Analysis of Brownfield Cleanup Alternatives

Former Western States Plywood Cooperative Mill

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Wild Rivers Land Trust

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Abbreviations

ABCA	Analysis of Brownfield Cleanup Alternatives
bgs	below ground surface
CFR	Code of Federal Regulations
COC	contaminant of concern
CWA	Clean Water Act
DEQ	Department of Environmental Quality (Oregon)
DSL	Department of State Lands (Oregon)
EPA	U.S. Environmental Protection Agency
ERA	ecological risk assessment
ESA	environmental site assessment
ESCP	erosion- and sediment-control plan
ERP	Elk River Partners LLC
HAI	Hahn and Associates, Inc.
JPA	joint permit application
MFA	Maul Foster & Alongi, Inc.
NMFS	National Marine Fisheries Service
OAR	Oregon Administrative Rule
PCP	pentachlorophenol
pg/g	picograms per gram
RBC	risk-based concentration
TEQ	toxicity equivalent quotient
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WRLT	Wild Rivers Land Trust
WSP	WSP USA, Inc.

1 Introduction

On behalf of Wild Rivers Land Trust (WRLT), Maul Foster & Alongi, Inc. (MFA) prepared this Analysis of Brownfield Cleanup Alternatives (ABCA) report for the Former Western States Plywood Cooperative Mill (the Site), located along the Elk River in Port Orford, Oregon. This ABCA focuses on the remediation of dioxin/furan-impacted soil and sediments which were identified as posing an unacceptable risk to ecological receptors (MFA 2022).

1.1 Background

MFA completed this ABCA to meet the requirements of the U.S. Environmental Protection Agency (EPA) Brownfield Cleanup Grants program. This ABCA report includes:

- Information about the project site and planned habitat restoration activities
- Summary of previous investigations and known contaminants, and applicable regulations and cleanup standards
- Evaluation of effectiveness, long-term reliability, implementability, implementation risk, and cost of the evaluated cleanup alternatives, as well as climate change and sustainability considerations
- Selection of a preferred cleanup alternative

2 Background

2.1 Site Description

The Site is located in section 27 of township 32 south, range 15 west of the Willamette Meridian and includes Curry County tax lots 104, 900, and 901 (see Figure 2-1). The Site is currently vacant and is covered with vegetation and disturbed ground from former plywood mill operations. Two ponds are present on the Site: the former log pond and the former fire suppression pond (see Figure 2-2). The former log pond comprises approximately 4.4 acres of freshwater Palustrine emergent wetland, primarily within tax lot 901, and is currently an overgrown low-lying marshy area (see Appendix B; WSP 2020). The former fire suppression pond occupies the northwest corner of Tax Lot 900. Bagley Creek crosses the Site in a southwest-to-northeast direction, through the former fire suppression pond and former log pond and enters the Elk River near the northeast corner of the Site. A concrete-fortified dam with an intrinsic spillway, an earthen dam, and seasonal beaver dams constrain the water along Bagley Creek into the two ponds. Most of the Site is relatively flat at an elevation of approximately 80 feet above mean sea level. The eastern portion of tax lot 104 contains a slight topographic slope to Elk River. The Site is bordered by agricultural land to the west and north and

rural residences to the east and south (see Figure 2-2). The Elk River flows along the northeast perimeter of the Site.

The Site, as well as the adjacent Curry County tax lots 902 and 903, were formerly developed and operated as a plywood mill owned by Western States Plywood Cooperative. The plywood manufacturing facility operated on the Site between approximately the 1950s until 1975. Prior to construction of the mill, the Site was vacant, undeveloped forestland. Historical features associated with the former mill are shown on Figure 2-2. The land has been largely vacant since a fire destroyed the mill in 1976. (HAI 2018; WSP 2020).

The main structure of the former plywood mill building was primarily present on an adjacent tax parcel to the east of the Site. The northwest portion of the mill building likely housed the debarking operations of the mill while the southwest portion may have been used to heat the logs prior to peeling into veneers. The locations of the gluing operations and phenolic resins storage are not known. North of the debarking area in tax lot 104 was the former stud mill. Stud mills during this period commonly treated lumber with pentachlorophenol (PCP) for anti-sap staining purposes; however, it is unknown whether PCP was used at the Site. Additional details on the historical features and operational activities are provided in the 2020 Targeted Brownfields Assessment and 2018 Phase II Environmental Site Assessment (HAI 2018; WSP 2020).

The following sensitive environments have been identified at the Site (WSP 2020):

The Elk River is designated as a Wild and Scenic River under the National Wild and Scenic Rivers Act as well as Essential Salmonid Habitat by the Oregon Department of State Lands (DSL).

Bagley Creek is designated as Essential Salmonid Habitat by DSL.

The former log pond on tax lots 104 and 901 contains freshwater emergent and freshwater forest/shrub wetlands as identified in the U.S. Fish and Wildlife National Wetlands Inventory.

The bank of the Elk River on tax lot 104 is defined as freshwater forest/shrub wetlands in the U.S. Fish and Wildlife National Wetlands Inventory.

The banks of the Elk River and Bagley Creek are identified as Riparian Habitat by the Oregon Department of Fish and Wildlife Strategy Habitats Database.

Federally listed threatened species (i.e., Coho salmon) may be present in the adjacent Elk River during certain times of the year (e.g., while migrating) and the proposed habitat restoration of Bagley Creek is being conducted to support reintroduction of Coho salmon.

2.2 Geology, Hydrogeology, and Surface Water

The Site is located on an alluvial plain of the Elk River, surrounded to the north and south by lowland hills of Oregon's coastal range. According to WSP USA, Inc.'s, (WSP's) review of light detection and ranging imagery, there is a relatively steep slope at the northern margin of the Site consistent with an ancestral alluvial bench rather than artificial fill placement imported to raise the grade of the Site (WSP 2020).

During previous investigations, subsurface drilling observations at the Site identified a mixture of sands, silts, and gravel to the maximum exploration depth of 25 feet below ground surface (bgs). Groundwater was typically encountered between 7 to 15 feet bgs, exceptions being the areas near the southern and northern margins of the former log pond, where groundwater was encountered

approximately 7.5 and 17 feet bgs, respectively. Based on topography, Hahn and Associates, Inc. (HAI) inferred that the groundwater flow direction ranged from an easterly to a northwesterly direction, and likely was subject to seasonal variation (HAI 2018; WSP 2020).

Bagley Creek intersects the Site through the former log pond and former fire suppression pond that were constructed as part of the former plywood mill operations. The presence of the ponds and dams through Bagley Creek has prevented fish access to upstream portions of Bagley Creek from Elk River. National Wetlands Inventory maps depicts several wetlands at low spots on the Site (see Appendix B). These include freshwater emergent and freshwater forest/shrub wetlands within the former log pond, and a freshwater emergent wetland on adjacent tax lots 902 and 903.

