


## PWB Filtration Final Report - 1077 Pages

References taken from this PWB document specifically regarding the filtration facility

	
PROJECT:	Bull Run Filtration Project
PROJECT NUMBER:	W02229
PREPARED BY:	Christopher Bowker
DATE:	August 31, 2018
<hr/>	
SUBJECT:	Filtration Plant Key Decisions and Process
<hr/>	
<h3>1.0 Executive Summary</h3>	
<p>In August 2017, the Portland City Council voted to construct a water filtration treatment facility to meet the treatment requirements for <i>Cryptosporidium</i>. On December 18, 2017 the Oregon Health Authority-Drinking Water Services (OHA) and the Portland Water Bureau (PWB) signed a bilateral compliance agreement that laid out a schedule for construction of a new filtration treatment system on the Bull Run Supply by September 30, 2027. The approved filtration schedule includes three primary phases – Planning, Design, and Construction. It will take approximately 10 years until the treatment facility is operational.</p>	
<p>The Bull Run Filtration Project (filtration project) will be one of the largest PWB projects to date. PWB has already begun the planning phase of this project, which included answering four preliminary questions related to filtration of the water supply: project delivery (procurement) method, plant capacity, location, and filtration technology. The results from this process were four preferred alternatives that the project will build upon moving forward.</p>	
<p>To reach a decision, each question was evaluated and discussed by the project team (which included stakeholders with broad technical and organizational representation) and the Executive Committee (comprised of PWB Management Team members) at a series of workshop sessions between January and June 2018. Three consultants were hired to assist in gathering and understanding relevant information for these decisions: Barney &amp; Worth (community outreach), HDR (procurement, location, and capacity), and Jacobs (decision framework and filtration technology).</p>	
<p>Technical memorandums were used to explain and document this process. Three of the decisions (capacity, location, and filtration technology) used a decision-making process generally referred to as a decision framework, which is discussed in the first document enclosed herein. This decision framework was used to help compare and contrast more complex issues related to these questions. The development and application of the decision framework components were accomplished through the workshops. Decisions were made by the Executive Committee.</p>	
<p>The collection of documents enclosed herein represents the initial work performed during the planning phase of the Bull Run Filtration Project and includes technical memorandums on the decision framework, the four key questions, as well as supporting documents. These documents are summarized below.</p>	

# Natural Resources Impact: **Bad for the Planet**

## **Every Year - Perpetually**

- ~3600 cubic yards of waste - dump trucks worth
- ~8000 tons of chemicals
- ~781 Truck Trips = mass quantities of CO2 & pollutants
- Perpetual ongoing noise effects natural resources of the area
- Perpetual traffic effects quality of natural resources
- Produces perpetual waste that **MUST** be hauled away

## **During Construction**

- ~122000 Truck Trips
- Mass quantities of CO2 & pollutants released to the environment

# PWB Commissioned Report

## PG 127; Cost & Waste generation

TECHNICAL MEMORANDUM



### Draft: Cost Curves for Granular Media Filtration

PREPARED FOR: Dave Peters, Portland Water Bureau  
Michelle Cheek, Portland Water Bureau

COPY TO: HDR, Barney & Worth

PREPARED BY: Lee Odell  
Enoch Nicholson

DATE: April 11, 2018

PROJECT NUMBER: 699275.01.03

REVIEWED BY: Bob Chapman

APPROVED BY: Kelly Irving

### Summary Information

Cost estimates and evaluation criteria metrics are presented in Table 1 for granular media direct filtration for water treatment plant (WTP) capacities of 115, 145, and 160 million gallons per day (mgd).

*Values provided are for a typical granular media direct filtration WTP and do not represent data or cost of a facility for the Bull Run Supply. The information in this technical memorandum is solely for comparative purposes. Any resemblance to actual conditions is simply coincidental. They do not include soft costs such as engineering, construction management, permitting etc.*

Table 1. Granular Media Direct Filtration Costs and Measures for Water Treatment Plant

Item	Capacity		
	115 mgd	145 mgd	160 mgd
Construction cost	\$215,600,000	\$253,940,000	\$275,720,000
Annual operations and maintenance	\$9,827,000	\$11,664,000	\$12,598,000
25-year life-cycle cost	\$402,823,000	\$476,259,000	\$515,847,000
Cost per CCF delivered*	\$0.44	\$0.52	\$0.56
Electrical usage (megawatt-hours per year)	10,024	12,370	13,677
Residuals (cubic yards per year)	3,628	3,628	3,628
Truck trips during construction	97,133	115,976	122,806
Truck trips per year	682	741	781
Fuel consumption (gallons during construction)	218,276	260,620	275,969
Fuel consumption (gallons per year)	3,831	4,163	4,388
Chemicals (dry tons per year)	6,946	7,808	8,238

\*CCF is hundred cubic feet. Includes construction costs and annual operations and maintenance costs.

