



**Madison
Water Utility**

Well 15 PFAS Treatment Project

**Public Information
Meeting #2 September
8, 2022**



Joe Grande, Project Manager – Water Utility
Angel Gebeau, Project Engineer – AECOM
Krishna Kumar, General Manager – Water Utility

Agenda

01

Project Background

02

Alternatives Evaluated

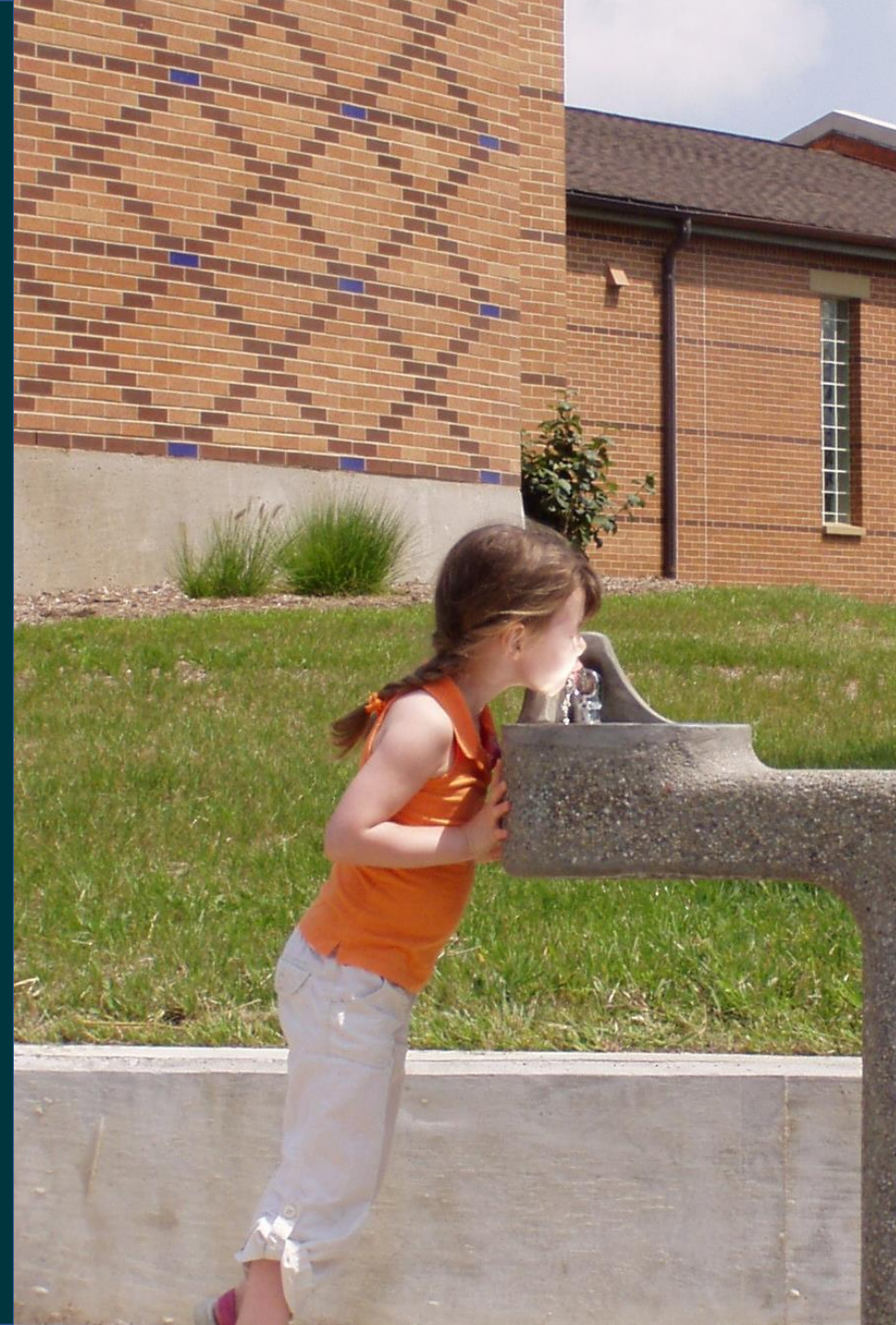
03

Schedule & Next Steps



Madison
Water Utility

AECOM



01
**Project
Background**

Project Objectives



Madison
Water Utility

AECOM



- Meet neighborhood and customer needs
- Cost effective treatment
PFAS & VOC Removal
- Restore pumping capacity up to 1,400 gallons per minute
- Construct within existing building/site footprint

The background image shows an industrial water treatment facility. In the foreground, there is a large metal structure with a grid of windows or panels. In the background, several large, cylindrical storage tanks are visible, with the brand name 'CalgonCarbon' printed on them. A network of red and grey pipes connects the tanks. The ground is paved with a grid pattern. A dark teal diagonal line runs across the right side of the image.

