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REMEDIAL INVESTIGATION WORK PLAN FOR UPLAND AREAS

Georgia-Pacific Consumer Products, Camas, Washington

Prepared for

Georgia-Pacific Consumer Operations LLC
401 NE Adams Street
Camas, Washington 98607

Prepared by

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Project: AS130290L

March 9, 2026

Cleanup Site ID 15156

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Project Number: AS130290L

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF IMAGES (IN TEXT)

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS AND ACRONYMS

°F	degrees Fahrenheit
mg/kg	milligrams per kilogram
µg/L	micrograms per liter
AO	Agreed Order No. DE 18201
AMSL	above mean sea level
ARARs	applicable, relevant, and appropriate requirements
ASB	aerated stabilization basin
AST	aboveground storage tank
bgs	below ground surface
BNSF	BNSF Railway Company
BTEX	benzene, toluene, ethylbenzene, and total xylenes
$CaCO_3$	calcium carbonate
CaO	calcium oxide
CBC	Camas Business Center
CCPH	Clark County Public Health
CFR	Code of Federal Regulations
cis-1,2-DCE	cis-1,2-Dichloroethene
CLARC	Cleanup Levels and Risk Calculation
ClO_2	chlorine dioxide
COC	chemical of concern
COPCs	chemicals of potential concern
CSM	conceptual site model
CY	cubic yards
DAHP	Washington State Department of Archaeology and Historic Preservation
DFW	Washington State Department of Fish and Wildlife
DMSO	dimethyl sulfoxide
DNAPL	dense non-aqueous phase liquid
DNR	Washington Department of Natural Resources
Ecology	Washington State Department of Ecology

ECF	elemental chlorine free
GP	Georgia-Pacific Consumer Operations LLC
GPR	ground penetrating radar
HASP	health and safety plan
HSO_3	bisulfate
ID	identification
IDP	inadvertent discovery plan
LILF	Lady Island Landfill
MERT	Mill Emergency Response Team
MMA	main mill area
MOU	Mill Operational Unit
MTBE	methyl tertiary-butyl ether
MTCA	Model Toxics Control Act
Na_2CO_3	sodium carbonate
Na_2S	sodium sulfide
Na_2SO_4	sodium sulfate
NaOH	sodium hydroxide
NAVD88	North American Vertical Datum of 1988
No.	number
NPDES	National Pollutant Discharge Elimination System
NWTPH-Dx	Northwest Total Petroleum Hydrocarbons as Diesel and Oil Extended
NWTPH-Gx	Northwest Total Petroleum Hydrocarbons as Gasoline Extended
OA	Operational Area
OFEE	oil-filled electrical equipment
PAH	polycyclic aromatic hydrocarbons
PARIS	Permitting and Reporting Information System (Washington Ecology Water Quality)
PCB	polychlorinated biphenyl
PCDD/PCDF	polychlorinated dibenzodioxin and polychlorinated dibenzofuran compounds (also referred to as "dioxins/furans")

PCE	tetrachloroethylene
PFAS	per- and polyfluoroalkyl substances
PID	photoionization detector
ppm	parts per million
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
RI	remedial investigation
ROW	right-of-way
RTC	Response to Comment
SAP	Sampling and Analysis Plan
SCUM	Sediment Cleanup User's Manual
SMS	Sediment Management Standards
SO_2	sulfur dioxide
SOAL	State-owned aquatic land
SOP	Standard Operating Procedures
TiO_2	titanium dioxide
SPCC Plan	Spill Prevention, Control, and Countermeasure Plan
SVOCs	semi-volatile organic compounds
TCE	trichloroethylene
TDEM	time domain electromagnetic induction
TEE	terrestrial and ecological evaluation
TGA	Troutdale Gravel Aquifer
TIC	tentatively identified compounds
TPH	total petroleum hydrocarbons
TPHd	total petroleum hydrocarbons-diesel range
TPHg	total petroleum hydrocarbons-gasoline range
TPH-HCID	total petroleum hydrocarbons - hydrocarbon identification
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency

USGS	United States Geological Survey
UST	underground storage tank
VCP	voluntary cleanup program
VOCs	volatile organic carbons
WAC	Washington Administrative Code
WP	Work Plan
WWTP	wastewater treatment plant

SECTION 1. INTRODUCTION AND BACKGROUND

This Work Plan (WP) presents a scope of work to initiate remedial investigation (RI) activities for the Georgia-Pacific Consumer Operations LLC (GP) property located at 401 NE Adams Street, Camas, Washington ("the Mill Property" or "the Mill"). The Washington State Department of Ecology (Ecology) identifies the facility as site identification number (ID No.) 66765272 and Cleanup Site ID No. 15156.[1] RI activities will occur in accordance with the Model Toxics Control Act (MTCA) regulations (Washington Administrative Code [WAC] 173-340),[2] policies, and guidance.

The Agency Review Draft RI WP was submitted to Ecology on January 3, 2022 ("First Draft Upland RI WP"; Kennedy Jenks 2022). Ecology provided comments on the First Draft Upland RI WP on November 4, 2022 (Ecology 2022). GP responded in a Response to Comment (RTC) letter dated February 3, 2023 (GRES 2023) and submitted the Agency Review Revised Upland Draft RI WP to Ecology on March 31, 2023 ("Second Draft Upland RI WP"; Kennedy Jenks 2023). Ecology provided comments on the Second Draft Upland RI WP on November 30, 2023 (Ecology 2023). Ecology comments, comments provided by the Yakama Nation, and preliminary GP responses were discussed in a meeting with Ecology and Yakama Nation representatives on February 29, 2024. GP responded in a RTC letter dated March 19, 2024 (GRES 2024) and submitted the Agency Review Revised Draft RI WP for Upland Areas to Ecology on June 14, 2024 ("Third Draft Upland RI WP"; Kennedy Jenks 2024). Ecology provided comments on the Third Draft Upland RI WP on March 26, 2025 (Ecology 2025). RTCs addressing Ecology comments were provided separately. Ecology comments and comments provided by the Yakama Nation were reviewed and considered for the revised Fourth Draft RI WP for Upland Areas. Ecology conditionally approved the Fourth Draft RI WP, and this update constitutes the final, herein referred to as the "Final RI WP" or "this RI WP."

Figure 1 identifies the Mill Property.[3] The "Site" will be defined by the RI results; therefore, the boundary shown on figures herein is a preliminary depiction based on current or historical industrial activity related to the Mill. Consistent with MTCA (WAC 173-340-350), the report presenting the findings of the RI efforts proposed herein will include a proposed Site boundary, where the Site is defined by where hazardous substances exceed the preliminary cleanup levels (see Section 4.1). This RI WP addresses upland areas of the Mill Property; in-water areas will be addressed separately ("Draft Sediment RI WP" herein; see Section 1.5).

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[1] https://apps.ecology.wa.gov/gsp/Sitepage.aspx?csid=15156

[2] MTCA (Chapter 173-340 WAC) applies to cleanups in upland areas (on dry land, including groundwater) and sediment cleanups. For in-water work in freshwater and marine environments (i.e., sediment cleanups), the Sediment Management Standards apply (WAC 173-204). This distinction and terminology are presented on the Ecology website and used herein (Ecology 2021a).

[3] The Ancillary Area and Camas Business Center have distinct and different historical operations from the areas with mill operations but are included in the preliminary depiction of the Mill Property.

In 2019, GP ceased certain operations at the Mill Property, including wood pulping, the communication paper machine, fine paper converting, and related equipment. Demolition plans are being implemented or considered for selected structures and equipment (see Section 3.4). Continuing operations at the Mill Property include production of tissue paper and paper towels from purchased pulp (Brynelson 2017). In response to cessation of certain operations, Ecology engaged GP to initiate RI activities in areas where "release or threatened release of hazardous substance(s), as defined in Revised Code of Washington (RCW) 70A.305.020(32) and (13), respectively, has occurred" (Ecology 2021b). On August 12, 2021, GP and Ecology completed Agreed Order (AO) No. DE 18201 to develop a RI WP and prepare a RI Report per WAC 173-340-350 and WAC 173-204-550. Figures 3a and 3b show areas of the Mill Property included in the RI scope of work for upland areas: the Main Mill Area (MMA), located north of the Camas Slough; the Camas Business Center[4] (CBC), located north of the MMA; and Lady Island, located between the Camas Slough and the Columbia River.[5]

Areas where operations have ceased are referred to herein as "static" and are generally considered accessible for purposes of the RI. In contrast, areas where operations continue and therefore conditions may continue to change due to ongoing operations are referred to herein as "dynamic" and are generally considered inaccessible for purposes of the RI. In this document, "inaccessible" describes an area where RI activities are not proposed at this time; it is not suggested that the area is exempt from the RI or AO. Developments in accessibility (e.g., condition change from dynamic to static) and sampling results will be discussed with Ecology, and RI activities will be evaluated; however, the process outlined in the AO will be maintained.

This Final Upland RI WP summarizes available historical information about operations at the Mill Property, identifies chemicals of potential concern (COPCs) based on historical and continuing operations, and proposes initial data collection efforts in accessible areas unimpeded by ongoing manufacturing and related operations. This Final Upland RI WP also presents a preliminary conceptual site model (CSM) to describe current and historical Mill Property operations, the associated chemical use and history of known releases, and the potential for chemical migration and receptor exposure in environmental media, including site hydrogeologic conditions. The preliminary CSM informs proposed initial data collection efforts to evaluate environmental conditions (e.g., depth to groundwater) and the presence and distribution of COPCs in environmental media on Mill Property (e.g., soil, groundwater).

Analytical results from RI field activities, as well as other available data (see Section 3.3), will be compared with MTCA cleanup levels[6] for current and planned future land use as well as other applicable, relevant, and appropriate requirements (ARARs) to evaluate potential risks to human

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[4] The former Fort James Specialty Chemicals site is located within the CBC (Ecology assigned Facility Site ID No. 78452582 and Cleanup Site ID No. 2961; https://apps.ecology.wa.gov/gsp/Sitepage.aspx?csid=2961).

[5] As noted in the RTC letter, MTCA and the AO are not limited by property boundaries.

[6] See Section 4.1 of this RI WP for discussion of MTCA Cleanup Levels.

health and the environment to guide decision making for subsequent investigation and response activities. Data, analytical results, and evaluations will be presented in a RI Report.

1.1 Purpose and Objectives

Per WAC 173-340-350,[7] the purpose of a RI in upland areas is to collect, develop, and evaluate sufficient information regarding a site to select a cleanup action under WAC 173-340-360 through 173-340-390. For the implementation of RI activities, the AO recognizes that this Mill has operated for nearly 140 years and continues to operate as a Mill in certain areas. These operations encumber safe access amidst materials movement, active machinery producing product, and above- and underground active utilities that energize, fuel, and enable ongoing production, amongst others. Specifically, Section 1 of the AO states: "due to the ongoing operations at the Mill Property, specific areas may be inaccessible and not allow for complete investigation/ characterization/cleanup actions to occur at this time. The cleanup actions described in this AO shall be deferred for such locations until they become accessible. In the event that such identified locations become accessible, RI WP and RI Report addenda shall be submitted to Ecology." Accordingly, this Final Upland RI WP proposes an initial scope of work focused on screening COPCs in soil and groundwater as an initial step of the RI and will be used to support subsequent investigation efforts. Additional information regarding currently accessible areas is presented in Section 3.5.

The RI process at the Mill Property under the AO is expected to be iterative and sequential, summarizing known information, identifying data gaps, conducting activities to resolve data gaps, refining the CSM, and working in successive phases until the RI objectives outlined in Section 1.1.1 below are met. This Final Upland RI WP represents the initial screening phase of RI activities. Additional iterative activities, addressed in this RI WP and report addenda, will be performed in currently accessible areas as information from initial RI phases provides an understanding of Mill Property conditions and in currently inaccessible areas (due to continuing manufacturing operations) as areas become accessible (e.g., after demolition activities are complete in an area) until the RI process is complete. This phased approach will allow for the investigation to build on available data in a step-wise manner, make decisions rooted in science and an understanding of site conditions, and follow adaptive management principles.

Activities proposed in this Final Upland RI WP represent an initial phase for RI activities in upland areas. Additional RI WP or RI WP addenda are anticipated and will build on the information obtained through implementation of the proposed scope of work. Objectives for the RI are presented in Section 1.1.1; objectives for this Final Upland RI WP are presented in Section 1.1.2.

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[7] Sediment management requirements are defined in WAC 173-204. See Section 1.5.

1.1.1 Remedial Investigation

Specific objectives of the RI include the following:

- Describe current understanding of Mill Property setting based on a review of Mill Property history, operations, and known spills or releases.
- Develop a CSM based on available information and identify data gaps.
- Collect data to describe the geological and hydrogeological setting for the Mill Property, as well as the nature and extent of COPCs present in Mill Property environmental media. Where environmental data have already been collected through existing programs (see Section 3.3), this existing data will be used.
- Characterize the migration pathways of COPCs based on available data and evaluate potential risk to human health and the environment in the context of current and future land use.

1.1.2 Remedial Investigation Work Plan

This RI process is expected to be iterative and follow adaptive management principles. As stated above, this Final Upland RI WP proposes a screening scope of work as a first phase of the RI. Objectives specific to this RI WP include:

- Introduce Mill Property operations. This RI WP organizes the Mill Property into six Mill Operational Units (MOUs) to present historical information prior to collection of environmental samples. The MOUs are further organized into Operational Areas (OAs) based on historical and current operations. Operational features are identified within each OA. This organizational structure facilitates an adaptive management approach to the RI, allowing evaluation of investigation results and refinement of a CSM to help identify data gaps for each OA and MOU. MOUs are presented on Figures 3a and 3b, and OAs are presented on Figures 4a and 4b.
- Summarize information regarding operational history, past investigations and/or cleanup activities, existing monitoring programs, and land use.
- Identify continuing manufacturing operations occurring at this time that impede safe and practical access for implementation of RI activities in certain OAs. In the AO, these areas are known as inaccessible areas.
- Identify COPCs based on known historical and current operational history as well as documented or known spills or releases.
- Present a preliminary CSM based on information known at this time.
- Identify initial data gaps in accessible upland areas. There is limited information available regarding Mill Property geology and hydrogeology and their effect on fate and transport of COPCs, and limited data regarding potential presence of COPCs. Therefore, this Final Upland RI WP focuses on upland media (e.g., soil and groundwater). Other media (e.g., surface water, sediment) will be addressed in a separate WP (see Section 1.5). At this time, groundwater characterization of COPCs is

prioritized to understand potential COPC transport from upland areas to the Camas Slough. Soil sampling is proposed during monitoring well installation and in additional target locations.

Propose RI activities to address initial data gaps in accessible areas. Activities proposed in this RI WP are guided by the current understanding of the Mill Property based on historical records and ongoing operations.

At this initial stage of the RI, activities described in this RI WP focus on potential releases to soil and groundwater in upland OAs of the Mill Property in accessible areas. Proposed RI activities (see Section 5) do not distinguish between dissolved and total COPCs, except for metals, at this initial stage of the RI. This initial stage of the RI focuses particularly on COPCs in groundwater to identify potential exposure pathways to receptors and soil in OAs where COPCs may be present. If there are other changes in operations and/or as demolition proceeds, additional areas may become accessible; additional RI activities will be considered for areas that become accessible, if warranted (see Sections 3.4 and 5; GRES 2023).

1.2 Project Management Strategy

This Final Upland RI WP was developed by Geosyntec Consultants (Geosyntec) on behalf of GP.[8] Ecology provides regulatory oversight of the RI in accordance with the AO. As required by the AO, key personnel involved in conducting the RI are listed below.

The project coordinator for Ecology is:

Mady Lyon
Department of Ecology
Solid Waste Management Program, Industrial Section
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The project coordinator for GP is:

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133 Peachtree Street
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[8] The First through Third drafts of the Upland RI WP were developed by Kennedy Jenks.

Each project coordinator shall be responsible for overseeing the implementation of the AO.

1.3 Project Schedule

Exhibit B of the AO defines a schedule for project milestones. The first milestone in Exhibit B of the AO is a RI Planning Meeting; this meeting was held on August 17, 2021. The next milestone in Exhibit B of the AO is submittal of an Agency Review Draft RI WP, which was due within 120 calendar days following the effective date of the AO and submitted to Ecology on January 3, 2022. Subsequent milestones include completing RI field work within 1 year after approval of the Final Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP) and Health and Safety Plan (HASP), an Agency Review Draft RI Report, and a Public Review Draft RI Report. Quarterly Progress Reports are also required on or before the 10th of the month after the end of each quarter. A RI Pre-Report Check-in Meeting is required prior to submittal of the Draft RI Report for Agency Review.

As described in Section 1.1, the RI process will be iterative. Parts of the Mill Property are currently inaccessible, and there are initial data gaps to be addressed in accessible areas. To understand the current state of Mill Property, we propose following a phased approach with adaptive management principles (i.e., following a systematic approach based on defining the current understanding of Mill Property conditions, identifying and resolving data gaps, and re-evaluating and re-prioritizing Mill Property activities). There are likely additional RI WP Addenda and associated reports to follow this initial RI WP as we refine our understanding of Mill Property conditions and identify the next priority data gaps. In-water areas will be addressed in a separate investigation (see Section 1.5). With this in mind, we anticipate activities will follow the timeline presented below.

Project Milestones in the AO	Completion Time Defined in AO	Estimated Date
Agency Review Draft RI Work Plan for Upland Areas	120 calendar days following effective date of the AO	TBD[a]
Completion of the RI Field Work for Upland Areas	12 months following completion of the Final SAP/QAPP and HASP	TBD
Agency Review Draft RI Report for Upland Areas	90 days following receipt of laboratory data[b]	TBD
Additional RI WP Addenda, Ecology Review, and RI WP Implementation to follow as needed		
Agency Review Draft RI Report for Upland Areas	90 days following receipt of laboratory data[c]	TBD
Public Review Draft RI Report for Upland Areas	45 calendar days following receipt of Ecology comments on Agency Review Draft RI Report	TBD

Notes:

(a) Ecology approved a deadline extension from December 10, 2021, to January 7, 2022, to incorporate the CBC into the Draft RI Work Plan (Ecology 2021c). The first Agency Review Draft RI WP for Upland Areas was submitted on January 3, 2022. Additional Draft Upland RI WPs for Upland Areas have been submitted in response to Ecology comments.

(b) It is assumed that 90 days begin when the last laboratory report associated with RI activities is received.

(c) The Public Review Draft RI Report for Upland Areas will be prepared when the purpose of the RI has been met and after the Agency Review Draft RI Report for Upland Areas. A Public Review Draft RI Report will not be prepared after implementation of each RI WP.

1.4 Report Organization

The remainder of this RI WP is organized as follows:

- **Section 2** summarizes information regarding the Mill Property location and the local geology and hydrogeology.
- **Section 3** summarizes information regarding existing monitoring programs, operational history, past field investigations and cleanup activities, and initial data gaps.
- **Section 4** presents a preliminary CSM.
- **Section 5** provides details regarding the specific investigative activities that will be performed during this initial RI effort. This section identifies approximate sampling locations, number of samples to be collected, and analytical methods for each sample matrix. This section also references the SAP/QAPP and HASP developed for the investigation and the Standard Operating Procedures (SOPs) that have been updated for this project (Appendix A).
- Attached tables, figures, and appendices are referred to in the above sections to support information presented in the text.

1.5 Sediment Remedial Investigation Work Plan Overview

The AO identifies the RI WP requirements for environmental site media including surface water, porewater, and sediment. Through discussions with Ecology, it was agreed that GP will prepare a separate RI WP to address aquatic sediment, porewater, and surface water adjacent to the Mill Property in the Camas Slough and in the Columbia River along Lady Island (Draft Sediments RI WP). As described in Section 1.1.2, this RI WP will provide information to support evaluation of sources of contamination from the Mill Property to sediments and the status of source control activities. A separate WP, the Agency Review Draft Sediment RI WP, will address the remaining RI tasks specific to sediment described in the AO, which include sampling and analysis of surface and subsurface sediment. Following approval of this RI WP and completion of data collection along pathways of potential COPC sources to sediment, if additional types of data collection are needed (for example, outfall sampling, or sediment trap sampling in the river or slough), those will be obtained as part of the Sediment RI.

The Draft Sediment RI WP will define an approach to sampling sufficient to evaluate the nature and extent of COPCs in surface and subsurface sediment exceeding preliminary SMS sediment cleanup standards, and other regulatory requirements. Surface water and porewater sampling to be included in the Draft Sediment RI WP will provide data to evaluate water quality compared to applicable water quality criteria (WAC 173-201A-240). The Agency Review Draft Sediment RI WP was prepared by Anchor QEA on behalf of GP and submitted to Ecology for review in December 2023.

The Draft Sediment RI WP includes the required content identified in the AO, which includes compilation of historical information concerning potential impacts to sediment; a preliminary

CSM that includes sediment; an evaluation of data gaps pertaining to sediment; an overview of the field investigation and data collection for surface sediment and subsurface sediment, surface water, porewater; and a proposed schedule. An associated Sediment SAP and a Sediment QAPP will be prepared for aquatic sediment sampling. A HASP will be prepared and/or updated for each phase of sediment sampling. The Sediment RI WP, Sediment SAP, and Sediment QAPP will be prepared consistent with the provisions of the Sediment Management Standards (SMS), Chapter 173-204 WAC, and the *Sediment Cleanup User's Manual* (SCUM; Ecology 2021d). In addition, the Sediments QAPP will follow Ecology's *Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies* (Ecology 2004) and United States Environmental Protection Agency (USEPA) Region 10 guidance.

The objectives of sampling and analysis activities described in the Draft Sediment RI WP, Sediment SAP, and associated QAPP are as follows:

- Fill data gaps and refine the CSM.
- Confirm sources of COPCs to sediment have been controlled, to the extent additional information is needed to supplement that collected through the RI WP.
- Provide information sufficient to evaluate water quality against applicable standards.
- Identify the nature and extent of contamination in surface sediment.
- Provide information sufficient to identify COPCs and confirm chemicals of concern (COCs) in the sediments. The terms COPCs and COCs in this context include chemicals that are toxic or bioaccumulative for humans or aquatic life, as well as other substances (e.g., wood waste) that may cause toxicity to the benthic community.
- Gather information on natural or regional background concentrations in sediment, if not already available.
- Provide information sufficient to identify boundaries of potential sediment cleanup areas (any such areas will be identified in collaboration with Ecology based on data provided through the RI field sampling activities).

The Sediment RI will employ a phased investigation approach. The initial phase sampling design will be based on the available Mill Property information and assessment of sediment bed elevations and texture, with sampling locations selected based on locations of Mill Property operations, prior releases, observed wood waste, and accumulated fine-grained sediments. If existing information is insufficient for this purpose, a preliminary reconnaissance phase of work will be included to collect this information sufficient to design the first phase of sediment sampling. The Sediment SAP describes a process to evaluate the results of initial sampling and identify subsequent phases of sampling in coordination with Ecology.

SECTION 2. MILL PROPERTY SETTING

Per WAC 173-340-350 (5 and 6), this section presents available information about Mill Property conditions, including location and size, topography, climate, geology, hydrogeology, hydrology, cultural resources, and land use.

As stated in Section 1, the Site will be defined by the RI results, so the boundary shown on figures and the area discussed below present a preliminary depiction of the Mill Property based on current or historical industrial activity related to the Mill. As discussed in Section 3, available documentation related to mill operational history and industrial activity has been reviewed and is the basis for the preliminary depiction of the Mill Property boundary.

2.1 General Facility Information

The Mill Property is located in southwestern Washington along the banks of the Camas Slough and Columbia River in the city of Camas (Figure 1). The Mill Property occupies approximately 661 acres, consisting of 476 utilized acres on Lady Island and 159 acres on the upland side north of the Camas Slough. Washington State Route (SR) 14 traverses east-west through the Mill Property at Lady Island.

The following sections present descriptions based on currently available information. Data gaps exist in the current understanding of geology, hydrogeology, groundwater, soils, surface water, sediments, and hydrology. These sections will be refined in future reporting efforts as understanding of site conditions improves through implementation of RI field activities.

