CLEANER AIR OREGON—
HYDRO MODELING PROTOCOL

HYDRO EXTRUSION PORTLAND, INC.
PORTLAND, OREGON

Prepared for

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

CLEANER AIR OREGON AIR TOXICS PROGRAM

May 30, 2023

Project No. M0201.10.002

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ACRONYMS AND ABBREVIATIONS

ASOS	Automated Surface Observation Systems
BPIP-PRM	Building Profile Input Program incorporating the Plume Rise Model Enhancements
CAO	Cleaner Air Oregon
DEQ	Oregon Department of Environmental Quality
EPA	U.S. Environmental Protection Agency
facility	Hydro Extrusion facility located at 5325 NE Skyport Way, Portland, Oregon
FTP	file transfer protocol
g/s	gram(s) per second
Hydro	Hydro Extrusion Portland, Inc.
IFW	Ice-Free Winds Groups
m	meter
m/s	meters per second
MFA	Maul Foster & Alongi, Inc.
NCEI	National Center for Environmental Information
NLCD92	State of Oregon National Land Cover Dataset, 1992
OAR	Oregon Administrative Rule
RBC	risk-based concentration
RTO	Regenerative thermal oxidizer
TAC	toxic air contaminant
TEU	toxic emissions unit
TIE	Thermally Improved Extrusion
ug/m³	microgram(s) per cubic meter
VPL	Vertical paint line
USGS	U.S. Geological Survey

1 INTRODUCTION

Hydro Extrusion Portland, Inc. (Hydro) owns and operates a coatings facility located at 5325 NE Skyport Way in Portland, Oregon (facility). The facility currently operates under Standard Air Contaminant Discharge Permit No. 26-3241-ST-01 issued by the Oregon Department of Environmental Quality (DEQ) on November 21, 2018.

Maul Foster & Alongi, Inc. (MFA) has been retained by Hydro to assist the facility with each step of the Cleaner Air Oregon (CAO) permitting process. On February 12, 2021, Hydro submitted the toxic air contaminant (TAC) emissions inventory to the DEQ for review and approval to satisfy the initial step of the CAO permit application process as specified in Oregon Administrative Rule (OAR) 340-245-0030(1)(a). Hydro addressed comments from the DEQ and submitted a revised version of the TAC emissions inventory on February 10, 2022. The DEQ completed internal review and approved the TAC emissions inventory by letter dated May 20, 2022.

As stated in OAR 340-245-0030(1)(b), a modeling protocol must be submitted no later than 30 days after receiving DEQ approval of the emissions inventory. Hydro met this requirement by submitting a Modeling Protocol to the DEQ on June 20, 2022. The purpose of this revised Modeling Protocol is to align with the revised TAC emissions inventory submitted on May 30, 2023 in tandem with this protocol. The DEQ agreed by an email dated May 5, 2023 to accept the submission of a revised TAC emissions inventory, Modeling Protocol, and Risk Assessment Work Plan with the Risk Assessment Report due May 30, 2023.

Hydro intends to conduct a Level 3 Risk Assessment to determine the potential excess cancer risk and chronic and acute noncancer risk (expressed numerically as the chronic and acute hazard index) impacts from the facility for comparison to the applicable risk action levels shown in OAR 340-245-8010 Table 1. The remainder of this Modeling Protocol outlines the proposed modeling methodology and specific information required by OAR 340-245-0210(1).

2 FACILITY DESCRIPTION

2.1 Facility Location

The facility is located in Portland, Oregon, between the Columbia River and the Columbia Slough, and borders the Portland Air National Guard Base and the Portland International Airport. The area immediately surrounding the facility is characterized primarily by flat terrain. The facility is surrounded by a mixture of residential, mixed-use, and industrial land-use zones. An aerial image of the facility location is shown in Figure 2-1. The topography of the area immediately surrounding the facility is presented in Figure 2-2.

2.2 Process Description

The facility is an extruded aluminum surface coating operation. The facility receives aluminum extrusions from off-site sources. Extrusions are transported to the facility by truck and unloaded for on-site storage.

Aluminum extrusions are cleaned and treated by a corrosion resistant chromate conversion coating in the pretreatment area. The aluminum extrusions are hung vertically on a monorail system and travel through a narrow, enclosed tunnel in which the chromate conversion coating is applied by spray application. The tunnel is divided into five compartments that are each separated by baffles designed to minimize carryout. The five tunnel compartment contents are alkaline cleaning, rinse, chromate conversion coating, rinse, and final rinse. Each tunnel compartment is equipped with vertical risers with interspaced spray nozzles that spray the extrusions along their length as they move through. Each tunnel compartment has a dedicated tank (covered and isolated from room air) from which the liquid is pumped. Overspray that occurs in a tunnel compartment drains back down into the respective tank to be recirculated for reuse. Stage 1 and Stage 3 tanks are heated to approximately 135º F.

After exiting the final rinse in the pretreatment process, extrusions enter the drying oven and are dried at approximately 175 °F. Emissions from the drying oven are solely from natural gas combustion from the burners.

Following the drying oven, the extrusions enter the Vertical Paint Line (VPL) application booth. The application booth incorporates electrostatic application equipment in the spray areas to coat the extrusions. Various paint formulations may be used depending on the desired customer specifications for the finished product. Coatings are mixed in a paint kitchen and transferred to the application line. After coating, the extrusions travel through a flash-off area and a curing oven. The curing oven is heated by natural gas burners. Emissions from the VPL application booth, flash off tunnel, paint kitchen, and curing oven are routed to the Telkamp Systems, Inc. regenerative thermal oxidizer (RTO), installed in 2014.

A small portion of extrusions are sent to the Thermally Improved Extrusion (TIE) Line. This process reduces thermal transfer and improves energy efficiency of the extrusions. A two-part polymer is poured into a small channel in the extrusions, then the polymer hardens into a structural insulating element. The metal "bridge" is mechanically removed by saws from the bottom of the channel, eliminating the conductive aluminum element and producing a non-metal to metal thermal barrier. All saws are equipped with saw enclosure cabinets with vacuum and dust filter systems, which vent indoors. No saws exhaust to the atmosphere.

The horizontal pretreatment and surface coating line previously operated by the facility was decommissioned in 2021.

A process flow diagram outlining the manufacturing process and points of emissions to atmosphere is presented in Figure 2-3.

3 EMISSION ESTIMATES AND MODEL SOURCES

Daily and annual TAC emission estimates for the process equipment and emission-control devices, considered to be toxic emissions units (TEUs) as defined in OAR 340-245-0020(59), were prepared as shown in the TAC emissions inventory dated May 30, 2023. The annual and daily TAC emission estimates for significant TEUs were converted to units of grams per second (g/s) for purposes of conducting the Level 3 Risk Assessment as shown in Tables 3-1, 3-2, and 3-3. Tables 3-4 and 3-5 present the annual and daily TAC emission estimates for natural gas TEUs. Additional details regarding how the daily and annual TAC emission rates will be used to complete the Level 3 Risk Assessment will be provided in the Risk Assessment Work Plan.

The TEUs identified in the TAC emissions inventory will be represented in a dispersion model developed to represent the facility. Each TEU in the dispersion model will be modeled using a unit emission rate equivalent to 1 g/s for all modeled source types as shown in Table 3-6. Additional details describing unit emission rate modeling are provided in Section 4.4.

3.1 Pretreatment System

Emissions from the pretreatment system are uncontrolled. There are two vertical ducts at the ends of the pretreatment tunnel that vent to the separate roof exhaust stacks, one is approximately over Stage 1, and one is approximately over Stage 5. The exhaust stacks for pretreatment will be represented in the air dispersion model as individual point sources with the unique model IDs VPT1 and VPT2.

3.2 Vertical Paint Line

The VPL consists of a coating application area, flash off tunnel, curing oven, and paint kitchen. The VPL areas are all interconnected and are considered one source. The electrostatic application equipment has a 90 percent transfer efficiency, and the VPL is equipped with overspray filters that control 98.2 percent of particulate matter emissions.

The VPL was verified as a permanent total enclosure using U.S. Environmental Protection Agency (EPA) Method 204 on August 13, 2021. The EPA Method 204 was conducted according to the test protocol dated July 28, 2021 that was approved by the DEQ. The VPL is a permanent total enclosure and 100 percent of process exhaust from all areas is routed to the RTO with a 98 percent destruction efficiency for volatile organic compounds. Therefore, the VPL has a combined volatile organic compound capture and control efficiency of 98 percent. The stack for the RTO will be represented in the air dispersion model as an individual point source with the unique model ID RTO.

3.2.1 Toxicity Weighted Emission Rates

Production at the facility operation relies on a wide variety of coatings, each with a unique blend of constituents. Multiple coating formulations are used that can vary year-to-year, or potentially undergo

periodic formula changes. As a result, MFA has developed a worst-case TAC emissions scenario with respect to the CAO permitting program.

MFA proposes to assess cancer and noncancer risk using a toxicity weighted emission rate ranking methodology. A toxicity weighted emission rate was calculated for cancer risk (residential, non-residential, and child), noncancer chronic risk (residential, non-residential, and child) and acute risk for each coating within a given exposure type. The coatings were ranked for each of the seven exposure types. MFA calculated a toxicity weighted emission rate for each coating using the following methodology:

- Using the calculation methodology identified in the approved emissions inventory, MFA estimated TAC emissions for each individual coating assuming a normalized usage rate of 1 gallon.
- MFA divided the individual TAC emission rate estimated for each coating by the applicable chronic cancer, chronic noncancer, and acute noncancer risk-based concentration (RBC) from OAR 340-245-8010 Table 2. This resulted in a toxicity-weighted emission rate of the individual TAC for each exposure type in units of pound per microgram per cubic meter for each coating. The toxicity-weighted emission rates calculated for each TAC were summed together for each coating, resulting in a total toxicity-weighted emission rate for each coating, and each exposure type.
- As identified in the approved emissions inventory, the coatings with the highest ranked toxicity-weighted emission rate for cancer risk, noncancer chronic risk, and acute risk will be used as the basis for the worst-case scenario for the Level 3 Risk Assessment.

To estimate emissions from the worst-case scenario, emissions for the highest ranked coatings were calculated based on either the facility maximum daily or annual production rates, depending on the type of risk being assessed (i.e., cancer, chronic noncancer, acute noncancer) as presented in Tables 3-1, 3-2, and 3-3.

3.3 TIE Line

Emissions from the TIE Line are uncontrolled. There are two vertical stacks for the TIE Line, one for the polymer mixing, and one for the application area. Exhaust stacks for the TIE Line will be represented in the air dispersion model as individual point sources with the unique model IDs TIE1, TIE2.

3.4 Natural Gas Combustion TEUs

The specific procedures for assessing the risk of each TEU are dependent on the TEU designation per OAR 340-245-0050(4). Per OAR 340-245-0050(5), the gas combustion "exemption applies to TEUs that solely combust natural gas, propane, [or] liquefied petroleum gas." Facility-wide natural gas usage is identified as TEU ID NG. The following units represent sources of natural gas-fired combustion emissions only (shown with the corresponding dispersion model IDs in parentheses).

- Drying oven (OVEN).
- Pretreatment burners for Stage 1 and Stage 3 tanks (PTH1, PTH2).
- Air make-up units (AMUA, AMUB).
- Building heaters (C1H1, C1H2, C1H3, C1H4, C2H1, C2H2, C2H3, C2H4, C2H5).
- Natural gas combustion emissions routed through the RTO stack (RTO_NG) including:
  - the air make-up unit located in the area previously occupied by the horizontal paint line,
  - the curing oven burner, and
  - the RTO burner.

4 AIR DISPERSION MODELING METHODOLOGY

The following subsections detail the dispersion model proposed methodology and setup, including input parameters and assumptions.

4.1 Model Selection

MFA proposes to set up the dispersion model of the facility using the models shown in Table 4-1. Lakes Environmental, a third-party overlay software, will be used to execute the dispersion model.

Table 4-1. Proposed Model Selection

Model	Model Version
AERMOD	22112
AERMET	22112
AERMAP	18081
AERSURFACE	20060
AERMINUTE	15272
BPIP	04274

4.2 Meteorological Data

In preparation for air dispersion modeling, MFA developed the meteorological and terrain data files shown in Table 4-2 below.

Table 4-2. Proposed Meteorological and Terrain Data

Dataset	Station ID
Surface	Station ID 24229 (Portland International Airport)
Upper Air	Station ID 24232 for Salem, OR (National Oceanic and Atmospheric Administration/ Earth System Research Laboratory Radiosonde Database)
Terrain	USGS National Elevation Dataset (1/3-arc seconds with horizontal resolution of 10 [m])

4.2.1 Surface Meteorological Data

Surface meteorological data were collected from the Portland International Airport monitoring station (ID 24229) located in Portland, Oregon (Portland met station). Hourly wind speed, wind direction, cloud cover, and temperature data for the years 2017 through 2021 were downloaded by file transfer protocol (FTP) from the National Center for Environmental Information (NCEI). The Portland met station was chosen as the most representative, publicly available surface meteorological data for the facility for the following reasons:

- The Portland met station represents the closest meteorological station to the facility location with data available for download from the NCEI. The Portland met station is approximately 2.2 kilometers to the north of the facility.
- Both the Portland met station and the facility are located within close proximity to the dominant topographical feature of the area – the Columbia River.

