CLEANER AIR OREGON—
RISK ASSESSMENT REPORT

ROSEBURG FOREST PRODUCTS
MEDFORD, OREGON

Prepared for

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

CLEANER AIR OREGON AIR TOXICS PROGRAM

December 12, 2020 (Revised November 16, 2021)

Project No. 1419.12.02

Prepared by

Maul Foster & Alongi, Inc.

3140 NE Broadway Street, Portland, OR 97232

MAUL FOSTER ALONGI

CONTENTS

TABLES AND FIGURES

TABLES

FIGURES

ACRONYMS AND ABBREVIATIONS

ASOS	National Weather Service Automated Surface Observation Systems
CAO	Cleaner Air Oregon
DEQ	Oregon Department of Environmental Quality
existing permit	Title V Operating Permit No. 15-0073-TV-01
Facility	MDF manufacturing facility located at 2685 North Pacific Highway in Medford, Oregon
FTP	file transfer protocol
g/s	gram(s) per second
IFW	Ice-Free Winds Group
m/s	meter(s) per second
ug/m^3	microgram(s) per cubic meter
MDF	medium-density fiberboard
MFA	Maul Foster & Alongi, Inc.
NCEI	National Center for Environmental Information
OAR	Oregon Administrative Rule
RAL	risk action level
RBC	risk based concentration
RCO	regenerative catalytic oxidizer
RFP	Roseburg Forest Products
Medford met station	Rogue Valley International-Medford Airport monitoring station ID 725970
TAC	toxic air contaminant
TEU	toxic emissions unit
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey

1 INTRODUCTION

Roseburg Forest Products (RFP) owns and operates a medium-density fiberboard (MDF) manufacturing facility located at 2685 North Pacific Highway in Medford, Oregon (the "facility"). The facility currently operates under Title V Operating Permit No. 15-0073-TV-01 (existing permit) issued by the Oregon Department of Environmental Quality (DEQ) on June 8, 2017.

Maul Foster & Alongi, Inc. (MFA) has been retained by RFP to assist the facility with the dispersion modeling and risk assessment component of the Cleaner Air Oregon (CAO) permitting process. A timeline of the CAO permitting process to date is presented in Table 1-1 below. Subsequent to the DEQ approval dates in Table 1-1 below, an updated TAC emissions inventory, modeling protocol, and Level 3 Risk Assessment work plan (RAWP) were submitted to the DEQ on November 16, 2021 due to new source test data for the regenerative catalytic oxidizer (RCO) stack.

Table 1-1. CAO Process Step Submittals and Approvals

CAO Requirement	RFP Submittal Date	DEQ Approval Date
CAO Emissions Inventory	May 30, 2019	January 8, 2020
CAO Modeling Protocol	February 6, 2020 (Final Revision—November 16, 2021)	May 28, 2020
CAO Level 3 Risk Assessment Work Plan	June 9, 2020 (Final Revision—November 16, 2021)	August 14, 2020

Oregon Administrative Rule (OAR) 340-245-0030(1)(e) states that a risk assessment is required to be submitted to the DEQ no later than 120 days after approval of the risk assessment work plan. To satisfy this requirement, MFA performed a Level 3 Risk Assessment to estimate the potential cancer and noncancer risk impacts from the facility for comparison to the applicable risk action levels (RAL), shown in OAR 340-245-8010 Table 1.

The remainder of this risk assessment report outlines the methodology used to complete the Level 3 Risk Assessment and presents a summary of the potential cancer and noncancer risk results. This revision reflects RFP's response to comments supplied by the DEQ and incorporates the latest source test data for the RCO exhaust stack.

2 FACILITY DESCRIPTION

2.1 Facility Location

The facility is located in Medford, Oregon, within the Medford urban growth boundary. An aerial image of the facility location and the property boundary is shown in Figure 2-1. The northeastern and southwestern property boundaries are adjacent to Oregon Highway 99 and the Central Oregon & Pacific Railroad line, respectively.

The area immediately surrounding the facility is characterized primarily by flat terrain with a mixture of land-use zoning including residential, mixed-use, and industrial. Existing land-use zoning information for the area surrounding the facility is discussed in Section 5.1. The topography of the area immediately surrounding the facility is presented in Figure 2-2.

2.2 Process Description

The facility produces MDF from wood furnish purchased as residuals from other wood products facilities and sawmills in the surrounding area. The wood furnish, composed mainly of chips, sawdust, and planer shavings, are transported to the facility by truck and unloaded for on-site storage.

The wood furnish is processed in a pressurized digester and refiner system to produce wood fiber, referred to as a fiber stream. Resins are blended with the fiber stream in the pneumatic transfer line (blowline blending), as it is conveyed to two direct natural gas-fired flash tube dryers for drying. The dried fibers are then formed into mats. Each mat is cut and trimmed to size and then cured in the hot press to form panels. Steam for the dryers and press is supplied by a boiler that can be fueled by either sanderdust and/or natural gas. Particulate matter (PM) emissions generated by fuel combustion in the boiler are controlled by a baghouse.

After exiting the hot press, the cured panels are allowed to cool in a series of board coolers. Once cooling is complete, each MDF panel is sanded and cut to finished product dimensions. Emissions generated by the two flash tube dryers and the hot press are routed through process baghouses operating in parallel for fiber recovery and precleaning prior to entering the RCO for control of organic TAC emissions. The facility also operates several other baghouses for controlling PM emissions from material handling processes, and for collecting wood residuals to be recycled back into the manufacturing process.

A process flow diagram outlining the MDF manufacturing process and locations 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 emissions control devices considered to be TEUs, as defined in OAR 340-245-0020(60), were prepared by RFP and based on TEU design capacity as shown in the DEQ-approved TAC emissions inventory. The DEQ-approved daily and annual TAC emission estimates were converted to units of grams per second (g/s) for purposes of conducting the Level 3 Risk Assessment. Tables 3-1 and 3-2 (attached) present the daily and annual TAC emission estimates for significant TEUs, and Table 3-3 (attached) presents the daily and annual TAC emission estimates for gas combustion TEUs. Tables 3-1, 3-2 and 3-3 only include emission estimates for TACs with established risk-based concentrations (RBCs) set forth under OAR 340-245-8040 Table 4.

Each TEU identified in the DEQ-approved TAC emissions inventory was included in the dispersion model developed for the facility. Each TEU included in the dispersion model was modeled using a unit emission rate, equivalent to 1 g/s, for all modeled source types as shown in Table 3-4 (attached). Unit emission rate modeling is described in greater detail in Section 5.4.

3.1 Significant Toxic Emission Units

3.1.1 Boiler

The facility uses a boiler that can be fired on sanderdust and/or natural gas. The boiler has a maximum heat input capacity of 77 million British thermal units per hour (MMBtu/hr) when combusting both sanderdust and natural gas fuel, and a maximum heat input capacity of 90 MMBtu/hr while combusting only natural gas fuel. The boiler is capable of producing a total of 80 thousand pounds of steam per hour.

Exhaust from the boiler is routed to a multiclone for removal of coarse particulate, and then to a baghouse for control of fine PM and metal (i.e., TACs). The exhaust stack for sanderdust combustion in the boiler was represented in the air dispersion model as an individual point source with a unique label (BOILER). The release parameters for the boiler stack are presented in Table 3-4.

3.1.2 RCO

The RCO is used primarily to control emissions generated by operation of the flash tube dryers and the MDF press. The RCO is fueled by a total of six natural gas-fired burners with a combined maximum heat input capacity of 24 MMBtu/hr. The burners provide the heat required to bring the RCO up to operational temperature, as well as the supplemental heat required to maintain the necessary RCO oxidation temperature. The natural gas required to sustain operating temperature of the unit is typically less than the heat input capacity of the burners.

Exhaust from the flash tube dryers and the MDF press was represented in the dispersion model as a single point source with a unique label (RCO). The release parameters for the RCO stack are presented in Table 3-4. Supporting details and descriptions for the flash tube dryer and MDF press are provided in the following subsections.

3.1.2.1 Flash Tube Dryers (Dryers 2 and 3)

The facility operates two flash tube dryers, identified as Dryers 2 and 3, to remove excess moisture in the wood fibers. Dryer 2 produces dried-face material (surface layers of panels) and Dryer 3 produces dried-core material (inner layer of panels). Dryers 2 and 3 are directly heated by natural gas-fired panel burners and/or indirectly heated by steam coils (using steam generated by the boiler). Indirect steam heat is maximized to the extent possible, depending on steam availability, with natural gas heat used primarily for supplemental purposes.

Exhaust from Dryers 2 and 3 is routed to one of six process baghouses operating in parallel for fiber recovery and precleaning prior to entering the RCO for final emissions control. It is important to note that, since the facility utilizes blowline blending, exhaust gases from the pressurized digesters, refiners, and application of the resins and waxes are incorporated into the flash tube dryer exhaust stream. Exhaust gases generated by natural gas-fired combustion from the direct-fired panel burners are also a part of the flash tube dryer exhaust stream and are routed to the RCO.

3.1.2.2 MDF Press

The MDF press is a steam-heated, multi-opening hot press housed in a partial enclosure to capture emissions. Pre-dried and blended mats are loaded into the hot press, which uses heat and pressure to cure the resin and produce MDF panels.

Exhaust gases captured by the partial enclosure are routed to one of three baghouses operating in parallel for fine PM removal, prior to combining with the flash tube dryer exhaust. The combined exhaust stream is then routed to the RCO for final emissions control.

3.1.3 MDF Press Fugitives

Uncaptured emissions from the MDF press (i.e., emissions not captured by the partial enclosure and routed to the RCO) are assumed to emit to atmosphere passively as fugitive emissions. The MDF press fugitive emissions were represented in the dispersion model as a volume source with a unique label (PRESSFUG). The release parameters for the volume source are presented in Table 3-4.

Roof vents and/or building openings are not located in close proximity to the press partial enclosure. As a result, MFA modeled the MDF press fugitives directly above the press partial enclosure area as a single volume source. The dimensions of the MDF press partial enclosure and adjacent building height were used to define the volume source initial lateral dimension and initial vertical dimensions, respectively.

3.1.4 MDF Former

The MDF former represents the vacuum forming system that produces a mat from the blended and dried fiber. Four forming heads spread the blended and dried fibers on a vacuum belt to form a continuous mat. The mat is then pre-trimmed to rough size before it enters the hot press.

Emissions generated by each forming head are controlled by one of four baghouses identified in the existing permit under the material handling emission unit. Each baghouse was represented in the dispersion model as a horizontally oriented point source with a unique label (FORM1BH, FORM2BH, FORM4BH, and FORM5BH). The release parameters for each forming head baghouse stack are shown in Table 3-4.

3.1.5 MDF Board Cooler

MDF panels from the hot press enter the MDF board cooler, where they are moved through indexing wheels. Cooled air is circulated between the MDF panels, allowing them to cool prior to final stacking.

Exhaust from the MDF board cooler is emitted to atmosphere through a series of roof vents (12 roof vents in total) located directly above the MDF board cooler. The exhaust vents are typically powered, but each vent can also be operated passively, depending on the desired product and ambient weather conditions. However, multiple vents are typically powered at all times the board cooler is in operation. Therefore, exhaust from the MDF board cooler was represented in the dispersion model both as a point source and as two distinct volume sources.

The powered roof vents were represented in the dispersion model as a representative individual point source with a unique label (BC1), while the group of passive roof vents were divided into two distinct volume sources with unique labels (BC2 and BC3). The length of side for both volume sources were set based on the general extents of adjacent roof vents. The release parameters for each MDF board cooler release points are shown in Table 3-4. MFA assumes that the active ventilation provided by the powered vents exhaust almost all the emissions generated by the MDF board cooler. To reflect this, 90% of the total emissions generated by the MDF board cooler was conservatively be assigned to the point source representation, and the remaining balance was assigned evenly between the two volume sources.

3.1.6 MDF Sander

The MDF sander smooths the surface of the MDF panels to final product specifications as part of the finishing operation. PM emissions generated by the MDF sander are controlled by a baghouse.

Emissions from the MDF sander baghouse was represented in the air dispersion model as an individual point source with a unique label (SANDBH). The release parameters for the MDF sander baghouse stack are shown in Table 3-4.

3.1.7 MDF Finishing Saw and Board Trim Hog

The MDF finishing saw and board trim hog are also utilized in the finishing operation to cut MDF panels to the appropriate final product dimensions. Trimmed material from the MDF finishing saw passes through the board trim hog for particle size reduction, generating wood furnish. The hogged wood furnish is then recycled back into the MDF manufacturing process.

Emissions generated by operating the MDF finishing saw and board trim hog are controlled by a baghouse identified in the existing permit under the material handling emission unit. The MDF finishing saw and board trim hog baghouse stack was represented in the air dispersion model as an individual point source with a unique label (SAWBH). The release parameters for the MDF finishing saw and board trim hog baghouse stack are presented in Table 3-4.

3.1.8 Coatings

Coating products, which include spray paints and marking inks with varied TAC compositions, are used for marking MDF panels. The coating products are primarily used within the finished goods warehouse. Fugitive emissions produced from using each coating product (i.e., spraying and/or ink drying) are assumed to be uncontrolled and emitted through nearby vents spaced incrementally along the finished goods warehouse roof.

Fugitive emissions from coatings use were represented in the air dispersion model as a volume source with unique label (COATINGS). The release parameters for the volume source are shown in Table 3-4.

3.2 Gas Combustion Toxic Emission Units

The specific procedures for assessing the risk of each TEU is 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." The following TEUs represent sources of natural gas-fired combustion emissions only (shown with the corresponding dispersion model ID in parentheses):

- Boiler 4 natural gas-fired combustion (BLR_NG)
- Dryer nos. 2 and 3 natural gas-fired combustion (DRY_NG)
- RCO natural gas-fired combustion (RCO_NG)

Based on this qualification, MFA conducted two separate Level 3 risk assessments, one for significant TEUs and one for the natural gas combustion TEUs listed above. However, for purposes of air dispersion modeling, each TEU identified in the DEQ-approved TAC emissions inventory was included in the dispersion model of the facility.

4 AIR DISPERSION MODELING METHODOLOGY

The following subsections detail the conceptual site model for the facility. The conceptual site model was developed as a part of the Level 3 Risk Assessment. The dispersion model input and output files will be submitted to the DEQ electronically for review in support of this risk assessment report.

4.1 Model Selection

MFA setup the dispersion model of the facility using the models shown in Table 4-1 below. Lakes Environmental, a third-party overlay software, was used to execute the dispersion model.

Table 4-1. Proposed Model Selection

Model	Model Version
AERMOD	19191
AERMET	19191
AERMAP	18081
AERSURFACE	20060
AERMINUTE	15272
BPIP	04274

4.2 Meteorological and Terrain Datasets

MFA obtained the meteorological and terrain data files shown in Table 4-2 below.

Table 4-2. Meteorological and Terrain Data

Dataset	Station ID
Surface	Station ID 725970 (Rogue Valley International-Medford Airport)
Upper Air	Station ID 24225 for Medford, OR (National Oceanic and Atmospheric Administration/ Earth System Research Laboratory Radiosonde Database)
Terrain	U.S. Geological Survey (USGS) National Elevation Dataset (1/3-arc seconds with horizontal resolution of 10 meter)

4.2.1 Surface Meteorological Data

Surface meteorological data were collected from the Rogue Valley International-Medford Airport monitoring station ID 725970 located in Medford, Oregon (Medford met station). Hourly wind speed, wind direction, cloud cover, and temperature data for the years 2014 through 2018 were downloaded by file transfer protocol (FTP) from the National Center for Environmental Information (NCEI). The

Medford met station was chosen as the most representative, publicly available surface meteorological data for the facility for the following reasons:

- The Medford met station represents the closest meteorological station to the facility location with data available for download from the NCEI. The Medford met station is approximately 4.1 kilometers to the northeast of the facility and is located in an area characterized as flat with minimal terrain features.
- Both the Medford met station and the facility are centrally located within Rogue valley.

The Medford met station is part of the National Weather Service Automated Surface Observation Systems (ASOS) network. The Medford 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 Medford 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 2014 through 2018 were extracted by FTP from the NCEI. These data were processed using the U.S. Environmental Protection Agency (USEPA) AERMINUTE program.

4.2.2 Upper Air Data

Upper air meteorological data were collected in the Forecast Systems Laboratory format for Medford, OR (station ID 24225), from the National Oceanic and Atmospheric Administration/Earth System Research Laboratory Radiosonde Database. Upper air meteorological data were extracted for the years 2014 through 2018.

4.2.3 Data Processing—AERMET

The surface and upper air meteorological data were processed using the USEPA 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 (referred to as "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 USEPA 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] https://www3.epa.gov/ttn/scram/guidance/clarification/20130308_Met_Data_Clarification.pdf

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 (attached), the surface and profile files produced by AERMET are more than 90% 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 north to northwest, with a southerly component. Note this wind direction orientation is consistent with the orientation of the Rogue Valley.

4.3 Land Use

AERSURFACE was used to generate seasonal values for albedo, Bowen ratio, and surface roughness heights. The National Land Cover Dataset, 1992 land cover class definitions for the State of Oregon were downloaded from the USGS. These data were processed using the USEPA AERSURFACE land use tool to generate the surface characteristics necessary to run AERMET. MFA processed AERSURFACE using the settings described in Table 4-4 (attached).

Surface moisture conditions were determined following the methodology set forth in the USEPA 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 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 (attached), 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 executed the dispersion model using rural dispersion coefficients. To make this determination, MFA followed the land use procedure, as recommended by USEPA "Guideline on Air Quality Models"[2], to conclude that less than 50 percent of the land use within the modeling domain is represented by the urban land use type.

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

4.4 Emissions Source Locations

The locations of each TEU included in the dispersion model are shown in Figure 4-2. As shown in Figure 4-2, wood-fired (BOILER) and natural gas-fired (BLR_NG) combustion TAC emissions are routed to atmosphere through the same stack location. Similarly, wood drying TAC emissions generated by Dryer nos. 2 and 3 and captured press TAC emissions (RCO), and natural gas-fired combustion TAC emissions from the dryers (DRY_NG) and RCO (RCO_NG) are routed to atmosphere through the same stack location.

4.5 Building Downwash

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

The locations for structures that were projected to influence downwash are included in Figure 4-2. All stacks at the facility meet Good Engineering Practice design parameters. Table 4-6 (attached) presents a summary of the downwash structure heights that were included in the air dispersion model.

4.6 Receptor Locations and Terrain

Dispersion factors were determined for each TEU at each modeling receptor identified outside the facility property boundary. MFA placed modeling receptors at potential exposure locations in the surrounding area up to 10 kilometers away from the center of the facility. Figure 4-3 presents the receptor spacing and locations for the modeling domain. Figure 4-4 presents the receptor locations in the immediate area surrounding the facility.

Receptors were defined in the dispersion model as shown in Table 4-7 below.

Table 4-7. Receptor Location Spacing

Receptor Spacing	Receptor Distance
25 m	Along fence line and out to 600 m from fence line
50 m	600 to 1,000 m
100 m	1,000 to 2,000 m
200 m	2,000 to 3,000 m
500 m	3,000 to 10,000 m

MFA identified multiple locations considered to be "sensitive exposure locations" (e.g., schools and daycares) within approximately 1-kilometer from the facility property boundary. Identified sensitive exposure locations are presented in Table 4-8 below. Each sensitive exposure location shown in Table 4-8 was accounted for in the dispersion model by a receptor location.

Table 4-8. Identification of Sensitive Exposure Locations

UTM Coordinates (m)		Sensitive Exposure Location
Easting	Northing	
508,909.66	4,689,462	Howard Elementary School
509,309.66	4,689,212	Early Head Start Merriman Campus (Preschool)
510,809.66	4,688,062	Wilson Elementary School
510,809.66	4,687,962	Medford Montessori School (Kindergarten)
510,309.66	4,686,962	Kids Unlimited (Youth Organization)
510,109.66	4,687,862	Wee Watch 'em Daycare (Rogue Valley Mall)

Terrain elevations for model receptors, source base elevations, and base elevations of downwash structures were taken 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.

5 RISK ASSESSMENT METHODOLOGY

5.1 Land-Use Zoning Classification-Exposure Types

The Department of Land Conservation and Development's statewide zoning data were reviewed 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 (e.g. residential, non-residential worker, non-residential child, or acute). The zoning data was further evaluated against local data sets such as City of Medford zoning, Jackson County zoning and school-location information. MFA also reviewed aerial imagery via Esri AcrGIS and Google Earth software, and a physical site inspection of select areas was performed by RFP personnel to determine whether the existing zoning information reflects actual land-use and the corresponding exposure type categorization.

The zoning data and internal review process indicate multiple proposed receptor locations fall within roadway and/or rail rights-of-way interstitial spaces as shown (in black) in Figures 4-3 and 4-4. These locations were included in the dispersion model in order to maintain a uniform receptor grid per DEQ request. MFA did not conduct risk evaluations for any receptors in roadway or rail rights-of-way as these are not exposure locations. In the crosswalk-of-receptors, previously provided to the DEQ in spreadsheet format with the DEQ-approved modeling protocol, these locations are labeled as "Risk Not Assessed," although they were modeled, and dispersion factors were generated.

Figure 4-5 presents the existing land-use zoning identified for the modeling domain, and Figure 4-6 is provided for a more detailed view of the land-use zoning in the area immediately surrounding the facility. Figures 4-7 and 4-8 present the corresponding exposure location categorization for the modeling domain and the immediate area surrounding the facility, respectively.

5.2 Exposure Pathways

It is assumed that cancer and noncancer risk (i.e., chronic and acute hazard index) resulting from facility TEUs do not have additional exposure pathways (i.e., ingestion or injection) other than those already accounted for in each published RBC. Moreover, based on a review of land-use zoning classifications and aerial imagery, there are no known locations that might present additional exposure pathways, such as a local lake where fish consumption might present an ingestion pathway, or a nearby farm where subsistence farming practices may occur.

5.3 Risk-Based Concentrations

On August 14, 2020, the DEQ approved the Level 3 Risk Assessment Work Plan submitted by the facility. Per item 2 in the approval letter, the DEQ requested the facility include an acute RBC for antimony and compounds of 1 microgram per cubic meter (ug/m^3) in the final Level 3 Risk Assessment. The DEQ also requested the facility assess risk attributable to the "Chromium VI, chromate and dichromate particulate" RBC for hexavalent chromium emissions from the wood boiler and onsite natural gas combustion. These RBC updates, and the most current RBCs published in OAR 340-245-8040 Table 4, were used for this final Level 3 Risk Assessment.

5.4 Unit Emission Rate

MFA executed the dispersion model using unit emission rates (equivalent to 1 g/s) for all TEUs, for both the annual and daily (i.e., 24-hour) averaging periods, as shown in Table 3-4 (attached).

The unit emission rate model produces the dispersion factor, in units of $ug/m^3/(g/s)$, for each modeled TEU for both averaging periods. When multiplied by the TAC emission rate for the modeled TEU, the result is the modeled concentration of the TAC. The dispersion factors were used to conduct the Level 3 Risk Assessments, in combination with TAC emission rates for each TEU in g/s and the RBCs in ug/m^3 set forth under OAR 340-245-8040 Table 4.

5.4.1 Example Calculation—Level 3 Risk Assessment

Example calculations for estimating excess cancer risk and noncancer hazard index (representative of both chronic and acute assessments) for a single proposed exposure location are presented in Equation 1 and Equation 2 per OAR 340-245-0210(2)(c).

