# GROUND WATER ASSESSMENT

**WEST SIDE QUARRY LLC**

6655 SW Hergert Road
Cornelius, Oregon 97113
Washington County Tax Lot 1S3200000405

ODEQ Case No. WQ/SW-NWR-2019-171

**Prepared for:**

**West Side Quarry LLC**
PO Box 1060
Woodburn, Oregon 97071

**Issued on:**

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EVREN NORTHWEST, INC.
Project No. 1350-20001-05

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*This*

# Ground Water Assessment

*Report for:*

**WEST SIDE QUARRY LLC**

6655 SW Hergert Road
Cornelius, Oregon 97113

*Has been prepared for the sole benefit and use of our Client:*

**West Side Quarry LLC**

PO Box 1060
Woodburn, Oregon 97071

*Issued* November 25, 2020 *by:*

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## Tables

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# List of Acronyms

| | |
|---|---|
| amsl | above mean sea level |
| bgs | below ground surface |
| CRB | Columbia River Basalts |
| DOGAMI | Department of Geology and Mineral Industries |
| ENW | EVREN Northwest, Inc. |
| EPA | US Environmental Protection Agency |
| GWA | Ground Water Assessment |
| HLW | Hudspeth Land and Water |
| MCL | Maximum Contaminant Level |
| µg/L | micrograms per Liter |
| mg/Kg | milligrams per Kilogram |
| mg/L | milligrams per Liter |
| NPDES | National Pollutant Discharge Elimination System |
| ODEQ | Oregon Department of Environmental Quality |
| ODOT | Oregon Department of Transportation |
| OWRD | Oregon Water Resources Department |
| ppm | parts per million |
| SOC | synthetic organic compounds |
| SWPCP | Storm Water Pollution Control Plan |
| Type 1 | Glass cullet received that was previously crushed and sorted to remove plastic, cork and metal at the source MRF, prior to hauling to quarry. |
| Type 2 | Glass cullet following further onsite processing, using equipment that further crushed the material and screened it down to approximately ½" size. |
| Type 3 | Reject material greater than ½" to ¾" that was hauled offsite as solid waste. |
| Type 4 | Residual Type 1 material on the ground (former stockpile location), which includes larger pieces of glass and plastic that did not make it through the processing screen. |
| VOC | volatile organic constituents |
| West Side Entities | Columbia Northwest Recycling, Inc. (doing business as Construction Materials Recycling), West Side Quarry LLC, Westside Redi-Mix & Rock, Inc. (formerly known as Westside Rock, Inc.), and Westside Rock & Reclaim, LLC |

# 1.0 Introduction

EVREN Northwest, Inc. (ENW) has conducted a Ground Water Assessment (GWA) at the West Side Quarry (Figures 1 and 2; subject site). This report describes the site, the results of site visits, reviews of hydrogeologic conditions, evaluation of stratigraphy and ground water occurrence in the area, and reviews of other pertinent data for the purpose of identifying potential impacts to ground-water quality.

The scope of work was developed in response to communications with the Oregon Department of Environmental Quality (ODEQ) and Oregon Department of Geology and Mineral Industries (DOGAMI).

This investigation was conducted at the request of West Side Quarry LLC, one of the "West Side Entities" comprised of: (1) Columbia Northwest Recycling, Inc. (doing business as Construction Materials Recycling), (2) West Side Quarry LLC, (3) Westside Redi-Mix & Rock, Inc. (formerly known as Westside Rock, Inc.), and (4) Westside Rock & Reclaim, LLC (collectively herein the "West Side Entities").

# 2.0 Background Leading to Ground Water Assessment

## 2.1 Quarry Description and Use Timeline

The subject site is a large upland basalt quarry located in the southern part of the Tualatin Valley in western Washington County. The site is identified on Tax Map 1S320 in the SE quarter of Section 20, Township 1 South Range 3 West, and it is over 100 acres in total area.

Since at least April 1997, West Side Entities has conducted mining operations at the subject site under a DOGAMI operating permit. On July 19, 2013, ODEQ assigned West Side Entities coverage under the National Pollutant Discharge Elimination System (NPDES) Stormwater Discharge General Permit Number 1200-A, under which the facility was authorized to discharge storm water.

Mining operations reportedly ceased in or around early 2016 and mine reclamation was commenced. Sometime in early 2017, West Side Entities brought glass cullet and recyclable asphalt shingles (no tear off, only unused shingles direct from the manufacturer) to the site as part of a supplementary recycling operation. These materials are further described in the next section.

## 2.2 Recycling Material Type Definitions and History Onsite

The following recycling material 'types' are defined by Type number (see Table 2-1, below) for a consistent understanding throughout this document.

**Table 2-1. Material Type Descriptions**

| Material Type | Description |
|---|---|
| Type 1 | Glass cullet received that was previously crushed and sorted to remove plastic, cork and metal at the source Material Recovery Facility (MRF), prior to hauling to quarry. |
| Type 2 | Glass cullet following further onsite processing, using equipment that further crushed the material and screened it down to approximately ½" size. |
| Type 3 | Reject material greater than ½" to ¾" that was hauled offsite as solid waste. |
| Type 4 | Residual Type 1 material on the ground (former stockpile location), which includes larger pieces of glass and plastic that did not make it through the processing screen. |

In 2017, Type 1 material was brought to the site. Over a period of several years, Type 1 material was stockpiled at the upper level of the quarry and gradually processed using equipment that crushed the material and screened it down to approximately ½" size, creating the Type 2 material. Approximately 500 cubic yards of Type 2 material was used in limited areas of the quarry, specifically as a levelling course in the equipment parking area and in haul roads and placing it in berms around parking areas. West Side Entities alleges the glass cullet contains no appreciable solid waste (i.e., less than 0.15 percent debris[1]).

Reject Type 3 material was periodically trucked to a landfill for disposal. The most recent disposal of Type 3 material was trucked to Hillsboro Landfill on April 7, 2020. Seven truck loads amounted to 69.67 tons as documented in Waste Management's invoice and partial truck tickets.

In September 2020, Type 4 material was scraped from the ground near the former processing area and stockpiled in a separate pile and covered by plastic sheeting.

Currently (October 2020), there is:

- No remaining Type 1 material on site.
- Approximately 3,000 cubic yards of Type 2 material is present in one large stockpile at the upper quarry level, next to where it was processed. Another approximately 50-100 cubic yards of Type 2 material are in smaller piles closer to the entrance to the quarry.
- No remaining Type 3 material on site.
- The small, plastic-sheeted stockpile of Type 4 near the former processing area. ENW understands that this Type 4 material will be shipped to Hillsboro landfill for disposal as a solid waste.

## 2.3 DOGAMI Inspections

On September 25, 2012, DOGAMI conducted an inspection of the quarry facility toward the end of their active quarry operations. The quarry was still actively extracting from the northwestern portion of the pit floor. A crushing and stockpiling area was in the central pit floor area. Reject overburden and imported

[1] Diamond Testing, July 16, 2019. Laboratory result following Oregon Department of Transportation (ODOT) Test Method TM225 showed 0.13% paper, plastic and cork in a sample of Type 2 material.

fill for reclamation was in the south end of the quarry. As mining progressed into the pit floor to the south, DOGAMI observed the presence of water in the pit floor, and in response, West Side Entities personnel were dewatering by pumping from a sump in the corner of the pit floor and conveying the water to the large storm water impoundment feature to the north. The DOGAMI inspector notified West Side Entities that dewatering was not permitted under the existing operating permit. West Side Entities immediately ceased pumping operations and filled the pit sump with 20 feet of fill consisting of boulders and pit run and an upper levelling course of 4-inch minus crushed rock. No solid waste was included in the fill material. The quarry storm water control operations, involving routing water from the south to the north end of the site via piping, ditching and retention basins, were determined to be in compliance with the NPDES 1200-A permit.

In July 2019, DOGAMI conducted a site inspection of the quarry facility. During the inspection, DOGAMI observed turbid storm water leaving the site. Measured turbidity readings during the visit led DOGAMI to conclude that Outfall B was contributing sediment to the discharge.

On February 28, 2020, DOGAMI conducted a site inspection of the quarry facility. During their inspection, DOGAMI observed evidence of erosion on steep slopes within the quarry and bare soil exposed due to backfilling activities. On the same inspection, DOGAMI noted sediment accumulation behind several check dams within the ditch alongside the entrance road into the quarry.

During the February 2020 inspection, DOGAMI reported seepage coming through the impoundment structure on the north side of the storm water impoundment feature. In the drainage below the impoundment structure, DOGAMI reported “water bubbling up” (later referred to as a “spring”) and a thick layer of bacteria on surface water causing a rust-colored iron oxidation on underlying sediments. The discolored sediments in the “spring” were reported to extend onto the adjoining private property to the north (Husin Property), extending toward, and possibly impacting the east-flowing unnamed stream on the Huson property.

## 2.4 ODEQ Violations

In the ODEQ Notice of Civil Penalty Assessment and Order, ODEQ issued penalty for operating a solid waste disposal site without a permit. The order cites improper storage of approximately 10,000 tons of Type 2 material, which allegedly contained a minor fraction of residual plastic and metal and which has been ground (“processed”) and used without approval from ODEQ. The order required West Side Entities to immediately cease accepting, grinding, and shredding of all materials.

On May 8, 2020, ODEQ issued an amended civil penalty for contamination of storm-water discharge, including possible contribution of iron contamination at the spring below the site. ODEQ requested that West Side Entities cease accepting any Type 1 material, submit a revised Storm Water Pollution Control Plan (SWPCP), and conduct a ground-water investigation to determine if wells in the area may have been impacted by solid waste stored and processed at the facility.

## 2.5 Quarry Reclamation Status and Fill Locations

As previously mentioned, following DOGAMI's 2012 site visit, West Side Entities filled the pit sump with 20 feet of rock fill. No solid waste was included in the fill material.

Type 1 material and asphalt shingles (from manufacturer, not tear off) were brought to the site only after reclamation and recycling operations began in 2017. Some Type 2 material was placed as a bedding for equipment parking, comprising a thickness of less than 6-inches and totaling less than 50 cubic yards. Additionally, approximately 500 cubic yards or less was used as levelling course in other parts of the haul road system above the pit and in berms near the equipment parking area. West Side Entities alleges the Type 2 material contains no appreciable solid waste (i.e., less than 0.15 percent debris[2]) and was appropriately used in accordance with Oregon Department of Transportation (ODOT) guidelines for re-use of recyclable construction materials.

# 3.0 Ground Water Assessment

An assessment of ground water conditions was performed by ENW and included a literature review of geology and hydrostratigraphy, a search of nearby water wells, two site visits to the quarry, and examination of laboratory results of samples collected by Hudspeth Land and Water (HLW) during visits in February through May 2020.

## 3.1 Topography and Surface Water

According to the US Geologic Survey Laurelwood, Oregon 7.5-minute quadrangle map, the property ranges in elevation from approximately 300 feet above mean sea level (amsl) at its northeast corner near the valley floor to about 800 feet amsl at its southwest corner. Most surface water run on enters the site at the southern end of the property.

