

January 26, 2021

Town of Ixonia Utility District No. 1 Draft Facility Plan Review

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Facility Plan Outline

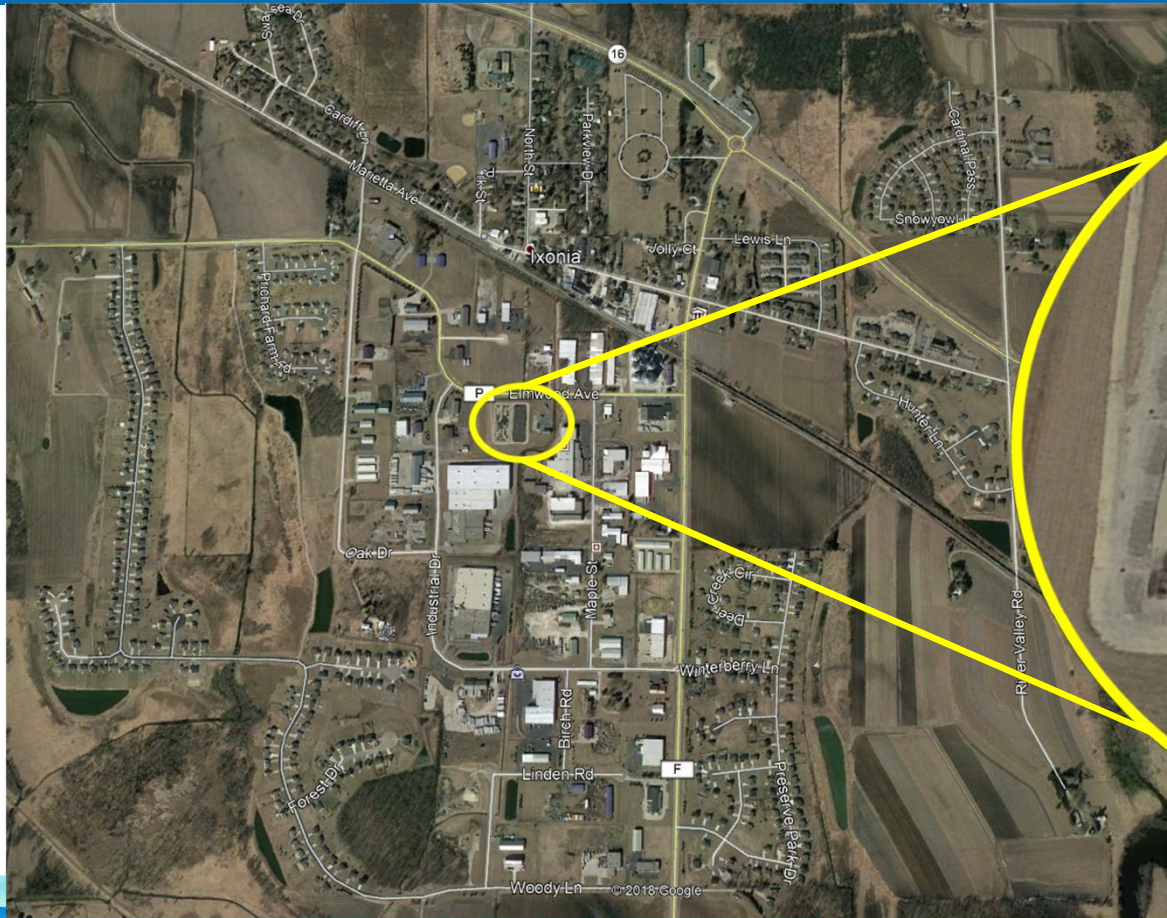
Why is a new facility needed?

