TECHNICAL MEMORANDUM

To: Dan Hafley, Oregon DEQ NWR

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Date: June 17, 2019

Subject: Remedial Action Construction Completion
Floragon Property, Former Dip Tank Area
Molalla, Oregon
ECSI File No. 0009

PNG Environmental, Inc. (PNG) has prepared this memorandum to summarize 2018 remediation action construction activities completed at the former Dip Tank Area of the Floragon Forest Products property (Floragon) site in Molalla, Oregon (Figure 1). The former Dip Tank Area is an approximately 3.2-acre parcel within the larger 105-acre former mill facility owned by Floragon (Figure 2). The selected remedial design was outlined in the Remedial Design/Remedial Action (RD/RA) Work Plan (PNG 2018) and the Oregon Department of Environmental Quality (DEQ) Record of Decision (ROD) (DEQ 2018a). The DEQ-selected remedial action included a combination of hot spot soil removal, storm water conveyance sediment removal and cleaning, surface debris removal, protective cover enhancement, habitat enhancement, and implementation of institutional controls. These measures as approved by DEQ are protective and achieve site-specific Remedial Action Objectives (RAOs) involving direct contact prevention and protection of the adjacent Bear Creek from site contamination.

SITE DESCRIPTION

The approximately 3.2-acre former Dip Tank Area is part of the approximate 5-acre study area of the 2016 Remedial Investigation Report located at 250 W. 7th Street, Molalla (Clackamas County), Oregon (Figure 1). The study area, formerly owned by Avison Lumber Company (Avison), is currently vacant but was historically associated with a much larger lumber mill and forest products manufacturing facility covering approximately 105 acres. Lumber-related manufacturing occurred at the 105-acre parent site beginning in the 1940s and was largely discontinued by 2009.

From approximately 1970 to 1985, Avison Lumber applied a water-based pentachlorophenol (PCP) solution on lumber in the area of former Dip Tank Area #1 for anti-fungal purposes prior to shipment in containers. The process for preventing lumber from staining during shipment is not considered a “wood treating” operation according to the U.S. Environmental Protection Agency (EPA); DEQ has adopted this conclusion for this site. Product literature for Noxtane SS1, a water-based fungicide used to control sapstain, indicates total chlorophenols comprised less than 30% of the undiluted formulation, of which PCP comprised 14% prior to blending. Based on the manufacturer’s recommended 100:1 dilution, PCP was used at working concentrations of approximately 1,400 parts per million (ppm) (0.14%). It was later discovered that this solution may have contained manufacturing impurities including a family of related chemicals called chlorinated dibenzo-p-dioxin and chlorinated dibenzofurans, commonly referred to as

dioxin. Lumber was prepared for shipping by being dipped into one of two tanks containing the water-based anti-fungal solution, consistent with industry standards. The lumber, after dipping, was allowed to drain over the tanks on forks to recover any residual solution. In approximately 1985, Dip Tank #1 was removed from service and a second dip tank system (Dip Tank #2 on Figure 3) was installed. The new dip tank system used NP-1 for lumber surface protection which contained dodecyl dimethyl ammonium chloride and 3-iodo-1-propynyl butyl carbamate. NP-1 is water based, diluted up to 200:1, and does not contain chlorophenols. Along with Dip Tank #1, no carrier solvent was reported to have been used by Avison during the anti-sapstain process. NP-1 reportedly was used by Avison until approximately 1998, when the site was sold to Floragon. Use of Dip Tank #2 was reportedly discontinued within six months following Floragon's acquisition of the site.

Most of the 105-acre property's mill buildings have been demolished although vacant buildings constructed in the 1990s (related to Floragon's former "glue-lam" manufacturing operations) remain in the southern portion of the property, south of the former Dip Tank Area near Molalla Forest Road. Northern portions of the former mill facility were sold following the "North Parcels" No Further Action (NFA) determination in 2014 and are currently being used for industrial purposes. Recently, another operator has moved onto a portion of the northern area and has paved a large section for industrial use.

Site Investigation Summary

Remedial investigation for the former Dip Tank Area of the Floragon property was conducted over three phases: Phase 1 was conducted across the entire 105-acre mill property in 2010; Phase 2 was conducted to address specific data gaps beginning in 2012; and Phase 3 was conducted in the onsite section of Bear Creek and former Dip Tank Area beginning in 2014. These efforts are discussed briefly below and in detail in the Phase 3 Remedial Investigation – Data Report (PNG 2016).

- **2010 Phase 1 Remedial Investigation:** Following DEQ approval of the 2009 Remedial Investigation/Feasibility Study (RI/FS) work plan (AMEC 2009), extensive site investigation efforts were conducted across the entire 105-acre Floragon property. These Phase I investigations supplemented the data collected prior to 2010. The Phase 1 RI further evaluated site-wide conditions and indicated that limited and localized environmental impacts were present at certain portions of the former mill property. In general, the greatest concentrations of primary contaminants of interest (COIs) were identified at several areas within the 105-acre parcel, including the former Dip Tank Area. The Phase 1 RI included baseline human health and ecological risk characterization tasks.
- **2012 Phase 2 Remedial Investigation:** A series of supplemental activities were conducted to address data gaps identified during the first phase of investigation. Based on Phase 2 RI and risk assessment findings, the DEQ issued an NFA determination for the 84-acre Northern Parcels Area in March 2014 and a separate NFA is currently pending for the 16-acre SE Corner Area. Investigation tasks conducted in 2012 focused on sediment contaminant characterization including (1) on-site portions of Bear Creek, and (2) surficial soil/sediment materials within the site's industrial North Ditch, and among related catch basin and drainage pipe features located near the Northern Ditch and former Hyster Shop areas. The sediment characterization effort focused on dioxin, since other COIs including non-PCP chlorophenols, polynuclear aromatic hydrocarbons (PAHs), and metals were generally concluded to not present unacceptable risks based on the Phase 1

RI risk assessment. Groundwater quality samples collected from the network of shallow and intermediate-depth monitoring wells, including within the former Dip Tank Area, showed that, where detected, none of the contaminant concentrations in groundwater exceed their respective DEQ risk-based concentrations (RBCs) for applicable exposure pathways (DEQ 2018b).

- **2014-2015 Phase 3 Remedial Investigation:** In accordance with a DEQ-approved work plan, Phase 3 RI activities were conducted in 2014 and 2015. The purpose of this phase was to further delineate the magnitude and extent of contaminants in Bear Creek sediment and former Dip Tank Area soils (surface soils and catch basin sediments). From the former Dip Tank Area, sixteen four-point composite soil samples were analyzed for dioxins as part of the Phase 3 RI. In combination with data from 2010-2014, one localized dioxin hot spot was identified in soil at the site, adjacent to former Dip Tank #2. Among the 16 composite soil samples analyzed during Phase 3, concentrations from samples within 20 feet of the hot spot contained low levels of dioxin mammalian toxicity equivalent (TEQ) at concentrations of 19 picogram per gram (pg/g) (0.5 feet depth) and 20 pg/g (1.5 feet depth), slightly exceeding the occupational direct contact RBC of 16 pg/g. More distant four-point composite samples (B13-B16) collected within 50 feet of AB-06 indicated dioxin levels of 489 and 172 pg/g for 0.5 foot and 1.5 foot depth samples, respectively. These detections exceed both the occupational direct contact RBC and the construction worker RBC (170 pg/g). Therefore moderately elevated levels of dioxin characterized in this former Dip Tank Area are limited to shallow soils that are not expected to experience extensive erosion or migration. The dioxin associated with shallow soil is not expected to migrate appreciably based on affected soils being localized and covered beneath paved surfaces, preventing direct erosion/runoff as well as limiting the potential for leaching and migration to shallow groundwater.

SITE CONTAMINATION CONDITIONS

Remedial investigation site characterization and associated risk assessment efforts indicate that dioxin are the primary contaminants of concern at the Dip Tank Area. A range of potential contaminants including anti-fungal chemicals, hydrocarbon-based lubricants and fuels and their constituents, and metals were evaluated during development of the RI (PNG 2016a). Dioxin are generally associated with both the subject site's lengthy history of lumber mill operations (including wood surface protection processes to control sapstain) and also with urban (commercial, industrial, and residential) land use in the immediate site vicinity.

Dioxins

- Dioxins in shallow soil are the primary contaminants of concern in the former Dip Tank Area. Identified contamination within this localized area is likely from historic surface spills from the former Dip Tank operations.
- Elevated dioxin levels (2,221 pg/g TEQ) detected at soil sample location AB-06 in 2010 were further delineated during Phase 3 RI by evaluating composite soil samples collected at increasing lateral and vertical distances from this location. These samples indicated dioxin concentration ranges between 19 and 489 pg/g

TEQ up to a depth of 1.5 feet and a distance of 50 feet from the sample location AB-06.

- Around the margins of the former Dip Tank Area, additional four-point shallow soil (up to 1.5 feet depth) composite samples collected during Phase 3 identified dioxin concentrations in soil of between 0.6 and 63 pg/g TEQ.

Petroleum Hydrocarbons

- Diesel and heavy oil range hydrocarbons have been identified across the site in soil, sediment, and (at select locations including the former Dip Tank, Hyster Shop, and former Log Pond Areas) groundwater. Petroleum hydrocarbon contamination identified at the site is likely associated with spills and leaks from the use of vehicles and heavy equipment, equipment maintenance, log/lumber transport and storage, as well as other industrial uses.
- Diesel was not detected at any of the Phase 3 soil samples from the Former Dip Tank Area.
- Oil, where present, was detected at concentrations ranging from 52 to 3,860 mg/kg.

Other Contaminants

- Other site contaminants (i.e., metals, polycyclic aromatic hydrocarbons [PAHs], chlorophenols, and volatile organic compounds [VOCs]) were identified in some areas of the site and may be associated with various activities including:
  - Industrial operations at the site.
  - Demolition/decommissioning of site infrastructure by Floragon conducted circa 2005.
  - Vicinity commercial/industrial land use, especially near site margins.
- In the former Dip Tank Area, PCP was detected at a depth of 1.5 feet in samples B1-4 and B17-20 at 0.021 mg/kg and 0.090 mg/kg, respectively. This compound was also detected in the B1-4 composite at a concentration of 0.193 mg/kg (0.5 feet) and 0.017 mg/kg (3.0 feet).
- With the exception of naphthalene and phenanthrene (0.0068 mg/kg and 0.0019 mg/kg, respectively), SVOCs were not detected in the former Dip Tank Area soil.
- Total metals concentrations were detected at levels generally expected in Willamette Valley soils or below applicable DEQ RBCs, with one slightly elevated arsenic concentration (9.4 mg/kg, versus DEQ's background concentration of 9 mg/kg) in soil sample composite B9-12.
- Overall, these other contaminants appear typically limited in extent and occur at concentrations that are generally low relative to their respective RBCs and are expected to pose a much lower risk to human health and the environment compared to previously described "primary" COIs.

Groundwater in the former Dip Tank Area discharges to the adjacent Bear Creek. Although the shallow water table discharges to Bear Creek in the area, site contaminants have not been identified in groundwater as it approaches the creek.

Risk Based Assessment Results

A baseline risk assessment conducted as part of Phase 1 RI activities evaluated the entire 105-acre mill property (PNG 2011). Subsequent phases of the RI resulted in a refined understanding of site conditions; therefore, the risk assessment focused on various exposure units based on topography, function, and infrastructure/layout.

The initial risk screening indicates that unacceptable risks exceeding the regulatory standard of $1x10^{-6}$ are possible for several receptors exposed to soils in the Dip Tank area (see Human Health Risk Assessment [HHRA] Table C3-7, PNG 2016b). Therefore, individual congeners were evaluated as unique carcinogens.

As previously applied by DEQ in this situation, the regulatory standard for individual carcinogens ($1x10^{-6}$) was evaluated for each individual congener, and an excess cancer risk (ECR) standard for acceptable cumulative risk of $1x10^{-5}$ for multiple congeners applied. This analysis was performed for receptors determined to have cumulative risks governed by dioxin in the ECR range between $1x10^{-6}$ and $1x10^{-5}$. The risk assessment (PNG 2016b) provides congener-specific ECR calculations for the identified receptor scenarios.

Using this approach for both carcinogenic and non-carcinogenic effects, the determination of unacceptable human health risks for the former Dip Tank Area can reasonably be narrowed, as summarized in HHRA Tables C3-8 and C3-14 (PNG 2016b), and as described below.

- No unacceptable risks to excavation workers or trespassers were identified.
- Unacceptable risk to occupational workers is based on dioxin in soil located beneath existing pavement surfaces at four locations and sediments in two catch basins (see HHRA Table C3-11, PNG 2016b):
  - Shallow surficial soil (0-0.5 feet) beneath the pavement at AB-03, AB-05, AB-06, and the B13-B16 composite.
  - Subsurface (1.5 feet deep) soil at the B13-16 composite.
  - Catch basin sediments at AB-19A and AB-19B.
- Unacceptable risk to construction workers is based on dioxin in soil at one paved location (AB-06 at 0-0.5 feet) and one catch basin (AB-19B), as noted in HHRA Table C3-12 (PNG 2016).

