WORK PLAN

FOR STORM WATER SOURCE CONTROL EVALUATION

Intrepid Marble and Granite

4000 NW St. Helens Rd.
Portland, Oregon

Agency Information

ODEQ ESCI Site No. 6148
ODEQ UIC No. 16205

Prepared for:

HDNGR NW Industrial LLC

1750 NW Front Avenue #106
Portland, Oregon 97209

Issued on:

October 11, 2021

EVREN NORTHWEST, INC.
Project No. 1260-19001-02

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This

Work Plan
for Storm Water Source Control Evaluation

for:

Intrepid Marble and Granite

4000 NW St. Helens Rd.
Portland, Oregon

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

HDNGR NW Industrial LLC

1750 NW Front Avenue #106
Portland, Oregon 97209

and its assignees

Issued October 11, 2021 *by:*

CERTIFIED
OREGON
LYNN DELAVAN GREEN
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EXP. 2/1/2022

(for)

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List of Acronyms and Abbreviations

Adapt	Adapt Engineering
Amec	Amec Foster Wheeler Environment & Infrastructure, Inc.
bgs	below ground surface
BMPs	Best Management Practices
Client	HDNGR NW Industrial LLC
COC	chain-of-custody
COIs	Constituents of Interest
DB	drainage basin
DB-A	Drainage Basin A
DB-B	Drainage Basin B
DRO	diesel range organics
ECSI	Environmental Cleanup Site Information
ENW	EVREN Northwest, Inc.
EPA	US Environmental Protection Agency
ESA	environmental site assessment
F&BI	Friedman & Bruya, Inc.
HREC	historical recognized environmental condition
JSCS	Joint Source Control Strategy
LUST	Leaking Underground Storage Tank
MDL	method detection limit
NPDES	National Pollution Discharge Elimination System
PCOIs	Potential Constituents of Interest
O&G	oil and grease
ODEQ	Oregon Department of Environmental Quality
PAHs	polycyclic aromatic hydrocarbons
QA/QC	quality assurance/quality control
REC	recognized environmental condition
RPD	Relative Percent Difference
RRO	residual range organics
SCE	Source Control Evaluation
SLVs	screening level values
TSS	total suspended solids
UIC	underground injection control
UST	underground storage tank
VCP	Voluntary Cleanup Program
VOC	volatile organic constituent

1.0 Introduction

1.1 Purpose

This work plan outlines the objectives and work scope for a storm water Source Control Evaluation (SCE) for the Intrepid Marble and Granite facility located at 4000 NW St. Helens Road, Portland, Oregon (subject site, see Figure 1). The subject site is currently owned by HDNGR NW Industrial LLC (Client) and leased to Intrepid Marble and Granite, an importer and distributor of natural stone, ceramic, porcelain, glass, and metal tile.

This SCE will be performed on behalf of HDNGR NW Industrial LLC by EVREN Northwest, Inc. (ENW) to identify, evaluate, and control sources of contamination that may reach the Willamette River.

1.2 Source Control Objective

The objective of a storm water SCE is to demonstrate that existing and potential sources of storm water contamination at the site have been addressed and no additional characterization or source control measures are needed at the site.

1.3 Regulatory Framework

This work plan was prepared in general accordance with Oregon Department of Environmental Quality's (ODEQ's) *Guidance for Evaluating the Stormwater Pathway at Upland Sites*, dated January 2009 and updated October 2010. This storm water SCE work plan was prepared at the request of ODEQ.[1]

2.0 Background

2.1 Site and Vicinity General Description

The 4000 NW St. Helens Road property is in Multnomah County within the City of Portland (see Figures 1 and 2) and consists of one tax lot (SECTION 19 1N 1E, TL 1100), totaling 1.77 acres in size. The majority of the site is covered by a large warehouse; all building space encompasses 69,293 square feet[2] in size. The City of Portland has zoned the subject site and surrounding properties as Heavy Industrial (IH).

The exterior areas of the facility are on the east side of the building and primarily asphalt-paved. There are several landscaped islands with trees and shrubs around the front entrance. Warehouse access bay doors are located at the south, middle, and north ends of the building. A gravel strip is present just off-site along the southern property line. Exterior areas are used for vehicle parking and loading and

[1] ODEQ. May 31, 2017. Letter to American Industries regarding Cleanup Program Status.

[2] Portlandmaps.com

unloading of product. Refuse is stored in closed receptacles located exteriorly in the northeast corner of the site.

2.2 Geographic Setting

The subject site lies at an elevation of approximately 35 to 40 feet above mean sea level[3]. The site and vicinity are generally level with regional topography sloping to the northeast toward the Willamette River (Figure 1).

2.3 Geologic Setting

The site is located within the northern part of the Portland Basin, a lowland area surrounding the confluence of the Columbia and Willamette Rivers and bounded by the Tualatin Mountains and Portland Hills to the west and the Cascade Range and Columbia Gorge to the east. The floor of the Portland Basin is underlain with up to 1,400 feet of semi-consolidated and unconsolidated materials consisting of Holocene sediments in the streambeds and flood plains of the active rivers and tributaries, glacial outburst flood deposits of the late Pleistocene Missoula Floods which have been mapped at up to 400 feet elevation amsl, and Miocene and Pliocene sediments of lacustrine and fluvial origin.

Madin (1990)[4] and Beeson and others (1991)[5] have mapped the geology beneath the subject property as Quaternary Alluvium (Qal) described as river and stream deposits composed of sand, silt, and organic-rich clay with subordinate gravel of mixed lithologies, which is largely confined to Columbia and Willamette River channels and valley bottoms of tributary streams. Locally may include lacustrine, paludal and eolian deposits. The alluvium reaches maximum thickness of 30 to 45 meters (100 to 150 feet) near the subject site.

Directly underlying the Qal is the Troutdale Formation of Tertiary age (Tt), consisting of unconsolidated to cemented pebble to cobble conglomerate with a silt or sand matrix.[6] Beeson and others (1991)[5] mapped the base of the Troutdale Formation in the site vicinity at approximately 60 to 75 meters (200 to 250 feet) below ground surface (bgs) and describe the Troutdale Formation as friable to moderately strong conglomerates with minor interbeds of sandstone, siltstone, and claystone.

The Sandy River Mudstone directly underlies the Troutdale Formation and overlies the volcanic rocks of the basin, and therefore represents the oldest sediments filling the Portland Basin in the subject area. Considered part of the Troutdale Formation by some, the sediments of the Sandy River Mudstone were

[3] USGS. 2017, Portland 7.5 Minute Topographic Map, Oregon-Washington: USGS 7.5-Minute Series, scale 1:24,000.

[4] Madin, I.P., 1990, Earthquake-Hazard Geology Maps of the Portland Metropolitan Area, Oregon—Text and Map Explanation: State of Oregon, Department of Geology and Mineral Industries Open-File Report 0-90-2, 21 p., 8 pls., scale 1:24,000.

[5] Beeson, M.H., Tolan, T.L., and Madin, I.P., 1991, Geologic Map of the Portland Quadrangle, Multnomah and Washington Counties, Oregon, and Clark County, Washington: State of Oregon Geological Map Series GMS-75, 1 sheet, scale 1:24,000.

