

Borough of Chambersburg

# Wastewater Treatment Plant Expansion and Upgrade Project



Presented by:

G. Bryan Salzman, Esq.

Manny Parada, PE

Jake Rainwater, PE

Beverley Stinson, PhD

Don Lavine

February 27, 2012

**ARRG** **AECOM**

## Background: Where We Were , WWTP Upgrade Project

- Initial WWTP Upgrade Project Cost Estimate of over \$39 Million
- Did not include replacing deficient Headworks, Influent Pump Station or Forcemain (Estimated \$10 Million)
- Did not include upgrading UV System (required), over \$1 Million Cost
- Total required WWTP Upgrade Costs over \$50 Million

## Update: Where We Are Now , WWTP Upgrade Project

- Estimated Total Project Costs of approximately \$35 Million, including replacing deficient Headworks, Influent Pump Station, Influent Forcemain and UV System
- Higher efficiency, less energy intensive biosolids treatment process design



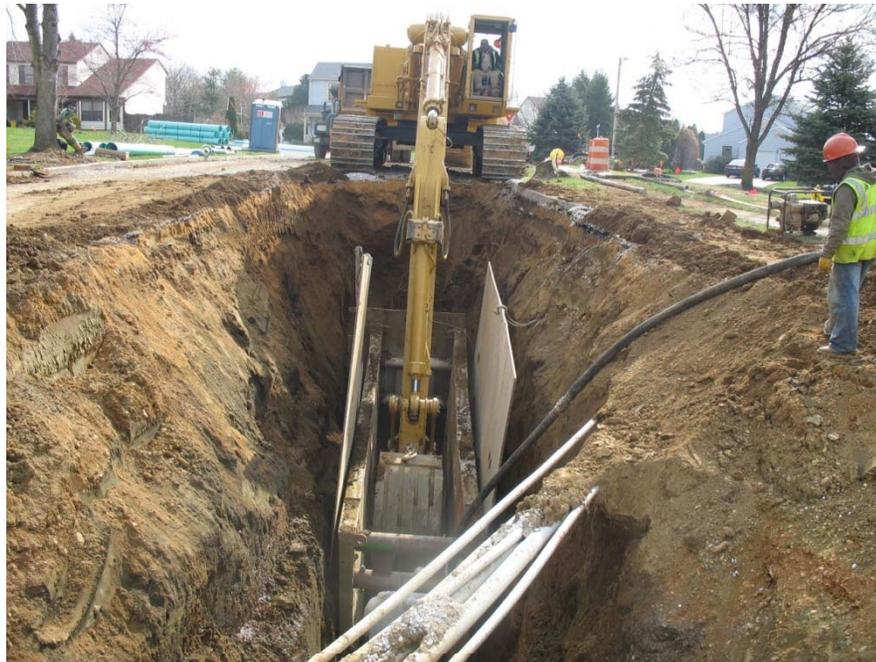
## Background: Where We Were, Collection and Conveyance

- Initially projected Collection and Conveyance System Improvement Costs: \$27,507,600.
- Frustrated relations and interactions with PA DEP



## Update: Where We Are, Collection and Conveyance

- Updated Collection and Conveyance System Improvement Costs Estimated at \$2,000,000.
- Cooperative and progressing interactions with PA DEP



## From There to Here: Summary of Costs

Items	Previous	Today	Change in Cost	Cost Reduction Percent
WWTP Expansion	\$39,144,800	\$34,466,560	\$18,226,928	46.6%
CPI Adjustment (2% a year for 3 years)	\$2,348,688			
New Headworks	\$10,000,000			
UV System Upgrade	\$1,200,000			
Nutrient Credits	* \$2,724,000	\$600,000	\$2,124,000	78.0%
Interceptors	\$27,507,600	\$2,000,000	\$25,507,600	92.7%
<b>TOTAL</b>	<b>\$82,925,088</b>	<b>\$37,066,560</b>	<b>\$45,858,528</b>	<b>55.3%</b>

