WWTP Electrical Substation Replacements	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
WWTP Disinfection Upgrade	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
WWTP Nutrient Upgrade	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$11,593,000	\$0
Replace Secondary Clarifiers 1-4	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
WWTP Electrical MCC Replacements	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$11,941,000
New Digesters (three)	\$0	\$0	\$0	\$0	\$11,783,000	\$12,136,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Rehab PMTF towers	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Replace Secondary Clarifiers 7-8	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Boiler Replacements	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Sludge Collection Mechanism Replacement-PCs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$4,927,000	\$0
Sludge Collection Mechanism replacement - SCs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6,269,000
Screening and Grit rehab/replacement	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,863,000	\$0	\$0	\$0	\$0	\$0
Gravity Thickener Rehab	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,863,000	\$0	\$0	\$0	\$0	\$0
Long Term Plant Upgrades	\$0	\$43,132,000	\$44,426,000	\$45,759,000	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Large diameter sewer main rehabilitation	\$11,306,000	\$0	\$0	\$0	\$0	\$7,282,000	\$0	\$0	\$0	\$0	\$3,658,000	\$0	\$0
Capital Management	\$46,000	\$48,000	\$50,000	\$52,000	\$54,000	\$56,000	\$58,000	\$60,000	\$62,000	\$64,000	\$66,000	\$68,000	\$71,000
Unidentified CIP every year	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unidentified CIP every 5 years	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unidentified CIP every 10 years	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Wastewater	\$13,267,000	\$45,152,000	\$46,507,000	\$47,903,000	\$13,991,000	\$21,692,000	\$2,341,000	\$10,138,000	\$2,484,000	\$2,558,000	\$6,292,000	\$19,233,000	\$21,006,000

Lehigh County Authority
Review of Allentown Water/Sewer Lease Concession
City Division Capital Requirements - Baseline
LCA Financial Planning Model Version 5

Water Capital	2056	2057	2058	2059	2060	2061	2062
General Water System Replacements	\$1,719,000	\$1,771,000	\$1,824,000	\$1,879,000	\$1,935,000	\$1,993,000	\$2,053,000
Mobile Equipment	\$218,000	\$225,000	\$232,000	\$239,000	\$246,000	\$253,000	\$261,000
New & Replacements Meter Installations	\$272,000	\$280,000	\$288,000	\$297,000	\$306,000	\$315,000	\$324,000
Other Equipment	\$549,000	\$565,000	\$582,000	\$599,000	\$617,000	\$636,000	\$655,000
Various Water System Related Studies	\$58,000	\$60,000	\$62,000	\$64,000	\$66,000	\$68,000	\$70,000
WFP General Improvements	\$549,000	\$565,000	\$582,000	\$599,000	\$617,000	\$636,000	\$655,000
WFP SCADA Upgrades							
Capital Management	\$74,000	\$77,000	\$80,000	\$83,000	\$86,000	\$89,000	\$92,000
Distribution System- Development	\$185,000	\$191,000	\$197,000	\$203,000	\$210,000	\$217,000	\$224,000
Reservoir Rehab/Maintenance	\$264,000	\$272,000	\$281,000	\$290,000	\$299,000	\$308,000	\$318,000
Misc CW Expenses/Upsizing/3rd Party	\$185,000	\$191,000	\$197,000	\$203,000	\$210,000	\$217,000	\$224,000
Water Main Replacements	\$8,742,000	\$9,004,000	\$9,274,000	\$9,552,000	\$9,839,000	\$10,134,000	\$10,438,000
WFP - Emergency Power, Schantz & Crystal Springs							
Schantz Spring Main Replacement & Leak Rehabilitation							
Fixed Base Meter Reading System							
Filter Upgrades							
Intake Upgrades							
Pretreatment / Sedimentation							
High Lift VFDs/Pumps							
Elec Improvements/Pumps							
Auxiliary Generator							
Ultraviolet Disinfection							
Security Improvements							
Pump Stations							
Rehab Buried Concrete Reservoirs		\$10,000,000					
Rehab Tanks and Reservoirs	\$1,000,000	\$1,000,000					
Roof Replacements		\$1,000,000					
Major Meter replacement program	\$5,000,000						
Unidentified CIP every year	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unidentified CIP every 5 years	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unidentified CIP every 10 years	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Water	\$18,815,000	\$25,201,000	\$13,599,000	\$14,008,000	\$14,431,000	\$14,866,000	\$15,314,000
Water CAPEX by Project Type (used for CAPEX Funding Worksheet)							
MCI	\$9,742,000	\$21,004,000	\$9,274,000	\$9,552,000	\$9,839,000	\$10,134,000	\$10,438,000
Annual Project	\$4,073,000	\$4,197,000	\$4,325,000	\$4,456,000	\$4,592,000	\$4,732,000	\$4,876,000
Non-reimbursable	\$5,000,000	\$0	\$0	\$0	\$0	\$0	\$0
Total	\$18,815,000	\$25,201,000	\$13,599,000	\$14,008,000	\$14,431,000	\$14,866,000	\$15,314,000

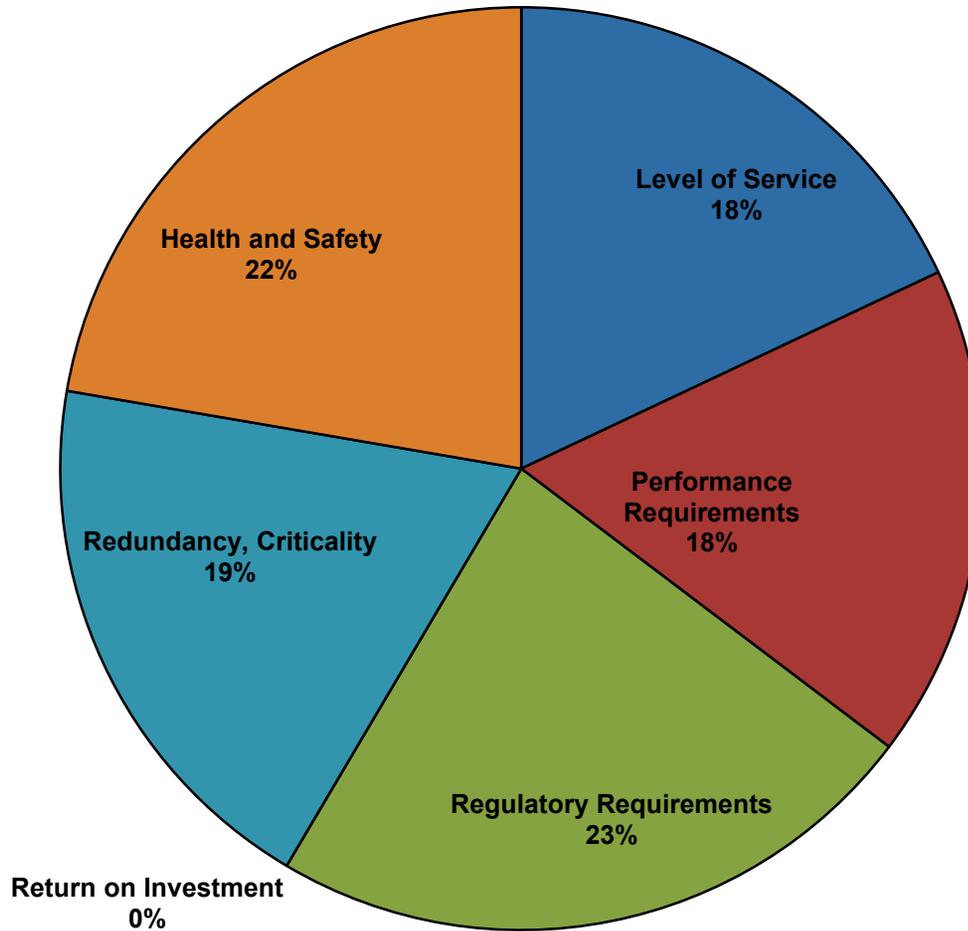
Lehigh County Authority
Review of Allentown Water/Sewer Lease Concession

City Division Capital Requirements - Baseline

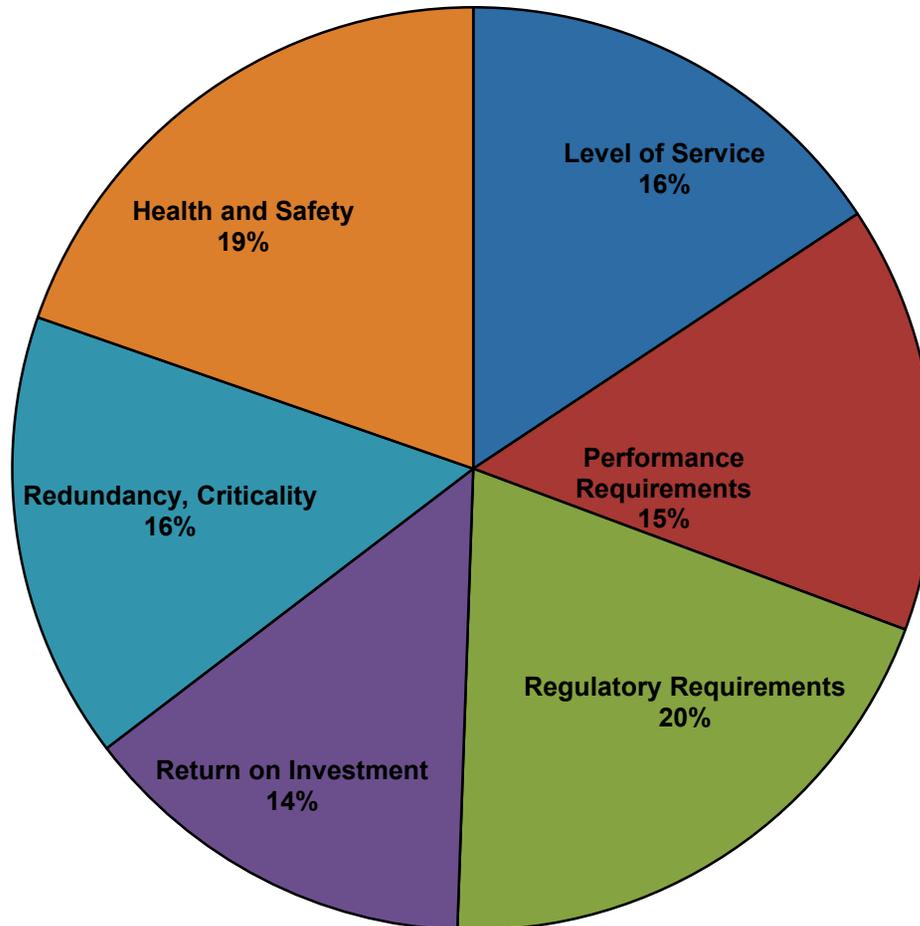
LCA Financial Planning Model Version 5

Wastewater Capital	2056	2057	2058	2059	2060	2061	2062
Belt Filter Press Replacements							
WWTP Motor Control Centers							
Digester Cover Replacements							
Roof Replacement							
Other Equipment	\$603,000	\$621,000	\$640,000	\$659,000	\$679,000	\$699,000	\$720,000
WWTP General Improvements	\$1,363,000	\$1,404,000	\$1,446,000	\$1,489,000	\$1,534,000	\$1,580,000	\$1,627,000
Sanitary Sewer Main Replacements & Rehab	\$272,000	\$280,000	\$288,000	\$297,000	\$306,000	\$315,000	\$324,000
Mobile Equipment	\$354,000	\$365,000	\$376,000	\$387,000	\$399,000	\$411,000	\$423,000
Various Wastewater System Related Studies	\$58,000	\$60,000	\$62,000	\$64,000	\$66,000	\$68,000	\$70,000
WWTP Dewatering SCADA Upgrades	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Indenture Report Improvements							
Collection System - Development	\$158,000	\$163,000	\$168,000	\$173,000	\$178,000	\$183,000	\$188,000
WWTP Electrical Substation Replacements	\$0	\$0	\$0	\$0	\$0	\$0	\$0
WWTP Disinfection Upgrade	\$0	\$0	\$0	\$0	\$0	\$0	\$0
WWTP Nutrient Upgrade	\$12,299,000	\$0	\$0	\$0	\$0	\$0	\$0
Replace Secondary Clarifiers 1-4	\$0	\$0	\$0	\$0	\$0	\$0	\$0
WWTP Electrical MCC Replacements	\$0	\$0	\$0	\$0	\$0	\$0	\$0
New Digesters (three)	\$0	\$15,835,000	\$16,310,000	\$0	\$0	\$0	\$0
Rehab PMTF towers	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Replace Secondary Clarifiers 7-8	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Boiler Replacements	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Sludge Collection Mechanism Replacement-PCs	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Sludge Collection Mechanism replacement - SCs	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Screening and Grit rehab/replacement	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Gravity Thickener Rehab	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Long Term Plant Upgrades	\$30,748,000	\$31,670,000	\$32,620,000	\$33,599,000	\$0	\$0	\$0
Large diameter sewer main rehabilitation	\$0	\$0	\$5,545,000	\$0	\$0	\$0	\$57,642,000
Capital Management	\$74,000	\$77,000	\$80,000	\$83,000	\$86,000	\$89,000	\$92,000
Unidentified CIP every year	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unidentified CIP every 5 years	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Unidentified CIP every 10 years	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Wastewater	\$45,929,000	\$50,475,000	\$57,535,000	\$36,751,000	\$3,248,000	\$3,345,000	\$61,086,000

