



Lakeside Cove Community Meeting

Wastewater Treatment Facility No.1

Odor Study Presentation

June 3, 2020



Date: June 2, 2020

From: Woodlands Water Agency – Odor Concern Ad Hoc Committee

Re: Odor Concerns at Wastewater Treatment Plants No. 1 and No. 2

The San Jacinto River Authority/Woodlands Division provided information on resident odor concerns from Wastewater Treatment Plants 1 and 2 to the 10 MUDs of The Woodlands Water Agency during the May 13 - May 20 meetings.

Related to resident concerns and potential improvement information provided by SJRA, WWA Trustee President Eric Hird formed an ad hoc committee to further assist in evaluating and responding to the odor concerns.

The odor concern committee had its first meeting on May 27. Following this meeting, the committee requested SJRA “pause” on committing engineering or construction expenses not currently in their budget that could impact future wholesale wastewater rates. The committee will tour the treatment facilities as soon as practical and then resume detailed discussions with SJRA, their consultants, the residents impacted by odor concerns and others to develop an action plan.

The ad hoc committee recognized that many of the improvement measures being considered could have a substantial impact on the SJRA/Woodlands Division budget and wholesale wastewater treatment rates. Given this potential substantial cost, the committee members decided it was their duty to consider the financial impact to all MUD customers and to become more engaged with the process and have input into the path forward.

Community Outreach Efforts



Wastewater Treatment Facility No. 1 FAQ

Stakeholder Updates

SJRA Website



Frequently Asked Questions Regarding Odor Issue at Wastewater Treatment Facility No. 1

What is Wastewater Treatment Facility (WWTF) No. 1?
WWTF No. 1 is located near Smedley Road and N. Millbrook Drive. It consists of mechanical and manual bar screens, a grit removal unit, four aeration basins, three secondary clarifiers, two fine-bubble diffusers, three fine-bubble clarifiers, and three sludge handling units. The plant is handling more than 3.5 million gallons per day.

The three WWTFs in the Woodlands are operated by the San Jacinto River Authority (SJRA) pursuant to contracts with the MUDs. For the contract, the MUDs approve the budgets and capital project plans and pay for maintenance, operations, and facility expansion through the sewer rate.



What's in the plant?
WWTF No. 1, located near Smedley Road and N. Millbrook Drive, consists of mechanical and manual bar screens, a grit removal unit, four aeration basins, three secondary clarifiers, two fine-bubble diffusers, three fine-bubble clarifiers, and three sludge handling units. The plant is handling more than 3.5 million gallons per day.

Are there problems at the plant? Is odor normal?
Can we do something about it?

- Odor is normal for a plant of this type and age, but we can do something about it.
- Considering that the plant was built in 1975 when there were no neighboring businesses or residences nearby, the plant is meeting as it was originally designed.
- Operationally, the plant has consistently earned awards for Task Performance and Waterstar Treatment Plant of the Year.
- Over the years, as development has occurred closer and closer to the plant, odors have become more noticeable, meaning that significant upgrades will be needed to bring the plant to today's higher standards for reduced odor.
- These upgrades will involve both short-term and long-term fixes.

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What has been done so far?

- SJRA and the MUDs have taken several steps to determine sources and mitigate odor, including:
 - Thick biosolids and vacuum dewatering of sewage sludge.
 - Covering grating to prevent wind-blown sludge.
 - Recovering the plant's gas unit.
 - Implementing maintenance and repairs to resolve existing issues and solid waste handling.
 - Implementing chemical disinfection of open cell-off conditions.
 - Upgrading odor control systems at the plant and installing additional units.
 - Changing processes in sludge handling.
 - Adjusting aeration, control, and dewatering processes.
 - Initiating a comprehensive odor control study in February 2022.

Has there been an odor control study in Lakeside Cove?

- Yes, this year SJRA and the MUDs initiated a comprehensive study to identify odor sources and recommended solutions.
 - January 2020: Texas Commission on Environmental Quality investigated reports of odor at WWTF No. 1. No evidence of odor was found during this inspection.
 - February 2022: MUDs assigned Parkins Engineering to conduct an odor study at the neighborhood of Lakeside Cove.
 - March-April 2020: Sensors were placed throughout Lakeside Cove. Data was collected from 16 locations over four weeks. Weather patterns and sensor locations pointed to WWTF No. 1.
 - May 2020: Council will review collected data and report findings at a public meeting.