The Portland met station is part of the National Weather Service Automated Surface Observation Systems (ASOS) network. The met station collects wind speed and wind direction, both of which are sampled once per second, with the average computed every five seconds. These data are referred to as "ASOS 1-minute."

The Portland met station is part of the Ice-Free Winds Group (IFW) within the ASOS network. IFW stations collect wind data, using a sonic anemometer, which has no minimum detection threshold to determine "calms." The ASOS 1-minute data (TD-6405) for the years 2017 through 2021 were extracted by FTP from the NCEI. These data were processed using the EPA AERMINUTE program.

4.2.2 Upper-Air Data

Upper-air meteorological data for Salem, OR (station ID 24232) were collected from the National Oceanic and Atmospheric Administration Earth System Research Laboratory Radiosonde Database in Forecast Systems Laboratory format. Upper-air meteorological data were extracted for years 2017 through 2021.

4.2.3 Data Processing—AERMET

The surface and upper air meteorological data were processed using the EPA AERMET program to produce five years of model-ready meteorological data for use in the AERMOD dispersion model. The adjustment to the surface frictional velocity (ADJ_U*) option was selected as part of the AERMET processing. The land use surface characteristics were processed using AERSURFACE, and AERMINUTE was used to process and incorporate the ASOS 1-minute wind data into AERMET.

When ASOS 1-minute data are used, AERMET enables a default wind speed adjustment option. This option adds 0.26 meters per second (m/s) to all wind speeds to account for wind speed truncation (in units of whole knots) applied by the ASOS quality assurance system. Per the EPA technical memorandum titled "Use of ASOS meteorological data in AERMOD dispersion modeling"[1] dated March 8, 2013, a minimum wind speed detection threshold of 0.5 m/s was used to account for the adjustment. Wind direction randomization was not selected when running AERMET because ASOS 1-minute data increase the precision of wind direction measurements and, unlike non-ASOS data, are rounded to the nearest ten whole degrees.

After executing AERMET for each calendar year, the surface and profile files were combined to create a complete 5-year meteorological dataset for use in the dispersion model. An analysis of the data completeness for the proposed meteorological dataset was performed by MFA using the QA feature available in the Lakes Environmental software. As shown in Table 4-3, the surface and profile files produced by AERMET are more than 90 percent complete for each calendar quarter in the meteorological dataset.

A wind rose for the meteorological dataset described above is presented in Figure 4-1. The wind direction for this meteorological dataset is predominantly northwest to southeast bimodal distribution. Note this wind direction orientation is consistent with the orientation of the Columbia River at this location.

4.3 AERSURFACE Land Use

In preparation for air dispersion modeling, AERSURFACE was used to generate seasonal values for albedo, Bowen ratio, and surface roughness heights. State of Oregon National Land Cover Dataset, 2016 (NLCD16) land cover class definitions, along with concurrent percent impervious surface and percent tree canopy data were downloaded from the U.S. Geological Survey (USGS) and processed using the AERSURFACE land-use tool to generate the surface characteristics necessary to run AERMET. The NLCD16 data will be processed in AERSURFACE, using the settings described in Table 4-4.

Surface moisture conditions were determined following the methodology set forth in the AERSURFACE User's Guide dated January 16, 2013 (AERSURFACE User's Guide). Section 2.2 of the AERSURFACE User's Guide states *"the surface moisture condition can be determined by comparing precipitation for the period of data to be processed to the 30-year climatological record, selecting "wet" conditions if*

[1] https://www3.epa.gov/ttn/scram/guidance/clarification/20130308_Met_Data_Clarification.pdf

precipitation is in the upper 30th-percentile, "dry" conditions if precipitation is in the lower 30th-percentile, and "average" conditions if precipitation is in the middle 40th-percentile."

Annual precipitation data for each year of the 5-year meteorological dataset were reviewed and compared against the 30-year climatological record to determine the representative surface moisture condition for each modeling year. As shown in Table 4-5, the average annual precipitation varied between the lower 30th percentile to greater than the 70th percentile of the 30-year climatological record. To account for this variability, AERSURFACE was executed for each year using the corresponding surface moisture condition associated with that year's annual rainfall.

MFA proposes to execute the dispersion model using urban dispersion coefficients. To make this determination, MFA followed the land use procedure, as recommended by EPA's "Guideline on Air Quality Models"[2], to conclude that 62.7 percent of the land use within a 3-kilometer radius about the facility is represented by the urban land use type. MFA will use a population of 641,162 for the urban source group within AERMOD. This value was provided by letter from the DEQ dated January 30, 2023, and is based on the 2021 US Census count within the City of Portland, Oregon.

4.4 Unit Emission Rates

Results from the air dispersion model runs, executed using unit emission rates for each TEU identified in the DEQ-approved TAC emissions inventory, can be used to derive the predicted concentrations for multiple TACs from a given TEU. MFA proposes to execute the dispersion model using unit emission rates for all TEUs, for both the annual and daily (i.e., 24-hour) averaging periods, as shown in Table 3-5.

The maximum modeled unit concentration in micrograms per cubic meter (ug/m^3) for each averaging period will be considered a modeled "dispersion factor" in units of ug/m^3 per g/s. When this "dispersion factor" is multiplied by the TAC emission rate for the modeled TEU, the result is the modeled concentration of the TAC. The dispersion factors will be used to conduct the Level 3 Risk Assessment, in combination with TAC emission rates for each TEU in g/s and the RBCs in ug/m^3 set forth under OAR 340-245-8010 Table 2.

4.5 Emissions Source Locations

The location of each significant TEU to be included in the dispersion model is shown in Figure 4-2, and natural gas combustion TEU locations are presented in Figure 4-3.

4.6 Building Downwash

The most recent version of the EPA Building Profile Input Program, incorporating the Plume Rise Model Enhancements Algorithms (BPIP-PRM), will be used to calculate direction-specific building downwash parameters for all significant building structures located at the facility. The current version of BPIP-PRM shown in Table 4-1 will be used.

[2] Appendix W to Part 51 – "Guideline on Air Quality Models". See Section 7.2.1.1(b)(i).

The proposed locations for structures that are projected to influence downwash are presented in Figure 4-2. Table 4-6 presents a summary of the proposed building heights to be included in the air dispersion model.

4.7 Receptor Locations and Terrain

Dispersion factors will be determined for each modeling receptor identified outside the facility property boundary. MFA proposes to place modeling receptors at potential exposure locations in the surrounding area up to 10 kilometers away from the center of the facility. Receptors will be defined consistent with Section 2.4 of the DEQ's guidance document (DEQ Recommended Procedures) (DEQ 2022) as shown in Table 4-7 below. Figure 4-4 presents the proposed receptor spacing and locations within the modeling domain. Figure 4-5 presents the proposed receptor locations in the area immediately surrounding the facility.

Table 4-7. Proposed Receptor Locations

Receptor Spacing (meters)	Receptor Distance (meters)
25	Along the property boundary and out to at least 200 meters from the property boundary
50	200 to 1,000
100	1,000 to 2,000
200	2,000 to 5,000
500	5,000 to 10,000

MFA identified a location considered to be a "sensitive area" within approximately 1 kilometer of the facility property boundary. The identified sensitive area (shown in Table 4-8) will be accounted for in the air dispersion model by a proposed receptor location specifically located on the site.

Table 4-8. Identification of Sensitive Exposure Location

UTM Coordinates (m)		Sensitive Area
Easting	Northing	
530446.87	5046424.88	NAYA Early College Academy

Terrain elevations for model receptors, source base elevations, and base elevations of downwash structures will be derived from USGS National Elevation Dataset data at a resolution of 1/3 arc-seconds (a horizontal resolution of roughly 10 meters) and processed using the current version of AERMAP as shown in Table 4-1.

4.8 Land-Use Zoning Classification Data for Determining Exposure Types

In anticipation of air dispersion modeling, MFA reviewed the Department of Land Conservation and Development's statewide zoning data to determine land-use classifications for areas within the modeling domain. The statewide zoning classifications provide the basis for the initial categorization of exposure classifications (i.e., residential, nonresidential worker, nonresidential child, or acute). School locations were obtained from the Oregon Department of Human Services and the Oregon Health Authority.

MFA also reviewed aerial imagery via Esri ArcGIS and Google Earth software to determine whether the existing zoning information reflects actual land-use and the corresponding exposure type categorization. It is important to note that exposure locations falling within the state of Washington will not be included in the proposed Level 3 Risk Assessment as these exposure locations fall under the jurisdiction of a different state department and permitting program per OAR 340-245-0010(1).

The zoning data and internal MFA review process indicate that multiple proposed locations fall within roadway and/or rail rights-of-way interstitial spaces as shown in blue in Figures 4-4 and 4-5. These locations are proposed for dispersion modeling to maintain a uniform receptor grid. MFA is not proposing to conduct risk evaluations for any receptor locations in roadways or rail rights-of-way inside the 50-m receptor grid. In the crosswalk-of-receptors, which will be provided to the DEQ in spreadsheet format due to the number of receptor locations, these locations are labeled as "Risk Not Assessed," even though they will be modeled, and dispersion factors generated.

Figure 4-6 presents the existing land-use classifications identified for the modeling domain, and Figure 4-7 is provided for the area immediately surrounding the facility. Figure 4-8 and Figure 4-9 present the corresponding exposure location categorization for the modeling domain and the immediate area surrounding the facility, respectively.

5 CLOSING

MFA looks forward to working with the DEQ throughout the CAO permit application process. If there are any questions or comments regarding this Modeling Protocol, please contact Leslie Riley at (971) 570-5319 or at lriley@maulfoster.com.

LIMITATIONS

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TABLES

Table 3–1
Significant Emission Units Emission Rates—Cancer Assessment
Hydro Extrusion Portland, Inc.—Portland, Oregon

Toxic Air Contaminant	CAS	RBC? (Yes/No)	Annual Emission Estimates											
			Vertical Paint Line		Pretreatment				TIE Line				Total	
			(lb/yr) [1]	(g/s) [a]	Total (lb/yr) [2]	Total (g/s) [a]	(g/s) [b]	(g/s) [b]	Total (lb/yr) [2]	Total (g/s) [a]	(g/s) [b]	(g/s) [b]	(lb/yr)	(g/s)
Model ID			RTO		--		VPT1	VPT2	--		TIE1	TIE2	--	
Emissions Fraction Estimate [3]			--		--		0.50	0.50	--		0.50	0.50	--	
ORGANIC COMPOUNDS														
2-Butanone (Methyl ethyl ketone)	78-93-3	Yes	237	3.4E-03	--	--	--	--	--	--	--	--	**237**	**3.4E-03**
Benzene	71-43-2	Yes	0.066	9.5E-07	--	--	--	--	--	--	--	--	**0.066**	**9.5E-07**
Cumene	98-82-8	Yes	12.8	1.8E-04	--	--	--	--	--	--	--	--	**12.8**	**1.8E-04**
Ethylbenzene	100-41-4	Yes	723	0.010	--	--	--	--	--	--	--	--	**723**	**0.010**
Formaldehyde	50-00-0	Yes	1.46	2.1E-05	--	--	--	--	--	--	--	--	**1.46**	**2.1E-05**
Isopropyl acohol	67-63-0	Yes	--	--	2,546	0.037	0.018	0.018	--	--	--	--	**2,546**	**0.037**
Methylene diphenyl diisocyanate (MDI)	101-68-8	Yes	--	--	--	--	--	--	0.013	1.9E-07	9.5E-08	9.5E-08	**0.013**	**1.9E-07**
n-Butyl alcohol	71-36-3	No	46.6	6.7E-04	--	--	--	--	--	--	--	--	**46.6**	**6.7E-04**
Naphthalene	91-20-3	Yes	559	8.0E-03	--	--	--	--	--	--	--	--	**559**	**8.0E-03**
Toluene	108-88-3	Yes	2,962	0.043	--	--	--	--	--	--	--	--	**2,962**	**0.043**
1,2,4-Trimethylbenzene	95-63-6	Yes	175	2.5E-03	--	--	--	--	--	--	--	--	**175**	**2.5E-03**
1,2,3-Trimethylbenzene	526-73-8	Yes	24.0	3.5E-04	--	--	--	--	--	--	--	--	**24.0**	**3.5E-04**
Xylene (m-xylene, o-xylene, p-xylene)	1330-20-7	Yes	3,341	0.048	--	--	--	--	--	--	--	--	**3,341**	**0.048**
METALS														
Barium and Compounds	7440-39-3	No	0.63	9.1E-06	--	--	--	--	--	--	--	--	**0.63**	**9.1E-06**
Chromium VI, chromate and dichromate particulate	18540-29-9	Yes	5.59	8.0E-05	--	--	--	--	--	--	--	--	**5.59**	**8.0E-05**
Chromium VI, chromic acid aerosol mist	7738-94-5	Yes	--	--	0.19	2.7E-06	1.4E-06	1.4E-06	--	--	--	--	**0.19**	**2.7E-06**
INORGANIC COMPOUNDS														
Hydrogen Fluoride	7664-39-3	Yes	--	--	2.12	3.1E-05	1.5E-05	1.5E-05	--	--	--	--	**2.12**	**3.1E-05**

Table 3–1
Significant Emission Units Emission Rates—Cancer Assessment
Hydro Extrusion Portland, Inc.—Portland, Oregon

Toxic Air Contaminant	CAS	RBC? (Yes/No)	Annual Emission Estimates											
			Vertical Paint Line		Pretreatment				TIE Line				Total	
			(lb/yr) [1]	(g/s) [a]	Total (lb/yr) [2]	Total (g/s) [a]	(g/s) [b]	(g/s) [b]	Total (lb/yr) [2]	Total (g/s) [a]	(g/s) [b]	(g/s) [b]	(lb/yr)	(g/s)
Model ID			**RTO**		**--**		**VPT1**	**VPT2**	**--**		**TIE1**	**TIE2**	**--**	
Emissions Fraction Estimate [3]			**--**		**--**		**0.50**	**0.50**	**--**		**0.50**	**0.50**	**--**	
GLYCOL/ETHERS														
Propylene glycol monomethyl ether acetate	108-65-6	No	603	8.7E-03	--	--	--	--	--	--	--	--	**603**	**8.7E-03**
Ethylene glycol monobutyl ether	111-76-2	Yes	1,240	0.018	--	--	--	--	--	--	--	--	**1,240**	**0.018**
Diethylene glycol monobutyl ether	112-34-5	Yes	1,733	0.025	--	--	--	--	--	--	--	--	**1,733**	**0.025**

NOTES:

RBC = risk-based concentration.