2.1.1 Topography

Mill Property (excluding Lady Island) topography generally slopes to the south towards the Camas Slough with ground surface elevations ranging from 12 feet to 175 feet.[9] BNSF Railway Company (BNSF) railroad tracks and infrastructure split the MMA into northern and southern portions. The southern portion of the MMA has generally flat surface topography. The northern portion of the MMA and the CBC area are at a higher ground surface elevation with more topographic relief, including exposed bedrock outcroppings in some locations. The highest ground surface elevation at the Mill Property is north of NW 6th Avenue at the CBC. Lady Island has generally flat surface topography at an elevation of approximately 30 feet (NAVD88). Figures 2a and 2b present Mill Property topography.

2.1.2 Climate

Camas receives an average rainfall of 51 inches annually. Most precipitation occurs during the winter months, with December identified as the wettest month. Summers are drier, with July

[9] North American Vertical Datum of 1988 (NAVD88)

identified as the driest month. Monthly precipitation ranges from 0.5 to 6.5 inches per month (City of Camas 2013).

Based on regional reports, the area experiences mild weather with typical winter temperatures near 40 degrees Fahrenheit (°F) and typical summer temperatures from 65 degrees °F up to the mid-80 degrees °F (City of Camas 2013; City of Vancouver 2021).

2.1.3 Soils

The native ground surface has been altered since the Mill began operating in 1883 and is largely covered by impervious surfaces. Native surface soils near the Mill Property are mapped as Olympic stony or clay loams, Hillsboro silt loams, Vader silt loams, or Fill in the northern portion of the Mill Property, and as Sauvie Island and Newberg silt loams in the southern portion of the Mill Property, including Lady Island. These soils belong to hydrologic soil groups C and D, which typically have slow to very slow infiltration rates (USDA NRC 2025). Based on available information from areas of the Mill Property where previous investigations have occurred, the ground surface is paved with asphalt or concrete that is underlain by fill material consisting of gravel and sand to depths ranging from 0 feet to approximately 8 feet to 14 feet below ground surface (bgs; Arcadis 2016). Beneath the fill material, soil consists of varying thicknesses of silt, sand, and gravel, which is described in more detail in the geology section, below.

Limited sample data are available for Mill Property soil. Improved understanding of soil conditions is expected through implementation of RI field activities proposed herein.

2.1.4 Geology, Groundwater, and Hydrogeologic Setting

2.1.4.1 Geology

The Mill Property is located near the east end of the Portland Basin, a structural depression in the central Puget-Willamette lowland. The basin is underlain by volcanic rocks that rise in elevation to the east to form the Cascade Mountain range. In most of the basin, the volcanic bedrock is overlain by weakly lithified to unconsolidated sediments, primarily derived from the Columbia River. These basin-fill deposits can reach up to over 1,700 feet thick in the center of the basin near Vancouver, Washington, but thin out near the margins of the basin in the Camas area. The primary geologic feature within Camas is an extinct volcanic vent (Prune Hill), which outcrops at the northwest end of the city and drops off towards the south and the Columbia River (Mundorff 1964; Tolan and Beeson 1984).

Surface geology in the vicinity of the Mill Property is shown on Figure 5, and major surficial geologic units are described below, from youngest to oldest:

- **Alluvial Deposits:** both recent alluvium (map symbols Qa, Qac) deposited by the Columbia River and Washougal River and older cataclysmic floods (Qfg) associated with glacial outbursts from the Pleistocene-age Glacial Lake Missoula. The recent alluvium consists of variable amounts of sand, gravel, silt, and clay, while the flood deposits are typically coarser-grained and consist primarily of boulder and cobbly sand

and gravel. These units are the primary surficial units underlying the MMA, CBC, Woodyard, and Lady Island (Figure 5). Across the Mill Property, alluvial deposits thicken to the east to observed depths of up to 130 feet bgs. On the eastern margin of the MMA-South, alluvial deposits form the alluvial aquifer from which the Mill's production wells are supplied. The Mill's production wells terminate between 70 to 130 feet bgs within the alluvium.

- **Unnamed Conglomerate and the Troutdale Formation (QTc, Ttfh):** an unnamed conglomerate (QTc) consisting of unconsolidated to cemented pebbles to cobbles and the underlying sandstone member of the Troutdale Formation (Ttfh) are mapped north of the Mill Property. The Troutdale Formation typically underlies the alluvial deposits, although it is not present where the older basalt bedrock is near ground surface (e.g., south and west of the Mill Property). The Troutdale Formation may be interbedded with or overlie the fine-grained Sandy River Mudstone (Tsr). Beneath the alluvial deposits, the Mill's production well boring logs indicate that the Sandy River Mudstone or Troutdale Formation are cemented.
- **Basalt and Oligocene Bedrock units (Tbem, Td):** basaltic andesite and dacite (commonly described as "basalt" in drilling and boring logs) underlie the alluvium of Lady Island, the MMA-North, and the CBC. At the western margins of the MMA-North and CBC, the basalt bedrock is exposed at the surface. The bedrock is visible in rock cuts along access roads to the former Lime Kiln area and forms the bluff north of the railroad tracks. The eastern edge and depth of the basalt bedrock beneath the Mill Property beyond where it outcrops is unknown.

Review of the well logs, surficial geology, and geotechnical borings generally confirms the surficial geology and provides additional understanding on the subsurface extent of bedrock and alluvium near the Mill. Based on available information from areas of the Mill Property where previous investigations have occurred, surface soils (beneath the asphalt or concrete) are generally described as fill material consisting of engineered gravel and sand to depths ranging from approximately 8 feet to 14 feet bgs (Section 2.1.3; Arcadis 2016). Beneath the fill material, soil consists of varying amounts of silt, sand, and gravel (i.e., alluvial deposits) and/or bedrock. The depth of alluvial deposits between the fill and bedrock appears to be dependent on bedrock depth. Where bedrock is close to or at ground surface, it may directly underlie fill (if fill is present at all). In other instances, bedrock was encountered between 15 to 40 feet bgs, wherein it is typically overlain by alluvial deposits. The majority of borings that encountered shallow bedrock described "refusal" or inability to drill deeper due to consolidation or compaction. Where present, bedrock is typically described as "solid gray rock" or "basalt." Logs from three test wells drilled on Lady Island in 1967 show that drillers encountered about 40 to 60 feet of clay overlying basalt to depths of up to 300 feet bgs. In general, the likelihood of encountering shallow bedrock appears to increase in the MMA–North and with distance west and southwest from within the MMA–South.

2.1.4.2 Groundwater and Local Hydrogeologic Conditions

Regionally, the younger unconsolidated and semi-consolidated materials of the upper unit of the Troutdale Formation described in Section 2.1.4.1 form the major regional aquifer (the Troutdale Gravel Aquifer [TGA]). Cementation, compaction, and weathering processes have significantly reduced the permeability and water-bearing capacity of some areas of the TGA, including in the Camas area where it is observed to generally exhibit low permeability due to its fine grained and cemented nature; however, in other areas, permeability is moderate to high and this aquifer is used for water production (Mundorff 1964).

The TGA is only present in the eastern portion of the Mill Property, where it is overlain by both recent and older alluvial deposits that form the primary aquifer system. The TGA/alluvium contact ranges from approximately 70 to 130 feet bgs. Where present, the TGA appears to be consolidated and of low permeability, often described as red clay, blue shale, conglomerate, or gray or brown rock. The blue shale and conglomerate are likely the Sandy River Mudstone and Troutdale Formation, respectively, while the brown or gray rocks are likely older bedrock units (e.g., Tbem). The TGA is absent in the western portion of the Mill Property where basalt bedrock is present.

There are two hydrogeologic regimes observed at the Mill Property. Shallow groundwater is present within unconsolidated fill and/or alluvial deposits overlying the basalt bedrock (i.e., 5 to 40 feet bgs) in the western and northern areas of the Mill. This shallow groundwater appears to be perched and may be seasonally saturated. The eastern extent of this “perched” groundwater zone is unknown. As described above, the thicker alluvial sediments form the primary aquifer at the Mill Property. This deeper, high-yielding alluvial aquifer system underlies the eastern portion where the Mill’s production wells are completed (i.e., MMA–South).

The shallow subsurface has been explored by several previous investigations (e.g., SECOR 2001; Arcadis 2012, 2015, and 2016; BergerABAM 2016b, etc.; Appendix B). Where saturated, perched groundwater has been encountered at depths ranging from approximately 3 feet to 20 feet bgs (SECOR 2001; Arcadis 2012, 2015, and 2016; BergerABAM 2016b).

Groundwater Flow Conditions

In the CBC area, shallow groundwater flow direction is generally to the south-southwest (BergerABAM 2016b; see Section 3.5.6). Limited information is available in the MMA, but the shallow groundwater flow direction is assumed to continue generally south/southwest toward the Camas Slough. Groundwater flow direction may shift seasonally to the southeast in response to Washougal River stage (i.e., lower in the summer and higher during the spring freshet) and/or as tidal influences from the Columbia River. On Lady Island, perched groundwater flow is assumed to be radial from a central area within the island. Assumed groundwater flow directions are illustrated on Figures 14a and 14b.

Though the shallow subsurface has been explored by several previous investigations, further exploration is needed to improve understanding of shallow groundwater flow and hydrogeologic conditions at the MMA and on Lady Island, including groundwater flow direction, rate, and vertical and horizontal gradients; groundwater divides; areas of groundwater recharge and discharge; areas where groundwater interfaces with surface water; and groundwater quality data. Improved understanding of groundwater conditions and hydrogeologic features is expected through implementation of the proposed RI field activities.

Mill Groundwater Supply

The deeper alluvial system underlying the eastern portion of the Mill Property provides industrial water supply to the Mill. The Mill has a total of 19 production wells, 15 of which are operational and supply water solely for use in industrial processes. These wells are completed in the alluvial deposits, in what is interpreted to primarily be coarse-grained Columbia River flood deposits. The production wells are located in the eastern area of the MMA, in an area immediately adjacent to and on a small island within the Washougal River. The production wells were constructed as early as 1939 and operate in accordance with GP's water rights for the Mill. The Mill's potable water supply is provided by the City of Camas.

Review of the Mill production well logs indicates that alluvial deposits extend to depths of about 70 to 130 feet bgs at the existing well sites. The Mill production wells are in hydraulic continuity with the nearby Washougal and Columbia Rivers. Static water levels in these wells range from approximately 2 to 50 feet bgs, depending on the wellhead elevation and season. Each of the wells was terminated near the apparent bottom of the alluvial deposits, where the logs describe either red clay, blue shale, conglomerate, or gray or brown rock, typically between 70 to 130 feet bgs. The blue shale and conglomerate are likely the Sandy River Mudstone and Troutdale Formation, respectively, while the brown or gray rocks are likely older bedrock units (e.g., Tbem).

Areas surrounding the Mill Property are served by City of Camas (City) municipal supply. GP is currently supporting the City with an on-going study of its drinking water supply. The City's wellfield is located northeast of the Mill, south of Lacamas Creek. Eight of nine of the City's active supply wells (i.e., Wells 5–8 and Wells 10–13) are completed in the alluvial aquifer to depths of 70 to 110 feet bgs.

As part of the drinking water study, the Mill is monitoring groundwater levels in four of its production wells (i.e., Wells 1, 4, 12, and 13). The Mill began monitoring water levels in November 2024 and intends to continue throughout summer 2025 to assess seasonal water level fluctuations. The Mill intends to survey the wellheads during summer 2025, allowing for a seasonal evaluation of groundwater flow direction.

2.1.4.3 Surface Water, Sediment, and Hydrology

Blue Creek flows north to south through the CBC area and the MMA. The lower portion is piped through the MMA and conveys stormwater from upstream areas beyond the Mill Property. It also conveys flows from a tributary, Whiskey Creek, which is also piped and merges with Blue Creek on the north side of the MMA. Blue Creek discharges to the Camas Slough, which borders the MMA to the south. Both creeks receive urban stormwater runoff (Georgia-Pacific 2019). Stormwater from the Woodyard, MMA, and Ancillary Area (Figures 3a) is conveyed to the wastewater treatment plant (WWTP) for treatment (see Section 3.3). The Washougal River flows along the eastern edge of the Mill Property to its confluence with the Camas Slough, which separates Lady Island from the MMA.

The Columbia River is located south of the MMA, Camas Slough, and Lady Island. The Columbia River is the fourth largest river in North America by volume with a total annual runoff of approximately 198 million acre-feet and year-round average flows of 275,000 cubic feet per second. It flows 1,214 miles from British Columbia to the mouth at the Pacific Ocean near Astoria, Oregon. The tidal influence of the ocean extends 146 miles upriver from the Pacific Ocean to the Bonneville Dam. The Mill Property is located approximately 120 miles upriver from the Pacific Ocean. Flow rates in the Columbia River experience a large seasonal fluctuation. The highest flows occur in the spring and early summer when the moisture stored as snowpack is released from the mountains (BPA 2001). The WWTP discharges treated stormwater and process water to the Columbia River on the south side of Lady Island.

Substrate in the Camas Slough and Columbia River adjacent to the Mill Property consists primarily of sand, gravel, and rock with lesser amounts of silt and clay. Previous sediment sampling investigations have experienced difficulties in collecting enough material for a sediment sample at Outfall 001 and Outfall 002 (Figures 11a and 11b) due to the rocky substrate and absence of significant fine sediment thickness due to strong currents in the Columbia River and Camas Slough (ESA 2018).

The Draft Sediment RI WP provides some reconnaissance photographs of Lady Island shoreline (Anchor QEA 2023).

2.2 Cultural Resources

A cultural resources desktop analysis was completed by Environmental Science Associates (ESA) to support the RI, and findings were presented under separate cover (ESA 2025). The Mill Property is classified as moderate-high to high archaeological probability by Clark County Assessor records, and as high to very high risk for precontact-era archaeological sites in the Washington State Department of Archaeology and Historic Preservation's (DAHP) Statewide Predictive Model. The desktop analysis identified five previously recorded archaeological sites and 29 historical resources (historic-aged built environment resources that therefore meet the minimum age threshold for potential listing in the National Register of Historic Places) within the vicinity of the Mill Property during background research (Zimmer et al. 2024). While the construction of monitoring wells might have temporary effects, including vibration, noise, and visual impacts on nearby historical resources, the proposed RI work locations are sufficiently removed in distance from identified resources such that it is ESA's opinion that there will be no adverse effect.

ESA recommended that the proposed RI ground-disturbing work locations, such as those for soil sampling and drilling for monitoring well installation, be placed no closer than 100 feet from known archaeological resources. The proposed location of one monitoring well on Lady Island (proposed MW-D1.4) has been revised in this Final Upland RI WP to accommodate a cultural resource; no other sampling locations have changed or been added to the investigation scope of work evaluated in the cultural resources desktop analysis. ESA recommended and prepared an Inadvertent Discovery Plan (IDP) for the RI work, as required and reviewed by Ecology. ESA also recommended that ground-disturbing work for the RI be conducted under an archaeological monitoring plan, which would specify which potions of the Mill Property should be subject to on-site observation of ground-disturbing work by an archaeologist and which areas can be covered by the IDP.

An IDP consistent with RCW 27.44 and RCW 27.53 and Ecology's template was prepared and submitted to Ecology on March 18, 2025 (Kennedy Jenks 2025).

2.3 Past, Present, and Future Land Use

The Mill has operated since 1883 under various ownership and is currently owned and operated by GP (see Section 3.1). The Mill Property is currently designated by the City as industrial land use and zoned for heavy industrial land use (City of Camas 2016, 2021a), and GP intends to continue heavy industrial operations at the Mill for the foreseeable future.

MTCA (WAC 173-340-200) defines industrial as properties that are "zoned for industrial use by a city or county conducting land use planning under chapter 36.70A RCW (Growth Management Act)." The City completes their planning under the Growth Management Act (City of Camas 2021c), and the City identifies the Mill Property zoning as heavy industrial and designated for industrial land use. However, the heavy industrial zoning code for the City of Camas allows for the development of schools.

SECTION 3. MILL PROPERTY HISTORY AND CURRENT OPERATIONS

Our understanding of the historical uses and current operations at the Mill Property was formed through extensive review of paper and electronic files, documents, reports, plans, drawings, images, historical aerials, laboratory reports, and correspondence.

The Mill has been owned and operated by several different entities throughout its approximate 140-year history. Requirements for documentation of various processes, operations, incidents, etc. have evolved through the years within and between these operating entities. Regulations requiring retention of specific information have evolved as well. As a result, records are generally stored in electronic format for more recent decades and physical copies for older information. While there is a large volume of records that are available, they are sporadic and incomplete as they relate to older generations of the Mill. GP and Kennedy Jenks staff spent over a year reviewing more than 400 files in an attempt to catalogue information relevant to this RI, including 8 weeks on-site at the Mill reviewing hard copy files. Documents reviewed included incident reports of spills and releases, aerial imagery, historical permits, and engineering drawings. Interviews were also conducted in August 2019 with GP personnel who had worked at the Mill Property for 30 years or more.

As a result of these efforts, the activities that have occurred and/or continue to occur at the Mill since operations began (in particular, the Woodmill, Pulping, Bleaching, Paper Mill, Finishing, and Converting processes) are known with reasonable confidence. The operations, summarized in the sections below, are the basis for identification of COPCs and proposed monitoring well and soil sample locations herein. This compendium of information provides the basis for identification of OAs and the operational features and COPCs involved in processes within OAs. Environmental data tables and well logs from previous investigations and ongoing monitoring programs are provided in Appendices B and C, respectively.

A visual footprint of mill activities using historical aerials and Sanborn maps is presented in Appendix F. It shows that the Mill operation generally grew over time, and the preliminary Mill Property boundary presented herein is inclusive of historical mill operations.

3.1 Operational History

Mill operations at the Mill Property commenced circa 1883 when Henry Pittock formed the Columbia River Paper Company (Geigenmiller 2018a). Pittock, owner of *The Oregonian* newspaper, chose the location for its ample access to water to power paper-making machines. In 1885, mill operations at the Mill Property were recognized as the first in the Pacific Northwest to produce wood pulp.[10] Following a fire in 1886, the Mill was rebuilt 2 years later with two paper machines. By 1906, the Mill produced paper bags in the northern portion of the Mill known as the

[10] Sanborn Maps and other historical summaries indicate the use of rags, straw, and old clothes as well as wood pulp in early paper manufacture at the Mill.

Bag Factory. The Mill expanded operations and by 1914 became one of the largest paper producers in the world (City of Camas 2015).

In the 1940s, to support efforts during World War II, machine shops at the Mill manufactured parts for Liberty Ships assembled at shipyards in nearby Portland and Vancouver. Following the war effort, the Central Research and Technical Department formed in 1946, and two laboratory buildings were constructed in the 1950s at the CBC. These facilities became known as the Central Research Division in 1960. Research involved pesticides,[11] energy production, crop yields, and synthetic pulp production. The research laboratory shut down in 1997 (Joner 2010). A summary of chemicals stored, used, and manufactured in this area was presented in the 2000 Site Investigation Report (SECOR 2001).

Other additions to the Mill Property over time include a WWTP located on Lady Island. Operational features and improvements to the WWTP include a Primary Clarifier[12] constructed in 1968, the south Aerated Stabilization Basin[13] (ASB) added between 1956 and 1961 (based on historical aerials; south ASB) initially as a sulfite liquor lagoon and then converted to an ASB in 1975, and the north ASB added in 1977 for secondary wastewater treatment. The WWTP captures and treats process water and stormwater[14] that is conveyed from the Mill via a pipeline under the Camas Slough. Treated water discharges to the Columbia River under a National Pollutant Discharge Elimination System (NPDES) Waste Discharge Permit (see Section 3.3). Solids from the Primary Clarifier are either disposed of at the Lady Island Landfill (LILF), which operates as a limited purpose landfill under Clark County Public Health (CCPH) Department Permit Number PT 0006096 (LILF permit) or are beneficially reused off-site.

From 1981 to 1984, mill operations underwent modernization (Mill Modernization Project) involving demolition of buildings containing outdated production processes and equipment, plus the addition of new machines to manufacture communication papers for copiers and printing. In 2000, GP, now a subsidiary of Koch Industries, Inc., acquired the Mill Property and mill operations.

In November 2017, GP announced plans to cease certain mill operations at the Mill Property, including the communication paper machine, fine paper converting assets, pulping operations, and related equipment. In 2019, GP completed shutdown of these operations. Currently, Mill operations continue to produce tissue paper and paper towels, using pulp purchased from off-site sources (Brynelson 2017).

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[11] Based on available records, pesticides relevant to the CBC area include dimethyl sulfoxide (DMSO).

[12] A clarifier is generally used to remove solid particulates or suspended solids from liquid.

[13] An aeration basin is a pond-like structure with aeration to promote treatment (biochemical oxidation) of wastewater.

[14] Based on available documentation (Georgia-Pacific Consumer Products LLC 2011, 2017c, Ecology 2020a,b), Mill Property stormwater has been generally captured and treated with process wastewater. Improvements have been made over the Mill's history to improve capture of stormwater from mill operational areas. At this time, known industrial stormwater associated with the Mill Property is captured and treated by the WWTP.

3.2 Paper Making Process

Generally, the paper making process shown on Figure 6 converts pulp fibers (separated from wood) into paper products. This section describes processes and operations used in the past and present at the Mill to produce paper products.

Historically, paper making at the Mill began at the Woodmill. Logs delivered to the Mill were sent to the Woodyard, where they were processed by the Woodmill to remove bark[15] and produce wood chips[16]. These wood chips were then conveyed to the Pulping area, where they underwent a mechanical or chemical pulping process that separates cellulose fibers from the wood chips to produce “brown stock.” Next, the brown stock was sent to the Bleaching area where it underwent bleaching and delignification processes to yield a whiter, “bleached pulp.” Bleached pulp was then sent to the Paper Mill where it was converted to a continuous roll of paper called a “parent roll.” Depending on the final use of the paper, the parent roll may have undergone a finishing step. Finally, the parent roll was cut into the desired final size in the converting area to produce a final product.

As of 2019, the Woodmill/Woodyard, Pulping, and Bleaching operations ceased at the Mill. Continuing operations at the Mill involve use of purchased pulp (from off-site sources) at the paper mill for finishing and converting into paper products such as paper towels. Processes used at the Mill are described in more detail below.

Woodmill

The Woodmill historically served as the handling area for logs staged in the adjacent Camas Slough. Whole, untreated logs were initially processed into wood chips at the original Woodmill (visible in Image 1 below), formerly located in the eastern portion of the Woodyard to the northwest of the Dock Warehouse. It was replaced in 1947 by a Woodmill in the western portion of the Woodyard (seen in Image 2). Both the First and Second Woodmills were demolished in 2003. After demolition, log processing ceased on the Mill Property and wood chips arrived by truck and barge; chips were briefly received via railcar during construction of the truck dumps. The Wood Chip Piles provided feedstock for pulping operations until the cessation of pulping operations in 2018–2019.

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[15] Removal of bark occurs in machinery known as a debarker. Removed bark provides a fuel to generate steam for other mill operations.

[16] Wood (or wood chips) used to make pulp contain three main components (apart from water): cellulose fibers (primary component for papermaking), lignin (a natural organic polymer that binds cellulose fibers to provide structure in wood) and hemicelluloses (polysaccharide, a carbohydrate composed of monosaccharides, or simple sugars).

Image 1: Aerial imagery from 1948 showing the First Woodmill

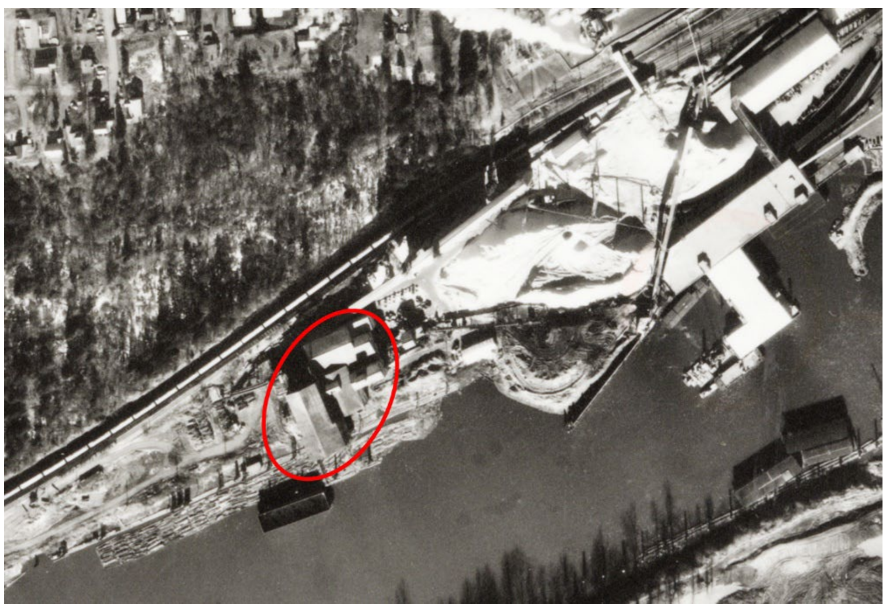

Image 2: Aerial imagery from 1980 showing the Second Woodmill

Pulping

Pulping operations at the Mill involved mechanical and/or chemical processes[17] to separate (cellulose) fibers from logs or wood chips. Chemical pulping produces brown stock (pulp) in pressure vessels called "digesters" in a process commonly called "cooking." After pulp is produced in the digesters, a mechanical washing process separates the cooking chemicals from the pulp.