- Current WWTP – Capacity Overview
- Treatment Requirements and Flow Projections

Treatment Alternatives Evaluation and Results

Recommended Plan and Schedule

Current WWTP Capacity



Current WWTP Capacity

- Constructed in 1984
 - Average flow: 85,800 gpd



Current WWTP Capacity

- Constructed in 1984
 - Average flow: 85,800 gpd
- 2002 Design Basis
 - 588 people in service area
 - 2022 Projection:
 - 768 people
 - 162,000 gpd

2018 Average:
187,000 gpd



Current WWTP Capacity

- Constructed in 1984
 - Average flow: 85,800 gpd
- 2002 Design Basis
 - 588 people in service area
 - 2022 Projection:
 - 768 people
 - 162,000 gpd
- Expanded in 2004
 - Septage receiving pit
 - Second sand filter
 - 220,000 gpd capacity (2007 re-rate)



Treatment Requirements

- 2002 Permit Requirements

- Total Suspended Solids
- Biological Oxygen Demand

	Recirculating Sand Filter
Total Suspended Solids	✓
Biological Oxygen Demand	✓
Ammonia	~
Chloride	X
Phosphorus	X

- Current Permit Requirements

- Total Suspended Solids
- Biological Oxygen Demand
- Ammonia
- Chloride

- Future Permit Requirements

- Phosphorus

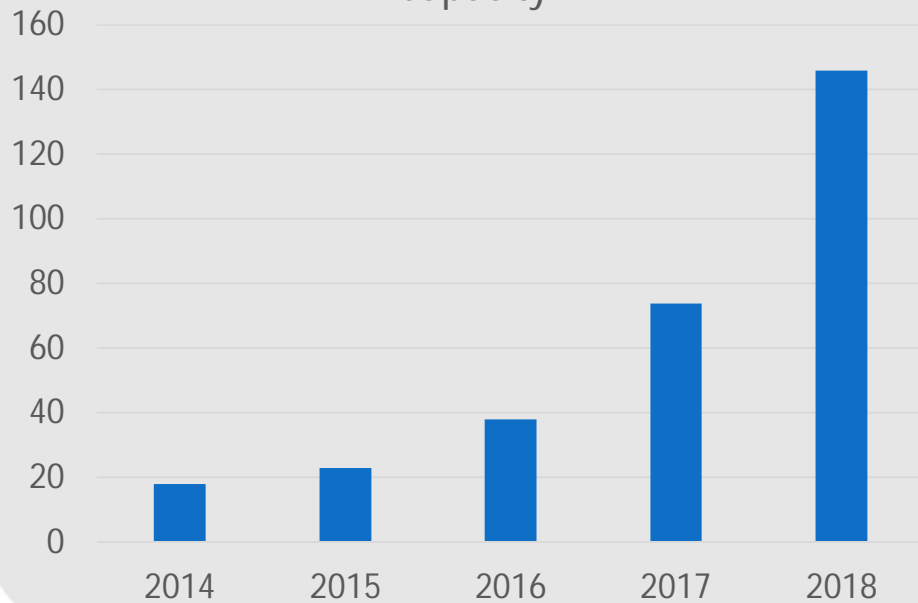
Increasing Flow

Flow

Chloride

Ammonia

Annual Number of Days Over Design Capacity



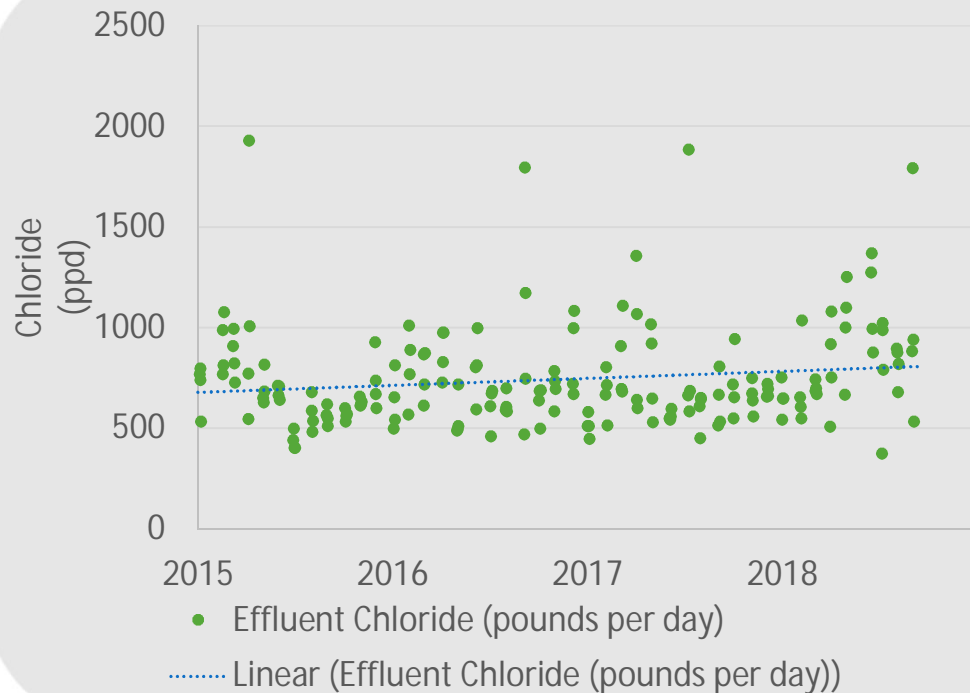
- Effected by weather, streetscape & population growth
- Effects ability to meet limits:
 - Total Suspended Solids
 - Biological Oxygen Demand
 - Chloride

