Attachment A Topographic map of location

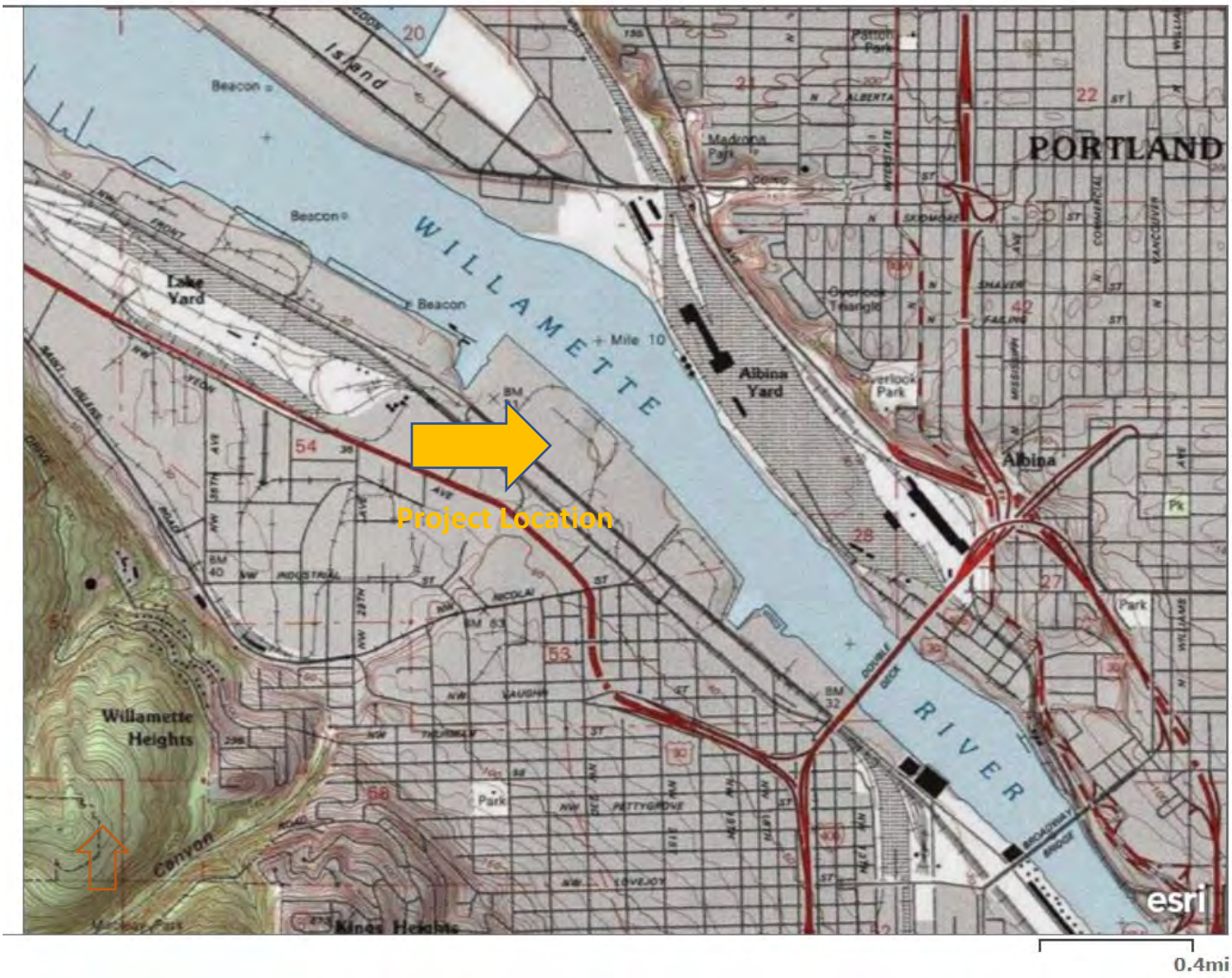


Figure 1 Topographic Map of Terminal 2

DUDEK
1 SW COLUMBIA STREET, SUITE 1500
PORTLAND, OREGON 97204
T 971.930.1700

March 5, 2022

Maureen Minister
Port of Portland
7200 NE Airport Way
Portland, Oregon 97218

Subject: Cultural Resources Risk Assessment for the Terminal 2 Mass Timber EDA Project, Portland, Oregon

Dear Ms. Minister:

Dudek has completed a cultural resources risk assessment for the Port of Portland's (the Port's) proposed Terminal 2 Mass Timber EDA Project (project). The Port's proposed Terminal 2 Mass Timber EDA project would be constructed within Terminal 2, situated in Sections 20, 21, 28, and 29 of Township 1 North, Range 1 East, Willamette Meridian. Terminal 2 straddles the west bank of the Willamette River in the City of Portland, Multnomah County, Oregon. The project proposes to develop a modular housing production facility to address the region's homeless crisis. The proposed project is situated on several Port of Portland parcels, encompassing approximately 49 acres and includes the demolition of four Port of Portland buildings within Terminal 2. Additionally, the project proposes to construct three new buildings: a modular housing manufacturing building, a workforce training building, and the University of Oregon Acoustic Laboratory building. Finally, a segment of railroad bisecting the property will be repaired and used by the project. Warehouse 205, an existing building within the proposed project footprint, was constructed more than 50 years ago (i.e., is of historic age) and will remain on the parcel; no work is planned for the building.

The proposed project would be constructed partially using grant money from the U.S. Economic Development Administration (EDA). Because federal funding would support the project, it is considered a federal undertaking and is therefore subject to compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended. The Port is acting as the responsibility entity (RE) for EDA and acting as the lead federal agency. The Port has retained Dudek to conduct a cultural resources risk assessment for the proposed project with recommendations for the project potential to affect historic properties.

Project Location

The proposed project site consists of approximately 49 acres along the west bank of the Willamette River amidst the City of Portland's Northwest Industrial Area in Multnomah County, Oregon in Sections 20, 21, 28, and 29 of Township 1 North, Range 1 East, Willamette Meridian (see Figure 1, Project Location). The area of potential effects (APE) encompasses approximately 51 acres within Terminal 2, which is zoned for heavy industrial use. The APE encompasses the following numbered parcels: R316326, R316330, R316342, R316344, and R316347, all of which are owned by the Port. The APE is bounded by Northwest Front Avenue to the southwest, the Willamette River to the northeast, parcel R315985 to the northwest, and parcel R316362 to the southeast (Figure 2).

Figure 1. Project Location.

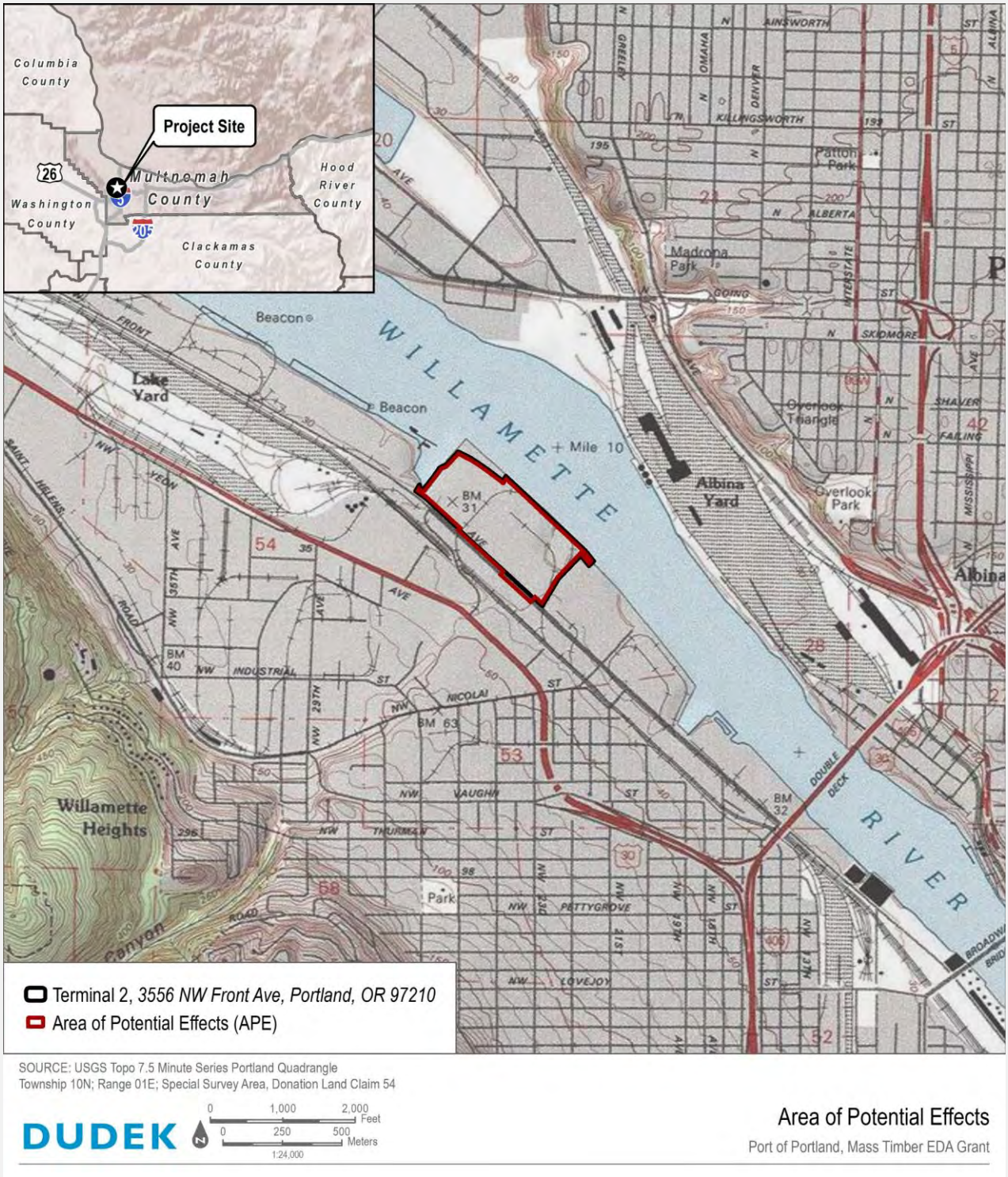


Figure 2. Project APE.

Figure 3. Project APE and Proposed Project Areas

Environmental Setting

The Project is located near the western edge of the Portland Basin, which is the northern terminus of the Willamette Valley physiographic province. The Willamette Valley is a broad structural depression between the Cascade and Coast mountain ranges that extends from the Columbia River, in the north, to Cottage Grove, in the south (Franklin and Dryness 1988:15-16; Orr and Orr 2012:186-187).

The Project APE sits on artificial fill between the west bank of the Willamette River and the Tualatin Mountains, a straight and narrow range with a sharp, fault-bonded eastern edge that separates the Portland Basin from the Tualatin Basin to the west (Madin 2009:74). Guild's Lake, an extinct crescent-shaped riparian marsh, was located immediately southwest of the Project APE. Guild's Lake was likely an oxbow of the Willamette River, fed by Balch Creek and hillside runoff from the Tualatin Mountains and linked to Kittredge and Doane Lakes. The lake encompassed approximately 250 acres and linked with the Willamette River via the underground water table (Tucker 2005:2-4).

The Willamette Valley is represented by broad alluvial flats separated by low hills (Franklin and Dyrness 1988:15). The majority of the alluvium was deposited by the late Pleistocene Missoula Floods. These floods occurred when glacial Lake Missoula repeatedly breached its ice dam, sending catastrophic floodwaters across the Channeled Scabland and down the Columbia River valley to the Pacific Ocean between 19,000 and 13,000 years before present (B.P.) (Benito and O'Connor 2003:624, 637). At constrictions in the Columbia River valley along the flood route, the flow of the floodwaters was temporarily impeded, causing ponding behind the narrowed flow channels. One such constriction at Kalama Gap, northwest of Portland, caused water to backflood south into the Willamette Valley as far south as Eugene (Minervini et al. 2003). The flood waters that ponded in the Willamette Valley reached an estimated maximum height of 400 feet above mean sea level (amsl) and swept through the gap in the Tualatin Mountains at Lake Oswego, northwesterly into the Tualatin Valley. The Project is located at 26 feet amsl and would have been affected by these flood waters (O'Connor et al. 2001:20–21).

The Urban land soil series (50A) is the only soil mapped within the Project. The Urban land soil occurs at 0% to 3% slopes along the floodplains of the Willamette River in Multnomah County, Oregon. The Urban land soil type is considerably impacted and developed with 95% of the soils covered with buildings, streets, sidewalks, parking lots, railroads, and other structures. Original soils in this area were gravelly loam, silt loam, or silty clay loam with some sandy materials. The original soils have been altered by cuts, fills, grading, and compaction from urban construction activities (Green 1983).

Cultural Setting

Precontact Period

The earliest human occupations in the Willamette Valley floodplain have been documented based on a few fluted projectile points (Allely 1975:551; Connolly 1994; Gerity 1960; Heinz 1971; Minor 1985:35; Ozbun and Stueber 2001), which are assumed to be associated with Clovis cultures defined in other parts of the Northwest Coast (Waters and Stafford 2007; Waters et al. 2011; Willig et al. 1988). Evidence of Clovis cultures has been tightly

dated to between 12,800 and 13,250 calendar year (cal yr) B.P. (Waters and Stafford 2007). Recent research has also suggested that large stemmed projectile points may be associated with populations that pre-date Clovis cultures (i.e., Wisner 1998), though none have been found near the project area. In particular, research at Paisley Caves in south-central Oregon has identified human coprolites dating to as old as 14,525 cal yr B.P., and stemmed projectile points associated with radiocarbon dates as old as 13,293–13,519 cal yr B.P. (Jenkins et al. 2014:486, 498).

The Early Archaic period has been characterized by a reliance on hunting and typified by leaf or lanceolate-shaped projectile points ("Cascade" points) (Beckham et al. 1981:165). The Early Archaic has been described as extending between 7950 and 5950 cal yr B.P., but somewhat older sites with the same characteristics have been documented, suggesting that the Early Archaic cultural period may actually have begun around 10,000 B.P. Cascadia Cave (35LIN111), situated in the Cascade foothills to the southeast, has been dated to at least 8650 cal yr B.P. and provided evidence for hunting and nut collection (Baxter 1989; Newman 1966). Extensive excavations and analysis in the Long Tom River floodplain of the Upper Willamette Valley have revealed cultural deposits dating to 10,910 cal yr B.P. at Site 35LA658 (Stamp Site), 9905 cal yr B.P. at Site 35LA439 (Long Tom Site), and 8500 cal yr B.P. at Site 35LA647 (Hannavan Creek Site) (Cheatham 1984:102; O'Neill et al. 2004:34).

Slightly younger sites representing the Middle Archaic period (5950 to 1950 cal yr B.P.) are also found in the Willamette Valley and have been well-studied. The Middle Archaic has been characterized by an increased reliance on vegetal resources and processing as well as broad-necked, stemmed projectile points (Beckham et al. 1981:167). Artifact assemblages and food resource remains suggestive of hunting, cooking, and camas processing, and the use of fruits and nuts have been documented at many sites. In the Middle Willamette Valley, the Middle Archaic is represented by the Mill Creek Prehistoric Site Complex that dates from circa 6000 cal yr B.P. and continues into the historic-period. In the Upper Willamette Valley, the Middle Archaic is represented by the Flanagan Site (35LA218) that dates to 3460 cal yr B.P., the Chalker Site (35LA420) that dates to 4610 cal yr B.P., and a component of the Long Tom Site (35LA439) (Connolly et al. 1998; Kramer 2000; Minor and Toepel 1995; Norris 2005; O'Neill et al. 2004:211; Tasa 2003; Toepel 1985).

The Late Archaic period (1950 to 200 cal yr B.P.) was a time of population growth in the Willamette Valley. This period is characterized by the shift from dart to arrow projectile point technology, narrow-necked projectile points, evidence of trade, and changes in mortuary practices (Aikens 1993:142; Beckham et al. 1981:170). Mound sites are a relatively unique feature of the Willamette Valley found particularly along the Calapooia River (Roulette 2006). These sites have been mostly lost due to relic hunters, agriculture, and construction activities, but mounds that have been studied represent midden deposits and tend to date to the Late Archaic. Most of the well-studied archaeological sites in the Willamette Valley and Cascade foothills either date to the Late Archaic or have components that fall in this period.

Ethnographic Period

The Kalapuya occupied almost all of the Willamette Valley and were divided into 13 bands or "tribes" at the time of Euroamerican contact. The project is mapped as being within the traditional territory of the Tualatin/Atfalati band of the Kalapuya and the Multnomah of the upper Chinookan-speaking peoples of the Columbia River system, with the Yamhill and Ahanfchuyuk bands of the Kalapuya nearby and to the south (Aikens 1993:186; Aikens et al. 2011:285; Mackey 2004:12; Zenk 1990:548, 552). The area in the vicinity of the project was likely utilized by both the Tualatin and Multnomah peoples for hunting and seasonal gathering (Silverstein 1990). The Kalapuyans were

linked by ties of language and culture, but each band and its component village groups was politically independent. The population of individual Kalapuyan bands is uncertain. Boyd (1990) estimated that there were about 16,000 Kalapuyans prior to the onset of European diseases in the late eighteenth century and about 8,500 at the time of the Lewis and Clark Expedition (1805–1806).

During the winter months, the Tualatin—like other Kalapuyan bands—occupied permanent villages on the major tributary systems of the Willamette River, around the shores of lakes and other wetlands, and on prairies. The villages consisted of clusters of rectangular houses occupied by one or more families. The house walls were banked on the outside with dirt to provide additional insulation, and the floors were excavated to a depth of 2–3 ft (Jacobs 1945:39; Zenk 1990:548–549).

During the drier part of the year, families moved out of the villages and lived in temporary camps near resource-gathering areas; these temporary camps were often nothing more than shelters in a grove of trees or brush windbreaks (Zenk 1990). Western red cedar was used for house planks, posts, beams, and canoes, wherever available, and western hemlock and Douglas fir saplings were used for poles and weirs. Red alder was used for utensils and dishes and vine maples were used for small tools (Suttles 1990:24).

The most important vegetable resources to the Kalapuya were camas, tarweed, and wapato. The Kalapuya burned the grasslands every year to maintain an open environment, a practice that was probably started thousands of years earlier and created the prairie and oak savanna that was characteristic of the valley (Aikens et al. 2011:285; Beckham 1977). Other secondary plant resources gathered by the Kalapuya included hazelnuts and various berries. Game resources used by the Kalapuya included small mammals, black-tailed and mule deer, elk, and black bear. Other live foods included lamprey, grasshopper, and certain types of caterpillar. Grasshoppers were gathered from the burned-over prairies, and caterpillars were either pit-roasted or boiled (Zenk 1976, 1990:548).

The Multnomah, an upper Chinookan-speaking tribe, occupied areas along the Columbia River from Government Island to the mouth of the Lewis River. Multnomah villages were located along the Columbia, Willamette, and Clackamas Rivers, with a large permanent village on Sauvie Island, situated approximately 7 miles northwest of the project. Permanent winter villages were comprised of multiple semi-subterranean and oblong-shaped houses constructed of upright cedar planks with gabled roofs. Temporary camps near resource-gathering areas were utilized between the spring and fall and constructed of cattail mats or cedar bark (Ames and Sobel 2013; Hajda 1994; Silverstein 1990).

The most important vegetable resources to the Multnomah were wapato and camas. Other secondary plant resources gathered by the Multnomah included aquatic plants, roots, and various berries. Game resources cultivated by the Multnomah included salmon, steelhead, sturgeon, deer, elk, black bear, rabbit, beaver, and cougar (Aikens et al. 2011; Drucker 1934; Juntunen et al. 2005; Zenk 1976, 1990; Zenk and Rigsby 1998).

Historic Period

Beginning in the early 1840s, The Willamette Valley was one of the primary Pacific Northwest destinations for Euroamerican settlers that crossed the continent on the Oregon Trail. The Tualatin Plains, open pastures crisscrossed by creeks and cleared by annual burns conducted by native groups, was an attractive area to early settlers for farming and had relatively easy access to the markets at Oregon City and the fast-growing community of Portland (Bassett et al. 1998: np).

Prior to Euroamerican settlement of northwest Portland, the area in the vicinity of the project comprised a riparian wetland wedged between the west bank of the Willamette River and the Tualatin Mountains. Guild's Lake, an extinct crescent-shaped marshy oxbow lake was located immediately southwest of the APE. In 1847, Peter and Elizabeth Guild (pronounced *guile*) claimed 598 acres of the wetland area in northwest Portland under the Donation Land Act. Guild's Lake, named after Peter and Elizabeth, occupied nearly half the acreage claimed by the Guild family. By the end of the nineteenth century, ownership of the property transferred to Guild's nine children and portions of the land were leased to Chinese farmers, dairies, and a city refuse incinerator (Dibling et al. 2006).

Early industrialization of northwest Portland included lumber mills, grain storage, railroads, and docks. In the 1880s the Northern Pacific Railroad constructed the Guild's Lake Rail Yard which operated as a major switching facility for several of the city's railroads (Portland Bureau of Planning 2001). A segment of the Northern Pacific Railroad was located directly southwest of the APE as early as 1897, and the rail yard became fully developed by 1956 (NETRa 2022:np; NETRb 2022:np).

By 1903, Guild's Lake was chosen as the setting for the 1905 Lewis and Clark Exposition. To prepare for the Exposition, city contractors flattened slopes and deepened the lake by damming its outlet and pumping in water from the Willamette River. Additionally, silt dredged from the Willamette was used to create an artificial island in the center of the lake. From June 1 to October 15, 1905, nearly 1.6 million people visited the Lewis and Clark Exposition. The Exposition featured several exhibition halls constructed in a Spanish-Renaissance style including the U.S. Government Building, which was built on a natural peninsula on the lake and accessed via a boat or pedestrian walking bridge (Dibling et al. 2006; Portland Bureau of Planning 2001; Tucker 2005). The Exposition proved successful and provided a significant boon to the local economy and growth of the city. At the close of the Exposition, land developers sought to further industrialize northwest Portland and began filling Guild's Lake with sediment sluiced from the Tualatin Mountains and dredged from the Willamette River. By the mid-1920s the Port of Portland completed the filling of Guild's Lake and northwest Portland quickly became the city's preeminent industrial area (Portland Bureau of Planning 2001; Tucker 2005).

Port of Portland

The Port of Portland Commission was established in 1891 with an objective to develop Portland into a major West Coast port. Initially, the Port operated under a board of fifteen commissioners appointed by the state legislature, with former Portland mayor William S. Ladd serving as the commission's first president. In 1932 commissioners were directly elected and by 1935 they were appointed to the board by the governor. The federal Rivers and Harbors Act of 1912 established formal cooperation between the Port and the U.S. Army Corps of Engineers in maintaining and deepening the navigation channel from Portland to the Pacific Ocean (Abbott 2018).

The independent Commission of Public Docks was established in 1910 in response to public concern over a private corporation and railroad monopoly of the city's waterfront property. By 1920, the Commission of Public Docks had constructed or acquired four shipping terminals that facilitated a near doubling of the tonnage of imports and exports through the city from 2.5 million to 4.5 million tons (MTMP 2020; Port of Portland 1991). Terminal 1 encompasses approximately 43 acres and is the Port's oldest maritime shipping terminal. The property was acquired in 1912 and operational by 1913. The upstream portion of the terminal is currently designated for nonmarine use. Terminal 2 (the project area) is a cargo/container facility encompassing 49 acres along the left bank of the Willamette River. The terminal property was acquired through two separate purchases in 1949 and 1953 from the U.S. War Assets Administration and the West Coast Terminal Company (Oceanic Terminal). The Port modernized the U.S. War Assets Administration in 1968 property using a $12.5 million general obligation bond

measure. In 1984, the Oceanic Terminal property was modernized with a $40 million general obligation bond measure (MTMP 1990).

In 1915, the Commission of Public Docks acquired public dock property from St. Johns and renamed the property Terminal 3. Unlike Terminal 1 and 2, Terminal 3 lacked rail facilities, electrical power, and water connections. Used primarily as a storage facility, Terminal 3 was ultimately donated to the City of Portland in 1929 to facilitate the construction of the St. Johns Bridge (MTMP 2020). Terminal 4 was acquired in 1917 with an initial purchase of 117.35 acres. Presently, Terminal 4 encompasses 283 acres and primarily handles grain, breakbulk cargoes (steel and lumber), logs, mineral bulks, liquid bulks, and automobiles (MTMP 1990).

Background Research

Records from the Oregon State Historic Preservation Office (SHPO) Oregon Archaeological Records Remote Access (OARRA) database and the Oregon Sites Database (OSD) for built environment resources were reviewed to determine if cultural resources have been previously recorded in or near the proposed project area and to determine if any cultural resources surveys have been conducted in the vicinity. Historic maps and aerial photography were also examined to determine the likelihood for prehistoric or historic resources to present in the area.

A total of nine cultural resources studies have been conducted within 1 mile of the APE, two of which include areas within the APE (Table 1). No resources were identified within the APE. Two surveys identified resources within 1 miles of the APE (Table 2).

Eighteen built environment resources have been previously been conducted within 0.5 miles of the APE. One resource, Terminal 2, was previously recorded in the APE (Table 3). A total of 17 built environment resources were previously recorded within 0.5 miles from the APE (Table 4).

Previous Cultural Resources Investigations

There are two previous cultural resources investigations overlapping with the Terminal 2 Mass Timber project area. There have been 9 cultural resources investigations within 1 mile of the project area (Table 1). Five of the previous investigations were conducted for utilities including natural fiber optics and telecommunications facilities. Two of the previous investigations were conducted for road improvement projects, including a Master's thesis designed to provide the Oregon Department of Transportation (ODOT) with an archaeological predictive model and project-planning tool. One of the previous investigations was conducted for a streambanks restoration project. One of the previous investigations was conducted to study historical Oregon National Guard encampments.

Table 1. Previous Cultural Resources Studies Within 1 Mile of the Project Area

SHPO Report No.	Year	Author(s)	Report Title	Work Conducted	Distance, Direction from Project Area
15865	1996	Ricks, Julie and White, Laura	HRA Letter Report 96-45: Cultural Resources Survey of Four Portland Area	Pedestrian survey	0.9 mile southwest

Table 1. Previous Cultural Resources Studies Within 1 Mile of the Project Area

SHPO Report No.	Year	Author(s)	Report Title	Work Conducted	Distance, Direction from Project Area
			Watersheds, Portland, Oregon		
17115	1999	Ellis, David, Judith Chapman, and John Fagan	Cultural Resources Reconnaissance Survey and Inventory of the Portland Segment of Level 3's Proposed Fiber Optic Line From Portland, Oregon to Seattle, Washington	Literature review, pedestrian survey	Passes through the southwest edge of the APE
17215	2000	Murphy, Laura, Dennis Lewarch, Leonard, Forsman, Michael Madson, David Iversen, and Lynn Larson	Fiber Optic Line Between Portland and Seattle Cultural Resources Assessment Clark, Cowlitz, Lewis, Thurston, Pierce and King Counties, Washington and Multnomah County, Oregon	Literature review, pedestrian survey	0.5 mile east. East bank of the Willamette River
17257	2000	Iversen David, Laura Murphy, Leonard Forsman, Lynn Larson, and Jason Cooper	Field Reconnaissance of Alternate Routes for the Proposed Fiber Optic Line Between Portland and Seattle Project Cowlitz County, Washington and Multnomah and Columbia Counties, Oregon	Literature review, pedestrian survey	Bisects the southwest portion of the APE
24021	2010	Hale, Jessica and Aimee Finley	Archaeological Resources Study of Six 2009 ITS Rural and Urban Improvement Work Areas, Clackamas, Clatsop, Multnomah, and Washington Counties, Oregon	Literature review, pedestrian survey	0.4 mile south
26416	2014	Finley, Aimee	Results of a Cultural Resources Inventory of the POR Swan Island Cell Site,	Literature review, pedestrian recon	0.9 mile northwest. East bank of the Willamette River

Table 1. Previous Cultural Resources Studies Within 1 Mile of the Project Area

SHPO Report No.	Year	Author(s)	Report Title	Work Conducted	Distance, Direction from Project Area
			Portland, Multnomah County, Oregon		
28723	2017	Larson, Jeffery and Mark Carpenter	Historic Properties Inventory and Documentation for the Union Pacific Railroad Port.OR.29 Communications Tower Multnomah County, Oregon	literature review, pedestrian recon	0.9 mile southeast. East bank of the Willamette River
30271	2003	Kachadoorian, Lydia	A Preliminary Archaeological Predictive Model for the US 30 Transportation Corridor, Portland, Oregon to Astoria, Oregon	Literature review	0.2 mile south
30747	2017	Griffin, Dennis	Archaeology of the Oregon National Guard: A Search for Archaeological Evidence of Early Military Encampments in Oregon	Literature review	0.7 mile southwest

Notes: SHPO = State Historic Preservation Office

Previously Recorded Archaeological Resources

There are no previously recorded archaeological resources that are within the project area. There are two resources within 1 mile of the project area (Table 2).

Site 35MU123 (Greeley Shaft) is a historic debris scatter dating from 1920 to 1940. The historic site is 0.6 miles northeast of the project area (Minor 2005).

Camp Sacajawea is a historic Oregon National Guard temporary encampment dating from May 15—October 19, 1905. The historic site is 0.7 miles southwest of the project area (Griffin 2017).

Table 2. Previously Recorded Archaeological Sites within 1 Miles of the Project Area

Site Name or Number	Site Type	Distance, Direction from Project Area	SHPO Report No.	Year	Author(s)	NRHP Status
35MU123 (Greeley Shaft)	Historic debris scatter	0.6 mile northeast	Wrong report uploaded to SHPO	2005	Minor, Rick	N/A
Camp Sacajawea	Oregon National Guard Temporary Encampment	0.7 mile southwest	30747	2017	Griffin, Dennis	N/A

Notes: SHPO = State Historic Preservation Office; NRHP = National Register of Historic Places

Previously Recorded Built Environment Resources within the APE

The Oregon Historic Sites Database lists one built environment historic resource within the Terminal 2 Mass Timber Project APE (Table 3). Terminal 2 (also referred to in the evaluation as Municipal Terminal 1) was evaluated as an eligible/contributing resource in c. 1981. The survey focused on a building and dock that historically were located on the north side of the current Terminal 2 Property. This building and dock alignment are no longer extant. No other previously recorded buildings or structures are located within the APE.