2.3 Previous Investigations

Previous environmental investigations at the Site have included the following:

- July 2017: Phase I Environmental Site Assessments (ESAs) for tax lots 900 and 901 of the Site prepared for WRLT by PBS Engineering and Environmental, Inc. (PBS 2017a, 2017b).
- December 2018: Phase II ESA for tax lots 104 and 900 of the Site on behalf of WRLT and Elk River Partners LLC (ERP) by HAI (HAI 2018). The Phase II ESA included the following:
  - Targeted geophysical survey work to assess three areas of the Site. Four subsurface anomalies were identified during the survey, including one potential underground storage tank (UST) near the former office (see Figure 2-2).
  - Advancement of 16 borings for soil and groundwater sampling.
  - Collection of six surface soil samples (three 3-point composite samples and three discrete samples) within the top foot of soil across the Site.
- January 2019: supplemental surface soil investigation for dioxins/furans on behalf of WRLT and ERP by HAI (HAI 2019a). This investigation included sampling eight discrete locations (SS-1 through SS-8) within the top foot of soil across the Site.
- March 2019: Phase I ESA for tax lots 104 and 901 by HAI on behalf of WRLT and ERP (HAI 2019b).
- July 2020: Phase I ESA for tax lot 900 and an adjacent tax lot to the east, Curry County tax lot 3215-27-00902 by HAI on behalf of ERP and JJW Sustainable Land Trust, LLC (HAI 2020).
- December 2020: Targeted Brownfields Assessment for the Site prepared on behalf of EPA by WSP (WSP 2020). This assessment included a Level 1 ecological risk assessment (ERA). This investigation included the following:
  - Collection of eight 30-point surface soil samples via incremental sampling methodology (ISM) from eight decision units. This included one background decision unit (DU-8) and the remaining seven decision units centered around the former northern and southern wigwam burners and the former stud mill.
  - Collection of subsurface soil and groundwater samples from temporary direct-push borings across the Site.
  - Collection of groundwater samples from two permanent wells on the Site, a domestic well with a downhole pump and hose spigot and an approximately 30-inch-diameter concrete cased well.

  - Collection of grab surface sediment samples from the upper 10 centimeters of the sediment along Bagley Creek and within the former ponds on the Site.
  - Collection of surface water along Bagley Creek and within the former ponds on the Site.
- August 2022: Screening level ERA and Beneficial Land and Water Use Determination for the Site prepared by MFA on behalf of WRLT. The ERA determined potential for unacceptable risk to ecological receptors at the Site. Reasonably likely future land use at the Site includes ecological habitat and recreational use. Beneficial uses of ground and surface water at the Site and surrounding area include drinking water, discharge to surface water to support fish and aquatic life, irrigation, domestic water supply, ecological habitat, and recreation.

2.3.1 Known Contaminants

Previous environmental investigations identified the operation of industrial machinery and vehicles onsite, leaks or spills from oil filled transformers, leaks or spills of maintenance shop-related materials stored in containers, and releases of wood treatment chemicals, such as PCP, as possible sources of contamination to the Site (WSP 2020). Potential contaminants associated with these sources included:

- Metals (including mercury)
- Diesel Range Organics
- Oil Range Organics
- Gasoline Range Organics
- Semivolatile organic compounds, including PCP and polycyclic aromatic hydrocarbons
- Polychlorinated biphenyls
- Benzene, toluene, ethylbenzene, and xylene
- Formaldehyde
- Dioxins/furans

Based on the investigations conducted, MFA prepared an ERA consistent with Oregon Department of Environmental Quality (DEQ) methodologies to determine whether contaminants at the Site currently pose, or are reasonably likely to pose in the future, unacceptable risks to ecological receptors including threatened Coho salmon under proposed future restored conditions (MFA 2022). MFA performed higher-tiered risk assessment evaluations, building on the Level 1 Scoping ERA that was previously prepared for EPA (WSP 2020), to identify ecological chemicals of concern (COCs). COCs were identified as follows and in the areas shown on Figure 2-3.

- **Soil:** Dioxin/furans for mammal populations based on a risk-based concentration (RBC) of 11 picograms per gram (pg/g) and an associated hot spot criterion of 110 pg/g for dioxin toxicity equivalent quotient (TEQ).[1]
- **Sediment:** Dioxin/furans for sediment direct toxicity based on a RBC of 21.5 pg/g and an associated hot spot criterion of 215 pg/g for dioxin TEQ.

[1] Concentrations of dioxins/furans congeners are multiplied by their toxicity equivalent factors to estimate the toxicity of these congeners relative to 2,3,7,8-tetrachlorodibenzo-p-dioxin; the resulting concentrations may be summed into a total 2 2,3,7,8-tetrachlorodibenzo-p-dioxin TEQ concentration.

- **Surface Water:** Elevated detections of dioxins in surface water above the surface water chronic criterion of 0.0031 picograms per liter[2] are likely related to elevated concentrations observed in soils/sediments, and addressing these media is anticipated to account for surface water given the hydrophobic nature of these compounds.

2.4 Planned Habitat Restoration

The planned reuse for the Site is as habitat for fish and wildlife, including reintroduction of Coho salmon, a federally listed threatened species. The project will include the removal of existing barriers to fish passage and reconnection of over 1 mile of upstream habitat on Bagley Creek, a tributary to the Elk River. The project supports several plans (especially the Elk River Coho Business Plan[3]) to restore habitat for threatened and endangered fish species in the Elk River.

The former log pond, smaller fire pond, and riparian areas along Bagley Creek will be restored to a more natural ecological condition by re-establishing hydrologic connectivity and native vegetation. The upland portions of the Site will be planted with native vegetation.

2.5 Regional and Site Vulnerabilities

According to the Fourth National Climate Assessment (May, et al. 2018), trends for the northwest region of the United States include: increased temperatures during all seasons under all future scenarios; decreased snowpack; increased wildfires and insect infestations; decreased rainfall and water availability during the dry season; increased flooding during the wet season; a rising sea level; increased storm surge events; more frequent heat waves; and increased risk of landslide and erosion. The most applicable climate related vulnerability to the cleanup of the site is increased precipitation that may affect flood waters.

According to the Federal Emergency Management Agency flood zone map 41015C0190F (see Appendix), the very northern and eastern boundaries of the Site are located within Zone AE, but the majority of the site is within Zone X, where minimal flooding is expected during the current 500-year recurrence interval event. The planned remediation and ecological restoration work will take place partially within Zone X.