No ecological receptors are anticipated for the former Dip Tank Area given that it is largely paved and zoned for industrial use. Ecological receptors are, of course, considered for the adjoining Bear Creek, and the potential for soil contamination to migrate to the creek was considered. Identification of cleanup measures for the on-site portion of Bear Creek impacted by dioxins will be addressed in a separate document. The former Dip Tank Area reedy was completed prior to a Bear Creek remedy to eliminate the upland area as a recontamination source.

FEASIBILITY STUDY AND RECORD OF DECISION

A Focused Feasibility Study (FFS) addressing the former Dip Tank Area was completed by PNG on July 24, 2017 (PNG 2017) with DEQ oversight. The FFS identified the nature and extent of former Dip Tank Area contamination exceeding human health risk-based levels and addressed the soil hot spot identified in the former Dip Tank Area. The FFS

included a preliminary screening of remedial alternatives, selection of remedial alternatives for detailed analysis, and final selection of a recommended remedial approach to address risk. Subsequent to the FFS, a Record of Decision (ROD) was issued on June 15, 2018 presenting DEQ's selected remedial action for the former Dip Tank Area.

Remedial Action Objectives

Remedial Action Objectives are media-specific goals for protecting human health and the environment (DEQ 1998, updated 2006). RAOs provide the underlying basis for developing and evaluating remedial actions. The selected remedy must achieve the site-specific RAOs.

The RAOs identified to address dioxin in soil at the former Dip Tank Area are listed below.

- Protection of occupational, construction, and excavation workers at the site from direct contact with shallow subsurface dioxins in soil within the approximately three-acre area. The occupational worker direct contact RBC for dioxins is 16 pg/g.

- Prevention of migration of dioxin from the Dip Tank Area soil to the adjacent Bear Creek. DEQ has established a site-specific PRG for dioxin in sediments of 20 pg/g.

Identification of Hot Spots

All remedial actions must be protective, provide a balance of remedy selection factors, and treat Hot Spots of contamination [as defined in Oregon Administrative Rules (OAR) 340-122-115 (35)] to the extent feasible. Impacted soil at in the former Dip Tank Area has been evaluated for Hot Spots as per DEQ guidance (DEQ 1998).

SOIL HOT SPOT EVALUATION

The criteria for identification of Hot Spots in media other than groundwater or surface water are defined as follows:

- Criteria A: Concentrations exceeding risk-based concentrations corresponding to
  - 100 times the acceptable risk level for human exposure to each individual carcinogen,
  - Ten times the acceptable risk level for human exposure to each individual non-carcinogen,
  - Ten times the acceptable risk level for individual ecological receptors or populations of ecological receptors to each individual hazardous substance.
- Criteria B: Are reasonably likely to migrate to such an extent that they create a risk to human health or the environment exceeding the acceptable level,
- Criteria C: Are not reliably containable.

Based on the screening of soils, the only exposure scenario for soil where a potentially unacceptable risk exists is for occupational and/or construction excavation worker direct contact to dioxin, a known human carcinogen. One soil sample, AB-06 at 0-0.5 feet bgs, containing Total TEQ dioxin at concentrations that exceed 1,600 pg/g (soil Hot Spot level of 100 times the occupational worker RBC of 16 pg/g), constitutes a soil Hot Spot under Criteria A. This evaluation is based on total TEQ, consistent with DEQ's current policy on chemical classes. Based on the dioxin concentrations in soil sample AB-06, a soil Hot

Spot is present within a relatively limited area adjacent to the location of a former dip tank in the feasibility study area.

GROUNDWATER HOT SPOT EVALUATION

According to OAR 340-122-115 (35), the criteria for identification of a groundwater Hot Spot is defined as:

> "A significant adverse effect on beneficial uses of water to which the hazardous substances would be reasonably likely to migrate and for which treatment is reasonably likely to restore or protect such beneficial uses within a reasonable time."

Based on the beneficial uses of groundwater no significant adverse risks were identified. Accordingly, Hot Spots of groundwater are not currently present or reasonably likely in the former Dip Tank Area in the future.

FFS Recommended Remedial Action and DEQ Record of Decision

In the FFS, a comparative evaluation and review of the alternatives was completed by PNG considering the balancing factors set forth in OAR 340-122-0080. The selected alternative was protective and achieved all site-specific RAOs in a relatively short timeframe. The selected remedial alternative also addressed the Hot Spot soil at a reasonable incremental cost. Subsequent to the FFS, a ROD was issued on June 15, 2018 presenting DEQ's selected remedial action for the former Dip Tank Area of the site. DEQ's selected remedial action for the site was consistent with that presented in the FFS and includes the following:

- Sediment removal from catch basins and associated storm sewer lines.
- Excavation of a small area (approximately 1,600 square feet to a depth of two feet) in the region of sample AB-06 where the highest dioxin concentrations in soil were found (dioxin concentrations in this small area exceed the Hot Spot level of 1,600 pg/g). This alternative involves excavation of an estimated 178 tons of Hot Spot soil and offsite disposal.
- Restoration of the excavated area to consistent elevation and grade.
- Outside of the Hot Spot soil removal area, preparation of the existing pavement surface through removal of vegetation and debris.
- Addition of a two-inch asphalt concrete overlay over the existing three to four inches of weathered asphalt concrete covering the Dip Tank Area (Figure 6).
- Habitat enhancement in the northwest and northeast corners of the former Dip Tank Area.
- Preparation of a Contaminated Media Management Plan (CMMP).
- Filing of a deed restriction prohibiting the non-conforming use of the property and detailing the extent and magnitude of the soil contamination remaining on site.
- Future inspections and maintenance of the asphalt concrete cover/cap.

Remedial Design and Remedial Action Workplan Modifications

In preparation for the former Dip Tank Area remedy implementation, waste stream samples were collected in June 2018 for disposal profiling or planning for onsite management (concrete containment rain water, storm water line catch basin sediment, etc.). Composite soil samples were also collected at this time from within the habitat areas in the northeast and northwest corners of the former Dip Tank Area. These samples were intended to support decisions on management of the soils excavated during the habitat construction, as well as provide additional data on surface soil quality in the unpaved areas.

Habitat area soil composite samples contained detectable concentrations of dioxins. The dioxin concentrations were not above the hot spot level of 1,600 pg/g, but did exceed the occupational worker direct contact RBC of 16 pg/g. Based on these results, the DEQ-selected remedy was modified to include an asphalt pavement cover over the majority of for the previously unpaved habitat areas, and a 1.5 to 2 foot thick topsoil backfill cover in the planting areas along Bear Creek.

FORMER DIP TANK AREA REMEDIAL ACTION ACTIVITIES

The majority of remedial action activities in the former Dip Tank Area, described below, were conducted between July and August 2018. Completion of the habitat enhancement area actions outlined in the RD/RA Work Plan, including installation of trees and shrubs within the designated planting areas, was completed in November 2018 as seasonally appropriate. Representative photographs taken during construction of the completed remedial action are attached in Appendix A.

Storm Water System Cleaning

A storm water system consisting of two catch basins and approximately 300 lineal feet of line appeared to run northward across the former Dip Tank area toward Bear Creek. Attempts to locate the outfall of this storm sewer line prior to implementation of the remedy in 2019 were unsuccessful. Actions taken to clean the storm water system included the following:

- By accessing through the creek during seasonal low water conditions during the summer of 2019, the outfall for the storm line was located along the Bear Creek bank adjacent to the western Habitat Enhancement area.
- The outfall location within Bear Creek was temporarily sealed to prevent discharge of water and sediment to the creek during line cleanout activities.
- Upland from the sealed outfall, excavated down to the sewer line. The sewer pipe was cut to create an access point for jetting of sediment and capture of water and sediment during cleanout activities.
- Sediment was removed from both catch basins.
- Line cleanout was conducted by progressively jetting the storm line between the outfall and the southern catch basin. The sediment/water slurry was removed from the line with a vacuum truck, and temporarily staged on site in drop boxes to allow for separation of solids and liquids.
- The created access point upland of the sealed outfall was repaired once all lines and catch basins were clean. The excavation was then backfilled to grade.

- Approximately 1,800 gallons of water from the drop boxes was permitted for recycling at Oil Re-Refining Company (ORRCO).
- Approximately three cubic yards of sediment from the catch basins and storm line was sampled for profiling, and subsequently sent off-site to Hillsboro Landfill for disposal.

Former Dip Tank #2 Containment Management

The former Dip Tank #2 containment vault, as shown on Figure 3, is approximately 5 feet deep (1.5 feet above land surface), 10 feet wide, and 45 feet long and constructed with 8 inch thick Portland cement concrete walls. Prior to other remedial construction activities, the vault contained an estimated ten cubic yards of wood, metal, and other debris as well as approximately 8,000 gallons of rainwater. Remedial action activities associated with the former Dip Tank #2 containment vault included the following:

- Rainwater from within the containment was pumped out of the vault, filtered and treated using activated carbon. The treated water was then discharged to the existing on site pavement surface for evaporation with DEQ approval.
- The containment vault was emptied of wood and other debris. This material was combined with other construction debris collected from within the former Dip Tank Area and staged on site for subsequent off-site disposal to Hillsboro Landfill.
- The containment vault was backfilled with gravel material excavated from the Habitat Enhancement areas (see below). This material was compacted and capped with approximately six inches of control density fill (CDF).

Hot Spot Soil Removal

Soil removal was completed adjacent to the north end of the containment vault of former Dip Tank #2 consistent with the DEQ approved RD/RA work plan. The soil removal location was centered around the location of soil sample AB-06 where analytical testing detected concentrations of dioxin in soil exceeding the Hot Spot criteria (i.e., greater than 1,600 pg/g). The extent of the excavation was delineated by the soil sample locations B-8 through B-12 and the existing Portland concrete slab on either side of the former Dip Tank #2 containment vault (concrete slab extends to depths below the floor of the Hot Spot soil excavation in these portions of the excavation). Previous investigation activities confirmed dioxin concentrations in soil at these sample locations were less than the Hot Spot criteria. Actions completed as part of the Hot Spot soil removal included the following:

- Soil was removed to depth of between 2.0 and 2.5 feet from the area adjacent to the former Dip Tank #2 containment vault, as shown on Figure 3. Approximately 65 cubic yards of soil were excavated and staged on site for later transportation off-site and disposal to Hillsboro Landfill.
- Eight confirmation soil samples were collected from the floor and walls of the excavation, as shown on Figure 4. Samples were submitted to Pace Analytical Services, LLC (Minneapolis, Minnesota) for laboratory analysis of dioxins and furans by EPA Method 1613b. The analytical results of these confirmation soil samples are included on Table 1. Where individual congeners were dot detected above the laboratory reporting limit, the detection limit was used to calculate the 2,3,7,8-TCDD toxicity equivalent. Dioxin concentration (as 2,3,7,8-TCDD TEQ) in the confirmation soil samples ranged from 7.1 to 880 pg/g.

- Following Hot Spot soil removal and analytical verification that remaining dioxin concentrations in soils are below the Hot Spot criteria of 1,600 pg/g, the excavation was backfilled with gravel from the habitat enhancement planting area excavation (see below). The backfilled Hot Spot excavated was then covered with three to four inches of imported ¾-inch minus crushed gravel to grade. The gravel was compacted in preparation for application of the asphalt concrete overlay.

Protective Surface Cover Enhancement

In anticipation for the placement of the asphalt concrete overlay (enhancement of the existing concrete surface/cover), the site-wide asphalt concrete surface was cleaned of grasses, weeds, loose materials, and surface and near-surface debris. This debris was temporarily staged on site for later transportation off-site and landfill disposal. Areas where surface and near surface debris were removed and a depression remained were then backfilled to grade with imported ¾-inch minus crushed gravel.

In late August 2018, consistent with the DEQ approved RD/RA work plan, a minimum 2-inch thick asphalt concrete overlay was placed over the existing weathered asphalt concrete pavement and ¾-inch minus crushed gravel backfill areas. Figure 3 shows the extent of asphalt paving within the former Dip Tank area. The asphalt concrete overlay was not applied over existing Portland concrete building floor slabs and foundations. The Portland cement concrete slab and foundation material was observed to be in good condition with no significant cracks or penetrations expected to allow exposure of the underlying soil.

Habitat Enhancement

Habitat enhancement for two unpaved areas in the northwest and northeast corners of the former Dip Tank Area adjacent to Bear Creek was completed consistent with the DEQ approved RD/RA work plan. Actions completed as part of the habitat enhancement included the following:

- In June 2018, collected surface and subsurface soil within the unpaved areas and submitted samples to Pace Laboratory for dioxin analysis as directed by DEQ. All samples contained dioxin levels above the applicable RBC of 16 pg/g, but below the Hot Spot level of 1,600 pg/g.
- Compacted gravel and pit run rock was excavated from the habitat enhancement areas adjacent to the creek creating two separate depressions up to two feet deep and approximately 20 feet wide, as shown on Figure 3.
- Excavated gravel was temporarily staged on site and used as backfill in the former Dip Tank #2 containment vault and the Hot Spot soil excavation, where possible. Excess gravel excavated from the habitat enhancement areas was transported offsite for disposal at Hillsboro Landfill.
- The habitat area excavations were backfilled to grade with approximately 220 cubic yards of imported clean topsoil from Lonnie Endicott Excavating (Aurora, Oregon). This imported top soil was necessary to create suitable conditions for the establishment of the habitat enhancement area plant species.
- Silt-fence wrapped straw bales, installed along the top of the creek bank prior to any on site construction, were left in place after backfilling to prevent potential erosion of topsoil into Bear Creek before vegetation became established.

