Sioux City WWTP Improvements

A Long Range Vision for the Future

Safety and Odors

Operational Reliability

Growth

WWTP Reconstruction and Design Advisory Committee

April 17, 2025

Hazen

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Agenda

- ✓ Recap of Last Meeting
- ✓ WTFAP Grant Overview
- ✓ City WWTP Update
- ✓ Emergency Repairs Project Update
- ✓ Digester Project Update
- ✓ CMAR Updates
- ✓ Odor Control Updates
- ✓ Overview of Upcoming Meetings
- ✓ Open Discussion

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Meeting 16 Recap / Follow-Up

WTFAP Grant Overview

Iowa WTFAP Grant

- Wastewater and Drinking Water Treatment Financial Assistance Program (WTFAP)
- City applied for grant in 2024
- $500,000 award from Iowa
- Assist with WWTP Phase 1 funding
- Grant funding approved by City council on April 7

Sioux City Receives Grant from State to Support Essential Local Water Quality Projects

The $500,000 award will help fund upgrades to the Sioux City Wastewater Treatment Plant

Post Date: 04/03/2025 11:03 AM

The state of Iowa has awarded the City of Sioux City a $500,000 grant that will support the Sioux City Wastewater Treatment Plant Improvements Project, a generational project that will boost the city's wastewater capacity, protect water quality in the Missouri River, and foster economic growth in the community.

The grant from the Wastewater and Drinking Water Treatment Financial Assistance Program (WTFAP) is part of more than $8 million in funds announced by Gov. Kim Reynolds to advance water quality projects across Iowa. According to WTFAP, the funds can be used for eligible costs related to installing or upgrading wastewater treatment facilities and systems, drinking water treatment facilities and systems (including source water protection projects), and for engineering or technical assistance for facility planning and design.

Securing this grant is part of the City's strategy to diversify the financing of its capital improvements and minimize the burden on ratepayers as much as possible. The distribution of cost impacts on ratepayers has been carefully evaluated for equity to users.

"We are grateful to be awarded this grant to support our essential projects, including the improvements at our Wastewater Treatment Plant," said City of Sioux City Utilities Director Tom Pingel. "This funding is key for offsetting some of the costs associated with ensuring our wastewater infrastructure will be in top shape into the future."

The Wastewater Treatment Plant (WWTP) Improvements Project was deemed essential by the City in its comprehensive Facility Plan. Action is urgently needed to ensure long-term operation of the WWTP and to stay in compliance with federal and state regulations. The WWTP treats wastewater for City residents as well as commercial and industrial customers, in addition to managing wastewater from five major communities in three different states.

Upgrading the WWTP instead of building a new facility will save ratepayers hundreds of millions of dollars, while also creating jobs and providing additional benefits for the local economy. Phase 1 design of the plant upgrades is anticipated to be completed later this year, with construction beginning in 2026.

More information about the Wastewater Treatment Plant Improvements Project can be found on the City's website at sioux-city.org/wwtp-improvements.

City WWTP Update

Emergency Repairs Project Update

North Primary Clarifier Structural Repairs

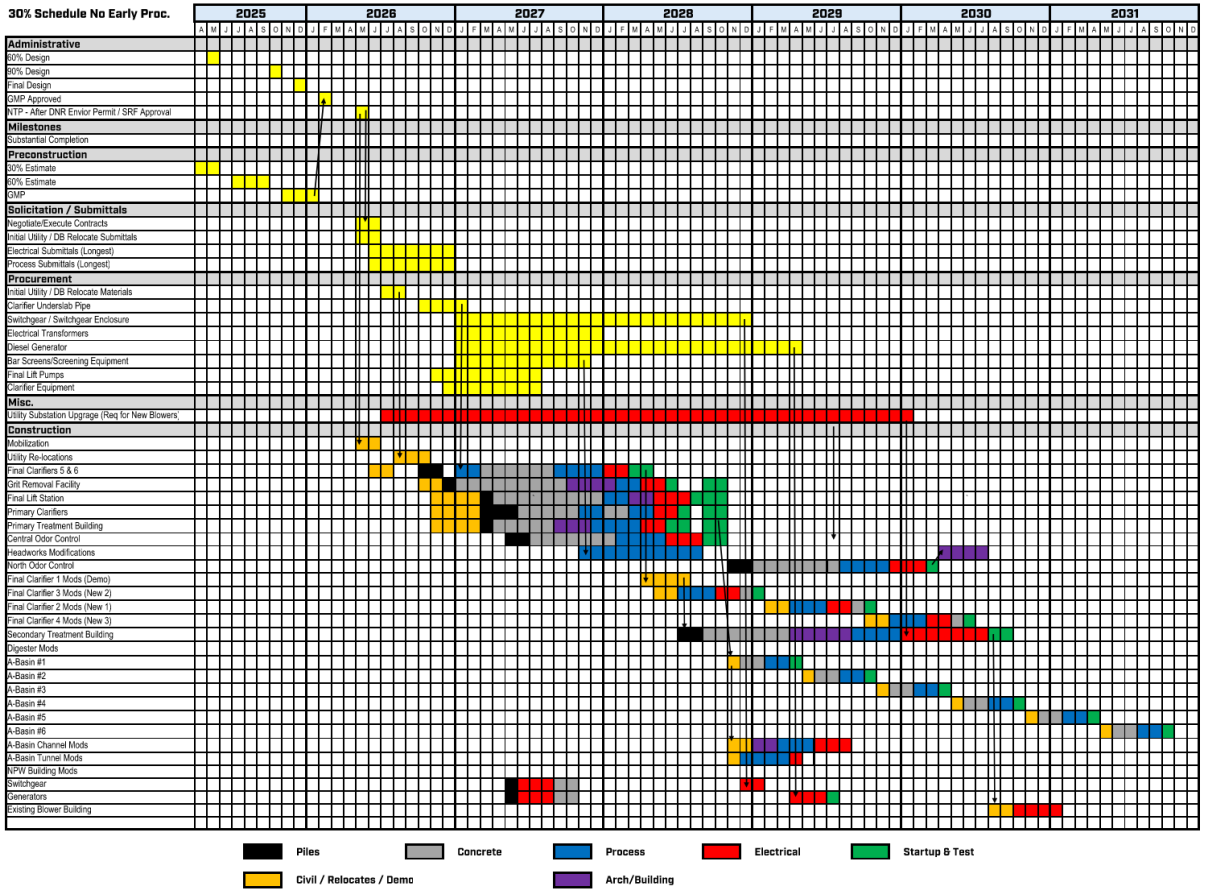
- Structural repairs completed on NPC tank 4
  - **Completed by March 31**
- City staff installing new clarifier equipment on NPC tank 4
- Structural repair contractor starting work on NPC tank 2
  - **Scheduled completion in early June**
- Scope modifications for cost savings
  - **~$700,000 below original project budget and contractor bid**