Increased storm frequency and intensity, along with increased precipitation in the wet months, may result in more frequent and powerful flood waters within the Elk River, which may result in changes to the flood zone and increased risk of flooding of the Site. The remediation and ecological restoration of the Site is designed with these factors in mind. Based on the nature of the Site and its proposed reuse, other climate change impacts are not likely to significantly affect the Site.

[2] Note that surface water concentrations are well below the acute criterion of 10,000 picograms per liter. See DEQ Table 2 freshwater SLVs for the basis of values (DEQ, 2020).
[3] The Elk River Coho Partnership, 2022. Strategic Action Plan for Coho Salmon Recovery, The Elk River.

3 Applicable Regulations and Cleanup Standards

3.1 State Cleanup Oversight and Regulations

DEQ is responsible for overseeing cleanup at the Site. Documents prepared for the Site are submitted to DEQ under state Environmental Cleanup Site Information number 556. The site is expected to be governed under Oregon Administrative Rule (OAR) Chapter 340 Division 122—Hazardous Substance and Remedial Action Rules. These rules require that any removal or remedial action address a release or threat of release of hazardous substances in a manner that assures protection of present and future public health, safety, and welfare and the environment. The rules also provide a framework for the development of RBCs to which concentrations of contaminants are compared to evaluate the need for remediation.

3.2 Joint Permit Application

The joint permit application (JPA) is administered by the U.S. Army Corps of Engineers (USACE) to facilitate application for federal and state permits for projects impacting waters of the U.S. and state waters. The regulations relevant to cleanup at the Site are summarized in the following subsections.

3.2.1 USACE Section 404 Permit

USACE requires that a permit be obtained for the discharge of dredged or fill materials in waters of the U.S., consistent with the Clean Water Act (CWA). The permit also requires that the state issue a water quality certification for the project under CWA Section 401. Discharges of dredged or fill materials are not permitted unless there is no practicable alternative that will have less adverse impact on the aquatic ecosystem. The USACE will determine if a nationwide or individual permit will be required for the proposed cleanup and restoration actions. In addition, the USACE may require a Nationwide Permit 27 for activities related to aquatic habitat restoration, enhancement, and establishment.

WRLT will prepare permit documents fulfilling the requirements of CWA Section 404. It is expected that the proposed work will be permitted under Nationwide Permit 38—Cleanup of Hazardous and Toxic Waste. This general action permit provides for a streamlined effort for specific activities required to affect the containment, stabilization, or removal of hazardous or toxic waste materials that are performed, ordered, or sponsored by a government agency with established legal or regulatory authority.

3.2.2 Endangered Species Act and Biological Opinion

USACE permitting may prompt an Endangered Species Act determination by USACE and subsequent consultation (informal concurrence or formal consultation) with the National Marine Fisheries Service (NMFS) for coho salmon and the U.S. Fish and Wildlife Service (USFWS) for pacific marten, marbled murrelet, northern spotted owl, western snowy plover, monarch butterfly, and western lily.

These consultations would result in biological opinions in which NMFS and the USFWS would document their opinions as to whether an in-water project or action is likely to jeopardize the existence of an Endangered Species Act-listed species or to result in the destruction or improper modification of the habitat of that species. WRLT will prepare a biological evaluation or assessment, to evaluate whether adverse or negative impacts to endangered species and their critical habitats during or resulting from sediment remediation should be anticipated, to be submitted with the JPA.

Alternatively, USACE may directly evaluate whether the proposed in-water project or action is likely to jeopardize the existence of a species recorded on the Endangered Species Act list or to result in the destruction or improper modification of the habitat of that protected species. USACE may then ask the NMFS and USFWS for concurrence with their evaluation (an informal consultation).

3.2.3 CWA Section 401 Certification

The CWA requires the development of regulations to protect the quality of the nation's waters. Section 401 requires that applicants for a federal license or permit to conduct work that may result in discharges into navigable U.S. waters provide the licensing or permitting agency a certification from the state that the discharge will comply with the applicable provisions of Sections 301, 302, 303, 306, and 307 of the CWA. This program has been delegated to the State of Oregon.

The objective of the CWA (33 U.S. Code 1251-1376 and 40 CFR 129 and 131) is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Sections 303 and 304 of the CWA require the EPA to issue ambient surface water quality criteria for the protection of aquatic life and human health. The federal water quality criteria, as specified in Title 40 Part 131 of the Code of Federal Regulations (CFR), are nonenforceable guidelines to be used by states to set water quality standards for surface water. Federal water quality criteria, based on chronic and acute effects to aquatic life, have been developed for 120 priority toxic pollutants and 45 nonpriority pollutants for marine waters and freshwaters.

At least 30 days prior to submitting the JPA to DEQ's 401 program, WRLT will prepare a pre-filing request to allow DEQ to determine whether a pre-filing meeting is required. Following notification of whether a pre-filing meeting is required, WRLT and DEQ will either attend a pre-filing meeting or, if a meeting is not required, submit the application for the 401 certification. A project-specific water quality plan and monitoring plan will be prepared, as necessary, following feedback from DEQ's 401 program.

3.2.4 Cultural Resources

The National Historic Preservation Act, passed in 1966 (16 U.S. Code 470 et seq.), established a national policy for the protection of important historic buildings and archaeological sites and outlined responsibilities for federal and state governments. Under Section 106 of the National Historic Preservation Act, each agency must consult with Oregon's State Historic Preservation Office and Indian Tribes to ensure that cultural resources are identified, and to obtain the formal opinion of the office on each site's significance and the impact of its action upon the site. The responsibilities of all parties in the Section 106 review process are set forth in federal regulations developed by the Advisory Council on Historic Preservation as 36 CFR 800. Section 106 compliance is required, as activities requiring a permit from USACE will be conducted.

Prior to submitting the JPA, WRLT will subcontract with a cultural resources firm to provide an assessment of potential cultural resources within the remedial action area. This assessment will

include an inadvertent discovery plan should cultural resources be disturbed/encountered during cleanup implementation.

3.2.5 Oregon Removal/Fill Law

Oregon Revised Statute 196.795-990 requires that a permit be obtained from DSL for removal of material from or the placement of fill within waters of the state; this permit will be applied for as part of the JPA. DSL will review the application for completeness and, if so, initiate a public review period. Following completion of the public comment period and the resolution of any technical issues, DSL will evaluate the entire record against the criteria for permit issuance and either approve or deny the application.

OAR 141-145 provides the rules governing "the granting and renewal of access authorizations, leases, and easements issued to facilitate remediation conducted pursuant to an order issued by DEQ or United States Environmental Protection Agency and habitat restoration activities in, on, under, or over state-owned submerged and submersible land." This OAR requires that an easement be obtained for the construction of a sediment cap. It is expected that the proposed work will require a removal/fill permit and access authorization from DSL.