Equation 1.

$$\text{Excess cancer risk (chances-in-a-million)} = \Sigma \frac{\text{(TAC annual emission rate [g/s]) x (proposed TEU dispersion factor } [\frac{\mu g/m^3}{g/s}])}{\text{(applicable RBC at exposure location } [\mu g/m^3])}$$

Equation 2.

$$\text{Noncancer Hazard Index } = \Sigma \frac{\text{(TAC daily emission rate [g/s]) x (proposed TEU dispersion factor } [\frac{\mu g/m^3}{g/s}])}{\text{(applicable RBC at exposure location } [\mu g/m^3])}$$

The total facility excess cancer risk and chronic and acute noncancer hazard index was derived by summing each individual TAC risk contribution from all of the TEUs at each proposed exposure location.

5.5 Risk Action Levels

The results of the Level 3 Risk Assessment were compared to the most current RALs published in OAR 340-245-8010 Table 1. As shown in the DEQ-approved TAC emissions inventory, TAC emissions from the facility are comprised of a mixture of TACs with assigned hazard indices of 3 and 5 per OAR 340-245-8030 Table 3 and OAR 340-245-8040 Table 4, respectively, for purposes of determining the risk determination ratio, if needed (i.e. the cumulative risk approaches the T-BACT RAL or above).

5.6 Uncertainty Analysis

Although the Level 3 Risk Assessment was conducted using the most accurate and readily available information, there are various levels of uncertainty associated with the risk assessment. Per OAR 340-245-0210(2)(d), known quantitative and qualitative uncertainties with the Level 3 Risk Assessment include, but may not be limited to, the following:

Acute Assessments:

- To assess acute noncancer risk (i.e., acute hazard index), the full 24-hour exposure duration was assumed. Acute exposure can occur anywhere from one to 24 hours. Although this risk assessment assumed 24 hours of exposure, it is very unlikely that any individual would be exposed for a full 24 hours outside of a residential location. However, if the toxicity reference value is based on data collected for a lower exposure duration than the 24-hour exposure duration, the estimated risk may differ. **Hence, for TACs with RBCs that were developed using toxicity reference values based on longer exposure durations, the Level 3 Risk Assessment may overestimate acute noncancer risk due to the 24-hour exposure duration assumption.**

- The Level 3 Risk Assessment was conducted assuming each TEU at the facility is operating at maximum design capacity for 24 hours, simultaneously. For example, the boiler typically does not need to operate at maximum operational capacity to satisfy the steam requirements of the facility. It is highly unlikely that all TEUs at the facility will simultaneously operate at their maximum capacity for a 24-hour period. **Therefore, the Level 3 Risk Assessment likely overestimates acute noncancer risk due to unrealistic operating conditions.**

- The Level 3 Risk Assessment relies on modeling using a five-year period of hourly meteorological data. Some meteorological conditions, which may only occur a few days or less in a five-year period, result in worst-case dispersion characteristics. It is extremely unlikely that these infrequent meteorological conditions would occur at the same time that the facility is simultaneously operating all TEUs at maximum capacity. **Therefore, the Level 3 Risk Assessment likely overestimates acute noncancer risk because of the improbability of**

facility operations at maximum capacity aligning with worst-case meteorological conditions.

- Dispersion modeling was used to determine the daily (i.e. 24-hour) dispersion factors per exposure location for use in risk estimate calculations. This method determines, for each TEU, a single day within the five-year period of hourly meteorological data, during which the highest predicted concentration occurs at each exposure location. Those TEU specific concentrations are then summed to generate the maximum aggregate concentration. It is highly unlikely that the maximum predicted concentration at a given exposure location occurs on the same day for all TEUs at the facility. For example, the highest predicted concentration for the RCO may occur at exposure location "X" on March 1 while, due to differences in location, release characteristics (i.e., stack height, velocity, etc.), and meteorological variation, the highest predicted concentration for the Board Cooler may occur at exposure location "X" on December 1. Thus, the maximum predicted concentrations are not paired-in-time such that maximum predicted concentrations per TEU may occur on different days within the meteorological dataset. **Therefore, the Level 3 Risk Assessment likely overestimates acute noncancer risk because it is unlikely that that the highest predicted concentration from each TEU occurs at every exposure location the on the same day.**

Cancer and Chronic Noncancer Assessments:

- The RBCs developed by the DEQ for excess cancer risk and chronic noncancer risk assume a 70-year exposure duration for 24 hours per day. It is unlikely that a person would remain at the same residence or in areas potentially impacted by emissions covered by the CAO program for 70 consecutive years for 24 hours per day. The risk assessments also account for a person being exposed to the local facility emission rate for the entire exposure duration (i.e., 70 years). The facility has not been at the current location in the current configuration and emitting at the current rates for 70 consecutive years and nor is it likely that it ever will be. **Therefore, the Level 3 Risk Assessment overestimates cancer and chronic noncancer risk due to the unrealistic exposure duration assumption.**

- The excess cancer and chronic noncancer risk assessments were performed assuming that all TEUs operated for the course of the calendar year at their maximum operational capacities. It is physically impossible that the facility could operate several of its TEUs at maximum capacity for an entire year without shutdown time for maintenance and cleaning of equipment, such as the boiler or flash tube dryers. **Therefore, the Level 3 Risk Assessment overestimates cancer and chronic noncancer risk due to the overestimation of emissions resulting from continuous maximum capacity facility operation.**

All Assessments:

- Only excess cancer risk and chronic and acute noncancer hazard index from TACs that have RBCs published by the DEQ were assessed (in addition to the acute RBC for antimony and compounds as noted above). Table 5-1 (attached) presents a list of the TACs emitted from the facility TEUs that do not have RBCs published by the DEQ. **As a result, the Level 3**

Risk Assessment may not accurately assess cancer and/or noncancer risk associated with those TACs that do not yet have an associated RBC. However, the development of RBCs generally has a level of conservatism that may overestimate cancer and/or noncancer risk from TACs with known RBCs.

6 RISK ASSESSMENT RESULT SUMMARY

MFA determined the total excess cancer risk and chronic and acute noncancer risk (expressed numerically as the chronic and acute noncancer hazard index) at each modeled exposure location for both significant TEUs and gas combustion TEUs following the applicable requirements set forth in OAR 340-245-0050(1) for Level 3 Risk Assessments. Excess cancer risk, and chronic and acute noncancer hazard index calculation methodologies are discussed in detail in Section 5. The modeled concentration at the location of maximum risk for each modeled TEU and exposure scenario are provided in Table 6-1 (attached).

6.1 Excess Cancer Risk

Following the Level 3 Risk Assessment methodology outlined above, the maximum predicted excess cancer risk for significant TEUs is 4 additional chances of developing cancer in a population of 1,000,000 people (chances-in-one-million) as shown in Table 6-2. The maximum predicted excess cancer risk for gas combustion TEUs is predicted to be <0.1 additional chances of developing cancer in a population of 1,000,000 people (chances-in-one-million) as shown in Table 6-3. In a community of 100,000 people, a 4-in-a-million cancer risk means that less than one additional cancer case would be expected. The population in Medford is less than 100,000 and the portion of the Medford population affected by the facility is a fraction of the overall population.

6.2 Chronic Noncancer Hazard Index

Following the Level 3 Risk Assessment methodology outlined above, the maximum predicted chronic noncancer hazard index for significant TEUs is 0.3 as shown in Table 6-2. The maximum predicted chronic noncancer hazard index for gas combustion TEUs is <0.1 as shown in Table 6-3.

6.3 Acute Noncancer Hazard Index

Following the Level 3 Risk Assessment methodology outlined above, the maximum predicted acute noncancer hazard index for significant TEUs is 0.3 as shown in Table 6-2. The maximum predicted acute noncancer hazard index for gas combustion TEUs is <0.1 as shown in Table 6-3.

6.4 Risk Action Level Analysis

Per OAR 340-245-0020(14), a *"de minimis source means a source whose excess cancer risk, chronic noncancer risk [i.e., hazard index] and acute noncancer risk [i.e., hazard index] estimates are each less than or equal to the Source Permit Level in OAR 340-245-8010 Table 1 when calculated based on the source's capacity, as determined under OAR 340-245-0050(7)."*

The Level 3 Risk Assessment was completed using TAC emission rates based on the maximum capacity for each TEU as discussed in Section 3. As shown in Table 6-4, the maximum predicted excess cancer risk, and chronic and acute noncancer hazard indices are below the Source Permit Level RAL for existing sources per OAR 340-245-8010 Table 1 notwithstanding the emissions inventory and risk assessment reflecting emission rates beyond what the facility is physically capable of maintaining (see Section 5.6). Therefore, the facility is determined to be a de minimis source with respect to CAO permitting. This risk assessment was performed consistent with the CAO rules in effect on the date of issuance of this report.

Table 6-4. Level 3 Risk Assessment Result Summary for Significant Toxic Emission Units

Exposure Assessment	Facility Risk / Hazard Index	Source Permit Level RAL	RAL Analysis
Cancer Risk (chances-in-a-10^6)			
Residential	**4**	**5**	**Below Source Permit Level**
Non-Residential Child	<0.1	5	Below Source Permit Level
Worker	1	5	Below Source Permit Level
Chronic Noncancer Hazard Index			
Residential	**0.3**	**0.5**	**Below Source Permit Level**
Non-Residential Child	<0.1	0.5	Below Source Permit Level
Worker	0.1	0.5	Below Source Permit Level
Acute Noncancer Hazard Index	**0.3**	**0.5**	**Below Source Permit Level**

Table 6-5. Level 3 Risk Assessment Result Summary for Natural Gas Combustion Toxic Emission Units

Exposure Assessment	Facility Risk / Hazard Index	RAL Analysis
Cancer Risk (chances-in-a-10^6)		
Residential	<0.1	Not Applicable
Non-Residential Child	<0.1	Not Applicable
Worker	<0.1	Not Applicable
Chronic Noncancer Hazard Index		
Residential	<0.1	Not Applicable
Non-Residential Child	<0.1	Not Applicable
Worker	<0.1	Not Applicable
Acute Noncancer Hazard Index	**<0.1**	Not Applicable

7 CLOSING

If there are any questions or comments regarding this risk assessment, please contact Brian Snuffer Zukas at (971) 254-8077.

LIMITATIONS

The services undertaken in completing this document were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This document is solely for the use and information of our client unless otherwise noted. Any reliance on this document by a third party is at such party's sole risk.

Opinions and recommendations contained in this document apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this document.

TABLES

Table 3–1
Daily Emission Rates for Significant Toxic Emission Units—RBC Only
Roseburg Forest Products—Medford, Oregon

Toxic Air Contaminant	CAS	Noncancer Class (HI)	Daily Emission Rates																														Total Facility Daily Emissions Estimate	
			Boiler 4		Dryers 2 & 3 / Press Captured / RCO						MDF Former								Press Fugitives		MDF Board Cooler						MDF Sander Baghouse		Inline Saw Baghouse		Material Balance			
			Wood		Wood Drying		Press		Total		Baghouse										Passive Ventilation				Forced Ventilation									
											No. 8		No. 9		No. 10		No. 11				Vent A		Vent B				No. 12		No. 13					
			(lb/day) [1]	(g/s) [a]	(lb/day) [1]	(g/s) [a]	(lb/day) [1]	(g/s) [a]	(lb/day) [1]	(g/s) [a]	(lb/day) [1]	(g/s) [a]	(lb/day) [1]	(g/s) [a]	(lb/day) [1]	(g/s) [a]	(lb/day) [1]	(g/s) [a]	(lb/day) [1]	(g/s) [a]	(lb/day) [1]	(g/s) [a]	(lb/day) [1]	(g/s) [a]	(lb/day) [1]	(g/s) [a]	(lb/day) [1]	(g/s) [a]	(lb/day) [1]	(g/s) [a]	(lb/day) [1]	(g/s) [a]	(lb/day)	(g/s)
Model Release Point ID	--	--	**BOILER**		**RCO**		**RCO**		**RCO**		**FORM1BH**		**FORM2BH**		**FORM4BH**		**FORM5BH**		**PRESSFUG**		**BC2**		**BC3**		**BC1**		**SANDBH**		**SAWBH**		**COATINGS**		--	--
1,1,1-Trichloroethane (methyl chloroform)	71-55-6	3	0.11	5.6E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.11	5.6E-04
1,2-Dichloropropane (propylene dichloride)	78-87-5	3	0.031	1.6E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.031	1.6E-04
Acetaldehyde	75-07-0	3	0.52	2.7E-03	6.21	0.033	1.09	5.7E-03	7.31	0.038	--	--	--	--	--	--	--	--	0.094	4.9E-04	0.022	1.2E-04	0.022	1.2E-04	0.40	2.1E-03	--	--	--	--	--	--	8.37	0.044
Acrolein	107-02-8	5	0.48	2.5E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.9E-03	3.6E-05	6.9E-03	3.6E-05	0.12	6.5E-04	--	--	--	--	--	--	0.62	3.2E-03
Benzene	71-43-2	3	1.81	9.5E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.81	9.5E-03
Bromomethane (methyl bromide)	74-83-9	3	0.021	1.1E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.021	1.1E-04
Carbon tetrachloride	56-23-5	3	0.018	9.6E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.018	9.6E-05
Chlorine	7782-50-5	3	1.46	7.7E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.46	7.7E-03
Chlorobenzene	108-90-7	3	0.031	1.6E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.031	1.6E-04
Chloroform	67-66-3	3	0.037	2.0E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.037	2.0E-04
Chloromethane (methyl chloride)	74-87-3	3	0.080	4.2E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.080	4.2E-04
Cumene	98-82-8	3	0.033	1.7E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.033	1.7E-04
Ethylbenzene	100-41-4	3	0.023	1.2E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.023	1.2E-04
Ethylene glycol monobutyl ether	111-76-2	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.45	2.4E-03	0.45	2.4E-03
Formaldehyde	50-00-0	3	1.94	0.010	104	0.55	--	--	104	0.55	--	--	--	--	--	--	--	--	0.92	4.8E-03	1.09	5.7E-03	1.09	5.7E-03	19.6	0.10	4.33	0.023	--	--	--	--	133	0.70
Hexane	110-54-3	3	0.53	2.8E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.53	2.8E-03
Hydrochloric acid	7647-01-0	3	0.23	1.2E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.23	1.2E-03
Hydrogen fluoride	7664-39-3	3	0.17	8.8E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.17	8.8E-04
Isopropyl alcohol (isopropanol)	67-63-0	3	8.35	0.044	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.40	2.1E-03	8.75	0.046
Methanol	67-56-1	3	1.35	7.1E-03	36.8	0.19	--	--	36.8	0.19	6.39	0.034	6.39	0.034	6.39	0.034	6.39	0.034	1.56	8.2E-03	1.23	6.5E-03	1.23	6.5E-03	22.2	0.12	8.27	0.043	7.02	0.037	--	--	105	0.55
Methyl ethyl ketone	78-93-3	3	0.013	6.8E-05	--	--	0.12	6.1E-04	0.12	6.1E-04	--	--	--	--	--	--	--	--	9.9E-03	5.2E-05	3.4E-03	1.8E-05	3.4E-03	1.8E-05	0.062	3.2E-04	--	--	--	--	--	--	0.21	1.1E-03
Methyl isobutyl ketone	108-10-1	3	--	--	1.80	9.5E-03	3.50	0.018	5.30	0.028	--	--	--	--	--	--	--	--	0.30	1.6E-03	--	--	--	--	--	--	--	--	--	--	--	--	5.60	0.029
Methylene diphenyl diisocyanate (MDI)	101-68-8	3	--	--	1.83	9.6E-03	0.80	4.2E-03	2.63	0.014	--	--	--	--	--	--	--	--	0.069	3.6E-04	--	--	--	--	--	--	--	--	--	--	--	--	2.70	0.014
Dichloromethane (methylene chloride)	75-09-2	3	0.74	3.9E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.74	3.9E-03
Phenol	108-95-2	3	0.30	1.6E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.30	1.6E-03
Propionaldehyde	123-38-6	5	0.57	3.0E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.57	3.0E-03
Propylene glycol monomethyl ether	107-98-2	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.054	2.9E-04	0.054	2.9E-04
Styrene	100-42-5	3	0.87	4.6E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.87	4.6E-03
Toluene	108-88-3	3	0.021	1.1E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.021	1.1E-04
Xylenes	1330-20-7	3	9.6E-03	5.1E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.6E-03	5.1E-05
Antimony and compounds	7440-36-0	3	5.7E-04	3.0E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.7E-04	3.0E-06
Arsenic and compounds	7440-38-2	3	3.5E-03	1.8E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.5E-03	1.8E-05
Beryllium and compounds	7440-41-7	3	5.3E-05	2.8E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.3E-05	2.8E-07
Cadmium and compounds	7440-43-9	3	6.0E-04	3.1E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.0E-04	3.1E-06
Chromium VI	18540-29-9	3	5.0E-04	2.6E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.0E-04	2.6E-06
Cobalt and compounds	7440-48-4	3	9.2E-04	4.8E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.2E-04	4.8E-06
Copper and compounds	7440-50-8	3	7.0E-03	3.7E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.0E-03	3.7E-05
Lead and compounds	7439-92-1	3	9.6E-03	5.1E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.6E-03	5.1E-05
Manganese and compounds	7439-96-5	3	0.18	9.3E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.18	9.3E-04
Mercury and compounds	7439-97-6	3	2.3E-04	1.2E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.3E-04	1.2E-06
Nickel and compounds	7440-02-0	3	5.2E-03	2.7E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.2E-03	2.7E-05
Selenium and compounds	7782-49-2	3	3.0E-03	1.6E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.0E-03	1.6E-05
Vanadium (fume or dust)	7440-62-2	3	1.1E-03	5.8E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.1E-03	5.8E-06
Benzo(a)anthracene	56-55-3	--	1.5E-04	7.9E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.5E-04	7.9E-07
Benzo(a)pyrene	50-32-8	3	5.0E-03	2.6E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.0E-03	2.6E-05
Benzo(b)fluoranthene	205-99-2	--	2.6E-04	1.4E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.6E-04	1.4E-06
Benzo(g,h,i)perylene	191-24-2	--	2.8E-04	1.5E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.8E-04	1.5E-06
Benzo(j)fluoranthene	205-82-3	--	2.9E-04	1.5E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.9E-04	1.5E-06
Benzo(k)fluoranthene	207-08-9	--	9.6E-05	5.0E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.6E-05	5.0E-07
Chrysene	218-01-9	--	1.5E-04	7.7E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.5E-04	7.7E-07
Dibenzo(a,h)anthracene	53-70-3	--	1.8E-05	9.3E-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.8E-05	9.3E-08
Fluoranthene	206-44-0	--	3.1E-03	1.6E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.1E-03	1.6E-05
Indeno(1,2,3,c,d)pyrene	193-39-5	--	1.9E-04	9.9E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.9E-04	9.9E-07
Naphthalene	91-20-3	3	0.18	9.7E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.18	9.7E-04
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	3	2.2E-09	1.1E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.2E-09	1.1E-11
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	40321-76-4	3	3.4E-09	1.8E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.4E-09	1.8E-11
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	39227-28-6	3	2.4E-09	1.3E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.4E-09	1.3E-11
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	57653-85-7	3	2.4E-09	1.3E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.4E-09	1.3E-11
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	19408-74-3	3	2.7E-09	1.4E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.7E-09	1.4E-11
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	35822-46-9	3	1.0E-08	5.5E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.0E-08	5.5E-11
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	3268-87-9	3	3.9E-08	2.1E-10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.9E-08	2.1E-10
2,3,7,8-Tetrachlorodibenzofuran	51207-31-9	3	7.4E-09	3.9E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.4E-09	3.9E-11
1,2,3,7,8-Pentachlorodibenzofuran	57117-41-6	3	3.4E-09	1.8E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.4E-09	1.8E-11
2,3,4,7,8-Pentachlorodibenzofuran	57117-31-4	3	4.9E-09	2.6E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.9E-09	2.6E-11
1,2,3,4,7,8-Hexachlorodibenzofuran	70648-26-9	3	2.4E-09	1.2E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.4E-09	1.2E-11
1,2,3,6,7,8-Hexachlorodibenzofuran	57117-44-9	3	1.7E-09	8.7E-12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.7E-09	8.7E-12
1,2,3,7,8,9-Hexachlorodibenzofuran	72918-21-9	3	2.5E-09	1.3E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.5E-09	1.3E-11
2,3,4,6,7,8-Hexachlorodibenzofuran	60851-34-5	3	2.2E-09	1.1E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.2E-09	1.1E-11
1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562-39-4	3	6.3E-09	3.3E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.3E-09	3.3E-11
1,2,3,4,7,8,9-Heptachlorodibenzofuran	55673-89-7	3	1.9E-09	1.0E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.9E-09	1.0E-11
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	39001-02-0	3	1.1E-08	5.6E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.1E-08	5.6E-11

Notes:

(a) Emission rate (g/s) = (emission rate (lb/day)) x (453.592 g/lb) / (24 hrs/day) / (3,600 sec/hr)

References:

(1) Emissions estimate obtained from DEQ-approved emissions inventory. Emission rates were derived based on TEU design capacity. Only TACs with established RBCs are included.

