

# Ponds Wastewater Treatment Plant Facility Plan

Presentation prepared for Oak Grove, MN

July 30, 2018



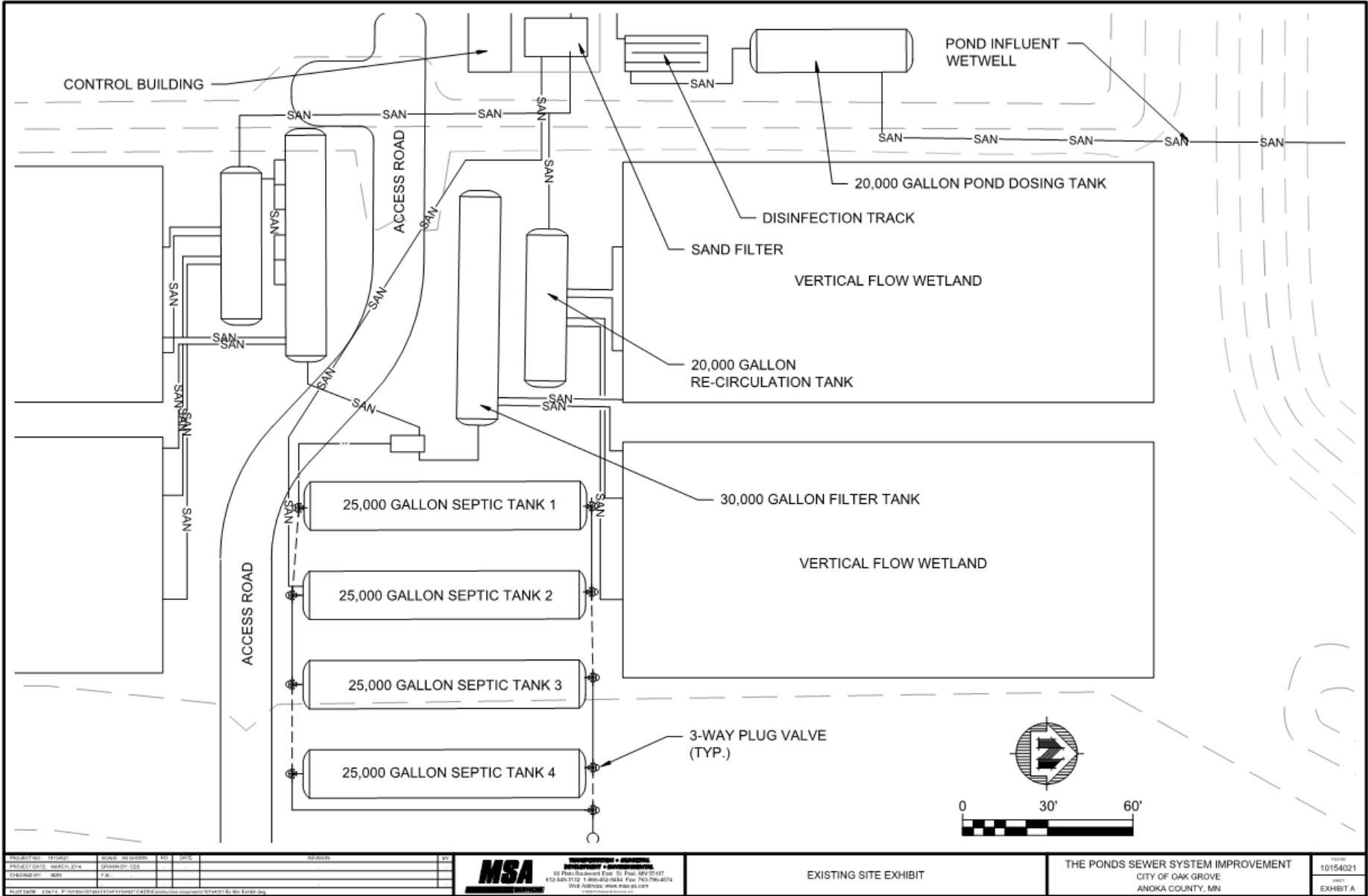
# Agenda

- Overview of Existing Facility
- MPCA Requirements for Permit Renewal
- Existing Facility Deficiencies / Pending Repairs
- Improvement Options
- Financial Impacts

# Facility History

- The Ponds was acquired by the City of Oak Grove from a private developer in 2010.
- The existing facility is a non-standard vertical flow wetland designed by the now defunct North American Wetland Engineering
- Originally built in 2002. Expanded in 2006.
- The facility reuses treated water for irrigating the Ponds Golf Course and therefore comes under special tertiary treatment permit requirements .