[17] Available records circa 1951 indicate that the Mill used three processes to produce pulp: groundwood (mechanical) installed in 1884, sulfite (chemical) initiated in 1884, and sulphate/Kraft (chemical) begun in 1926 (Adams, 1951).

Over its history, prior to cessation of pulping operations in 2018–2019, both the sulfite and Kraft (sulphate) processes produced pulp at the Mill. The sulfite pulping process was the first chemical pulping process used at the Mill. In the sulfite pulping process, cellulose (wood) fibers are separated from the wood chips by dissolving lignin and hemicellulose. Generally, the sulfite process refers to several methods that involve acidic cooking liquors containing bisulfite (HSO_3). The sulfite process uses sulfur dioxide (SO_2) dissolved in water to yield an acid (sulfurous acid) to extract lignin from wood in digesters using high heat and pressure. From circa 1890 to 1950, the only commercially important sulfite pulping process used a cooking liquor prepared from sulfurous acid and limestone (USEPA 1978). In the 1950s, modifications to the sulfite process involved use of other soluble bases, such as sodium or magnesium (magnefite) instead of calcium (limestone). In its operational history, sulfite pulping at the Mill used calcium, magnesium, and sodium as soluble bases.

Pulping using the Kraft process began at the Mill in 1926 (Geigenmiller 2018b). The Kraft pulping process uses a chemical mixture of water, sodium hydroxide, and sodium sulfide (called "white liquor") along with heat and pressure to separate (cellulose) fibers from wood chips. Multiple cooking steps break down the cellular components of wood. The Kraft process yields pulp (fiber) and black liquor;[18] white liquor converts to black liquor during the cooking process. Before proceeding to the bleaching step, the pulp is washed[19] to separate the pulp from the black liquor.

After washing, the black liquor enters a chemical recovery process. This chemical recovery process is a defining feature of the Kraft process and recovers spent cooking chemicals for reuse (i.e., white liquor). The black liquor from pulp washing (called "weak black liquor") is collected in tanks and pumped through evaporators and concentrators to remove water and increase the black liquor solids content. The collected black liquor, which has a high energy value, is burned in a recovery boiler. The heat in the recovery boiler is used to produce steam for processes throughout the Mill. A liquid smelt[20] is removed from the recovery boiler and converted to "green liquor" by addition of a weak caustic solution in a "smelt dissolving tank."

Lime is added to the green liquor to produce white liquor and lime mud, completing the chemical recovery cycle.

The Lime Kiln supports the Kraft process by providing quicklime. Lime mud (calcium carbonate; $CaCO_3$) is converted to quicklime (calcium oxide; CaO) in the lime kiln using heat, mechanical movement of materials, and airflow in a process called calcination. Quicklime provides a base to

[18] Black liquor contains inorganic substances from the white liquor used in the cooking process; lignin, hemicellulose, and cellulose degradation products; soaps; and organic acids dissolved from the wood chips during pulping. Inorganic components of black liquor include sodium hydroxide (NaOH), sodium carbonate (Na_2CO_3), sodium sulfide (Na_2S), sodium sulfate (Na_2SO_4) and other sodium salts combined with organic matter.

[19] After the Pulp Mill was constructed during the Mill Modernization Project (1981 to 1984), pulp washing occurred at the Pulp Mill.

[20] Smelt contains mainly sodium sulfide (Na_2S) and sodium carbonate (Na_2CO_3).

counteract the (sulfurous) acid condition in the sulfite pulping process. A summary of substances involved in the Kraft pulping process appears below.

Product Name	Primary Composition
White Liquor	Sodium hydroxide (NaOH), Sodium sulfide (Na_2S)
Green Liquor	Sodium carbonate (Na_2CO_3), Sodium sulfide (Na_2S)
Black Liquor	Degraded cellulose, hemicellulose, and lignin from wood, Sodium hydroxide (NaOH), Sodium carbonate (Na_2CO_3), Sodium sulfide (Na_2S), Sodium sulfate (Na_2SO_4)
Lime Mud	Calcium carbonate ($CaCO_3$)

Kraft pulping operations at the Mill ceased in April 2018 (Ecology 2020a). Based on historical aerials, sulfite pulping operations at the Mill ceased by the 1980s.

Bleaching

In the bleaching process, brown stock completes one or more cycles of low pH bleaching, washing, and high pH extraction, until pulp achieves the desired level of brightness. Unbleached pulp (brown stock) is brown due to the presence of residual lignin and residual weak black liquor. Originally, not all pulp at the Mill was bleached; pulp at the Pulp Mill reportedly was not bleached and was used to manufacture brown paper products. According to available documentation, the first sulfite mill bleach plant was installed in 1924.

The bleaching process was completed in the K4 Bleach Plant, K5 Bleach Plant, Sulfite Pulp Bleaching, and Kraft Pulp Bleaching buildings. There are separate bleaching operations to process pulp from the sulfite pulping process and pulp from the Kraft pulping process.

In the sulfite pulp bleaching process, hydrogen peroxide is used to effectively remove lignin from sulfite pulps (NCASI 2013). In contrast to the Kraft pulp bleaching process, the sulfite pulp bleaching process uses less chemicals, is less reliant on chlorine or chlorine dioxide, and removes less lignin.

Two types of bleaching processes were used in the Kraft process at the Mill: chlorine bleaching[21] and elemental chlorine free (ECF) bleaching. In the chlorine bleaching process, elemental chlorine is the bleaching agent. When chlorine reacts with the high organic content of the brown stock, polychlorinated dibenzodioxin and polychlorinated dibenzofuran compounds (PCDD/PCDF, or dioxins/furans) can form as unintended byproducts. To reduce production of PCDD/PCDF, mill bleaching operations transitioned to the ECF process in 2000. In the ECF bleaching process, the

[21] Chlorine bleaching includes the use of both elemental chlorine and hypochlorite.

bleaching and delignification agent is chlorine dioxide (ClO_2) rather than elemental chlorine and significantly less chlorinated organic matter is generated compared to chlorine bleaching. To supply ECF bleaching agent, chlorine dioxide was manufactured at the R8 Plant using sulfuric acid, methanol, and sodium chlorate.

Kraft bleaching operations at the Mill ceased in April 2018 (Ecology 2020a). Based on historical aerials, sulfite bleaching operations at the Mill ceased by the 1980s.

Paper Mill

At the Paper Mill, bleached pulp moves through presses and dryers to form large rolls of paper (parent rolls). Generally, this process involves three stages: (1) stock preparation, (2) wet end, and (3) dry end (NCASI 2013). Stock preparation involves repulping and refining the various fiber furnishes, blending with additives, and removing particulates using screens and cleaners. In the wet end stage, pulp is applied to a wire mesh and undergoes multiple pressing and drying steps. In the dry end stage, pulp undergoes additional drying, pressing between rolls to manage sheet thickness and smoothness, and winding into a parent roll. The parent rolls are cut (see Converting section below) and may be treated with coatings or other chemical additives (see Finishing section below) depending on the grade of paper and the product being produced. Pulp continues to be used to produce parent rolls at the Mill (using pulp purchased from off-site sources).

Finishing

The finishing step is dependent on the use of the final product and can involve surface coatings. Coatings involve aqueous mixtures containing mostly solids and include:

- Pigments such as clay, calcium carbonate ($CaCO_3$), titanium dioxide (TiO_2), and polystyrene.
- Adhesives bind coating to paper and include water-soluble glues, starches, and gums and polymers (e.g., latexes, acrylics).

Other specialty coatings are also used. An example of paper treatment operations in the Mill's history is the treatment of paper to be used as food wrapping. Examples of chemicals used for this purpose include diphenyl, which was used primarily as a fungicide for papers used in food wrapping for citrus fruit, and ethoxyquin, which was used in papers specifically to reduce browning (scald) in pears. Other known finishing processes are described in Section 3.5 as applicable.

Converting

The final step in the paper making process is the converting step. At this stage, parent rolls are converted into smaller sizes depending on the type of paper product being produced. This step is primarily mechanical; chemical use during this step involves glues to produce cores for products such as paper towels. The Mill produced various paper products over its history with different converting and finishing requirements, such as paper towels, tissue paper, coffee filters, envelopes, food wrap, card stock, newspaper, communication paper, and bags. Converting operations continue at the Mill.

Power Boilers

Historically, there have been multiple Power Boilers supplying steam and/or power for mill operations. Power Boilers generate steam by using heat generated by combusting fuel in a furnace chamber. Power Boilers are typically able to burn multiple types of fuel sources, including coal, natural gas, oil, and wood waste (hog fuel).

There was a central Power House at the Mill that included a steam plant, turbines, and multiple power boilers. These power boilers included:

- No. 1 through No. 4 Hog Fuel Boilers: four power boilers that were primarily fueled by hog fuel but also had the capability to use fuel oil and natural gas. They were reportedly decommissioned in 1988 and demolished by 1990.
- No. 3 Power Boiler: this power boiler was fueled by natural gas and was decommissioned in 1988 and demolished by 1990.
- No. 3 Combination Boiler: the existing (but inactive) Power Boiler in this area was fueled by hog fuel. It was decommissioned in October 2020.
- No. 4 Power Boiler: the existing (but inactive) Power Boiler in this area was fueled by fuel oil. It was decommissioned in 2020.

Historically, the Power House provided steam for mill operations. The Power House is no longer operational.

Additional Power Boilers were located in other areas of the Mill. The No. 5 Power Boiler is located in the northwestern portion of Pulping OA (Section 3.5.2.1) and was permanently decommissioned in September 2021. The No. 6 Power Boiler, located in the western portion of Finishing/Coatings/Additives OA (Section 3.5.3.1), is the only active Power Boiler and continues to generate steam and electricity for ongoing mill operations. The No. 6 Power Boiler is powered by natural gas.

Other boilers, called recovery boilers, also produce steam for the Mill. The recovery boilers use concentrated black liquor as the primary fuel and are a critical piece of the Kraft pulping chemical recovery cycle (see Pulping section above).

3.3 Ongoing Monitoring Program

There are monitoring programs for compliance with existing permits and programs that pre-date the AO and will continue to occur in parallel with RI activities. Summaries of existing monitoring programs and monitored parameters are described below and presented in Table 1.

3.3.1 National Pollutant Discharge Elimination System Waste Discharge Permit

The Mill's WWTP operates under NPDES Waste Discharge Permit No. WA0000256. The WWTP treats process wastewater and stormwater[22] flows from the Woodyard, Main Mill Areas, and Ancillary Area (conveyed through the K6 sewer, K7 sewer, process sewer, and acid sewer; see Figure 7).[23] As summarized in Table 1, monitoring of treated process wastewater effluent and stormwater as well as sediment (in the vicinity of Outfall 001[24] and Outfall 002;[25] ESA 2018) and sludge occurs through the ongoing NPDES monitoring programs. Sediment samples have been collected to support dredging activities in the Camas Slough and continue to be collected through the existing NPDES permit. The WWTP is active and continues to operate, and RI activities are not proposed for active WWTP areas at this time. However, monitoring data collected through existing programs will be evaluated together with analytical data collected during the RI (see Section 5). Monitoring data are available on Ecology's Water Quality Permitting and Reporting Information System (PARIS), and recent years of NPDES permit monitoring data are presented in Appendix B.

3.3.2 Spill Prevention, Control, and Countermeasure Plan

Spill response follows the Spill Prevention, Control, and Countermeasure (SPCC) Plan (Georgia-Pacific 2019) prepared in accordance with the requirements of the SPCC regulations (40 Code of Federal Regulations [CFR] 112) and the Mill's NPDES Waste Discharge Permit. The SPCC Plan maintains a comprehensive list of bulk oil storage tanks, mobile/portable containers (e.g., drums/totes), and oil-containing equipment, and describes preventative measures for routine handling of products, countermeasures for spill response and cleanup, disposal methods, and reporting requirements. Regular inspections occur in accordance with the SPCC Plan. Incident and spill response documentation was reviewed to define the operational features and was one source of information used to define COPCs for an OA (see Section 3.5).

3.3.3 LILF Clark County Public Health Department Permit

Dewatered solids from the Primary Clarifier and No. 3 Power Boiler ash (prior to decommissioning) are either managed at the LILF or beneficially reused off-site. The Mill operates the LILF as a limited purpose landfill under CCPH Permit Number PT 0006096 (LILF permit). In accordance with the LILF permit, groundwater monitoring is completed quarterly, and seep inspections are completed annually. Seeps were identified previously but have not been identified for at least 6 years (2019 to 2024). Leachate from this landfill is collected and sent to the WWTP

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[22] As noted in the *Storm Water Monitoring Plan* (Georgia-Pacific Consumer Operations LLC 2017c), mill runoff and non-mill runoff are commingled and transported together and ultimately treated by the WWTP.

[23] Until demolition activities in 2021, the WWTP also treated process wastewater, and stormwater flows from the CBC.

[24] Outfall 001 is the primary outfall for the Waste Discharge Permit and discharges treated mill wastewater (Ecology 2020b). There is strong turbulence in the river where Outfall 001 discharges (Ecology 2008).

[25] Discharge at Outfall 002 contains Lacamas Lake water, mill water treatment filter backwash, and stormwater from the City of Camas (Ecology 2008, 2020).

for treatment. The LILF remains regulated by Clark County, continues to receive dewatered wastewater solids, and is considered inaccessible for RI activities at this time. Recent years of LILF permit monitoring data are presented in Appendix B.

3.4 Demolition Activities

The Camas Mill is still operational. Where operations in an area have ceased, and/or where lease[26] expiration terms involve removal of structures, demolition plans may be prepared. These plans may also change based on operational considerations (i.e., currently anticipated demolition activities could be rescheduled or canceled). As stated in the AO (Section VII.H), planned demolition and construction activities at the Mill Property that do not disturb soil are not considered remedial actions for purposes of this AO.

There are two current demolition plans for the facility. The area of proposed or in-progress demolition activities, expected date of completion, and a description of whether demolition activities affect accessibility for the purposes of the RI are summarized in the sections below. If additional demolition activities are developed, Ecology will be notified in the quarterly progress reports when the necessary permit applications are submitted and again after completion of a demolition project (GRES 2024).

3.4.1 Upland Demolition

The upland demolition Phase I scope described in the Third Draft Upland RI WP was completed in 2024. The upland demolition Phase II scope is in the permitting stage as of the date of this Final Upland RI WP. The work areas generally include the No. 5 Power Boiler, Black Liquor Area, Former Bag Factory, Kraft Mill, No. 6 Substation, and No. 8 Substation (see Figure 8a). Existing buildings and structures in these work areas will be demolished down to the top of the building slabs or surrounding grade; no soil disturbance, backfilling, or exposure of subgrade was part of this demolition scope. The total demolition work area is approximately 12 acres, which includes demolition, work area access, and supporting areas. This work is expected to be completed by the end of September 2026. These areas are considered in the proposed RI activities (see Section 5).

3.4.2 In- and Over-Water Demolition

The in- and over-water demolition scope is in the permitting stage as of the date of this RI WP. The proposed work areas are generally in- and over-water in the Camas Slough and Columbia River (see Figures 8a and 8b), and within Washington State Department of Natural Resources (DNR) Lease Area 17. The structures proposed for removal include dolphins and pilings, a crane foundation, five docks/piers, a warehouse, and an aboveground oil storage tank. The proposed

[26] GP has a leasehold agreement (number 20-B12845) and various easements with the Washington State Department of Natural Resources (DNR) for structures in aquatic areas. These structures include docks/piers, crane foundations, pilings, and other similar structures. DNR is also involved where operations may have occurred in State-owned aquatic land (SOAL).

scope of work also includes regrading in the Woodyard. Based on discussions with Ecology and DNR, this scope of work is expected to be implemented following the completion of RI activities.

3.5 Mill Operational Units and Operational Areas

Based on the information review and for the purpose of developing the RI approach, this RI WP organizes, presents, and describes historical and recent Mill Property information as follows:

- Six Mill Operational Units (MOUs; Figures 3a and 3b) based on location and historical and continuing mill operations.
- Eighteen Operational Areas (OAs), distributed across the MOUs based on historical and continuing processes and operational features (see Figures 4a and 4b, which also highlight locations of currently inaccessible areas related to continuing operations).

Operational features within each OA based on information about equipment and processes conducted (see Table 2 and Figures 9a and 9b) as well as documented spills and releases (Appendix E). These operational features are focused on historical or current activities, as well as spills or releases with the potential to affect human health or the environment; therefore, they may not cover every building at the Mill.

This organization approach for the RI facilitates evaluation of prior investigation results, development of a preliminary CSM and identification of initial data gaps for each OA and MOU. COPCs are summarized by operational feature in Table 2.

The MOUs and OAs are shown on Figures 3a, 3b, 4a, and 4b, and listed below. Operational features of each are listed in Table 2.

MOU	OAs
A – Woodyard	A1 – Woodmill
B – Main Mill Area - North	B1 – Pulping B2 – Power House B3 – Bleaching B4 – Finishing/Coatings - North B5 – Specialty Minerals B6 – Warehouse/Product Storage - North
C – Main Mill Area - South	C1 – Finishing/Coatings – South C2 – Warehouse/Product Storage – South C3 – Operational Support C4 – Pump Houses C5 – Wooded Area C6 – Production Wells
D – Lady Island	D1 – Wastewater Treatment Plant D2 – Dredge Spoils Area

MOU	OAs
E – Ancillary Area	E1 – Ancillary Area
F – Camas Business Center (CBC)	F1 – CBC Area F2 – No. 7 Substation

The following sections provide known information by OA (in each MOU) about

- remaining and former structures (where operations occurred),
- historical and current operations (what was done or continues to occur, and area accessibility for RI activities at this time),
- chemical usage in operations (what was used),
- documented incidents or spills (what was released; see Appendix D[27]),
- utilities and pipelines (see Figures 10a through 10j),
- previous field investigations[28] (investigation activities conducted in response to a spill (see Figures 11a and 11b, Table 3, and Appendices B and C), and
- ongoing monitoring programs (media already monitored through another regulatory program; see Table 1 and Appendix B).

As presented in Section 1.1 and the RTC letter (GRES 2023), certain areas of the Mill are currently inaccessible for RI activities. However, each operational feature is discussed in the following sections, and RI activities are proposed where field activities can be safely and efficiently completed (see Section 5). The RTC letter (GRES 2023) states that as changes in operations and/or demolition activities allow for safe access in the future, RI activities will be proposed (see Section 3.4).

The Site will be defined by the RI results. The boundary shown on figures herein is a preliminary depiction of the Mill Property based on current or historical industrial activity related to the Mill. Pipelines related to current and historical mill operations are included as part of the Mill Property. The proposed scope of work herein includes investigation of areas that are static[29] and accessible,

[27] If additional spills occur, the information will be noted and may result in targeted investigation; however, there are existing reporting requirements related to spills through other programs (e.g., SPCC Plan), and the Mill complies with those reporting requirements. If additional documentation is found that provides new information for historical spills, it will be incorporated in addendums to this RI WP.

[28] It is acknowledged that the cleanup activities in Table 3 may not have been formally closed out with respect to MTCA.

[29] As stated in Section 1, areas of the Mill Property are categorized as "static" and "dynamic." In this context, dynamic is used to describe areas with active mill operations, where conditions may change due to the ongoing industrial activity. In contrast, static indicates that industrial activity has ceased, and conditions are not expected to change due to industrial activity.

including areas assumed to be upgradient and downgradient of inaccessible areas (such as rights-of-way [ROWs]). If in the course of the RI, sampling results indicate that a hazardous substance(s) may extend into the ROWs, those areas will be included in the investigation. As described in the March 2024 RTC (GRES 2024), the rationale for not proposing sample locations in a ROW herein is two-fold: (1) sample locations in static, accessible areas are proposed in presumed upgradient and/or downgradient locations; and (2) to protect the health and safety of field staff where a safer option exists, preference will be given to sample locations outside of the transportation ROWs where feasible.

A complete, detailed description of Mill Property operational history, including information related to delivery, off-loading, handling, and storage of chemicals used at the facility, is difficult due to the lengthy operating history of mill and availability of Mill Property information and operating records. Available information was reviewed and summarized in the following sections. Based on available information, COPCs and initial data gaps are identified for each operational feature. At this time, groundwater characterization of COPCs is prioritized to understand potential COPC transport from upland areas to the Camas Slough, and therefore initial data gaps focus on COPCs in groundwater. Soil sampling may also be proposed opportunistically (i.e., during monitoring well installation).

3.5.1 MOU-A: Woodyard

The Woodyard abuts the banks of the Camas Slough south of the railroad tracks. MOU-A contains OA-A1 (Woodmill), where log processing occurred to create and store wood chips wood chips for use in pulping and papermaking operations.

Image 3: Aerial imagery of MOU-A

3.5.1.1 OA-A1: Woodmill

Operational features in OA-A1 are presented in the following sections. Process wastewater and stormwater from this area is collected by the grit sump and conveyed to the K7 sewer for treatment at the WWTP.

First Woodmill and Wood Chip Piles

The First Woodmill was located in this area before it was demolished. This area is largely unpaved and contained remnant wood chips up to approximately 16 feet bgs. GP has transported and used the majority of wood chips remaining after cessation of pulping operations at other regional facilities. The hog fuel conveyor and chip screen room structures remain but are included in the demolition plans being considered. There are also two out-of-service aboveground storage tanks (ASTs; 250 gallons and 55 gallons, respectively) that formerly contained hydraulic fluid. Operations in this area have ceased, and the area is accessible.

Chemicals used in this operational feature include petroleum hydrocarbons, which fueled and lubricated machinery used in the discontinued log processing, and chip pile management operations. There are documented records[30] of small, discrete diesel fuel and lube oil releases from machinery and vehicle traffic. Investigation and/or cleanup activities were completed as part of the original spill response.

COPCs associated with operations and/or documented spills/releases include petroleum hydrocarbons and metals. Polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and naphthalene are also COPCs per Table 830-1 (in WAC 173-340-900) due to the presence of heavy oil such as lube oil and hydraulic fluid. See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of petroleum hydrocarbons, PCBs, PAHs, naphthalene, and metals in groundwater • Presence of petroleum hydrocarbons, PCBs, PAHs, naphthalene, and metals in soil

Dock Warehouse

The inactive Dock Warehouse housed pulp, paper, and shipped product. The Dock Warehouse is partially constructed on pilings along the shoreline; access to soil and/or groundwater below this area is limited while the structure remains. The Dock Warehouse is included in the demolition

[30] The following spills documented in Appendix A of the AO occurred in this area: June 4, 2001, and August 7, 2000.

plans being considered. This area will be accessible after completion of planned demolition activities.[31]

There are no known chemicals used for operations at the Dock Warehouse. The Dock Warehouse was previously used for chemical storage; there are no known chemical releases of stored chemicals. There is a documented record of a process sewer sump overflow when a pump failed in February 2002.[32] In the notification to Ecology, it was reported that less than half a cup of oil was spilled (Fort James Camas LLC 2002a). Subsequently, a corrective action plan was completed, including a spill response and cleanup, system repair and redesign, and installation of a high-level alarm (Fort James Camas LLC 2002b).