Table 3–2
Annual Emission Rates for Significant Toxic Emission Units—RBC Only
Roseburg Forest Products—Medford, Oregon

Toxic Air Contaminant	CAS	Noncancer Class (HI)	Annual Emission Rates																														Total Facility Annual Emissions Estimate	
			Boiler 4		Dryers 2 & 3 / Press Captured / RCO						MDF Former										Press Fugitives		MDF Board Cooler						MDF Sander Baghouse		Inline Saw Baghouse		Material Balance			
			Wood		Wood Drying		Press		Total		Baghouse												Passive Ventilation				Forced Ventilation									
											No. 8		No. 9		No. 10		No. 11						Vent A		Vent B				No. 12		No. 13					
			(lb/yr) [1]	(g/s) [a]	(lb/yr) [1]	(g/s) [a]	(lb/yr) [1]	(g/s) [a]	(lb/yr) [1]	(g/s) [a]	(lb/yr) [1]	(g/s) [a]	(lb/yr) [1]	(g/s) [a]	(lb/yr) [1]	(g/s) [a]	(lb/yr) [1]	(g/s) [a]	(lb/yr) [1]	(g/s) [a]	(lb/yr) [1]	(g/s) [a]	(lb/yr) [1]	(g/s) [a]	(lb/yr) [1]	(g/s) [a]	(lb/yr) [1]	(g/s) [a]	(lb/yr) [1]	(g/s) [a]	(lb/yr) [1]	(g/s) [a]	(lb/yr) [1]	(g/s) [a]	(lb/yr)	(g/s)
Model Release Point ID	--	--	**BOILER**		**RCO**		**RCO**		**RCO**		**FORM1BH**		**FORM2BH**		**FORM4BH**		**FORM5BH**		**PRESSFUG**		**BC2**		**BC3**		**BC1**		**SANDBH**		**SAWBH**		**COATINGS**		--	--
1,1,1-Trichloroethane (methyl chloroform)	71-55-6	3	32.2	4.6E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	32.2	4.6E-04
1,2-Dichloropropane (propylene dichloride)	78-87-5	3	9.35	1.3E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.35	1.3E-04
Acetaldehyde	75-07-0	3	157	2.3E-03	1,640	0.024	289	4.2E-03	1,928	0.028	--	--	--	--	--	--	--	--	24.8	3.6E-04	5.92	8.5E-05	5.92	8.5E-05	107	1.5E-03	--	--	--	--	--	--	2,229	0.032
Acrolein	107-02-8	5	145	2.1E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.82	2.6E-05	1.82	2.6E-05	32.8	4.7E-04	--	--	--	--	--	--	181	2.6E-03
Benzene	71-43-2	3	545	7.8E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	545	7.8E-03
Bromomethane (methyl bromide)	74-83-9	3	6.29	9.0E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.29	9.0E-05
Carbon tetrachloride	56-23-5	3	5.49	7.9E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.49	7.9E-05
Chlorine	7782-50-5	3	440	6.3E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	440	6.3E-03
Chlorobenzene	108-90-7	3	9.24	1.3E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.24	1.3E-04
Chloroform	67-66-3	3	11.2	1.6E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	11.2	1.6E-04
Chloromethane (methyl chloride)	74-87-3	3	24.2	3.5E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	24.2	3.5E-04
Cumene	98-82-8	3	9.85	1.4E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.85	1.4E-04
Ethylbenzene	100-41-4	3	6.79	9.8E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.79	9.8E-05
Ethylene glycol monobutyl ether	111-76-2	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	142	2.0E-03	142	2.0E-03
Formaldehyde	50-00-0	3	584	8.4E-03	27,555	0.40	--	--	27,555	0.40	--	--	--	--	--	--	--	--	243	3.5E-03	287	4.1E-03	287	4.1E-03	5,171	0.074	1,143	0.016	--	--	--	--	35,271	0.51
Hexane	110-54-3	3	160	2.3E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	160	2.3E-03
Hydrochloric acid	7647-01-0	3	70.1	1.0E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	70.1	1.0E-03
Hydrogen fluoride	7664-39-3	3	50.4	7.2E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	50.4	7.2E-04
Isopropyl alcohol (isopropanol)	67-63-0	3	2,515	0.036	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	126	1.8E-03	2,641	0.038
Methanol	67-56-1	3	407	5.9E-03	9,713	0.14	--	--	9,713	0.14	1,688	0.024	1,688	0.024	1,688	0.024	1,688	0.024	411	5.9E-03	325	4.7E-03	325	4.7E-03	5,852	0.084	2,183	0.031	1,854	0.027	--	--	27,822	0.40
Methyl ethyl ketone	78-93-3	3	3.88	5.6E-05	--	--	30.6	4.4E-04	30.6	4.4E-04	--	--	--	--	--	--	--	--	2.62	3.8E-05	0.90	1.3E-05	0.90	1.3E-05	16.3	2.3E-04	--	--	--	--	--	--	55.2	7.9E-04
Methyl isobutyl ketone	108-10-1	3	--	--	476	6.8E-03	923	0.013	1,398	0.020	--	--	--	--	--	--	--	--	79.1	1.1E-03	--	--	--	--	--	--	--	--	--	--	--	--	1,478	0.021
Methylene diphenyl diisocyanate (MDI)	101-68-8	3	--	--	482	6.9E-03	212	3.0E-03	694	1.0E-02	--	--	--	--	--	--	--	--	18.2	2.6E-04	--	--	--	--	--	--	--	--	--	--	--	--	712	0.010
Dichloromethane (methylene chloride)	75-09-2	3	221	3.2E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	221	3.2E-03
Phenol	108-95-2	3	89.0	1.3E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	89.0	1.3E-03
Propionaldehyde	123-38-6	5	173	2.5E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	173	2.5E-03
Propylene glycol monomethyl ether	107-98-2	3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	17.3	2.5E-04	17.3	2.5E-04
Styrene	100-42-5	3	261	3.8E-03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	261	3.8E-03
Toluene	108-88-3	3	6.34	9.1E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.34	9.1E-05
Xylenes	1330-20-7	3	2.90	4.2E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.90	4.2E-05
Antimony and compounds	7440-36-0	3	0.17	2.4E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.17	2.4E-06
Arsenic and compounds	7440-38-2	3	1.05	1.5E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.05	1.5E-05
Beryllium and compounds	7440-41-7	3	0.016	2.3E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.016	2.3E-07
Cadmium and compounds	7440-43-9	3	0.18	2.6E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.18	2.6E-06
Chromium VI	18540-29-9	3	0.15	2.2E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.15	2.2E-06
Cobalt and compounds	7440-48-4	3	0.28	4.0E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.28	4.0E-06
Copper and compounds	7440-50-8	3	2.11	3.0E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.11	3.0E-05
Lead and compounds	7439-92-1	3	2.90	4.2E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.90	4.2E-05
Manganese and compounds	7439-96-5	3	53.3	7.7E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	53.3	7.7E-04
Mercury and compounds	7439-97-6	3	0.068	9.8E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.068	9.8E-07
Nickel and compounds	7440-02-0	3	1.56	2.2E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.56	2.2E-05
Selenium and compounds	7782-49-2	3	0.90	1.3E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.90	1.3E-05
Vanadium (fume or dust)	7440-62-2	3	0.33	4.8E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.33	4.8E-06
Benzo(a)anthracene	56-55-3	--	0.045	6.5E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.045	6.5E-07
Benzo(a)pyrene	50-32-8	3	1.52	2.2E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.52	2.2E-05
Benzo(b)fluoranthene	205-99-2	--	0.079	1.1E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.079	1.1E-06
Benzo(g,h,i)perylene	191-24-2	--	0.084	1.2E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.084	1.2E-06
Benzo(j)fluoranthene	205-82-3	--	0.087	1.2E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.087	1.2E-06
Benzo(k)fluoranthene	207-08-9	--	0.029	4.1E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.029	4.1E-07
Chrysene	218-01-9	--	0.044	6.3E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.044	6.3E-07
Dibenzo(a,h)anthracene	53-70-3	--	5.3E-03	7.7E-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.3E-03	7.7E-08
Fluoranthene	206-44-0	--	0.93	1.3E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.93	1.3E-05
Indeno(1,2,3,c,d)pyrene	193-39-5	--	0.057	8.2E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.057	8.2E-07
Naphthalene	91-20-3	3	55.4	8.0E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	55.4	8.0E-04
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	3	6.5E-07	9.4E-12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.5E-07	9.4E-12
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	40321-76-4	3	1.0E-06	1.5E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.0E-06	1.5E-11
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	39227-28-6	3	7.3E-07	1.0E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.3E-07	1.0E-11
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	57653-85-7	3	7.3E-07	1.1E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.3E-07	1.1E-11
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	19408-74-3	3	8.3E-07	1.2E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8.3E-07	1.2E-11
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	35822-46-9	3	3.2E-06	4.5E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.2E-06	4.5E-11
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	3268-87-9	3	1.2E-05	1.7E-10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.2E-05	1.7E-10
2,3,7,8-Tetrachlorodibenzofuran	51207-31-9	3	2.2E-06	3.2E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.2E-06	3.2E-11
1,2,3,7,8-Pentachlorodibenzofuran	57117-41-6	3	1.0E-06	1.5E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.0E-06	1.5E-11
2,3,4,7,8-Pentachlorodibenzofuran	57117-31-4	3	1.5E-06	2.1E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.5E-06	2.1E-11
1,2,3,4,7,8-Hexachlorodibenzofuran	70648-26-9	3	7.1E-07	1.0E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.1E-07	1.0E-11
1,2,3,6,7,8-Hexachlorodibenzofuran	57117-44-9	3	5.0E-07	7.2E-12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.0E-07	7.2E-12
1,2,3,7,8,9-Hexachlorodibenzofuran	72918-21-9	3	7.4E-07	1.1E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.4E-07	1.1E-11
2,3,4,6,7,8-Hexachlorodibenzofuran	60851-34-5	3	6.6E-07	9.4E-12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6.6E-07	9.4E-12
1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562-39-4	3	1.9E-06	2.7E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.9E-06	2.7E-11
1,2,3,4,7,8,9-Heptachlorodibenzofuran	55673-89-7	3	5.9E-07	8.4E-12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.9E-07	8.4E-12
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	39001-02-0	3	3.2E-06	4.6E-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.2E-06	4.6E-11

Notes:
(a) Emission rate (g/s) = (emission rate (lb/yr)) x (453.592 g/lb) / (8,760 hrs/yr) / (3,600 sec/hr)

References:
(1) Emissions estimate obtained from DEQ-approved emissions inventory. Emission rates were derived based on TEU design capacity. Only TACs with established RBCs are included.

Table 3–3
Daily and Annual Emission Rates for Gas Combustion Toxic Emission Units—RBC Only
Roseburg Forest Products—Medford, Oregon

Toxic Air Contaminant	CAS	Emission Rates											
		Boiler 4 (BLR_NG)				Dryers 2 & 3 (DRY_NG)				RCO (RCO_NG)			
		Daily		Annual		Daily		Annual		Daily		Annual	
		(lb/day) [1]	(g/s) [a]	(lb/yr) [1]	(g/s) [b]	(lb/day) [1]	(g/s) [a]	(lb/yr) [1]	(g/s) [b]	(lb/day) [1]	(g/s) [a]	(lb/yr) [1]	(g/s) [b]
Acetaldehyde	75-07-0	5.6E-03	2.9E-05	1.68	2.4E-05	--	--	--	--	1.7E-03	9.1E-06	0.64	9.1E-06
Acrolein	107-02-8	4.9E-03	2.6E-05	1.46	2.1E-05	--	--	--	--	1.5E-03	8.0E-06	0.55	8.0E-06
Benzene	71-43-2	0.010	5.5E-05	3.15	4.5E-05	--	--	--	--	3.3E-03	1.7E-05	1.19	1.7E-05
Ethylbenzene	100-41-4	0.012	6.5E-05	3.74	5.4E-05	3.4E-03	1.8E-05	1.24	1.8E-05	3.9E-03	2.0E-05	1.41	2.0E-05
Formaldehyde	50-00-0	0.022	1.2E-04	6.67	9.6E-05	--	--	--	--	6.9E-03	3.6E-05	2.52	3.6E-05
Hexane	110-54-3	8.3E-03	4.3E-05	2.49	3.6E-05	2.3E-03	1.2E-05	0.82	1.2E-05	2.6E-03	1.4E-05	0.94	1.4E-05
Propylene	115-07-1	0.95	5.0E-03	287	4.1E-03	0.26	1.4E-03	95.0	1.4E-03	0.30	1.6E-03	109	1.6E-03
Toluene	108-88-3	0.048	2.5E-04	14.4	2.1E-04	--	--	--	--	0.015	7.8E-05	5.43	7.8E-05
Xylenes	1330-20-7	0.035	1.9E-04	10.7	1.5E-04	--	--	--	--	0.011	5.8E-05	4.04	5.8E-05
Arsenic and compounds	7440-38-2	7.9E-06	4.2E-08	2.4E-03	3.4E-08	6.2E-06	3.2E-08	2.3E-03	3.2E-08	1.2E-04	6.5E-07	0.045	6.5E-07
Cadmium and compounds	7440-43-9	4.0E-05	2.1E-07	0.012	1.7E-07	3.1E-05	1.6E-07	0.011	1.6E-07	6.2E-04	3.2E-06	0.23	3.2E-06
Chromium VI	18540-29-9	2.0E-06	1.1E-08	6.1E-04	8.7E-09	1.6E-06	8.3E-09	5.7E-04	8.3E-09	3.1E-05	1.7E-07	0.011	1.7E-07
Cobalt and compounds	7440-48-4	3.0E-06	1.6E-08	9.1E-04	1.3E-08	2.4E-06	1.2E-08	8.6E-04	1.2E-08	4.7E-05	2.5E-07	0.017	2.5E-07
Copper and compounds	7440-50-8	3.1E-05	1.6E-07	9.2E-03	1.3E-07	2.4E-05	1.3E-07	8.7E-03	1.3E-07	4.8E-04	2.5E-06	0.17	2.5E-06
Manganese and compounds	7439-96-5	1.4E-05	7.2E-08	4.1E-03	5.9E-08	1.1E-05	5.6E-08	3.9E-03	5.6E-08	2.1E-04	1.1E-06	0.078	1.1E-06
Mercury and compounds	7439-97-6	1.7E-07	8.8E-10	5.0E-05	7.3E-10	7.3E-06	3.8E-08	2.7E-03	3.8E-08	1.5E-04	7.7E-07	0.053	7.7E-07
Nickel and compounds	7440-02-0	7.6E-05	4.0E-07	0.023	3.3E-07	5.9E-05	3.1E-07	0.022	3.1E-07	1.2E-03	6.2E-06	0.43	6.2E-06
Vanadium (fume or dust)	7440-62-2	8.3E-05	4.3E-07	0.025	3.6E-07	6.5E-05	3.4E-07	0.024	3.4E-07	1.3E-03	6.8E-06	0.47	6.8E-06
Chrysene	218-01-9	3.2E-06	1.7E-08	9.8E-04	1.4E-08	--	--	--	--	1.0E-06	5.3E-09	3.7E-04	5.3E-09
Fluoranthene	206-44-0	5.4E-06	2.8E-08	1.6E-03	2.3E-08	--	--	--	--	1.7E-06	8.8E-09	6.1E-04	8.8E-09
Naphthalene	91-20-3	5.4E-04	2.8E-06	0.16	2.3E-06	--	--	--	--	1.7E-04	8.8E-07	0.061	8.8E-07

Notes:

(a) Acute emission rate (g/s) = (emission rate [lb/day]) x (453.592 g/lb) x (day/24 hrs) x (hr/3,600 s)

(b) Chronic emission rate (g/s) = (emission rate [lb/yr]) x (453.592 g/lb) x (yr/8,760 hrs) x (hr/3,600 s)

References:

(1) Emissions estimate obtained from DEQ-approved emissions inventory. Emission rates were derived based on TEU design capacity. Only TACs with established RBCs are included.

Table 3–4
Model Source Parameters
Roseburg Forest Products—Medford, Oregon

Point Sources											
Model ID	Model Source Description	UTM Coordinates [1]		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								
BOILER	Boiler at Baghouse Stack	509,019.69	4,688,238.9	1.00	Vertical	408.2	18.29	1.219	14.15	16.52	464.8
BLR_NG	Natural Gas Combustion from Boiler	509,019.69	4,688,238.9	1.00	Vertical	408.2	18.29	1.219	14.15	16.52	464.8
RCO	Press and Face-Core Dryers to RCO	509,181.80	4,688,354.4	1.00	Vertical	407.4	15.24	2.375	16.76	74.24	357.0
RCO_NG	Natural Gas Combustion from RCO	509,181.80	4,688,354.4	1.00	Vertical	407.4	15.24	2.375	16.76	74.24	357.0
DRY_NG	Natural Gas Combustion from Dryers	509,181.80	4,688,354.4	1.00	Vertical	407.4	15.24	2.375	16.76	74.24	357.0
BC1	Board Cooler Exhaust Pressurized Vent	508,962.20	4,688,384.3	1.00	Capped	407.0	13.60	1.244	11.66	14.16	308.2
FORM1BH	Former Head 1 Baghouse 8	509,061.38	4,688,344.5	1.00	Horizontal	407.1	11.89	1.459	5.645	9.439	305.4
FORM2BH	Former Head 2 Baghouse 9	509,048.39	4,688,355.0	1.00	Horizontal	407.0	11.89	1.459	5.645	9.439	320.4
FORM4BH	Former Head 4 Baghouse 10	509,051.86	4,688,349.3	1.00	Horizontal	407.1	11.89	1.459	5.645	9.439	320.4
FORM5BH	Former Head 5 Baghouse 11	509,057.74	4,688,350.3	1.00	Horizontal	407.1	11.89	1.459	5.645	9.439	305.4
SANDBH	Sander Baghouse 12	508,956.69	4,688,356.1	1.00	Vertical	407.1	4.572	1.676	19.24	42.48	Ambient
SAWBH	Inline Saw Baghouse 13	508,944.91	4,688,364.2	1.00	Vertical	407.2	4.115	0.814	22.68	11.80	Ambient

Volume Sources									
Model ID	Model Source Description	UTM Coordinates [1]		Emission Rate [2] (g/s)	Base Elevation [3] (m)	Release Height [1] (m)	Length of Side (m)	Initial Lateral Dimension [b] (m)	Initial Vertical Dimension [c] (m)
		Easting	Northing						
COATINGS	Finished Goods Warehouse Coating Usage	508,933.88	4,688,453.2	1.00	406.7	13.60	25.00 [6]	5.814	6.321
PRESSFUG	Press Fugitive Exhaust Not Captured	508,989.61	4,688,384.0	1.00	406.9	14.63	15.24 [7]	3.544	6.805
BC2	Board Cooler Passive Vents-Group 1	508,955.05	4,688,390.0	1.00	407.0	13.60	4.500 [8]	1.047	6.321
BC3	Board Cooler Passive Vents-Group 2	508,967.37	4,688,383.9	1.00	407.0	13.60	4.500 [8]	1.047	6.321

Notes:

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

(b) Initial lateral dimension (m) = (length of side [m]) / (4.3) (4)

(c) Initial vertical dimension (m) = (building height [m]) / (2.15) (4)

Building 1 height (m) = 13.59 (5)

Building 2-Tier 2 height (m) = 14.63 (5)

References:

(1) Value based on information provided by Roseburg Forest Products.

(2) Dispersion model was executed using unit-emission rates.

(3) Base elevation derived from the US Geological Survey National Elevation Dataset downloaded and processed in AERMAP.

(4) See "User's Guide for the AMS/EPA Regulatory Model (AERMOD)," EPA-454/B-18-001 dated April 2018. Assumes elevated source on or adjacent to a building.

(5) See Table 4–6, Summary of Downwash Structure Heights.

(6) Length of side based on relative location for coating product use within the finished goods warehouse.

(7) Length of side based on physical dimensions for the MDF press partial enclosure.

(8) Length of side based on general extents of roof vent groupings and a review of aerial imagery.

Table 4–3
Assessment of Missing Meteorological Data
Roseburg Forest Products—Medford, Oregon

Quarter [1]	Meteorological Data Assessment per Year														
	2014			2015			2016			2017			2018		
	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	2	99.9%	2,160	9	99.6%	2,184	28	98.7%	2,160	2	99.9%	2,160	2	99.9%
Q2	2,184	0	100.0%	2,184	3	99.9%	2,184	33	98.5%	2,184	17	99.2%	2,184	2	99.9%
Q3	2,208	0	100.0%	2,208	21	99.0%	2,208	16	99.3%	2,208	0	100.0%	2,208	22	99.0%
Q4	2,208	20	99.1%	2,208	1	100.0%	2,208	8	99.6%	2,208	0	100.0%	2,208	35	98.4%

Notes:

(a) Available hours (%) = (1 - [{missing hours} / {total hours}]) x (100%)

References:

(1) Total hours obtained from the surface and profile files generated using AERMET (version 19191) for the period between 2014 through 2018. The combined 5-year meteorological dataset is representative of the Rogue Valley International-Medford Airport monitoring station (WBAN: 24225).

(2) The number of missing hours was determined by exporting a surface "QA" file to excel via AERMET (version 19191).

Table 4–4
AERSURFACE Settings
Roseburg Forest Products—Medford, 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
Is this an airport site?	Yes
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
Roseburg Forest Products—Medford, Oregon

Calendar Year	Annual Precipitation [1] (in)	Climatic Significance [2] (in)	Calendar Year Soil Moisture [3] (in)
2014	20.25	Upper 70th Percentile	Wet
2015	17.48	Middle 40th Percentile	Average
2016	21.71	Upper 70th Percentile	Wet
2017	18.13	Middle 40th Percentile	Average
2018	12.06	Lower 30th Percentile	Dry

30-Year Climate Precipitation Data [4]		
Average Annual Precipitation	[5]	18.34
Lower 30th Percentile Annual Precipitation	[6]	16.90
Upper 70th Percentile Annual Precipitation	[7]	20.24

References:

(1) Climatological data obtained from National Oceanic and Atmospheric Administration National Climatic Data Center for Rogue Valley-Medford International Airport located in Medford, Oregon (WBAN: 24225).

(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 1990 and 2019. 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 40th percentile annual precipitation during 30-year climatological period.

(7) Represents upper limit of middle 40th percentile annual precipitation during 30-year climatological period.

Table 5-1
Uncertainty Evaluation (TACs without an RBC)
Roseburg Forest Products—Medford, Oregon

Toxic Air Contaminant [1]	CAS	RBC? [2]
Acetophenone	98-86-2	No
n-Butyl alcohol (1-Butanol)	71-36-3	No
Crotonaldehyde	4170-30-3	No
Diethylphthalate	84-66-2	No
Dibutyl phthalate	84-74-2	No
Barium and compounds	7440-39-3	No
Molybdenum trioxide	1313-27-5	No
Phosphorus and compounds	7723-14-0	No
Silver and compounds	7440-22-4	No
Zinc and compounds	7440-66-6	No
Acenaphthene	83-32-9	No
Acenaphthylene	208-96-8	No
Anthracene	120-12-7	No
Benzo(e)pyrene	192-97-2	No
Fluorene	86-73-7	No
2-Methyl naphthalene	91-57-6	No
Perylene	198-55-0	No
Phenanthrene	85-01-8	No
Pyrene	129-00-0	No

TAC = Toxic air contaminant.
RBC = Risk-based concentration.
OAR = Oregon Administrative Rule.
LECR = Lifetime excess cancer risk.

References:

(1) OAR 340-245-8040, Table 4, Risk-Based Concentrations.

(2) Includes LECR, non-residential chronic hazard and acute hazard RBC.

Table 4–6
Summary of Downwash Structure Heights
Roseburg Forest Products—Medford, Oregon

Downwash Structure Model ID	Base Elevation [1]		Number of Building Tiers	Tier Height [2]	
	(ft)	(m)		(ft)	(m)
BLD_1	1,333	406.3	1	44.6	13.6
BLD_2, Tier 1	1,335	406.9	1	35.0	10.7
BLD_2, Tier 2	1,335	406.9	2	48.0	14.6
BLD_3	1,337	407.6	1	44.3	13.5
BLD_4	1,335	406.9	1	25.0	7.6
BLD_5	1,337	407.4	1	25.0	7.6
BLD_6	1,336	407.3	1	35.0	10.7
BLD_7	1,336	407.1	1	25.0	7.6
BLD_8	1,336	407.2	1	25.0	7.6
BLD_9	1,336	407.4	1	32.8	10.0
BLD_10	1,338	407.8	1	32.8	10.0
BLD_11	1,338	408.0	1	16.4	5.0
BLD_12	1,340	408.3	1	35.5	10.8
BLD_13	1,338	408.0	1	74.1	22.6
BLD_14	1,338	407.8	1	74.1	22.6
BLD_15	1,340	408.4	1	38.0	11.6
BLD_16	1,336	407.2	1	25.0	7.6
BLD_17	1,336	407.2	1	25.0	7.6
BLD_18	1,337	407.4	1	25.0	7.6
BLD_19	1,336	407.2	1	25.0	7.6
BLD_20	1,336	407.1	1	25.0	7.6
BLD_21	1,336	407.2	1	25.0	7.6
BLD_22	1,336	407.2	1	25.0	7.6
BLD_26	1,338	407.9	1	53.0	16.2
BLD_24	1,338	407.9	1	50.0	15.2
BLD_25	1,339	408.1	1	55.0	16.8
BLD_27	1,339	408.0	1	55.0	16.8
BLD_28	1,338	408.0	1	55.0	16.8
BLD_29	1,338	407.9	1	50.0	15.2
BLD_30	1,338	407.7	1	50.0	15.2

References:

(1) Base elevation derived from 1/3-arc second United States Geological Survey National Elevation Data via AERMAP View processor.

(2) Information provided by Roseburg Forest Products.