# Facility Overview





**Storage / Polishing Pond**

**The Ponds Golf Course / Irrigation Site**

**Control Building / Sand Filter**

**Vertical Flow Wetlands**

# MPCA Sand Filter Requirements

- Currently, the Sand Filters (tertiary treatment) are non-functional
- MPCA is requiring Oak Grove to restart the sand filters to come into compliance with their reuse permit
- MPCA issued following compliance timeline:
  - March 1, 2018 – Engineering Report due to MPCA. Engineering summary report was submitted to MPCA on February 26, 2018, recommending a Facility Plan completed by August 30, 2018.
  - February 1, 2019 – Submit Plans and Specifications for WWTF Upgrade to bring Sand Filters online
  - December 30, 2019 – Begin operation of sand filters

# Alternative 1 – Repair Existing Filters



# Alternative 2 – New Filters





# Existing Facility Deficiencies/Pending Repairs

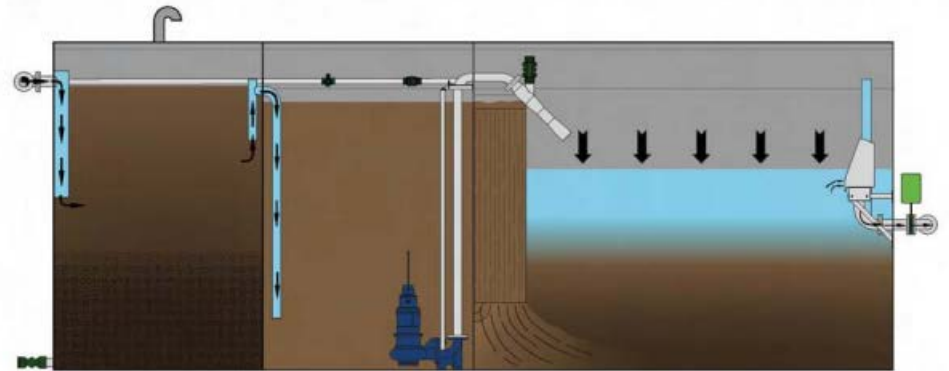
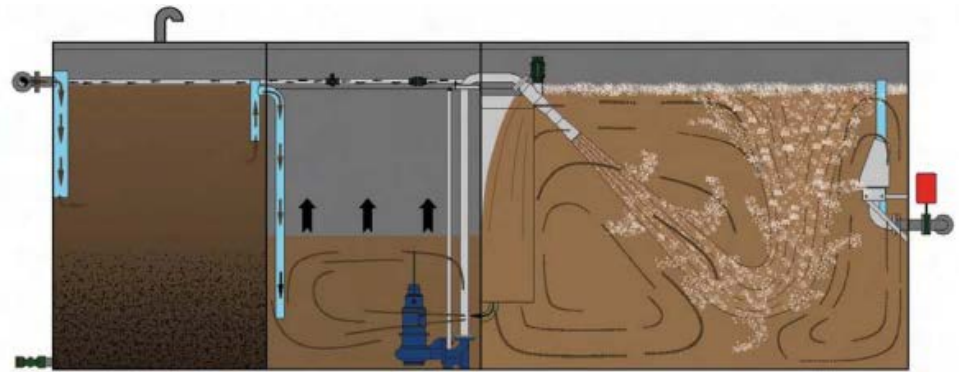
- Facility will need significant investment to rehabilitate in coming years:
  1. The four vertical flow wetlands are filling with fine particles and rags, will need complete rehabilitation within 5-7 years
  2. The four vertical flow wetlands were lined with low quality treated plywood and a thin synthetic liner, these will need to be replaced soon
  3. The splitter structure has deteriorated due to lack of external venting and H<sub>2</sub>S corrosion and will need to be rehabilitated or replaced
  4. The blowers, pumps, and other mechanical equipment will need to be replaced in the next 5 years as they have reached the end of their useful life
  5. Since this was a non-standard design performed by an out of business engineering company, it will be difficult to develop rehabilitation plans based on existing process data

