

Public Meeting Agenda
Former Willamette Industries Sweet Home Mill Site Assessment Findings
September 27, 2018, 5:30 PM, Jim Riggs Community Center
878 18th Avenue, Sweet Home, Oregon

- 5:30 PM** **Welcome, Introductions, Announcements (Rick Partipilo, Ray Towry)**
- 5:40 PM** **Site Investigation (Nancy Sawka, DEQ)**
- **Historical Activities**
 - Phase I
 - Recognized Environmental Concerns (map)
 - **EPA Site Investigation (SI)**
 - Findings (sources & locations of contaminants)
 - Recommendations
 - Analysis of Brownfields Cleanup Alternatives (ABCA, map)
 - Data Gaps
 - **Formaldehyde Investigation by DEQ and Weyerhaeuser (map)**
 - Findings (Apex Forensics Report)
 - Risk Assessment (Todd Hudson, OHA)
 - Discussion
- 6:40 PM** **Break, Information Displays**
- 7:00 PM** **Other Observations/Events (Rick Partipilo, Todd Hudson, Ray Towry)**
- **Arsenic in Groundwater**
 - Findings, Health Risks
 - Options: LID vs. Individual Wells
 - **Halloween Fire 2015**
 - Health Risks, Clean-up
- 7:30 PM** **Next Steps (Rick Partipilo, Ray Towry, Nancy Sawka)**
- **Decisions by Governing Bodies**
 - Ownership, Land Use, Partial No Further Action Determination(s), Cleanup Grants, etc.
 - **Ongoing Site Management/Planning/Development**
 - Risk Management, Development Plan(s), Data Archive, Contaminated Media Management Plans, etc.

Former Willamette Industries Sweet Home Mill - Site Investigation, Analysis of Brownfields Clean-up Alternatives, and Formaldehyde Investigation Executive Summary, September 12, 2018

Background

This summary provides an overview of the effort to investigate and characterize the environmental conditions present on the Former Willamette Industries Mill site in Sweet Home, Oregon. It includes a brief history of the site since Linn County acquired ownership through tax foreclosure in December 2010/January 2011, and provides an overview of the site investigation (SI) findings, the analysis of brownfields clean-up alternatives (ABCA), and the additional formaldehyde investigation (FI) conducted by DEQ and Weyerhaeuser. The FI was undertaken to determine whether formaldehyde found in groundwater on the western boundary of the mill site was impacting domestic wells in the neighborhood immediately west of and adjacent to the mill site.

The Site Investigation and Analysis of Brownfields Clean-up Alternatives were funded by EPA grant BF-00J94801 awarded to Linn County. Linn County entered into an Intergovernmental Agreement with the Oregon Department of Environmental Quality (DEQ) to provide management of the on-site project activities and fulfill the EPA grant reporting requirements. In a separate action, EPA provided funding to DEQ for the FI, and Weyerhaeuser made an in-kind contribution.

This summary is not a standalone document. The reader is encouraged to refer to the documents relied upon for this summary: Site Investigation Report (SI) dated December 15, 2017, the Analysis of Brownfield Cleanup Alternatives (ABCA) dated January 30, 2018, both prepared by Geosyntec Consultants, and the FI summary report published by GSI Water Solutions, Inc., when finalized. The FI report is dated August 23, 2018, and is currently under review. The FI was an in-depth look at specific contaminant transport mechanisms which influence the presence, location, and movement of formaldehyde on Site. As such and when finalized, it may amend findings of the SI and ABCA, which were based on a broad overview of site conditions. Before moving into the details of the site investigation, a brief discussion of several terms and concepts may

be helpful. For the purposes of this summary, Screening Values are defined as chemical concentrations in environmental media below which no regulatory action is needed. They are not specific indicators of health risk. They are used to determine when additional investigation or evaluation of a particular chemical is warranted. Risk Based Concentrations (RBCs) are chemical concentration thresholds, which if exceeded correspond to an increased health risk, typically one additional cancer case per 1,000,000 population. The laboratory results of soil, groundwater and surface water samples are compared to screening values and RBCs to highlight chemicals of interest or concern. A Conceptual Site Model (see attached Geosyntec Figure 24, September 2017) graphically displays the various contaminant sources, chemical transport mechanisms and pathways, and routes of exposure to human and ecological receptors. If an exposure pathway is complete from contaminant to receptor and the level of the contaminant is higher than the appropriate RBC, then either the contaminant level must be reduced or the nature or intensity of the site use must be modified, or both. The mobility of contaminants is an additional factor to be considered when assessing the exposure risk to receptors. These data are used to determine current exposure risks and clean-up priorities, and to assess and manage exposure risks associated with future site use and development plans.

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Brief Chronology of Events

EPA Site Assessment Grant Award

- EPA Site Assessment Grant awarded to Linn County in the amount of \$350K with project period of October 1, 2014 to September 30, 2018.