## PG 132; Cost & Waste generation

### Chemicals

Table 6 presents the chemicals, average annual dose assumptions, and chemical unit costs associated with each WTP type, resulting in a total chemical cost per million gallons by WTP type. Chemical hauling distance is estimated at 50 miles.

Jacobs CH2M

34

ERROR! USE THE HOME TAB TO APPLY MEMO SUBJECT TO THE TEXT THAT YOU WANT TO APPEAR HERE.

Table 6. Project Component Staffing Requirements & Rates

Chemical	Unit Cost (\$/dry ton)	Average Surface WTP Dose (mg/L)
Sodium hypochlorite	\$1,500	3.0
Sodium hydroxide	\$600	10
Aluminum sulfate	\$450	5
Polymer	\$2,500	0.75/0.1

### Power

Power cost is based on a unit power rate of \$0.0605 per kilowatt-hour.

### Residuals Handling and Disposal

Residuals handling will include 100 percent liquid recycle with solids drying and disposal at a landfill. Hauling distance is estimated at 20 miles; disposal costs are estimated at \$50 per cubic yard.

# PG 127; Waste generation & Chemicals

# Chemicals:

TECHNICAL MEMORANDUM JACOBS *ch2m*

**Draft: Cost Curves for Granular Media Filtration**

PREPARED FOR: Dave Peters, Portland Water Bureau  
Michelle Cheek, Portland Water Bureau

COPY TO: HDR, Barney & Worth

PREPARED BY: Lee Odell  
Enoch Nicholson

DATE: April 11, 2018

PROJECT NUMBER: 699275.01.03

REVIEWED BY: Bob Chapman

APPROVED BY: Kelly Irving

**Summary Information**

Cost estimates and evaluation criteria metrics are presented in Table 1 for granular media direct filtration for water treatment plant (WTP) capacities of 115, 145, and 160 million gallons per day (mgd).

*Values provided are for a typical granular media direct filtration WTP and do not represent data or cost of a facility for the Bull Run Supply. The information in this technical memorandum is solely for comparative purposes. Any resemblance to actual conditions is simply coincidental. They do not include soft costs such as engineering, construction management, permitting etc.*

**Table 1. Granular Media Direct Filtration Costs and Measures for Water Treatment Plant**

Item	Capacity		
	115 mgd	145 mgd	160 mgd
Construction cost	\$215,600,000	\$253,940,000	\$275,720,000
Annual operations and maintenance	\$9,827,000	\$11,664,000	\$12,598,000
25-year life-cycle cost	\$402,823,000	\$476,259,000	\$515,847,000
Cost per CCF delivered*	\$0.44	\$0.52	\$0.56
Electrical usage (megawatt-hours per year)	10,024	12,370	13,677
Residuals (cubic yards per year)	3,628	3,628	3,628
Truck trips during construction	97,133	115,976	122,806
Truck trips per year	682	741	781
Fuel consumption (gallons during construction)	218,276	260,620	275,969
Fuel consumption (gallons per year)	3,831	4,163	4,388
Chemicals (dry tons per year)	6,946	7,808	8,238

\*CCF is hundred cubic feet. Includes construction costs and annual operations and maintenance costs.

Jacobs CH2M 30



**16,000,000 lbs**  
**Chemicals into the water**

## PG 127; Waste generation & Chemicals

**Waste:**  
**3628 Cubic yards / year**  
**Est. over 700 every year**



**Year after Year...**

- Huge quantities of CO2 & pollutants released to the atmosphere

TECHNICAL MEMORANDUM JACOBS ch2m

Draft: Cost Curves for Granular Media Filtration

PREPARED FOR: Dave Peters, Portland Water Bureau  
 Michelle Cheek, Portland Water Bureau

COPY TO: HDR, Barney & Worth

PREPARED BY: Lee Odell  
 Enoch Nicholson

DATE: April 11, 2018

PROJECT NUMBER: 699275.01.03

REVIEWED BY: Bob Chapman

APPROVED BY: Kelly Irving

Summary Information

Cost estimates and evaluation criteria metrics are presented in Table 1 for granular media direct filtration for water treatment plant (WTP) capacities of 115, 145, and 160 million gallons per day (mgd).

