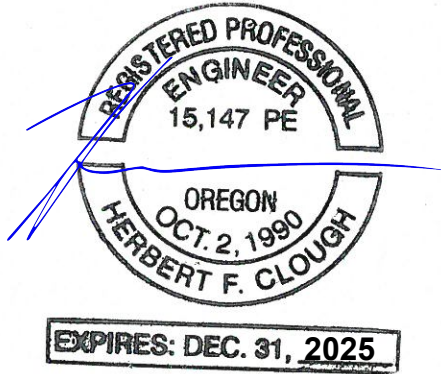




MEMORANDUM

Date: June 7, 2024
To: Dan Hafley and Sarah Vanglubl, DEQ
cc: David Breen – Port of Portland
From: Herb Clough, P.E. – Apex Companies
Re: Current and Former Fire Training Facilities Source Control Area
Portland International Airport
Portland, Oregon



This memorandum identifies a planned source control action in the vicinity of the current and former fire training facilities at Portland International Airport (PDX). The below provides a brief summary of the extent of per- and polyfluoroalkyl substance (PFAS) impacts to groundwater in the fire training facilities area, summarizes relevant regulatory criteria, and identifies the general area where a stormwater source control action is planned to address the infiltration of PFAS-impacted groundwater in the vicinity of the fire training area.

PFAS CONCENTRATIONS IN GROUNDWATER AND STORMWATER

Since 2017, the Port of Portland (Port) has conducted investigations to assess the extent of PFAS in groundwater at PDX. The initial focus for groundwater was the area surrounding the current and former fire training facilities where PFAS firefighting foams have been used for training purposes. Figure 1 shows the location of the fire training facilities at PDX. Figure 2 summarizes the detections of PFAS in groundwater around the fire training facilities. Two key PFAS chemicals, perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS), have been detected in wells nearest the fire training facilities at concentrations up to 39,000 and 203,000 nanograms per liter (ng/L), respectively.

Long-term monitoring of groundwater levels at the fire training facilities has shown a depression in the groundwater surface near storm drain lines passing near the fire training facilities. This suggests that groundwater may be infiltrating into the stormwater lines in that area. Figure 3 shows groundwater elevation contours from the March 2022 groundwater monitoring event (Apex, 2022). The March 2022 sampling event is generally representative of the long-term observed groundwater levels in the vicinity of the fire training facilities. The extent of the depression suggesting higher potential for groundwater infiltration is shown by the elevation 15 contour.

In 2017, stormwater samples were collected from manholes near the fire training facilities. From 2017 to 2021, stormwater samples were collected at the outfalls from the PDX drainage basins. Detected concentrations of PFOA and PFOS are summarized below.

Location	Date	Concentration (ng/L)	
		PFOA	PFOS
Basin 1 Outfall (range)	2017 - 2021	6 - 288	9 - 425
Basin 1 Outfall (mean)	2017 - 2021	110	210
Outfalls Basins 2-9 (range)	2020 - 2021	2 - 80	2 - 46
Fire Training Facility Manholes	2017	1,220	14,500

Based on the groundwater and stormwater data summarized above, it was concluded that groundwater containing PFAS is infiltrating storm drains near the fire training facilities that are located in PDX Basin 1. As a result, PFAS concentrations in stormwater discharging from Basin 1 are approximately 10 times greater than other PDX basins.

PFAS REGULATORY CRITERIA

Currently, there are no applicable Oregon Department of Environmental Quality (DEQ) screening levels for PFAS in groundwater, stormwater, surface water, sediment, or soil. However, the Oregon Health Authority (OHA) has a drinking water advisory level, and extensive rulemaking is underway. The following lists potentially relevant PFAS criteria.