- The previously unpaved portions of the habitat enhancement areas outside of the planting areas were covered with a one to six inch layer of imported ¾-inch minus crushed gravel in preparation for paving. The gravel covered areas outside the planting area received an overlay of a minimum of two inches of asphalt concrete pavement in late August 2018 together with the rest of the former Dip Tank area.
- In November 2018, when seasonally appropriate, planting in the topsoil backfilled areas was completed. The planting areas were vegetated with a native plant community consistent with the ROD and DEQ approved RD/RA Work Plan. The planting areas were seeded with a native grass and forb seed mix, with larger shrubs and trees planted along the outer edges. The combined planting area was approximately 5,000 square feet, requiring more than 300 potted plants and stakes, as listed in the table below. Following application of the seed mix, erosion control matting (C32BD erosion control blanket) along with the silt fence-wrapped straw bales were installed to minimize potential erosion while vegetation became established. After planting activities completed, the erosion control matting was stapled back into place, where necessary.

Common Name	Scientific Name	Size/Type	Quantity
Tree			
Oregon white oak	*Quercus garryana*	one-gallon band pot	20
Oregon ash	*Fraxinus latifolia*	one-gallon band pot	20
Scouler's willow	*Salix scouleriana*	5-foot long live stake cuttings	40
Shrub			
common snowberry	*Symphoricarpos albus*	one-gallon pot	60
red osier dogwood	*Cornus sericea*	one-gallon pot	48
bald-hip rose	*Rosa gymnocarpa*	one-gallon pot	40
Douglas' spirea	*Spiraea douglasii*	one-gallon pot	40
Saskatoon serviceberry	*Amalanchier alnifolia*	one-gallon pot	20
oceanspray, creambush	*Holodiscus discolor*	one-gallon pot	20

Inspection and Maintenance Plan

A Pavement Inspection and Maintenance Plan was prepared consistent with the RD/RA Work Plan. The purpose of the Inspection and Maintenance Plan is to establish routine practices to document the continued integrity of this paved area such that the pavement remains in use as a protective working surface. The paved area serves to isolate underlying soils and fill material from exposure to the surrounding environment until such time as the underlying soils are determined to meet DEQ acceptable risk criteria. The Inspection and Maintenance Plan will be adopted by current and future property owners and implemented as detailed in Appendix B.

SUMMARY AND CONCLUSIONS

Dioxin are generally associated with both the subject site's lengthy history of lumber mill operations (including wood surface protection processes to control sapstain) and also with urban (commercial, industrial, and residential) land use in the immediate site vicinity. As outlined in the ROD and RD/RA Work Plan, the remedy for dioxin contamination in the former Dip Tank Area included several components: hot spot soil removal, storm water conveyance sediment removal and cleaning, surface debris removal, protective cover enhancement, habitat enhancement, and implementation of institutional controls. The following is a summary of the results of the remediation activities in the former Dip Tank Area.

- Storm Sewer System Cleanout
  - A storm water system consisting of two catch basins and approximately 300 lineal feet of line was cleaned of sediment. The outfall location within Bear Creek was temporarily sealed to prevent discharge of water and sediment to the creek during line cleanout activities.
  - Sediment was removed from both catch basins. Line cleanout was conducted by progressively jetting the storm line between an access created in the line just upland from the outfall and the southern catch basin. The created access point upland of the sealed outfall was repaired once all lines and catch basins were clean. The excavation was then backfilled to grade.
- Former Dip Tank Containment Vault
  - The former Dip Tank #2 containment vault contained an estimated ten cubic yards of wood, metal and other debris and approximately 8,000 gallons of rainwater. Rainwater from within the containment was pumped out of the vault, filtered and treated using activated carbon. The containment vault was emptied of wood and other debris.
  - The containment vault was backfilled with gravel material excavated from the Habitat Enhancement areas (see below). This material was compacted and capped with approximately six inches of control density fill (CDF).
- Hot Spot Soil
  - Based on the results of site investigations from 2010-2015, one localized dioxin hot spot was identified in soil at the site, adjacent to former Dip Tank #2.
  - Soil was removed to depth of between 2.0 and 2.5 feet from the area adjacent to the former Dip Tank #2 containment vault. In total, approximately 65 cubic yards of soil was excavated for the hot spot area. Eight confirmation soil samples were collected from the floor and walls of the excavation. Dioxin concentrations in the confirmation soil samples ranged from 7.1 to 880 pg/g, and all are below the hot spot criteria of 1,600 pg/g.
- Protective Surface Cover Enhancement
  - The site-wide asphalt concrete surface was cleaned of grasses, weeds, loose materials, and surface and near-surface debris. Areas where surface and near surface debris were removed and a depression remained were then backfilled to grade with imported ¾-inch minus crushed gravel.

  - In late August 2018, consistent with the DEQ approved RD/RA work plan, a minimum 2-inch thick asphalt concrete overlay was placed over the existing weathered asphalt concrete pavement and ¾-inch minus crushed gravel backfill areas. The asphalt concrete overlay was not applied over existing Portland concrete building floor slabs and foundations. The Portland cement concrete slab and foundation material was observed to be in good condition with no significant cracks or penetrations expected to allow exposure of the underlying soil.

- Habitat Enhancement
  - In June 2018, collected surface and subsurface soil within the unpaved areas as directed by DEQ. All samples contained dioxin levels above the applicable RBC of 16 pg/g, but below the Hot Spot level of 1,600 pg/g.
  - Compacted gravel and pit run rock was excavated from these areas adjacent to the creek creating two separate depressions up to two feet deep and approximately 20 feet wide. Excavated gravel was temporarily staged on site and used as backfill in the former Dip Tank #2 containment vault and the Hot Spot soil excavation, where possible. Excess gravel was transported offsite for disposal at Hillsboro Landfill.
  - The habitat area excavations were backfilled to grade with approximately 220 cubic yards of imported clean topsoil. This imported top soil was necessary to create suitable conditions for the establishment of the habitat area plant species.
  - The previously unpaved portions of the habitat enhancement areas outside of the planting areas were covered with a one to six inch layer of imported ¾-inch minus crushed gravel to grade in preparation for paving. The gravel in these areas received an overlay of a minimum of two inches of asphalt concrete pavement in late August 2018 together with the rest of the former Dip Tank area.
  - In November 2018, when seasonally appropriate, planting in the topsoil backfilled areas was completed. The planting areas were vegetated with a native plant community consistent with the ROD and DEQ approved RD/RA Work Plan. The planting areas were seeded with a native grass and forb seed mix, with larger shrubs and trees planted along the outer edges. The combined planting area was approximately 5,000 square feet, requiring more than 300 potted plants and stakes. Erosion control matting along with the silt fence-wrapped straw bales was installed to minimize potential erosion while vegetation becomes established.

All remaining dioxin in soil within the former Dip Tank Area have dioxin concentrations that are below the hot spot criteria (greater than 1,600 pg/g) and are covered by a minimum of 2-inch asphalt concrete pavement or one to two feet of imported topsoil (i.e., habitat enhancement planting areas). The paved surface and cleaned catch basins/sewer line minimize erosion of site soils from surface water runoff. These measures, as approved by DEQ, are protective and achieve site-specific RAOs involving direct contact prevention and protection of the adjacent Bear Creek from site contamination.

cc: Bill Avison, Avison Lumber Co.
Brien Flanagan, Schwabe Williamson & Wyatt

Attachments

Table 1 – Hot Spot Analytical Results - Dioxins

Figure 1 – Site Vicinity Map
Figure 2 – Overview Map – Aerial 2012
Figure 3 – Dip Tank Area Remedial Action Summary
Figure 4 – Hot Spot Soil Removal Area Summary
Figure 5 – Asphalt Concrete Cover Detail

Appendix A – Site Photographs
Appendix B – Inspection and Maintenance Plan

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TABLES

Table 1
Hot Spot Analytical Results - Dioxins
Floragon Property
Molalla, Oregon

Sample HSW-N Post-Excavation Confirmation Results						
	Totals			TEF	Equivalent Concentration	Equivalent Concentration
Analyte	pg/g	mg/Kg	mg/Kg		pg/g	mg/Kg
2,3,7,8-TCDD	3.0 U	0.000003 U	3.0E-06 U	1	3.0 U	3.0E-06 U
1,2,3,7,8-PeCDD	5.7 U	0.0000057 U	5.7E-06 U	1	5.7 U	5.7E-06 U
1,2,3,4,7,8-HxCDD	7.5 U	0.0000075 U	7.5E-06 U	0.1	0.75 U	7.5E-07 U
1,2,3,6,7,8-HxCDD	350	0.00035	3.5E-04	0.1	35	3.5E-05
1,2,3,7,8,9-HxCDD	35 J	0.000035 J	3.5E-05 J	0.1	3.5 J	3.5E-06 J
1,2,3,4,6,7,8-HpCDD	1,200	0.0012	1.2E-03	0.01	12	1.2E-05
OCDD	6,300	0.0063	6.3E-03	0.0003	1.9	1.9E-06
2,3,7,8-TCDF	4.3 J	0.0000043 J	4.3E-06 J	0.1	0.43 J	4.3E-07 J
1,2,3,7,8-PeCDF	4.4 U	0.0000044 U	4.4E-06 U	0.03	0.13 U	1.3E-07 U
2,3,4,7,8-PeCDF	9.2 J	0.0000092 J	9.2E-06 J	0.3	2.8 J	2.8E-06 J
1,2,3,4,7,8-HxCDF	6.9 U	0.0000069 U	6.9E-06 U	0.1	0.69 U	6.9E-07 U
1,2,3,6,7,8-HxCDF	12 J	0.000012 J	1.2E-05 J	0.1	1.2 J	1.2E-06 J
2,3,4,6,7,8-HxCDF	10 J	0.0000095 J	9.5E-06 J	0.1	1.0 J	9.5E-07 J
1,2,3,7,8,9-HxCDF	10 U	0.00001 U	1.0E-05 U	0.1	1.0 U	1.0E-06 U
1,2,3,4,6,7,8-HpCDF	240	0.00024	2.4E-04	0.01	2.4	2.4E-06
1,2,3,4,7,8,9-HpCDF	15 J	0.000015 J	1.5E-05 J	0.01	0.15 J	1.5E-07 J
OCDF	360	0.00036	3.6E-04	0.0003	0.11	1.1E-07
Total Toxic Equivalency (TEQ)						
2,3,7,8-TCDD TEQ (with detection limits)					**71.7**	**7.2E-05**
2,3,7,8-TCDD TEQ (with 1/2 detection limits)					**66.0**	**6.6E-05**
2,3,7,8-TCDD TEQ (without no-detects)					**60.4**	**6.0E-05**
DEQ Screening Level Criteria for Soil						
Soil Ingestion, Dermal Contact, and Inhalation						
Residential[a]					**4.7**	**4.7E-06**
Occupational[b]					**16**	**1.6E-05**
Construction Worker[c]					**170**	**1.7E-04**
Excavation Worker[d]					4,800	4.8E-03

Notes:

[a]Generic Risk-Based concentration (RBC) for soil ingestion, dermal contact, and inhalation in a residential setting (revised June 2018)

[b]Generic RBC for soil ingestion, dermal contact, and inhalation in an occupational setting (revised June 2018)

[c]Generic RBC for soil ingestion, dermal contact, and inhalation for a construction worker (revised June 2018)

[d]Generic RBC for soil ingestion, dermal contact, and inhalation for an excavation worker (revised June 2018)

pg/g = picogram per gram

mg/Kg = milligram per kilogram

U = Undetected at method reporting limit shown

J = Sample result is qualified as an estimated value, below the method reporting limit.