Distribution of Ideal Criteria Weighting



Distribution of Financial Condition Improvement Criteria Weighting



Lehigh County Authority **SAMPLE**

**CIP Prioritization/Validation
Data Collection Form**

Project Name: Water – Water Main Replacements

Project Number: 1

Project Description: Replacement water main (average 2 miles) per year

Date of Scoring: _____ **Prepared by:** _____

1. Level of Service

Failure to do Project could result in:

- High system pressure
- Increase in leakage
- Unplanned water outages/disruptions
- Odor/color in water

Scoring scale:

- 10** - Significant improvement in level of service provided to large portion or all the City service area
- 7** - Significant improvement in level of service provided to a small portion (50% or less) of the City service area, or moderate improvement to all or a large portion (51% or more) of City service area
- 3** - Moderate improvement in level of service provided in a small (50% or less) portion of the City service area
- 0** - Project does not improve level of service provided in City service area

Comments

Score assigned: _____

2. Performance Requirements

Consequence – Failure to do Project could result in Liquidated Damages according to the Concession Agreement

Scoring scale:

- 10** - Project would avoid any liquidated damages to be incurred by LCA - requirement fulfilled
- 7** - Project would avoid over \$5,000 in liquidated damages potentially incurred by LCA
- 3** - Project would avoid up to \$5,000 in liquidated damages potentially incurred by LCA
- 0** - Most liquidated damages incurred by LCA - requirement not fulfilled, or project would not contribute to or help avoid any potential liquidated damages

Comments

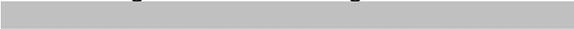
Scale Value assigned: _____

3. Regulatory Requirement

The project:

- Supports alignment with a Federal, State or Local Regulation

- Required for alignment with a Federal, State, or Local Regulation

Benefits alignment with the regulation


- Scoring scale:
- 10** - Project needed to resolve an immediate regulatory issue
 - 7** - Project helps meet two or more regulatory requirements or anticipated future regulatory requirements
 - 3** - Project helps meet one regulatory requirement or an anticipated future regulatory requirement
 - 0** - Project does not help City service are meet regulatory requirements

Comments

Scale Value assigned: _____

4. Return on Investment

- Reduces Life-cycle Cost/Improves Efficiency

- Generates Additional Revenue

- Scoring scale:
- 10** - Project provides major return on investment significantly in excess of project capital cost within the first 5 years
 - 7** - Project provides significant return on investment and/or cost savings sufficient to cover project capital investment over 15 years
 - 3** - Project provides minor return on investment and/or cost savings insufficient to recover project capital investment
 - 0** - Project does not provide any return on investment in terms of additional revenue or cost savings

Comments

Scale Value assigned: _____

5. Redundancy, Criticality

Consequence – Failure to do Project could result in the following Impacts:

- Threats to Life, Health and Safety
- Reduced Availability/Level of Service
- Reduced Redundancy

Likelihood

- Age
- Condition: Good ____ Avg ____ Poor ____
- Maintenance: Normal ____ High ____

Scoring scale:

- 10** - Project provides redundancy and reduces immediate or near term (within 5 years) threat to function of water/wastewater system
- 5** - Project provides redundancy or reduces threat to function of water/wastewater system anticipated within next 10 years
- 0** - Project does not provide redundancy and does not reduce threat to function of water/wastewater system

6. Health and Safety

Mitigates a Hazard:

Removes/Prevents a Hazard:

Scoring scale:

- 10** - Project reduces or eliminate immediate or near term (within 5 years) threat to health and safety of the water/wastewater system
- 5** - Project improves health and safety function of water/wastewater system anticipated within next 10 years
- 0** - Project does not improve health and safety of water/wastewater system

Comments

Scale Value assigned: _____

Water Project Scoring

Project Number	Category/Fund Type	Project Name	Evaluation Criteria					
			Level of Service	Performance Requirements	Regulatory Requirements	Return on Investment	Redundancy, Criticality	Health and Safety
1	Annual Project	General Water System Replacements	8	5	7	7	8	7
2	Annual Project	Mobile Equipment	6	3	3	5	3	7
3	Annual Project	New & Replacements Meter Installations	6	4	5	8	3	4
4	Annual Project	Other Equipment	8	7	7	6	8	7
5	Annual Project	Various Water System Related Studies	5	8	4	3	4	4
6	Annual Project	WFP General Improvements	8	5	7	5	6	8
7	Annual Project	WFP SCADA Upgrades	5	4	5	5	5	8
8	Annual Project	Capital Management	2	3	3	2	3	3
9	Annual Project	Distribution System- Development	6	5	5	4	4	5
10	Annual Project	Reservoir Rehab/Maintenance	6	7	7	4	4	7
11	Annual Project	Misc CW Expenses/Upsizing/3rd Party	2	2	2	2	3	3
12	Major Capital (Paid through CCRC)	Water Main Replacements	8	8	4	4	5	4
13	Major Capital (Paid through CCRC)	WFP - Emergency Power, Schantz & Crystal Springs	8	3	6	2	6	7
14	Major Capital (Paid through CCRC)	Schantz Spring Main Replacement & Leak Rehabilitation	7	8	5	4	4	6
15	Non-reimbursable spending	Fixed Base Meter Reading System	2	2	4	7	3	3
16	Major Capital (Paid through CCRC)	Filter Upgrades	8	5	7	4	7	7
17	Major Capital (Paid through CCRC)	Intake Upgrades	8	5	7	4	5	7
18	Major Capital (Paid through CCRC)	Pretreatment / Sedimentation	6	5	7	4	4	4
19	Major Capital (Paid through CCRC)	High Lift VFDs/Pumps	8	6	6	6	7	7
20	Major Capital (Paid through CCRC)	Elec Improvements/Pumps	8	5	6	6	7	8
21	Major Capital (Paid through CCRC)	Auxiliary Generator	8	3	6	2	8	6
22	Major Capital (Paid through CCRC)	Ultraviolet Disinfection	4	2	5	3	3	4
23	Non-reimbursable spending	Security Improvements	5	4	7	3	3	9
24	Major Capital (Paid through CCRC)	Pump Stations	8	7	6	3	7	7
25	Major Capital (Paid through CCRC)	Rehab Buried Concrete Reservoirs	7	7	6	3	6	6
26	Major Capital (Paid through CCRC)	Rehab Tanks and Reservoirs	7	7	6	3	6	6
27	Major Capital (Paid through CCRC)	Roof Replacements	4	4	3	5	5	6
28	Non-reimbursable spending	Major Meter replacement program	3	4	5	7	5	4

Wastewater Project Scoring

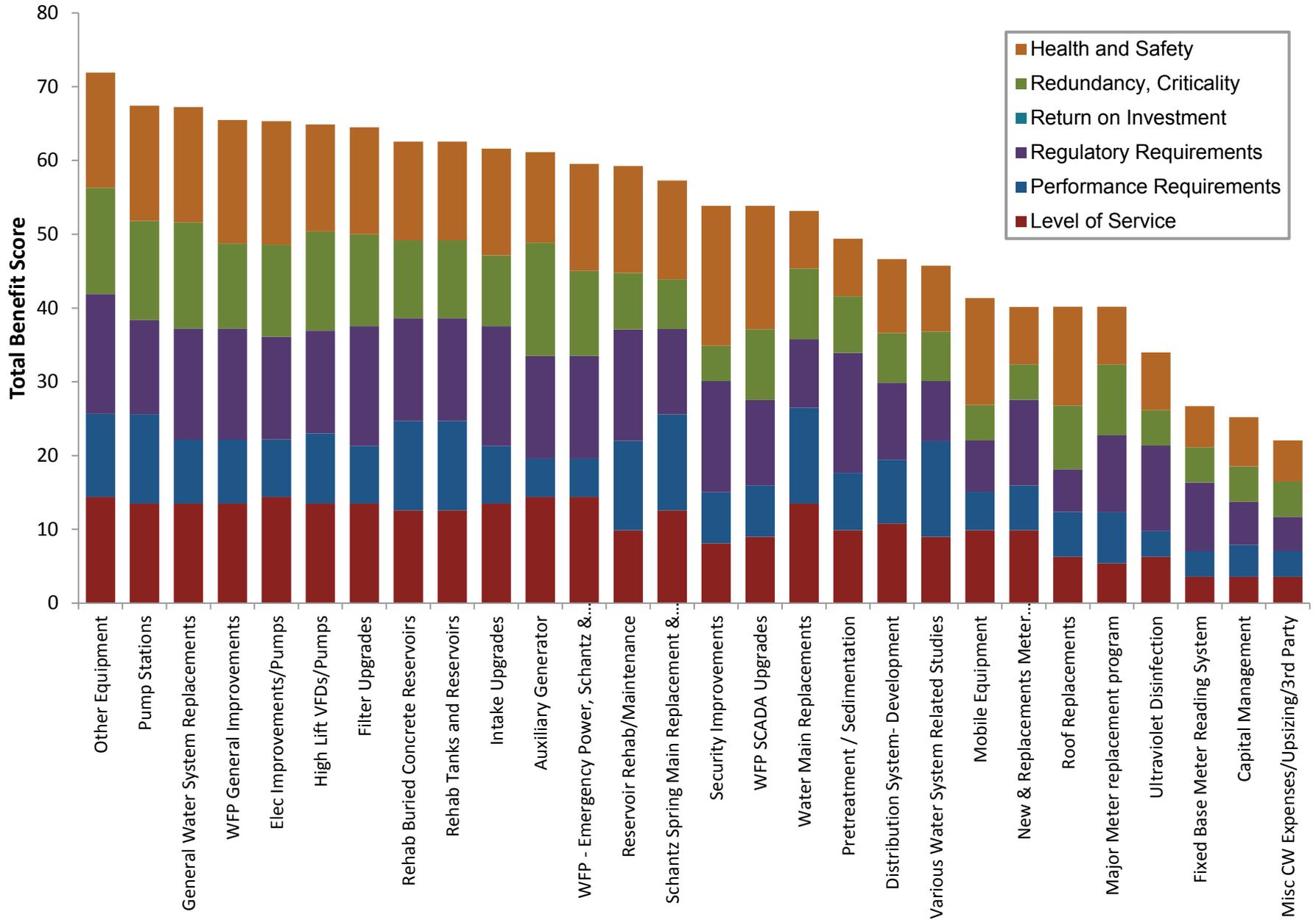
Project Number	Category/Fund Type	Project Name	Evaluation Criteria					
			Level of Service	Performance Requirements	Regulatory Requirements	Return on Investment	Redundancy, Criticality	Health and Safety
1	Annual Project	Other Equipment	7	6	6	5	7	7
2	Annual Project	WWTP General Improvements	7	7	7	4	7	8
3	Annual Project	Sanitary Sewer Main Replacements & Rehab	7	7	6	5	6	6
4	Annual Project	Mobile Equipment	6	3	3	3	4	5
5	Annual Project	Various Wastewater System Related Studies	5	6	5	3	4	4
6	Annual Project	WWTP Dewatering SCADA Upgrades	6	4	3	5	5	5
7	Annual Project	Indenture Report Improvements	7	8	5	4	4	5
8	Annual Project	Collection System - Development	4	3	2	6	3	3
9	Major Capital (Paid through CCRC)	WWTP Electrical Substation Replacements	8	4	5	6	8	9
10	Major Capital (Paid through CCRC)	WWTP Disinfection Upgrade	6	5	8	4	7	9
11	Major Capital (Paid through CCRC)	WWTP Nutrient Upgrade	5	6	7	4	5	6
12	Major Capital (Paid through CCRC)	Replace Secondary Clarifiers 1-4	6	4	5	3	8	6
13	Major Capital (Paid through CCRC)	WWTP Electrical MCC Replacements	7	3	6	4	8	8
14	Major Capital (Paid through CCRC)	New Digesters (three)	6	3	6	5	6	3
15	Major Capital (Paid through CCRC)	Rehab PMTF towers	7	3	6	3	5	5
16	Major Capital (Paid through CCRC)	Replace Secondary Clarifiers 7-8	6	3	6	3	7	4
17	Major Capital (Paid through CCRC)	Boiler Replacements	6	3	5	6	7	7
18	Major Capital (Paid through CCRC)	Sludge Collection Mechanism Replacement-PCs	5	2	6	3	6	5
19	Major Capital (Paid through CCRC)	Sludge Collection Mechanism replacement - SCs	5	2	6	3	6	5
20	Major Capital (Paid through CCRC)	Screening and Grit rehab/replacement	6	3	5	4	7	3
21	Major Capital (Paid through CCRC)	Gravity Thickener Rehab	5	3	5	3	7	4
22	Major Capital (Paid through CCRC)	Long Term Plant Upgrades	6	6	8	5	6	5
23	Major Capital (Paid through CCRC)	Large diameter sewer main rehabilitation	7	7	7	5	7	6
24	Annual Project	Capital Management	3	3	3	5	4	4