# Alternative 3 – Constructed Wetland/New Filters



# Alternative 4 – Replace Wetland with Package Plant

- Abandon vertical flow wetland and replace with small package mechanical plant similar to West Lake George facility
- Advantages
  - Operator familiar with operation of package plants
  - Greatly reduces complexity and footprint of existing system
  - Future maintenance and replacement costs reduced
  - Improved reliability of system



# Alternative 4 – Package Plant/New Filters



# Construction Cost Analysis

<b>Descriptions</b>	<b>Alternative 1 - Repair Filters</b>	<b>Alternative 2 - Filter Upgrade</b>	<b>Alternative 3 - Constructed Wetland</b>	<b>Alternative 4 - Package Plant</b>
<b>Construction Costs</b>	<b>\$ 150,000</b>	<b>\$ 655,000</b>	<b>\$1,398,000</b>	<b>\$1,096,000</b>
<b>Eng, Legal, Fiscal, Admin</b>	<b>\$ 30,000</b>	<b>\$ 131,000</b>	<b>\$ 280,000</b>	<b>\$ 219,000</b>
<b>Total Project Costs</b>	<b>\$ 180,000</b>	<b>\$ 790,000</b>	<b>\$1,678,000</b>	<b>\$1,315,000</b>

# Alternative Evaluation

<b>WW Treatment</b>	<b>Alternative 1 - Repair Filters</b>	<b>Alternative 2 - Filter Upgrade</b>	<b>Alternative 3 - Constructed Wetland</b>	<b>Alternative 4 - Package Plant</b>
<b>Total Project Costs</b>	<b>\$ 180,000</b>	<b>\$ 790,000</b>	<b>\$1,678,000</b>	<b>\$1,315,000</b>
<b>Annual O&amp;M Costs</b>	<b>\$ 64,000</b>	<b>\$ 64,000</b>	<b>\$ 64,000</b>	<b>\$ 38,000</b>
<b>20-Year Present Worth</b>	<b>N/A</b>	<b>N/A</b>	<b>\$2,530,000</b>	<b>\$1,770,000</b>

<b>Initial Project Costs</b>	<b>Low</b>	<b>Medium</b>	<b>High</b>	<b>Medium High</b>
<b>Service Life</b>	<b>5-7 Years</b>	<b>5-7 Years</b>	<b>20 Years</b>	<b>20 Years</b>
<b>20-Year Present Worth</b>	<b>N/A</b>	<b>N/A</b>	<b>High</b>	<b>Low</b>
<b>Future Expansion</b>	<b>Poor</b>	<b>Poor</b>	<b>Poor</b>	<b>Good</b>
<b>Ease of Operation and Maintenance</b>	<b>Poor</b>	<b>Fair</b>	<b>Fair</b>	<b>Good</b>
<b>System Reliability</b>	<b>Poor</b>	<b>Fair</b>	<b>Good</b>	<b>Good</b>
<b>Foot Print</b>	<b>Large</b>	<b>Large</b>	<b>Large</b>	<b>Small</b>