Digester Project Update

CMAR Updates

On-going CMAR items

- Weekly task force meetings
  - **Review design assumptions**
  - **Value engineering idea discussion and review**
- Priorities and on-going work
  - **Site potholing for subsurface utility locating**
  - **30% design review**
  - **30% cost model development**
  - **Construction schedule development and review**
  - **Geotech design review / input**
  - **Design procurement evaluation and assistance**

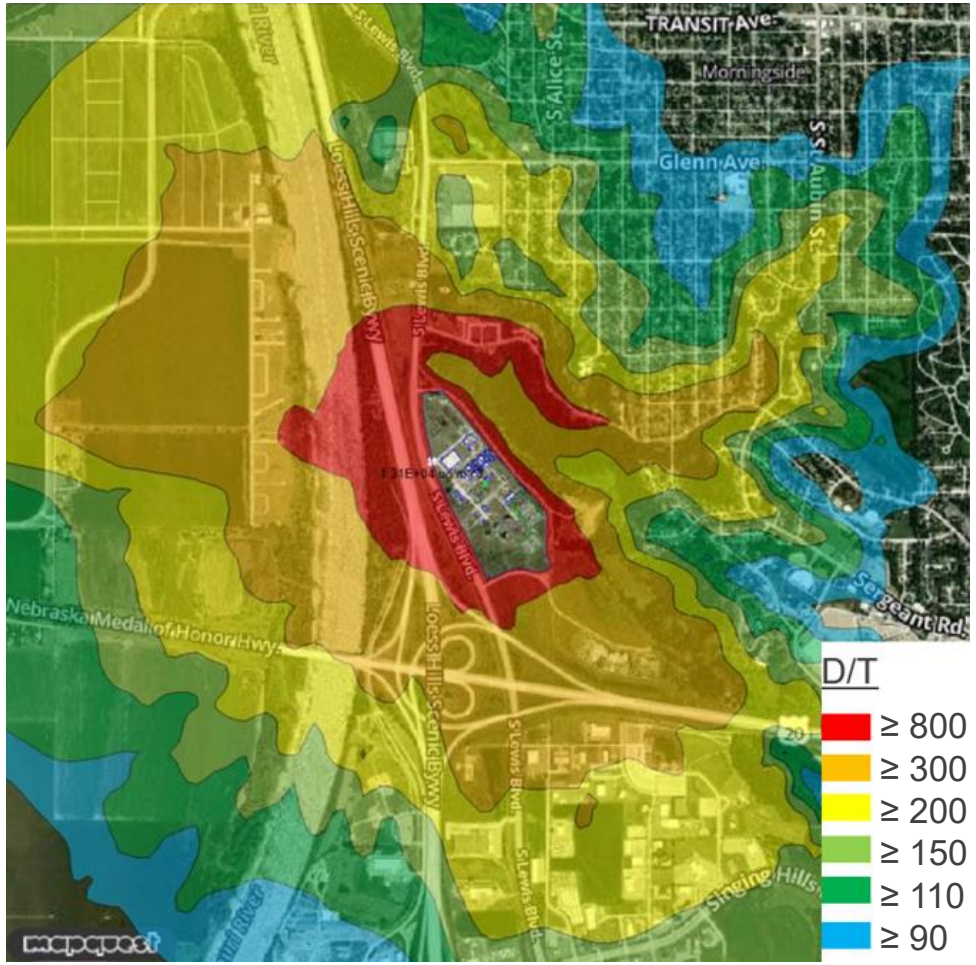


Odor Control Updates

Current Conditions - Odor Dispersion Modeling Results

Worst Case Scenario

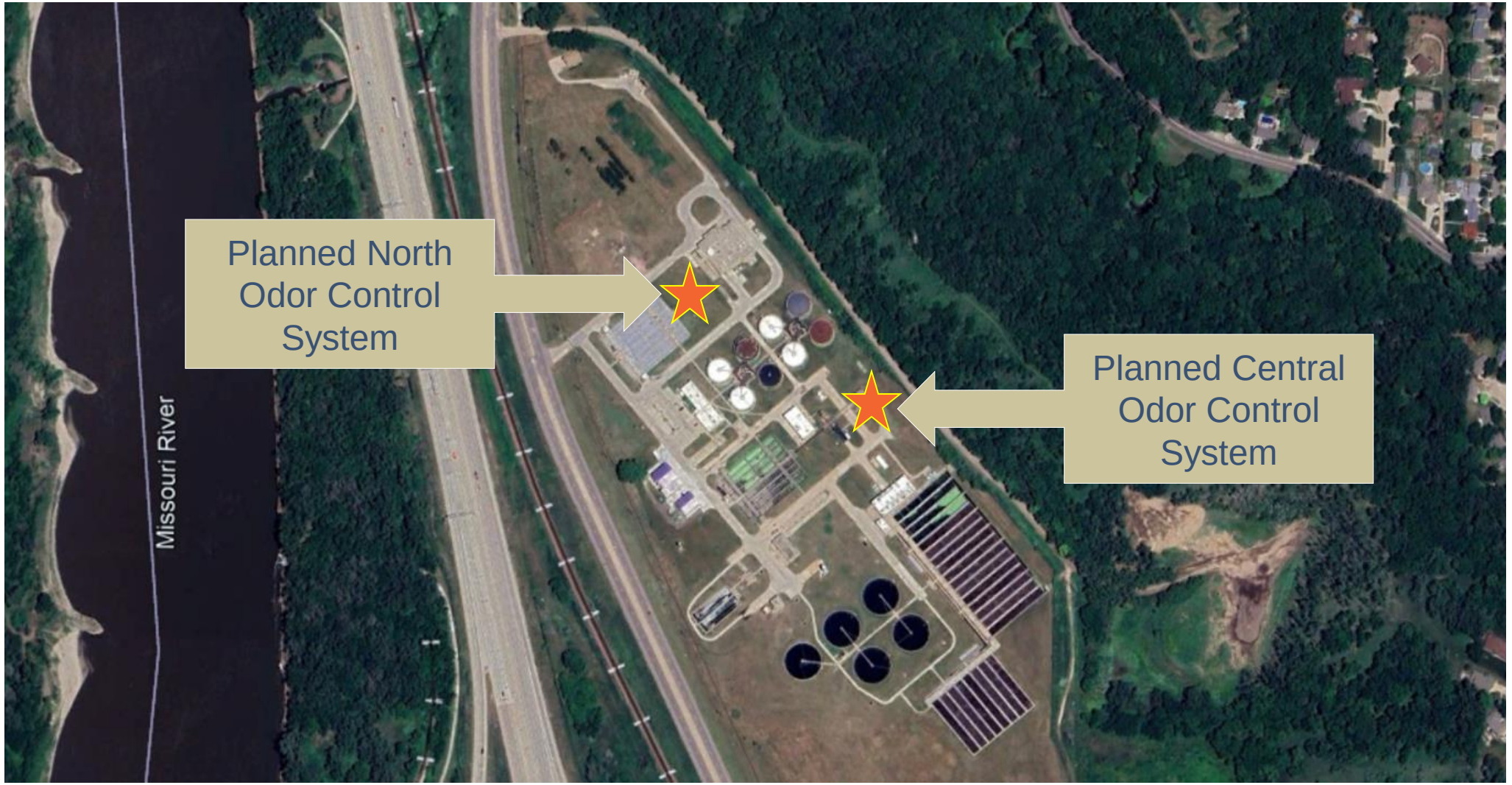
- Maximum values from sampling
- Maximum 5-year hourly modeled scenario