VOC Removal Options

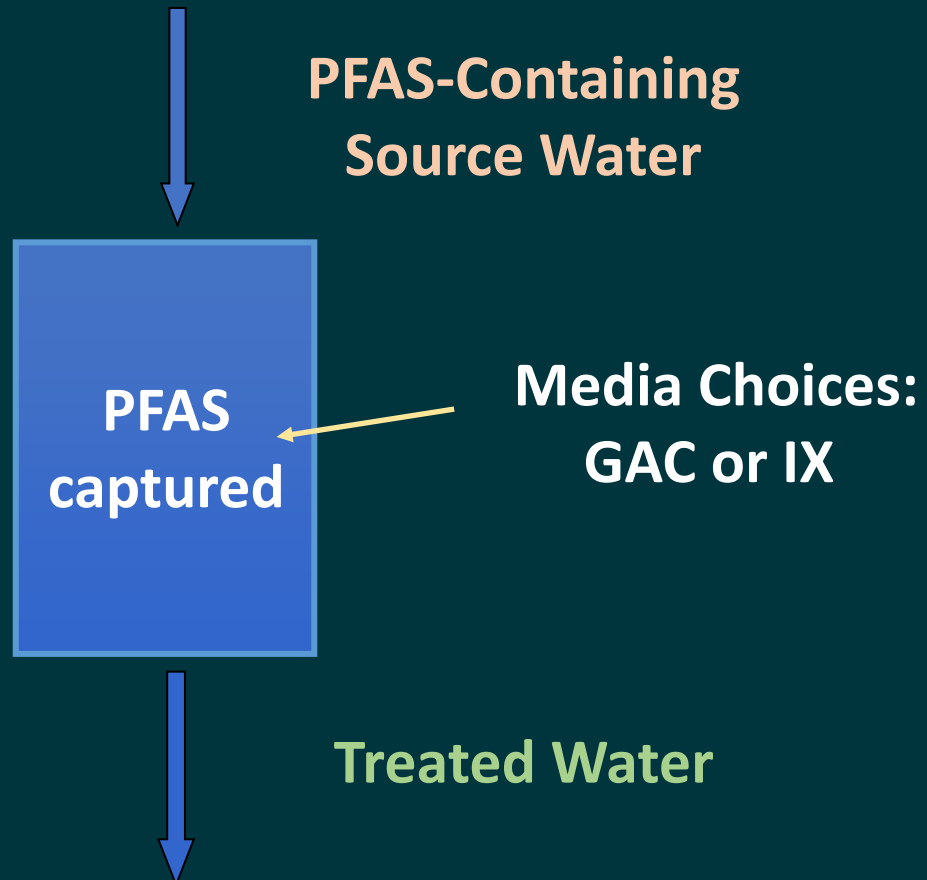
- Air Stripper (Existing)
- Granular Activated Carbon (GAC) media

PFAS Removal Options

- **GAC media** – Better at long chain PFAS removal
- **Ion Exchange (IX) media** – Better at short chain PFAS removal
- **Other technologies**
 - **Membranes (filtration)** – Excessive waste
 - **Other emerging technologies** – Not suitable for drinking water currently