[6] Trimble, D.E., 1963, *Geology of Portland, Oregon and Adjacent Areas:* U.S. Geological Survey Bulletin 1119, scale 1:62,500.

largely deposited in slack water environments by the ancestral Columbia River and local streams and sediment derived from Pliocene High Cascade volcanism.[7,8] The Sandy River Mudstone is beyond depths considered to be of concern.

2.4 Ground Water

According to the USGS Oregon Water Science Center, depth to ground water at the subject site is expected to be approximately ten feet bgs. According to well logs pertaining to nearby properties, ground water was typically encountered around 10 feet below ground surface.

The direction of ground water flow in the subject area is generally expected to be northeasterly based on local topography and location southwest of the Willamette River.

2.5 Site History

Site history has been documented through several previous environmental investigations performed at the subject site by others. The information presented in this section was garnered from the following reports:

- Adapt Engineering, *Phase I Environmental Site Assessment Report.* Dated December 16, 2015.
- Adapt Engineering, *Limited Phase II Environmental Site Assessment.* Dated February 17, 2016.
- Adapt Engineering, *Extended Limited Phase II Environmental Site Assessment.* Dated June 13, 2016.
- Amec Foster Wheeler Infrastructure and Environment, Inc., *Closure Report.* Dated March 22, 2017.
- Amec Foster Wheeler Infrastructure and Environment, Inc., *Limited Subsurface Investigation Work Plan.* Dated December 4, 2017.
- Amec Foster Wheeler Infrastructure and Environment, Inc., *Closure Report Addendum.* Dated February 28, 2018.

The subject site was undeveloped land prior to at least 1905 and located between former Guilds Lake and Kitteridge Lake. By 1922, the site had been developed with two buildings and a storage yard and occupied by the Rushlight Steel Works Foundry and The Steel Products Company. This land use continued to at least 1940, with the foundry reportedly including an earthen floor. By 1948, expansion of original buildings, or construction of additional buildings, on site had been performed. By 1980, the site was developed with the current structure and has remained as such to present day. Occupants of the site have included the Rushlight Steel Works Foundry, The Steel Products Company, LaGrand Steel Company,

[7] Tolan, T.E., 1982, The Stratigraphic Relationships of the Columbia River Basalt Group in the lower Columbia River Gorge of Oregon and Washington: Portland State University Master's Thesis, 169 p.

[8] Tolan, T.E. and Beeson, M.H., 1984, Exploring the Neogene History of the Columbia River: Discussion and Geologic Field Trip Guide to the Columbia River Gorge, Part I. Discussion in Oregon Geology, v. 46, no. 8, August 1984: Oregon Department of Geology and Mineral Industries, 11 p.

LaGrand Chain Corporation, GTS Interior Supply, McDowell Welding & Pipe Fitting, Inc., Omega Locksmith, and Intrepid Marble and Granite (current occupant).

In 1993, a 5,000-gallon diesel UST was removed from the site. Evidence of a release was observed, and 48 cubic yards of impacted soil was removed from the excavation. The site was added to the Leaking Underground Storage Tank (LUST) database under LUST ID 26-94-0001. Post-soil removal confirmation sampling indicated no detectable diesel in remaining soils and the LUST incident received a No Further Action determination in December 1995 from ODEQ.

In 2015 and 2016, Adapt Engineering (Adapt) conducted several environmental assessments at the subject site including Phase I and Phase II Environmental Site Assessments (ESA). In their 2015 Phase I ESA, Adapt identified the closed LUST listing as an historical recognized environmental conditions (HREC). They also identified the presence of significant ground water contamination on the east-adjoining property as a recognized environmental condition (REC). This east-adjoining property was identified as a bulk petroleum facility at 3800 NW St. Helens Road. Adapt noted that available ground water monitoring data indicated impacts had not migrated, and did not appear to be migrating, to the subject site. Although not identified as a REC, Adapt identified the former operation of a metal foundry and plate shop on site from 1940 to 1973 as an environmental issue that could have resulted in the release of various constituents of concern to soil and ground water on site. In January 2016, Adapt further investigation these concern during a Phase II ESA. The results of this investigation identified diesel range organics (DRO) and selected polycyclic aromatic hydrocarbons (PAHs) at two feet below ground surface (bgs) and DRO and low concentrations of petroleum related volatile organic constituents (VOCs) and PAHs in one ground water ample. Residual range organics (RRO) and arsenic were detected in soil at two feet bgs as well, in a different boring. Based on these results, an extended Phase II ESA was performed on site and identified DRO in soil from three sampling locations, several PAHs in three samples, and VOCs in one sample. DRO and selected PAHs were identified in two ground water samples.

In October 2016, the site was entered in ODEQ's Voluntary Cleanup Program (VCP) under ECSI ID 6148 with the intent of pursuing a No Further Action Determination. In March 2017, a Site Closure Report was prepared by Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec). Amec stated the release appeared to be related to a historical release from the former leaking diesel UST that was decommissioned by removal in 1993. The residual impacts appeared limited to the southeast corner of the site, with concentrations decreasing from the source area. Available ground water monitoring data indicated that impacts in shallow ground water decreased to below detection limits at the nearest offsite temporary well locations, approximately 150 feet down-gradient. Amec stated that COIs in soil and ground water on site did not pose an unacceptable risk to current and future human and ecological receptors and recommended a No Further Action determination for the site.

After review of the Closure Report, ODEQ requested additional characterization of the nature and extent of soil and ground water impacts at the site in a letter from May 2017. Amec performed additional sampling to address ODEQ's concerns that they summarized in a Closure Report Addendum dated

February 2018. Again, Amec concluded that No Further Action determination was warranted. The ECSI/VCP listing for the subject site remains open as requiring further investigation.

ODEQ approved the report summarizing the 2018 investigation activities and findings in a letter dated May 3, 2018, stating "Diesel-related residual contaminants found in soil and groundwater near the UST were below DEQ Risk Based Concentrations for applicable exposure pathways and do not require further investigation or remediation."

2.6 Storm Water Conveyance System Layout

Figure 2 presents the storm water system at the property. All storm water collected at the site is directed in series to a treatment vault and drywell. During large storm events, drywell overflow discharges to an adjacent manhole which pumps treated storm water to the City of Portland storm sewer. The two drainage basins shown on Figure 2 represent:

- Drainage Basin A: Primarily roof drainage; however, includes some drainage from a trench drain (TD03) present in a rear building bay door (door no longer used).
- Drainage Basin B: Mixed roof and asphalt-paved area drainage. This includes:
    - Trench drains present in front of building bay doors in the center of the building (TD01) and at the southern end of the building (TDO2).
    - Asphalt-paved area catch basins located near the northeast corner of the building (CB01), north central portion of the building (CB02), and near the center bay door of the building (CB03).