Table 3. Previously Recorded Built Environment Resources Within the APE

Resource ID	Name	Year Built	Address	Resource type	NRHP Listing
50285	Municipal Terminal #1	c. 1929	3530 NW Front Avenue	Building	Eligible/Contributing

Notes: NRHP = National Register of Historic Places

Previously Recorded Built Environment Resources within Approximately 0.5 miles of the APE

The Oregon Historic Sites Database lists 17 aboveground historic resources within 0.5 miles of the APE (Table 4). One building, the Pacific Hardware and Steel Company Warehouse (55999), was listed on the National Register of Historic Places in 2008.

Eight buildings were previously inventoried and recommended eligible for listing in the NRHP. The Helser Machine & Marine Works building (50692) was recommended Eligible/Contributing and is located 0.3 miles southeast of the APE. The Chase Bag Company (52638), located at 3710 NW Front Avenue, is first visible on the 1981 aerial of the area and remains in the same orientation today. The building is adjacent to Terminal 2, 0.2 miles from the APE. The U.S. Department of Agricultural Forest Service Equipment Depot (53678) also appears in the same orientation today and was recommended eligible/contributing for the NRHP. The building sits 0.1 miles southwest of the APE. The Heracles Powder Company Chemical Tanks (53688) is listed as an eligible/contributing resource 0.3 miles

west of the APE. The Fuller, W. P., Paint Company Building's (53686) appears to remain today. The building sits 0.2 miles west of the APE.

Preliminary research suggests that several have been demolished since these evaluations. The Portland Electric & Power Station E. Steam Plant (51965) no longer is visible on aerials after 2000. The location is 0.2 miles southeast of the APE. The Northern Pacific Railroad Roundhouse (53689) and the Northern Pacific Railroad Turntable (53690) are no longer visible after 1990 (NETR 2022a). Historically, they were located at 3500 NW Yeon Avenue, 0.4 miles west of the APE.

Several buildings within 0.5 miles of the APE were identified but remain undetermined. The following building are undetermined: the Factory Warehouse (54094), located 0.4 miles west of the APE; the Port Center Plaza (51632), located on the north side of the Willamette River 0.5 miles from the APE; the Willamette Iron & Steel Works (51966), adjacent to the southeast of the APE, 0.1 miles; and the Crown Zellerbach, Central Engineering Offices (51969), located 0.1 miles northwest of the APE.

The Fremont Bridge (51968) is listed as Undetermined and is shown adjacent to Terminal 2, but this is a mapping error, as the bridge is approximately 1.0 mile southeast of Terminal 2.

The Wolfman Building (658136) shows on the map as just across Front Avenue directly across from the APE. The building was determined as not eligible/not contributing to the South Portland Historic District. This resource appears to be incorrectly mapped, as the boundaries of the district are south of Downtown, several miles from the Project APE. Likely the streets name change, from Front Avenue to Naito Parkway, facilitated this mapping error.

The Woodbury & Company Warehouse (49411), once located at 2262 NW Nicolai Street, was demolished.

Finally, the United States Steel Corporation and Office & Warehouse (49411), located at 2345 NW Nicolai Street, just 0.2 miles from the APE was delisted from the NRHP in 1994.

Table 4. Previously Recorded Built Environment Resources Within Approximately 0.5 Miles of the Project Area

Resource ID	Name	Year Built	Address	Resource type	NRHP Listing
55999	Pacific Hardware and Steel Company Warehouse	1911	2181 NE Nicolai Street	Building	Listed 12/31/2008
51965	Portland Electric & Power Station E. Steam Plant	1904	2635 NW Front Avenue	Building	Eligible/Contributing
53689	Northern Pacific Railroad Roundhouse	c. 1925	3500 NW Yeon Avenue	Building	Eligible/Contributing
53690	Northern Pacific Railroad Turntable	c. 1925	3500 NW Yeon Avenue	Building	Eligible/Contributing
54094	Factory/Warehouse	1973	3275 NW 29th Avenue	Building	Undetermined

Resource ID	Name	Year Built	Address	Resource type	NRHP Listing
658136	Wolfman, A., Building	c. 1952	3223 SW Front Avenue	Building	Not Eligible/Non-Contributing (Listed in Historic District)
50692	Hesler Machine & Marine Works	1926	2401-2415 NW 22nd Avenue	Building	Eligible/Contributing
49411	US Steel Corporation and Office & Warehouse	1927	2345 NW Nicolai Street	Building	Delisted
51632	Port Center Plaza	1972	4555 N. Channel Avenue	Building	Undetermined
51966	Willamette Iron & Steel Works	No date	2800-2860 NW Front Avenue	Site	Undetermined
51968	Fremont Bridge	1971	3600 NW Front Avenue	Structure	Undetermined
51969	Crown Zellerbach, Central Engineering Offices	1974	3710 NW Front Avenue	Building	Undetermined
52638	Chase Bag Company	1940	3710 NW Front Avenue	Building	Eligible/Contributing
53686	Fuller, W. P., Paint Company	c. 1923	2526-2532 NW Yeon Avenue	Building	Eligible/Contributing
53678	US Department of Agricultural Forest Service Equipment Depot	1935	2760 NW Yeon	Building	Eligible/Contributing
53688	Heracles Powder Co Chemical Tanks	1956	3366 NW Yeon Avenue	Building	Eligible/Contributing
52637	Woodbury & Company Warehouse	1939	2262 NW Nicolai Street	Building	Demolished

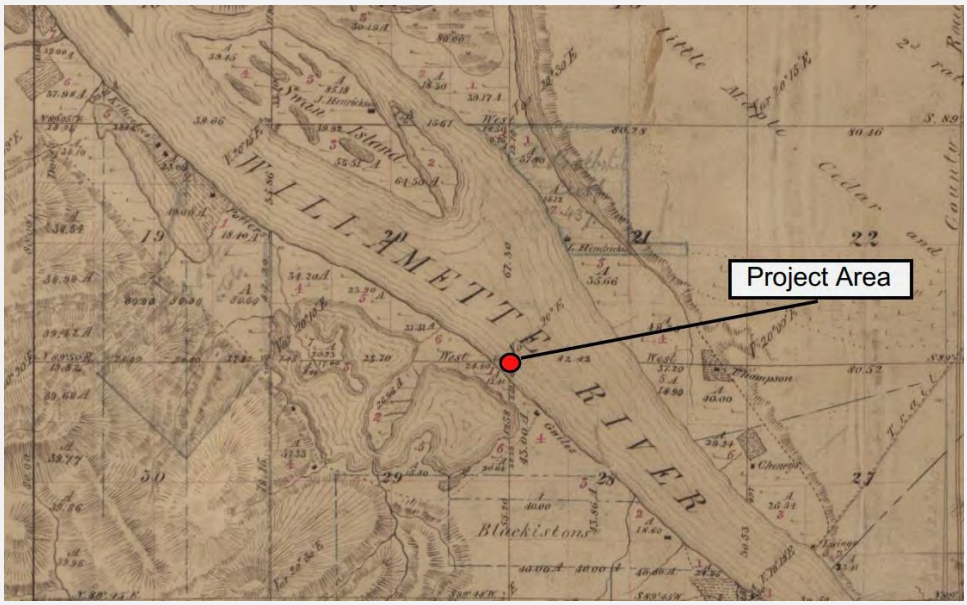
Land Development within the Project APE

The 1852 General Land Office (GLO) map for the area shows the APE in the Willamette River and the surrounding areas as undeveloped wetland. In 1852, the APE and 598.06 acres of the surrounding areas were claimed by Peter and Elizabeth Guild. The only other 1852 claim in the vicinity of the project was 199.59 acres awarded to William Blackston. Mr. Blackston's claim was approximately 1 mile south of the project area (GLO 1852). In 1865, the area near the project remained undeveloped. The 1865 GLO map shows three claims approximately 1 to 2 miles south of the APE: 345.93 acres to the heirs of Dunford Balch, 640 acres to Caroline Couch and the heirs of John H. Couch, and 535.6 acres to Amos and Malinda King (GLO 1865).

In 1897, the APE was located in the Willamette River and a segment of the Northern Pacific Railroad was located directly southwest of the project area (NETRa 2022: np). In 1905, two docks were constructed within the project area and the infrastructure for the Lewis and Clark Exposition is visible in Guild's Lake to the southwest (NETRc 2022: np). By 1951, the area around the project was significantly developed by NW Front Avenue, the Portland Lake Yard, and Yeon Avenue to the southwest. Water tanks and warehouses are visible to the southeast and oil tanks, an oil refinery, and chemical tanks are visible to the northwest. Additionally, dredge spoils are visible in the Willamette River approximately 0.44 miles northwest of the project area. Finally, the Terminal 2 structure comprising the project area and APE is largely present by 1951 (NETRd 2022: np).

The development of the northwest Portland industrial area viewed through historic maps suggests the project area and APE were constructed with artificial fill dredged from the Willamette River between 1957 and 1986 (Exhibits 1-8).

Exhibit 1. 1852 GLO Map, showing the Project Area



Source: Bureau of Land Management, General Land Office.

Exhibit 2. 1937 aerial of Terminal 2

Source: 1937 Aerial of Terminal 2. On file with Port of Portland

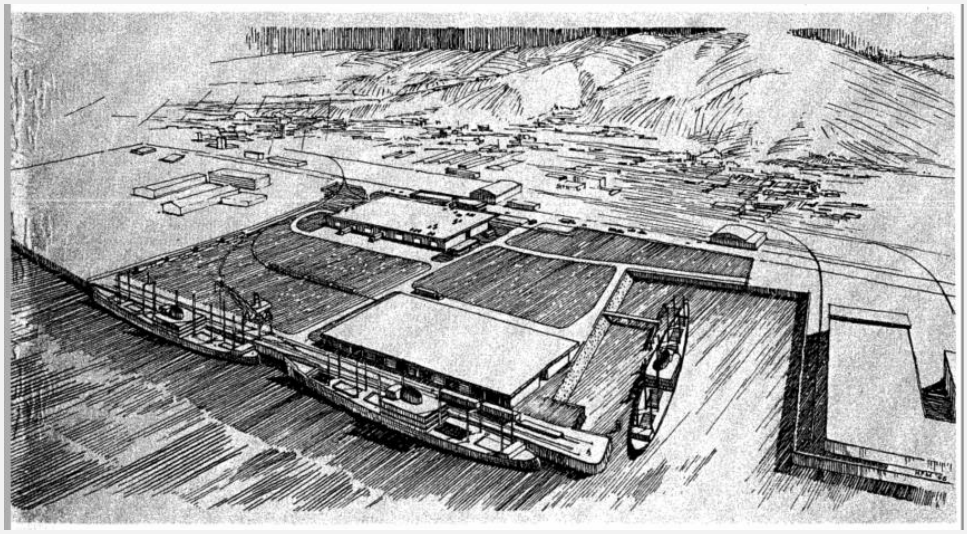
Exhibit 3. 1948 aerial of Terminal 2, during flooding in July of 1948.

Source: 1948 Aerial of Terminal 2. On file with Port of Portland

Exhibit 4. 1957 site drawing of Terminal 2 showing area planned for fill.

Source: 1957 Aerial of Terminal 2. On file with Port of Portland

Exhibit 5. 1965 site drawing of Terminal 2



Source: Cornell, Howland, Hayes, & Merryfield, July 1965, On file with Port of Portland

Exhibit 6. 1969 aerial of Terminal 2

Source: 1969 Aerial of Terminal 2. On file with Port of Portland

Exhibit 7. 1976 aerial of Terminal 2

Source: 1976 Aerial of Terminal 2. On file with Port of Portland

Exhibit 8. 1986 aerial of Terminal 2

Source: 1986 Aerial of Terminal 2. On file with Port of Portland

Field Reconnaissance

Dudek archaeologist Zach Windler and Dudek architectural historian Adrienne Donovan-Boyd conducted a reconnaissance-level field visit to the project site on March 2, 2022. Mr. Windler conducted an informal survey of the parcels to assess current conditions and Ms. Donovan-Boyd assessed the extant historic era, built-environment components in the project area.

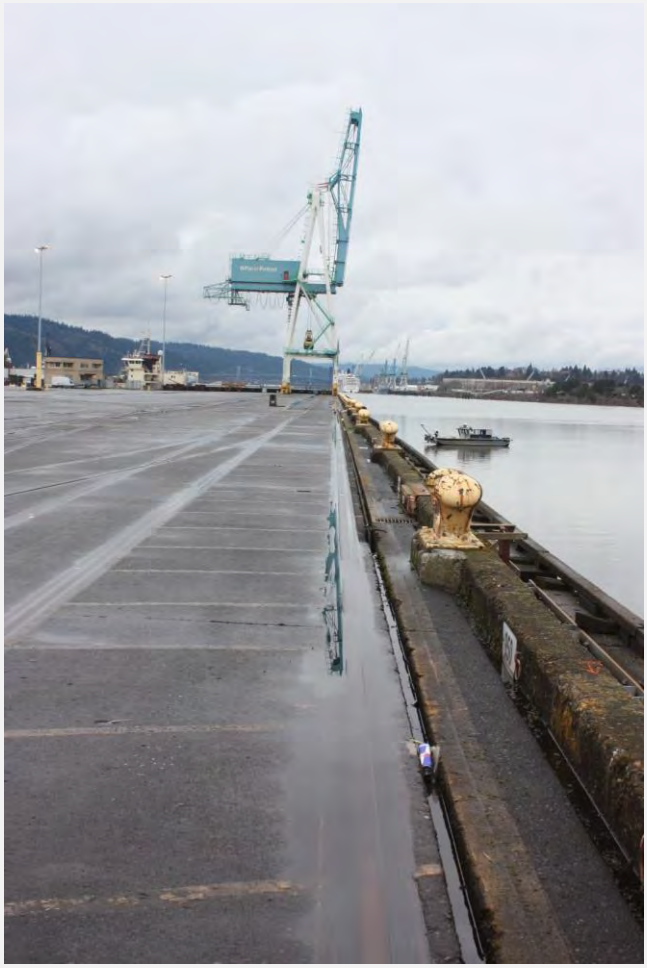
Archaeological Reconnaissance

Terminal 2 is situated between Highway 30 and the Willamette River on a flat landform, which is entirely paved (Exhibit 9). Terminal 2, itself, remains to be used for industrial activities and is considered to be part of the historic built environment. The developed property includes parking lots, rail lines for loading and unloading goods. No landscaping or unpaved areas exist within the APE, thereby making preconstruction subsurface testing impossible. No archaeological objects, artifacts, or features were observed adjacent or within Warehouse 205 (built in 1971), which is the only historic building remaining within Terminal 2. Nor were any archaeological materials observed elsewhere within Terminal 2.

Exhibit 9. Looking north towards Warehouses 205 and 206.

Source: Dudek IMAGE 0528

Exhibit 10. Looking northwest along edge of Terminal 2



Source: Dudek IMG_0489

Built Environment Site Visit

Several buildings are located within in the legal parcels of Terminal 2. A single warehouse, Warehouse 205, appears to be the only extant building from the historic period. The building, an unused warehouse, is rectangular and measures approximately 460 feet by 235 feet. The building sits on a concrete foundation wall and upper section of the building is clad in corrugated metal (Exhibit 11). The low-pitched roof has a large overhang on the south elevation that covers a concrete loading dock. Large side sliding doors are located on the north and south elevations. A small office and restrooms are located on the northeast corner of the building. Railroad tracks lead from Front Avenue and are located on both the north and south elevations of the building (Exhibit 12).

Exhibit 11. Warehouse 205, looking east at the northwest elevation.

Source: Dudek IMG_0481

Exhibit 12. Looking north from the southern section of the APE, Warehouse 204 and 205 visible on left.

Source: Dudek IMG_0523

Discussion

Archaeology

Dudek formulated expectations for the archaeological sensitivity of the APE based on review of recorded cultural resources in the region, review of historic maps and aerial photography, and a field reconnaissance visit.

Review of historic aerial photographs (Port of Portland 1953, 1961, 1962, 1963, 1966, and 1969), the 1965 dredging site plan for Terminal 2 (Adams and MacKay 1965), and soils data (see Environmental Setting section) for the proposed project suggests that Terminal 2's landform has undergone significant alterations, especially within the project's northern third where roughly 20 feet of silt was dredged and removed before the vicinity was filled with between 50 and 70 feet of sand (Adams and MacKay 1965). The southern two thirds of the proposed project is filled with between 2 and 20 feet of dredged sand, the highest elevation of native surface being located in the middle of Terminal 2, from the dock to Highway 30. Thus, the southern two-thirds of the proposed project from the landside of the dock to Highway 30 is where the native surface is likely to be nearest the finished grade of Terminal 2. Thus, it is considered to have the highest probability for intact archaeological deposits.

Built Environment

Dudek formulated expectations for the built environment resources within the APE based on a review of previously recorded resources in the area, a review of historic maps and aerial photography and a field reconnaissance visit.

Review of the Oregon Historic Sites database shows the site was previously evaluated as eligible for the NRHP. Given the landscape is drastically changed from the date of this evaluation a resurvey of the site should be undertaken to reassess this determination. Additionally, a single building is located on the site that has yet to be evaluated, as it was constructed in 1971. This building, Warehouse 205, should also be surveyed as part of this undertaking. The resurvey of the site and the evaluation of Warehouse 205 are the only known built environment components in the APE.

Summary and Recommendations

Dudek conducted a cultural resources desktop assessment, including background research and field reconnaissance, to assess the potential for the project to affect cultural resources. Terminal 2 was previously recorded as an historic built environment resource and has been determined eligible for listing in the NRHP. Warehouses 204 and 206, located within the footprint of the proposed Modular Manufacturing building footprint, were constructed between 1979 and 1981, which places the buildings outside of the 45-year-old cut off to have them considered historic resources. Warehouse 205, located adjacent to the north edge of the area of direct impacts, was constructed in ca. 1971.

No archaeological objects were observed within the APE during the reconnaissance visit. Historic aerials the 1965 dredging site plan for Terminal 2 (Adams and MacKay 1965) suggest that the northern third of the APE has a low probability for intact archaeological deposits below the surface. Based on the same historic documents, the southern two-thirds of the APE has a moderate to high probability for intact archaeological deposits.

Terminal 2 should be reevaluated as part of this undertaking. An updated evaluation would address the substantial changes that have occurred on the site since its establishment in the early 20th century. Warehouse 205 should be included in this survey effort.

Dudek's recommendations for further cultural resources work, if any, for the modular manufacturing, acoustics lab, and Workforce training facilities are outlined separately below.

Modular Manufacturing Building

The modular manufacturing building is located within the norther third of the APE and situated atop approximately 50 feet of dredged sand. This area is recommended to be low probability for the discovery of intact archaeological deposits. No further archaeological work is recommended for the building footprint prior to construction. Should the planned parking area and utilities west of the building incur ground disturbances, Dudek recommends having an archaeological monitor present during construction.

Based on the architectural site plan, the modular manufacturing facility or its associated parking will include the demolition of Warehouses 204 and 206 and SSA Gear Lockers (Buildings 3080 and 3154), which currently occupy that space on Terminal 2.

Oregon Acoustics Laboratory

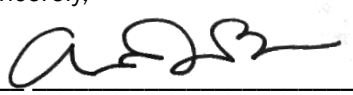
The Oregon Acoustics Laboratory will include the deepest excavation (30 feet below surface) for a subterranean chamber. The total anticipated footprint of the deep excavation is an area measuring 30 feet by 40 feet. The location of the acoustics lab is slated for the central third of the APE, which has the highest probability for near-surface intact archaeological deposits. Given the depth of the proposed excavation at the acoustics lab and the existing pavement covering the ground surface, Dudek recommends that archaeological testing prior to construction is not practical. Rather, Dudek recommends that an archaeological monitor be present during construction.

Workforce Training

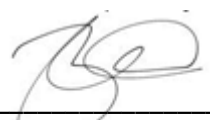
The Workforce Training building and associated parking, stormwater planter and swales, and forest zone are located within the southern third of Terminal 2. While the excavation for each of these facilities is slated to be shallower than at the acoustics lab, ground disturbances would have the potential to impact any near-surface intact archaeological deposits, for which this portion of the APE has the potential. Dudek recommends that an archaeological monitor be present during construction of the Workforce Training facilities.

Please do not hesitate to contact me by phone at 503.201.3592 or by email at adonovanboyd@dudek.com should you have any questions about this report.

Sincerely,



Adrienne Donovan-Boyd, MSHP
Architectural Historian



Zach Windler, MLitt, RPA
Senior Archaeologist

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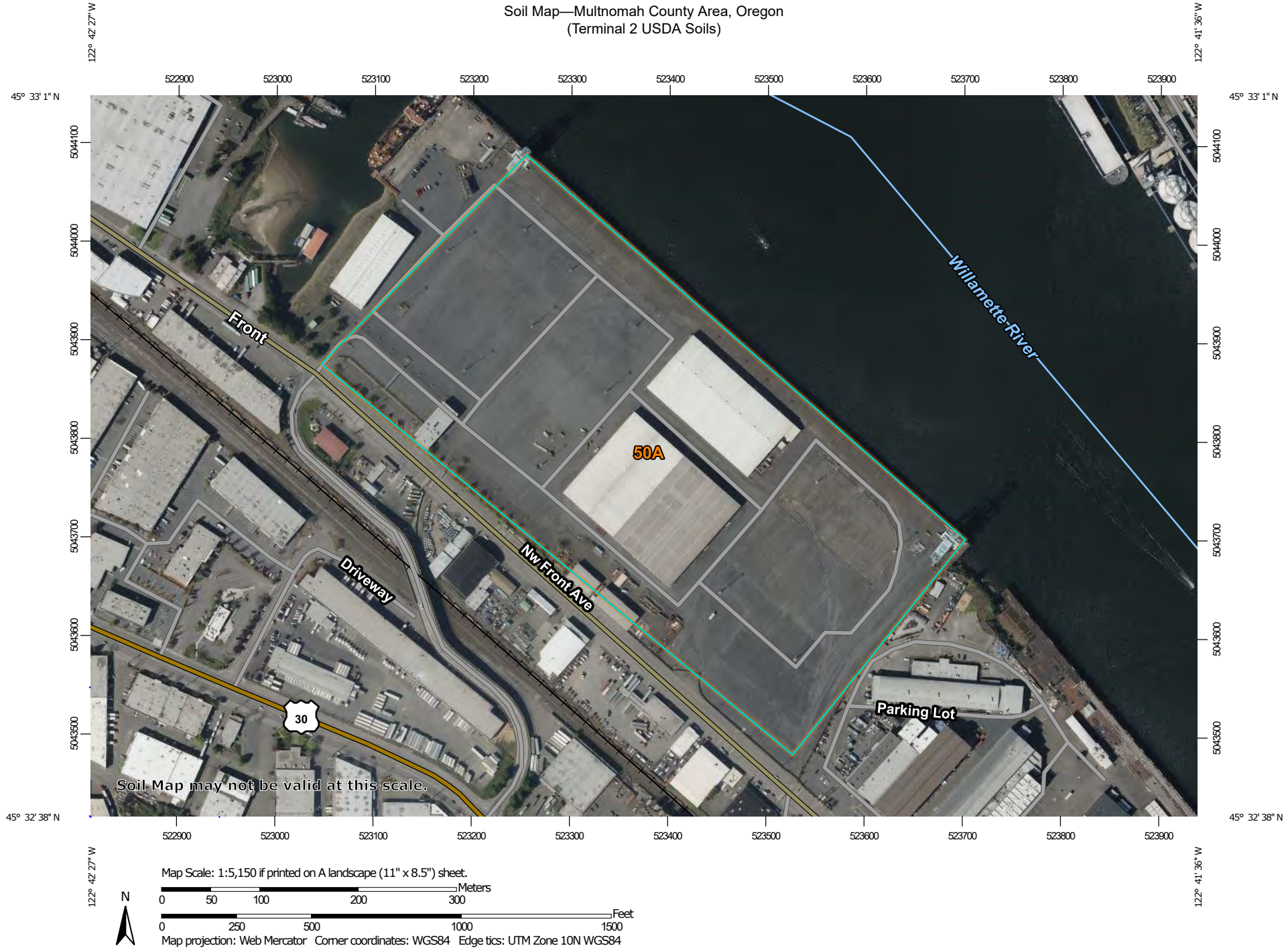
Attachment C USDA Soils

Soil Map—Multnomah County Area, Oregon
(Terminal 2 USDA Soils)



Map Scale: 1:5,150 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Multnomah County Area, Oregon
Survey Area Data: Version 20, Oct 27, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 16, 2021—Apr 18, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
50A	Urban land, 0 to 3 percent slopes	43.5	100.0%
Totals for Area of Interest		**43.5**	**100.0%**

Attachment D FEMA FIRMette

NOTES TO USERS

s for use in administering the National Flood Insurance Program. It cessarily identify all areas subject to flooding, particularly from local urces of small size. The **community map repository** should be r possible updated or additional flood hazard information.

more detailed information in areas where **Base Flood Elevation** r **floodways** have been determined, users are encouraged to consult rofiles and Floodway Data tables contained within the Flood Insur- (FIS) report that accompanies this FIRM. Users should be aware that s on the FIRM represent rounded whole-foot elevations. These BFEs d for flood insurance rating purposes only and should not be used source of flood elevation information. Accordingly, flood elevation ted in the FIS should be utilized in conjunction with the FIRM for construction and/or floodplain management.

se Flood Elevation (BFEs) shown on this map apply only land- 0' North American Vertical Datum (NAVD). Users of this FIRM eware that coastal flood elevations may also be provided in the Stillwater Elevations table in the Flood Insurance Study report for nity. Elevations shown in the Summary of Stillwater Elevations table sed for construction, and/or floodplain management purposes when er than the elevations shown on this FIRM.

of the **floodways** were computed at cross sections and interpolated ss sections. The floodways were based on hydraulic considerations to requirements of the National Flood Insurance Program. Floodway other pertinent floodway data are provided in the Flood Insurance for this jurisdiction.

s not in Special Flood Hazard Areas may be protected by **flood uctures.** Refer to Section 2.4 "Flood Protection Measures" of nsurance Study report for information on flood control structures ction.

tion used in the preparation of this map is Universal Tranverse UTM) zone 10. The **horizontal datum** is NAD83, GRS1980 ifferences in datum, spheroid, projection or UTM zones used in ion of FIRMs for adjacent jurisdictions may result in slight positional in map features across jurisdiction boundaries. These differences t the accuracy of the FIRM.

tions on this map are referenced to the North American Vertical 988. These flood elevations must be compared to structure and ations referenced to the same **vertical datum.** For information onversion between the National Geodetic Vertical Datum of 1929 rth American Vertical Datum of 1988, visit the National Geodetic ssite at www.ngs.noaa.gov or contact the National Geodetic Survey ing address:

rence System Division
detic Survey, NOAA
Metro Center
West Highway
, Maryland 20910
191

rrent elevation, description, and/or location information for **bench marks** this map, please contact the Information Services Branch of the odetic Survey at **(301) 713-3242,** or visit their website at saa.gov.

information shown on this FIRM was provided in digital format by ta Resource Center, 600 NE Grand Avenue, Portland, OR, 97232-2736. dst.or.us (503) 797-1742

limits shown on this map are based on the best data available of publication. Because changes due to annexations or de-annexations occurred after this map was published, map users should contact community officials to verify current corporate limit locations.

to the separately printed **Map Index** for an overview map showing f map panels for this jurisdiction.

anying Flood Insurance Study report, Letters of Map Revision or Map Amendment revising portions of this panel, and digital versions EL may be available. Contact the **FEMA Map Service Center** at g phone numbers and Internet address for information on all related ailable from FEMA:

358-9616
58-9620
gov/mac

questions about this map or questions concerning the National nce Program in general, please call **1-877-FEMA-MAP** (1-877-336- t the FEMA website at www.fema.gov.

eflects more detailed and up-to-date stream channel configurations shown on the previous FIRM for this jurisdiction. The floodplains eys that were transferred from the previous FIRM may have been conform to these new stream channel configurations. As a Flood Profiles and Floodway Data tables in the Flood Insurance t may reflect stream channel distances that differ from what is map.

HAZARD INFORMATION OUTSIDE THE CITY OF PORTLAND, SEPARATELY PRINTED FLOOD INSURANCE RATE MAP FOR RATE COMMUNITY.

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INU BY THE 1% ANNUAL CHANCE FLOOD EVENT

The 1% annual chance flood (100-year flood), also known as the base flood, that has a 1% chance of being equaled or exceeded in any given year. Flood Hazard Area is the area subject to flooding by the 1% annual chance of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and V Flood Elevation is the water surface elevation of the 1% annual chance flood.

ZONE A No base flood elevations determined.

ZONE AE Base flood elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on slop average depths determined. For areas of alluvial fan floodin also determined.

ZONE AR Area of special flood hazard formerly protected from the chance flood event by a flood control system that was decertified. Zone AR indicates that the former flood contro being restored to provide protection from the 1% annua greater flood event.

ZONE A99 Area to be protected from 1% annual chance flood event flood protection system under construction; no base floo determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); base floo determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas kept free of encroachment so that the 1% annual chance flood can be substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual with average depths of less than 1 foot or with drainage are 1 square mile; and areas protected by levees from 1% an flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) A

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Haza

- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas Base Flood Elevations, flood depths or velocities.
- 513 — Base Flood Elevation line and value; elevation in feet
- (EL 987) — Base Flood Elevation value where uniform elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- A — A — Cross Section Line
- 23 — 23 — Transect Line
- 97°07'30", 32°22'30" — Geographic coordinates referenced to the Nort Datum of 1983 (NAD 83)
- 4276000M — 1000-meter Universal Transverse Mercator grid valu
- 600000 FT — 5000-foot grid ticks
- DX5510 × — Bench mark (see explanation in Notes to Users this FIRM panel).
- M1.5 — River Mile

MAP REPOSITORY

City of Portland, Bureau of Environmental Services, 1221 SW 4th Avenue, Portland, OR 97204 (Maps available for reference only, not for distribution.)