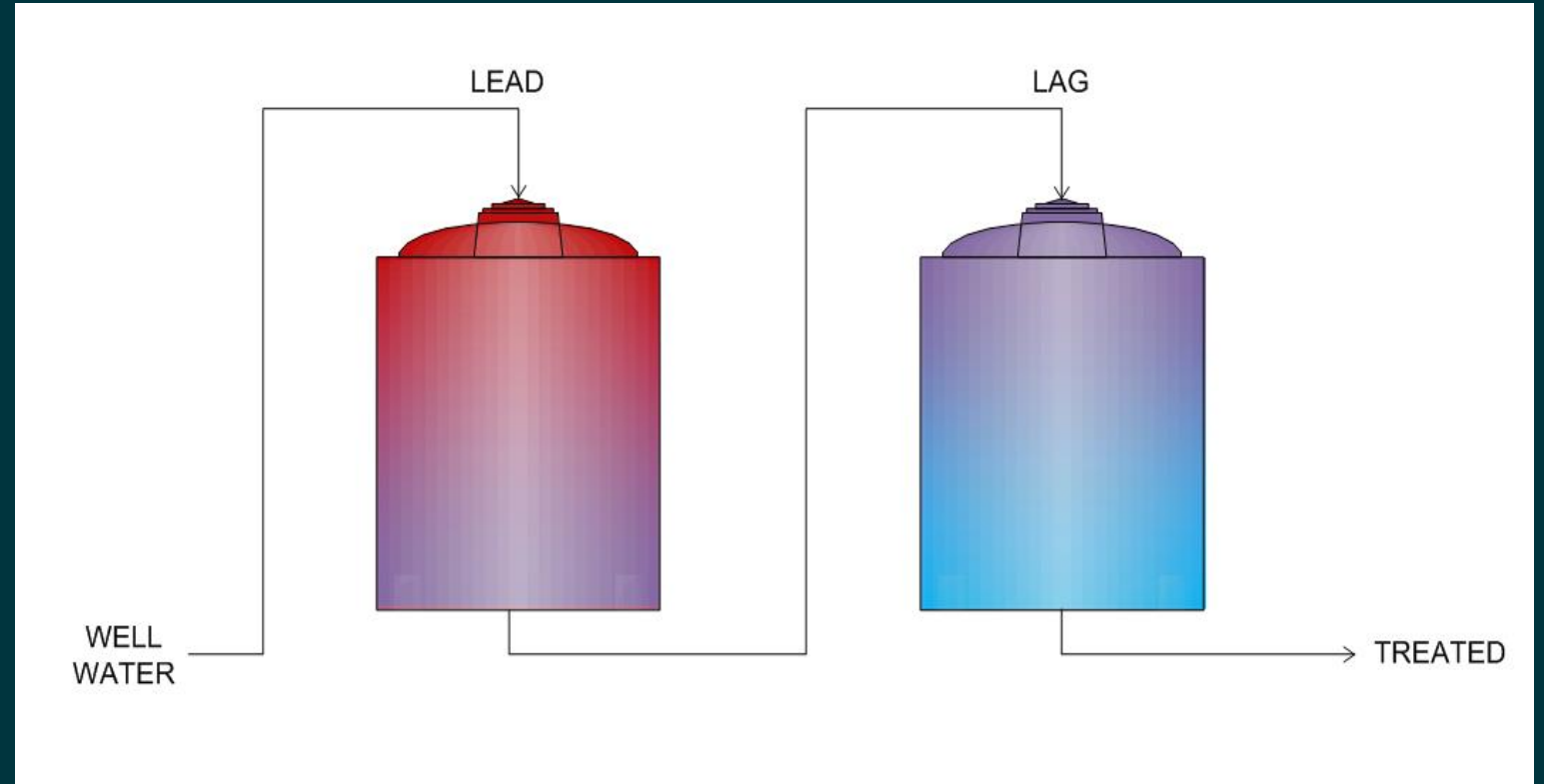


PFAS Removal Process



Typical PFAS Removal System Layout

- Two vessels in series
- Optimizes use of media
- Frequency of media change reduced



Used Media Disposal

Current Options:

- **Landfill – preferred?**
- Incineration
- Reactivation (GAC only)

Emerging technologies:

- Biological reduction
- UV destruction
- Electrochemical*
- Defractionization*

* Suitable for highly concentrated liquid streams

02

Alternatives Evaluated

Alternatives

1. Air Stripping & IX / IX (4 vessels)
2. GAC / GAC (4 vessels)
3. GAC / IX (4 vessels)
4. GAC / IX / IX (6 vessels)
5. GAC / GAC / IX (6 vessels)

Media Types:

1. **GAC** = Granular Activated Carbon
2. **IX** = Ion Exchange

Decision Factor	Option #1	Option #2	Option #3	Option #4	Option #5
	Air Stripping & IX / IX	GAC / GAC	GAC / IX	GAC / IX / IX	GAC / GAC / IX
Treatment Effectiveness	70	75	90	95	100
Media Replacement	90	80	60	60	60
System Redundancy	50	70	60	60	60
Waste Management	80	50	70	70	70
Weighted Score	72	70	77	80	82
Comparative Capital Costs	\$2.1 M	\$2.1 M	\$1.7 M	\$2.7 M	\$3.1 M
Estimated Annual Operating Costs	\$0.4 M	\$0.1 M	\$0.2 M	\$0.3 M	\$0.3 M
NPV of 25-years of Operating Costs	\$4.5 M	\$1.1 M	\$2.5 M	\$3.5 M	\$2.8 M
25-Year Life Cycle Cost	\$6.5 M	\$3.1 M	\$4.1 M	\$6.3 M	\$5.9 M
Benefit-to-Cost Ratio	11	22	19	13	14
Overall Ranking	5	1	2	4	3

