Lehigh County Authority

# Kline's Island WWTP Master Plan Presentation

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# Presentation Outline

- Master Plan Objectives
- KIWWTP Overview
- CIP Development
- Near-Term Improvements (0-10 years)
- Mid-Term Improvements (10-25 years)
- Long-Term Improvements (25-50 years)
- Event-Driven Improvements
- Questions

# Master Plan Objectives

- Evaluate existing conditions and Identify phased improvements needed to
  - Enable reliable permit compliance over the full term of the lease
  - Reduce operational risks
  - Enhance efficiency
- Assist LCA in achieving its Capital Asset Management Goal

  *Achieve system sustainability through properly managing, maintaining and optimizing the use of existing assets and properly planning to meet the needs of future generations of customers*

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# CIP Development

Condition Assessment

Process Assessment

DRBC SPW Considerations

Capital Improvement Plan

# Condition Assessment

- Conducted inspections of systems and structures and identified improvement needs based on condition and age
- Established condition and criticality ratings and risk score
- Held consensus building workshop with LCA
- Prepared draft report
- Discussed and addressed LCA comments
- Prepared final report

Collaborative process to establish recommended improvements to process, HVAC and electrical equipment and systems and concrete tanks and buildings

# Process Assessment

- Evaluated capacity of each unit process
- Performed regulatory preparedness evaluations
  - Identified  cost impacts associated with several hypothetical regulatory changes
- Operational issues evaluations
  - Developed budgetary costs to address several operational issues
- Held consensus building workshop with LCA
- Prepared draft report and discussed LCA's comments
- Prepared final report - presenting budgetary costs to address operational issues and hypothetical regulatory changes

# DRBC SPW Considerations

- DRBC Special Protection Waters (SPW) requirements are triggered when a WWTP undergoes “substantial alterations or additions”
- If and when triggered, the KIWWTP will need to comply with new effluent limitations for nitrate nitrogen, total nitrogen, total phosphorus and a more stringent effluent limit for ammonia nitrogen
  - Cost greater than $20 million based on current grandfathering provisions of DRBC’s regulations
- Essential consideration in developing the CIP was to avoid triggering the SPW regulations

# Near-Term Improvements (0-10 years)

| Project Proposals | Near Term | |
|---|---|---|
| | Years 0-5<br>2021 Dollars | Years 5-10<br>2026 Dollars |
| Project Proposal No. 1 - Main Pump Station Improvments | $2,542,000 | |
| Project Proposal No. 2 - Auxiliary Pump Station Improvements | | $1,191,000 |
| Project Proposal No. 3 - Sludge Thickening/Digestion Improvements | $1,454,000 | |
| Project Proposal No. 4 - PMTF Effluent Flushing Water Line Replacement | $172,000 | |
| Project Proposal No. 5 - Odor Control Unit 24 Replacement | $387,000 | |
| Project Proposal No. 6 - Convert to Sodium Hypochlorite Disinfection | $487,000 | |
| Project Proposal No. 7 - Masonry Restoration | | $1,703,000 |
| Project Proposal No. 8 - PMTF Steel Rehabilitation | | $1,121,000 |
| Project Proposal No. 9 - HVAC Equipment Replacement | | $1,274,000 |
| Project Proposal No. 10 - 480V Motor Control Center Replacement | $3,232,000 | |
| Project Proposal No. 11 - Concrete Restoration | | $336,000 |
| Project Proposal No. 12 - Unit Process Equipment Painting | | $2,245,000 |
| Project Proposal No. 13 - Drainage Lift Staton Rehabilitation | $699,000 | |
| Project Proposal No. 14 - Final Clarifers No. 1 - 4 Rehabilitation | $3,262,000 | |
| **Total** | **$ 12,235,000** | **$ 7,870,000** |