INITIAL IDENTIFICATION
JANUARY 10, 1975
FLOOD HAZARD BOUNDARY MAP REVISIONS
APRIL 25, 1978
FLOOD INSURANCE RATE MAP EFFECTIVE
OCTOBER 15, 1980
FLOOD INSURANCE RATE MAP REVISIONS
OCTOBER 10, 1982
JANUARY 3, 1986
NOVEMBER 7, 2001
October 19, 2004: to update corporate limits, to change base flood elevati base flood elevations, to change special flood hazard areas, to u designations, to update map format, to add roads and road names, updated topographic information, and to incorporate previously issued map revision.

To determine if flood insurance is available in this community, contact you agent or call the National Flood Insurance Program at (800) 638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0087E

FIRM
FLOOD INSURANCE RATE M

CITY OF
PORTLAND, OREGON
MULTNOMAH, CLACKAMAS,
AND WASHINGTON COUNTIES

PANEL 87 OF 250

(SEE MAP INDEX FOR FIRM PANEL

CONTAINS:

COMMUNITY	NUMBER	PANEL
PORTLAND, CITY OF	410183	0087

Notice to User: The **Map Number** shown below a when placing map orders; the **Community Nu** above should be used on insurance applications f community.

MAP N
41018

MAP R
OCTOBER 1

Federal Emergency Managemen

IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Multnomah County, Oregon

Local office

Oregon Fish And Wildlife Office

(503) 231-6179
(503) 231-6195

2600 Southeast 98th Avenue, Suite 100
Portland, OR 97266-1398

https://www.fws.gov/oregonfwo/articles.cfm?id=149489416

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Birds

NAME	STATUS
Northern Spotted Owl Strix occidentalis caurina Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/1123	Threatened
Streaked Horned Lark Eremophila alpestris strigata Wherever found There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/7268	Threatened
Yellow-billed Cuckoo Coccyzus americanus There is **final** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/3911	Threatened

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Flowering Plants

NAME	STATUS
Nelson's Checker-mallow Sidalcea nelsoniana Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7340	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES

THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)

Bald Eagle Haliaeetus leucocephalus — Breeds Jan 1 to Sep 30
This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1626

Cassin's Finch Carpodacus cassinii — Breeds May 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9462

Evening Grosbeak Coccothraustes vespertinus — Breeds May 15 to Aug 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31
This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Lesser Yellowlegs Tringa flavipes — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9679

Olive-sided Flycatcher Contopus cooperi — Breeds May 20 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/3914

Rufous Hummingbird selasphorus rufus — Breeds Apr 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8002

Short-billed Dowitcher Limnodromus griseus — Breeds Jun 1 to Aug 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9480

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

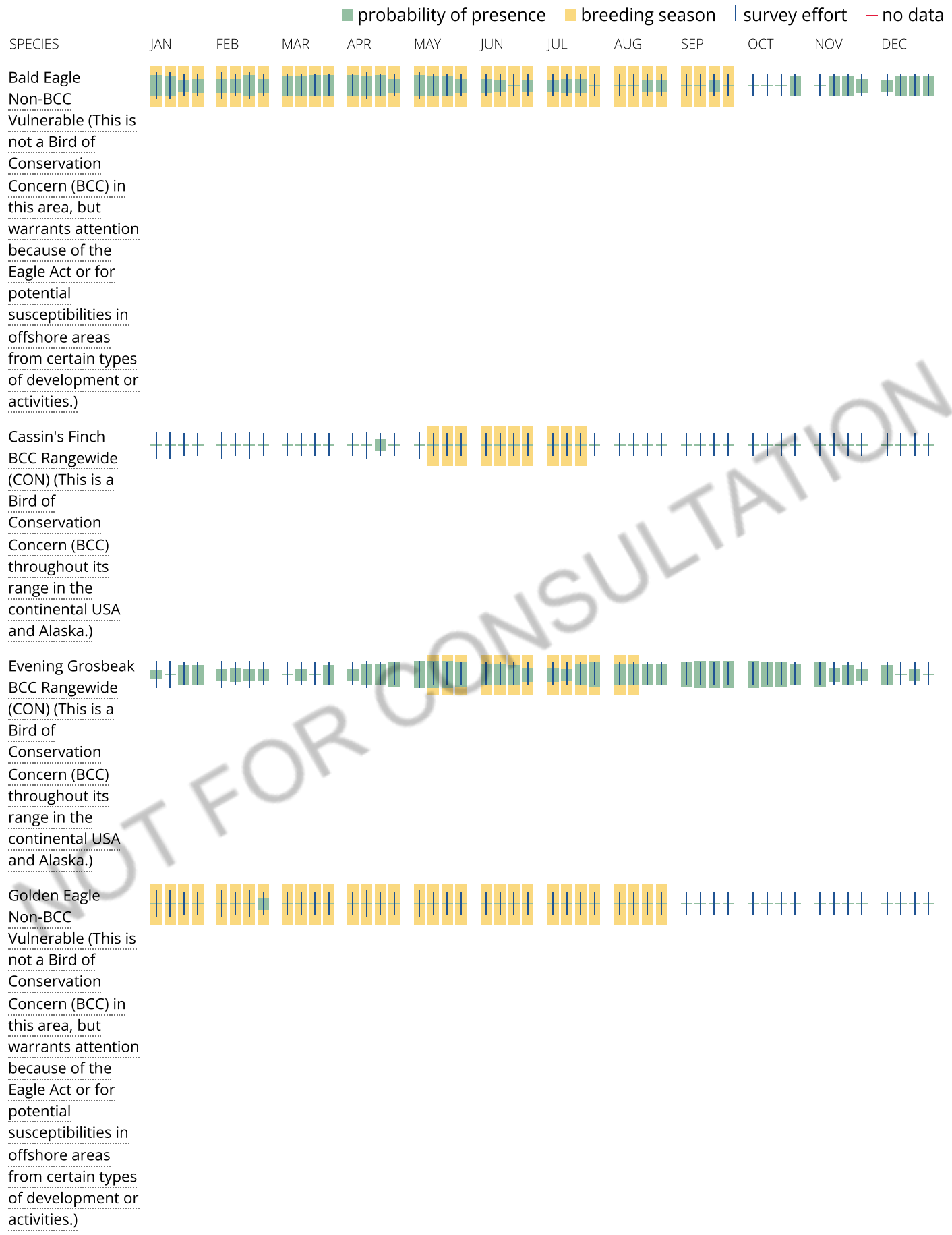
Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

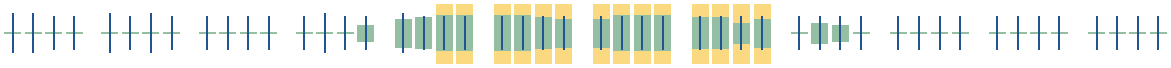
No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



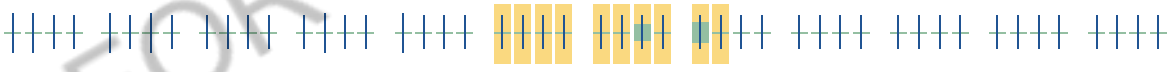
Lesser Yellowlegs BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Olive-sided Flycatcher BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Rufous Hummingbird BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Short-billed Dowitcher BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

Wildlife refuges and fish hatcheries

REFUGE AND FISH HATCHERY INFORMATION IS NOT AVAILABLE AT THIS TIME

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

RIVERINE

R1UBV

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

State of Oregon
Department of Environmental Quality Memorandum

To: **ECSI #2769 file** **Date: February 13, 2014**

From: **Tom Gainer, Project Manager**

Subject: **No Further Action Determination**
Port of Portland Terminal 2 Site
2635 NW Front Avenue, Portland, OR

Introduction

This document presents the basis for the Oregon Department of Environmental Quality's (DEQ's) No Further Action (NFA) determination for the Port of Portland (Port) Terminal 2 site, located at 2635 NW Front Avenue in Portland, Oregon.

The NFA determination meets the requirements of Oregon Administrative Rules Chapter 340, Division 122, Sections 0205 to 360; and Chapter 340 Division 122, Sections 010 to 0140; and ORS 465.200 through 465.455.

This NFA determination follows a Source Control Decision issued by DEQ on November 6, 2013. The Source Control Decision concluded that the Terminal 2 site does not appear to be a current or reasonably likely future source of Willamette River water or sediment contamination.

Site Description and History

The Terminal 2 site is located on the west bank of the Willamette River at about river mile (RM) 9.8 within the Portland Harbor study area (Figure 1). The Port assumed ownership of the 49-acre Terminal 2 after its merger with the Commission of Public Docks on January 1, 1971. Filling activities to create Terminal 2 started in the late 1800's. During World War II, the U.S. government manufactured and built ships southeast of Terminal 2 (Willamette Iron and Steel Company) and launched them in the Oceanic Terminal's three shipways located at the current Terminal 2 site. Terminal 2 became a public marine terminal after World War II. The three shipways were filled in during the 1960's and 1980's. Operations include cargo handling of lumber, plywood, pulp, and steel, storage, and equipment maintenance.

Investigation History

The Port completed a Preliminary Assessment (PA) and Source Control Evaluation (SCE) at their Terminal 2 site. The primary focus was to determine if the subject site is a current source of contamination to the Willamette River. Historical research conducted for the PA identified past activities and features that were considered potential areas of concern on the site. These potential sources included historical underground storage tanks (USTs) and general light industrial use.

Soil and Groundwater

Three USTs (1,500-gallon used oil, 2,750-gallon diesel, and 5,500-gallon gasoline) were removed from south of the gearlocker building in 1997 (Figure 2). Confirmation sampling showed no evidence of contamination beneath the USTs. Approximately 15 tons of diesel-impacted soil was removed beneath the concrete fueling pad. DEQ issued a no further action letter on May 18, 1998 (#26-97-0949).

A heating oil underground storage tank (UST) was removed during demolition of Building 3060 in 1998. Approximately 108 tons of petroleum-contaminated soil were excavated and disposed off site, and confirmation sampling resulted in closure by DEQ's Heating Oil Tank Program on October 17, 2001 (#26-98-0081).

During demolition of Building 3070 in 1998, TPH was not detected in shallow soil beneath the adjacent used oil storage area.

Soil and groundwater were evaluated with nine push probes in 1998 and 2001 (Figure 2). Soil data from the nine push probes did not show significant concentrations of TPH, BTEX, or PAHs. Although groundwater PAH concentrations in borings GP-3 and GP-9 exceeded Joint Source Control Strategy (JSCS, DEQ 12/05, revised 2007) screening level values (SLVs), these locations are located over 800 feet from the river and PAHs were not detected in boring GP-7 located between these borings and the river. In addition, elevated PAH concentrations were not observed in sediment adjacent to the site. Investigation and regulatory closure of potential contaminant source areas described above indicate that groundwater contamination from site activities is unlikely.

Stormwater

Sediment was removed from several storm water catch basins and characterized in December 1994. Laboratory analyses indicated that the material was a non-hazardous waste, with elevated levels of petroleum (9,000 mg/kg TPG-418.1 and 120 mg/kg TPH-G) but non-detectable polychlorinated biphenyls (PCBs) and low to non-detectable metals. Sediment was removed from the stormwater system in October 2008, including catch basins and conveyance lines, and disposed off site. Removed legacy sediment showed elevated levels of arsenic, cadmium, chromium, lead, and PCBs relative to the range observed at active industrial sites in Portland Harbor. Solids that exceeded SLVs were removed and best management practices were effective in keeping it from returning.

Stormwater sampling results indicate that contaminant concentrations that may exceed screening levels do not appear to be a legacy contaminant source or pose a significant risk to the Willamette River. Ongoing stormwater discharges from the site will continue to be regulated through evolving iterations of the 1200-Z permit.

Hazardous Substance Releases

An equipment hydraulic fluid leak on December 5, 1992, resulted in a sheen on the Willamette River. Subsequent sediment sampling in the vicinity of the release did not show contaminants from hydraulic oil.

The site does not currently generate or manage hazardous waste.

Summary of Source Control Decision

Based on review of the file and the SCE, DEQ concluded that the upland site is adequately characterized and does not appear to be a current or reasonably likely future source of contamination to the Willamette River. No additional upland source control work is needed, provided that implementation of the source control measures described in the stormwater pollution control plans and stormwater monitoring as mandated by the site's NPDES 1200-Z permits continues. DEQ will continue to review monitoring and permit compliance to ensure that source control measures continue to be effective. EPA submitted a December 4, 2013, letter of concurrence on this Source Control Decision.

Conceptual Site Model

Historical research conducted for the PA identified past activities and features that were considered potential areas of concern on the site. Review of near shore sediment, soil, groundwater, stormwater, and stormwater solids data identified Contaminants of Interest (COI; i.e., chemicals that may be present at the site). These chemicals included total petroleum hydrocarbons (TPH), polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), phthalates, and metals.

Terminal 2 is within an active industrial area and will likely remain so indefinitely. Following is a conceptual site model summary table that considers current and future land use, relevant receptors, and potential exposure pathways.

Potential Receptor	Exposure Pathway	Pathway Complete?	Reason for Selection or Exclusion / Evaluation of Complete Pathways
Current Land Use: *Industrial*			
Occupational/Excavation/ Construction Workers	Direct contact with chemicals in site soil	No	No COI present in soil above regulatory screening levels.
Terrestrial Receptors	Direct contact with chemicals in site soil	No	The majority of the site is covered with asphalt-concrete. The riverbank includes heavy rip-rap.
Occupational Workers	Outdoor air	No	There are no volatile organic compounds (VOCs) in the COI.
Occupational Workers	Indoor air	No	There are no VOCs in the COI.
Occupational Workers	Groundwater ingestion	No	Groundwater is not used and is not reasonably likely to be used in the future.
Occupational Workers/ Residents	Leaching to groundwater	No	Soil data were collected at the observed groundwater table at the time of the sampling and as such the potential for leaching of COI were directly assessed through the groundwater analyses

			discussed below.
Aquatic Receptors/ Recreational Users	Groundwater to surface water	Yes	Groundwater and soil data were screened in the SCE to assess direct groundwater discharge to the river. Although PAH concentrations were detected above the JSCS screening levels in groundwater samples, the sample locations were located over 800 feet from the Willamette River. In addition, PAHs were not detected in a groundwater sample collected between the upgradient borings and the river. PAHs have also not been detected at elevated concentrations in nearby river sediments. Based on these lines of evidence, the groundwater pathway from the Site is considered insignificant.
Aquatic Receptors/ Recreational Users	Stormwater to surface water	Yes	Only a few constituents were identified exceeding the conservative JSCS criteria. These detected concentrations are low and not considered significant relative to other Portland Harbor sites. The storm water system cleanout reduced uncertainty that accumulated solids within the system could be a source to the river. BMPs are in place to minimize the potential for releases to the Willamette River. Consequently, the storm water pathway is not a pathway of concern.
Future Land Use: *Industrial*			

With the exception of *groundwater to surface water* and *stormwater to surface water*, there are no complete exposure pathways for human or ecological receptors.

Risk Evaluation

Based upon the information presented above, the Terminal 2 site does not pose an unacceptable risk to human health or ecological receptors. All but two exposure pathways are incomplete. The two complete pathways, groundwater and stormwater discharge to the river, were evaluated in the SCE, which showed that they do not appear to be a current or reasonably likely future source of contamination to the Willamette River.

Recommendations

No further action is recommended.

Project Submittals

Terminal 2 Preliminary Assessment (PA), Port of Portland, August 29, 2000.

Dredge Material Characterization Study, Marine Terminal 2, Berths 203-206, Marine Terminal 5, Berth 501, Hart Crowser, August 24, 2001.

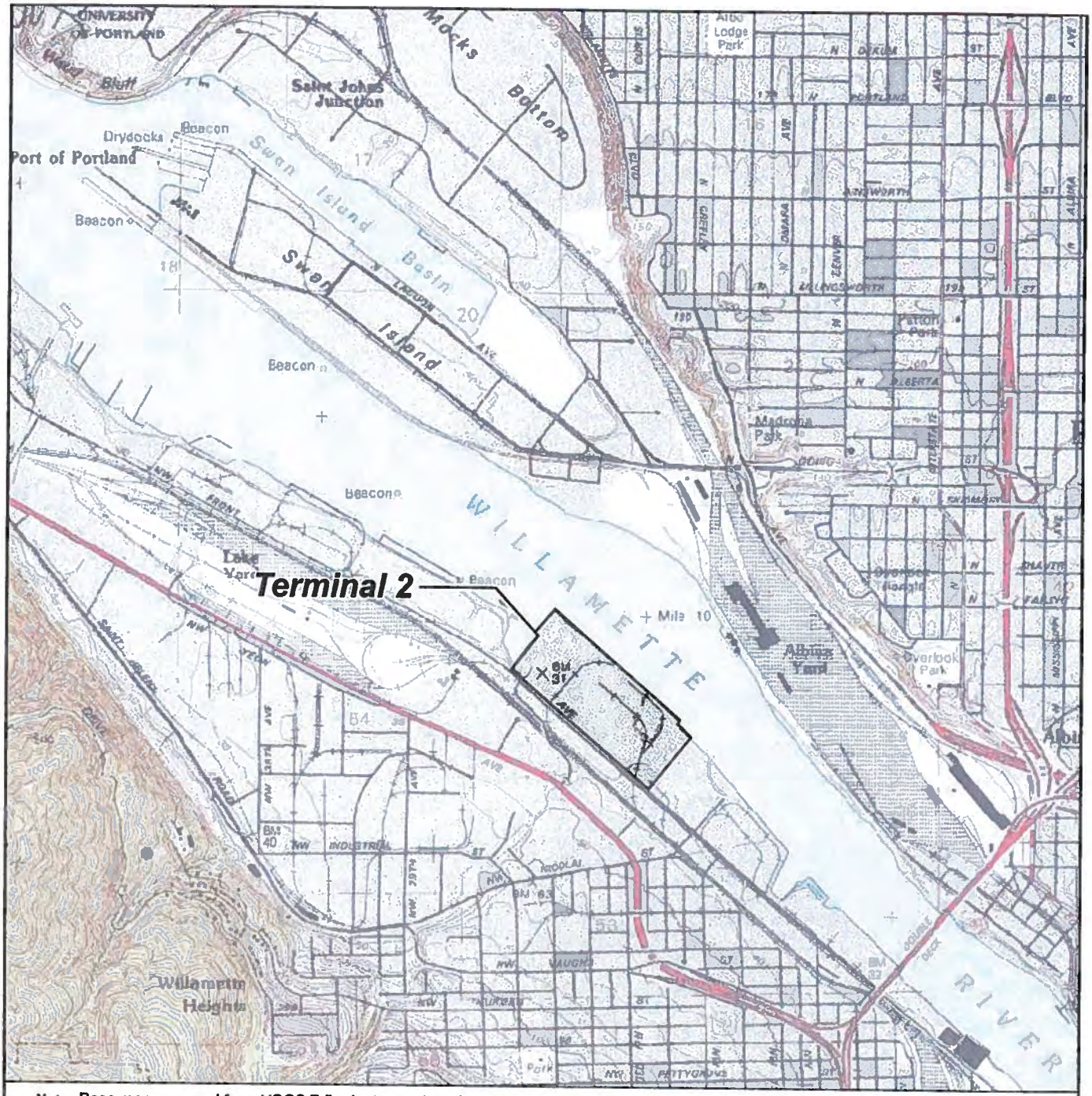
Storm Water Evaluation Data Summary Report, Terminal 2, Ash Creek Associates, Inc. and NewFields, April 2009.

Source Control Evaluation, Terminal 2 Upland Facility, Ash Creek Associates, Inc., December 1, 2011.

Storm Water Sampling Results, Terminal 2 Upland Facility, Apex, May 7, 2013.

Storm Water Sampling Results Addendum, Terminal 2 Upland Facility, Apex, June 26, 2013.

Attachments: 2 Figures



Note: Base map prepared from USGS 7.5-minute quadrangle of Portland, OR, dated 1990 as provided by Topozone.

0 2,000 4,000

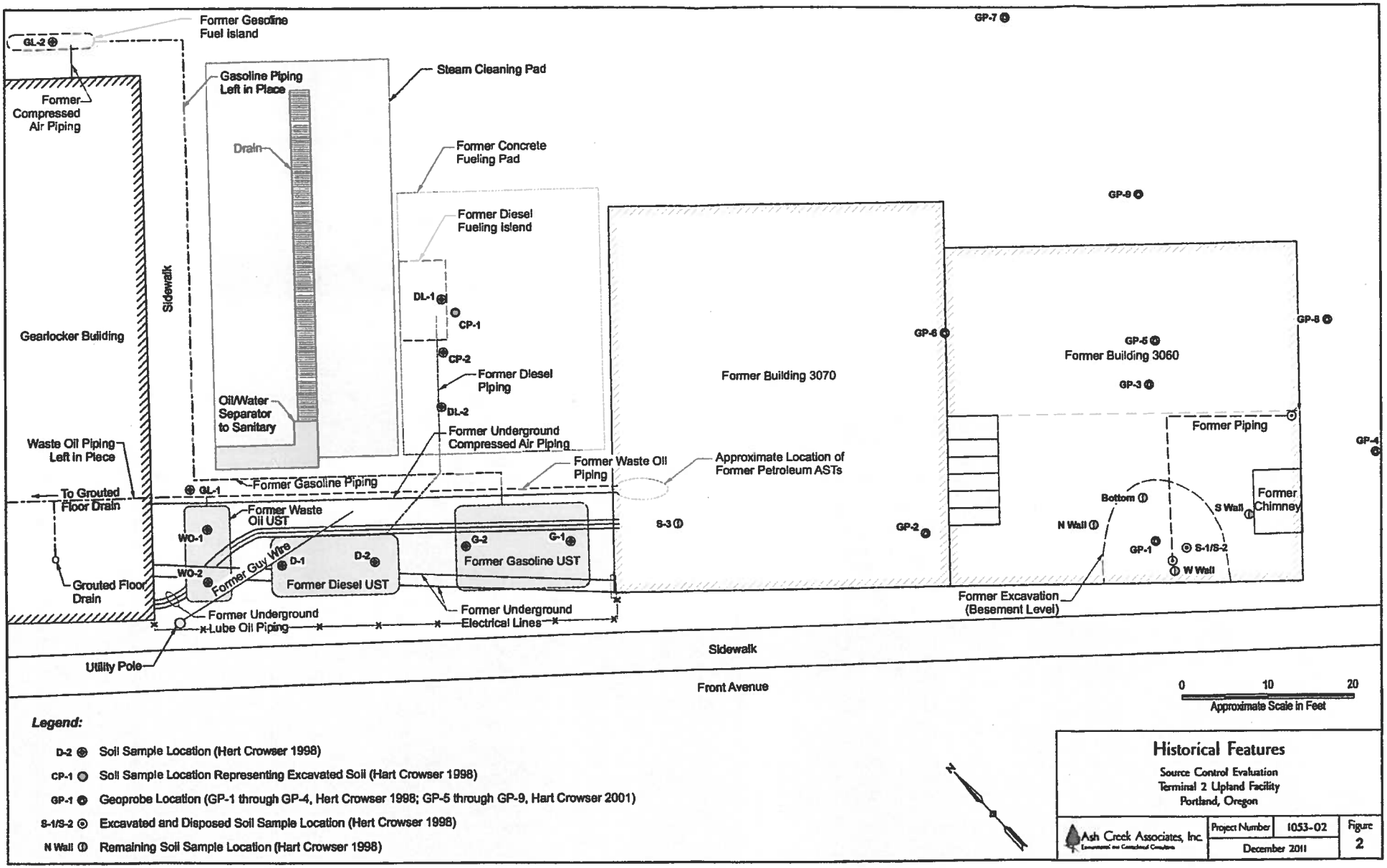
Approximate Scale in Feet

N

Facility Location Map

Storm Water Evaluation Report
Terminal 2
Portland, Oregon

Ash Creek Associates, Inc. Environmental and Geotechnical Consultants	Project Number 1053-01	Figure 1
	April 2009	



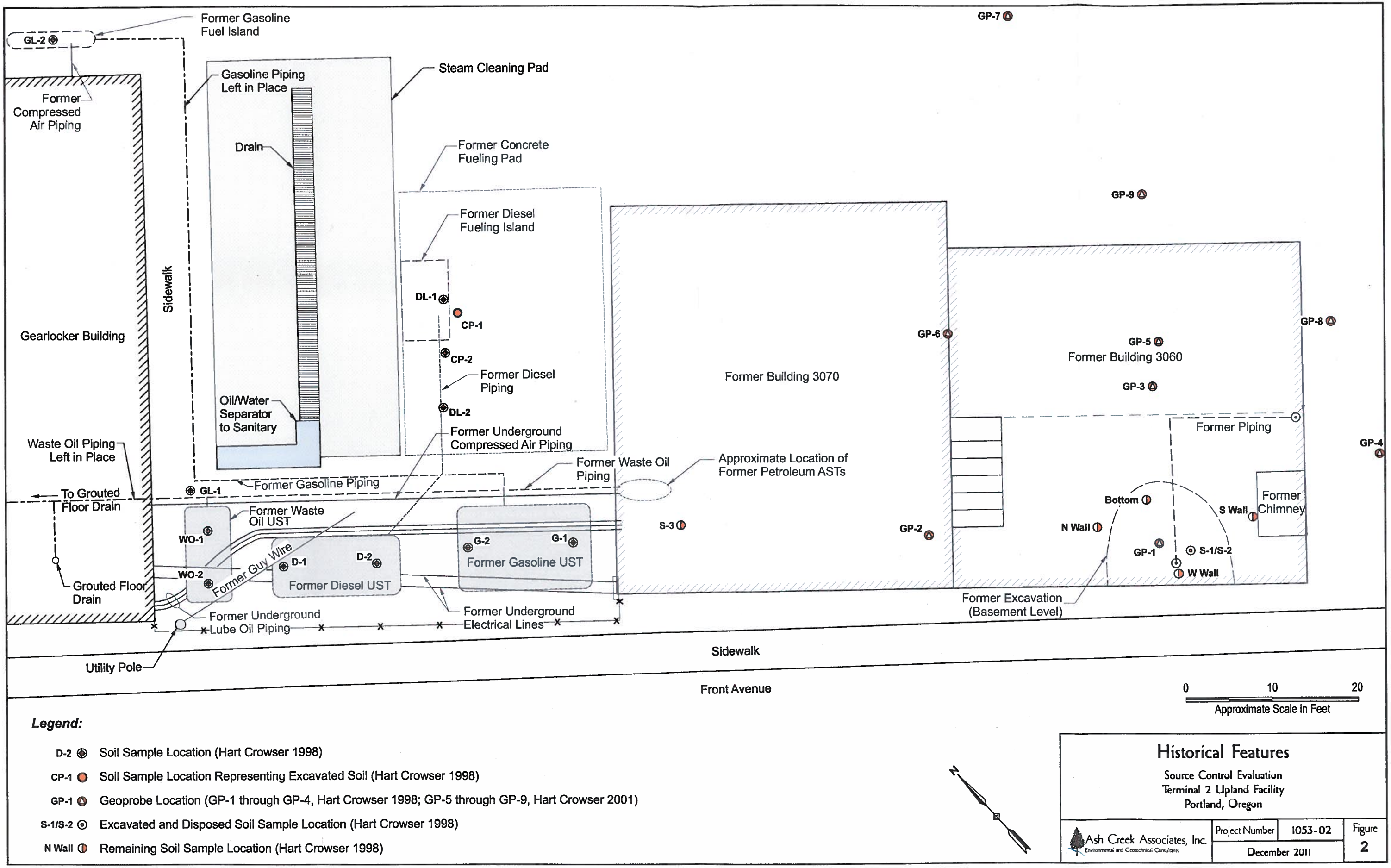
Legend:

- D-2 ⊕ Soil Sample Location (Hart Crowser 1998)
- CP-1 ○ Soil Sample Location Representing Excavated Soil (Hart Crowser 1998)
- GP-1 ⊙ Geoprobe Location (GP-1 through GP-4, Hart Crowser 1998; GP-5 through GP-9, Hart Crowser 2001)
- S-1/S-2 ⊙ Excavated and Disposed Soil Sample Location (Hart Crowser 1998)
- N Wall ⓘ Remaining Soil Sample Location (Hart Crowser 1998)

Historical Features

Source Control Evaluation
Terminal 2 Upland Facility
Portland, Oregon

Ash Creek Associates, Inc.	Project Number 1053-02	Figure 2
	December 2011	



Legend:

- D-2 — Soil Sample Location (Hart Crowser 1998)
- CP-1 — Soil Sample Location Representing Excavated Soil (Hart Crowser 1998)
- GP-1 — Geoprobe Location (GP-1 through GP-4, Hart Crowser 1998; GP-5 through GP-9, Hart Crowser 2001)
- S-1/S-2 — Excavated and Disposed Soil Sample Location (Hart Crowser 1998)
- N Wall — Remaining Soil Sample Location (Hart Crowser 1998)

Historical Features

Source Control Evaluation
Terminal 2 Upland Facility
Portland, Oregon

Ash Creek Associates, Inc. Environmental and Geotechnical Consultants	Project Number 1053-02	Figure 2
	December 2011	

Oregon
John A. Kitzhaber, MD, Governor

Department of Environmental Quality
Northwest Region Portland Office
2020 SW 4th Avenue, Suite 400
Portland, OR 97201-4987
(503) 229-5263
FAX (503) 229-6945
TTY (503) 229-5471

February 13, 2014

Mr. Dwight Leisle
Port of Portland
P.O. Box 3529
Portland, Oregon 97208

Re: No Further Action
Terminal 2
3556 NW Front Avenue, Portland, Oregon
ECSI #2769

Dear Mr. Leisle:

DEQ issued a Portland Harbor *Final Source Control Decision* on November 6, 2013, which determined that the Terminal 2 facility is adequately characterized and does not appear to be a current or reasonably likely future source of Willamette River water or sediment contamination. Based on the attached memo, DEQ concludes that the Terminal 2 facility is currently protective of public health and the environment. Therefore, no further action is required under the Oregon Environmental Cleanup Law, ORS 465.200 et seq., unless new or previously undisclosed information becomes available. We will update the Environmental Cleanup Site Information System (ECSI) database to reflect this decision.

Please call Tom Gainer at 503-229-5326 if you have any questions.