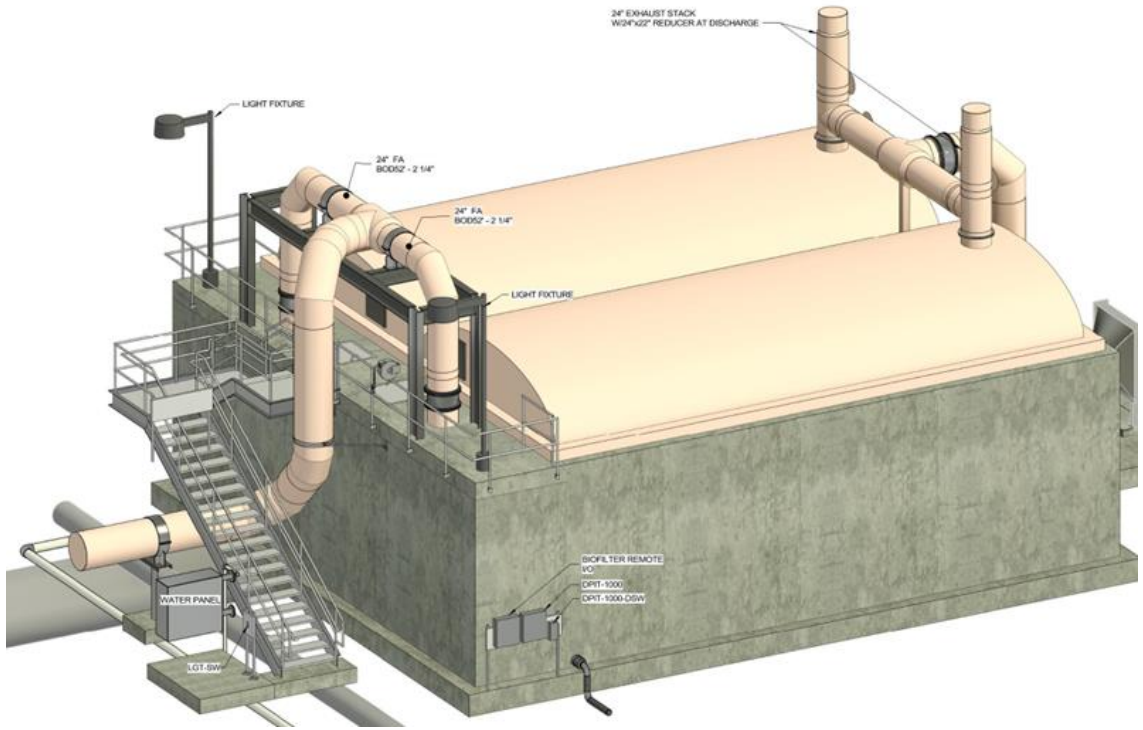
Existing Odor Conditions

Treatment Goal: Reduce Odors Below 10 D/T (typical detection threshold in non-laboratory settings)

WWTP Phase 1 Improvements – New Odor Control Systems



Vapor Phase Treatment – Biofilter Odor Control System



Note: This is not the exact design planned for this installation

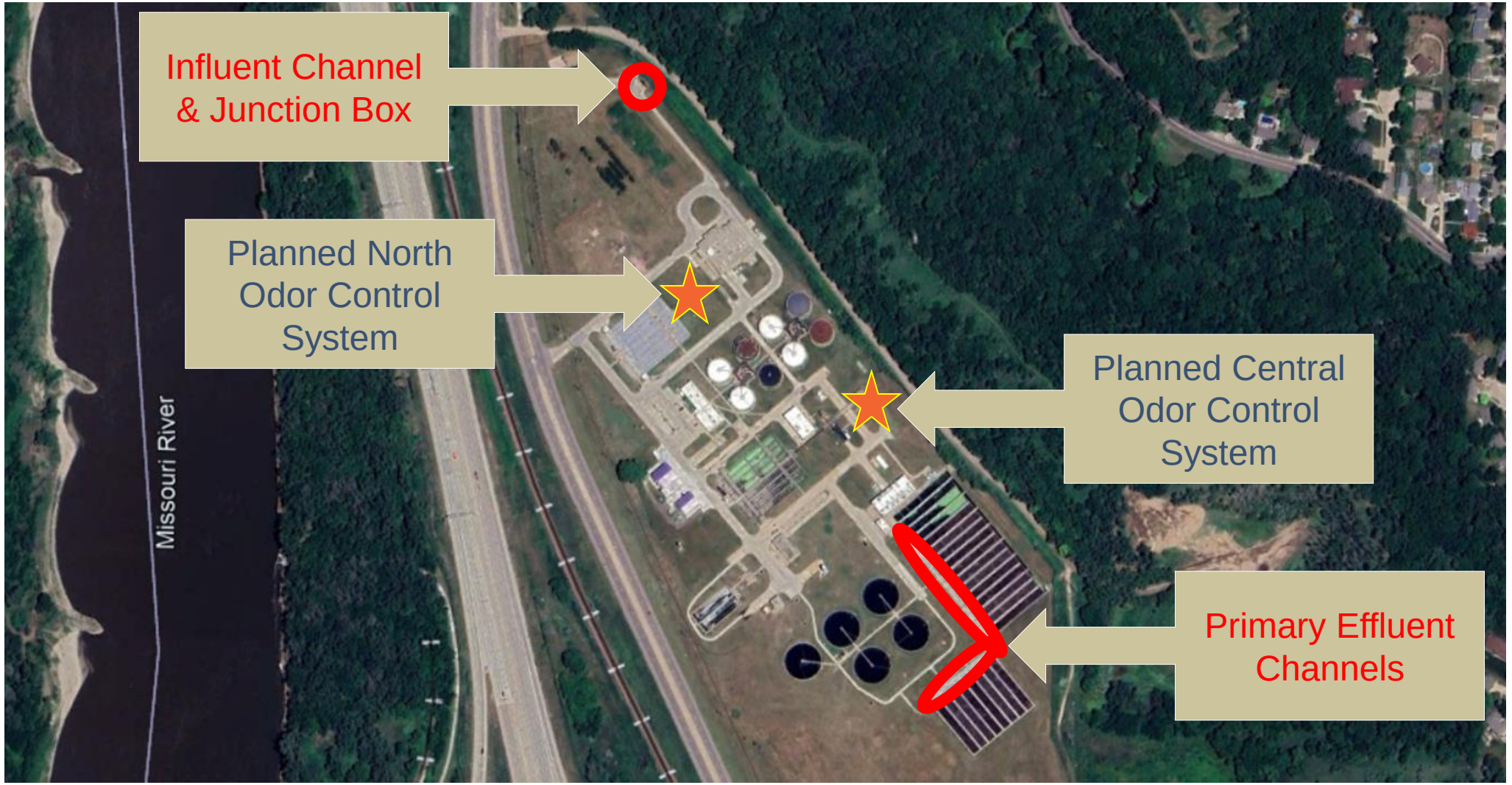
- **Microorganisms** (not chemicals) convert odorous compounds to non-odorous forms
- Engineered **synthetic media** in biofilter house beneficial microorganisms
- Green, sustainable technology
- Wide range of compounds treated effectively
- Relatively simple/low cost operation and maintenance