- Linn/EPA Cooperative Agreement, Linn/DEQ Intergovernmental Agreement, Site Assessment Work

Plan and Budget, Environmental Contractor Procurement, Community Outreach Steering Committee

formation completed July 2015.

- Community Meeting #1, August 2015.

Halloween Fire 2015

- Planer shed complex burned October 31, 2015.

- Hazardous Building Materials survey completed February 2016, asbestos containing materials, lead

base paint and likely PCB light ballasts found.

- Literature Search: Fire posed very limited asbestos exposure risk to neighborhood. Literature relied

upon is archived with site investigation documents.

- Linn County Property Management obtained a clean-up grant from Business Oregon to remove burn

debris. Completed May 2017.

Site Investigation (SI) Events

- Ecological Risk Assessment, Endangered Species Act and Historic Preservation reviews, and Cultural

Resources and Tribal Consultations, Spring/Summer 2016.

- Initial and Follow-up SI field events, Fall/Winter 2016.

- Data review and Supplemental Site Investigation, Spring/Summer 2017.

- Final Site Investigation Report distributed January 2018.

Analysis of Brownfield Cleanup Alternatives (ABCA)

- Final ABCA Report distributed January 2018

Formaldehyde Investigation (FI)

- Three sampling events: December 2017, January 2018, June 2018

- Draft report issued August 2018.

Community Meeting #2, September 2018

Grant Closeout December 2018

Site Investigation Findings

The results of the initial, follow-up and supplemental sampling events indicate that soils, groundwater, and

pond sediments have been impacted by contaminants associated with former mill activities (see attached

Geosyntec Figure 2, December 2017). In summary:

- Sediments within the ponds contain concentrations of petroleum hydrocarbons, hydrocarbon constituents, metals, and dioxin/furans at concentrations that are above human and ecological receptor screening values.

- Both soil and groundwater in the vicinity of the former hydraulic area contain petroleum hydrocarbon concentrations above human and ecological receptor screening values.

- Shallow groundwater across much of the Site has been impacted by formaldehyde and diesel and

oil range petroleum hydrocarbons above human receptor screening values.

- Soil in the vicinity of the former spray booth and the former wigwam burner contain dioxins and

furans at concentrations above human and ecological receptor screening values.

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Primary Sources of Contamination

Based on historical use and prior site investigation work, thirteen areas of concern were identified on the Site

and included in the SI. Five of these areas were found to have contaminants present at concentrations that

exceed human and/or ecological receptor screening values. The five areas and potential sources of contamination for each are also shown on Geosyntec Figure 2, December 2017, and described below:

- **Former Wigwam Burner.** The former wigwam burner area contains dioxins and furans in the shallow soil. The primary source of the contamination is most likely the historical operation of the burner.
- **Former Resin Tanks.** Based on historical documents, the area east of the former plywood mill housed storage tanks that contained resins with formaldehyde. The primary source of formaldehyde in shallow soil in this area is most likely associated with spills or drips from the former resin tanks. The historical use of formaldehyde throughout the Site may be the source of the formaldehyde contamination detected in shallow groundwater across the entire Site.
- **Log Ponds.** The log ponds contained various contaminants of interest. The contamination in the ponds is likely due to more than one single source. Potential sources could include: up gradient (offsite) sources; historical mill operations, including chain oiling of tie-down chains within the pond; and overland flow from other areas of concern.
- **Former Hydraulic Area.** The west end of the former plywood mill contained elevated total petroleum hydrocarbons (TPH) and TPH-related constituents in both shallow soil and groundwater. During the SI, stained soil, a former hydraulic storage area, and a potential existing underground storage tanks (USTs) were observed in this area. In addition, free-phase product and heavy sheens were noted in the groundwater of test pits in this area. The likely sources of the contamination are the former hydraulic units, former and current USTs, and former transformers in this area.
- **Former Spray Booth.** Dioxins and furans have been detected in the soil around the former spray booth area. The source of the contamination is mostly likely associated with historical operation of the spray booth and use of pentachlorophenol (PCP).

Analysis of Brownfields Clean-up Alternatives (ABCA)

The ABCA was completed prior to the FI and provides guidance on cleanup alternatives for the contaminants found during the SI. The alternatives are based on site-specific conditions, technical feasibility, and preliminary cost. The ABCA includes:

- Information about the Site and contamination issues, i.e., exposure pathways, identification of contaminant

sources, etc., potential cleanup standards, applicable laws, alternatives considered, and contingent cleanup recommendations;

- Effectiveness, implementability, and the cost of alternatives, including the preferred or proposed cleanup alternative, if recommended;

- A comparative analysis of the alternatives considered; and

- An assessment of whether additional land-use controls will be necessary after the remediation is complete.