Sincerely,

Kevin Parrett, PhD
Manager, NWR Cleanup and Leaking USTs

Attachments: NFA Determination Memo

cc: Tom Gainer, DEQ/NWR
Rich Muza, EPA
Kristine Koch, EPA

EJSCREEN Report (Version 2020)

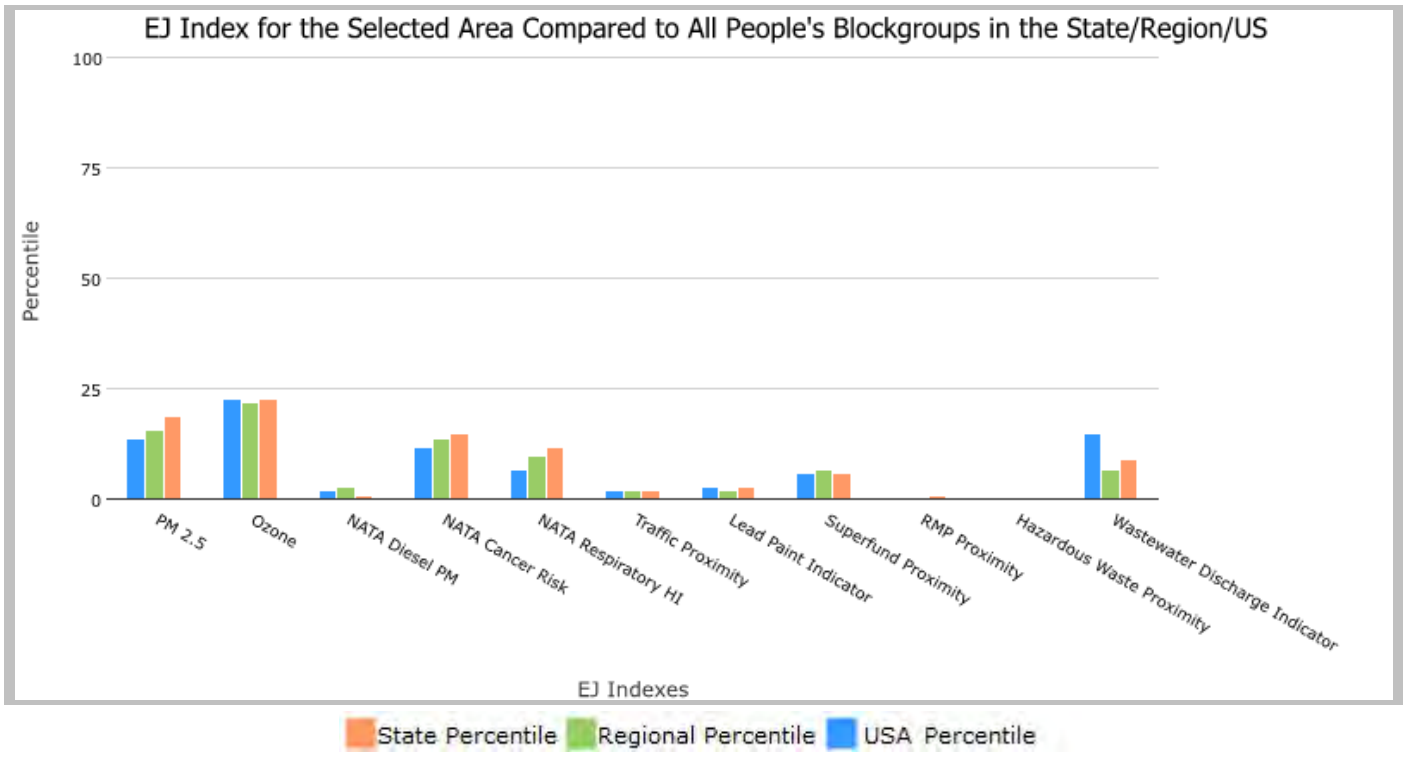
1 mile Ring Centered at 45.546264,-122.699432, OREGON, EPA Region 10

Approximate Population: 6,068

Input Area (sq. miles): 3.14

(The study area contains 1 blockgroup(s) with zero population.)

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	19	16	14
EJ Index for Ozone	23	22	23
EJ Index for NATA* Diesel PM	1	3	2
EJ Index for NATA* Air Toxics Cancer Risk	15	14	12
EJ Index for NATA* Respiratory Hazard Index	12	10	7
EJ Index for Traffic Proximity and Volume	2	2	2
EJ Index for Lead Paint Indicator	3	2	3
EJ Index for Superfund Proximity	6	7	6
EJ Index for RMP Proximity	1	0	0
EJ Index for Hazardous Waste Proximity	0	0	0
EJ Index for Wastewater Discharge Indicator	9	7	15



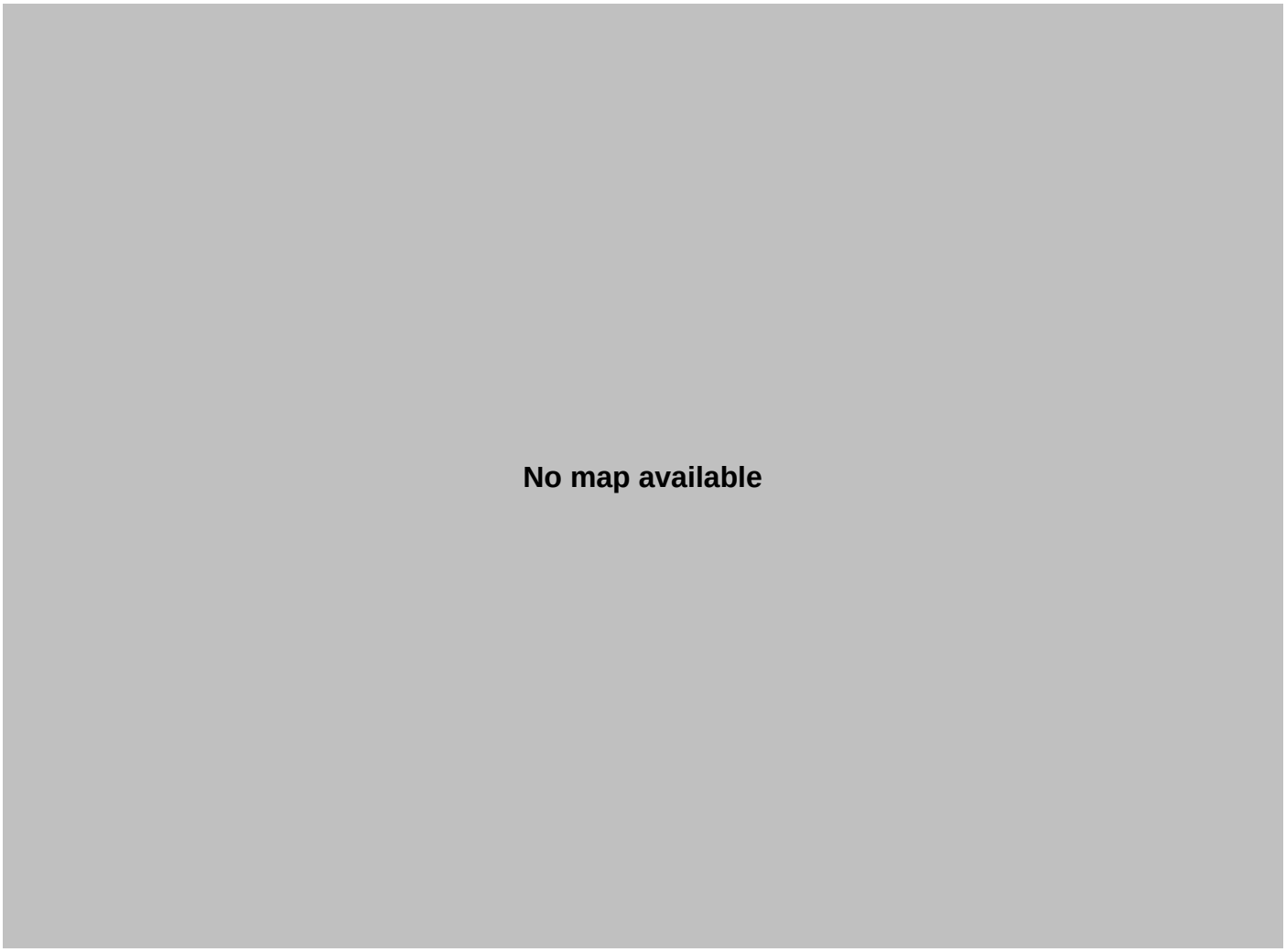
This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

1 mile Ring Centered at 45.546264,-122.699432, OREGON, EPA Region 10

Approximate Population: 6,068

Input Area (sq. miles): 3.14

(The study area contains 1 blockgroup(s) with zero population.)



Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	5

EJSCREEN Report (Version 2020)

1 mile Ring Centered at 45.546264,-122.699432, OREGON, EPA Region 10

Approximate Population: 6,068

Input Area (sq. miles): 3.14

(The study area contains 1 blockgroup(s) with zero population.)

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Environmental Indicators							
Particulate Matter (PM 2.5 in µg/m^3)	9.54	8.83	80	8.52	78	8.55	82
Ozone (ppb)	36.9	38.7	28	39.1	40	42.9	16
NATA* Diesel PM (µg/m^3)	1.06	0.393	98	0.481	90-95th	0.478	90-95th
NATA* Cancer Risk (lifetime risk per million)	38	31	92	31	80-90th	32	70-80th
NATA* Respiratory Hazard Index	0.64	0.48	98	0.46	90-95th	0.44	90-95th
Traffic Proximity and Volume (daily traffic count/distance to road)	1400	480	92	510	91	750	86
Lead Paint Indicator (% Pre-1960 Housing)	0.53	0.25	86	0.22	87	0.28	78
Superfund Proximity (site count/km distance)	0.18	0.083	91	0.13	82	0.13	84
RMP Proximity (facility count/km distance)	4	0.78	96	0.65	98	0.74	97
Hazardous Waste Proximity (facility count/km distance)	12	1.5	99	1.5	98	5	94
Wastewater Discharge Indicator (toxicity-weighted concentration/m distance)	0.0017	0.0022	83	3.1	87	9.4	69
Demographic Indicators							
Demographic Index	18%	28%	27	29%	27	36%	26
People of Color Population	21%	24%	52	28%	46	39%	39
Low Income Population	15%	33%	17	30%	23	33%	24
Linguistically Isolated Population	2%	3%	64	3%	60	4%	57
Population With Less Than High School Education	3%	10%	20	9%	23	13%	18
Population Under 5 years of age	5%	6%	49	6%	44	6%	45
Population over 64 years of age	12%	17%	34	15%	41	15%	40

* The National-Scale Air Toxics Assessment (NATA) is EPA's ongoing, comprehensive evaluation of air toxics in the United States. EPA developed the NATA to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that NATA provides broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. More information on the NATA analysis can be found at: https://www.epa.gov/national-air-toxics-assessment.

For additional information, see: www.epa.gov/environmentaljustice

Attachment I: Air Quality Analysis Calculations

Airport Construction Emissions Inventory Tool (ACEIT)
Version 1.0
Run Date & Time: 3/1/2022 5:17:09 PM

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STUDY

Study Name

Acoustic Facility

Study Description

Acoustic Facility
No Demolition

==========
EMISSIONS INVENTORY - SUMMARY

Total Emissions by Year
Units for Non-Greenhouse Gases Emission: Short Ton
Units for Greenhouse Gases (CO2, CH4, and N2O) Emission: Metric Ton

Year	CO	NOx	SO2	PM10	PM2.5	VOC	CO2	CH4	N2O
2023	6.723668	1.091689	0.015549	0.20021	0.06291	1.064036	1376.823	0.096686	0.00884

Total Emissions by Source Categories
Units for Non-Greenhouse Gases Emission: Short Ton
Units for Greenhouse Gases Emission: Metric Ton

Year	Emission S	CO	NOx	SO2	PM10	PM2.5	VOC	CO2	CH4	N2O
2023	NonRoad	0.691821	0.808254	0.004237	0.055343	0.050916	0.296743	769.6933	--	--
2023	OnRoad	6.031847	0.283436	0.011313	0.01301	0.011994	0.396343	607.13	0.096686	0.00884
2023	Fugitive	0	0	0	0.131856	--	0.37095	--	--	--
2023	TOTAL	6.723668	1.091689	0.015549	0.20021	0.06291	1.064036	1376.823	0.096686	0.00884

==========
EMISSIONS INVENTORY - DETAILS:

Non-Road Sources
Units for Non-Greenhouse Gases Emission: Short Ton
Units for Greenhouse Gases (CO2, CH4, and N2O) Emission: Metric Ton

Scenario It	Year	Project	Constructi	Equipmen	Fuel	HP	Averag	Load Factc	Hours of A	CO	NOx	SO2	PM10	PM2.5	VOC	CO2	
1	2023	Building - :	Concrete F	Backhoe	Diesel	100	0.21	320.1	0.022897	0.016645	2.86E-05	0.002935	0.0027	0.003497	4.669359		
1	2023	Building - :	Concrete F	Concrete P	Diesel	600	0.59	60	0.003506	0.007812	6.08E-05	0.00028	0.000257	0.003272	11.39331		
1	2023	Building - :	Concrete F	Fork Truck	Diesel	100	0.59	320.1	0.008223	0.005859	5.99E-05	0.000217	0.0002	0.002899	11.25099		
1	2023	Building - :	Concrete F	Tool Truck	Diesel	600	0.59	80.1	0.00468	0.010429	8.11E-05	0.000373	0.000344	0.004365	15.21007		
1	2023	Building - :	Concrete F	Tractor Tr	Diesel	600	0.59	15.9	0.000929	0.00207	1.61E-05	7.41E-05	6.82E-05	0.000873	3.019227		
1	2023	Building - :	Constructi	Survey Cre	Diesel	600	0.59	9.9	0.000578	0.001289	1.00E-05	4.62E-05	4.25E-05	0.000547	1.879896		
1	2023	Building - :	Constructi	Tractor Tr	Diesel	600	0.59	3.9	0.000228	0.000508	3.95E-06	1.82E-05	1.67E-05	0.00022	0.740565		
1	2023	Building - :	Exterior W	Fork Truck	Diesel	100	0.59	600	0.015413	0.010982	0.000112	0.000407	0.000374	0.005435	21.08901		
1	2023	Building - :	Exterior W	Generator	Diesel	40	0.43	300	0.004715	0.021081	1.85E-05	0.000882	0.000811	0.001386	3.042513		
1	2023	Building - :	Exterior W	Man Lift	Diesel	75	0.21	600	0.032869	0.044404	4.21E-05	0.004207	0.00387	0.006259	6.56011		
1	2023	Building - :	Exterior W	Tool Truck	Diesel	600	0.59	150	0.008765	0.01953	0.000152	0.000699	0.000643	0.008167	28.48328		
1	2023	Building - :	Exterior W	Tractor Tr	Diesel	600	0.59	150	0.008765	0.01953	0.000152	0.000699	0.000643	0.008167	28.48328		
1	2023	Building - :	Interior Bu	Fork Truck	Diesel	100	0.59	2400	0.061654	0.04393	0.000449	0.001628	0.001498	0.021738	84.35606		
1	2023	Building - :	Interior Bu	Man Lift	Diesel	75	0.21	2400	0.131475	0.177614	0.000168	0.016826	0.01548	0.0249	26.24044		
1	2023	Building - :	Interior Bu	Tool Truck	Diesel	600	0.59	300	0.01753	0.039061	0.000304	0.001399	0.001287	0.016325	56.96655		
1	2023	Building - :	Interior Bu	Tractor Tr	Diesel	600	0.59	600	0.03506	0.078121	0.000608	0.002797	0.002573	0.032642	113.9331		
1	2023	Building - :	Roofing	High Lift	Diesel	100	0.59	120	0.003083	0.002196	2.24E-05	8.14E-05	7.49E-05	0.001087	4.217803		
1	2023	Building - :	Roofing	Man Lift (P	Diesel	75	0.21	24	0.001315	0.001776	1.68E-06	0.000168	0.000155	0.000294	0.262404		
1	2023	Building - :	Roofing	Material D	Diesel	600	0.59	60	0.003506	0.007812	6.08E-05	0.00028	0.000257	0.003272	11.39331		
1	2023	Building - :	Roofing	Tractor Tr	Diesel	600	0.59	60	0.003506	0.007812	6.08E-05	0.00028	0.000257	0.003272	11.39331		
1	2023	Building - :	Security &	High Lift	Diesel	100	0.59	800.1	0.020554	0.014645	0.00015	0.000543	0.000499	0.007247	28.1222		
1	2023	Building - :	Security &	Tool Truck	Diesel	600	0.59	200.1	0.011692	0.026053	0.000203	0.000933	0.000858	0.010892	37.99669		
1	2023	Building - :	Structural	90 Ton Cra	Diesel	300	0.43	320.1	0.00582	0.026844	0.00012	0.000977	0.000899	0.006612	21.9102		
1	2023	Building - :	Structural	Concrete F	Diesel	11	0.43	12	0.000278	0.000277	2.48E-07	2.33E-05	2.14E-05	3.95E-05	0.033405		
1	2023	Building - :	Structural	Concrete T	Diesel	600	0.59	24	0.001402	0.003125	2.43E-05	0.000112	0.000103	0.001314	4.557324		
1	2023	Building - :	Structural	Fork Truck	Diesel	100	0.59	80.1	0.002058	0.001466	1.50E-05	5.43E-05	5.00E-05	0.000726	2.815383		
1	2023	Building - :	Structural	Tool Truck	Diesel	600	0.59	12	0.000701	0.001562	1.22E-05	5.59E-05	5.15E-05	0.000661	2.278662		
1	2023	Building - :	Structural	Tractor Tr	Diesel	600	0.59	39.9	0.002331	0.005195	4.04E-05	0.000186	0.000171	0.002178	7.576551		
1	2023	Building - :	Structural	Trowel Ma	Diesel	600	0.59	12	0.00329	0.007696	1.38E-05	0.000475	0.000437	0.001035	2.278265		
1	2023	Drainage S	Drainage -	Dozer	Diesel	175	0.59	79.41176	0.001704	0.003669	2.37E-05	0.000218	0.000201	0.001288	4.398103		
1	2023	Drainage S	Drainage -	Dump Truc	Diesel	600	0.59	79.41176	0.00464	0.01034	8.04E-05	0.00037	0.000341	0.004328	15.07938		
1	2023	Drainage S	Drainage -	Excavator	Diesel	175	0.59	79.41176	0.001452	0.003106	2.35E-05	0.000144	0.000133	0.00127	4.398138		
1	2023	Drainage S	Drainage -	Loader	Diesel	175	0.59	79.41176	0.002197	0.005165	2.41E-05	0.000356	0.000327	0.001343	4.397981		
1	2023	Drainage S	Drainage -	Other Gen	Diesel	175	0.43	79.41176	0.001477	0.00531	1.78E-05	0.000314	0.000289	0.001039	3.170599		
1	2023	Drainage S	Drainage -	Pickup Tru	Diesel	600	0.59	79.41176	0.00464	0.01034	8.04E-05	0.00037	0.000341	0.004328	15.07938		
1	2023	Drainage S	Drainage -	Roller	Diesel	100	0.59	79.41176	0.003449	0.003322	1.53E-05	0.000279	0.000256	0.000787	2.79105		
1	2023	Drainage S	Drainage -	Dozer	Diesel	175	0.59	43.2	0.000927	0.001996	1.29E-05	0.000119	0.000109	0.000705	2.392568		
1	2023	Drainage S	Drainage -	Dump Truc	Diesel	600	0.59	43.2	0.002524	0.005625	4.37E-05	0.000201	0.000185	0.002358	8.203183		
1	2023	Drainage S	Drainage -	Excavator	Diesel	175	0.59	43.2	0.00079	0.00169	1.28E-05	7.84E-05	7.21E-05	0.000693	2.392587		
1	2023	Drainage S	Drainage -	Loader	Diesel	175	0.59	43.2	0.001195	0.00281	1.31E-05	0.000194	0.000178	0.00074	2.392502		
1	2023	Drainage S	Drainage -	Other Gen	Diesel	175	0.43	43.2	0.000804	0.002889	9.70E-06	0.000171	0.000157	0.00058	1.724806		
1	2023	Drainage S	Drainage -	Pickup Tru	Diesel	600	0.59	43.2	0.002524	0.005625	4.37E-05	0.000201	0.000185	0.002358	8.203183		
1	2023	Drainage S	Drainage -	Roller	Diesel	100	0.59	43.2	0.001876	0.001807	8.32E-06	0.000152	0.000139	0.000435	1.518331		
1	2023	Drainage S	Drainage S	Dump Truc	Diesel	600	0.59	10.8	0.000631	0.001406	1.09E-05	5.03E-05	4.63E-05	0.000596	2.050796		
1	2023	Drainage S	Drainage S	Excavator	Diesel	175	0.59	10.8	0.000197	0.000422	3.20E-06	1.96E-05	1.80E-05	0.000177	0.598147		
1	2023	Drainage S	Drainage S	Other Gen	Diesel	175	0.43	21.6	0.000402	0.001444	4.85E-06	8.55E-05	7.87E-05	0.000305	0.862403		
1	2023	Drainage S	Drainage S	Pickup Tru	Diesel	600	0.59	21.6	0.001262	0.002812	2.19E-05	0.000101	9.26E-05	0.001183	4.101592		
1	2023	Drainage S	Hydroseed	Hydroseed	Diesel	600	0.59	0.408	2.38E-05	5.31E-05	4.13E-07	1.90E-06	1.75E-06	3.06E-05	0.077475		
1	2023	Drainage S	Hydroseed	Off-Road T	Diesel	600	0.59	0.408	2.38E-05	5.31E-05	4.13E-07	1.90E-06	1.75E-06	3.06E-05	0.077475		
1	2023	Drainage S	Soil Erosio	Other Gen	Diesel	175	0.43	0.4	7.44E-06	2.67E-05	8.98E-08	1.58E-06	1.46E-06	3.63E-05	0.01597		
1	2023	Drainage S	Soil Erosio	Pickup Tru	Diesel	600	0.59	0.8	4.67E-05	0.000104	8.10E-07	3.73E-06	3.43E-06	5.19E-05	0.151911		
1	2023	Drainage S	Soil Erosio	Pumps	Diesel	11	0.43	0.4	9.28E-06	9.22E-06	8.27E-09	7.77E-07	7.15E-07	2.73E-06	0.001113		
1	2023	Drainage S	Soil Erosio	Tractors/Lo	Diesel	100	0.21	0.4	2.86E-05	2.08E-05	3.57E-08	3.67E-06	3.37E-06	0.000149	0.005835		
1	2023	Drainage S	Topsoil Pla	Dozer	Diesel	175	0.59	1.006667	2.16E-05	4.65E-05	3.01E-07	2.77E-06	2.55E-06	2.63E-05	0.055753		
1	2023	Drainage S	Topsoil Pla	Dump Truc	Diesel	600	0.59	1.006667	5.88E-05	0.000131	1.02E-06	4.69E-06	4.32E-06	6.31E-05	0.191154		
1	2023	Drainage S	Topsoil Pla	Pickup Tru	Diesel	600	0.59	1.006667	5.88E-05	0.000131	1.02E-06	4.69E-06	4.32E-06	6.31E-05	0.191154		
1	2023	Open Park	Binder Coa	Paving Ma	Diesel	175	0.59	16	0.000643	0.001551	5.00E-06	0.000129	0.000119	0.000321	0.886061		
1	2023	Open Park	Binder Coa	Ten Wheel	Diesel	600	0.59	16	0.000935	0.002083	1.62E-05	7.46E-05	6.86E-05	0.000879	3.038216		
1	2023	Open Park	Constructi	Survey Cre	Diesel	600	0.59	4	0.000234	0.000521	4.05E-06	1.86E-05	1.72E-05	0.000226	0.759554		
1	2023	Open Park	Constructi	Tractor Tr	Diesel	600	0.59	4	0.000234	0.000521	4.05E-06	1.86E-05	1.72E-05	0.000226	0.759554		
1	2023	Open Park	Curbing	Bob Cat	Diesel	75	0.21	24	0.001419	0.001758	1.68E-06	0.000198	0.000182	0.000363	0.262365		
1	2023	Open Park	Curbing	Concrete F	Diesel	600	0.59	24	0.001402	0.003125	2.43E-05	0.000112	0.000103	0.001314	4.557324		
1	2023	Open Park	Curbing	Material D	Diesel	600	0.59	24	0.001402	0.003125	2.43E-05	0.000112	0.000103	0.001314	4.557324		
1	2023	Open Park	Curbing	Tractor Tr	Diesel	600	0.59	24	0.001402	0.003125	2.43E-05	0.000112	0.000103	0.001314	4.557324		
1	2023	Open Park	Grub the s	Bulldozer	Diesel	175	0.59	16	0.000343	0.000739	4.78E-06	4.40E-05	4.05E-05	0.000268	0.886136		
1	2023	Open Park	Grub the s	Front Load	Diesel	100	0.21	16	0.001144	0.000832	1.43E-06	0.000147	0.000135	0.000312	0.233395		
1	2023	Open Park	Grub the s	Ten Wheel	Diesel	600	0.59	16	0.000935	0.002083	1.62E-05	7.46E-05	6.86E-05	0.000879	3.038216		
1	2023	Open Park	Lighting Pr	Auger Drill	Diesel	175	0.43	24	0.001265	0.00465	6.02E-06	0.000293	0.00027	0.000557	0.957758		
1	2023	Open Park	Lighting Pr	Fork Truck	Diesel	100	0.59	24	0.000617	0.000439	4.49E-06	1.63E-05	1.50E-05	0.000217	0.843561		
1	2023	Open Park	Lighting Pr	Front Load	Diesel	100	0.21	24	0.001717	0.001248	2.14E-06	0.00022	0.000202	0.000396	0.350093		
1	2023	Open Park	Lighting Pr	Tractor Tr	Diesel	600	0.59	12	0.000701	0.001562	1.22E-05	5.59E-05	5.15E-05	0.000661	2.278662		
1	2023	Open Park	Remove Tr	Bulldozer	Diesel	175	0.59	40	0.000858	0.001848	1.19E-05	0.00011	0.000101	0.000654	2.215341		
1	2023	Open Park	Remove Tr	Chain Saw	Diesel	11	0.7	24	0.059795	0.00027	2.86E-05	0.001986	0.001827	0.020131	0.126772	*** GASOLINE DATA USED. DIESEL DATA NOT AVAILABLE ***	
1	2023	Open Park	Remove Tr	Flat Bed or	Diesel	600	0.59	40	0.002337	0.005208	4.05E-05	0.000186	0.000172	0.002184	7.59554		
1	2023	Open Park	Remove Tr	Log Chippe	Diesel	100	0.43	24	0.001535	0.002659	3.79E-06	0.000253	0.000232	0.000427	0.608379		
1	2023	Open Park	Remove Tr	Mulcher	Diesel	100	0.43	24	0.001535	0.002659	3.79E-06	0.000253	0.000232	0.000427	0.608379		
1	2023	Open Park	Remove Tr	Tractor	Diesel	100	0.21	40	0.002861	0.00208	3.57E-06	0.000367	0.000337	0.000564	0.583488		
1	2023	Open Park	Rough Gra	Compactin	Diesel	6	0.43	16	0.000203	0.000198	1.81E-07	1.64E-05	1.51E-05	2.76E-05	0.024296		
1	2023	Open Park	Rough Gra	Small Doze	Diesel	175	0.59	16	0.000343	0.000739	4.78E-06	4.40E-05	4.05E-05	0.000268	0.886136		
1	2023	Open Park	Set in-plac	40 Ton Rot	Diesel	300	0.43	16	0.000291	0.001342	5.98E-06	4.88E-05	4.49E-05	0.000358	1.095168		
1	2023	Open Park	Set in-plac	High Lift	Diesel	100	0.59	16	0.000411	0.000293	2.99E-06	1.09E-05	9.99E-06	0.000145	0.562374		
1	2023	Open Park	Set in-plac	Tractor Tr	Diesel	600	0.59	16	0.000935	0.002083	1.62E-05	7.46E-05	6.86E-05	0.000879	3.038216		
1	2023	Open Park	Stripping	Line Painti	Diesel	600	0.59	8	0.000467	0.001042	8.10E-06	3.73E-05	3.43E-05	0.000443	1.519108		
1	2023	Open Park	Subgrade I	Backhoe	Diesel	100	0.21	16	0.001144	0.000832	1.43E-06	0.000147	0.000135	0.000312	0.233395		
1	2023	Open Park	Subgrade I	Roller	Diesel	100	0.59	16	0.000695	0.000669	3.08E-06	5.61E-05	5.16E-05	0.000171	0.562345		
1	2023	Open Park	Subgrade I	Tractor Tr	Diesel	600	0.59	16	0.000935	0.002083	1.62E-05	7.46E-05	6.86E-05	0.000879	3.038216		
1	2023	Open Park	Top Coat c	Paving Ma	Diesel	175	0.59	16	0.000643	0.001551	5.00E-06	0.000129	0.000119	0.000321	0.886061		
1	2023	Open Park	Top Coat c	Ten Wheel	Diesel	600	0.59	16	0.000935	0.002083	1.62E-05	7.46E-05	6.86E-05	0.000879	3.038216		
1	2023	Open Park	Undergrou	Backhoe	Diesel	100	0.21	24	0.001717	0.001248	2.14E-06	0.00022	0.000202	0.000396	0.350093		
1	2023	Open Park	Undergrou	Fork Truck	Diesel	100	0.59	24	0.000617	0.000439	4.49E-06	1.63E-05	1.50E-05	0.000217	0.843561		
1	2023	Open Park	Undergrou	Tractor Tr	Diesel	600	0.59	12	0.000701	0.001562	1.22E-05	5.59E-05	5.15E-05	0.000661	2.278662		
1	2023	Site Work	Constructi	Survey Cre	Diesel	600	0.59	10	0.000584	0.001302	1.01E-05	4.66E-05	4.29E-05	0.000552	1.898885		
1	2023	Site Work	Constructi	Tractor Tr	Diesel	600	0.59	4	0.000234	0.000521	4.05E-06	1.86E-05	1.72E-05	0.000226	0.759554		
1	2023	Site Work	Site Clearii	Bulldozer	Diesel	175	0.59	40	0.000858	0.001848	1.19E-05	0.00011	0.000101	0.000654	2.215341		