COPCs associated with operations and/or unresolved documented spills/releases in this area include petroleum hydrocarbons and metals. See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Presence of petroleum hydrocarbons and metals in groundwater • Presence of petroleum hydrocarbons and metals in soil

Second Woodmill

The Second Woodmill was located in this area before it was demolished. Existing structures include the rail car chip unloader, chip truck tippers, and an aboveground wood chip conveyor structure. This area is accessible.

Chemicals used in this operational feature include petroleum hydrocarbons associated with machinery used in the Woodmill. There are documented records of small, discrete oil releases in this area.[33] Investigation and/or cleanup activities were completed as part of the original spill response.

COPCs associated with operations and/or documented spills/releases include petroleum hydrocarbons and metals. PAHs and naphthalene are also COPCs per Table 830-1 (in WAC 173-340-900). See Section 3.3 for information regarding ongoing monitoring programs that include this area.

[31] GP is preparing to initiate the permitting process for demolition activities that include the Dock Warehouse.

[32] The following spills documented in Appendix A of the AO occurred in this area: February 8, 2002. The AO states the spill occurred at an oil/water separator. Per Mill records, the overflow occurred at a process sewer sump (Fort James Camas LLC 2002a).

[33] The following spills documented in Appendix A of the AO occurred in this area: January 22, 2001.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of metals, PAHs, naphthalene, and petroleum hydrocarbons in groundwater

Former Cat Shop, Electric Shop, and Underground Storage Tanks

A former Cat Shop, Electric Shop, and underground storage tanks (USTs) located in this area supported the First and Second Woodmills. Structures remain in this inactive area, including the Cat Shop, an office and parts storage building, and a maintenance shop; these structures are included in the demolition plans being considered. Two USTs in this area were removed in 1985: a 2,000-gallon UST containing gasoline; and a 600-gallon UST containing degreaser solvent. This area is accessible.

Chemicals used in this operational feature include diesel fuel, gasoline, and degreaser solvents stored in the USTs and/or used in the shops. There are documented records of spills in this area associated with vehicular traffic.[34] For example, in 2015, during sewer line trenching activities, petroleum hydrocarbons were observed between the Cat Shop and the Wood Chip Pile. GP advanced soil borings and collected soil and groundwater samples in the area for analysis of total petroleum hydrocarbons (TPH) in the gasoline range (TPHg), diesel range (TPHd), and heavy oil range (Figures 11a and 11b; Arcadis 2016, Georgia-Pacific Consumer Operations LLC 2016). Approximately 20 cubic yards (CY) of soil containing petroleum hydrocarbons were removed and disposed of off-site.

COPCs associated with operations and/or documented spills/releases include metals, petroleum hydrocarbons, and volatile organic compounds (VOCs)[35] related to solvent use. See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of petroleum hydrocarbons, metals, and VOCs in groundwater • Presence of petroleum hydrocarbons, metals, and VOCs in soil

[34] The following spills documented in Appendix A of the AO occurred in this area: June 30, 1999, and July 1, 1999.

[35] Specific VOC analytes are listed in the SAP/QAPP provided as Appendix A.

3.5.2 MOU-B: Main Mill Area–North

MMA–North (MOU-B) is located south of NW 6th Avenue and north of the railroad tracks. It encompasses six OAs: Pulping, Power House, Bleaching, Finishing/Coatings, Specialty Minerals, and Warehouse/Product Storage.

Image 4: Aerial imagery of MOU-B

3.5.2.1 OA-B1: Pulping

Operational features in OA-B1 are presented in the following sections. Process wastewater and stormwater in this OA is collected by the K6, K7, acid, and process sewers (see Figure 7 for approximate coverage areas) and conveyed to the WWTP for treatment.

Kraft Mill

The Kraft Mill was part of the Kraft pulping process. Structures remain in this area, including the Kraft Mill; however, operation of the Kraft Mill ceased in April 2018, and this area is inactive. RI activities will be limited while the existing structures remain due to the density of structures and below-grade features (e.g., basements and utilities). As changes in operations and/or demolition activities allow for safe access in the future, RI activities will be proposed.

Chemicals used in this operational feature include white liquor for cooking wood chips during the chemical pulping. There are documented records of black liquor spills (spent cooking chemicals) in this area. In 2014, in response to an observed release of black liquor at the Kraft Mill, GP completed three borings and monitored pH in groundwater encountered (Figures 11a and 11b; Arcadis 2015). No further action was recommended after the investigation.

COPCs associated with operations and/or documented spills/releases at the Kraft Mill include sulfur, sodium, metals, and petroleum hydrocarbons. See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of metals, petroleum hydrocarbons, sulfur, and sodium in groundwater • Current pH of groundwater (as an indicator for black liquor)

Black Liquor Area

ASTs storing black liquor located in this area supported the nearby Kraft Mill. This area is inactive. Black liquor storage ASTs and a green liquor clarifier remain but are included in the demolition plans being considered. RI activities will be limited while the existing structures remain due to the density of structures and below-grade features (e.g., basements, utilities). As changes in operations and/or demolition activities allow for safe access in the future, RI activities will be proposed.

Chemicals in this operational feature include inorganic components of black liquor and green liquor. There are documented records of black liquor releases and K6 sewer spills in this area.[36] An investigation was completed in response to an observed release of black liquor in the No. 4 swing tank area in August 2011. Three borings were advanced; soil cores were tested for pH, a groundwater grab sample was collected (where encountered), and a pH and conductivity measurement were collected (Figures 11a and 11b). Based on the findings of the investigation, no additional actions were recommended (Arcadis 2012). In 2018, there was a black liquor release of 154,000 gallons from an AST. Spilled liquids were diverted to the process sewer for treatment by the WWTP and bulk material that could be collected was disposed of off-site (Georgia-Pacific Consumer Operations LLC 2018c, 2018d).

COPCs associated with operations and/or documented spills/releases include petroleum hydrocarbons, metals, sulfur, and sodium. See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of petroleum hydrocarbons, metals, sulfur, and sodium in groundwater

[36] The following spills documented in Appendix A of the AO occurred in this area: October 10, 2014, April 21, 2014, September 18, 2012, August 26, 2011, September 22, 2002, August 2, 2001, May 15, 2001, July 7, 2000, May 8, 2000, December 7, 1998, and October 22, 1997.

	• Current pH of groundwater (as an indicator for black liquor) • Presence of petroleum hydrocarbons, metals, sulfur, and sodium in soil

Former Bag Factory

Constructed in 1906, the Former Bag Factory produced paper bags until it was demolished, and the Pulp Mill (OA-B1) was constructed during the Mill Modernization Project (1981 to 1984). This area is inactive. Existing structures in this area include the Pulp Mill and multiple ASTs, which are empty and out of service. RI activities will be limited while the existing structures remain due to the density of structures and below-grade features (e.g., basements, utilities). As changes in operations and/or demolition activities allow for safe access in the future, RI activities will be proposed.

Chemicals used in this operational feature include petroleum hydrocarbons. There are documented records of a black liquor release at the aboveground Filtrate Tank No. 2.[37] Mill staff observed liquid seeping from the base of one of the filtrate ASTs and subsequently observed weak black liquor in the underlying engineered fill material within the tank ringwall. GP excavated soil to approximately 1.5 feet bgs within the ringwall and pumped the encountered liquid to the WWTP for treatment. Weak black liquor leaks were then observed in two additional filtrate ASTs, which were contained by the concrete pad and discharged to the process sewer for treatment at the WWTP. Buildings, structures, and utilities (above and belowground) are dense in this area, and soil borings were advanced where feasible to monitor pH and conductivity (Figures 11a and 11b). Measurements were also taken in Blue Creek upgradient and downgradient of the filtrate tank area. The investigation concluded that soils in the saturated zone, groundwater, and Blue Creek had not been impacted by the filtrate tank release. (Arcadis 2011a, 2011b).

COPCs associated with operations and/or documented spills/releases include petroleum hydrocarbons, metals, sulfur, and sodium. See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of petroleum hydrocarbons, metals, sulfur, and sodium in groundwater • Current pH of groundwater (as an indicator for black liquor)

[37] The following spills documented in Appendix A of the AO occurred in this area: April 21, 2011.

Former Sulfite Mill

The Former Sulfite Mill was part of the sulfite pulping process. This area is inactive. The Former Sulfite Mill was demolished during the Mill Modernization Project (1981 to 1984). Existing structures include an electrical and instrumentation shop, compressor building, and ASTs. RI activities will be limited while the existing structures remain due to the density of structures and below-grade features (e.g., basements, utilities). As changes in operations and/or demolition activities allow for safe access in the future, RI activities will be proposed.

Chemicals used in this operational feature include sulfurous acid (sulfur dioxide dissolved in water). There is a record of a weak black liquor spill in this area.[38] Investigation and/or cleanup activities were completed as part of the original spill response. Some soils were excavated during demolition and disposed in the Mill Modernization Debris Area (in OA-C2).

COPCs associated with operations and/or documented spills/releases include petroleum hydrocarbons, metals, and sulfur. See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of petroleum hydrocarbons, metals, and sulfur in groundwater • Presence of petroleum hydrocarbons, metals, and sulfur in soil

[38] The following spills documented in Appendix A of the AO occurred in this area: April 21, 2013.

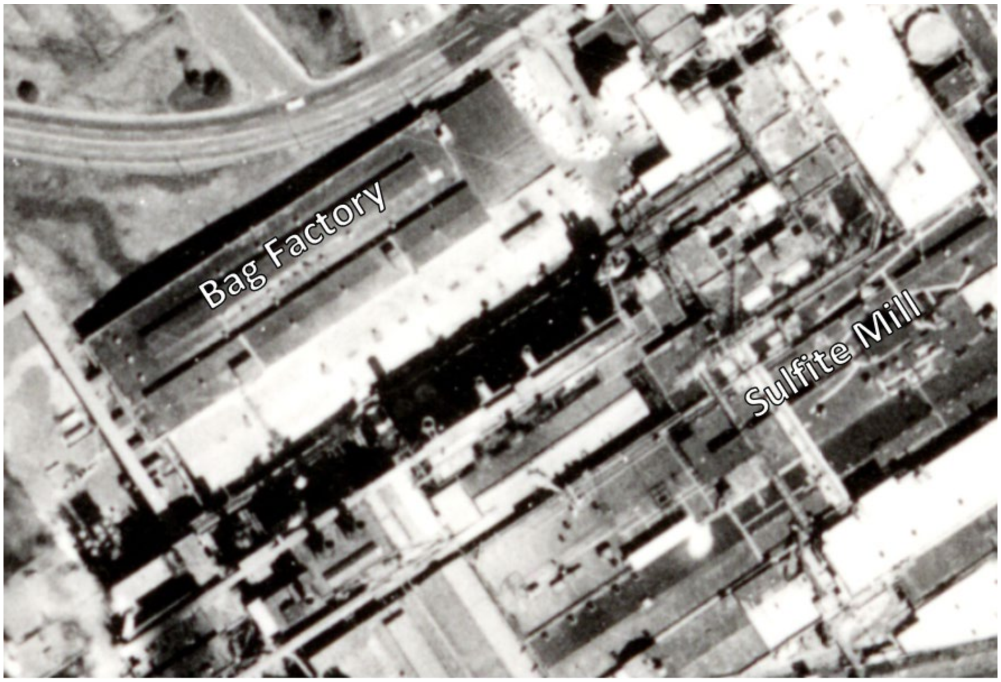

Image 5: Aerial imagery from 1973 showing the Former Bag Factory and Former Sulfite Mill

Lime Kiln

The Lime Kiln was part of the chemical recovery process for the Kraft pulping operations. A natural gas pipeline and a fuel oil pipeline delivered to machinery at the eastern area of the Lime Kiln (Recaust Area). This area is inactive, and the Lime Kiln structure has been demolished. The area is anticipated to be accessible.

Chemicals used in this operational feature include green liquor and lime mud. There are documented records of lime mud and green liquor spills in this area.[39] Lime mud primarily consists of calcium carbonate with trace amounts of other minerals; residual lime mud (calcium carbonate) from spills to land is not considered to present a threat to human health or the environment. Investigation and/or cleanup activities were completed as part of the original spill response.

COPCs associated with operations and/or documented spills/releases in this area include petroleum hydrocarbons and metals. PAHs, benzene, toluene, ethylbenzene and total xylenes (BTEX), and naphthalene are also COPCs per Table 830-1 (in WAC 173-340-900). See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions

[39] The following spills documented in Appendix A of the AO occurred in this area: May 5, 1999.

	• Presence of petroleum hydrocarbons, metals, PAHs, BTEX, and naphthalene in groundwater • Presence of petroleum hydrocarbons, metals, PAHs, BTEX, and naphthalene in soil

No. 5 Power Boiler

The No. 5 Power Boiler is north of the Black Liquor Area and near the northern entrance to the Mill. The No. 5 Power Boiler used fuel oil and was supplied by the fuel oil pipeline. There are no known spills or previous investigations in this area.

The No. 5 Power Boiler is currently inactive. It was shut down in April 2021, and the natural gas and steam lines were disconnected in September 2021 (Georgia-Pacific Consumer Operations LLC 2021). Existing equipment includes two liquid-filled non-polychlorinated biphenyl (PCB) transformer units (186 gallons each) and two pieces of oil-filled electrical equipment (OFEE) containing 55 and 80 gallons of lube oil and hydraulic oil, respectively.

Chemicals used in this operational feature include the Power Boiler fuel (fuel oil) as well as petroleum hydrocarbons associated with operation of the machinery within the power boiler. COPCs include petroleum hydrocarbons and metals. BTEX, PAHs, naphthalene, and PCBs are also COPCs per Table 830-1 (in WAC 173-340-900).

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of petroleum hydrocarbons, metals, BTEX, PAHs, naphthalene, and PCBs in groundwater

No. 6 Substation

The No. 6 Substation is west of the Lime Kiln. Based on historical aerials, it was constructed between 1966 and 1968. Existing equipment includes three liquid-filled non-PCB transformer units (<50 parts per million [ppm] PCB;[40] 1,590 gallons, 1,140 gallons, and 2,429 gallons) and 10 OFEE containing between 200 to 300 gallons of oil each. There are no known spills or previous investigations in this area.

COPCs include petroleum hydrocarbons, metals, and PCBs. The equipment in this substation is routinely monitored in accordance with the SPCC Plan (see Section 3.3). This substation is active;

[40] In accordance with 40 CFR 761.180, Camas maintains a log of PCB-containing containers, transformers, and/or large capacitors at the Mill (see Appendix E).

only non-invasive activities will be proposed while the substation is active. Geology/hydrogeology information will be obtained in nearby operational features to avoid invasive activities (see Section 5). The No. 6 Substation is slated for decommissioning; if it has been decommissioned prior to the start of field activities, invasive activities (e.g., surface soil sampling) will be included in the field scope of work.

Initial Data Gaps in Accessible Areas	• Presence of petroleum hydrocarbons, metals, and PCBs in shallow soil

No. 8 Substation

The No. 8 Substation is north of the Former Bag Factory. Existing equipment includes four non-PCB transformer units (5,935 gallons, 2,700 gallons, 1,934 gallons, and 3,060 gallons) and three OFEE containing 363 gallons of oil each. There are no known spills or previous investigations in this area.

COPCs include petroleum hydrocarbons, metals, and PCBs. The equipment in this substation is routinely monitored in accordance with the SPCC Plan (see Section 3.3). This substation is active; only non-invasive activities will be proposed while the substation is active. Geology/hydrogeology information will be obtained in nearby operational features to avoid invasive activities (see Section 5). The No. 8 Substation is slated for decommissioning; if it has been decommissioned prior to the start of field activities, invasive activities (e.g., surface soil sampling) will be included in the field scope of work.

Initial Data Gaps in Accessible Areas	• Presence of petroleum hydrocarbons, metals, and PCBs in shallow soil

3.5.2.2 OA-B2: Power House

The Power House in MOU-B is the only operational feature in OA-B2. As described in Section 3.2, there were multiple Power Boilers in this area, but they are not operational. There are pipelines (above and belowground) for the K6, acid, and process sewers in this area. Blue Creek flows in an underground pipe through this approximate area. The Power House is now inactive. There are existing ASTs, including three 3,500-gallon lube oil ASTs, one 80-gallon hydraulic oil AST, and one 55-gallon diesel fuel AST; most tanks are empty and out of service. RI activities will be limited while the existing structures remain due to the density of structures and below-grade features (e.g., basements, utilities). As changes in operations and/or demolition activities allow for safe access in the future, RI activities will be proposed.

Chemicals used in this operational feature include the Power Boiler fuel (hog fuel, fuel oil, and natural gas), as well as petroleum hydrocarbons associated with operation of the machinery within the steam plant. There are documented records of oil releases in this area.[41] Soils containing petroleum hydrocarbons were observed during the Mill Modernization Project (1981 to 1984) and at least in part, were reportedly removed and disposed in an area near the south Mill office.

COPCs associated with operations and/or documented spills/releases include petroleum hydrocarbons and metals. PCBs and PAHs are also COPCs per Table 830-1 (in WAC 173-340-900) due to the presence of heavy oil such as lube oil and hydraulic fluid. This area is inaccessible for RI activities at this time; if changes in operations and/or completion of demolition activities result in a dynamic and/or inaccessible area becoming static and accessible in the future, RI activities will be assessed. See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of metals, PCBs, PAHs, and residual petroleum hydrocarbons in groundwater

3.5.2.3 OA-B3: Bleaching

Operational features in OA-B3 are presented in the following sections. Process wastewater and stormwater in this area is collected by the process and acid sewers and then conveyed to the WWTP for treatment.

Kraft Pulp Bleaching

Pulp from the Kraft Mill was bleached in this area. When the Mill transitioned from elemental chlorine to ECF, this building was repurposed to house the R8 Chlorine Dioxide Plant, which produced chlorine dioxide. This area is inactive. RI activities will be limited while the existing structures remain due to the density of structures and below-grade features (e.g., basements, utilities). As changes in operations and/or demolition activities allow for safe access in the future, RI activities will be proposed.

Chemicals used in this operational feature include chlorine, sulfuric acid, methanol, and sodium chlorate. There are documented records of pulp and wastewater spills in this area. Investigation and/or cleanup activities were completed as part of the original spill response.

COPCs associated with operations and/or documented spills/releases include petroleum hydrocarbons, dioxins/furans (related to wastewater releases), and metals. This area is inaccessible for RI activities at this time; if changes in operations and/or completion of demolition activities

[41] The following spills documented in Appendix A of the AO occurred near this area: September 26, 2015.

result in a dynamic and/or inaccessible area becoming static and accessible in the future, RI activities will be assessed. See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of petroleum hydrocarbons, dioxins/furans, and metals (including chromium) in groundwater

Sulfite Pulp Bleaching

Pulp from the Sulfite Mill was bleached in this area. One out-of-service 150-gallon AST that formerly contained oil remains. The Outside Repulper is now located in this area and is still active. RI activities will be limited while the existing structures remain due to the density of structures and below-grade features (e.g., basements, utilities). As changes in operations and/or demolition activities allow for safe access in the future, RI activities will be proposed.

Chemicals used in this operational feature include chlorine, hypochlorite, and hydrogen peroxide. There are no records of notable spills in this area.

COPCs associated with operations include metals, dioxins/furans, and petroleum hydrocarbons. See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of petroleum hydrocarbons, dioxins/furans, and metals in groundwater

K5 Bleach Plant

The K5 Bleach Plant bleached pulp using ECF. This area is inactive. One out-of-service 55-gallon AST that formerly contained lube oil remains. RI activities will be limited while the existing structures remain due to the density of structures and below-grade features (e.g., basements, utilities). As changes in operations and/or demolition activities allow for safe access in the future, RI activities will be proposed.

Chemicals used in this operational feature include chlorine dioxide. There are no records of notable spills in this area.

COPCs associated with operations include metals, dioxins/furans, and petroleum hydrocarbons. PCBs are also a COPC per Table 830-1 (in WAC 173-340-900) due to the presence of heavy oil such as lube oil. This area is inaccessible for RI activities at this time; if changes in operations and/or completion of demolition activities result in a dynamic and/or inaccessible area becoming static and accessible in the future, RI activities will be assessed. See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of petroleum hydrocarbons, PCBs, dioxins/furans, and metals in groundwater

K4 Bleach Plant

The K4 Bleach Plant bleached pulp for the Mill. This area is inactive. Two 60-gallon oil ASTs have been removed from this area. RI activities will be limited while the existing structures remain due to the density of structures and below-grade features (e.g., basements, utilities). As changes in operations and/or demolition activities allow for safe access in the future, RI activities will be proposed.

Chemicals used in this operational feature include chlorine, sodium chlorate, sodium dichromate, and hydrochloric acid. There are documented records of sodium chlorate, sodium dichromate, and hydrochloric acid releases in this area.[42] Investigation and/or cleanup activities were completed as part of the original spill response.

COPCs associated with operations and/or documented spills/releases include petroleum hydrocarbons, PCBs, dioxins/furans, and metals. This area is inaccessible for RI activities at this time; if changes in operations and/or completion of demolition activities result in a dynamic and/or inaccessible area becoming static and accessible in the future, RI activities will be assessed. See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of petroleum hydrocarbons, PCBs, dioxins/furans, and metals (including chromium) in groundwater • Current pH of groundwater

[42] The following spills documented in Appendix A of the AO occurred in this area: February 7, 2002.

No. 1 Substation

The No. 1 Substation is on the eastern side of OA-B3. Existing equipment includes two liquid-filled non-PCB transformer units (<50 ppm PCB; 1,885 gallons and 2,309 gallons) and four OFEE containing 363 gallons of oil each. There are no known spills or previous investigations in this area.

COPCs include metals, petroleum hydrocarbons and PCBs. The equipment in this substation is routinely monitored in accordance with the SPCC Plan (see Section 3.3). This substation is active; only non-invasive activities will be proposed while the substation is active. Geology/hydrogeology information will be obtained in nearby operational features to avoid invasive activities (see Section 5).

Initial Data Gaps in Accessible Areas	• Presence of petroleum hydrocarbons, metals, and PCBs in shallow soil

3.5.2.4 OA-B4: Finishing/Coatings–North

Operational features in OA-B4 are presented in the following sections. Process wastewater and stormwater in this operational area is collected by the K6, K7, acid, and process sewers (see Figure 7 for approximate coverage areas) and conveyed to the WWTP for treatment.

Paper Treatment

The area is inactive, but paper treatment operations were previously completed in this area. The buildings that housed the former paper treatment operation are still present. RI activities will be limited while the existing structures remain due to the density of structures and below-grade features (e.g., basements, utilities). As changes in operations and/or demolition activities allow for safe access in the future, RI activities will be proposed.

Chemicals used in this operational feature include diphenyl, ethoxyquin, PFAS, and copper carbonate. There are no records of spills in this area.

COPCs associated with operations include petroleum hydrocarbons, diphenyl, PFAS, and metals. See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of petroleum hydrocarbons, diphenyl, PFAS, and metals (including copper) in groundwater • Presence of petroleum hydrocarbons, diphenyl, PFAS, and metals (including copper) in soil

Machine Shop

The Machine Shop was used to produce various parts for machinery used throughout the Mill. In order to support the war effort, the Machine Shop was converted to produce rudders for Liberty Ships during World War II. This area is inactive. The buildings that housed the former Machine Shop are still present. RI activities will be limited while the existing structures remain due to the density of structures and below-grade features (e.g., basements, utilities). As changes in operations and/or demolition activities allow for safe access in the future, RI activities will be proposed.

Chemicals used in this operational feature include oils and solvents. There are no records of spills in this area.

COPCs associated with operations include petroleum hydrocarbons, metals, and VOCs. PCBs are also a COPC per Table 830-1 (in WAC 173-340-900) due to the presence of heavy oil such as lube oil and hydraulic fluid. This area is inaccessible for RI activities at this time; if changes in operations and/or completion of demolition activities result in a dynamic and/or inaccessible area becoming static and accessible in the future, RI activities will be assessed. See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of petroleum hydrocarbons, PCBs, metals, and VOCs in groundwater

Fuel Oil Day Tank

The Fuel Oil Day Tank is located in the western end of OA-B4, south of the Power House (OA-B2) and the Kraft Mill (OA-B1). The existing 50,400-gallon AST is empty and has been decommissioned and removed from service. This area is inactive. The area is anticipated to be accessible, but access to specific locations may be difficult due to the density of structures.