Effluent Chlorides

Flow

Chloride

Ammonia



- No Removal Capacity
- Currently Operating Under a Variance

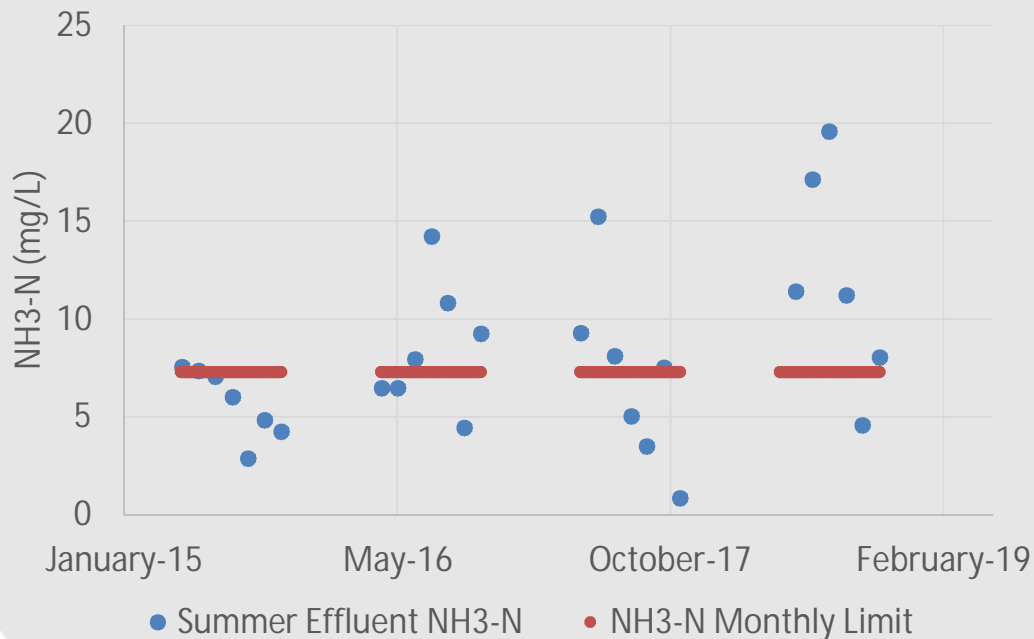
Ammonia Treatment

Flow

Chloride

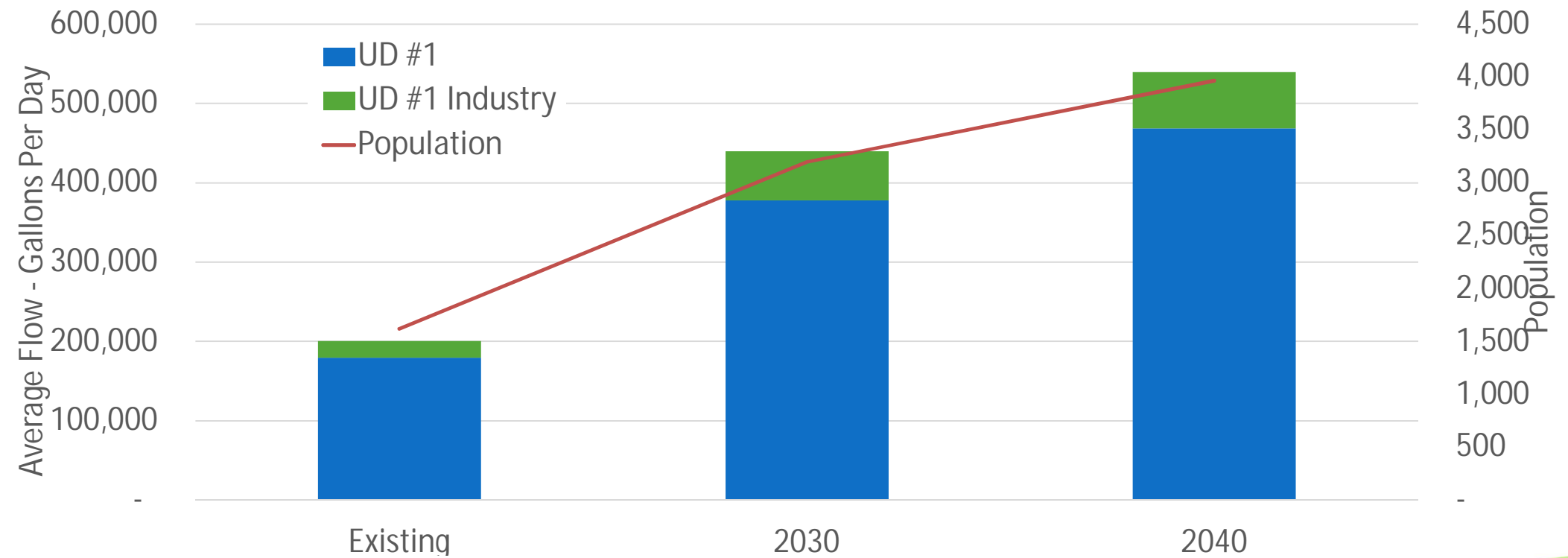
Ammonia

Summer Effluent Ammonia (mg/L)



- Loading is exceeding the limited nitrification capabilities of recirculating sand filters
- Currently: Non-Compliance
- This plant wasn't designed to remove ammonia

Flow Projections



Why Does Ixonia Need a New WWTP?

Flow

- *Exceeding Design Capacity*
- *Community Growth*

Chloride

- *No Treatment Capability*
- *Currently Operating Under Variance*

Ammonia

- *Existing facility not designed to remove ammonia*
- *Exceeding Treatment Capability*
- *Non-Compliance*

Phosphorus

- *New stringent limit in 2024*
- *Existing Facility Not Designed to Remove Phosphorus*

Allow for Future Residential & Industrial Growth



Alternatives Analysis



Alternatives Analysis

- Regionalization
- Service Area Alternatives
- New Plant Siting
- Treatment Technologies



