Town of Johnstown

TOWN COUNCIL WORK SESSION

450 S. Parish, Johnstown, CO
Monday, August 29, 2022 at 7:00 PM

MISSION STATEMENT: Enhancing the quality of life of our residents, businesses, and visitors through community focused leadership.

AGENDA

CALL TO ORDER

AGENDA ITEMS

1. Water Treatment Plant Project - Update

ADJOURN

AMERICANS WITH DISABILITIES ACT NOTICE

In accordance with the Americans with Disabilities Act, persons who need accommodation in order to attend or participate in this meeting should contact Town Hall at (970) 587-4664 within 48 hours prior to the meeting in order to request such assistance.

TOWN COUNCIL WORKSESSION COMMUNICATION

AGENDA DATE: August 29, 2022

SUBJECT: Water Treatment Plant Design and Construction Project

ATTACHMENTS: 1. Water Treatment Plant Project Update Presentation

PRESENTED BY: Matt LeCerf, Town Manager

WORKSESSION ITEM DESCRIPTION:

As directed by the Town Council, Town Staff has been working in coordination with Burns and McDonnell, the Town's Contract and Design Engineer, for design services related to a new Water Treatment Plant (WTP). The design is expected to culminate with the construction of a new WTP with a 12.5 million gallon per day capacity. Also assisting these efforts is BlueWater Engineering, Ltd. who is acting as the Town's Owner Representative (OR) for this project.

One of the more critical items that was expressed by the Town Council specifically on this project has been the desire to address historical taste and odor issues in the water. Taste and odor issues are the result of an increased level of geosmin and MiB in the water. These elements may commonly just be referred to as algae blooms. Ultimately, increased levels impact the taste and odor of the water and historical have resulted in complaints received by residents based on water quality. This was a primary concern of the Town Council to be addressed and mitigated in construction of a new water treatment plant. The other issue necessitating the need for a new WTP has been the demand on the water system. This situation relates to the Town's current demand, which is currently at or near capacity based on the seasonal variances that occur; especially during summer irrigation season. In order to meet this current demand and the future demand, an increase in the WTP capacity is necessary to meet these demands but it will also facilitate future demands as well.

Town staff has requested the assistance of Burns and McDonnell to provide a presentation that assesses and provides clarity on the selection process. Three options are being presented tonight in terms of treatment processes:

- An Ozone Bio-Activated Filtration (BAF) System.

- A Granular Activated Carbon (GAC) Filtration System with planned ozone installation in the future; or
- A Membrane Filtration and GAC Contactors.

The additional reasoning in the presentation is due to the fluctuations in costs, additional learned information regarding technology processes and their reliability, and to keep the Council apprised of the process in this project. While staff does have a recommendation on the treatment process, we also feel that is in imperative to gain feedback and support from Town Council as we continue to progress forward in this design. Staff looks forward to a productive dialogue following the presentation by Burns and McDonnell.

Reviewed and Approved for Presentation,

Town Manager

BURNS McDONNELL

WTP Expansion Project Update

Town of Johnstown

August 29, 2022

Drivers for WTP Expansion

INCREASING DEMAND

TASTE & ODOR

AGING INFRASTRUCTURE

CONSTRAINTS = SCHEDULE + BUDGET

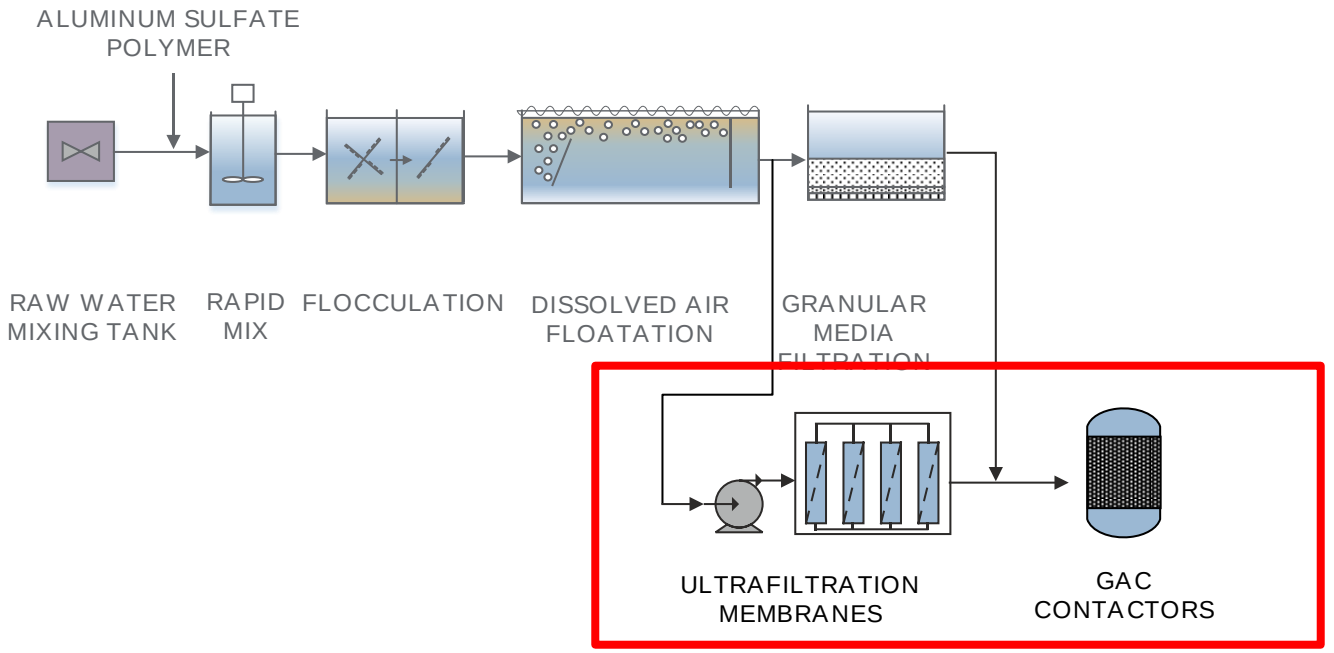
WTP Phasing

Current Capacity	Phase I	Phase II
• 6 mgd • 18,700 population	• 12 mgd • 21,000 population • Online 2025	• 21 mgd • 50,000 design population • Online TBD