What's the path forward?

Mitigation measures are being implemented right now to provide as much odor reduction as possible in the near term while permanent fixes are designed and presented to the MUDs for approval.

Results and recommendations from the Parkins Engineering odor study will be presented to the MUDs. As the contract cooperation, SJRA stands ready to execute any measures approved by the MUDs.

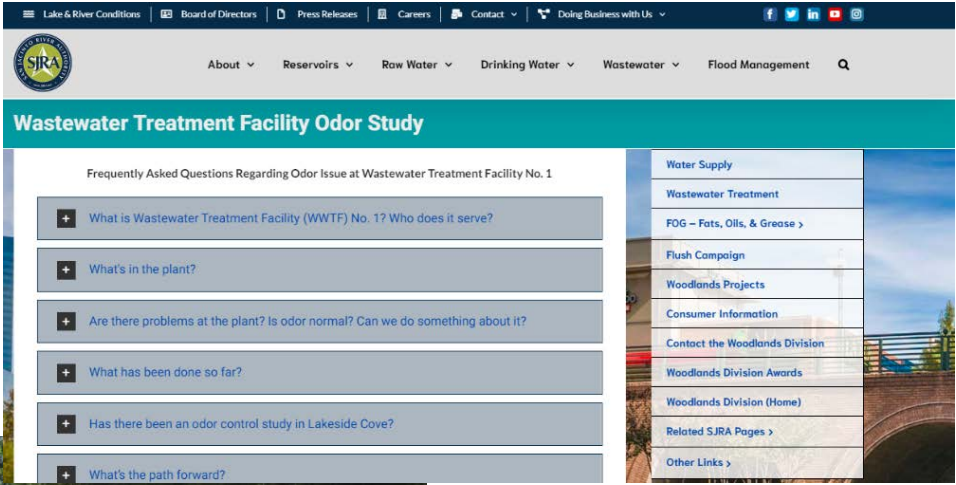
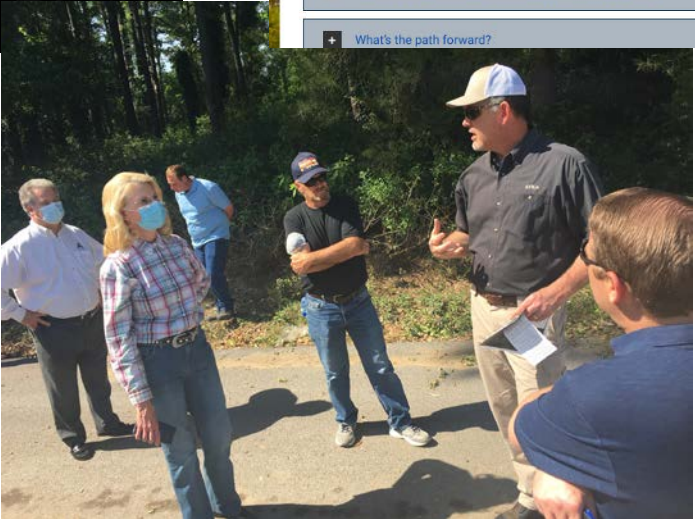
For additional information on the WWTF No. 1 Odor Study, please visit our website at www.sjra.net/wwtf1odorstudy or follow us on Twitter @SJRA or Facebook @SanJacintoRiverAuthority.

For more information on Woodlands Water Agency visit their website at <https://www.woodlandswater.org> like them @WoodlandsWater and follow them on Facebook @WoodlandsWater.

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THE WOODLANDS
TOWNSHIP



SJRA Wastewater Treatment Facility No. 1

Background:

- Completed in 1975
- WWTF No. 1 receives raw sewage from homes and businesses across seven Woodlands MUDs
- Average daily flow is approximately 3.5 million gallons per day