TIE = thermally improved extrusion.

lb/yr = pound per year.

g/s = gram per second.

[a] Emission rate (g/s) = (annual emissions estimate [lb/yr]) x (453.592 g/lb) x (yr/8,760 hrs) x (hr/3,600 s)

[b] Emission rate (g/s) = (total emission rate [g/s]) x (emissions fraction estimate)

REFERENCES:

[1] Emissions estimate obtained from the emissions inventory submitted to the DEQ on May 30, 2023. The products representing the highest toxicity-weighted emission rate per gallon based on cancer RBCs are assumed to be produced at the PTE annual rates.

[2] Emissions estimate obtained from the emissions inventory submitted to the DEQ on May 30, 2023.

[3] Emissions fraction equally apportioned between ventilation points based on general orientation of the ventilation point in relation to the emission source.

Table 3–2
Significant Emission Units Emission Rates—Chronic Noncancer Assessment
Hydro Extrusion Portland, Inc.—Portland, Oregon

Toxic Air Contaminant	CAS	RBC? (Yes/No)	Annual Emission Estimates											
			Vertical Paint Line		Pretreatment				TIE Line				Total	
			(lb/yr) [1]	(g/s) [a]	Total (lb/yr) [2]	Total (g/s) [a]	(g/s) [b]	(g/s) [b]	Total (lb/yr) [2]	Total (g/s) [a]	(g/s) [b]	(g/s) [b]	(lb/yr)	(g/s)
Model ID			**RTO**		**--**		**VPT1**	**VPT2**	**--**		**TIE1**	**TIE2**	**--**	
Emissions Fraction Estimate [3]			**--**		**--**		**0.50**	**0.50**	**--**		**0.50**	**0.50**	**--**	
ORGANIC COMPOUNDS														
2-Butanone (Methyl ethyl ketone)	78-93-3	Yes	237	3.4E-03	--	--	--	--	--	--	--	--	**237**	**3.4E-03**
Benzene	71-43-2	Yes	0.066	9.5E-07	--	--	--	--	--	--	--	--	**0.066**	**9.5E-07**
Cumene	98-82-8	Yes	4.87	7.0E-05	--	--	--	--	--	--	--	--	**4.87**	**7.0E-05**
Dimethyl phthalate	131-11-3	No	1,768	0.025	--	--	--	--	--	--	--	--	**1,768**	**0.025**
Ethylbenzene	100-41-4	Yes	651	9.4E-03	--	--	--	--	--	--	--	--	**651**	**9.4E-03**
Formaldehyde	50-00-0	Yes	0.012	1.7E-07	--	--	--	--	--	--	--	--	**0.012**	**1.7E-07**
Isopropyl acohol	67-63-0	Yes	--	--	2,546	0.037	0.018	0.018	--	--	--	--	**2,546**	**0.037**
Methylene diphenyl diisocyanate (MDI)	101-68-8	Yes	--	--	--	--	--	--	0.013	1.9E-07	9.5E-08	9.5E-08	**0.013**	**1.9E-07**
Naphthalene	91-20-3	Yes	26.4	3.8E-04	--	--	--	--	--	--	--	--	**26.4**	**3.8E-04**
Toluene	108-88-3	Yes	4,628	0.067	--	--	--	--	--	--	--	--	**4,628**	**0.067**
1,2,3-Trimethylbenzene	526-73-8	Yes	72.7	1.0E-03	--	--	--	--	--	--	--	--	**72.7**	**1.0E-03**
1,2,4-Trimethylbenzene	95-63-6	Yes	446	6.4E-03	--	--	--	--	--	--	--	--	**446**	**6.4E-03**
Xylene (m-xylene, o-xylene, p-xylene)	1330-20-7	Yes	3,063	0.044	--	--	--	--	--	--	--	--	**3,063**	**0.044**
METALS														
Chromium VI, chromate and dichromate particulate	18540-29-9	Yes	1.12	1.6E-05	--	--	--	--	--	--	--	--	**1.12**	**1.6E-05**
Chromium VI, chromic acid aerosol mist	7738-94-5	Yes	--	--	0.19	2.7E-06	1.4E-06	1.4E-06	--	--	--	--	**0.19**	**2.7E-06**
INORGANIC COMPOUNDS														
Ethene, 1,1-difluoro-, homopolymer	489	No	454	6.5E-03	--	--	--	--	--	--	--	--	**454**	**6.5E-03**
Hydrogen Fluoride	7664-39-3	Yes	--	--	2.12	3.1E-05	1.5E-05	1.5E-05	--	--	--	--	**2.12**	**3.1E-05**
GLYCOL/ETHERS														
Propylene glycol monomethyl ether acetate	108-65-6	No	871	0.013	--	--	--	--	--	--	--	--	**871**	**0.013**
Diethylene glycol monobutyl ether	112-34-5	Yes	4,663	0.067	--	--	--	--	--	--	--	--	**4,663**	**0.067**

Table 3–2
Significant Emission Units Emission Rates—Chronic Noncancer Assessment
Hydro Extrusion Portland, Inc.—Portland, Oregon

NOTES:

RBC = risk-based concentration.

TIE = thermally improved extrusion.

lb/yr = pound per year.

g/s = gram per second.

[a] Emission rate (g/s) = (annual emissions estimate [lb/yr]) x (453.592 g/lb) x (yr/8,760 hrs) x (hr/3,600 s)

[b] Emission rate (g/s) = (total emission rate [g/s]) x (emissions fraction estimate)

REFERENCES:

[1] Emissions estimate obtained from the emissions inventory submitted to the DEQ on May 30, 2023. The products representing the highest toxicity-weighted emission rate per gallon based on chronic non-cancer RBCs are assumed to be produced at the PTE annual rates.

[2] Emissions estimate obtained from the emissions inventory submitted to the DEQ on May 30, 2023.

[3] Emissions fraction equally apportioned between ventilation points based on general orientation of the ventilation point in relation to the emission source.

Table 3–3
Significant Emission Units Emission Rates—Acute Assessment
Hydro Extrusion Portland, Inc.—Portland, Oregon

Toxic Air Contaminant	CAS	RBC? (Yes/No)	Daily Emission Estimates											
			Vertical Paint Line		Pretreatment				TIE Line				Total	
			(lb/day) [1]	(g/s) [a]	Total (lb/day) [2]	Total (g/s) [a]	(g/s) [a]	(g/s) [a]	Total (lb/day) [2]	Total (g/s) [a]	(g/s) [a]	(g/s) [a]	(lb/yr)	(g/s)
Model ID					--		VPT1	VPT2	--		TIE1	TIE2	--	
Emissions Fraction Estimate [3]					--		0.50	0.50	--		0.50	0.50	--	
ORGANIC COMPOUNDS														
2-Butanone (Methyl ethyl ketone)	78-93-3	Yes	27.2	0.14	--	--	--	--	--	--	--	--	**27.2**	**0.14**
Benzene	71-43-2	Yes	1.1E-03	5.8E-06	--	--	--	--	--	--	--	--	**1.1E-03**	**5.8E-06**
Cumene	98-82-8	Yes	0.28	1.5E-03	--	--	--	--	--	--	--	--	**0.28**	**1.5E-03**
Dimethyl phthalate	131-11-3	No	20.4	0.11	--	--	--	--	--	--	--	--	**20.4**	**0.11**
Ethylbenzene	100-41-4	Yes	8.51	0.045	--	--	--	--	--	--	--	--	**8.51**	**0.045**
Isopropyl acohol	67-63-0	Yes	--	--	8.73	0.046	0.023	0.023	--	--	--	--	**8.73**	**0.046**
Methylene diphenyl diisocyanate (MDI)	101-68-8	Yes	--	--	--	--	--	--	7.5E-05	3.9E-07	2.0E-07	2.0E-07	**7.5E-05**	**3.9E-07**
n-Butyl alcohol	71-36-3	No	1.01	5.3E-03	--	--	--	--	--	--	--	--	**1.01**	**5.3E-03**
Naphthalene	91-20-3	Yes	1.00	5.2E-03	--	--	--	--	--	--	--	--	**1.00**	**5.2E-03**
Toluene	108-88-3	Yes	356	1.87	--	--	--	--	--	--	--	--	**356**	**1.87**
1,2,4-Trimethylbenzene	95-63-6	Yes	9.24	0.049	--	--	--	--	--	--	--	--	**9.24**	**0.049**
1,2,3-Trimethylbenzene	526-73-8	Yes	0.91	4.8E-03	--	--	--	--	--	--	--	--	**0.91**	**4.8E-03**
Xylene (m-xylene, o-xylene, p-xylene)	1330-20-7	Yes	64.3	0.34	--	--	--	--	--	--	--	--	**64.3**	**0.34**
METALS														
Anitmony and Compounds	7440-36-0	Yes	0.88	4.6E-03	--	--	--	--	--	--	--	--	**0.88**	**4.6E-03**
Barium and Compounds	7440-39-3	No	0.014	7.3E-05	--	--	--	--	--	--	--	--	**0.014**	**7.3E-05**
Chromium VI, chromate and dichromate particulate	18540-29-9	Yes	0.12	6.3E-04	--	--	--	--	--	--	--	--	**0.12**	**6.3E-04**
Chromium VI, chromic acid aerosol mist	7738-94-5	Yes	--	--	5.2E-04	2.7E-06	1.4E-06	1.4E-06	--	--	--	--	**5.2E-04**	**2.7E-06**
Cobalt and Compounds	7440-48-4	Yes	0.024	1.3E-04	--	--	--	--	--	--	--	--	**0.024**	**1.3E-04**
INORGANIC COMPOUNDS														
Ethene, 1,1-difluoro-, homopolymer	489	No	5.60	0.029	--	--	--	--	--	--	--	--	**5.60**	**0.029**
Hydrogen Fluoride	7664-39-3	Yes	--	--	5.8E-03	3.1E-05	1.5E-05	1.5E-05	--	--	--	--	**5.8E-03**	**3.1E-05**
GLYCOL/ETHERS														
Propylene glycol monomethyl ether acetate	108-65-6	No	21.9	0.12	--	--	--	--	--	--	--	--	**21.9**	**0.12**
Ethylene glycol monobutyl ether	111-76-2	Yes	3.79	0.020	--	--	--	--	--	--	--	--	**3.79**	**0.020**
Diethylene glycol monobutyl ether	112-34-5	Yes	37.8	0.20	--	--	--	--	--	--	--	--	**37.8**	**0.20**

NOTES:

RBC = risk-based concentration.

TIE = thermally improved extrusion.

lb/yr = pound per year.

g/s = gram per second.

[a] Emission rate (g/s) = (daily emissions estimate [lb/day]) x (453.592 g/lb) x (day/24 hrs) x (hr/3,600 s)

[b] Emission rate (g/s) = (total emission rate [g/s]) x (emissions fraction estimate)

Table 3–3
Significant Emission Units Emission Rates—Acute Assessment
Hydro Extrusion Portland, Inc.—Portland, Oregon

REFERENCES:

(1) Emissions estimate obtained from the emissions inventory submitted to the DEQ on May 30, 2023. The products representing the highest toxicity-weighted emission rate per gallon based on acute RBCs are assumed to be produced at the PTE daily rates.

(2) Emissions estimate obtained from the emissions inventory submitted to the DEQ on May 30, 2023.

(3) Emissions fraction equally apportioned between ventilation points based on general orientation of the ventilation point in relation to the emission source.