1	2023	Site Work	Site Clearii	Chain Saw	Diesel	11	0.7	40	0.099659	0.000449	4.76E-05	0.00331	0.003045	0.028536	0.211287	*** GASOLINE DATA USED. DIESEL DATA NOT AVAILABLE ***
1	2023	Site Work	Site Clearii	Flat Bed oi	Diesel	600	0.59	80	0.004675	0.010416	8.10E-05	0.000373	0.000343	0.00436	15.19108	
1	2023	Site Work	Site Clearii	Front Load	Diesel	100	0.21	40	0.002861	0.00208	3.57E-06	0.000367	0.000337	0.000564	0.583488	
1	2023	Site Work	Site Clearii	Grub the s	Diesel	40	0.59	40	0.0003	0.003183	3.02E-06	2.97E-05	2.74E-05	0.000149	0.562362	
1	2023	Site Work	Site Clearii	Log Chippe	Diesel	100	0.43	40	0.002559	0.004432	6.32E-06	0.000421	0.000387	0.000641	1.013965	
1	2023	Site Work	Site Clearii	Mulcher	Diesel	100	0.43	40	0.002559	0.004432	6.32E-06	0.000421	0.000387	0.000641	1.013965	
1	2023	Site Work	Site Clearii	Ten Whee	Diesel	600	0.59	40	0.002337	0.005208	4.05E-05	0.000186	0.000172	0.002184	7.59554	
1	2023	Site Work	Site Clearii	Tractor	Diesel	100	0.21	80	0.005722	0.00416	7.15E-06	0.000734	0.000675	0.000983	1.166975	
1	2023	Site Work	Site Restoi	Bob Cat	Diesel	75	0.21	24	0.001419	0.001758	1.68E-06	0.000198	0.000182	0.000363	0.262365	
1	2023	Site Work	Site Restoi	Concrete F	Diesel	600	0.59	24	0.001402	0.003125	2.43E-05	0.000112	0.000103	0.001314	4.557324	
1	2023	Site Work	Site Restoi	Tractor Tra	Diesel	600	0.59	24	0.001402	0.003125	2.43E-05	0.000112	0.000103	0.001314	4.557324	
1	2023	Site Work	Site Restoi	Compactir	Diesel	6	0.43	24	0.000304	0.000297	2.71E-07	2.46E-05	2.26E-05	4.11E-05	0.036444	
1	2023	Site Work	Site Restoi	Small Doze	Diesel	175	0.59	24	0.000515	0.001109	7.17E-06	6.60E-05	6.07E-05	0.000396	1.329205	
1	2023	Site Work	Site Restoi	Forktruck (	Diesel	100	0.59	80	0.002055	0.001464	1.50E-05	5.43E-05	4.99E-05	0.000725	2.811869	
1	2023	Site Work	Site Restoi	Roller	Diesel	100	0.59	40	0.001737	0.001673	7.70E-06	0.00014	0.000129	0.000404	1.405862	
1	2023	Site Work	Site Restoi	Seed Truck	Diesel	600	0.59	16	0.000935	0.002083	1.62E-05	7.46E-05	6.86E-05	0.000879	3.038216	
1	2023	Site Work	Site Restoi	Tractor Tra	Diesel	600	0.59	80	0.004675	0.010416	8.10E-05	0.000373	0.000343	0.00436	15.19108	
1	2023	Site Work	Undergrou	Backhoe	Diesel	100	0.21	120	0.008584	0.00624	1.07E-05	0.0011	0.001012	0.001402	1.750463	
1	2023	Site Work	Undergrou	Fork Truck	Diesel	100	0.59	60	0.001541	0.001098	1.12E-05	4.07E-05	3.74E-05	0.000543	2.108901	
1	2023	Site Work	Undergrou	Tractor Tra	Diesel	600	0.59	30	0.001753	0.003906	3.04E-05	0.00014	0.000129	0.00164	5.696655	

On-Road Sources
Units for Non-Greenhouse Gases Emission: Short Ton
Units for Greenhouse Gases (CO2, CH4, and N2O) Emission: Metric Ton

Scenario ID	Year	Project	Equipmen	Equipmen	On-road A	Fuel	Roadway T	Round Trip	Distance fo	Number of	Number of	Number of	Project Len	Project Wi	Project Are	Building H	Open Spac	Number of	Activity Ra	VMT	CO	NOx	SO2	PM10	PM2.5	VOC	CO2	CH4	N2O
1	2023	Building -	Cement M	Single Unit	Material D	Diesel	Urban Unr	40	5	1	--	258	--	--	30000	--	--	--	--	6938	0.008129	0.008228	6.78E-05	0.000131	0.000127	0.000363	8.992272	0.000557	0.000494
1	2023	Building -	Dump Truc	Single Unit	Material D	Diesel	Urban Unr	40	5	1	--	258	--	--	30000	--	--	--	--	3700	0.006683	0.004561	3.64E-05	6.97E-05	6.76E-05	0.000351	4.824773	0.000297	0.000264
1	2023	Building -	Passenger	Passenger	Employee	Gasoline	Urban Unr	30	--	198	198	258	--	--	--	--	--	--	--	1532520	5.230167	0.229947	0.009751	0.011111	0.010231	0.335236	512.9702	0.083428	0.006838
1	2023	Building -	Tractor Tra	Combinati	Material D	Diesel	Urban Unr	40	5	1	--	258	--	--	30000	--	--	--	0.00053	159	0.006204	0.000919	3.48E-06	6.63E-06	6.43E-06	0.003733	0.46127	1.97E-05	1.16E-05
1	2023	Drainage S	Passenger	Passenger	Employee	Gasoline	Urban Unr	30	--	27	27	258	--	--	--	--	--	--	--	208980	0.713205	0.031356	0.00133	0.001515	0.001395	0.045714	69.95049	0.011377	0.000932
1	2023	Open Park	Dump Truc	Single Unit	Material D	Diesel	Urban Unr	40	5	1	--	258	--	--	10000	--	--	--	--	1233	0.005581	0.001766	1.24E-05	2.33E-05	2.26E-05	0.000342	1.649597	9.90E-05	8.79E-05
1	2023	Open Park	Passenger	Passenger	Employee	Gasoline	Urban Unr	30	--	0.55	0.55	258	--	--	--	--	--	--	--	4257	0.014528	0.000639	2.71E-05	3.09E-05	2.84E-05	0.000931	1.424917	0.000232	1.90E-05
1	2023	Open Park	Tractor Tra	Combinati	Material D	Diesel	Urban Unr	40	5	1	--	258	--	--	10000	--	--	--	0.0012	120	0.006185	0.000845	2.78E-06	5.01E-06	4.86E-06	0.003733	0.368338	1.49E-05	8.73E-06
1	2023	Site Work	Dump Truc	Single Unit	Material D	Diesel	Urban Unr	40	5	1	--	258	--	--	10000	--	--	--	--	1233	0.005581	0.001766	1.24E-05	2.33E-05	2.26E-05	0.000342	1.649597	9.90E-05	8.79E-05
1	2023	Site Work	Passenger	Passenger	Employee	Gasoline	Urban Unr	30	--	1.1	1.1	258	--	--	--	--	--	--	--	8514	0.029056	0.001277	5.42E-05	6.17E-05	5.68E-05	0.001862	2.849835	0.000463	3.80E-05
1	2023	Site Work	Tractor Tra	Combinati	Material D	Diesel	Urban Unr	40	5	1	--	258	--	--	10000	--	--	--	0.008	800	0.006528	0.002131	1.50E-05	3.32E-05	3.22E-05	0.003736	1.988689	9.91E-05	5.82E-05

Fugitive Sources
Units for Non-Greenhouse Gases Emission: Short Ton

Scenario ID	Year	Project	Fugitive Sc	Number of	CO	NOx	SO2	PM10	VOC
1	2023	Building -	Concrete M	12	0	0	0	0.02565	0
1	2023	Building -	Material M	12	0	0	0	0.01195	0
1	2023	Building -	Material M	12	0	0	0	0.03535	0
1	2023	Drainage S	Material M	12	0	0	0	0	0
1	2023	Drainage S	Material M	12	0	0	0	0.004299	0
1	2023	Drainage S	Soil Handli	12	0	0	0	0.001147	0
1	2023	Drainage S	Unstabilize	12	0	0	0	1.63E-09	0
1	2023	Open Park	Asphalt Dr	12	0	0	0	0	0.37095
1	2023	Open Park	Material M	12	0	0	0	0.006	0
1	2023	Open Park	Material M	12	0	0	0	0.0178	0
1	2023	Open Park	Soil Handli	12	0	0	0	0.002831	0
1	2023	Open Park	Unstabilize	12	0	0	0	4.03E-09	0
1	2023	Site Work	Material M	12	0	0	0	0.006	0
1	2023	Site Work	Material M	12	0	0	0	0.018	0
1	2023	Site Work	Soil Handli	12	0	0	0	0.002831	0
1	2023	Site Work	Unstabilize	12	0	0	0	4.03E-09	0

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INPUT DATA AND SPECIFICATIONS

State/County
Oregon
Multnomah County

Scenarios

Scenario ID	Year	Number of	Season	Average D	Max Daily	Min Daily Temp Change (degF)
1	2023	12	Summer	50 < T <= 8	20 <= Char	0 <= Change in T < 10
2						

Project Final Selections

Scenario ID	Project	Constructi	Equipmen	Fuel Type
1	Building -	Concrete F	Backhoe	Diesel
1	Building -	Concrete F	Concrete F	Diesel
1	Building -	Concrete F	Fork Truck	Diesel
1	Building -	Concrete F	Tool Truck	Diesel
1	Building -	Concrete F	Tractor Tra	Diesel
1	Building -	Constructi	Survey Cre	Diesel
1	Building -	Constructi	Tractor Tra	Diesel
1	Building -	Exterior W	Fork Truck	Diesel
1	Building -	Exterior W	Generator	Diesel
1	Building -	Exterior W	Man Lift	Diesel
1	Building -	Exterior W	Tool Truck	Diesel
1	Building -	Exterior W	Tractor Tra	Diesel
1	Building -	Interior Bu	Fork Truck	Diesel
1	Building -	Interior Bu	Man Lift	Diesel
1	Building -	Interior Bu	Tool Truck	Diesel
1	Building -	Interior Bu	Tractor Tra	Diesel
1	Building -	Roofing	High Lift	Diesel
1	Building -	Roofing	Man Lift (F	Diesel
1	Building -	Roofing	Material D	Diesel
1	Building -	Roofing	Tractor Tra	Diesel
1	Building -	Security &	High Lift	Diesel
1	Building -	Security &	Tool Truck	Diesel
1	Building -	Structural	90 Ton Cra	Diesel
1	Building -	Structural	Concrete F	Diesel
1	Building -	Structural	Concrete T	Diesel
1	Building -	Structural	Fork Truck	Diesel
1	Building -	Structural	Tool Truck	Diesel
1	Building -	Structural	Tractor Tra	Diesel
1	Building -	Structural	Trowel Ma	Diesel
1	Drainage S	Drainage -	Dozer	Diesel
1	Drainage S	Drainage -	Dump Truc	Diesel
1	Drainage S	Drainage -	Excavator	Diesel
1	Drainage S	Drainage -	Loader	Diesel
1	Drainage S	Drainage -	Other Gen	Diesel
1	Drainage S	Drainage -	Pickup Tru	Diesel
1	Drainage S	Drainage -	Roller	Diesel
1	Drainage S	Drainage -	Dozer	Diesel
1	Drainage S	Drainage -	Dump Truc	Diesel
1	Drainage S	Drainage -	Excavator	Diesel
1	Drainage S	Drainage -	Loader	Diesel
1	Drainage S	Drainage -	Other Gen	Diesel
1	Drainage S	Drainage -	Pickup Tru	Diesel
1	Drainage S	Drainage -	Roller	Diesel
1	Drainage S	Drainage S	Dump Truc	Diesel
1	Drainage S	Drainage S	Excavator	Diesel
1	Drainage S	Drainage S	Other Gen	Diesel
1	Drainage S	Drainage S	Pickup Tru	Diesel
1	Drainage S	Hydroseec	Hydroseec	Diesel
1	Drainage S	Hydroseec	Off-Road T	Diesel
1	Drainage S	Soil Erosio	Other Gen	Diesel
1	Drainage S	Soil Erosio	Pickup Tru	Diesel
1	Drainage S	Soil Erosio	Pumps	Diesel
1	Drainage S	Soil Erosio	Tractors/L	Diesel
1	Drainage S	Topsoil Pla	Dozer	Diesel
1	Drainage S	Topsoil Pla	Dump Truc	Diesel
1	Drainage S	Topsoil Pla	Pickup Tru	Diesel
1	Open Park	Binder Coa	Paving Ma	Diesel
1	Open Park	Binder Coa	Ten Whee	Diesel
1	Open Park	Constructi	Survey Cre	Diesel
1	Open Park	Constructi	Tractor Tra	Diesel
1	Open Park	Curbing	Bob Cat	Diesel
1	Open Park	Curbing	Concrete F	Diesel
1	Open Park	Curbing	Material D	Diesel
1	Open Park	Curbing	Tractor Tra	Diesel

1	Open Park	Grub the s	Bulldozer	Diesel		
1	Open Park	Grub the s	Front Load	Diesel		
1	Open Park	Grub the s	Ten Wheel	Diesel		
1	Open Park	Lighting Pr	Auger Drill	Diesel		
1	Open Park	Lighting Pr	Fork Truck	Diesel		
1	Open Park	Lighting Pr	Front Load	Diesel		
1	Open Park	Lighting Pr	Tractor Tra	Diesel		
1	Open Park	Remove Ti	Bulldozer	Diesel		
1	Open Park	Remove Ti	Chain Saw	Diesel	*** GASOLINE DATA USED. DIESEL DATA NOT AVAILABLE ***	
1	Open Park	Remove Ti	Flat Bed or	Diesel		
1	Open Park	Remove Ti	Log Chippe	Diesel		
1	Open Park	Remove Ti	Mulcher	Diesel		
1	Open Park	Remove Ti	Tractor	Diesel		
1	Open Park	Rough Gra	Compactin	Diesel		
1	Open Park	Rough Gra	Small Doze	Diesel		
1	Open Park	Set in-plac	40 Ton Rot	Diesel		
1	Open Park	Set in-plac	High Lift	Diesel		
1	Open Park	Set in-plac	Tractor Tra	Diesel		
1	Open Park	Stripping	Line Painti	Diesel		
1	Open Park	Subgrade I	Backhoe	Diesel		
1	Open Park	Subgrade I	Roller	Diesel		
1	Open Park	Subgrade I	Tractor Tra	Diesel		
1	Open Park	Top Coat c	Paving Ma	Diesel		
1	Open Park	Top Coat c	Ten Wheel	Diesel		
1	Open Park	Undergrou	Backhoe	Diesel		
1	Open Park	Undergrou	Fork Truck	Diesel		
1	Open Park	Undergrou	Tractor Tra	Diesel		
1	Site Work	Constructi	Survey Cre	Diesel		
1	Site Work	Constructi	Tractor Tra	Diesel		
1	Site Work	Site Clearii	Bulldozer	Diesel		
1	Site Work	Site Clearii	Chain Saw	Diesel	*** GASOLINE DATA USED. DIESEL DATA NOT AVAILABLE ***	
1	Site Work	Site Clearii	Flat Bed or	Diesel		
1	Site Work	Site Clearii	Front Load	Diesel		
1	Site Work	Site Clearii	Grub the s	Diesel		
1	Site Work	Site Clearii	Log Chippe	Diesel		
1	Site Work	Site Clearii	Mulcher	Diesel		
1	Site Work	Site Clearii	Ten Wheel	Diesel		
1	Site Work	Site Clearii	Tractor	Diesel		
1	Site Work	Site Restor	Bob Cat	Diesel		
1	Site Work	Site Restor	Concrete F	Diesel		
1	Site Work	Site Restor	Tractor Tra	Diesel		
1	Site Work	Site Restor	Compactin	Diesel		
1	Site Work	Site Restor	Small Doze	Diesel		
1	Site Work	Site Restor	Forktruck I	Diesel		
1	Site Work	Site Restor	Roller	Diesel		
1	Site Work	Site Restor	Seed Truck	Diesel		
1	Site Work	Site Restor	Tractor Tra	Diesel		
1	Site Work	Undergrou	Backhoe	Diesel		
1	Site Work	Undergrou	Fork Truck	Diesel		
1	Site Work	Undergrou	Tractor Tra	Diesel		

Overall Size

Scenario ID	Project	Project Siz	User Input	Unit
1	Building - :	What is th	18	$ Million(s)
1	Drainage S	What is th	0.1	$ Million(s)
1	Drainage S	What is th	9.5	Feet
1	Drainage S	What is th	1350	Feet
1	Drainage S	What is th	3	Feet
1	Open Park	What is th	0.05	$ Million(s)
1	Site Work	What is th	0.1	$ Million(s)

Size Detail (Estimated based on engineering experience)

ScenarioID	Project	Constructi	Default Ac	Unit	User Activity Size
1	Drainage S	Drainage -	1350	Linear Feet	
1	Drainage S	Drainage -	1350	Linear Feet	
1	Drainage S	Drainage S	2.7	Units	
1	Drainage S	Hydroseec	4080	Square Feet	
1	Drainage S	Soil Erosio	0.1	Acres	
1	Drainage S	Topsoil Pla	75.5	Cubic Yards	

Activity: Non-Road (Estimated based on engineering experience)

Scenario ID	Project	Constructi	Equipmen	Fuel Type	Activity Siz	Activity Ra	Default Ac	Activity Ur	User Activity Data
1	Building - :	Concrete F	Backhoe	Diesel	30000.00	0.01067	320.1	hours	
1	Building - :	Concrete F	Concrete F	Diesel	30000.00	0.002	60	hours	
1	Building - :	Concrete F	Fork Truck	Diesel	30000.00	0.01067	320.1	hours	
1	Building - :	Concrete F	Tool Truck	Diesel	30000.00	0.00267	80.1	hours	
1	Building - :	Concrete F	Tractor Tra	Diesel	30000.00	0.00053	15.9	hours	
1	Building - :	Constructi	Survey Cre	Diesel	30000.00	0.00033	9.9	hours	
1	Building - :	Constructi	Tractor Tra	Diesel	30000.00	0.00013	3.9	hours	
1	Building - :	Exterior W	Fork Truck	Diesel	30000.00	0.02	600	hours	
1	Building - :	Exterior W	Generator	Diesel	30000.00	0.01	300	hours	
1	Building - :	Exterior W	Man Lift	Diesel	30000.00	0.02	600	hours	
1	Building - :	Exterior W	Tool Truck	Diesel	30000.00	0.005	150	hours	
1	Building - :	Exterior W	Tractor Tra	Diesel	30000.00	0.005	150	hours	
1	Building - :	Interior Bu	Fork Truck	Diesel	30000.00	0.08	2400	hours	
1	Building - :	Interior Bu	Man Lift	Diesel	30000.00	0.08	2400	hours	
1	Building - :	Interior Bu	Tool Truck	Diesel	30000.00	0.01	300	hours	
1	Building - :	Interior Bu	Tractor Tra	Diesel	30000.00	0.02	600	hours	
1	Building - :	Roofing	High Lift	Diesel	30000.00	0.004	120	hours	
1	Building - :	Roofing	Man Lift (F	Diesel	30000.00	0.0008	24	hours	
1	Building - :	Roofing	Material D	Diesel	30000.00	0.002	60	hours	
1	Building - :	Roofing	Tractor Tra	Diesel	30000.00	0.002	60	hours	
1	Building - :	Security &	High Lift	Diesel	30000.00	0.02667	800.1	hours	
1	Building - :	Security &	Tool Truck	Diesel	30000.00	0.00667	200.1	hours	
1	Building - :	Structural	90 Ton Cra	Diesel	30000.00	0.01067	320.1	hours	
1	Building - :	Structural	Concrete F	Diesel	30000.00	0.0004	12	hours	
1	Building - :	Structural	Concrete T	Diesel	30000.00	0.0008	24	hours	
1	Building - :	Structural	Fork Truck	Diesel	30000.00	0.00267	80.1	hours	
1	Building - :	Structural	Tool Truck	Diesel	30000.00	0.0004	12	hours	
1	Building - :	Structural	Tractor Tra	Diesel	30000.00	0.00133	39.9	hours	
1	Building - :	Structural	Trowel Ma	Diesel	30000.00	0.0004	12	hours	
1	Drainage S	Drainage -	Dozer	Diesel	1350.00	LF	8	Hours pe	79.41 hours
1	Drainage S	Drainage -	Dump Truc	Diesel	1350.00	LF	8	Hours pe	79.41 hours
1	Drainage S	Drainage -	Excavator	Diesel	1350.00	LF	8	Hours pe	79.41 hours
1	Drainage S	Drainage -	Loader	Diesel	1350.00	LF	8	Hours pe	79.41 hours
1	Drainage S	Drainage -	Other Gen	Diesel	1350.00	LF	8	Hours pe	79.41 hours
1	Drainage S	Drainage -	Pickup Tru	Diesel	1350.00	LF	8	Hours pe	79.41 hours
1	Drainage S	Drainage -	Roller	Diesel	1350.00	LF	8	Hours pe	79.41 hours
1	Drainage S	Drainage -	Dozer	Diesel	1350.00	LF	8	Hours pe	43.2 hours
1	Drainage S	Drainage -	Dump Truc	Diesel	1350.00	LF	8	Hours pe	43.2 hours
1	Drainage S	Drainage -	Excavator	Diesel	1350.00	LF	8	Hours pe	43.2 hours
1	Drainage S	Drainage -	Loader	Diesel	1350.00	LF	8	Hours pe	43.2 hours
1	Drainage S	Drainage -	Other Gen	Diesel	1350.00	LF	8	Hours pe	43.2 hours
1	Drainage S	Drainage -	Pickup Tru	Diesel	1350.00	LF	8	Hours pe	43.2 hours
1	Drainage S	Drainage -	Roller	Diesel	1350.00	LF	8	Hours pe	43.2 hours
1	Drainage S	Drainage S	Dump Truc	Diesel	2.70	Unit	4	Hours pe	10.8 hours
1	Drainage S	Drainage S	Excavator	Diesel	2.70	Unit	8	Hours pe	10.8 hours
1	Drainage S	Drainage S	Other Gen	Diesel	2.70	Unit	8	Hours pe	21.6 hours
1	Drainage S	Drainage S	Pickup Tru	Diesel	2.70	Unit	8	Hours pe	21.6 hours
1	Drainage S	Hydroseec	Hydroseed	Diesel	4080.00	SF	8	Hours pe	0.41 hours
1	Drainage S	Hydroseec	Off-Road T	Diesel	4080.00	SF	8	Hours pe	0.41 hours
1	Drainage S	Soil Erosio	Other Gen	Diesel	0.10	Acre	4	Hours pe	0.4 hours
1	Drainage S	Soil Erosio	Pickup Tru	Diesel	0.10	Acre	8	Hours pe	0.8 hours
1	Drainage S	Soil Erosio	Pumps	Diesel	0.10	Acre	4	Hours pe	0.4 hours
1	Drainage S	Soil Erosio	Tractors/L	Diesel	0.10	Acre	4	Hours pe	0.4 hours
1	Drainage S	Topsoil Pla	Dozer	Diesel	75.50	CY	8	Hours pe	1.01 hours
1	Drainage S	Topsoil Pla	Dump Truc	Diesel	75.50	CY	8	Hours pe	1.01 hours
1	Drainage S	Topsoil Pla	Pickup Tru	Diesel	75.50	CY	8	Hours pe	1.01 hours
1	Open Park	Binder Coa	Paving Ma	Diesel	10000.00	0.0016	16	hours	
1	Open Park	Binder Coa	Ten Wheel	Diesel	10000.00	0.0016	16	hours	
1	Open Park	Constructi	Survey Cre	Diesel	10000.00	0.0004	4	hours	
1	Open Park	Constructi	Tractor Tra	Diesel	10000.00	0.0004	4	hours	
1	Open Park	Curbing	Bob Cat	Diesel	10000.00	0.0024	24	hours	
1	Open Park	Curbing	Concrete F	Diesel	10000.00	0.0024	24	hours	
1	Open Park	Curbing	Material D	Diesel	10000.00	0.0024	24	hours	
1	Open Park	Curbing	Tractor Tra	Diesel	10000.00	0.0024	24	hours	

1	Open Park	Grub the s	Bulldozer	Diesel	10000.00	0.0016 Ho	16	hours	
1	Open Park	Grub the s	Front Load	Diesel	10000.00	0.0016 Ho	16	hours	
1	Open Park	Grub the s	Ten Whee	Diesel	10000.00	0.0016 Ho	16	hours	
1	Open Park	Lighting Pr	Auger Drill	Diesel	10000.00	0.0024 Ho	24	hours	
1	Open Park	Lighting Pr	Fork Truck	Diesel	10000.00	0.0024 Ho	24	hours	
1	Open Park	Lighting Pr	Front Load	Diesel	10000.00	0.0024 Ho	24	hours	
1	Open Park	Lighting Pr	Tractor Tra	Diesel	10000.00	0.0012 Ho	12	hours	
1	Open Park	Remove Tr	Bulldozer	Diesel	10000.00	0.004 Hou	40	hours	
1	Open Park	Remove Tr	Chain Saw	Diesel	10000.00	0.0024 Ho	24	hours	*** GASOLINE DATA USED. DIESEL DATA NOT AVAILABLE ***
1	Open Park	Remove Tr	Flat Bed or	Diesel	10000.00	0.004 Hou	40	hours	
1	Open Park	Remove Tr	Log Chippe	Diesel	10000.00	0.0024 Ho	24	hours	
1	Open Park	Remove Tr	Mulcher	Diesel	10000.00	0.0024 Ho	24	hours	
1	Open Park	Remove Tr	Tractor	Diesel	10000.00	0.004 Hou	40	hours	
1	Open Park	Rough Gra	Compactin	Diesel	10000.00	0.0016 Ho	16	hours	
1	Open Park	Rough Gra	Small Doze	Diesel	10000.00	0.0016 Ho	16	hours	
1	Open Park	Set in-plac	40 Ton Ro	Diesel	10000.00	0.0016 Ho	16	hours	
1	Open Park	Set in-plac	High Lift	Diesel	10000.00	0.0016 Ho	16	hours	
1	Open Park	Set in-plac	Tractor Tra	Diesel	10000.00	0.0016 Ho	16	hours	
1	Open Park	Stripping	Line Painti	Diesel	10000.00	0.0008 Ho	8	hours	
1	Open Park	Subgrade I	Backhoe	Diesel	10000.00	0.0016 Ho	16	hours	
1	Open Park	Subgrade I	Roller	Diesel	10000.00	0.0016 Ho	16	hours	
1	Open Park	Subgrade I	Tractor Tra	Diesel	10000.00	0.0016 Ho	16	hours	
1	Open Park	Top Coat c	Paving Ma	Diesel	10000.00	0.0016 Ho	16	hours	
1	Open Park	Top Coat c	Ten Whee	Diesel	10000.00	0.0016 Ho	16	hours	
1	Open Park	Undergrou	Backhoe	Diesel	10000.00	0.0024 Ho	24	hours	
1	Open Park	Undergrou	Fork Truck	Diesel	10000.00	0.0024 Ho	24	hours	
1	Open Park	Undergrou	Tractor Tra	Diesel	10000.00	0.0012 Ho	12	hours	
1	Site Work	Constructi	Survey Cre	Diesel	10000.00	0.001 Hou	10	hours	
1	Site Work	Constructi	Tractor Tra	Diesel	10000.00	0.0004 Ho	4	hours	
1	Site Work	Site Cleari	Bulldozer	Diesel	10000.00	0.004 Hou	40	hours	
1	Site Work	Site Cleari	Chain Saw	Diesel	10000.00	0.004 Hou	40	hours	*** GASOLINE DATA USED. DIESEL DATA NOT AVAILABLE ***
1	Site Work	Site Cleari	Flat Bed or	Diesel	10000.00	0.008 Hou	80	hours	
1	Site Work	Site Cleari	Front Load	Diesel	10000.00	0.004 Hou	40	hours	
1	Site Work	Site Cleari	Grub the s	Diesel	10000.00	0.004 Hou	40	hours	
1	Site Work	Site Cleari	Log Chippe	Diesel	10000.00	0.004 Hou	40	hours	
1	Site Work	Site Cleari	Mulcher	Diesel	10000.00	0.004 Hou	40	hours	
1	Site Work	Site Cleari	Ten Whee	Diesel	10000.00	0.004 Hou	40	hours	
1	Site Work	Site Cleari	Tractor	Diesel	10000.00	0.008 Hou	80	hours	
1	Site Work	Site Resto	Bob Cat	Diesel	10000.00	0.0024 Ho	24	hours	
1	Site Work	Site Resto	Concrete F	Diesel	10000.00	0.0024 Ho	24	hours	
1	Site Work	Site Resto	Tractor Tra	Diesel	10000.00	0.0024 Ho	24	hours	
1	Site Work	Site Resto	Compactin	Diesel	10000.00	0.0024 Ho	24	hours	
1	Site Work	Site Resto	Small Doze	Diesel	10000.00	0.0024 Ho	24	hours	
1	Site Work	Site Resto	Forktruck (	Diesel	10000.00	0.008 Hou	80	hours	
1	Site Work	Site Resto	Roller	Diesel	10000.00	0.004 Hou	40	hours	
1	Site Work	Site Resto	Seed Truck	Diesel	10000.00	0.0016 Ho	16	hours	
1	Site Work	Site Resto	Tractor Tra	Diesel	10000.00	0.008 Hou	80	hours	
1	Site Work	Undergrou	Backhoe	Diesel	10000.00	0.012 Hou	120	hours	
1	Site Work	Undergrou	Fork Truck	Diesel	10000.00	0.006 Hou	60	hours	
1	Site Work	Undergrou	Tractor Tra	Diesel	10000.00	0.003 Hou	30	hours	

Activity: On-Road (Estimated based on engineering experience)