**Water Ideal Project
Total Benefit Score**

Project Number	Project Description	Category/Fund Type	Capital Cost	Cumulative Capital Cost	Total Benefit Score	Benefit-Cost Score
4	Other Equipment	Annual Project	\$16,884,500	\$16,884,500	71.90	4.26
24	Pump Stations	Major Capital (Paid throu	\$11,700,000	\$28,584,500	67.42	5.76
1	General Water System Replacements	Annual Project	\$52,114,000	\$80,698,500	67.24	1.29
6	WFP General Improvements	Annual Project	\$16,522,000	\$97,220,500	65.48	3.96
20	Elec Improvements/Pumps	Major Capital (Paid throu	\$13,200,000	\$110,420,500	65.31	4.95
19	High Lift VFDs/Pumps	Major Capital (Paid throu	\$14,000,000	\$124,420,500	64.87	4.63
16	Filter Upgrades	Major Capital (Paid throu	\$28,140,000	\$152,560,500	64.50	2.29
25	Rehab Buried Concrete Reservoirs	Major Capital (Paid throu	\$46,000,000	\$198,560,500	62.57	1.36
26	Rehab Tanks and Reservoirs	Major Capital (Paid throu	\$13,000,000	\$211,560,500	62.57	4.81
17	Intake Upgrades	Major Capital (Paid throu	\$37,120,000	\$248,680,500	61.62	1.66
21	Auxiliary Generator	Major Capital (Paid throu	\$3,000,000	\$251,680,500	61.14	20.38
13	WFP - Emergency Power, Schantz & Crystal Springs	Major Capital (Paid throu	\$1,790,000	\$253,470,500	59.53	33.25
10	Reservoir Rehab/Maintenance	Annual Project	\$7,729,000	\$261,199,500	59.27	7.67
14	Schantz Spring Main Replacement & Leak Rehabilitation	Major Capital (Paid throu	\$335,000	\$261,534,500	57.28	170.97
23	Security Improvements	Non-reimbursable spend	\$500,000	\$262,034,500	53.86	107.71
7	WFP SCADA Upgrades	Annual Project	\$3,568,000	\$265,602,500	53.85	15.09
12	Water Main Replacements	Major Capital (Paid throu	\$264,529,000	\$530,131,500	53.16	0.20
18	Pretreatment / Sedimentation	Major Capital (Paid throu	\$23,000,000	\$553,131,500	49.41	2.15
9	Distribution System- Development	Annual Project	\$5,331,000	\$558,462,500	46.65	8.75
5	Various Water System Related Studies	Annual Project	\$1,796,000	\$560,258,500	45.74	25.46
2	Mobile Equipment	Annual Project	\$6,922,500	\$567,181,000	41.35	5.97
3	New & Replacements Meter Installations	Annual Project	\$8,233,000	\$575,414,000	40.16	4.88
27	Roof Replacements	Major Capital (Paid throu	\$7,000,000	\$582,414,000	40.18	5.74
28	Major Meter replacement program	Non-reimbursable spend	\$10,000,000	\$592,414,000	40.17	4.02
22	Ultraviolet Disinfection	Major Capital (Paid throu	\$12,000,000	\$604,414,000	33.97	2.83
15	Fixed Base Meter Reading System	Non-reimbursable spend	\$1,705,000	\$606,119,000	26.72	15.67
8	Capital Management	Annual Project	\$2,026,000	\$608,145,000	25.22	12.45
11	Misc CW Expenses/Upsizing/3rd Party	Annual Project	\$5,331,000	\$613,476,000	22.08	4.14

Total Benefit

Water Ideal Project Total Benefit Score

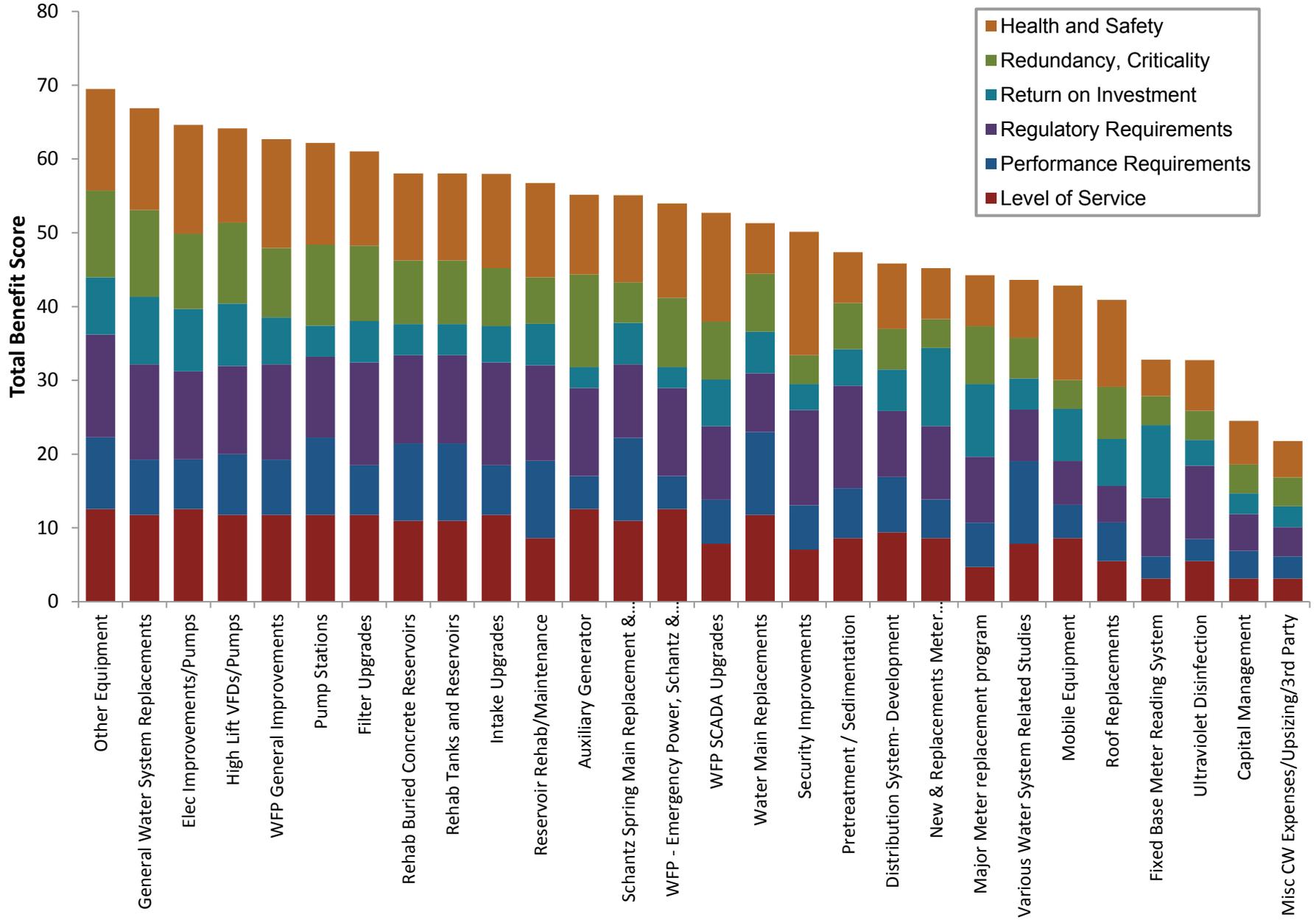


**Water Financial Condition Improvement Project
Total Benefit Score**

Project Number	Project Description	Category/Fund Type	Capital Cost	Cumulative Capital Cost	Total Benefit Score	Benefit-Cost Score
4	Other Equipment	Annual Project	\$16,884,500	\$16,884,500	69.49	4.12
1	General Water System Replacements	Annual Project	\$52,114,000	\$68,998,500	66.87	1.28
20	Elec Improvements/Pumps	Major Capital (Paid throu	\$13,200,000	\$82,198,500	64.62	4.90
19	High Lift VFDs/Pumps	Major Capital (Paid throu	\$14,000,000	\$96,198,500	64.15	4.58
6	WFP General Improvements	Annual Project	\$16,522,000	\$112,720,500	62.69	3.79
24	Pump Stations	Major Capital (Paid throu	\$11,700,000	\$124,420,500	62.17	5.31
16	Filter Upgrades	Major Capital (Paid throu	\$28,140,000	\$152,560,500	61.04	2.17
25	Rehab Buried Concrete Reservoirs	Major Capital (Paid throu	\$46,000,000	\$198,560,500	58.06	1.26
26	Rehab Tanks and Reservoirs	Major Capital (Paid throu	\$13,000,000	\$211,560,500	58.06	4.47
17	Intake Upgrades	Major Capital (Paid throu	\$37,120,000	\$248,680,500	57.99	1.56
10	Reservoir Rehab/Maintenance	Annual Project	\$7,729,000	\$256,409,500	56.74	7.34
21	Auxiliary Generator	Major Capital (Paid throu	\$3,000,000	\$259,409,500	55.16	18.39
14	Schantz Spring Main Replacement & Leak Rehabilitation	Major Capital (Paid throu	\$335,000	\$259,744,500	55.09	164.45
13	WFP - Emergency Power, Schantz & Crystal Springs	Major Capital (Paid throu	\$1,790,000	\$261,534,500	53.99	30.16
7	WFP SCADA Upgrades	Annual Project	\$3,568,000	\$265,102,500	52.72	14.77
12	Water Main Replacements	Major Capital (Paid throu	\$264,529,000	\$529,631,500	51.32	0.19
23	Security Improvements	Non-reimbursable spend	\$500,000	\$530,131,500	50.14	100.29
18	Pretreatment / Sedimentation	Major Capital (Paid throu	\$23,000,000	\$553,131,500	47.38	2.06
9	Distribution System- Development	Annual Project	\$5,331,000	\$558,462,500	45.83	8.60
3	New & Replacements Meter Installations	Annual Project	\$8,233,000	\$566,695,500	45.19	5.49
28	Major Meter replacement program	Non-reimbursable spend	\$10,000,000	\$576,695,500	44.24	4.42
5	Various Water System Related Studies	Annual Project	\$1,796,000	\$578,491,500	43.63	24.29
2	Mobile Equipment	Annual Project	\$6,922,500	\$585,414,000	42.84	6.19
27	Roof Replacements	Major Capital (Paid throu	\$7,000,000	\$592,414,000	40.91	5.84
15	Fixed Base Meter Reading System	Non-reimbursable spend	\$1,705,000	\$594,119,000	32.79	19.23
22	Ultraviolet Disinfection	Major Capital (Paid throu	\$12,000,000	\$606,119,000	32.76	2.73
8	Capital Management	Annual Project	\$2,026,000	\$608,145,000	24.50	12.09
11	Misc CW Expenses/Upsizing/3rd Party	Annual Project	\$5,331,000	\$613,476,000	21.77	4.08