The ABCA separates the Site into four remediation areas based on contaminants and cleanup methods. These

remediation areas are also shown on Geosyntec Figure 2, December 2017 and identified as follows:

- Remediation Area 1-Former PCP spray booth and former Wigwam burner

- Remediation Area 2-Former hydraulic area

- Remediation Area 3-Log ponds

- Remediation Area 4-Site wide shallow groundwater

- Remediation Area 4-Site wide shallow groundwater

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Remediation Alternatives Considered

For each Remediation Area, a range of alternatives was considered. Areas 1 through 4 share a number of

common alternatives, which are described below.

- No Action. This Alternative is included for baseline purposes and would not include any activities to

remove, treat, monitor, or manage Site contamination.

- Excavation of Soil with Offsite Disposal. Under this Alternative, soil will be excavated from the Remediation Area and transported offsite for disposal. This Alternative controls potential risks and

hazards from exposure to contaminated soil. Any residual contamination left at the bottom of an

excavated area will be left in place.

- Capping in Place. Capping in place includes remedial action components to contain contaminants in

soil. Under this Alternative, soil that exceeds cleanup levels will be left in place and capped by an

asphalt or concrete cover. This Alternative controls potential risks and hazards from exposure to

contaminated soil by covering the soil with an impermeable surface to prevent direct contact. In

addition, the impermeable cap will minimize rain and surface water infiltration which will limit potential migration of contaminants to groundwater.

- Excavation of Soil, Consolidation, and Capping. This Alternative is similar to Capping in place, except that soil would be excavated and placed in one location (consolidated) and capped, which will

minimize the area capped. Soil excavated from a Remediation Area may be consolidated within

the remedial footprint of other Remediation Areas, used under constructed features such as road beds or parking lots, or consolidated in a separate remote area of the site. During the remedial design phase, a number of areas may be considered, depending on site development plans.

- Other. The alternatives above are modified for Area 3 and not applicable to Area 4. See the sections on Remediation Areas 3 and 4 for discussion of alternatives considered appropriate for those areas.

Remediation Area 1 (Former PCP spray booth and former Wigwam burner)

Remediation Area 1 includes shallow soil in the vicinity of the former PCP spray booth and the former

Wigwam burner. At both locations, the primary contaminants are dioxins and furans. The estimated extent of

soil contamination for both areas are shown on Geosyntec Figure 3, December 2017, attached.

Based on the

SI analytical results, the depth of the contamination was not fully defined; however, concentrations decreased

rapidly with depth. The extent of soil contamination is assumed to be limited to a maximum depth of

three feet below ground surface (bgs) for this alternative. In addition, three feet bgs corresponds to the default

exposure depth for the direct contact pathway for residential receptors. Based on the assumed extent of

contamination, approximately 1,760 cubic yards of soil is included in Remediation Area 1.

Estimated costs for Area 1 alternatives:

- No Action \$0
- Excavation of Soil with Offsite Disposal \$701,000
- Capping in Place \$306,000
- Excavation of Soil, Consolidation, and Capping \$310,000

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Remediation Area 2 (Former hydraulic area)

Remediation Area 2 includes the former hydraulic storage area located at the west end of the former

plywood mill. At this location, petroleum hydrocarbons were identified in soil. In addition, a potential UST was

identified in this area. A number of contaminants were detected above residential direct contact RBCs within

Remediation Area 2; however, most contaminants were detected at depths deeper than three feet bgs, which is

below the default exposure depth for direct contact with residential receptors. As such, they are not considered

for the direct contact pathway. The removal area within Remediation Area 2 was determined

based on the leaching to groundwater RBC for diesel-range petroleum hydrocarbons. The estimated extent of soil contamination is shown on Geosyntec Figure 4, December 2017, attached. The depth of contamination varies slightly between each remediation footprint, however, a 5-foot thickness (average) was assumed. Based on the assumed extent of contamination, approximately 750 cubic yards of soil is included in Remediation Area

2. This volume is based on a 30' x 30' square around each detection and limited soil removal around the potential UST. It is likely that additional testing in these areas would refine the remedial areas. Estimated costs for Area 2 alternatives:

- No Action \$0
- Excavation of Soil with Offsite Disposal \$372,000
- Capping in Place N/A
- Excavation of Soil, Consolidation, and Capping \$360,000

Remediation Area 3 (Log Ponds)

Remediation Area 3 includes the sediment within the three existing log ponds. Based on the analytical results from the SI and previous investigations, it is assumed that sediment throughout the ponds is contaminated; however, the depth of the contamination has not been defined. For purposes of this Alternative, an assumption is made that up to two feet of sediment will need to be remediated. Additional sediment characterization will be needed to refine this depth estimate for remedial design. Sediment will also need to be sampled and analyzed for formaldehyde to determine if it is a contaminant of concern that needs to be addressed as part of a remedial action. If additional assessment indicates that a remedy would not be protective or would not resolve leaching to groundwater concerns, then other alternatives would need to be developed (e.g., draining and filling the ponds and re-routing the storm water). The existing ponds cover approximately 8.1 acres, and assuming a sediment depth of two feet, the volume of sediment for remediation is approximately 26,200 cubic yards. Geosyntec Figure 5, December 2017, attached, shows the extent of contamination in Remediation Area 3.