Vapor Phase Treatment – V-Bank Transition System Odor Control System

Polishing Unit

- Dry media treatment
- Adsorption
  - **When a (molecule, ion, or atom) adheres to a solid surface**
- Has a proven track record
- Not mechanically intensive

WWTP Phase 1 Improvements – Other Odor Sources



Selected Receptor Odor Impacts

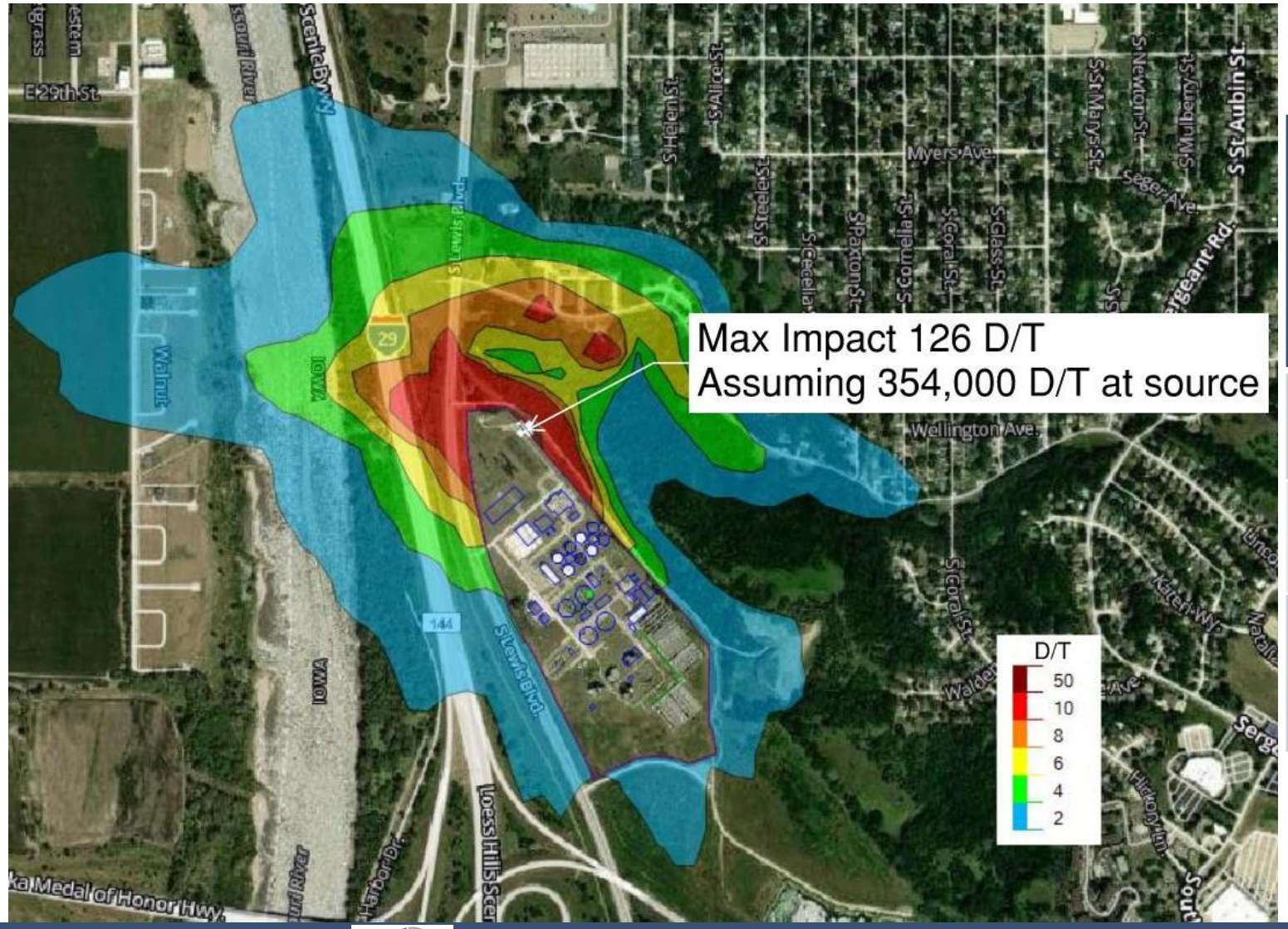
Receptor		% of Hours in 5-Year Simulation Exceeding 10 D/T		
		Base Case (All Sources, No New Odor Control)	Influent Only	Primary Effluent Channels Only
1*	Max Offsite Impact	63%	11%	0.7%
2	Lincoln Woods	6%	0.0%	0.0%
3	Park View Homes	3%	0.0%	0.0%
4	St Louis Blvd	26%	0.2%	0.0%
5	South Ravine Park	22%	0.6%	0.0%
6	Prairie Park	20%	0.0%	0.1%