- On April 10, 2024, the Environmental Protection Agency (EPA) finalized its new maximum contaminant levels (MCLs) for drinking water for six PFAS, including 4 ng/L each for PFOA and PFOS. These are the first federally enforceable levels for PFAS.
- In April 2022, EPA proposed national recommended ambient water quality criteria (AWQC) for PFOA and PFOS. They have published draft criteria (chronic criteria include 94,000 ng/L PFOA and 8,400 ng/L PFOS over a four-day average and not to exceed more than once in three years). The draft criteria also include fish tissue recommendations to protect aquatic life from bioaccumulation. Following the comment period, the EPA intends to issue final PFOA and PFOS recommended criteria.
- On April 19, 2024, EPA finalized the rule making PFOA and PFOS hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act (the rule becomes effective 60 days after publication in the Federal Register which is pending). The DEQ is expected to update their rules by 2025.
- The OHA has a drinking water advisory level of 30 ng/L for the combined total of PFOA, PFOS, perfluorohexanesulphonic acid (PFHxS), and perfluorononanoic acid (PFNA).

The shallow groundwater that is infiltrating the storm drains is not used for drinking water. Additionally, stormwater from PDX discharges to the Columbia Slough throughout the year and to the Columbia River during deicing activities in the winter. The Columbia Slough is not used for drinking water. The Columbia River is designated for beneficial uses including drinking water supply. A review of drinking water sources in OHA and Washington State Department of Health databases identified six public drinking water systems downriver from PDX in which water from the Columbia River may be used. The closest system to PDX is the City of St Helens, Oregon which is approximately 23 miles downriver (Apex, 2024). It is unlikely that drinking water criteria would be applicable to stormwater discharges.

The Columbia Slough supports aquatic life, including fish that may be harvested for human consumption. Therefore, the AWQC may be applicable once it is finalized.

The Columbia Slough is currently undergoing cleanup under DEQ oversight. While PFAS are not currently target contaminants of concern for the Columbia Slough, preliminary fish tissue sampling indicates that PFAS are present in fish, with PFOS tissue concentrations in one species of fish exceeding EPA's criteria for protection of aquatic life. After DEQ promulgates state cleanup rules specific to PFAS (expected in 2025), human health risk-based cleanup levels for PFAS may be selected for the Columbia Slough project based on fish consumption scenarios. DEQ may require

source control actions within the Columbia Slough drainage basin as a method to reduce PFAS concentrations in fish tissue. In the interim, the Port is contributing funding to Multnomah County to support their fish advisory outreach so that community members understand risks from consuming fish from the Columbia Slough.

PDX STORMWATER INFRASTRUCTURE

Figure 4 shows the stormwater infrastructure in the vicinity of the fire training facilities. These include catch basins, manholes, stormwater piping, and surface ditches.

PLANNED STORMWATER INFRASTRUCTURE SOURCE CONTROL

Stormwater source control will focus on the area where both higher groundwater concentrations of PFAS are present and groundwater is infiltrating into stormwater infrastructure. Figure 5 combines the summary information from Figures 2, 3, and 4 to highlight where stormwater source control would be most effective. Groundwater infiltration into stormwater infrastructure is occurring within areas of relatively higher concentrations of PFAS in stormwater pipes and open ditches as shown on Figure 5. Implementation of a source control action in the stormwater infrastructure in this area would be expected to significantly reduce the PFAS concentrations in stormwater from Basin 1.

PERMITTING

The project would likely result in impacts to a ditch which is within the 100-year floodplain. These impacts would require compliance with the National Flood Insurance Program standards and local standards. The project will also require an Oregon Removal/Fill permit and, depending on jurisdiction, may also require Clean Water Act Section 401 Water Quality Certification, a Section 404 dredge/fill permit, and associated mitigation. The project may also trigger the need for Endangered Species Act consultation. The timeline for regulatory approvals varies by jurisdiction and complexity of the project, but it is anticipated that collectively the permitting process could take between two and three years.

REFERENCES

Apex Companies, LLC (Apex), 2022. *Original and Former Fire Training Facilities First Quarter 2022 Groundwater Monitoring Report, Portland International Airport Portland, Oregon, ECSI No. 3324*. August 29, 2022.