Table 6-1
Maximum Predicted Risk Exposure Location per TEU
Roseburg Forest Products—Medford, Oregon

Modeled TEU	Cancer						Chronic Noncancer						Acute Noncancer	
	Residential		Child		Worker		Residential		Child		Worker			
	Exposure Location (1) (Location of Maximum Risk)	Dispersion Factor (μg/m^3/[g/s])	Exposure Location (1) (Location of Maximum Risk)	Dispersion Factor (μg/m^3/[g/s])	Exposure Location (1) (Location of Maximum Risk)	Dispersion Factor (μg/m^3/[g/s])	Exposure Location (1) (Location of Maximum Risk)	Dispersion Factor (μg/m^3/[g/s])	Exposure Location (1) (Location of Maximum Risk)	Dispersion Factor (μg/m^3/[g/s])	Exposure Location (1) (Location of Maximum Risk)	Dispersion Factor (μg/m^3/[g/s])	Exposure Location (1) (Location of Maximum Risk)	Dispersion Factor (μg/m^3/[g/s])
Significant Toxic Emission Units														
BOILER	1,411	0.39027	2,204	0.39507	6,490	0.79269	910	1.01943	2,204	0.39507	868	1.97848	868	12.67427
RCO	1,411	0.3136	2,204	0.03313	6,490	0.17876	910	0.08566	2,204	0.03313	868	0.09711	868	0.76893
BC1	1,411	3.80677	2,204	1.11349	6,490	7.90166	910	2.14177	2,204	1.11349	868	5.59622	868	24.26221
FORM1BH	1,411	4.29045	2,204	0.57916	6,490	14.98666	910	2.3958	2,204	0.57916	868	6.9526	868	38.65167
FORM2BH	1,411	2.77835	2,204	0.30402	6,490	10.9525	910	1.30315	2,204	0.30402	868	6.02543	868	37.26998
FORM4BH	1,411	2.8191	2,204	0.32559	6,490	11.50271	910	1.45585	2,204	0.32559	868	5.92729	868	33.73116
FORM5BH	1,411	4.26551	2,204	0.58411	6,490	14.31665	910	2.43141	2,204	0.58411	868	6.87634	868	38.63458
SANDBH	1,411	9.04291	2,204	2.78101	6,490	16.03997	910	8.6809	2,204	2.78101	868	15.85686	868	61.5656
SAWBH	1,411	10.53756	2,204	3.47916	6,490	17.1716	910	11.98972	2,204	3.47916	868	18.16301	868	65.97152
COATINGS	1,411	7.84138	2,204	3.41319	6,490	11.4591	910	11.16447	2,204	3.41319	868	13.75413	868	63.4356
PRESSFUG	1,411	8.2294	2,204	2.77945	6,490	14.2757	910	7.08992	2,204	2.77945	868	12.64806	868	71.39821
BC2	1,411	7.95479	2,204	3.09995	6,490	14.51266	910	9.00567	2,204	3.09995	868	16.02582	868	75.53137
BC3	1,411	8.28382	2,204	3.05267	6,490	15.25174	910	8.65097	2,204	3.05267	868	15.63935	868	82.13737
Gas Combustion Toxic Emission Units														
BLR_NG	1,605	0.50939	3,507	0.16867	1,603	0.59761	1,605	0.50939	3,507	0.16867	1,603	0.59761	1,069	5.54687
DRY_NG	1,605	0.42777	3,507	0.11273	1,603	0.42691	1,605	0.42777	3,507	0.11273	1,603	0.42691	1,069	8.41575
RCO_NG	1,605	0.42777	3,507	0.11273	1,603	0.42691	1,605	0.42777	3,507	0.11273	1,603	0.42691	1,069	8.41575

TEU = toxic emission unit

References:

(1) Exposure location represents the following receptor ID coordinates in the unit emission rate dispersion model with the highest predicted cancer or noncancer risk:

Receptor ID	UTM X (m)	UTM Y (m)
868	508,884.66	4,688,137.00
910	508,909.66	4,688,687.00
1,069	509,034.66	4,688,537.00
1,411	509,259.66	4,688,262.00
1,603	509,359.66	4,688,162.00
1,605	509,359.66	4,688,212.00
2,204	508,859.66	4,689,312.00
3,507	510,109.66	4,687,862.00
6,490	509,027.45	4,688,120.08

Table 6-2
Level 3 Risk Assessment Results for Significant Toxic Emission Units
Roseburg Forest Products—Medford, Oregon

Toxic Air Contaminant	CAS	Cancer									Chronic Noncancer									Acute		
		Residential			Child			Worker			Residential			Child			Worker			Noncancer		
		Calculated Conc. [a] ($\mu g/m^3$)	RBC [2] ($\mu g/m^3$)	Risk [b] (chances-in-10^6)	Calculated Conc. [a] ($\mu g/m^3$)	RBC [2] ($\mu g/m^3$)	Risk [b] (chances-in-10^6)	Calculated Conc. [a] ($\mu g/m^3$)	RBC [2] ($\mu g/m^3$)	Risk [b] (chances-in-10^6)	Calculated Conc. [a] ($\mu g/m^3$)	RBC [2] ($\mu g/m^3$)	Hazard Index [c]	Calculated Conc. [a] ($\mu g/m^3$)	RBC [2] ($\mu g/m^3$)	Hazard Index [c]	Calculated Conc. [a] ($\mu g/m^3$)	RBC [2] ($\mu g/m^3$)	Hazard Index [c]	Calculated Conc. [a] ($\mu g/m^3$)	RBC [2] ($\mu g/m^3$)	Hazard Index [c]
Exposure Location [3]		1,411			2,204			6,490			910			2,204			868			868		
Cumulative Facility-wide Risk		--	--	4.46	--	--	0.057	--	--	0.59	--	--	0.25	--	--	0.017	--	--	0.083	--	--	0.35
BOILER																						
Cumulative TEU Risk		--	--	0.58	--	--	0.015	--	--	0.039	--	--	0.17	--	--	9.2E-03	--	--	0.046	--	--	0.23
Dispersion Factor ($\mu g/m^3/(g/s)$)			0.39			0.40			0.79			1.02			0.40			1.98			12.7	
1,1,1-Trichloroethane (methyl chloroform)	71-55-6	1.8E-04	--	[4]	1.8E-04	--	[4]	3.7E-04	--	[4]	4.7E-04	5,000	9.4E-08	1.8E-04	22,000	8.3E-09	9.2E-04	22,000	4.2E-08	7.1E-03	11,000	6.5E-07
1,2-Dichloropropane (propylene dichloride)	78-87-5	5.2E-05	--	[4]	5.3E-05	--	[4]	1.1E-04	--	[4]	1.4E-04	4.00	3.4E-05	5.3E-05	18.0	3.0E-06	2.7E-04	18.0	1.5E-05	2.1E-03	230	9.0E-06
Acetaldehyde	75-07-0	8.8E-04	0.45	2.0E-03	8.9E-04	12.0	7.5E-05	1.8E-03	5.50	3.3E-04	2.3E-03	140	1.6E-05	8.9E-04	620	1.4E-06	4.5E-03	620	7.2E-06	0.035	470	7.4E-05
Acrolein	107-02-8	8.1E-04	--	[4]	8.2E-04	--	[4]	1.6E-03	--	[4]	2.1E-03	0.35	6.1E-03	8.2E-04	1.50	5.5E-04	4.1E-03	1.50	2.7E-03	0.032	6.90	4.6E-03
Benzene	71-43-2	3.1E-03	0.13	0.024	3.1E-03	3.30	9.4E-04	6.2E-03	1.50	4.1E-03	8.0E-03	3.00	2.7E-03	3.1E-03	13.0	2.4E-04	0.016	13.0	1.2E-03	0.12	29.0	4.2E-03
Bromomethane (methyl bromide)	74-83-9	3.5E-05	--	[4]	3.6E-05	--	[4]	7.2E-05	--	[4]	9.2E-05	5.00	1.8E-05	3.6E-05	22.0	1.6E-06	1.8E-04	22.0	8.1E-06	1.4E-03	3,900	3.6E-07
Carbon tetrachloride	56-23-5	3.1E-05	0.17	1.8E-04	3.1E-05	4.30	7.3E-06	6.3E-05	2.00	3.1E-05	8.1E-05	100.0	8.1E-07	3.1E-05	440	7.1E-08	1.6E-04	440	3.6E-07	1.2E-03	1,900	6.4E-07
Chlorine	7782-50-5	2.5E-03	--	[4]	2.5E-03	--	[4]	5.0E-03	--	[4]	6.4E-03	0.15	0.043	2.5E-03	0.66	3.8E-03	0.013	0.66	0.019	0.097	170	5.7E-04
Chlorobenzene	108-90-7	5.2E-05	--	[4]	5.2E-05	--	[4]	1.1E-04	--	[4]	1.4E-04	50.0	2.7E-06	5.2E-05	220	2.4E-07	2.6E-04	220	1.2E-06	2.0E-03	--	[4]
Chloroform	67-66-3	6.3E-05	--	[4]	6.4E-05	--	[4]	1.3E-04	--	[4]	1.6E-04	300	5.5E-07	6.4E-05	1,300	4.9E-08	3.2E-04	1,300	2.4E-07	2.5E-03	490	5.0E-06
Chloromethane (methyl chloride)	74-87-3	1.4E-04	--	[4]	1.4E-04	--	[4]	2.8E-04	--	[4]	3.5E-04	90.0	3.9E-06	1.4E-04	400	3.4E-07	6.9E-04	400	1.7E-06	5.3E-03	1,000	5.3E-06
Cumene	98-82-8	5.5E-05	--	[4]	5.6E-05	--	[4]	1.1E-04	--	[4]	1.4E-04	400	3.6E-07	5.6E-05	1,800	3.1E-08	2.8E-04	1,800	1.6E-07	2.2E-03	--	[4]
Ethylbenzene	100-41-4	3.8E-05	0.40	9.5E-05	3.9E-05	10.0	3.9E-06	7.7E-05	4.80	1.6E-05	1.0E-04	260	3.8E-07	3.9E-05	1,100	3.5E-08	1.9E-04	1,100	1.8E-07	1.5E-03	22,000	6.8E-08
Formaldehyde	50-00-0	3.3E-03	0.17	0.019	3.3E-03	4.30	7.7E-04	6.7E-03	2.00	3.3E-03	8.6E-03	9.00	9.5E-04	3.3E-03	40.0	8.3E-05	0.017	40.0	4.2E-04	0.13	49.0	2.6E-03
Hexane	110-54-3	9.0E-04	--	[4]	9.1E-04	--	[4]	1.8E-03	--	[4]	2.3E-03	700	3.4E-06	9.1E-04	3,100	2.9E-07	4.6E-03	3,100	1.5E-06	0.035	--	[4]
Hydrochloric acid	7647-01-0	3.9E-04	--	[4]	4.0E-04	--	[4]	8.0E-04	--	[4]	1.0E-03	20.0	5.1E-05	4.0E-04	88.0	4.5E-06	2.0E-03	88.0	2.3E-05	0.015	2,100	7.4E-06
Hydrogen fluoride	7664-39-3	2.8E-04	--	[4]	2.9E-04	--	[4]	5.7E-04	--	[4]	7.4E-04	2.10	3.5E-04	2.9E-04	19.0	1.5E-05	1.4E-03	19.0	7.5E-05	0.011	16.0	7.0E-04
Isopropyl alcohol (isopropanol)	67-63-0	0.014	--	[4]	0.014	--	[4]	0.029	--	[4]	0.037	200	1.8E-04	0.014	880	1.6E-05	0.072	880	8.1E-05	0.56	3,200	1.7E-04
Methanol	67-56-1	2.3E-03	--	[4]	2.3E-03	--	[4]	4.6E-03	--	[4]	6.0E-03	4,000	1.5E-06	2.3E-03	18,000	1.3E-07	0.012	18,000	6.4E-07	0.090	28,000	3.2E-06
Methyl ethyl ketone	78-93-3	2.2E-05	--	[4]	2.2E-05	--	[4]	4.4E-05	--	[4]	5.7E-05	5,000	1.1E-08	2.2E-05	22,000	1.0E-09	1.1E-04	22,000	5.0E-09	8.6E-04	5,000	1.7E-07
Dichloromethane (methylene chloride)	75-09-2	1.2E-03	59.0	2.1E-05	1.3E-03	620	2.0E-06	2.5E-03	1,200	2.1E-06	3.2E-03	600	5.4E-06	1.3E-03	2,600	4.8E-07	6.3E-03	2,600	2.4E-06	0.049	2,100	2.3E-05
Phenol	108-95-2	5.0E-04	--	[4]	5.1E-04	--	[4]	1.0E-03	--	[4]	1.3E-03	200	6.5E-06	5.1E-04	880	5.7E-07	2.5E-03	880	2.9E-06	0.020	5,800	3.4E-06
Propionaldehyde	123-38-6	9.7E-04	--	[4]	9.8E-04	--	[4]	2.0E-03	--	[4]	2.5E-03	8.00	3.2E-04	9.8E-04	35.0	2.8E-05	4.9E-03	35.0	1.4E-04	0.038	--	[4]
Styrene	100-42-5	1.5E-03	--	[4]	1.5E-03	--	[4]	3.0E-03	--	[4]	3.8E-03	1,000	3.8E-06	1.5E-03	4,400	3.4E-07	7.4E-03	4,400	1.7E-06	0.058	21,000	2.7E-06
Toluene	108-88-3	3.6E-05	--	[4]	3.6E-05	--	[4]	7.2E-05	--	[4]	9.3E-05	5,000	1.9E-08	3.6E-05	22,000	1.6E-09	1.8E-04	22,000	8.2E-09	1.4E-03	7,500	1.9E-07
Xylenes	1330-20-7	1.6E-05	--	[4]	1.7E-05	--	[4]	3.3E-05	--	[4]	4.3E-05	220	1.9E-07	1.7E-05	970	1.7E-08	8.3E-05	970	8.5E-08	6.4E-04	8,700	7.4E-08
Antimony and compounds	7440-36-0	9.6E-07	--	[4]	9.7E-07	--	[4]	1.9E-06	--	[4]	2.5E-06	0.30	8.3E-06	9.7E-07	1.30	7.4E-07	4.8E-06	1.30	3.7E-06	3.8E-05	1.00	3.8E-05
Arsenic and compounds	7440-38-2	5.9E-06	2.4E-05	0.25	6.0E-06	1.3E-03	4.6E-03	1.2E-05	6.2E-04	0.019	1.5E-05	1.7E-04	0.091	6.0E-06	2.4E-03	2.5E-03	3.0E-05	2.4E-03	0.012	2.3E-04	0.20	1.2E-03
Beryllium and compounds	7440-41-7	8.9E-08	4.2E-04	2.1E-04	9.0E-08	0.011	8.2E-06	1.8E-07	5.0E-03	3.6E-05	2.3E-07	7.0E-03	3.3E-05	9.0E-08	0.031	2.9E-06	4.5E-07	0.031	1.5E-05	3.5E-06	0.020	1.8E-04
Cadmium and compounds	7440-43-9	1.0E-06	5.6E-04	1.8E-03	1.0E-06	0.014	7.3E-05	2.1E-06	6.7E-03	3.1E-04	2.6E-06	5.0E-03	5.3E-04	1.0E-06	0.037	2.8E-05	5.1E-06	0.037	1.4E-04	4.0E-05	0.030	1.3E-03
Chromium VI	18540-29-9	8.5E-07	3.1E-05	0.027	8.6E-07	5.2E-04	1.7E-03	1.7E-06	1.0E-03	1.7E-03	2.2E-06	0.083	2.7E-05	8.6E-07	0.88	9.8E-07	4.3E-06	0.88	4.9E-06	3.3E-05	0.30	1.1E-04
Cobalt and compounds	7440-48-4	1.6E-06	--	[4]	1.6E-06	--	[4]	3.2E-06	--	[4]	4.1E-06	0.10	4.1E-05	1.6E-06	0.44	3.6E-06	7.9E-06	0.44	1.8E-05	6.1E-05	--	[4]
Copper and compounds	7440-50-8	1.2E-05	--	[4]	1.2E-05	--	[4]	2.4E-05	--	[4]	3.1E-05	--	[4]	1.2E-05	--	[4]	6.0E-05	--	[4]	4.7E-04	100.0	4.7E-06
Lead and compounds	7439-92-1	1.6E-05	--	[4]	1.6E-05	--	[4]	3.3E-05	--	[4]	4.3E-05	0.15	2.8E-04	1.6E-05	0.66	2.5E-05	8.3E-05	0.66	1.3E-04	6.4E-04	0.15	4.3E-03
Manganese and compounds	7439-96-5	3.0E-04	--	[4]	3.0E-04	--	[4]	6.1E-04	--	[4]	7.8E-04	0.090	8.7E-03	3.0E-04	0.40	7.6E-04	1.5E-03	0.40	3.8E-03	0.012	0.30	0.039
Mercury and compounds	7439-97-6	3.8E-07	--	[4]	3.9E-07	--	[4]	7.8E-07	--	[4]	1.0E-06	0.077	1.3E-05	3.9E-07	0.63	6.2E-07	1.9E-06	0.63	3.1E-06	1.5E-05	0.60	2.5E-05
Nickel and compounds	7440-02-0	8.7E-06	3.8E-03	2.3E-03	8.9E-06	0.10	8.9E-05	1.8E-05	0.046	3.9E-04	2.3E-05	0.014	1.6E-03	8.9E-06	0.062	1.4E-04	4.4E-05	0.062	7.2E-04	3.4E-04	0.20	1.7E-03

Table 6-2
Level 3 Risk Assessment Results for Significant Toxic Emission Units
Roseburg Forest Products—Medford, Oregon

