

# MW-82 Area Supplemental Investigation Work Plan

Former Gunderson LLC Facility  
4350 NW Front Avenue  
Portland, Oregon

*for*  
**Gunderson LLC**

August 29, 2025

5820 South Kelly Avenue, Suite B  
Portland, Oregon 97239  
503.906.6577

**GEOENGINEERS** 

# MW-82 Area Supplemental Investigation Work Plan

Former Gunderson LLC Facility  
4350 NW Front Avenue  
Portland, Oregon

File No. 25323-001-20  
August 29, 2025

Prepared for:

Gunderson LLC  
One Centerpointe Drive, Suite 200  
Lake Oswego, Oregon 97035

Attention: David Harvey, Senior Director EHS

Prepared by:

GeoEngineers, Inc.  
5820 South Kelly Avenue, Suite B  
Portland, Oregon 97239  
503.906.6577



---

Kirsten White, PE  
Associate Environmental Engineer



---

Chris Breemer, RG  
Principal

SJR:KW:mce:she:jm

Disclaimer: Any electronic form, facsimile, or hard copy of the original document (email, text, table and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

**Table of Contents**..... 1

**1.0 Introduction** ..... 1

**2.0 MW-82 Area Background** ..... 1

2.1 MW-82 Groundwater Assessment ..... 1

2.2 Historical filling of Launchways 3 area ..... 2

2.3 2023 Porewater Investigation offshore of MW-82 Area ..... 2

2.4 MW-82 Area Subsurface Investigation ..... 3

2.5 DEQ and EPA Comments on MW-82 Area Investigation Report ..... 4

2.6 FMC Memorandum ..... 4

**3.0 Proposed Scope of Work** ..... 5

3.1 Monitoring Well Installation..... 5

3.2 Monitoring Well Development..... 6

3.3 Monitoring Well Sampling ..... 6

3.4 Reporting..... 6

**4.0 Schedule** ..... 6

**5.0 References**..... 7

**List of Figures**

- Figure 1. Facility Location Map
- Figure 2. Groundwater Monitoring Well Network
- Figure 3. Proposed Monitoring Well Locations

**List of Appendices**

- Appendix A. Launchways 3 Historical Aerial Photographs—1963 and 1966

## 1.0 Introduction

This *MW-82 Area Supplemental Investigation Work Plan* (Work Plan) presents the proposed scope of work and approach for the installation of two monitoring wells and collection of soil and groundwater samples near monitoring well MW-82 at the facility at 4350 NW Front Avenue in Portland, Oregon (the Facility; Figure 1). This Work Plan is being submitted on behalf of Gunderson LLC (Gunderson). The objective of the proposed monitoring well installations and soil and groundwater sampling is to further characterize the extent of arsenic in soil and groundwater near monitoring well MW-82.

The Facility is an active industrial barge manufacturing facility currently owned and operated by OGM Properties LLC and Gunderson Marine LLC, respectively, which purchased the Facility and Gunderson's interest in the business in May 2023. The Oregon Department of Environmental Quality (DEQ) Environmental Cleanup and Site Information (ECSI) number for the Facility is 1155. Ongoing source control activities, including the groundwater source control evaluation, are being performed by Gunderson under Consent Order No. LQVC-NWR-13-02. The Facility is located within the boundary of the "River Mile 9 West" or "RM9W" Project Area. An unrelated party, FMC Corporation (FMC), is conducting the U.S. Environmental Protection Agency (EPA)-required remedial design for RM9W under an administrative settlement agreement and order on consent with EPA. FMC operated the Facility prior to Gunderson.

The Work Plan is organized as follows:

- MW-82 Area Background—Section 2.0
- Proposed Scope of Work—Section 3.0
- Schedule—Section 4.0
- References—Section 5.0

## 2.0 MW-82 Area Background

The Facility covers approximately 59 acres and 4,000 lineal feet of river frontage on the western bank of the Willamette River between river mile (RM) 8.5 and 9.2. The Facility is zoned Heavy Industrial and River Industrial. The Facility is divided into three areas (from downriver to upriver): Area 1, Area 2 and the Schnitzer ASD Yard (referred to in some historical reports as Area 3). Monitoring well MW-82 is located in Area 2 of the Facility near the top of the riverbank, as shown on Figures 2 and 3.

### 2.1 MW-82 GROUNDWATER ASSESSMENT

Monitoring well MW-82 was installed in June 2019 and has been sampled on a quarterly schedule since the second quarter 2019 monitoring event. Well MW-82 was installed as part of a Facility-wide stormwater infiltration groundwater assessment conducted to evaluate groundwater quality downgradient of stormwater infiltration features at the Facility. Well MW-82 is located approximately 10 feet downgradient of stormwater infiltration feature INF-2-3, as shown on Figure 3. Well MW-82 is between the stormwater infiltration feature and the top of the riverbank.