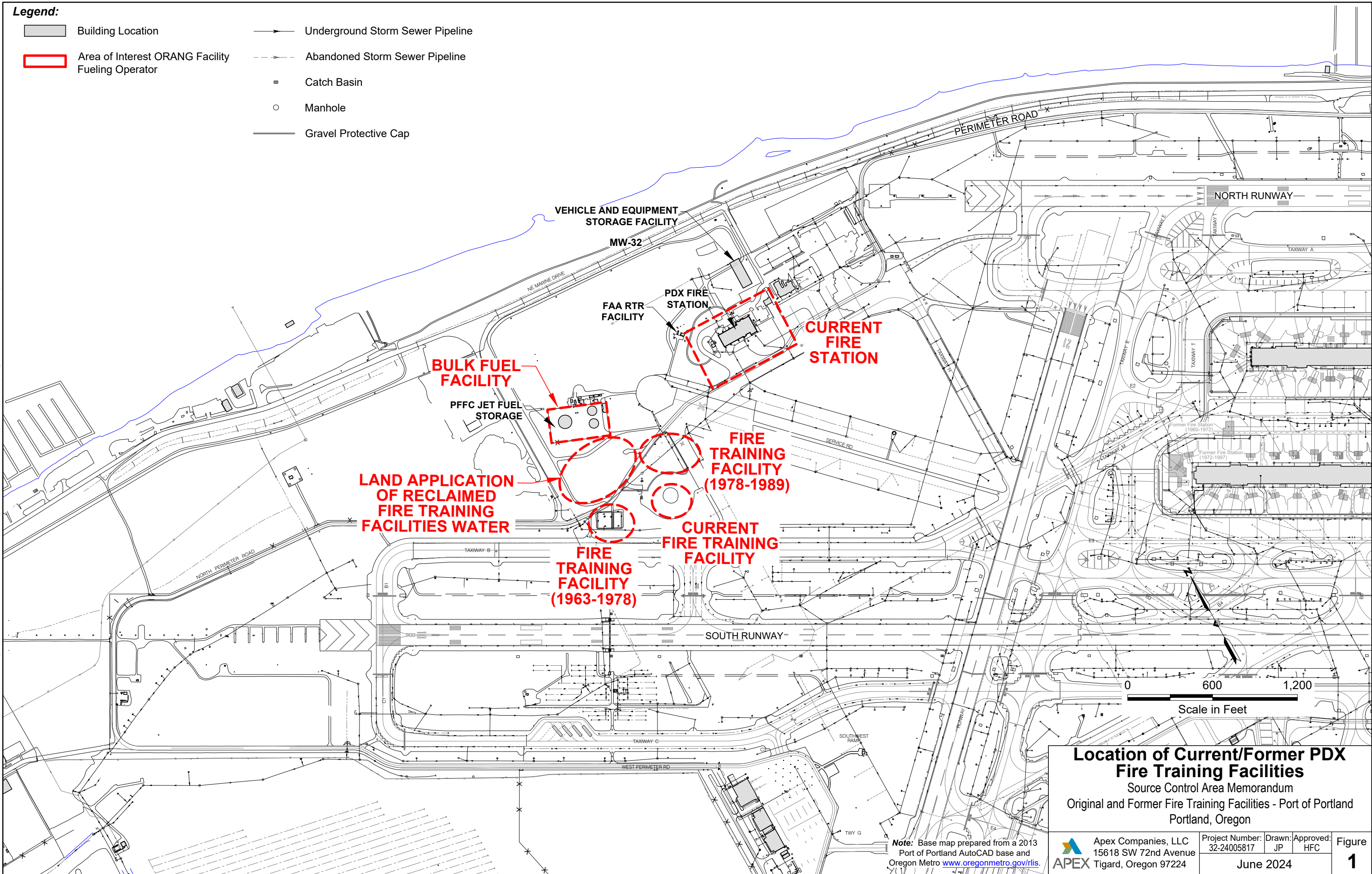
Apex, 2024. *Columbia River Drinking Water*. Letter to David Breen, Port of Portland. February 13, 2024.