3.2.6 National Pollutant Discharge Elimination System 1200-C Permit

The National Pollutant Discharge Elimination System 1200-C permit is administered by DEQ to regulate construction activities that disturb one or more acres of land through clearing, grading, excavating, or stockpiling of fill material and where the possibility exists that stormwater could run off the Site into surface waters or conveyance systems leading to surface waters of the state during construction. To obtain a permit, applicants must prepare an erosion- and sediment-control plan (ESCP) and incorporate best management practices into their land-disturbing construction work. A complete application packet includes an application form, Land Use Compatibility Statement, and the ESCP.

3.3 County Permits

The Site is in an unincorporated portion of Curry County. The selected cleanup alternative will require a county erosion and sediment control permit. As the cleanup will include the existing log pond (part of Bagley Creek), the project may require a floodplain development permit, also administered by Curry County. WRLT will coordinate with Curry County to identify which permits will be required and obtain those required permits.

4 Cleanup Alternatives

The purpose of this ABCA is to identify and evaluate the most appropriate remedial alternative that reduces contaminant exposure to levels below RBCs protective of human health and the environment. This ABCA was completed in general accordance with EPA guidelines for conducting an ABCA and Oregon regulations for conducting a feasibility study (OAR 340-122-0085).

The remedial action area consists of soil/sediment with elevated concentrations of contaminants as described in section 2.3.1. Areas of exceedances include the log pond berm area sediments as well as upland areas as shown in Figure 2-3. Addressing these media will address dioxins in surface water, which are likely related to concentrations observed in soils/sediments.

4.1 Remedial Alternatives Considered

Typically, under DEQ removal authority (OAR 340-122-0090), remedial alternatives are evaluated using the following criteria:

- Effectiveness
- Long-term reliability
- Implementability
- Implementation risk
- Reasonableness of cost[4]

The above factors are discussed below, along with a discussion of climate change and sustainability related to resilience per EPA guidance (EPA 2014).

The objective of the remedial alternatives is to mitigate risk from chemical concentrations present at a site, such that any potential exposures do not exceed levels protective of human health and the environment.

4.1.1 Alternative 1—No Action

This alternative is included as a baseline condition only and is not considered a long-term solution for remediation of the site. This alternative would not include any activities to remove, treat, monitor, or manage site contamination. If impacted soil and sediments are left in place, human and ecological exposure to soil and sediments is likely and the potential for contaminant migration via erosion would remain. This alternative is not protective of human health and the environment, and reduction of contaminant concentrations below RBCs would not be achieved. This alternative is not evaluated further.

4.1.2 Alternative 2—Excavation and Off-Site Disposal

The first remediation and restoration scenario (Alternative 2) assumes that the existing log pond dike and impacted sediments within the northern end of the log pond (adjacent to the dike) will be excavated. Excavated soil and sediment that exceeds RBCs would be disposed of offsite as nonhazardous waste in a permitted Subtitle D landfill. A 6-inch-thick residuals cover would be placed over excavated areas to stabilize the post-excavation surface and provide suitable habitat substrate. The residuals cover and all disturbed areas would be planted with native plants. It is assumed planted areas would be maintained for three years; any additional measures to meet mitigation

[4] Per DEQ's "Guidance for Conducting Feasibility Studies" reasonableness of cost criteria for evaluation can be "summarized as a preference to treat hot spots of contamination and a preference for the least costly, protective alternative for non-hot spots of contamination."

requirements and ensure plant establishment would be determined as part of project design and permitting.

4.1.3 Alternative 3—Excavation and Protective Cap Installation

The second remediation and restoration scenario (Alternative 3) assumes that the existing log pond dike and impacted sediments within the northern end of the log pond (adjacent to the dike) will be excavated. Excavated soil and sediment that exceeds RBCs but that does not exceed hot spot criteria would be placed upland and capped with a high-visibility geotextile and at least two feet of other soil/sediment from the Site that does not exceed RBCs. Excavated soil and sediment that exceeds hot spot criteria (estimated to be 10% of soil/sediment exceeding RBCs) would be disposed of offsite as nonhazardous waste in a permitted Subtitle D landfill. A 6-inch-thick residuals cover would be placed over excavated areas to stabilize the post-excavation surface and provide suitable habitat substrate; similar approaches have been implemented under DEQ oversight.[5] The residuals cover and all disturbed areas would be planted with native plants; planted areas would be maintained for three years.

4.2 Evaluation of Cleanup Alternatives

4.2.1 Effectiveness

Both Alternative 2 and Alternative 3 are judged to be effective, as they would eliminate the exposure of contaminated soil/sediment to human and ecological receptors.

4.2.2 Long-Term Reliability

Alternative 3 requires the use of institutional controls (e.g., soil management plan) and the maintenance of engineering controls (a cap) to prevent exposure of human and ecological receptors to contaminated soil.

Alternative 2 would remove all contaminated soil and sediments from the site and would not rely on either institutional controls or engineering controls. Alternative 2 is judged to be more reliable in the long term.

4.2.3 Implementability

Both proposed alternatives are considered implementable, as they utilize common construction practices. Alternative 2 is judged to be slightly more implementable as it would not require consolidation and capping of excavated soil/sediment onsite.

4.2.4 Implementation Risk

The implementation risks for the two alternatives are similar. The impact on the community would be minimized, as the cleanup site is in a rural area and not directly adjacent to residences. The nearby community would be primarily impacted by haul routes. Worker risk would be minimized by

[5] See for example the East Whitaker Pond Cleanup (ECSI NO. 5455) as described in the MFA June 2022 *Completion Report, East Whitaker Pond.*

adherence to a health and safety plan. The required permits would reduce risk to the environment during construction through engineering and institutional controls.

4.2.5 Climate Change Concerns

The Elk River drainage is a rain-dominated basin, with much of the streamflow occurring between October and April. As the effects of climate change advance through midcentury and beyond, this general pattern is expected to continue. However, the frequency and magnitude of flood events are expected to increase during the rainy season, followed by decreased summer stream flows. Both Alternatives would remove contaminated sediment from the Bagley Creek drainage. While contaminated sediment would remain on site under Alternative 3, it would be capped and located well outside the floodplain of even the current 500-year event (Zone X of the flood insurance rate map).