Note: All above based upon estimated costs

\* at \$9 per Nitrogen credit and \$5 per Phosphorus credit for 3 years

## From There to Here: Cost Per Partner

<b>Municipality</b>	<b>Post Construction Flow</b>	<b>IMA Percent of Project</b>	<b>Previous</b>	<b>Today</b>	<b>Total Estimated Cost Savings</b>
Chambersburg	3.42	15.40%	\$12,770,464	\$5,708,250	\$7,062,213
Hamilton	2.03	28.35%	\$23,509,262	\$10,508,370	\$13,000,893
Greene	3.71	41.74%	\$34,612,932	\$15,471,582	\$19,141,350
Guilford	2.12	14.51%	\$12,032,430	\$5,378,358	\$6,654,072
<b>TOTAL</b>	<b>11.28</b>	<b>100.00%</b>	<b>\$82,925,088</b>	<b>\$37,066,560</b>	<b>\$45,858,528</b>

Note: Cost figures based upon estimates

## Background: Where We Were, Municipal Partner Relations

- Lack of Communication
- Lack of Cooperation
- Disjointed and inconsistent correspondence with PA DEP

## Update: Where We Are, Municipal Partner Relations

- Monthly meetings to provide updates and discuss progress
- Cooperative and productive interactions
- Consistent and beneficial correspondence with PA DEP



## How Did We Get Here?

- Cooperation and hard work from Borough Manager, Staff, Borough Solicitor, Borough Engineers, Municipal Partners, and Municipal Partner's Professional Consultants