03

Schedule & Next Steps

Schedule & Next Steps

Preliminary Design Report &
Drinking Water Loan Application

October 2022

Grant Funding (BIL) Status

April 2023

Final Construction Design

June 2023

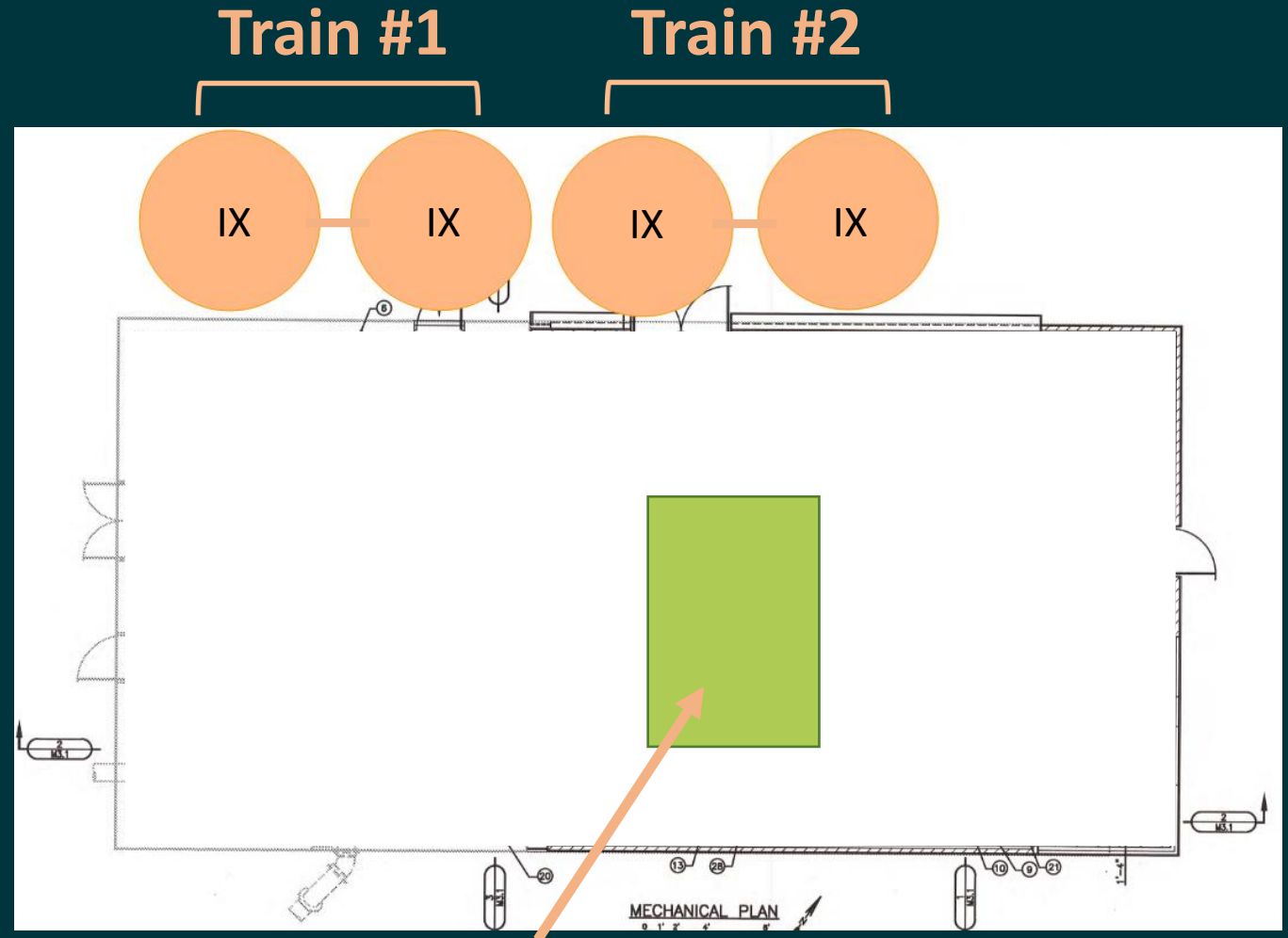
Begin Construction

Spring 2024

Questions

Option #1: Air Stripping and Ion Exchange (IX)