Most of the drainage from the quarry is directed to a storm water impoundment structure located at the northeast corner of the quarry (Figure 2). Some drainage from the south rim of the quarry drains to a ditch along the southern quarry boundary and the quarry entrance road. There are two storm water outfalls at the subject site; one from the storm water impoundment feature (Outfall A) and one from a culvert at the entrance of the quarry facility (Outfall B). Outfall A and Outfall B join an unnamed creek which discharges to the Tualatin River.

## 3.2 Geology and Soils

The subject quarry site is located at the northern end of the Chehalem Mountains, which form the southwestern border of the Tualatin Valley lowland. The Chehalem Mountains are mapped by Trimble (1968) as Miocene and Pliocene Columbia River Basalts (CRB) comprising a series of tholeiitic flood basalts.

[2] Diamond Testing, July 16, 2019. Laboratory result following ODOT Test Method TM225 showed 0.13% paper, plastic and cork in a sample of Type 2 material.

Deformation of the CRB forms a structural basin below the Tualatin Valley which has been filled with up to 1,300 feet of lacustrine and fluvial deposits of lower Pliocene age (Trimble, 1963).

Two units of the Yakima subgroup of the CRB are exposed in the Chehalem Mountains including the Grande Ronde Basalt and the overlying Frenchman Springs Member of the Wanapum Basalt.[3] Several flows make up the approximately 420-foot thick basalt sequence. The West Side Entities quarry generally bisects the Grande Ronde member of the CRB; Frenchman Springs basalt outcrops above the quarry at elevations above 900 feet.

The upper exposed layers of basalt form the deeply weathered and moderately eroded slopes of the Chehalem Mountains. Weathered zones measure up to 100 feet thick locally are described as red to brown clay (laterite) with fragments of decomposed basalt. Unweathered basalt is generally brownish-gray to dark blue-gray and fine grained.

Different flood basalt flows are separated by well-developed columnar jointing and vesicular to slaggy vesicular zones (interflow zones).[4] Sedimentary interbeds are less common; however, tuffaceous sediment layers, interpreted as interflow zones, were observed near the top of the quarry by ENW during a recent site visit. Exposures of the Grande Ronde basalt in the Chehalem Mountains dip generally east and northeast into the Tualatin Valley at 9 to 11 degrees.[2]

The CRB uncomformably overlie late Eocene to early Miocene altered volcanic rocks and marine sedimentary formations which are not exposed in the Chehalem Mountains. These older rocks consist largely of sandstone and siltstone and undifferentiated Eocene volcanics and sediments.

## 3.3 Ground Water

An online search of the record of water wells of the Oregon Water Resources Department (OWRD) identifies 87 records of water wells in the same township/section/range as the subject site (T1SR3W Sec 20). There are at least seven wells near the quarry based on available location information (wells logs attached as Appendix A). One well outside the immediate area (WASH633/Animal Farm Well) approximately 3 miles east of the quarry reportedly penetrates the entire CRB unit near the east margin of the Chehalem Mountains. Table 3-1 summarizes well depths, well completions, and water-bearing units encountered during drilling. The locations of nearby water wells are illustrated on the Cross Sections and Well Locations map on Figure 3. Generalized cross-sections compiled from well driller's descriptions are provided on Figures 4 and 5.

[3] Al-Eisa, A., 1980. "The Structural and Stratigraphy of the Columbia River Basalt in the Chehalem Mountains, Oregon, Portland State University Masters Thesis".

[4] Interflow zones consist of the top of one basalt flow and the bottom of the overlying flow as well as any intervening sediment, if present, and generally are permeable where the basalt is vesicular or brecciated.

**Table 3-1. Summary of Select Wells Near the Subject Site**

| Well ID | Name | Approx Elev. (feet) | First Water (feet) | Completion Depth (feet) | Static Water Level (feet) | Water-Bearing Units (depth in feet) | Aquifer Characteristics |
|---|---|---|---|---|---|---|---|
| Section 20 | | | | | | | |
| WASH1334 | Finley | 740 | | 160 | 140 | 135 - 160 | Sandy clay |
| WASH63422 | Stratton | 717 | | 605 | 380 | 500 - 605 | Claystone |
| WASH76970 | Columbia NW | 364 | | 268 | 73 | 180 - 265 | Basalt Occass. Soft Interbeds |
| WASH10831 | Huson, H | 245 | 138 | 155 | 18 | 138 - 146 | Porous basalt |
| WASH59852 | Schneider | 621 | | 360 | 255 | 330 - 350 | Basalt |
| WASH 10821 | Saeslock | 500 | 270, 350, 375 | 385 | 225 | 270, 350, 375 | Basalt |
| WASH74995 | Nathan | 471 | | | 65 | 120 - 148 | Broken basalt |
| Section 23 | | | | | | | |
| WASH 633 | OSU Animal Farm | 171 | 85 | 450 | 13 | 85-105 | Fract basalt |
| | | | | | | 165-175 | Broken Basalt |
| | | | | | | 255-375 | Broken Basalt |

Well completion depths range from 155 to 605 feet below ground surface (bgs) and depth to first ground water occurred mostly within basalt aquifers at depths between 85 feet (WASH 633) and 500 feet bgs (WASH 63422). The deepest wells (WASH 63422 and WASH 633) likely penetrate the CRB unit.

The Saeslock and Animal farm wells reported multiple water-bearing zones. Water-bearing zones are characterized broadly in well driller's notes as unconsolidated sediments (clays), claystone, and basalt with occasional 'soft' interbeds, broken/fractured basalt, and basalt. Up to 135 feet of weathered clay materials were reported near the surface in some wells. Ground-water flow is anticipated to be primarily east to northeast based on the east- to northeast dip of the CRB.

Cross sections A – A' and B – B' (see Figures 4 and 5) illustrate the relative positions of emergent seeps and shallow pit water (and elevation of quarry fill) and the underlying basalt aquifers. The surface elevations within the quarry site were gathered from Google Earth elevation data. Google Earth uses elevation data from 2014 LIDAR imagery[5]. The elevation data within the quarry represents the surface during the latter period of the quarry's active mining operations (1997 through 2012). These depictions indicate the seeps and quarry fill lie significantly above the productive aquifers. Ground water emerging as seeps and shallow pit water encountered in the quarry pit area in 2012 are attributed to separate, shallower water-bearing zones within the weathered basalt layers near the surface.

## 3.4 ENW Inspections (Seeps)

ENW conducted two site inspections of the West Side Entities quarry on July 16 and August 7, 2020. The visits were in response to DOGAMI's observations of reported seepage coming through the impoundment structure on the north side of the storm water impoundment feature and their concerns of impact of seepage on adjoining properties downstream. In the drainage below the storm water impoundment feature, DOGAMI had reported water "bubbling up" and a thick layer of bacterium on surface water possibly impacting the unnamed creek on the adjoining Husson property. Attached is a photographic log of ENW's site visit observations (Appendix B).

[5] USGS NED elevation dataset, dated 2014

During our visits, ENW inspected the same areas that DOGAMI observed, including the ravine below Outfall B at the storm water impoundment feature. The storm water impoundment feature was dry during both visits so any seeps would have likely been due to ground-water sources.

The drainage below the impoundment structure is a vegetated slope with a dry creek bed running in a northeast direction. The creek bed flows through two 3-foot diameter corrugated culverts (C1 and C3 on Figure 2), C1 running beneath a roadway on the VanAkin property, hydraulically down-gradient from the impoundment structure. No significant sediment or iron staining was observed in the creek bed; however, the bottom of the corrugated metal culvert pipe was deteriorated. The outlet of culvert C3 (reported by DOGAMI to be full of sediment) emerged at a vegetated hillside approximately 175 feet to the northeast. Counter to DOGAMI's report, the culvert was elevated above a rocky creek bed and neither the pipe nor creek bed had any visible sediment buildup.

Approximately 100 feet down slope of outfall C3 the embankment expanded into a broad swampy area covered by wetland vegetation. The area where DOGAMI had previously observed bubbling water coming from the ground was dry and stained (iron oxide); however, approximately 75 feet further northeast, ENW noted several active ground water seeps coming from the ground with associated rust-colored sediments. The channeled water from the quarry drainage joined the unnamed creek approximately 600 feet northeast of the impoundment structure. No evidence of oxidizing iron deposits was noted within the sediments of the unnamed creek bed.

To investigate possible iron sources above the impoundment structure, ENW walked the haul road from the quarry entrance to the upper portions of the quarry. The haul road leads to a mid-level bench where quarry trucks were parked (estimated elevation of 512 feet amsl). At the top of the quarry, an area was used to store recyclable materials including new asphalt shingles (no tear-offs) and Type 2 material.

During both visits, ENW observed two seeps (SEEP2 and SEEP3 on Figure 2) collecting in a shallow ditch along the haul road, below the middle bench. SEEP3 was on the lower switchback at an elevation of approximately 425 feet amsl, and SEEP2 was directly upslope of SEEP3 on the upper switchback of the main haul road at an elevation of approximately 450 feet amsl. A platy, iridescent film was noted on both seeps typical of organic residue from iron-oxidizing bacteria. No obvious source of water was found in the hydraulically up gradient direction above the seeps; therefore, ground water was the suspected origin.

Site inspections confirmed the presence of seeps within the lower slope of the drainage below the impoundment structure and along the haul road above the storm water impoundment feature. Iron oxide deposits appeared to correlate with some of the emergent seeps in both areas. No evidence of storm water contribution to seep water such as surface water runoff from the quarry (dry at the time) or the truck wash area (closed loop system). In fact, according to Mr. Philippi, storm water discharges from the storm water impoundment feature occur only during periods of seasonally high precipitation (less than a few times per year).

The source of native iron in seep water may be explained by chemical composition of tholeittic basalt. In a trace element geochemcial analysis of samples collected from outcrops in Chehalem Mountains and

from drill cuttings from the Animal Farm well by Ai-Eisa (1980), elemental iron was detected at concentrations up to 11 parts per million (ppm). In the Chehalem Mountains concentrations of iron oxide were similar to those of other areas of Columbia River Basalt derived by Wright et al. (1974) and Swanson et al. (1979). Highly weathered samples were found to be enriched in minor elements as would be expected from normal weathering; for example, sodium was depleted, and iron was enriched.

The presence of seep water emerging during a dry period when no water is present in the storm water impoundment feature, and presence of seeps above the storm water impoundment feature are evidence that seeps are more likely a result of emergent ground water from basalt interflow zones exposed in the quarry. The upper seeps at 425 to 450 feet above mean sea level lie above the productive aquifer at nearby Finley well and may receive contribution from infiltration through overlying weathered soil and rock materials. ENW concludes that high iron precipitation due to bacterium is likely naturally occurring.

Iron oxidizing bacteria pose no threat to human health. Iron in drinking water can cause cosmetic effects (staining) or aesthetic effects (odor, taste) in wells. Because of the cosmetic and aesthetic effects, the US Environmental Protection Agency (EPA) has established a secondary Maximum Contaminant Level (MCL) for iron in drinking water of 0.3 milligrams per Liter (mg/L). No reports of cosmetic or aesthetic effects have been reported by well owners in the area.

## 3.5 Hudspeth Land and Water Sample Results

ENW understands that on February 28, 2020, HLW collected surface water samples from two locations below the storm water impoundment feature as part of a follow up to DOGAMI's storm-water inspection. Additionally, one sediment sample was collected below the impoundment structure. One of the surface-water samples (labelled "Upstream") is reportedly from clear ground water seepage below the impoundment structure but upstream of the lower "spring" exhibiting iron deposits. The second surface water sample (labelled "Downstream") was apparently collected from the "spring" containing rust-colored sediment. The sediment sample was collected from the sample "Downstream" location as the surface water sample.