TEF = Toxicity equivalent factor (EPA's Dioxin and Dioxin-like Compounds Toxic Equivalency (TEQ) Information Rule- Final, Federal Register Notice: 72 Federal Register 26544; promulgated May 10, 2007)

TEQ = Sum of dioxin-like congener concentrations multiplied by their respective TEF values, expressed as a single 2,3,7,8-TCDD equivalent

NV = This chemical is classified as "nonvolatile" for purposes of the exposure screening, per DEQ 2007

Table 1
Hot Spot Analytical Results - Dioxins
Floragon Property
Molalla, Oregon

Sample HSW-S Post-Excavation Confirmation Results						
	Totals			TEF	Equivalent Concentration	Equivalent Concentration
Analyte	pg/g	mg/Kg	mg/Kg		pg/g	mg/Kg
2,3,7,8-TCDD	2.2 U	0.0000022 U	2.2E-06 U	1	2.200 U	2.2E-06 U
1,2,3,7,8-PeCDD	4.7 U	0.0000047 U	4.7E-06 U	1	4.700 U	4.7E-06 U
1,2,3,4,7,8-HxCDD	9.4 U	0.0000094 U	9.4E-06 U	0.1	0.940 U	9.4E-07 U
1,2,3,6,7,8-HxCDD	32 J	0.000032 J	3.2E-05 J	0.1	3.200 J	3.2E-06 J
1,2,3,7,8,9-HxCDD	11 U	0.000011 U	1.1E-05 U	0.1	1.100 U	1.1E-06 U
1,2,3,4,6,7,8-HpCDD	240	0.00024	2.4E-04	0.01	2.400	2.4E-06
OCDD	1,200	0.0012	1.2E-03	0.0003	0.360	3.6E-07
2,3,7,8-TCDF	2.1 U	0.0000021 U	2.1E-06 U	0.1	0.210 U	2.1E-07 U
1,2,3,7,8-PeCDF	3.2 U	0.0000032 U	3.2E-06 U	0.03	0.096 U	9.6E-08 U
2,3,4,7,8-PeCDF	2.9 U	0.0000029 U	2.9E-06 U	0.3	0.870 U	8.7E-07 U
1,2,3,4,7,8-HxCDF	6.8 U	0.0000068 U	6.8E-06 U	0.1	0.680 U	6.8E-07 U
1,2,3,6,7,8-HxCDF	6.7 U	0.0000067 U	6.7E-06 U	0.1	0.670 U	6.7E-07 U
2,3,4,6,7,8-HxCDF	6.4 U	0.0000064 U	6.4E-06 U	0.1	0.640 U	6.4E-07 U
1,2,3,7,8,9-HxCDF	10 U	0.00001 U	1.0E-05 U	0.1	1.000 U	1.0E-06 U
1,2,3,4,6,7,8-HpCDF	120	0.00012	1.2E-04	0.01	1.200	1.2E-06
1,2,3,4,7,8,9-HpCDF	3.4 U	0.0000034 U	3.4E-06 U	0.01	0.034 U	3.4E-08 U
OCDF	93 J	0.000093 J	9.3E-05 J	0.0003	0.028 J	2.8E-08 J
Total Toxic Equivalency (TEQ)						
2,3,7,8-TCDD TEQ (with detection limits)					**20**	**2.0E-05**
2,3,7,8-TCDD TEQ (with 1/2 detection limits)					**14**	**1.4E-05**
2,3,7,8-TCDD TEQ (without no-detects)					**7.2**	**7.2E-06**
DEQ Screening Level Criteria for Soil						
Soil Ingestion, Dermal Contact, and Inhalation						
Residential[a]					**4.7**	**4.7E-06**
Occupational[b]					**16**	**1.6E-05**
Construction Worker[c]					**170**	**1.7E-04**
Excavation Worker[d]					**4,800**	**4.8E-03**

Notes:

[a]Generic Risk-Based concentration (RBC) for soil ingestion, dermal contact, and inhalation in a residential setting (revised June 2018)

[b]Generic RBC for soil ingestion, dermal contact, and inhalation in an occupational setting (revised June 2018)

[c]Generic RBC for soil ingestion, dermal contact, and inhalation for a construction worker (revised June 2018)

[d]Generic RBC for soil ingestion, dermal contact, and inhalation for an excavation worker (revised June 2018)

pg/g = picogram per gram

mg/Kg = milligram per kilogram

U = Undetected at method reporting limit shown

J = Sample result is qualified as an estimated value, below the method reporting limit.

E = Exceeds calibration range

D = Result obtaind from analysis of diluted samples

TEF = Toxicity equivalent factor (EPA's Dioxin and Dioxin-like Compounds Toxic Equivalency (TEQ) Information Rule- Final, Federal Register Notice: 72 Federal Register 26544; promulgated May 10, 2007)

TEQ = Sum of dioxin-like congener concentrations multiplied by their respective TEF values, expressed as a single 2,3,7,8-TCDD equivalent

NV = This chemical is classified as "nonvolatile" for purposes of the exposure screening, per DEQ 2007

Bold values exceed one or more preliminary screening values

Table 1
Hot Spot Analytical Results - Dioxins
Floragon Property
Molalla, Oregon

Sample HSW-E Post-Excavation Confirmation Results						
	Totals			TEF	Equivalent Concentration	Equivalent Concentration
Analyte	pg/g	mg/Kg	mg/Kg		pg/g	mg/Kg
2,3,7,8-TCDD	3.4 J	0.0000034 J	3.4E-06 J	1	3.400 J	3.4E-06 J
1,2,3,7,8-PeCDD	61	0.000061	6.1E-05	1	61.000	6.1E-05
1,2,3,4,7,8-HxCDD	69	0.000069	6.9E-05	0.1	6.900	6.9E-06
1,2,3,6,7,8-HxCDD	1,200	0.0012	1.2E-03	0.1	120.000	1.2E-04
1,2,3,7,8,9-HxCDD	320	0.00032	3.2E-04	0.1	32.000	3.2E-05
1,2,3,4,6,7,8-HpCDD	8,200	0.0082	8.2E-03	0.01	82.000	8.2E-05
OCDD	37,000	0.037	3.7E-02	0.0003	11.100	1.1E-05
2,3,7,8-TCDF	12	0.000012	1.2E-05	0.1	1.200	1.2E-06
1,2,3,7,8-PeCDF	15 J	0.000015 J	1.5E-05 J	0.03	0.450 J	4.5E-07 J
2,3,4,7,8-PeCDF	16 J	0.000016 J	1.6E-05 J	0.3	4.800 J	4.8E-06 J
1,2,3,4,7,8-HxCDF	50	0.00005	5.0E-05	0.1	5.000	5.0E-06
1,2,3,6,7,8-HxCDF	70	0.00007	7.0E-05	0.1	7.000	7.0E-06
2,3,4,6,7,8-HxCDF	47 J	0.000047 J	4.7E-05 J	0.1	4.700 J	4.7E-06 J
1,2,3,7,8,9-HxCDF	13 J	0.000013 J	1.3E-05 J	0.1	1.300 J	1.3E-06 J
1,2,3,4,6,7,8-HpCDF	1,100	0.0011	1.1E-03	0.01	11.000	1.1E-05
1,2,3,4,7,8,9-HpCDF	44 J	0.000044 J	4.4E-05 J	0.01	0.440 J	4.4E-07 J
OCDF	1,100	0.0011	1.1E-03	0.0003	0.330	3.3E-07
Total Toxic Equivalency (TEQ)						
2,3,7,8-TCDD TEQ (with detection limits)					**352.6**	**3.5E-04**
2,3,7,8-TCDD TEQ (with 1/2 detection limits)					**352.6**	**3.5E-04**
2,3,7,8-TCDD TEQ (without no-detects)					**352.6**	**3.5E-04**
DEQ Screening Level Criteria for Soil						
Soil Ingestion, Dermal Contact, and Inhalation						
Residential[a]					**4.7**	**4.7E-06**
Occupational[b]					**16**	**1.6E-05**
Construction Worker[c]					**170**	**1.7E-04**
Excavation Worker[d]					4,800	4.8E-03

Notes:

[a]Generic Risk-Based concentration (RBC) for soil ingestion, dermal contact, and inhalation in a residential setting (revised June 2018)

[b]Generic RBC for soil ingestion, dermal contact, and inhalation in an occupational setting (revised June 2018)

[c]Generic RBC for soil ingestion, dermal contact, and inhalation for a construction worker (revised June 2018)

[d]Generic RBC for soil ingestion, dermal contact, and inhalation for an excavation worker (revised June 2018)

pg/g = picogram per gram

mg/Kg = milligram per kilogram

U = Undetected at method reporting limit shown

J = Sample result is qualified as an estimated value, below the method reporting limit.

TEF = Toxicity equivalent factor (EPA's Dioxin and Dioxin-like Compounds Toxic Equivalency (TEQ) Information Rule- Final, Federal Register Notice: 72 Federal Register 26544; promulgated May 10, 2007)

TEQ = Sum of dioxin-like congener concentrations multiplied by their respective TEF values, expressed as a single 2,3,7,8-TCDD equivalent

NV = This chemical is classified as "nonvolatile" for purposes of the exposure screening, per DEQ 2007

Bold values exceed one or more preliminary screening values

Table 1
Hot Spot Analytical Results - Dioxins
Floragon Property
Molalla, Oregon

Sample HSW-W Post-Excavation Confirmation Results						
	Totals			TEF	Equivalent Concentration	Equivalent Concentration
Analyte	pg/g	mg/Kg	mg/Kg		pg/g	mg/Kg
2,3,7,8-TCDD	2.5 U	0.0000025 U	2.5E-06 U	1	2.500 U	2.5E-06 U
1,2,3,7,8-PeCDD	9.3 J	0.0000093 J	9.3E-06 J	1	9.300 J	9.3E-06 J
1,2,3,4,7,8-HxCDD	7.3 U	0.0000073 U	7.3E-06 U	0.1	0.730 U	7.3E-07 U
1,2,3,6,7,8-HxCDD	140	0.00014	1.4E-04	0.1	14.000	1.4E-05
1,2,3,7,8,9-HxCDD	27 J	0.000027 J	2.7E-05 J	0.1	2.700 J	2.7E-06 J
1,2,3,4,6,7,8-HpCDD	960	0.00096	9.6E-04	0.01	9.600	9.6E-06
OCDD	5,400	0.0054	5.4E-03	0.0003	1.620	1.6E-06
2,3,7,8-TCDF	4.0 J	0.000004 J	4.0E-06 J	0.1	0.400 J	4.0E-07 J
1,2,3,7,8-PeCDF	2.7 U	0.0000027 U	2.7E-06 U	0.03	0.081 U	8.1E-08 U
2,3,4,7,8-PeCDF	3.6 IJ	0.0000036 IJ	3.6E-06 IJ	0.3	1.080 IJ	1.1E-06 IJ
1,2,3,4,7,8-HxCDF	5.0 U	0.000005 U	5.0E-06 U	0.1	0.500 U	5.0E-07 U
1,2,3,6,7,8-HxCDF	4.9 U	0.0000049 U	4.9E-06 U	0.1	0.490 U	4.9E-07 U
2,3,4,6,7,8-HxCDF	8.4 J	0.0000084 J	8.4E-06 J	0.1	0.840 J	8.4E-07 J
1,2,3,7,8,9-HxCDF	7.7 U	0.0000077 U	7.7E-06 U	0.1	0.770 U	7.7E-07 U
1,2,3,4,6,7,8-HpCDF	350	0.00035	3.5E-04	0.01	3.500	3.5E-06
1,2,3,4,7,8,9-HpCDF	13 J	0.000013 J	1.3E-05 J	0.01	0.130 J	1.3E-07 J
OCDF	260	0.00026	2.6E-04	0.0003	0.078	7.8E-08
Total Toxic Equivalency (TEQ)						
2,3,7,8-TCDD TEQ (with detection limits)					**48.3**	**4.8E-05**
2,3,7,8-TCDD TEQ (with 1/2 detection limits)					**45.8**	**4.6E-05**
2,3,7,8-TCDD TEQ (without no-detects)					**43.2**	**4.3E-05**
DEQ Screening Level Criteria for Soil						
Soil Ingestion, Dermal Contact, and Inhalation						
Residential[b]					**4.7**	**4.7E-06**
Occupational[c]					**16**	**1.6E-05**
Construction Worker[d]					**170**	**1.7E-04**
Excavation Worker[e]					4,800	4.8E-03

Notes:

[a] Maximum highest possible estimated concentration

[b]Generic Risk-Based concentration (RBC) for soil ingestion, dermal contact, and inhalation in a residential setting (revised June 2018)

[c]Generic RBC for soil ingestion, dermal contact, and inhalation in an occupational setting (revised June 2018)

[d]Generic RBC for soil ingestion, dermal contact, and inhalation for a construction worker (revised June 2018)

[e]Generic RBC for soil ingestion, dermal contact, and inhalation for an excavation worker (revised June 2018)

pg/g = picogram per gram

mg/Kg = milligram per kilogram

U = Undetected at method reporting limit shown

J = Sample result is qualified as an estimated value, below the method reporting limit.