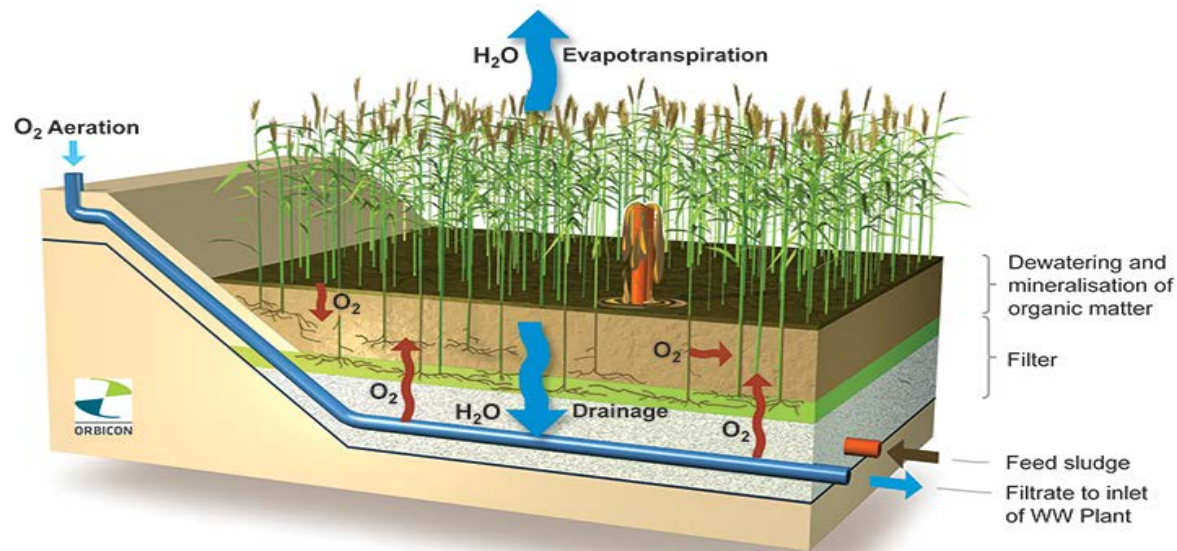
# Biosolids Handling Alternatives

## 1. Biosolids Hauling

- Biosolids from WLG and the Ponds are currently hauled to other municipal wastewater plants for disposal. Average annual disposal costs were \$22,000.

## 2. Reed Beds

- Reed beds are lined solids holding ponds with planted phragmites (reeds) that help with solids stabilization creating pathways for drainage
- Thickened solids are removed and either land applied or landfilled once every 10 years



# Biosolids Handling Alternatives

Descriptions	Alternative S1 - Reed Beds	Alternative S2 - Haul Sludge
Construction Costs	\$ 401,000	\$ -
Eng, Legal, Fiscal, Admin	\$ 80,000	\$ -
Total Capital Costs	\$ 481,000	\$ -
Annual O&M Costs	\$ 7,000	\$ 25,000
20-Year Present Worth	\$ 570,000	\$ 340,000

- Reed Beds are not cost effective at this time.
- Re-evaluate biosolids handling options when the hauling costs escalate more than 50%.



# St. Francis Wastewater System

- Sewer Hook-up Fee: \$4,284 (For St Francis Residents)
- Sewer Rates
  - Monthly Base Fee: \$24.50
  - Charge per 1,000 gallon usage: \$9.60
- For Ponds Residents (Hypothetical Scenario)
  - 222 Homes, Average Water Usage of 4,000 gallons per home per month.
  - Potential Initial Costs:
    - St. Francis Hook-up Fee: \$950,000 ( $\$4,284 \times 222$ ). Costs may be higher for non-St Francis residents.
    - Force main Extension from the Ponds to St. Francis: \$50,000
    - Total Initial Costs > \$1,000,000
  - Potential Monthly Charges:
    - Monthly Sewer Charges: \$63 ( $\$24.5 + \$9.60 \times 4$ )
  - Mortgage of Initial Cost+ Sewer Charge:
    - **Potential Monthly Total: \$87**

# Potential Sewer Rate Impact – Recommend Plan

- Project Cost: \$ 1,315,000
- Low Interest State Revolving Fund Loan Rate: 1.5%
- Term: 20 years
- Annual Debt Services: \$75,500
- Monthly Debt Retirement per Home: \$28.0
- Current Monthly Rate per Home: \$39.5
- **Projected New Monthly Rate per Home: \$67.5**
- **Current Sewer Rate at West Lake George: \$62.0**

# Proposed Project Schedule

- Submit Facility Plan to MPCA August 2018
- Public Notice September 2018
- Public Hearing October 2018
- Council Adopt Facility Plan October 2018
- Plans and Specifications Nov 2018 - June
- PPL Request March 2019
- Intended Use Plan Request May 2019
- Advertisement for Bid July 2019
- Construction Begins September 2019
- Project Start-up June 2020

# Conclusions and Recommendations

- Package plant is the most cost effective long-term alternative for upgrading the Pond WWTF.
- Current biosolids hauling is more economical than reed beds.
- Consider raising the sewer rate from \$39.5 to \$53.5 in 2019, and to \$67.5 in 2020.
- Consider issuing a public notice for the proposed rate increases.
- Prepare for a public hearing to communicate with residents.