Toxic Air Contaminant	CAS	Cancer									Chronic Noncancer									Acute		
		Residential			Child			Worker			Residential			Child			Worker			Noncancer		
		Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Risk [b] (chances-in-10⁶)	Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Risk [b] (chances-in-10⁶)	Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Risk [b] (chances-in-10⁶)	Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Hazard Index [c]	Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Hazard Index [c]	Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Hazard Index [c]	Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Hazard Index [c]
Exposure Location [3]		1,411			2,204			6,490			910			2,204			868			868		
Cumulative Facility-wide Risk		--	--	4.46	--	--	0.057	--	--	0.59	--	--	0.25	--	--	0.017	--	--	0.083	--	--	0.35
BOILER (Continued)																						
Selenium and compounds	7782-49-2	5.1E-06	--	[4]	5.1E-06	--	[4]	1.0E-05	--	[4]	1.3E-05	--	[4]	5.1E-06	--	[4]	2.6E-05	--	[4]	2.0E-04	2.00	1.0E-04
Vanadium (fume or dust)	7440-62-2	1.9E-06	--	[4]	1.9E-06	--	[4]	3.8E-06	--	[4]	4.8E-06	0.10	4.8E-05	1.9E-06	0.44	4.3E-06	9.4E-06	0.44	2.1E-05	7.3E-05	0.80	9.1E-05
Benzo(a)anthracene	56-55-3	2.5E-07	2.1E-04	1.2E-03	2.6E-07	7.8E-03	3.3E-05	5.2E-07	0.015	3.4E-05	6.6E-07	--	[4]	2.6E-07	--	[4]	1.3E-06	--	[4]	1.0E-05	--	[4]
Benzo(a)pyrene	50-32-8	8.5E-06	4.3E-05	0.20	8.6E-06	1.6E-03	5.4E-03	1.7E-05	3.0E-03	5.8E-03	2.2E-05	2.0E-03	0.011	8.6E-06	8.8E-03	9.8E-04	4.3E-05	8.8E-03	4.9E-03	3.4E-04	2.0E-03	0.17
Benzo(b)fluoranthene	205-99-2	4.4E-07	5.3E-05	8.4E-03	4.5E-07	2.0E-03	2.2E-04	9.0E-07	3.8E-03	2.4E-04	1.2E-06	--	[4]	4.5E-07	--	[4]	2.2E-06	--	[4]	1.7E-05	--	[4]
Benzo(g,h,i)perylene	191-24-2	4.7E-07	4.7E-03	1.0E-04	4.8E-07	0.17	2.8E-06	9.6E-07	0.34	2.8E-06	1.2E-06	--	[4]	4.8E-07	--	[4]	2.4E-06	--	[4]	1.9E-05	--	[4]
Benzo(j)fluoranthene	205-82-3	4.9E-07	1.4E-04	3.5E-03	4.9E-07	5.2E-03	9.5E-05	9.9E-07	0.010	9.9E-05	1.3E-06	--	[4]	4.9E-07	--	[4]	2.5E-06	--	[4]	1.9E-05	--	[4]
Benzo(k)fluoranthene	207-08-9	1.6E-07	1.4E-03	1.2E-04	1.6E-07	0.052	3.1E-06	3.3E-07	0.10	3.3E-06	4.2E-07	--	[4]	1.6E-07	--	[4]	8.2E-07	--	[4]	6.4E-06	--	[4]
Chrysene	218-01-9	2.5E-07	4.3E-04	5.7E-04	2.5E-07	0.016	1.6E-05	5.0E-07	0.030	1.7E-05	6.4E-07	--	[4]	2.5E-07	--	[4]	1.3E-06	--	[4]	9.7E-06	--	[4]
Dibenzo(a,h)anthracene	53-70-3	3.0E-08	4.3E-06	6.9E-03	3.0E-08	1.6E-04	1.9E-04	6.1E-08	3.0E-04	2.0E-04	7.8E-08	--	[4]	3.0E-08	--	[4]	1.5E-07	--	[4]	1.2E-06	--	[4]
Fluoranthene	206-44-0	5.2E-06	5.3E-04	9.8E-03	5.3E-06	0.020	2.6E-04	1.1E-05	0.038	2.8E-04	1.4E-05	--	[4]	5.3E-06	--	[4]	2.6E-05	--	[4]	2.1E-04	--	[4]
Indeno(1,2,3,c,d)pyrene	193-39-5	3.2E-07	6.1E-04	5.2E-04	3.2E-07	0.022	1.5E-05	6.5E-07	0.043	1.5E-05	8.3E-07	--	[4]	3.2E-07	--	[4]	1.6E-06	--	[4]	1.3E-05	--	[4]
Naphthalene	91-20-3	3.1E-04	0.029	0.011	3.1E-04	0.76	4.1E-04	6.3E-04	0.35	1.8E-03	8.1E-04	3.70	2.2E-04	3.1E-04	16.0	2.0E-05	1.6E-03	16.0	9.9E-05	0.012	200	6.1E-05
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	3.7E-12	1.0E-09	3.7E-03	3.7E-12	9.0E-08	4.1E-05	7.5E-12	4.2E-08	1.8E-04	9.6E-12	1.3E-07	7.4E-05	3.7E-12	2.6E-05	1.4E-07	1.9E-11	2.6E-05	7.2E-07	1.4E-10	--	[4]
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	40321-76-4	5.7E-12	1.0E-09	5.7E-03	5.8E-12	9.0E-08	6.4E-05	1.2E-11	4.2E-08	2.8E-04	1.5E-11	1.3E-07	1.1E-04	5.8E-12	2.6E-05	2.2E-07	2.9E-11	2.6E-05	1.1E-06	2.3E-10	--	[4]
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	39227-28-6	4.1E-12	1.0E-08	4.1E-04	4.1E-12	9.0E-07	4.6E-06	8.3E-12	4.2E-07	2.0E-05	1.1E-11	1.3E-06	8.2E-06	4.1E-12	2.6E-04	1.6E-08	2.1E-11	2.6E-04	8.0E-08	1.6E-10	--	[4]
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	57653-85-7	4.1E-12	1.0E-08	4.1E-04	4.1E-12	9.0E-07	4.6E-06	8.3E-12	4.2E-07	2.0E-05	1.1E-11	1.3E-06	8.2E-06	4.1E-12	2.6E-04	1.6E-08	2.1E-11	2.6E-04	8.0E-08	1.6E-10	--	[4]
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	19408-74-3	4.6E-12	1.0E-08	4.6E-04	4.7E-12	9.0E-07	5.2E-06	9.4E-12	4.2E-07	2.2E-05	1.2E-11	1.3E-06	9.3E-06	4.7E-12	2.6E-04	1.8E-08	2.4E-11	2.6E-04	9.1E-08	1.8E-10	--	[4]
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	35822-46-9	1.8E-11	1.0E-07	1.8E-04	1.8E-11	9.0E-06	2.0E-06	3.6E-11	4.2E-06	8.6E-06	4.6E-11	1.3E-05	3.6E-06	1.8E-11	2.6E-03	6.9E-09	9.0E-11	2.6E-03	3.5E-08	7.0E-10	--	[4]
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	3268-87-9	6.6E-11	3.4E-06	1.9E-05	6.7E-11	3.0E-04	2.2E-07	1.3E-10	1.4E-04	9.6E-07	1.7E-10	4.2E-04	4.1E-07	6.7E-11	0.085	7.9E-10	3.3E-10	0.085	3.9E-09	2.6E-09	--	[4]
2,3,7,8-Tetrachlorodibenzofuran	51207-31-9	1.3E-11	1.0E-08	1.3E-03	1.3E-11	9.0E-07	1.4E-05	2.6E-11	4.2E-07	6.1E-05	3.3E-11	1.3E-06	2.5E-05	1.3E-11	2.6E-04	4.9E-08	6.4E-11	2.6E-04	2.5E-07	4.9E-10	--	[4]
1,2,3,7,8-Pentachlorodibenzofuran	57117-41-6	5.8E-12	3.4E-08	1.7E-04	5.9E-12	3.0E-06	2.0E-06	1.2E-11	1.4E-06	8.4E-06	1.5E-11	4.2E-06	3.6E-06	5.9E-12	8.5E-04	6.9E-09	2.9E-11	8.5E-04	3.5E-08	2.3E-10	--	[4]
2,3,4,7,8-Pentachlorodibenzofuran	57117-31-4	8.3E-12	3.4E-09	2.4E-03	8.4E-12	3.0E-07	2.8E-05	1.7E-11	1.4E-07	1.2E-04	2.2E-11	4.2E-07	5.2E-05	8.4E-12	8.5E-05	9.9E-08	4.2E-11	8.5E-05	5.0E-07	3.3E-10	--	[4]
1,2,3,4,7,8-Hexachlorodibenzofuran	70648-26-9	4.0E-12	1.0E-08	4.0E-04	4.0E-12	9.0E-07	4.5E-06	8.1E-12	4.2E-07	1.9E-05	1.0E-11	1.3E-06	8.0E-06	4.0E-12	2.6E-04	1.6E-08	2.0E-11	2.6E-04	7.8E-08	1.6E-10	--	[4]
1,2,3,6,7,8-Hexachlorodibenzofuran	57117-44-9	2.8E-12	1.0E-08	2.8E-04	2.8E-12	9.0E-07	3.2E-06	5.7E-12	4.2E-07	1.4E-05	7.4E-12	1.3E-06	5.7E-06	2.8E-12	2.6E-04	1.1E-08	1.4E-11	2.6E-04	5.5E-08	1.1E-10	--	[4]
1,2,3,7,8,9-Hexachlorodibenzofuran	72918-21-9	4.1E-12	1.0E-08	4.1E-04	4.2E-12	9.0E-07	4.7E-06	8.4E-12	4.2E-07	2.0E-05	1.1E-11	1.3E-06	8.3E-06	4.2E-12	2.6E-04	1.6E-08	2.1E-11	2.6E-04	8.1E-08	1.6E-10	--	[4]
2,3,4,6,7,8-Hexachlorodibenzofuran	60851-34-5	3.7E-12	1.0E-08	3.7E-04	3.7E-12	9.0E-07	4.1E-06	7.5E-12	4.2E-07	1.8E-05	9.6E-12	1.3E-06	7.4E-06	3.7E-12	2.6E-04	1.4E-08	1.9E-11	2.6E-04	7.2E-08	1.4E-10	--	[4]
1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562-39-4	1.1E-11	1.0E-07	1.1E-04	1.1E-11	9.0E-06	1.2E-06	2.2E-11	4.2E-06	5.1E-06	2.8E-11	1.3E-05	2.1E-06	1.1E-11	2.6E-03	4.1E-09	5.4E-11	2.6E-03	2.1E-08	4.2E-10	--	[4]
1,2,3,4,7,8,9-Heptachlorodibenzofuran	55673-89-7	3.3E-12	1.0E-07	3.3E-05	3.3E-12	9.0E-06	3.7E-07	6.7E-12	4.2E-06	1.6E-06	8.6E-12	1.3E-05	6.6E-07	3.3E-12	2.6E-03	1.3E-09	1.7E-11	2.6E-03	6.4E-09	1.3E-10	--	[4]
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	39001-02-0	1.8E-11	3.4E-06	5.3E-06	1.8E-11	3.0E-04	6.0E-08	3.6E-11	1.4E-04	2.6E-07	4.7E-11	4.2E-04	1.1E-07	1.8E-11	0.085	2.1E-10	9.1E-11	0.085	1.1E-09	7.0E-10	--	[4]
RCO																						
Cumulative TEU Risk		--	--	0.75	--	--	3.1E-03	--	--	0.036	--	--	0.014	--	--	1.3E-03	--	--	3.7E-03	--	--	9.6E-03
Dispersion Factor (µg/m³)/(g/s))		0.31			0.033			0.18			0.086			0.033			0.097			0.77		
Acetaldehyde	75-07-0	8.7E-03	0.45	0.019	9.2E-04	12.0	7.7E-05	5.0E-03	5.50	9.0E-04	2.4E-03	140	1.7E-05	9.2E-04	620	1.5E-06	2.7E-03	620	4.3E-06	0.029	470	6.3E-05
Formaldehyde	50-00-0	0.12	0.17	0.73	0.013	4.30	3.1E-03	0.071	2.00	0.035	0.034	9.00	3.8E-03	0.013	40.0	3.3E-04	0.038	40.0	9.6E-04	0.42	49.0	8.6E-03
Methanol	67-56-1	0.044	--	[4]	4.6E-03	--	[4]	0.025	--	[4]	0.012	4,000	3.0E-06	4.6E-03	18,000	2.6E-07	0.014	18,000	7.5E-07	0.15	28,000	5.3E-06
Methyl ethyl ketone	78-93-3	1.4E-04	--	[4]	1.5E-05	--	[4]	7.9E-05	--	[4]	3.8E-05	5,000	7.5E-09	1.5E-05	22,000	6.6E-10	4.3E-05	22,000	1.9E-09	4.7E-04	5,000	9.4E-08
Methyl isobutyl ketone	108-10-1	6.3E-03	--	[4]	6.7E-04	--	[4]	3.6E-03	--	[4]	1.7E-03	3,000	5.7E-07	6.7E-04	13,000	5.1E-08	2.0E-03	13,000	1.5E-07	0.021	--	[4]
Methylene diphenyl diisocyanate (MDI)	101-68-8	3.1E-03	--	[4]	3.3E-04	--	[4]	1.8E-03	--	[4]	8.6E-04	0.080	0.011	3.3E-04	0.35	9.5E-04	9.7E-04	0.35	2.8E-03	0.011	12.0	8.8E-04
FORM1BH																						
Cumulative TEU Risk		--	--	0	--	--	0	--	--	0	--	--	1.5E-05	--	--	7.8E-07	--	--	9.4E-06	--	--	4.6E-05
Dispersion Factor (µg/m³)/(g/s))		4.29			0.58			15.0			2.40			0.58			6.95			38.7		
Methanol	67-56-1	0.10	--	[4]	0.014	--	[4]	0.36	--	[4]	0.058	4,000	1.5E-05	0.014	18,000	7.8E-07	0.17	18,000	9.4E-06	1.30	28,000	4.6E-05
FORM2BH																						
Cumulative TEU Risk		--	--	0	--	--	0	--	--	0	--	--	7.9E-06	--	--	4.1E-07	--	--	8.1E-06	--	--	4.5E-05
Dispersion Factor (µg/m³)/(g/s))		2.78			0.30			11.0			1.30			0.30			6.03			37.3		
Methanol	67-56-1	0.067	--	[4]	7.4E-03	--	[4]	0.27	--	[4]	0.032	4,000	7.9E-06	7.4E-03	18,000	4.1E-07	0.15	18,000	8.1E-06	1.25	28,000	4.5E-05

Table 6-2
Level 3 Risk Assessment Results for Significant Toxic Emission Units
Roseburg Forest Products—Medford, Oregon

Toxic Air Contaminant	CAS	Cancer									Chronic Noncancer									Acute		
		Residential			Child			Worker			Residential			Child			Worker			Noncancer		
		Calculated Conc. [a] ($\mu g/m^3$)	RBC [2] ($\mu g/m^3$)	Risk [b] (chances-in-10^6)	Calculated Conc. [a] ($\mu g/m^3$)	RBC [2] ($\mu g/m^3$)	Risk [b] (chances-in-10^6)	Calculated Conc. [a] ($\mu g/m^3$)	RBC [2] ($\mu g/m^3$)	Risk [b] (chances-in-10^6)	Calculated Conc. [a] ($\mu g/m^3$)	RBC [2] ($\mu g/m^3$)	Hazard Index [c]	Calculated Conc. [a] ($\mu g/m^3$)	RBC [2] ($\mu g/m^3$)	Hazard Index [c]	Calculated Conc. [a] ($\mu g/m^3$)	RBC [2] ($\mu g/m^3$)	Hazard Index [c]	Calculated Conc. [a] ($\mu g/m^3$)	RBC [2] ($\mu g/m^3$)	Hazard Index [c]
Exposure Location [3]		**1,411**			**2,204**			**6,490**			**910**			**2,204**			**868**			**868**		
Cumulative Facility-wide Risk		--	--	**4.46**	--	--	**0.057**	--	--	**0.59**	--	--	**0.25**	--	--	**0.017**	--	--	**0.083**	--	--	**0.35**
FORM4BH																						
Cumulative TEU Risk		--	--	**0**	--	--	**0**	--	--	**0**	--	--	**8.8E-06**	--	--	**4.4E-07**	--	--	**8.0E-06**	--	--	**4.0E-05**
Dispersion Factor ($\mu g/m^3$/(g/s))		**2.82**			**0.33**			**11.5**			**1.46**			**0.33**			**5.93**			**33.7**		
Methanol	67-56-1	0.068	--	[4]	7.9E-03	--	[4]	0.28	--	[4]	0.035	4,000	8.8E-06	7.9E-03	18,000	4.4E-07	0.14	18,000	8.0E-06	1.13	28,000	4.0E-05
FORM5BH																						
Cumulative TEU Risk		--	--	**0**	--	--	**0**	--	--	**0**	--	--	**1.5E-05**	--	--	**7.9E-07**	--	--	**9.3E-06**	--	--	**4.6E-05**
Dispersion Factor ($\mu g/m^3$/(g/s))		**4.27**			**0.58**			**14.3**			**2.43**			**0.58**			**6.88**			**38.6**		
Methanol	67-56-1	0.10	--	[4]	0.014	--	[4]	0.35	--	[4]	0.059	4,000	1.5E-05	0.014	18,000	7.9E-07	0.17	18,000	9.3E-06	1.30	28,000	4.6E-05
PRESSFUG																						
Cumulative TEU Risk		--	--	**0.18**	--	--	**2.3E-03**	--	--	**0.026**	--	--	**0.026**	--	--	**2.3E-03**	--	--	**0.011**	--	--	**9.3E-03**
Dispersion Factor ($\mu g/m^3$/(g/s))		**8.23**			**2.78**			**14.3**			**7.09**			**2.78**			**12.6**			**71.4**		
Acetaldehyde	75-07-0	2.9E-03	0.45	6.5E-03	9.9E-04	12.0	8.2E-05	5.1E-03	5.50	9.2E-04	2.5E-03	140	1.8E-05	9.9E-04	620	1.6E-06	4.5E-03	620	7.3E-06	0.035	470	7.5E-05
Formaldehyde	50-00-0	0.029	0.17	0.17	9.7E-03	4.30	2.3E-03	0.050	2.00	0.025	0.025	9.00	2.7E-03	9.7E-03	40.0	2.4E-04	0.044	40.0	1.1E-03	0.34	49.0	7.0E-03
Methanol	67-56-1	0.049	--	[4]	0.016	--	[4]	0.084	--	[4]	0.042	4,000	1.0E-05	0.016	18,000	9.1E-07	0.075	18,000	4.2E-06	0.58	28,000	2.1E-05
Methyl ethyl ketone	78-93-3	3.1E-04	--	[4]	1.0E-04	--	[4]	5.4E-04	--	[4]	2.7E-04	5,000	5.4E-08	1.0E-04	22,000	4.8E-09	4.8E-04	22,000	2.2E-08	3.7E-03	5,000	7.5E-07
Methyl isobutyl ketone	108-10-1	9.4E-03	--	[4]	3.2E-03	--	[4]	0.016	--	[4]	8.1E-03	3,000	2.7E-06	3.2E-03	13,000	2.4E-07	0.014	13,000	1.1E-06	0.11	--	[4]
Methylene diphenyl diisocyanate (MDI)	101-68-8	2.2E-03	--	[4]	7.3E-04	--	[4]	3.7E-03	--	[4]	1.9E-03	0.080	0.023	7.3E-04	0.35	2.1E-03	3.3E-03	0.35	9.4E-03	0.026	12.0	2.2E-03
BC2																						
Cumulative TEU Risk		--	--	**0.19**	--	--	**3.0E-03**	--	--	**0.030**	--	--	**4.8E-03**	--	--	**3.8E-04**	--	--	**1.9E-03**	--	--	**9.2E-03**
Dispersion Factor ($\mu g/m^3$/(g/s))		**7.95**			**3.10**			**14.5**			**9.01**			**3.10**			**16.0**			**75.5**		
Acetaldehyde	75-07-0	6.8E-04	0.45	1.5E-03	2.6E-04	12.0	2.2E-05	1.2E-03	5.50	2.2E-04	7.7E-04	140	5.5E-06	2.6E-04	620	4.3E-07	1.4E-03	620	2.2E-06	8.9E-03	470	1.9E-05
Acrolein	107-02-8	2.1E-04	--	[4]	8.1E-05	--	[4]	3.8E-04	--	[4]	2.4E-04	0.35	6.7E-04	8.1E-05	1.50	5.4E-05	4.2E-04	1.50	2.8E-04	2.7E-03	6.90	4.0E-04
Formaldehyde	50-00-0	0.033	0.17	0.19	0.013	4.30	3.0E-03	0.060	2.00	0.030	0.037	9.00	4.1E-03	0.013	40.0	3.2E-04	0.066	40.0	1.7E-03	0.43	49.0	8.8E-03
Methanol	67-56-1	0.037	--	[4]	0.014	--	[4]	0.068	--	[4]	0.042	4,000	1.1E-05	0.014	18,000	8.1E-07	0.075	18,000	4.2E-06	0.49	28,000	1.7E-05
Methyl ethyl ketone	78-93-3	1.0E-04	--	[4]	4.0E-05	--	[4]	1.9E-04	--	[4]	1.2E-04	5,000	2.3E-08	4.0E-05	22,000	1.8E-09	2.1E-04	22,000	9.5E-09	1.4E-03	5,000	2.7E-07
BC3																						
Cumulative TEU Risk		--	--	**0.20**	--	--	**3.0E-03**	--	--	**0.032**	--	--	**4.6E-03**	--	--	**3.7E-04**	--	--	**1.9E-03**	--	--	**0.010**
Dispersion Factor ($\mu g/m^3$/(g/s))		**8.28**			**3.05**			**15.3**			**8.65**			**3.05**			**15.6**			**82.1**		
Acetaldehyde	75-07-0	7.1E-04	0.45	1.6E-03	2.6E-04	12.0	2.2E-05	1.3E-03	5.50	2.4E-04	7.4E-04	140	5.3E-06	2.6E-04	620	4.2E-07	1.3E-03	620	2.1E-06	9.7E-03	470	2.1E-05
Acrolein	107-02-8	2.2E-04	--	[4]	8.0E-05	--	[4]	4.0E-04	--	[4]	2.3E-04	0.35	6.5E-04	8.0E-05	1.50	5.3E-05	4.1E-04	1.50	2.7E-04	3.0E-03	6.90	4.3E-04
Formaldehyde	50-00-0	0.034	0.17	0.20	0.013	4.30	2.9E-03	0.063	2.00	0.032	0.036	9.00	4.0E-03	0.013	40.0	3.2E-04	0.065	40.0	1.6E-03	0.47	49.0	9.6E-03
Methanol	67-56-1	0.039	--	[4]	0.014	--	[4]	0.071	--	[4]	0.040	4,000	1.0E-05	0.014	18,000	7.9E-07	0.073	18,000	4.1E-06	0.53	28,000	1.9E-05
Methyl ethyl ketone	78-93-3	1.1E-04	--	[4]	4.0E-05	--	[4]	2.0E-04	--	[4]	1.1E-04	5,000	2.3E-08	4.0E-05	22,000	1.8E-09	2.0E-04	22,000	9.2E-09	1.5E-03	5,000	3.0E-07

Table 6-2
Level 3 Risk Assessment Results for Significant Toxic Emission Units
Roseburg Forest Products—Medford, Oregon

Toxic Air Contaminant	CAS	Cancer									Chronic Noncancer									Acute		
		Residential			Child			Worker			Residential			Child			Worker			Noncancer		
		Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Risk [b] (chances-in-10⁶)	Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Risk [b] (chances-in-10⁶)	Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Risk [b] (chances-in-10⁶)	Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Hazard Index [c]	Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Hazard Index [c]	Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Hazard Index [c]	Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Hazard Index [c]
Exposure Location [3]		**1,411**			**2,204**			**6,490**			**910**			**2,204**			**868**			**868**		
Cumulative Facility-wide Risk		--	--	**4.46**	--	--	**0.057**	--	--	**0.59**	--	--	**0.25**	--	--	**0.017**	--	--	**0.083**	--	--	**0.35**
BC1																						
Cumulative TEU Risk		--	--	**1.68**	--	--	**0.019**	--	--	**0.30**	--	--	**0.021**	--	--	**2.4E-03**	--	--	**0.012**	--	--	**0.053**
Dispersion Factor (µg/m³/(g/s))		**3.81**			**1.11**			**7.90**			**2.14**			**1.11**			**5.60**			**24.3**		
Acetaldehyde	75-07-0	5.8E-03	0.45	0.013	1.7E-03	12.0	1.4E-04	0.012	5.50	2.2E-03	3.3E-03	140	2.3E-05	1.7E-03	620	2.8E-06	8.6E-03	620	1.4E-05	0.051	470	1.1E-04
Acrolein	107-02-8	1.8E-03	--	[4]	5.3E-04	--	[4]	3.7E-03	--	[4]	1.0E-03	0.35	2.9E-03	5.3E-04	1.50	3.5E-04	2.6E-03	1.50	1.8E-03	0.016	6.90	2.3E-03
Formaldehyde	50-00-0	0.28	0.17	1.67	0.083	4.30	0.019	0.59	2.00	0.29	0.16	9.00	0.018	0.083	40.0	2.1E-03	0.42	40.0	0.010	2.50	49.0	0.051
Methanol	67-56-1	0.32	--	[4]	0.094	--	[4]	0.67	--	[4]	0.18	4,000	4.5E-05	0.094	18,000	5.2E-06	0.47	18,000	2.6E-05	2.82	28,000	1.0E-04
Methyl ethyl ketone	78-93-3	8.9E-04	--	[4]	2.6E-04	--	[4]	1.9E-03	--	[4]	5.0E-04	5,000	1.0E-07	2.6E-04	22,000	1.2E-08	1.3E-03	22,000	6.0E-08	7.9E-03	5,000	1.6E-06
SANDBH																						
Cumulative TEU Risk		--	--	**0.87**	--	--	**0.011**	--	--	**0.13**	--	--	**0.016**	--	--	**1.1E-03**	--	--	**6.5E-03**	--	--	**0.029**
Dispersion Factor (µg/m³/(g/s))		**9.04**			**2.78**			**16.0**			**8.68**			**2.78**			**15.9**			**61.6**		
Formaldehyde	50-00-0	0.15	0.17	0.87	0.046	4.30	0.011	0.26	2.00	0.13	0.14	9.00	0.016	0.046	40.0	1.1E-03	0.26	40.0	6.5E-03	1.40	49.0	0.029
Methanol	67-56-1	0.28	--	[4]	0.087	--	[4]	0.50	--	[4]	0.27	4,000	6.8E-05	0.087	18,000	4.9E-06	0.50	18,000	2.8E-05	2.67	28,000	9.5E-05
SAWBH																						
Cumulative TEU Risk		--	--	**0**	--	--	**0**	--	--	**0**	--	--	**8.0E-05**	--	--	**5.2E-06**	--	--	**2.7E-05**	--	--	**8.7E-05**
Dispersion Factor (µg/m³/(g/s))		**10.5**			**3.48**			**17.2**			**12.0**			**3.48**			**18.2**			**66.0**		
Methanol	67-56-1	0.28	--	[4]	0.093	--	[4]	0.46	--	[4]	0.32	4,000	8.0E-05	0.093	18,000	5.2E-06	0.48	18,000	2.7E-05	2.43	28,000	8.7E-05
COATINGS																						
Cumulative TEU Risk		--	--	**0**	--	--	**0**	--	--	**0**	--	--	**3.8E-04**	--	--	**2.6E-05**	--	--	**1.1E-04**	--	--	**4.6E-05**
Dispersion Factor (µg/m³/(g/s))		**7.84**			**3.41**			**11.5**			**11.2**			**3.41**			**13.8**			**63.4**		
Ethylene glycol monobutyl ether	111-76-2	0.016	--	[4]	7.0E-03	--	[4]	0.023	--	[4]	0.023	82.0	2.8E-04	7.0E-03	360	1.9E-05	0.028	360	7.8E-05	0.15	29,000	5.2E-06
Isopropyl alcohol (isopropanol)	67-63-0	0.014	--	[4]	6.2E-03	--	[4]	0.021	--	[4]	0.020	200	1.0E-04	6.2E-03	880	7.0E-06	0.025	880	2.8E-05	0.13	3,200	4.1E-05
Propylene glycol monomethyl ether	107-98-2	2.0E-03	--	[4]	8.5E-04	--	[4]	2.8E-03	--	[4]	2.8E-03	7,000	4.0E-07	8.5E-04	31,000	2.7E-08	3.4E-03	31,000	1.1E-07	0.018	--	[4]

RBC = risk-based concentration.

TEU = toxic emission unit.

TAC = toxic air contaminant.

Notes:

(a) Calculated concentration (µg/m³) = (dispersion factor [(µg/m³)/(g/s)]) x (TAC emission rate per TEU [g/s])
TAC emission rate per TEU (g/s) = (1)

(b) Risk (chances-in-1,000,000) = (calculated concentration [µg/m³]) / (risk-based concentration [µg/m³])

(c) Hazard index = (calculated concentration [µg/m³]) / (risk-based concentration [µg/m³])

References:

(1) See Table 3–1, Daily Emission Rates for Significant Toxic Emission Units—RBC Only for Acute, and Table 3–2, Annual Emission Rates for Significant Toxic Emission Units—RBC Only for Cancer and Chronic Noncancer.

(2) Oregon Administrative Rule 340-245-8040, Table 4, Risk-Based Concentrations.

(3) Represents the exposure location with the highest predicted cancer or noncancer risk per exposure category.

(4) TAC does not have an established RBC for this exposure category per Oregon Administrative Rule 340-245-8040, Table 4.