Total Benefit

Water Financial Condition Improvement Project Total Benefit Score

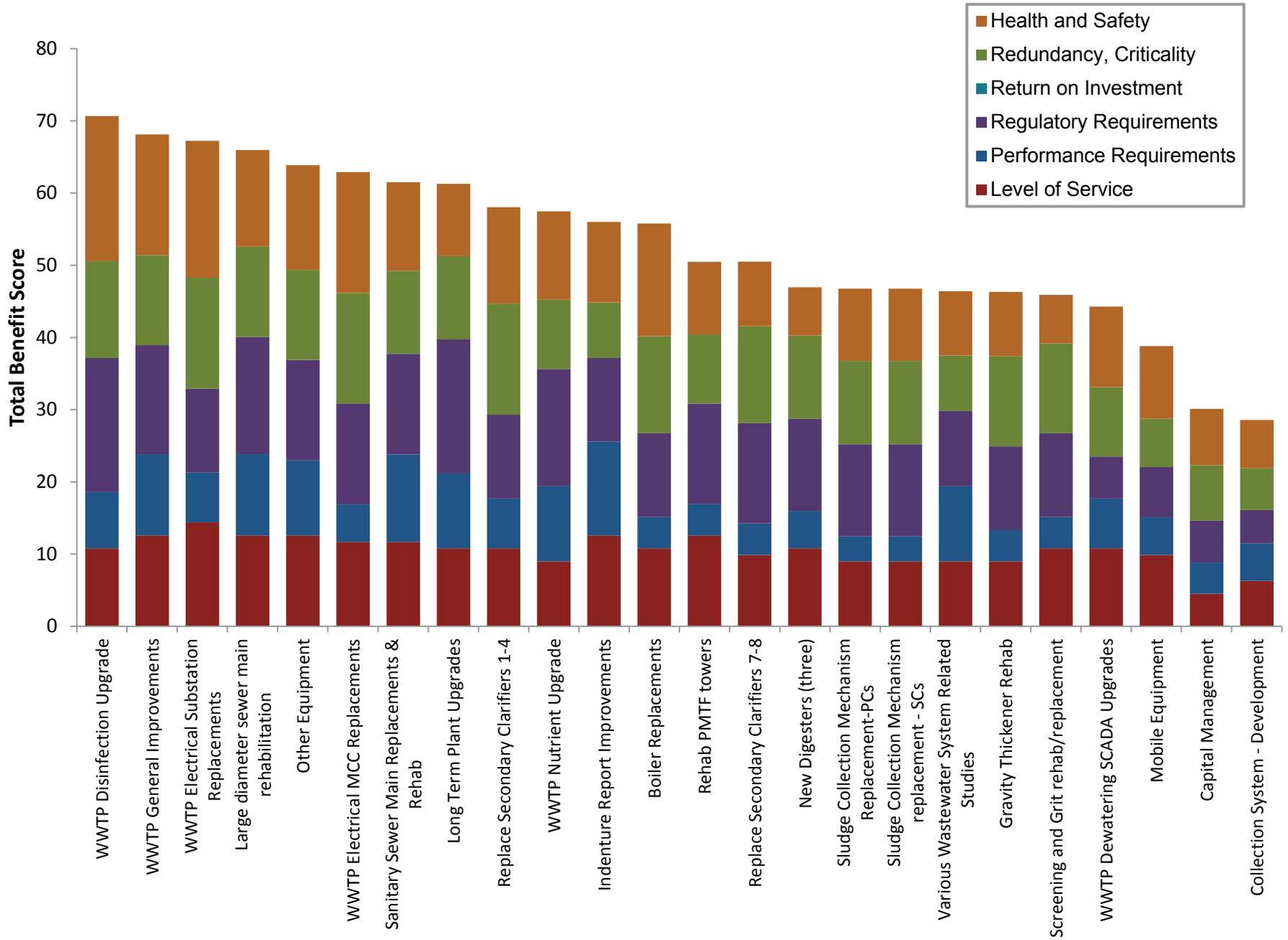


**Wastewater Ideal Project
Total Benefit Score**

Project Number	Project Description	Category/Fund Type	Capital Cost	Cumulative Capital Cost	Total Benefit Score	Benefit-Cost Score
10	WWTP Disinfection Upgrade	Major Capital (Paid throu	\$1,931,000	\$1,931,000	70.66	36.59
2	WWTP General Improvements	Annual Project	\$41,165,000	\$43,096,000	68.13	1.66
9	WWTP Electrical Substation Replacements	Major Capital (Paid throu	\$3,489,000	\$46,585,000	67.24	19.27
23	Large diameter sewer main rehabilitation	Major Capital (Paid throu	\$149,568,000	\$196,153,000	65.95	0.44
1	Other Equipment	Annual Project	\$18,628,000	\$214,781,000	63.88	3.43
13	WWTP Electrical MCC Replacements	Major Capital (Paid throu	\$15,631,000	\$230,412,000	62.90	4.02
3	Sanitary Sewer Main Replacements & Rehab	Annual Project	\$8,233,000	\$238,645,000	61.52	7.47
22	Long Term Plant Upgrades	Major Capital (Paid throu	\$261,954,000	\$500,599,000	61.30	0.23
12	Replace Secondary Clarifiers 1-4	Major Capital (Paid throu	\$3,564,000	\$504,163,000	58.06	16.29
11	WWTP Nutrient Upgrade	Major Capital (Paid throu	\$69,381,000	\$573,544,000	57.49	0.83
7	Indenture Report Improvements	Annual Project	\$5,000,000	\$578,544,000	56.01	11.20
17	Boiler Replacements	Major Capital (Paid throu	\$3,738,000	\$582,282,000	55.78	14.92
15	Rehab PMTF towers	Major Capital (Paid throu	\$4,707,000	\$586,989,000	50.48	10.72
16	Replace Secondary Clarifiers 7-8	Major Capital (Paid throu	\$5,537,000	\$592,526,000	50.51	9.12
14	New Digesters (three)	Major Capital (Paid throu	\$73,863,000	\$666,389,000	46.96	0.64
18	Sludge Collection Mechanism Replacement-PCs	Major Capital (Paid throu	\$7,655,000	\$674,044,000	46.78	6.11
19	Sludge Collection Mechanism replacement - SCs	Major Capital (Paid throu	\$9,740,000	\$683,784,000	46.78	4.80
5	Various Wastewater System Related Studies	Annual Project	\$2,055,000	\$685,839,000	46.42	22.59
21	Gravity Thickener Rehab	Major Capital (Paid throu	\$6,002,000	\$691,841,000	46.33	7.72
20	Screening and Grit rehab/replacement	Major Capital (Paid throu	\$6,002,000	\$697,843,000	45.90	7.65
6	WWTP Dewatering SCADA Upgrades	Annual Project	\$230,000	\$698,073,000	44.27	192.48
4	Mobile Equipment	Annual Project	\$11,433,000	\$709,506,000	38.81	3.39
24	Capital Management	Annual Project	\$2,026,000	\$711,532,000	30.11	14.86
8	Collection System - Development	Annual Project	\$4,772,000	\$716,304,000	28.58	5.99

Total Benefit

Wastewater Ideal Project Total Benefit Score

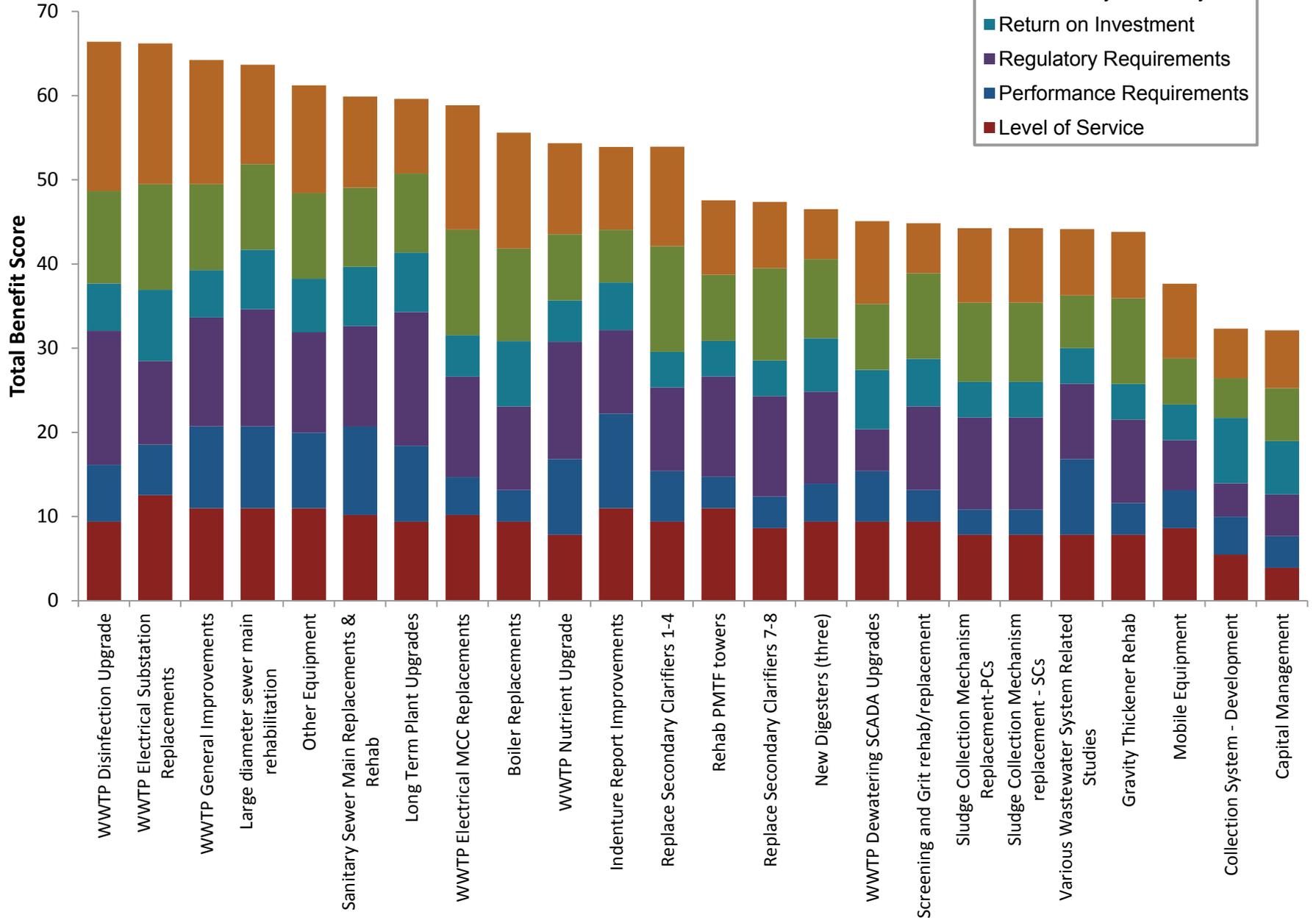


**Wastewater Financial Condition Improvement Project
Total Benefit Score**

Project Number	Project Description	Category/Fund Type	Capital Cost	Cumulative Capital Cost	Total Benefit Score	Benefit-Cost Score
10	WWTP Disinfection Upgrade	Major Capital (Paid throu	\$1,931,000	\$1,931,000	66.38	34.38
9	WWTP Electrical Substation Replacements	Major Capital (Paid throu	\$3,489,000	\$5,420,000	66.21	18.98
2	WWTP General Improvements	Annual Project	\$41,165,000	\$46,585,000	64.23	1.56
23	Large diameter sewer main rehabilitation	Major Capital (Paid throu	\$149,568,000	\$196,153,000	63.68	0.43
1	Other Equipment	Annual Project	\$18,628,000	\$214,781,000	61.22	3.29
3	Sanitary Sewer Main Replacements & Rehab	Annual Project	\$8,233,000	\$223,014,000	59.89	7.27
22	Long Term Plant Upgrades	Major Capital (Paid throu	\$261,954,000	\$484,968,000	59.62	0.23
13	WWTP Electrical MCC Replacements	Major Capital (Paid throu	\$15,631,000	\$500,599,000	58.85	3.77
17	Boiler Replacements	Major Capital (Paid throu	\$3,738,000	\$504,337,000	55.60	14.87
11	WWTP Nutrient Upgrade	Major Capital (Paid throu	\$69,381,000	\$573,718,000	54.35	0.78
7	Indenture Report Improvements	Annual Project	\$5,000,000	\$578,718,000	53.91	10.78
12	Replace Secondary Clarifiers 1-4	Major Capital (Paid throu	\$3,564,000	\$582,282,000	53.92	15.13
15	Rehab PMTF towers	Major Capital (Paid throu	\$4,707,000	\$586,989,000	47.57	10.11
16	Replace Secondary Clarifiers 7-8	Major Capital (Paid throu	\$5,537,000	\$592,526,000	47.37	8.56
14	New Digesters (three)	Major Capital (Paid throu	\$73,863,000	\$666,389,000	46.49	0.63
6	WWTP Dewatering SCADA Upgrades	Annual Project	\$230,000	\$666,619,000	45.10	196.08
20	Screening and Grit rehab/replacement	Major Capital (Paid throu	\$6,002,000	\$672,621,000	44.83	7.47
18	Sludge Collection Mechanism Replacement-PCs	Major Capital (Paid throu	\$7,655,000	\$680,276,000	44.26	5.78
19	Sludge Collection Mechanism replacement - SCs	Major Capital (Paid throu	\$9,740,000	\$690,016,000	44.26	4.54
5	Various Wastewater System Related Studies	Annual Project	\$2,055,000	\$692,071,000	44.15	21.48
21	Gravity Thickener Rehab	Major Capital (Paid throu	\$6,002,000	\$698,073,000	43.82	7.30
4	Mobile Equipment	Annual Project	\$11,433,000	\$709,506,000	37.66	3.29
8	Collection System - Development	Annual Project	\$4,772,000	\$714,278,000	32.32	6.77
24	Capital Management	Annual Project	\$2,026,000	\$716,304,000	32.14	15.86

Total Benefit

Wastewater Financial Condition Improvement Project Total Benefit Score



Appendix E
Affordability Supporting Analysis

MEMO

To: Liesel Gross, Chief Executive Officer, Lehigh County Authority

From: John Mastracchio, Vice President, Raftelis

Date: April 16, 2018

Re: Preliminary Water and Sewer Affordability Analysis for the City of Allentown

INTRODUCTION

Raftelis Financial Consultants, Inc. (“Raftelis”) prepared this preliminary water and sewer affordability analysis for the Lehigh County Authority (“LCA”) to provide a preliminary assessment of residential affordability of water and sewer bills for customers located within the City of Allentown (“City”) Division. Affordability is a concept that is easily understood but difficult to define precisely. At its heart, it means that customers can pay their utility bills without undue hardship.