On April 30, 2020 HLW collected one surface water sample from run-on near the top of the quarry (labelled "Upper") and one surface water sample from the "spring" below the storm water impoundment feature (labelled "Lower").

Samples were selectively analyzed for drinking water constituents, including volatile organic constituents (VOCS), synthetic organic compounds (SOCs) and inorganic compounds, total iron, iron deposits as well as microbiologic interpretation.

The results of laboratory analysis as provided to ENW are summarized in Tables 1 and 2.

The results from these samples indicate the following:

- Results of the "Upper" sample (spring above quarry) indicates surface water run-on entering the quarry contained total iron at 144 micrograms per Liter (µg/L). Surface water sample "Lower" collected from seepage at the spring contained the highest total iron of 5,020 µg/L.

- The sediment sample collected from the "Downstream" sample location contained concentrations of total iron at 8,890 milligrams per Kilogram (mg/Kg).
- Drinking water constituents were either below detection limits or below regulatory drinking water standards. The absence of pesticides/herbicides, VOCs, and elevated metals, with the exception total iron, in seep water directly below the storm water impoundment feature suggests that seepage has not been adversely impacted.

# 4.0 Findings and Conclusions

In response to ODEQ's request for a ground water investigation, ENW completed a review of hydrogeological conditions, including evaluation of stratigraphy and ground water occurrence in the vicinity of the West Side Quarry. In addition, ENW conducted site visits, reviewed water and sediment samples collected by others, and presented a summary of glass cullet and asphalt shingle materials stockpile at the quarry. The findings of ENW's evaluation of site conditions are as follows:

- During a 2012 site visit, DOGAMI observed pit-water dewatering from a sump in the pit floor south of the storm water impoundment feature. The water was being pumped through hoses and conveyance to the storm water impoundment feature. West Side Entities subsequently filled the quarry pit with 20 feet of inert rock fill. No solid waste was included in the fill material.
- The only potential "solid waste" placed at the site included Type 2 material and unused asphalt shingles. Type 1 material and recycled asphalt shingles were not brought to the site until after 2017. The Type 2 material was used as a leveling course for the haul road in the upper portion of the quarry and as bedding and berms for the equipment parking area. Approximately 500 cubic yards was placed in the quarry for these purposes.
- During site visits in 2020 by DOGAMI and ENW, ground water seeps were noted below the storm water impoundment feature near the northern end of the quarry. Seeps were observed to contain iron-staining due to iron-oxidizing bacteria. ENW noted two additional seeps higher up in the quarry along the haul road. These seeps also contained iron oxidized sediments.
- A review of well logs and research indicates Chehalem Mountains are underlain by approximately 140-meter-thick sequence of Columbia River basalts underlain by Marine Sedimentary deposits, undifferentiated. Due to post-depositional uplift of the area, the overlying CRB have been tilted and dip to the east and northeast. Wells in the area derive ground water from interflow zones within the CRB flows and from product units within the underlying marine deposits. There is significant separation between seeps and the elevation of fill materials at the quarry relative to underlying water bearing units; therefore, the ground water seeps are not likely hydraulically connected to underlying productive aquifers used by nearby wells.
- Iron deposits associated with the seeps are due to the oxidation of ferrous iron to ferric iron. The ferric iron is insoluble and precipitates out of water as a rust-colored deposit. The process can

occur by exposing iron-rich ground water to the atmosphere, and also by iron-oxidizing bacteria, which are naturally occurring. Iron oxidizing bacteria pose no threat to human health. However, iron in drinking water can cause cosmetic effects (staining) or aesthetic effects (odor, taste) in wells. Because of the cosmetic and aesthetic effects, EPA has established a secondary MCL for iron in drinking water of 0.3 mg/L. We are not aware of any cosmetic or aesthetic effects being reported by well owners in the area.

- Surface water samples collected by others did not identify synthetic organic compounds, volatile organic compounds, or inorganic compounds at concentrations that would pose a risk to surrounding wells.

Based on these findings, no further investigation into ground water quality appears warranted at this time.

# *Tables*

Table 1 - Summary of Analytical Data, Sediment

| Location ID | Downstream |
|---|---|
| Date Sampled | 2/28/20 |
| Sampled By | HLW |
| Location | Below Pond at "spring" |
| Constituent of Interest | mg/Kg (ppm) |
| **Metals** | |
| Iron | 8890 |
| **Total Petroleum Hydrocarbons** | |
| Generic Diesel / Heating Oil (DRO) | -- |
| Generic Mineral Insulating Oil (RRO) | -- |

Notes:
mg/Kg = milligram per kilogram or parts per million (ppm).
<# (ND) = not detected at or above the laboratory method reporting limit shown.

Table 2 - Summary of Analytical Data, Surface Water

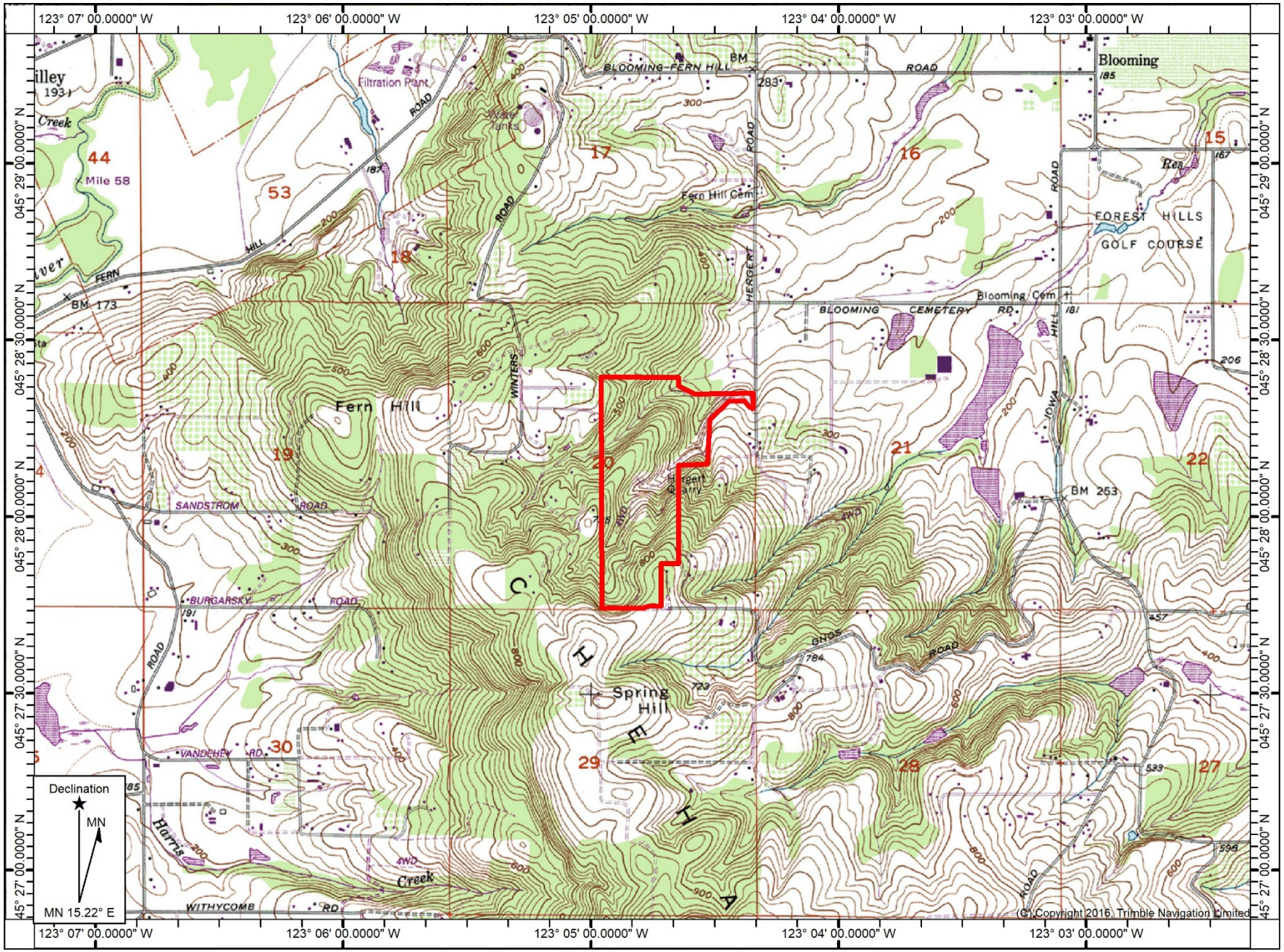
| Location ID | Upstream | Downstream | | Upper |
|---|---|---|---|---|
| Sample ID | Upstream | Downstream | Lower | Upper |
| Date Sampled | 2/28/20 | 2/28/20 | 4/30/20 | 4/30/20 |
| Depth Sampled (feet) | surface water | surface water | | surface water |
| Sampled By | HLW | HLW | | HLW |
| Location | Below pond; surface water upstream of "spring" | Below pond; surface water at the "spring" | | Surface water run-on at southern end of quarry |
| Constituent of Interest | µg/L (ppb) | µg/L (ppb) | µg/L (ppb) | µg/L (ppb) |
| **Volatile Organic Compounds / Synthetic Organic Compounds** | | | | |
| VOCs | -- | -- | All ND | All ND |
| SOCs | -- | -- | All ND | All ND |
| **Inorganic Compounds** | | | | |
| Barium | **--** | **--** | 86.7 | 30.4 |
| Iron | 651 | **--** | 5020 | 144 |
| Nickel | **--** | **--** | 2.59 | 2.59 |
| Nitrogen, Nitrate | **--** | **--** | <200 (ND) | 837 |
| Nitrogen, Nitrate-Nitrite | **--** | **--** | <200 (ND) | 837 |
| Sodium | **--** | **--** | 1890 | 3960 |
| Remaining IOC | **--** | **--** | All ND | All ND |
| **Iron Bacteria Microscopic Examination (units indicated below)** | | | | |
| Total Coliform Bacteria | -- | -- | Present | -- |
| E. Coli Bacteria | -- | -- | Absent | -- |
| Iron Bacteria Fragments Observed | 3 | 25 | **--** | **--** |
| Iron Deposits Observed | 15 | 80 | **--** | **--** |

Notes:

ug/L = micrograms per Liter or parts per billion (ppb).

ND = not detected at or above the laboratory method reporting limit.