Groundwater samples collected from well MW-82 have exhibited concentrations of some dissolved metals that exceed Portland Harbor Record of Decision Cleanup Levels (ROD CULs; EPA, 2017 and 2020) for groundwater, most notably arsenic. While arsenic concentrations in groundwater across the Facility and in groundwater at many other upland areas near the Portland Harbor exceed the ROD CUL, concentrations of arsenic in groundwater in well MW-82 are elevated relative to other groundwater monitoring wells at the Facility. Concentrations of dissolved arsenic in well MW-82 groundwater samples have ranged from 26.4 to 252 micrograms per liter ( $\mu\text{g}/\text{L}$ ). Overall, concentration trends for arsenic in well MW-82 groundwater are stable; however, arsenic concentrations have exhibited seasonal variability. Higher concentrations of arsenic generally are observed during the wet season when groundwater elevations are highest.

An arsenic source investigation conducted in 2021 and 2022 showed that the stormwater discharging to infiltration feature INF 2-3 is not a significant source of arsenic to groundwater at well MW-82. Arsenic was not detected above the laboratory method detection limit (MDL) in the infiltrating stormwater. The INF 2-3 stormwater influent was also sampled in 2025, and arsenic was again not detected above the MDL.

## 2.2 HISTORICAL FILLING OF LAUNCHWAYS 3 AREA

The source of elevated concentrations of arsenic in groundwater at the MW-82 area appears to be waste materials that were buried in that area and on the riverbank as part of the overall closure and filling process completed in 1972 at the Launchways 3 Area. Historical images show that from at least 1962 to 1972, a vessel launchway (known as Launchways 3), was present in the MW-82 area. Launchways 3 was constructed and operated by FMC. A 1966 aerial photograph of Launchways 3 from the 2002 *Preliminary Assessment—Gunderson Area 2 Industrial Operations Area* is included in Appendix A (Squier, 2002). The 1966 image shows that Launchways 3 consisted of a large area that was excavated below the surrounding grade. The central part of the launchways was excavated to a greater depth. The launchways was directly connected to the Willamette River through stormwater and operations on the riverbank. Launch “rails” that sloped the length of Launchways 3 and approximately 50 feet out into the Willamette River were installed in the central part of the launchways. Vessels were fabricated in the launchways before launching into the Willamette River using the launch rails. The footprint of Launchways 3 in 1970 is shown on Figure 3.

A 1963 aerial photograph of the Launchways 3 in operation, with a vessel under construction, is included in Appendix A. As shown in the 1963 photograph, barge construction activities occurred in the upland portion of Launchways 3 and extended overwater beyond the edge of the riverbank. The Launchways 3 Area was filled by FMC about 1973 using fill of unknown origin. Remnants of Launchways 3 (i.e., the launch rails) remain in place and project from the riverbank into the Willamette River (Figure 3),

## 2.3 2023 POREWATER INVESTIGATION OFFSHORE OF MW-82 AREA

In August and September 2023, a porewater investigation was conducted offshore of the Facility to inform the ongoing groundwater source control evaluation at the Facility. The scope of the investigation included assessment of arsenic concentrations in porewater and sediment offshore of well MW-82. The results of the porewater investigation are summarized below and were reported in the *Final Focused Porewater Investigation Results Report* (GeoEngineers, 2024).

Dissolved arsenic was detected in the three porewater samples collected offshore of well MW-82 at concentrations ranging from 29 to 63  $\mu\text{g}/\text{L}$ . The ROD surface water CUL for arsenic is 0.018  $\mu\text{g}/\text{L}$ . Studies conducted in the Portland Harbor (e.g., the PDI Evaluation Report, Portland Harbor Pre-Remedial Design

[Pre-RD] Investigation; AECOM/Geosyntec, 2019) indicate that background concentrations of arsenic in porewater<sup>1</sup> in the Portland Harbor are several orders of magnitude higher than the ROD surface water CUL.

Arsenic concentrations in sediment samples collected offshore of well MW-82 during the 2023 porewater investigation ranged from 5.11 to 9.23 milligrams per kilogram (mg/kg). The ROD sediment CUL and the DEQ Regional Background Metals Concentrations in Soil for the Portland Basin are 3.0 and 8.8 mg/kg, respectively (EPA, 2017 and 2020; DEQ, 2013). These concentrations of arsenic in collocated sediment samples are less than or similar to the DEQ Regional Background Metals Concentration for arsenic.