Table 6-3
Level 3 Risk Assessment Results for Gas Combustion Toxic Emission Units
Roseburg Forest Products—Medford, Oregon

Toxic Air Contaminant	CAS	Cancer									Chronic Noncancer									Acute		
		Residential			Child			Worker			Residential			Child			Worker			Noncancer		
		Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Risk [b] (chances-in-10⁶)	Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Risk [b] (chances-in-10⁶)	Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Risk [b] (chances-in-10⁶)	Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Hazard Index [c]	Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Hazard Index [c]	Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Hazard Index [c]	Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Hazard Index [c]
Exposure Location [3]		**1,605**			**3,507**			**1,603**			**1,605**			**3,507**			**1,603**			**1,069**		
Cumulative Facility-wide Risk		--	--	**0.020**	--	--	**1.5E-04**	--	--	**9.6E-04**	--	--	**2.4E-03**	--	--	**6.5E-05**	--	--	**2.4E-04**	--	--	**1.5E-03**
BLR_NG																						
Cumulative TEU Risk		--	--	**1.7E-03**	--	--	**1.8E-05**	--	--	**1.2E-04**	--	--	**1.8E-04**	--	--	**7.7E-06**	--	--	**2.7E-05**	--	--	**1.0E-04**
Dispersion Factor (µg/m³/[g/s])		**0.51**			**0.17**			**0.60**			**0.51**			**0.17**			**0.60**			**5.55**		
Acetaldehyde	75-07-0	1.2E-05	0.45	2.7E-05	4.1E-06	12.0	3.4E-07	1.4E-05	5.50	2.6E-06	1.2E-05	140	8.8E-08	4.1E-06	620	6.6E-09	1.4E-05	620	2.3E-08	1.6E-04	470	3.5E-07
Acrolein	107-02-8	1.1E-05	--	[4]	3.6E-06	--	[4]	1.3E-05	--	[4]	1.1E-05	0.35	3.1E-05	3.6E-06	1.50	2.4E-06	1.3E-05	1.50	8.4E-06	1.4E-04	6.90	2.1E-05
Benzene	71-43-2	2.3E-05	0.13	1.8E-04	7.6E-06	3.30	2.3E-06	2.7E-05	1.50	1.8E-05	2.3E-05	3.00	7.7E-06	7.6E-06	13.0	5.9E-07	2.7E-05	13.0	2.1E-06	3.0E-04	29.0	1.0E-05
Ethylbenzene	100-41-4	2.7E-05	0.40	6.9E-05	9.1E-06	10.0	9.1E-07	3.2E-05	4.80	6.7E-06	2.7E-05	260	1.1E-07	9.1E-06	1,100	8.3E-09	3.2E-05	1,100	2.9E-08	3.6E-04	22,000	1.6E-08
Formaldehyde	50-00-0	4.9E-05	0.17	2.9E-04	1.6E-05	4.30	3.8E-06	5.7E-05	2.00	2.9E-05	4.9E-05	9.00	5.4E-06	1.6E-05	40.0	4.0E-07	5.7E-05	40.0	1.4E-06	6.5E-04	49.0	1.3E-05
Hexane	110-54-3	1.8E-05	--	[4]	6.1E-06	--	[4]	2.1E-05	--	[4]	1.8E-05	700	2.6E-08	6.1E-06	3,100	2.0E-09	2.1E-05	3,100	6.9E-09	2.4E-04	--	[4]
Propylene	115-07-1	2.1E-03	--	[4]	7.0E-04	--	[4]	2.5E-03	--	[4]	2.1E-03	3,000	7.0E-07	7.0E-04	13,000	5.4E-08	2.5E-03	13,000	1.9E-07	0.028	--	[4]
Toluene	108-88-3	1.1E-04	--	[4]	3.5E-05	--	[4]	1.2E-04	--	[4]	1.1E-04	5,000	2.1E-08	3.5E-05	22,000	1.6E-09	1.2E-04	22,000	5.6E-09	1.4E-03	7,500	1.9E-07
Xylenes	1330-20-7	7.8E-05	--	[4]	2.6E-05	--	[4]	9.2E-05	--	[4]	7.8E-05	220	3.6E-07	2.6E-05	970	2.7E-08	9.2E-05	970	9.5E-08	1.0E-03	8,700	1.2E-07
Arsenic and compounds	7440-38-2	1.7E-08	2.4E-05	7.3E-04	5.8E-09	1.3E-03	4.5E-06	2.1E-08	6.2E-04	3.3E-05	1.7E-08	1.7E-04	1.0E-04	5.8E-09	2.4E-03	2.4E-06	2.1E-08	2.4E-03	8.5E-06	2.3E-07	0.20	1.2E-06
Cadmium and compounds	7440-43-9	8.7E-08	5.6E-04	1.6E-04	2.9E-08	0.014	2.1E-06	1.0E-07	6.7E-03	1.5E-05	8.7E-08	5.0E-03	1.7E-05	2.9E-08	0.037	7.8E-07	1.0E-07	0.037	2.8E-06	1.2E-06	0.030	3.8E-05
Chromium VI	18540-29-9	4.5E-09	3.1E-05	1.4E-04	1.5E-09	5.2E-04	2.8E-06	5.2E-09	1.0E-03	5.2E-06	4.5E-09	0.083	5.4E-08	1.5E-09	0.88	1.7E-09	5.2E-09	0.88	5.9E-09	5.9E-08	0.30	2.0E-07
Cobalt and compounds	7440-48-4	6.7E-09	--	[4]	2.2E-09	--	[4]	7.8E-09	--	[4]	6.7E-09	0.10	6.7E-08	2.2E-09	0.44	5.0E-09	7.8E-09	0.44	1.8E-08	8.8E-08	--	[4]
Copper and compounds	7440-50-8	6.8E-08	--	[4]	2.2E-08	--	[4]	7.9E-08	--	[4]	6.8E-08	--	[4]	2.2E-08	--	[4]	7.9E-08	--	[4]	8.9E-07	100.0	8.9E-09
Manganese and compounds	7439-96-5	3.0E-08	--	[4]	1.0E-08	--	[4]	3.5E-08	--	[4]	3.0E-08	0.090	3.4E-07	1.0E-08	0.40	2.5E-08	3.5E-08	0.40	8.9E-08	4.0E-07	0.30	1.3E-06
Mercury and compounds	7439-97-6	3.7E-10	--	[4]	1.2E-10	--	[4]	4.3E-10	--	[4]	3.7E-10	0.077	4.8E-09	1.2E-10	0.63	1.9E-10	4.3E-10	0.63	6.9E-10	4.9E-09	0.60	8.1E-09
Nickel and compounds	7440-02-0	1.7E-07	3.8E-03	4.4E-05	5.5E-08	0.10	5.5E-07	2.0E-07	0.046	4.3E-06	1.7E-07	0.014	1.2E-05	5.5E-08	0.062	8.9E-07	2.0E-07	0.062	3.2E-06	2.2E-06	0.20	1.1E-05
Vanadium (fume or dust)	7440-62-2	1.8E-07	--	[4]	6.1E-08	--	[4]	2.1E-07	--	[4]	1.8E-07	0.10	1.8E-06	6.1E-08	0.44	1.4E-07	2.1E-07	0.44	4.9E-07	2.4E-06	0.80	3.0E-06
Chrysene	218-01-9	7.2E-09	4.3E-04	1.7E-05	2.4E-09	0.016	1.5E-07	8.4E-09	0.030	2.8E-07	7.2E-09	--	[4]	2.4E-09	--	[4]	8.4E-09	--	[4]	9.4E-08	--	[4]
Fluoranthene	206-44-0	1.2E-08	5.3E-04	2.2E-05	3.9E-09	0.020	2.0E-07	1.4E-08	0.038	3.7E-07	1.2E-08	--	[4]	3.9E-09	--	[4]	1.4E-08	--	[4]	1.6E-07	--	[4]
Naphthalene	91-20-3	1.2E-06	0.029	4.1E-05	3.9E-07	0.76	5.2E-07	1.4E-06	0.35	4.0E-06	1.2E-06	3.70	3.2E-07	3.9E-07	16.0	2.5E-08	1.4E-06	16.0	8.7E-08	1.6E-05	200	7.9E-08
DRY_NG																						
Cumulative TEU Risk		--	--	**8.7E-04**	--	--	**6.5E-06**	--	--	**4.1E-05**	--	--	**1.1E-04**	--	--	**2.7E-06**	--	--	**1.0E-05**	--	--	**6.6E-05**
Dispersion Factor (µg/m³/[g/s])		**0.43**			**0.11**			**0.43**			**0.43**			**0.11**			**0.43**			**8.42**		
Ethylbenzene	100-41-4	7.6E-06	0.40	1.9E-05	2.0E-06	10.0	2.0E-07	7.6E-06	4.80	1.6E-06	7.6E-06	260	2.9E-08	2.0E-06	1,100	1.8E-09	7.6E-06	1,100	6.9E-09	1.5E-04	22,000	6.8E-09
Hexane	110-54-3	5.1E-06	--	[4]	1.3E-06	--	[4]	5.1E-06	--	[4]	5.1E-06	700	7.2E-09	1.3E-06	3,100	4.3E-10	5.1E-06	3,100	1.6E-09	1.0E-04	--	[4]
Propylene	115-07-1	5.8E-04	--	[4]	1.5E-04	--	[4]	5.8E-04	--	[4]	5.8E-04	3,000	1.9E-07	1.5E-04	13,000	1.2E-08	5.8E-04	13,000	4.5E-08	0.012	--	[4]
Arsenic and compounds	7440-38-2	1.4E-08	2.4E-05	5.8E-04	3.7E-09	1.3E-03	2.8E-06	1.4E-08	6.2E-04	2.2E-05	1.4E-08	1.7E-04	8.2E-05	3.7E-09	2.4E-03	1.5E-06	1.4E-08	2.4E-03	5.8E-06	2.7E-07	0.20	1.4E-06
Cadmium and compounds	7440-43-9	6.9E-08	5.6E-04	1.2E-04	1.8E-08	0.014	1.3E-06	6.9E-08	6.7E-03	1.0E-05	6.9E-08	5.0E-03	1.4E-05	1.8E-08	0.037	4.9E-07	6.9E-08	0.037	1.9E-06	1.4E-06	0.030	4.5E-05
Chromium VI	18540-29-9	3.5E-09	3.1E-05	1.1E-04	9.3E-10	5.2E-04	1.8E-06	3.5E-09	1.0E-03	3.5E-06	3.5E-09	0.083	4.3E-08	9.3E-10	0.88	1.1E-09	3.5E-09	0.88	4.0E-09	6.9E-08	0.30	2.3E-07
Cobalt and compounds	7440-48-4	5.3E-09	--	[4]	1.4E-09	--	[4]	5.3E-09	--	[4]	5.3E-09	0.10	5.3E-08	1.4E-09	0.44	3.2E-09	5.3E-09	0.44	1.2E-08	1.0E-07	--	[4]
Copper and compounds	7440-50-8	5.4E-08	--	[4]	1.4E-08	--	[4]	5.3E-08	--	[4]	5.4E-08	--	[4]	1.4E-08	--	[4]	5.3E-08	--	[4]	1.1E-06	100.0	1.1E-08
Manganese and compounds	7439-96-5	2.4E-08	--	[4]	6.3E-09	--	[4]	2.4E-08	--	[4]	2.4E-08	0.090	2.7E-07	6.3E-09	0.40	1.6E-08	2.4E-08	0.40	6.0E-08	4.7E-07	0.30	1.6E-06
Mercury and compounds	7439-97-6	1.6E-08	--	[4]	4.3E-09	--	[4]	1.6E-08	--	[4]	1.6E-08	0.077	2.1E-07	4.3E-09	0.63	6.9E-09	1.6E-08	0.63	2.6E-08	3.2E-07	0.60	5.4E-07
Nickel and compounds	7440-02-0	1.3E-07	3.8E-03	3.5E-05	3.5E-08	0.10	3.5E-07	1.3E-07	0.046	2.9E-06	1.3E-07	0.014	9.5E-06	3.5E-08	0.062	5.6E-07	1.3E-07	0.062	2.1E-06	2.6E-06	0.20	1.3E-05
Vanadium (fume or dust)	7440-62-2	1.4E-07	--	[4]	3.8E-08	--	[4]	1.4E-07	--	[4]	1.4E-07	0.10	1.4E-06	3.8E-08	0.44	8.7E-08	1.4E-07	0.44	3.3E-07	2.9E-06	0.80	3.6E-06

Table 6-3
Level 3 Risk Assessment Results for Gas Combustion Toxic Emission Units
Roseburg Forest Products—Medford, Oregon

Toxic Air Contaminant	CAS	Cancer									Chronic Noncancer									Acute		
		Residential			Child			Worker			Residential			Child			Worker			Noncancer		
		Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Risk [b] (chances-in-10⁶)	Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Risk [b] (chances-in-10⁶)	Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Risk [b] (chances-in-10⁶)	Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Hazard Index [c]	Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Hazard Index [c]	Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Hazard Index [c]	Calculated Conc. [a] (µg/m³)	RBC [2] (µg/m³)	Hazard Index [c]
Exposure Location [3]		1,605			3,507			1,603			1,605			3,507			1,603			1,069		
Cumulative Facility-wide Risk		--	--	0.020	--	--	1.5E-04	--	--	9.6E-04	--	--	2.4E-03	--	--	6.5E-05	--	--	2.4E-04	--	--	1.5E-03
RCO_NG																						
Cumulative TEU Risk		--	--	0.017	--	--	1.3E-04	--	--	8.0E-04	--	--	2.2E-03	--	--	5.5E-05	--	--	2.1E-04	--	--	1.3E-03
Dispersion Factor (µg/m³/[g/s])		0.43			0.11			0.43			0.43			0.11			0.43			8.42		
Acetaldehyde	75-07-0	3.9E-06	0.45	8.7E-06	1.0E-06	12.0	8.6E-08	3.9E-06	5.50	7.1E-07	3.9E-06	140	2.8E-08	1.0E-06	620	1.7E-09	3.9E-06	620	6.3E-09	7.7E-05	470	1.6E-07
Acrolein	107-02-8	3.4E-06	--	[4]	9.0E-07	--	[4]	3.4E-06	--	[4]	3.4E-06	0.35	9.7E-06	9.0E-07	1.50	6.0E-07	3.4E-06	1.50	2.3E-06	6.7E-05	6.90	9.7E-06
Benzene	71-43-2	7.3E-06	0.13	5.6E-05	1.9E-06	3.30	5.8E-07	7.3E-06	1.50	4.9E-06	7.3E-06	3.00	2.4E-06	1.9E-06	13.0	1.5E-07	7.3E-06	13.0	5.6E-07	1.4E-04	29.0	5.0E-06
Ethylbenzene	100-41-4	8.7E-06	0.40	2.2E-05	2.3E-06	10.0	2.3E-07	8.7E-06	4.80	1.8E-06	8.7E-06	260	3.3E-08	2.3E-06	1,100	2.1E-09	8.7E-06	1,100	7.9E-09	1.7E-04	22,000	7.8E-09
Formaldehyde	50-00-0	1.6E-05	0.17	9.1E-05	4.1E-06	4.30	9.5E-07	1.5E-05	2.00	7.7E-06	1.6E-05	9.00	1.7E-06	4.1E-06	40.0	1.0E-07	1.5E-05	40.0	3.9E-07	3.1E-04	49.0	6.2E-06
Hexane	110-54-3	5.8E-06	--	[4]	1.5E-06	--	[4]	5.8E-06	--	[4]	5.8E-06	700	8.3E-09	1.5E-06	3,100	4.9E-10	5.8E-06	3,100	1.9E-09	1.1E-04	--	[4]
Propylene	115-07-1	6.7E-04	--	[4]	1.8E-04	--	[4]	6.7E-04	--	[4]	6.7E-04	3,000	2.2E-07	1.8E-04	13,000	1.4E-08	6.7E-04	13,000	5.1E-08	0.013	--	[4]
Toluene	108-88-3	3.3E-05	--	[4]	8.8E-06	--	[4]	3.3E-05	--	[4]	3.3E-05	5,000	6.7E-09	8.8E-06	22,000	4.0E-10	3.3E-05	22,000	1.5E-09	6.6E-04	7,500	8.8E-08
Xylenes	1330-20-7	2.5E-05	--	[4]	6.5E-06	--	[4]	2.5E-05	--	[4]	2.5E-05	220	1.1E-07	6.5E-06	970	6.7E-09	2.5E-05	970	2.6E-08	4.9E-04	8,700	5.6E-08
Arsenic and compounds	7440-38-2	2.8E-07	2.4E-05	0.012	7.3E-08	1.3E-03	5.6E-05	2.8E-07	6.2E-04	4.5E-04	2.8E-07	1.7E-04	1.6E-03	7.3E-08	2.4E-03	3.0E-05	2.8E-07	2.4E-03	1.2E-04	5.5E-06	0.20	2.7E-05
Cadmium and compounds	7440-43-9	1.4E-06	5.6E-04	2.5E-03	3.7E-07	0.014	2.6E-05	1.4E-06	6.7E-03	2.1E-04	1.4E-06	5.0E-03	2.8E-04	3.7E-07	0.037	9.9E-06	1.4E-06	0.037	3.7E-05	2.7E-05	0.030	9.1E-04
Chromium VI	18540-29-9	7.1E-08	3.1E-05	2.3E-03	1.9E-08	5.2E-04	3.6E-05	7.0E-08	1.0E-03	7.0E-05	7.1E-08	0.083	8.5E-07	1.9E-08	0.88	2.1E-08	7.0E-08	0.88	8.0E-08	1.4E-06	0.30	4.6E-06
Cobalt and compounds	7440-48-4	1.1E-07	--	[4]	2.8E-08	--	[4]	1.1E-07	--	[4]	1.1E-07	0.10	1.1E-06	2.8E-08	0.44	6.3E-08	1.1E-07	0.44	2.4E-07	2.1E-06	--	[4]
Copper and compounds	7440-50-8	1.1E-06	--	[4]	2.8E-07	--	[4]	1.1E-06	--	[4]	1.1E-06	--	[4]	2.8E-07	--	[4]	1.1E-06	--	[4]	2.1E-05	100.0	2.1E-07
Manganese and compounds	7439-96-5	4.8E-07	--	[4]	1.3E-07	--	[4]	4.8E-07	--	[4]	4.8E-07	0.090	5.3E-06	1.3E-07	0.40	3.2E-07	4.8E-07	0.40	1.2E-06	9.4E-06	0.30	3.1E-05
Mercury and compounds	7439-97-6	3.3E-07	--	[4]	8.6E-08	--	[4]	3.3E-07	--	[4]	3.3E-07	0.077	4.3E-06	8.6E-08	0.63	1.4E-07	3.3E-07	0.63	5.2E-07	6.4E-06	0.60	1.1E-05
Nickel and compounds	7440-02-0	2.6E-06	3.8E-03	7.0E-04	7.0E-07	0.10	7.0E-06	2.6E-06	0.046	5.7E-05	2.6E-06	0.014	1.9E-04	7.0E-07	0.062	1.1E-05	2.6E-06	0.062	4.3E-05	5.2E-05	0.20	2.6E-04
Vanadium (fume or dust)	7440-62-2	2.9E-06	--	[4]	7.6E-07	--	[4]	2.9E-06	--	[4]	2.9E-06	0.10	2.9E-05	7.6E-07	0.44	1.7E-06	2.9E-06	0.44	6.6E-06	5.7E-05	0.80	7.1E-05
Chrysene	218-01-9	2.3E-09	4.3E-04	5.3E-06	6.0E-10	0.016	3.7E-08	2.3E-09	0.030	7.5E-08	2.3E-09	--	[4]	6.0E-10	--	[4]	2.3E-09	--	[4]	4.5E-08	--	[4]
Fluoranthene	206-44-0	3.8E-09	5.3E-04	7.1E-06	1.0E-09	0.020	5.0E-08	3.8E-09	0.038	9.9E-08	3.8E-09	--	[4]	1.0E-09	--	[4]	3.8E-09	--	[4]	7.4E-08	--	[4]
Naphthalene	91-20-3	3.8E-07	0.029	1.3E-05	1.0E-07	0.76	1.3E-07	3.8E-07	0.35	1.1E-06	3.8E-07	3.70	1.0E-07	1.0E-07	16.0	6.2E-09	3.8E-07	16.0	2.4E-08	7.4E-06	200	3.7E-08

RBC = risk-based concentration

TEU = toxic emission unit

TAC = toxic air contaminant

Notes:

(a) Calculated concentration (µg/m³) = (dispersion factor [(µg/m³)/(g/s)]) x (TAC emission rate per TEU [g/s])
TAC emission rate per TEU (g/s) = (1)

(b) Risk (chances-in-1,000,000) = (calculated concentration [µg/m³]) / (risk-based concentration [µg/m³])

(c) Hazard index = (calculated concentration [µg/m³]) / (risk-based concentration [µg/m³])

References:

(1) See Table 3–3, Daily and Annual Emission Rates for Gas Combustion Toxic Emission Units—RBC Only.

(2) Oregon Administrative Rule 340-245-8040, Table 4, Risk-Based Concentrations.

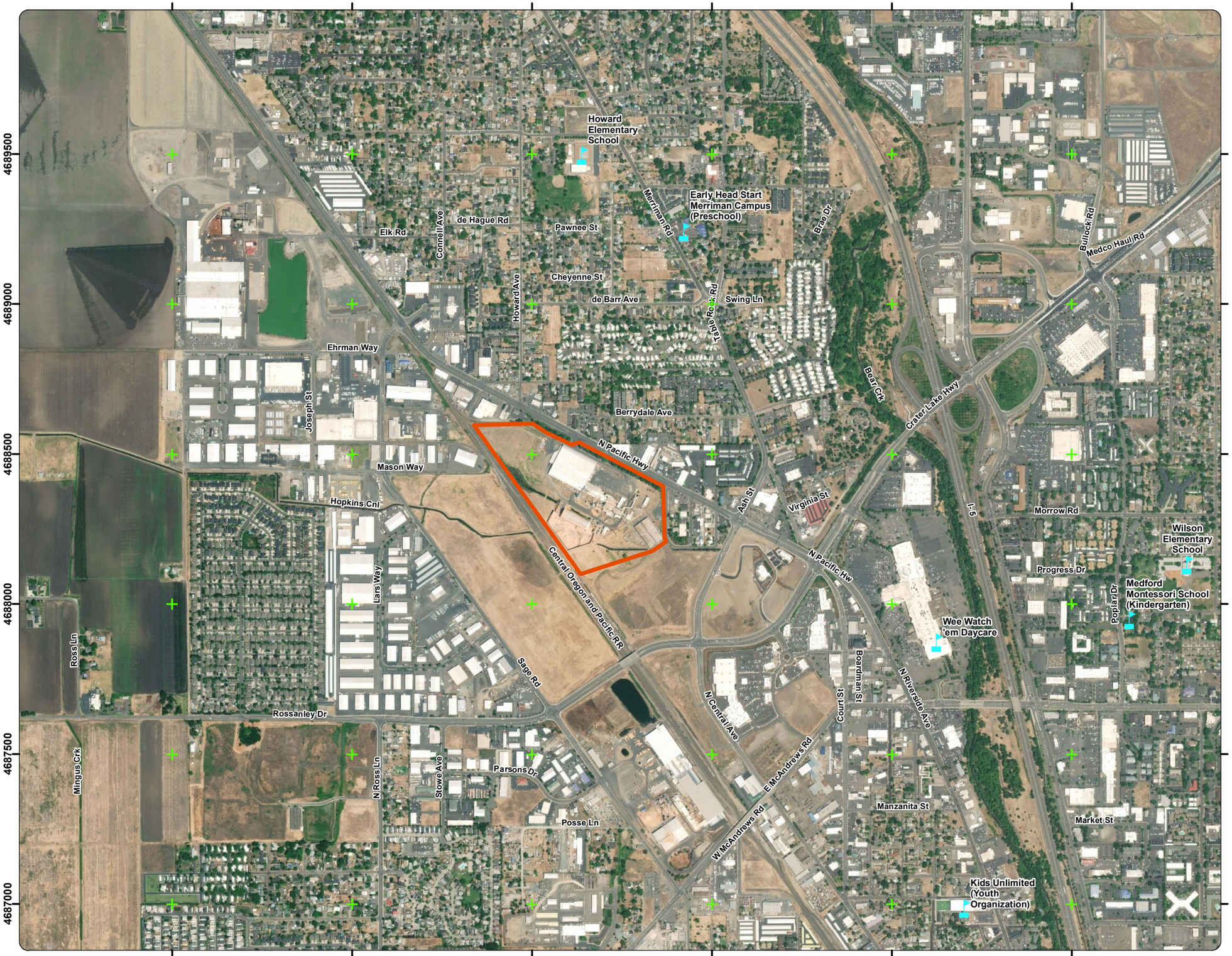
(3) Represents the exposure location with the highest predicted cancer or noncancer risk per exposure category.