Affordability of water and sewer service can be examined in several ways. One of the most basic ways to measure affordability is to compare the residential cost as a percentage of median household income (“MHI”) to the United States Environmental Protection Agency (“USEPA”) threshold for “high” financial capability impact, which has been established at 2.0 percent of MHI.¹ While there is no similar guidance document for water system affordability, an independent water system affordability study performed by the USEPA stated that an affordability threshold could range from 1.5 to 3.0 percent of MHI.² Therefore, for the purposes of this analysis, we have assumed a residential affordability threshold (“Residential Indicator”) for water and sewer utility service to be 4.5 percent of MHI.

This technical memorandum presents information on this basic affordability indicator for the City, but examines this indicator on a more granular level, along with an assessment of income and poverty levels. More specifically, income levels and utility cost as a percentage of income metrics were examined by United States Census Bureau (“Census Bureau”) Census Tracts³ to highlight the disparity of income and affordability within the City that can be masked when only using median or average figures. This technical memorandum also presents historical poverty rate information for the City of Allentown, and compares these poverty rates to County, State, and National poverty rates.

¹Combined Sewer Overflows – Guidance for Financial Capability Assessment and Schedule Development, EPA 832-B-97-004, February 1997.

²National Affordability Criteria Under the 1996 Amendments to the Safe Drinking Water Act, prepared by International Consultants, Inc. for the USEPA, 1998.

³A Census Tract is an area roughly equivalent to a neighborhood, and is defined by the Census Bureau for the purpose of analyzing populations.

AFFORDABILITY ANALYSIS

Poverty Rates

The poverty rate is the ratio of the number of people whose income falls below the poverty level as defined by the Census Bureau, and is an indicator of the prevalence of economic hardship within an area. The national poverty thresholds according to household size in 2016 are summarized in Table 1 for the latest year that comprehensive statistics published by the Census Bureau are available.

Table 1. National Poverty Thresholds According to Household Size (2016)

Household Size	2016 National Poverty Threshold
1	\$12,486
2	\$16,072
3	\$18,774
4	\$25,160
5	\$29,854
6	\$34,337
7	\$39,509
8	\$44,188

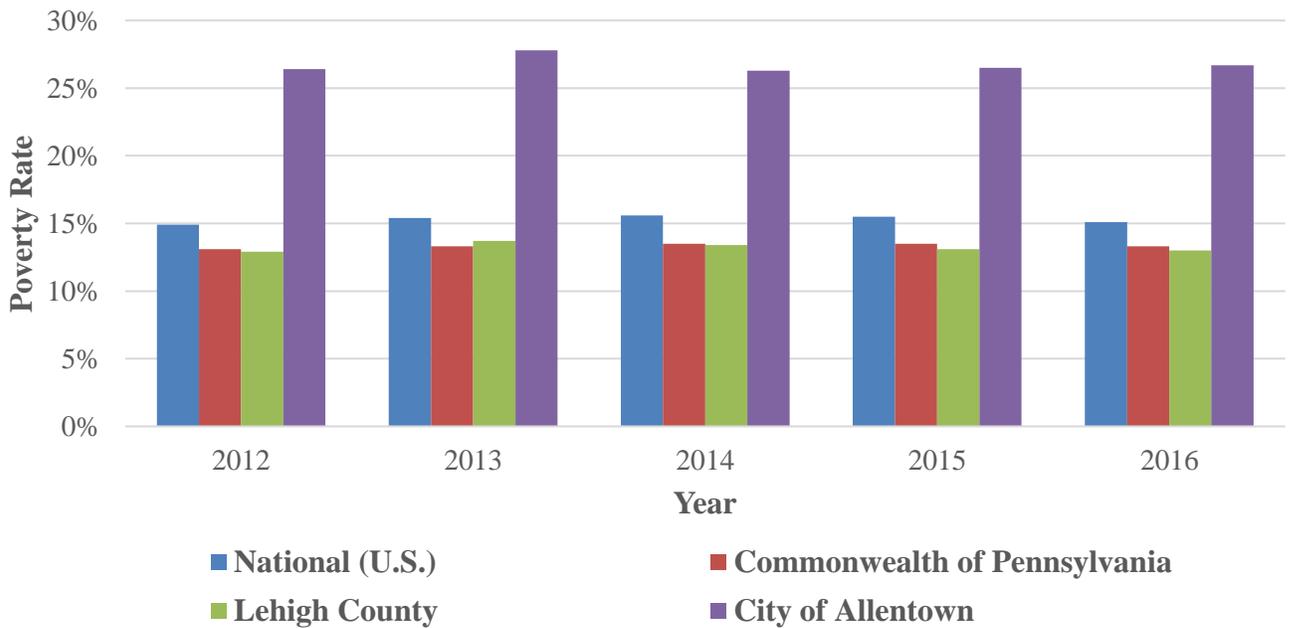
The poverty rates and historical poverty rate trends for the City of Allentown from 2012 to 2016 are summarized in Table 2 according to the Census Bureau's estimates from the American Community Survey. As shown in Table 2, the percentage of households at or below the poverty level (ranging from 26 to 28 percent for the five-year period) is a significant proportion of households within the City.

Table 2. Poverty Rates in the City of Allentown (2012 – 2016)

Year	Poverty Rate
2012	26.4%
2013	27.8%
2014	26.3%
2015	26.5%
2016	26.7%

The historical poverty rates for the City are also relatively high when compared to those of Lehigh County, the Commonwealth of Pennsylvania, and the National statistics as a whole, as shown in Figure 1. For the five-year period reported here, the poverty rates for the City were approximately double the rates reported for the County, the Commonwealth, and at the National level. This highlights that there is a large household population within the City with very low income levels, and indicates the prevalence of economic hardship and distress of some households within LCA's City Division service area.

Figure 1. Poverty Rates for the City of Allentown Compared to the Commonwealth of Pennsylvania, and the U.S. (2012 – 2016)



Income by Census Tract

The MHI for the City was \$37,256 in 2016 according to the last American Community Survey (“ACS”) conducted by the Census Bureau. This median income was much lower than the National MHI, which was reported to be \$57,617 in 2016. The MHI within the Allentown Metropolitan Statistical Area was reported to have increased by an annual average of 1.18% between 2012 and 2016. Applying this rate of growth to the City’s 2016 MHI results in an estimated MHI for the City of \$38,144 in 2018.

Examining MHI statistics at the city level can often mask stark income differences between neighborhoods. Therefore, to address this, MHI data was analyzed at the Census Tract level, which is the most detailed information that is available for the City from the Census Bureau. A map of the median income levels for the Census Tracts within the City in 2018 is presented in Figure 2. As shown in this map, the Census Tract median income levels were grouped into five income categories. The Census Tracts in “red” have the lowest income (\$0 to \$15,000 annual MHI) while the census tracts in dark green have the highest income (MHI above \$60,000 per year). As shown in Figure 2, there is a wide disparity of income levels within the City, and the Census Tracts with the lowest MHI levels are primarily located in the central portions of the City.

The percentages of total households within the City with income levels in various low, medium, and high-income ranges are shown below.

- Households with Income Below \$15,000 19%
- Households with Income Between \$15,000 and \$30,000 21%
- Households with Income Between \$30,000 and \$45,000 18%
- Households with Income Between \$45,000 and \$60,000 12%
- Households with Income Over \$60,000 30%

These income statistics from the Census Bureau further demonstrate that there is a large disparity of income across the City, with a large proportion of income levels below \$30,000 and a large proportion greater than \$60,000.

Typical Residential Utility Bill as a % of MHI by Census Tract

The projected future Residential Indicator was examined by Census Tract to assess how the affordability of residential water and sewer bills is likely to change over time. For the purposes of this analysis, we have assumed an affordability threshold for water and sewer utility service to be 4.5 percent of MHI, and it was assumed that a typical residential customer is billed based on 4,600 gallons monthly and has a 5/8” meter size.

A map of the 2018 annual residential water and sewer bill as a percentage of MHI by Census Tract is presented in Figure 3 under the monthly billing rate schedule for City residential customers. This monthly billing rate schedule was used because LCA intends to change from quarterly to monthly billing of City customers in 2018. Given the billed consumption assumptions, the annual residential water and sewer bill was calculated to be \$652.34. This combined bill estimate includes fixed and volumetric rates, as well as capital cost recovery

charges, administrative order, change of law, and DRBC charges and fees. The results presented in Figure 3 indicate that currently, affordability issues within the City do not appear to be widespread even if LCA changes its billing frequency for LCA's City Division customers from quarterly to monthly. As shown in Figure 3, the combined residential water and sewer bill as a percentage of MHI by Census Tract is expected to remain below the assumed affordability threshold of 4.5 percent for all of the Census Tracts within the City. Therefore, it is anticipated that LCA could change the bill frequency and rate schedule for City customers from a quarterly basis to a monthly basis in 2018 without causing immediate widespread affordability issues.

However, as noted above, due to the high poverty rates within the City, there are some customers that would likely be experiencing economic hardship and may have additional difficulty paying their water and sewer bills with this billing methodology change. Therefore, it is recommended that LCA complete a more detailed affordability analysis by 2019 using metrics beyond MHI to assess the near-term localized affordability issues, along with a potential customer assistance program.

Maps of the projected Residential Indicator by Census Tract in 2027, 2037, and 2047 are presented in Figure 4 through 6 under the monthly billing rate schedule for City residential customers. The year 2047 was analyzed because it is anticipated to be the last full year of annual debt service payments associated with the debt from the initial lease transaction. After this year, the financial forecast shows that there is the likelihood that LCA will be able to accumulate net cash, with the possibility of lowering the annual increases in water and sewer rates that are projected to be needed prior to this year.

These figures show that as LCA continues to increase water and sewer rates, affordability issues are expected to become more widespread, especially for the central and eastern neighborhoods in the city. However, note that these are very long-term projections and should not be viewed as a firm prediction of rates and rate increases that will be implemented. The actual pace of utility rate inflation will be impacted significantly by several factors, including LCA's decisions on phasing and prioritization of capital improvements. Further, the rate of change of inflation factors, local economic conditions, and other factors may impact the rate of change in income levels that were projected.

CONCLUSIONS

The following are the preliminary water and sewer affordability assessment conclusions for the City of Allentown:

1. There is a wide disparity of household income among residential customers within the City, and a large household population with very low income levels (e.g. a poverty rate of 27 percent and 40 percent of households with income under \$30,000 per year).
2. However, affordability issues within the City do not appear to be widespread as there are no Census Tracts within the City where the typical residential water and sewer bill as a percentage of MHI is currently above 4.5 percent assuming monthly billing.
3. LCA could change the billing frequency and rate schedule for City customers from a quarterly basis to a monthly basis in 2018 without causing the Residential Indicator in any Census Tract to exceed the 4.5 percent level.
4. As LCA continues to increase water and sewer rates, affordability issues are expected to become more widespread by 2027. By this year, it is anticipated that a large number of Census Tracts within the City will approach the 4.5 percent level, and one is projected to exceed the 6.0 percent level.