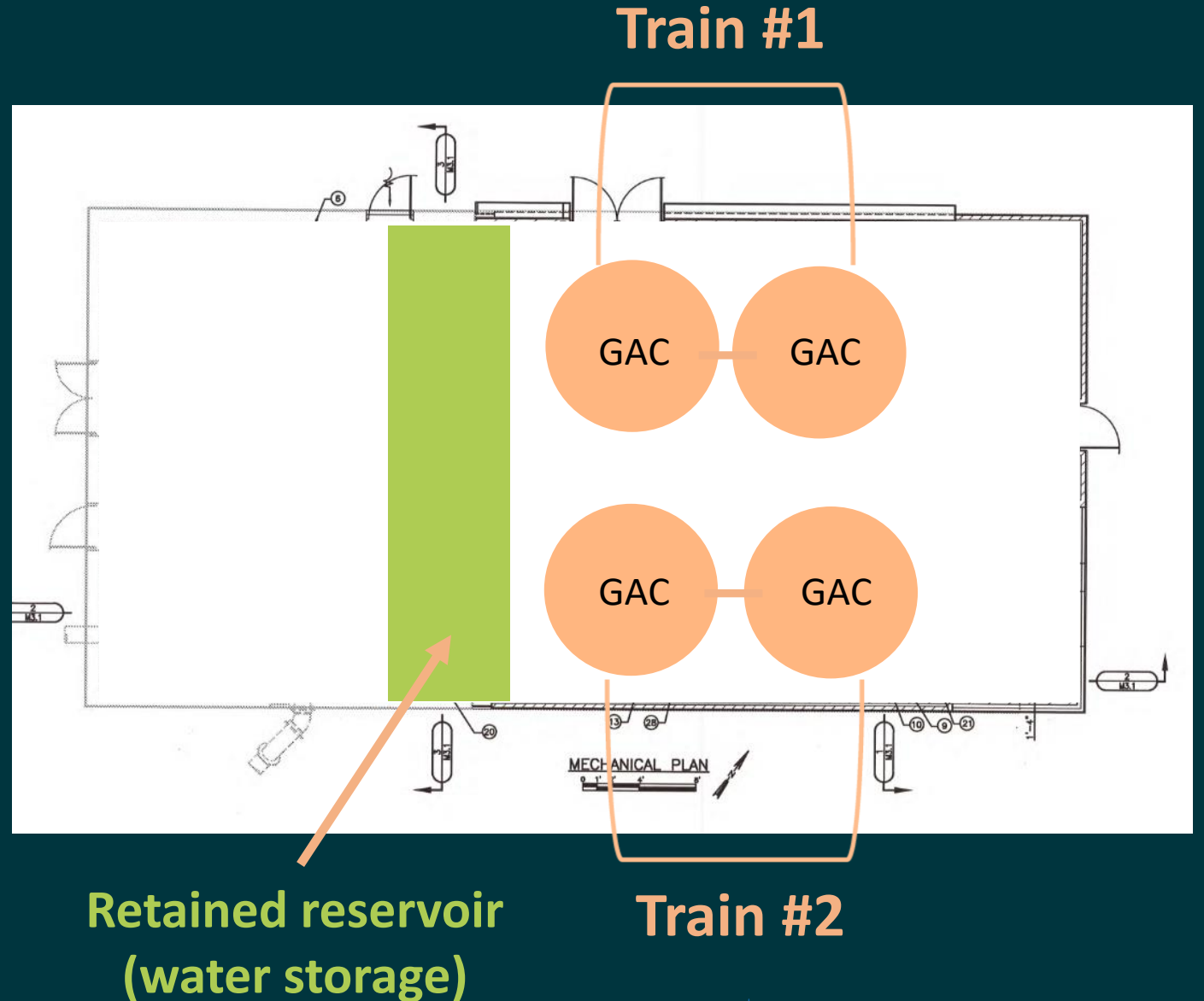
- ✓ 4 IX vessels
 - 2 parallel IX / IX trains
- ✓ 12-foot diameter vessels
 - 800 gpm each
- ✓ **Requires building expansion**
- ✓ Energy intensive process
- ✓ Post-treatment Water Conditioning
- ✓ High chemical costs
- ✓ Tray cleaning required
- ✓ Pre-filters required for IX