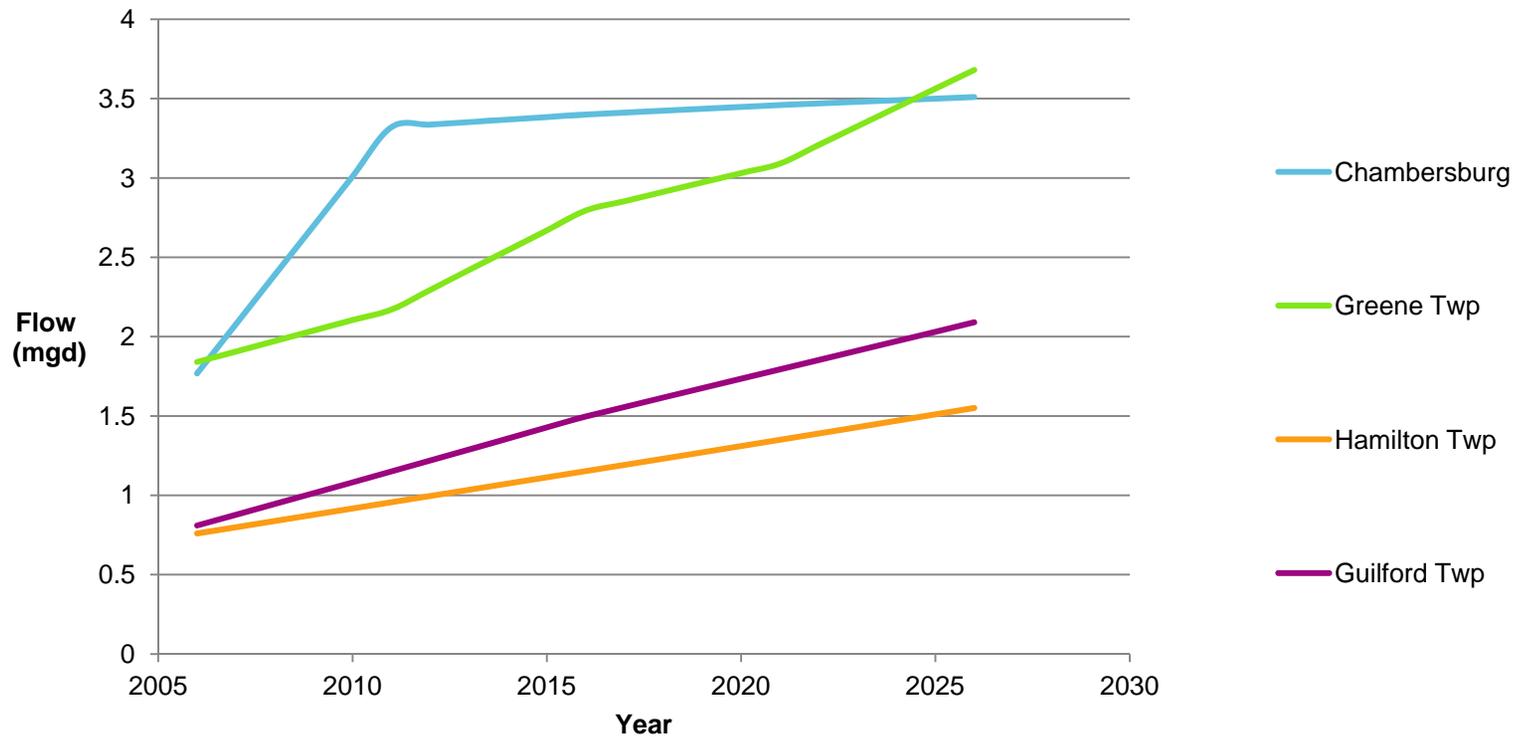
## Introductions

- G. Bryan Salzmann, Esq., Salzmann and Hughes – Borough Solicitor
- Manny Parada, P.E., AECOM – Branch Manager, Quality Assurance Role, Constructability Expert
- Jake Rainwater, P.E., AECOM – Project Manager
- Beverley Stinson, PhD, AECOM – Treatment Process Expert
- Don Lavine, ARRO – Client Satisfaction Manager

# Project Goals

- Meet Future Growth Needs of Contributing Municipalities:

## Act 537 Plan Flow Projections

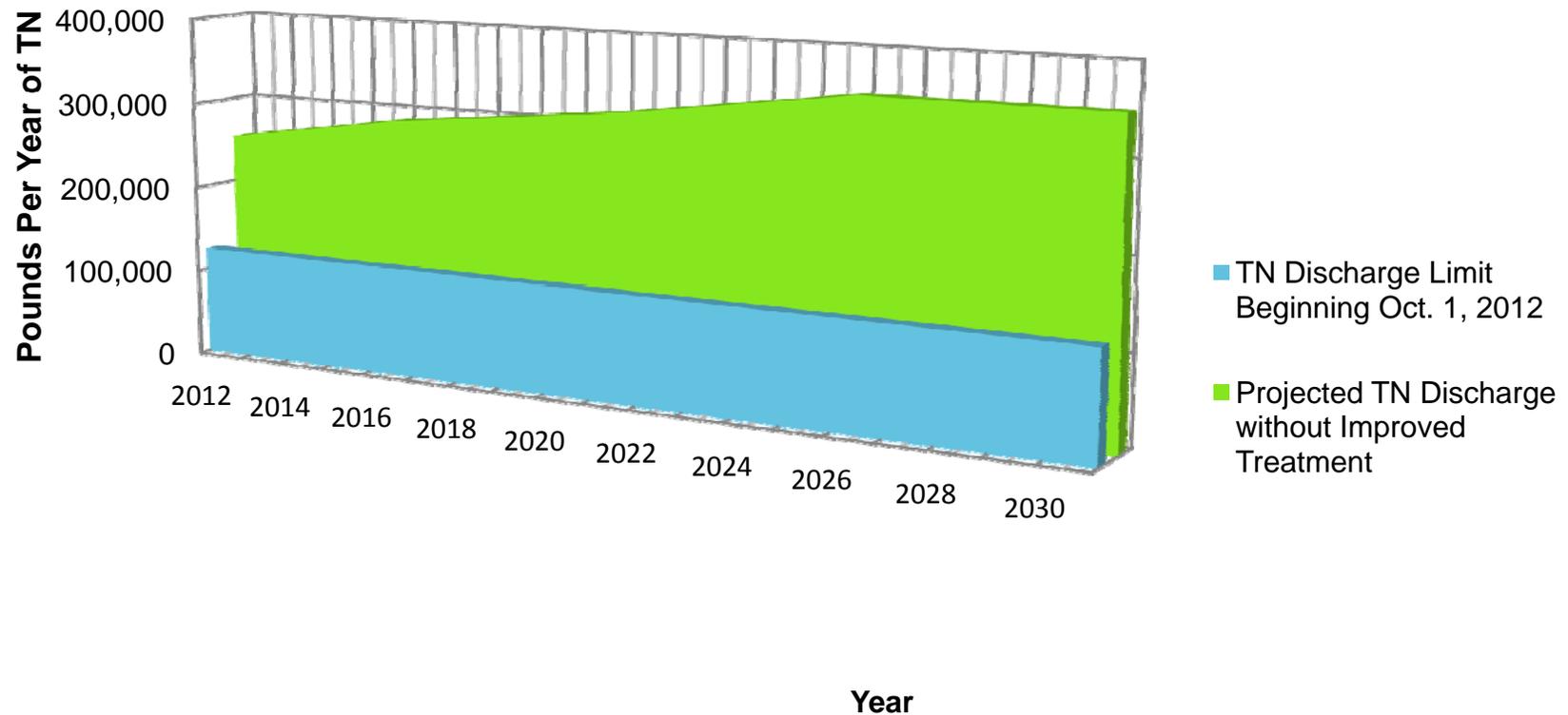


## Project Goals

- Meet Chesapeake Bay Tributary Strategy Nutrient Removal Requirements
  - Compliance required for compliance year starting October 1, 2012 through September 30, 2013
    - 16,560 lb/yr for Total Phosphorus (TP)
    - 124,199 lb/yr for Total Nitrogen (TN)
  - At current WWTP design flow (6.8 mgd), equivalent to 0.8 mg/l for TP and 6 mg/l for TN
  - At 20 year projected flow (11.28 mgd), equivalent to 0.48 mg/l for TP and 3.62 mg/l for TN

# Projected Nitrogen Discharge Without Upgrade

## Projected Exceedance of Allowable Nitrogen Discharge



## Project Design Objectives

- Provide adequate treatment capacity to facilitate the planned future growth of the Borough and its partnering Townships
- Provide treatment processes that can meet the stringent nutrient reduction requirements of DEP
- Complete a design that is:
  - Cost Effective
  - Energy Efficient
  - Environmentally Sensitive