Alternatives Analysis

- ~~Regionalization~~
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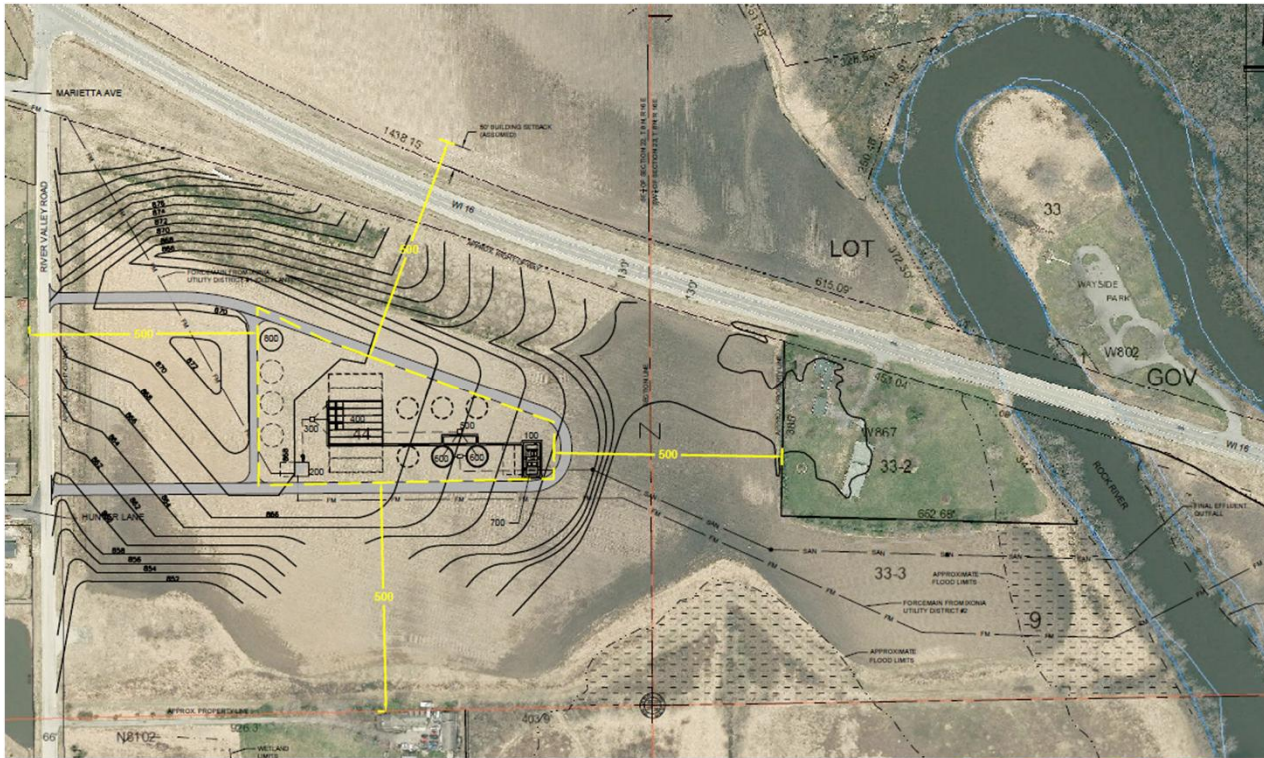


Alternatives Analysis

- ~~Regionalization~~
- ~~Service Area Alternatives~~
- New Plant Siting
- Treatment Technologies



New Wastewater Treatment Plant



Requirements & Considerations:

- 500 foot setback from any residence
- Majority of area out of floodplain
- Minimal wetland impacts
- Access to roads and piping
- Evaluate endangered resource impacts
- Land Use/Zoning acceptable
- Soil Type