# Mid-Term Improvements (10-25 Years)

| Mid-Term Improvements | Years 10-25<br>Cost<br>2036 Dollars |
|---|---|
| Headworks Improvements | $766,000 |
| Auxilary Pumping Station Improvements | $766,000 |
| Aerated Grit Chamber Improvements | $426,000 |
| PSTs Cover Replacement | $3,405,000 |
| PST Odor Control Sytem Improvements | $936,000 |
| Intermediate Pumping Station (PE Pumps) Improvements | $1,021,000 |
| Intermediate Pumping Station (PMTF Pumps) Improvements | $1,021,000 |
| Plastic Media Trickling Filters (PMTF) Rotary Distributor Improvements | $1,362,000 |
| PMTF Odor Control System 13 Improvements | $1,277,000 |
| PMTF Odor Control System 24 Improvements | $851,000 |
| ISTs Clarifier Mechanisms Improvements | $255,000 |
| Intermediate Sludge Pumping Station Improvements | $204,000 |
| Rock Media Trickling Filters (RMTFs) Improvements | $6,010,000 |
| FSTs 7-10 Improvements | $3,745,000 |
| Effluent Pump Station Improvements | $681,000 |
| Thickening Tanks 1, 2, 4 Improvements | $204,000 |
| Thickening Tank Odor Control Systems Improvements | $936,000 |
| Sludge Transfer and Feed Pumps Improvements | $153,000 |
| Elutriation Tanks Improvements | $136,000 |
| Anaerobic Digesters Improvements | $306,000 |
| Belt Filter Press Building Improvements | $5,380,000 |
| **Total** | **$ 29,841,000** |

# Long-Term Improvements (25-50 Years)

| Long-Term Improvements | Long Term Years 25-50 2056 Dollars |
|---|---|
| Main Flow Venturi Meter Improvements | $154,000 |
| Primary Settling Tanks (PSTs) Improvements | $6,765,000 |
| PST Odor Control Sytem Improvements | $1,691,000 |
| Primary Sludge Pumping Station Improvements | $2,152,000 |
| Intermediate Pumping Station (PE Pumps) Improvements | $1,230,000 |
| Intermediate Pumping Station (PMTF Pumps) Improvements | $1,230,000 |
| Plastic Media Trickling Filters (PMTF) Improvements | $43,047,000 |
| PMTF Odor Control System 13 Improvements | $769,000 |
| PMTF Odor Control System 24 Improvements | $1,537,000 |
| ISTs Clarifier Mechanisms and Flow Distribution Chamber Improvements | $5,227,000 |
| RMTF - Venturi Improvements | $154,000 |
| Final Settling Tanks 1-4 Improvements | $4,305,000 |
| Final Settling Tanks 5 & 6 Improvements | $2,460,000 |
| Final Settling Tanks 7 & 8 Improvements | $3,075,000 |
| Final Settling Tanks 9 & 10 Improvements | $3,690,000 |
| Final Sludge Pumping Station 1 Improvements | $553,000 |
| Final Sludge Pumping Station 2 Improvements | $553,000 |
| Final Sludge Pumping Station 3 Improvements | $553,000 |
| Final Sludge Pumping Station 4 Improvements | $553,000 |
| Chlorine Building Improvements | $154,000 |
| Chlorine Contact Tank Improvements | $553,000 |
| Thickening Tank 1 Improvements | $769,000 |
| Thickening Tank 2 Improvements | $769,000 |
| Thickening Tank 3 Improvements | $769,000 |
| Thickening Tank 4 Improvements | $769,000 |
| Sludge Transfer and Feed Pumps Improvements | $92,000 |
| Polymer System Improvements | $307,000 |
| Elutriation Tanks Improvements | $1,230,000 |
| Anaerobic Digester 1 Improvements | $4,612,000 |
| Anaerobic Digester 2 Improvements | $4,612,000 |
| Anaerobic Digester 3 Improvements | $4,612,000 |
| **Total** | **$ 98,946,000** |

# Event-Driven Improvements

| Event | Budgetary Capital Cost |
|---|---|
| PADEP revokes prior approval to filter effluent samples prior to WET testing and filamentous bacteria are still present in the plant effluent | $14,585,000 |
| PADEP imposes a more stringent chlorine residual effluent limit | $355,000 |
| PADEP eliminates the instantaneous maximum fecal coliform effluent limitation | $355,000 |
| DRBC's SPW Requirements are triggered due to substantial alterations or additions to the KIWWTP and the grandfathering provisions of the SPW regulations remain in effect | $20,900,000 |
| DRBC's SPW Requirements are triggered due to substantial alterations or additions to the KIWWTP and the grandfathering provisions of the SPW regulations are revoked | $44,200,000 |

# Questions