(4) TAC does not have an established RBC for this exposure category per Oregon Administrative Rule 340-245-8040, Table 4.

FIGURES

Figure 2-1
Aerial Photograph of Facility

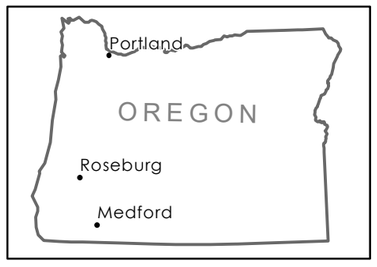
Roseburg Forest Products
Medford, Oregon



Legend

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

KEY MAP



0 100 200
Meters

Source: Aerial photograph obtained from Esri ArcGIS Online

MAUL FOSTER ALONGI
p. 971 544 2139 | www.maulfoster.com

Path: X:\1419.12_RFP - Medford\Projects\Figure 2-1_Aerial Photograph of Facility.mxd
Print Date: 1/31/2020
Approved By:
Produced By: mjosef
Project: 1443.03.01

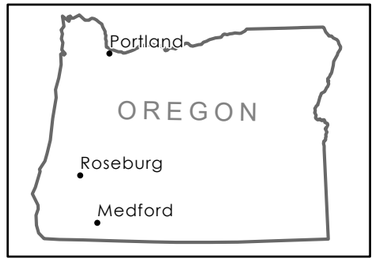
Figure 2-2
Local Topography

Roseburg Forest Products
Medford, Oregon

Legend

- Property Boundary
- UTM Grid Guideline

KEY MAP



0 290 580
Meters

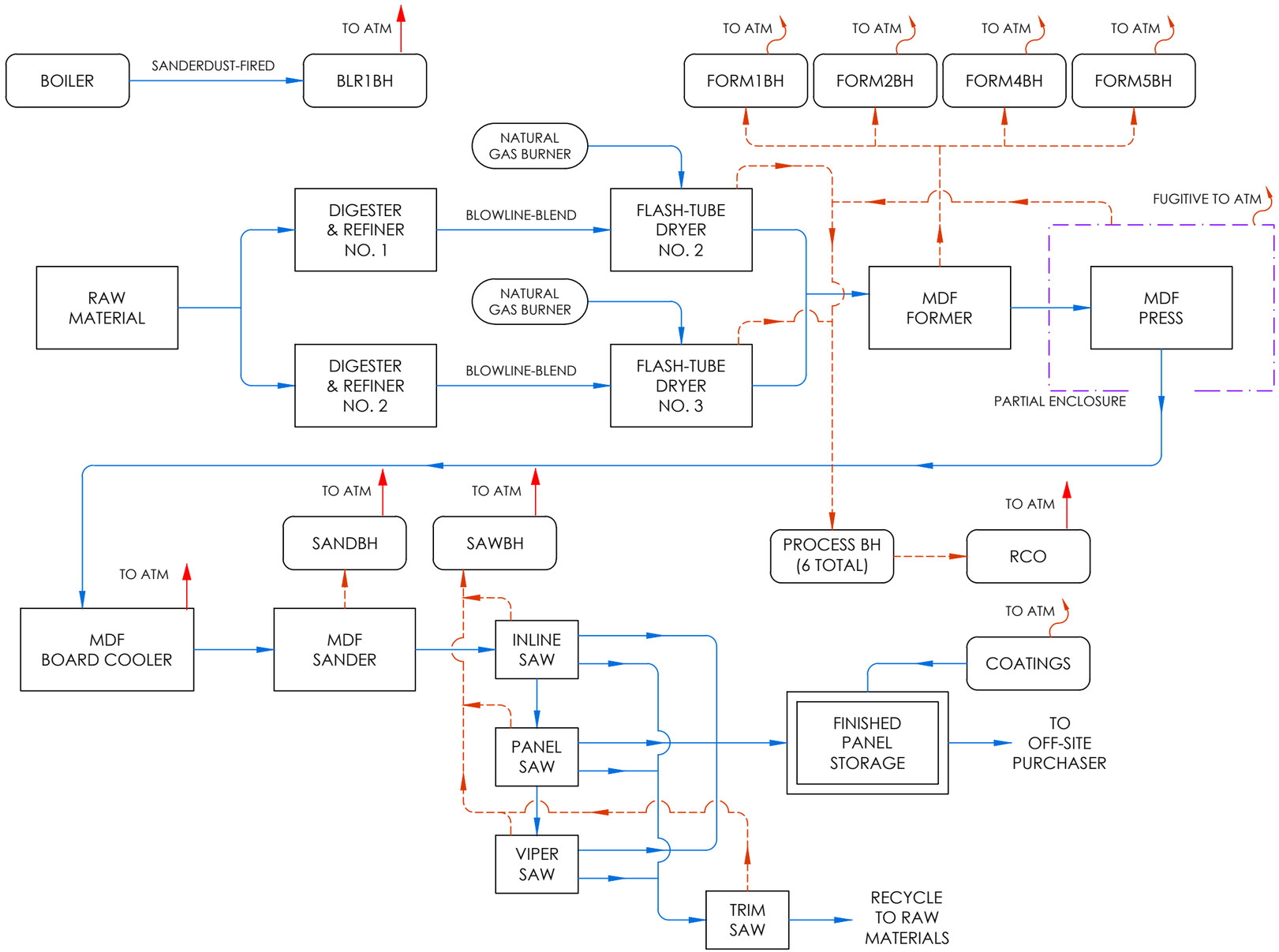
Source: Topographic map obtained from USGS.

MAUL FOSTER ALONGI
p. 971 544 2139 | www.maulfoster.com

Path: X:\1419.12_RFP - Medford\Projects\Figure 2-2_Local Topography.mxd
Print Date: 9/24/2019
Approved By:
Produced By: aguse
Project: 1443.03.01

4691500 4691000 4690500 4690000 4689500 4689000 4688500 4688000 4687500 4687000 4686500 4686000 4685500

505200 505800 506400 507000 507600 508200 508800 509400 510000 510600 511200 511800 512400 513000



Filepath:G:\00_MFA Civil 3D\00_PROJECTS\1419.12 RFP Medford\PLANS\Fig2-3_PFD.dwg

Printed by:Brian Snuffer

Date:1/30/2020 2:06:11 PM

MAUL FOSTER ALONGI
971.544.2139 (phone) | www.maulfoster.com

Legend

- PROCESS MATERIAL FLOW
- PROCESS EXHAUST
- PRESS PARTIAL ENCLOSURE
- POINT EMISSION UNIT
- FUGITIVE EMISSION UNIT

Figure 2-3
Process Flow Diagram

Roseburg Forest Products
Medford, Oregon

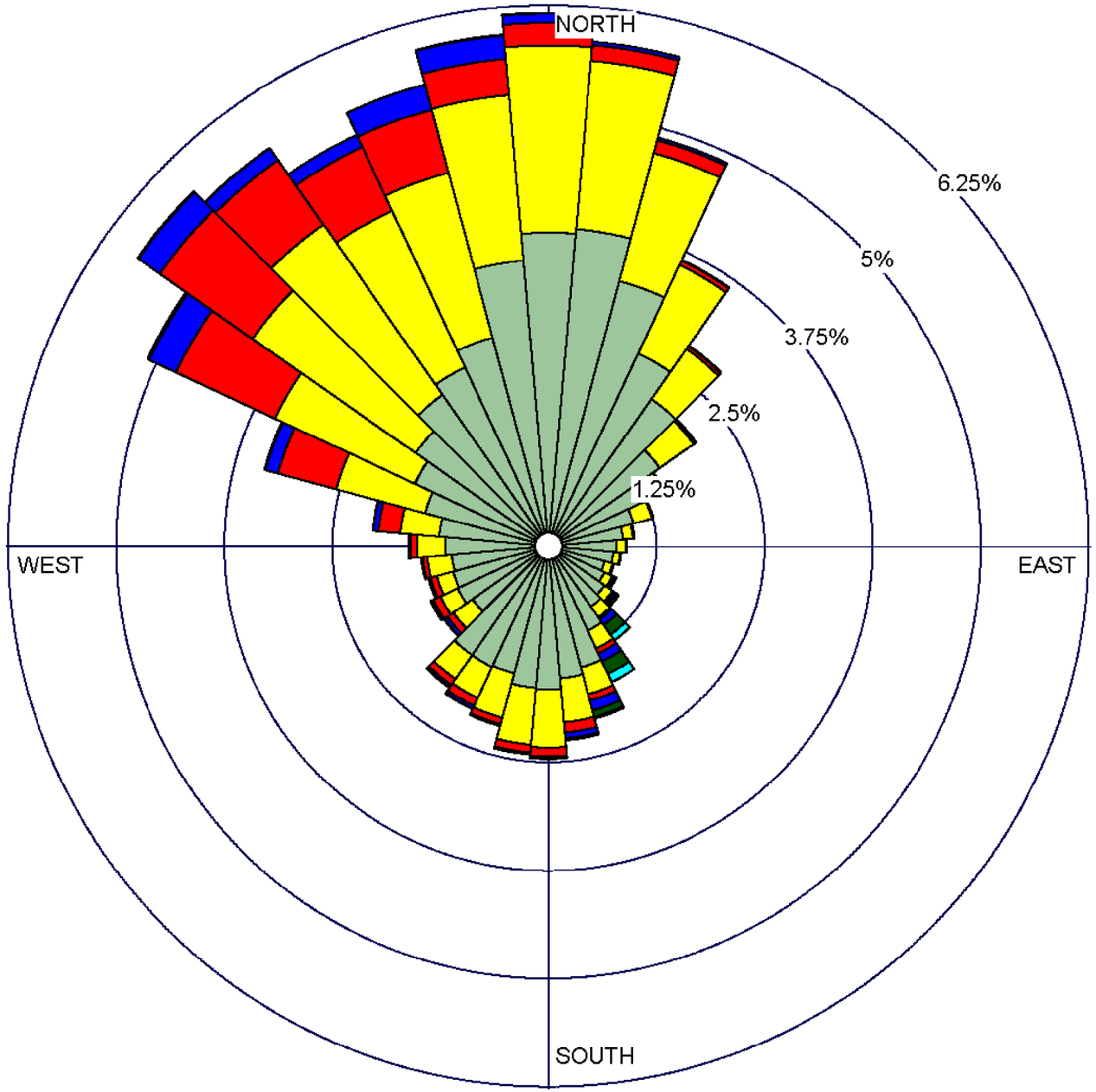


Figure 4-1
Wind Rose

Roseburg Forest Products
Medford, Oregon

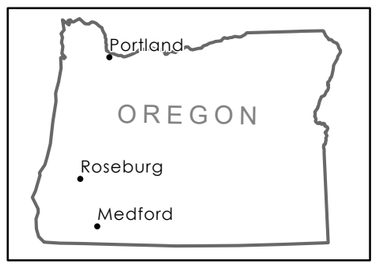
Legend

WIND SPEED
(m/s)

- >= 10.00
- 8.00 - 10.00
- 6.00 - 8.00
- 4.00 - 6.00
- 2.00 - 4.00
- 0.20 - 2.00

Calms: 1.67%

KEY MAP

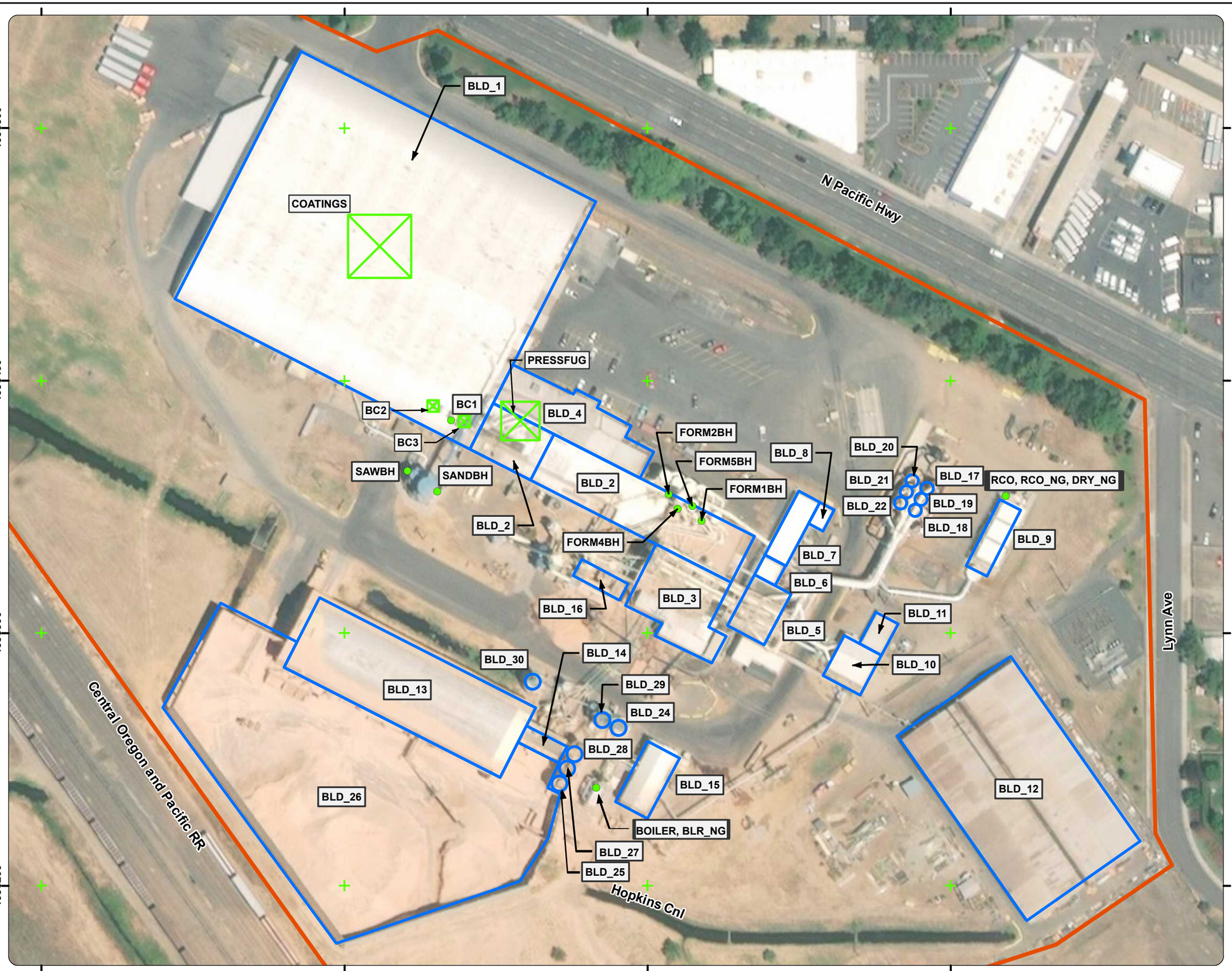


Notes:
Data from Station #24225 - Medford/Jackson Country Airport, OR, for dates 1/1/2014-12/31/2018.
Average Wind Speed = 2.23 m/s
Total number of hours = 43,724
Wind Direction = Blowing from

MAUL FOSTER ALONGI
p. 971 544 2139 | www.maulfoster.com

Figure 4-2
Downwash Structures and Emission Source Locations

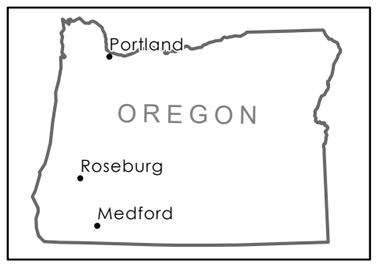
Roseburg Forest Products
Medford, Oregon



Legend

- Point Source Location
- Volume or Area Source Location
- Downwash Structure
- Modeling Boundary
- UTM Grid Guideline

KEY MAP



0 10 20
Meters

Source: Aerial photograph obtained from Esri ArcGIS Online

MAUL FOSTER ALONGI
p. 971 544 2139 | www.maulfoster.com

Path: X:\1419.12_RFP - Medford\Projects\Figure 4-2_Proposed Downwash Structures and Emission Source Locations.mxd
Print Date: 2/5/2020
Approved By:
Produced By: aguse
Project: 1443.03.01

Path: X:\1419.12_RFP - Medford\Projects\Figure 4-3_Proposed Receptor Locations.mxd

Print Date: 5/11/2020

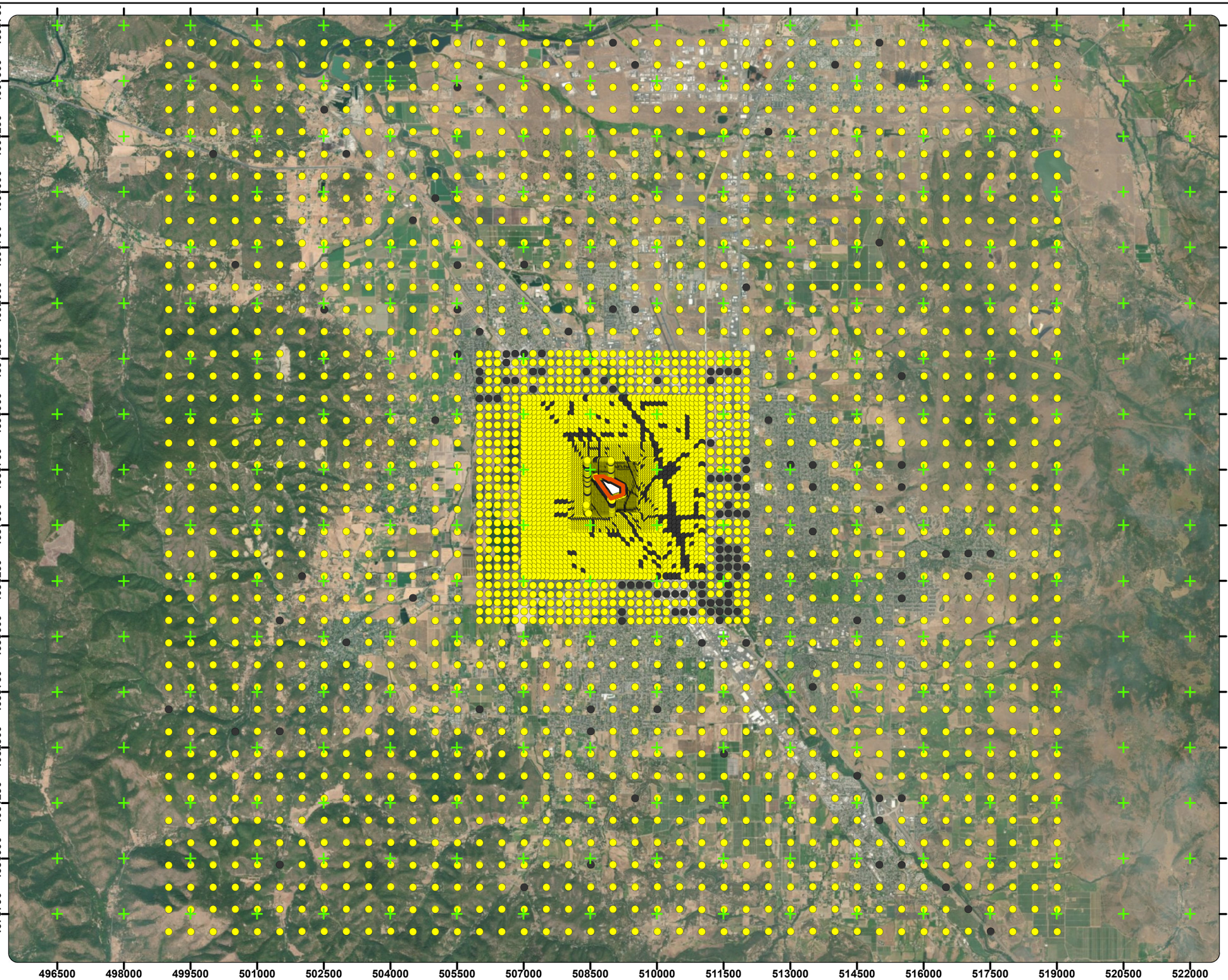
Approved By:

Produced By: agase

Project: 1443.03.01

Figure 4-3
Receptor Locations Within the Modeling Domain

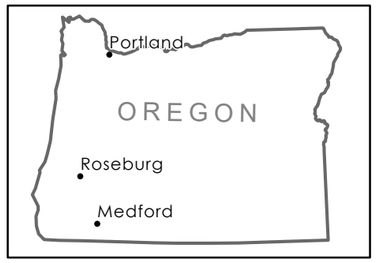
Roseburg Forest Products
Medford, Oregon



Legend

- Receptors
- Receptor in Road or Rail Right-of-Way
- Property Boundary
- UTM Grid Guideline