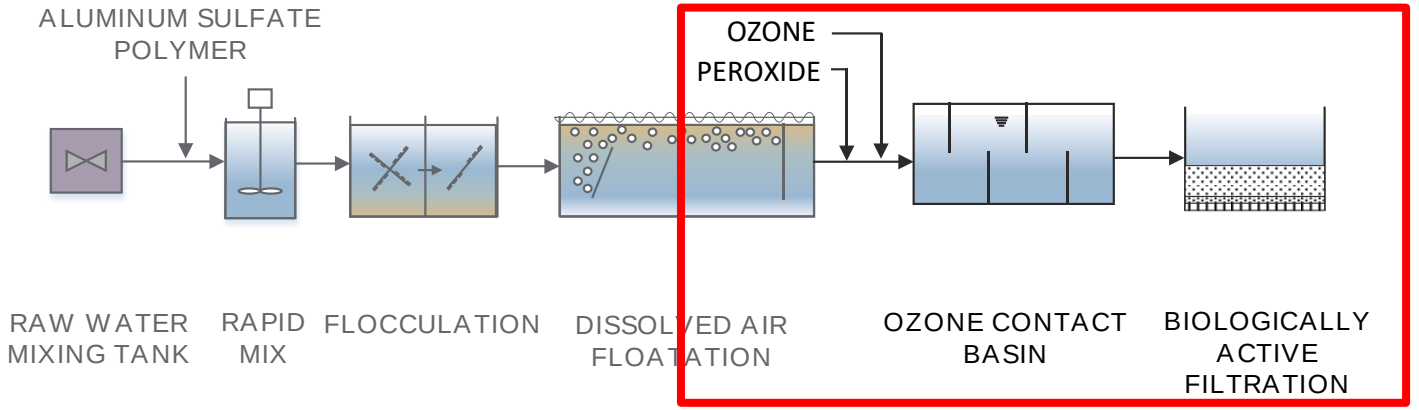
April 2021
Working Session

Taste & Odor Removal Trains (April 2021)

1. Membranes + GAC



2. Ozone + BAF



Estimated Construction Cost (April 2021)

Item	Membrane / GAC	Ozone / BAF
Construction Cost	$16M to $28M	$36M to $48M
Contingency 20%	$4M to $7M	$9M to $12M
Total	**$20M to $35M**	**$45M to $60M**

Current Status (August 2022)

- **Expanded Scope**
  - Residuals handling at WTP, not sanitary sewer
  - Expand onto southern site
  - Avoid existing infrastructure
  - Finished water volumes
  - Changed configuration
- **Escalation**
  - Inflation
  - High demand for materials
  - Supply chain impacts
  - Craft labor shortage

Current Status

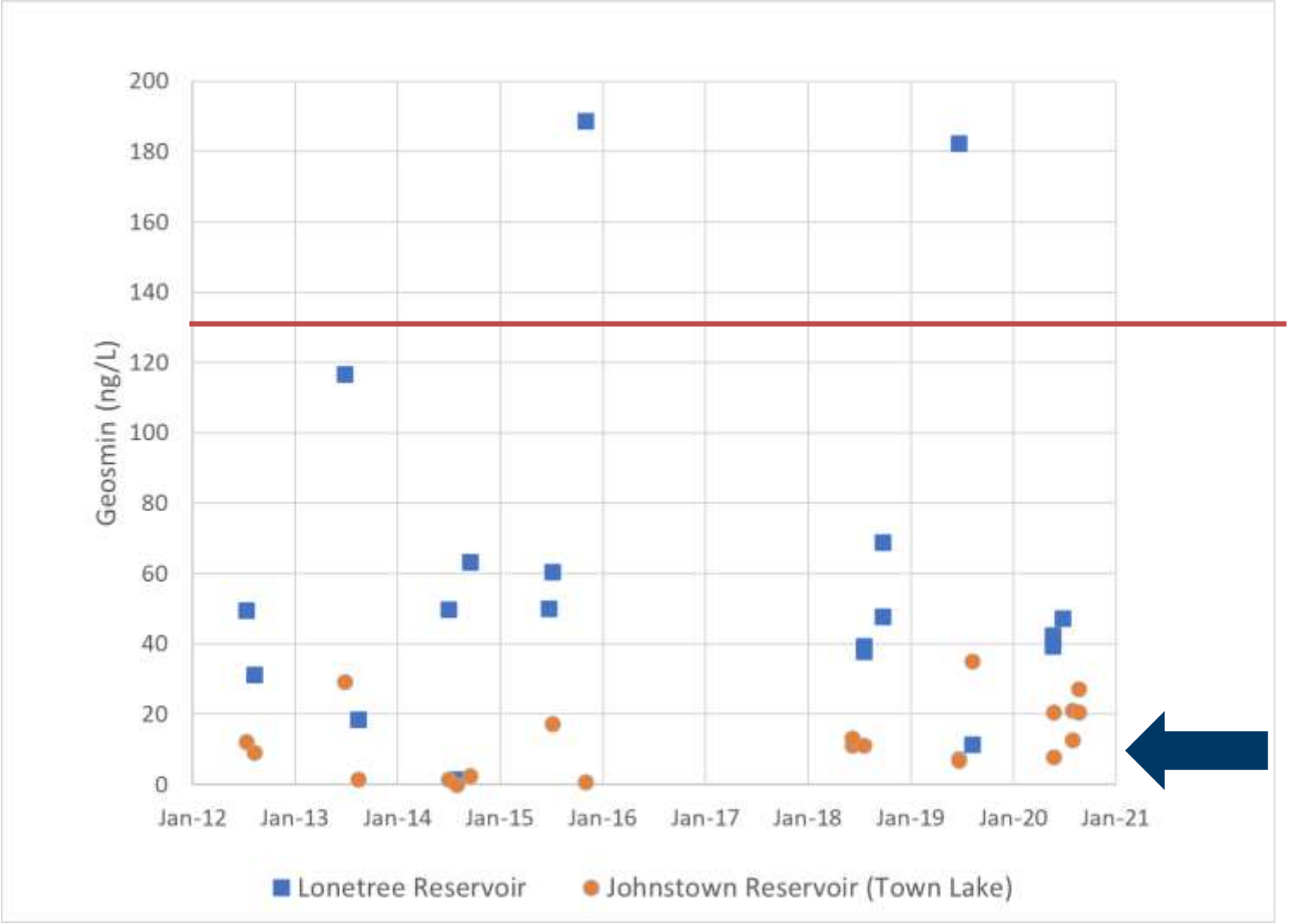
Proceed as Ozone & Biologically Active Filtration (BAF)