# *Figures*



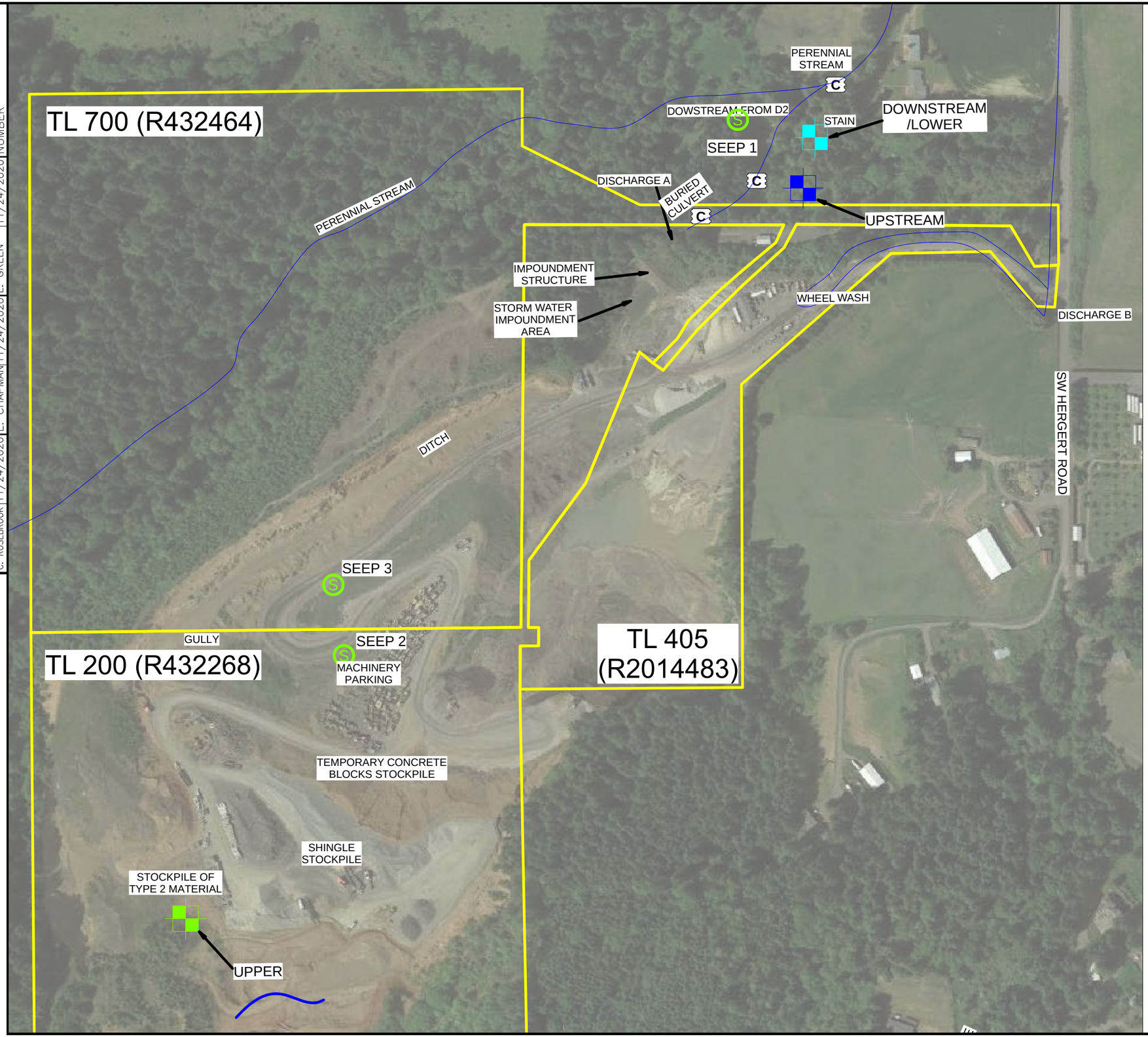

Name: LAURELWOOD
Date: Jan 1, 1992

0 1000 2000 3000 4000 5000
Feet

Location: 045° 28' 06.8697" N, 123° 04' 47.6088" W
Contour Interval: 20 ft

| | | | | |
|---|---|---|---|---|
| EVREN NORTHWEST | Date Drawn: 11/24/2020<br>CAD File Name:<br>Drawn By: CLR<br>Approved By: LDG | West Side Quarry<br>6655 SW Hergert Road<br>Cornelius, Oregon | **Site Vicinity Map** | Project No.<br>1350-20001<br>Figure No.<br>**1** |

| DRAWING NUMBER | APPROVED BY | CHECKED BY | DRAWN BY |
|---|---|---|---|
| 1350-20001(v01) | L. GREEN 11/24/2020 | E. CHAPMAN 11/24/2020 | C. ROSEBROOK 11/24/2020 |




LEGEND:

- TAXLOT BOUNDARIES
- C — CULVERT
- S — SEEP
- C1 — CULVERT ON VANAKIN PROPERTY
- C2 — CULVERT FROM CONFLUENCE OF DRAINAGES
- C3 — OUTLET FROM C1
- SEEP 1 — STAINED AREA OBSERVED BY DOGAMI, IRON OXIDE AREA
- SEEP 2 — ACTIVE SEEP ALONG HAUL ROAD
- SEEP 3 — ACTIVE SEEP ALONG HAUL ROAD IN QUARRY, ABOUT 30 FEET VERTICAL LOWER IN ELEVATION
- DOWNSTREAM: BACTERIA AND IRON ANALYSIS FEBRUARY 28, 2020
- LOWER: DRINKING WATER ANALYSIS APRIL 30, 2020
- UPSTREAM: BACTERIA AND IRON ANALYSIS FEBRUARY 28, 2020
- UPPER: DRINKING WATER ANALYSIS APRIL 30, 2020

NOTES:

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2019 AND ENW FIELD NOTES.
2. ALL BUILDING, STREET, AND FEATURE LOCATIONS ARE APPROXIMATE.
3. SYMBOLS REPRESENT LOCATION AND DO NOT ALWAYS REPRESENT EXACT SHAPE, SIZE, OR ORIENTATION.

APPROXIMATE SCALE

0 250 500 FEET

N

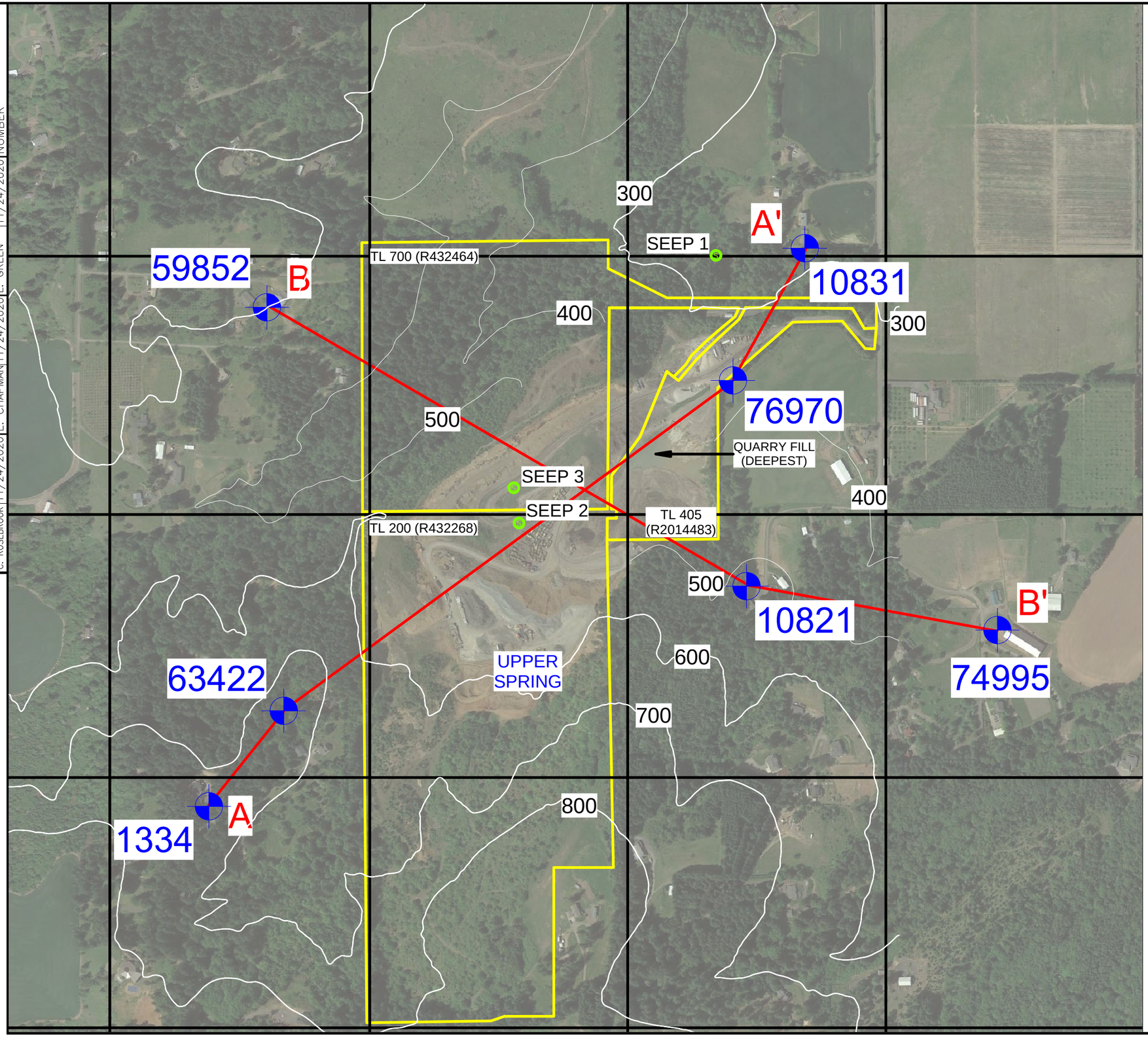
EVREN NORTHWEST INC.
environmental natural resource consultants
PO BOX 14488, PORTLAND, OREGON 97293
P: (503)452-5561, E: ENW@EVREN-NW.COM

FIGURE 2

SITE PLAN

WEST SIDE QUARRY LLC
6655 HERGERT ROAD
CORNELIUS, OREGON

| DRAWN BY | CHECKED BY | APPROVED BY | DRAWING NUMBER |
|---|---|---|---|
| C. ROSEBROOK 11/24/2020 | E. CHAPMAN 11/24/2020 | L. GREEN 11/24/2020 | 1350-20001 (v01) |




LEGEND:

- TAXLOT BOUNDARIES
- WELL LOCATION (630)
- CROSS SECTION LOCATIONS
- TOPOGRAPHIC CONTOURS MODELED FROM LIDAR IMAGERY (100 FOOT INTERVALS) (CONTOUR DATA FROM 2014)
- (S) SEEP

NOTES:

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2019 AND ENW FIELD NOTES.
2. ALL BUILDING, STREET, AND FEATURE LOCATIONS ARE APPROXIMATE.
3. SYMBOLS REPRESENT LOCATION AND DO NOT ALWAYS REPRESENT EXACT SHAPE, SIZE, OR ORIENTATION.

