PFAS Treatment Design, Bidding, and Funding Assistance Phase Services

PFAS Study Summary

- 9 total alternatives were evaluated
- Treatment of Crystal Spring was selected due to its exceedance of the newly published MCL
- 3 alternatives evaluated for Crystal Spring including Granular Activated Carbon (GAC), Anion Exchange (IX) and Fluoro-Sorb®
- GAC has an estimated $17.3M Construction value with a $1.7M estimated annual O&M cost
- GAC preferred due to its benefits over IX which was lower Capex at $14.5M with slightly higher O&M at $1.8M

Source	PFOA (ng/L)	PFOS (ng/L)
Little Lehigh Creek	3.0	2.4
Lehigh River	2.2	2.0
Crystal Spring	6.2	6.1
Schantz Spring	2.5	3.2
Finished Water to Distribution	3.6	2.9

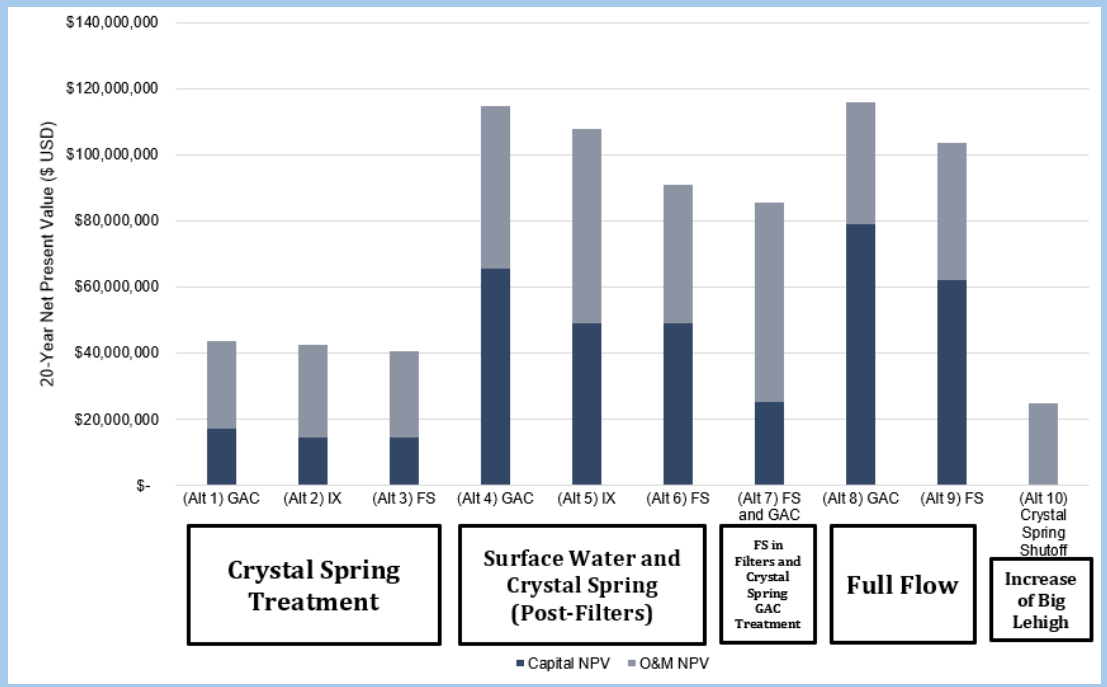
*Numbers in RED are > EPA's MCL
**Numbers in BLUE are > 75% of EPA's Proposed MCL