**Existing Air
Stripper**

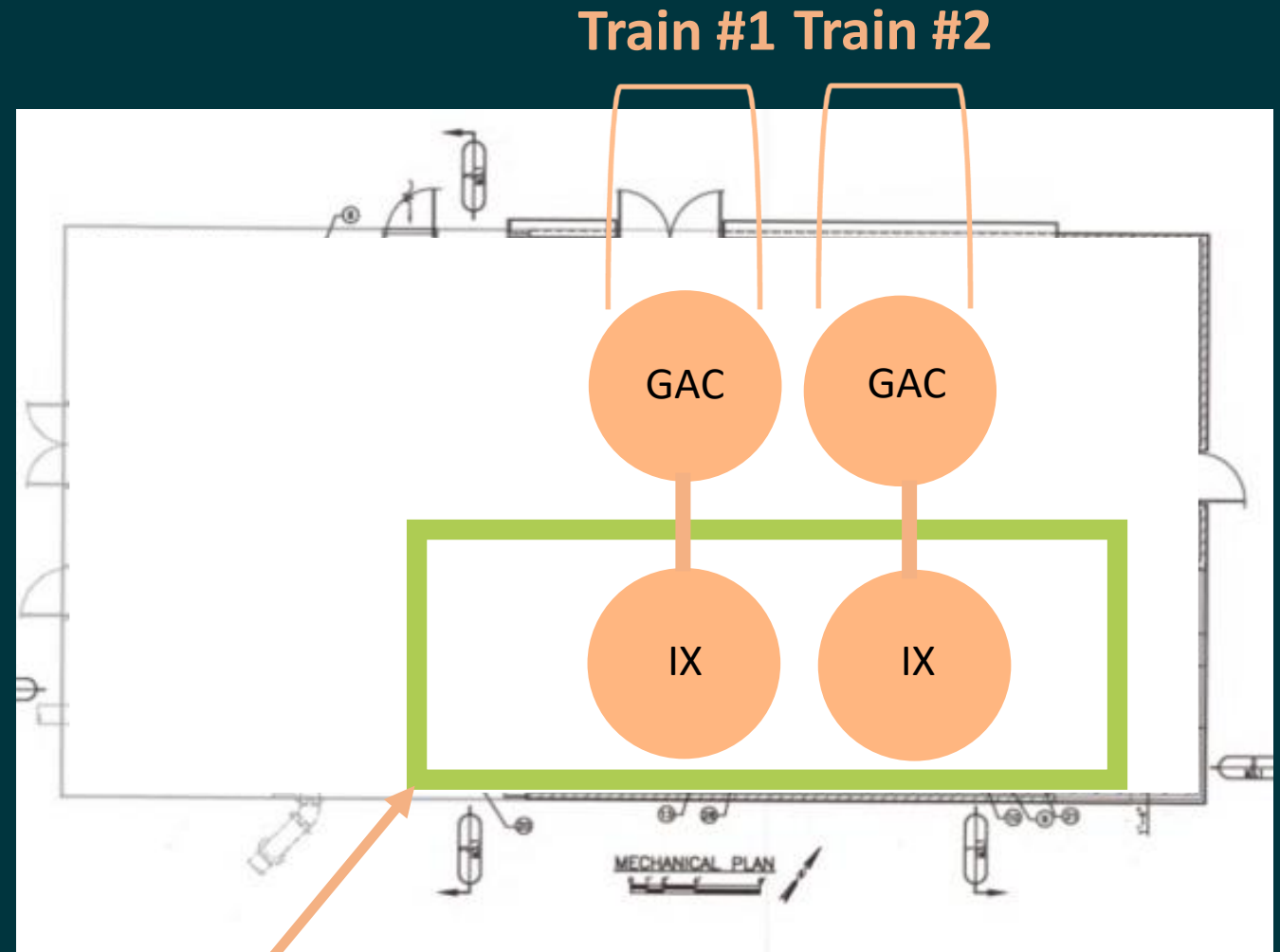
Option #2: GAC / GAC

- ✓ 4 GAC vessels
 - 2 parallel GAC / GAC trains
- ✓ 12-foot diameter vessels
 - 700 gpm each
- ✓ 24 feet tall
- ✓ 40,000 lb GAC media each
- ✓ **Air stripper removed**
- ✓ Reservoir reduced
 - Operational range reduced to maintain desired disinfection