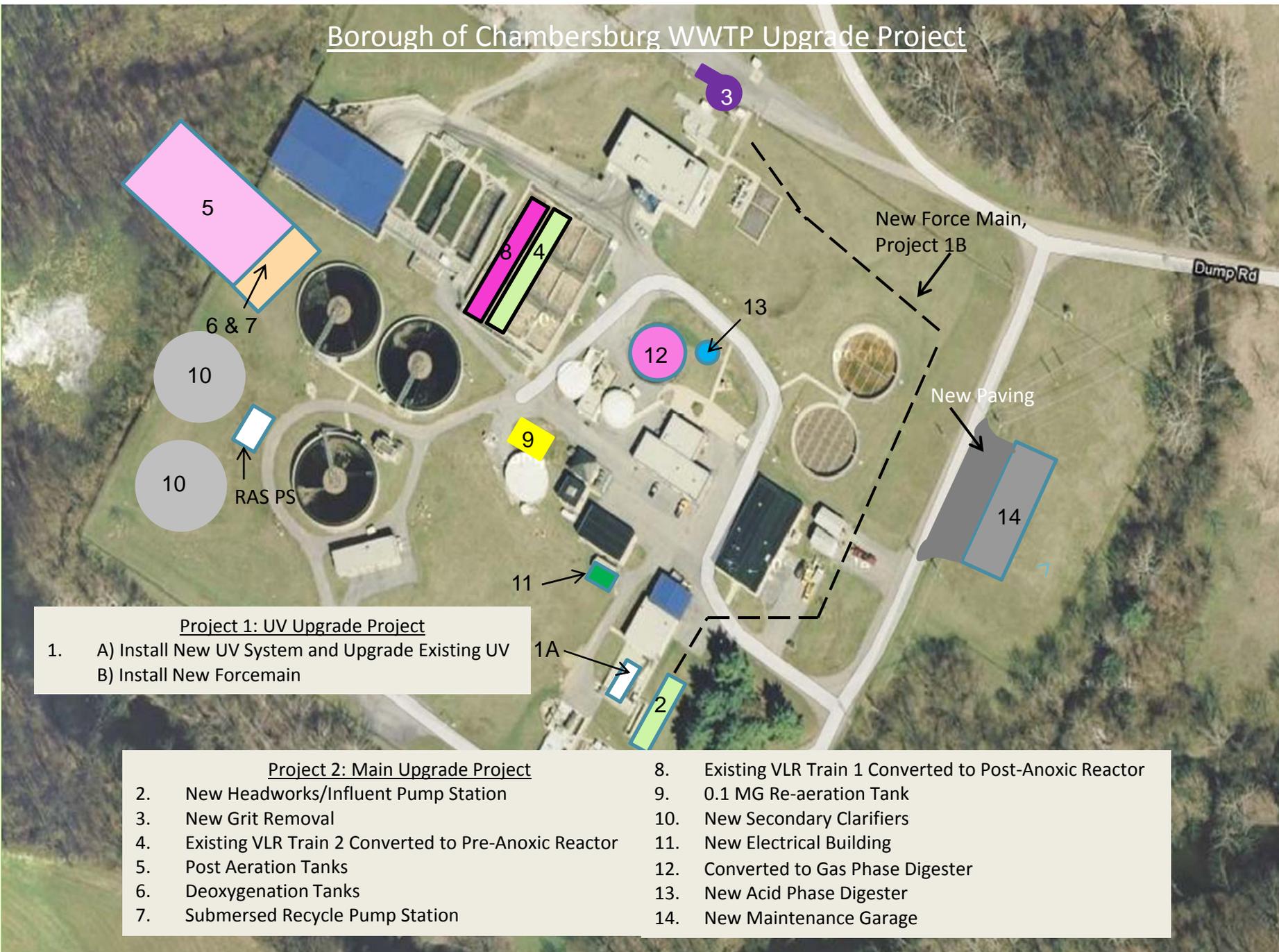


## Key Project Components

- New “Headworks” and Influent Pump Station to replace the existing deficient facilities
- Improved Biological Treatment Process to provide nutrient (nitrogen and phosphorus) removal
- Improved biosolids treatment process – more energy efficient and improved final product quality



# Borough of Chambersburg WWTP Upgrade Project



**Project 1: UV Upgrade Project**  
 1. A) Install New UV System and Upgrade Existing UV  
 B) Install New Forcemain

- |   |  |
|---|--|
| <b>Project 2: Main Upgrade Project</b>                  |  |
| 2. New Headworks/Influent Pump Station                  | 8. Existing VLR Train 1 Converted to Post-Anoxic Reactor |
| 3. New Grit Removal                                     | 9. 0.1 MG Re-aeration Tank                               |
| 4. Existing VLR Train 2 Converted to Pre-Anoxic Reactor | 10. New Secondary Clarifiers                             |
| 5. Post Aeration Tanks                                  | 11. New Electrical Building                              |
| 6. Deoxygenation Tanks                                  | 12. Converted to Gas Phase Digester                      |
| 7. Submersed Recycle Pump Station                       | 13. New Acid Phase Digester                              |
|   | 14. New Maintenance Garage                               |