Fuel oil was stored in the Fuel Oil Day Tank. There are no records of spills in this area; however, fuel oil has been identified in the subsurface. Subsurface impacts were identified during a construction project and subsequently evaluated in 2018 (Figures 11a and 11b; Kennedy Jenks 2018). Approximately 12 CY of soil containing petroleum hydrocarbons were removed . The excavation extended laterally to surrounding foundations or roads, where further removal was infeasible. Visual indicators of petroleum hydrocarbons were observed at approximately 3 feet bgs around the perimeter of the excavation with the exception of the southwestern corner. Petroleum impacts appeared to extend from 3 feet bgs to bedrock at 4 to 5 feet bgs (Kennedy Jenks 2018).

Analytical samples were collected from the four excavation sidewalls at a depth of 2 feet bgs to confirm that petroleum hydrocarbon impacts did not extend above the visibly impacted soil at 3 feet bgs. An additional soil sample was collected from the southwest corner of the excavation sidewall at a depth of 3 feet bgs as visible indicators of petroleum hydrocarbons were not observed in this area. Neither diesel- nor oil-range organics were detected in soil samples at concentrations exceeding the MTCA screening level of 2,000 milligrams per kilogram (mg/kg).

A test pit was dug approximately 25 feet south (presumed downgradient) of the excavation, across the access road, to assess the extent of petroleum hydrocarbon impacts. No visual or olfactory evidence of petroleum hydrocarbons was observed. Groundwater was not encountered. Soil samples were collected at 4.5 and 6 feet bgs. Neither diesel- nor oil-range organics were detected in the soil sample at 4.5 feet bgs, and oil-range organics were detected at a concentration below the MTCA screening level in the sample at 6 feet bgs. Therefore, petroleum hydrocarbon impacts were not observed at a distance of 25 feet from the southern extent of the excavation.

COPCs associated with operations include petroleum hydrocarbons and metals. PAHs, BTEX, and naphthalene are also COPCs per Table 830-1 (in WAC 173-340-900). See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of petroleum hydrocarbons, BTEX, PAHs, naphthalene, and metals in groundwater • Presence of petroleum hydrocarbons, BTEX, PAHs, naphthalene, and metals in soil

No. 5 Substation

The No. 5 Substation is south of the Machine Shop. Existing equipment includes six liquid-filled non-PCB transformer units (<50 ppm PCB; approximately 1,000 gallons each; one spare being stored, not used), two non-PCB transformer units (2,285 gallons and 2,935 gallons), and six OFEE containing 363 gallons of oil each. There are no known spills or previous investigations in this area.

COPCs include petroleum hydrocarbons, metals, and PCBs. The equipment in this substation is routinely monitored in accordance with the SPCC Plan (see Section 3.3). This substation is active; only non-invasive activities will be proposed while the substation is active. Geology/hydrogeology information will be obtained in nearby operational features to avoid invasive activities (see Section 5).

Initial Data Gaps in Accessible Areas	• Presence of petroleum hydrocarbons, metals, and PCBs in shallow soil

3.5.2.5 OA-B5: Specialty Minerals

The Mill leased property in the western portion of the Mill Property to Specialty Minerals, Inc. The area is inactive and has been demolished.

The Specialty Minerals operation produced precipitated calcium carbonate ($CaCO_3$) for use as a paper whitener at No. 20 Paper Machine. There are no records of spills in this area.

There are no COPCs associated with operations or documented spills/releases in this area. See Section 3.3 for information regarding ongoing monitoring programs that include this area.

3.5.2.6 OA-B6: Warehouse/Product Storage – North

This operational area is in the northwestern portion of the Mill Property and was historically used for product storage. There are no known chemical usages, reported spills or releases, or current operations in this OA.

3.5.3 MOU-C: Main Mill Area – South

The Main Mill Area–South (MOU-C) is located between the railroad tracks and the Camas Slough. It encompasses five operational areas which included finishing, coating, product storage, and operational support activities.

Image 6: Aerial imagery of MOU-C

3.5.3.1 OA-C1: Finishing/Coatings/Additives–South

Operational features in OA-C1 are presented in the following sections. Process wastewater and stormwater in this operational area is collected by the K6 sewer, the acid sewer, and the process sewer (see Figure 7 for approximate coverage areas) and conveyed to the WWTP for treatment.

Fuel Oil Storage

Historically, this area contained ASTs which stored fuel oil to support mill operations. There is one existing fuel oil AST (No. 5 Storage Tank) located near the Camas Slough between the Dock Warehouse and the No. 20 Paper Machine. The existing No. 5 Storage Tank is empty and has been removed from service. The original capacity of the No. 5 Storage Tank was 1,680,000 gallons; in 2003, the tank was modified, and the capacity reduced to 719,000 gallons. Previously, there were four fuel oil storage tanks in the vicinity of present-day No. 20 Paper Machine (seen in Image 7). One of these tanks was demolished prior to 1950 and the remaining three were demolished during the Mill Modernization Project (1981 to 1984). The eastern portion of this area, near and at the No. 20 Paper Machine, is currently inaccessible due to ongoing operations.

Chemicals used in this operational feature include the fuel oil stored in tanks. There are no records of spills in this area; however, fuel oil has been discovered in the subsurface. A field investigation was completed when suspected petroleum hydrocarbons were observed during excavation activities associated with equipment installation (Kennedy Jenks 2020). No evidence of an active release was observed. Six soil samples were collected from the excavation area and analyzed for Northwest total petroleum hydrocarbons as diesel and oil extended (NWTPH-Dx; without silica gel cleanup); BTEX, naphthalene, and PAHs (Figures 11a and 11b). Eight additional soil samples were collected after the excavation was completed and analyzed for NWTPH-Dx (without silica gel cleanup), BTEX, naphthalene, and PAHs. After agreement with Ecology, the excavation was backfilled.

COPCs associated with operations include petroleum hydrocarbons and metals. PAHs, BTEX, and naphthalene are also COPCs per Table 830-1 (in WAC 173-340-900).

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of metals, petroleum hydrocarbons, PAHs, BTEX, and naphthalene in groundwater • Presence of metals, residual petroleum hydrocarbons, PAHs, BTEX, and naphthalene in soil

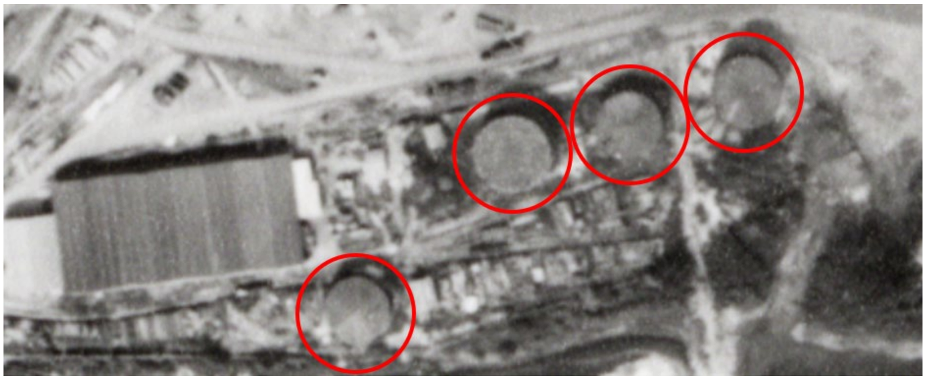

Image 7: Aerial imagery from 1948 showing four historical fuel oil storage tanks

Additives/Coatings

This area of the Mill was used to store and apply specialty chemicals used to manufacture specific paper products. This area is still active, including ASTs and Boiler No. 6. Existing structures in this area include buildings that house converting machinery, a storeroom, and finishing operations. There are also reclaim tanks along the northern boundary of these buildings and 20 existing 275-gallon oil ASTs. Based on historical aerials, structures in the northern portion of OA-C1 existed at least as early as 1948. Boiler No. 6 was recently installed in 2020. This area is inaccessible due to ongoing operations.

Chemicals used in this operational feature include petroleum hydrocarbons. There are no records of notable spills in this area.

COPCs associated with operations include petroleum hydrocarbons and metals. PCBs are also a COPC per Table 830-1 (in WAC 173-340-900) due to the presence of heavy oil such as lube oil and hydraulic fluid. See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of petroleum hydrocarbons, metals, and PCBs in groundwater • Presence of petroleum hydrocarbons, metals, and PCBs in soil

Converting

This area of the Mill was used for Converting and is still active. Existing structures include buildings that house a Converting plant and associated electrical and instrumentation rooms and mechanical shop, two Converting annexes, reject paper storage, and baling operations. Based on historical aerials, the Converting buildings existed at least as early as 1948. There are no known former structures in this area that do not currently exist. This area is inaccessible due to ongoing operations.

Chemicals used in this operational feature include petroleum hydrocarbons and glues. There are no records of spills in this area.

COPCs associated with operations include petroleum hydrocarbons, metals, and VOCs. See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of petroleum hydrocarbons, metals, and VOCs in groundwater

No. 9 Substation

The No. 9 Substation is west of the Effluent Pump Station. Existing equipment includes three non-PCB transformer units (two 1,934 gallons each, one 3,060 gallons) and three OFEE containing 363 gallons of oil each. There are no known spills or previous investigations in this area.

COPCs include petroleum hydrocarbons, metals, and PCBs. The equipment in this substation is routinely monitored in accordance with the SPCC Plan (see Section 3.3). This substation is active; only non-invasive activities will be proposed while the substation is active. Geology/hydrogeology information will be obtained in nearby operational features to avoid invasive activities(see Section 5).

Initial Data Gaps in Accessible Areas	• Presence of petroleum hydrocarbons, metals, and PCBs in shallow soil

3.5.3.2 OA-C2: Warehouse/Product Storage – South

Operational features in OA-C2 are presented in the following sections. Process wastewater and stormwater in this operational area is collected by the process sewer (see Figure 7 for approximate coverage areas) and conveyed to WWTP for treatment.

Mill Modernization Debris Area

During the Mill Modernization Project (1981 to 1984), soil and demolition debris from the former Sulfite Mill and Bag Factory were placed to create a parking area and then covered with asphalt. Differential settlement in the parking area has caused the asphalt surface to be uneven. This area is still active. There is an existing structure in this area that is included in the demolition plans being considered. There are no known former structures in this area that do not currently exist. This area is expected to be accessible.

There are no known chemicals used for operations in this operational feature. There are also no records of spills in this area.

COPCs associated with debris underlying the asphalt surface include petroleum hydrocarbons, VOCs, semi-volatile organic compounds (SVOCs), PCBs, dioxins/furans, PFAS, and metals. The nature and extent of buried materials will be evaluated using non-invasive methods prior to proceeding with invasive sampling activities. When the materials can be safely accessed, an accredited inspector will evaluate buried materials for hazardous content, such as asbestos. See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Extent of buried materials • Presence of petroleum hydrocarbons, VOCs, SVOCs (including PAHs), dioxins/furans, PFAS, PCBs, and metals in groundwater • Presence of hazardous building materials (e.g., asbestos)

No. 2 Substation

The No. 2 Substation is on the western side of the Mill Modernization Debris Area and may extend into the Mill Modernization Debris Area. Existing equipment includes four liquid-filled non-PCB transformer units (<50 ppm PCB; three 1,305 gallons and one 1,237 gallons). There are no known spills or previous investigations in this area.

COPCs include petroleum hydrocarbons, metals, and PCBs. The equipment in this substation is routinely monitored in accordance with the SPCC Plan (see Section 3.3). This substation is active; only non-invasive activities will be proposed while the substation is active. Geology/hydrogeology information will be obtained in nearby operational features to avoid invasive activities (see Section 5).

Initial Data Gaps in Accessible Areas	• Presence of petroleum hydrocarbons, metals, and PCBs in shallow soil

Buried Material Area

The Sheeter Building was built on the closed inert waste landfill during the Mill Modernization project (1981 to 1984). Interviews with staff confirmed uncovering trash, debris, and other materials while excavating for construction of the Sheeter Building. Historical aerial imagery identifies locations of other possible buried materials and a waste incinerator (seen in Image 8) near the present-day Sheeter Building. This area is still active. Existing structures in this area include the Sheeter Building (now called the "Will II" building and currently used for storage), a Mobile Maintenance Shop, and a salvage yard. There is one existing 500-gallon AST that formerly contained lube oil but is now empty and has been removed from service. There were three known USTs near the Mobile Maintenance Shop (adjacent to the Sheeter Building): a 12,000-gallon gasoline UST, a 1,000-gallon gasoline UST, and a 150-gallon UST, which was part of a spill containment/oil separation system. These three USTs have been removed.

An approximately 1.5-acre closed inert waste landfill is located to the east of the Sheeter Building (see Figure 11a). When it was active, the inert waste landfill accepted hog fuel boiler bottom ash and inert construction debris (e.g., aggregate, asphalt, brick, concrete, gravel, sand, and tile). Chemicals, garbage, lime mud, wood waste, paper, hazardous waste, sludge, and other wastes were prohibited. The inert waste landfill was formally closed in 1999 (Fort James Camas LLC 1999b). There was a waste incinerator in the southeastern corner of this area and waste was stockpiled in the southwestern corner (see Image 8 below). The incinerator was reportedly used to burn paper waste generated at the Mill. This area is inaccessible due to ongoing operations.

Chemicals used in this operational feature include petroleum hydrocarbons. There are no records of spills in this area. Excavation activities were completed in the Buried Materials Area during construction of the Sheeter Building. The three USTs in this area near the Mobile Maintenance Shop have been removed. COPCs in this area are related to potential buried materials, as well as the former USTs.

COPCs associated with buried materials include petroleum hydrocarbons, VOCs (including 1,2-dibromoethane and 1,2-dichloroethane), SVOCs (including PAHs), BTEX, methyl tertiary-butyl ether (MTBE), PCBs, dioxins/furans, PFAS, and metals (including total lead). The nature and extent of buried materials will be evaluated using non-invasive methods prior to proceeding with invasive sampling activities. When they can be safely accessed, an accredited inspector will evaluate buried materials for hazardous materials, such as asbestos. See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Extent of buried materials • Presence of petroleum hydrocarbons, VOCs (including 1,2-dibromoethane and 1,2-dichloroethane), SVOCs (including PAHs), BTEX, MTBE, PFAS, PCBs,

	dioxins/furans, and metals (including total lead) in groundwater • Presence of petroleum hydrocarbons, VOCs (including 1,2_dibromoethane and 1,2-dichloroethane), SVOCs (including PAHs), BTEX, MTBE, PFAS, PCBs, dioxins/furans, and metals (including total lead) in soil • Presence of hazardous building materials (e.g., asbestos)

Image 8: Aerial imagery from 1968 showing waste incinerator

MERT Storage Building

The Mill Emergency Response Team (MERT) Storage Building is north of the Mill Modernization Debris Area and is used for equipment storage, including aqueous firefighting foams. This is the only current or previous storage location for firefighting foams that has been identified. There are no known spills or previous investigations in this area.

COPCs include PFAS, petroleum hydrocarbons, and metals. The MERT Storage Building is part of active and ongoing Mill operations.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of PFAS, petroleum hydrocarbons, and metals in groundwater

	• Presence of PFAS, petroleum hydrocarbons, and metals in soil

3.5.3.3 OA-C3: Operational Support

The Operational Support area serves the Mill, including waste and product storage and fueling. Operational features in OA-C3 are presented in the following sections. Process wastewater and stormwater in this operational area is collected by the K7 sewer and conveyed to the WWTP for treatment (see Figure 7 for approximate coverage areas).

Waste Handling Area and Fueling Station

This operational feature is currently an active Waste Handling Area. Used and clean oil along with dangerous wastes and miscellaneous wastes, such as waste solvent and paint, are stored in aboveground totes and other containers in this area. There is also a fueling station in the eastern end of this area with a 5,000-gallon gasoline AST and a 1,000-gallon diesel AST, and three existing structures (two existing covered sheds and a garage). This area is inaccessible due to ongoing operations.

Chemicals used in this operational feature include gasoline and diesel for fueling operations. There are no records of spills in this area; however, petroleum hydrocarbons were identified east of the fueling station during drilling operations for a utility pole installation in 2018 (Figure 11a). Diesel-range and heavy oil hydrocarbons were present in water samples collected from the boring installed to receive the utility pole (Kennedy Jenks 2019).

COPCs associated with operations include petroleum hydrocarbons, metals, and VOCs. See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of petroleum hydrocarbons, metals, and VOCs in groundwater

Car Barn, Paint Shop, and UST Area

The Car Barn and Paint Shop were used to store drums and totes of oil and solvents. The Car Barn and Paint Shop buildings are still present. There were three known USTs near the Car Barn: a 10,000-gallon gasoline UST, a 1,000-gallon gasoline UST, and a 300-gallon UST containing thinner solvent. The tanks were removed in the mid-1980s. This area is inaccessible due to ongoing operations.

Chemicals used in this operational feature include petroleum hydrocarbons and solvents. There are no records of spills in this area.

COPCs associated with operations include petroleum hydrocarbons, metals, and VOCs. See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of petroleum hydrocarbons, metals, and VOCs in groundwater

Former Sulfur Pile

When the Mill used the sulfite pulping process, sulfur was stored in an outdoor pile in this location. There are no existing or former structures in this area. This area is accessible.

Chemicals used in this operational feature include stockpiled sulfur. There are records of hydraulic oil spills in this area.[43] In 1999, less than 1 gallon of hydraulic oil was released, and absorbent media were deployed (Fort James Camas LLC 1999a). In 2006, approximately 60 gallons of hydraulic oil reportedly spilled and contacted bare ground. In response, absorbent media was deployed, and the impacted soil was excavated and disposed of (Fort James Camas LLC 2006).

COPCs associated with operations and/or documented spills/releases include petroleum hydrocarbons, metals, and sulfur. PCBs are also a COPC per Table 830-1 (in WAC 173-340-900) due to the documented release of hydraulic fluid. See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of petroleum hydrocarbons, metals, PCBs, and sulfur in groundwater • Presence of petroleum hydrocarbons, metals, PCBs, and sulfur in soil

3.5.3.4 OA-C4: Pump Houses

Operational features in OA-C4 are presented in the following sections.

[43] The following spills documented in Appendix A of the AO occurred in this area: March 6, 2006, and January 17, 1999.

Riverbank Pump House

The Riverbank Pump House on the banks of the Camas Slough supplies water for the Mill's fire suppression system. There was previously an 850-gallon diesel AST to support the former diesel pump; the diesel pump has been replaced with an electric pump, and diesel is no longer stored in this area. This area is still active and is inaccessible due to ongoing operations.

Chemicals used in this operational feature include diesel for the pumps. Diesel releases from the AST and equipment have occurred in this location onto the bank and to the slough.[44] In February 2017, oil sheen was observed in Camas Slough (Georgia-Pacific Consumer Operations LLC 2017a). The source was a diesel leak at the Riverbank Pump House. Oil absorbent equipment (booms, sweeps, and socks) were deployed, the contents of the concrete vault containment for the leaking tank were pumped out, and the pump engine system was disconnected. Approximately 600 cubic feet of diesel-contaminated soil was excavated until diesel was not observed visually or by odor (Georgia-Pacific Consumer Operations LLC 2017b). Six soil samples were collected from the excavation area in August 2017 and analyzed for TPHd organics (Figure 11a); results ranged from 360 mg/kg to 1,800 mg/kg and were below MTCA cleanup level of 2,000 mg/kg. Groundwater was not encountered during excavation activities.

Additional corrective action and repairs were completed after the required permits and approvals were obtained, including decommissioning the diesel pumps at the Riverbank Pump House and replacing with a new electric fire pump (Georgia-Pacific Consumer Operations LLC 2018a, 2018b). A new skid-mounted diesel fire pump and a new diesel emergency generator were also installed within the WWTP collection system; there is no longer diesel stored at the Riverbank Pump House. A new inspection plan was also established for the Riverbank Pump House (Georgia-Pacific Consumer Operations LLC 2018a, 2018b).

COPCs associated with operations and/or documented spills/releases include petroleum hydrocarbons (i.e., diesel fuel) and metals. PAHs and naphthalene are also COPCs per Table 8301 (in WAC 173-340-900). See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of metals, PAHs, naphthalene, and residual petroleum hydrocarbons (diesel fuel) in groundwater • Presence of metals, PAHs, naphthalene, and residual petroleum hydrocarbons (diesel fuel) in soil

[44] The following spills documented in Appendix A of the AO occurred in this area: December 11, 2006, May 7, 2003, and December 26, 1999.

Effluent Pump Station

The Effluent Pump Station on the banks of the Camas Slough pumps the Mill's process wastewater (including the K6 sewer, K7 sewer, and grit sump) to the WWTP on Lady Island. This area is still active. There are no known former structures in this area that do not currently exist. This area is inaccessible due to ongoing operations.

Chemicals used in this operational feature include diesel fuel to feed the backup generator used to run the pump station in case of a power outage. There have been documented releases of wastewater to the bank and to the slough.[45]

COPCs associated with operations and/or documented spills/releases include petroleum hydrocarbons, dioxin/furans, and metals. See Section 3.3 for information regarding ongoing monitoring programs that include this area.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of petroleum hydrocarbons (diesel-range organics), dioxins/furans, and metals in groundwater • Presence of petroleum hydrocarbons (diesel-range organics), dioxins/furans, and metals in soil

3.5.3.5 OA-C5: Wooded Area

The Wooded Area is monitored by the Mill; however, it is not fenced, and access is not controlled. There are no historical or current operational activities, no known spills, and no known chemical usage in this area.

A visual survey and soil investigation via test pits will be conducted as part of this initial stage of the RI.

Initial Data Gaps in Accessible Areas	• Presence of petroleum hydrocarbons, VOCs, PCBs, and metals in soil

[45] The following spills documented in Appendix A of the AO occurred in this area: September 7, 2012, and July 3, 2006.

3.5.3.6 OA-C6: Production Wells

There are 19 production wells, 15 of which are active, that supply up to 7,800 acre-feet per year to the Mill for industrial use. Each well is approximately the same depth and extracts groundwater from the deeper alluvium aquifer. As shown on Figure 10g, the production wells are located northeast of the Wooded Area (OA-C5). There are no known chemical usage, spills, or previous investigations in this area. The production wells are active and continue to operate.

The production wells are manifolded into two large sand filters, located adjacent to the production wells, to reduce sedimentation. Following filtration, water is piped to the Mill in underground pipes. Sampling ports are available on the sand filters, but water quality sampling ports are not currently present on the production wells.

3.5.4 MOU-D: Lady Island

Lady Island (MOU-D) is located between the Camas Slough and the Columbia River. It is partially developed and is traversed by SR 14. The Mill's WWTP is located on Lady Island and consists of a Primary Clarifier constructed in 1968 and two ASBs added in the 1960s and 1970s. Process sewer lines[46] cross the Camas Slough to convey process wastewater from the Main Mill Area to the WWTP (see Figure 7). Prior to installation of pipelines connecting the clarifier to the ASBs, wastewater was conveyed through earthen ditches (see Section 3.5.4.1). A permitted landfill is located west of the Primary Clarifier and is used for management of dewatered wastewater solids.

The WWTP continues to operate and is regulated by the Mill's existing NPDES permit, as well as the LILF permit (see Section 3.3).

3.5.4.1 OA-D1: Wastewater Treatment Plant

Active Landfill

Solids from the Primary Clarifier[47] are dewatered and managed at the LILF, which operates as a limited purpose landfill under the LILF permit. In accordance with the permit, quarterly groundwater monitoring occurs at five monitoring wells. In addition, seep inspections occur annually as part of routine monitoring events; although seeps have been identified previously, seeps have not been identified for the last 6 years (2019–2024). Leachate from this landfill is collected and sent to the WWTP for treatment.[48] The LILF is active and continues to operate as part of the WWTP, making it inaccessible for RI activities.

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[46] Existing pipelines crossing the Camas Slough include both existing and active pipelines (acid sewer and process sewer) as well as existing but abandoned pipelines.

[47] The Primary Clarifier receives flows from the K6 sewer, K7 sewer, and process water sewer.

[48] The following spills documented in Appendix A of the AO occurred in this area: June 25, 1999.