Table 3–4
Natural Gas Toxic Emission Units Annual Emission Rates
Hydro Extrusion Portland, Inc.—Portland, Oregon

Toxic Air Contaminant	CAS	RBC? (Yes/No)	Annual Emission Estimates															
			Natural Gas															
			Total (lb/yr) [1]	Total (g/s) [a]	(g/s) [b]	(g/s) [b]	(g/s) [b]	(g/s) [b]	(g/s) [b]	(g/s) [b]	(g/s) [b]	(g/s) [b]	(g/s) [b]	(g/s) [b]	(g/s) [b]	(g/s) [b]	(g/s) [b]	(g/s) [b]	(g/s) [b]
Model ID			--		OVEN	PTH1	PTH2	AMUA	AMUB	C1H1	C1H2	C1H3	C1H4	C2H1	C2H2	C2H3	C2H4	C2H5	RTO_NG
Total Heat Input Rating for Sources Apportioned to Each Ventilation Point (MMBtu/hr) [2]			--		4.50	5.00	3.80	0.70	0.70	0.15	0.15	0.15	0.15	0.25	0.25	0.25	0.20	0.20	9.74
Emissions Fraction Estimate [c]			--		0.17	0.19	0.15	0.027	0.027	5.7E-03	5.7E-03	5.7E-03	5.7E-03	9.5E-03	9.5E-03	9.5E-03	7.6E-03	7.6E-03	0.37
ORGANIC COMPOUNDS																			
Acetaldehyde	75-07-0	Yes	0.97	1.4E-05	2.4E-06	2.7E-06	2.0E-06	3.7E-07	3.7E-07	8.0E-08	8.0E-08	8.0E-08	8.0E-08	1.3E-07	1.3E-07	1.3E-07	1.1E-07	1.1E-07	5.2E-06
Acrolein	107-02-8	Yes	0.61	8.7E-06	1.5E-06	1.7E-06	1.3E-06	2.3E-07	2.3E-07	5.0E-08	5.0E-08	5.0E-08	5.0E-08	8.3E-08	8.3E-08	8.3E-08	6.7E-08	6.7E-08	3.2E-06
Ammonia	7664-41-7	Yes	720	0.010	1.8E-03	2.0E-03	1.5E-03	2.8E-04	2.8E-04	5.9E-05	5.9E-05	5.9E-05	5.9E-05	9.9E-05	9.9E-05	9.9E-05	7.9E-05	7.9E-05	3.9E-03
Benzene	71-43-2	Yes	1.80	2.6E-05	4.4E-06	4.9E-06	3.8E-06	6.9E-07	6.9E-07	1.5E-07	1.5E-07	1.5E-07	1.5E-07	2.5E-07	2.5E-07	2.5E-07	2.0E-07	2.0E-07	9.6E-06
Benzo(a)pyrene	50-32-8	Yes	2.7E-04	3.9E-09	6.7E-10	7.4E-10	5.6E-10	1.0E-10	1.0E-10	2.2E-11	2.2E-11	2.2E-11	2.2E-11	3.7E-11	3.7E-11	3.7E-11	3.0E-11	3.0E-11	1.4E-09
Ethylbenzene	100-41-4	Yes	2.14	3.1E-05	5.3E-06	5.9E-06	4.5E-06	8.2E-07	8.2E-07	1.8E-07	1.8E-07	1.8E-07	1.8E-07	2.9E-07	2.9E-07	2.9E-07	2.3E-07	2.3E-07	1.1E-05
Formaldehyde	50-00-0	Yes	3.82	5.5E-05	9.4E-06	1.0E-05	8.0E-06	1.5E-06	1.5E-06	3.1E-07	3.1E-07	3.1E-07	3.1E-07	5.2E-07	5.2E-07	5.2E-07	4.2E-07	4.2E-07	2.0E-05
Hexane	110-54-3	Yes	1.42	2.0E-05	3.5E-06	3.9E-06	3.0E-06	5.4E-07	5.4E-07	1.2E-07	1.2E-07	1.2E-07	1.2E-07	1.9E-07	1.9E-07	1.9E-07	1.6E-07	1.6E-07	7.6E-06
Naphthalene	91-20-3	Yes	0.067	9.7E-07	1.7E-07	1.9E-07	1.4E-07	2.6E-08	2.6E-08	5.6E-09	5.6E-09	5.6E-09	5.6E-09	9.3E-09	9.3E-09	9.3E-09	7.4E-09	7.4E-09	3.6E-07
Polycyclic Aromatic Hydrocarbons (PAH)	401	Yes	0.022	3.2E-07	5.6E-08	6.2E-08	4.7E-08	8.6E-09	8.6E-09	1.9E-09	1.9E-09	1.9E-09	1.9E-09	3.1E-09	3.1E-09	3.1E-09	2.5E-09	2.5E-09	1.2E-07
Toluene	108-88-3	Yes	8.23	1.2E-04	2.0E-05	2.3E-05	1.7E-05	3.2E-06	3.2E-06	6.8E-07	6.8E-07	6.8E-07	6.8E-07	1.1E-06	1.1E-06	1.1E-06	9.0E-07	9.0E-07	4.4E-05
Xylene (m-xylene, o-xylene, p-xylene)	1330-20-7	Yes	6.12	8.8E-05	1.5E-05	1.7E-05	1.3E-05	2.4E-06	2.4E-06	5.0E-07	5.0E-07	5.0E-07	5.0E-07	8.4E-07	8.4E-07	8.4E-07	6.7E-07	6.7E-07	3.3E-05
METALS																			
Arsenic and Compounds	7440-38-2	Yes	0.045	6.5E-07	1.1E-07	1.2E-07	9.4E-08	1.7E-08	1.7E-08	3.7E-09	3.7E-09	3.7E-09	3.7E-09	6.2E-09	6.2E-09	6.2E-09	4.9E-09	4.9E-09	2.4E-07
Barium and Compounds	7440-39-3	No	0.99	1.4E-05	2.4E-06	2.7E-06	2.1E-06	3.8E-07	3.8E-07	8.2E-08	8.2E-08	8.2E-08	8.2E-08	1.4E-07	1.4E-07	1.4E-07	1.1E-07	1.1E-07	5.3E-06
Beryllium and Compounds	7440-41-7	Yes	2.7E-03	3.9E-08	6.7E-09	7.4E-09	5.6E-09	1.0E-09	1.0E-09	2.2E-10	2.2E-10	2.2E-10	2.2E-10	3.7E-10	3.7E-10	3.7E-10	3.0E-10	3.0E-10	1.4E-08
Cadmium and Compounds	7440-43-9	Yes	0.25	3.6E-06	6.1E-07	6.8E-07	5.2E-07	9.5E-08	9.5E-08	2.0E-08	2.0E-08	2.0E-08	2.0E-08	3.4E-08	3.4E-08	3.4E-08	2.7E-08	2.7E-08	1.3E-06
Chromium VI, chromate and dichromate particulate	18540-29-9	Yes	0.013	1.8E-07	3.1E-08	3.5E-08	2.6E-08	4.8E-09	4.8E-09	1.0E-09	1.0E-09	1.0E-09	1.0E-09	1.7E-09	1.7E-09	1.7E-09	1.4E-09	1.4E-09	6.7E-08
Cobalt and Compounds	7440-48-4	Yes	0.019	2.7E-07	4.7E-08	5.2E-08	3.9E-08	7.3E-09	7.3E-09	1.6E-09	1.6E-09	1.6E-09	1.6E-09	2.6E-09	2.6E-09	2.6E-09	2.1E-09	2.1E-09	1.0E-07
Copper and Compounds	7440-50-8	Yes	0.19	2.7E-06	4.7E-07	5.2E-07	4.0E-07	7.3E-08	7.3E-08	1.6E-08	1.6E-08	1.6E-08	1.6E-08	2.6E-08	2.6E-08	2.6E-08	2.1E-08	2.1E-08	1.0E-06
Lead and Compounds	7439-92-1	Yes	0.11	1.6E-06	2.8E-07	3.1E-07	2.3E-07	4.3E-08	4.3E-08	9.3E-09	9.3E-09	9.3E-09	9.3E-09	1.5E-08	1.5E-08	1.5E-08	1.2E-08	1.2E-08	6.0E-07
Manganese and Compounds	7439-96-5	Yes	0.085	1.2E-06	2.1E-07	2.3E-07	1.8E-07	3.3E-08	3.3E-08	7.0E-09	7.0E-09	7.0E-09	7.0E-09	1.2E-08	1.2E-08	1.2E-08	9.4E-09	9.4E-09	4.6E-07
Mercury and Compounds	7439-97-6	Yes	0.058	8.4E-07	1.4E-07	1.6E-07	1.2E-07	2.2E-08	2.2E-08	4.8E-09	4.8E-09	4.8E-09	4.8E-09	8.0E-09	8.0E-09	8.0E-09	6.4E-09	6.4E-09	3.1E-07
Molybdenum trioxide	1313-27-5	No	0.37	5.3E-06	9.2E-07	1.0E-06	7.7E-07	1.4E-07	1.4E-07	3.1E-08	3.1E-08	3.1E-08	3.1E-08	5.1E-08	5.1E-08	5.1E-08	4.1E-08	4.1E-08	2.0E-06
Nickel and Compounds	7440-02-0	Yes	0.47	6.8E-06	1.2E-06	1.3E-06	9.9E-07	1.8E-07	1.8E-07	3.9E-08	3.9E-08	3.9E-08	3.9E-08	6.5E-08	6.5E-08	6.5E-08	5.2E-08	5.2E-08	2.5E-06
Selenium and Compounds	7782-49-2	Yes	5.4E-03	7.8E-08	1.3E-08	1.5E-08	1.1E-08	2.1E-09	2.1E-09	4.4E-10	4.4E-10	4.4E-10	4.4E-10	7.4E-10	7.4E-10	7.4E-10	5.9E-10	5.9E-10	2.9E-08
Vanadium (fume or dust)	7440-62-2	Yes	0.52	7.4E-06	1.3E-06	1.4E-06	1.1E-06	2.0E-07	2.0E-07	4.3E-08	4.3E-08	4.3E-08	4.3E-08	7.1E-08	7.1E-08	7.1E-08	5.7E-08	5.7E-08	2.8E-06
Zinc and Compounds	7440-66-6	No	6.52	9.4E-05	1.6E-05	1.8E-05	1.4E-05	2.5E-06	2.5E-06	5.4E-07	5.4E-07	5.4E-07	5.4E-07	9.0E-07	9.0E-07	9.0E-07	7.2E-07	7.2E-07	3.5E-05

NOTES:

g/s = gram per second.

lb/day = pound per day.

RBC = risk-based concentration.

TAC = toxic air contaminant.

[a] Emission rate (g/s) = (annual emissions estimate [lb/yr]) x (453.592 g/lb) x (yr/8,760 hrs) x (hr/3,600 s)

[b] Emission rate (g/s) = (total emission rate [g/s]) x (emissions fraction estimate)

[c] Emissions fraction estimate = (total heat input rating apportioned to each ventialtion point [MMBtu/hr]) / (total facility combined natural gas heat input [MMBtu/hr])

Total facility combined natural gas heat input (MMBtu/hr) = 26.19 (3)

REFERENCES:

[1] Emissions estimate obtained from the emissions inventory submitted to the DEQ on May 30, 2023.

[2] Emissions fraction apportioned between ventilation points based on the heat input rating of each emission source.

[3] Total facility combined natural gas heat input obtained from the emissions inventory submitted to the DEQ on May 30, 2023.

Table 3–5
Natural Gas Toxic Emission Units Daily Emission Rates
Hydro Extrusion Portland, Inc.—Portland, Oregon