KEY MAP



0 1 2
Kilometers

Source: Aerial photograph obtained from Esri ArcGIS Online

MAUL FOSTER ALONGI
p. 971 544 2139 | www.maulfoster.com

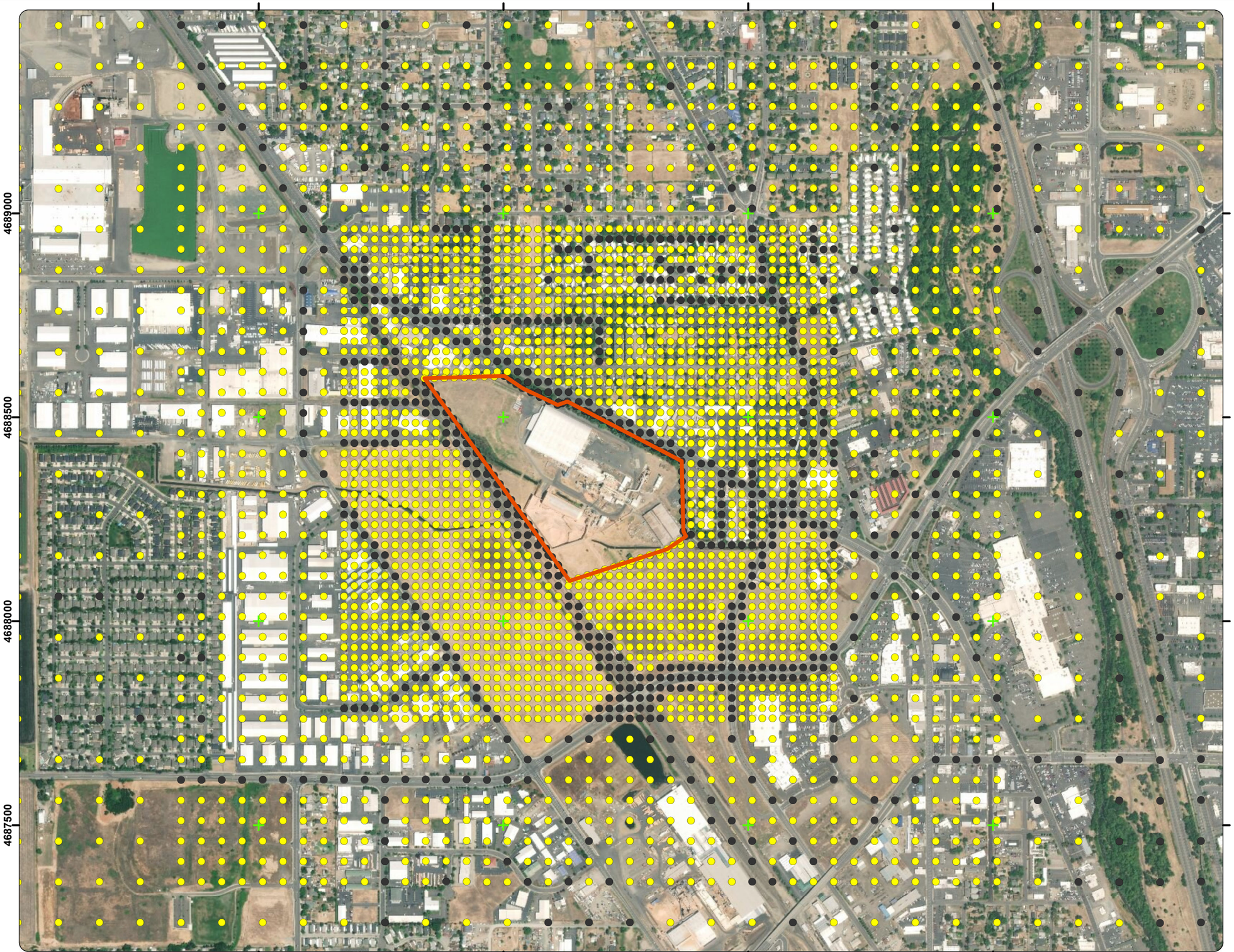


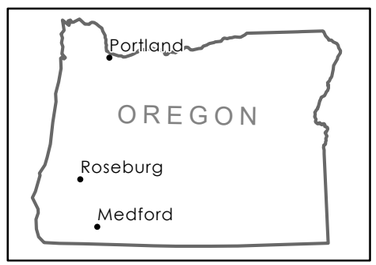
Figure 4-4
Receptor Locations in the Immediate Area

Roseburg Forest Products
Medford, Oregon

Legend

- Receptors
- Receptor in Road or Rail Right-of-Way
- Property Boundary
- UTM Grid Guideline

KEY MAP



0 110 220
Meters

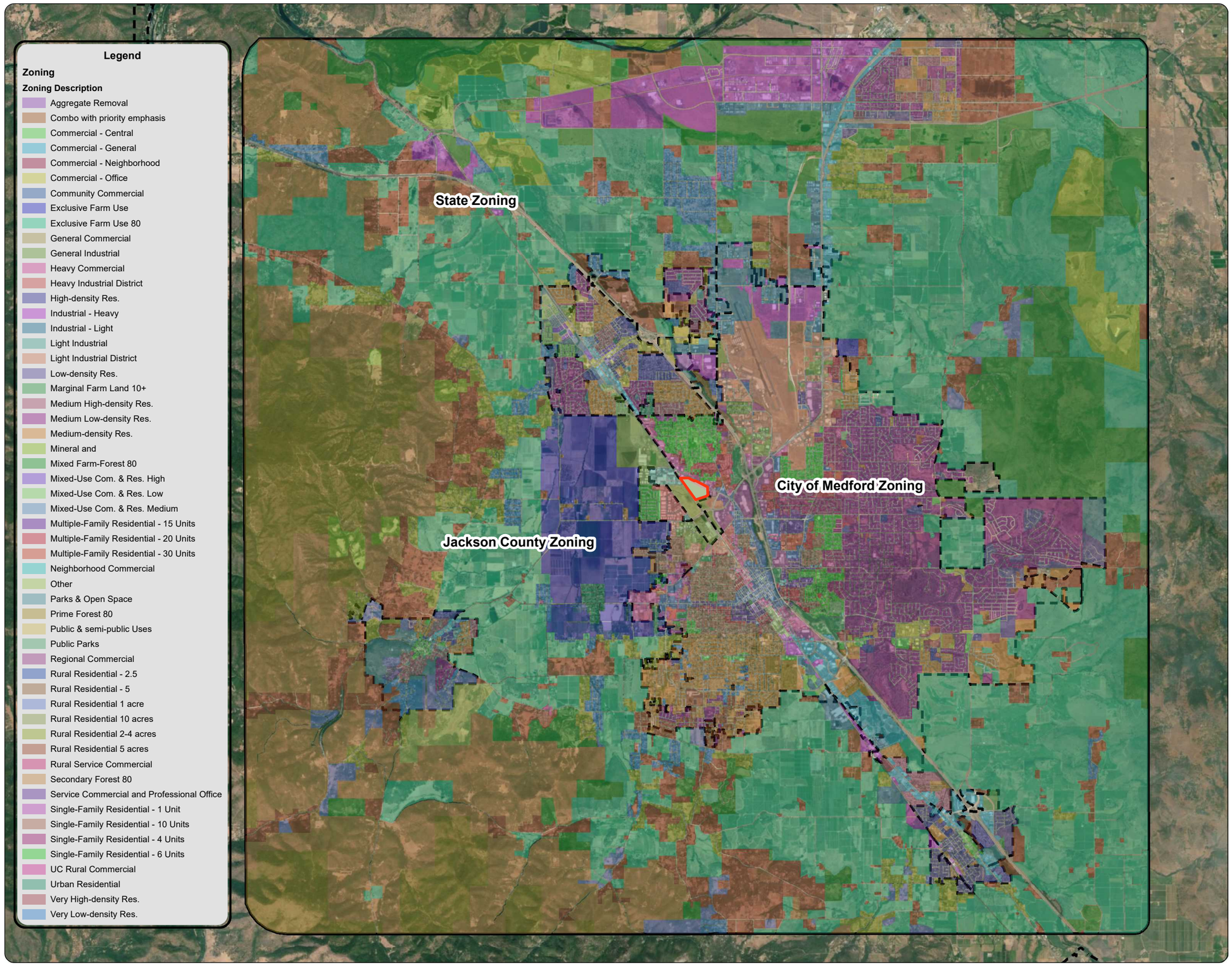
Source: Aerial photograph obtained from Esri ArcGIS Online

MAUL FOSTER ALONGI
p. 971 544 2139 | www.maulfoster.com

Path: X:\1419.12_RFP - Medford\Projects\Figure 4-4_Proposed Receptor Locations in the Immediate Area.mxd
Print Date: 5/12/2020
Approved By:
Produced By: agase
Project: 1443.03.01

Figure 4-5
Existing Land-Use Zoning Classifications

Roseburg Forest Products
Medford, Oregon



Legend

Zoning

Zoning Description

- Aggregate Removal
- Combo with priority emphasis
- Commercial - Central
- Commercial - General
- Commercial - Neighborhood
- Commercial - Office
- Community Commercial
- Exclusive Farm Use
- Exclusive Farm Use 80
- General Commercial
- General Industrial
- Heavy Commercial
- Heavy Industrial District
- High-density Res.
- Industrial - Heavy
- Industrial - Light
- Light Industrial
- Light Industrial District
- Low-density Res.
- Marginal Farm Land 10+
- Medium High-density Res.
- Medium Low-density Res.
- Medium-density Res.
- Mineral and
- Mixed Farm-Forest 80
- Mixed-Use Com. & Res. High
- Mixed-Use Com. & Res. Low
- Mixed-Use Com. & Res. Medium
- Multiple-Family Residential - 15 Units
- Multiple-Family Residential - 20 Units
- Multiple-Family Residential - 30 Units
- Neighborhood Commercial
- Other
- Parks & Open Space
- Prime Forest 80
- Public & semi-public Uses
- Public Parks
- Regional Commercial
- Rural Residential - 2.5
- Rural Residential - 5
- Rural Residential 1 acre
- Rural Residential 10 acres
- Rural Residential 2-4 acres
- Rural Residential 5 acres
- Rural Service Commercial
- Secondary Forest 80
- Service Commercial and Professional Office
- Single-Family Residential - 1 Unit
- Single-Family Residential - 10 Units
- Single-Family Residential - 4 Units
- Single-Family Residential - 6 Units
- UC Rural Commercial
- Urban Residential
- Very High-density Res.
- Very Low-density Res.

Legend

- Property Boundary
- Proposed Modeling Domain Extents
- City Limits (2018)

0 1 2
Kilometers

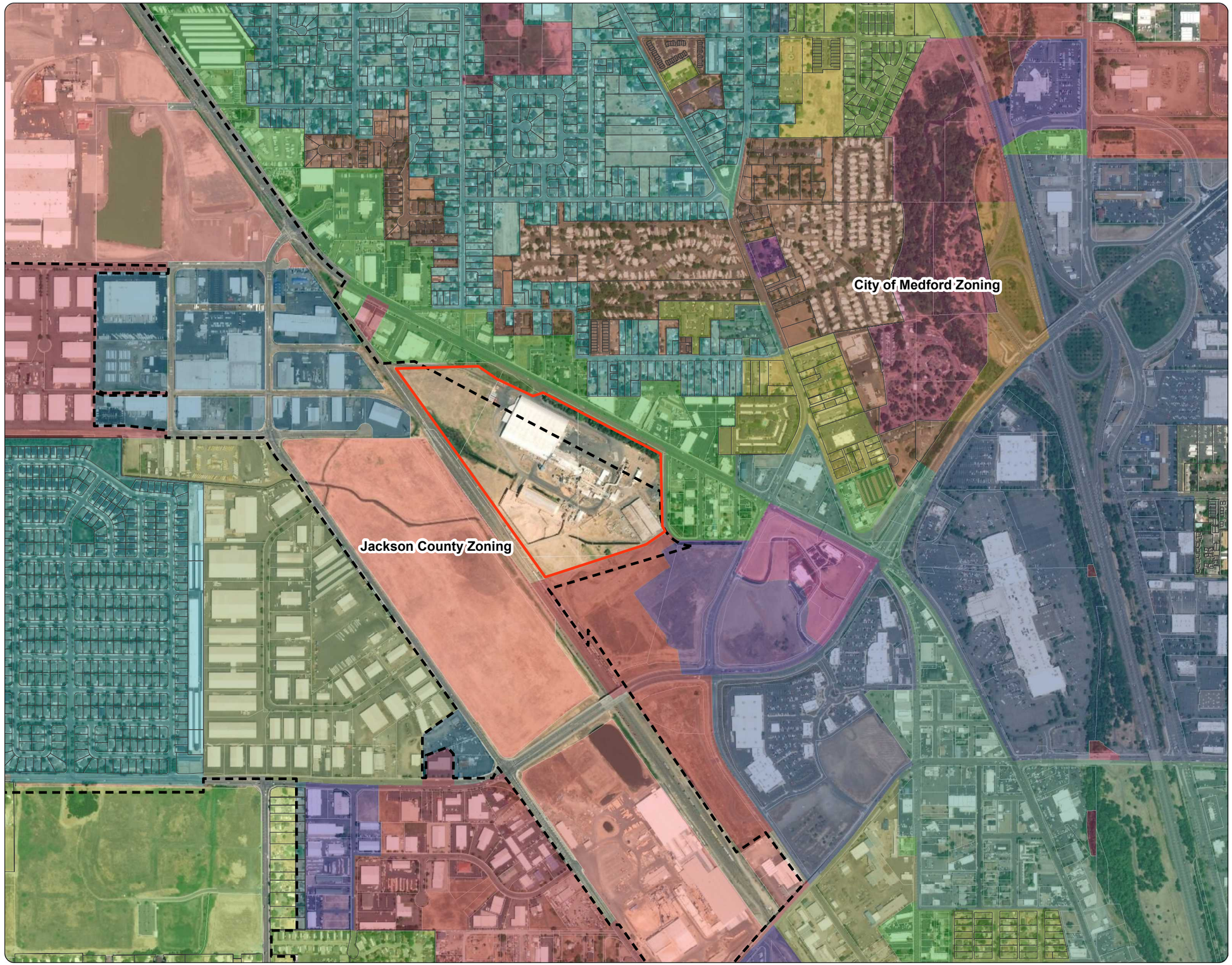
Source: Aerial photograph obtained from Esri ArcGIS Online. Parcel and road data obtained from Jackson County. Zoning comprised of City of Medford, Jackson Co., & State of Oregon data.

MAUL FOSTER ALONGI
p. 971 544 2139 | www.maulfoster.com

Path: X:\1419.12_RFP - Medford\Projects\Figure 4-5_Existing Land-Use Zoning Classifications.mxd
Print Date: 1/30/2020
Approved By:
Produced By: agase
Project:

Figure 4-6
Existing Land-Use Zoning Classifications in the Immediate Area

Roseburg Forest Products
Medford, Oregon



Legend

- Property Boundary
- City Limits (2018)
- Residential Zoned Parcel
- Parcel

City of Medford Zoning

- Community Commercial
- General Industrial
- Heavy Commercial
- Heavy Industrial District
- Light Industrial District
- Multiple-Family Residential - 20 Units
- Multiple-Family Residential - 30 Units
- Neighborhood Commercial
- Public Parks
- Regional Commercial
- Service Commercial and Professional Office
- Single-Family Residential - 1 Unit
- Single-Family Residential - 10 Units
- Single-Family Residential - 4 Units
- Single-Family Residential - 6 Units

Jackson County Zoning

- Exclusive Farm Use (EFU)
- General Industrial (GI)
- Light Industrial (LI)
- Residential

0 50 100
Meters

Source: Aerial photograph obtained from Esri ArcGIS Online. Parcel and land-use zoning data obtained from Jackson County. Zoning comprised of City of Medford, Jackson Co., & State of Oregon data.

MAUL FOSTER ALONGI
p. 971 544 2139 | www.maulfoster.com

Path: X:\1419.12_RFP - Medford\Projects\Figure 4-6_Existing LandUse Zoning Classifications Immediate.mxd
Print Date: 1/31/2020
Approved By:
Produced By: agusse
Project:

Path: X:\1419.12_RFP - Medford\Projects\Figure 4-7_Proposed Exposure Categorization.mxd

Print Date: 5/12/2020

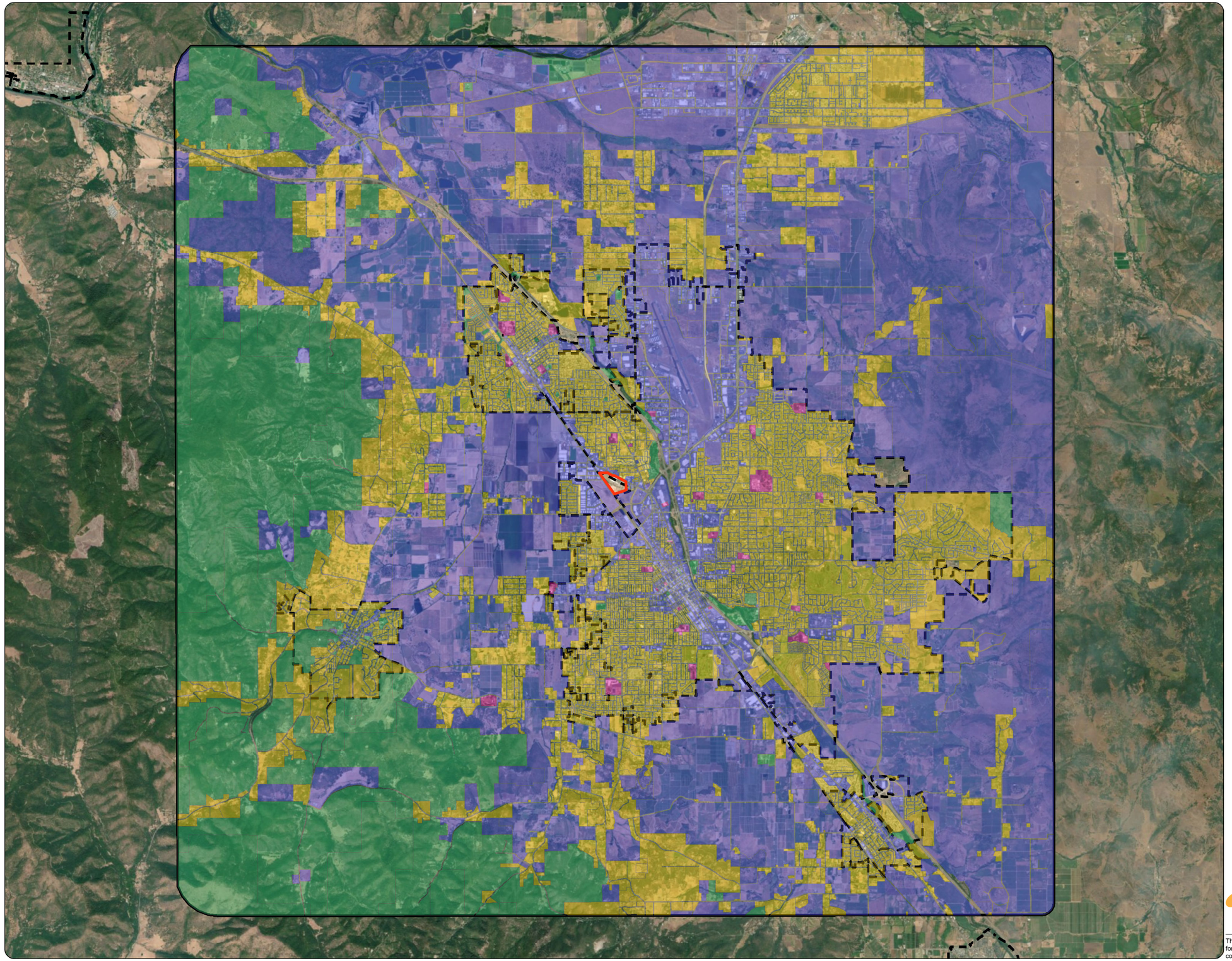
Approved By:

Produced By: agase

Project:

Figure 4-7
Exposure Categorization Within the Modeling Domain

Roseburg Forest Products
Medford, Oregon



Legend

- Property Boundary
- Modeling Domain Extents
- City Limits (2018)
- Tax Lots

Zoning

RBC Classification

- Residential (Chronic and Acute)
- Child (Chronic and Acute)
- Worker (Chronic and Acute)
- Acute Only

1. Land-use zoning data obtained from the City of Medford, Jackson County, and the State of Oregon.
2. Existing land-use zoning 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 zoning areas (e.g., interstate right-of-way) will not be assessed for cancer or noncancer risk.

0 1.5 3
Kilometers

Source: Aerial photograph obtained from Esri ArcGIS Online. Parcel and road data obtained from Jackson County. Zoning comprised of City of Medford, Jackson Co., & State of Oregon data.

MAUL FOSTER ALONGI
p. 971 544 2139 | www.maulfoster.com

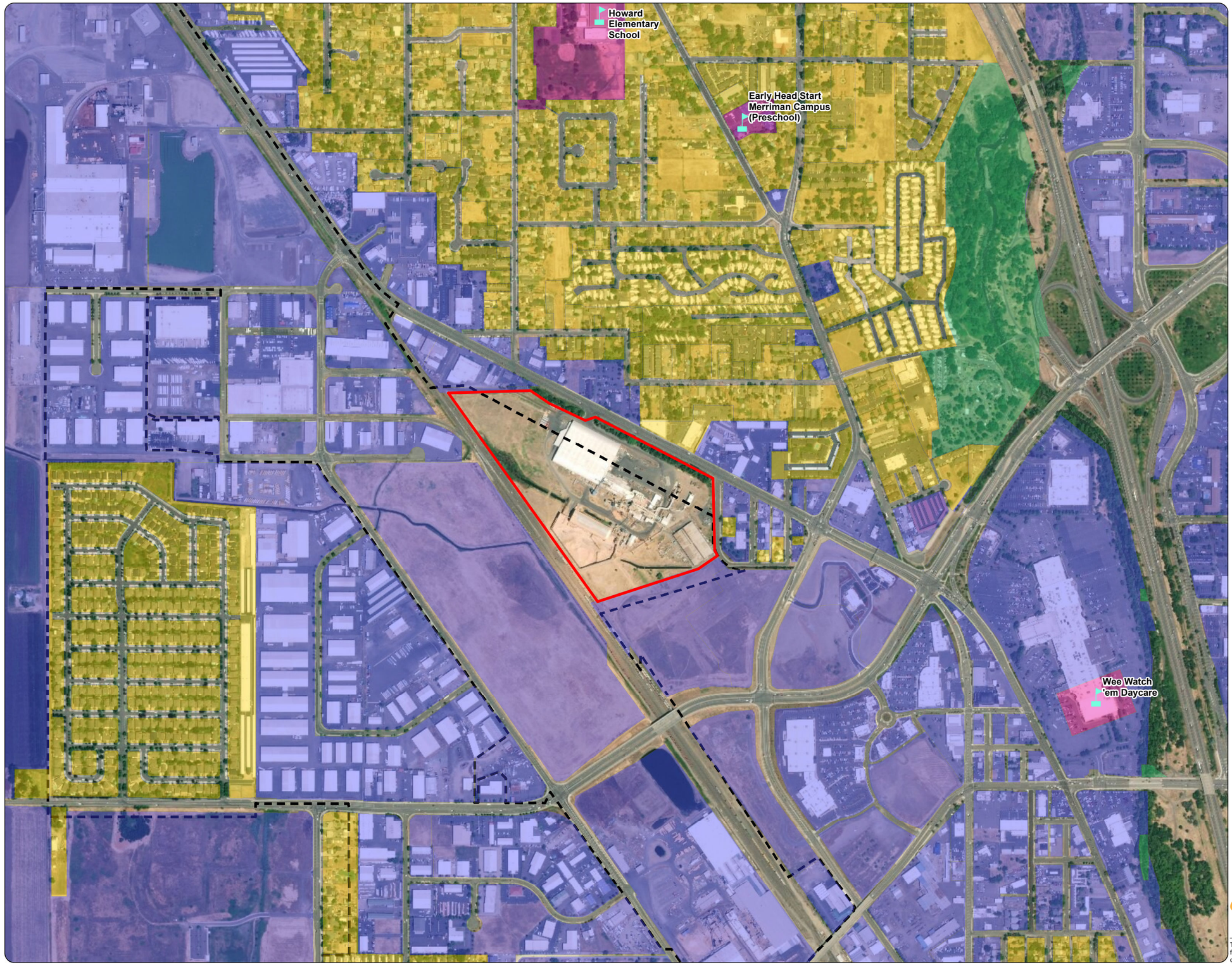


Figure 4-8 Exposure Categorization in the Immediate Area

Roseburg Forest Products
Medford, Oregon

Legend

- Property Boundary
- City Limits (2018)
- School or Daycare Location (2015-16)

Zoning
RBC Classification

- Residential (Chronic and Acute)
- Child (Chronic and Acute)
- Worker (Chronic and Acute)
- Acute Only

1. Land-use zoning data obtained from the City of Medford, Jackson County, and the State of Oregon.
2. Existing land-use zoning 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 zoning areas (e.g., interstate right-of-way) will not be assessed for cancer or noncancer risk.

0 50 100
Meters

Source: Aerial photograph obtained from Esri ArcGIS Online. Parcel data obtained from Jackson County. Zoning comprised of City of Medford, Jackson Co., & State of Oregon data.

MAUL FOSTER ALONGI
p. 971 544 2139 | www.maulfoster.com

Path: X:\1419.12_RFP - Medford\Projects\Figure 4-8_Proposed Exposure Categorization Immediate.mxd
Print Date: 5/11/2020
Approved By:
Produced By: aguse
Project: