PRESENTATION OVERVIEW

• Water Pollution Control Plant Overview
• Master Plan
  • History
  • Goals
  • Process
• Status of Project
• Timeline
WATER POLLUTION CONTROL PLANT

• We treat 25 million gallons of wastewater each day
• Our mission is to safely and economically process wastewater and hazardous waste materials to protect our environment
• County vision refers to:
  • secure, attractive residential and commercial neighborhoods
  • participating, sustainable community
WHAT ARE “SOLIDS?”

- Residual material recovered from the liquid wastewater treatment processes
- In Arlington, they result from the Primary and Secondary liquids treatment processes
- The WPCP produces approximately 200,000 lbs per day of Class B biosolids

![Diagram showing solids handling processes]
WHY EVALUATE CURRENT PROCESS?

- Land application may get more expensive
- Some solids handling processes 50+ years old – maintenance issues
- Solids quantity will continue to increase
- More focus County-wide on sustainability and energy management
MASTER PLAN HISTORY

• Master Plans provide long-term future direction
• Last master plan completed in 2001 – plant upgrade to liquid side
• Focus of current Master Plan to upgrade the solids handling process in a manner that:
  • Replaces failing equipment
  • Provides a sustainable solution that reduces the WPCP’s impact on environment
  • Takes advantage of innovations in solids handling
  • Is responsive to community needs (noise, traffic, odor)
MASTER PLANNING EFFORT

- Obtained input from WPCP staff, DES staff, County Management, and Community Stakeholders
- Studied existing infrastructure to determine changes needed
- Developed evaluation criteria for new technologies
- Determining which technology will be implemented at the WPCP
EVALUATION CRITERIA

Economic
- Capital Cost
- Annual O&M Cost
- Life Cycle Cost
- Financial Options/Risk
- End Use Control

Operational
- Flexibility
- Operability and Safety
- Constructability
- MOPO/Impacts on Plant
- Proven System/Technology
- Reliability

Environmental
- Resource recovery potential
- Energy Intensity
- Carbon Footprint
- Regulatory Permits
- Gas and Product Quality

Social
- Odor Generation Potential/ Reduction
- Acceptability (noise, odor)
- Hauling

Economic
Operational
Environmental
Social
SOLIDS MASTER PLAN – EVALUATION PROCESS

- Universe of Technologies
- Screened Technologies and Process Analysis
- Top 4 Selected Alternatives
- Ranking and Final Evaluation

Other ongoing activities:
- Understanding pros/cons of regional solution
- Emission study

We are here

Recommended Plan
## SELECTED LONG-TERM ALTERNATIVES FOR FURTHER EVALUATION

<table>
<thead>
<tr>
<th>Name</th>
<th>Biosolids quality</th>
<th>Major features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lime Stabilization rehab-only</td>
<td>Class B</td>
<td>What we have now; most trucks for biosolids hauling; no gas production odorous</td>
</tr>
<tr>
<td>Anaerobic Digestion (AD)</td>
<td>Class B</td>
<td>Biosolids volume lower; gas production; less odors</td>
</tr>
<tr>
<td>Thermal Hydrolysis (THP) + Anaerobic Digestion</td>
<td>Class A</td>
<td>Biosolids volume reduced further; more gas production; less odors</td>
</tr>
<tr>
<td>Anaerobic Digestion + Heat Drying</td>
<td>Class A</td>
<td>Least amount of biosolids; gas production (used in process—no export); less odors</td>
</tr>
</tbody>
</table>
POTENTIAL BENEFITS TO COUNTY

“The wastewater treatment plant is the single largest energy user in County operations, consuming 13% of all energy use”

“In 2007, total emissions from the WPCP were nearly 21% of the total government operations’ net emissions”

“Offsetting either natural gas or electricity, AD and THP/AD will provide extremely significant reductions to the plant’s carbon footprint.”
## OPERATIONAL PROJECTIONS

<table>
<thead>
<tr>
<th></th>
<th>Lime</th>
<th>Anaerobic Digestion</th>
<th>THP + Anaerobic Digestion</th>
<th>Anaerobic Digestion + Heat Drying</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solids production in 2021</td>
<td>259,000 lbs/day</td>
<td>155,000 lbs/day</td>
<td>115,000 lbs/day</td>
<td>43,000 lbs/day</td>
</tr>
<tr>
<td>Net gas production in 2021</td>
<td>N/A</td>
<td>192 million BTU/day</td>
<td>228 million BTU/day</td>
<td>N/A (no export)</td>
</tr>
<tr>
<td>Greenhouse gas impact for WPCP in 2020</td>
<td>N/A</td>
<td>-8% (natural gas)/-33% (electricity)</td>
<td>-9/-39%</td>
<td>+14%/-11%</td>
</tr>
<tr>
<td>Number of trucks per year in 2021</td>
<td>2080</td>
<td>1350</td>
<td>990</td>
<td>620</td>
</tr>
</tbody>
</table>
## FINANCIAL PROJECTIONS

<table>
<thead>
<tr>
<th></th>
<th>Lime</th>
<th>Anaerobic Digestion</th>
<th>THP + Anaerobic Digestion</th>
<th>Anaerobic Digestion + Heat Drying</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital Costs</td>
<td>$35</td>
<td>$68</td>
<td>$94</td>
<td>$109</td>
</tr>
<tr>
<td>Operating Costs, Net Present Value (NPV)</td>
<td>$54</td>
<td>$37</td>
<td>$39</td>
<td>$25</td>
</tr>
<tr>
<td>Life-cycle Cost (base), NPV</td>
<td>$89</td>
<td>$105</td>
<td>$133</td>
<td>$134</td>
</tr>
<tr>
<td>Life-cycle Cost with CHP, NPV</td>
<td>$89</td>
<td>$116</td>
<td>$143</td>
<td>$152</td>
</tr>
<tr>
<td>Life-cycle Cost with CNG, NPV</td>
<td>$89</td>
<td>$104</td>
<td>$130</td>
<td>$140</td>
</tr>
</tbody>
</table>
DC METRO AREA BIOSOLIDS TRENDS

Percentage of Class A and Class B Biosolids over time in Mid-Atlantic Region

LEGEND

A Class A
B Class B
F Incineration
Fa Future Class A
L Landfill
RECOMMENDATION

• Implement a future solids alternative with digestion (i.e. discontinue lime stabilization process)
• Proceed with THP + AD alternative

Rationale:
• Long term positioning for regulatory compliance
• Facilities within the region are at (or trending to) Class A
• Innovative technology to meet Arlington's and WPCP’s energy reduction goals
• Benefit to the community – possible give back - soil amendment product

• County Manager has asked us to continue to evaluate potential regional options
• Emissions study to be conducted on recommended alternative in order to understand impacts of upgrades
**SOLIDS MASTER PLAN – TIMELINE FROM LAST CAPITAL IMPROVEMENT PLAN**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediate Needs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Phase I)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Design and construction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Short term</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Design and construction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>improvements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Phase II)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long-term</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Design and construction</td>
</tr>
<tr>
<td>improvements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Phase III)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Master Plan does not conclude the opportunities for involvement—we will continue to request stakeholder input during future project phases.*
THANK YOU!

https://water.arlingtonva.us/locations/water-pollution-control-plant/


Mary Strawn
mstrawn@arlingtonva.us