# Act 537 Planning Update

LCA Board of Directors

September 13, 2021

# Today's Updates

- Pretreatment Plant Upgrade Alternative – Engineering Analysis
  - Authorized August 24, 2020
- Revenue Planning Tool Development
  - Authorized December 14, 2020

# Quick Reminders / Background

- Act 537 Plan required to be submitted to DEP by March 2025
- Plan must include:
  - Future sewer capacity needs through 2050
  - Flow monitoring & modeling
  - Treatment alternatives analysis
  - Conveyance alternatives analysis
  - Cost, financing and rate analysis
  - Regional approaches
  - Governance structure for implementation of the plan
  - Participation and commitment in some form by all 15 municipalities

**Today's topics touch on these areas of the planning process**

# Regional Wastewater Treatment Alternatives

## Two Primary Options:

1. Continue to treat at Allentown Kline's Island WWTP

   *Dry-day and wet-weather upgrades needed*

2. Upgrade LCA Pretreatment Plant (PTP) to full treatment

   *Lehigh River discharge location*

   *Dry-day and wet-weather upgrades still needed*

# PTP Upgrade Option – Engineering Analysis

Prior studies (2011-2015) were conceptual

Additional analysis needed to understand:

- Treatment technology options & costs
- Permit implications
- Impact on downstream flows & loads in different scenarios
- Potential impact on size/cost of other downstream system upgrades

# PTP Upgrade: Analysis Parameters

- 2050 projected flows (provided by municipalities)
- Hydraulic modeling through Park Pump Station (modeling through Kline's Island WWTP will be available in 2022)
- Wet-weather scenarios included in modeling and analysis:
  - Normal / dry year (2017)
  - Extended wet period (2018-2019)
  - 10-Year storm event inserted during dry period

# PTP Upgrade: Analysis Parameters

- Three treatment alternatives analyzed
- Kline's Island WWTP dry-day and wet-weather improvements updated
- Western Lehigh flow scenarios included in modeling and analysis:
  - PTP treats all dry-day flow going to the PTP
  - PTP treats all dry-day and wet-weather flow going to the PTP
  - Maximize flow going to PTP (pumping flow out of the Western Lehigh Interceptor at Spring Creek Pump Station location)

# Engineering Team

- AECOM – Project lead
- Jacobs – PTP technical lead
- Arcadis – Conveyance system lead & hydraulic modeling

# Cost Evaluation Parameters

- Includes conveyance system upgrades (interceptors & pump stations) in addition to treatment costs
- Pricing includes hard and soft costs
- Class V engineering estimates (-50%/+30%)
- All costs in 2021 dollars (impact of phasing not included)
- O&M cost changes excluded at this stage of analysis
- Estimates performed during a major construction cost “bubble” (examples, current cost of plastic pipe up 40%, steel up 240%, over the past 12 months)
- Upgrades needed at PTP regardless of final option selection – costs included
- Excludes individual municipal sewer collection system rehab work

# Summary of Results

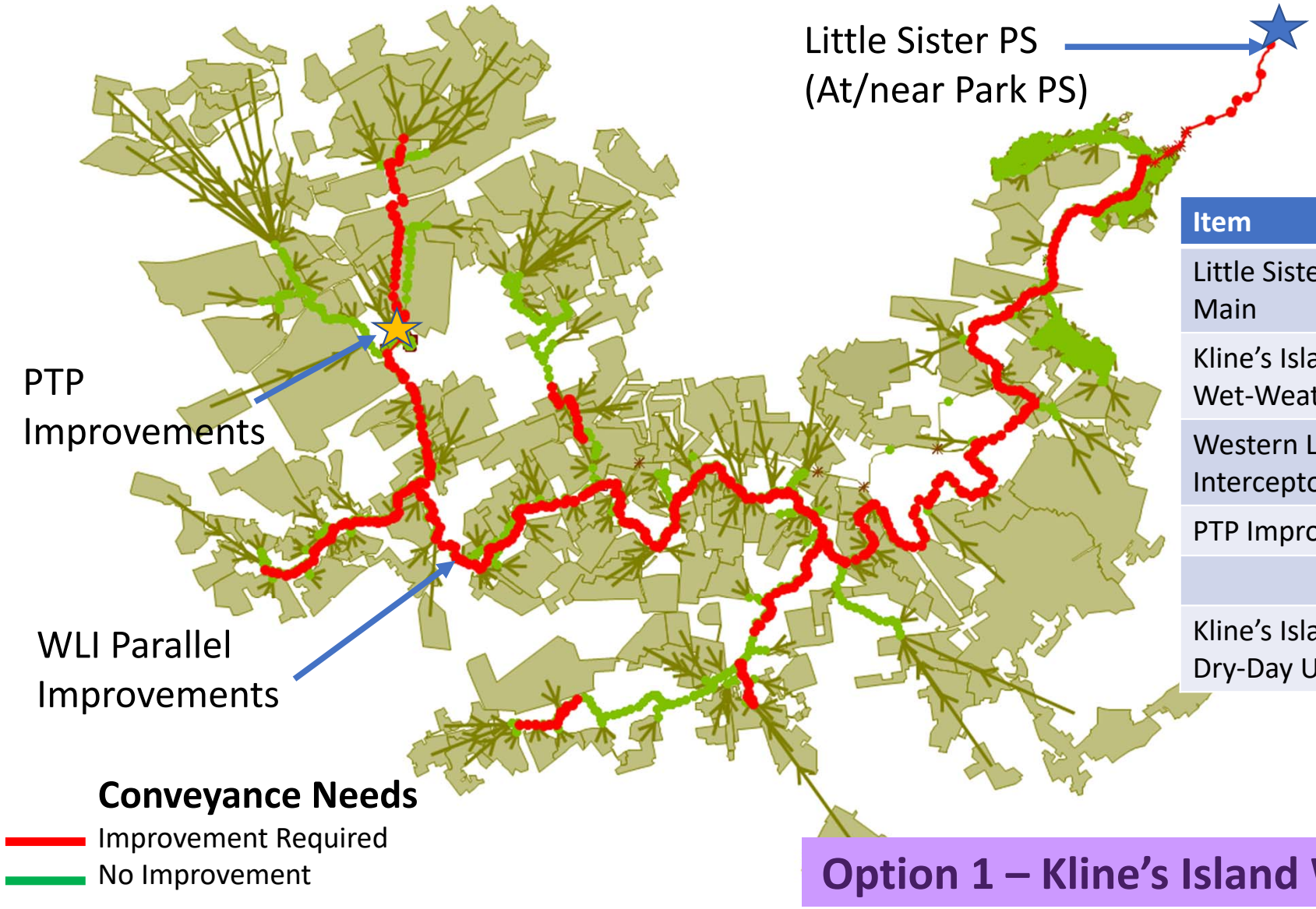
**Option 1 – Kline's Island WWTP Upgrade Only**

- No dry-day expansion = $386M
- With dry-day expansion = $418M

**Option 2 – PTP Upgrade to Full Treatment**

- Max flow scenario* = $436M

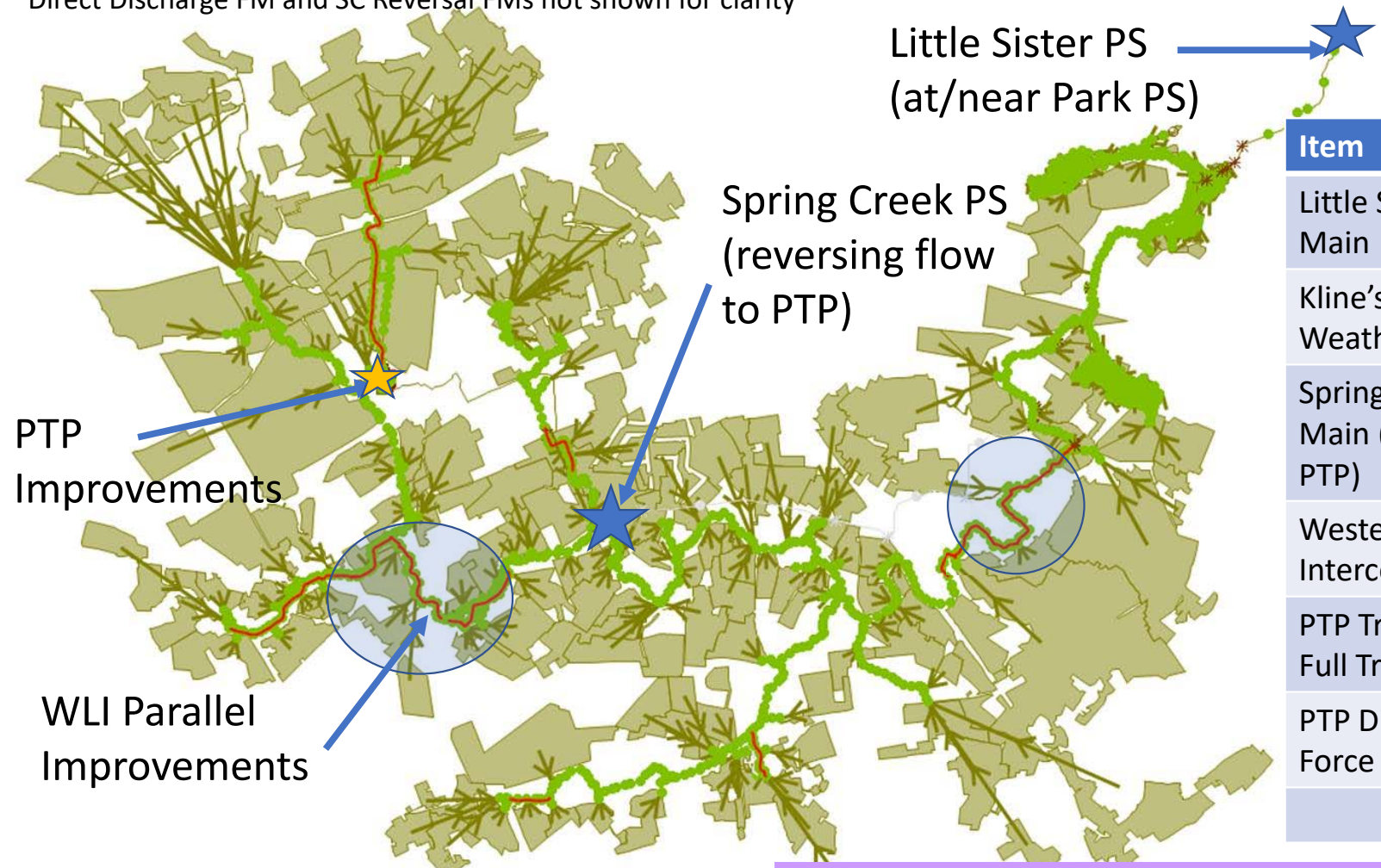
** "Max flow scenario" includes reversing flow through a pump station at/near Spring Creek to maximize flows going to the PTP. This alternative was the most cost-effective PTP Upgrade option analyzed.*




| Item | Cost |
|---|---|
| Little Sister PS & Force Main | $56M |
| Kline's Island WWTP Wet-Weather Upgrades | $73M |
| Western Lehigh / Other Interceptor Parallels | $177M |
| PTP Improvements | $80M |
| **TOTAL** | **$386M** |
| Kline's Island WWTP Dry-Day Upgrade | $32M |

## Option 1 – Kline's Island WWTP Upgrade

*Direct Discharge FM and SC Reversal FMs not shown for clarity




| Item | Cost |
|---|---|
| Little Sister PS & Force Main | $29M |
| Kline's Island WWTP Wet-Weather Upgrades | $52M |
| Spring Creek PS & Force Main (reversing flow to PTP) | $29M |
| Western Lehigh / Other Interceptor Parallels | $53M |
| PTP Treatment Upgrade to Full Treatment | $160M |
| PTP Direct Discharge PS & Force Main to Lehigh River | $113M |
| **TOTAL** | **$436M** |