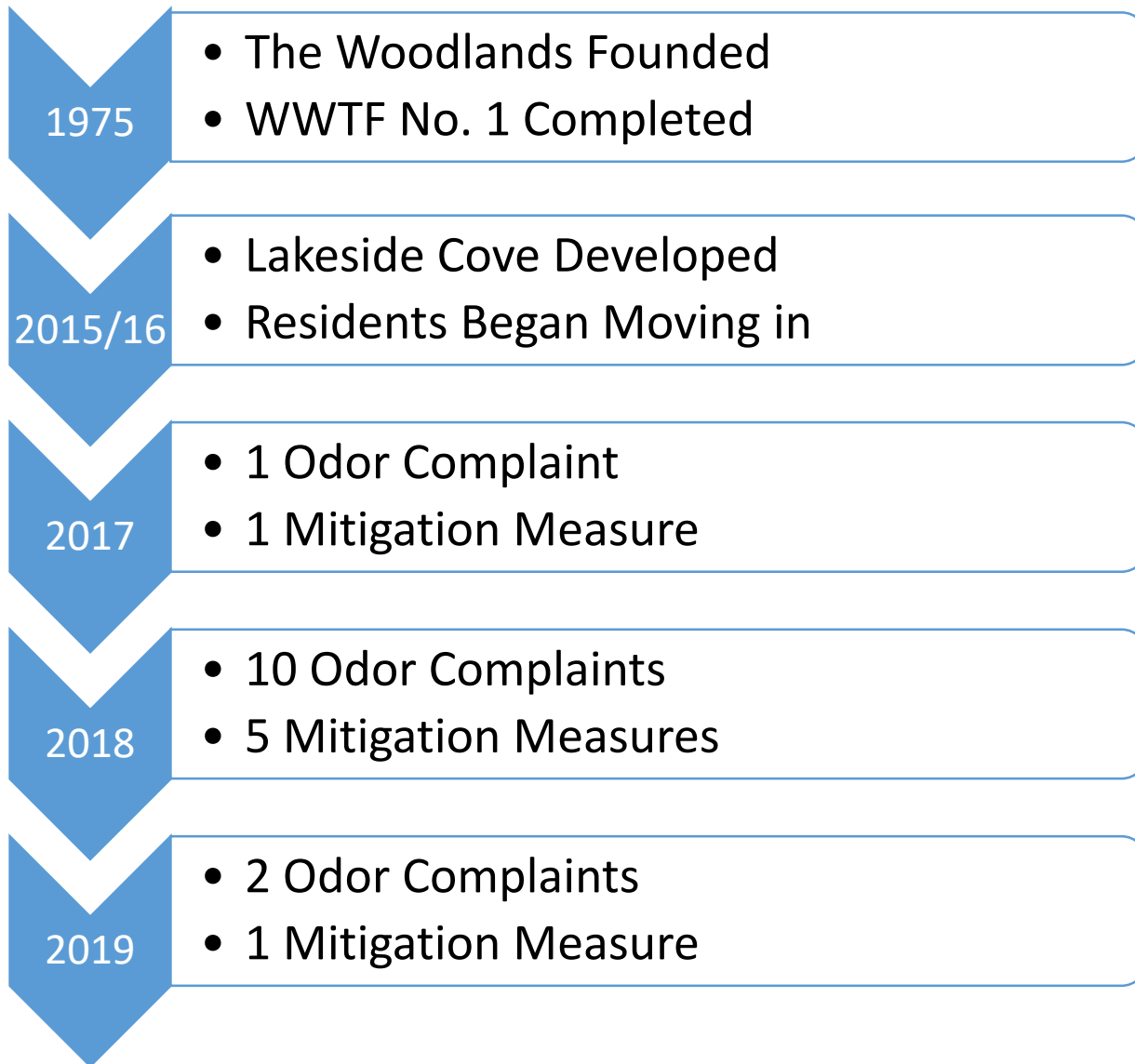
The Texas Commission on Environmental Quality (TCEQ) Requirements for Treatment Plant Odors

TCEQ has two (2) standards for treatment plant odors:

- **30 TAC 112.31** – Prohibits hydrogen sulfide on downwind residential, business, or commercial properties from exceeding a “...net ground level concentration of **0.08 parts per million averaged over any 30-minute period...**”
- **30 TAC 101.4** – Prohibits “...air contaminants or combinations thereof, in such concentration and of such duration as are or may tend to be injurious to or adversely affect human health or welfare, animal life, vegetation, or property, or as to interfere with the normal use and enjoyment of animal life, vegetation, or property.”