- September 2021 – Start of Design
- March 2022 – Basis of Design (15% Complete)
- Piloting
  - Spring 2022 – Pretreatment
  - Summer 2022 – Ozone & Biological Filtration
- May 2022 – Preliminary Design (30%)

Variable Water Quality

Exceeding Available Funds

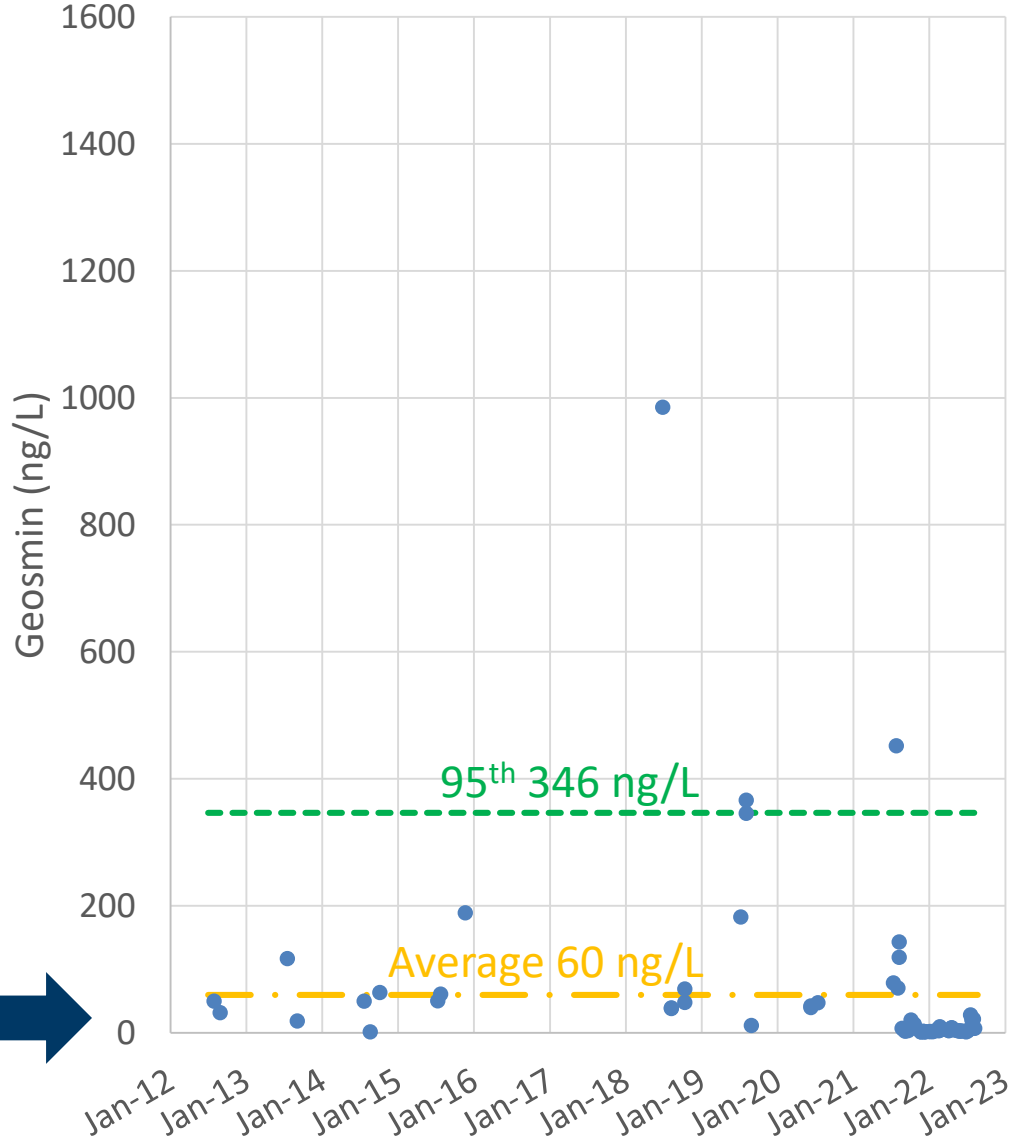
Historic Geosmin Concentrations (January 2021)