Sites & Sounds of Wastewater Treatment

Odor

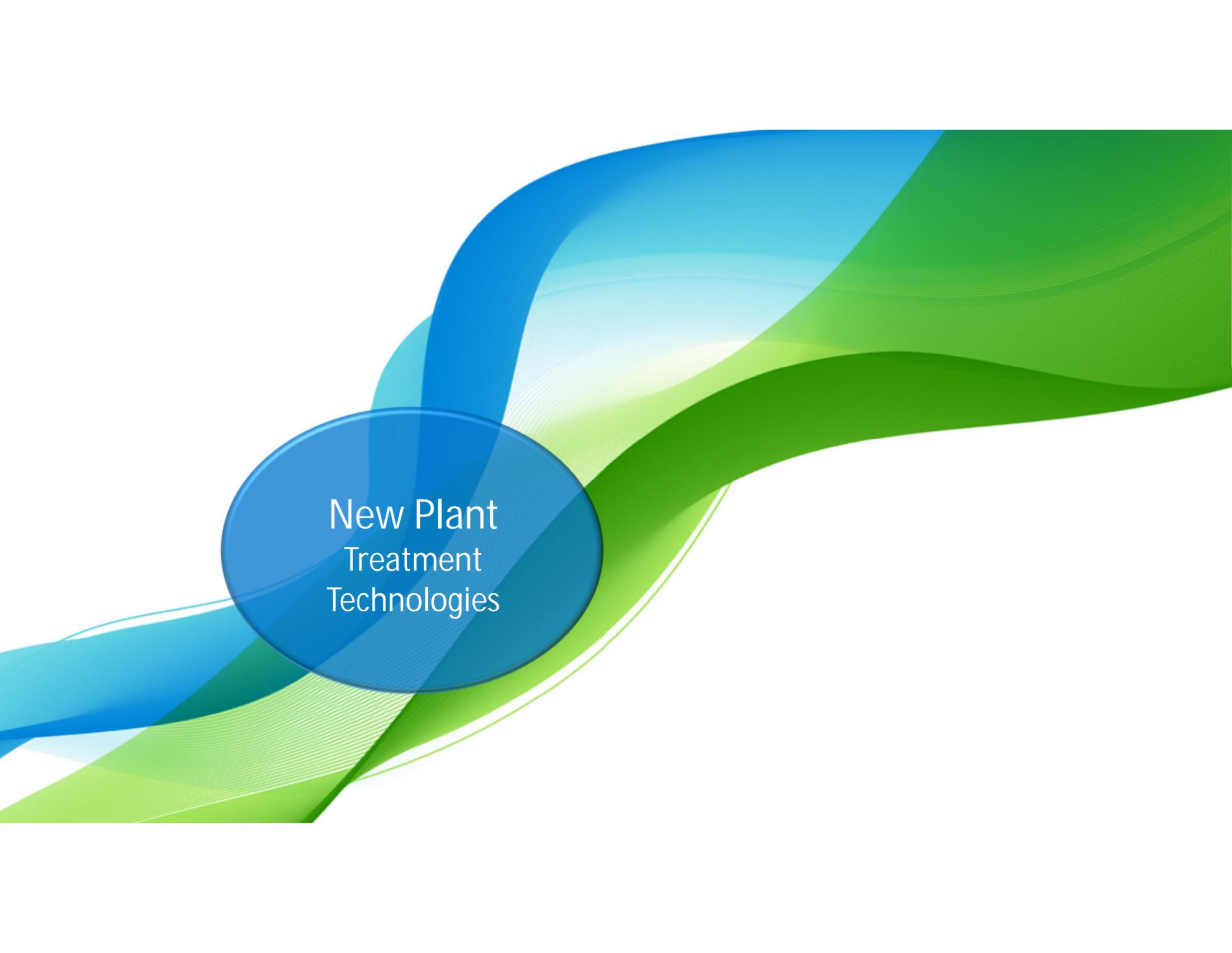
- “Earthy” smell
- Can use odor control covers & equipment
- Current WWTP smell might be noticeable – due to overloading

Noise Pollution

- Some equipment may be loud, i.e. blowers
- Use buildings and acoustic insulation

Our Goal: make sure nobody notices the plant





New Plant
Treatment
Technologies



Screening & Grit Removal

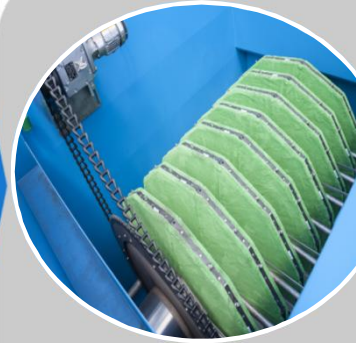
- Removes materials to protect downstream equipment.
- Screen from existing plant will continue to be used.

Primary Treatment



- Replaces recirculating sand filters for biological removal of organics & nutrients
- Increase treatment capacity, meet ammonia and phosphorus removal requirements
- Alternatives:
 - Aeration Basin
 - Oxidation Ditch
 - Sequencing Batch Reactor
- May require Final Clarification

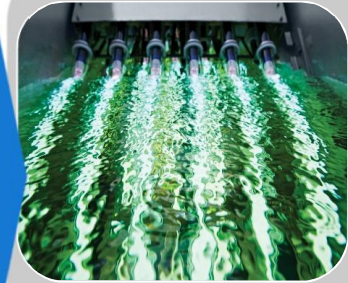
Secondary Treatment



Cloth Media Disc Filters

- Filtration meets high quality effluent required to meet future permit limits
- May not be required as part of current project – include this in a future phase.