*For purposes of this evaluation, **7 parts per billion (ppb)** is adopted as the level at which a person having “normal” olfactory senses can detect H₂S. However, individual sensitivity determines the level at which one can detect a smell, and different researchers have suggested varying recognition thresholds for H₂S.*

Timeline of Events



Mitigation Measures

2018:

- High pressure and vacuum cleaned of sewage lines
- Inspected manholes and repaired as needed
- Installed inserts and solid, non-venting manhole lids
- Expanded chemical disinfection of open roll-off containers

2019:

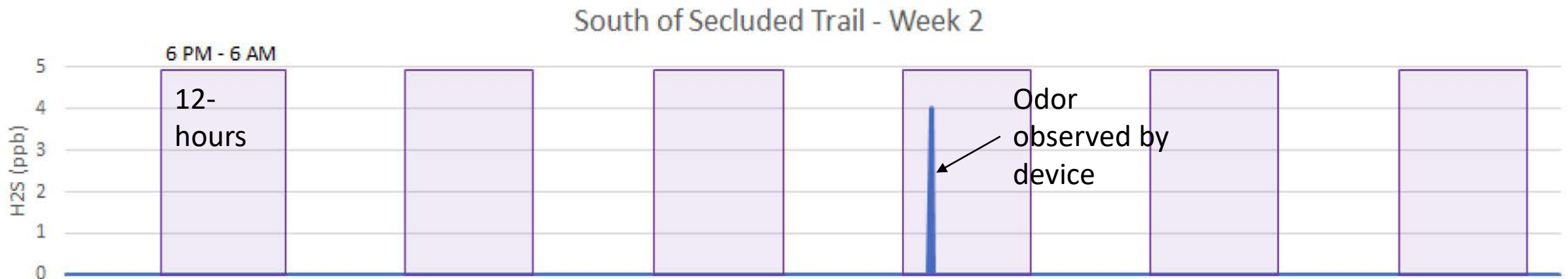
- Upgraded odor mitigation systems at the plant and installed additional units
- Changed processes in aerated basins
- Adjusted aeration control, monitoring, and alarming practices

2020:

- Initiated an odor study in February 2020

WWTF No. 1 Odor Study – Perkins Engineering

- Assist with Development of a Complaint Response Protocol
- Fence Line Monitoring -----→
- Projected Cost for Odor Abatement
- Odor monitors in plant and Lakeside Cove
- 30 days of 24/7 testing – March 2020
- Results confirm presence of H₂S but do not confirm any source of odor



Development of Odor Complaint Response Protocol

Key Components of SJRA's Odor Complaint Response Protocol

- Scheduled Weekly Monitoring
- Odor Complaint Response and Record

<u>Weather Conditions</u>	<u>Precipitation</u>	<u>Wind Direction (Blowing From)</u>	<u>Wind Speed</u>
<input type="checkbox"/> Mostly Sunny	<input type="checkbox"/> None	N	<input type="checkbox"/> Calm
<input type="checkbox"/> Partly Cloudy	<input type="checkbox"/> Fog	NW NE	<input type="checkbox"/> Light Breeze (1- 5 mph)
<input type="checkbox"/> Mostly Cloudy	<input type="checkbox"/> Rain	W ----- E	<input type="checkbox"/> Moderate Wind (5 – 15 mph)
<input type="checkbox"/> Overcast	<input type="checkbox"/> Sleet	SW SE	<input type="checkbox"/> Strong Winds (15 mph or higher)
<input type="checkbox"/> Hazy	<input type="checkbox"/> Snow	S	
Temperature: _____ F Relative Humidity: _____ % Barometric Pressure _____			
Notes: _____ _____ _____ _____ _____			
_____	_____	_____	_____
Date	Name	Signature	

Monitoring Scope

- Suggest locations for monitoring of H₂S within and adjacent to SJRA WWTF No. 1
- Monitoring Began on March 11
 - Total of 4 odor monitors deployed
 - Odor locations were monitored for 1 week
 - Duration of 4 weeks
- Review the H₂S data and identify the source of the odor and concentration