Scenario ID	Project	Equipmen	On-road A	Fuel	Roadway T	Round Trip	Number of	Number of	Project Len	Project Wi	Project Are	Building H	Open Spac	Number of	Activity Siz	Activity Ra	Default VM	User VMT
1	Building -	Cement M	Material D	Diesel	Urban Unr	40	--	258	--	--	30000	--	--	--	--	--	6938	
1	Building -	Dump Truc	Material D	Diesel	Urban Unr	40	--	258	--	--	30000	--	--	--	--	--	3700	
1	Building -	Passenger	Employee	Gasoline	Urban Unr	30	198	258	--	--	--	--	--	--	--	--	1532520	
1	Building -	Tractor Tra	Material D	Diesel	Urban Unr	40	--	258	--	--	30000	--	--	--	--	0.00053	159	
1	Drainage S	Passenger	Employee	Gasoline	Urban Unr	30	27	258	--	--	--	--	--	--	--	--	208980	
1	Open Park	Dump Truc	Material D	Diesel	Urban Unr	40	--	258	--	--	10000	--	--	--	--	--	1233	
1	Open Park	Passenger	Employee	Gasoline	Urban Unr	30	0.55	258	--	--	--	--	--	--	--	--	4257	
1	Open Park	Tractor Tra	Material D	Diesel	Urban Unr	40	--	258	--	--	10000	--	--	--	--	0.0012	120	
1	Site Work	Dump Truc	Material D	Diesel	Urban Unr	40	--	258	--	--	10000	--	--	--	--	--	1233	
1	Site Work	Passenger	Employee	Gasoline	Urban Unr	30	1.1	258	--	--	--	--	--	--	--	--	8514	
1	Site Work	Tractor Tra	Material D	Diesel	Urban Unr	40	--	258	--	--	10000	--	--	--	--	0.008	800	

Emission Factor: Non-Road (from NONROAD)

Scenario ID	Project	Constructi	Equipmen	Fuel Type	Avg Rated	Load Facto	CO (g/hp-h	NOx (g/hp	CO2 (g/hp-	SO2 (g/hp-	PM10 (g/h	PM2.5 (g/h	VOC Exhau	VOC Evaporative (g/equipment-day)
1	Building -	Concrete F	Backhoe	Diesel	100	0.21	3.090042	2.246349	694.6281	0.00386	0.396118	0.364429	0.452423	0.509507
1	Building -	Concrete F	Concrete F	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Building -	Concrete F	Fork Truck	Diesel	100	0.59	0.394992	0.281442	595.7349	0.002875	0.010431	0.009597	0.139269	0
1	Building -	Concrete F	Tool Truck	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Building -	Concrete F	Tractor Tra	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Building -	Constructi	Survey Cre	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Building -	Constructi	Tractor Tra	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Building -	Exterior W	Fork Truck	Diesel	100	0.59	0.394992	0.281442	595.7349	0.002875	0.010431	0.009597	0.139269	0
1	Building -	Exterior W	Generator	Diesel	40	0.43	0.828891	3.706185	589.6344	0.003253	0.15504	0.142637	0.242424	0.023866
1	Building -	Exterior W	Man Lift	Diesel	75	0.21	3.155336	4.262646	694.1916	0.004039	0.403827	0.371521	0.596515	0.158369
1	Building -	Exterior W	Tool Truck	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Building -	Exterior W	Tractor Tra	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Building -	Interior Bu	Fork Truck	Diesel	100	0.59	0.394992	0.281442	595.7349	0.002875	0.010431	0.009597	0.139269	0
1	Building -	Interior Bu	Man Lift	Diesel	75	0.21	3.155336	4.262646	694.1916	0.004039	0.403827	0.371521	0.596515	0.158369
1	Building -	Interior Bu	Tool Truck	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Building -	Interior Bu	Tractor Tra	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Building -	Roofing	High Lift	Diesel	100	0.59	0.394992	0.281442	595.7349	0.002875	0.010431	0.009597	0.139269	0
1	Building -	Roofing	Man Lift (F	Diesel	75	0.21	3.155336	4.262646	694.1916	0.004039	0.403827	0.371521	0.596515	0.158369
1	Building -	Roofing	Material D	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Building -	Roofing	Tractor Tra	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Building -	Security &	High Lift	Diesel	100	0.59	0.394992	0.281442	595.7349	0.002875	0.010431	0.009597	0.139269	0
1	Building -	Security &	Tool Truck	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Building -	Structural	90 Ton Cra	Diesel	300	0.43	0.127853	0.589746	530.6045	0.002629	0.021467	0.019749	0.144623	0.101715
1	Building -	Structural	Concrete F	Diesel	11	0.43	4.450283	4.423016	588.5275	0.003967	0.372388	0.342597	0.607792	0.005149
1	Building -	Structural	Concrete T	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Building -	Structural	Fork Truck	Diesel	100	0.59	0.394992	0.281442	595.7349	0.002875	0.010431	0.009597	0.139269	0
1	Building -	Structural	Tool Truck	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Building -	Structural	Tractor Tra	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Building -	Structural	Trowel Ma	Diesel	600	0.59	0.702678	1.643487	536.3147	0.002938	0.101429	0.093315	0.170243	0.836094
1	Drainage S	Drainage -	Dozer	Diesel	175	0.59	0.188494	0.40593	536.4022	0.002624	0.024173	0.022239	0.141377	0.035599
1	Drainage S	Drainage -	Dump Truc	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Drainage S	Drainage -	Excavator	Diesel	175	0.59	0.160623	0.343675	536.4064	0.002603	0.015938	0.014663	0.140006	0.016516
1	Drainage S	Drainage -	Loader	Diesel	175	0.59	0.243066	0.571426	536.3873	0.002665	0.039376	0.036226	0.146333	0.072697
1	Drainage S	Drainage -	Other Gen	Diesel	175	0.43	0.224268	0.806122	530.5789	0.002706	0.047735	0.043917	0.153062	0.109876
1	Drainage S	Drainage -	Pickup Tru	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Drainage S	Drainage -	Roller	Diesel	100	0.59	0.667747	0.643142	595.7042	0.00296	0.053948	0.049632	0.149373	0.053001
1	Drainage S	Drainage -	Dozer	Diesel	175	0.59	0.188494	0.40593	536.4022	0.002624	0.024173	0.022239	0.141377	0.035599
1	Drainage S	Drainage -	Dump Truc	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Drainage S	Drainage -	Excavator	Diesel	175	0.59	0.160623	0.343675	536.4064	0.002603	0.015938	0.014663	0.140006	0.016516
1	Drainage S	Drainage -	Loader	Diesel	175	0.59	0.243066	0.571426	536.3873	0.002665	0.039376	0.036226	0.146333	0.072697
1	Drainage S	Drainage -	Other Gen	Diesel	175	0.43	0.224268	0.806122	530.5789	0.002706	0.047735	0.043917	0.153062	0.109876
1	Drainage S	Drainage -	Pickup Tru	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Drainage S	Drainage -	Roller	Diesel	100	0.59	0.667747	0.643142	595.7042	0.00296	0.053948	0.049632	0.149373	0.053001
1	Drainage S	Drainage S	Dump Truc	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Drainage S	Drainage S	Excavator	Diesel	175	0.59	0.160623	0.343675	536.4064	0.002603	0.015938	0.014663	0.140006	0.016516
1	Drainage S	Drainage S	Other Gen	Diesel	175	0.43	0.224268	0.806122	530.5789	0.002706	0.047735	0.043917	0.153062	0.109876
1	Drainage S	Drainage S	Pickup Tru	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Drainage S	Hydroseec	Hydroseec	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Drainage S	Hydroseec	Off-Road T	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Drainage S	Soil Erosio	Other Gen	Diesel	175	0.43	0.224268	0.806122	530.5789	0.002706	0.047735	0.043917	0.153062	0.109876
1	Drainage S	Soil Erosio	Pickup Tru	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Drainage S	Soil Erosio	Pumps	Diesel	11	0.43	4.450283	4.423016	588.5275	0.003967	0.372388	0.342597	0.607792	0.005149
1	Drainage S	Soil Erosio	Tractors/L	Diesel	100	0.21	3.090042	2.246349	694.6281	0.00386	0.396118	0.364429	0.452423	0.509507
1	Drainage S	Topsoil Pla	Dozer	Diesel	175	0.59	0.188494	0.40593	536.4022	0.002624	0.024173	0.022239	0.141377	0.035599
1	Drainage S	Topsoil Pla	Dump Truc	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Drainage S	Topsoil Pla	Pickup Tru	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Open Park	Binder Coa	Paving Ma	Diesel	175	0.59	0.353244	0.851498	536.3566	0.002748	0.07086	0.065191	0.156423	0.126714
1	Open Park	Binder Coa	Ten Whee	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Open Park	Constructi	Survey Cre	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Open Park	Constructi	Tractor Tra	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Open Park	Curbing	Bob Cat	Diesel	75	0.21	3.406588	4.219469	694.0884	0.00404	0.474343	0.436396	0.630535	0.351802
1	Open Park	Curbing	Concrete F	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Open Park	Curbing	Material D	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Open Park	Curbing	Tractor Tra	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Open Park	Grub the s	Bulldozer	Diesel	175	0.59	0.188494	0.40593	536.4022	0.002624	0.024173	0.022239	0.141377	0.035599
1	Open Park	Grub the s	Front Load	Diesel	100	0.21	3.090042	2.246349	694.6281	0.00386	0.396118	0.364429	0.452423	0.509507
1	Open Park	Grub the s	Ten Whee	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406
1	Open Park	Lighting Pr	Auger Drill	Diesel	175	0.43	0.635653	2.335897	530.3203	0.003023	0.147258	0.135478	0.238485	0.288593
1	Open Park	Lighting Pr	Fork Truck	Diesel	100	0.59	0.394992	0.281442	595.7349	0.002875	0.010431	0.009597	0.139269	0
1	Open Park	Lighting Pr	Front Load	Diesel	100	0.21	3.090042	2.246349	694.6281	0.00386	0.396118	0.364429	0.452423	0.509507
1	Open Park	Lighting Pr	Tractor Tra	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406

1	Open Park	Remove Ti	Bulldozer	Diesel	175	0.59	0.188494	0.40593	536.4022	0.002624	0.024173	0.022239	0.141377	0.035599	
1	Open Park	Remove Ti	Chain Saw	Diesel	11	0.7	293.535	1.322993	685.9964	0.140192	9.748189	8.968334	61.88836	26.45543	*** GASOLINE DATA USED. DIESEL DATA NOT AVAILABLE ***
1	Open Park	Remove Ti	Flat Bed or	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406	
1	Open Park	Remove Ti	Log Chippe	Diesel	100	0.43	1.349577	2.337535	589.5146	0.003332	0.222084	0.204317	0.281997	0.374948	
1	Open Park	Remove Ti	Mulcher	Diesel	100	0.43	1.349577	2.337535	589.5146	0.003332	0.222084	0.204317	0.281997	0.374948	
1	Open Park	Remove Ti	Tractor	Diesel	100	0.21	3.090042	2.246349	694.6281	0.00386	0.396118	0.364429	0.452423	0.509507	
1	Open Park	Rough Gra	Compactin	Diesel	6	0.43	4.455144	4.348809	588.5694	0.003968	0.360111	0.331302	0.593991	0.002071	
1	Open Park	Rough Gra	Small Doze	Diesel	175	0.59	0.188494	0.40593	536.4022	0.002624	0.024173	0.022239	0.141377	0.035599	
1	Open Park	Set in-plac	40 Ton Ro	Diesel	300	0.43	0.127853	0.589746	530.6045	0.002629	0.021467	0.019749	0.144623	0.101715	
1	Open Park	Set in-plac	High Lift	Diesel	100	0.59	0.394992	0.281442	595.7349	0.002875	0.010431	0.009597	0.139269	0	
1	Open Park	Set in-plac	Tractor Tra	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406	
1	Open Park	Stripping	Line Painti	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406	
1	Open Park	Subgrade I	Backhoe	Diesel	100	0.21	3.090042	2.246349	694.6281	0.00386	0.396118	0.364429	0.452423	0.509507	
1	Open Park	Subgrade I	Roller	Diesel	100	0.59	0.667747	0.643142	595.7042	0.00296	0.053948	0.049632	0.149373	0.053001	
1	Open Park	Subgrade I	Tractor Tra	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406	
1	Open Park	Top Coat c	Paving Ma	Diesel	175	0.59	0.353244	0.851498	536.3566	0.002748	0.07086	0.065191	0.156423	0.126714	
1	Open Park	Top Coat c	Ten Wheel	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406	
1	Open Park	Undergrou	Backhoe	Diesel	100	0.21	3.090042	2.246349	694.6281	0.00386	0.396118	0.364429	0.452423	0.509507	
1	Open Park	Undergrou	Fork Truck	Diesel	100	0.59	0.394992	0.281442	595.7349	0.002875	0.010431	0.009597	0.139269	0	
1	Open Park	Undergrou	Tractor Tra	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406	
1	Site Work	Constructi	Survey Cre	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406	
1	Site Work	Constructi	Tractor Tra	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406	
1	Site Work	Site Clearii	Bulldozer	Diesel	175	0.59	0.188494	0.40593	536.4022	0.002624	0.024173	0.022239	0.141377	0.035599	
1	Site Work	Site Clearii	Chain Saw	Diesel	11	0.7	293.535	1.322993	685.9964	0.140192	9.748189	8.968334	61.88836	26.45543	*** GASOLINE DATA USED. DIESEL DATA NOT AVAILABLE ***
1	Site Work	Site Clearii	Flat Bed or	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406	
1	Site Work	Site Clearii	Front Load	Diesel	100	0.21	3.090042	2.246349	694.6281	0.00386	0.396118	0.364429	0.452423	0.509507	
1	Site Work	Site Clearii	Grub the s	Diesel	40	0.59	0.288667	3.058433	595.7229	0.002904	0.028589	0.026302	0.143208	0	
1	Site Work	Site Clearii	Log Chippe	Diesel	100	0.43	1.349577	2.337535	589.5146	0.003332	0.222084	0.204317	0.281997	0.374948	
1	Site Work	Site Clearii	Mulcher	Diesel	100	0.43	1.349577	2.337535	589.5146	0.003332	0.222084	0.204317	0.281997	0.374948	
1	Site Work	Site Clearii	Ten Wheel	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406	
1	Site Work	Site Clearii	Tractor	Diesel	100	0.21	3.090042	2.246349	694.6281	0.00386	0.396118	0.364429	0.452423	0.509507	
1	Site Work	Site Restor	Bob Cat	Diesel	75	0.21	3.406588	4.219469	694.0884	0.00404	0.474343	0.436396	0.630535	0.351802	
1	Site Work	Site Restor	Concrete F	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406	
1	Site Work	Site Restor	Tractor Tra	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406	
1	Site Work	Site Restor	Compactin	Diesel	6	0.43	4.455144	4.348809	588.5694	0.003968	0.360111	0.331302	0.593991	0.002071	
1	Site Work	Site Restor	Small Doze	Diesel	175	0.59	0.188494	0.40593	536.4022	0.002624	0.024173	0.022239	0.141377	0.035599	
1	Site Work	Site Restor	Forktruck (	Diesel	100	0.59	0.394992	0.281442	595.7349	0.002875	0.010431	0.009597	0.139269	0	
1	Site Work	Site Restor	Roller	Diesel	100	0.59	0.667747	0.643142	595.7042	0.00296	0.053948	0.049632	0.149373	0.053001	
1	Site Work	Site Restor	Seed Truck	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406	
1	Site Work	Site Restor	Tractor Tra	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406	
1	Site Work	Undergrou	Backhoe	Diesel	100	0.21	3.090042	2.246349	694.6281	0.00386	0.396118	0.364429	0.452423	0.509507	
1	Site Work	Undergrou	Fork Truck	Diesel	100	0.59	0.394992	0.281442	595.7349	0.002875	0.010431	0.009597	0.139269	0	
1	Site Work	Undergrou	Tractor Tra	Diesel	600	0.59	0.149744	0.333662	536.4082	0.002595	0.011947	0.010991	0.139381	0.029406	

Emission Factors: On-Road (from MOVES)

Scenario ID	Project Ty	Equipmer	Fuel Type	Roadway T	CO(g/mi)	NOx(g/mi)	CO2(g/mi)	SO2(g/mi)	PM10(g/m	PM2.5(g/n	CH4(g/mi)	N2O(g/mi)	VOC(g/mi)	RV CO(g/v	RV NOx(g/	RV CO2(g/	RV SO2(g/	RV PM10(g	RV PM2.5(	RV VOC(g/	RP VOC(g/veh-day)
1	Building -	Cement M	Diesel	Urban Unr	0.405183	1.027492	1287.06	0.008808	0.017086	0.016574	0.080324	0.07126	0.003464	17.68767	1.300782	242.8373	0.001662	0.00012	0.000116	1.1846	0
1	Building -	Dump Tru	Diesel	Urban Unr	0.405183	1.027492	1287.06	0.008808	0.017086	0.016574	0.080324	0.07126	0.003464	17.68767	1.300782	242.8373	0.001662	0.00012	0.000116	1.1846	0
1	Building -	Passenger	Gasoline	Urban Unr	2.040768	0.082303	323.1771	0.005573	0.005222	0.004808	0.054438	0.004462	0.001668	31.65737	1.614443	346.387	0.005973	0.040652	0.037432	5.285132	0.618156
1	Building -	Tractor Tra	Diesel	Urban Unr	0.458113	1.715499	2382.87	0.016306	0.037571	0.036445	0.123844	0.072776	0.003464	21.53336	2.172695	319.354	0.002185	0.000158	0.000153	13.12443	0
1	Drainage S	Passenger	Gasoline	Urban Unr	2.040768	0.082303	323.1771	0.005573	0.005222	0.004808	0.054438	0.004462	0.001668	31.65737	1.614443	346.387	0.005973	0.040652	0.037432	5.285132	0.618156
1	Open Park	Dump Tru	Diesel	Urban Unr	0.405183	1.027492	1287.06	0.008808	0.017086	0.016574	0.080324	0.07126	0.003464	17.68767	1.300782	242.8373	0.001662	0.00012	0.000116	1.1846	0
1	Open Park	Passenger	Gasoline	Urban Unr	2.040768	0.082303	323.1771	0.005573	0.005222	0.004808	0.054438	0.004462	0.001668	31.65737	1.614443	346.387	0.005973	0.040652	0.037432	5.285132	0.618156
1	Open Park	Tractor Tra	Diesel	Urban Unr	0.458113	1.715499	2382.87	0.016306	0.037571	0.036445	0.123844	0.072776	0.003464	21.53336	2.172695	319.354	0.002185	0.000158	0.000153	13.12443	0
1	Site Work	Dump Tru	Diesel	Urban Unr	0.405183	1.027492	1287.06	0.008808	0.017086	0.016574	0.080324	0.07126	0.003464	17.68767	1.300782	242.8373	0.001662	0.00012	0.000116	1.1846	0
1	Site Work	Passenger	Gasoline	Urban Unr	2.040768	0.082303	323.1771	0.005573	0.005222	0.004808	0.054438	0.004462	0.001668	31.65737	1.614443	346.387	0.005973	0.040652	0.037432	5.285132	0.618156
1	Site Work	Tractor Tra	Diesel	Urban Unr	0.458113	1.715499	2382.87	0.016306	0.037571	0.036445	0.123844	0.072776	0.003464	21.53336	2.172695	319.354	0.002185	0.000158	0.000153	13.12443	0

Fugitive Emissions (Emission Factors from Various Sources including AP-42)

Scenario ID	Project	Fugitive T	Variable	Default Va	Units	User Value
1	Building -	Concrete F	V = Volum	1387.5	yd3	
1	Building -	Concrete F	PM10 = 0.(	51.3	lbs	
1	Building -	Material N	sL = Road	0.1	g/m3	
1	Building -	Material N	Wt. = Mea	32	tons	
1	Building -	Material N	VMT = Veh	2580	miles	
1	Building -	Material N	PM10 = 0.(	23.9	lbs	
1	Building -	Material N	s = Surface	0.043	fraction	
1	Building -	Material N	Wt. = Mea	32	tons	
1	Building -	Material N	VMT = Veh	2580	miles	
1	Building -	Material N	PM10 = 1.!	70.7	lbs	
1	Drainage S	Material N	s = Surface	0.043	fraction	
1	Drainage S	Material N	Wt. = Mea	32	tons	
1	Drainage S	Material N	VMT = Veh	313.9	miles	
1	Drainage S	Material N	PM10 = 1.!	8.597	lbs	
1	Drainage S	Material N	sL = Road	0.1	g/m3	
1	Drainage S	Material N	Wt. = Mea	32	tons	
1	Drainage S	Material N	VMT = Veh	0	miles	
1	Drainage S	Material N	PM10 = 0.(	0	lbs	
1	Drainage S	Unstabilize	A = Area af	0.093	acres	
1	Drainage S	Unstabilize	TPConv = 1	0.5	fraction	
1	Drainage S	Unstabilize	CE = Contr	0.63	fraction	
1	Drainage S	Unstabilize	t = year (e.	1	years	
1	Drainage S	Unstabilize	PM10 = 0.:	0	lbs	
1	Drainage S	Soil Handli	u = Wind s	5	mph	
1	Drainage S	Soil Handli	m = Moistu	0.25	fraction	
1	Drainage S	Soil Handli	T = Mass o	111.4	tons	
1	Drainage S	Soil Handli	PM10 = T)	2.293	lbs	
1	Open Park	Material N	sL = Road	0.1	g/m3	
1	Open Park	Material N	Wt. = Mea	32	tons	
1	Open Park	Material N	VMT = Veh	1290	miles	
1	Open Park	Material N	PM10 = 0.(	12	lbs	
1	Open Park	Material N	s = Surface	0.043	fraction	
1	Open Park	Material N	Wt. = Mea	32	tons	
1	Open Park	Material N	VMT = Veh	1300	miles	
1	Open Park	Material N	PM10 = 1.!	35.6	lbs	
1	Open Park	Soil Handli	u = Wind s	5	mph	
1	Open Park	Soil Handli	m = Moistu	0.25	fraction	
1	Open Park	Soil Handli	T = Mass o	275	tons	
1	Open Park	Soil Handli	PM10 = T)	5.661	lbs	
1	Open Park	Unstabilize	A = Area af	0.23	acres	
1	Open Park	Unstabilize	TPConv = 1	0.5	fraction	
1	Open Park	Unstabilize	CE = Contr	0.63	fraction	
1	Open Park	Unstabilize	t = year (e.	1	years	
1	Open Park	Unstabilize	PM10 = 0.:	0	lbs	
1	Open Park	Asphalt Dr	A = Area of	929	m2	
1	Open Park	Asphalt Dr	AR = Applic	1.811	l/m2	
1	Open Park	Asphalt Dr	VD = Volur	0.35	fraction	
1	Open Park	Asphalt Dr	EF = Mass	0.7	fraction	
1	Open Park	Asphalt Dr	D = Densit	1.8	lbs/l	
1	Open Park	Asphalt Dr	VOC = A x	741.9	lbs	
1	Site Work	Material N	s = Surface	0.043	fraction	
1	Site Work	Material N	Wt. = Mea	32	tons	
1	Site Work	Material N	VMT = Veh	1315	miles	
1	Site Work	Material N	PM10 = 1.!	36	lbs	
1	Site Work	Material N	sL = Road	0.1	g/m3	
1	Site Work	Material N	Wt. = Mea	32	tons	
1	Site Work	Material N	VMT = Veh	1290	miles	
1	Site Work	Material N	PM10 = 0.(	12	lbs	
1	Site Work	Soil Handli	u = Wind s	5	mph	
1	Site Work	Soil Handli	m = Moistu	0.25	fraction	
1	Site Work	Soil Handli	T = Mass o	275	tons	
1	Site Work	Soil Handli	PM10 = T)	5.661	lbs	
1	Site Work	Unstabilize	A = Area af	0.23	acres	
1	Site Work	Unstabilize	TPConv = 1	0.5	fraction	
1	Site Work	Unstabilize	CE = Contr	0.63	fraction	
1	Site Work	Unstabilize	t = year (e.	1	years	
1	Site Work	Unstabilize	PM10 = 0.:	0	lbs	

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ASSUMPTIONS

Emission factors were developed from the following models:

- On-Road Vehicles: MOVES 2010b, revised January 2013
- Non-Road Equipment: NONROAD2008a, July 2009

In addition to the overall project size dimensions (e.g., Length and width) provided by the user, an additional 10 ft length and 10 ft width is added to account for disturbance areas.

The number of employees is based on the higher of two methods: (1) number of equipment, and (2) multiply the project cost in million by 11.

The average employee travels 30 miles round-trip from home to construction site each day.

The average on-road material delivery round-trip distance per truck is 40 miles per day.

For calculating fugitive, re-entrained PM emissions from on-road and non-road material delivery and handling equipment, a nominal VMT of 5 miles is used for each vehicle per day.

In deriving emission factors from NONROAD, the horsepower for each equipment represents the most popular in each equipment category.

The total length of each modeled scenario is used to define the number of days associated with vehicle/equipment evaporative emissions.

The choice of location and season are assumed to adequately represent differences in fuel characteristics affecting emissions.

Only two seasons (Summer and Winter) are used to represent all seasons.

14 U.S. Counties are used to represent all other counties in the U.S. (all other counties are mapped to the 14).

The default methods assume that all construction equipment use diesel as well as heavy-duty on-road vehicles, while passenger vehicles (including motorcycles) use gasoline.

Fugitive emissions are only modeled for:

- Asphalt drying
- Asphalt storage and batching
- Concrete mixing/batching
- Soil handling
- Unstabilized land and wind erosion
- Material movement (unpaved roads)
- Material movement (paved roads)

On-Road vehicle speeds are not explicitly modeled. The associated emission factors for each modeled vehicle from MOVES represent averages over the driving cycles, the roadway type, and daily temperature variations.

The default equipment hours-of-use data are developed based on the overall size of the project provided by the user and activity rates based on expert engineering judgment.

Under the Construction Activity Type list (Activity Tab), when a choice between asphalt and concrete materials occurs, asphalt is always selected as default. To choose concrete, de-select the aphalt item and select the corresponding concrete item.

Two trips per day were assumed for each on-road material handling trucks.

Only CO2, CH4, and N2O are used to represent greenhouse gas emissions. Other potential greenhouse gases including air conditioning refrigerants were not included.

The following equipment are always modeled using diesel emission factors since gasoline-based emission factors are not available:

- Asphalt Deliveries/Ten Wheelers
- Bulldozer
- Concrete Ready Mix Trucks
- Concrete Ready Trucks Mix for Cores
- Concrete Truck
- Crack Filler (Trailer Mounted)
- Delivery of Tanks (3)
- Distributing Tanker
- Dozer
- Dump Truck
- Dump Truck (12 cy)
- Excavator
- Excavator for U/G Services/Tanks
- Flat Bed or Dump Trucks
- Flatbed Truck
- Grader
- Grout Wheel Truck
- Hoist Equipment with 40 Ton Rig
- Hydralic Hammer
- Hydroseeder
- Line Painting Truck and Sprayer
- Material Deliveries
- Off-Road Truck
- Pickup Truck
- Scraper
- Seed Truck Spreader
- Small Dozer
- Survey Crew Trucks
- Ten Wheelers
- Ten Wheelers- Material Delivery
- Tool Truck
- Tractor Trailer- Equipment Delivery
- Tractor Trailer- Material Delivery
- Tractor Trailer- Steel Deliveries
- Tractor Trailer- Stone Delivery
- Tractor Trailer- Topsoil & Seed
- Tractor Trailer- Truck Delivery
- Tractor Trailer with Boom Hoist- Curbs Del & Place
- Tractor Trailer with Boom Hoist- Delivery
- Tractor Trailers- Rebar Deliveries
- Tractor Trailers Temp Fac.
- Truck for Topsoil & Seed Del&Spread
- Water Truck
- Excavator with Bucket
- Excavator with Hoe Ram

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Table C-1
Input Process Rates and Parameters - Oregon Acoustic Laboratory Construction
Port of Portland

Activities	Input Value [1]	
Acoustic Facility		
Building	12,480	(ft^2)
Parking	7,600	(ft^2)
Site Preparation	179,615	(ft^2)
Project Length	8.00	(months)
Project Length	172	(days)
Construction Employees	88.0	(employees/day)

REFERENCES:

(1) Data provided by Mackenzie.