ATTACHMENTS

- Figure 1 Location of Current/Former PDX Fire Training Facilities
- Figure 2 Summary of PFAS in Groundwater at the PDX Fire Training Facilities Area
- Figure 3 Shallow (OD) Groundwater Elevations Contour Map (March 2022)
- Figure 4 Stormwater Infrastructure
- Figure 5 Planned Source Control Area

Legend:

- Building Location
- Underground Storm Sewer Pipeline
- Abandoned Storm Sewer Pipeline
- Area of Interest ORANG Facility Fueling Operator
- Catch Basin
- Manhole
- Gravel Protective Cap



Location of Current/Former PDX Fire Training Facilities

Source Control Area Memorandum
Original and Former Fire Training Facilities - Port of Portland
Portland, Oregon

Note: Base map prepared from a 2013 Port of Portland AutoCAD base and Oregon Metro www.oregonmetro.gov/rliis.

Apex Companies, LLC
15618 SW 72nd Avenue
Tigard, Oregon 97224

Project Number: 32-24005817	Drawn: JP	Approved: HFC	Figure 1
June 2024			

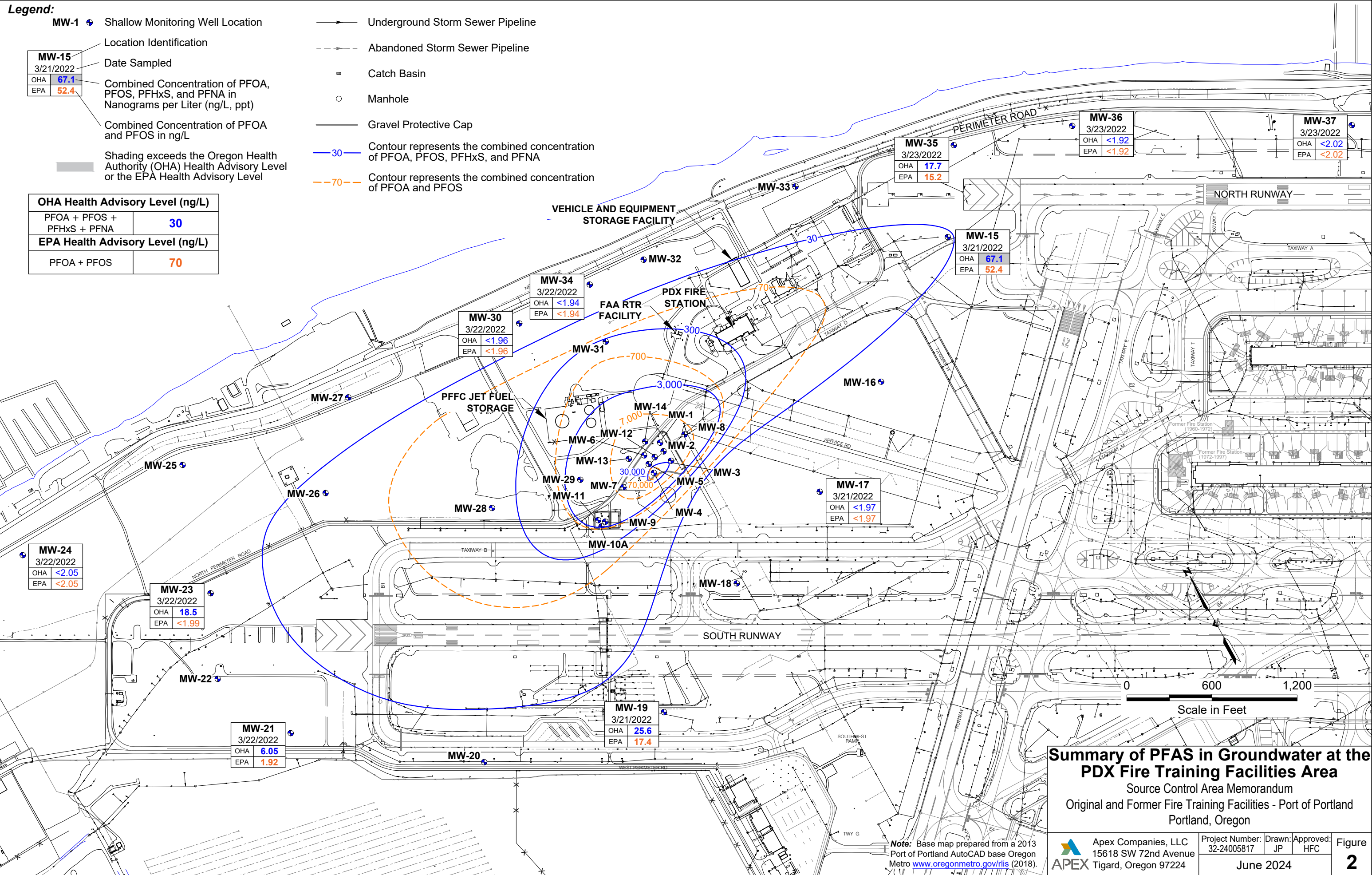
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Legend:

- MW-1 Shallow Monitoring Well Location
- Location Identification
- Date Sampled
- Combined Concentration of PFOA, PFOS, PFHxS, and PFNA in Nanograms per Liter (ng/L, ppt)
- Combined Concentration of PFOA and PFOS in ng/L
- Shading exceeds the Oregon Health Authority (OHA) Health Advisory Level or the EPA Health Advisory Level
- Underground Storm Sewer Pipeline
- Abandoned Storm Sewer Pipeline
- Catch Basin
- Manhole
- Gravel Protective Cap
- 30 Contour represents the combined concentration of PFOA, PFOS, PFHxS, and PFNA
- 70 Contour represents the combined concentration of PFOA and PFOS

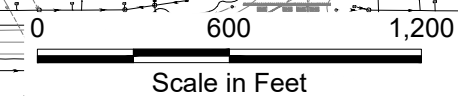
OHA Health Advisory Level (ng/L)	
PFOA + PFOS + PFHxS + PFNA	30
EPA Health Advisory Level (ng/L)	
PFOA + PFOS	70











Summary of PFAS in Groundwater at the PDX Fire Training Facilities Area
 Source Control Area Memorandum
 Original and Former Fire Training Facilities - Port of Portland
 Portland, Oregon

Apex Companies, LLC 15618 SW 72nd Avenue Tigard, Oregon 97224	Project Number: 32-24005817	Drawn: JP	Approved: HFC	Figure 2
	June 2024			

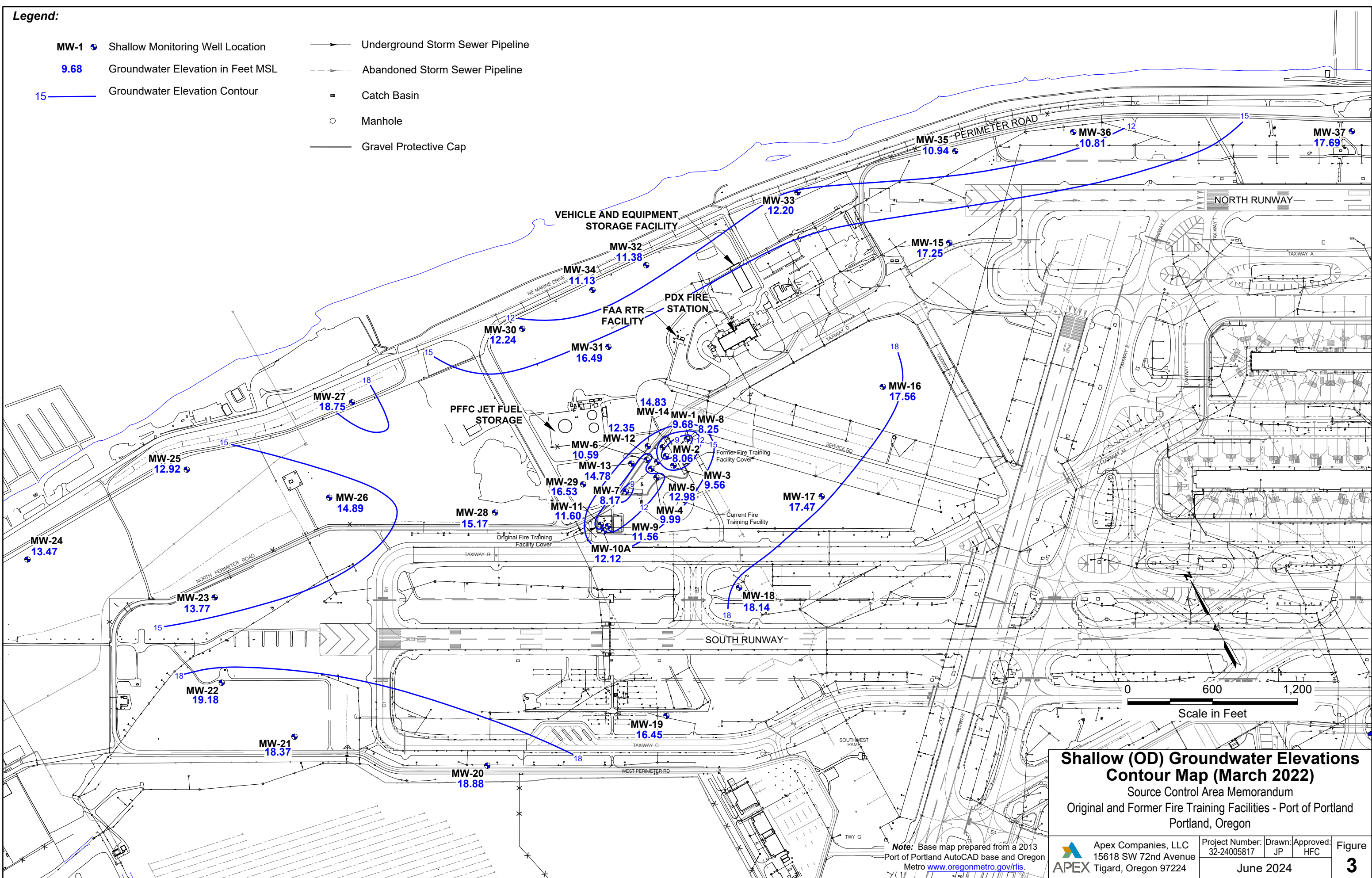
Note: Base map prepared from a 2013 Port of Portland AutoCAD base Oregon Metro www.oregonmetro.gov/rlis (2018).