TEF = Toxicity equivalent factor (EPA's Dioxin and Dioxin-like Compounds Toxic Equivalency (TEQ) Information Rule- Final, Federal Register Notice: 72 Federal Register 26544; promulgated May 10, 2007)

TEQ = Sum of dioxin-like congener concentrations multiplied by their respective TEF values, expressed as a single 2,3,7,8-TCDD equivalent

NV = This chemical is classified as "nonvolatile" for purposes of the exposure screening, per DEQ 2007

Table 1
Hot Spot Analytical Results - Dioxins
Floragon Property
Molalla, Oregon

Sample HSF-N Post-Excavation Confirmation Results						
	Totals			TEF	Equivalent Concentration	Equivalent Concentration
Analyte	pg/g	mg/Kg	mg/Kg		pg/g	mg/Kg
2,3,7,8-TCDD	1.8 U	0.0000018 U	1.8E-06 U	1	1.800 U	1.8E-06 U
1,2,3,7,8-PeCDD	5.6 U	0.0000056 U	5.6E-06 U	1	5.600 U	5.6E-06 U
1,2,3,4,7,8-HxCDD	8.9 U	0.0000089 U	8.9E-06 U	0.1	0.890 U	8.9E-07 U
1,2,3,6,7,8-HxCDD	11 U	0.000011 U	1.1E-05 U	0.1	1.100 U	1.1E-06 U
1,2,3,7,8,9-HxCDD	10 U	0.0000098 U	9.8E-06 U	0.1	0.980 U	9.8E-07 U
1,2,3,4,6,7,8-HpCDD	39 J	0.000039 J	3.9E-05 J	0.01	0.390 J	3.9E-07 J
OCDD	620	0.00062	6.2E-04	0.0003	0.186	1.9E-07
2,3,7,8-TCDF	2.0 U	0.000002 U	2.0E-06 U	0.1	0.200 U	2.0E-07 U
1,2,3,7,8-PeCDF	3.2 U	0.0000032 U	3.2E-06 U	0.03	0.096 U	9.6E-08 U
2,3,4,7,8-PeCDF	3.3 U	0.0000033 U	3.3E-06 U	0.3	0.990 U	9.9E-07 U
1,2,3,4,7,8-HxCDF	6.6 U	0.0000066 U	6.6E-06 U	0.1	0.660 U	6.6E-07 U
1,2,3,6,7,8-HxCDF	7.3 U	0.0000073 U	7.3E-06 U	0.1	0.730 U	7.3E-07 U
2,3,4,6,7,8-HxCDF	10 U	0.0000095 U	9.5E-06 U	0.1	0.950 U	9.5E-07 U
1,2,3,7,8,9-HxCDF	11 U	0.000011 U	1.1E-05 U	0.1	1.100 U	1.1E-06 U
1,2,3,4,6,7,8-HpCDF	8.9 U	0.0000089 U	8.9E-06 U	0.01	0.089 U	8.9E-08 U
1,2,3,4,7,8,9-HpCDF	5.8 U	0.0000058 U	5.8E-06 U	0.01	0.058 U	5.8E-08 U
OCDF	14 IJ	0.000014 IJ	1.4E-05 IJ	0.0003	0.004 IJ	4.2E-09 IJ
Total Toxic Equivalency (TEQ)						
2,3,7,8-TCDD TEQ (with detection limits)					**15.8**	**1.6E-05**
2,3,7,8-TCDD TEQ (with 1/2 detection limits)					**8.20**	**8.2E-06**
2,3,7,8-TCDD TEQ (without no-detects)					**0.58**	**5.8E-07**
DEQ Screening Level Criteria for Soil						
Soil Ingestion, Dermal Contact, and Inhalation						
Residential[b]					**4.7**	**4.7E-06**
Occupational[c]					**16**	**1.6E-05**
Construction Worker[d]					170	1.7E-04
Excavation Worker[e]					4,800	4.8E-03

Notes:

[a] Maximum highest possible estimated concentration

[b]Generic Risk-Based concentration (RBC) for soil ingestion, dermal contact, and inhalation in a residential setting (revised June 2018)

[c]Generic RBC for soil ingestion, dermal contact, and inhalation in an occupational setting (revised June 2018)

[d]Generic RBC for soil ingestion, dermal contact, and inhalation for a construction worker (revised June 2018)

[e]Generic RBC for soil ingestion, dermal contact, and inhalation for an excavation worker (revised June 2018)

pg/g = picogram per gram

mg/Kg = milligram per kilogram

U = Undetected at method reporting limit shown

J = Sample result is qualified as an estimated value, below the method reporting limit.

TEF = Toxicity equivalent factor (EPA's Dioxin and Dioxin-like Compounds Toxic Equivalency (TEQ) Information Rule- Final, Federal Register Notice: 72 Federal Register 26544; promulgated May 10, 2007)

TEQ = Sum of dioxin-like congener concentrations multiplied by their respective TEF values, expressed as a single 2,3,7,8-TCDD equivalent

NV = This chemical is classified as "nonvolatile" for purposes of the exposure screening, per DEQ 2007

Table 1
Hot Spot Analytical Results - Dioxins
Floragon Property
Molalla, Oregon

Sample HSF-S Post-Excavation Confirmation Results						
	Totals			TEF	Equivalent Concentration	Equivalent Concentration
Analyte	pg/g	mg/Kg	mg/Kg		pg/g	mg/Kg
2,3,7,8-TCDD	0.94 U	0.00000094 U	9.4E-07 U	1	0.940 U	9.4E-07 U
1,2,3,7,8-PeCDD	2.1 U	0.0000021 U	2.1E-06 U	1	2.100 U	2.1E-06 U
1,2,3,4,7,8-HxCDD	4.0 U	0.000004 U	4.0E-06 U	0.1	0.400 U	4.0E-07 U
1,2,3,6,7,8-HxCDD	5.3 U	0.0000053 U	5.3E-06 U	0.1	0.530 U	5.3E-07 U
1,2,3,7,8,9-HxCDD	4.9 U	0.0000049 U	4.9E-06 U	0.1	0.490 U	4.9E-07 U
1,2,3,4,6,7,8-HpCDD	40 J	0.00004 J	4.0E-05 J	0.01	0.400 J	4.0E-07 J
OCDD	390	0.00039	3.9E-04	0.0003	0.117	1.2E-07
2,3,7,8-TCDF	0.70 U	0.0000007 U	7.0E-07 U	0.1	0.070 U	7.0E-08 U
1,2,3,7,8-PeCDF	1.5 U	0.0000015 U	1.5E-06 U	0.03	0.045 U	4.5E-08 U
2,3,4,7,8-PeCDF	1.2 U	0.0000012 U	1.2E-06 U	0.3	0.360 U	3.6E-07 U
1,2,3,4,7,8-HxCDF	3.8 U	0.0000038 U	3.8E-06 U	0.1	0.380 U	3.8E-07 U
1,2,3,6,7,8-HxCDF	2.9 U	0.0000029 U	2.9E-06 U	0.1	0.290 U	2.9E-07 U
2,3,4,6,7,8-HxCDF	3.6 U	0.0000036 U	3.6E-06 U	0.1	0.360 U	3.6E-07 U
1,2,3,7,8,9-HxCDF	5.2 U	0.0000052 U	5.2E-06 U	0.1	0.520 U	5.2E-07 U
1,2,3,4,6,7,8-HpCDF	12 J	0.000012 J	1.2E-05 J	0.01	0.120 J	1.2E-07 J
1,2,3,4,7,8,9-HpCDF	1.9 U	0.0000019 U	1.9E-06 U	0.01	0.019 U	1.9E-08 U
OCDF	20 J	0.00002 J	2.0E-05 J	0.0003	0.006 J	6.0E-09 J
Total Toxic Equivalency (TEQ)						
2,3,7,8-TCDD TEQ (with detection limits)					**7.1**	**7.1E-06**
2,3,7,8-TCDD TEQ (with 1/2 detection limits)					**3.9**	**3.9E-06**
2,3,7,8-TCDD TEQ (without no-detects)					**0.64**	**6.4E-07**
DEQ Screening Level Criteria for Soil						
Soil Ingestion, Dermal Contact, and Inhalation						
Residential[b]					**4.7**	**4.7E-06**
Occupational[c]					**16**	**1.6E-05**
Construction Worker[d]					**170**	**1.7E-04**
Excavation Worker[e]					4,800	4.8E-03

[a] Maximum highest possible estimated concentration

[b]Generic Risk-Based concentration (RBC) for soil ingestion, dermal contact, and inhalation in a residential setting (revised June 2018)

[c]Generic RBC for soil ingestion, dermal contact, and inhalation in an occupational setting (revised June 2018)

[d]Generic RBC for soil ingestion, dermal contact, and inhalation for a construction worker (revised June 2018)

[e]Generic RBC for soil ingestion, dermal contact, and inhalation for an excavation worker (revised June 2018)

pg/g = picogram per gram

mg/Kg = milligram per kilogram

U = Undetected at method reporting limit shown

I = Interference present

J = Sample result is qualified as an estimated value, below the method reporting limit.

TEF = Toxicity equivalent factor (EPA's Dioxin and Dioxin-like Compounds Toxic Equivalency (TEQ) Information Rule- Final, Federal Register Notice: 72 Federal Register 26544; promulgated May 10, 2007)

TEQ = Sum of dioxin-like congener concentrations multiplied by their respective TEF values, expressed as

NV = This chemical is classified as "nonvolatile" for purposes of the exposure screening, per DEQ 2007

Table 1
Hot Spot Analytical Results - Dioxins
Floragon Property
Molalla, Oregon

Sample HSF-S Post-Excavation Confirmation Results						
	Totals			TEF	Equivalent Concentration	Equivalent Concentration
Analyte	pg/g	mg/Kg	mg/Kg		pg/g	mg/Kg
2,3,7,8-TCDD	1.7 U	0.0000017 U	1.7E-06 U	1	1.700 U	1.7E-06 U
1,2,3,7,8-PeCDD	9.6 J	0.0000096 J	9.6E-06 J	1	9.600 J	9.6E-06 J
1,2,3,4,7,8-HxCDD	13 J	0.000013 J	1.3E-05 J	0.1	1.300 J	1.3E-06 J
1,2,3,6,7,8-HxCDD	170	0.00017	1.7E-04	0.1	17.000	1.7E-05
1,2,3,7,8,9-HxCDD	36 J	0.000036 J	3.6E-05 J	0.1	3.600 J	3.6E-06 J
1,2,3,4,6,7,8-HpCDD	1,400	0.0014	1.4E-03	0.01	14.000	1.4E-05
OCDD	8,300	0.0083	8.3E-03	0.0003	2.490	2.5E-06
2,3,7,8-TCDF	6.0 J	0.000006 J	6.0E-06 J	0.1	0.600 J	6.0E-07 J
1,2,3,7,8-PeCDF	8.0 J	0.000008 J	8.0E-06 J	0.03	0.240 J	2.4E-07 J
2,3,4,7,8-PeCDF	21 J	0.000021 J	2.1E-05 J	0.3	6.300 J	6.3E-06 J
1,2,3,4,7,8-HxCDF	15	0.000015	1.5E-05	0.1	1.500	1.5E-06
1,2,3,6,7,8-HxCDF	26	0.000026	2.6E-05	0.1	2.600	2.6E-06
2,3,4,6,7,8-HxCDF	18 IJ[a]	0.000018 IJ[a]	1.8E-05 IJ[a]	0.1	1.800 IJ[a]	1.8E-06 IJ[a]
1,2,3,7,8,9-HxCDF	8.5 J	0.0000085 J	8.5E-06 J	0.1	0.850 J	8.5E-07 J
1,2,3,4,6,7,8-HpCDF	290	0.00029	2.9E-04	0.01	2.900	2.9E-06
1,2,3,4,7,8,9-HpCDF	20 J	0.00002 J	2.0E-05 J	0.01	0.200 J	2.0E-07 J
OCDF	280	0.00028	2.8E-04	0.0003	0.084	8.4E-08
Total Toxic Equivalency (TEQ)						
2,3,7,8-TCDD TEQ (with detection limits)					**66.8**	**6.7E-05**
2,3,7,8-TCDD TEQ (with 1/2 detection limits)					**65.9**	**6.6E-05**
2,3,7,8-TCDD TEQ (without no-detects)					**65.1**	**6.5E-05**
DEQ Screening Level Criteria for Soil						
Soil Ingestion, Dermal Contact, and Inhalation						
Residential[b]					**4.7**	**4.7E-06**
Occupational[c]					**16**	**1.6E-05**
Construction Worker[d]					**170**	**1.7E-04**
Excavation Worker[e]					4,800	4.8E-03

[a] Maximum highest possible estimated concentration

[b]Generic Risk-Based concentration (RBC) for soil ingestion, dermal contact, and inhalation in a residential setting (revised June 2018)

[c]Generic RBC for soil ingestion, dermal contact, and inhalation in an occupational setting (revised June 2018)

[d]Generic RBC for soil ingestion, dermal contact, and inhalation for a construction worker (revised June 2018)

[e]Generic RBC for soil ingestion, dermal contact, and inhalation for an excavation worker (revised June 2018)

pg/g = picogram per gram

mg/Kg = milligram per kilogram

U = Undetected at method reporting limit shown

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TEF = Toxicity equivalent factor (EPA's Dioxin and Dioxin-like Compounds Toxic Equivalency (TEQ) Information Rule- Final, Federal Register Notice: 72 Federal Register 26544; promulgated May 10, 2007)

TEQ = Sum of dioxin-like congener concentrations multiplied by their respective TEF values, expressed as

NV = This chemical is classified as "nonvolatile" for purposes of the exposure screening, per DEQ 2007

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Floragon Property
Molalla, Oregon