Estimated costs for Area 3 alternatives:

- No Action \$0
- Excavation of Sediment with Offsite Disposal \$5,815,000

- Capping in Place \$1,685,000
- Excavation of Sediment, Consolidation within Existing Ponds and Capping \$1,931,000
- Excavation of Sediment, Consolidation on Site away from Existing Ponds, and Capping (does not include cost of liner if deemed necessary to protect ground water) \$4,572,000

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Remediation Area 4 (Site wide shallow groundwater)

Remediation Area 4 includes contaminated shallow groundwater across the Site, specifically as it relates to

offsite residential receptors immediately northwest of the Site. The SI determined that oil-range petroleum hydrocarbons and formaldehyde are present in monitoring wells located on the westernmost (down gradient)

boundary of the Site. Diesel and heavy oil were also detected in several of the offsite private wells, but at concentrations below DEQ's tap water RBCs.

Offsite investigation of this area was beyond the scope of the EPA SI grant, however, DEQ secured separate additional

funding and Weyerhaeuser agreed to provide an in-kind contribution and conduct an additional targeted assessment of

this neighborhood. The targeted assessment to further investigate formaldehyde both on and off Site has

been completed and a draft report dated August 23, 2018 is under review. The ABCA includes potential

alternatives should formaldehyde contamination be confirmed in private wells down gradient from the Site at

concentrations above DEQ's tap water RBC for ingestion, inhalation, and dermal contact. Based on

conversations with the City of Sweet Home, approximately 47 houses are located in this potentially impacted

neighborhood (north of Vine Street and between 18th and 22nd Avenues) and currently obtain water from

residential drinking water wells.

Due to the size of the Site and the relatively low-level concentrations of contaminants in the groundwater, the

alternatives considered focus on treating the contamination at the source or point of withdrawal and do not

address full remediation of Site groundwater. Area 4 alternatives being considered include:

- Abandonment of Existing Drinking Water Wells and Installation of New Wells

This Alternative includes the abandonment of the existing drinking water well at each residence and

the installation of a new drinking water well at each residence. The new well would be installed in a

manner to eliminate exposure to the potential shallow groundwater contamination. For budgetary planning purposes, we have assumed that each new drinking water well would be installed to an estimated depth of 100 feet below ground surface (bgs) using telescoping drilling methods. Additional assessment of the existing contamination distribution as well as the aquifer characteristics would be needed to determine the actual depth of new wells.

- Abandonment of Existing Drinking Water Wells and Connection to City Water

This Alternative includes the abandonment of the existing drinking water well at each residence with

the subsequent connection of each residence to the City of Sweet Home's municipal water supply

system. At this time, it has not been fully determined if the City can accommodate the additional

capacity of 47 residences. In addition, up to 3,000 feet of new water mainline will need to be installed

to provide water to these locations, and the residents would need to be willing to hook up to and pay

for City water service.

- Installation of Water Treatment System on Existing Drinking Water Wells

This Alternative includes a water treatment system installed at each residence to treat formaldehyde,

the assumed primary contaminant in the shallow water associated with the Site. However, the Site and

surrounding areas are also known for the presence of naturally occurring arsenic. It is likely that any

treatment system would also need to be capable of treating arsenic. Regarding formaldehyde, limited

commercial options are available for treatment. Options may include granular activated carbon however,

limited data is available on the effectiveness and sizing requirements for treatment. Other options

include advance oxidation processes or biological degradation, which are designed to treat groundwater and do not serve as an "end of pipe" solution. It is likely that a treatability study would

need to be performed to design an appropriate residential treatment system.

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Estimated costs for Area 4 alternatives:

- Abandonment of Existing Wells, Installation of New Wells \$1,203,000
- Abandonment of Existing Wells, Connection to City Water System \$1,292,000
- Installation of Water Treatment System on Existing Wells \$1,236,000

Total Remediation cost estimate (Areas 1 through 4): \$3.8M – \$8.2M

Data Gaps

The SI Report (Geosyntec, 2017) noted a number of data gaps that, when resolved, could affect

the

alternatives identified in the ABCA. The data gaps noted in the SI included:

1. The extent of diesel and oil range hydrocarbons in groundwater has not fully been defined.

During the

SI, two additional down gradient wells were installed (MW09 and MW10). Both wells contained low

level concentrations of diesel and oil range hydrocarbons.