Legend:

- MW-1  Shallow Monitoring Well Location
- 9.68  Groundwater Elevation in Feet MSL
- 15  Groundwater Elevation Contour
-  Underground Storm Sewer Pipeline
-  Abandoned Storm Sewer Pipeline
-  Catch Basin
-  Manhole
-  Gravel Protective Cap

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Shallow (OD) Groundwater Elevations Contour Map (March 2022)
 Source Control Area Memorandum
 Original and Former Fire Training Facilities - Port of Portland
 Portland, Oregon

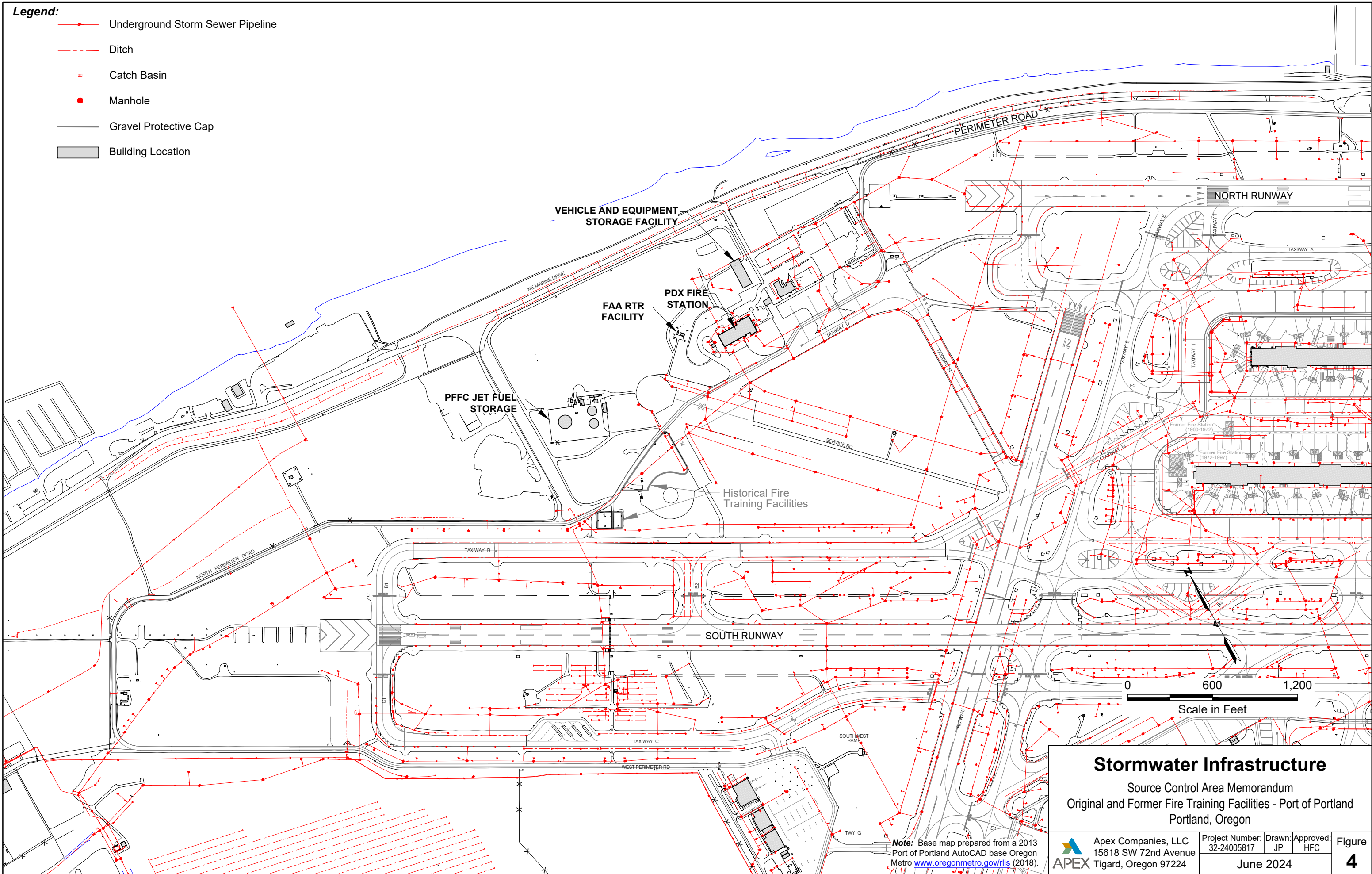
Note: Base map prepared from a 2013 Port of Portland AutoCAD base and Oregon Metro www.oregonmetro.gov/rlis.

Apex Companies, LLC
 15618 SW 72nd Avenue
 Tigard, Oregon 97224

Project Number: 32-24005817	Drawn: JP	Approved: HFC	Figure 3
June 2024			

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- Legend:**
-  Underground Storm Sewer Pipeline
 -  Ditch
 -  Catch Basin
 -  Manhole
 -  Gravel Protective Cap
 -  Building Location





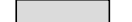






Stormwater Infrastructure
 Source Control Area Memorandum
 Original and Former Fire Training Facilities - Port of Portland
 Portland, Oregon