## Project Status

- Sewer Steering Committee Meetings, typically every month
  - Chambersburg Borough, Greene Township, Guilford Township, Hamilton Township, Solicitor, Engineer
  - Cooperative and interactive
  - Keeps all parties engaged and informed
  - Demonstrates teamwork and common objectives to PA DEP
- Regular and Cooperative Correspondence with PA DEP
  - Treatment portion of Act 537 Plan is approved
  - Collection and Conveyance Portion of Act 537 Plan currently working through approval process

## Project Status

Project is currently in Design Phase. Upcoming milestones include:

- March 2012: 60% Design Submitted for Borough Review
- May 2012: Submit Water Quality Management (WQM) Part II Application to PA DEP for Review
- August 2012: Receive PA DEP WQM Part II Approval
- September 2012: Documents 100% Complete, Project Advertised for Bidding
- November 2012: Open Bids
- December 2012: Contract Awarded
- Summer 2014: Construction Complete, Start-up Performed

## Project Status

- A First Phase UV Disinfection Project is currently approaching the end of construction
  - UV Project meets an immediate upgrade need
  - Separate UV Project allows for utilization of a time sensitive grant that Salzmann Hughes secured for the Borough



# Overall Preliminary Opinion of Probable Cost

## Project 1: UV Upgrade/New Forcemain & Yard Piping Installation

Project 1 Preliminary Opinion of Probable Construction Cost Estimate:	\$1,388,800
20% (Before Grant Reduction) for Engineering, Legal, Admin. and Financial Services*:	\$277,760
Associated H2O Grant Allocation:	<b>(\$1,000,000)</b>
Preliminary Opinion of Probable Capital Cost for Project 1:	\$666,560

## Project 2: Main Upgrade Project

New Headworks/Influent Pump Station	\$8,500,000
Grit Removal	\$500,000
Existing VLR Tank Modifications	\$700,000
New Process Tanks, Equipment, and Associated Piping	\$7,000,000
New Secondary Clarifiers and Flow Splitter Box Modifications	\$3,000,000
New RAS Pump Station	\$800,000
Solids System Improvements	\$2,700,000
Chemical Feed Systems and Associated Safety Provisions	\$500,000
Electrical	\$4,500,000
SCADA	\$800,000

Main Upgrade Project Preliminary Opinion of Probable Construction Cost Estimate:	\$29,000,000
20% for Engineering, Legal, Admin. and Financial Services:	\$5,800,000
Associated H2O Grant Allocation:	<b>(\$1,000,000)</b>
Preliminary Opinion of Probable Capital Cost for Project 2:	\$33,800,000

**Total Preliminary Opinion of Probable Capital Costs for Projects 1 & 2 : \$34,466,560**

## Estimated Cost Per Municipality

Estimated Preliminary Opinion of Total Project Cost:  
\$34,466,560

	<u>Existing Flow</u> <u>Allocation</u> <u>(mgd)</u>	<u>Flow</u> <u>Increase</u> <u>(MGD)</u>	<u>% of New Flow</u>	<u>Cost Share</u> <u>Portion</u>
Chambersburg	2.73	0.69	15.40%	\$5,308,466
Hamilton Township	0.76	1.27	28.35%	\$9,770,654
Greene Township	1.84	1.87	41.74%	\$14,386,711
Guilford Township	<u>1.47</u>	<u>0.65</u>	<u>14.51%</u>	<u>\$5,000,729</u>
<b>Totals:</b>	<b>6.8</b>	<b>4.48</b>	<b>100.00%</b>	<b>\$34,466,560</b>

# THANK YOU FOR THE OPPORTUNITY TO PARTNER WITH THE BOROUGH!

Borough Staff:

Jeffrey Stonehill, Borough Manager

Lance Anderson PE, Superintendent

Ron Kelly, Plant Manager