2. The extent of formaldehyde in groundwater has not been fully defined. During the SI, two additional

down gradient wells were installed (MW09 and MW10). Both of these wells, along with the other

four (Site) wells sampled contained formaldehyde above the (drinking water) RBC.

3. Significant levels of formaldehyde are present in the groundwater. Surface water and sediment

samples (in the log ponds) should also be tested for formaldehyde.

4. The location and disposition of former Site drinking water well(s) has not been identified.

5. The up-gradient sediment sample SD24 (upstream of culvert under 24th Street, south of RR track)

contained elevated concentrations of dioxins and furans. The source of the dioxins and furans at this

location is unknown.

6. The vertical extent (depth) of Contaminants of Interest in the sediments is unknown.

7. The residential properties located to the northwest of the Site receive their drinking water from

groundwater wells. At this time, it is unknown if the diesel-range hydrocarbons, oil-range hydrocarbons

or formaldehyde detected in the down gradient Site wells have impacted the drinking water wells.

During the preparation of the ABCA report (Geosyntec, 2018), two additional data gaps were identified:

8. The horizontal extent of contamination in Remediation Area 2 is not fully defined. The proposed

remediation areas are based on singular detections. Additional assessment in Remediation Area 2

could assist in refining the remediation area.

9. The presence or absence of formaldehyde in pond sediments has not been determined. This data will be

required to determine the most appropriate action for Remediation Area 3.

Formaldehyde Investigation (FI)

In December of 2017, DEQ and Weyerhaeuser began sampling downgradient residential wells to determine if

diesel and oil range hydrocarbons and formaldehyde detected in MW09 and MW10 on the western boundary

of the Site had impacted drinking water wells in the area. In all, four sampling events were

conducted: two in December 2017, one in January 2018, and one in June 2018. DEQ, GSI Water Solutions and Apex Forensics conducted a study to compare EPA Method 8315A, used for the initial sampling of Site groundwater with an alternative method (EPA Method 556), which was thought to be better suited to analysis of less contaminated samples such as drinking water. The draft report for the FI, dated August 23, 2018, is under review and not yet final. If accepted, the findings of that report and forensic analysis of EPA Methods 8315A and 556 indicate that formaldehyde concentration in Site and downgradient wells are significantly lower than originally reported by EPA Method 8315A and downgradient drinking water wells do not appear to be impacted by past Site operations. This Formaldehyde Investigation conducted by DEQ and Weyerhaeuser began the process of addressing data gaps 1, 2, 3, and 7 (above).

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Discussion and Next Steps

Hot Spots in Media

Hot Spots in media are defined by OAR 340-122-115(32)(b) as “hazardous substances that present a risk to human health or the environment exceeding the acceptable risk level determined through a risk assessment and that meet any of the following criteria; 1) are highly concentrated contaminants present in concentrations exceeding risk-based concentrations; 2) are highly mobile; and 3) are not reliably containable, as determined in a feasibility study.” If a hot spot is identified, DEQ Cleanup Rules require treatment and/or excavation and offsite disposal of contaminated media to the extent that such actions are feasible. The Hot Spot Analysis section of the ABCA states that no soil or sediment hot spots were identified, and none of the other detected contaminants are considered highly concentrated, highly mobile or not readily containable, with the possible exception of formaldehyde. If the final FI report is accepted, it would support excluding formaldehyde in groundwater from classification as a hot spot.

Grant Closeout Activities

- Community Outreach #2, Thursday, September 27, 2018.
- Final Performance Report to EPA by December 28, 2018.

Post Closeout Activities Needed to Maintain Eligibility for Future EPA Assessment or Clean-up

Grants

- Secure access to derelict buildings and site in general.
- Characterize and properly dispose of contents of buildings and above ground storage tanks in petroleum containment area in former operations yard.
- Address Remediation Area 1 concerns where RBCs for dioxins/furans are exceeded prior to construction/excavation worker exposure and/or reoccupation of the site.
- Post warning signage regarding water quality in ponds.
- Inspect and remove wood debris clogging culvert between north and west ponds to prevent beaver activity and flooding of Site; maintain as needed.
- Post signage listing project sponsors, funding sources, and contact information.
- Within 6 months prior to conveyance of mill property, a Phase 1 site assessment must be completed to ensure that new owner will maintain eligibility for future EPA assessment/clean-up grant funding.