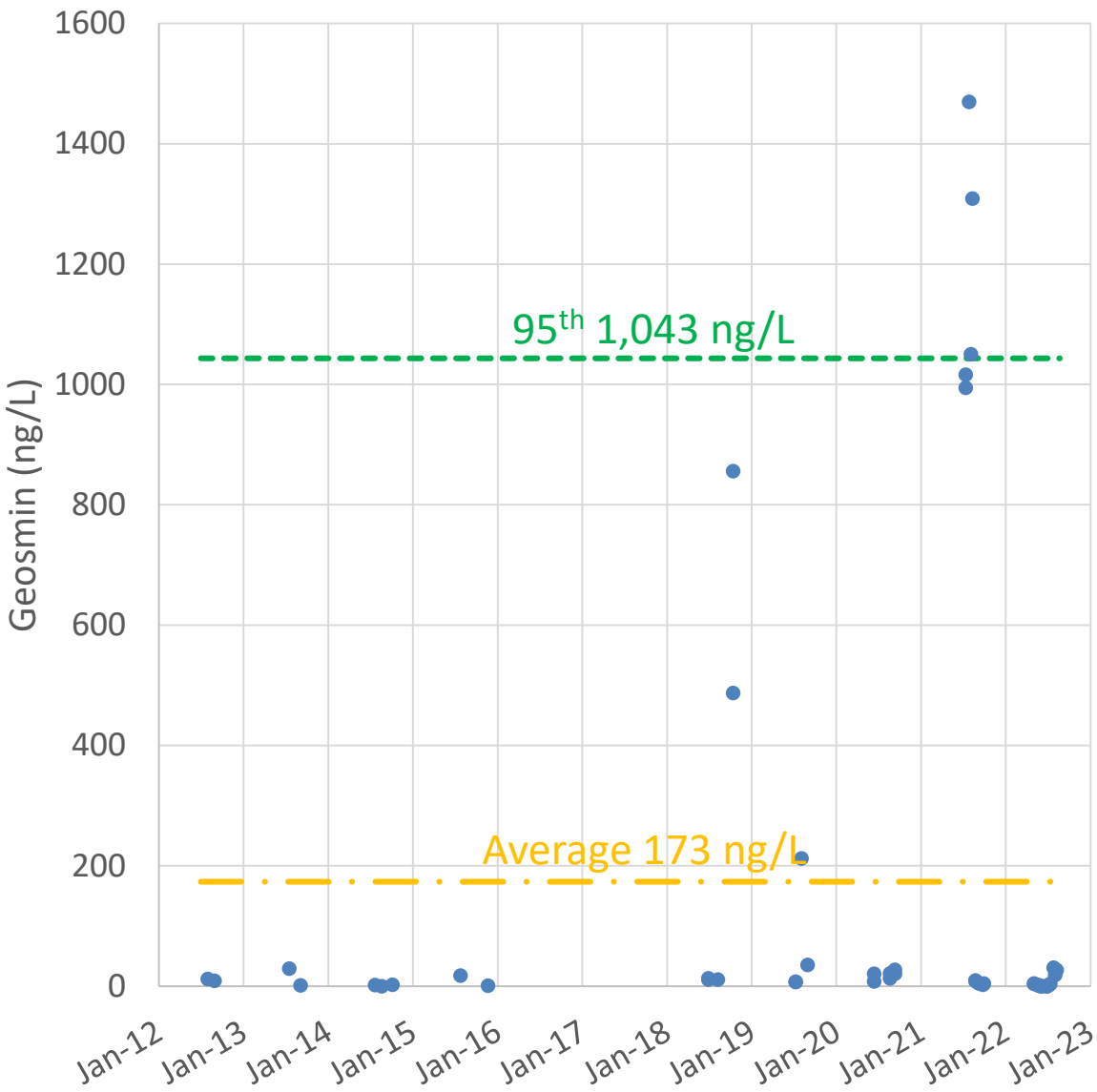
Average 129 ng/L

Goal: 6 to 10 ng/L
70 to 95% Removals

Lonetree Reservoir



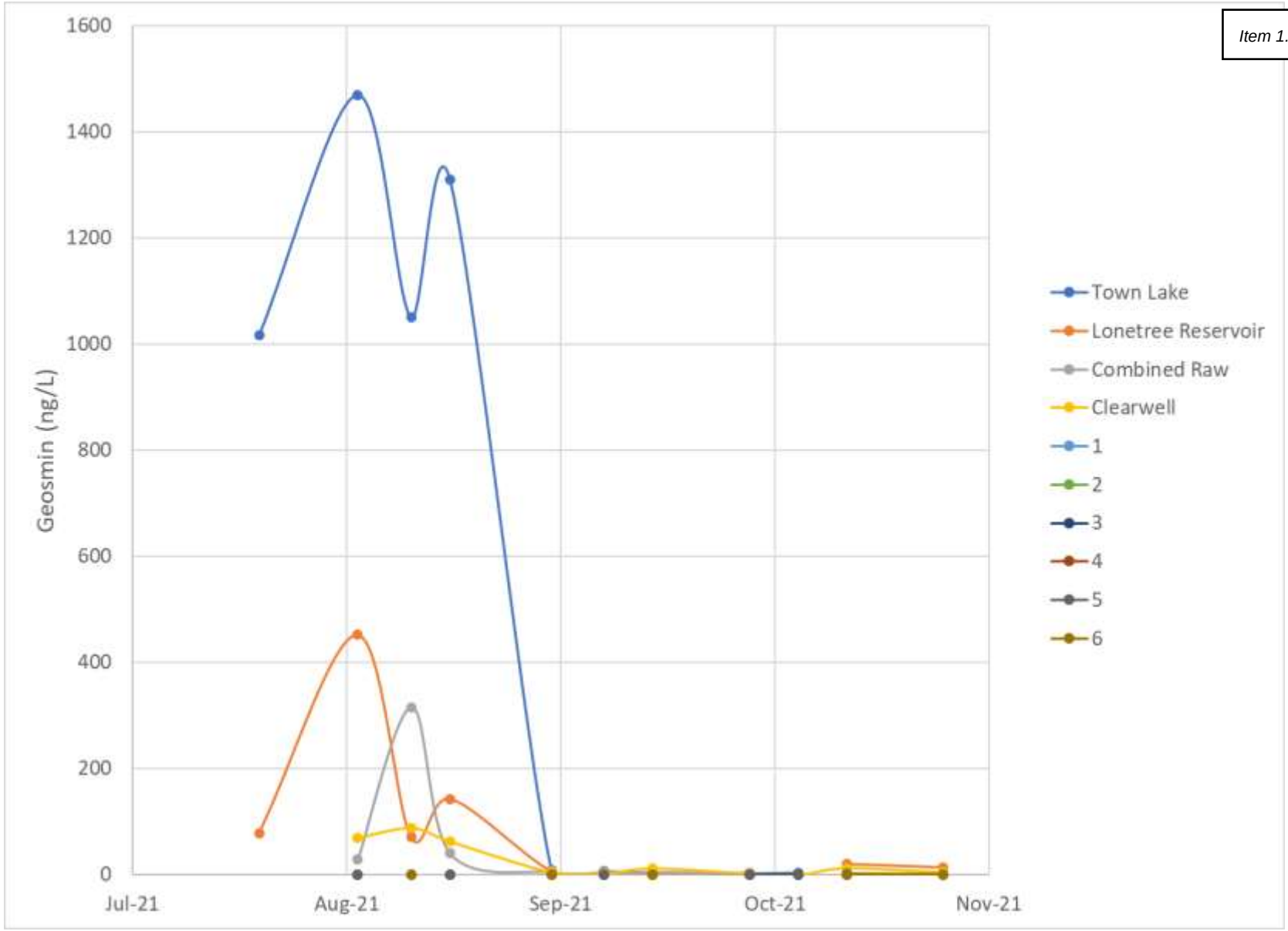
Town Lake



Goal: 6 to 10 ng/L

Geosmin Trends 2021

- Combination of Treatment & ***Source Water Management***



Multi-Barrier Approach to Taste & Odor

January 2021 Taste & Odor Study

Short Term (2021)

Source Water Management

- Blending Ratio
- Ultrasonic Algae Control
- Bypass Pumping from Home Supply Ditch
- Use Existing Interconnections

Powdered Activated Carbon