4.2.6 Sustainability

Alternative 3 is judged to be more sustainable than Alternative 2, as it would require much less trucking of material from the Site. Alternative 2 would require trucking of all contaminated soil to a permitted landfill as well as the trucking of landfill cover materials. The nearest municipal solid waste landfill is over 100 miles away in Roseburg, Oregon and this alternative would therefore generate substantially more fuel usage and related emissions when compared to Alternative 3. While the soil cover included in Alternative 3 is expected to require periodic maintenance in the long term, the additional emissions from hauling a much larger quantity of material to the landfill during initial construction (Alternative 2) are more significant than the emissions related to minor long-term maintenance activities (Alternative 3).

4.2.7 Cost

The conceptual-level cost estimate to implement Alternative 2 is approximately $3,222,000 (see Table 4-1). The conceptual-level cost estimate to implement Alternative 3 is approximately $1,945,000 (see Table 4-2).

4.3 Public Participation

The ABCA process mandates that public comments and concerns be addressed during the selection of a cleanup alternative. This ABCA report will be included in the EPA grant application to be presented for public comment. Additional public comment period(s) will be included during permitted of the cleanup action.

5 Preferred Cleanup Alternative

The preferred cleanup alternative to remediate soil and sediment with concentrations of contaminants above RBCs is Alternative 3, which includes:

- Excavation of soil and sediment with concentrations exceeding RBCs

- Off-site disposal of soil and sediment with concentrations exceeding hot-spot criteria
- Consolidation of remaining excavated soil and sediment on site
- Capping of consolidated soil and sediment with clean site soil and/or imported clean soil
- Operation and maintenance of native plant areas over residuals cover and all disturbed areas

Alternative 1 cannot be recommended since it does not address site risks. While Alternative 2 ranks slightly higher in long-term reliability and implementability, it ranks lower in sustainability and is nearly 50% more expensive than Alternative 3. The long-term reliability and implementability concerns of Alternative 3 can be well managed. Environmental caps are proven technologies and upland soil caps can be easily and effectively monitored. For these reasons, Alternative 3 is the preferred alternative.

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MFA. 2022. Screening level ecological risk assessment for Former Western States Plywood Cooperative Mill. Prepared by Maul Foster & Alongi, Inc., Bellingham, Washington for the Wild Rivers Land Trust. August 25.

WSP USA, Inc. 2020. Former Western States Plywood Cooperative Mill Site targeted brownfields assessment Port Orford, Oregon. WSP USA, Inc. Seattle, WA. December.

Limitations

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

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

Figures

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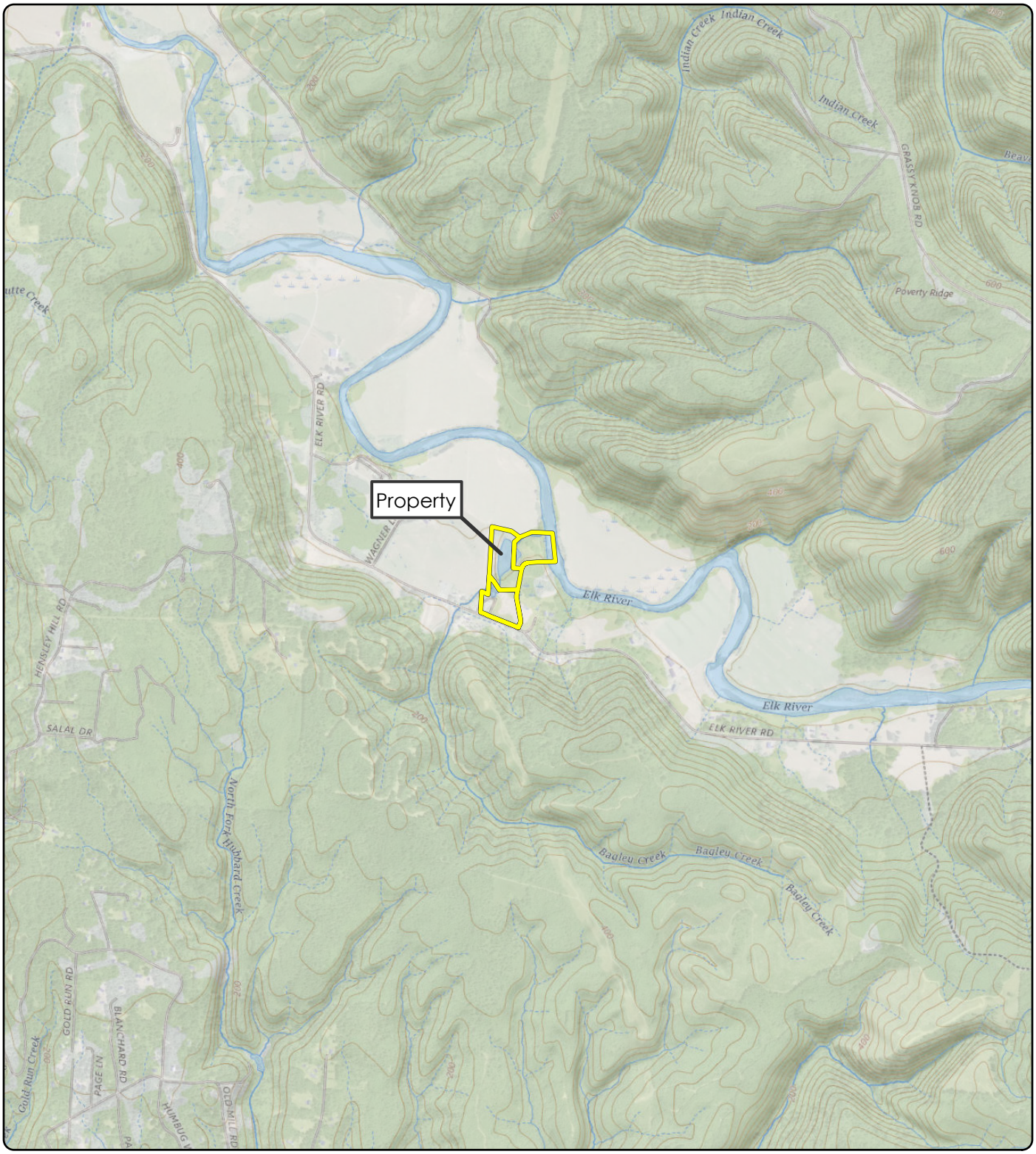
ALONGI



Notes:
U.S. Geological Survey 7.5-minute topographic quadrangle: Sixes. Township 32 south, range 15 west, section 27.

Data Source:
Property boundary obtained from Curry County.