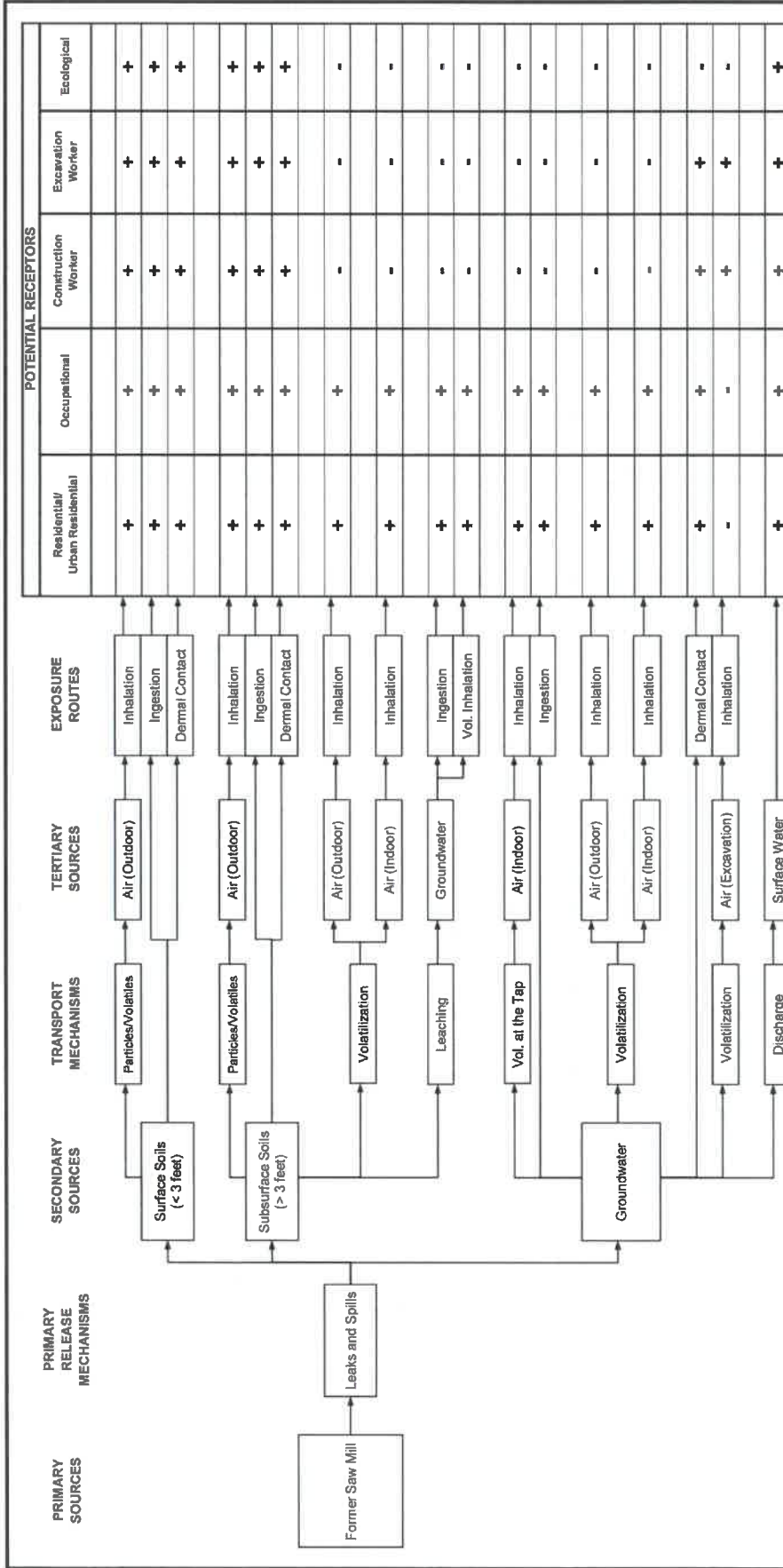
Vision, Planning, Land Use

City of Sweet Home vision for development would be needed to make any EPA grant application competitive, and would also support grant applications to other funding entities such as Business Oregon. EPA may have planning resources available including bringing a “visioning” workshop to Sweet Home.

Independent

consultants with experience in brownfields redevelopment are also available. A development plan would also support refinement of the remediation alternatives identified in the ABCA. For example, road development would likely require a detailed ROW characterization (borings to depth along route of the ROW, contaminated media management plan, excavation, consolidation or removal of contaminated soil to protect construction/excavation workers where applicable RBCs are exceeded, and restricted access to the undeveloped remainder of mill site.

Decisions by local governing bodies will be needed in areas such as ownership, land use, request(s) for partial no further action determination (NFA), remediation versus litigation, and clean-up grant applications. A joint City/County work group with access to legal and environmental consulting expertise would likely prove helpful in facilitating this process, particularly if local government ownership is to be maintained.