Former Wastewater Ditches

Prior to installation of pipelines connecting the clarifier to the ASBs, wastewater was conveyed through earthen ditches. Based on historical aerials, the ditches are apparent between 1968 and 1970, and conveyed effluent from the Primary Clarifier as well as effluent from the acid sewer to the south ASB and former outfall. The ditches are no longer used and are accessible for RI activities. COPCs include petroleum hydrocarbons, dioxins/furans, PCBs, PFAS, and metals.

Initial Data Gaps in Accessible Areas	• Presence of petroleum hydrocarbons, dioxins/furans, PCBs, PFAS, and metals in shallow soil

Image 9: Aerial imagery from 1973 showing wastewater ditches on Lady Island

Aerated Stabilization Basins

There are two ASBs that are part of the WWTP on Lady Island. The south ASB was constructed in the 1960s, and the north ASB was constructed in 1977 for secondary treatment of wastewater.

The ASBs continue to provide secondary treatment for industrial wastewater treated by the Primary Clarifier and are an active part of Mill treatment processes. ASB conditions will continue to be dynamic and changing, and accumulated solids will continue to be managed through sampling, dredging, and beneficial reuse or disposal in accordance with applicable permits and operations programs. The integrity of the ASBs must also be maintained while they remain active; collecting samples at the ASBs could compromise them. Therefore, RI activities within the ASBs are not proposed by the terms of the AO, but investigations will be completed if the ASBs are removed from mill operations in the future.

Media at the ASBs continue to be monitored in accordance with the Mill's existing NPDES permit monitoring program (see Table 1). Monitoring data is available at Ecology's Water Quality PARIS and in Appendix B.

Monitoring wells are proposed in the vicinity of the ASBs to improve understanding of groundwater flow direction on Lady Island and to monitor groundwater conditions between the ASBs and the Columbia River and Camas Slough while the ASBs remain an active part of mill operations (GRES 2024). Proposed monitoring wells are discussed in Section 5.3.

Primary Clarifier

The Primary Clarifier was constructed in the 1960s and receives flows from the K6 sewer, K7 sewer, and process water sewer.[49] Solids from the Primary Clarifier are dewatered and managed at the LILF (or beneficially reused off-site), and effluent is conveyed from the clarifier to the ASBs. The Primary Clarifier and supporting buildings and equipment continue to operate as part of the WWTP and are regulated by the Mill's existing NPDES permit. This area is inaccessible for RI activities due to ongoing operations.

No. 10 Substation

The No. 10 Substation is south of the Primary Clarifier. Existing equipment includes three non-PCB transformer units (1,160 gallons each) and two OFEE containing 363 gallons of oil each. There are no known spills or previous investigations in this area.

COPCs include petroleum hydrocarbons and PCBs. The equipment in this substation is routinely monitored in accordance with the SPCC Plan (see Section 3.3). This substation is active; only non-invasive activities will be proposed while the substation is active. Geology/hydrogeology information will be obtained in nearby operational features to avoid invasive activities (see Section 5).

Initial Data Gaps in Accessible Areas	• Presence of petroleum hydrocarbons and PCBs in shallow soil

3.5.4.2 OA-D2: Dredge Spoils Area

Dredge sediments from Mill-related dredging activities in Camas Slough are stockpiled in the Dredge Spoils Area on Lady Island, occupying an area of approximately 5 acres (Figure 14b). Figure 10h presents approximate maintenance dredging areas in the Camas Slough. The fill area is separated from the Mill Property by the Camas Slough and is west of the ASBs on Lady Island.

[49] The following spills documented in Appendix A of the AO occurred in this area: October 31, 2015.

Dredged materials are owned by the United States Army Corps of Engineers (USACE). Under USACE and Washington State Department of Fish and Wildlife (DFW) permits, the Mill is allowed to conduct annual maintenance dredging by removing up to 20,000 CY of sediment, totaling no more than 100,000 CY over 5 years. Available sampling results from dredged material are provided in Appendix B. The dredged materials generally consist of sand, silt, gravel, rock, wood, and miscellaneous debris and trash (separated during offloading).

The Dredge Spoils Area[50] consists of two storage piles separated by roadway access to the Camas Slough. Based on a survey completed in September 2014, the final top elevations of the two storage piles are 60 feet (eastern pile) and 95 feet (western pile). The piles are confined by a compacted subgrade of low permeability native clay and topographical features. The piles have been constructed over a four-decade period by placing, shaping, and hydroseeding lifts of dredged materials. The bowl-shaped contour of the current deposit area retains stormwater on the Mill Property.

Maintenance dredging has been performed routinely within the Camas Slough to maintain navigation channels for floating vessels to stage and transport materials associated with mill operations, and to maintain adequate intake flow for the Mill's fire water intake structure. Mill operations scaled back after 2017, and subsequently the annual dredging needs have greatly reduced. Ongoing dredging may be required to maintain functionality of the Mill's emergency fire intake structure, but the Mill no longer completes loading/unloading activities from barges. From 1970 to 2002, approximately 1,930 CY of material was dredged from the Camas Slough annually. Between 2002 and 2021, annual dredging activities have been less consistent, with at least 12 years seeing no dredging activities. In total, approximately 75,000 CY of material have been dredged from the Camas Slough since 2002.

COPCs associated with historical operations include petroleum hydrocarbons, BTEX, naphthalene, PAHs, metals, and PCBs.

Initial Data Gaps in Accessible Areas	• Presence of petroleum hydrocarbons, BTEX, naphthalene, PAHs, metals, dioxins/furans, PFAS, VOCs, SVOCs, and PCBs in dredged materials

[50] On January 25, 2019, Georgia-Pacific Consumer Operations LLC received confirmation from CCPH regarding the Dredge Material Landfill reclassification. Based upon the verbiage in the updated WAC 173-350-020 revisions, the regulations do not cover material from river dredging activities. The Dredge Material Area receives material exclusively from Camas Slough dredging activities. Therefore, the Dredge Material Area is no longer classified as a landfill by CCPH. Pursuant to this WAC rule revision and concurrence from CCPH, and after consultation with Ecology, the Washington solid waste regulations no longer apply.

3.5.5 MOU-E: Ancillary Area

The Ancillary Area (MOU-E) is located near the intersection of NE Adams Street and NE 6th Avenue. It contains a single operational area where former private businesses (unrelated to the Mill) operated.

The Mill acquired multiple properties as it expanded to the north and east, including a former gas station, a former service station, and a former laundromat/dry cleaner. These buildings have been demolished. This area is currently active. Ongoing Mill-related activities include the repulping operation and mill parking areas; however, the former activities in the Ancillary Area will drive RI activities. Limited documentation is available for the former, non-Mill activities.

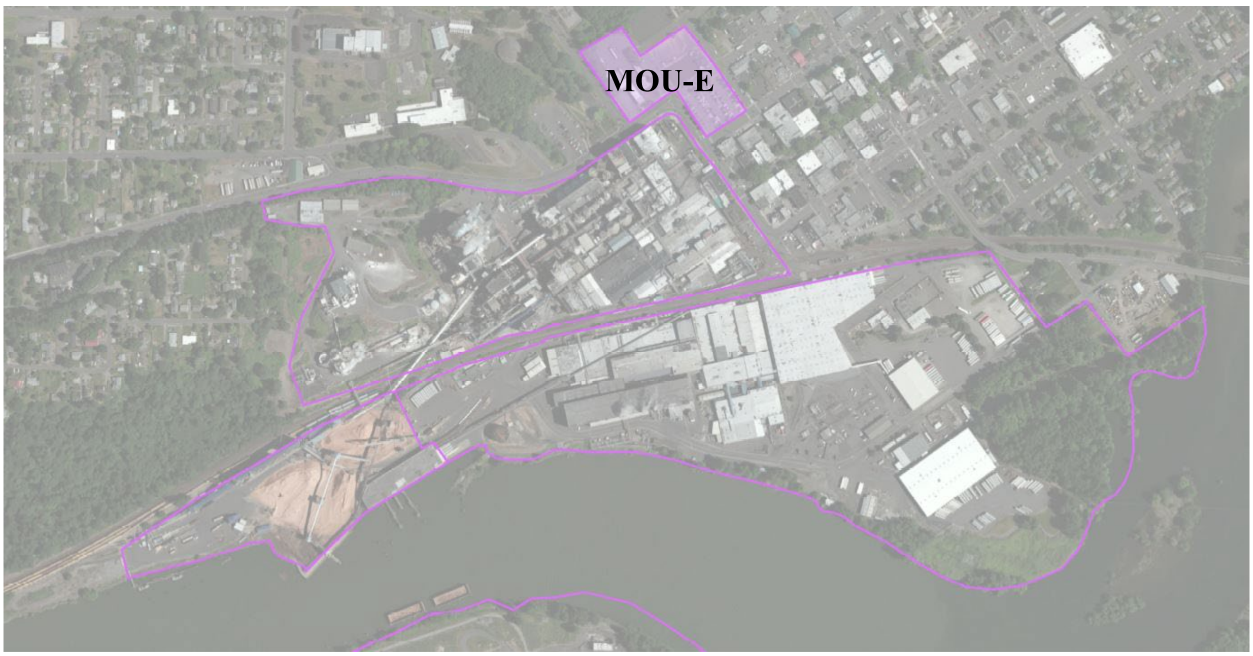

Image 10: Aerial imagery of MOU-E

3.5.5.1 OA-E1: Ancillary Area

Former Service Station

The Former Service Station is located in the northwestern area of the Ancillary Area. A previous cleanup report indicates that the original service station was constructed in 1941. The original service station was demolished and reconstructed in 1961 with the addition of five USTs on the west side of the property. In 1990, the USTs on the west side of the property developed leaks and reportedly the tanks were excavated and removed, and aboveground remediation of the soil was completed under Ecology oversight. In 1991, the James River Corporation acquired the property to construct a terminal to receive secondary fiber from the recycle mill in Halsey, Oregon. The purchase was completed with the understanding that USTs had been removed and the cleanup was complete; however, additional USTs were discovered and found to contain petroleum hydrocarbons and water (see Table 3). Both the contents and the tanks were subsequently removed, and soil samples were collected from the bottom of the tank pits. According to records, soils impacted by petroleum hydrocarbons were excavated and bioremediated on-site and confirmation samples were collected from the bottom of the excavation. Confirmation samples were analyzed for TPHd and TPHg and the results indicated that neither were detected. Samples were also collected from the bioremediated soils and analyzed for TPHd, heavy oil, BTEX, and TPHg (James River 1992).

There are no COPCs associated with current and ongoing Mill-related activities. COPCs associated with the Former Service Station include petroleum hydrocarbons and BTEX.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of petroleum hydrocarbons and BTEX in groundwater • Presence of residual petroleum hydrocarbons and BTEX in soil

Former Laundromat and Dry Cleaner

The Former Laundromat and Dry Cleaner is located in the northeastern area of the Ancillary Area. Limited information is available about its operations.

There are no COPCs associated with current and ongoing Mill-related activities. COPCs associated with the Former Laundromat and Dry Cleaner include VOCs.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of VOCs in groundwater • Presence of VOCs in soil

Former Gas Station

The Former Gas Station is located in the southeastern area of the Ancillary Area. Limited information is available about its operations.

There are no COPCs associated with current and ongoing Mill-related activities. COPCs associated with the Former Gas Station include petroleum hydrocarbons and BTEX.

Initial Data Gaps in Accessible Areas	• Depth to groundwater and groundwater flow direction • Geologic conditions • Presence of petroleum hydrocarbons and BTEX in groundwater • Presence of residual petroleum hydrocarbons BTEX in soil

3.5.6 MOU-F: Camas Business Center

The CBC (MOU-F) is bound by NW Benton Street and residential properties to the north, Division Street to the east, NW 6th Avenue to the south, and NW Drake Street to the west. It contains a single operational area where research and development were conducted.

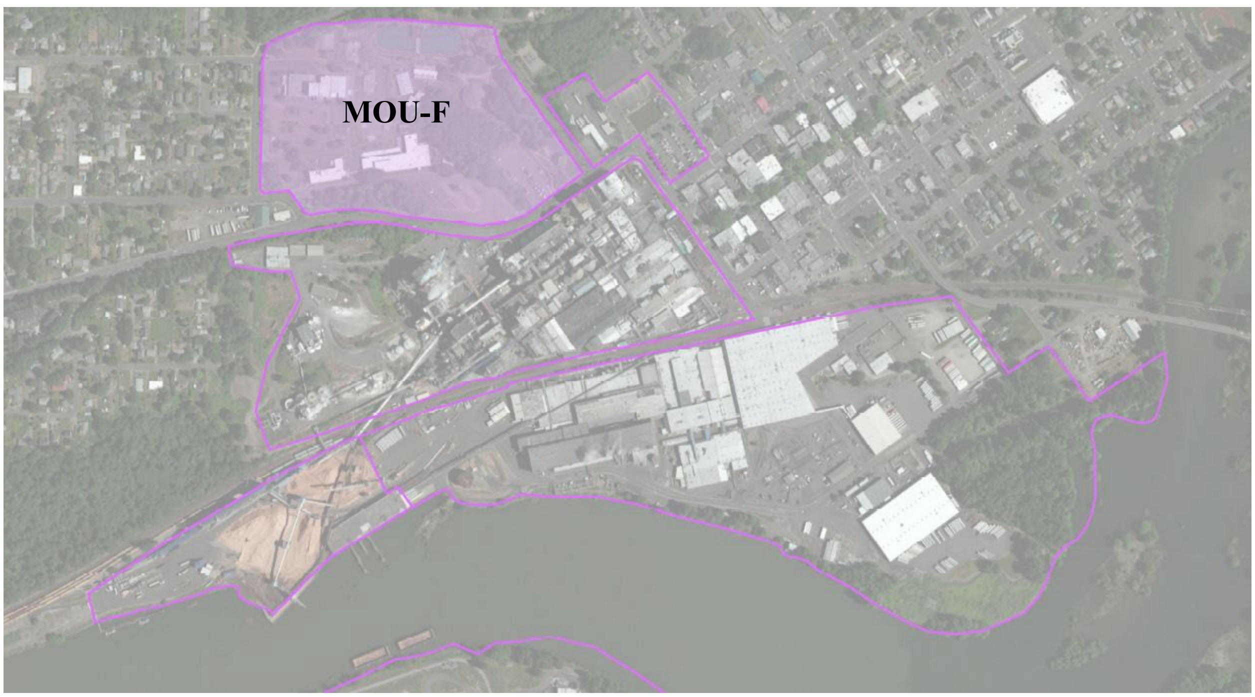

Image 11: Aerial imagery of MOU-F

3.5.6.1 OA-F1: CBC Area

This area was formerly used for research and development. Former structures include the Camas Business Center, the Non-Wovens Plant, the Environmental Center, and Fort James Specialty Chemicals. Operations in this area ceased by 1999; many of the former laboratories and offices were demolished by 2002, and most remaining buildings were demolished in 2021. Building 402 and a water supply tank are the only remaining structures.

Previous investigations have been completed in this area.[51] A preliminary assessment and investigation was completed in 2000 (SECOR 2000). In 2001, GP submitted a Preliminary Site Assessment Report and Site Investigation Report to Ecology (SECOR 2001). These activities were followed by a supplemental soil investigation in 2002 (Georgia-Pacific LLC 2002), a Phase II Environmental Site Assessment in 2016 (BergerABAM 2016b), and a groundwater monitoring event in 2021. A data package summarizing environmental data collected at the CBC was submitted to Ecology via email on July 12, 2021 (GRES 2021).

During the course of investigation, soil samples were analyzed for total petroleum hydrocarbon–hydrocarbon -dentification (TPH-HCID), Resource Conservation and Recovery Act (RCRA) metals, PCBs, VOCs (including tentatively identified compounds [TIC]), and SVOCs (including TIC); groundwater samples were analyzed for TPH-HCID, RCRA metals, PCBs, and VOCs. Soil analytical results were generally below MTCA cleanup levels with the exception of one surface soil sample (lead at 345 mg/kg in sample LS-1[52]) and three boring soil samples (tetrachloroethylene [PCE] at 2.95 mg/kg at GP9 at 12 feet bgs, PCE at 0.25 mg/kg at GP10 at 21.5 feet bgs, and methylene chloride at 0.75 mg/kg at GP17 at 6 feet bgs). Other soil samples collected in the vicinity were below MTCA cleanup levels for PCE and methylene chloride. Groundwater flow direction is generally to the south-southwest (BergerABAM 2016b), but further confirmation is needed as part of this RI. GP9 and GP10 are in the vicinity/upgradient of MW-1 and the other existing monitoring wells. Groundwater analytical results were generally below MTCA cleanup levels; in the most recent event in March 2021, results were below MTCA cleanup levels except for trichloroethylene (TCE), which exceeded the MTCA cleanup level [5 micrograms per liter (µg/L)] at MW-3 (8.2 µg/L). Methylene chloride was not detected in groundwater. Questions regarding previous sampling results were addressed in the RTC Letter (GRES 2023). Collectively, findings from previous investigations suggest that outstanding data gaps are limited to lead in soil in the vicinity of LS-1 and TCE in groundwater. PFAS will be included in groundwater monitoring proposed at existing monitoring wells.

The COPCs for the CBC include PCE, TCE, 1,1,1-trichloroethane, 1,1-dichloroethene, cis-1,2-DCE in groundwater and lead in soil (in the vicinity of LS-1). Groundwater samples will also be screened for dimethyl sulfoxide (DMSO) and PFAS. Five monitoring wells exist at CBC. The monitoring wells are not currently in an ongoing monitoring program; however, groundwater

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[51] At one point in time, the Fort James Specialty Chemicals area was in Ecology's Voluntary Cleanup Program (VCP; Ecology assigned Facility Site ID No. 78452582 and Cleanup Site ID No. 2961).

[52] As reported in the 2016 Phase I Environmental Site Assessment (BergerABAM 2016a), the reservoir near Building 402 and previous soil samples LS-1 and LS-2 was a water supply reservoir supplied by Lacamas Lake (the facility reportedly also had a permit to pump water from the Columbia River if insufficient supply was available from Lacamas Lake). The water from the reservoir was treated by sodium hypochlorite, sent through filtration tanks at Building 401, and conveyed to the Mill for use. Building 402 was a Reservoir Chemical Storage building (previously used to store sodium hypochlorite and chlorine dioxide for raw water treatment). The exterior paint on the building may have been lead-based, and therefore soil samples were collected near the building to address this data gap. The settling basin received raw lake and/or river water; it did not receive process wastewater.

samples were collected most recently in March 2021. Monitoring wells at CBC are expected to represent groundwater conditions upgradient of the MMA.

Initial Data Gaps in Accessible Areas	• Concentrations of TCE, PCE, PCBs, 1,1,1-trichloroethane, 1,1-dichloroethene, cis-1,2-DCE, and metals in groundwater • Presence of PFAS and DMSO in groundwater at existing monitoring wells • Presence of lead in shallow soil in the vicinity of LS-1

Image 12: Aerial imagery from 1985 showing the CBC, Environmental Center, Specialty Chemicals, and Non-Wovens Plant

3.5.6.2 OA-F2: No. 7 Substation

The No. 7 Substation is on the western side of the CBC. According to SPCC equipment inventory records, a former electrical substation existed south of Building 201 but was taken out of service in 2004.

Equipment at this former substation has been taken out of service and removed. Former equipment included three liquid-filled non-PCB transformer units (<50 ppm PCB). There are no known spills or previous investigations in this area.

COPCs include petroleum hydrocarbons, metals, and PCBs. This substation is inactive and may be accessible for soil sampling, pending confirmation of subsurface utilities.

Initial Data Gaps in Accessible Areas	• Presence of petroleum hydrocarbons, metals, and PCBs in shallow soil

SECTION 4. PRELIMINARY CONCEPTUAL SITE MODEL

A CSM describes the relationship between COPC sources and receptors through potential or actual migration and exposure pathways. The preliminary CSM described in this section is expected to undergo refinement as information and data are obtained during the RI process.

Regional and local information about the Mill Property setting coupled with historical and current Mill Property-related information (Section 3) provide the basis to assemble a preliminary CSM based on identification of the following:

- COPC sources and release mechanisms based on review of Mill Property historical and current operations and documentation of spills and releases (Section 3).
- Potential pathways for COPC migration within environmental media (e.g., groundwater flow) or transfer between environmental media (e.g., COPC leaching from soil to groundwater or groundwater discharge to surface water).
- Exposure pathways that may link a COPC and migration pathway to a potential receptor.

The preliminary CSM will help identify data gaps and/or uncertainties that RI activities will address over time to achieve the objectives listed in Section 1.1.

Previous environmental investigation and monitoring at the Mill Property occurred

- as part of Mill Property operational permits (e.g., NPDES Waste Discharge Permit),
- in response to spills or discharges related to mill operations (in accordance with the Mill Property-specific SPCC plan), and
- as part of area-specific environmental investigations (e.g., the CBC[53])

These efforts provide operational, incident, and/or area-specific data about COPC sources and releases. Following cessation of certain Mill operations, and entering into the AO with Ecology, the RI will focus on adding to existing data/information and understanding of Mill Property operations (Section 3). This will be used to determine the following in accessible portions of the Mill Property:

- Potential sources of COPCs, including spatial and chronological evaluation based on Mill Property operations
- Potentially affected environmental media
- Potential migration pathways and fate and transport mechanisms

[53] As described in Section 3.5.6, previous investigation has been completed in the CBC area under Ecology's VCP.

The preliminary CSM shown on Figure 13 and described in the following sections. The CSM is preliminary and presented in tabular format using information available at this time. Throughout the RI process, GP will follow an adaptive management process (see Section 1.1) to revisit and refine the CSM. The adaptive management process will incorporate data and information gathered during the RI phases and existing Mill Property data/information (e.g., permit-required monitoring) to adjust and target subsequent decisions based on observations, prior experience, and actual measurable change.

4.1 Constituents of Potential Concern

COPC sources relate to historical mill operations, as well as construction, renovation, and demolition over the Mill's 140-year history. Historical and current chemical usage in each OA, as well as known spills, are described in Section 3. Additionally, only isolated subsurface investigations have been performed, mostly in response to spills and leaks, to provide OA-specific confirmation of contamination.

Based on the understanding of historical and current chemical usage and known spills/releases at the Mill Property, two groups of COPCs have been identified for the OAs:

- **OA-specific COPCs**. These COPCs are expected to be localized to Mill OAs and operational features where COPCs were used, handled, and stored or where specific documented spills or releases occurred. For example, in the MMA–North (MOU-B), spills of black liquor occurred during Pulping operations in OA-B1. COPCs related to black liquor include sulfur and sodium from salts used in the Pulping operation.
- **Mill Property-wide COPCs.** These COPCs relate to more general Mill operations, typical heavy industrial processes, and support functions. For example, Mill Property-wide operations involve use of petroleum hydrocarbons as an energy source to power mill operations and as a lubricant or hydraulic fluid to operate and maintain machinery.

Based on understanding of historical and current chemical usage and known spills/releases at the Mill Property, OA-specific COPCs include VOCs, SVOCs, dioxins/furans, sulfur, PCBs, and PFAS. Mill Property-wide COPCs include petroleum hydrocarbons[54] and metals.[55] OAs and COPCs are presented in Table 2.

Cleanup levels for Mill Property COPCs have not been established at this time. MTCA cleanup standards and other ARARs will be evaluated in consultation with Ecology as the CSM is refined through implementation of the RI. Screening levels will be used to evaluate COPC data based on

[54] Where petroleum hydrocarbons are identified as a COPC, samples will be analyzed by NWTPH-Gx and NWTPH-Dx per Ecology guidance (WAC 173-340-900). Additional analytes may be included based on the type of petroleum hydrocarbons expected to be present in the area based on operations and incident records (see Section 3.5; Table 830-1 of WAC 173-340-900).

[55] Unless otherwise specified, metals include the following analytes: aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, selenium, silver, sodium, thallium, vanadium, zinc, and mercury.

potential receptors and exposure pathways, MTCA requirements, and Ecology's Cleanup Levels and Risk Calculation (CLARC) tool. For most sites and constituents, MTCA Method B provides the screening criteria protective of unrestricted land use; however, as presented in the *Guidance for Remediation of Petroleum Contaminated Sites* (Ecology 2016), MTCA Method A provides this information for petroleum hydrocarbons. For the purpose of this RI WP, screening levels for soil and groundwater consist of the following:

- **Soil.** MTCA Method B (WAC 173-340-740)[56] provides the basis for developing screening levels for unrestricted or restricted land use. Based on City zoning, the Mill Property meets the definition of an industrial property. However, at this time, Ecology has not made a determination regarding land use, so analytical results for soil samples analyzed during the RI will consider screening levels based on restricted and unrestricted land use. To this end, MTCA Method B specifies that soil cleanup levels shall be at least as stringent as
    - concentrations established under applicable state and federal laws (ARARs), and
    - concentrations that result in no significant adverse effects on the protection and propagation of terrestrial ecological receptors established using the procedures specified in WAC 173-340-7490 through 173-340-7494 unless it is demonstrated under those sections that establishing a soil (COPC) concentration is unnecessary.