* Location different for each scenario. Base Case location shown

Influent Channel and Junction Box

Influent Channel and Junction Box

Odor Dispersion Model Results – Influent Channel and Junction Box Only



Model Results - Percent of Time at Each Odor Level

Odor Level	No Changes Upstream to Reduce Sulfide Formation (354,000 D/T at source)	SuperOx System at Floyd LS Reduces Sulfide Formation (50,000 D/T at source)
10 – 50 D/T	**11%** ~960 hr/yr	**0.2%** ~20 hr/yr
50 – 100 D/T	**1%** ~110 hr/yr	**0%**
Exceeds 100 D/T	**0.03%** ~3 hr/yr	**0%**

Influent Channel and Junction Box

Odor Dispersion Model Results with No Treatment of Foul Air From this Source

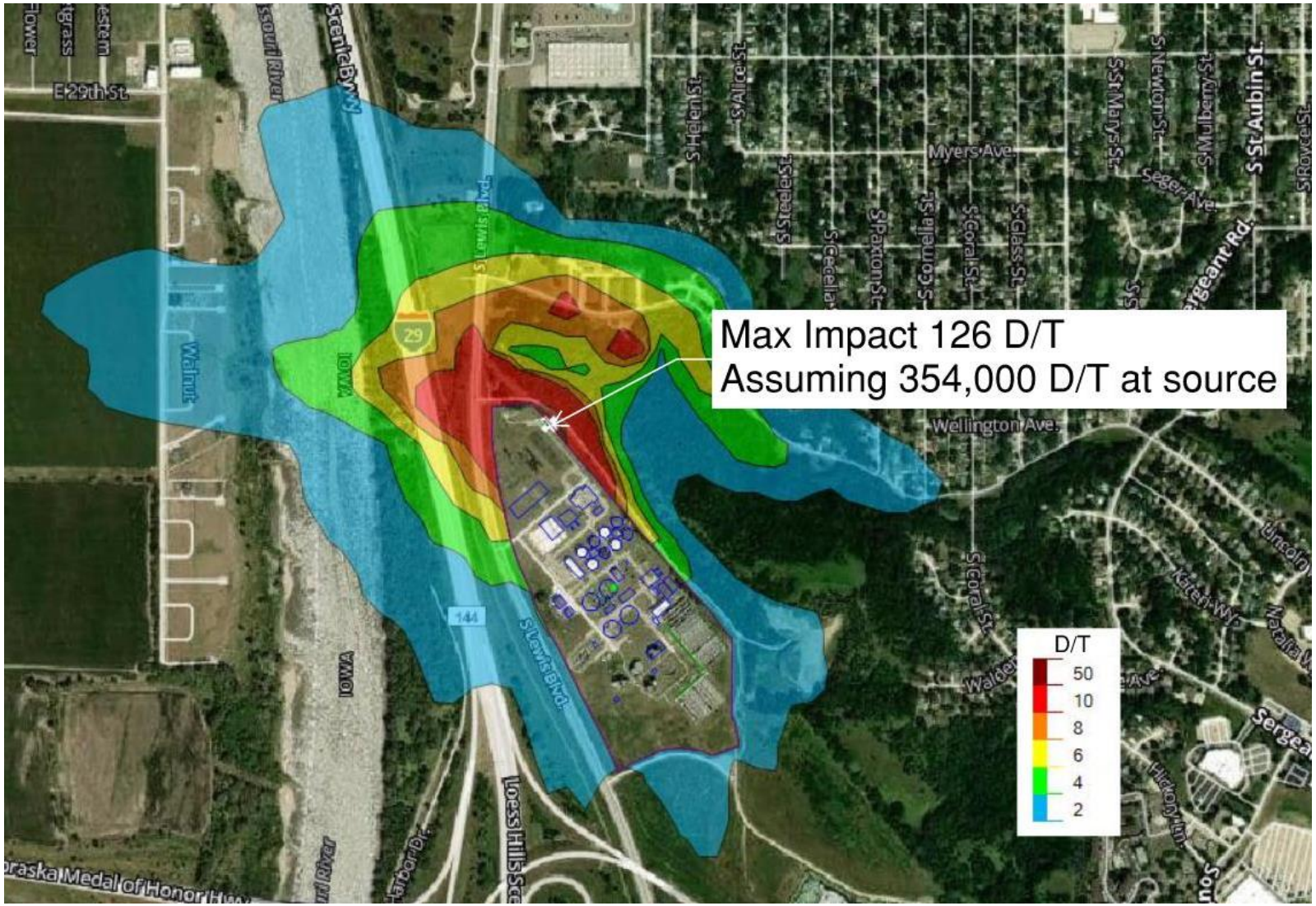
- Without treatment: odor impacts surpass threshold of 10 D/T in the surrounding community ~11% of hours of the year
- Expect odors to decrease with improvements to upstream liquid phase treatment