<u>Benefits of GAC</u>

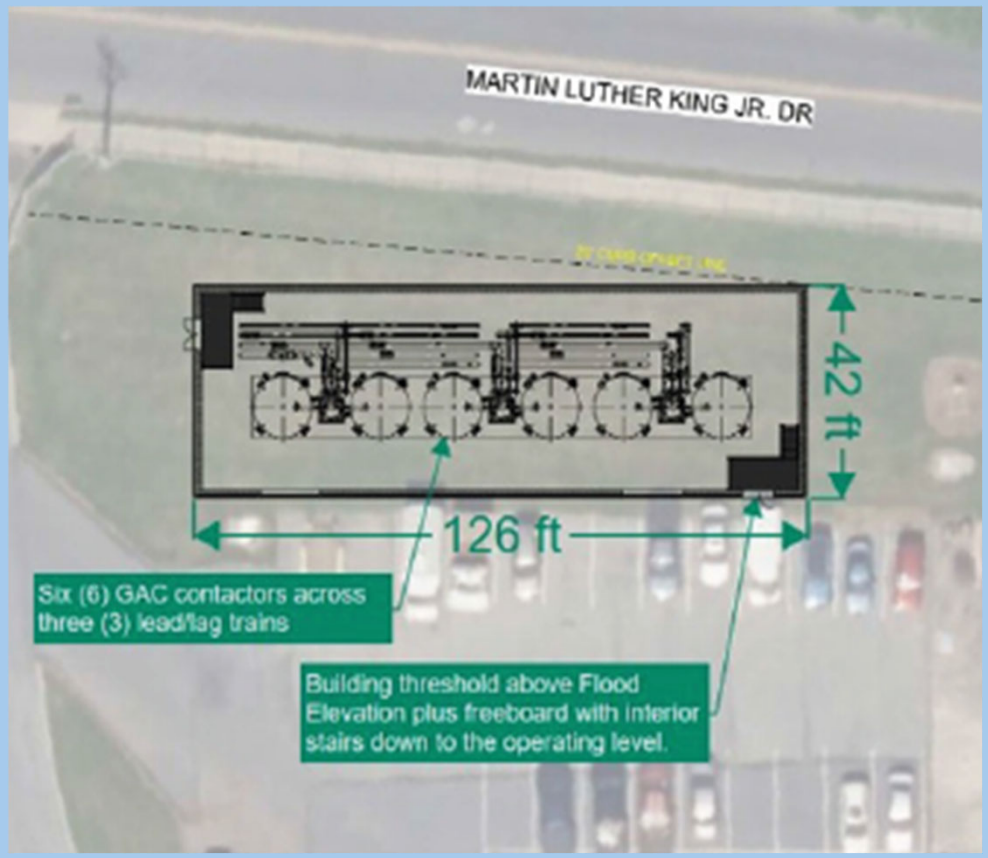
- High level of demonstration for PFAS removal
- Effective at removing other organic contaminants
- Can be reactivated, eliminating the need for direct disposal
- Removes TOC which is good for Disinfection By-Product precursor removal

Summary of Alternatives Considered – Present Value Analysis

Alternative Group Name	Alternative	Alternative Description	Design Flowrate (gpm)
Existing Condition	0	Existing Condition	22,200
Crystal Spring	1	GAC Treatment	2,700
	2	IX Treatment	
	3	FS Treatment	
Surface Water and Crystal Spring (Post Filters)	4	GAC Treatment	16,700
	5	IX Treatment	
	6	FS Treatment	
Surface Water (FS in Filters) and Crystal Spring (GAC)	7	GAC Treatment of CS, FS in Filters	13,900 (Filters), 2,700 (CS)
Full Flow (Surface Water, Crystal, and Shantz Spring, Post Clearwell)	8	GAC Treatment	22,200
	9	FS Treatment	
Crystal Spring Shutoff	10	Shutoff	