Both drainage basins discharge to a 4-foot x 12-foot pre-cast concrete vault, that is being replaced with a PerkFilter™ vault (VAULT) outfitted with seven treatment cartridges as soon as possible (due to structural integrity issues with the current vault). Storm water will discharge to a 48-inch diameter, approximately 8-foot-deep dry well manhole (DW01), constructed of pre-formed perforated concrete rings. Overflow from DW01 (during saturated conditions / large rainfall events) discharges south to a 48-inch diameter, approximately 10-foot-deep manhole (PUMP-MH) constructed of pre-formed solid concrete rings outfitted with a duplex pump system rated up to 125 gallons per minute. When activated, this system pumps storm water to the City of Portland storm (only) sewer located in NW St. Helens Rd., which eventually discharges to the Willamette River. The inlet to the City of Portland storm sewer uses existing infrastructure. Refer to

The storm water treatment system on site, including primary source control measures and best management practices, is described in detail in the Storm Water Injection Management Plan provided by ENW to ODEQ.

2.7 Project Site Ownership Operating History

In the past, the subject site was occupied by the Rushlight Steel Works Foundry and The Steel Products Company. This land use continued to at least 1940. By 1948, expansion of original buildings, or construction of additional buildings, on site had been performed. By 1980, the site was developed with the current structure and has remained as such to present day. Occupants of the site have included the Rushlight Steel Works Foundry, The Steel Products Company, LaGrand Steel Company, LaGrand Chain

Corporation, GTS Interior Supply, McDowell Welding & Pipe Fitting, Inc., Omega Locksmith, and Intrepid Marble and Granite (current occupant).

2.8 Regulatory History (Storm Water Permitting)

2.8.1 Industrial Storm Water Discharge

In 2021, a dry well on site was registered with ODEQ's Underground Injection Control (UIC) database. Additionally, a Storm Water Injection Management Plan was created for the site to manage storm water on site that is discharged to this drywell.

2.8.2 Underground Injection Control

The subject site has been registered in ODEQ's Underground Injection Control (UIC) program under Facility ID 16205.

3.0 Potential Sources, Pathways, and Contaminants of Interest

3.1 Potential Contaminant Sources

Based on previous investigations and our knowledge of the project site, the sources for potential project site-related contaminants are as follows:

- The presence of TSS, O&G, copper, and zinc from truck traffic on site.
- Petroleum-related VOCs, PAHs, DRO, RRO from former releases on site.

An inventory of hazardous substances stored on site was performed on September 15, 2021. Substances noted on site are as follows:

- Hydraulic oil
- Other various oils (gear, pump, vacuum seal pump, motor)
- Brake cleaner
- Paint
- Primer
- Isopropyl grease
- WD-40
- Gasoline
- Enamel
- Propane
- Diesel
- Polyester adhesive
- Grout
- Brake fluid
- Caulk
- General cleaners (glass, all purpose)
- Bleach
- Magiclean soap
- Mapelastic

All of the above materials were stored in original containers with no container exceeding 5-gallons in capacity. All materials were stored over concrete, inside the shop building. No drains were noted within

the shop building; therefore, it is very unlikely that a spill of any of these materials inside the shop building would result in contact with storm water.

3.2 Outfall Sediment Data

The subject site does not discharge directly to an "outfall." Currently, storm water at the entire subject site is collected by several onsite catch basins, trench basins, and roof drains which direct storm water to an onsite vault outfitted with seven treatment cartridges. Treated storm water then discharges to a dry well. Overflow from the drywell discharges south to a manhole with pump system which, when activated, pumps overflow discharge to the City of Portland storm (only) sewer located in NW St. Helens Road, which eventually discharges to the Willamette River at the City of Portland's outfall OF19. Investigation of sediments near the outfall identified the following potential contaminants of interest (PCOIs)[9]:

- Polychlorinated biphenyls (PCBs),
- PAHs,
- phthalates, and
- metals (chromium, copper, lead, nickel, zinc).

3.3 Potential Future Pathways

Only one complete pathway for potential sources of contaminants from the subject site to impact Portland Harbor sediments was identified:

- Discharge of contaminants via storm water conveyance lines to the Willamette River.

The SCE report will further document these lines of evidence as well as additional information identified during the implementation of this storm water SCE work plan.

3.4 Contaminants of Interest

Based on current and historical site use, and PCOIs previously identified by the City of Portland for Outfall 19, contaminants of interest (COIs) in storm water discharging from the subject site include the following.

- PCBs,
- PAHs,
- phthalates
- Petroleum-related VOCs (specifically: benzene, toluene, ethylbenzene, total xylenes),
- Total metals (specifically: copper, lead, nickel, and zinc),
- TPH by NWTPH-Gx and NWTPH-Dx, and
- TSS.

[9] GSI. August 2006. Phase I Report for City of Portland Priority 1 Basins. Prepared by Groundwater Solutions, Inc.

4.0 Storm Water Control Measures

4.1 Previous Storm Water Source Control Measures

During the current tenancy of the project site by Intrepid Marble and Granite, best management practices (BMPs) are employed to minimize pollutant contact with storm water runoff. Reportedly, routine BMPs employed by Intrepid Marble and Granite include the following:

- Storage of product is exclusively indoors.
- Recycling/waste dumpsters are covered and located away from catch basins.
- Truck cleaning, maintenance, and repair activities are prohibited for loading/unloading vehicles.
- Daily observation of truck parking/waiting areas to collect refuse and identify excessive oil and grease accumulation.
- Treatment of excessive oil and grease accumulation with approved absorbent materials, is present (located in on-site spill kit).
- Monthly sweeping to remove sediment and debris that might otherwise be transported to the storm water system including vacuuming of paved surfaces in and near truck-travelled areas.
- Routine cleaning of storm water features to prevent buildup of silt, leaves, and other debris. Cartridge filters are regularly inspected and maintained.
- Daily observations from Intrepid Marble & Granite personnel to identify, contain, report, and remove accidental spills.
- Annual training of employees in BMPs.

4.1.1 Maintenance of the Storm Water Treatment System

As outline in the ODEQ-approved Storm Water Injection Management Plan[10], the storm water treatment system will be maintained following both City of Portland recommended best management practices (BMPs) for catch basins and drywells, as well as the inspection and maintenance guide provide by the filter vault manufacturer (see Attachment B). Sediment accumulation within the treatment vault, if any, will be removed and disposed of following these BMPs.

5.0 Storm Water Confirmation Sampling Plan

The following storm water confirmation sampling plan is intended to assess post-redevelopment storm water discharging from the site and eventually discharging to the Willamette River for the COIs identified in Section 3.4.

[10] ENW. February 26, 2021. Strom Water Injection Management Plan: Intrepid Marple and Granite

5.1 Proposed Storm Water Sampling Plan

5.1.1 Sampling Location

Storm water samples will be collected at the Storm Water Monitoring Location 1 (Figure 2), located at the manhole in the onsite vault, right before storm water is discharged into the dry well.

5.1.2 Sample Frequency

Sampling frequency will follow ODEQ guidance[11] and will be conducted based on the criteria put forth in Section 6.1.3. It is expected that an initial round of sampling followed by several rounds of storm water sampling will be performed.

5.1.3 Storm Event Criteria

Two storm water confirmation samples will be collected to represent a first-flush condition and the other two storm water confirmation samples will be collected to represent a longer rain event. In accordance with ODEQ guidance,[11] specific conditions necessary to support first-flush sampling include the following:

- An antecedent dry period of at least 24 hours (less than 0.1 inch of precipitation over the previous 24 hours).
- A minimum predicted rainfall volume exceeding 0.2 inch for the storm event.
- An expected storm duration of at least three hours.
- Samples collected within the first 30 minutes of observed storm water flow.