## 2.4 MW-82 AREA SUBSURFACE INVESTIGATION

In November 2024, five borings were advanced in the monitoring well MW-82 area to determine whether a subsurface source of arsenic in MW-82 groundwater is present in soil. Three borings were advanced along the riverbank within 10 feet of well MW-82 (borings B82-3 through B82-5), and two borings (B82-1 and B82-2) were completed approximately 45 feet upgradient of well MW-82 (Figure 3). Soil samples for laboratory analysis were collected across the depth interval where groundwater has been typically encountered in monitoring well MW-82. Additionally, a groundwater sample was collected at boring B82-2, located upgradient of infiltration feature INF 2-3. As shown on Figure 3, the borings were completed within the footprint of the riverbank and the Launchways 3 Area. The results of the soil and groundwater investigation were detailed in the *MW-82 Area Investigation Report* (Investigation Report; GeoEngineers, 2025).

Debris was encountered in each of the five boring locations. Debris consistent with waste products generated during vessel manufacturing operations (e.g., metal, suspected blast grit, and dried paint flakes) was encountered in borings at depths between 22 and 28 feet below ground surface (bgs). Based on the position and depth of the remaining launchways rails, this depth interval appears to approximately correspond to the depth of the historical floor of Launchways 3 including the riverbank area. Therefore, the suspected source of this debris is the historical operations of the launchways. The highest concentrations of arsenic, other metals, and polychlorinated biphenyls (PCBs) were detected in this interval. Other types of debris, including wood, brick, and concrete, were found at varying depths during the investigation. This debris is associated with the historical filling in of Launchways 3 at least 52 years ago.

Total and dissolved arsenic concentrations measured in groundwater from boring B82-2 (completed upgradient of former Launchways 3) were within the range of typical arsenic concentrations in groundwater across the Facility and were significantly lower than concentrations measured in well MW-82 groundwater on the riverbank.

The Investigation Report included the following conclusions regarding arsenic in the investigation area:

- Arsenic impacts to MW-82 groundwater in the vicinity of the riverbank are buried soil and debris from historical operations in the former Launchways 3. Elevated concentrations of arsenic in soil are limited to the saturated zone and were not found in vadose zone soil.

---

<sup>1</sup> PDI Evaluation Report. *Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling* (AECOM/Geosyntec, 2019) proposed a porewater arsenic background concentration of 0.058 µg/L.

- The extent of elevated arsenic in groundwater has been defined and is limited to the riverbank area, immediately near well MW-82.
- Arsenic is present in porewater offshore of the MW 82 area; however, sediment in that area has not been significantly impacted by arsenic.
- Groundwater in the vicinity of monitoring well MW-82 is a low recontamination risk to the Willamette River and no further investigation, groundwater source control evaluation, or source control measures in the area should be required.

## 2.5 DEQ AND EPA COMMENTS ON MW-82 AREA INVESTIGATION REPORT

By letter dated March 10, 2025, DEQ provided comments to the Investigation Report (DEQ, 2025). EPA's comments to the Investigation Report, dated March 7, 2025, were included as an attachment to the DEQ comment letter (EPA, 2025). DEQ requested that Gunderson prepare a revised Investigation Report addressing DEQ and EPA comments within 30 days. DEQ also requested that Gunderson prepare a source control measure work plan to discontinue stormwater discharge to infiltration feature INF 2-3 within 45 days. Gunderson requested extensions to these deadlines by letter dated March 25, 2025, citing the need to consider sediment analytical data collected by FMC for the Supplemental Pre-Design Investigation (SPDI) that is not due for submittal to EPA until September 2025 and the need for coordination with Gunderson Marine.

By letter dated April 30, 2025 DEQ approved the requested schedule extensions as follows:

- The Revised MW-82 Area Investigation Report is due 60 days after FMC submits the SPDI report to EPA; and
- A Source Control Measures Work Plan for Infiltration Feature INF 2-3 is due September 30, 2025.

DEQ's and EPA's comments were closely followed by FMC's comments on the Investigation Report, which were submitted to EPA on March 13, 2025, as discussed in more detail below. In the comments, FMC alleges that there may be an arsenic source area in Facility groundwater that poses a threat to the river, pointing to sediment data that will not be in the public record until later this fall. Because FMC's comments raise a concern about the Facility's potential impacts to nearshore sediment around the MW-82 area, Gunderson proposes to conduct the targeted evaluation described in this Work Plan prior to revising the Investigation Report.