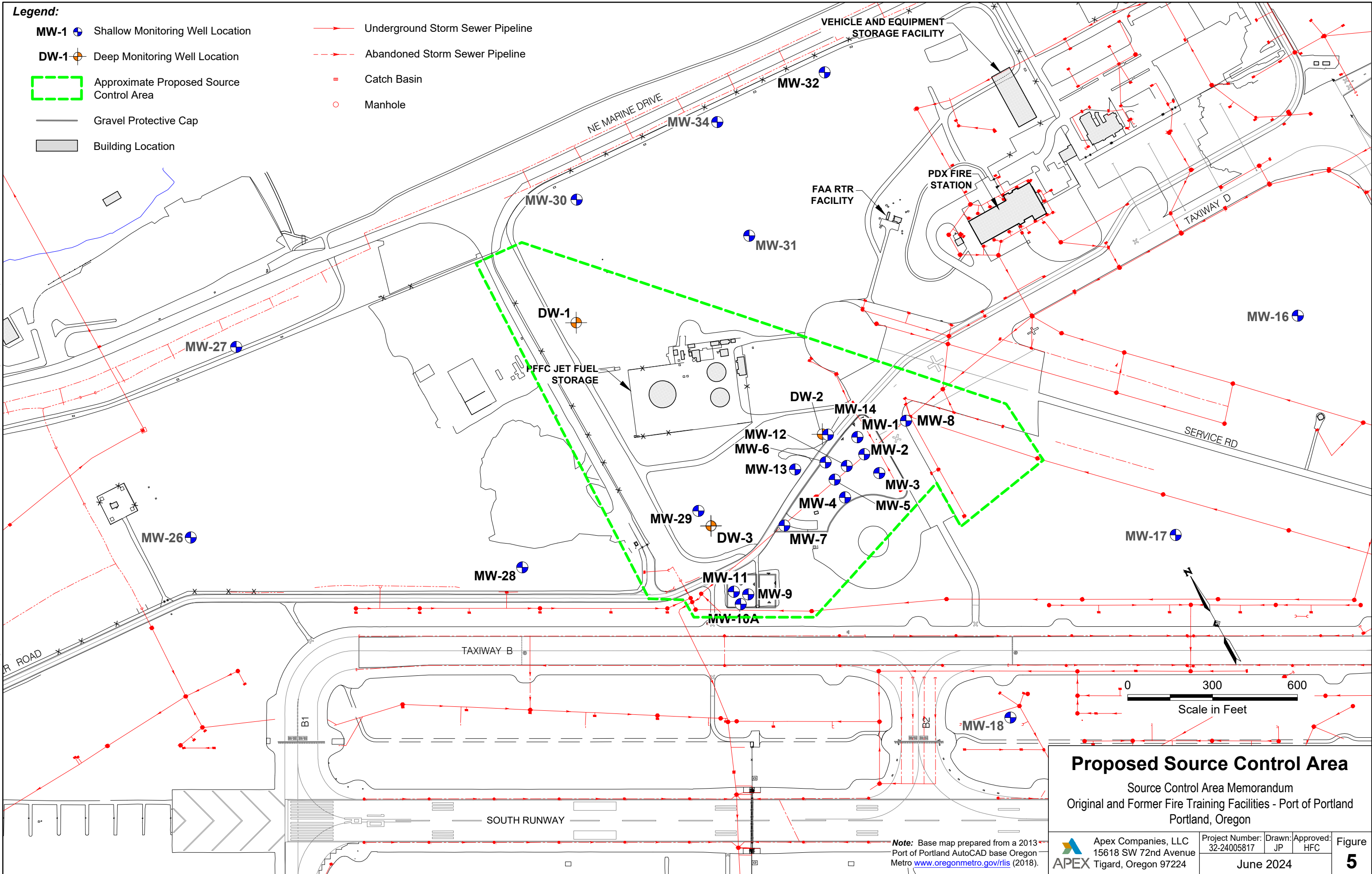
 Apex Companies, LLC 15618 SW 72nd Avenue Tigard, Oregon 97224	Project Number: 32-24005817	Drawn: JP	Approved: HFC	Figure 4
	June 2024			

Note: Base map prepared from a 2013 Port of Portland AutoCAD base Oregon Metro www.oregonmetro.gov/iris (2018).

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- Legend:**
- MW-1  Shallow Monitoring Well Location
 - DW-1  Deep Monitoring Well Location
 -  Approximate Proposed Source Control Area
 -  Gravel Protective Cap
 -  Building Location

-  Underground Storm Sewer Pipeline
-  Abandoned Storm Sewer Pipeline
-  Catch Basin
-  Manhole



Proposed Source Control Area
 Source Control Area Memorandum
 Original and Former Fire Training Facilities - Port of Portland
 Portland, Oregon

<p>Note: Base map prepared from a 2013 Port of Portland AutoCAD base Oregon Metro www.oregonmetro.gov/iris (2018).</p>	<p>Project Number: 32-24005817</p>	<p>Drawn: JP</p>	<p>Approved: HFC</p>	<p>June 2024</p>
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Figure 5

Apex Companies, LLC
 15618 SW 72nd Avenue
 Tigard, Oregon 97224