We recognize logistical challenges to collect samples within these time frames and storm events. We will attempt to meet these criteria. However, if we are unable to, samples will be collected in general accordance with an NPDES 1200-Z general permit. The sample timing according to an NPDES 1200-Z permit is described below.

> *Sample the discharge during the first 12 hours of the discharge event, which is a measurable storm event resulting in an actual discharge from a site. If it is not practicable to collect the sample within this period, collect the sample as soon as practicable. Sample collection is not required outside of regular business hours or during unsafe conditions. Regular business hours will be from 8 a.m. to 5 p.m. on weekdays.*

5.1.4 Sampling Methods and Handling

Storm water sampling methods will be completed in general accordance with ODEQ guidance.[11] Grab samples will be collected from Storm Water Monitoring Location 1 using a peristaltic pump and disposable polyethylene tubing lowered into the central portion of the flow stream. Because disposable equipment will be used for each storm water sample, rinse blanks will not be required.

[11] ODEQ, January 2009. *Guidance for Evaluating the Stormwater Pathway at Upland Sites*. Updated October 2010.

Samples will be transferred directly into laboratory-supplied containers (as specified in Table 6-2) as whole water samples from the access points described above. The sampler will wear disposable nitrile gloves during sampling activities. The sample containers will be placed in a cooler with ice and transported to an analytical laboratory under standard chain-of-custody procedures.

5.1.5 Sample Transport and COC Procedures

After storm water samples have been collected, they will be placed in a cooler with ice or an equivalent and transported to the analytical laboratory. Chain-of-custody (COC) procedures will begin in the field and will track delivery of the samples to the laboratory. The COC will include each sample listed, date, time, number of jars, and the analytical testing requested.

Upon transfer of samples to the laboratory, the COC form will be signed by the persons transferring custody of the coolers. Upon receipt of samples by the laboratory, the shipping-container seal will be broken, and the condition of the samples will be recorded by the receiver.

5.2 Analytical Methods and Concentration Goals

Storm water samples will be submitted to the analytical laboratory for analysis of the following:

- PAHs,
- PCBs (as aroclors)
- Phthalates
- Petroleum-related VOCs,
- Total metals (specifically: copper, lead, nickel, and zinc),
- TPH by NWTPH-Gx and NWTPH-Dx, and
- TSS

Analytical concentration goals will be consistent with the Portland Harbor Joint Source Control Strategy (JSCS) screening values. Table 1 presents a list of analytes with corresponding screening values and laboratory method detection limits (MDLs). We note that some JSCS screening level values (SLVs) are lower than the achievable MDLs using approved analytical methods.

Samples will be immediately placed in cooled storage and kept cooled until they are delivered to Friedman & Bruya, Inc. (F&BI) of Seattle, Washington, following chain-of-custody protocol. The samples will be analyzed according to the Analysis Plan shown in Table 5-1, below. Sample containers, preservatives, and holding times for each analytical method are provided on Table 5-2.

Table 5-1. Proposed Analytical Plan, Storm Water

Analytical Method	Constituents	Storm Water
EPA 8270-SIM	PAHs, PCBs and Phthalates	All
EPA 8260C	Volatile Organic Constituents • Benzene • Ethylbenzene • Toluene • Total xylenes	All
NWTPH-Gx	GRO	All
NWTPH-Dx	DRO and RRO	All
EPA 200/6000/7000 series	Total metals: • Copper • Lead • Nickel • Zinc	All
SM2540D	Total Suspended Solids	All

Table 5-2. Analytical Protocol, Storm Water

Analyte(s)	Analytical Method	Container	Holding time	Preservation
Storm Water:				
PCBs, PAHs and Phthalates	EPA Method 8270-SIM	1-L amber container (for each)	7 days	none
VOCs	EPA Method 8260	40-ml VOA x 3	2 weeks	HCl
Total Metals	EPA 200/6000/7000 series	250-ml poly container	6 months	HNO_3
Total Suspended Solids	SM2540D	500-ml poly bottle	7 days	NA
Indicators (data collected during temporary well-point purge)	pH	per instrument instructions	Field	N/A
	Temperature	per instrument instructions	Field	N/A

5.3 Quality Assurance and Quality Control

5.3.1 Transportation Blank

A trip blank will be utilized during each sampling event to ensure there is no cross-contamination during sample collection and transport to the laboratory.

5.3.2 Field Duplicate

A blind field duplicate will be collected during one of the sampling events to measure laboratory precision and variability. Precision is a measure of mutual agreement among individual measurements of the same property under prescribed similar conditions. Precision for this project may be demonstrated by the analytical laboratory based upon results of either laboratory duplicate analyses, laboratory control sample/control sample duplicate analyses, matrix spike/matrix spike duplicate analyses, and/or results

from field duplicate samples.

A field duplicate is defined as a sample that is collected and divided into two parts for analysis of the same parameters. Results from field duplicates are useful in determining potential sampling variability. Greater than expected differences between duplicates may occur due to variability within the sample matrix. Field duplicates shall be used as a quality control measure to monitor precision of sample collection methods.

Precision is independent of the error (accuracy) of the analyses and reflects only the degree to which the measurements agree with one another, not the degree to which they agree with the "true" value for the parameter measured.

Precision is calculated in terms of Relative Percent Difference (RPD), which is expressed as:

$$RPD = \frac{|X_1 - X_2|}{(X_1 + X_2) / 2} \times 100$$

Where X1 and X2 represent the individual values found for the target analytes in the duplicate analyses. RPDs for field duplicate samples include the additional variability of field sampling methods and sample homogeneity. Therefore, RPDs for field duplicate samples will be evaluated against an acceptance criterion of 50 percent for quantitative data.

5.4 Data Evaluation

Laboratory analytical results will be reviewed and presented with respect to JSCS SLVs and achievable laboratory MDLs. The data evaluation will also incorporate a discussion of the following:

- Adherence to quality assurance/quality control (QA/QC) procedures detailed in Section 6.3.
- Characterization of site storm water (from Storm Water Monitoring Location 1) relative to the JSCS SLVs.
- A discussion of the nature of the sampling storm event regarding storm event criteria.
- Comparison to other numeric standards (typical background concentrations, permit benchmarks, etc.).

5.5 Schedule

At this time, it is anticipated that proposed storm water confirmation sample activities will be initiated prior to the start of the rainy season following the summer of 2021; however, this is based on our current understand of site redevelopment timelines and pending ODEQ approval of this work plan.