Figure 2. Median Residential Income by Census Tract for the City of Allentown (2018)

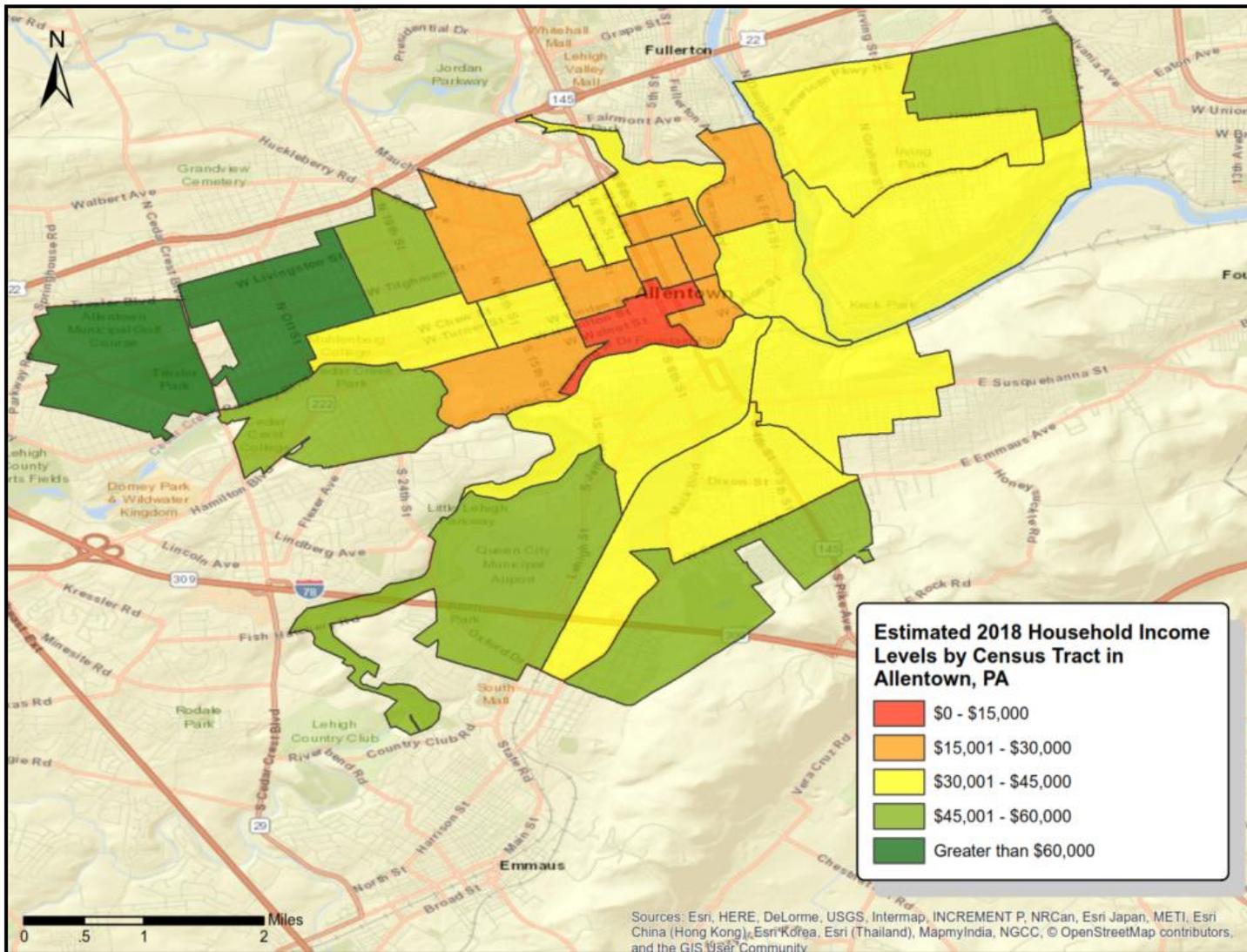


Figure 3. Annual Residential Water and Sewer Utility Cost as a % of MHI (2018)

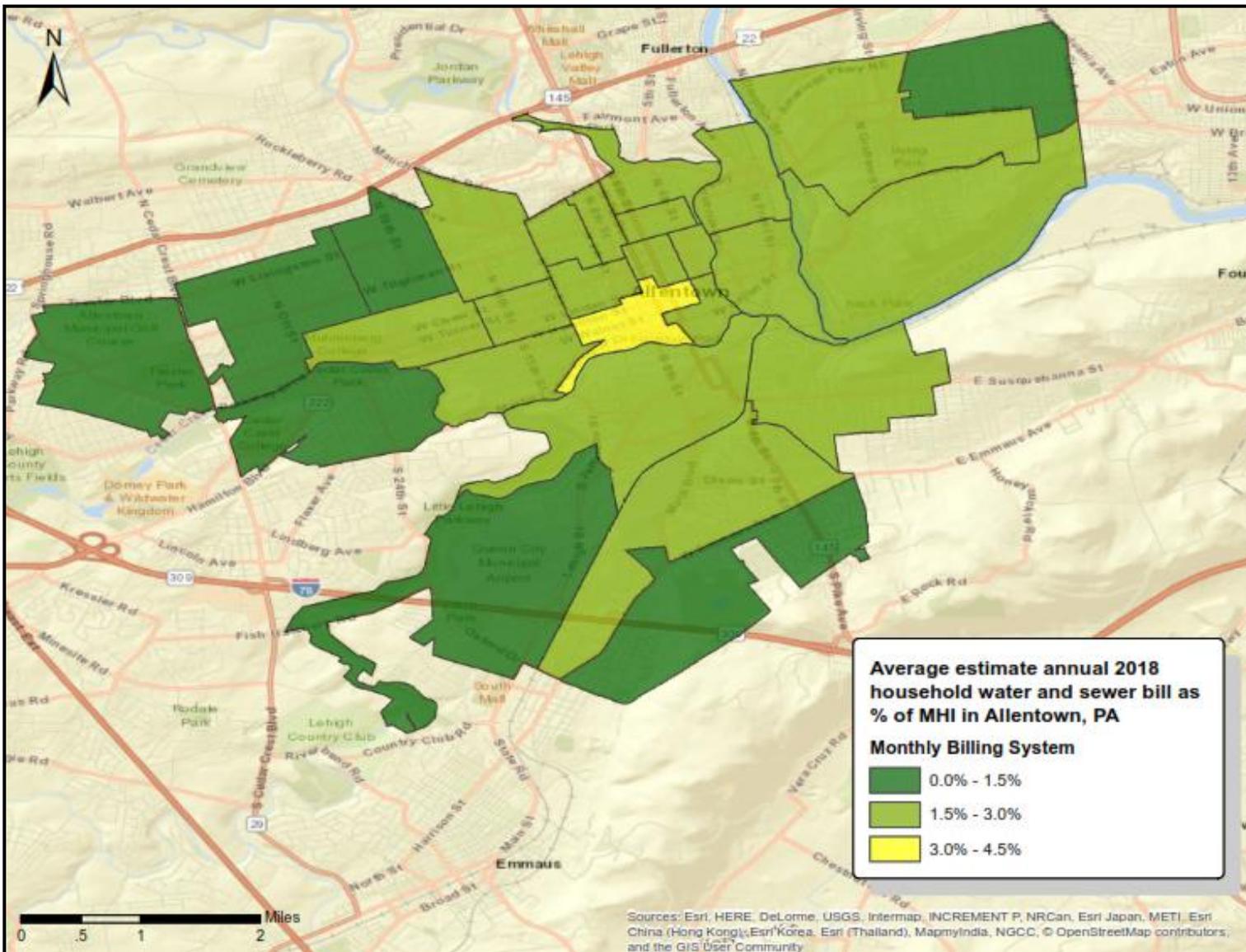


Figure 4. Annual Residential Water and Sewer Utility Cost as a % of MHI (2027)

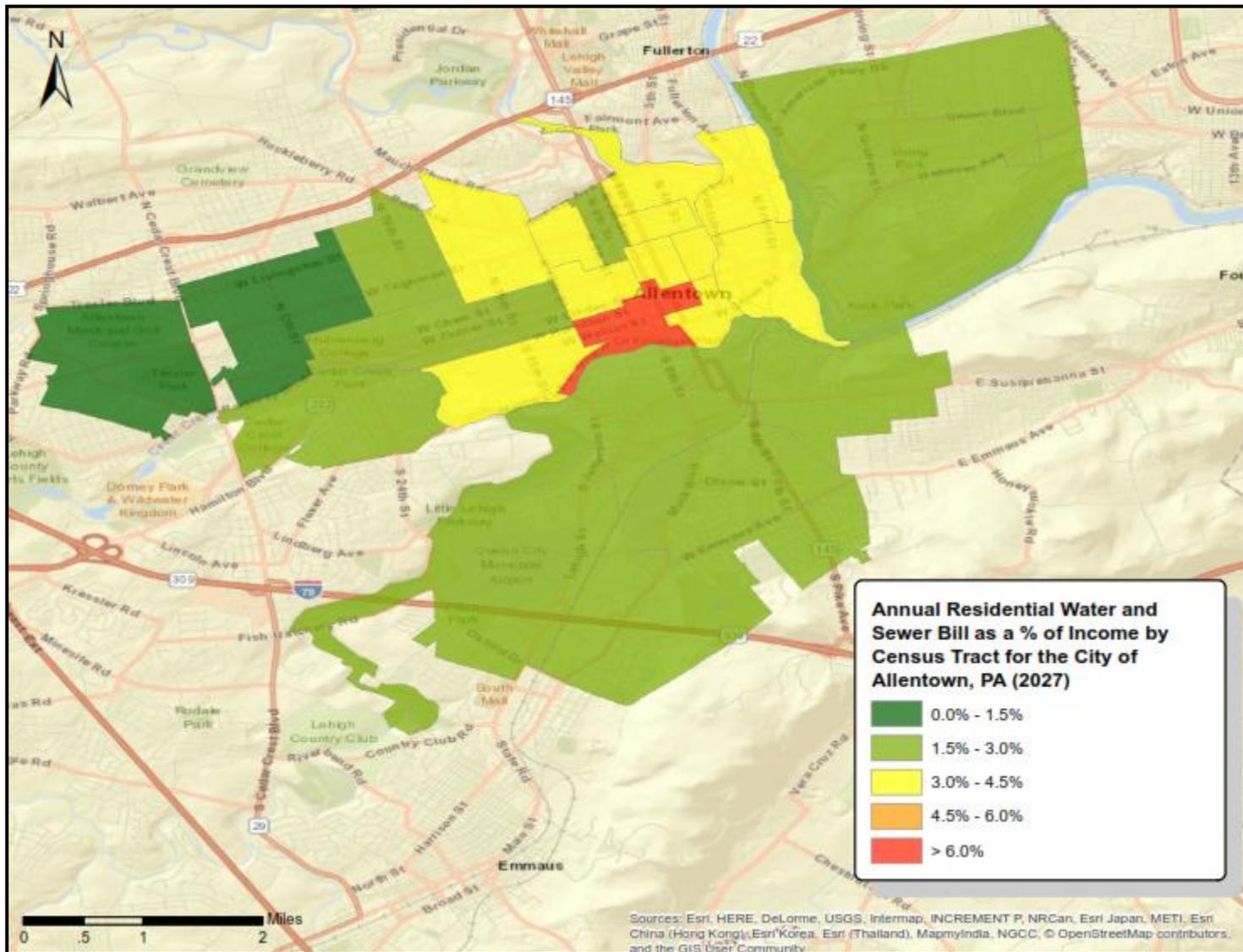


Figure 5. Annual Residential Water and Sewer Utility Cost as a % of MHI (2017)