Notes:
 "+" = Potentially complete exposure pathway
 "*" = Potentially complete exposure pathway but further delineation required
 "-" = Incomplete exposure pathway or pathway is not applicable to the receptor

Conceptual Site Model
 Willamette Industries
 Sweet Home, Oregon

Geosyntec consultants
 Portland, Oregon

Figure 24
 September 2017



Legend

- Monitoring Well - Previous Consultant
- Pond Staff Gauge
- Monitoring Well - Geosyntec
- Boring Location
- Surface Water Sample Location
- Composite Surface Soil Sample Location
- Sediment Sample Location
- Test Pit Location
- Remediation Area 1
- Remediation Area 2
- Remediation Area 3

Notes

1. Aerial source: Linn County GIS, 2015
2. Remediation Area 4 consists of shallow groundwater

Scale: 0, 150, 300 Feet

Figure 2

Geosyntec consultants

Portland, OR December 2017

**Remediation Areas
Analysis of Brownfield Cleanup Alternatives
Willamette Industries - Sweet Home**

Sweet Home, OR



Legend

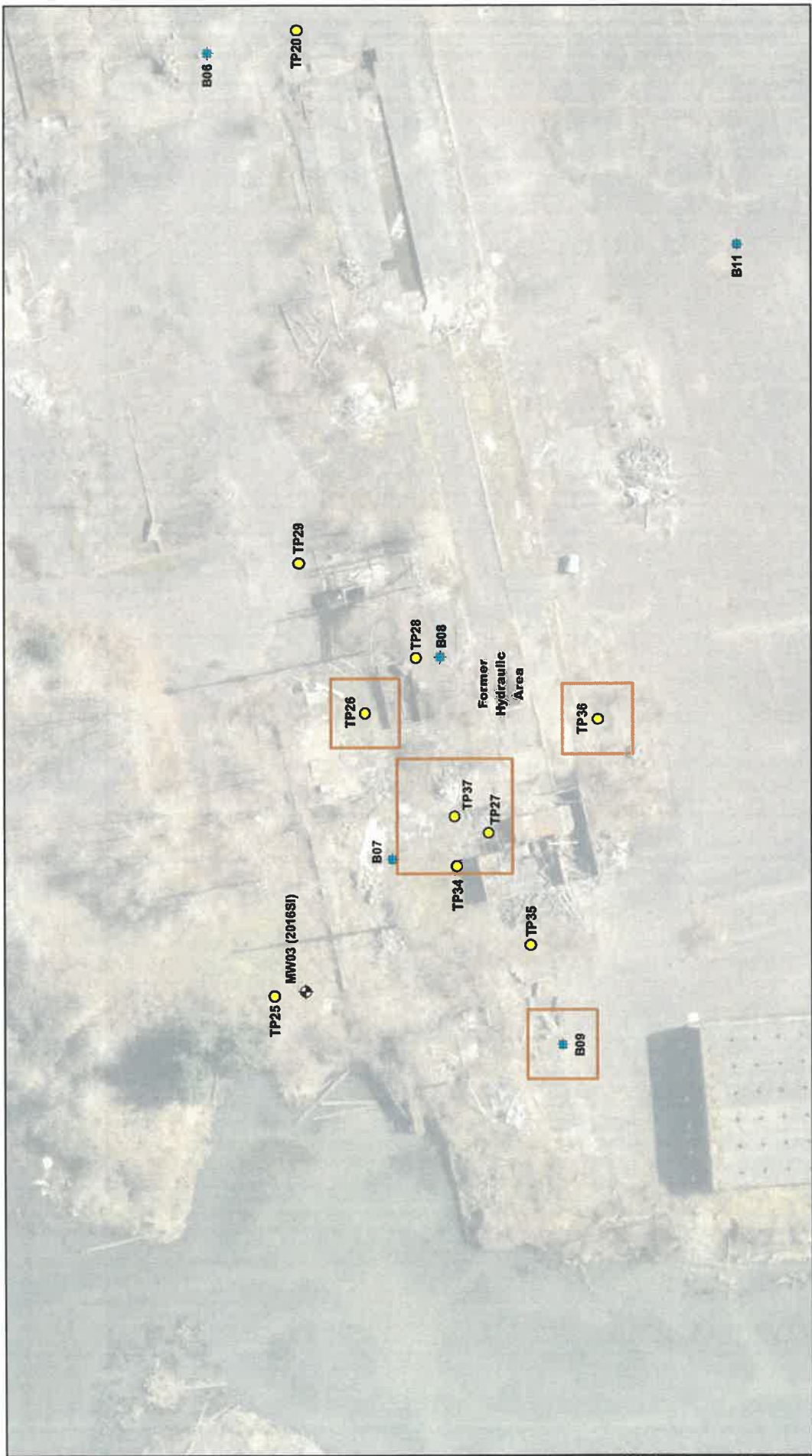
- Monitoring Well - Previous Consultant
- Test Pit Locations (Geosyntec, 2016)
- Boring Location
- Composite Surface Soil Sample Location
- Remediation Areas

Notes

1. Aerial source: Lin County GIS, 2015
2. Former spray booth excavation depth = 3 feet
3. Eastern Wigwam area excavation depth = 3 feet
4. Western Wigwam area reclamation depth = 1 foot



	Figure 3
Remediation Area 1 Analysis of Brownfield Cleanup Alternatives Willamette Industries - Sweet Home	
Portland, OR	December 2017