5.6 Documentation and Reporting

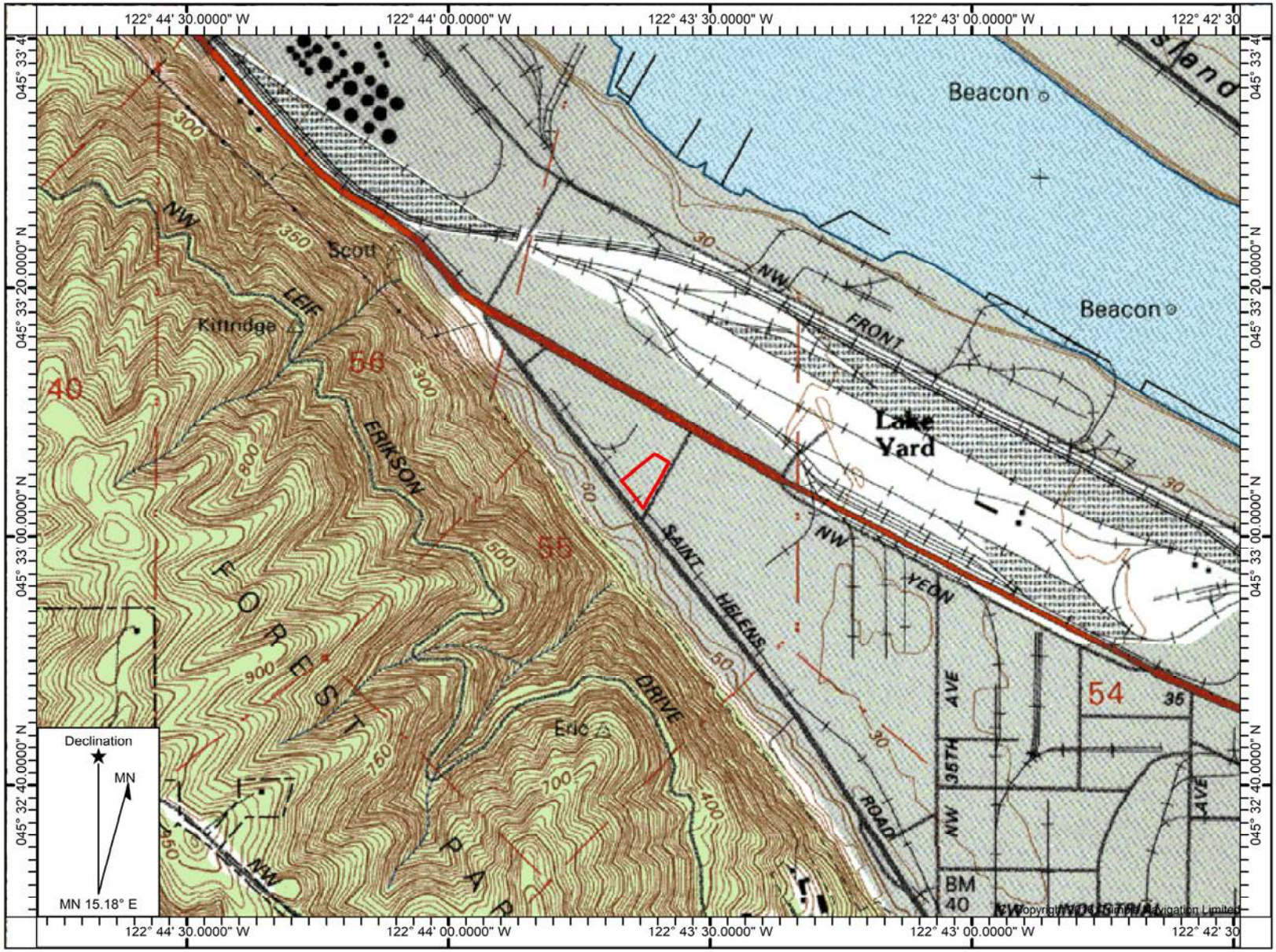
Upon completion of storm water system cleaning, and following receipt of the subsequent storm water and sediment sampling analytical data reports, an SCE report will be submitted that includes a description of the following:

- Field sampling methods and deviations from the sampling plan.
- Field documentation, including photographs, field notes, and supporting storm event statistics.

- A figure showing the sampling locations.
- Tabulated data comparing results to applicable SLVs, with copies of supporting laboratory analytical reports with chain-of-custody documentation and QA/QC summaries.
- A discussion of contaminant concentrations and any exceedances of SLVs.
- Lines of evidence to support a Source Control Determination from ODEQ.
- Conclusions and recommendations, and request for an ODEQ Source Control Determination, as warranted.

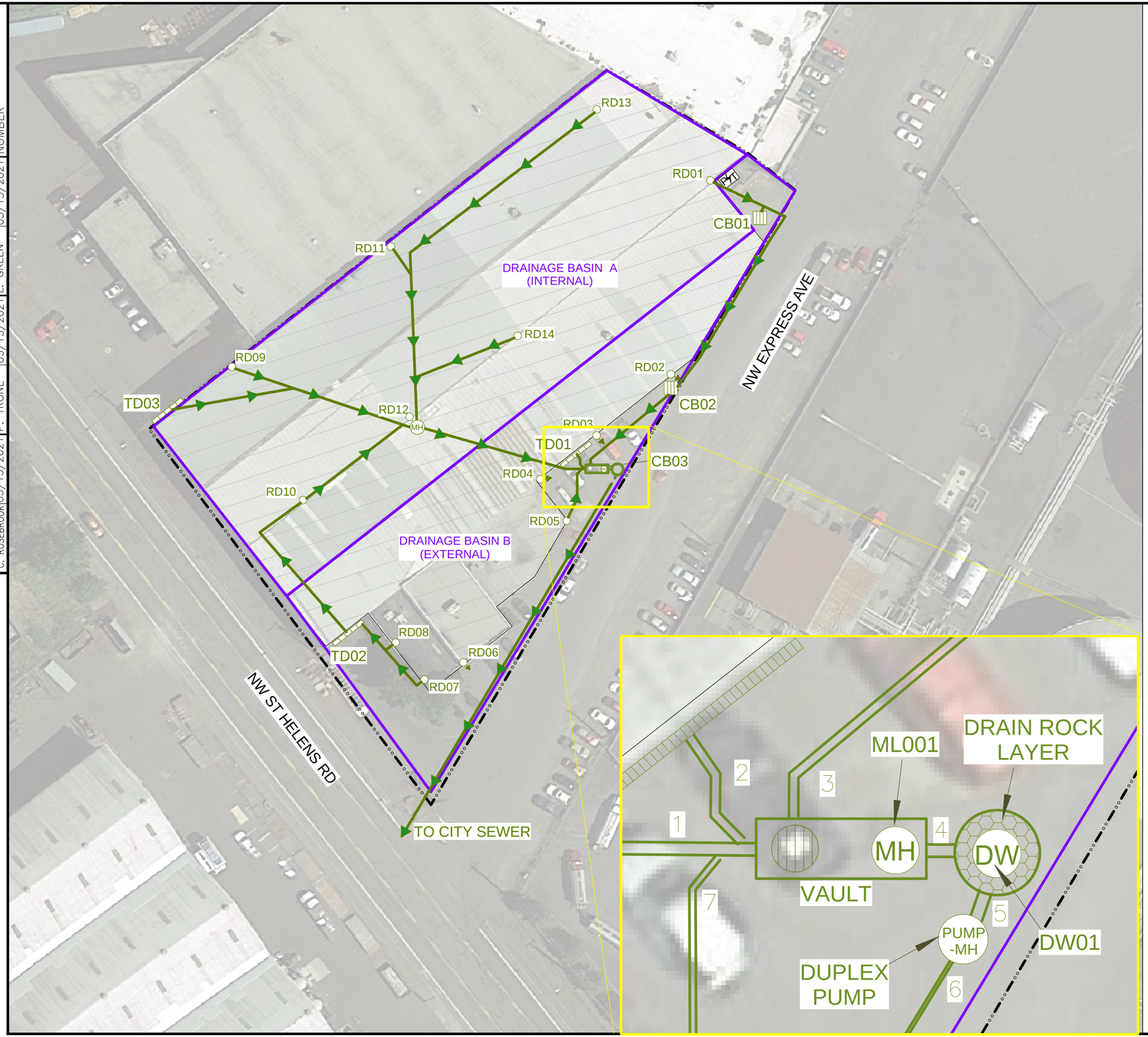
The SCE report will follow the recommended format of ODEQ's *Guidance for Evaluating the Stormwater Pathway at Upland Sites*.