Legend

Property Boundary

Figure 2-1
Vicinity Map

Wild Rivers Land Trust
Port Orford, OR

0 1,000 2,000
Feet

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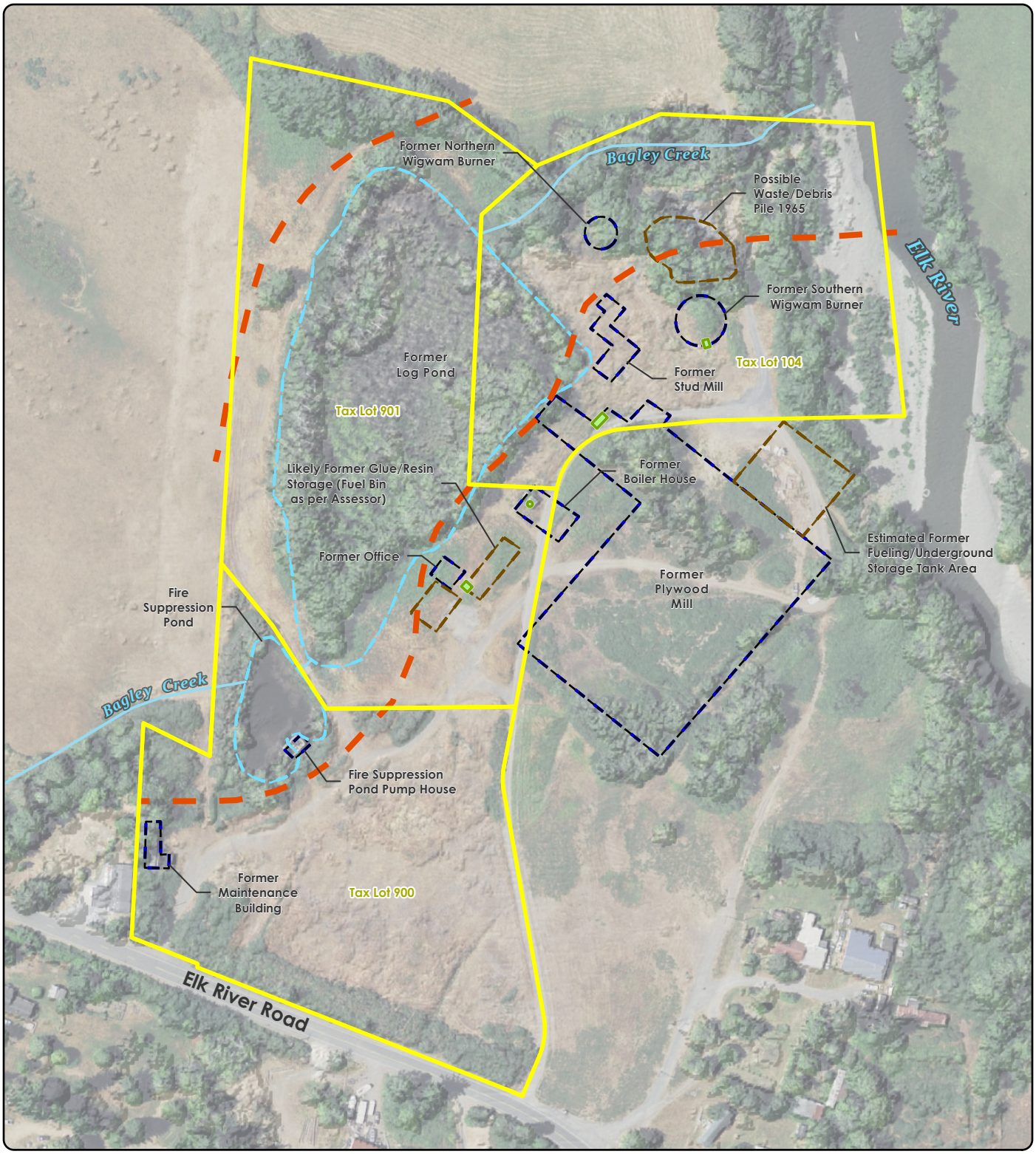
Path: X:\0_MFA_Projects\M2272\01\001\Projects\Pro\M2272_01_001.aprx
Print Date: 7/25/2022
Reviewed By: cwise
Produced By: jroberts
Project: M2272.01.001



Notes:
All site features are approximate.

Data Sources:
Creek, possible restoration area, geophysical anomalies, and historic site features from HAI (2019). Property boundary obtained from Oregon Department of Revenue (2019).

Legend

- Geophysical Anomaly
- Building
- Other
- Pond
- Creek
- Possible Restoration Area
- Site Tax Lots

Figure 2-2
Historical Site Features

Wild Rivers Land Trust
Port Orford, OR

0 100 200
Feet

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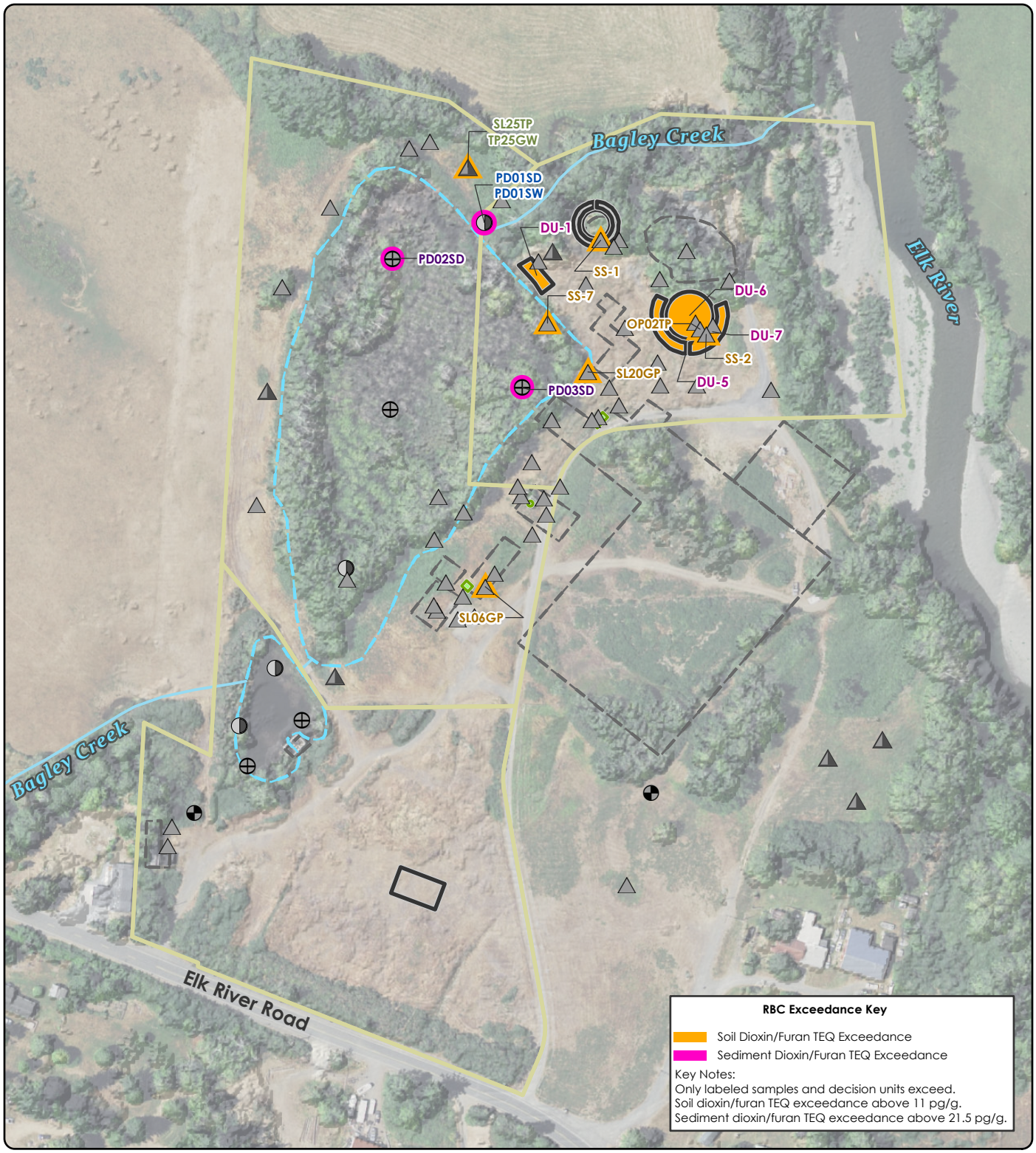