APPROXIMATE SCALE

0 500 1000 FEET

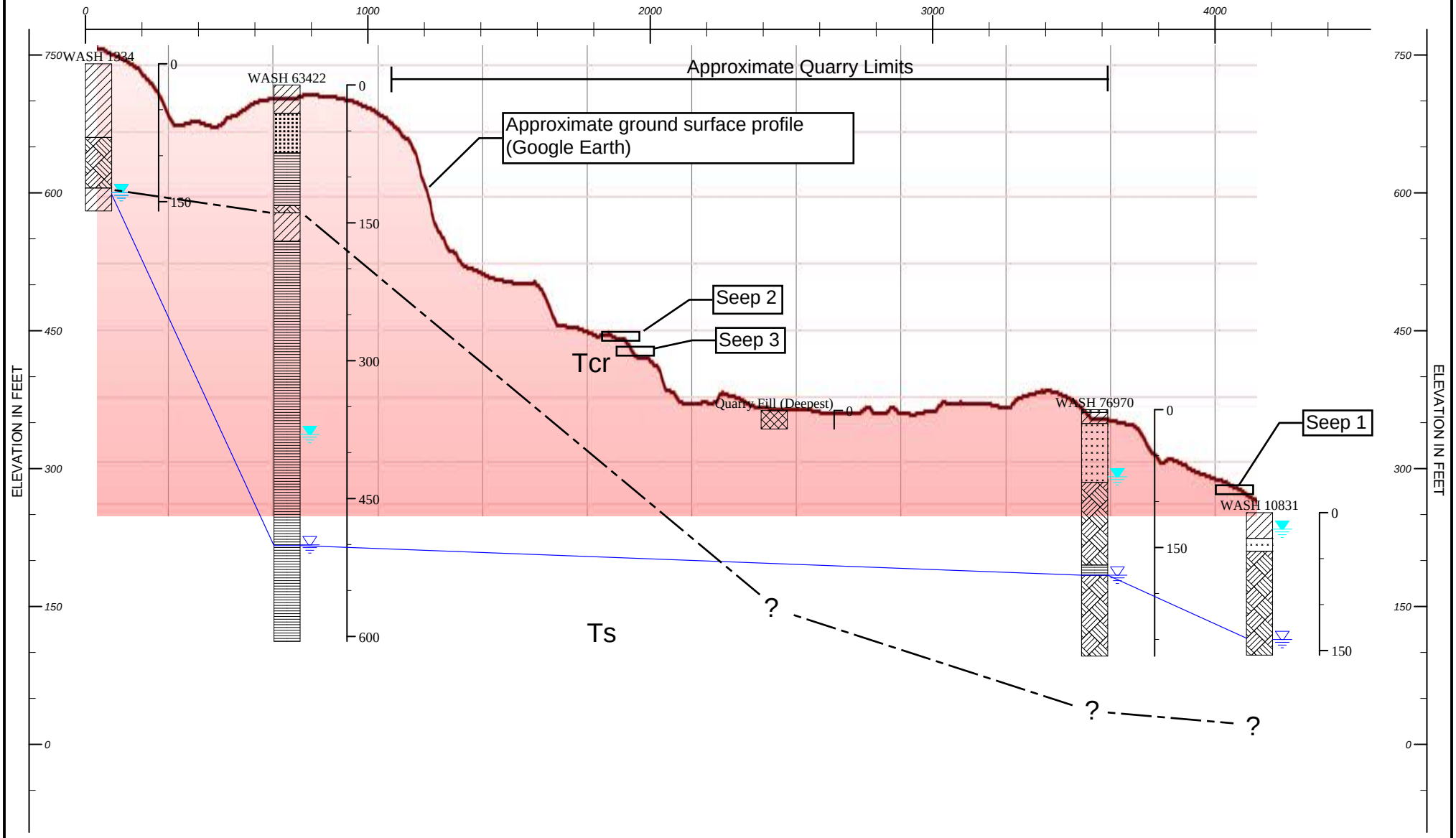
N

EVREN NORTHWEST INC.
environmental natural resource consultants
PO BOX 14488, PORTLAND, OREGON 97293
P: (503)452-5561, E: ENW@EVREN-NW.COM

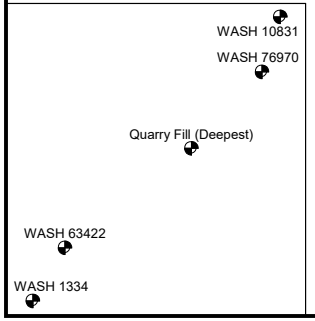
FIGURE 3

CROSS SECTIONS AND WELL LOCATIONS

WEST SIDE QUARRY LLC
6655 HERGERT ROAD
CORNELIUS, OREGON




Plan View




- Low plasticity clay
- Basalt (or generic rock)
- Sandstone
- Claystone
- Fill
- Frac rock
- Water table during drilling
- Water table at boring completion
- Tcr — Columbia River Basalt Group
- Ts — Marine Sediments Undifferentiated

EVREN Northwest

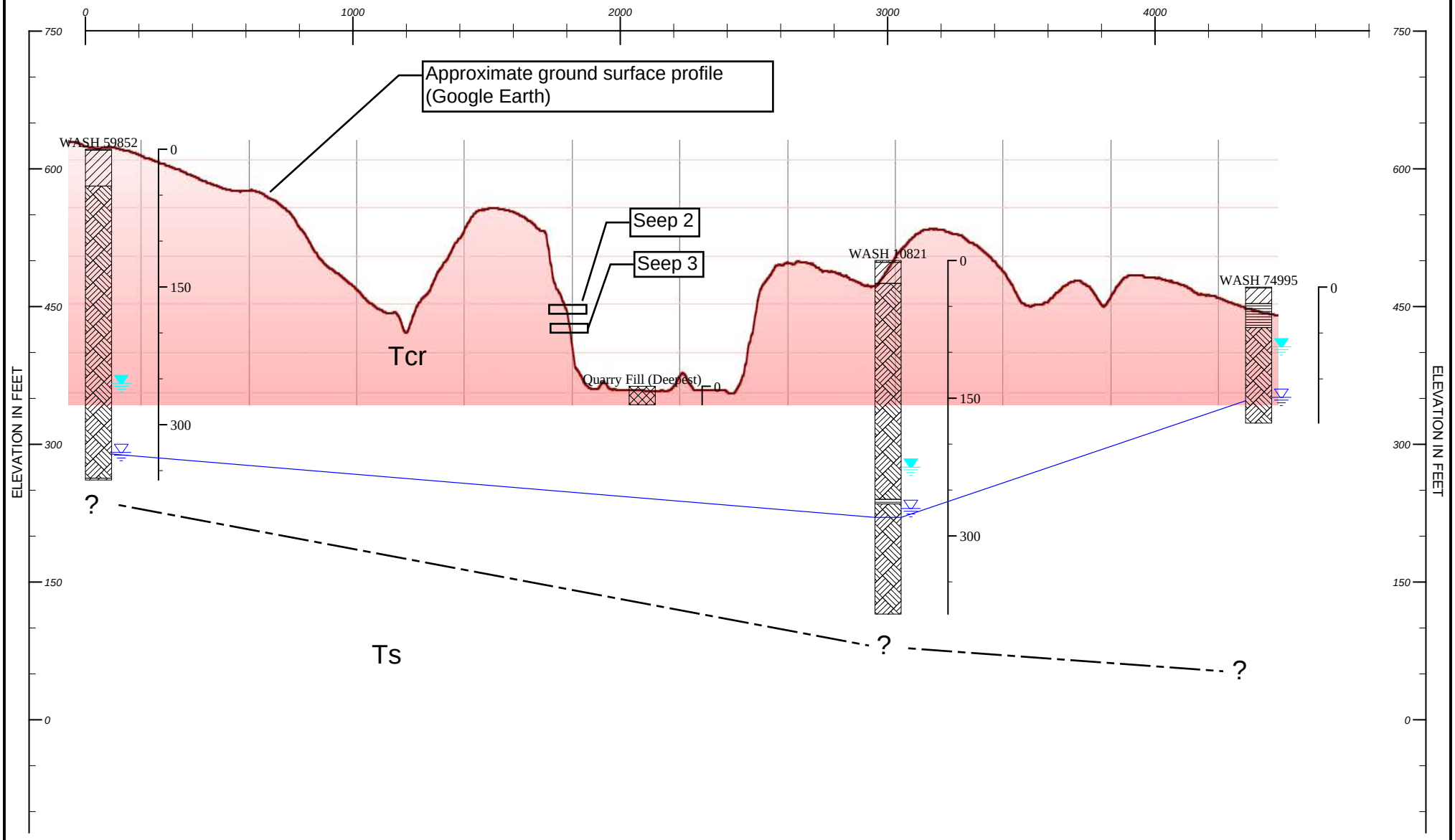
GENERALIZED CROSS SECTION A-A'

| HORIZONTAL SCALE: 1"=(proportional)' / VERTICAL SCALE: 1"=150' | DRAWN BY/APPROVED BY | DATE DRAWN |
|---|---|---|
| | E. Bruggeman | 11/24/2020 |

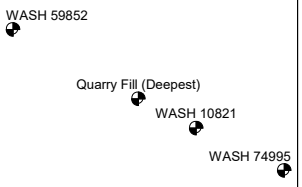
West Side Quarry LLC

1350-20001-05

FIGURE NUMBER 4




Plan View




- Topsoil
- Low plasticity clay
- Basalt (or generic rock)
- Fill
- Shale
- Claystone
- Water table during drilling
- Water table at boring completion

Tcr Columbia River Basalt Group

Ts Marine Sediments Undifferentiated

EVREN Northwest

# GENERALIZED CROSS SECTION B-B'

| HORIZONTAL SCALE: 1"=(proportional)' | DRAWN BY/APPROVED BY | DATE DRAWN |
|---|---|---|
| VERTICAL SCALE: 1"=150' | E. Bruggeman | 11/24/2020 |

West Side Quarry LLC

| 1350-20001-05 | FIGURE NUMBER 5 |
|---|---|

# *Appendix A – Well Logs*

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

# WATER WELL REPORT
## STATE OF OREGON

(Please type or print) RECEIVED State Well No. 1S/3W-23

(Do not write above this line) DEC 19 1977 State Permit No.

WATER RESOURCES DEPT. SALEM, OREGON

## (1) OWNER:
Name Oregon Department of Higher Education
Address P. O. Box 488
Corvallis, Oregon 97330

## (2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

## (3) TYPE OF WELL:
Rotary ☒ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

## (4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

## (5) CASING INSTALLED:
Threaded ☐ Welded ☒
8-5/8" Diam. from plus 2 ft. to 78 ft. Gage .322
..." Diam. from ... ft. to ... ft. Gage ...
..." Diam. from ... ft. to ... ft. Gage ...

## (6) PERFORATIONS:
Perforated? ☐ Yes ☒ No
Type of perforator used
Size of perforations in. by in.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.

## (7) SCREENS:
Well screen installed? ☐ Yes ☒ No
Manufacturer's Name ...
Type ... Model No. ...
Diam. ... Slot size ... Set from ... ft. to ... ft.
Diam. ... Slot size ... Set from ... ft. to ... ft.

## (8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom? A. M. Jannsen
Yield: 180 gal./min. with 307 ft. drawdown after ... hrs.
" 120 " 107 " "
" 100 " 72 " "
Bailer test 75 gal./min. with 62 ft. drawdown after ... hrs.
Artesian flow ... g.p.m.
Temperature of water 55° Depth artesian flow encountered ... ft.

## (9) CONSTRUCTION:
Well seal—Material used Cement grout
Well sealed from land surface to 78 ft.
Diameter of well bore to bottom of seal 12 in.
Diameter of well bore below seal 8 in.
Number of sacks of cement used in well seal 35 sacks
How was cement grout placed? Pumped to 78 feet through grout pipe to ground level.