Sample HSF-S Post-Excavation Confirmation Results						
	Totals			TEF	Equivalent Concentration	Equivalent Concentration
Analyte	pg/g	mg/Kg	mg/Kg		pg/g	mg/Kg
2,3,7,8-TCDD	9.9 J	0.0000099 J	9.9E-06 J	1	9.900 J	9.9E-06 J
1,2,3,7,8-PeCDD	130	0.00013	1.3E-04	1	130.000	1.3E-04
1,2,3,4,7,8-HxCDD	120	0.00012	1.2E-04	0.1	12.000	1.2E-05
1,2,3,6,7,8-HxCDD	2,600	0.0026	2.6E-03	0.1	260.000	2.6E-04
1,2,3,7,8,9-HxCDD	660	0.00066	6.6E-04	0.1	66.000	6.6E-05
1,2,3,4,6,7,8-HpCDD	24,000 E	0.024 E	2.4E-02 E	0.01	240.000 E	2.4E-04 E
OCDD	320,000	0.32	3.2E-01	0.0003	96.000	9.6E-05
2,3,7,8-TCDF	25	0.000025	2.5E-05	0.1	2.500	2.5E-06
1,2,3,7,8-PeCDF	11 J	0.000011 J	1.1E-05 J	0.03	0.330 J	3.3E-07 J
2,3,4,7,8-PeCDF	82 P	0.000082 P	8.2E-05 P	0.3	24.600 P	2.5E-05 P
1,2,3,4,7,8-HxCDF	47 J	0.000047 J	4.7E-05 J	0.1	4.700 J	4.7E-06 J
1,2,3,6,7,8-HxCDF	49 J	0.000049 J	4.9E-05 J	0.1	4.900 J	4.9E-06 J
2,3,4,6,7,8-HxCDF	80	0.00008	8.0E-05	0.1	8.000	8.0E-06
1,2,3,7,8,9-HxCDF	18 J	0.000018 J	1.8E-05 J	0.1	1.800 J	1.8E-06 J
1,2,3,4,6,7,8-HpCDF	1,600	0.0016	1.6E-03	0.01	16.000	1.6E-05
1,2,3,4,7,8,9-HpCDF	110	0.00011	1.1E-04	0.01	1.100	1.1E-06
OCDF	5,800	0.0058	5.8E-03	0.0003	1.740	1.7E-06
Total Toxic Equivalency (TEQ)						
2,3,7,8-TCDD TEQ (with detection limits)					**880**	**8.8E-04**
2,3,7,8-TCDD TEQ (with 1/2 detection limits)					**880**	**8.8E-04**
2,3,7,8-TCDD TEQ (without no-detects)					**880**	**8.8E-04**
DEQ Screening Level Criteria for Soil						
Soil Ingestion, Dermal Contact, and Inhalation						
Residential[a]					**4.7**	**4.7E-06**
Occupational[b]					**16**	**1.6E-05**
Construction Worker[c]					**170**	**1.7E-04**
Excavation Worker[d]					**4,800**	**4.8E-03**

Notes:

[a]Generic Risk-Based concentration (RBC) for soil ingestion, dermal contact, and inhalation in a residential setting (revised June 2018)

[b]Generic RBC for soil ingestion, dermal contact, and inhalation in an occupational setting (revised June 2018)

[c]Generic RBC for soil ingestion, dermal contact, and inhalation for a construction worker (revised June 2018)

[d]Generic RBC for soil ingestion, dermal contact, and inhalation for an excavation worker (revised June 2018)

pg/g = picogram per gram

mg/Kg = milligram per kilogram

P = PCDE Interference

U = Undetected at method reporting limit shown

J = Sample result is qualified as an estimated value, below the method reporting limit.

E = Exceeds calibration range

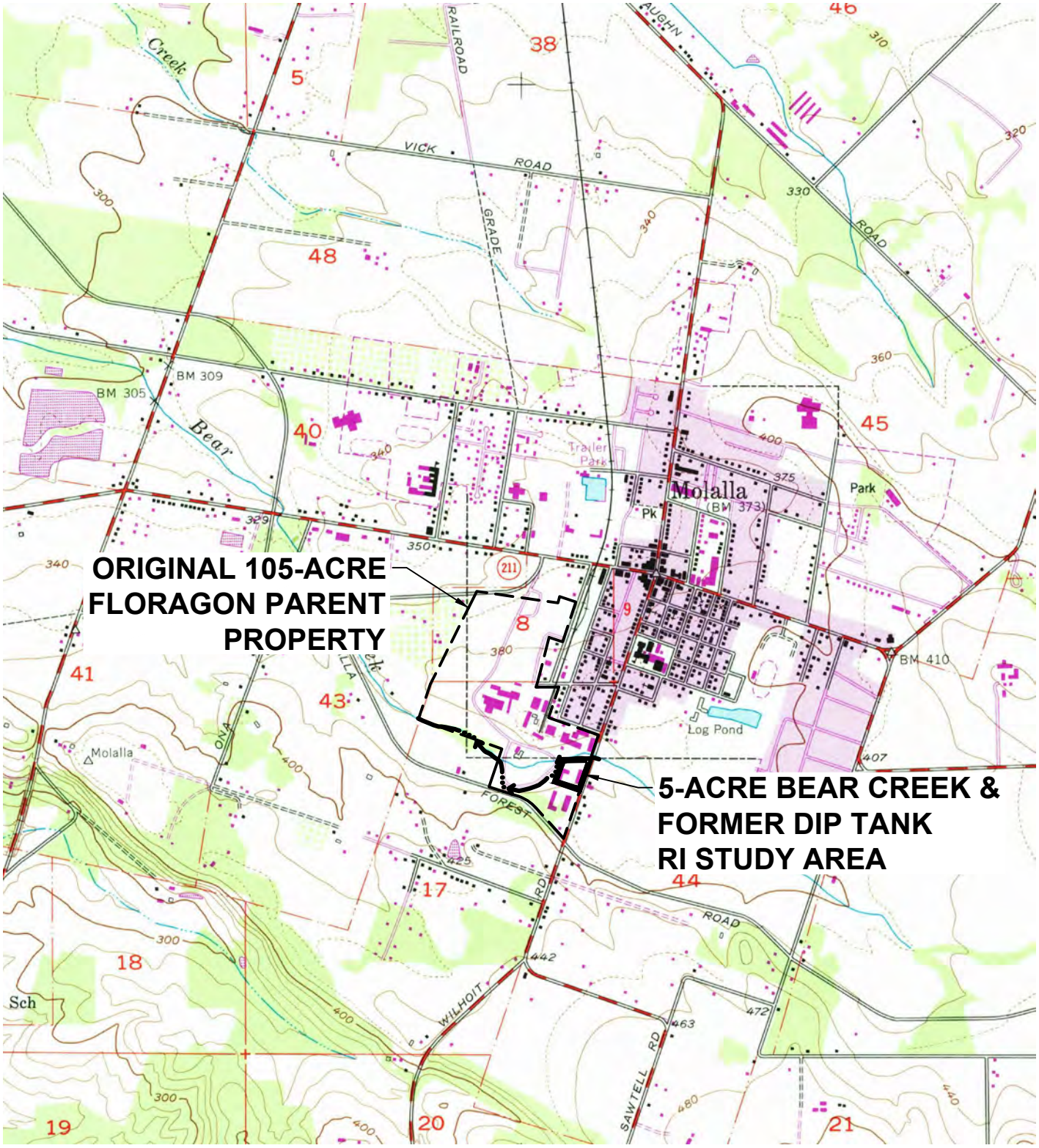
D = Result obtaind from analysis of diluted samples

TEF = Toxicity equivalent factor (EPA's Dioxin and Dioxin-like Compounds Toxic Equivalency (TEQ) Information Rule- Final, Federal Register Notice: 72 Federal Register 26544; promulgated May 10, 2007)

TEQ = Sum of dioxin-like congener concentrations multiplied by their respective TEF values, expressed as a single 2,3,7,8-TCDD equivalent

NV = This chemical is classified as "nonvolatile" for purposes of the exposure screening, per DEQ 2007

FIGURES



APPROXIMATE SCALE IN FEET

0 1000 2000 4000

NOTE: USGS, MOLALLA QUADRANGLE
OREGON - CLACKAMAS CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

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APPROVED BY:	SV

FLORAGON PROPERTY
7TH & HART STREET
MOLALLA, OREGON

SITE VICINITY MAP

Project No. 1177-01

Figure No. 1

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APPROXIMATE SCALE IN FEET

0 250 500

North Drainage Ditch

84-Acre
North Parcels
Upland Area
(NFA March 2014)

HART AVENUE

7TH STREET

Bear Creek &
Former Dip Tank
RI Study Area

Bear Creek

Beaver Pond

Beaver Dam #3

Beaver Dam #2

Beaver Dam #1

Bear Creek

FORMER DIP TANK AREA

S. MOLALLA FOREST ROAD

S. MOLALLA AVENUE

LEGEND

- Property Boundary
- Tax Lots
- Bear Creek
- Surface Drainage and Flow Direction
- Catch Basin
- Former Building Footprints
- Current Building Footprints
- Culvert
- Beaver Pond

Note: Aerial photograph provided by Google Earth Pro™ 2012.

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FLORAGON PROPERTY
7TH & HART STREET
MOLALLA, OREGON

OVERVIEW MAP
AERIAL 2012

Project No. 1177-02

Figure No. 2

Description of Remedial Action:

- Excavation of Hot Spot soil (concentrations >1,600 pg/g)
- Asphalt Pavement surfacing of existing asphalt concrete cover.
- Sediment removal from catch basins and storm sewer lines leading to Bear Creek.
- Institutional Controls.
- Habitat enhancement near Bear Creek.

FORMER DIP TANK AREA

Sediment Removal from Catch Basins and Associated Storm Sewer Line(s)

Former Dip Tank #1

Hot Spot Soil Removal Area

Former Dip Tank #2

Bear Creek

IMW-01

MW-01

IMW-02

MW-02

MW-03/AE-03

MW-05

MW-07

IMW-04

MW-04

S. MOLALLA AVENUE

DIP TANK SOUTHWEST COMP B25-B28

DIP TANK SOUTHEAST COMP B29-B32

LEGEND

- Property Boundary
- Former Dip Tank Area
- Tax Lots
- Bear Creek
- Monitoring Well
- Catch Basin
- Former Building Footprints
- Current Building Footprints
- Culvert
- Habitat Enhancement Planting Area
- Asphalt Concrete Overlay
- Hot Spot Soil (>1,600 pg/g) Excavation (0-2 feet bgs)

N

APPROXIMATE SCALE IN FEET

0 30 60 120

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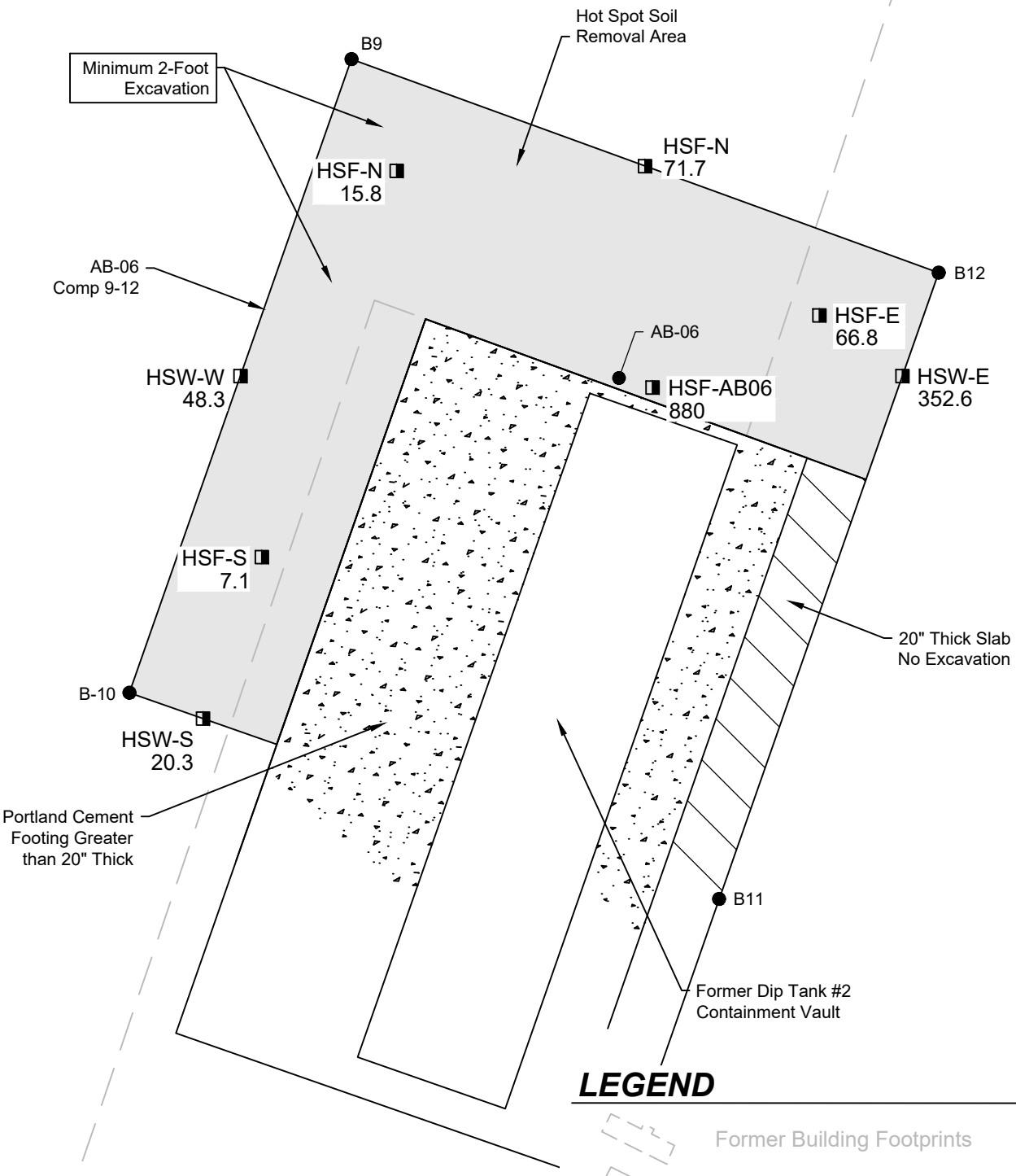
DIP TANK AREA
REMEDIAL ACTION SUMMARY