Notes:
All site features are approximate.
RBC = risk based concentrations.
TEQ = toxicity equivalents.

Data Sources:
Historic sample locations from WSP (2020) and Hahn and Associates (2018). Creek, possible restoration area, geophysical anomalies, and historic site features from HAI (2019). Property boundary obtained from Oregon Department of Revenue (2019).

Legend

- Soil Sample
- Sediment Sample
- Groundwater Sample
- Soil and Groundwater Sample
- Sediment and Surface Water Sample
- Decision Units
- Site Tax Lots
- Creek

Historical Site Features

- Geophysical Anomaly
- Building
- Other
- Pond

Figure 2-3
Dioxin Tier II
RBC Exceedances

Wild Rivers Land Trust
Port Orford, OR

0 100 200
Feet

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Print Date: 8/25/2022
Reviewed By: cwise
Produced By: sturner
Project: M2272.01.001

Tables

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Table 4-1
Alternative 2 Conceptual Cost Estimate
Former Western States Plywood Cooperative Mill - Impacted Soil and Sediment Remediation
Wild Rivers Land Trust
Port Orford, Oregon

Alternative 2—Sediment and Soil Off-Site Disposal

Project: Former Western States Plywood Cooperative Mill
Client: Wild Rivers Land Trust
Project #: M2272.01.003
Prepared By: Josh Elliott, PE
Checked By: Phil Wiescher, PhD
Date: 1/22/2025
Revision #: 0

MAUL FOSTER ALONGI

6 Centerpointe Drive, Suite 360
Lake Oswego, OR 97035
www.maulfoster.com

Primary Assumptions:

In-place unit weight for soil (import and disposal) assumed at 1.5 tons/cubic yard.

Construction Cost	Units	Unit Cost	No. of Units	Cost
Direct Construction Costs				
Mobilization[1]	LS	10%	1	$213,000
Preliminary Site Work				
Erosion & Sediment Controls	LS	$10,000	1	$10,000
Private Utility Locate	LS	$2,500	1	$2,500
Construction-Phase Surveying	LS	$15,000	1	$15,000
Sediment and Soil Excavation and Placement				
Soil and Sediment Excavation	CY	$20	17,000	$340,000
Transportation and Disposal	TON	$130	10,200	$1,326,000
Upland Placement (non-cap)	CY	$10	10,200	$102,000
Soil and Sediment Residuals Cover				
Material Purchase and Import	TON	$65	1,500	$97,500
Material Placement	CY	$15	1,000	$15,000
Site Restoration				
Restoration Plantings	SY	$36	6,000	$216,000
Planting Maintenance (3 years)	LS	$50,000	1	$50,000
Direct Construction Costs Subtotal				**$2,387,000**
Contingency (20%)				$477,400
Design and Permitting (15%)				$358,050
CONSTRUCTION TOTAL (rounded to nearest thousand)				**$3,222,000**

Table 4-1
Alternative 2 Conceptual Cost Estimate
Former Western States Plywood Cooperative Mill - Impacted Soil and Sediment Remediation
Wild Rivers Land Trust
Port Orford, Oregon

Alternative 2—Sediment and Soil Off-Site Disposal	
Project: Former Western States Plywood Cooperative Mill	
Client: Wild Rivers Land Trust	
Project #: M2272.01.003	6 Centerpointe Drive, Suite 360
Prepared By: Josh Elliott, PE	Lake Oswego, OR 97035
Checked By: Phil Wiescher, PhD	www.maulfoster.com
Date: 1/22/2025	
Revision #: 0	

Notes

CY = cubic yard.

LS = lump sum.

SY = square yard.

TON = ton.

(1)Calculated as 10 percent of direct construction costs excluding planting maintenance.

Table 4-2
Alternative 3 Conceptual Cost Estimate
Former Western States Plywood Cooperative Mill - Impacted Soil and Sediment Remediation
Wild Rivers Land Trust
Port Orford, Oregon

Alternative 3—Sediment and Soil Capping On Site	MAUL FOSTER ALONGI
Project: Former Western States Plywood Cooperative Mill	
Client: Wild Rivers Land Trust	
Project #: M2272.01.003	6 Centerpointe Drive, Suite 360
Prepared By: Josh Elliott, PE	Lake Oswego, OR 97035
Checked By: Phil Wiescher, PhD	www.maulfoster.com
Date: 1/22/2025	
Revision #: 0	

Primary Assumptions:

In-place unit weight for soil (import and disposal) assumed at 1.5 tons/cubic yard.