Tertiary Treatment



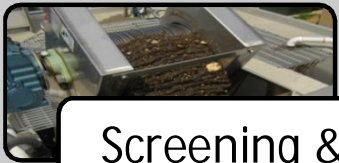
UV Disinfection

- Destroys, deactivates, or removes pathogenic microorganisms
- Current effluent outfall has no disinfection requirements
- Rock River will require disinfection during part of the year

Disinfection

Alternative 1:
Aeration Basin

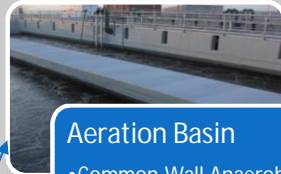
Alternative 2:
Oxidation Ditch



Screening &
Grit Removal

Alternative 3:
Sequencing Batch
Reactor

Primary Treatment



Aeration Basin

- Common Wall Anaerobic Selectors for Biological Nutrient Removal

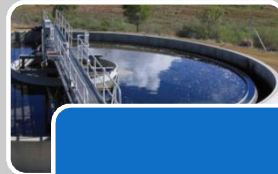


Oxidation Ditch



Sequencing Batch
Reactor

Secondary Treatment



Final Clarification



Final
Clarification



Tertiary Treatment

- Future – Cloth Media Disk Filters



Tertiary
Treatment

- Future – Cloth Media Disk Filters



Tertiary Treatment

- Future – Cloth Media Disk Filters

Tertiary Treatment



UV
Disinfection

Disinfection

Estimated Project Costs

Alternative	Plant Construction Cost
Alternative 1: Aeration Basin	\$13,641,000
Alternative 2: Oxidation Ditch	\$13,342,000
Alternative 3: Sequencing Batch Reactor	\$11,659,000

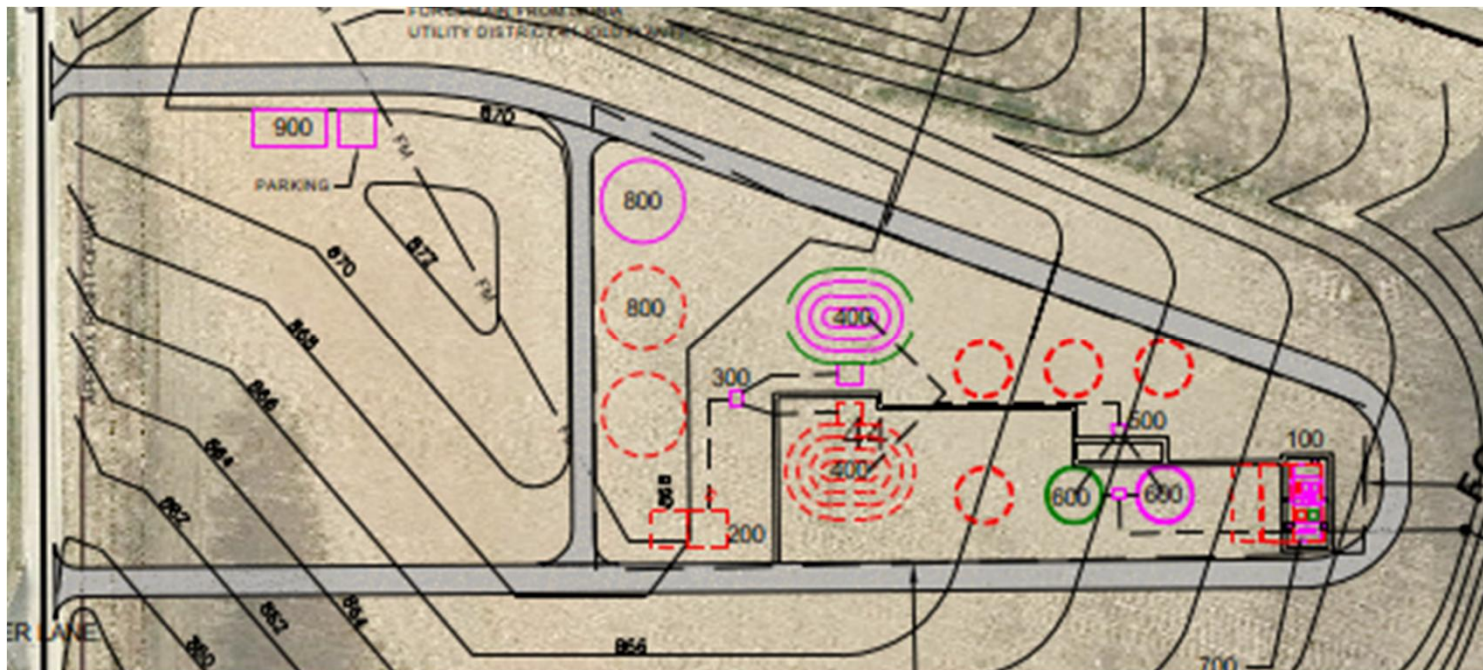
Alternative	Conveyance Construction Cost
Pump Station and Forcemain from Current Site	\$1,700,000