Was a drive shoe used? ☐ Yes ☒ No Plugs ... Size: location ... ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel: ...
Gravel placed from ... ft. to ... ft.

## (10) LOCATION OF WELL:
County Washington Driller's well number
¼ ¼ Section 23 T. 1 S R. 3 W. W.M.
Bearing and distance from section or subdivision corner

## (11) WATER LEVEL: Completed well.
Depth at which water was first found 85 ft.
Static level 13 ft. below land surface. Date 12/7/77
Artesian pressure lbs. per square inch. Date

## (12) WELL LOG:
Diameter of well below casing 8"
Depth drilled 450 ft. Depth of completed well 450 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

| MATERIAL | From | To | SWL |
|---|---|---|---|
| Brown silty clay | 0 | 15 | |
| Blue-gray clay w/muddy gray-black silt & sand | 15 | 35 | |
| Brown clay w/rotten rock fragments | 35 | 40 | |
| Red&brown basalt-occ;weathered | 40 | 60 | |
| Hard gray-brown basalt | 60 | 70 | |
| Fractured brown basalt streak | 70 | 72 | |
| Hard gray-black basalt | 72 | 85 | |
| Fractured black basalt & lava-occ. broken | 85 | 105 | 10 gpm |
| Hard gray-black basalt | 105 | 125 | |
| Creviced hard gray-black basalt--occ. lava streak | 125 | 145 | |
| Broken gray-black basalt-occ. soapstone | 145 | 165 | |
| Broken black basalt w/red & brown basalt | 165 | 175 | 5 gpm |
| Gray-black basalt-occ.fractur | 175 | 255 | |

Work started 11/28/77 19 Completed 12/1/77 19
Date well drilling machine moved off of well 12/7/77 19

**Drilling Machine Operator's Certification:**
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] ... (Drilling Machine Operator) Date 12/12/77, 19...
Drilling Machine Operator's License No. 523

**Water Well Contractor's Certification:**
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name A. M. JANNSEN DRILLING CO. (Person, firm or corporation) (Type or print)
Address 21075 SW Tualatin Valley Hwy, Aloha, Or.
[Signed] ... (Water Well Contractor)
Contractor's License No. 79 Date 12/12/77, 19...

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45656-119

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

WASH

# WATER WELL REPORT
## STATE OF OREGON
(Please type or print)

010872 (Do not write above this line)

RECEIVED
DEC 19 1977
WATER RESOURCES DEPT.
SALEM, OREGON

State Well No. 1S/3W-23

State Permit No. .....

## (1) OWNER:
Name Oregon Department of Education Page 2

Address

## (2) TYPE OF WORK (check):
New Well ☐ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

## (3) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

## (4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

## CASING INSTALLED:
Threaded ☐ Welded ☐

..." Diam. from ... ft. to ... ft. Gage ...

..." Diam. from ... ft. to ... ft. Gage ...

..." Diam. from ... ft. to ... ft. Gage ...

## PERFORATIONS:
Perforated? ☐ Yes ☐ No.

Type of perforator used

Size of perforations in. by in.

... perforations from ... ft. to ... ft.

... perforations from ... ft. to ... ft.

... perforations from ... ft. to ... ft.

## (7) SCREENS:
Well screen installed? ☐ Yes ☐ No

Manufacturer's Name ...

Type ... Model No. ...

Diam. ... Slot size ... Set from ... ft. to ... ft.

Diam. ... Slot size ... Set from ... ft. to ... ft.

## (8) WELL TESTS:
Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☐ No If yes, by whom?

Yield: gal./min. with ft. drawdown after hrs.

" " " "

" " " "

Bailer test gal./min. with ft. drawdown after hrs.

Artesian flow g.p.m.

Temperature of water Depth artesian flow encountered ... ft.

## (9) CONSTRUCTION:
Well seal—Material used ...

Well sealed from land surface to ... ft.

Diameter of well bore to bottom of seal ... in.

Diameter of well bore below seal ... in.

Number of sacks of cement used in well seal ... sacks

How was cement grout placed? ...

Was a drive shoe used? ☐ Yes ☐ No Plugs ... Size: location ... ft.

Did any strata contain unusable water? ☐ Yes ☐ No

Type of water? depth of strata

Method of sealing strata off

Was well gravel packed? ☐ Yes ☐ No Size of gravel: ...

Gravel placed from ... ft. to ... ft.

## (10) LOCATION OF WELL:
County Driller's well number

¼ ¼ Section T. R. W.M.

Bearing and distance from section or subdivision corner

## (11) WATER LEVEL: Completed well.
Depth at which water was first found ft.

Static level ft. below land surface. Date

Artesian pressure lbs. per square inch. Date

## (12) WELL LOG:
Diameter of well below casing ...

Depth drilled ft. Depth of completed well ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

| MATERIAL | From | To | SWL |
|---|---|---|---|
| Broken gray-black basalt | 255 | 265 | 35 gpm |
| Fractured gray basalt-occ. broken streak | 265 | 305 | 10 gpm |
| Black basalt & lava | 305 | 315 | 40 gpm |
| Fractured gray-black basalt w/ occ. broken black basalt | 315 | 375 | 25 gpm |
| Blue silty sandstone | 375 | 405 | |
| Gray silty sandstone | 405 | 435 | |
| Light gray siltstone w/sandstone streaks | 435 | 450 | |

Work started 19 Completed 19

Date well drilling machine moved off of well 19

**Drilling Machine Operator's Certification:**

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] ... Date ..., 19...
(Drilling Machine Operator)

Drilling Machine Operator's License No. ...

**Water Well Contractor's Certification:**

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Name ...
(Person, firm or corporation) (Type or print)

Address ...

[Signed] ...
(Water Well Contractor)

Contractor's License No. ... Date ..., 19...

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45656-119

# WELL IDENTIFICATION FORM

Owner's Well Number: _____

**CURRENT WELL OWNER:** Phone 359-2365



Name: ROBERT FINELY

Mailing Address: P.O. 101 CORNELIUS

City: CORNELIUS State: OR. Zip: 97113

***If a well report is available for this well, please attach a copy of it to this form and return. It is not necessary for you to complete the remainder of the form if the well report is attached. If a well report is not available, please complete the remainder of the form to the best of your ability.***

**WELL LOCATION:** Wash 1334

County: WASHINGTON Latitude: _____ Longitude: _____

Township: 1S N or S, Range: 3W E or W Section: 20 _____ 1/4 _____ 1/4

Tax Lot Number: 1006

Street Address of Well (if different from above): 7576 SW BRACKEN RD. CORNELIUS

**WELL INFORMATION:**

Start Card Number: 29204 Approx. Construction Date: 8-1-91

Well Constructor: SAME

Name of Owner at Time of Construction: ROBERT FINELY

Well Depth (in feet): 160' Static Water Level (in feet): 140'

Diameter of Exposed Well Casing (in inches): 6"

Does this well have a formal water right associated with it? Yes: X No: _____ If yes:

Application #: _____ Permit #: 29204 Certificate #: 6909

**Please Return Completed Form to:**

**Oregon Water Resources Department**
**158 12th Street NE**
**Salem, OR 97310**

---

(Office use only)

Well Identification Number: 20000471

# WATER WELL REPORT
STATE OF OREGON

WASH 010805

RECEIVED
SEP 21 1983
WATER RESOURCES DEPT.
SALEM, OREGON

State Well No. 15/3W-20aa

PLEASE TYPE or PRINTER

State Permit No.

## (1) OWNER:
Name STOVE HUSON
Address RT 4, BX [redacted] 136
City CORVALLIS State ORE

## (2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

## (3) TYPE OF WELL:
Rotary Air ☒ Driven ☐
Rotary Mud ☐ Dug ☐
[redacted] ☐ Bored ☐

## (4) PROPOSED USE (check):
Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐
Thermal: Withdrawal ☐ Reinjection ☐

## (5) CASING INSTALLED:
Steel ☒ Plastic ☐
Threaded ☐ Welded ☒
6" Diam. from +2 ft. to 80 ft. Gauge 250
" Diam. from ft. to ft. Gauge

## [redacted] LINER INSTALLED:
" Diam. from ft. to ft. Gauge

## (6) PERFORATIONS:
Perforated? ☐ Yes ☒ No
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

## (7) SCREENS:
Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot Size Set from ft. to ft.
Diam. Slot Size Set from ft. to ft.

## (8) WELL TESTS:
Drawdown is amount water level is lowered below static level

[redacted] a pump test made? ☐ Yes ☒ No If yes, by whom?
[redacted]ld: gal./min. with ft. drawdown after hrs.
" " " "
Air test 25 gal./min. with drill stem at 240 ft. 1 hrs.
Bailer test gal./min. with ft. drawdown after hrs.
[redacted]sian flow g.p.m.
Temperature of water 53° Depth artesian flow encountered ft.

## (9) CONSTRUCTION:
Special standards: Yes ☐ No ☒
Well seal—Material used Cement Grout
Well sealed from land surface to 30 - 75-80 ft.
Diameter of well bore to bottom of seal 10" in.
Diameter of well bore below seal 6" in.
Number of sacks of cement used in well seal 9 sacks
How was cement grout placed? Pressure Grout
Was pump installed? NO Type HP Depth ft.
Was a drive shoe used? ☐ Yes ☒ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of Water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

## (10) LOCATION OF WELL:
County Wash Driller's well number
NE ¼ NE ¼ Section 20 T. 15 R. 3W W.M.
Tax Lot # Lot Blk Subdivision
Address at well location: SAME AS (1)

## (11) WATER LEVEL: Completed well.
Depth at which water was first found 206 ft.
Static level 76 ft. below land surface. Date 9-8-83
Artesian pressure lbs. per square inch. Date

## (12) WELL LOG:
Diameter of well below casing 6"
Depth drilled 240 ft. Depth of completed well 240 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

| MATERIAL | From | To | SWL |
|---|---|---|---|
| Brown Soil | 0 | 2 | |
| Brown Clay | 2 | 14 | |
| Red Clay | 14 | 58 | |
| Corky Basalt + Clay | 58 | 72 | |
| Hard Gray Basalt | 72 | 146 | |
| Gray Porous Basalt | 146 | 154 | |
| Hard Gray Basalt | 154 | 206 | |
| Gray + Brown Basalt (water) | 206 | 228 | 76 |
| Hard Gray Basalt | 228 | 240 | |

Work started 9-1 19 83 Completed 9-8 19 83
Date well drilling machine moved off of well 9-8 19 83

## (unbonded) Water Well Constructor Certification (if applicable):
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] [redacted] Date 9-8, 19 83

## Bonded Water Well Constructor Certification:
Bond 2178577 (number) Issued by: New Hampshire Surety Company Name

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name Bartlett Drilling INC. (Person, firm or corporation) (Type or print)
Address [redacted]
[Signed] [redacted] Water Well Constructor
Date 9-8, 19 83

NOTICE TO WATER WELL CONSTRUCTOR
The original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

SP*45292-690

WASH

**STATE ENGINEER**
**Salem, Oregon**

# Well Record

010845

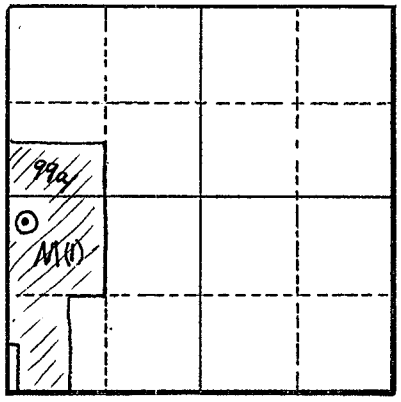
STATE WELL NO. 1/3W-20 M(1)
COUNTY Washington
APPLICATION NO. GR-4

OWNER: Robert P. and Emma M. Nixon
MAILING ADDRESS:

LOCATION OF WELL: Owner's No.
CITY AND STATE: Forest Grove, Oregon

NW ¼ SW ¼ Sec. 20 T. 1 S., R. 3 W., W.M.