Options for odor control

1 – No treatment ← Alternative tentatively selected

2 – Treat with existing packaged biofilter (if not used for primary effluent channels)

3 – Treat at North Odor Control Unit



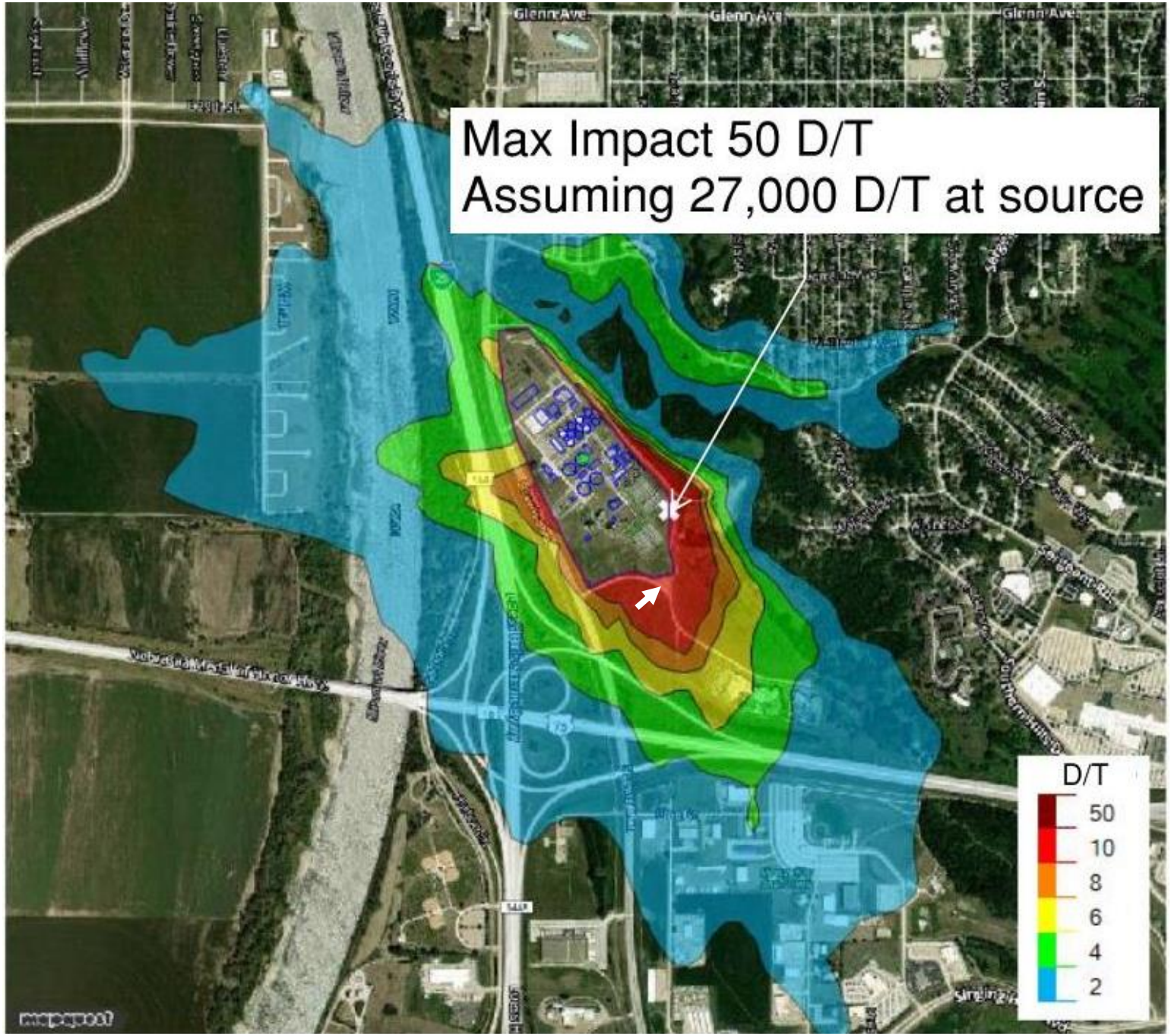
Primary Effluent Channels

Primary Effluent Channels

- Modeling results indicate odors offsite may be above the 10 D/T threshold without treatment
- Odor management approaches:
  - **Option 1 – no covers or treatment ← Alternative tentatively selected**
  - **Option 2 – cover channels and treat foul air**