Recommended Alternative 2: Oxidation Ditch



- Reliable - low sensitivity to peak flows
- Flexibility for future expansion
- Better treatment performance
- Ease of operation

Phasing Plan



- Startup Construction (Phase 1)
- Expansion (Phase 2)
- Future

Plant Construction Cost Opinion

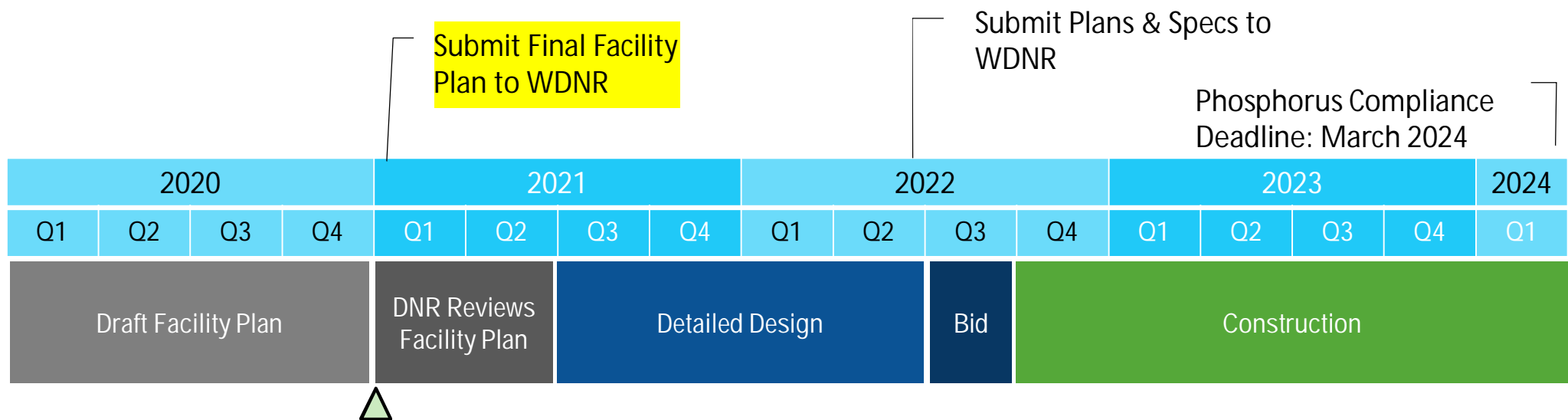
Alternative	Plant Construction Cost
Phase 1	\$12,088,000
Phase 2	\$3,225,000

Estimated Rate Impact

- Rate study was performed by Ehlers utilizing the estimated project costs
- Increase includes:
 - New loan payment for the \$12,088,000 project
 - New operation and maintenance expenses
- Rates must be in effect prior to project loan closing (2nd quarter of 2022)

Current Residential Rate	Estimated New Rate
\$49/month	\$100/month

Where Are We/What Is Decided?



Thank You