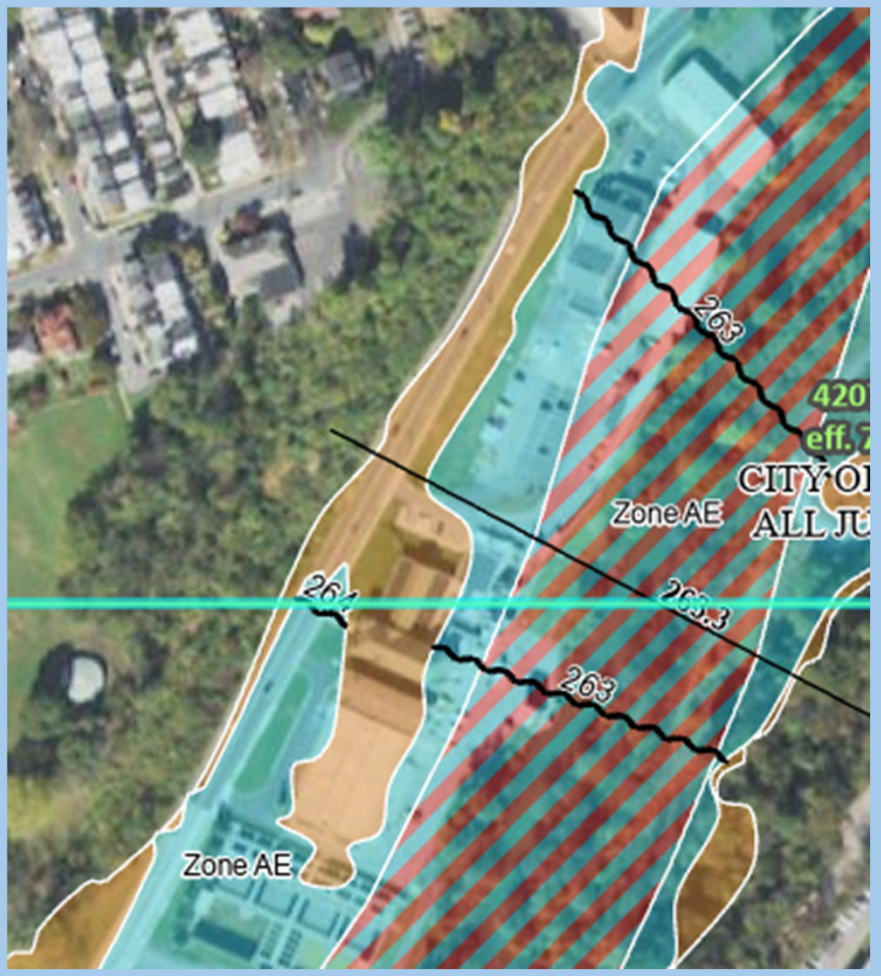


Potential layout

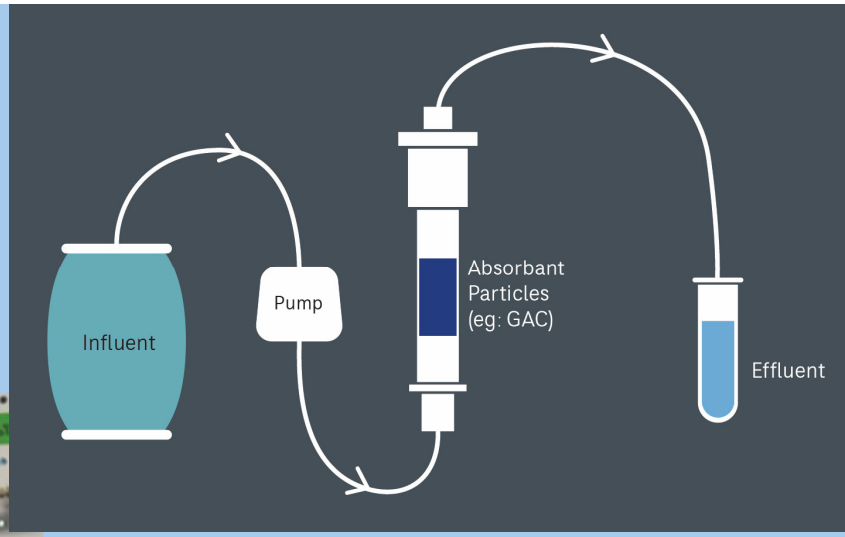


Project Challenges

Pumping – Space & Power
Backwashing – supply and discharge
Chemical System – water hardness
Site Constraints – limited space and FEMA flood zone



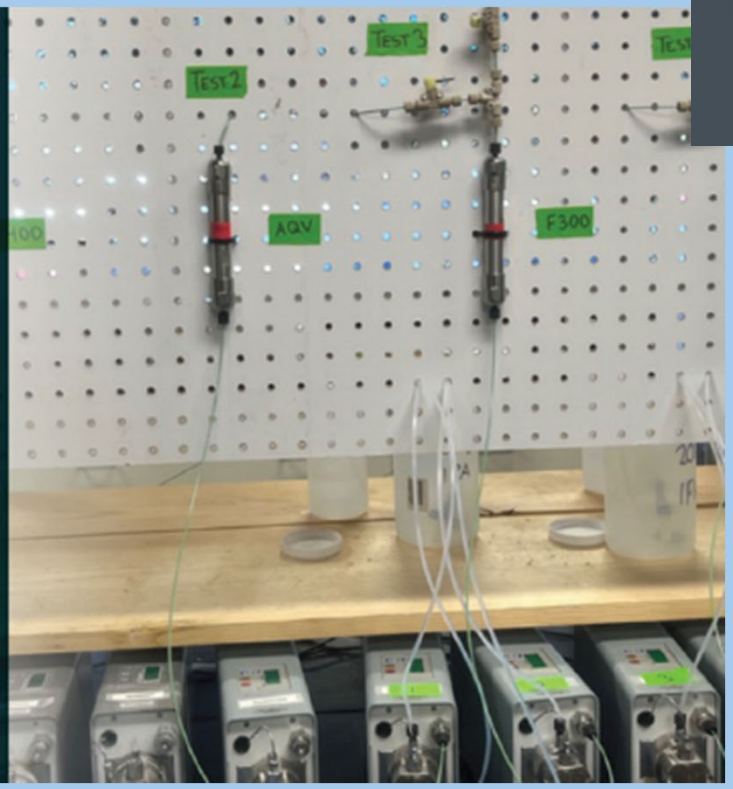
Rapid Small-Scale Column Tests (RSSCT)



RSSCT

Sorbent Comparison High quality instrumentation and process equipment enhance reliability and drive experimental success

Rapid Small-Scale Column Tests (RSSCTs) are used to predict the ability of sorbents, such as activated carbon or ion-exchange resins, to remove low concentration contaminants such as PFAS, VOCs, and others. RSSCTs scale down the amount of time, material, and contaminated liquid needed, so that a bench-scale tests can be performed in weeks, rather than the months needed with traditional approaches. Additional benefits include reduced footprint of multiple tests in parallel and reduced waste handling.



Field Column Testing for Anti-Scalant Chemical

Figure 2: Scaling within a GAC vessel due to Calcium Carbonate Formation. Granular GAC has agglomerated into "soft ball" solid chunks which prevent full use of the adsorptive media surface area.

Summary of Capital Project Authorization Request

SERVICE	FEE
AECOM Base Proposal	$943,330
Rapid Small Scale Column Testing for GAC material	$38,000
Field Column Pilot for anti-scalant chemical including $10,000 additional design fee	$88,500
TOTAL	**$1,069,830**