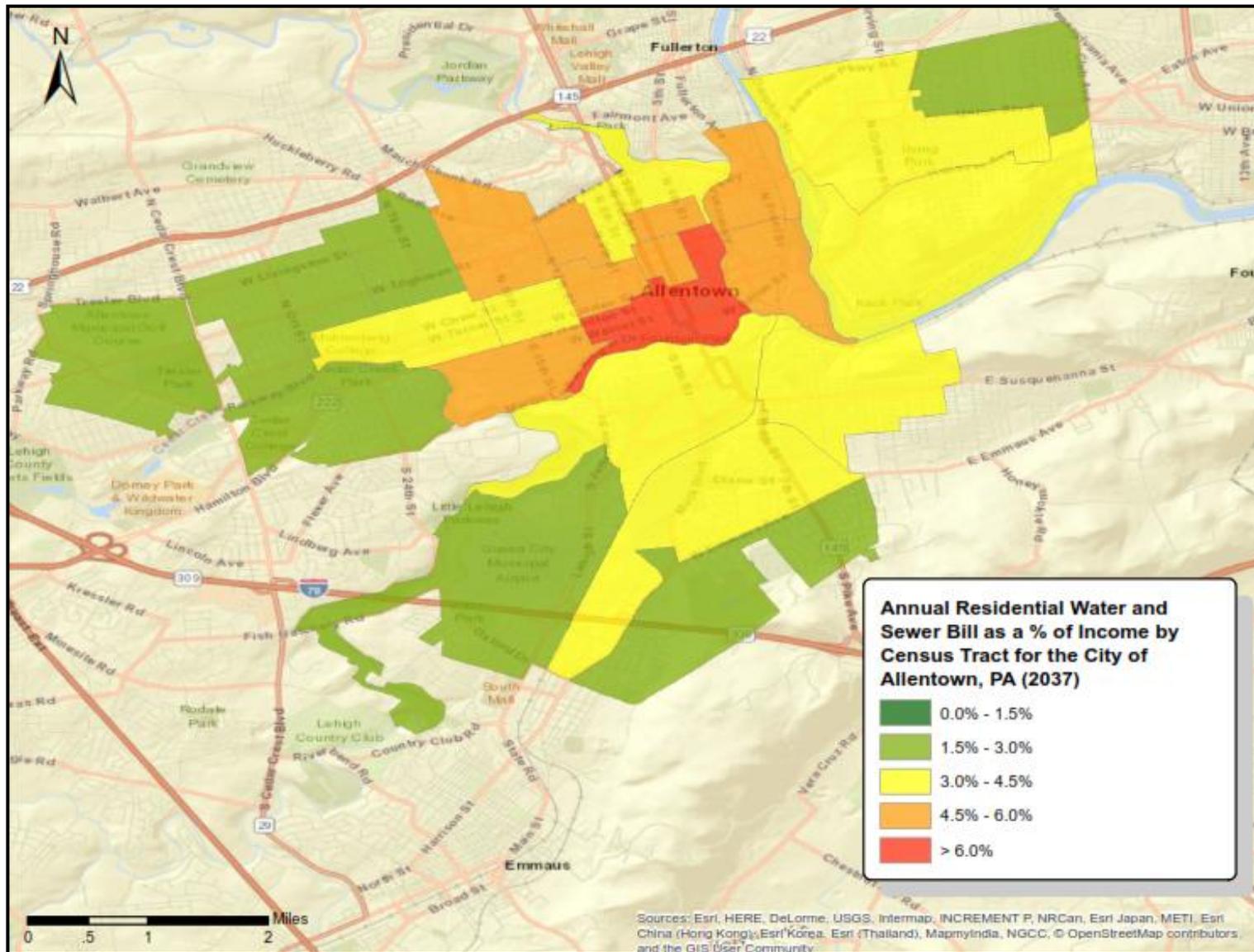
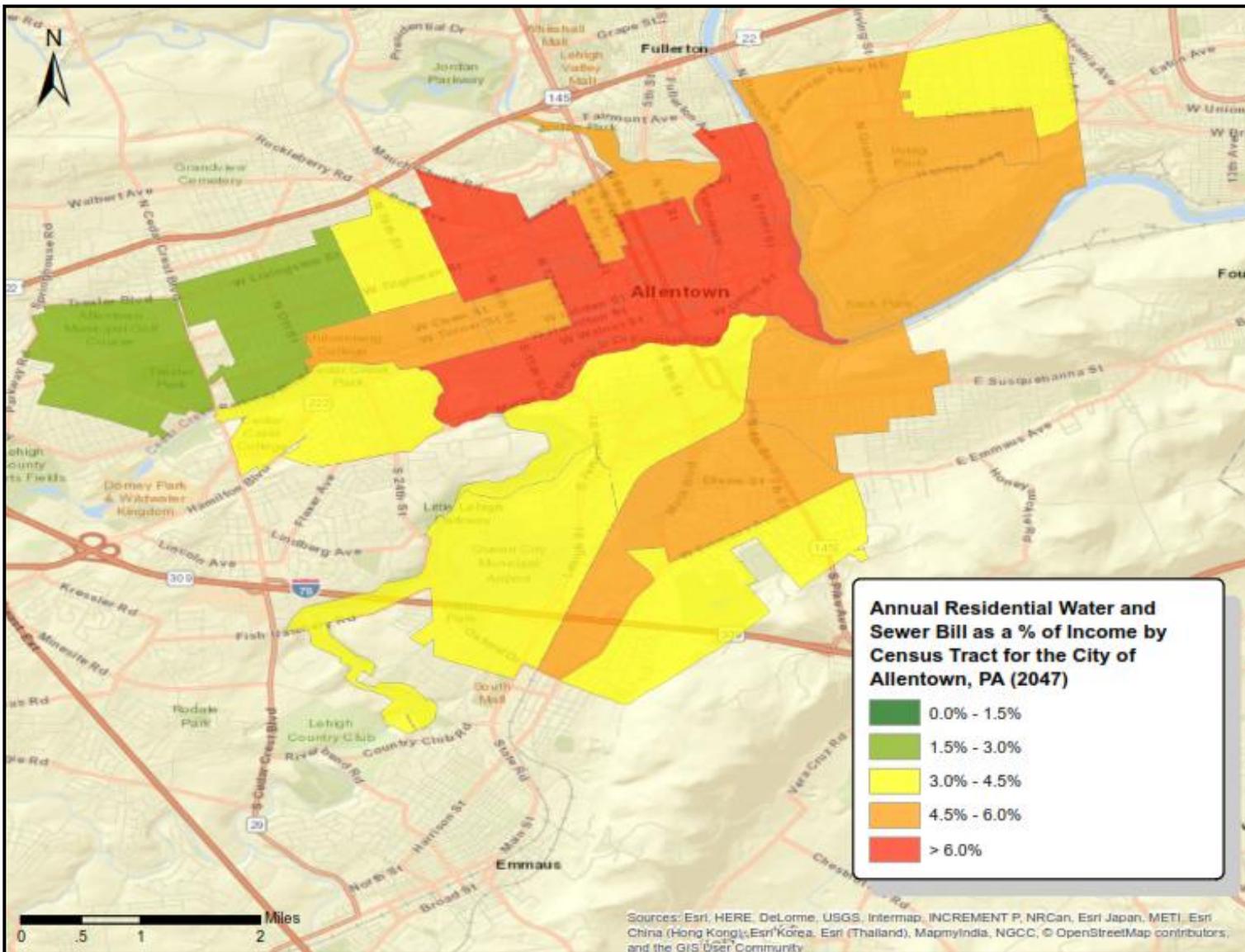


Figure 6. Annual Residential Water and Sewer Utility Cost as a % of MHI (2047)



Appendix F
Debt Profile Considerations

Debt Profile Considerations

Introduction

Debt related to the City of Allentown (hereafter, “the City”) Division consists of a single 2013 Revenue Bond issuance comprised of three series: 2013A (Tax Exempt); 2013B (Capital Appreciation Bonds (CABs); 2013C (Taxable Bullet Maturity) (together, the “2013 Bonds”). Payments on the existing 2013 Bonds “spike” in December 2018 as the 2013C Taxable Bullet Maturity comes due in full. Further discussion on this specific series within the 2013 Bonds is contained herein. Outside of the debt service “spike” in December 2018, annual payments increase from approximately \$12.9 million in fiscal year (FY) 2019 to a peak of \$38.2 million in 2043.

The 2013A Bonds were structured with a 10-year call provision (that is, prepayment provision) that is typical for most long-term, tax-exempt municipal bonds. As a result, this series may provide the future ability to refinance and/or restructure as will be discussed further herein.

The 2013B CABs are generally not prepayable and thus will not provide the opportunity to refinance. This inflexible prepayment provision will likely also limit the effectiveness of the 2013B Bonds in a debt restructuring scenario.

The 2013C Bonds come due in a bullet maturity on December 1, 2018. This series will need to be termed out prior to final maturity, as the City Division does not have excess cash over and above legal reserve requirements or recommended policy targets with which to pay the bullet maturity.

Refinancing/Restructuring Considerations

Debt Refinancing Considerations

Davenport and Company (hereafter, “Davenport”) was tasked with first analyzing the estimated ability to refinance any of the 2013 Bonds purely for interest rate savings purposes. As noted previously, the 2013A Bonds are the only series that provides the ability to refinance on a conventional basis for interest rate savings purposes.

Based on market interest rates as of January 2018 and without the ability to advance refunding on a tax-exempt basis, no opportunity existed to refinance for meaningful economic savings especially considering the City Division’s near-term cash flow pressure.

Davenport recommends that Lehigh County Authority (LCA) continue to monitor the taxable and tax-exempt markets to explore the opportunity to refinance the 2013 Bonds via a conventional refinancing structure.

Given the City Division’s cash flow pressures, any refinancing transaction should closely consider not only the long-term economic/interest rate savings but also the near-term cash flow benefit and opportunity cost of executing a refinancing transaction that may have limited impact to near-term cash flows.

2013C Term Out Considerations

As noted previously, the bullet maturity of the 2013C Bonds needs to be termed out because, based on the information Davenport was provided, LCA does not have the required reserves to pay the \$18+ million that comes due on December 1, 2018.

The term out transaction will likely not be a straightforward financing, and at the time of this Report, LCA has at most 8 months with which to complete and close on a successful refinancing.

Complications may include:

- Public market access
- Potential need for discussion(s) with rating agencies

Credit ratings are a primary factor in determining the cost of borrowing for any municipal borrower like LCA. The City Division only has a single credit rating and it is currently in the second-lowest investment grade category (“A”). It will be important for LCA to quickly implement the recommendations contained in this report to sustain public market access, both for the term out of the 2013C bonds and for future capital borrowing needs.

In the absence of a public markets transaction, a direct bank placement may be possible for the 2013C term out but should not be viewed as a certainty.

LCA may want to consider a 5- to 7-year term out with a direct bank placement structured with limited principal amortization to roll the imminent 2013C balloon payment without the need to enter the public credit markets and provide time to build more favorable financial trends before entering the public credit markets.

Davenport recommends that LCA develop a multi-track plan in the near term for evaluating financing options to term out the 2013C balloon. As stated previously, this process will likely be time-consuming and complex, and there are at most 8 months before the maturity of the 2013C taxable balloon.

Debt Restructuring Analysis

In addition to the refinancing analysis and 2013C taxable balloon term out noted above, Davenport was also asked to evaluate opportunities to restructure existing City Division debt for cash-flow savings but not necessarily economic savings over the life of the restructured bond(s).

Davenport prepared two options for consideration, both of which considered a present value cost/dissavings over the life refunded bonds. The options were prepared to estimate the amount of up-front cash-flow savings that could be achieved under a “smaller” restructuring transaction or a “larger” restructuring transaction. At this time, it is not recommended that LCA pursue either option.

Davenport views the restructuring transactions prepared to date as a potential tool to help bolster City Division reserves by reducing debt service in the next 3 to 5 fiscal years. LCA may be able to reduce annual debt service payments or otherwise engage in a more beneficial restructuring if LCA is able to extend its charter life, which currently governs the final maturity of the existing 2013 Bonds. Extending existing debt service payments beyond the current final maturity may provide a degree of additional up-front cash-flow relief if needed by the City Division.

Additionally, a restructuring transaction that extends the life of the existing debt may allow LCA to “smooth” the existing debt structure whereby payments ramp up at an increasing rate for the next 25 years. Any restructuring transaction should be undertaken after a thorough and holistic analysis of the impact to the City Division’s critical financial metrics.

Conditions Precedent to Issuance of Either Refunding Bonds or New Money

The 2013 Bonds were issued pursuant to a Trust Indenture that dictates the process and requirements for issuing additional bonds to be secured by the revenues of the City Division.

Davenport reviewed these provisions and discussed them with Bond Counsel for the 2013 Bonds - McNeese Wallace & Nurick LLC (“McNeese”).

Because of the nature and complexity of the Lease Concession Agreement, the legal/security provisions related to issuing additional revenue bonds are unique versus what may be considered typical for a municipal water and sewer revenue bond issue.

More specifically, the critical financial tests that must be met to issue additional debt secured by the revenues of the City Division (or “Leasehold Mortgage Debt”, as it is defined in the Indenture) generally include the following (note: per McNeese the any “Additional Bonds” as the term is used in the Trust Indenture effectively refers to “Leasehold Mortgage Debt”):

For the sake of brevity, Davenport has summarized the provisions included in the Trust Indenture for inclusion in the report. For a detailed and comprehensive listing of all provisions required to issue Additional Bonds, please refer to the 2013 Trust Indenture.

- “...confirming the aggregate amount of Leasehold Mortgage Debt after giving effect to the incurrence or commitment of such new debt evidenced by the issuance of the Series of Additional Bonds is not in excess of 80 percent of the fair market value of the Concessionaire Interest set forth in such Written Appraisal at the time of incurrence or commitment of such new debt...” (Section 3.02g of the 2013 Trust Indenture)

In discussions with Authority Staff, Jacob’s, and McNeese the calculation and process for compliance with this requirement is not entirely clear.

The Jacob’s team and LCA staff developed a methodology for the appraised value in the system using discounted future net revenues

Given that the appraisal methodology is not clear in the Trust Indenture, the Jacob’s / LCA appraisal methodology may be suitable but, as of the time of this writing, the issue has not been definitively settled with from a legal perspective with either Bond Counsel or Counsel to the Trustee, Manufacturers & Traders (“M&T”) Trust Company.