Bearing and distance from section or subdivision corner 500 feet north of north line of Lot 32 Springhill Farm and 100 ft. East of west line of Section 20




Altitude at well 600 feet Interpolated

TYPE OF WELL: Drilled Date Constructed May 1955
Depth drilled 285' Depth cased 249'7"

Section 20

CASING RECORD:

8 inch casing set from 0 to 249 feet

FINISH:

Perforations at 105 feet

AQUIFERS:

Basalt from 95 feet to 285 feet

WATER LEVEL:

180 feet to static level measured - May, 1955

PUMPING EQUIPMENT: Type Peerless H.P. 25
Capacity 250 G.P.M.

WELL TESTS:
Drawdown 30 ft. after hours 250 G.P.M.
Drawdown ft. after hours G.P.M.

USE OF WATER Domestic - Irrigation Temp. °F., 19
SOURCE OF INFORMATION Registration Statement GR-4
DRILLER or DIGGER —
ADDITIONAL DATA:
Log ✓ Water Level Measurements ✓ Chemical Analysis Aquifer Test

REMARKS:

State Printing 89316

**STATE ENGINEER**
**Salem, Oregon**

State Well No. 1/3W-20M(1)
County WASHINGTON
Application No. GR-4

# Well Log

Owner: ROBERT P. & EMMA M. NIXON Owner's No. .....

Driller: ..... Date Drilled .....

| CHARACTER OF MATERIAL | (Feet below land surface) From | To | Thickness (feet) |
|---|---|---|---|
| Clay | 0 | 190 | 190 |
| Rock | 190 | 285 | 95 |

WASH
54823

# STATE OF OREGON
# WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

**Instructions for completing this report are on the last page of this form.**

WELL I.D. # L 30291
START CARD # 120569

**(1) OWNER:** Well Number 1
Name James & Mary Huson
Address 142 NE Shannon St.
City Hillsboro State Oregon Zip 97124

**(2) TYPE OF WORK**
[X] New Well [ ] Deepening [ ] Alteration (repair/recondition) [ ] Abandonment

**(3) DRILL METHOD:**
[X] Rotary Air [ ] Rotary Mud [ ] Cable [ ] Auger
[ ] Other

**(4) PROPOSED USE:**
[X] Domestic [ ] Community [ ] Industrial [ ] Irrigation
[ ] Thermal [ ] Injection [ ] Livestock [ ] Other

**(5) BORE HOLE CONSTRUCTION:**
Special Construction approval [ ] Yes [X] No Depth of Completed Well 80 ft.
Explosives used [ ] Yes [X] No Type _____ Amount _____

| HOLE Diameter | From | To | SEAL Material | From | To | Sacks or pounds |
|---|---|---|---|---|---|---|
| 10 | 0 | 19 | Bentonite | 0 | 19 | 53 |
| 6 | 19 | 80 | — | — | — | — |
| | | | | | | |
| | | | | | | |

How was seal placed: Method [ ]A [ ]B [ ]C [ ]D [ ]E
[X] Other Placed in dry + prodded
Backfill placed from ____ ft. to ____ ft. Material ____
Gravel placed from ____ ft. to ____ ft. Size of gravel ____

**(6) CASING/LINER:**

| | Diameter | From | To | Gauge | Steel | Plastic | Welded | Threaded |
|---|---|---|---|---|---|---|---|---|
| Casing: | 6 | +1½ | 59½ | .250 | [X] | [ ] | [X] | [ ] |
| | | | | | [ ] | [ ] | [ ] | [ ] |
| | | | | | [ ] | [ ] | [ ] | [ ] |
| | | | | | [ ] | [ ] | [ ] | [ ] |
| Liner: | | | | | [ ] | [ ] | [ ] | [ ] |
| | | | | | [ ] | [ ] | [ ] | [ ] |

Final location of shoe(s) 59½

**(7) PERFORATIONS/SCREENS:**
[ ] Perforations Method ____
[ ] Screens Type ____ Material ____

| From | To | Slot size | Number | Diameter | Tele/pipe size | Casing | Liner |
|---|---|---|---|---|---|---|---|
| | | | | | | [ ] | [ ] |
| | | | | | | [ ] | [ ] |
| | | | | | | [ ] | [ ] |
| | | | | | | [ ] | [ ] |
| | | | | | | [ ] | [ ] |

**(8) WELL TESTS: Minimum testing time is 1 hour**
[ ] Pump [ ] Bailer [X] Air [ ] Flowing Artesian

| Yield gal/min | Drawdown | Drill stem at | Time |
|---|---|---|---|
| 30 | 45 | 60 | 1 hr. |
| | | | |

Temperature of water 55 Depth Artesian Flow Found ____
Was a water analysis done? [ ] Yes By whom ____
Did any strata contain water not suitable for intended use? [ ] Too little
[ ] Salty [ ] Muddy [ ] Odor [ ] Colored [ ] Other ____
Depth of strata: ____

**(9) LOCATION OF WELL by legal description:**
County Washington Latitude ____ Longitude ____
Township 1S N or S Range 3W E or W. WM.
Section 20 NE 1/4 NE 1/4
Tax Lot 100 Lot ____ Block ____ Subdivision ____
Street Address of Well (or nearest address) 6363 SW Hergert Rd

**(10) STATIC WATER LEVEL:**
15 ft. below land surface. Date 6-2-99
Artesian pressure ____ lb. per square inch. Date ____

**(11) WATER BEARING ZONES:**
Depth at which water was first found 8

| From | To | Estimated Flow Rate | SWL |
|---|---|---|---|
| 8 | 9 | T | |
| 56 | 80 | 30 | 15 |
| | | | |
| | | | |
| | | | |

**(12) WELL LOG:**
Ground Elevation ____

| Material | From | To | SWL |
|---|---|---|---|
| Topsoil | 0 | 1 | |
| Brown Clay | 1 | 2 | |
| Gray Clay | 2 | 14 | |
| Brown Clay w/Med. Gravel | 14 | 55 | |
| Brown Clay w/Lg. Gravel | 55 | 80 | 15 |

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WATER RESOURCES DEPT.
SALEM, OREGON

Date started 6-1-99 Completed 6-2-99

**(unbonded) Water Well Constructor Certification:**
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
WWC Number ____
Signed ____ Date ____

**(bonded) Water Well Constructor Certification:**
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
WWC Number 1221
Signed Larry C Ewell Date 6-2-99

ORIGINAL & FIRST COPY-WATER RESOURCES DEPARTMENT SECOND COPY-CONSTRUCTOR THIRD COPY-CUSTOMER

**STATE OF OREGON**
**WATER SUPPLY WELL REPORT**
**(as required by ORS 537.765 & OAR 690-205-0210)**

**WASH 74995**

**9/12/2016**

**WELL I.D. LABEL# L** 123025
**START CARD #** 1031425
**ORIGINAL LOG #**

## (1) LAND OWNER

Owner Well I.D.
First Name KECIA Last Name NATHAN
Company
Address 7447 SW HERGERT RD
City CORNELIUS State OR Zip 97113

## (2) TYPE OF WORK

☒ New Well ☐ Deepening ☐ Conversion ☐ Alteration (complete 2a & 10) ☐ Abandonment(complete 5a)

## (2a) PRE-ALTERATION

| | Dia | + | From | To | Gauge | Stl | Plstc | Wld | Thrd |
|---|---|---|---|---|---|---|---|---|---|
| Casing: | | | | | | | | | |

| | Material | From | To | Amt | sacks/lbs |
|---|---|---|---|---|---|
| Seal: | | | | | |

## (3) DRILL METHOD

☒ Rotary Air ☐ Rotary Mud ☐ Cable ☐ Auger ☐ Cable Mud
☐ Reverse Rotary ☐ Other

## (4) PROPOSED USE

☐ Domestic ☐ Irrigation ☐ Community
☐ Industrial/ Commericial ☒ Livestock ☐ Dewatering
☐ Thermal ☐ Injection ☐ Other

## (5) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)
Depth of Completed Well 148.00 ft.

BORE HOLE

| Dia | From | To |
|---|---|---|
| 10 | 0 | 52 |
| 6 | 52 | 148 |
| | | |
| | | |

SEAL

| Material | From | To | Amt | sacks/lbs |
|---|---|---|---|---|
| Bentonite Chips | 0 | 52 | 29 | S |
| | | Calculated | 23.73 | |
| | | | | |
| | | Calculated | | |

How was seal placed: Method ☐ A ☐ B ☐ C ☐ D ☐ E
☒ Other POURED N HYDRATED
Backfill placed from ft. to ft. Material
Filter pack from ft. to ft. Material Size
Explosives used: ☐ Yes Type Amount

## (5a) ABANDONMENT USING UNHYDRATED BENTONITE

Proposed Amount Actual Amount

## (6) CASING/LINER

| Casing | Liner | Dia | + | From | To | Gauge | Stl | Plstc | Wld | Thrd |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | ○ | 6 | ☒ | 2 | 58 | .250 | ● | ○ | ☒ | ☐ |
| ○ | ● | 4 | ☐ | 28 | 148 | shd40 | ○ | ● | ☒ | ☐ |
| ○ | ○ | | ☐ | | | | ○ | ○ | ☐ | ☐ |
| ○ | ○ | | ☐ | | | | ○ | ○ | ☐ | ☐ |
| ○ | ○ | | ☐ | | | | ○ | ○ | ☐ | ☐ |

Shoe ☐ Inside ☒ Outside ☐ Other Location of shoe(s) 58
Temp casing ☐ Yes Dia From To

## (7) PERFORATIONS/SCREENS

Perforations Method drilled
Screens Type Material

| Perf/ Screen | Casing/ Screen Liner | Dia | From | To | Scrn/slot width | Slot length | # of slots | Tele/ pipe size |
|---|---|---|---|---|---|---|---|---|
| Perf | Liner | 4 | 108 | 148 | .5 | 0.5 | 160 | 4 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

## (8) WELL TESTS: Minimum testing time is 1 hour

○ Pump ○ Bailer ◉ Air ○ Flowing Artesian

| Yield gal/min | Drawdown | Drill stem/Pump depth | Duration (hr) |
|---|---|---|---|
| 5 | | 140 | 1.5 |
| | | | |
| | | | |

Temperature 58 °F Lab analysis ☐ Yes By
Water quality concerns? ☐ Yes (describe below) TDS amount 77 ppm

| From | To | Description | Amount | Units |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

## (9) LOCATION OF WELL (legal description)

County WASHINGTON Twp 1.00 S N/S Range 3.00 W E/W WM
Sec 21 NW 1/4 of the SW 1/4 Tax Lot 0601
Tax Map Number Lot
Lat ° ' " or DMS or DD
Long ° ' " or DMS or DD
◉ Street address of well ○ Nearest address
7447 SW HERGERT RD