**Option 2 – PTP Upgrade with Direct Discharge**
**New Plant = 11.7 MGD dry/30 MGD peak**

# Summary

## PTP Upgrade Option provides some noteworthy benefits

| | | |
|---|---|---|
| Significant reduction in cost of downstream system improvements | Ability to leverage existing need for major plant improvements for regional benefit | Potential environmental benefit of reducing construction impact in environmentally sensitive areas |

## Cost difference for PTP Upgrade Option ($60M +/-) is not significant enough to remove it from the list of available alternatives

# Next Steps: Major Considerations

- Construction challenges
- Permitting
- Community drivers & environmental impact
- Sequencing
- Existing agreement structure

*PTP Upgrade Option will remain "in the mix" as we complete the next phase of Act 537 Planning work!*

# Questions / Discussion

- PTP Upgrade Option – Alternatives Analysis

# Revenue Planning Tool: LCA Needs

- Capture obligations of complex intermunicipal agreements
- Evaluate and compare financial impact of various alternatives
- Incorporate phasing of multiple projects over time
- Incorporate O&M cost impacts
- Calculate impact to each signatory
  - LCA's Western Lehigh signatories
  - Kline's Island Sewer System signatories
- Calculate impact to LCA "funds" (driven by contractual obligations)
  - Western Lehigh
  - Little Lehigh Relief Facilities
  - Allentown Division
  - Pretreatment Plant (Boston Beer, haulers, etc.)

# Status Update: Revenue Planning Tool

- AECOM developed robust Excel tool
- Includes capacity to evaluate multi-project scenarios
  - Up to 10 projects per scenario
  - Phased in over multiple years
  - Cost-sharing of project costs based on debt service calculation
  - Cost-sharing of O&M costs based on projected flows & loads
  - Cost evaluation based on current or future adjusted treatment capacity allocation by signatory
- Includes Palisade's @Risk (Excel add-in) for probability simulations

# Project Input Screens (examples)

**PTP Direct Discharge (Box - 1A)**

| | |
|---|---|
| PTP Direct Discharge (Y/N) | No |

**Project Timing (Box - 1B)**

| | Project 1 | Project 2 | Project 3 | Project 4 | Project 5 | Project 6 | Project 7 | Proje |
|---|---|---|---|---|---|---|---|---|
| Year Construction Begins | 2021 | | | | | | | |
| Year Project Opens | 2025 | | | | | | | |

# Project Input Screens (examples)

**Project Costs (Box - 1C)**

Input projects in chronological order

Escalate capital costs to the year construction begins and escalate O&M to the year project opens

Note: Input values individually, do not drag values over or condittional formmatting will be disrupted

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Facility Improvement | LLRI-P1 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Total Capital Cost ($) | $1,000,000 | | | | | | | | |
| Capital Cost Max Contingency ($) | | | | | | | | | |
| Annual New O&M ($) | $100,000 | | | | | | | | |
| Annual O&M Standard Deviation | | | | | | | | | |

**Periodic O&M Costs (Box - 1D)**

| Year | Periodic O&M ($) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2021 | | | | | | | | | |
| 2022 | | | | | | | | | |
| 2023 | | | | | | | | | |
| 2024 | | | | | | | | | |

# Other Inputs

- Treatment allocation changes by signatory
- Debt service assumptions (financing period, interest, etc.)
- Projected flows & loads
- Cost escalators & other economic inputs

# Outputs

- Cash flow impact (cost impact) by signatory
- Cash flow impact by LCA “fund”
- Net present value of the entire scenario being analyzed, by LCA “fund”

# Next Steps: Major Considerations

- Extensive testing required
- Test case scenarios to further understand how to use the tool & interpret results
- Can use work on PTP Upgrade Option as test case
- Consider how updated intermunicipal agreements might work (tool can only model what we currently know)

*Complex financial and contractual obligations for the Kline's Island Sewer System require deeper thought and simplification!*

# Questions / Discussion

- Revenue Planning Tool