Construction Cost	**Units**	**Unit Cost**	**No. of Units**	**Cost**
Direct Construction Costs				
Mobilization[1]	LS	10%	1	$127,000
Preliminary Site Work				
Erosion & Sediment Controls	LS	$10,000	1	$10,000
Private Utility Locate	LS	$2,500	1	$2,500
Construction-Phase Surveying	LS	$25,000	1	$25,000
Sediment and Soil Excavation				
Contaminated Soil and Sediment Excavation	CY	$20	6,800	$136,000
Uncontaminated Soil and Sediment Excavation	CY	$20	10,200	$204,000
Upland Soil and Sediment Placement	CY	$25	17,000	$425,000
Transport and Disposal (Hot Spot Soil/Sediment)	TON	$130	1,020	$132,600
Soil and Sediment Residuals Cover				
Material Purchase and Import	TON	$65	1,500	$97,500
Material Placement	CY	$15	1,000	$15,000
Site Restoration				
Restoration Plantings	SY	$36	6,000	$216,000
Planting Maintenance (3 years)	LS	$50,000	1	$50,000
Direct Construction Costs Subtotal				**$1,440,600**
Contingency (20%)				$288,120
Design and Permitting (15%)				$216,090
CONSTRUCTION TOTAL (rounded to nearest thousand)				**$1,945,000**

Table 4-2
Alternative 3 Conceptual Cost Estimate
Former Western States Plywood Cooperative Mill - Impacted Soil and Sediment Remediation
Wild Rivers Land Trust
Port Orford, Oregon

Alternative 3—Sediment and Soil Capping On Site	MAUL FOSTER ALONGI
Project: Former Western States Plywood Cooperative Mill	
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Notes

CY = cubic yard.

LS = lump sum.

SY = square yards.

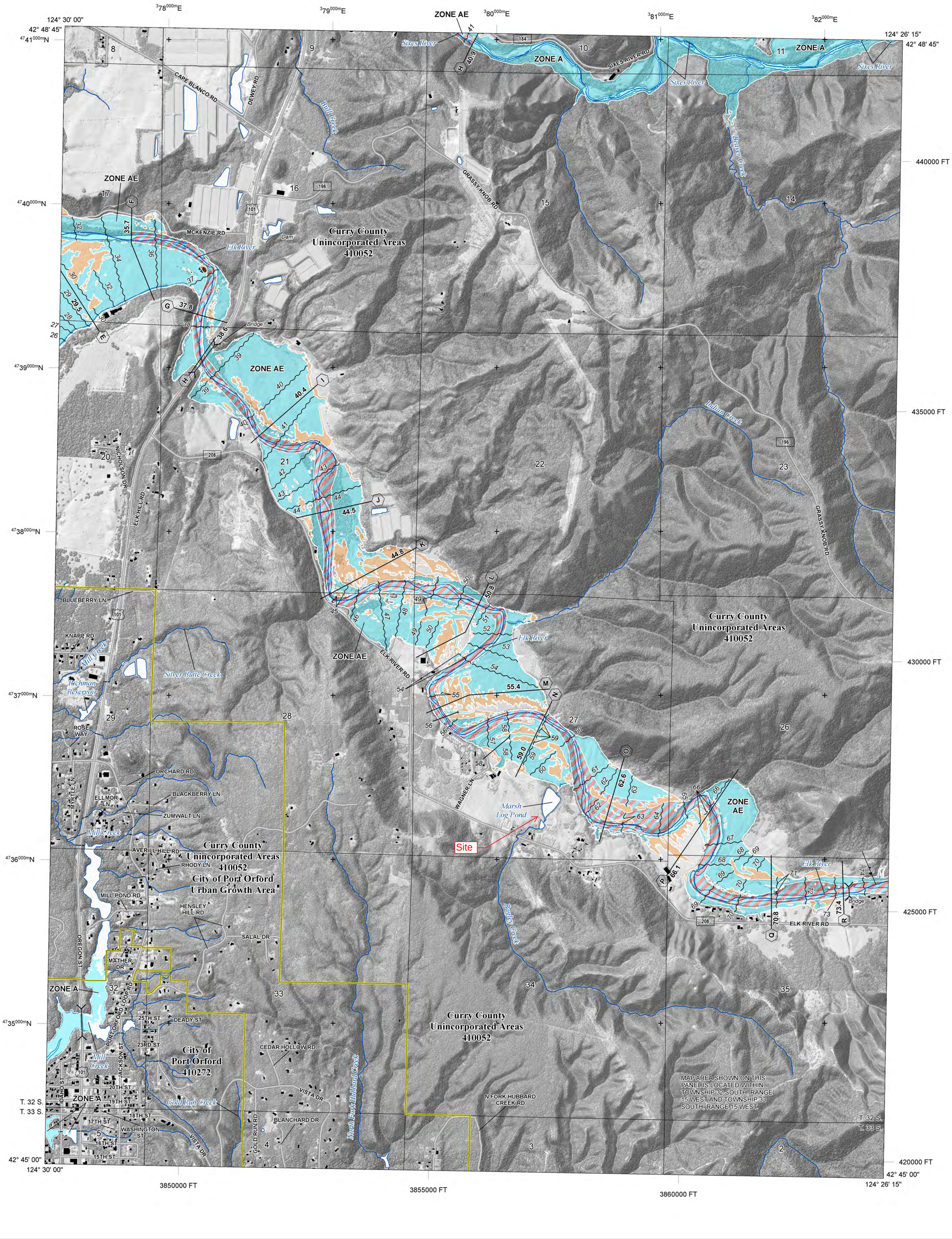
TON = ton.

(1)Calculated as 10 percent of direct construction costs excluding planting maintenance.

Appendix A

FEMA Flood Insurance Rate Map

MAUL FOSTER ALONGI



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

HTTP://MSC.FEMA.GOV

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A,V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee See Notes. *Zone X*

OTHER AREAS
- NO SCREEN Areas Determined to be Outside the 0.2% Annual Chance Floodplain *Zone X*
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- E 18.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
- 8 Coastal Transect
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Map Service Center at the number listed above.

For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in the community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this work map was developed and/or compiled in digital format by the Oregon Department of Geology and Mineral Industries (DOGAMI). Data sources include DOGAMI, Oregon Lidar Consortium, Bureau of Land Management, U.S. Geological Survey, Oregon Department of Fish and Wildlife, Oregon Department of Transportation, Oregon Water Resources Department, Oregon Department of Administrative Services Geospatial Enterprise Office, and Curry County. Base map information was rectified to 3-foot resolution lidar topographic data acquired in 2008.

SCALE

N

Map Projection:
Universal Transverse Mercator Zone 10N; North American Datum 1983; Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 1,000 feet 1:12,000

0 1,000 2,000 4,000 Feet

0 255 510 1,020 Meters

PANEL LOCATOR

* PANEL NOT PRINTED

FEMA National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

CURRY COUNTY, OREGON
and Incorporated Areas

PANEL 190 OF 1475

FEMA

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
CURRY COUNTY	410052	0190	F
PORT ORFORD, CITY OF	410272	0190	F

VERSION NUMBER
2.3.2.1

MAP NUMBER
41015C0190F

MAP REVISED
NOVEMBER 16, 2018