Figures



EVREN NORTHWEST	Date Drawn: 2/22/2021 CAD File Name: 1206-19001-04_fig1sv_map Drawn By: CLR Approved By: LDG	Intrepid 4000 NW St Helens Road Portland, Oregon	**Site Vicinity Map**	Project No. 1260-19001 Figure No. **1**

DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
C. ROSEBROOK 03/15/2021	P. TRONE 03/15/2021	L. GREEN 03/15/2021	1260-19001(v01)



LEGEND:

- SUBJECT BUILDINGS
- SUBJECT PROPERTY BOUNDARIES
- DRAINAGE BASIN BOUNDARY
- PAD TRANSFORMER
- CATCH BASIN
- MANHOLE
- ROOF DOWNSPOUT
- FLOOR DRAIN
- STORM SYSTEM
- TRENCH DRAIN
- DRYWELL
- ML001 MONITORING LOCATION

1	12" INNER DIAMETER PVC
2	8" INNER DIAMETER STEEL
3	8" INNER DIAMETER CONCRETE
4	12" INNER DIAMETER PVC
5	12" INNER DIAMETER PVC
6	3" INNER DIAMETER PIPE TO CITY STORM SEWER
7	8" INNER DIAMETER PVC

VAULT DIMENSIONS:
LENGTH: 11'
WIDTH: 4'
DEPTH: 6'9"

NOTES:

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2018 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 60 120 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

STORM SYSTEM

INTREPID TILE
4000 NW ST HELENS ROAD
PORTLAND, OREGON

Table 1. ODEQ Portland Harbor Screening Level Values

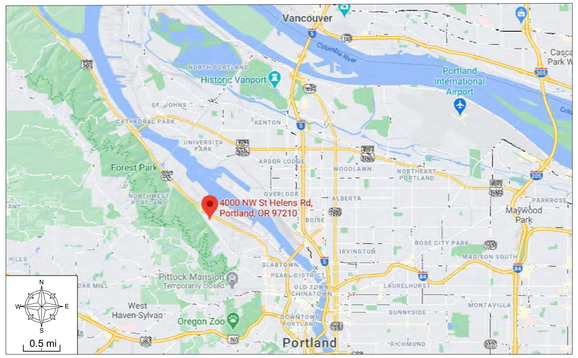
Analyte	Laboratory Method Detection Limits (µg/L)	Screening Levels	
		EPA Portland Harbor ROD Cleanup Levels (µg/L)	JSCS SLV (µg/L)
Gasoline-, Diesel- and Residual(Oil)-Range Petroleum Hydrocarbons			
Diesel-range	5.4	NE	NE
Oil-range	52	NE	NE
Total Metals			
Copper	0.15	2.74	2.7
Lead	0.15	NE	0.54
Nickel	1.0	NE	16
Zinc	1.0	36.5	36
Semi-Volatile Organic Constituents/Phthalate Esters			
Aroclor 1016	0.05	NE	0.96
Aroclor 1221	0.05	NE	0.034
Aroclor 1232	0.05	NE	0.034
Aroclor 1242	0.05	NE	0.034
Aroclor 1248	0.05	NE	0.034
Aroclor 1254	0.05	NE	0.034
Aroclor 1260	0.05	NE	0.034
Aroclor 1262	0.05	NE	0.034
Aroclor 1268	0.05	NE	0.034
Semi-Volatile Organic Constituents/Phthalate Esters			
Dimethylphthalate	0.5	NE	3
Diethylphthalate	0.5	NE	3
Di-n-butylphthalate	0.5	NE	3
Butylbenzylphthalate	0.5	NE	3
Di-n-octylphthalate	0.5	NE	3
bis(2-Ethylhexyl)phthalate	0.5	NE	2.2
Semi-Volatile Organic Constituents/Polycyclic Aromatic Hydrocarbons			
Acenaphthene	0.0037	NE	0.2
Acenaphthylene	0.0033	NE	0.2
Anthracene	0.0023	NE	0.2
Fluorene	0.0044	NE	0.2
1-Methylnapthalene	0.003	NE	NE
2-Methylnapthalene	0.0034	NE	0.2
Naphthalene	0.005	NE	0.2
Phenanthrene	0.0062	NE	0.2
Benz(a)anthracene	0.007	0.0012	0.018
Benzo(a)pyrene	0.0028	0.00012	0.018
Benzo(b)fluoranthene	0.0021	0.0012	0.018
Benzo(k)fluoranthene	0.0035	0.0013	0.018
Benzo(b+k)fluoranthene		NE	NE
Benzo(g,h,i)perylene	0.0057	NE	0.2
Chrysene	0.0024	0.0013	0.018
Dibenz(a,h)anthracene	0.0051	0.00012	0.018
Fluoranthene	0.0029	NE	0.2
Indeno(1,2,3-cd)pyrene	0.0049	0.0012	0.018
Pyrene	0.0054	NE	0.2
Volatile Organic Constituents			
Benzene	0.35	NE	5
Ethylbenzene	1	7.3	700
Toluene	1	NE	1,000
Total Xylenes	1	NE	10,000
Total Suspended Solids			
TSS	5000	NE	NE