Option #3: GAC / IX

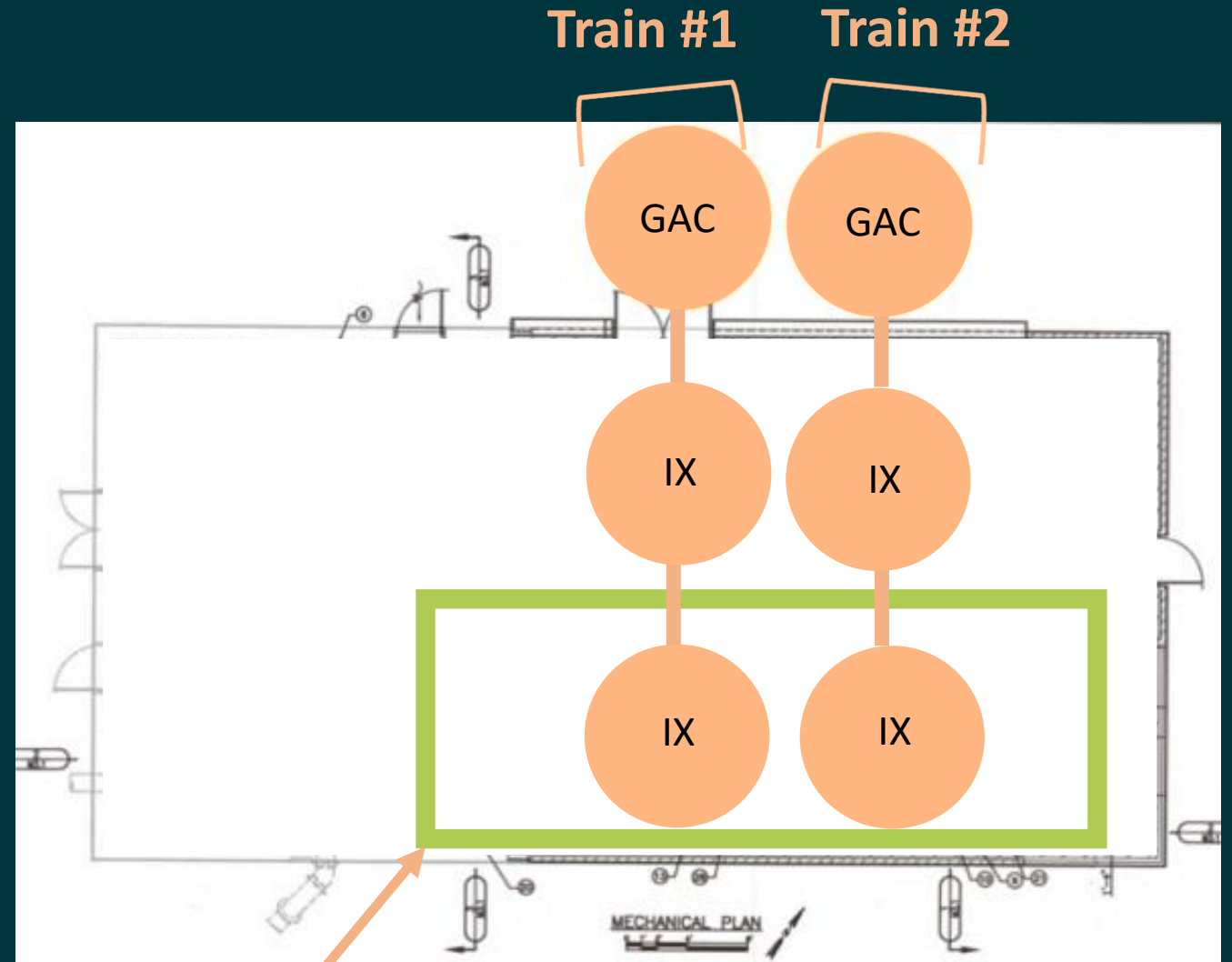
- ✓ 4 total vessels
 - 2 GAC & 2 IX vessels
 - 2 GAC / IX treatment trains
- ✓ 12-foot diameter vessels
- ✓ 24 ft (GAC) and 16 ft (IX) tall
- ✓ **Air stripper removed**
- ✓ ½ reservoir capacity retained