Table C-2
Non-Road Emission Factors
Port of Portland

Equipment [1]	Fuel Type	Avg Rated HP	Load Factor	Emission Factor (g/hp-hr) [2]						
				CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	VOC	CO_2
Dozer	Diesel	175	0.59	0.152626126	0.454301567	0.001452111	0.038807873	0.037643566	0.023004734	536.7642489
Excavator	Diesel	175	0.59	0.111893913	0.344477749	0.001436756	0.027946209	0.027107811	0.017092293	536.7808669
Pickup Truck	Diesel	600	0.59	0.076725896	0.228542673	0.001434325	0.016254976	0.015767322	0.016499225	536.7806252
Bob Cat	Diesel	75	0.21	3.691153775	4.437308555	0.002210479	0.576318305	0.559029885	0.756037889	693.8095778
Dump Truck	Diesel	600	0.59	0.076725896	0.228542673	0.001434325	0.016254976	0.015767322	0.016499225	536.7806252
Excavator with Bucket	Diesel	175	0.59	0.111893913	0.344477749	0.001436756	0.027946209	0.027107811	0.017092293	536.7808669
Generator Sets	Diesel	40	0.43	0.975295712	3.395845754	0.001851623	0.162096045	0.157233206	0.277163686	589.5692102
Loader	Diesel	175	0.59	0.963736108	1.977330118	0.001862386	0.211239735	0.204902379	0.297522908	625.6936024
Other General Equipment	Diesel	175	0.43	0.289094818	0.951736676	0.001506118	0.070236865	0.068129737	0.055304246	536.6738374
Roller	Diesel	100	0.59	0.524992216	1.356307149	0.00163807	0.08627869	0.083690532	0.04121266	596.0384734
Hydroseeder	Diesel	600	0.59	0.076725896	0.228542673	0.001434325	0.016254976	0.015767322	0.016499225	536.7806252
Off-Road Truck	Diesel	600	0.59	0.076725896	0.228542673	0.001434325	0.016254976	0.015767322	0.016499225	536.7806252
Pumps	Diesel	11	0.43	2.567230792	4.246616551	0.002162364	0.270799471	0.262675407	0.793385692	588.0946593
Tractors/Loader/Backhoe	Diesel	100	0.21	2.342587489	2.540912586	0.002068758	0.352074296	0.341512192	0.394980349	694.8656824
Survey Crew Trucks	Diesel	600	0.59	0.076725896	0.228542673	0.001434325	0.016254976	0.015767322	0.016499225	536.7806252
Tractor Trailers Temp Fac.	Diesel	600	0.59	0.076725896	0.228542673	0.001434325	0.016254976	0.015767322	0.016499225	536.7806252
Bulldozer	Diesel	175	0.59	0.152626126	0.454301567	0.001452111	0.038807873	0.037643566	0.023004734	536.7642489
Flat Bed or Dump Trucks	Diesel	600	0.59	0.076725896	0.228542673	0.001434325	0.016254976	0.015767322	0.016499225	536.7806252
Front Loader	Diesel	100	0.21	2.342587489	2.540912586	0.002068758	0.352074296	0.341512192	0.394980349	694.8656824
Grub the site down 2'-0	Diesel	40	0.59	0.280926358	2.530054595	0.001569017	0.020812336	0.020187957	0.092605869	595.879497
Log Chipper	Diesel	100	0.43	1.544071486	3.311063459	0.001882874	0.279257867	0.270880445	0.298201936	589.5096432
Mulcher	Diesel	100	0.43	1.544071486	3.311063459	0.001882874	0.279257867	0.270880445	0.298201936	589.5096432
Ten Wheelers	Diesel	600	0.59	0.076725896	0.228542673	0.001434325	0.016254976	0.015767322	0.016499225	536.7806252
Tractor	Diesel	100	0.21	2.342587489	2.540912586	0.002068758	0.352074296	0.341512192	0.394980349	694.8656824
Concrete Ready Mix Trucks	Diesel	600	0.59	0.076725896	0.228542673	0.001434325	0.016254976	0.015767322	0.016499225	536.7806252
Tractor Trailer with Boom Hoist- Delivery	Diesel	600	0.59	0.076725896	0.228542673	0.001434325	0.016254976	0.015767322	0.016499225	536.7806252
Compacting Equipment	Diesel	6	0.43	2.471336887	4.183949454	0.002183168	0.24101706	0.233785847	0.837973234	593.7535514
Small Dozer	Diesel	175	0.59	0.152626126	0.454301567	0.001452111	0.038807873	0.037643566	0.023004734	536.7642489
Forktruck (Hoist)	Diesel	100	0.59	0.081507105	0.877753554	0.001574333	0.016715931	0.016214447	0.00915233	596.1315399
Seed Truck Spreader	Diesel	600	0.59	0.076725896	0.228542673	0.001434325	0.016254976	0.015767322	0.016499225	536.7806252
Tractor Trailer- Material Delivery	Diesel	600	0.59	0.076725896	0.228542673	0.001434325	0.016254976	0.015767322	0.016499225	536.7806252
Backhoe	Diesel	100	0.21	2.342587489	2.540912586	0.002068758	0.352074296	0.341512192	0.394980349	694.8656824
Fork Truck	Diesel	100	0.59	0.081507105	0.877753554	0.001574333	0.016715931	0.016214447	0.00915233	596.1315399
Tool Truck	Diesel	600	0.59	0.076725896	0.228542673	0.001434325	0.016254976	0.015767322	0.016499225	536.7806252
Generator	Diesel	40	0.43	0.975295712	3.395845754	0.001851623	0.162096045	0.157233206	0.277163686	589.5692102
Man Lift	Diesel	75	0.21	2.550496672	3.895062171	0.00223193	0.321647605	0.311998105	0.505681372	694.5411904
High Lift	Diesel	100	0.59	3.356880688	3.223590304	0.002195269	0.423769987	0.411056953	0.528086928	694.4859947
Man Lift (Fascia Construction)	Diesel	75	0.21	2.550496672	3.895062171	0.00223193	0.321647605	0.311998105	0.505681372	694.5411904
Material Deliveries	Diesel	600	0.59	0.076725896	0.228542673	0.001434325	0.016254976	0.015767322	0.016499225	536.7806252
90 Ton Crane	Diesel	300	0.43	0.126762817	0.514392308	0.001462265	0.024943	0.024194729	0.03500353	530.941233
Concrete Pump	Diesel	11	0.43	2.567230792	4.246616551	0.002162364	0.270799471	0.262675407	0.793385692	588.0946593
Concrete Truck	Diesel	600	0.59	0.076725896	0.228542673	0.001434325	0.016254976	0.015767322	0.016499225	536.7806252
Tractor Trailer- Steel Deliveries	Diesel	600	0.59	0.076725896	0.228542673	0.001434325	0.016254976	0.015767322	0.016499225	536.7806252
Trowel Machine	Diesel	600	0.59	0.77689333	1.904857492	0.001645993	0.10951782	0.106232272	0.109264629	536.5159113
Paving Machine	Diesel	175	0.59	0.187093308	0.625091391	0.001465181	0.046911618	0.045504297	0.029164945	536.7470415
Ten Wheelers- Material Delivery	Diesel	600	0.59	0.076725896	0.228542673	0.001434325	0.016254976	0.015767322	0.016499225	536.7806252
Auger Drill	Diesel	175	0.43	0.615907254	2.813109352	0.001671368	0.158010075	0.153269827	0.210657877	530.4371259
40 Ton Rough Terrain Crane	Diesel	300	0.43	0.126762817	0.514392308	0.001462265	0.024943	0.024194729	0.03500353	530.941233
Line Painting Truck and Sprayer	Diesel	600	0.59	0.076725896	0.228542673	0.001434325	0.016254976	0.015767322	0.016499225	536.7806252
Chain Saws	Gasoline	11	0.7	266.0287586	1.528301887	0.004135453	9.748199594	8.968343996	68.30039499	685.9970496

REFERENCES:

(1) Values from Airport Construction Emissions Inventory Tool (ACEIT)

(2) Emission factors from EPA MOVES3.

Table C-3
On-Road Emission Factors
Port of Portland

Equipment Type [1] (ACEIT)	Equipment Type (MOVES)	Fuel Type	Emission Factor (g/mile) [2]									
			CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	VOC	CO_2	CH_4	N_2O	CO_2e
Cement Mixer	Single Unit Short-haul Truck	Diesel	0.9378333	1.4890515	0.0042896	0.0323748	0.0297847	0.0846975	1278.9457	0.0133139	0.0055032	1281.2347
Dump Truck Subbase Material	Single Unit Short-haul Truck	Diesel	0.9378333	1.4890515	0.0042896	0.0323748	0.0297847	0.0846975	1278.9457	0.0133139	0.0055032	1281.2347
Passenger Car	Passenger Car	Gasoline	1.519311	0.0533205	0.0027929	0.0013997	0.0012382	0.0192896	420.41723	0.005751	0.0033847	421.70972
Tractor Trailer	Combination Short-haul Truck	Diesel	1.7385703	3.5425314	0.0071166	0.0583729	0.0537029	0.1206239	2125.6087	0.0193104	0.0055031	2128.1856
Dump Truck	Single Unit Short-haul Truck	Diesel	0.9378333	1.4890515	0.0042896	0.0323748	0.0297847	0.0846975	1278.9457	0.0133139	0.0055032	1281.2347

REFERENCES:

(1) Values from Airport Construction Emissions Inventory Tool (ACEIT)

(2) Emission factors from EPA MOVES3. Default Scale; Calculation type - Emission Rates; 2023; June, July, August; Weekdays; Geographic Bounds - Multnomah County; Roadtype – Urban Unrestricted.

Table C-4
Non-Road Activity - Oregon Acoustic Laboratory Construction
Port of Portland

ACEIT Project	Construction Activity	Equipment [1]	Fuel Type	Default Activity [1] (hrs)	Activity Rate [1]		Revised Activity (hrs)	
Building - 30000 sqft- 3 stories	Concrete Foundations	Backhoe	Diesel	320	0.01067	Hours per 1.00 SF	133	[a]
		Concrete Ready Mix Trucks	Diesel	60.0	0.002	Hours per 1.00 SF	25.0	[a]
		Fork Truck	Diesel	320	0.01067	Hours per 1.00 SF	133	[a]
		Tool Truck	Diesel	80.1	0.00267	Hours per 1.00 SF	33.3	[a]
		Tractor Trailer- Material Delivery	Diesel	15.9	0.00053	Hours per 1.00 SF	6.61	[a]
	Construction Mob & Layout	Survey Crew Trucks	Diesel	9.90	0.00033	Hours per 1.00 SF	4.12	[a]
		Tractor Trailers Temp Fac.	Diesel	3.90	0.00013	Hours per 1.00 SF	1.62	[a]
	Exterior Wall Framing	Fork Truck	Diesel	600	0.02	Hours per 1.00 SF	250	[a]
		Generator	Diesel	300	0.01	Hours per 1.00 SF	125	[a]
		Man Lift	Diesel	600	0.02	Hours per 1.00 SF	250	[a]
		Tool Truck	Diesel	150	0.005	Hours per 1.00 SF	62.4	[a]
		Tractor Trailer- Material Delivery	Diesel	150	0.005	Hours per 1.00 SF	62.4	[a]
	Interior Build-Out/ Finishes	Fork Truck	Diesel	2,400	0.08	Hours per 1.00 SF	998	[a]
		Man Lift	Diesel	2,400	0.08	Hours per 1.00 SF	998	[a]
		Tool Truck	Diesel	300	0.01	Hours per 1.00 SF	125	[a]
		Tractor Trailer- Material Delivery	Diesel	600	0.02	Hours per 1.00 SF	250	[a]
	Roofing	High Lift	Diesel	120	0.004	Hours per 1.00 SF	49.9	[a]
		Man Lift (Fascia Construction)	Diesel	24.0	0.0008	Hours per 1.00 SF	10.0	[a]
		Material Deliveries	Diesel	60.0	0.002	Hours per 1.00 SF	25.0	[a]
		Tractor Trailer- Material Delivery	Diesel	60.0	0.002	Hours per 1.00 SF	25.0	[a]
	Security & Safety Systems	High Lift	Diesel	800	0.02667	Hours per 1.00 SF	333	[a]
		Tool Truck	Diesel	200	0.00667	Hours per 1.00 SF	83.2416	[a]
	Structural Steel Frame	90 Ton Crane	Diesel	320	0.01067	Hours per 1.00 SF	133	[a]
		Concrete Pump	Diesel	12.0	0.0004	Hours per 1.00 SF	4.992	[a]
		Concrete Truck	Diesel	24.0	0.0008	Hours per 1.00 SF	9.984	[a]
		Fork Truck	Diesel	80.1	0.00267	Hours per 1.00 SF	33.3	[a]
		Tool Truck	Diesel	12.0	0.0004	Hours per 1.00 SF	4.992	[a]
		Tractor Trailer- Steel Deliveries	Diesel	39.9	0.00133	Hours per 1.00 SF	16.6	[a]
		Trowel Machine	Diesel	12.0	0.0004	Hours per 1.00 SF	4.992	[a]
Drainage System	Drainage - 24 inch Reinforced Concrete Pipe	Dozer	Diesel	79.4	8	Hours per 136.00 LF	79.4	[1]
		Dump Truck	Diesel	79.4	8	Hours per 136.00 LF	79.4	[1]
		Excavator	Diesel	79.4	8	Hours per 136.00 LF	79.4	[1]
		Loader	Diesel	79.4	8	Hours per 136.00 LF	79.4	[1]
		Other General Equipment	Diesel	79.4	8	Hours per 136.00 LF	79.4	[1]
		Pickup Truck	Diesel	79.4	8	Hours per 136.00 LF	79.4	[1]
		Roller	Diesel	79.4	8	Hours per 136.00 LF	79.4	[1]
	Drainage - 24 inch SICPP	Dozer	Diesel	43.2	8	Hours per 250.00 LF	43.2	[1]
		Dump Truck	Diesel	43.2	8	Hours per 250.00 LF	43.2	[1]
		Excavator	Diesel	43.2	8	Hours per 250.00 LF	43.2	[1]
		Loader	Diesel	43.2	8	Hours per 250.00 LF	43.2	[1]
		Other General Equipment	Diesel	43.2	8	Hours per 250.00 LF	43.2	[1]
		Pickup Truck	Diesel	43.2	8	Hours per 250.00 LF	43.2	[1]
		Roller	Diesel	43.2	8	Hours per 250.00 LF	43.2	[1]
	Drainage Structures	Dump Truck	Diesel	10.8	4	Hours per 1.00 Unit	10.8	[1]
		Excavator	Diesel	10.8	8	Hours per 2.00 Unit	10.8	[1]
		Other General Equipment	Diesel	21.6	8	Hours per 1.00 Unit	21.6	[1]
		Pickup Truck	Diesel	21.6	8	Hours per 1.00 Unit	21.6	[1]
	Hydroseeding	Hydroseeder	Diesel	0.41	8	Hours per 80000.00 SF	0.41	[1]
		Off-Road Truck	Diesel	0.41	8	Hours per 80000.00 SF	0.41	[1]
	Soil Erosion/Sediment Control	Other General Equipment	Diesel	0.40	4	Hours per 1.00 Acre	0.40	[1]
		Pickup Truck	Diesel	0.80	8	Hours per 1.00 Acre	0.80	[1]
		Pumps	Diesel	0.40	4	Hours per 1.00 Acre	0.40	[1]
		Tractors/Loader/Backhoe	Diesel	0.40	4	Hours per 1.00 Acre	0.40	[1]
	Topsoil Placement	Dozer	Diesel	1.01	8	Hours per 600.00 CY	1.01	[1]
		Dump Truck	Diesel	1.01	8	Hours per 600.00 CY	1.01	[1]
		Pickup Truck	Diesel	1.01	8	Hours per 600.00 CY	1.01	[1]

Table C-4
Non-Road Activity - Oregon Acoustic Laboratory Construction
Port of Portland

ACEIT Project	Construction Activity	Equipment [1]	Fuel Type	Default Activity [1] (hrs)	Activity Rate [1]		Revised Activity (hrs)
Open Parking Lot @Grade - 10000 sqft	Binder Coat of Pavement	Paving Machine	Diesel	16.0	0.0016	Hours per 1.00 SF	12.2 [a]
		Ten Wheelers- Material Delivery	Diesel	16.0	0.0016	Hours per 1.00 SF	12.2 [a]
	Construction Mob & Layout	Survey Crew Trucks	Diesel	4.00	0.0004	Hours per 1.00 SF	3.04 [a]
		Tractor Trailers Temp Fac.	Diesel	4.00	0.0004	Hours per 1.00 SF	3.04 [a]
	Curbing	Bob Cat	Diesel	24.0	0.0024	Hours per 1.00 SF	18.2 [a]
		Concrete Ready Mix Trucks	Diesel	24.0	0.0024	Hours per 1.00 SF	18.2 [a]
		Material Deliveries	Diesel	24.0	0.0024	Hours per 1.00 SF	18.2 [a]
		Tractor Trailer with Boom Hoist- Delivery	Diesel	24.0	0.0024	Hours per 1.00 SF	18.2 [a]
	Grub the site down 2 ft.	Bulldozer	Diesel	16.0	0.0016	Hours per 1.00 SF	12.2 [a]
		Front Loader	Diesel	16.0	0.0016	Hours per 1.00 SF	12.2 [a]
		Ten Wheelers	Diesel	16.0	0.0016	Hours per 1.00 SF	12.2 [a]
	Lighting Pre-Cast Concrete Piers (10)	Auger Drill	Diesel	24.0	0.0024	Hours per 1.00 SF	18.2 [a]
		Fork Truck	Diesel	24.0	0.0024	Hours per 1.00 SF	18.2 [a]
		Front Loader	Diesel	24.0	0.0024	Hours per 1.00 SF	18.2 [a]
		Tractor Trailer- Material Delivery	Diesel	12.0	0.0012	Hours per 1.00 SF	9.12 [a]
	Remove Trees and shrubs	Bulldozer	Diesel	40.0	0.004	Hours per 1.00 SF	30.4 [a]
		Chain Saws	Diesel	24.0	0.0024	Hours per 1.00 SF	18.2 [a]
		Flat Bed or Dump Trucks	Diesel	40.0	0.004	Hours per 1.00 SF	30.4 [a]
		Log Chipper	Diesel	24.0	0.0024	Hours per 1.00 SF	18.2 [a]
		Mulcher	Diesel	24.0	0.0024	Hours per 1.00 SF	18.2 [a]
		Tractor	Diesel	40.0	0.004	Hours per 1.00 SF	30.4 [a]
	Rough Grading	Compacting Equipment	Diesel	16.0	0.0016	Hours per 1.00 SF	12.2 [a]
		Small Dozer	Diesel	16.0	0.0016	Hours per 1.00 SF	12.2 [a]
	Set in-place Light Poles	40 Ton Rough Terrain Crane	Diesel	16.0	0.0016	Hours per 1.00 SF	12.2 [a]
		High Lift	Diesel	16.0	0.0016	Hours per 1.00 SF	12.2 [a]
		Tractor Trailer- Material Delivery	Diesel	16.0	0.0016	Hours per 1.00 SF	12.2 [a]
	Stripping	Line Painting Truck and Sprayer	Diesel	8.00	0.0008	Hours per 1.00 SF	6.08 [a]
	Subgrade Materials installed	Backhoe	Diesel	16.0	0.0016	Hours per 1.00 SF	12.2 [a]
		Roller	Diesel	16.0	0.0016	Hours per 1.00 SF	12.2 [a]
		Tractor Trailer- Material Delivery	Diesel	16.0	0.0016	Hours per 1.00 SF	12.2 [a]
	Top Coat of Asphalt	Paving Machine	Diesel	16.0	0.0016	Hours per 1.00 SF	12.2 [a]
		Ten Wheelers- Material Delivery	Diesel	16.0	0.0016	Hours per 1.00 SF	12.2 [a]
	Underground Conduits	Backhoe	Diesel	24.0	0.0024	Hours per 1.00 SF	18.2 [a]
		Fork Truck	Diesel	24.0	0.0024	Hours per 1.00 SF	18.2 [a]
		Tractor Trailer- Material Delivery	Diesel	12.0	0.0012	Hours per 1.00 SF	9.12 [a]
Site Work - 10000 sqft	Construction Mob & Layout	Survey Crew Trucks	Diesel	10.0	0.001	Hours per 1.00 SF	180 [a]
		Tractor Trailers Temp Fac.	Diesel	4.00	0.0004	Hours per 1.00 SF	71.8 [a]
	Site Clearing- Remove Trees & Shrubs	Bulldozer	Diesel	40.0	0.004	Hours per 1.00 SF	718 [a]
		Chain Saws	Diesel	40.0	0.004	Hours per 1.00 SF	718 [a]
		Flat Bed or Dump Trucks	Diesel	80.0	0.008	Hours per 1.00 SF	1,437 [a]
		Front Loader	Diesel	40.0	0.004	Hours per 1.00 SF	718 [a]
		Grub the site down 2'-0	Diesel	40.0	0.004	Hours per 1.00 SF	718 [a]
		Log Chipper	Diesel	40.0	0.004	Hours per 1.00 SF	718 [a]
		Mulcher	Diesel	40.0	0.004	Hours per 1.00 SF	718 [a]
		Ten Wheelers	Diesel	40.0	0.004	Hours per 1.00 SF	718 [a]
		Tractor	Diesel	80.0	0.008	Hours per 1.00 SF	1,437 [a]
	Site Restoration- Landscaping (Curbing)	Bob Cat	Diesel	24.0	0.0024	Hours per 1.00 SF	431 [a]
		Concrete Ready Mix Trucks	Diesel	24.0	0.0024	Hours per 1.00 SF	431 [a]
		Tractor Trailer with Boom Hoist- Delivery	Diesel	24.0	0.0024	Hours per 1.00 SF	431 [a]
	Site Restoration- Landscaping (Rough Grading)	Compacting Equipment	Diesel	24.0	0.0024	Hours per 1.00 SF	431 [a]
		Small Dozer	Diesel	24.0	0.0024	Hours per 1.00 SF	431 [a]
	Site Restoration- Landscaping (Top Soil Seed and Plantings)	Forktruck (Hoist)	Diesel	80.0	0.008	Hours per 1.00 SF	1,437 [a]
		Roller	Diesel	40.0	0.004	Hours per 1.00 SF	718 [a]
		Seed Truck Spreader	Diesel	16.0	0.0016	Hours per 1.00 SF	287 [a]
		Tractor Trailer- Material Delivery	Diesel	80.0	0.008	Hours per 1.00 SF	1,437 [a]
	Underground Services to 5 ft. of Building	Backhoe	Diesel	120	0.012	Hours per 1.00 SF	2,155 [a]
		Fork Truck	Diesel	60.0	0.006	Hours per 1.00 SF	1,078 [a]
		Tractor Trailer- Material Delivery	Diesel	30.0	0.003	Hours per 1.00 SF	539 [a]

NOTES:

(a) Revised activity (hrs) = (activity rate [hrs/ft^2]) x (project activity [ft^2])

Building (ft^2) =	12,480	(2)
Parking (ft^2) =	7,600	(2)
Site Preparation (ft^2) =	179,615	(2)

REFERENCES:

(1) Values from Airport Construction Emissions Inventory Tool (ACEIT).

(2) Table C-1, Input Process Rates and Parameters - Mass Timber Manufacturing Facility Construction.

Table C-5
On-Road Activity - Oregon Acoustic Laboratory Construction
Port of Portland

Project	Equipment	On-road Activity	Fuel	Round Trip Distance (miles)	ACEIT Project Area (ft^2)	**Default VMT**	**Number of Vehicles**	Calculated Activity Rate [a] (VMT/ft^2)	Revised VMT
Building - 30000 sqft- 3 stories	Cement Mixer	Material Delivery	Diesel	40	30,000	6,938	1 [1]	0.231	2,886 [b]
	Dump Truck Subbase Material	Material Delivery	Diesel	40	30,000	3,700	1 [1]	0.123	1,539 [b]
	Passenger Car	Employee Commute	Gasoline	30	--	1,532,520	88 [2]	--	454,080 [c]
	Tractor Trailer	Material Delivery	Diesel	40	30,000	159	1 [1]	0.0053	66.1 [b]
Drainage System	Passenger Car	Employee Commute	Gasoline	30	--	208,980	27 [1]	--	208,980 [1]
Open Parking Lot @Grade - 10000 sqft	Dump Truck Subbase Material	Material Delivery	Diesel	40	10,000	1,233	1 [1]	0.123	937 [b]
	Passenger Car	Employee Commute	Gasoline	30	--	4,257	0.55 [1]	--	4,257 [1]
	Tractor Trailer	Material Delivery	Diesel	40	10,000	120	1 [1]	0.012	91.2 [b]
Site Work - 10000 sqft	Dump Truck Subbase Material	Material Delivery	Diesel	40	10,000	1,233	1 [1]	0.123	22,147 [b]
	Passenger Car	Employee Commute	Gasoline	30	--	8,514	1.1 [1]	--	8,514 [1]
	Tractor Trailer	Material Delivery	Diesel	40	10,000	800	1 [1]	0.08	14,369 [b]

NOTES:

(a) Calculated activity rate (VMT/ft^2) = (default VMT [veh-mi]) x (ACEIT project area [ft^2])

(b) Revised activity (hrs) = (activity rate [hrs/"unit"]) x (project activity ["unit"])

Building (ft^2) =	12,480	(2)
Parking (ft^2) =	7,600	(2)
Site Preparation (ft^2) =	179,615	(2)

(c) Revised VMT (veh-mi) = (round trip distance [mi]) x (number of vehicles) x (project length [days])

REFERENCES:

(1) Values from Airport Construction Emissions Inventory Tool (ACEIT).

(2) Table C-1, Input Process Rates and Parameters - Mass Timber Manufacturing Facility Construction.

Table C-6
Non-Road Criteria Emissions Estimate - Oregon Acoustic Laboratory Construction
Port of Portland

ACEIT Project	Construction Activity	Equipment [1]	Fuel Type [1]	Revised Activity [2] (hrs)	Avg Rated HP [1]	Load Factor [1]	Emission Factor [3] (g/hp-hr)							Emission Estimates [a] (tons)						
							CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	VOC	CO_2	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	VOC	CO_2
Building - 30000 sqft- 3 stories	Concrete Foundations	Backhoe	Diesel	133	100	0.21	2.3425875	2.5409126	0.0020688	0.3520743	0.3415122	0.3949803	694.86568	7.2E-03	7.8E-03	6.4E-06	1.1E-03	1.1E-03	1.2E-03	2.14
		Concrete Ready Mix Trucks	Diesel	24.96	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	7.5E-04	2.2E-03	1.4E-05	1.6E-04	1.5E-04	1.6E-04	5.23
		Fork Truck	Diesel	133	100	0.59	0.0815071	0.8777536	0.0015743	0.0167159	0.0162144	0.0091523	596.13154	7.1E-04	7.6E-03	1.4E-05	1.4E-04	1.4E-04	7.9E-05	5.16
		Tool Truck	Diesel	33.3216	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	1.0E-03	3.0E-03	1.9E-05	2.1E-04	2.1E-04	2.1E-04	6.98
		Tractor Trailer- Material Delivery	Diesel	6.6144	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	2.0E-04	5.9E-04	3.7E-06	4.2E-05	4.1E-05	4.3E-05	1.39
	Construction Mob & Layout	Survey Crew Trucks	Diesel	4.1184	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	1.2E-04	3.7E-04	2.3E-06	2.6E-05	2.5E-05	2.7E-05	0.86
		Tractor Trailers Temp Fac.	Diesel	1.6224	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	4.9E-05	1.4E-04	9.1E-07	1.0E-05	1.0E-05	1.0E-05	0.34
	Exterior Wall Framing	Fork Truck	Diesel	250	100	0.59	0.0815071	0.8777536	0.0015743	0.0167159	0.0162144	0.0091523	596.13154	1.3E-03	0.014	2.6E-05	2.7E-04	2.6E-04	1.5E-04	9.68
		Generator	Diesel	125	40	0.43	0.9752957	3.3958458	0.0018516	0.162096	0.1572332	0.2771637	589.56921	2.3E-03	8.0E-03	4.4E-06	3.8E-04	3.7E-04	6.6E-04	1.40
		Man Lift	Diesel	250	75	0.21	2.5504967	3.8950622	0.0022319	0.3216476	0.3119981	0.5056814	694.54119	0.011	0.017	9.7E-06	1.4E-03	1.4E-03	2.2E-03	3.01
		Tool Truck	Diesel	62.4	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	1.9E-03	5.6E-03	3.5E-05	4.0E-04	3.8E-04	4.0E-04	13.1
		Tractor Trailer- Material Delivery	Diesel	62.4	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	1.9E-03	5.6E-03	3.5E-05	4.0E-04	3.8E-04	4.0E-04	13.1
	Interior Build-Out/ Finishes	Fork Truck	Diesel	998	100	0.59	0.0815071	0.8777536	0.0015743	0.0167159	0.0162144	0.0091523	596.13154	5.3E-03	0.057	1.0E-04	1.1E-03	1.1E-03	5.9E-04	38.7
		Man Lift	Diesel	998	75	0.21	2.5504967	3.8950622	0.0022319	0.3216476	0.3119981	0.5056814	694.54119	0.044	0.068	3.9E-05	5.6E-03	5.4E-03	8.8E-03	12.0
		Tool Truck	Diesel	125	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	3.7E-03	0.011	7.0E-05	7.9E-04	7.7E-04	8.0E-04	26.1
		Tractor Trailer- Material Delivery	Diesel	250	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	7.5E-03	0.022	1.4E-04	1.6E-03	1.5E-03	1.6E-03	52.3
	Roofing	High Lift	Diesel	49.92	100	0.59	3.3568807	3.2235903	0.0021953	0.42377	0.411057	0.5280869	694.48599	0.011	0.010	7.1E-06	1.4E-03	1.3E-03	1.7E-03	2.25
		Man Lift (Fascia Construction)	Diesel	9.984	75	0.21	2.5504967	3.8950622	0.0022319	0.3216476	0.3119981	0.5056814	694.54119	4.4E-04	6.8E-04	3.9E-07	5.6E-05	5.4E-05	8.8E-05	0.12
		Material Deliveries	Diesel	24.96	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	7.5E-04	2.2E-03	1.4E-05	1.6E-04	1.5E-04	1.6E-04	5.23
		Tractor Trailer- Material Delivery	Diesel	24.96	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	7.5E-04	2.2E-03	1.4E-05	1.6E-04	1.5E-04	1.6E-04	5.23
	Security & Safety Systems	High Lift	Diesel	333	100	0.59	3.3568807	3.2235903	0.0021953	0.42377	0.411057	0.5280869	694.48599	0.073	0.070	4.8E-05	9.2E-03	8.9E-03	0.011	15.0
		Tool Truck	Diesel	83.2416	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	2.5E-03	7.4E-03	4.7E-05	5.3E-04	5.1E-04	5.4E-04	17.4
	Structural Steel Frame	90 Ton Crane	Diesel	133	300	0.43	0.1267628	0.5143923	0.0014623	0.024943	0.0241947	0.0350035	530.94123	2.4E-03	9.7E-03	2.8E-05	4.7E-04	4.6E-04	6.6E-04	10.1
		Concrete Pump	Diesel	4.992	11	0.43	2.5672308	4.2466166	0.0021624	0.2707995	0.2626754	0.7933857	588.09466	6.7E-05	1.1E-04	5.6E-08	7.0E-06	6.8E-06	2.1E-05	0.015
		Concrete Truck	Diesel	9.984	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	3.0E-04	8.9E-04	5.6E-06	6.3E-05	6.1E-05	6.4E-05	2.09
		Fork Truck	Diesel	33.3216	100	0.59	0.0815071	0.8777536	0.0015743	0.0167159	0.0162144	0.0091523	596.13154	1.8E-04	1.9E-03	3.4E-06	3.6E-05	3.5E-05	2.0E-05	1.29
		Tool Truck	Diesel	4.992	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	1.5E-04	4.5E-04	2.8E-06	3.2E-05	3.1E-05	3.2E-05	1.05
		Tractor Trailer- Steel Deliveries	Diesel	16.5984	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	5.0E-04	1.5E-03	9.3E-06	1.1E-04	1.0E-04	1.1E-04	3.48
		Trowel Machine	Diesel	4.992	600	0.59	0.7768933	1.9048575	0.001646	0.1095178	0.1062323	0.1092646	536.51591	1.5E-03	3.7E-03	3.2E-06	2.1E-04	2.1E-04	2.1E-04	1.05
Drainage System	Drainage - 24 inch Reinforced Concrete Pipe	Dozer	Diesel	79.41	175	0.59	0.1526261	0.4543016	0.0014521	0.0388079	0.0376436	0.0230047	536.76425	1.4E-03	4.1E-03	1.3E-05	3.5E-04	3.4E-04	2.1E-04	4.85
		Dump Truck	Diesel	79.41	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	2.4E-03	7.1E-03	4.4E-05	5.0E-04	4.9E-04	5.1E-04	16.6
		Excavator	Diesel	79.41	175	0.59	0.1118939	0.3444777	0.0014368	0.0279462	0.0271078	0.0170923	536.78087	1.0E-03	3.1E-03	1.3E-05	2.5E-04	2.4E-04	1.5E-04	4.85
		Loader	Diesel	79.41	175	0.59	0.9637361	1.9773301	0.0018624	0.2112397	0.2049024	0.2975229	625.6936	8.7E-03	0.018	1.7E-05	1.9E-03	1.9E-03	2.7E-03	5.65
		Other General Equipment	Diesel	79.41	175	0.43	0.2890948	0.9517367	0.0015061	0.0702369	0.0681297	0.0553042	536.67384	1.9E-03	6.3E-03	9.9E-06	4.6E-04	4.5E-04	3.6E-04	3.54
		Pickup Truck	Diesel	79.41	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	2.4E-03	7.1E-03	4.4E-05	5.0E-04	4.9E-04	5.1E-04	16.6
		Roller	Diesel	79.41	100	0.59	0.5249922	1.3563071	0.0016381	0.0862787	0.0836905	0.0412127	596.03847	2.7E-03	7.0E-03	8.5E-06	4.5E-04	4.3E-04	2.1E-04	3.08
	Drainage - 24 inch SICPP	Dozer	Diesel	43.2	175	0.59	0.1526261	0.4543016	0.0014521	0.0388079	0.0376436	0.0230047	536.76425	7.5E-04	2.2E-03	7.1E-06	1.9E-04	1.9E-04	1.1E-04	2.64
		Dump Truck	Diesel	43.2	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	1.3E-03	3.9E-03	2.4E-05	2.7E-04	2.7E-04	2.8E-04	9.05
		Excavator	Diesel	43.2	175	0.59	0.1118939	0.3444777	0.0014368	0.0279462	0.0271078	0.0170923	536.78087	5.5E-04	1.7E-03	7.1E-06	1.4E-04	1.3E-04	8.4E-05	2.64
		Loader	Diesel	43.2	175	0.59	0.9637361	1.9773301	0.0018624	0.2112397	0.2049024	0.2975229	625.6936	4.7E-03	9.7E-03	9.2E-06	1.0E-03	1.0E-03	1.5E-03	3.08
		Other General Equipment	Diesel	43.2	175	0.43	0.2890948	0.9517367	0.0015061	0.0702369	0.0681297	0.0553042	536.67384	1.0E-03	3.4E-03	5.4E-06	2.5E-04	2.4E-04	2.0E-04	1.92
		Pickup Truck	Diesel	43.2	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	1.3E-03	3.9E-03	2.4E-05	2.7E-04	2.7E-04	2.8E-04	9.05
		Roller	Diesel	43.2	100	0.59	0.5249922	1.3563071	0.0016381	0.0862787	0.0836905	0.0412127	596.03847	1.5E-03	3.8E-03	4.6E-06	2.4E-04	2.4E-04	1.2E-04	1.67
	Drainage Structures	Dump Truck	Diesel	10.8	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	3.2E-04	9.6E-04	6.0E-06	6.9E-05	6.6E-05	7.0E-05	2.26
		Excavator	Diesel	10.8	175	0.59	0.1118939	0.3444777	0.0014368	0.0279462	0.0271078	0.0170923	536.78087	1.4E-04	4.2E-04	1.8E-06	3.4E-05	3.3E-05	2.1E-05	0.66
		Other General Equipment	Diesel	21.6	175	0.43	0.2890948	0.9517367	0.0015061	0.0702369	0.0681297	0.0553042	536.67384	5.2E-04	1.7E-03	2.7E-06	1.3E-04	1.2E-04	9.9E-05	0.96
		Pickup Truck	Diesel	21.6	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	6.5E-04	1.9E-03	1.2E-05	1.4E-04	1.3E-04	1.4E-04	4.52
	Hydroseeding	Hydroseeder	Diesel	0.41	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	1.2E-05	3.7E-05	2.3E-07	2.6E-06	2.5E-06	2.6E-06	0.086
		Off-Road Truck	Diesel	0.41	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	1.2E-05	3.7E-05	2.3E-07	2.6E-06	2.5E-06	2.6E-06	0.086
	Soil Erosion/Sediment Control	Other General Equipment	Diesel	0.4	175	0.43	0.2890948	0.9517367	0.0015061	0.0702369	0.0681297	0.0553042	536.67384	9.6E-06	3.2E-05	5.0E-08	2.3E-06	2.3E-06	1.8E-06	0.018
		Pickup Truck	Diesel	0.8	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	2.4E-05	7.1E-05	4.5E-07	5.1E-06	4.9E-06	5.2E-06	0.17
		Pumps	Diesel	0.4	11	0.43	2.5672308	4.2466166	0.0021624	0.2707995	0.2626754	0.7933857	588.09466	5.4E-06	8.9E-06	4.5E-09	5.6E-07	5.5E-07	1.7E-06	1.2E-03
		Tractors/Loader/Backhoe	Diesel	0.4	100	0.21	2.3425875	2.5409126	0.0020688	0.3520743	0.3415122	0.3949803	694.86568	2.2E-05	2.4E-05	1.9E-08	3.3E-06	3.2E-06	3.7E-06	6.4E-03