Primary Effluent Channels

Receptor	% of Hours in 5-Year Simulation Exceeding 10 D/T	
	Base Case (All Sources, No New Odor Control)	**Primary Effluent Channels Only**
Prairie Park	**63%** ~5,510 hr/yr	**0.7%** ~60 hr/yr



Primary Clarifier Cover Approach

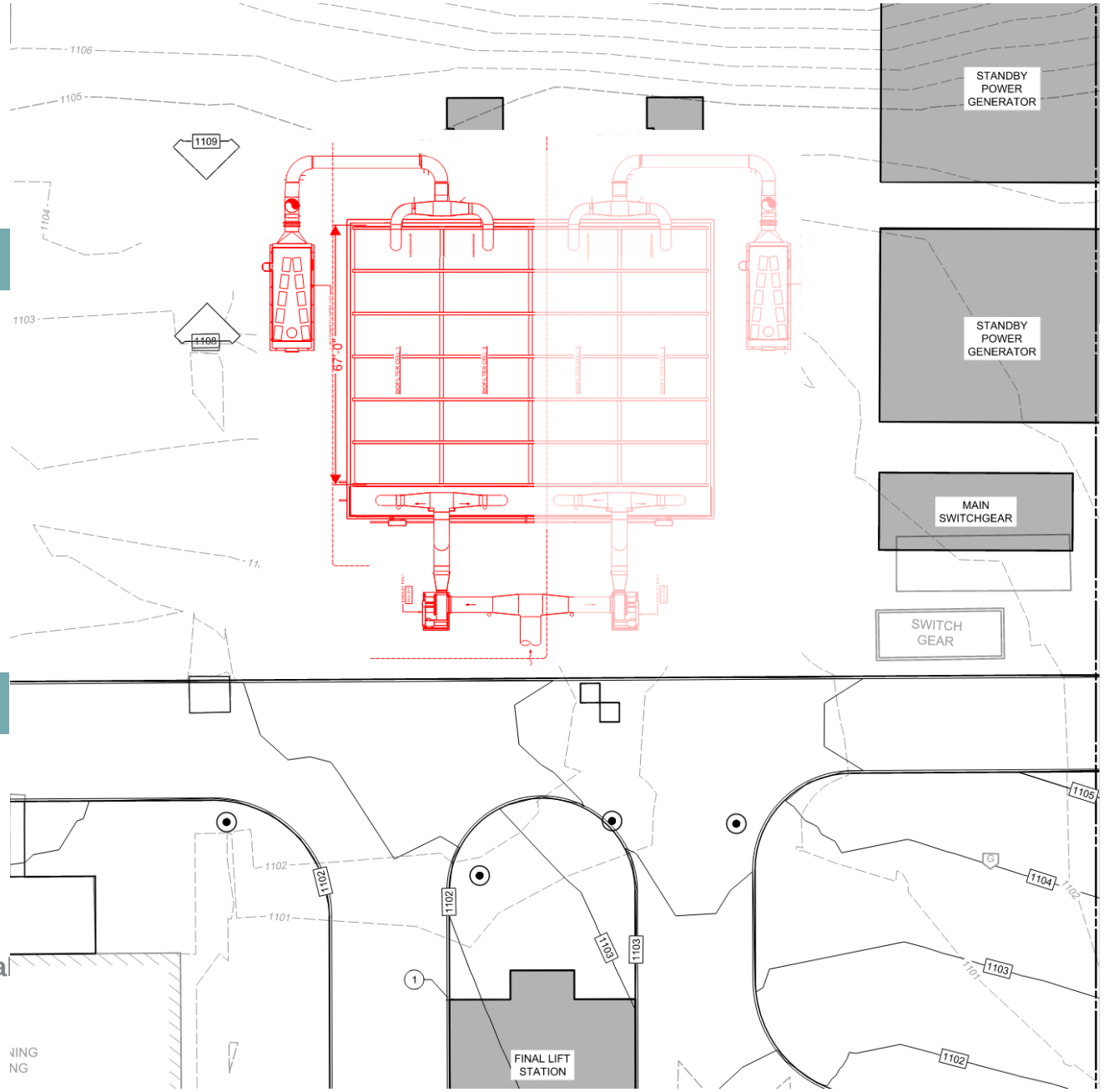
Primary Clarifier Cover Approach

Low-rise Aluminum Optidome by CST

- 16 ft tall at dome center
- 1 dormer entry with door
- 72,000 cfm to central odor control system
  - **11,000 cfm less foul air flow than taller dome**
  - **Reduces biofilter length by 10 ft (footprint 100’ x 67’)**

Launder Covers

- Supported by launder wall
- 3” above water surface
- 35,000 cfm to central odor control system
  - **Significant odor control sizing implications, reducing size of central system by 50%**



Upcoming Meetings

TBD	TBD	TBD	TBD
Meeting 18 May 22, 2025	**Meeting 19** June 26, 2025	**Meeting 20** July 24, 2025	**Meeting 21** August 28, 2025

Open Discussion