## 2.6 FMC MEMORANDUM

On March 13, 2025, FMC submitted a technical memorandum to EPA including comments on the Investigation Report (Foth Infrastructure & Environment, LLC, [Foth] 2025). The memorandum was prepared by Foth, on behalf of FMC. This memorandum included Foth's analysis and conclusions; however, the memorandum did not include surface sediment data collected by FMC as part of the SPDI work.

In the memorandum, Foth suggests that a "Gunderson Arsenic Source Area" is present in Facility groundwater spanning much of Area 1 and a portion of Area 2 of the Facility and that this groundwater discharge has impacted an approximately 500-foot-long section of nearshore sediment adjacent to the Facility and that this groundwater discharge may present a recontamination risk to the river. FMC based this assertion on the presence of elevated concentrations of arsenic (up to 147 mg/kg) in sediment

samples collected within approximately 50 feet of the toe of the riverbank offshore of the Facility and the elevated concentration of arsenic in well MW-82. FMC's suggestion that a significant source of arsenic contamination to the river exists at Launchways 3 and adjacent areas has not been demonstrated. Elevated concentrations of arsenic have been detected in only a single monitoring well (MW-82) at the Launchways 3 Area despite decades of groundwater monitoring. DEQ, in their March 10, 2025 comments, noted that buried soil and debris from the historical operations associated with the former Launchways 3 are likely sources of arsenic detected in porewater samples collected offshore.

FMC and Gunderson have conferred on this issue and Gunderson has agreed to collect more data to further evaluate groundwater near MW-82.

### 3.0 Proposed Scope of Work

The objective of the proposed scope of work is to reduce the uncertainty that elevated concentrations of arsenic in groundwater are localized to the riverbank area near MW-82. The proposed scope of work includes completion of soil borings and installation of two groundwater monitoring wells near the top of the riverbank at the approximate locations shown on Figure 3. The proposed monitoring wells will be installed outside of the footprint of the historical Launchways 3, to assess whether elevated arsenic concentrations are present in groundwater outside of the former launchways. Soil samples will be collected from the borings and groundwater samples will be collected from the completed monitoring wells, as described below.

#### 3.1 MONITORING WELL INSTALLATION

Prior to the initiation of the monitoring well installations, the Oregon 811 Utility Notification Center will be contacted, and a private utility locator will assess for the presence of subsurface utilities or infrastructure in the work area. The presence of unknown subsurface utilities or infrastructure, or other access issues, may result in modification of the proposed monitoring locations from those presented on Figure 3.

Based on previously observed subsurface conditions at the Facility and the targeted depth of the well installations, monitoring well borings will be advanced using a track-mounted sonic drill rig. Soil cores will be collected continuously to the full depth of the exploration and soil conditions will be logged in general accordance with ASTM International (ASTM) Method D2488. During quarterly monitoring events, depth to groundwater in well MW-82 ranges from approximately 18 to 25 feet bgs, corresponding to seasonal high and low groundwater levels, respectively. Beginning at 18 feet bgs, soil samples for laboratory analysis will be collected approximately every 2 feet to the full depth of the boring. Additional samples will be collected if buried debris and/or indications of contamination are observed. Approximately 14 soil samples will be collected (seven from each boring) and submitted for laboratory analysis of arsenic by EPA Method 6020B. A subset of samples (six samples assumed, approximately three from each boring) will also be analyzed for PCBs by EPA Method 8082.

Monitoring wells will be installed in accordance with Oregon Water Resource Department (OWRD) regulations. The wells will be constructed of 2-inch-diameter, flush-threaded, Schedule 40 polyvinyl chloride (PVC) casing and a machine-slotted well screen with clean 10/20 silica sand pack or an equivalent pre-pack well screen. Prior to installation of the well seal, the well will be surged using a surge block or similar technique to allow for the sand pack to settle. The remainder of the annular space will be filled with

bentonite grout slurry and/or hydrated bentonite chip seal to approximately 2 feet bgs. The wells will be finished at or slightly above ground surface with a concrete surface seal housing a flush-mounted, traffic-rated monument.

The monitoring wells will be screened from approximately 10 feet to 30 feet bgs, consistent with the screen interval in monitoring well MW-82 and the observed seasonal fluctuation of groundwater elevation near the proposed well locations. Well construction forms and boring logs will be completed to document well installation details. Following construction, the horizontal location and top of casing elevation will be measured by a licensed land surveyor.

Investigation derived waste (IDW), consisting of soil cuttings and decontamination water will be placed in labeled 55-gallon drums and stored on site. The IDW (assumed to be non-hazardous) will be disposed of at a licensed Subtitle D disposal facility, pending waste profiling and transportation to the disposal facility.