- Consider PAC use at Lone Tree during high events

Pretreatment

- Optimize DAF Removals

Granular Activated Carbon

- System installed 2021
- Permanent System as part of Expansion

Ozone

- Liquid Oxygen and Reactor
- Retrofit Existing Clarifiers

Biologically Active Filtration

- Add Nutrients to Create Biofilm
- Add Associated Chemical Systems
- Retrofit Existing Filters, Not Suitable for Membranes

Long Term – Achieve > 90% Removal

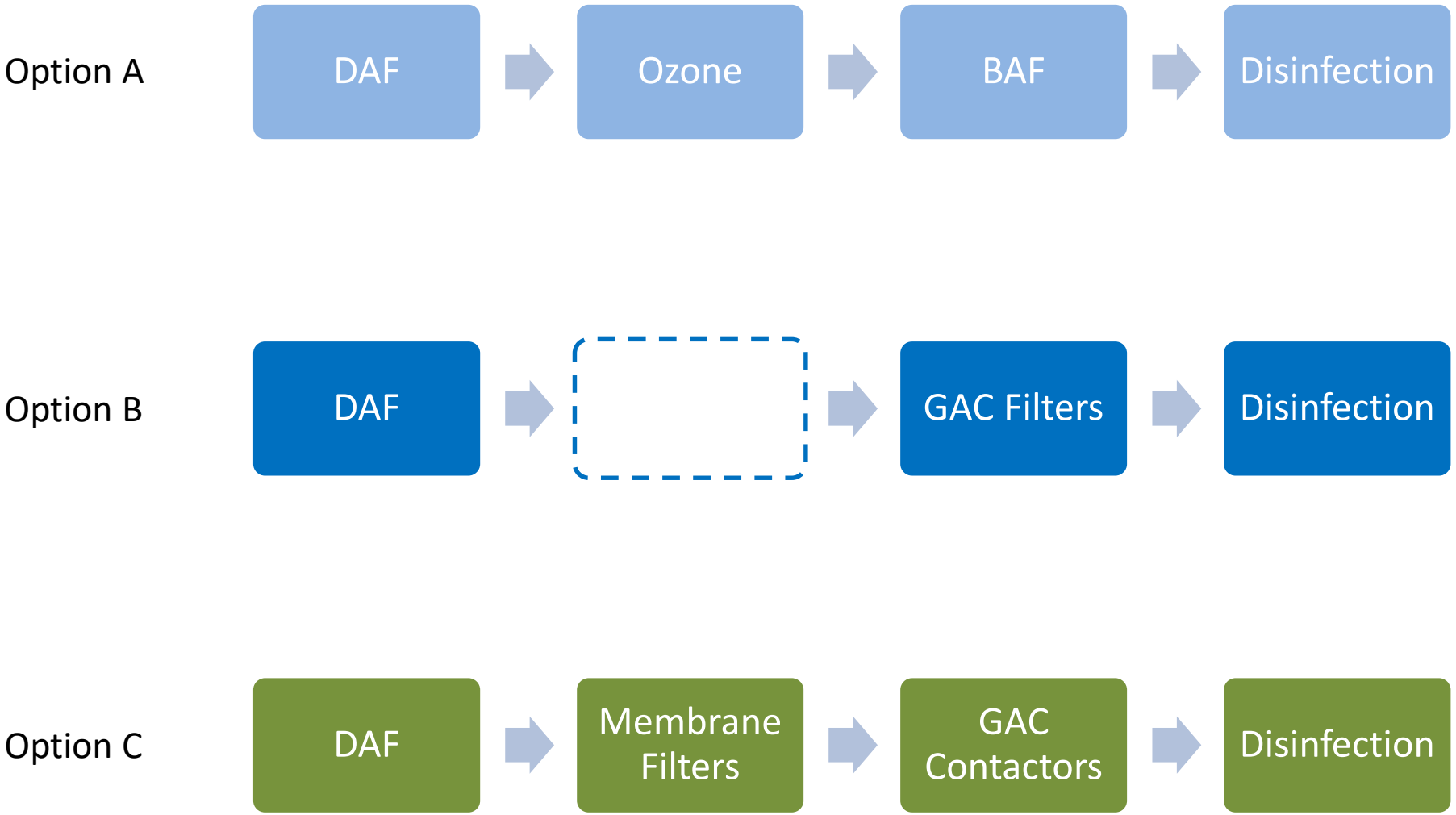
Mission Critical – Taste & Odor Performance