Project No. 1177-02

Figure No. 4



LEGEND

- Former Building Footprints
- Current Building Footprints
- Polygon Indicates Sample Composite Area
- Hot Spot Soil Excavation
- HSF — Floor Soil Sample
- HSW — Wall Soil Sample (1' bgs)
- 20.3 — TEQ Dioxin Concentration (pg/g)

APPROXIMATE SCALE IN FEET

0 10 20

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HOT SPOT SOIL REMOVAL
AREA SUMMARY

Project No. 1177-02
Figure No. 4

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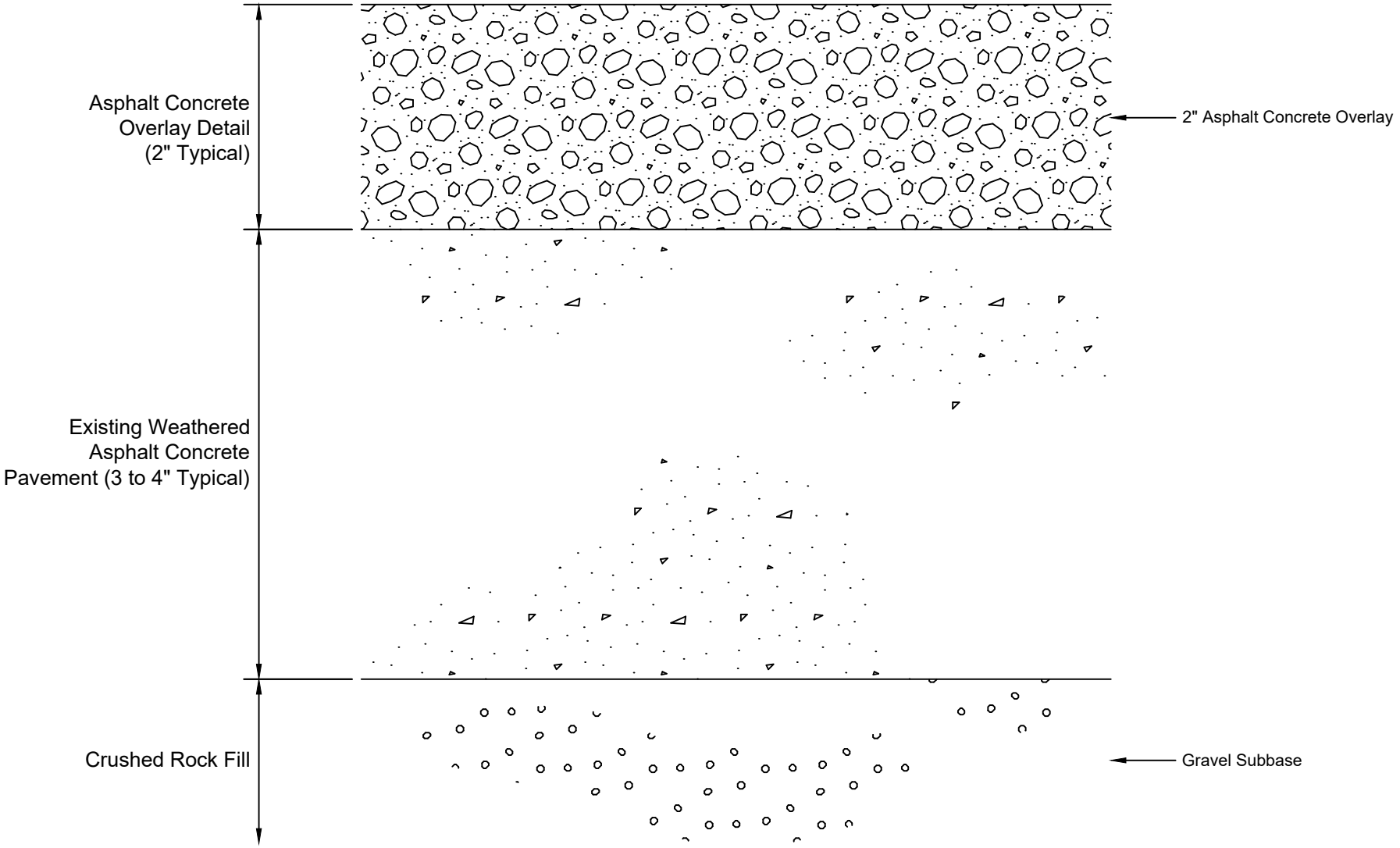
ASPHALT CONCRETE COVER DETAIL



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ASPHALT CONCRETE COVER DETAIL

Project No. 1177-02

Figure No. 5

APPENDIX A
SITE PHOTOGRAPHS

PHOTO 1
Catch basin prior to cleaning.

6/12/18

PHOTO 2
After blocking storm sewer discharge at Bear Creek, jetted sediment from the catch basin line and collected the resulting slurry.

7/23/18

PHOTO 3
Removal of sediment water slurry from catch basin with vacuum truck.

7/23/18

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FLORAGON PROPERTY
7TH & HART STREET
MOLALLA, OREGON

SITE PHOTOGRAPHS

Project No. 1177-02
Figure No. 1

PHOTO 4
Cleaned catch basin.

7/26/18

PHOTO 5
Catch basin cover final.

9/4/18

PHOTO 6
Former Dip Tank #2 concrete containment vault prior to rainwater and debris removal.

7/20/18

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FLORAGON PROPERTY
7TH & HART STREET
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SITE PHOTOGRAPHS

Project No. 1177-02
Figure No. 2

PHOTO 7
Former Dip Tank #2 concrete containment vault debris.

7/20/18

PHOTO 8
Placement of soil fill in Former Dip Tank #2 concrete containment structure.

7/20/18

PHOTO 9
Placement of concrete cap over fabric and soil fill in Former Dip Tank #2 concrete containment vault.

7/26/18

PHOTO 10
Finished concrete cover on Former Dip Tank #2 concrete containment vault.

7/27/18

PHOTO 11
Eastern habitat area surface preparation.

7/18/18

PHOTO 12
Western habitat area surface preparation.

7/18/18

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7TH & HART STREET
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SITE PHOTOGRAPHS

Project No. 1177-02
Figure No. 4

PHOTO 13
Eastern habitat area after topsoil and gravel placement.

8/21/18

PHOTO 14
Western habitat area after topsoil and gravel placement.

8/21/18

PHOTO 15
Eastern habitat area after asphalt concrete cover/ paving and tree and shrub planting.

11/19/18

PHOTO 16
Eastern habitat area after asphalt concrete cover/ paving and tree and shrub planting.

11/19/18

PHOTO 17
Hot spot soil area prior to excavation. View from the north.

7/24/18

PHOTO 18
Hot spot excavation. View from the north.

7/24/18

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FLORAGON PROPERTY
7TH & HART STREET
MOLALLA, OREGON

SITE PHOTOGRAPHS

Project No. 1177-02
Figure No. 6

PHOTO 19
Hot spot excavation. View from the north.

7/24/18

PHOTO 20
Hot spot soil excavation final depth.

7/24/18

PHOTO 21
Hot spot soil excavation after backfill placement. View from the west.

8/20/18

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7TH & HART STREET
MOLALLA, OREGON

SITE PHOTOGRAPHS

Project No. 1177-02
Figure No. 7

PHOTO 22
Hot spot soil excavation following backfill placement.
View from the northwest.

8/20/18

PHOTO 23
Debris cleaning, existing concrete surface preparation for asphalt concrete overlay placement.

7/18/18

PHOTO 24
Debris cleaning, existing concrete surface preparation for asphalt concrete overlay placement.

7/18/18

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SITE PHOTOGRAPHS

Project No. 1177-02
Figure No. 8

PHOTO 25
Debris cleaning, existing concrete surface preparation for asphalt concrete overlay placement.

7/19/18

PHOTO 26
Following placement of gravel fill surface preparation for paving.

8/20/18

PHOTO 27
Placement of asphalt concrete overlay completed. View to the southeast.

8/25/18

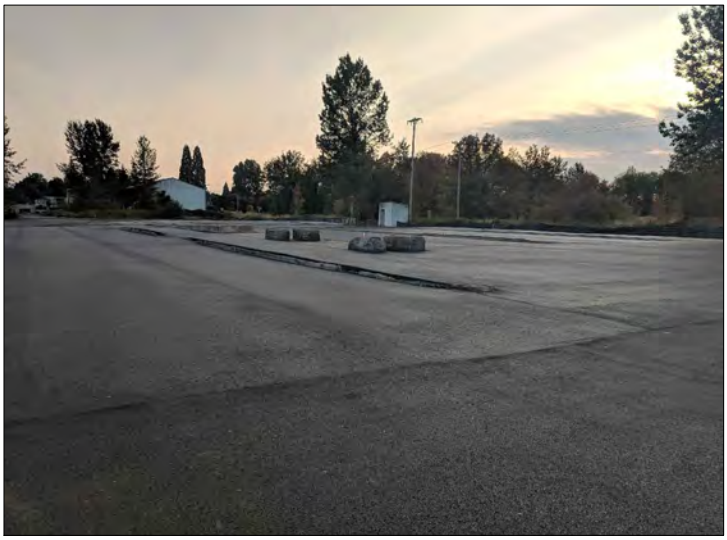

PHOTO 28
Completed paving. View to the northeast.

8/25/18

PHOTO 29
Completed paving. View to the northwest.

8/25/18

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DATE: 4-19-19
FILE NAME: 1177-02
DRAWN BY: JJT
APPROVED BY: SV

FLORAGON PROPERTY
7TH & HART STREET
MOLALLA, OREGON

SITE PHOTOGRAPHS

Project No. 1177-02
Figure No. 10

APPENDIX B
INSPECTION AND MAINTENANCE PLAN

PAVEMENT INSPECTION AND MAINTENANCE PLAN

Former Dip Tank Area
Molalla, Oregon

DEQ ECSI Number 0009

Prepared for:

AVISON LUMBER COMPANY
P.O. Box 419
Molalla, Oregon 97038

Prepared by:

PNG ENVIRONMENTAL, INC.

1177-02
May 10, 2019

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INTRODUCTION

1.1 PURPOSE

PNG Environmental, Inc. (PNG) prepared this report to describe planned Inspection and Maintenance activities for the approximately 3.2 acre asphalt concrete covered former Dip Tank Area area located at the Floragon Forest Products property in Molalla, Oregon (Figures 1 and 2). The purpose of the Inspection and Maintenance Plan is to establish routine practices to document the integrity of this asphalt concrete paved area such that the pavement remains in use as a protective working surface and to isolate underlying soils and fill material from exposure to the surrounding environment.

1.2 BACKGROUND

The former 3.2-acre Dip Tank Area is part of the approximate 5-acre study area of the 2016 Remedial Investigation Report located at 250 W. 7th Street, Molalla (Clackamas County), Oregon (Figure 1). The study area, formerly owned by the Avison Lumber Company (Avison), is currently vacant but was historically associated with a much larger lumber mill and forest products manufacturing facility covering approximately 105 acres. Lumber-related manufacturing occurred at the 105-acre parent site beginning in the 1940s and was largely discontinued by 2009.

The selected remedial action and subsequent remedial action design was outlined in the Oregon Department of Environmental Quality (DEQ) Record of Decision (ROD) (DEQ 2018), the Remedial Design/Remedial Action Work Plan (PNG 2018), and the Remedial Action Construction Completion Report (PNG 2019). The DEQ selected remedial action included a combination of hot spot soil removal, storm water conveyance sediment removal and cleaning, surface debris removal, protective cover enhancement, habitat enhancement, and implementation of institutional controls. These measures as approved by DEQ are protective and achieve site-specific Remedial Action Objectives (RAOs) involving direct contact prevention and protection of the adjacent Bear Creek from site contamination.

The majority of remedial action activities in the former Dip Tank Area, described below, were conducted between July and August 2018. Completion of the habitat enhancement area actions outlined in the RD/RA Work Plan, including planting of trees and shrubs within the designated areas, were completed in November 2018 as seasonally appropriate.

2 INSPECTION & MAINTENANCE REQUIREMENTS

2.1 GENERAL REQUIREMENTS

Inspections of the approximately three-acre paved area located at the site are intended to verify the integrity and performance of the pavement surface, and to establish repair protocols as necessary to maintain this surface. Specifically, two items must be inspected and maintained on a regular basis as long as dioxins remain in subsurface fill/soils at concentrations exceeding regulatory limits:

- **Paved area:** Inspection of the asphalt concrete pavement overlay and remnant concrete building foundations within the 3.2 acre area. The pavement surface must be maintained in a manner consistent with its intended function as a sealed, intact working surface to be used for vehicle traffic and typical yard usage. Significant cracks (i.e., cracks allowing release and/or exposure to the soil/fill underlying the pavement surfaces), potholes, or other penetrations are to be identified, documented, and repaired in a timely fashion.
- **Surface water drainages across this paved area:** Inspection to help ensure that surface water runoff does not damage or cause erosion of the paved area, and that runoff materials/sediments do not accumulate on the paved surface.