Acrulog® PPB Fence Line Monitors

Monitoring Locations

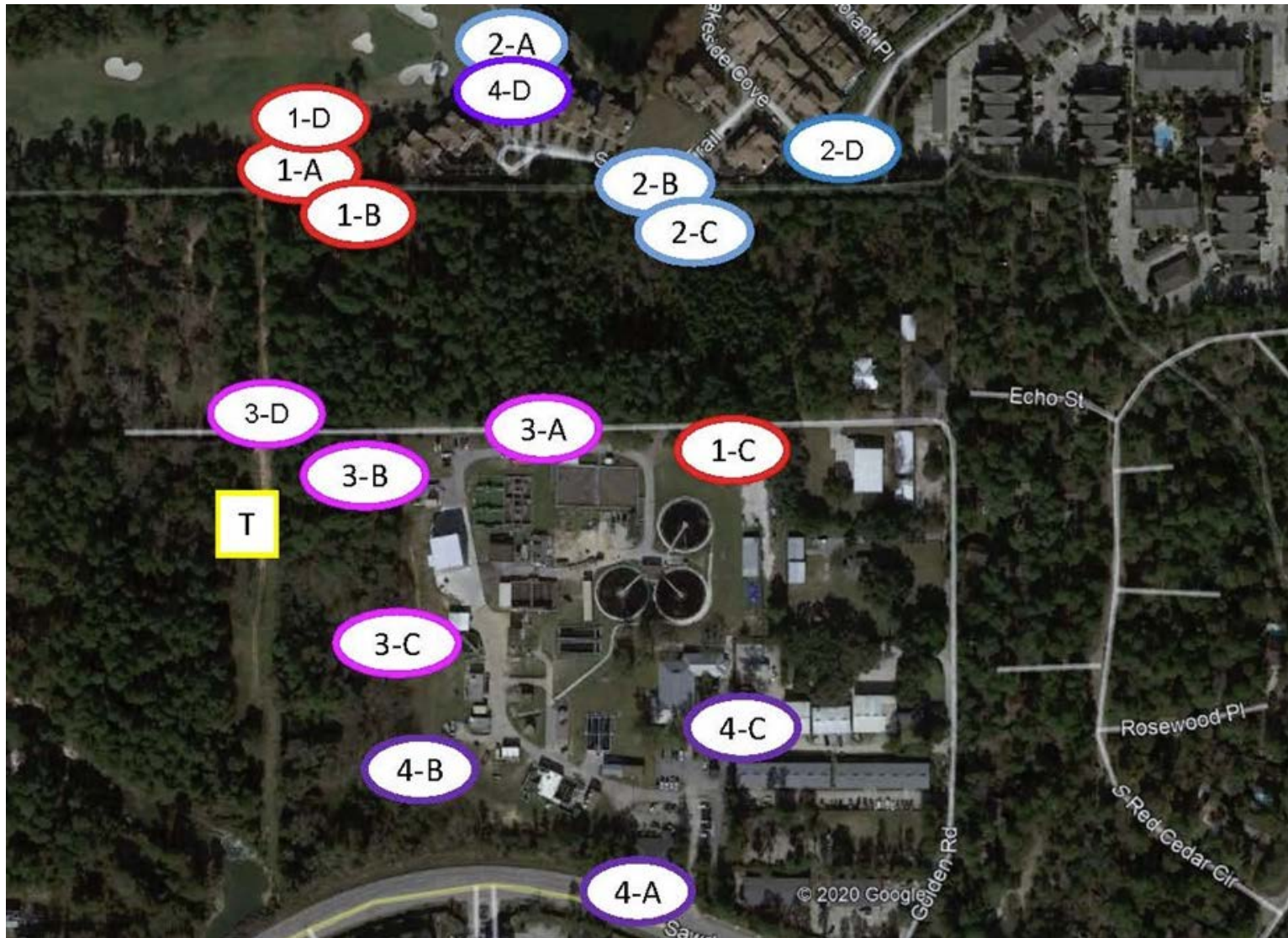


Table 1: Odor Monitor Locations to Corresponding Code

Code	Location
1-A	Southwest of Gas Valve
2-A	Water Well No. 3
3-A	North of Aeration Basin on Fence
4-A	Plant Entrance
1-B	Southwest of Gas Valve
2-B	South of Secluded Trail
3-B	North of Grit Structure by Fence
4-B	Southwest of Bar Screens by Fence
1-C	Northeast Area of WWTP
2-C	South of Secluded Trail
3-C	West Fence of Facility
4-C	Southeast Fence of Facility (near Administration Building)
1-D	North of Gas Valve
2-D	2 Black Cormorant
3-D	North of Tin Man
4-D	Water Well No. 3

Summary of Monitoring

- 15,528 discreet measurements taken
- No measured instances greater than the 80 ppb over a 30-minute average
- Registered concentrations high enough for a normal person to smell less than 1% of the sampling time.
- West fence of facility had the most consistent H2S measurements, 10.6% of the sampling time and none of these measurements were above 80 ppb (0.08ppm).

Table 3 Data Summary Log

Location	Date Start	Date End	Max H2S	Max 30-Minute Avg. H2S	Average H2S
"Tin Man"*	3/10	3/18	13 ppm	-	6.4 ppm
Southwest of Gas Valve*	3/11	3/17	21 ppb	15.3 ppb	0.4 ppb
North of Aeration Basins	3/11	3/17	17 ppb	7.3 ppb	0.13 ppb
Plant Entrance	3/11	3/17	6 ppb	2 ppb	0.01 ppb
Water Well No. 3*	3/11	3/17	7 ppb	5.3 ppb	0.03 ppb
Southwest of Gas Valve*	3/17	3/25	57 ppb	24 ppb	0.67 ppb
North of Grit Structure	3/17	3/25	63 ppb	30 ppb	0.23 ppb
South of Secluded Trail*	3/17	3/25	9 ppb	4.3 ppb	0.02 ppb
Southwest of Bar Screen	3/17	3/25	22 ppb	18.7 ppb	0.12 ppb
Northeast of WWTP	3/25	3/31	4 ppb	1.33 ppb	0.01 ppb
South of Secluded Trail*	3/25	3/31	4 ppb	1.33 ppb	0.005 ppb
Southeast Fence of Facility	3/25	3/31	0 ppb	0 ppb	0 ppb
West Fence of Facility	3/25	3/31	38 ppb	23.67 ppb	1.19 ppb
2 Black Cormorant*	3/31	4/7	0 ppb	0 ppb	0 ppb
North of Gas Valve*	3/31	4/7	5 ppb	2.67 ppb	0.01 ppb
North of Tin Man*	3/31	4/7	19 ppb	12.33 ppb	0.09 ppb
Water Well No. 3*	3/31	4/7	0 ppb	0 ppb	0 ppb

Highlighted locations are near the complaint area.

*Beyond the fence line

Alternatives Analyzed for Odor Abatement

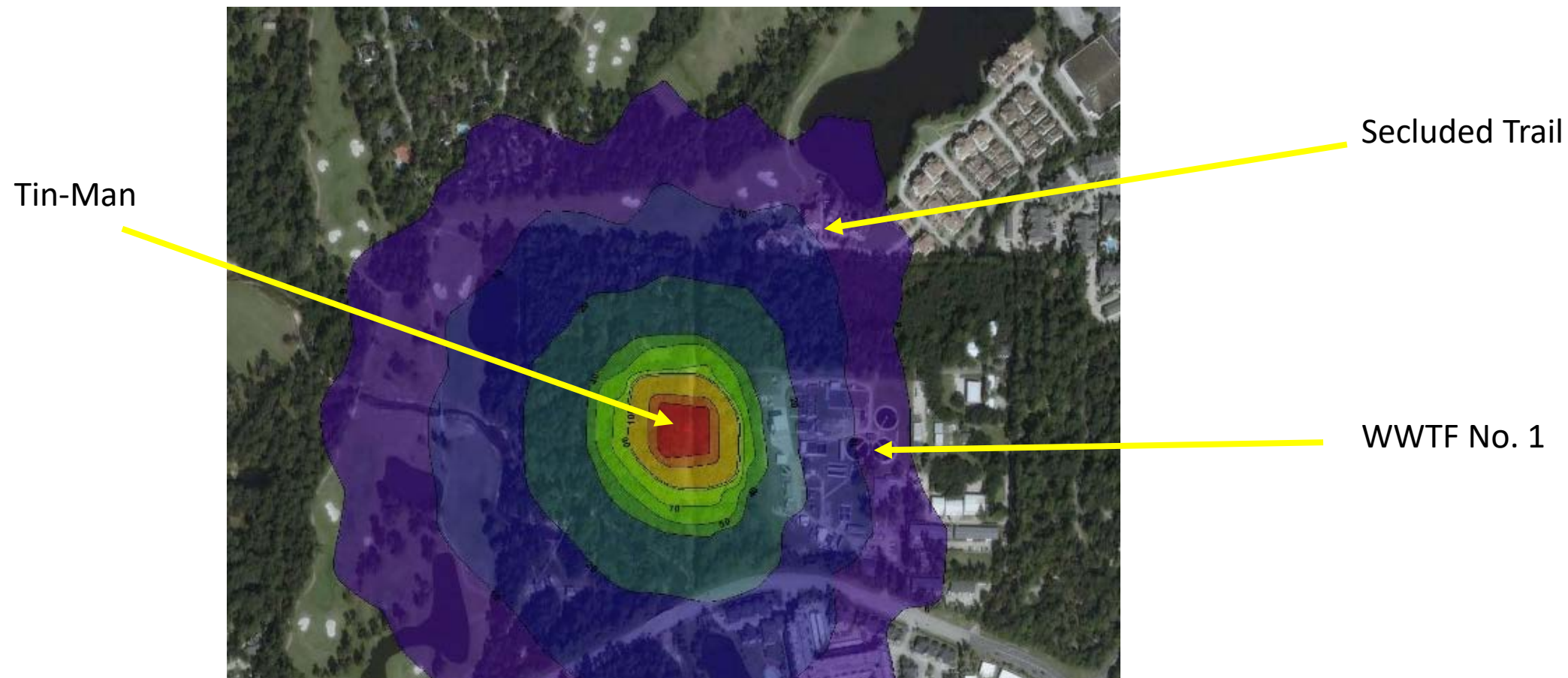


The “Tin Man”, located west of the plant, is where incoming sewer air is exhausted to maintain vacuum conditions in the upstream collection system

Two alternatives were analyzed

1. Installation of an elevated stack to improve dispersion
2. Installation of a carbon absorber to treat the discharged air and reduce the concentration of hydrogen sulfide (H_2S) and other odorants therein

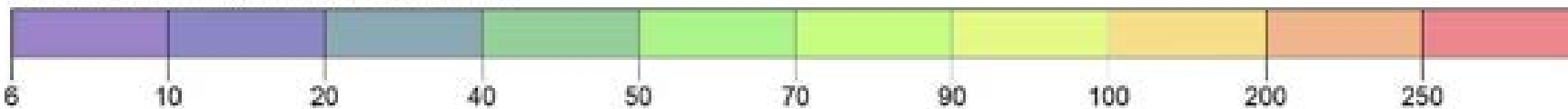
Current Conditions – Tin-Man Only



PLOT FILE OF HIGH 1ST HIGH 5.0-MIN VALUES FOR SOURCE GROUP: ALL

PPB

Max: 28 [PPB] at (261275.84, 3336414.97)



Option #1 - Elevated Discharge Stack

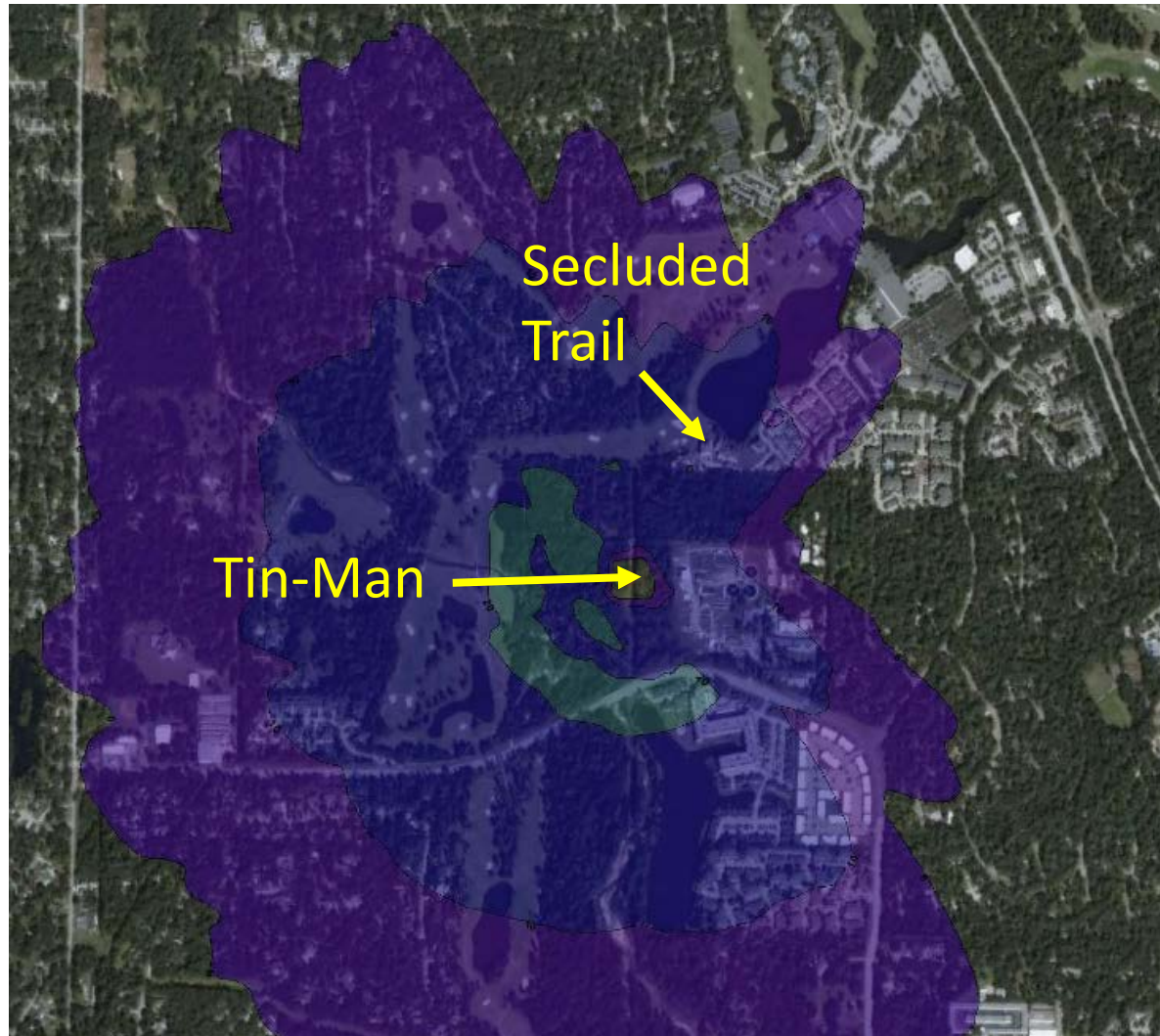


Table 2: Opinion of Probable Construction Cost – FRP Stack

Description	OPCC
Earthwork, Concrete Slab, etc.	\$20,000
FRP Fan, Ductwork, and Stack	\$100,000
Fencing, Misc.	\$19,000
Tree Allowance, Restoration	\$50,000
Electrical and Instrumentation	\$40,000
SUBTOTAL	\$229,000
Mobilization, Demob., Bonds, Insurance @ 5%	\$12,000
Contractor's Overhead and Profit @ 15%	\$37,000
Contingency @ 30%	\$84,000
TOTAL CAPITAL CONSTRUCTION COST	\$370,000

Does not include Engineering and Permitting.

Option #2 - Carbon Absorption



Table 3: Opinion of Probable Construction Cost – Carbon Adsorption

Description	OPCC
Earthwork, Concrete Slab, etc.	\$29,000
6,600 cfm Adsorber, Fan, Ductwork, Installation	\$182,000
Condensate Handling, Fencing, Misc.	\$20,000
Tree Allowance, Restoration	\$50,000
Electrical and Instrumentation	\$40,000
SUBTOTAL	\$321,000
Mobilization, Demob., Bonds, Insurance @ 5%	\$17,000
Contractor's Overhead and Profit @ 15%	\$51,000
Contingency @ 30%	\$117,000
TOTAL CAPITAL CONSTRUCTION COST	\$510,000

Does not include Engineering and Permitting.

Possible Temporary Items

- Bar screen
 - Building and filter
 - \$400,000
 - ~3 months after approval and Purchase Order
- Grit Structure
 - Building and filter
 - \$300,000
 - ~3 months after approval and Purchase Order
- Splitter box
 - Plywood covering
 - \$500
 - Already done

*All items have to
be reviewed and
approved by
Woodlands Water
Trustees*



Another Item to Consider



- Land Acquisition
 - Screening / Limits Future Development
 - Greater than \$1,000,000
 - 12 – 18 months, maybe longer



Next Steps



Woodlands Water Trustees Ad Hoc Committee

- Visit the sites to observe odors
- Tour WWTF No. 1
- Review/discuss what has been done to date
- Review/discuss near-term and long-term measures with SJRA
- Visit the sites with Ad Hoc Committee to observe odors
- Present/discuss what has been done to date
- Present/discuss near-term and long-term measures to Trustee Ad Hoc Committee

Final Reports / Documents uploaded to SJRA website:

<https://www.sjra.net/woodlands/construction/wastewater-treatment-facility-odor-study>



Questions?