*Values provided are for a typical granular media direct filtration WTP and do not represent data or cost of a facility for the Bull Run Supply. The information in this technical memorandum is solely for comparative purposes. Any resemblance to actual conditions is simply coincidental. They do not include soft costs such as engineering, construction management, permitting etc.*

Table 1. Granular Media Direct Filtration Costs and Measures for Water Treatment Plant

Item	Capacity		
	115 mgd	145 mgd	160 mgd
Construction cost	\$215,600,000	\$253,940,000	\$275,720,000
Annual operations and maintenance	\$9,827,000	\$11,664,000	\$12,598,000
25-year life-cycle cost	\$402,823,000	\$476,259,000	\$515,847,000
Cost per CCF delivered*	\$0.44	\$0.52	\$0.56
Electrical usage (megawatt-hours per year)	10,024	12,370	13,677
Residuals (cubic yards per year)	3,628	3,628	3,628
Truck trips during construction	97,133	115,976	122,806
Truck trips per year	682	741	781
Fuel consumption (gallons during construction)	218,276	260,620	275,969
Fuel consumption (gallons per year)	3,831	4,163	4,388
Chemicals (dry tons per year)	6,946	7,808	8,238

\*CCF is hundred cubic feet. Includes construction costs and annual operations and maintenance costs.

Jacobs CH2M 30

City of Portland able to recognize gas leaf blowers are bad for the environment and sufficient to warrant action in an urban environment, but perpetual generation of thousands of cubic yards of chemically laden residuals that must be trucked away and these many hundreds of heavy trucks certainly generating tremendous amounts of noise & pollutants is acceptable in a wildlife rich rural area.

**PORTLAND**

# **Portland City Council unanimously bans gas- powered leaf blowers**

by: [Aimee Plante](#)

Posted: Mar 13, 2024 / 12:19 PM PDT

Updated: Mar 13, 2024 / 04:24 PM PDT

“Gas leaf blowers emit toxic pollutants, particulate matter, and noise that creates negative health impacts for people nearby,” Rubio said in a statement after the decision was announced. “This policy is the culmination of many years of hard work and advocacy to make Portland a healthier and cleaner place to live.”



LUP Hearings &lt;lup-hearings@multco.us&gt;

---

**Submit docs related to my testimony for Remand Hearing for PWB and Multnomah County Planning on April 16th**

2 messages

---

**Jeff Knapp** <jeffkn@designlab62.com>  
To: "LUP-hearings@multco.us" <LUP-hearings@multco.us>

Wed, Apr 16, 2025 at 2:13 PM

External Sender

Please find attached documents. I will send another email as the large report I am referencing is too large to email in a single email

---

**3 attachments** **20250416 Testimony Regarding the Water Treatment Plant.pptx**  
1713K **Pgs 001-400\_FINAL with Supporting docs.pdf**  
7339K **Pgs 401-775\_FINAL with Supporting docs.pdf**  
4230K

---

**LUP Hearings** <lup-hearings@multco.us>  
To: Jeff Knapp <jeffkn@designlab62.com>

Wed, Apr 16, 2025 at 2:18 PM

Hello Jeff,

Your written submission has been received. Given that your comment is after the 2pm deadline, your submission will be exhibited and added to the record during or after the hearing as soon as staff is able.

Thank you.

---

Multnomah County  
Department of Community Services - Land Use Planning Division  
1600 SE 190th Ave., Portland OR 97233  
T: 503-988-3043  
E: [lup-hearings@multco.us](mailto:lup-hearings@multco.us)  
<https://multco.us/landuse>

---

**Multnomah County**  
Department of Community Services - Land Use Planning Division  
1600 SE 190th Ave., Portland OR 97233  
T: 503-988-3043  
E: [lup-hearings@multco.us](mailto:lup-hearings@multco.us)  
<https://multco.us/landuse>

[Quoted text hidden]