Informal inspections of the paved area will occur regularly as part of the property's operations to maintain the functional use for site worker and vehicle access (routine inspections are specified in Section 2.3 of this document). If areas of the pavement are damaged, repairs should be conducted in a timely manner, as the damage is noted. All repairs shall be performed by qualified and properly trained personnel, at the direction of the property owner's designated operations manager. After a repair is made, a written repair record should be filed permanently with the property owner. A form for reporting repairs is included as Attachment A1.

Copies of completed inspection and maintenance reports will be submitted to DEQ (one paper and one electronic copy) for the first five years of operations and maintenance (O&M) activity, after which DEQ will determine whether continued submission of reports is necessary. Inspection and maintenance activities under this plan are required in perpetuity unless otherwise approved by DEQ.

If surface water drainages on this paved area become blocked with debris, silt, or other material, the material should be removed, allowing normal flow to be restored. A repair record is not required for maintenance removal of debris from these surface water drainage features.

2.2 PAVEMENT SURFACE

Asphalt and Portland cement concrete pavement surfaces cover the majority of the site, with the exception of small topsoil-backfilled planting areas in the northwest and northeast corners or the area. Intact Portland cement concrete building foundations and floor slabs are located within the paved area. The paved surfaces have been used for many decades as part of industrial property operations, and continued use of these areas for similar purposes is anticipated.

In anticipation of continued future commercial/industrial site use, the former Dip Tank Area surface was cleaned and a minimum 2-inch thick asphalt concrete overlay was installed directly over the existing weathered asphalt concrete pavement surface. The asphalt concrete overlay was installed in late August 2018. A schematic cross section illustrating the asphalt concrete overlay is provided as Figure 2.

2.3 ROUTINE PAVEMENT SURFACE AND FENCE INSPECTIONS

Pavement inspections are required on an annual basis, and are required in perpetuity unless otherwise approved by DEQ. Pavement maintenance should be performed whenever necessary so that the protective function of these features is ensured.

Routine inspections should be thorough and should cover the entire former Dip Tank area pavement. Written notes and photographs should accompany the inspection documents, as needed. All inspection reports shall be dated, signed, and filed with the property owner and DEQ. After five years, DEQ will determine whether continued submission of reports to the Department is necessary. Attachment A1 contains the inspection/repair forms and photographic log.

Inspection activities should include the following elements. These areas should be repaired as necessary to match the existing design elevations and functions.

- Areas where the pavement (including concrete) has cracked or settled, such that the potential for exposure of the underlying fill material may be increased. .
- Areas where the pavement overlay surface has been worn, penetrated, cut, trenched, or removed to the extent that underlying original asphalt pavement is exposed.
- In any areas where work is being done within or below the pavement surface, excavations should be properly backfilled and paved with clean material as soon as possible to prevent exposure to subsurface fill material. If excavations must extend below the pavement layer, the excavation activities should be conducted by appropriately health and safety trained personnel under a site-specific health and safety plan, and soils generated from such activities will be transported to an appropriate offsite treatment or disposal facility. Appropriate restrictions such as barricades or temporary fencing, should be established to prevent worker or public access to the excavation areas. Any exposed or new pavement should include a functional wearing surface intended to match the existing asphalt concrete pavement or equivalent.

Any problems with the pavement surface should be corrected, as described above as soon as possible. A dated repair notice should be filed with the property owner within 30 days following corrective action.

2.4 SITE DRAINAGE

Surface water flow and drainage areas should be inspected and modified as necessary to eliminate obvious erosion.

The following specific items should be inspected:

- Blockage of drainage paths by debris or other materials that may obstruct the flow of water. Such materials should be removed from the drainage path, allowing flow to be restored.
- Damage to the drainage paths as a result of traffic, falling debris, or other occurrences. The drainage paths should be repaired to their original condition.
- Any blockage to the two catch basins as a result of falling debris or other occurrences. The debris or blockage should be removed to allow for stormwater flow.

3 REPORTING AND RECORDS MANAGEMENT PROCEDURES

3.1 REPORTING

Table 1 summarizes the reports to be generated and filed by the property owner. Forms for the necessary reports are provided in Attachment A1.

Table 1
Summary of Record-Keeping and Reporting Requirements

Item	Frequency or Timing	Reporting Requirements
Repair report	Repairs to the pavement, and/or drainage should be made as soon as possible after observance of a maintenance problem.	A repair report should be submitted to property owner's file within 30 days of repair completion.
Inspection report	Annually.	The annual inspection report and documentation including photographs and repair records should be submitted annually to property owner's file and to DEQ.

3.2 RECORDS MANAGEMENT

Copies of the following should be kept by the property owner at all times and are subject to DEQ inspection:

- This inspection and maintenance plan.
- All repair reports.
- All annual inspection reports. Annual inspection reports containing repair records through end of year must also be submitted to DEQ's Northwest Regional Office according to the schedule noted above.

4 LIMITATIONS

PNG has prepared this report for use by Avison Lumber Company. This report may be made available to future property owners and to regulatory agencies. This report is not intended for use by others and the information contained herein is not applicable to other sites.

Our interpretation of subsurface conditions is based on field observations and chemical analytical data. Areas with contamination may exist in portions of the site that were not explored or analyzed.

Within the limitations of scope, schedule, and budget, our services have been executed in accordance with generally accepted practices and laws, rules, and regulations at the time that the report was prepared. No other conditions, express or implied, should be understood.

5 REFERENCES

DEQ. 2018 (June 15). *Record of Decision.* Oregon Department of Environmental Quality.

PNG. 2018 (June 19). *Remedial Design/Remedial Action Work Plan.* PNG Environmental, Inc.

PNG. 2019 (March 10). *Remedial Action Construction Completion Report.* PNG Environmental, Inc.

FIGURES

Description of Remedial Action:

- Excavation of Hot Spot soil (concentrations >1,600 pg/g)
- Asphalt Pavement surfacing of existing asphalt concrete cover.
- Sediment removal from catch basins and storm sewer lines leading to Bear Creek.
- Institutional Controls.
- Habitat enhancement near Bear Creek.

FORMER DIP TANK AREA

Sediment Removal from Catch Basins and Associated Storm Sewer Line(s)

Former Dip Tank #1

Hot Spot Soil Removal Area

Former Dip Tank #2

Bear Creek

S. MOLALLA AVENUE

IMW-01 MW-01

IMW-02

MW-02

MW-03/AE-03

MW-07

MW-05

IMW-04 MW-04

LEGEND

- Property Boundary
- Former Dip Tank Area
- Tax Lots
- Bear Creek
- Monitoring Well (Abandoned 2018)
- Catch Basin
- Former Building Footprints
- Current Building Footprints
- Culvert
- Habitat Enhancement Planting Area
- Asphalt Concrete Overlay
- Hot Spot Soil (>1,600 pg/g) Excavation (0-2 feet bgs)

N

APPROXIMATE SCALE IN FEET

0 30 60 120

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DATE:	4-30-19
FILE NAME:	1177-02
DRAWN BY:	JJT
APPROVED BY:	SV

FLORAGON PROPERTY
7TH & HART STREET
MOLALLA, OREGON

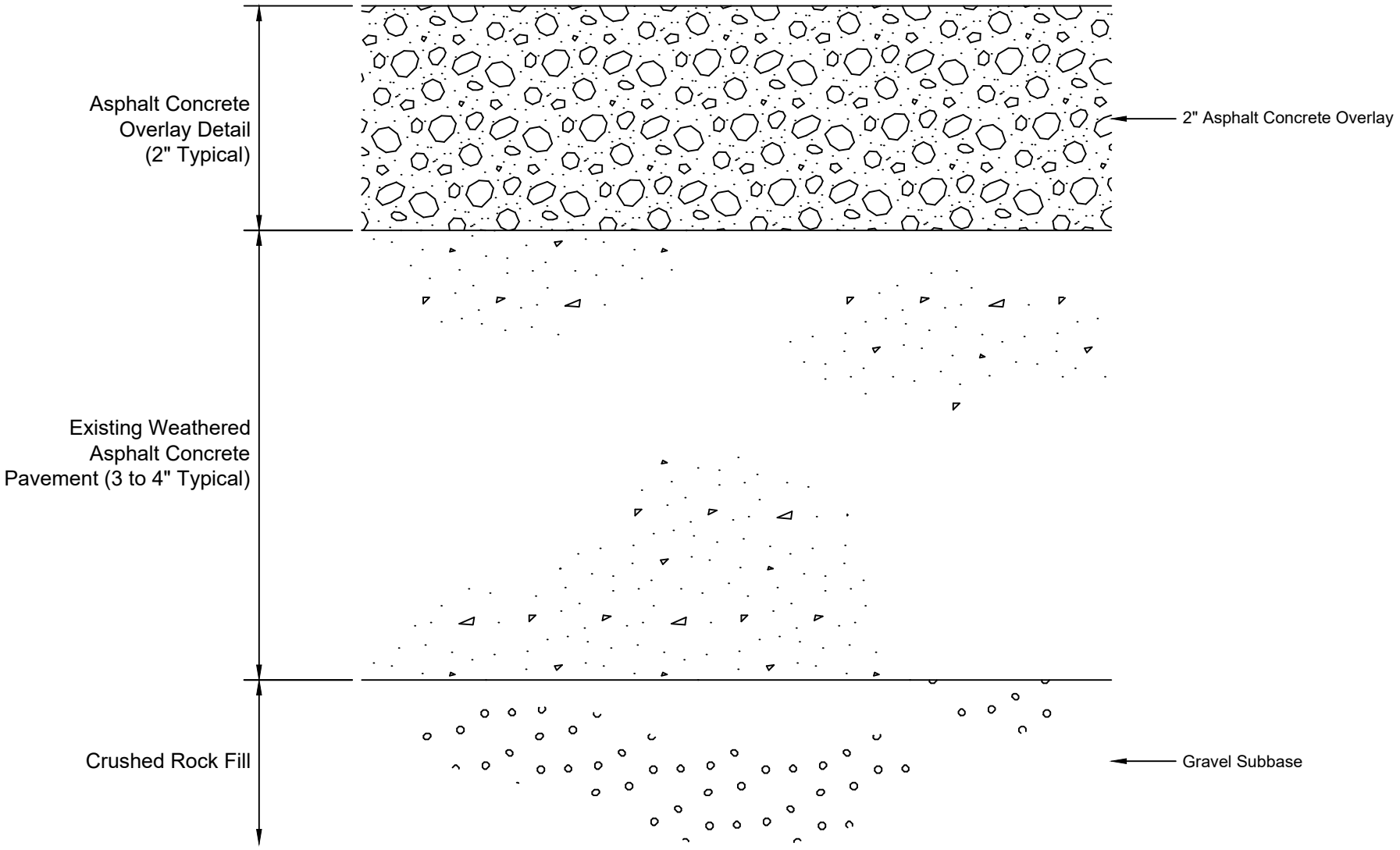
DIP TANK AREA
REMEDIAL ACTION SUMMARY

Project No. 1177-02

Figure No. 1

C:\Users\Josh\Desktop\Autocad Files\PNG-Autocad\1177-02 Avison\2018\Nov 2018\1177-02_BM-Data-111518.dwg 2.17.2014

ASPHALT CONCRETE COVER DETAIL



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FLORAGON PROPERTY
7TH & HART STREET
MOLALLA, OREGON

ASPHALT CONCRETE COVER DETAIL

Project No. 1177-02

Figure No. 2

ATTACHMENT A1
ANNUAL INSPECTION RECORD

Annual Inspection Record
Former Dip Tank Area Pavement – Floragon Property

Inspection performed by: _____

Date: _____

PAVEMENT SURFACE

List any areas requiring inspection and any observations made:

_____

_____

_____

Additional comments:

_____

_____

_____

Ruts? Yes _____ No _____

Location: _____

Maintenance required?* Yes _____ No _____

Trenches? Yes _____ No _____

Location: _____

Maintenance required?* Yes _____ No _____

Underlying Asphalt Pavement Layer Exposed? Yes _____ No _____

Location: _____

Maintenance required?* Yes _____ No _____

Underlying Soil/Fill Exposed? Yes _____ No _____

Location: _____

Maintenance required?* Yes _____ No _____

DRAINAGE

Comments

_____

_____

_____

Erosion

Present? Yes _____ No _____

Location: _____

Maintenance required?* Yes _____ No _____

Pooling/Standing Water/Sediment Accumulation (circle if observed)

Present? Yes _____ No _____

Location: _____

Maintenance required?* Yes _____ No _____

Attach photographic record if photographs taken.

File this Inspection Record (with photographs, if taken) within 30 days to property owner and DEQ Northwest Regional Office*:

Oregon DEQ NWR
Att: Daniel Hafley, ECSI File #0009
700 NE Multnomah St #600
Portland, OR 97232

* Attach repair record if maintenance required.

Repair Record
Former Dip Tank Area Pavement – Floragon Property

Date: _____

The following maintenance was required:

_____

_____

_____

_____

_____

The following maintenance was performed:

_____

_____

_____

_____

_____

Maintenance was performed by: _____

Maintenance was completed on (date): _____

Save record in owner's permanent file.