- Evaluate Risk at Elevated Geosmin Levels
  - Ability of system to treat all scenarios
- Manage escalating costs

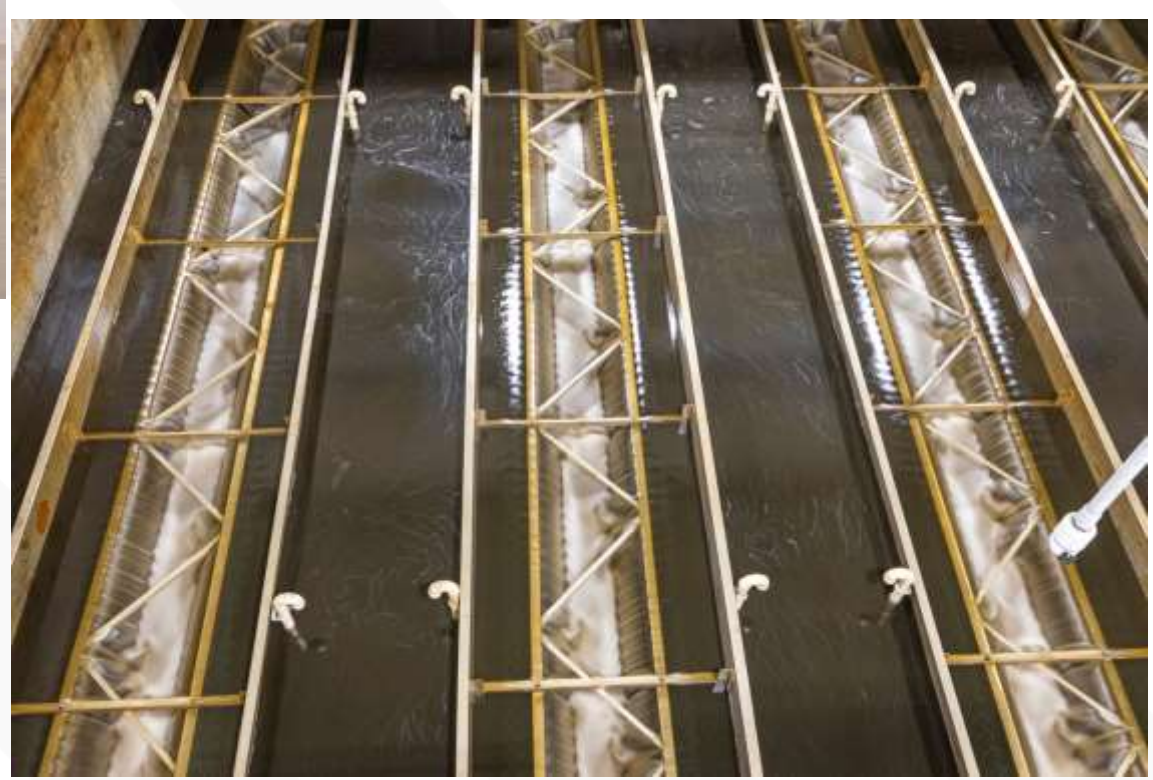
Option A
Ozone & BAF

Option B
GAC Filters

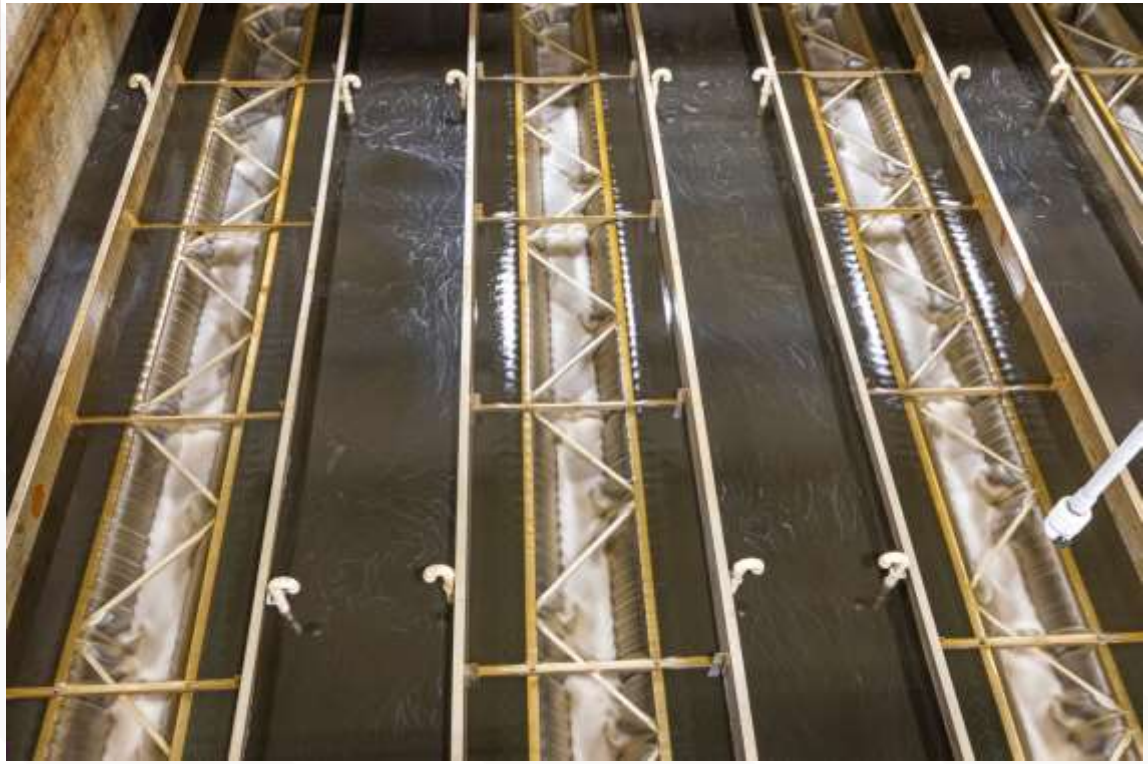
Option C
Membrane Filtration & GAC Contactors