Toxic Air Contaminant	CAS	RBC? (Yes/No)	Daily Emission Estimates															
			Natural Gas															
			Total (lb/day) [1]	Total (g/s) [a]	(g/s) [a]	(g/s) [a]	(g/s) [a]	(g/s) [a]	(g/s) [a]	(g/s) [a]	(g/s) [a]	(g/s) [a]	(g/s) [a]	(g/s) [a]	(g/s) [a]	(g/s) [a]	(g/s) [a]	(g/s) [a]	(g/s) [a]
Model ID			--		OVEN	PTH1	PTH2	AMUA	AMUB	C1H1	C1H2	C1H3	C1H4	C2H1	C2H2	C2H3	C2H4	C2H5	RTO_NG
Total Heat Input Rating for Sources Apportioned to Each Ventilation Point (MMBtu/hr)			--		**4.50**	**5.00**	**3.80**	**0.70**	**0.70**	**0.15**	**0.15**	**0.15**	**0.15**	**0.25**	**0.25**	**0.25**	**0.20**	**0.20**	**9.74**
Emissions Fraction Estimate [c]			--		**0.17**	**0.19**	**0.15**	**0.027**	**0.027**	**5.7E-03**	**5.7E-03**	**5.7E-03**	**5.7E-03**	**9.5E-03**	**9.5E-03**	**9.5E-03**	**7.6E-03**	**7.6E-03**	**0.37**
ORGANIC COMPOUNDS																			
Acetaldehyde	75-07-0	Yes	2.6E-03	1.4E-05	2.4E-06	2.7E-06	2.0E-06	3.7E-07	3.7E-07	8.0E-08	8.0E-08	8.0E-08	8.0E-08	1.3E-07	1.3E-07	1.3E-07	1.1E-07	1.1E-07	5.2E-06
Acrolein	107-02-8	Yes	1.7E-03	8.7E-06	1.5E-06	1.7E-06	1.3E-06	2.3E-07	2.3E-07	5.0E-08	5.0E-08	5.0E-08	5.0E-08	8.3E-08	8.3E-08	8.3E-08	6.7E-08	6.7E-08	3.2E-06
Ammonia	7664-41-7	Yes	1.97	0.010	1.8E-03	2.0E-03	1.5E-03	2.8E-04	2.8E-04	5.9E-05	5.9E-05	5.9E-05	5.9E-05	9.9E-05	9.9E-05	9.9E-05	7.9E-05	7.9E-05	3.9E-03
Benzene	71-43-2	Yes	4.9E-03	2.6E-05	4.4E-06	4.9E-06	3.8E-06	6.9E-07	6.9E-07	1.5E-07	1.5E-07	1.5E-07	1.5E-07	2.5E-07	2.5E-07	2.5E-07	2.0E-07	2.0E-07	9.6E-06
Benzo(a)pyrene	50-32-8	Yes	7.4E-07	3.9E-09	6.7E-10	7.4E-10	5.6E-10	1.0E-10	1.0E-10	2.2E-11	2.2E-11	2.2E-11	2.2E-11	3.7E-11	3.7E-11	3.7E-11	3.0E-11	3.0E-11	1.4E-09
Ethylbenzene	100-41-4	Yes	5.9E-03	3.1E-05	5.3E-06	5.9E-06	4.5E-06	8.2E-07	8.2E-07	1.8E-07	1.8E-07	1.8E-07	1.8E-07	2.9E-07	2.9E-07	2.9E-07	2.3E-07	2.3E-07	1.1E-05
Formaldehyde	50-00-0	Yes	0.010	5.5E-05	9.4E-06	1.0E-05	8.0E-06	1.5E-06	1.5E-06	3.1E-07	3.1E-07	3.1E-07	3.1E-07	5.2E-07	5.2E-07	5.2E-07	4.2E-07	4.2E-07	2.0E-05
Hexane	110-54-3	Yes	3.9E-03	2.0E-05	3.5E-06	3.9E-06	3.0E-06	5.4E-07	5.4E-07	1.2E-07	1.2E-07	1.2E-07	1.2E-07	1.9E-07	1.9E-07	1.9E-07	1.6E-07	1.6E-07	7.6E-06
Naphthalene	91-20-3	Yes	1.8E-04	9.7E-07	1.7E-07	1.9E-07	1.4E-07	2.6E-08	2.6E-08	5.6E-09	5.6E-09	5.6E-09	5.6E-09	9.3E-09	9.3E-09	9.3E-09	7.4E-09	7.4E-09	3.6E-07
Polycyclic Aromatic Hydrocarbons (PAH)	401	Yes	6.2E-05	3.2E-07	5.6E-08	6.2E-08	4.7E-08	8.6E-09	8.6E-09	1.9E-09	1.9E-09	1.9E-09	1.9E-09	3.1E-09	3.1E-09	3.1E-09	2.5E-09	2.5E-09	1.2E-07
Toluene	108-88-3	Yes	0.023	1.2E-04	2.0E-05	2.3E-05	1.7E-05	3.2E-06	3.2E-06	6.8E-07	6.8E-07	6.8E-07	6.8E-07	1.1E-06	1.1E-06	1.1E-06	9.0E-07	9.0E-07	4.4E-05
Xylene (m-xylene, o-xylene, p-xylene)	1330-20-7	Yes	0.017	8.8E-05	1.5E-05	1.7E-05	1.3E-05	2.4E-06	2.4E-06	5.0E-07	5.0E-07	5.0E-07	5.0E-07	8.4E-07	8.4E-07	8.4E-07	6.7E-07	6.7E-07	3.3E-05
METALS																			
Arsenic and Compounds	7440-38-2	Yes	1.2E-04	6.5E-07	1.1E-07	1.2E-07	9.4E-08	1.7E-08	1.7E-08	3.7E-09	3.7E-09	3.7E-09	3.7E-09	6.2E-09	6.2E-09	6.2E-09	4.9E-09	4.9E-09	2.4E-07
Barium and Compounds	7440-39-3	No	2.7E-03	1.4E-05	2.4E-06	2.7E-06	2.1E-06	3.8E-07	3.8E-07	8.2E-08	8.2E-08	8.2E-08	8.2E-08	1.4E-07	1.4E-07	1.4E-07	1.1E-07	1.1E-07	5.3E-06
Beryllium and Compounds	7440-41-7	Yes	7.4E-06	3.9E-08	6.7E-09	7.4E-09	5.6E-09	1.0E-09	1.0E-09	2.2E-10	2.2E-10	2.2E-10	2.2E-10	3.7E-10	3.7E-10	3.7E-10	3.0E-10	3.0E-10	1.4E-08
Cadmium and Compounds	7440-43-9	Yes	6.8E-04	3.6E-06	6.1E-07	6.8E-07	5.2E-07	9.5E-08	9.5E-08	2.0E-08	2.0E-08	2.0E-08	2.0E-08	3.4E-08	3.4E-08	3.4E-08	2.7E-08	2.7E-08	1.3E-06
Chromium VI, chromate and dichromate particulate	18540-29-9	Yes	3.5E-05	1.8E-07	3.1E-08	3.5E-08	2.6E-08	4.8E-09	4.8E-09	1.0E-09	1.0E-09	1.0E-09	1.0E-09	1.7E-09	1.7E-09	1.7E-09	1.4E-09	1.4E-09	6.7E-08
Cobalt and Compounds	7440-48-4	Yes	5.2E-05	2.7E-07	4.7E-08	5.2E-08	3.9E-08	7.3E-09	7.3E-09	1.6E-09	1.6E-09	1.6E-09	1.6E-09	2.6E-09	2.6E-09	2.6E-09	2.1E-09	2.1E-09	1.0E-07
Copper and Compounds	7440-50-8	Yes	5.2E-04	2.7E-06	4.7E-07	5.2E-07	4.0E-07	7.3E-08	7.3E-08	1.6E-08	1.6E-08	1.6E-08	1.6E-08	2.6E-08	2.6E-08	2.6E-08	2.1E-08	2.1E-08	1.0E-06
Lead and Compounds	7439-92-1	Yes	3.1E-04	1.6E-06	2.8E-07	3.1E-07	2.3E-07	4.3E-08	4.3E-08	9.3E-09	9.3E-09	9.3E-09	9.3E-09	1.5E-08	1.5E-08	1.5E-08	1.2E-08	1.2E-08	6.0E-07
Manganese and Compounds	7439-96-5	Yes	2.3E-04	1.2E-06	2.1E-07	2.3E-07	1.8E-07	3.3E-08	3.3E-08	7.0E-09	7.0E-09	7.0E-09	7.0E-09	1.2E-08	1.2E-08	1.2E-08	9.4E-09	9.4E-09	4.6E-07
Mercury and Compounds	7439-97-6	Yes	1.6E-04	8.4E-07	1.4E-07	1.6E-07	1.2E-07	2.2E-08	2.2E-08	4.8E-09	4.8E-09	4.8E-09	4.8E-09	8.0E-09	8.0E-09	8.0E-09	6.4E-09	6.4E-09	3.1E-07
Molybdenum trioxide	1313-27-5	No	1.0E-03	5.3E-06	9.2E-07	1.0E-06	7.7E-07	1.4E-07	1.4E-07	3.1E-08	3.1E-08	3.1E-08	3.1E-08	5.1E-08	5.1E-08	5.1E-08	4.1E-08	4.1E-08	2.0E-06
Nickel and Compounds	7440-02-0	Yes	1.3E-03	6.8E-06	1.2E-06	1.3E-06	9.9E-07	1.8E-07	1.8E-07	3.9E-08	3.9E-08	3.9E-08	3.9E-08	6.5E-08	6.5E-08	6.5E-08	5.2E-08	5.2E-08	2.5E-06
Selenium and Compounds	7782-49-2	Yes	1.5E-05	7.8E-08	1.3E-08	1.5E-08	1.1E-08	2.1E-09	2.1E-09	4.4E-10	4.4E-10	4.4E-10	4.4E-10	7.4E-10	7.4E-10	7.4E-10	5.9E-10	5.9E-10	2.9E-08
Vanadium (fume or dust)	7440-62-2	Yes	1.4E-03	7.4E-06	1.3E-06	1.4E-06	1.1E-06	2.0E-07	2.0E-07	4.3E-08	4.3E-08	4.3E-08	4.3E-08	7.1E-08	7.1E-08	7.1E-08	5.7E-08	5.7E-08	2.8E-06
Zinc and Compounds	7440-66-6	No	0.018	9.4E-05	1.6E-05	1.8E-05	1.4E-05	2.5E-06	2.5E-06	5.4E-07	5.4E-07	5.4E-07	5.4E-07	9.0E-07	9.0E-07	9.0E-07	7.2E-07	7.2E-07	3.5E-05

NOTES:

g/s = gram per second.

lb/day = pound per day.

RBC = risk-based concentration.

TAC = toxic air contaminant.

[a] Emission rate (g/s) = (daily emissions estimate [lb/day]) x (453.592 g/lb) x (day/24 hrs) x (hr/3,600 s)

[b] Emission rate (g/s) = (total emission rate [g/s]) x (emissions fraction estimate)

[c] Emissions fraction estimate = (total heat input rating apportioned to each ventialtion point [MMBtu/hr]) / (total facility combined natural gas heat input [MMBtu/hr])

Total facility combined natural gas heat input (MMBtu/hr) = 26.19 (3)

REFERENCES:

[1] Emissions estimate obtained from the emissions inventory submitted to the DEQ on May 30, 2023.

[2] Emissions fraction apportioned between ventilation points based on the heat input rating of each emission source.

[3] Total facility combined natural gas heat input obtained from the emissions inventory submitted to the DEQ on May 30, 2023.

Table 3–6
Proposed Model Source Parameters
Hydro Extrusion Portland, Inc.—Portland, Oregon

Point Sources											
Model ID	Model Source Description	UTM Coordinates [1] (m)		Emission Rate [2] (g/s)	Discharge Orientation [1]	Base Elevation [3] (m)	Release Height [1] (m)	Stack Diameter [1] (m)	Exit Velocity [1] (m/s)	Exit Flowrate [a] (m^3/s)	Exit Temperature [1] (K)
		Easting	Northing								
Significant Toxic Emission Units											
RTO	Regenerative thermal oxidizer	530515.05	5047080.67	1	VERTICAL	5.53	10.4	1.11	12.6	12.2	382
VPT1	Pretreatment 1	530510.03	5047043.1	1	CAPPED	5.66	13.8	0.61	2.90	0.85	310
VPT2	Pretreatment 2	530538.56	5047044.18	1	CAPPED	5.65	13.8	0.61	2.90	0.85	310
TIE1	TIE Mixing Process Exhaust	530546.76	5047000.22	1	HORIZONTAL	5.26	7.82	0.36	9.17	0.91	295
TIE2	TIE Application Process (Hooded Area)	530541.434	5046999.28	1	VERTICAL	5.19	7.82	0.46	3.00	0.49	295
Natural Gas Toxic Emission Units											
OVEN	VPL Drying Oven Burner Exhaust	530516.88	5047052.31	1	CAPPED	5.74	14.6	0.41	8.64	1.12	379
PTH1	Pretreatement Burner 1 (Stage 1) Exhaust	530537.17	5047045.9	1	CAPPED	5.65	13.4	0.36	6.83	0.68	394
PTH2	Pretreatment Burner 2 (Stage 3) Exhaust	530524.707	5047048.01	1	CAPPED	5.67	13.4	0.30	1.60	0.12	342
AMUA	AMU-A Natural Gas Burner Exhausts	530538.366	5047065.61	1	CAPPED	5.57	13.1	0.15	2.84	0.052	340
AMUB	AMU-B Natural Gas Burner Exhausts	530532.806	5047065.48	1	CAPPED	5.52	13.1	0.15	2.84	0.052	340
C1H1	CTGS1 Space Heater (1)	530549.907	5047035.08	1	CAPPED	5.68	7.77	0.13	1.0E-03	1.27E-05	340
C1H2	CTGS1 Space Heater (2)	530539	5047024.13	1	CAPPED	5.5	7.77	0.13	1.0E-03	1.27E-05	340
C1H3	CTGS 1 Space Heater (3)	530507.66	5047007.97	1	CAPPED	5.21	7.77	0.13	1.0E-03	1.27E-05	340
C1H4	CTGS 1 Space Heater (4)	530560.441	5047005.89	1	CAPPED	5.40	7.77	0.13	1.0E-03	1.27E-05	340
C2H1	CTGS 2 Space Heater (1)	530563.33	5046999.28	1	CAPPED	5.49	7.77	0.25	1.0E-03	5.07E-05	340
C2H2	CTGS 2 Space Heater (2)	530538.06	5046996.67	1	CAPPED	5.18	7.77	0.20	1.0E-03	3.24E-05	340
C2H3	CTGS 2 Space Heater (3)	530508.06	5046996.45	1	CAPPED	5.13	7.77	0.20	1.0E-03	3.24E-05	340
C2H4	CTGS 2 Space Heater (4)	530507.83	5046972.18	1	CAPPED	5.30	7.77	0.20	1.0E-03	3.24E-05	340
C2H5	CTGS 2 Space Heater	530565.75	5046974.35	1	CAPPED	5.49	7.77	0.25	1.0E-03	5.07E-05	340
RTO_NG	RTO Natural Gas Burner, VPL Cure Oven Burner, HZPL Air Make-up Unit	530515.05	5047080.67	1	VERTICAL	5.53	10.4	1.11	12.6	12.2	382

Table 3–6
Proposed Model Source Parameters
Hydro Extrusion Portland, Inc.—Portland, Oregon

NOTES:

g/s = grams per second.