  For COPCs for which sufficiently protective, health-based criteria or standards have not been established under applicable state and federal laws, those concentrations that protect human health are determined by evaluating the following exposure pathways:

    - Groundwater protection (as a drinking water and transport medium to surface water)
    - Soil direct contact
    - Soil vapors

- **Groundwater.** MTCA Method B (WAC 173-340-720) 57 provides the basis for developing screening levels for groundwater. Generally, MTCA Method B requires that groundwater cleanup levels equate to (COPC) concentrations protective of drinking water beneficial uses, unless groundwater qualifies as non-potable. Groundwater underlying the Mill Property is not used as drinking water; however, for the purpose of the RI, analytical results for groundwater samples will consider screening levels based on MTCA Method B. To this end, MTCA Method B specifies that groundwater cleanup levels shall be at least as stringent as
    - concentrations established under applicable state and federal laws (ARARs), and

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[56] MTCA Method A (WAC 173-340-900) provides screening levels for unrestricted and industrial land use for petroleum hydrocarbons. Method B may be used but requires a site-specific calculation.

[57] MTCA Method A (WAC 173-340-900) provides standard groundwater cleanup levels for petroleum hydrocarbons. Method B may be used but requires a site-specific calculation.

- concentrations protective of surface water beneficial uses unless COPC are unlikely to reach surface water.

For COPCs for which sufficiently protective, health-based criteria or standards have not been established under applicable state and federal laws, those concentrations that protect human health are determined by MTCA Equations 720-1 and 720-2.

4.2 Release Mechanisms and Potential Migration Pathways

Release mechanisms describe the means by which a COPC is released from a source to the environment. Potential migration pathways describe the means for COPC movement within an environmental medium or transfer between environmental media. Potential migration pathways are influenced by COPC physical and chemical properties (e.g., water solubility, vapor pressure) that affect mobility and distribution, characteristics of environmental media (e.g., soil type, depth to water), and site-specific transport mechanisms (e.g., groundwater flow direction).

Proposed field activities (discussed in Section 5) will improve current understanding of COPC presence and distribution in soil and groundwater related to releases and potential migration to other environmental media (e.g., surface water, vapor).

Based on existing data and current operations, the release mechanisms noted in the AO include the following:

- **Mill Property operations.** Areas of the Mill where there is potential for COPC release due to historical operations are described in Section 3 and represent a focus of RI activities in accessible areas. It is critical to understand nature and extent of COPCs in soil and groundwater in upland areas with historical and current Mill Property operations; this understanding will allow for an informed evaluation of the potential for COPC migration or transfer to other media.
- **Spills, dumping, leaks, housekeeping, and management practices.** GP complies with applicable local, state, and federal requirements, including an SPCC Plan. Spills and materials management have been reviewed and will guide RI activities. As described in Section 3, historical direct discharges have been reported to regulatory agencies, investigated, and mitigated through corrective action. Additionally, leaks or releases from existing (including existing but abandoned) pipe crossings for industrial/process waters (acid sewer and process sewer) from the MMA to Lady Island across the Camas Slough are a potential release mechanism.
- **Direct discharges.** Direct discharges relate to wastewater management and monitoring programs (e.g., the NPDES permit). Some historical wastewater discharges may pre-date operation of the WWTP, but discharges are now managed with current monitoring as part of the Mill Property's NPDES Waste Discharge Permit No. WA0000256 and in accordance with the Mill Property's SPCC Plan (Georgia-Pacific 2019). Further, Mill Property stormwater is collected and conveyed to the WWTP on Lady Island; therefore, if spills were to reach the Mill Property storm system prior to being controlled, they are connected to the process sewer and managed by the WWTP and are not expected to

directly discharge to the environment. Therefore, current and more recent direct discharge of COPCs to surface water or sediment is not anticipated to be a complete migration pathway. In Section 5, sampling is proposed to target soil within the footprint of the former wastewater ditches on Lady Island (i.e., a historical discharge). Other potential historical discharges to surface water are most relevant for the sediment investigation and will be addressed in the Draft Sediment RI WP process (see Section 1.5). Assessment of potential impacts from historical discharges to the Camas Slough and Columbia River are included as data quality objectives in the Draft Sediment RI WP submitted in December 2023 (Anchor QEA, 2023).

- **Stormwater discharges.** As described in Section 3.3 and in the direct discharges summary above, stormwater is currently regulated by NPDES Waste Discharge Permit No. WA0000256. The Mill's *Storm Water Monitoring Plan for the Camas Mill* (Georgia-Pacific Consumer Operations LLC 2017c) states that stormwater is collected and conveyed to the WWTP. Stormwater samples have previously been collected to comply with the NPDES permit; industrial stormwater is captured and treated by the WWTP, and therefore stormwater samples are not currently collected routinely. However, the Mill completes annual surveys to monitor for stormwater discharges not captured by the existing conveyance system. Recent stormwater discharges are not anticipated to be a complete migration pathway. Available information regarding historical stormwater discharges will be considered in the development of the CSM (see Figure 13).

Migration pathways noted in the AO include the following:

- **Groundwater discharges and seeps.** Historical spills or releases of COPCs have the potential to reach groundwater. This medium and migration pathway will be evaluated as part of RI activities. In this RI WP (Section 5), we proposed monitoring wells be installed for collection and analysis of groundwater samples and evaluation of groundwater flow direction. Characterization of groundwater will also inform the evaluation of groundwater/surface water interaction and potential groundwater seeps (discussed in Section 5). Buried utilities will be considered when reviewing groundwater sample results.
- **Overland flow.** Mill Property operations are conducted under an SPCC Plan and Mill Property stormwater is collected for conveyance and treatment at the WWTP. Overland flow is collected in storm drains and conveyed to the WWTP. Therefore, overland flow is not anticipated to be a complete migration pathway.
- **Soil erosion.** The Mill is primarily paved, and the banks of the Columbia River are protected with rip rap to reduce the potential for erosion. Soil erosion is not anticipated to be a complete migration pathway.

4.3 Potential Exposure Pathways

A complete exposure pathway consists of four fundamental components: (1) a source and mechanism of COPC release, (2) an affected environmental medium and probable migration process, (3) an exposure point, and (4) an exposure route by which humans and/or ecological receptors could come into contact with a COPC (ASTM 2003, USEPA 2004). If one or more of these components is missing, then the exposure pathway is considered incomplete.

Potential exposure routes include ingestion; direct contact; inhalation from potential COPC sources such as surface soil, subsurface soil, and groundwater; and potential uptake by ecological receptors. Potential human receptors include maintenance/utility/trench workers, construction workers, and commercial/industrial workers. Potential ecological receptors include the benthic community, plants, soil invertebrates, birds, and mammals.

The primary exposure pathways for COPCs at the Mill Property include the following:

- Potential ingestion and direct contact with COPCs by Mill Property workers performing subsurface activities where COPCs may be present in soils or groundwater.
- Potential migration (via volatilization) and inhalation of airborne vapors.
- Potential migration and discharge of COPCs to the Camas Slough or Columbia River, uptake from ecological receptors and consumption of aquatic organisms by humans.

These potential exposure pathways are evaluated by media below, including consideration of current land use, zoning, Mill Property operations, and existing permits that regulate discharges from the Mill.

- **Surface and subsurface soil**. The Mill is primarily paved or consists of structures that limit potential exposure to surface or subsurface soils. Intrusive work related to mill operations that may result in worker exposure are controlled through facility health and safety policies and procedures.

  Once the Site boundary is defined based on the findings of the field efforts proposed herein, the terrestrial and ecological evaluation (TEE) and associated exclusions will be evaluated as necessary. The TEE process will be completed in accordance with Ecology's *Terrestrial Ecological Evaluations under MTCA* (Ecology 2017). Current impervious and undeveloped areas within the Mill Property and a 500-foot buffer are presented on Figures 12a and 12b, along with. areas identified by DFW maps as potential priority habitat. Based on the DFW mapping, there are no known endangered species found on-site in upland areas. As shown on Figures 12a and 12b, buildings, pavement, and other physical barriers cover much of the Mill Property, particularly in areas with more intensive Mill operations and chemical use. As stated in Section 2.3, the Mill is zoned for heavy industrial land use (as identified by the City) and is currently used for heavy industrial operations; therefore, minimal ecological receptors are expected to be present for Mill Property surface and subsurface soils. Current demolition plans do not include removal of foundations, paved areas, or subsurface features. As such, there is currently limited potential human or ecological exposure to COPCs in surface and subsurface soil.
- **Groundwater.** Groundwater underlying the Mill Property is not currently used as for drinking water, and there are no current or future plans to do so. Areas surrounding the

Mill Property are served by municipal water supplies (City of Camas 2019). The drinking water pathway will be evaluated at a later stage of the RI.

- **Air.** Mill operations are commercial/industrial in nature. The potential for indoor air exposure and/or potential for inhalation of airborne vapors (e.g., during maintenance or construction work) potentially exists.
- **Surface Water and Sediment.** As described in previous sections, overland flow, stormwater, and facility wastewater are collected and conveyed to the WWTP. The WWTP discharges to the Columbia River under NPDES Waste Discharge Permit No. WA0000256. Potential COPC migration to surface water and/or sediment may occur via surface runoff or infiltration (i.e., groundwater/surface water interaction) and will be a focus of RI activities. Surface water and sediment will be addressed separately (see Section 1.5) and include ecological and human receptors.

In the absence of MTCA cleanup levels and/or guidance specifying exposure assumptions for developing criteria for evaluation of risk, tribal user and/or tribal fisher-based exposure assumptions will be reviewed for use in the calculation/evaluation of risk and/or development of risk management approaches.

4.4 Remedial Investigation Data Gaps

RI data gaps are presented for each operational feature of the OAs discussed in Section 3.5. These initial data gaps should be addressed prior to other data gaps that may exist at the Mill Property to refine the preliminary CSM and improve understanding of potential migration pathways and exposure pathways. As described in Section 1.1.2, initial RI activities (proposed in Section 5) are focused on media in accessible upland areas (e.g., soil and groundwater) and refining an understanding of potential migration pathways from upland areas to other media (e.g., sediment) and receptors (e.g., Camas Slough). In-water areas will be addressed separately (see Section 1.5). This phased approach will allow for the investigation to build on available data in a step-wise manner, make decisions based on understanding of Mill Property conditions, and follow adaptive management principles.

SECTION 5. REMEDIAL INVESTIGATION ACTIVITIES

The purpose of a RI under MTCA is to characterize a site such that the potential threat posed to human health and the environment is understood (WAC 173-340-350). The scope of work for the RI WP, included in the AO, has a requirement to describe general facility information, facility history and conditions, known spills or releases, past field investigations, a CSM, and land use as well as a requirement to "identify areas where further RI may be necessary but are inaccessible at this time due to existing infrastructure and/or ongoing site operations" (Ecology 2021b). An extensive summary of historical and current operations, including both mill operations and supporting operations, are presented in Section 3, and are the basis for proposed actions discussed below.

COPCs have been identified based on an extensive review of available records, including historical operations, utility maps, spill response reports, and Mill Property investigations (Section 3) and Ecology input. Data gaps exist with respect to the presence and migration of COPCs. As stated in Section 1.1 and Section 3.5, the initial data gaps[58] focus on areas currently accessible for RI activities. In some areas of the Mill Property, the density of structures and belowground features (e.g., basements, live utilities) render areas inaccessible for RI activities at this time.[59] In other areas, ongoing operations render areas inaccessible for RI activities at this time; where the Mill continues to operate, activities encumber safe access amidst materials movement, active machinery producing product, and above- and underground active utilities that energize, fuel, and enable ongoing production, amongst others. For this reason, this Final Upland RI WP proposes a phased approach, with an initial scope of work focused on screening COPCs in soil and groundwater as a first step of the RI (see Section 1.1). As stated in the RTC letter (GRES 2024), if changes in operations and/or demolition activities result in a dynamic and/or inaccessible area becoming static and accessible in the future, additional RI activities will be assessed.

Initial data gaps are presented in Section 3.5 and Table 4. Table 4 also indicates which operational features are currently accessible for RI activities. Understanding the geology and hydrogeology, in particular groundwater flow direction(s), are important to understand fate and transport mechanisms, and monitoring well installation is proposed as a first step toward that understanding. As stated in Section 1.1.2 and Section 3.5, groundwater characterization of COPCs is prioritized to understand potential COPC transport from upland areas to the Camas Slough, and therefore initial data gaps prioritize COPCs in groundwater and groundwater elevations. Initial data gaps also include COPCs in soil, with a priority on screening soil through targeted and soil sampling during monitoring well installation.

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[58] In-water areas will be addressed separately. See Section 1.5.

[59] RI activities are not proposed within existing building footprints.

To resolve these data gaps, the following RI field activities are proposed:

- A first phase (Phase I) of monitoring well installation including soil sampling during installation activities, well surveying, and measuring depths to groundwater to develop an understanding of the groundwater flow system. An initial 21 wells have been identified across the Mill Property.
- A second phase (Phase II) of monitoring well installation, once groundwater elevations and flow direction(s) are known.
- Quarterly groundwater monitoring for four consecutive quarters.[60]
- Focused surface and shallow soil sampling.
- Non-invasive investigation to determine extent of buried materials in OA-C2.

Proposed field activities are described in the following sections. Proposed sampling locations are shown on Figures 14a, 14b, and 15, and proposed sample analyses are summarized in Tables 6 and 7 and in the SAP/QAPP (Appendix A). SOPs for the field activities that will be performed during this RI are provided in the SAP/QAPP. As stated in the RTC Letter (GRES 2024), the list of analytes proposed for each proposed sampling location was expanded to include all COPCs at each location for this stage of the RI in response to Ecology comments (Ecology 2022). Based on the initial round of groundwater monitoring and soil sample results, the need to analyze for all COPCs at all wells will be evaluated for future groundwater monitoring events in consultation with Ecology.

As described in Section 3, the Mill Property was organized into MOUs to facilitate discussion, and MOUs are further defined by OAs and operational features. Groundwater flow direction in upland areas is presumed to be either towards the southeast or southwest in different portions of the Mill Property based on groundwater depth and proximity to Camas Slough or the Washougal River. The Columbia River flow and tidal stages could also influence groundwater flow directions. Therefore, MOUs may be connected through groundwater. Some field activities, such as groundwater monitoring, are expected to provide useful information to assess more than one MOU. Field activities that help to establish groundwater flow direction(s) are an important first step to understanding potential contaminant fate and transport.

[60] As noted in the RTC letter (GRES 2024), the proposed scope of work is intended to be an initial effort to begin the investigation and is not proposed as or expected to be the complete investigation. The RI process is expected to be iterative, where data are generated and discussed with Ecology and next steps of the investigation are driven by the data. Additional groundwater monitoring to understand variations in groundwater conditions is expected after initial monitoring results are reviewed. The initial four groundwater monitoring events proposed herein are intended to start developing a fundamental understanding of the CSM, which can be used as the basis for future investigation efforts. To this end, tidal influences and seasonal variability will be addressed over the course of the RI and additional monitoring wells and sampling events are anticipated to be needed in the future.

5.1 Pre-Field Activities

Prior to invasive activities, a utility survey will be performed to evaluate the potential for underground utilities at each proposed subsurface sample or well location. The utility survey will augment information provided by GP regarding potential underground utilities. The utility location procedures will include the following:

- Coordination with the Washington Utility Notification Center (as needed; public property only).
- Coordination with GP regarding utilities at proposed sampling locations.
- Coordination with a private utility locator to identify possible underground lines on private property. The private utility locate may be paired with Time Domain Electromagnetic Induction (TDEM) and Ground Penetrating Radar (GPR; see Section 5.2).
- Use of an air-knife or similar tool (where appropriate) to assess possible underground utilities.

When necessary, proposed boring/well locations will be adjusted in the field to accommodate possible underground or overhead utilities. The Mill Property HASP, including with the SAP/QAPP (Appendix A), provides specific procedures to be used to protect the health and safety of field personnel during the Mill Property investigations.

5.2 Non-Invasive Exploration

There is anticipated to be an extensive network of buried utilities and potentially other buried features at the Mill. Non-invasive exploration methods are proposed beyond the private utility location to better understand the subsurface features as follows:

- Buried materials are suspected to be present in the Mill Modernization Debris Area and Buried Material Area, located in MOU-C. Non-invasive exploration methods are proposed in these areas to better identify the nature and extent of suspect debris buried in the operational features prior to developing a plan for subsurface exploration.
- Non-invasive exploration methods are proposed to locate the existing pipeline from the Primary Clarifier to the South ASB on Lady Island to support soil sampling of the former wastewater ditches.

Geophysical surveys will be completed within accessible areas to help identify potential subsurface anomalies. Surveys will be completed in a grid pattern using a combination of TDEM and GPR. Survey methods will be selected based on site-specific conditions, such as proximity to metallic objects including buildings, fences, and vehicles, as well as accessibility due to current Mill operations.

5.3 Shallow Monitoring Wells

The purpose of each proposed well location is presented in Table 5. Proposed well locations are shown on Figures 14a and 14b.

5.3.1 Well Installation and Soil Sampling

GP proposes installation of 43 monitoring wells to augment current understanding of Mill Property geology and hydrogeology and to evaluate potential presence of COPCs. Proposed monitoring well locations are presented on Figures 14a and14b; actual locations may change based on Mill Property constraints, utility locates, and field observations. Soil samples will be collected from the boreholes prior to monitoring well construction. As described in the RTC letter (GRES 2024), the proposed scope of work is intended to be an initial effort and is not proposed as the complete investigation. This phased approach will be conducted during ongoing operations at the Mill that limit access in certain areas due to building foundations, density of structures, dynamic conditions, and/or safety concerns. This phased approach allows for refinement of the CSM and informs future field efforts.

5.3.1.1 Monitoring Well Locations and Installation

The first phase of proposed monitoring well locations was selected to provide information that will help determine groundwater flow directions and gradients. An initial 21 wells will be installed at locations across the Mill Property, which will be monitored during low (autumn) and high (winter) seasonal groundwater elevations. The wells will be developed, surveyed, and water levels measured following SOPs (Appendix A).

Once the groundwater flow system is better understood, the second phase of well installations is planned to target groundwater conditions upgradient and downgradient from areas (MOUs/OAs) with documented chemical use and/or spills (see Table 5). Well locations may be adjusted based on findings from the first phase, and the number and locations of subsequent monitoring wells will be evaluated in consultation with Ecology.

Monitoring wells will be installed using sonic drilling methods to a target depth of approximately 10 or 20 feet below the observed shallow groundwater table,[61] and will be based on field observations, location, and season. At least one boring or well in each MOU, except MOU-D (Lady Island), will be advanced to the top of the TGA or to bedrock, depending on location relative to the geology. Due to potentially difficult drilling conditions in the Camas area (e.g., cobbles and shallow bedrock) sonic drilling was chosen as the preferred method; however, not all borings will not be advanced into bedrock (one per MOU may be advanced into the top of bedrock to evaluate rock conditions [e.g., rock strength, degree of weathering and fracturing, etc.]). The total depth of borings may be adjusted based on observed field conditions (including penetration resistance or refusal).

[61] Anticipated depths to groundwater based on previous work at the Mill Property is presented in Section 2.1.4.

Since the depth to groundwater at the Mill Property has not been fully characterized, field observations will be used to determine the depth of the shallow water table. Short core runs may be employed if field screening indicates that the heat from the core barrel could limit easy identification of shallow groundwater levels.

At six select locations, as shown on Figures 14a and 14b, borings will be advanced to refusal to estimate the saturated interval at the location. After reaching the target drilling depth, a 2-inch monitoring well will be installed at each boring location. Monitoring well depths and screen lengths will be determined based on field conditions, and filter pack size will be based on the grain sizes of surrounding geologic material. Drilling and well installation will be conducted by a Washington State-licensed driller and in accordance with the Minimum Standards for Construction and Maintenance of Wells (WAC 173-160).

Following well installation, monitoring wells will be developed by surging and pumping to remove entrained sediments. Once installed and developed, monitoring well tops of casing, rims, and ground surface elevations will be measured by a Licensed Professional Surveyor.

To the extent feasible (i.e., access) a production well will be included in the groundwater monitoring program.

5.3.1.2 Soil Sampling During Well Installation

Soil samples will be collected from the borings prior to monitoring well installations. Sonic drilling allows for retrieval of continuous core samples, which will be field screened and logged during drilling. Field screening will include measuring total VOCs using a photoionization detector (PID), conducting a field sheen test for petroleum hydrocarbons, and documenting visual characteristics (staining) or olfactory (odor) indicators of impacts.

Soil samples will be collected for laboratory analysis from each boring. Approximately one soil sample every 5 feet will be retained for possible analysis; however, depending on the boring depth and number of soil samples collected, some soil samples may not be analyzed. In general, samples prioritized for laboratory analysis will include

- soil samples with field indication of impacts,
- soil samples collected near the ground surface (e.g., 0 to 3 feet bgs) in areas with suspected surface spills,
- soil samples collected at the shallow water table and smear zone, and
- soil samples collected from the bottom of the boring.

A minimum of two soil samples will be analyzed at each location for the COPCs within the applicable OA (see Table 7). Soil samples will be collected directly into laboratory-supplied bottles using decontaminated reusable equipment or clean, new disposable gloves (Appendix A: SAP/QAPP SOP-5).

5.3.2 Groundwater Monitoring

At least 1 week following development, water levels in the new monitoring wells will be gauged with a water level meter or interface probe, if needed. The water level measurement SOP is included in Appendix A.

Groundwater samples will be collected at installed monitoring wells and one of the Mill production wells using low-flow sampling methods following the SOP in Appendix A. Groundwater samples are expected to be collected using either peristaltic or bladder pumps, depending on the depth to groundwater. Samples will be analyzed for the COPCs[62] as noted in Table 6.[63] After the initial sampling event, groundwater samples will be collected using the same methods for the following three quarters to complete 1 year (four consecutive quarters) of monitoring.

Groundwater monitoring at existing monitoring wells will continue in accordance with applicable permit requirements (e.g., the LILF monitoring wells). However, additional analyses may be added to existing monitoring wells (Table 6). Groundwater monitoring at the LILF monitoring wells will continue on its existing schedule. Groundwater monitoring at the existing CBC monitoring wells will be completed at the same time as groundwater monitoring at the proposed new monitoring wells.

Mill Property groundwater may be influenced by its proximity to the Columbia and Washougal Rivers. Water level measurements from monitoring wells will be compared to the Columbia River and Washougal River stage to monitor for impacts, if any. The following river stations will be used:

- United States Geological Survey (USGS) Station 14144700 at Vancouver,[64] approximately 13 miles downstream of the Mill Property.
- USGS Station 14128870 at Bonneville Dam,[65] approximately 24 miles upstream of the Mill Property.
- Ecology Station 28B080 on the Washougal River at Hathaway Park, approximately 3 miles upstream of the Mill Property.

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[62] As noted in the RTC letter (GRES 2024), while operations have changed over time, a reasonable understanding of historical and current operations and associated chemicals used has been described herein, and this understanding of historical operations is the appropriate basis for identification of COPCs in different areas of the (with some consideration given to presumed upgradient and downgradient areas). In response to Ecology request, all COPCs are proposed to be sampled at all monitoring wells in areas associated with mill operations (see Table 6). The Ancillary Area (MOU-E) and the CBC (MOU-F) have distinct and different historical operations from the areas with mill operations (MOU-A, -B, -C, and -D), and a separate investigation effort has been completed in MOU-F; proposed COPCs for MOU-E and MOU-F are consistent with the history of industrial activity and investigation activities completed in those areas.

[63] Unless specified otherwise, groundwater samples to be analyzed for metals will be field filtered and analyzed for dissolved metals.