LCA covenants that it shall maintain, charge and collect such Service Charges which, together with other Cash Available for Debt Service, shall be at all times at least sufficient to provide annually 1.2 debt service coverage requirement during the then current fiscal year;

The Debt Service Reserve Fund (“DSRF”) will would need to be funded at the appropriate level to secure all outstanding Leasehold Mortgage Debt secured by the DSRF. It should be noted that it is not necessarily a legal requirement that a new series of Leasehold Mortgage Debt be secured by the DSRF but Davenport recommends that LCA consider this a practical requirement for accessing the credit markets at competitive cost of capital;

Provisions of note specific to refunding existing debt:

- If the Additional Bonds are being issued to finance the refunding of existing bonds, Additional Parity Indebtedness or Reimbursement Obligations, in lieu of the certificate stating 1.2x coverage will be achieved , LCA may provide a certificate stating that for the then current and each future Fiscal Year, the Debt Service Requirements for the refunding bonds is projected to be equal to or less than the Debt Service Requirements that would have existed for that Fiscal Year with respect to the portion of the Bonds, Additional Parity Indebtedness or Reimbursement Obligations being refunded.
- In the definition of Leasehold Mortgage Debt there is a provision that waives the written appraisal requirement noted previously if the refinancing bonds do not increase the aggregate amount of Leasehold Mortgage Debt and the sale price of the Additional Bonds does not exceed 110%. This provision should be studied closer especially as it relates to the 2013C term out as the Authority may be able to utilize this provision to alleviate the written appraisal requirement for the 2013C term out.

Going forward, LCA should consider working closely with a financial advisor and bond counsel experienced in working with financially challenged utility systems.

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Appendix G
Operational Savings and Revenue
Enhancement Considerations
Supporting Information

Operational Savings and Revenue Enhancement Considerations Supporting Information

Operational Savings

Indirect Cost Allocation

Lehigh County Authority (LCA) maintains three internal services funds with separate associated budgets: City Division Internal Services, Suburban Division Internal Services, and Consolidated Internal Services. The City and Suburban Division Internal Services track overhead and support services that are provided directly to the two divisions based on the associated services provided. The Consolidated Internal Services budget is smaller than the other Internal Services budgets, but is still significant (the 2017 budget was \$2.6 million). The Consolidated Internal Services budget includes costs that benefit both the City and Suburban Divisions, but where there is no direct tracking or capture of the costs associated with these services that are used by each of the Divisions. Therefore, an indirect cost allocation has been established to allocate these costs to the City and Suburban Divisions. This allocation is based on a *pro-rata* share of payroll for each of the divisions.

While using payroll as a method to calculate each division's *pro-rata* share of the Consolidated Internal Services budget appears to be a reasonable method of allocation, several methods of allocating indirect costs are acceptable if the direct services provided by these costs cannot be explicitly tracked. Using a *pro-rata* share of payroll is one such method. Others include using a *pro-rata* share of total Division revenues, operating expenses, and total expense budgets. If LCA were to employ a combination of other acceptable methods of allocation of indirect costs, it would result in the re-allocation of consolidated internal services costs from the City Division to the Suburban Division. For example, changing from a method of allocating Consolidated Internal Services costs from a *pro-rata* share of payroll to a *pro-rata* share of operating expenses or revenues would shift the indirect cost allocation by approximately \$600,000 to \$700,000 from the City Division to the Suburban Division. Often, multiple methods are used in combination to reflect that there is not just one cost driver for these internal services costs. Combining the payroll *pro-rata* method with a percentage of revenues and a percentage of operating expenses methods would likely shift the allocation of the Consolidated Internal Services Cost from the City Division to the Suburban Division by approximately \$440,000 using 2017 budget numbers.

Because of the significance of the potential shifts in the indirect cost allocation for the Consolidated Internal Services Fund that would result from using different *pro-rata* share methods, LCA should consider completing a detailed indirect cost allocation study that can help to determine the most reasonable and cost-justifiable methods of allocation of indirect costs to the City and Suburban Divisions, as well as between the Water and Wastewater funds within each division.

Revenue Enhancements

Bulk Water Rate for LCA's Suburban Division

Prior to the execution of the Lease Concession Agreement between LCA and the City of Allentown (hereafter, "the City"), LCA entered into a Water Supply Agreement with the City to provide bulk water

for its Suburban Division. The pricing provisions contained in the agreement specifically defined “O&M Cost” to mean:

“the City’s costs for chemicals, power, sludge disposal, maintenance and repairs, and miscellaneous costs reasonably incurred by the City for the Filtration Plant in providing the Long-Term Water Supply to LCA...”,

The agreement also contains the following related provision:

“if a substantial technological or regulatory change occurs in the way the City treats water such that the foregoing cost components no longer accurately measure the City’s operation and maintenance costs in providing the Long-Term Water Supply to LCA, then the parties shall negotiate in good faith a new definition of the term “O&M Cost” to accurately reflect the City’s actual operation and maintenance costs in providing the Long-Term Water Supply to LCA.”

As illustrated in these provisions, LCA’s intentions for executing the Water Supply Agreement was to pay only the incremental O&M costs incurred that are directly related to providing LCA with the water it purchases. At the time, LCA’s intent was to pay no more for water from the City than the cost that LCA would incur to produce water from LCA’s own groundwater facilities.

With this understanding of the background of the pricing provisions contained in the Water Supply Agreement, the Project Team carefully examined the City Division operating costs and identified some additional O&M costs that we would consider to be “incremental” and directly related to providing LCA Suburban Division with the water it purchases. The current method of calculating the bulk water rate for LCA’s Suburban Division takes the total of specific cost components (that is, chemicals, power, sludge disposal, maintenance/repairs, and materials/supplies) and divides them by the total water volume produced to calculate a unit cost that is charged to LCA’s Suburban Division. The increase in the unit cost from year to year is the amount that is added to the O&M rate that is charged to the Suburban Division.

Based on this review, other O&M cost components that should be considered for inclusion in the bulk water rate include the cost of equipment maintenance and backwashing operations. During this study, water treatment plant (WTP) management staff were contacted regarding the frequency and cost of major equipment rebuilds and preventive maintenance at the WTP. Information was provided that indicated that the schedule for most equipment maintenance at the WTP is primarily on a scheduled basis (either scheduled monthly or quarterly), but some maintenance is completed based on the results of oil analysis, and preventive maintenance inspections. Therefore, while the frequency and associated cost of some of the maintenance may be attributable to higher production volumes, given the limitations in the scope of this engagement, the Project Team was not able to quantify a portion of equipment maintenance that may be directly attributable to the production of water to LCA’s Suburban Division. However, further study of equipment maintenance driven by production of water for LCA’s Suburban Division is recommended.

Filter backwash volumes were also reviewed during the time that the water production volumes for LCA’s Suburban Division were phased in, and increased. Using these data, a unit rate of backwash volume per gallon of water plant production was calculated, and an incremental volume of filter backwash water attributable to providing water to LCA’s Suburban Division was also calculated (2.31 million gallons per month). It was estimated that the annual cost of the production and disposal of this filter backwash water is approximately \$82,300 based on 2017 rates and costs. LCA should consider including these additional costs in the calculated unit cost of water charged to LCA’s Suburban Division, which would increase the annual revenues of LCA’s City Division.

A review of the bulk water unit cost calculations from 2012 through 2017 for consistency with the Water Supply Agreement was also completed. Based on the calculations provided by LCA, it was apparent that the 2013 actual operating costs were ignored in the calculation of the 2014 rate, which serves as the basis for each year’s rate thereafter. According to LCA, the 2013 costs were not included in the

calculation because it was the transition year for the lease and costs were split between the City and LCA operation of the water plant. In addition, the City was unable to provide actual 2013 costs to include in the calculation. If these actual costs are provided, and if they are higher than the 2012 operating costs, then LCA can complete the calculation and adjust the rate that should have been applied for the time period of 2014 forward.

It is recommended that LCA complete additional analyses annually and after completion of major capital improvements to help ensure that any new incremental costs are captured in the bulk water rate to the suburban division.

Private Fire Protection Charges

The Water Rate Schedule for the City Division includes a yearly Fire Hydrant Charge to recover a portion of the cost of providing private fire protection service. This private fire protection charge differs from the charge that LCA assesses in the Suburban Division. The Private Fire Protection Charges for the Suburban Division are monthly charges that vary by fireline size and are assessed to commercial customers with private fire suppression systems, as well as single-family residential customers with fire sprinkler systems. If LCA were to charge the City Division customers for private fire protection on the same fee schedule as the Suburban Division, LCA could potentially increase its revenues for Private Fire Protection within the City Division from approximately \$65,000 per year to \$300,000 per year.

Additional analysis should be completed to refine and confirm the potential revenue impact for the City Division. The next steps that would be required to further analyze this option include:

1. completing an investigation to identify and verify the property listings within the City Division that have private fire protection systems, identify the size of the fireline connection, and cross-check against the fire hydrant billing locations to eliminate any potential duplicate billing, and
2. complete a cost-of-service evaluation to identify the cost-justified level of private fire protection charges for the City Division.

In lieu of a full investigation as described under item 1 above, LCA could also consider establishing an “unknown” size category based on data from the Suburban Division or other utilities to determine the most typical fireline size to use for the “unknown” category. Using a typical size (perhaps by customer class), while allowing for a customer appeals process for adjustments, could allow LCA to implement the fireline charges without completing a field survey of all customers with firelines. Another approach would be to first send out a letter to potential customers that may have firelines with a request for the line/connection size information, along with some verification, such as a photo. This would give customers the opportunity to provide the information before an assumption is made using a typical size for billing purposes. If LCA wants to implement this change, an action plan should be developed to identify the implementation approach and to outline the next steps.

Other Miscellaneous Fees

The Project Team completed a comparison of the miscellaneous fees charged to customers in LCA’s City Division with the miscellaneous fees charged by six other water and wastewater providers in Pennsylvania and in the northeast. The results of the miscellaneous fee comparison indicated that the miscellaneous fees charged by LCA are generally comparable to those charged by the other utility providers that were surveyed. LCA should consider completing a miscellaneous fee cost-of-service evaluation to assess the ability of the existing fees to sufficiently recover the associated cost of completing the activity or providing the service.

In addition, as part of the miscellaneous fee cost-of-service evaluation, LCA should complete a tapping fee evaluation. Tapping fees are fees charged to new customers to connect to the water and wastewater system, and generally compensate the utility for providing system capacity to serve the new customer.

The Initial Schedule of Service Charges, Schedule 3 of the Lease Agreement, identifies the Water and Sewer Tapping Fees that can be charged to new customers that connect to LCA’s City Division water and wastewater systems. Title 53 of the Commonwealth of Pennsylvania Statutes specifies a required methodology for calculating and updating tapping fees that are assessed by municipalities in Pennsylvania. The City transferred the rights for LCA to charge water and sewer tapping fees in accordance with Schedule 3 of the Lease Agreement, but did not provide supporting information on the method that was used to establish the existing fees. Therefore, an analysis of the tapping fees should be completed to ensure that the current fees follow the Pennsylvania Tapping Fee Statute.

Appendix H

Financial Metrics

Financial Metrics

Days Cash on Hand

Days cash on hand assumes unrestricted fund balance is maintained at 90 days operating expense. The required Operations and Maintenance Reserve Fund is maintained at 180 days. While the Operations and Maintenance Reserve Fund is restricted, the combined balance of these funds are maintained at 270 days cash on hand.

Debt Service Coverage Ratio

The required operations-based Debt Service Coverage Ratio (DSCR) is 120 percent. The target operations based DSCR is 180 percent. Operations-based DSCR is based on operating revenues less operating expenses divided by total debt service.

The required Indenture based DSCR is 120 percent. The target Indenture based DSCR is 180 percent. Indenture-based DSCR is based on operating revenues plus non-operating revenues less operating expenses divided by total debt service.

Debt-to-Operating Ratio

The ratio is calculated by dividing debt service by net operating revenues. The ratio measures the remaining net operating revenues for every dollar spent on debt service. While there is no requirement for debt-to-operating ratio, a target of 30 to 100 percent is assumed (with the intent of having it toward the higher end of that range).

Operating Ratio

The operating ratio is a measure of cost efficiency and is calculated by dividing operating expenses by operating revenues. There is no Indenture requirement, and a target measure of no less than 50 percent is assumed.

Percent Equity Funded CIP

This is the amount of capital spending that is funded with unrestricted fund balances. There is no Indenture requirement. Because financial performance varies year to year to maintain 90 days of unrestricted fund balance, a specific target is difficult to identify.

Water and Wastewater Bills as Percent of Median Household Income (Affordability)

General measure of affordability is based on typical residential bill as a percentage of median household income (MHI). Based on 2017 water consumption data, typical residential bill assumes 4,600 gallons per month. Based on U.S. Census American Community Survey, the MHI is assumed to be \$37,256 and increases 1 percent per year. The target affordability threshold is typical residential bill is 4.5 percent of MHI.