K = kelvin.

m = meter.

m/s = meters per second.

m^3/s = cubic meters per second.

UTM = universal transverse mercator.

[a] Exit flowrate (m^3/s) = ($\pi/4$) x (stack diameter [m])^2 x (exit velocity [m/s])

REFERENCES:

[1] Value based on information provided by Hydro Extrusion Portland, Inc.

[2] Dispersion model executed using unit-emission rates.

[3] Base elevation derived from the US Geological Survey National Elevation Dataset downloaded and processed using AERMET.

Table 4–3
Assessment of Missing Meteorological Data
Hydro Extrusion Portland, Inc.—Portland, Oregon

Quarter [1]	Meteorological Data Assessment per Year														
	2017			2018			2019			2020			2021		
	Total Hours [1]	Missing Hours [2]	Available [a] (%)	Total Hours [1]	Missing Hours [2]	Available [a] (%)	Total Hours [1]	Missing Hours [2]	Available [a] (%)	Total Hours [1]	Missing Hours [2]	Available [a] (%)	Total Hours [1]	Missing Hours [2]	Available [a] (%)
Q1	2,160	0	100%	2,160	10	99.5%	2,184	14	99.4%	2,184	7	99.7%	2,160	98	95.5%
Q2	2,184	24	98.9%	2,184	113	94.8%	2,184	0	100%	2,184	2	99.9%	2,184	58	97.3%
Q3	2,208	18	99.2%	2,208	108	95.1%	2,208	17	99.2%	2,208	1	100%	2,208	31	98.6%
Q4	2,208	10	99.5%	2,208	0	100%	2,208	9	99.6%	2,208	53	97.6%	2,208	31	98.6%

NOTES:

SFC = Surface

[a] Available hours (%) = ([total hours] - [missing hours]) / (total hours) x (100)

REFERENCES:

[1] Meteorological data obtained from the National Oceanic and Atmospheric Administration National Climatic Data Center Integrated Surface Data for the Portland International Airport located in Portland, Oregon (WBAN: 24229).

[2] The number of missing hours was determined by preparing an SFC QA excel file generated by AERMET version 21112.

Table 4–4
AERSURFACE Settings
Hydro Extrusion Portland, Inc.—Portland, Oregon

Parameter	Setting
Study radius for surface roughness	1.0 kilometer
Are the surface data collected at an airport?	Yes
Should continuous snow cover be assumed?	No
Is this an arid region?	No
Number of sectors	12
Months assumed to constitute "winter"	December, January, and February
Months assumed to constitute "spring"	March, April, and May
Months assumed to constitute "summer"	June, July, and August
Months assumed to constitute "autumn"	September, October, and November
Period for land use calculations	Monthly

Table 4–5
Surface Soil Moisture Condition Assessment
Hydro Extrusion Portland, Inc.—Portland, Oregon

Calendar Year	Annual Precipitation [1] (in)	Climatic Significance [2]	Calendar Year Soil Moisture [3]
2017	45.80	Upper 70th Percentile	Wet
2018	27.30	Lower 30th Percentile	Dry
2019	26.67	Lower 30th Percentile	Dry
2020	32.44	Middle 40th Percentile	Average
2021	35.59	Middle 40th Percentile	Average

30-Year Climate Precipitation Data [4]		
Average Annual Precipitation	[5]	35.85
Lower 30th Percentile Annual Precipitation	[6]	30.48
Upper 70th Percentile Annual Precipitation	[7]	41.18

REFERENCES:

[1] Climatological data obtained from National Oceanic and Atmospheric Administration National Climatic Data Center for Portland International Airport located in Portland, Oregon (WBAN: 24229).

[2] Climatic significance represents annual precipitation compared to 30-year climatological period.

[3] Surface moisture conditions correspond to "Dry", "Average" or "Wet" soil content determined by comparing annual precipitation to 30-year climatological period. This method is consistent with the methodology set forth in the current version of the US EPA AERSURFACE User's Guide dated January 16, 2013.

[4] Represents 30-year period between 1992 and 2021. Period chosen as most current 30-year period available.

[5] Represents average annual precipitation during 30-year climatological period.

[6] Represents lower limit of middle 30th percentile annual precipitation during 30-year climatological period.

[7] Represents upper limit of middle 70th percentile annual precipitation during 30-year climatological period.

Table 4–6
Summary of Downwash Structure Heights
Hydro Extrusion Portland, Inc.—Portland, Oregon

Downwash Structure Model ID	Base Elevation [1]		Number of Building Tiers	Tier Height [2]	
	(ft)	(m)		(ft)	(m)
BLDG_4	18.2	5.56	1	30.0	9.14
BLDG_4B	18.2	5.56	1	41.4	12.6
BLDG_2	17.3	5.26	1	22.0	6.71
BLDG_3	18.6	5.67	1	22.0	6.71
BLD_1	18.3	5.58	1	18.0	5.49

REFERENCES:

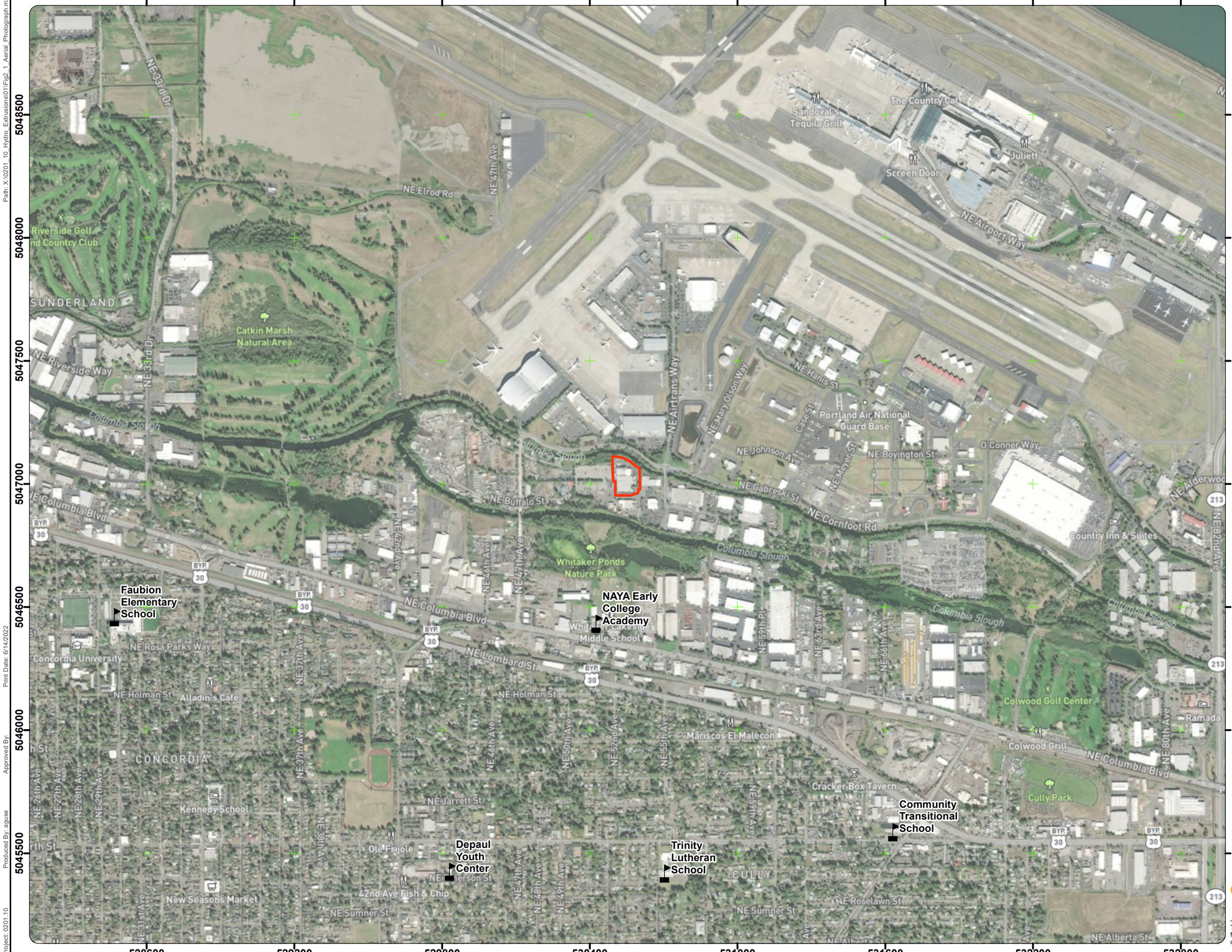
[1] Base elevation derived from 1/3-arc second United States Geological Survey National Elevation Data processed using AERMAP.

[2] Information provided by Hydro Extrusion Portland, Inc. Value represents height above base elevation.

FIGURES

Figure 2-1
Aerial Image of Facility

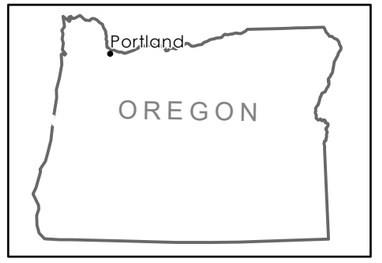
Hydro Extrusion Portland, Inc.
Portland, OR



Legend

- Property Boundary
- School Location (2015-16)
- UTM Grid Guideline

KEY MAP



0 200 400
Meters

Sources: Aerial photograph obtained from Mapbox.
School locations obtained from Oregon Dept. of Human Services & Oregon Health Authority.

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p. 971 544 2139 | www.maulfoster.com

Path: X:\0201_10_Hydro_Extrusions\01\Fig2_1_Aerial_Photograph.mxd
Print Date: 6/14/2022
Approved By:
Produced By: aguse
Project: 0201.10

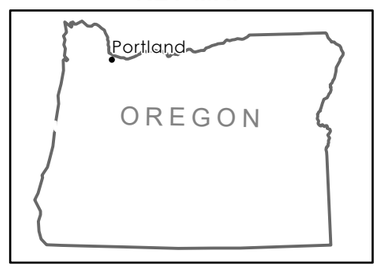
Figure 2-2
Local Topography

Hydro Extrusion Portland, Inc.
Portland, OR

Legend

- UTM Grid Guideline
- Property Boundary

KEY MAP



0 400 800
Meters

Source: Basemap obtained from Esri.

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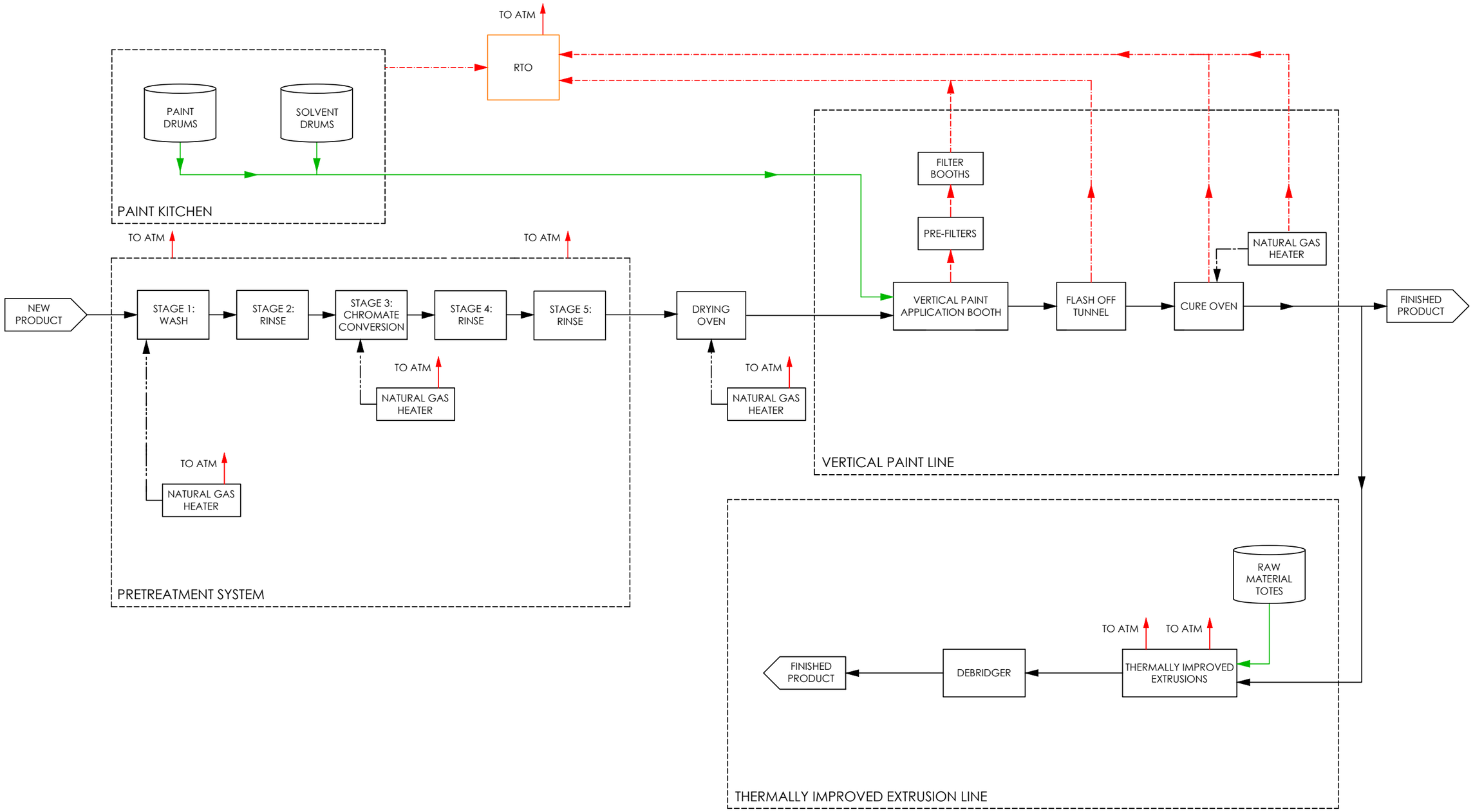
Path: X:\0201.10_Hydro_Extrusions\01\Fig2_2_Local_Topography.mxd
Print Date: 10/7/2021
Approved By:
Produced By: aguse
Project: 0201.10