## (10) STATIC WATER LEVEL

| | Date | SWL(psi) | + | SWL(ft) |
|---|---|---|---|---|
| Existing Well / Pre-Alteration | | | ☐ | |
| Completed Well | 8/14/2016 | | ☐ | 65 |

Flowing Artesian? ☐ Dry Hole? ☐

WATER BEARING ZONES Depth water was first found 120.00

| SWL Date | From | To | Est Flow | SWL(psi) | + | SWL(ft) |
|---|---|---|---|---|---|---|
| 8/14/2016 | 120 | 148 | 5 | | ☐ | 65 |
| | | | | | ☐ | |
| | | | | | ☐ | |
| | | | | | ☐ | |
| | | | | | ☐ | |

## (11) WELL LOG

Ground Elevation

| Material | From | To |
|---|---|---|
| topsoil | 0 | 1 |
| hard brwn clay | 1 | 18 |
| brwn claystone w/gravel | 18 | 44 |
| dark grey basalt | 44 | 90 |
| black basalt | 90 | 120 |
| black basalt brkn w/brn streaks | 120 | 148 |

Date Started 8/7/2016 Completed 8/14/2016

**(unbonded) Water Well Constructor Certification**

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number Date

Signed

**(bonded) Water Well Constructor Certification**

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

License Number 1956 Date 9/12/2016

Signed JOHN ROSS (E-filed)

Contact Info (optional)

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK Form Version:

**STATE OF OREGON**
**WATER SUPPLY WELL REPORT**
**(as required by ORS 537.765 & OAR 690-205-0210)**

**WELL I.D. LABEL# L** 130433
**START CARD #** 215433
**ORIGINAL LOG #**

## (1) LAND OWNER

Owner Well I.D. WASH 76970
First Name _____ Last Name _____
Company COLUMBIA NORTHWEST RECYCLING
Address P.O. BOX 947
City NORTH PLAINS State OR Zip 97133

## (2) TYPE OF WORK

[X] New Well [ ] Deepening [ ] Conversion [ ] Alteration (complete 2a & 10) [ ] Abandonment (complete 5a)

## (2a) PRE-ALTERATION

| | Dia | + | From | To | Gauge | Stl | Plstc | Wld | Thrd |
|---|---|---|---|---|---|---|---|---|---|
| Casing: | | | | | | | | | |

| | Material | From | To | Amt | sacks/lbs |
|---|---|---|---|---|---|
| Seal: | | | | | |

## (3) DRILL METHOD

[X] Rotary Air [ ] Rotary Mud [ ] Cable [ ] Auger [ ] Cable Mud
[ ] Reverse Rotary [ ] Other _____

## (4) PROPOSED USE

[X] Domestic [ ] Irrigation [ ] Community
[ ] Industrial/ Commericial [ ] Livestock [ ] Dewatering
[ ] Thermal [ ] Injection [ ] Other _____

## (5) BORE HOLE CONSTRUCTION

Special Standard [ ] (Attach copy)
Depth of Completed Well 268 ft.

| BORE HOLE Dia | From | To | SEAL Material | From | To | Amt | sacks/lbs |
|---|---|---|---|---|---|---|---|
| 10 | 0 | 98 | Cement w/1% Bentonil | 0 | 98 | 25 | S |
| | | | | | Calculated | 24.72 | |
| 6 | 98 | 268 | | | | | |
| | | | | | Calculated | | |

How was seal placed: Method [ ] A [ ] B [X] C [ ] D [ ] E
[ ] Other _____
Backfill placed from _____ ft. to _____ ft. Material _____
Filter pack from _____ ft. to _____ ft. Material _____ Size _____
Explosives used: [ ] Yes Type _____ Amount _____

## (5a) ABANDONMENT USING UNHYDRATED BENTONITE

Proposed Amount _____ Pounds Actual Amount _____ Pounds

## (6) CASING/LINER

| Casing | Liner | Dia | + | From | To | Gauge | Stl | Plstc | Wld | Thrd |
|---|---|---|---|---|---|---|---|---|---|---|
| ● | ○ | 6 | X | 2 | 98 | .250 | ● | ○ | X | |
| ○ | ● | 4.5 | | 2 | 268 | 200# | ○ | ● | X | |
| ○ | ○ | | | | | | ○ | ○ | | |
| ○ | ○ | | | | | | ○ | ○ | | |
| ○ | ○ | | | | | | ○ | ○ | | |

Shoe [ ] Inside [ ] Outside [ ] Other Location of shoe(s) _____
Temp casing [ ] Yes Dia _____ From _____ To _____

## (7) PERFORATIONS/SCREENS

Perforations Method DRILLED
Screens Type _____ Material PVC

| Perf/Screen | Casing/Liner | Screen Dia | From | To | Scrn/slot width | Slot length | # of slots | Tele/pipe size |
|---|---|---|---|---|---|---|---|---|
| Perf | Liner | 4.5 | 248 | 267 | .50 | | 42 | PIPE |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

## (8) WELL TESTS: Minimum testing time is 1 hour

( ) Pump ( ) Bailer (●) Air ( ) Flowing Artesian

| Yield gal/min | Drawdown | Drill stem/Pump depth | Duration (hr) |
|---|---|---|---|
| 52 | | 210 | .5 |
| 65 | | 240 | |
| 65 | | 265 | 1 |

Temperature 57 °F Lab analysis [ ] Yes By _____
Water quality concerns? [ ] Yes (describe below) TDS amount 254 ppm

| From | To | Description | Amount | Units |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |

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## (9) LOCATION OF WELL (legal description)

County WASHINGTON Twp 1 S N/S Range 3 W E/W WM
Sec 20 SE 1/4 of the NE 1/4 Tax Lot 405
Tax Map Number _____ Lot _____
Lat ° ' " or _____ DMS or DD
Long ° ' " or _____ DMS or DD
(●) Street address of well ( ) Nearest address
6655 SW HERGERT RD., CORNELIUS, OR 97113

## (10) STATIC WATER LEVEL

| | Date | SWL(psi) | + | SWL(ft) |
|---|---|---|---|---|
| Existing Well / Pre-Alteration | | | | |
| Completed Well | 08-17-2018 | | | 73 |

Flowing Artesian? [ ] Dry Hole? [ ]

WATER BEARING ZONES Depth water was first found 180

| SWL Date | From | To | Est Flow | SWL(psi) | + | SWL(ft) |
|---|---|---|---|---|---|---|
| 08-17-2018 | 180 | 265 | 65 | | | 73 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

## (11) WELL LOG

Ground Elevation _____

| Material | From | To |
|---|---|---|
| ROCK FILL | 0 | 3 |
| BROWN CLAY | 3 | 15 |
| DECOMP BROWN BASALT | 15 | 79 |
| SOFT BROWN BASALT | 79 | 93 |
| FIRM GRAY BROWN BASALT | 93 | 103 |
| HARD GRAY BASALT | 103 | 159 |
| FIRM GRAY BROWN BASALT WITH SOFT | 159 | |
| BROWN INTERBEDS | | 169 |
| LITE BROWN CLAYSTONE | 169 | 180 |
| FIRM GRAY BROWN BASALT OCC. SOFT | 180 | |
| INTERBEDS | | 238 |
| HARD GRAY BASALT | 238 | 259 |
| SOFT BLACK BASALT | 259 | 268 |

Date Started 08-09-2018 Completed 08-17-2018

**(unbonded) Water Well Constructor Certification**

I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

License Number _____ Date _____
Signed _____

**(bonded) Water Well Constructor Certification**

I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

License Number 1266 Date 08-20-2018
Signed _____
Contact Info (optional) _____

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK. Form Version: 0.95

# *Appendix B – Photographic Log*

The top of the basaltic lava, deeply weathered and moderately eroded, forms the surface in the upland slopes of the Chehalem Mountains. These red paleosols are visible along the northern slope of the quarry and are about 10 to 15 feet thick.

(July 16, 2020)

The outlet of culvert C1 (reported by DOGAMI to be full of sediment) emerged at a vegetated hillside approximately 175 feet to the northeast. Counter to DOGAMI's report, the culvert was elevated above a rocky creek bed and neither the pipe nor creek bed had any visible sediment buildup.

View of culvert inlet C1, hydraulically down-gradient of impoundment structure, showing absence of sediment and iron staining. (August 7, 2020)

View of outfall of lower culvert showing absence of sediment and iron staining. (August 7, 2020)

Approximately 100 feet down slope of outfall C3 the embankment expanded into a broad swampy area covered by sword fern and wetland vegetation. The area where DOGAMI had previously observed bubbling water coming from the ground was dry and stained (iron oxide). Approximately 75 feet further northeast, ENW noted several active ground water seeps coming from the ground with associated rust-colored sediments.

View of typical rust-colored seeps emerging from the boggy area below the storm water impoundment feature (July 16, 2020)

Channel below seeps (July 16, 2020)

The channeled water from the quarry drainage joined the generally eastward-flowing perennial creek on the Husin Property approximately 600 feet northeast of the impoundment structure. A culvert below the confluence of drainages was noted about 40 feet downstream. This culvert reportedly discharges to a roadside ditch along Hergert Road at the end of the Husin's driveway. No evidence of oxidizing iron deposits was noted within the sediments of the Husin creek bed.

View of confluence of quarry runoff and a stream on adjoining property. (August 7, 2020)

View of culvert below confluence of two drainages. (August 7, 2020)

On the August 7, 2020 visit, ENW observed two seeps (SEEP2 and SEEP3 on Figure 2) collecting in a shallow ditch along the haul road, below the middle bench. SEEP3 was on the lower switchback and SEEP2 was directly upslope of SEEP3 on the upper switchback of the main haul road. No obvious source of water was found in the hydraulically up gradient direction above the seeps; therefore, ground water was the suspected origin.

View of lower switch back of haul road and SEEP3 (July 16, 2020).

Close-up view of SEEP3 next to haul road (August 7, 2020).

A platy, iridescent film was noted on both seeps typical of organic residue from iron-oxidizing bacteria.

Close-up view of organic 'sheen' associated with iron oxidizing bacterial (August 7, 2020)

At the middle bench above the seeps, there were numerous quarry trucks parked on gravel surfaces. However, no evidence of rust surface staining was noted beneath the trucks, leading ENW to conclude that seep water staining in the haul road ditch was more likely due to iron-oxidizing bacteria.

View of quarry trucks parked at the middle bench level of the quarry. (July 16, 2020)

View northeast from the middle bench level of the quarry, showing storm water impoundment feature in distance.
(July 16, 2020)

The ditch along Hergert Road was inspected from the quarry entrance north to the Husin property driveway where it converged with the combined flow of Outfall B and the perennial stream. Outfall A and Outfall B converge at a point just north of the Husin driveway. Inspection of the ditch along Hergert Road did not reveal any flowing water, nor any significant sediment buildup from the quarry. It was noted that the ditch had just recently been cleaned and new gravel placed. The perennial stream from the Husin property was observed flowing into the Herger road ditch just north of the driveway. No significant turbidity was noted in the perennial stream at its convergence with the ditch.

View south along Hergert Rd ditch from the Husin Driveway entrance. (August 7, 2020)