Table C-6
Non-Road Criteria Emissions Estimate - Oregon Acoustic Laboratory Construction
Port of Portland

ACEIT Project	Construction Activity	Equipment [1]	Fuel Type [1]	Revised Activity [2] (hrs)	Avg Rated HP [1]	Load Factor [1]	Emission Factor [3] (g/hp-hr)							Emission Estimates [a] (tons)						
							CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	VOC	CO_2	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	VOC	CO_2
	Topsoil Placement	Dozer	Diesel	1.01	175	0.59	0.1526261	0.4543016	0.0014521	0.0388079	0.0376436	0.0230047	536.76425	1.8E-05	5.2E-05	1.7E-07	4.5E-06	4.3E-06	2.6E-06	0.062
		Dump Truck	Diesel	1.01	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	3.0E-05	9.0E-05	5.7E-07	6.4E-06	6.2E-06	6.5E-06	0.21
		Pickup Truck	Diesel	1.01	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	3.0E-05	9.0E-05	5.7E-07	6.4E-06	6.2E-06	6.5E-06	0.21
Open Parking Lot @Grade - 10000 sqft	Binder Coat of Pavement	Paving Machine	Diesel	12.16	175	0.59	0.1870933	0.6250914	0.0014652	0.0469116	0.0455043	0.0291649	536.74704	2.6E-04	8.7E-04	2.0E-06	6.5E-05	6.3E-05	4.0E-05	0.74
		Ten Wheelers- Material Delivery	Diesel	12.16	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	3.6E-04	1.1E-03	6.8E-06	7.7E-05	7.5E-05	7.8E-05	2.55
	Construction Mob & Layout	Survey Crew Trucks	Diesel	3.04	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	9.1E-05	2.7E-04	1.7E-06	1.9E-05	1.9E-05	2.0E-05	0.64
		Tractor Trailers Temp Fac.	Diesel	3.04	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	9.1E-05	2.7E-04	1.7E-06	1.9E-05	1.9E-05	2.0E-05	0.64
	Curbing	Bob Cat	Diesel	18.24	75	0.21	3.6911538	4.4373086	0.0022105	0.5763183	0.5590299	0.7560379	693.80958	1.2E-03	1.4E-03	7.0E-07	1.8E-04	1.8E-04	2.4E-04	0.22
		Concrete Ready Mix Trucks	Diesel	18.24	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	5.5E-04	1.6E-03	1.0E-05	1.2E-04	1.1E-04	1.2E-04	3.82
		Material Deliveries	Diesel	18.24	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	5.5E-04	1.6E-03	1.0E-05	1.2E-04	1.1E-04	1.2E-04	3.82
		Tractor Trailer with Boom Hoist- Delivery	Diesel	18.24	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	5.5E-04	1.6E-03	1.0E-05	1.2E-04	1.1E-04	1.2E-04	3.82
	Grub the site down 2 ft.	Bulldozer	Diesel	12.16	175	0.59	0.1526261	0.4543016	0.0014521	0.0388079	0.0376436	0.0230047	536.76425	2.1E-04	6.3E-04	2.0E-06	5.4E-05	5.2E-05	3.2E-05	0.74
		Front Loader	Diesel	12.16	100	0.21	2.3425875	2.5409126	0.0020688	0.3520743	0.3415122	0.3949803	694.86568	6.6E-04	7.2E-04	5.8E-07	9.9E-05	9.6E-05	1.1E-04	0.20
		Ten Wheelers	Diesel	12.16	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	3.6E-04	1.1E-03	6.8E-06	7.7E-05	7.5E-05	7.8E-05	2.55
	Lighting Pre-Cast Concrete Piers (10)	Auger Drill	Diesel	18.24	175	0.43	0.6159073	2.8131094	0.0016714	0.1580101	0.1532698	0.2106579	530.43713	9.3E-04	4.3E-03	2.5E-06	2.4E-04	2.3E-04	3.2E-04	0.80
		Fork Truck	Diesel	18.24	100	0.59	0.0815071	0.8777536	0.0015743	0.0167159	0.0162144	0.0091523	596.13154	9.7E-05	1.0E-03	1.9E-06	2.0E-05	1.9E-05	1.1E-05	0.71
		Front Loader	Diesel	18.24	100	0.21	2.3425875	2.5409126	0.0020688	0.3520743	0.3415122	0.3949803	694.86568	9.9E-04	1.1E-03	8.7E-07	1.5E-04	1.4E-04	1.7E-04	0.29
		Tractor Trailer- Material Delivery	Diesel	9.12	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	2.7E-04	8.1E-04	5.1E-06	5.8E-05	5.6E-05	5.9E-05	1.91
	Remove Trees and shrubs	Bulldozer	Diesel	30.4	175	0.59	0.1526261	0.4543016	0.0014521	0.0388079	0.0376436	0.0230047	536.76425	5.3E-04	1.6E-03	5.0E-06	1.3E-04	1.3E-04	8.0E-05	1.86
		Chain Saws	Diesel	18.24	11	0.7	266.02876	1.5283019	0.0041355	9.7481996	8.968344	68.300395	685.99705	0.041	2.4E-04	6.4E-07	1.5E-03	1.4E-03	0.011	0.11
		Flat Bed or Dump Trucks	Diesel	30.4	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	9.1E-04	2.7E-03	1.7E-05	1.9E-04	1.9E-04	2.0E-04	6.37
		Log Chipper	Diesel	18.24	100	0.43	1.5440715	3.3110635	0.0018829	0.2792579	0.2708804	0.2982019	589.50964	1.3E-03	2.9E-03	1.6E-06	2.4E-04	2.3E-04	2.6E-04	0.51
		Mulcher	Diesel	18.24	100	0.43	1.5440715	3.3110635	0.0018829	0.2792579	0.2708804	0.2982019	589.50964	1.3E-03	2.9E-03	1.6E-06	2.4E-04	2.3E-04	2.6E-04	0.51
		Tractor	Diesel	30.4	100	0.21	2.3425875	2.5409126	0.0020688	0.3520743	0.3415122	0.3949803	694.86568	1.6E-03	1.8E-03	1.5E-06	2.5E-04	2.4E-04	2.8E-04	0.49
	Rough Grading	Compacting Equipment	Diesel	12.16	6	0.43	2.4713369	4.1839495	0.0021832	0.2410171	0.2337858	0.8379732	593.75355	8.5E-05	1.4E-04	7.5E-08	8.3E-06	8.1E-06	2.9E-05	0.021
		Small Dozer	Diesel	12.16	175	0.59	0.1526261	0.4543016	0.0014521	0.0388079	0.0376436	0.0230047	536.76425	2.1E-04	6.3E-04	2.0E-06	5.4E-05	5.2E-05	3.2E-05	0.74
	Set in-place Light Poles	40 Ton Rough Terrain Crane	Diesel	12.16	300	0.43	0.1267628	0.5143923	0.0014623	0.024943	0.0241947	0.0350035	530.94123	2.2E-04	8.9E-04	2.5E-06	4.3E-05	4.2E-05	6.1E-05	0.92
		High Lift	Diesel	12.16	100	0.59	3.3568807	3.2235903	0.0021953	0.42377	0.411057	0.5280869	694.48599	2.7E-03	2.5E-03	1.7E-06	3.4E-04	3.3E-04	4.2E-04	0.55
		Tractor Trailer- Material Delivery	Diesel	12.16	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	3.6E-04	1.1E-03	6.8E-06	7.7E-05	7.5E-05	7.8E-05	2.55
	Stripping	Line Painting Truck and Sprayer	Diesel	6.08	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	1.8E-04	5.4E-04	3.4E-06	3.9E-05	3.7E-05	3.9E-05	1.27
	Subgrade Materials installed	Backhoe	Diesel	12.16	100	0.21	2.3425875	2.5409126	0.0020688	0.3520743	0.3415122	0.3949803	694.86568	6.6E-04	7.2E-04	5.8E-07	9.9E-05	9.6E-05	1.1E-04	0.20
		Roller	Diesel	12.16	100	0.59	0.5249922	1.3563071	0.0016381	0.0862787	0.0836905	0.0412127	596.03847	4.2E-04	1.1E-03	1.3E-06	6.8E-05	6.6E-05	3.3E-05	0.47
		Tractor Trailer- Material Delivery	Diesel	12.16	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	3.6E-04	1.1E-03	6.8E-06	7.7E-05	7.5E-05	7.8E-05	2.55
	Top Coat of Asphalt	Paving Machine	Diesel	12.16	175	0.59	0.1870933	0.6250914	0.0014652	0.0469116	0.0455043	0.0291649	536.74704	2.6E-04	8.7E-04	2.0E-06	6.5E-05	6.3E-05	4.0E-05	0.74
		Ten Wheelers- Material Delivery	Diesel	12.16	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	3.6E-04	1.1E-03	6.8E-06	7.7E-05	7.5E-05	7.8E-05	2.55
	Underground Conduits	Backhoe	Diesel	18.24	100	0.21	2.3425875	2.5409126	0.0020688	0.3520743	0.3415122	0.3949803	694.86568	9.9E-04	1.1E-03	8.7E-07	1.5E-04	1.4E-04	1.7E-04	0.29
		Fork Truck	Diesel	18.24	100	0.59	0.0815071	0.8777536	0.0015743	0.0167159	0.0162144	0.0091523	596.13154	9.7E-05	1.0E-03	1.9E-06	2.0E-05	1.9E-05	1.1E-05	0.71
		Tractor Trailer- Material Delivery	Diesel	9.12	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	2.7E-04	8.1E-04	5.1E-06	5.8E-05	5.6E-05	5.9E-05	1.91

Table C-6
Non-Road Criteria Emissions Estimate - Oregon Acoustic Laboratory Construction
Port of Portland

ACEIT Project	Construction Activity	Equipment [1]	Fuel Type [1]	Revised Activity [2] (hrs)	Avg Rated HP [1]	Load Factor [1]	Emission Factor [3] (g/hp-hr)							Emission Estimates [a] (tons)						
							CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	VOC	CO_2	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	VOC	CO_2
Site Work - 10000 sqft	Construction Mob & Layout	Survey Crew Trucks	Diesel	180	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	5.4E-03	0.016	1.0E-04	1.1E-03	1.1E-03	1.2E-03	37.6
		Tractor Trailers Temp Fac.	Diesel	71.846	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	2.2E-03	6.4E-03	4.0E-05	4.6E-04	4.4E-04	4.6E-04	15.0
	Site Clearing-Remove Trees & Shrubs	Bulldozer	Diesel	718	175	0.59	0.1526261	0.4543016	0.0014521	0.0388079	0.0376436	0.0230047	536.76425	0.012	0.037	1.2E-04	3.2E-03	3.1E-03	1.9E-03	43.9
		Chain Saws	Diesel	718	11	0.7	266.02876	1.5283019	0.0041355	9.7481996	8.968344	68.300395	685.99705	1.62	9.3E-03	2.5E-05	0.059	0.055	0.42	4.18
		Flat Bed or Dump Trucks	Diesel	1,437	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	0.043	0.13	8.0E-04	9.1E-03	8.8E-03	9.3E-03	301
		Front Loader	Diesel	718	100	0.21	2.3425875	2.5409126	0.0020688	0.3520743	0.3415122	0.3949803	694.86568	0.039	0.042	3.4E-05	5.9E-03	5.7E-03	6.6E-03	11.6
		Grub the site down 2'-0	Diesel	718	40	0.59	0.2809264	2.5300546	0.001569	0.0208123	0.020188	0.0926059	595.8795	5.3E-03	0.047	2.9E-05	3.9E-04	3.8E-04	1.7E-03	11.1
		Log Chipper	Diesel	718	100	0.43	1.5440715	3.3110635	0.0018829	0.2792579	0.2708804	0.2982019	589.50964	0.053	0.11	6.4E-05	9.5E-03	9.2E-03	0.010	20.1
		Mulcher	Diesel	718	100	0.43	1.5440715	3.3110635	0.0018829	0.2792579	0.2708804	0.2982019	589.50964	0.053	0.11	6.4E-05	9.5E-03	9.2E-03	0.010	20.1
		Ten Wheelers	Diesel	718	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	0.022	0.064	4.0E-04	4.6E-03	4.4E-03	4.6E-03	150
		Tractor	Diesel	1,437	100	0.21	2.3425875	2.5409126	0.0020688	0.3520743	0.3415122	0.3949803	694.86568	0.078	0.085	6.9E-05	0.012	0.011	0.013	23.1
	Site Restoration-Landscaping (Curbing)	Bob Cat	Diesel	431	75	0.21	3.6911538	4.4373086	0.0022105	0.5763183	0.5590299	0.7560379	693.80958	0.028	0.033	1.7E-05	4.3E-03	4.2E-03	5.7E-03	5.19
		Concrete Ready Mix Trucks	Diesel	431	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	0.013	0.038	2.4E-04	2.7E-03	2.7E-03	2.8E-03	90.3
		Tractor Trailer with Boom Hoist- Delivery	Diesel	431	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	0.013	0.038	2.4E-04	2.7E-03	2.7E-03	2.8E-03	90.3
	Site Restoration-Landscaping (Rough Grading)	Compacting Equipment	Diesel	431	6	0.43	2.4713369	4.1839495	0.0021832	0.2410171	0.2337858	0.8379732	593.75355	3.0E-03	5.1E-03	2.7E-06	3.0E-04	2.9E-04	1.0E-03	0.73
		Small Dozer	Diesel	431	175	0.59	0.1526261	0.4543016	0.0014521	0.0388079	0.0376436	0.0230047	536.76425	7.5E-03	0.022	7.1E-05	1.9E-03	1.8E-03	1.1E-03	26.3
	Site Restoration-Landscaping (Top Soil Seed and Plantings)	Forktruck (Hoist)	Diesel	1,437	100	0.59	0.0815071	0.8777536	0.0015743	0.0167159	0.0162144	0.0091523	596.13154	7.6E-03	0.082	1.5E-04	1.6E-03	1.5E-03	8.6E-04	55.7
		Roller	Diesel	718	100	0.59	0.5249922	1.3563071	0.0016381	0.0862787	0.0836905	0.0412127	596.03847	0.025	0.063	7.7E-05	4.0E-03	3.9E-03	1.9E-03	27.9
		Seed Truck Spreader	Diesel	287	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	8.6E-03	0.026	1.6E-04	1.8E-03	1.8E-03	1.9E-03	60.2
		Tractor Trailer- Material Delivery	Diesel	1,437	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	0.043	0.13	8.0E-04	9.1E-03	8.8E-03	9.3E-03	301
	Underground Services to 5 ft. of Building	Backhoe	Diesel	2,155	100	0.21	2.3425875	2.5409126	0.0020688	0.3520743	0.3415122	0.3949803	694.86568	0.12	0.13	1.0E-04	0.018	0.017	0.020	34.7
		Fork Truck	Diesel	1,078	100	0.59	0.0815071	0.8777536	0.0015743	0.0167159	0.0162144	0.0091523	596.13154	5.7E-03	0.062	1.1E-04	1.2E-03	1.1E-03	6.4E-04	41.8
		Tractor Trailer- Material Delivery	Diesel	539	600	0.59	0.0767259	0.2285427	0.0014343	0.016255	0.0157673	0.0164992	536.78063	0.016	0.048	3.0E-04	3.4E-03	3.3E-03	3.5E-03	113
TOTAL														2.50	1.81	5.1E-03	0.20	0.19	0.58	1,884

NOTES:

(a) Emissions estimate (tons) = (emission rate [g/hp-hr]) x (average horsepower [hp]) x (load factor) x (revised activity [hrs]) / (453.952 g/lb) / (2,000 lb/ton)

REFERENCES:

(1) Values from Airport Construction Emissions Inventory Tool (ACEIT)

(2) Table C-4, Non-Road Activity - Oregon Acoustic Laboratory Construction.

(3) Table C-2, Non-Road Emission Factors.

Table C-7
On-Road Criteria Emissions Estimate - Oregon Acoustic Laboratory Construction
Port of Portland

ACEIT Project	Equipment [1]	MOVES3 Equipment	Fuel Type	Revised VMT [2]	Emission Factor [3] (g/mi)										Emission Estimates [a] (tons)									
					CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	VOC	CO_2	CH_4	N_2O	CO_2e	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	VOC	CO_2	CH_4	N_2O	CO_2e
Building - 30000 sqft- 3 stories	Cement Mixer	Single Unit Short-haul Truck	Diesel	2,886	0.9378	1.4891	0.0043	0.0324	0.0298	0.0847	1278.9457	0.0133	0.0055	1281.2347	3.0E-03	4.7E-03	1.4E-05	1.0E-04	9.5E-05	2.7E-04	4.07	4.2E-05	1.8E-05	4.08
	Dump Truck Subbase Material	Single Unit Short-haul Truck	Diesel	1,539	0.9378	1.4891	0.0043	0.0324	0.0298	0.0847	1278.9457	0.0133	0.0055	1281.2347	1.6E-03	2.5E-03	7.3E-06	5.5E-05	5.1E-05	1.4E-04	2.17	2.3E-05	9.3E-06	2.17
	Passenger Car	Passenger Car	Gasoline	454,080	1.5193	0.0533	0.0028	0.0014	0.0012	0.0193	420.4172	0.0058	0.0034	421.7097	0.76	0.027	1.4E-03	7.0E-04	6.2E-04	9.7E-03	210	2.9E-03	1.7E-03	211
	Tractor Trailer	Combination Short-haul Truck	Diesel	66,144	1.7386	3.5425	0.0071	0.0584	0.0537	0.1206	2125.6087	0.0193	0.0055	2128.1856	1.3E-04	2.6E-04	5.2E-07	4.3E-06	3.9E-06	8.8E-06	0.15	1.4E-06	4.0E-07	0.16
Drainage System	Passenger Car	Passenger Car	Gasoline	208,980	1.5193	0.0533	0.0028	0.0014	0.0012	0.0193	420.4172	0.0058	0.0034	421.7097	0.35	0.012	6.4E-04	3.2E-04	2.9E-04	4.4E-03	96.8	1.3E-03	7.8E-04	97.1
Open Parking Lot @Grade - 10000 sqft	Dump Truck Subbase Material	Single Unit Short-haul Truck	Diesel	937	0.9378	1.4891	0.0043	0.0324	0.0298	0.0847	1278.9457	0.0133	0.0055	1281.2347	9.7E-04	1.5E-03	4.4E-06	3.3E-05	3.1E-05	8.7E-05	1.32	1.4E-05	5.7E-06	1.32
	Passenger Car	Passenger Car	Gasoline	4,257	1.5193	0.0533	0.0028	0.0014	0.0012	0.0193	420.4172	0.0058	0.0034	421.7097	7.1E-03	2.5E-04	1.3E-05	6.6E-06	5.8E-06	9.1E-05	1.97	2.7E-05	1.6E-05	1.98
	Tractor Trailer	Combination Short-haul Truck	Diesel	91.2	1.7386	3.5425	0.0071	0.0584	0.0537	0.1206	2125.6087	0.0193	0.0055	2128.1856	1.7E-04	3.6E-04	7.2E-07	5.9E-06	5.4E-06	1.2E-05	0.21	1.9E-06	5.5E-07	0.21
Site Work - 10000 sqft	Dump Truck Subbase Material	Single Unit Short-haul Truck	Diesel	22,147	0.9378	1.4891	0.0043	0.0324	0.0298	0.0847	1278.9457	0.0133	0.0055	1281.2347	0.023	0.036	1.0E-04	7.9E-04	7.3E-04	2.1E-03	31.2	3.3E-04	1.3E-04	31.3
	Passenger Car	Passenger Car	Gasoline	8,514	1.5193	0.0533	0.0028	0.0014	0.0012	0.0193	420.4172	0.0058	0.0034	421.7097	0.014	5.0E-04	2.6E-05	1.3E-05	1.2E-05	1.8E-04	3.95	5.4E-05	3.2E-05	3.96
	Tractor Trailer	Combination Short-haul Truck	Diesel	14,369	1.7386	3.5425	0.0071	0.0584	0.0537	0.1206	2125.6087	0.0193	0.0055	2128.1856	0.028	0.056	1.1E-04	9.2E-04	8.5E-04	1.9E-03	33.7	3.1E-04	8.7E-05	33.7
TOTAL															1.19	0.14	2.3E-03	3.0E-03	2.7E-03	0.019	386	5.0E-03	2.8E-03	387

NOTES:

(a) Emissions estimate (tons) = (emission rate [g/mi]) x (revised VMT [miles]) / (453.592 g/lb) / (2,000 lb/ton)

REFERENCES:

(1) Values from Airport Construction Emissions Inventory Tool (ACEIT)

(2) Table C-5, On-Road Activity - Oregon Acoustic Laboratory Construction.

(3) Table C-3, On-Road Emission Factors.

Table C-8
Fugitive Criteria Emissions Estimate - Oregon Acoustic Laboratory Construction
Port of Portland

Project	Fugitive Source Type	Number of Months	Emission Estimates (tons) [1]				
			CO	NO_X	SO_2	PM_{10}	VOC
Building - 30000 sqft- 3 stories	Concrete Mixing/Batching	12	0	0	0	0.02565	0
	Material Movement (Paved Roads)	12	0	0	0	0.01195	0
	Material Movement (Unpaved Roads)	12	0	0	0	0.03535	0
Drainage System	Material Movement (Paved Roads)	12	0	0	0	0	0
	Material Movement (Unpaved Roads)	12	0	0	0	4.30E-03	0
	Soil Handling	12	0	0	0	1.15E-03	0
	Unstabilized Land and Wind Erosion	12	0	0	0	1.63E-09	0
Open Parking Lot @Grade - 10000 sqft	Asphalt Drying	12	0	0	0	0	0.37095
	Material Movement (Paved Roads)	12	0	0	0	0.006	0
	Material Movement (Unpaved Roads)	12	0	0	0	0.0178	0
	Soil Handling	12	0	0	0	2.83E-03	0
	Unstabilized Land and Wind Erosion	12	0	0	0	4.03E-09	0
Site Work - 10000 sqft	Material Movement (Paved Roads)	12	0	0	0	0.006	0
	Material Movement (Unpaved Roads)	12	0	0	0	0.018	0
	Soil Handling	12	0	0	0	2.83E-03	0
	Unstabilized Land and Wind Erosion	12	0	0	0	4.03E-09	0
Total			0	0	0	0.13186	0.37095

REFERENCES:

(1) Values from Airport Construction Emissions Inventory Tool (ACEIT).

Table C-9
Criteria Emission Estimate Summary - Oregon Acoustic Laboratory Construction
Port of Portland

Emission Source	Emission Estimates (tons)									
	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	VOC	CO_2	CH_4	N_2O	CO_2e
OnRoad	1.19	0.14	2.3E-03	3.0E-03	2.7E-03	0.019	386	5.0E-03	2.8E-03	387
NonRoad	2.50	1.81	5.1E-03	0.20	0.19	0.58	1,884	--	--	1,884
Fugitive	--	--	--	0.13	--	0.37	--	--	--	--
TOTAL	3.69	1.95	7.4E-03	0.34	0.20	0.97	2,270	5.0E-03	2.8E-03	2,271

Table O-1
Input Process Rates and Parameters - Oregon Acoustic Laboratory
Port of Portland

Source	Proposed Production or Throughput Rate		
	Input Value	Daily Parameter	Annual Parameter
Facility-Wide			
Hours of Operation	--	24.0 (hr/day) (1)	365 (days/yr) (1)

Vehicle Activity - Other Facilities	Input Value	Daily Parameter	Annual Parameter
Worker Commute	1.00 (workers/trip)	10.0 (trips/day) (2)	3,650 (trips/yr) (2)

REFERENCES:

(1) Information based on continuous operation.

(2) Information provided by the Port of Portland. Assumes 10 trips per day for 365 days per year.

Table O-2
On-road Emission Estimates - Oregon Acoustic Laboratory
Port of Portland

ACEIT Project	MOVES3 Equipment	Fuel Type	Miles /Trip [1]	Trips /Year [2]	Revised VMT [a]	Emission Factor [3] (g/mi)										Emission Estimates [b] (tons/yr)									
						CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	VOC	CO_2	CH_4	N_2O	CO_2e	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	VOC	CO_2	CH_4	N_2O	CO_2e
Worker Commute	Passenger Car	Gasoline	30	3,650	109,500	1.5193	0.0533	0.0028	0.0014	0.0012	0.0193	420.4172	0.0058	0.0034	421.7097	0.18	6.4E-03	3.4E-04	1.7E-04	1.5E-04	2.3E-03	50.7	6.9E-04	4.1E-04	50.9
TOTAL																0.18	6.4E-03	3.4E-04	1.7E-04	1.5E-04	2.3E-03	50.7	6.9E-04	4.1E-04	50.9

NOTES:

(a) Revised VMT (miles) = (miles/trip) x (trips/yr)

(b) Emissions estimate (tons) = (emission rate [g/mi]) x (revised VMT [miles]) / (453.592 g/lb) / (2,000 lb/ton)

REFERENCES:

(1) Values from Airport Construction Emissions Inventory Tool (ACEIT)

(2) Table C-5, On-Road Activity - Mass Timber Manufacturing Facility Construction.

(3) Emission factors from EPA MOVES3. Default Scale; Calculation type - Emission Rates; 2023; June, July, August; Weekdays; Geographic Bounds - Multnomah County; Roadtype – Urban Unrestricted