Filename: Hydro_Process Flow Diagram_2022-0607.dwg

Printed by: Tessa Shabram

Date: 6/7/2022 4:44:37 PM

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LEGEND:

- PRODUCT
- RAW MATERIALS
- EMISSIONS
- HEAT INPUT
- PROCESS
- CONTROL DEVICE
- ATM ATMOSPHERE
- RTO REGENERATIVE THERMAL OXIDIZER
- EMISSIONS TO ATMOSPHERE

Figure 2-3 Process Flow Diagram

Hydro Extrusion Portland, Inc.
Portland, Oregon

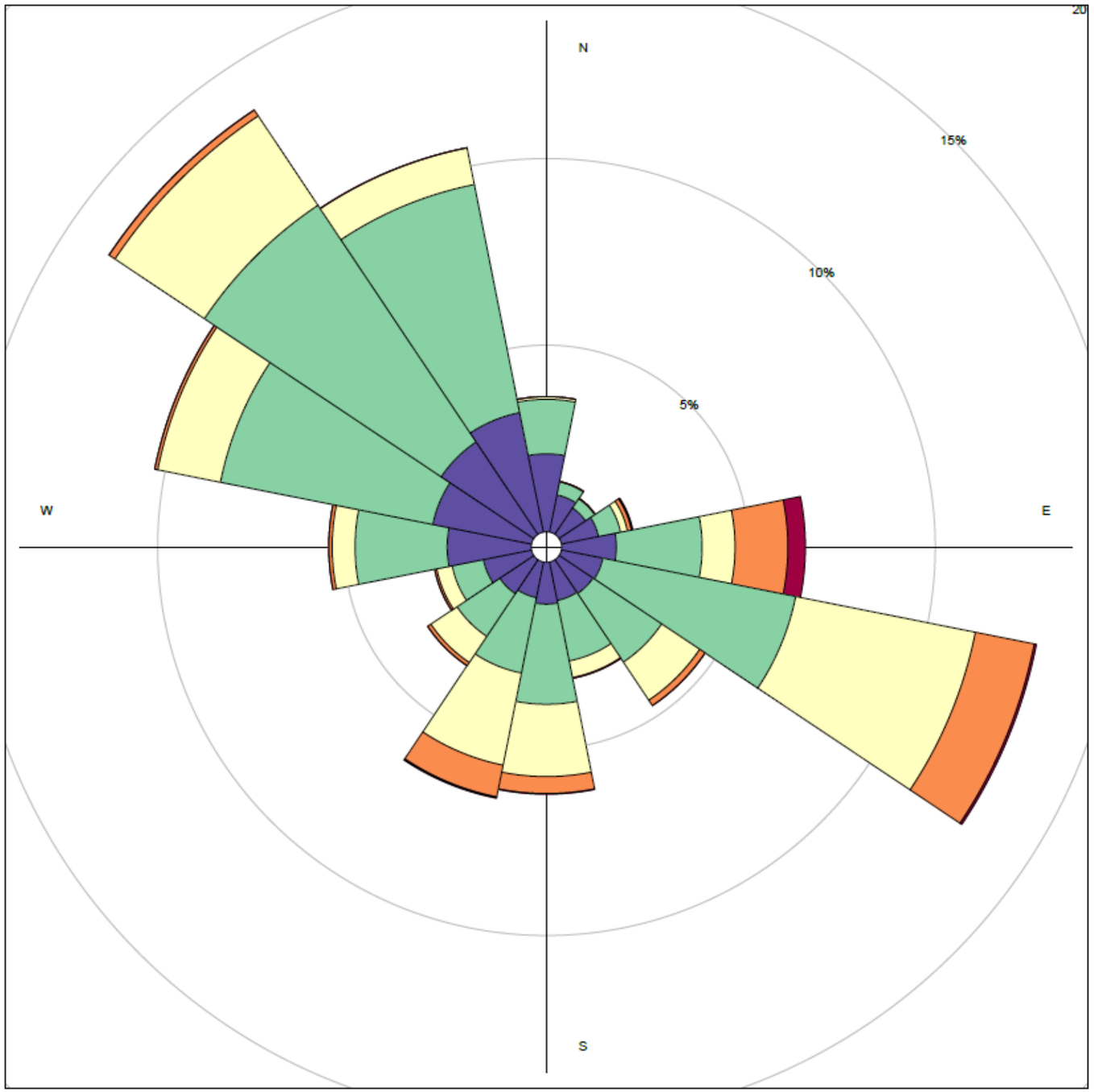
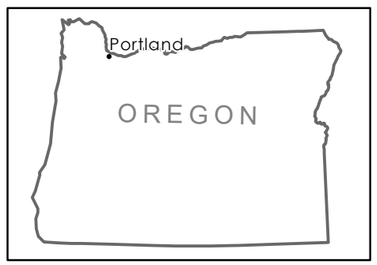


Figure 4-1
Wind Rose

Hydro Extrusion Portland, Inc.
Portland, Oregon

KEY MAP



Notes:
Data from Station #24225 - Portland International Airport, OR, for dates 1/1/2017 - 12/31/2021.
Total number of hours = 43,848
Wind direction = blowing from

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Path: X:\0201_10_Hydro_Extrusion\GIS\Figure4_1_Wind Rose.mxd
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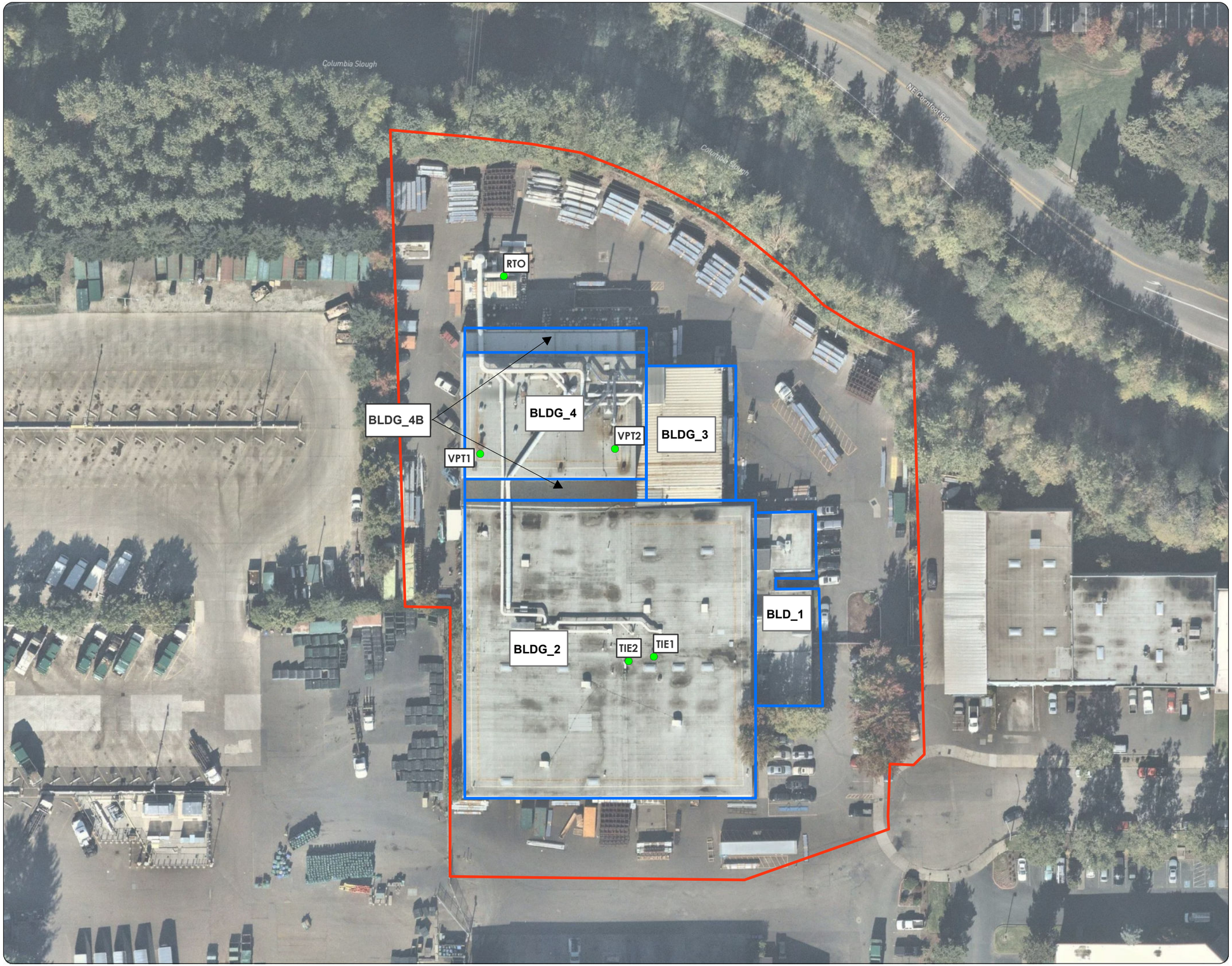
Approved By:
Produced By: jelstrott
Project: 0201.10

Figure 4-2
Proposed Downwash Structures and Significant Toxic Emission Unit Locations

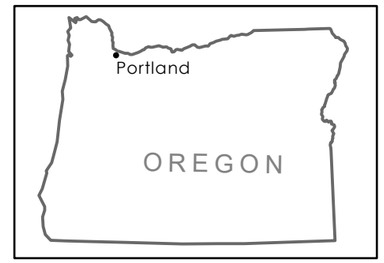
Hydro Extrusion Portland, Inc.
Portland, OR



Legend

- Proposed Point Source Location
- Property Boundary
- Buildings

KEY MAP



Source: Aerial imagery obtained from Mapbox.

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1,000

Path: X:\0201.10_Hydro_Extrusions\01\Fig4_2_Proposed_Downwash_Structures_and_Emission_Source_Locations.mxd
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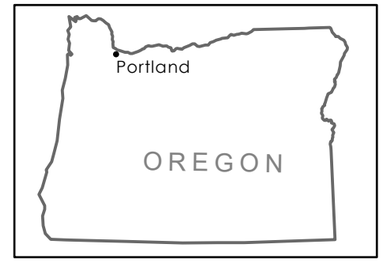
Figure 4-3
Proposed Natural Gas Toxic Emission Unit Locations

Hydro Extrusion Portland, Inc.
Portland, OR

Legend

- Proposed Point Source Location
- Property Boundary

KEY MAP



Source: Aerial imagery obtained from Mapbox.

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1,000

Path: X:\0201_10_Hydro_Extrusions\01\Fig4_3_Proposed_NG_Toxic_Emission_Units.mxd
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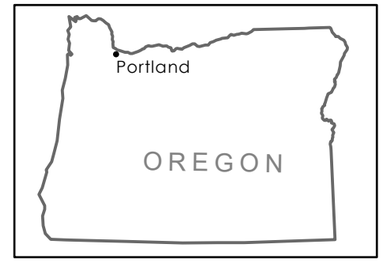
Figure 4-4
Proposed Receptor Locations

Hydro Extrusion Portland, Inc.
Portland, OR

Legend

- Proposed Receptor
- Proposed Receptor in Road, Rail Right-of-Way, or Outside Oregon State Border
- UTM Grid Guideline
- Property Boundary
- Proposed Modeling Domain Extents

KEY MAP



0 1,000 2,000
Meters

Source: Aerial imagery obtained from Mapbox.

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Path: X:\0201.10_Hydro_Extrusions\01\Fig4_4_Proposed_Receptor_Locations.mxd
Print Date: 6/15/2022
Approved By:
Produced By: aguse
Project: 0201.10

5057200 5056000 5054800 5053600 5052400 5051200 5050000 5048800 5047600 5046400 5045200 5044000 5042800 5041600 5040400 5039200 5038000

517000 518400 519800 521200 522600 524000 525400 526800 528200 529600 531000 532400 533800 535200 536600 538000 539400 540800 542200 543600

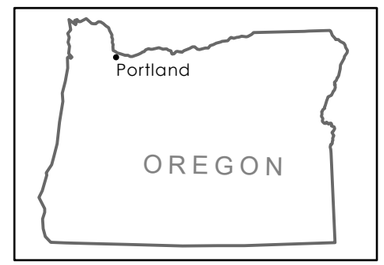
Figure 4-5
Proposed Receptor Locations in the Immediate Area

Hydro Extrusion Portland, Inc.
Portland, OR

Legend

- Property Boundary
- Proposed Receptor
- Proposed Receptor in Road, Rail Right-of-Way or Outside Oregon State Border
- UTM Grid Guideline

KEY MAP



0 100 200
Meters

Source: Aerial imagery obtained from Mapbox.

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Path: X:\0201.10 Hydro Extrusions\01\Fig4.5 Proposed Receptor Locations Immediate Area.mxd
Print Date: 6/16/2022
Approved By:
Produced By: aguse
Project: 0201.10

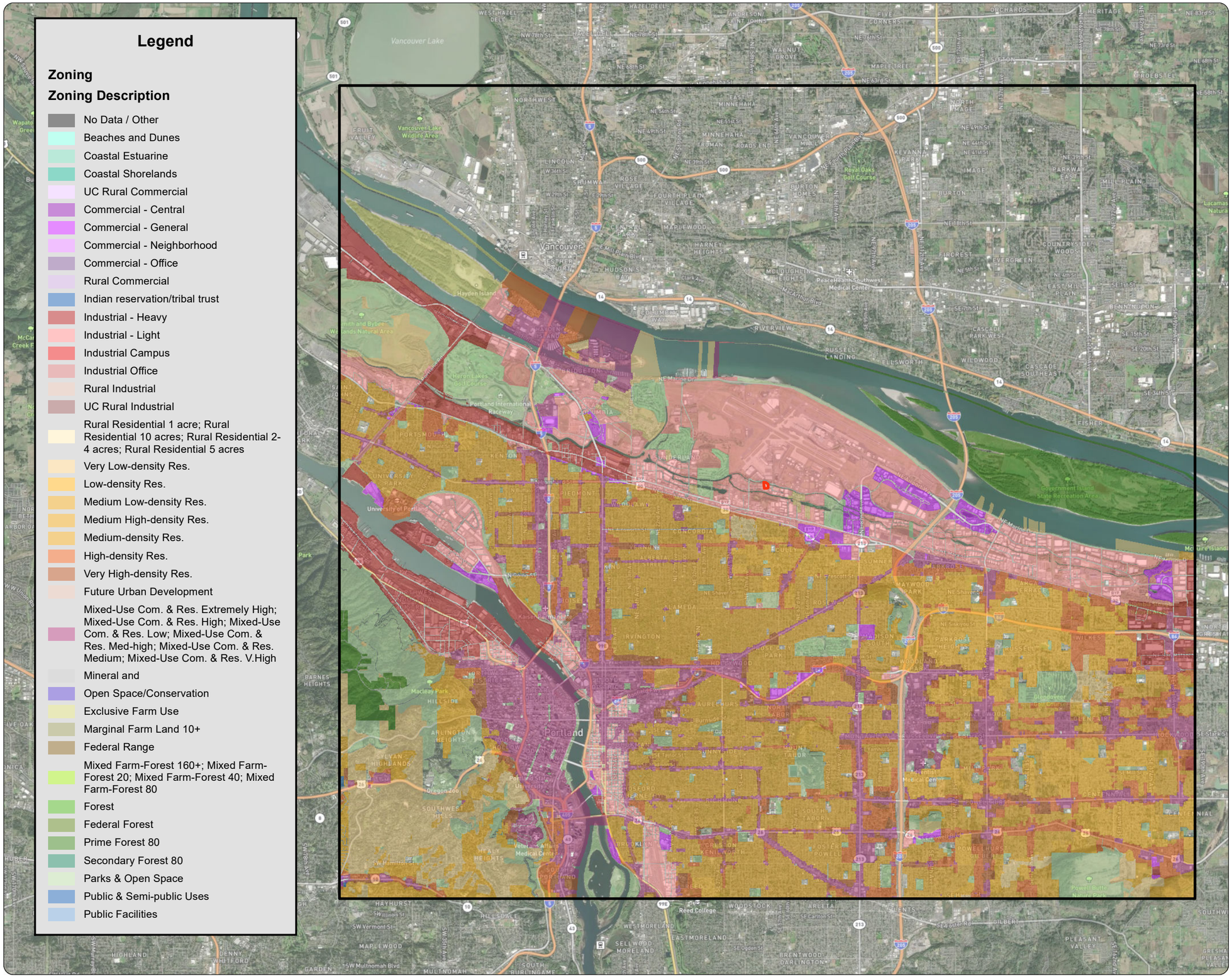

Figure 4-6
Existing Land-Use Zoning Classifications

Hydro Extrusion Portland, Inc.
Portland, OR

Source: Aerial imagery obtained from Mapbox. Zoning obtained from the Oregon Dept. of Land Conservation and Development.

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Path: X:\0201.10_Hydro_Extrusions\01\Fig4_6_Existing_Land_Use_Classification.mxd
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Produced By: aguse
Project: 0201.10

Figure 4-7
Existing Land-Use Zoning Classifications in the Immediate Area

Hydro Extrusion Portland, Inc.
Portland, OR

Zoning

Zoning Description

- No Data / Other
- Beaches and Dunes
- Coastal Estuarine
- Coastal Shorelands
- UC Rural Commercial
- Commercial - Central
- Commercial - General
- Commercial - Neighborhood
- Commercial - Office
- Rural Commercial
- Indian reservation/tribal trust
- Industrial - Heavy
- Industrial - Light
- Industrial Campus
- Industrial Office
- Rural Industrial
- UC Rural Industrial
- Rural Residential 1 acre; Rural Residential 10 acres; Rural Residential 2-4 acres; Rural Residential 5 acres
- Very Low-density Res.
- Low-density Res.
- Medium Low-density Res.
- Medium High-density Res.
- Medium-density Res.
- High-density Res.
- Very High-density Res.
- Future Urban Development
- Mixed-Use Com. & Res. Extremely High; Mixed-Use Com. & Res. High; Mixed-Use Com. & Res. Low; Mixed-Use Com. & Res. Med-high; Mixed-Use Com. & Res. Medium; Mixed-Use Com. & Res. V.High
- Mineral and Aggregate
- Open Space/Conservation
- Exclusive Farm Use
- Marginal Farm Land 10+
- Federal Range
- Mixed Farm-Forest 160+; Mixed Farm-Forest 20; Mixed Farm-Forest 40; Mixed Farm-Forest 80
- Forest
- Federal Forest
- Prime Forest 80
- Secondary Forest 80
- Parks & Open Space
- Public & Semi-public Uses
- Public Facilities

Legend

- Property Boundary
- Parcel

0 200 400
Meters

Source: Aerial imagery obtained from Mapbox.
Zoning obtained from the Oregon Dept. of Land Conservation and Development.

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Path: X:\0201_10_Hydro_Extrusions\01\Fig4_7_Existing_Land_Use_Classification_Immediate_Area.mxd
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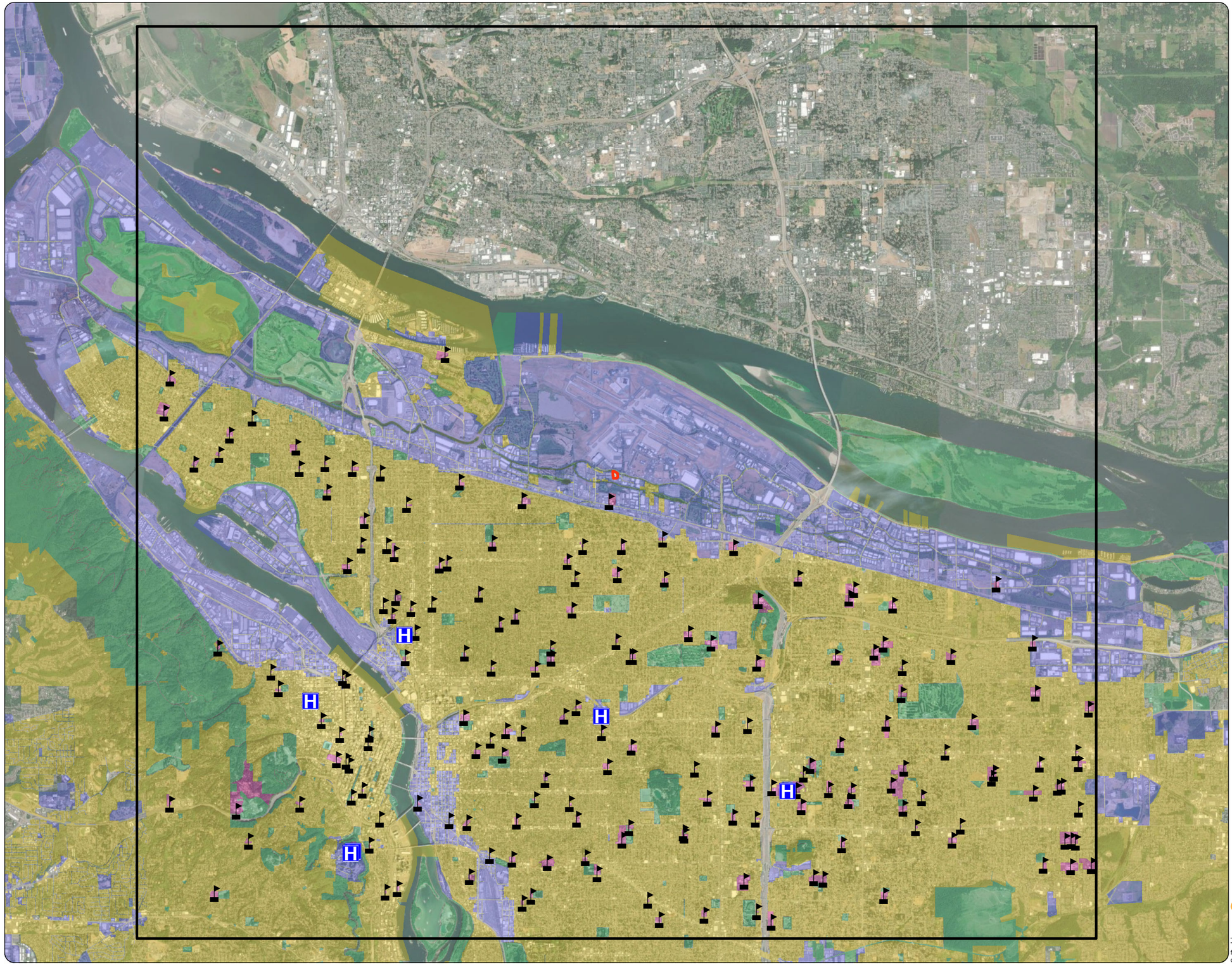
Project: 0201.10

Figure 4-8
Proposed Exposure Categorization

Hydro Extrusion Portland, Inc.
Portland, OR



Legend

- Hospital Location (2014)
- School Location (2015-16)
- Property Boundary

Proposed Exposure Classification

RBC Basis

- Residential
- Child
- Worker
- Acute

1. Zoning data obtained from the Oregon Dept. of Land Conservation and Development.
2. Existing land use classifications revised to reflect one of the four risk-based concentration categories presented in Oregon Administrative Rule 340-245-8040 Table 4.
3. Non-taxlot land use areas (e.g., interstate right-of-way) will not be assessed for cancer or noncancer risk.

0 1 2
Kilometers

Sources: Aerial photograph obtained from Mapbox. Schools obtained from Oregon Dept. of Human Services & Oregon Health Authority.

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Path: X:\0201_10_Hydro_Extrusions\01\Fig4_8_Proposed_Exposure_Categorization_in_the_Immediate_Area.mxd
Print Date: 12/23/2022
Approved By: triley
Produced By: jroberts
Project: M0201.10.001

Figure 4-9
Proposed Exposure Categorization in the Immediate Area

Hydro Extrusion Portland, Inc.
Portland, OR

Legend

- School Location (2015-16)
- Property Boundary

Proposed Exposure Classification
RBC Basis

- Residential
- Child
- Worker
- Acute

1. Zoning data obtained from the Oregon Dept. of Land Conservation and Development.
2. Existing land use classifications revised to reflect one of the four risk-based concentration categories presented in Oregon Administrative Rule 340-245-8040 Table 4.
3. Non-taxlot land use areas (e.g., interstate right-of-way) will not be assessed for cancer or noncancer risk.

0 0.1 0.2
Kilometers

Sources: Aerial photograph obtained from Mapbox. Schools obtained from Oregon Dept. of Human Services & Oregon Health Authority.

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Path: X:\0201_10_Hydro_Extrusions\011\Fig4_9_Proposed_Exposure_Categorization_in_the_Immediate_Area.mxd
Print Date: 12/23/2022
Approved By: Iriley
Produced By: jroberts
Project: M0201.10.001