Option A
DAF
Ozone
BAF
Disinfection
Option B
DAF
GAC Filters
Disinfection
Option C
DAF
Membrane Filters
GAC Contactors
Disinfection

Option A – Ozone & BAF



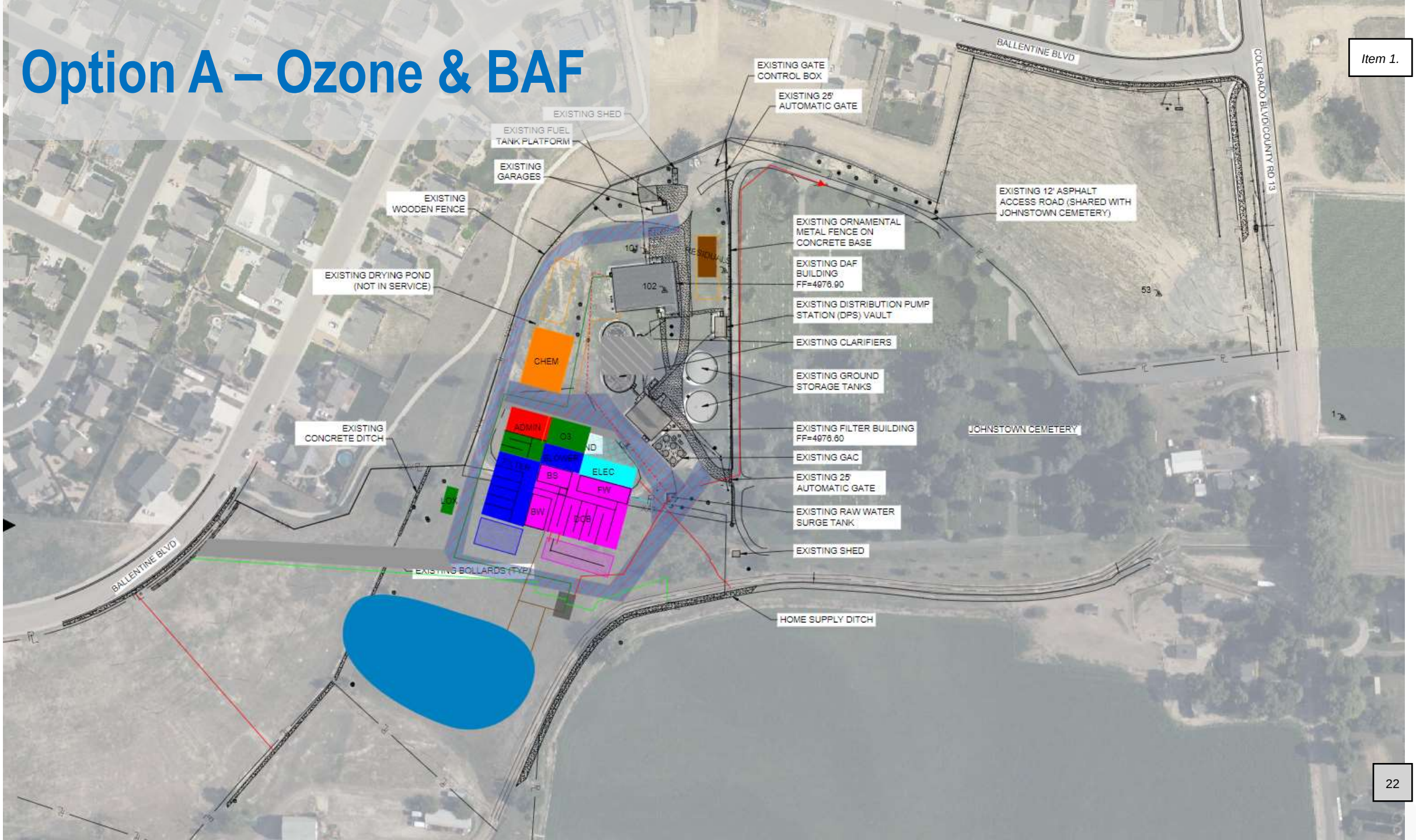
Option B – GAC Filters



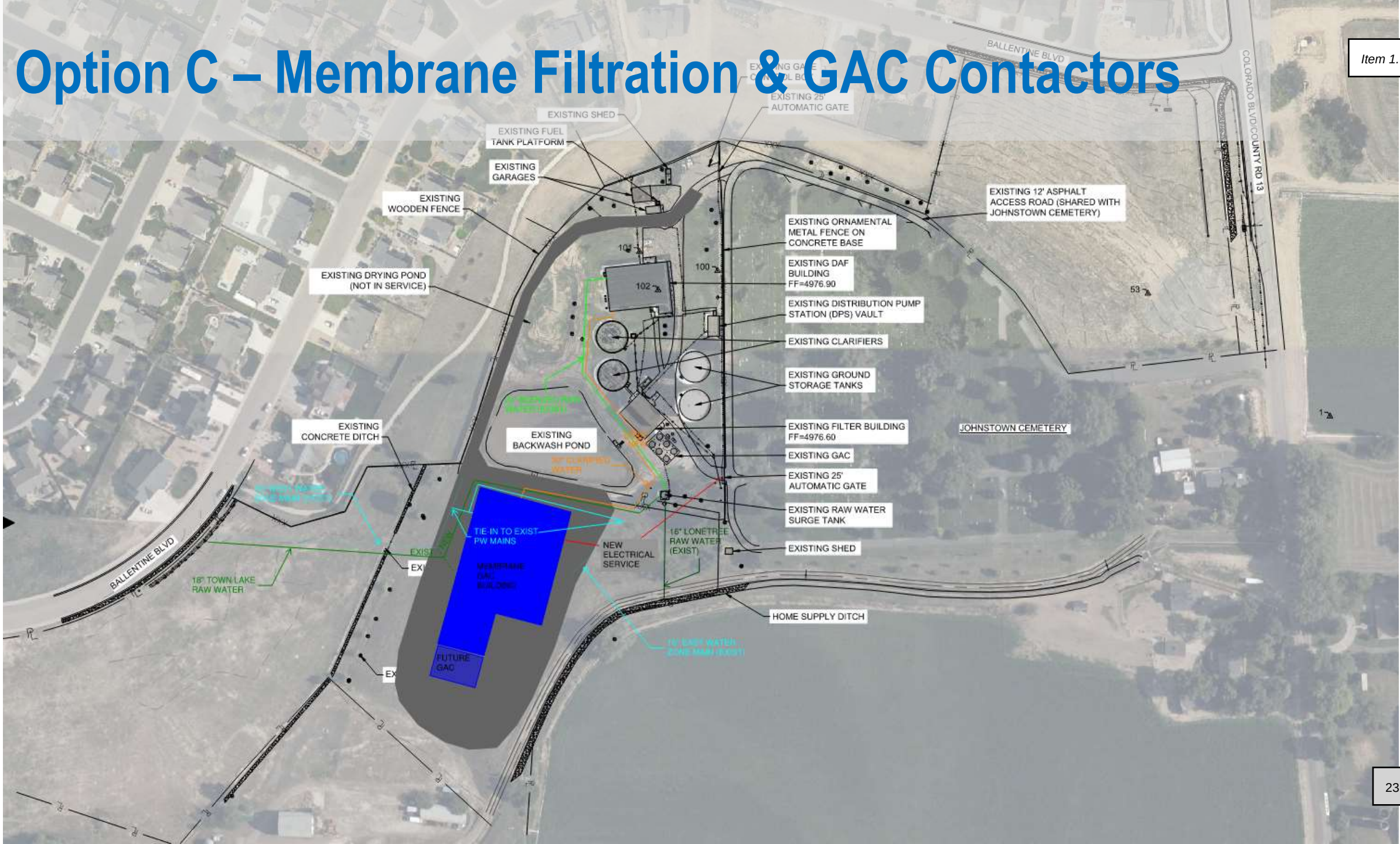
Option C – Membrane Filtration & GAC Contactors

30% Design – Ozone & BAF

Option A – Ozone & BAF



Option C – Membrane Filtration & GAC Contactors



Ranking (Non-Cost)

WEIGHT SCORED No. 1 (Non-Weighted)						
Option *	Taste & Odor Performance	Finished Water Quality	Scalability	Complexity	Reliability	Total
Option A: Ozone BAF	3.6	3.8	3.3	2.9	3.7	17.2
Option B: GAC Filters	3.8	3.6	3.0	3.9	3.5	17.7
Option C: Membranes GAC Contactors	4.6	4.7	4.9	4.0	4.4	22.6

** Assessed at high-risk water quality*

Option C: Membranes

Ranking (Weighted)

WEIGHT SCORED No. 2 (Non-Cost)						
Option	Taste & Odor Performance	Finished Water Quality	Scalability	Complexity	Reliability	Total
Option A: Ozone BAF	10.7	11.4	3.3	2.9	7.4	35.6
Option B: GAC Filters	11.3	10.7	3.0	3.9	7.0	35.8
Option C: Membranes GAC Contactors	13.9	14.1	4.9	4.0	8.8	45.6

Ranking (Cost-Weighted)

WEIGHT SCORED No. 3 (Cost)								
Option	Taste & Odor Performance	Finished Water Quality	Scalability	Complexity	Reliability	Construction Cost	Operating Cost	Total