- Legend**
- Test Pit Location
 - ⊕ Monitoring Well - Geosyntec
 - ⊕ Boring Location
 - ▭ Remediation Areas

Notes

1. Aerial source: Linn County GIS, 2015
2. Excavation depths range, however a 5-foot thickness (average) was assumed.

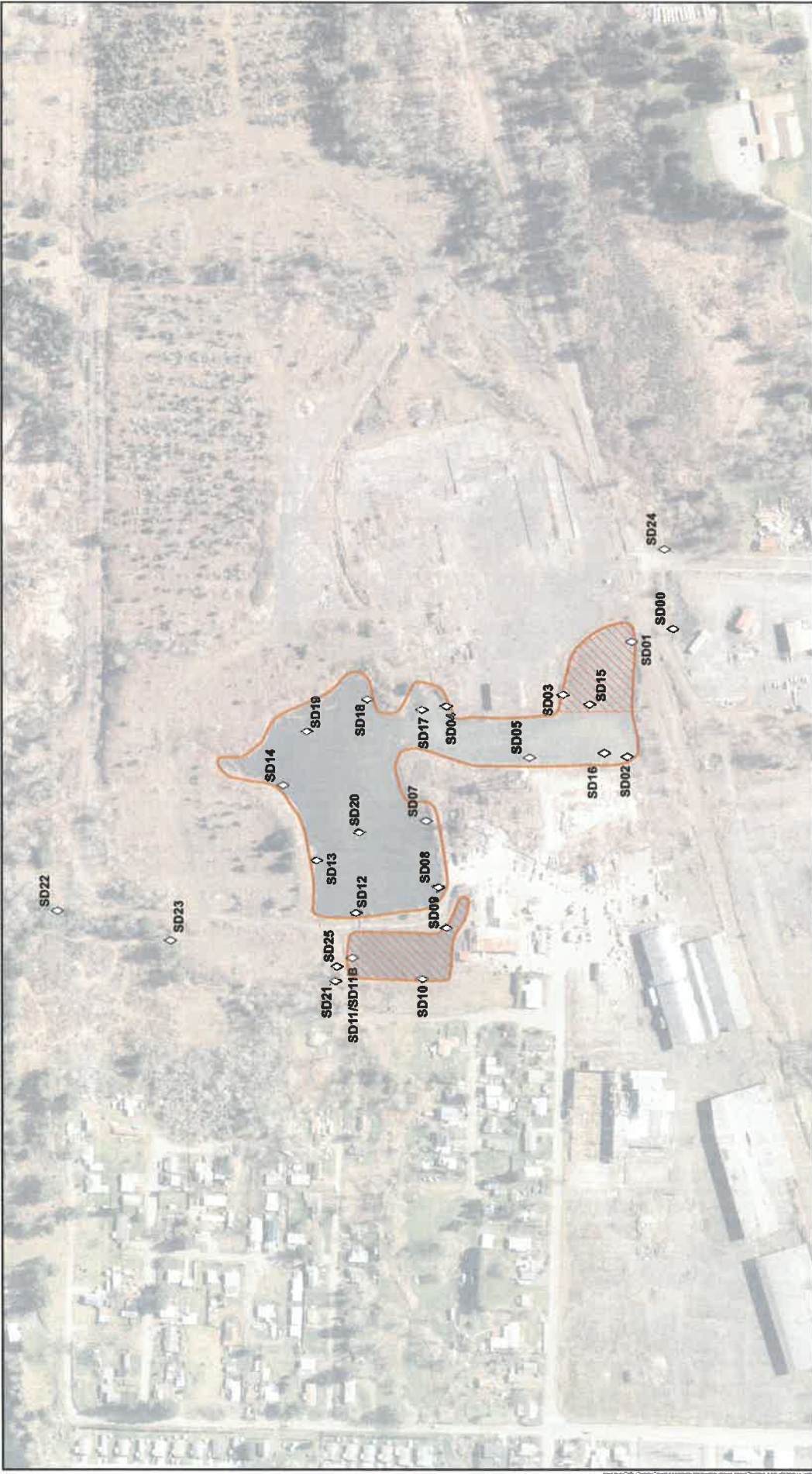
40 20 0 40 Feet



Remediation Area 2
Analysis of Brownfield Cleanup Alternatives
Willamette Industries - Sweet Home

Geosyntec
 consultants

Portland, OR December 2017



Legend

- ◇ Sediment Sample Location
- ▭ Remediation Areas
- ▨ Proposed Consolidation Area (Alternative C4)

Notes
 1. Aerial source: Lin County GIS, 2015



**Remediation Area 3
 Analysis of Brownfield Cleanup Alternatives
 Willamette Industries - Sweet Home**

Portland, OR
 December 2017

**Figure
 5**