STORMWATER MANAGEMENT IM3ROVEMENTS

INTRE3ID MARBLE AND GRANITE

4000 NW ST HELENS RD
PORTLAND, OREGON 97210

P5OPE5TY ID: R315814



VICINITY MAPS 2 C-1
AS NOTED

GENERAL CONSTRUCTION NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE CURRENT AND APPLICABLE REGULATIONS, SPECIFICATIONS, CODES, AND REQUIREMENTS OF THE APPLICABLE PLUMBING AND STRUCTURAL CODES.
2. THE CONTRACTOR SHALL PERFORM ALL WORK NECESSARY TO COMPLETE THIS PROJECT IN ACCORDANCE WITH THE PLANS INCLUDING SUCH INCIDENTALS AS MAY BE NECESSARY TO MEET APPLICABLE AGENCY REQUIREMENTS AND AS NECESSARY TO PROVIDE A COMPLETED PROJECT.
3. THE CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS AND LICENSES PRIOR TO COMMENCING WORK ON THIS PROJECT.
4. THE CONTRACTOR AND/OR SUB-CONTRACTOR SHALL HAVE A MINIMUM OF ONE (1) FULL-SIZED SET OF APPROVED CONSTRUCTION PLANS ON THE JOB SITE AT ALL TIMES DURING CONSTRUCTION.
5. THE CONTRACTOR SHALL NOTIFY ALL COMPANIES AND AGENCIES WITH UNDERGROUND FACILITIES IN THE PROJECT AREA 48 HOURS BEFORE COMMENCING CONSTRUCTION IN THEIR VICINITY.
6. PROPERTY AND RIGHT-OF-WAY LINES SHOWN ARE FOR REFERENCE ONLY. THESE PLANS ARE NOT MEANT TO SERVE BOUNDARY SURVEY PURPOSES.
7. ANY ALTERATION OR VARIANCE FROM THESE PLANS, EXCEPT MINOR FIELD ADJUSTMENTS NEEDED TO MEET EXISTING FIELD CONDITIONS, SHALL BE APPROVED BY THE ENGINEER AND OWNER.
8. ANY CONSTRUCTION OBSERVATION BY THE OWNER OR ENGINEER, SHALL NOT, IN ANY WAY, RELIEVE THE CONTRACTOR FROM ANY OBLIGATION TO PERFORM THE WORK IN STRICT COMPLIANCE WITH THE APPLICABLE CODES AND REGULATORY AGENCY REQUIREMENTS.
9. ALL MATERIAL SUPPLIER(S) SHALL SUBMIT TO THE ENGINEER PROOF OF MATERIALS TESTED IN ACCORDANCE WITH APPLICABLE STANDARDS AND SHALL CERTIFY THAT ALL MATERIAL DELIVERED TO THE JOB SITE MEET OR EXCEED OWNER SPECIFICATIONS PRIOR TO DELIVERY OF MATERIAL TO THE SITE. ANY MATERIAL NOT CERTIFIED BY THE SUPPLIER SHALL BE REMOVED FROM THE JOB SITE AT NO ADDITIONAL COST TO THE OWNER.
10. THE ENGINEER HAS NOT BEEN RETAINED OR COMPENSATED TO PROVIDE DESIGN AND CONSTRUCTION REVIEW SERVICES RELATING TO THE CONTRACTORS SAFETY PRECAUTIONS OR TO MEANS, METHODS, TECHNIQUES, SEQUENCES, OR PROCEDURES REQUIRED FOR THE CONTRACTOR TO PERFORM HIS/HER WORK.
11. CONTRACTOR SHALL COORDINATE AND SCHEDULE ALL EARTHWORK, TRENCH BACKFILL AND ROAD CONSTRUCTION COMPACTION TESTS AND GEOTECHNICAL REVIEWS WITH THE SOILS TESTING LAB AS REQUIRED FOR ACCEPTANCE OF PROJECT WORK BY THE OWNER.
12. THE OWNER RESERVES RIGHT TO DIRECT TESTING AGENCY OF FREQUENCY OF TESTING
13. PAVEMENT MARKINGS - FINAL PAVEMENT MARKINGS THAT ARE IMPACTED BY CONSTRUCTION ACTIVITY SHALL BE REPLACED IN-KIND BY CONTRACTOR (INCLUDING TYPE, COLOR WIDTH, ETC. .