[64] https://waterdata.usgs.gov/monitoring-location/14144700/#parameterCode=00065&period=P7D

[65] https://waterdata.usgs.gov/monitoring-location/14128870/#parameterCode=00065&period=P7D

5.4 Additional Soil Sampling

In addition to collecting soil samples while installing monitoring wells, soil sampling is proposed at specific locations to address initial data gaps identified related to PCBs and dioxins/furans; however, additional analytes may also be proposed. As described in the RTC letter (GRES 2024), the proposed scope of work is intended to be an initial effort to begin investigation and is not proposed as the complete investigation. Soil sampling locations were selected to target static and accessible areas with a history of industrial activity related to historical and/or current Mill operations.

Each soil sample will be collected directly into laboratory-supplied bottles using decontaminated equipment or clean, new disposable gloves. Soil samples will be analyzed for the COPCs[66] as noted in Table 7.

Four types of soil collection methods are proposed:

- Surface soil samples collected by scraping existing ground surface
- Shallow soil samples collected from a depth of 0 to 1 feet bgs
- Test pit samples collected from the bottom of a test pit
- Deeper soil samples within the footprints of the Former Wastewater Ditches

The soil sample depth measurement will start at approximately bare ground for these four methods. If the sample location is heavily vegetated, covered by gravel, or otherwise covered, the material will be cleared to allow for sample collection.

5.4.1 Surface Soil Sampling

Two surface soil samples are proposed to be collected from each of the Substations No. 1, 2, 5, 6, 7, 8, 9, and 10. See Figure 15 for approximate sampling locations.

Some Substations are active due to ongoing operations at the Mill Property, which limits access to these areas. Samples will not be collected at active Substations; only non-invasive activities will be used. Non-intrusive surface soil samples will be collected by hand using scoops, such as pre-cleaned, decontaminated spoons or trowels.

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[66] As noted in the RTC letter (GRES 2024), while operations have changed over time, a reasonable understanding of historical and current operations and associated chemicals used has been described herein, and this understanding of historical operations is the appropriate basis for identification of COPCs in different areas of the facility (with some consideration given to presumed upgradient and downgradient areas). In response to Ecology request, all COPCs proposed to be sampled at all locations in areas associated with mill operations (see Table 7). The Ancillary Area (MOU-E) and the CBC (MOU-F) have distinct and different historical operations from the areas with mill operations (MOU-A, -B, -C, and -D), and a separate investigation effort has been completed in MOU-F; proposed COPCs for MOU-E and MOU-F are consistent with the history of industrial activity and investigation activities completed in those areas.

Prior to surface soil sample collection, the area surrounding each Substation will be observed for visual characteristics (staining) or olfactory (odor) indicators of impacts. Observations will be photo-documented by field personnel, subject to Mill photography policy. Final sampling locations will be selected based on field observations to target areas of potential impact.

Soil samples will be collected from areas that are not covered by asphalt, concrete, or another permanent barrier that cannot be removed using hand tools. Soil sampling in areas where pavement disturbance is required will be postponed until Substation is accessible for RI activities.

5.4.2 Shallow Subsurface Soil Sampling

Proposed shallow subsurface soil sampling locations are shown on Figure 15 and in Table 7. Generally, two soil samples will be collected from each of the proposed locations. At the Dredge Spoils Area (OA-D2), four samples will be collected from the stockpiles.

Prior to shallow subsurface soil sample collection, the proposed sampling area will be observed for visual characteristics (staining) or olfactory (odor) indicators of impacts. Observations will be photo-documented by field personnel, subject to Mill photography policy. Final sampling locations will be selected based on field observations to target areas with potential impacts. Sampling locations may also be adjusted to avoid local low spots or other physical features/obstructions.

Shallow subsurface soil samples will be collected using a push-probe, hand auger, or other hand tools, taking care to avoid loose materials surrounding the excavation from falling into the sample hole. One sample will be collected representative of 0 to 0.5 feet bgs, and a second sample will be collected representative of 0.5 to 1 feet bgs. If sufficient volume for two samples cannot be collected from a location, one sample will be collected as deep as possible to be representative of 0 to 1 feet bgs.

At select locations in OA-A1 (Woodmill), three soil samples will be collected at select locations near the PECO crane dock to support the proposed regrading effort in the planned in- and over-water demolition project (see Section 3.4.2). One sample will be collected representative of 0 to 1 feet bgs, one sample will be collected that targets the proposed final grade, and one sample will be collected representative of approximately 1 foot below the proposed final grade. These three soil sample locations are presented on Figure 15.

5.4.3 Test Pits

Based on the results of the interpretation of the geophysical surveys, test pits will be completed in the Mill Modernization Debris Area, Buried Material Area and Wooded Area. Proposed test pit locations are presented on Figure 15; actual sampling locations will be identified based on field observations and documented in the field. Test pits will be excavated up to 5 feet deep and 2 feet wide using a small excavator. At each test pit location, one soil sample will be collected from the bottom of the test pit. Additional samples at various depths may be collected during excavation based on field observations. Soil samples will be collected directly from the excavator bucket.

Following soil sampling and visual documentation of soil characteristics in the test pit, excavated materials will be returned to their associated disturbed area.

An accredited hazardous building materials inspector will be present for test pits completed in areas with suspected buried materials (e.g., the Mill Modernization Debris Area and Buried Material Area).

5.4.4 Soil Sampling in Former Wastewater Ditches

An additional six samples are proposed to be collected from Lady Island, approximately every 500 linear feet along the Former Wastewater Ditches[67] (see Figure 16 for approximate locations). The Former Wastewater Ditches were backfilled; aside from a short segment near Outfall 001, no visible indications of the extents of the ditches remain. Based on historical aerials and field indicators, the existing pipeline may have been installed in the Former Wastewater Ditch between the Primary Clarifier and the South ASB.

Actual sampling locations will be identified based on field observations and documented in the field. Prior to sampling, the location of the pipeline will be identified via non-invasive methods (see Section 5.2). Sample locations will be selected within the footprints of the former ditches and offset from the location of the pipeline. To the extent feasible, this work will be completed during dry weather conditions to avoid standing water in the Former Wastewater Ditches.

Soil samples will be collected using either a hand auger or (if needed) a direct-push drill rig. At each sample location, the soil core will be observed and logged, and the fill material used to backfill the ditches will be visually characterized and field screened. Changes in soil characteristics potentially indicative of the transition from fill material to material originally present at the base of the ditches will be noted. Based on existing Mill Property conditions and historical aerial photographs of the Former Wastewater Ditches, ditch bottom material is expected to be encountered at a depth of approximately 5 feet bgs.

Soil samples will be collected from the transition to ditch bottom material to 6 inches below the transition. Additional samples of the fill material above the transition to ditch bottom material may be collected based on field observations.

5.5 Seep, Sediment, and Stormwater Sampling

In addition to soil and groundwater, the AO includes sampling and analysis of seeps, surface and subsurface sediments, and stormwater and catch basin solids. Routine inspection and/or monitoring of seeps, sediment, and stormwater occurs as part of existing monitoring programs (Section 3.3). These media will continue to be monitored under their existing programs, and the results will be evaluated together with the results from RI field activities in the RI Report.

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[67] Initial sampling efforts will use existing features to guide soil sampling efforts.

Seeps have been identified on Lady Island; however, they have not been observed in the past 6 years of annual monitoring activities (2019–2024) (Section 3.3). The proposed groundwater monitoring (Section 5.3) to characterize groundwater is expected to be sufficient to characterize seeps as well. If a seep is observed, Ecology will be notified and a plan to evaluate the seep will be developed.

Sediment samples are collected through the existing waste discharge monitoring program (Section 3.3). Sediment samples were collected from the Camas Slough and Columbia River near two active outfalls (Outfall 001 and Outfall 002) in September 2017 in compliance with the Mill's Waste Discharge Permit (No. WA0000256) and included comparisons to the *Sediment Quality Standards in the Sediment Management Standards* (SMS; Chapter 173-204 WAC; ESA 2017, 2018). As reported in the *Sediment Data Report* (ESA 2018), none of the results from Outfall 001 or Outfall 002 exceeded the SMS chemical criteria. At Outfall 001 (Columbia River), dioxins/furans were not detected above the reportable detection limit. At Outfall 002 (Camas Slough), most dioxin/furan compounds were either not detected or detected between the estimated detection limit and the reportable detection limit. Monitoring through the existing monitoring program for the waste discharge permit is representative of potential impacts from Mill Property operations to sediment. Sediment sampling will be discussed separately in the Draft Sediment RI WP (see Section 1.5).

As described in Section 3.3, Mill Property stormwater is collected and conveyed to the Mill's WWTP and sampled in accordance with the Mill's NPDES Permit (Georgia-Pacific Consumer Products LLC 2011, 2017c). Therefore, stormwater and potential solids in Mill Property stormwater are expected to be captured, managed, and monitored by the Waste Discharge Permit, and stormwater will continue to be monitored in accordance with the NPDES Permit.

5.6 Laboratory Analysis

Laboratory analyses will be conducted in accordance with the SAP/QAPP (Appendix A). Soil and groundwater samples will be submitted under chain-of-custody protocol to the laboratory and analyzed on a standard turn-around basis. Sample handling, packing, and shipping procedures are presented in the SAP/QAPP.

Analytical methods to be used during sample analyses, including method reporting limits, are presented in the SAP/QAPP. Additional soil sample analyses may be made based on field screening results or initial analytical results to provide further characterization of Mill Property conditions.

SECTION 6. REFERENCES

Adams, W. Claude. 1951. "History of Papermaking in the Pacific Northwest: II." Oregon Historical Quarterly 52, no. 2: 154-185.

Anchor QEA. 2023. Agency Review Draft Sediment Remedial Investigation Work Plan, December 2023.

Arcadis. 2011a. Memo from Shannon Dunn and Ryan Shatt, Arcadis, to David Massengill, Georgia-Pacific LLC, RE: Investigation of Weak Black Liquor Release, Georgia-Pacific Consumer Products LLC, Camas Mill, Camas, Washington. June 7.

Arcadis. 2011b. *Data Summary Report Investigation of Weak Black Liquor Release*. Prepared for Georgia-Pacific Consumer Products LLC. October.

Arcadis. 2012. *Data Summary Report Investigation of Black Liquor Release from No. 4 Swing Tank*. Prepared for Georgia-Pacific Consumer Products LLC. October.

Arcadis. 2015. Data *Summary Report Investigation of Black Liquor Basement Release*. Prepared for Georgia-Pacific Consumer Products LLC. January.

Arcadis. 2016. *Summary Report Investigation of Hydrocarbon Release*. Prepared for Georgia-Pacific Consumer Products LLC. January.

ASTM International. 2003. TBD.

BergerABAM. 2016a. *Phase I Environmental Site Assessment, Clark County Tax Parcel 82920000, Camas, Washington*. Prepared for the City of Camas. April.

BergerABAM. 2016b. *Phase II Environmental Site Assessment, Clark County Tax Parcel 82920000, Camas, Washington*. Prepared for the City of Camas. August.

BPA. 2001. *The Columbia River System Inside Story*. Second Edition. Federal Columbia River Power System. Bonneville Power Administration. United States Bureau of Reclamation. United States Army Corps of Engineers. April.

Brynelson, T. and Littman, A. 2017. "As Paper Mill's Presence Fades, Camas Grapples with Identity, Its Future." *The Columbian*. November 26.

City of Camas. 2013. *City of Camas Comprehensive Stormwater Drainage Plan.* Prepared by Otak, Inc. April.

City of Camas. 2015. *Brief History of Camas*. http://www.cityofcamas.us/parksfacilities/43-ourcommunity/69-history.

City of Camas. 2016. *Camas 2035: A Comprehensive Plan to guide future growth and development for the City of Camas*. June. https://www.cityofcamas.us/sites/default/files/fileattachments/community_development/page/5971/comprehensive_plan_camas_2035.pdf.

City of Camas. 2019. City of Camas Water System Plan Update. October.

City of Camas. 2021a. *Camas Zoning, Ordinance 21-010*. Map dated July 21, 2021. https://www.cityofcamas.us/sites/default/files/fileattachments/community_development/page/6131/zoning_2021.pdf. Accessed October 6.

City of Camas. 2021b. Long-Range Planning. https://www.cityofcamas.us/com-dev/page/long-range-planning. Accessed October 6.

City of Vancouver. 2021. Climate and Weather. https://www.cityofvancouver.us/ourcity/page/climate-and-weather. Accessed December 10.

Ecology. 2004. *Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies.* Washington State Department of Ecology. July. https://apps.ecology.wa.gov/publications/documents/0403030.pdf.

Ecology. 2008. Fact Sheet, Permit No. WA 000025-6. National Pollutant Discharge Elimination System Wastewater Discharge Permit, Georgia Pacific Consumer Products (Camas), LLC, Camas, Washington. Washington State Department of Ecology. February 15.

Ecology. 2016. *Guidance for Remediation of Petroleum Contaminated Sites*. Washington State Department of Ecology. Toxics Cleanup Program, Publication No. 10-09-057. Revised June.

Ecology. 2017. *Terrestrial Ecological Evaluations under the Model Toxics Control Act.* Washington State Department of Ecology. Publication No. 19-09-051. February.

Ecology. 2020a. Fact Sheet for NPDES Permit WA0000256, Georgia Pacific Consumer Products, LLC. Washington State Department of Ecology. September 29.

Ecology. 2020b. National Pollutant Discharge Elimination System, Wastewater Discharge Permit No. WA0000256. Washington State Department of Ecology. Issuance date: November 2, 2015. Second Modification date: November 20.

Ecology. 2021a. Website: Model Toxics Control Act. Washington State Department of Ecology. https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Rules-directing-our-cleanup-work/Model-Toxics-Control-Act. n.d.

Ecology. 2021b. Agreed Order No. DE 18201. Washington State Department of Ecology. August 12.

Ecology. 2021c. Letter from Shingo Yamazaki, Washington State Department of Ecology, to Matt Tiller, Georgia-Pacific, RE: Request for Deadline Extension – Draft RI Work Plan. December 8.

Ecology. 2021d. *Sediment Cleanup User's Manual (SCUM)*. Washington State Department of Ecology. Toxics Cleanup Program, Publication No. 12-09-057. Third Revision. December.

Ecology. 2022. Letter from Mady Lyon, Washington State Department of Ecology, to Sean Thomas Wood, Georgia-Pacific Consumer Operations LLC, RE: Georgia Pacific Camas Draft Remedial Investigation Work Plan Review. November 4.

Ecology. 2023. Letter from Mady Lyon, Washington State Department of Ecology, to Sean Thomas Wood, Georgia-Pacific Consumer Operations LLC, RE: Georgia Pacific Camas 2nd Draft Remedial Investigation Work Plan Review. November 30.

Ecology. 2025. Letter from Mady Lyon, Washington State Department of Ecology, to Jon Busby, Georgia-Pacific Consumer Operations LLC, RE: Georgia Pacific Camas 3rd Draft Uplands Remedial Investigation Work Plan Review. March 26.

ESA. 2017. *Sediment Sampling and Analysis Plan: NPDES Waste Discharge Permit Number WA0000256*. Prepared by Environmental Science Associates for Georgia-Pacific Consumer Products (Camas) LLC. Camas, Washington. Environmental Science Associates. August 2017.

ESA. 2018. *Sediment Data Report.* Prepared for Georgia-Pacific Consumer Products LLC. Environmental Science Associates. February.

ESA. 2025. *Cultural Resources Desktop Analysis, Camas Mill Remedial Investigation, Clark County, Washington*. Prepared for Georgia-Pacific Consumer Operations LLC. Environmental Science Associates. February.

Evarts, R. and O'Connor, J. 2008. *Geologic Map of the Camas Quadrangle, Clark County, Washington, and Multnomah County, Oregon*. United States Geological Survey. Scientific Investigations Map 3017. June.

Fort James Camas LLC. 1999a. Letter from R. D. McCollister, Fort James, to Teddy Le, Washington Department of Ecology. 19 January.

Fort James Camas LLC. 1999b. *Inert Waste Landfill Post-Closure Report*. May.

Fort James Camas LLC. 2002a. Letter from James A Cadd, Fort James, to Teddy Le, Washington Department of Ecology. February 8.

Fort James Camas LLC. 2002b. Letter from James A Cadd, Fort James, to Teddy Le, Washington Department of Ecology. May 30.

Fort James Camas LLC. 2006. Letter from Michael D. Tompkins, Fort James, to Teddy Le, Washington Department of Ecology. March 7.

Geigenmiller, E. 2018a. “Papermaker History, Part 1: Mill Interpretive Center & The Early Years”. *Lacamas Magazine*. February 24. https://lacamasmagazine.com/2018/02/papermaker-history-part-1-camas-mill-interpretive-center.html

Geigenmiller, E. 2018b. “Papermaker History, Part 2: 1920s-1950s – Corporate Mergers, Newsprint Stops.” *Lacamas Magazine*. April 2. https://lacamasmagazine.com/2018/04/papemaker-history.html.

Georgia-Pacific. 2001. Letter from Julie B. Raming to Teddy Le, Washington State Department of Ecology, RE: Former Specialty Chemicals Facility, Georgia-Pacific Camas Mill, Camas, Washington. October 17.

Georgia-Pacific. 2019. *Spill Prevention Control and Countermeasure (SPCC) Plan*. June.

Georgia-Pacific Consumer Products LLC. 2011. *Camas Mill Storm Water Monitoring: Final Report*. July.

Georgia-Pacific Consumer Operations LLC. 2016. Letter from Joe Ertolacci, Georgia-Pacific Consumer Operations LLC, to Ms. Ha Tran, Washington State Department of Ecology, RE: Summary Report for Investigation of Hydrocarbon Release. January 29.

Georgia-Pacific Consumer Operations LLC. 2017a. Letter from Shawn Wood, Georgia-Pacific Consumer Operations LLC, to Ha Tran, Washington State Department of Ecology, RE: Incident Report. February 20.

Georgia-Pacific Consumer Operations LLC. 2017b. Letter from Shawn Wood, Georgia-Pacific Consumer Operations LLC, to Ha Tran, Washington State Department of Ecology, RE: Update on the Cleanup of the Diesel Release to the Camas Slough. November 15.

Georgia-Pacific Consumer Products LLC. 2017c. *Storm Water Monitoring Plan for the Camas Mill*. May.

Georgia-Pacific Consumer Operations LLC. 2018a. Letter from Shawn Wood, Georgia-Pacific Consumer Operations LLC, to Ha Tran, Washington State Department of Ecology, RE: Administrative Order Docket #115397, Completion of Phase 1 Corrective Actions in Response to Administrative Order Docket #15397. January 12.

Georgia-Pacific Consumer Operations LLC. 2018b. Letter from Shawn Wood, Georgia-Pacific Consumer Operations LLC, to Ha Tran, Washington State Department of Ecology, RE: Administrative Order Docket #115397, Completion of Phase 2 Corrective Actions in Response to Administrative Order Docket #15397. March 16.

Georgia-Pacific Consumer Operations LLC. 2018c. Letter from Shawn Wood, Georgia-Pacific Consumer Operations LLC, to Ha Tran, Washington State Department of Ecology, RE: 50% Black Liquor Spill. April 27.

Georgia-Pacific Consumer Operations LLC. 2018d. Letter from Shawn Wood, Georgia-Pacific Consumer Operations LLC, to Ha Tran, Washington State Department of Ecology, RE: Georgia-Pacific Consumer Operations LLC, EPCRA Section 304(c) Written Follow-up Report, NRC Incident Report #1210244, ERTS Incident #680842. May 24.

Georgia-Pacific Consumer Operations LLC. 2021. Letter from Shawn Wood, Georgia-Pacific Consumer Operations LLC, to Danny Phipps, Southwest Clean Air Agency. October 21.

GRES. 2021. Email from Matt Tiller, GRES, to Shingo Yamazaki, Washington State Department of Ecology, RE: Camas Business Center (CBC) Soil and Groundwater Summary. Global Remediation & Environmental Services LLC. July 12.

GRES. 2023. Letter from Matt Tiller, Georgia-Pacific Consumer Operations LLC, to Mady Lyon, Washington Department of Ecology, RE: Draft RI Work Plan – Response to Ecology Comments. Global Remediation & Environmental Services LLC. February 3.

GRES. 2024. Letter from Matt Tiller, Georgia-Pacific Consumer Operations LLC, to Mady Lyon, Washington Department of Ecology, RE: Second Draft RI Work Plan – Response to Ecology Comments. Global Remediation & Environmental Services LLC. March 19.

James River. 1992. Letter from G. Elsbree, James River, to Mr. Teddy Lee, Washington Department of Ecology. James River Corporation Camas Mill. September 14.

Joner, C. 2010. "A Time Line of Georgia-Pacific Corp.'s Central Research Division." *The Columbian*. March 14.

Kennedy Jenks. 2018. Letter from Julia Schwarz, Kennedy Jenks, to Sunanda Chunder, Georgia-Pacific Consumer Operations LLC, RE: Investigation of Bunker C Release Discovered at Georgia-Pacific Camas Mill. Kennedy/Jenks Consultants, Inc. September 19.

Kennedy Jenks. 2019. Technical Memorandum from Deonne Knill, Kennedy Jenks, to Georgia-Pacific Consumer Operations LLC, RE: Investigation of Suspected Bunker C Release at Georgia-Pacific Camas Mill. Kennedy/Jenks Consultants, Inc. February 1.

Kennedy Jenks. 2020. Letter from Deonne Knill, Kennedy Jenks, to Ha Tran, Washington Department of Ecology, RE: Investigation of Petroleum Release Discovered at Georgia-Pacific Consumer Operations LLC (Camas, Washington). Kennedy/Jenks Consultants, Inc. November 13.

Kennedy Jenks. 2022. *Agency Review Draft Remedial Investigation Work Plan*. Prepared for Georgia-Pacific Consumer Operations LLC. Kennedy/Jenks Consultants, Inc. January 3.

Kennedy Jenks. 2023. *Agency Review Revised Draft Remedial Investigation Work Plan.* Prepared for Georgia-Pacific Consumer Operations LLC. Kennedy/Jenks Consultants, Inc. March 31.

Kennedy Jenks. 2024. *Agency Review Revised Draft Remedial Investigation Work Plan for Upland Areas*. Prepared for Georgia-Pacific Consumer Operations LLC. Kennedy/Jenks Consultants, Inc. June 14.

Kennedy Jenks. 2025. Email from Rachel Morgan, Kennedy Jenks, to Mady Lyon, Washington Department of Ecology, RE: Camas - Cultural Resources. Kennedy/Jenks Consultants, Inc. March 18.

Mundorff, M.J. 1964. *Geology and Ground-Water Conditions of Clark County Washington, with a Description of a Major Alluvial Aquifer Along the Columbia River*. United States Geological Survey, Water Supply Paper 1600. Washington, DC. https://doi.org/10.3133/wsp1600.

NCASI. 2013. *Handbook of Environmental Regulations and Control (HERC)*. National Council for Air and Stream Improvement, Inc. 2013.

SECOR. 2000. *Preliminary Assessment – Former Specialty Chemicals, Inc*. SECOR International Incorporated. July 26.

SECOR. 2001. *2000 Site Investigation Report – Former Fort James Specialty Chemicals*. SECOR International Incorporated. January 17.

USDA NRC. 2025. Web Soil Survey. United Stated Department of Agriculture, Natural Resources Conservation Service. https://websoilsurvey.nrcs.usda.gov/app/ n.d.

USEPA. 1978. *Screening Study on Feasibility of Standards of Performance for Two Wood Pulping Processes*. United States Environmental Protection Agency. Office of Air, Noise, and Radiation, Office of Air Quality Planning and Standards. Research Triangle Park, NC. EPA-450/3-78-111.

USEPA. 2004. TBA.

Zimmer et al. 2024. TBA

TABLES

FIGURES

Geosyntec consultants

APPENDIX A
Sampling and Analysis Plan

Geosyntec consultants

APPENDIX B

Previous Investigation Environmental Data Tables

Geosyntec consultants

APPENDIX C
Previous Investigation Well Logs

APPENDIX D
Summary of Spills

APPENDIX E
SPCC Tank and Equipment Inventory Tables

Geosyntec consultants

APPENDIX F
Visual Timeline

APPENDIX G
Response to Comments Table