Option A: Ozone BAF	7	7	0	0	0	11	13	38
Option B: GAC Filters	7	7	0	0	0	19	8	40
Option C: Membranes GAC Contactors	9	9	0	0	0	11	5	34

High Score	Option B: GAC

Ranking Summary

	Option A	Option B	Option C
Scenario*	Ozone BAF	GAC Filters	Membranes & GAC Contactors
Non-Weighted	3	2	1
T&O	3	2	1
Cost	2	1	3

** Assessed at high-risk water quality*

Cost Models

- Opinion of Probable Construction Cost
  - Phase I – Costs in 2022 for new WTP online in 2025
  - Phase II – Costs in 2031 for expanded WTP online in 2033
- 20-Year Net Present Value
  - Operation and maintenance
    - Electricity
    - Chemicals
    - Labor
    - Replacements – GAC media, membrane modules
  - Escalation at 3.5% to match CPI
    - Higher escalation assumed for GAC at 4.5%
- Options based on partially complete design.
- Accuracy varies by option, -30 to +50%

Cost Summary

Option	Option A	Option B	Option C
	Ozone & Biofilters	GAC Filters (Future Ozone)	Membranes & GAC Contactors
Phase I Capital Cost (2022)	$76,800,000	$67,700,000	$77,100,000
Phase II Capital Cost (2031)	$58,300,000	$67,400,000	$46,800,000
20-Year O&M	$33,900,000	$46,300,000	$61,300,000
20-Year Net Present Value	**$169,000,000**	**$181,400,000**	**$185,200,000**

Project Goals

INCREASING DEMAND

TASTE & ODOR

MEET AVAILABLE BUDGET

REQUESTING COUNCIL INPUT