**Retained reservoir
(water storage)**

Option #4: GAC / IX / IX

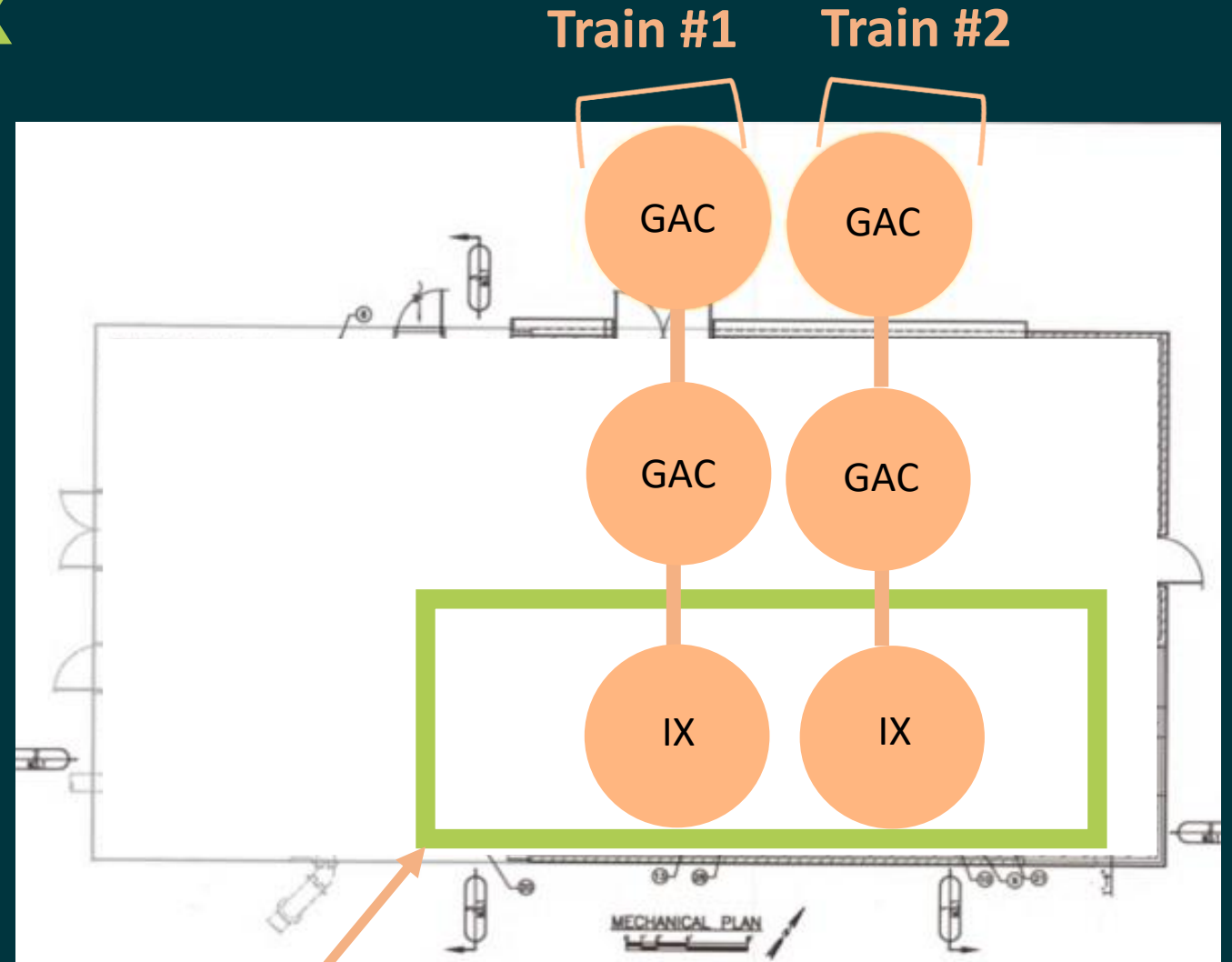
- ✓ 6 total vessels
 - 2 GAC & 4 IX vessels
 - 2 GAC / IX / IX trains
- ✓ 12-foot diameter vessels
- ✓ 24 ft (GAC) and 16 ft (IX) tall
- ✓ **Requires building expansion**
- ✓ **Air stripper removed**
- ✓ ½ Reservoir retained



**Retained reservoir
(water storage)**

Option #5: GAC / GAC / IX

- ✓ 6 total vessels
 - 4 GAC & 2 IX vessels
 - 2 GAC / GAC / IX trains
- ✓ 12-foot diameter vessels
- ✓ 24 ft (GAC) and 16 ft (IX) tall
- ✓ **Requires building expansion**
- ✓ **Air stripper removed**
- ✓ ½ Reservoir retained



**Retained reservoir
(water storage)**