### **3.2 MONITORING WELL DEVELOPMENT**

The wells will be allowed to sit for at least 24 hours prior to initiating well development. The wells will then be developed by GeoEngineers by over-pumping to remove excess turbidity and improve hydraulic communication with the adjacent water-bearing zone. A minimum of 5 to 10 casing volumes will be pumped or bailed from the well during development until the water removed from the well is reasonably free of sediment. Following development, monitoring wells will be allowed to sit for at least 7 days before sampling.

### **3.3 MONITORING WELL SAMPLING**

Groundwater samples will be collected using low-flow methodology and will be analyzed for total and dissolved arsenic by EPA Method 6020B. Samples for dissolved arsenic will be field filtered using a 0.45-micron filter. Following the initial sampling event, the wells will be sampled for total and dissolved arsenic during the next two quarterly groundwater monitoring events. At the conclusion of three rounds of sampling, Gunderson will evaluate if further characterization is warranted.

### **3.4 REPORTING**

Following installation and completion of the initial groundwater sampling event, an investigation report will be prepared. The report will include documentation of investigation procedures, field observations and detailed boring logs, and tabulated soil and groundwater analytical data. The data will be compared to CULs and the report will include an evaluation of the nature and extent of arsenic in the vicinity of well MW-82. The report will include recommendations of additional investigation, if warranted.

Following the initial sampling event, groundwater sampling results for the new wells will be documented in the routine quarterly groundwater monitoring reports.

## **4.0 Schedule**

The monitoring installations and initial groundwater sampling event will be completed within 45 days of receipt of DEQ approval of this Work Plan, pending driller subcontractor availability and Facility access. The investigation report will be submitted to DEQ within 30 days of receipt of the analytical data.

The investigation report will be submitted as part of the Revised MW-82 Area Investigation Report, if possible, or as a standalone report depending on the schedule for DEQ Work Plan approval and subcontractor availability. As noted in Section 2.5, the Revised MW-82 Area Investigation Report is due to DEQ 60 days after FMC submits the SPDI report to EPA, expected in September 2025.

## 5.0 References

AECOM/Geosyntec, 2019. PDI Evaluation Report. Portland Harbor Pre-Remedial Design Investigation and Baseline Sampling. June 17, 2019.

Oregon Department of Environmental Quality (DEQ), 2013. Development of Oregon Background Metals Concentrations in Soil. State of Oregon Department of Environmental Quality Land Quality Division Cleanup Program. March 2013.

DEQ, 2025. DEQ Comments on MW-82 Area Investigation Report. Gunderson Inc. (ECSI No. 1155). March 10, 2025.

U.S. Environmental Protection Agency (EPA), 2017 and 2020. Record of Decision, Portland Harbor Superfund Site, Portland, Oregon. January 2017, revised January 2020.

EPA, 2025. EPA Comments on MW-82 Area Investigation Report, Gunderson LLC Facility, Portland Oregon ECSI #1155. March 7, 2025.

Foth Infrastructure & Environment, LLC (Foth), 2025. Comments on Gunderson MW-82 Investigation Report, River Mile 9 West, Portland Harbor Superfund Site. March 13, 2025.

GeoEngineers, Inc. (GeoEngineers), 2024. Final Focused Porewater Investigation Results Report. May 10, 2024.

GeoEngineers, 2025. MW-82 Area Investigation Report. January 24, 2025.

Squier, 2002. August 7, 1966 Aerial Photo from Preliminary Assessment—Gunderson Area 2 Industrial Operations.

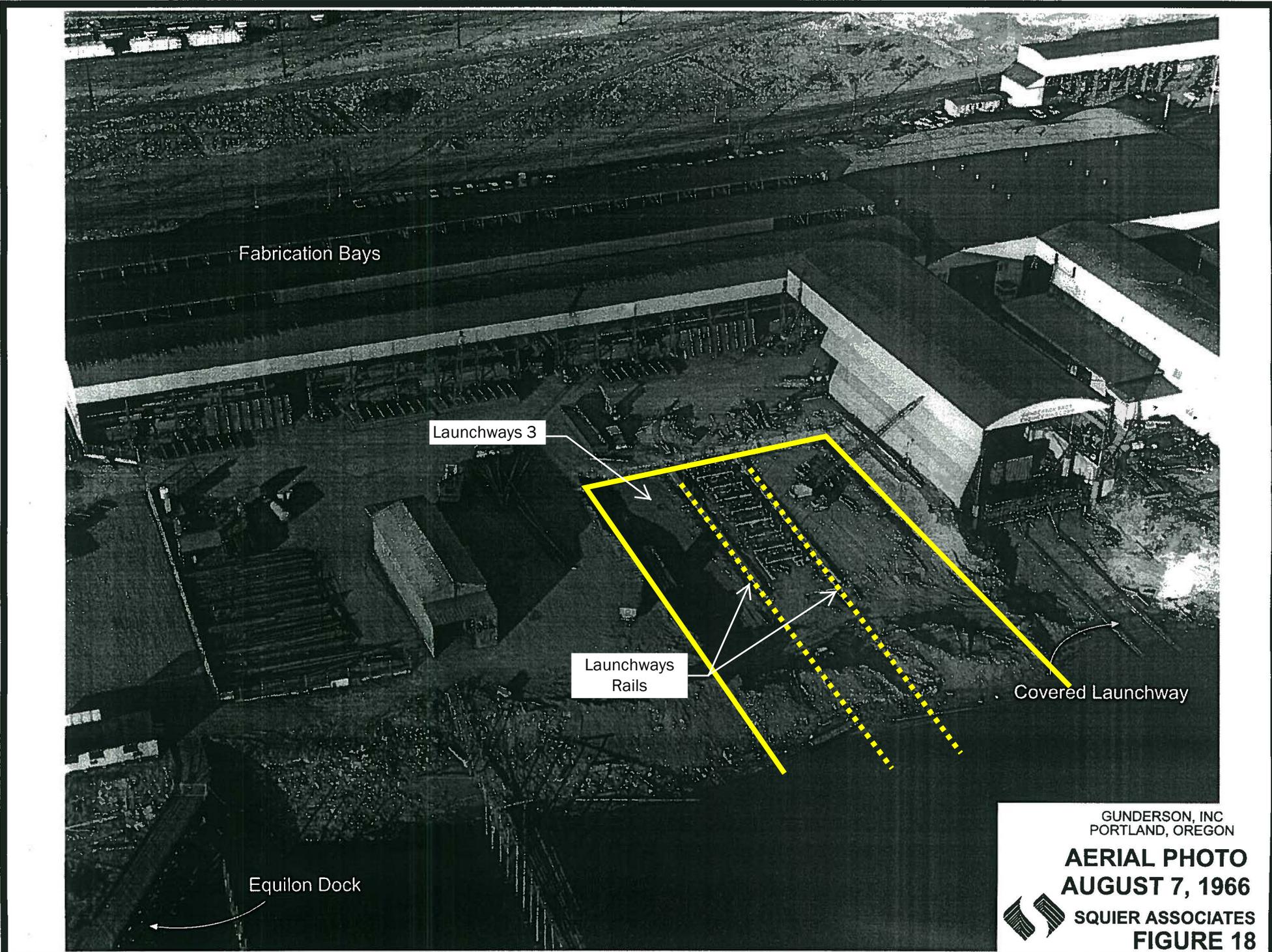
**Appendix A**  
**Launchways 3 Historical Aerial Photographs:**  
**1963 and 1966**



1963 Aerial Photo of Launchways 3

MW-82 Area Investigation Report  
Former Gunderson LLC Facility

**GEOENGINEERS** 



Fabrication Bays

Launchways 3

Launchways Rails

Covered Launchway

Equilon Dock

GUNDERSON, INC  
PORTLAND, OREGON

**AERIAL PHOTO**  
**AUGUST 7, 1966**



**SQUIER ASSOCIATES**  
**FIGURE 18**

Drawn by: TLK

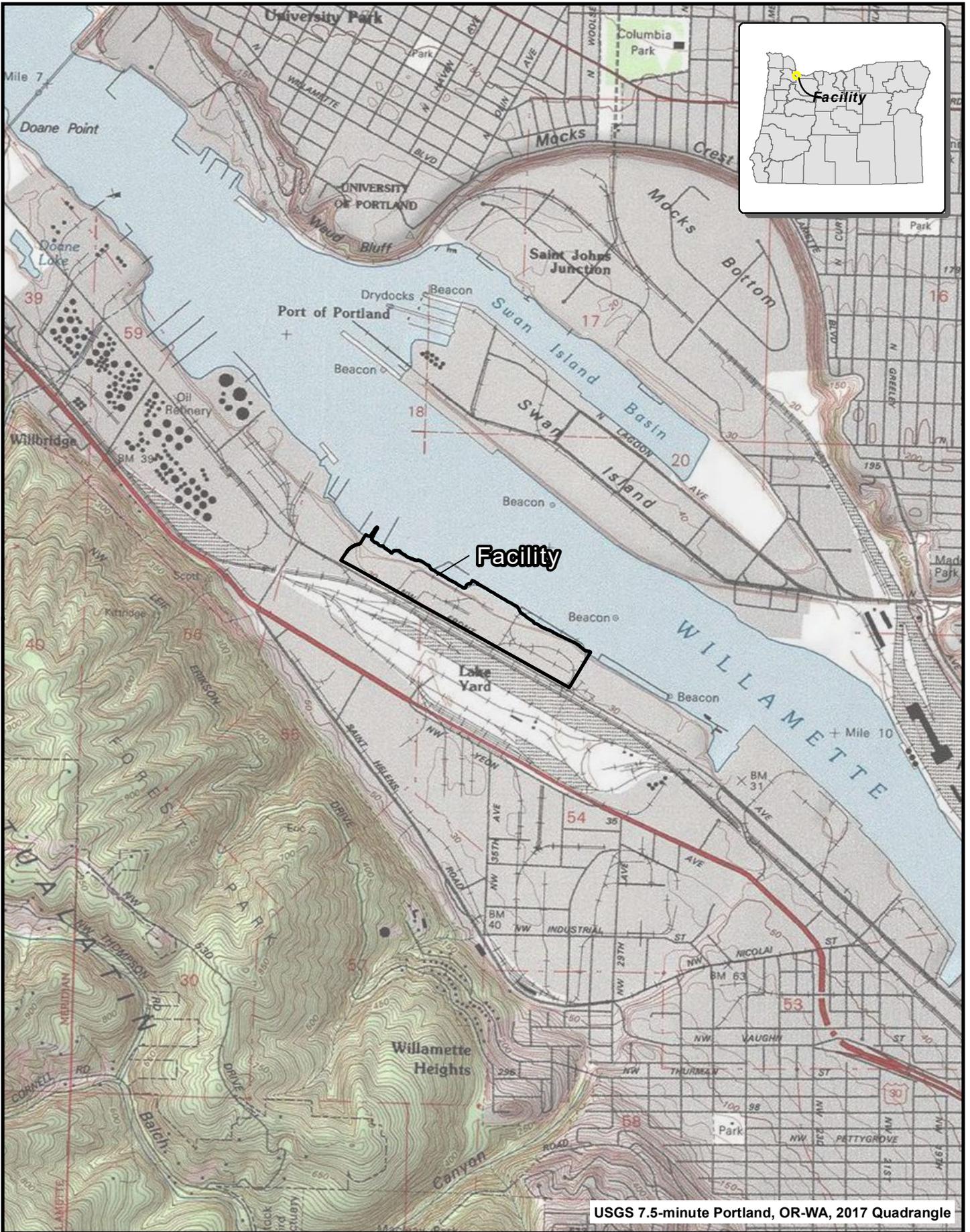
Checked by: [Signature] Graphics Check:

File: P:\PROJECTS.90190445\90445.9

Date: 04/02

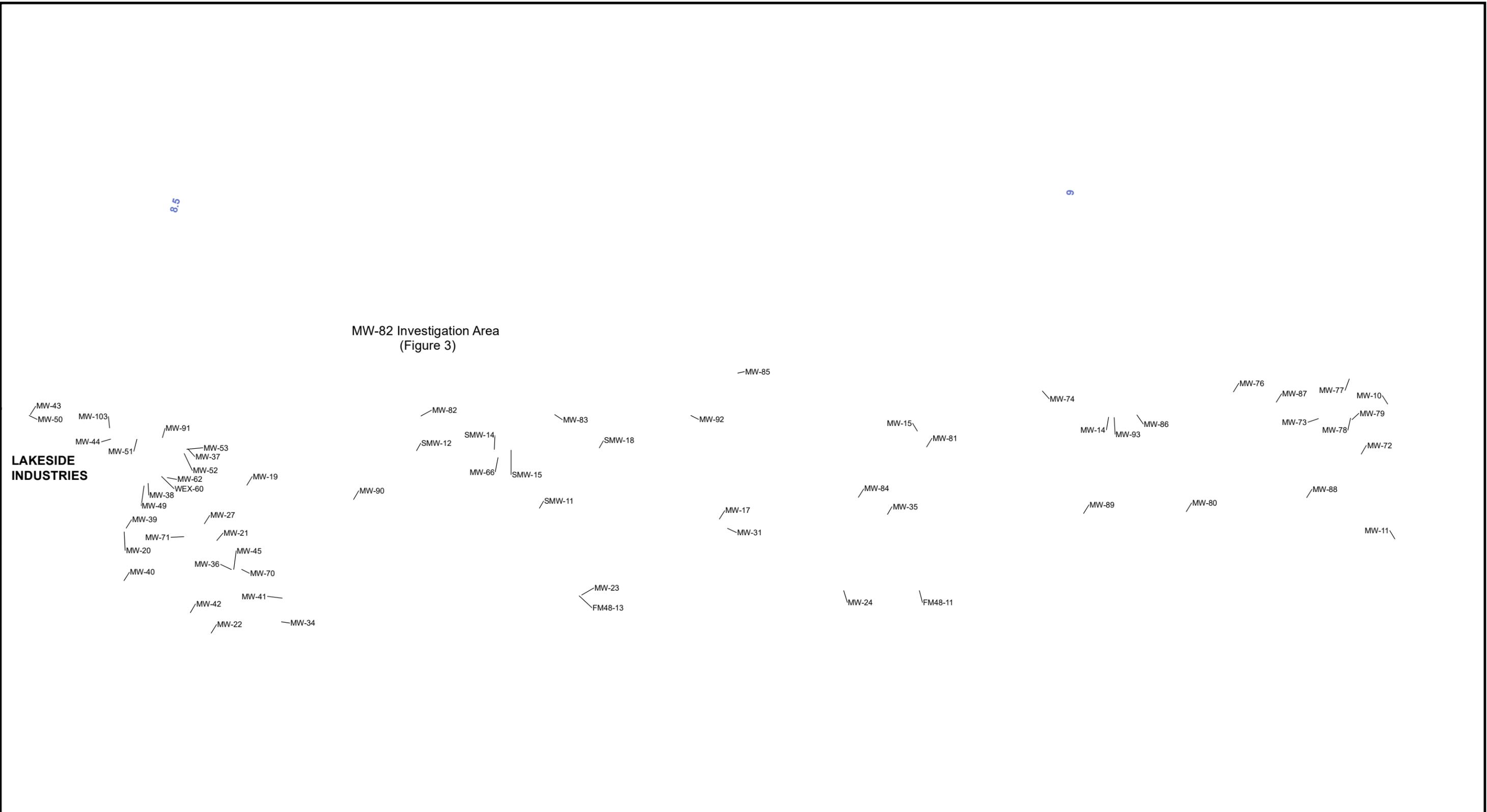
Job. No. 90445.24

## Figures



USGS 7.5-minute Portland, OR-WA, 2017 Quadrangle

Document Path: P:\25125323001\GIS\MXD\MW\_82\Figure2\_well\_network\_02\_2024.mxd

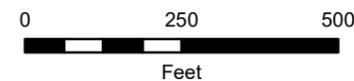


**Legend**

**Well Network**

-  Decommissioned Monitoring Well
-  Monitoring Well - In Current Groundwater Monitoring Program
-  Monitoring Well - Not in Current Groundwater Monitoring Program

-  River Mile
-  Facility Property Boundary



<p><b>Groundwater Monitoring Well Network</b>          MW-82 Area Supplemental Investigation Work Plan          Former Gunderson LLC Facility, Portland, Oregon</p>		
		<p>Figure <b>2</b></p>
PREPARED BY: estrandhagen	DATE: 7/14/2025	PROJECT:025323-001 -15/-16/-17

**Sources:**  
 Johnson Land Surveying; Minister and Glaeser Surveying.  
**Coordinate System:**  
 North American Datum of 1983 (2011) State Plane Oregon North (International Feet)



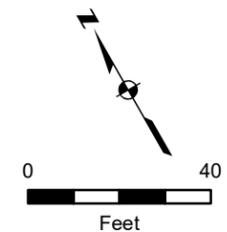
Document Path: P:\25\25323001\GIS\MXD\MW\_82\Figure3\_Prop\_Well\_Locs\_2025\_0714.mxd

**Sources:**  
 Launchways extent and rails position based on exported georeferenced image (FirstSearch, 1970-07-05 aerial, DC 750)  
 Johnson Land Surveying; Minister and Glaeser Surveying.

**Coordinate System:**  
 North American Datum of 1983 (2011) State Plane Oregon North (International Feet)

**Legend**

- Facility Property Boundary
- Monitoring Well
- 2024 Soil Boring Location
- Proposed Monitoring Well Location
- Decommissioned Monitoring Well
- 2010 Vector Boring Location (Shaw 2011)
- Launchways rails
- Extent of excavated launchways (1970)



**Proposed Monitoring Well Locations**

MW-82 Area Supplemental Investigation Work Plan  
 Former Gunderson LLC Facility, Portland, Oregon



Figure  
**3**