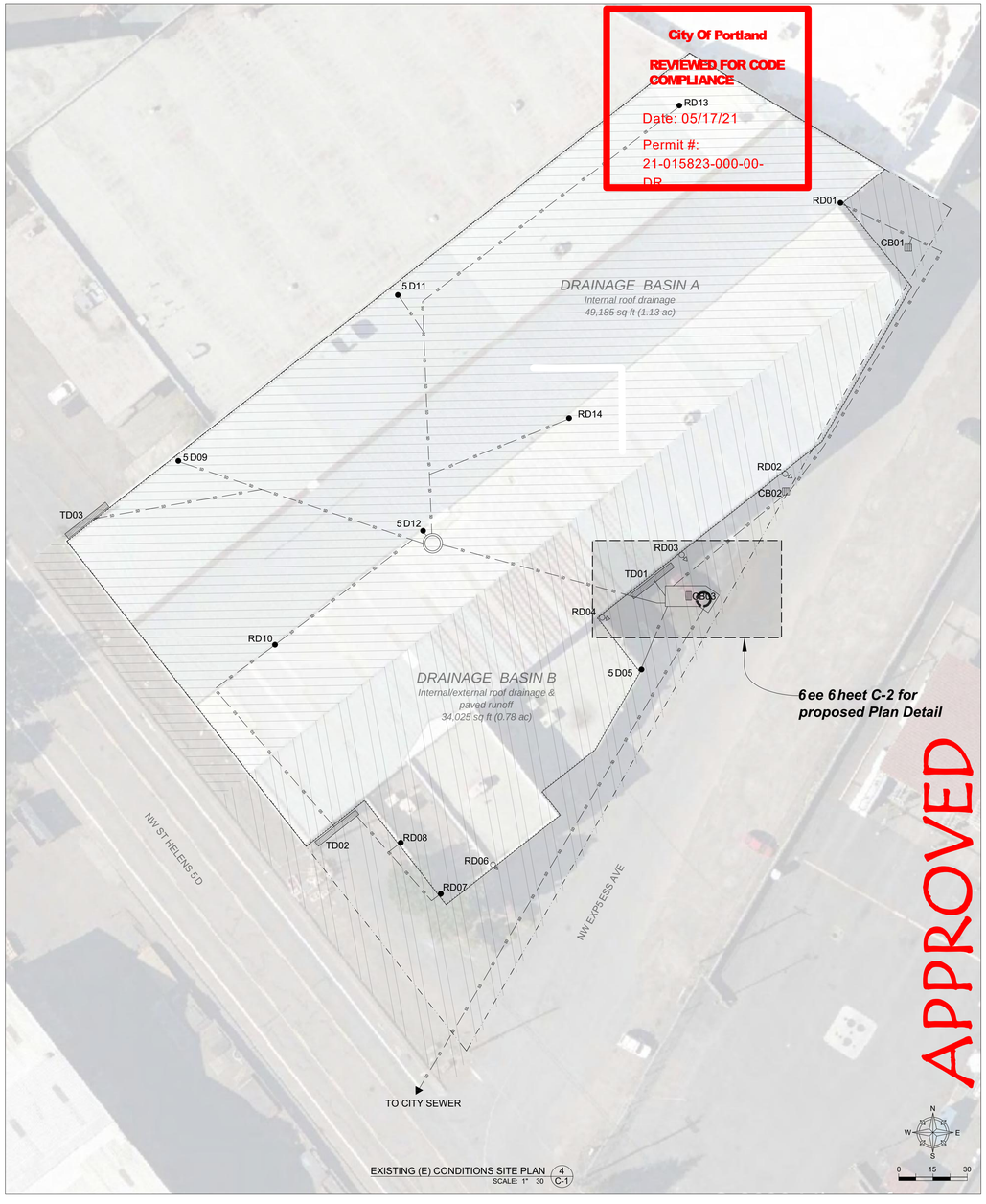
GRAVITY PRESSURE PIPE SYSTEM NOTES

1. PIPE MATERIALS FOR THIS PROJECT ARE AS FOLLOWS:
   -ALL GRAVITY PIPES SHALL BE PVC SDR 35
   -ALL PRESSURE PIPES (FMs) SHALL BE HDPE AND/OR SCH 80 PVC
2. EACH CLEANOUT FITTING AND CLEANOUT PLUG OR CAP SHALL BE OF AN APPROVED TYPE. PLUGS SHALL HAVE RAISED SQUARE HEADS OR APPROVED COUNTERSUNK RECTANGULAR SLOTS. COUNTERSUNK CLEANOUT PLUGS SHALL BE INSTALLED WHERE RAISED HEADS MAY CAUSE A HAZARD. WHEN A HUBLESS BLIND PLUG IS USED FOR A REQUIRED CLEANOUT, THE COMPLETE COUPLING AND PLUG SHALL BE ACCESSIBLE FOR REMOVAL OR REPLACEMENT.
3. ALL CONNECTING PIPES TO MANHOLES AND CATCH BASINS SHALL HAVE A FLEXIBLE, GASKETTED AND UNRESTRAINED JOINT WITHIN 18-INCHES OF MANHOLE WALL THAT PROVIDES A WATER TIGHT CONNECTION. NO FLEXIBLE COMPRESSION JOINT SHALL BE EMBEDDED IN THE MANHOLE BASE. MANHOLES SHALL HAVE A SMOOTH, UNIFORM WATERWAY WITH CHANGES OF DIRECTION MADE WITH THE APPROPRIATE SWEEP OFFSET AS PER THE OREGON PLUMBING SPECIALTY CODE. OPEN-GRATE LIDS WILL NOT BE ALLOWED ON ANY MANHOLE.
4. GRAVITY LINES SHALL BE TESTED ACCORDING TO THE REQUIREMENTS OF THE OWNER. ALL GRAVITY LINES SHALL BE FLUSHED AND CLEANED PRIOR TO TESTING. IF NECESSARY, THE CONTRACTOR SHALL USE MECHANICAL RODDING, BUCKETING OR VACTOR EQUIPMENT.
5. DURING FLUSHING, CONTRACTOR SHALL PROVIDE SCREENING AND REMOVE ALL ACCUMULATED CONSTRUCTION DEBRIS, ROCKS, GRAVEL, SAND, SILT, AND OTHER FOREIGN MATERIAL FROM THE SYSTEM AT OR NEAR THE CLOSEST DOWNSTREAM MANHOLE; NO MATERIAL SHALL BE FLUSHED INTO ANY BODY OF WATER.
6. PAVEMENT SHALL NOT BE INSTALLED AND FACILITIES SHALL NOT BE ACTIVATED AND/OR CONNECTED TO PUBLIC SYSTEMS OR WATERWAYS UNTIL FACILITY HAS BEEN APPROVED BY THE OWNER.
7. ALL GRAVITY LINES SHALL BE BACKFILLED PER PIPE BEDDING AND BACKFILL DETAIL SHOWN IN THIS PLAN SET.
8. RIM ELEVATIONS FOR MANHOLES, CATCH BASINS, AND CLEANOUTS ARE SURVEYED OR APPROXIMATE. CONTRACTOR TO MATCH MANHOLE RIM ELEVATIONS TO FINISHED GRADE OF PAVEMENT OR GRAVEL OR 6" ABOVE FINISH GRADE IN LANDSCAPE AREAS.

GENERAL UTILITY NOTES

1. THE LOCATION OF EXISTING UTILITIES SHOWN ON THE PLANS IS APPROXIMATE AND SHOWN FOR INFORMATION PURPOSES ONLY. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL EXISTING ABOVE GROUND AND BELOW GROUND UTILITIES PRIOR TO STARTING ANY WORK.
2. THE CONTRACTOR SHALL HAVE ALL UTILITIES LOCATED AND POTHOLED PRIOR TO STARTING ANY WORK. THE CONTRACTOR SHALL COORDINATE WITH THE SURVEYOR REGARDING THE LOCATION, ADJUSTMENT, OR REPLACEMENT OF ANY UTILITY OR RELATED STRUCTURE AS MAY BE NECESSARY. NO RESPONSIBILITY IS ASSUMED BY EITHER THE OWNER OR THE ENGINEER FOR ACCURACY OR COMPLETENESS OF THESE LOCATIONS
3. ALL TRENCHES PARALLEL TO A BUILDING SHALL BE KEPT OUT OF THE ANGLE OF REPOSE FOR THE BUILDING FOOTING.
4. CHANGES IN DIRECTION OF DRAINAGE PIPING SHALL BE MADE BY THE APPROPRIATE USE OF APPROVED FITTINGS AND SHALL BE OF THE ANGLES PRESENTED BY ONE-SIXTEENTH BEND, ONE-EIGHTH BEND, ONE-SIXTH BEND OR OTHER APPROVED FITTINGS OF EQUIVALENT SWEEP.
5. ANY EXISTING UTILITIES THAT WILL BE LOCATED UNDER AND WITHIN TWO FEET OF A PROPOSED BUILDING SHALL BE REPLACED WITH PIPE MATERIALS THAT ARE ALLOWED FOR USE WITHIN THE BUILDING. TESTS AND INSPECTIONS ARE REQUIRED PRIOR TO COVERING.
   ATTENTION: NOTIFY OWNER FOR NECESSARY UTILITY LOCATIONS PRIOR TO CONSTRUCTION.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE RELOCATION OF BURIED AND OVERHEAD UTILITIES. NO SERVICE INTERRUPTIONS SHALL BE PERMITTED WITHOUT PRIOR WRITTEN AGREEMENT WITH THE UTILITY PROVIDER.
7. THE INSTALLATION OF NEW OR RELOCATION OF EXISTING ELECTRICAL, TELEPHONE, GAS, AND CABLE SERVICE SHALL BE COORDINATED BY THE CONTRACTOR WITH THE APPROPRIATE UTILITY COMPANY.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLATION OF UTILITY TRENCHES, CONDUIT, VAULTS, PADS, PEDESTALS, AND UTILITY TRENCH BACKFILL IN ACCORDANCE WITH STANDARD SPECIFICATIONS AND PLANS OF SERVICING UTILITIES (ELECTRICAL, TELEPHONE, GAS, AND CABLE). PRIVATE UTILITY TRENCH BACKFILL SHALL BE COMPACTED TO A DENSITY NOT LESS THAN 95% IN PAVED OR STRUCTURAL FILL AREAS AREAS WITHIN 2 OF SUBGRADE AND NOT LESS THAN 92 IN PAVED OR STRUCTURAL FILLS GREATER THAN 2 BELOW SUBGRADE. MINIMUM COMPACTION IN UNPAVED, NON-STRUCTURAL FILL AREAS IS 85 . COMPACTION IS TO BE PER ASTM D-1557 UNLESS OTHERWISE NOTED.
   ATTENTION EXCAVATORS:
   - NOTIFY OWNE5 FO5 NECESSA5Y UTILITY LOCATIONS P5IO5 TO CONST5UCTION.
   - O5EGON LAW 5EQUI5ES YOU TO FOLLOW 5ULES ADOPTED BY THE O5EGON UTILITY NOTIFICATION CENTE5 . YOU MUST NOTIFY THE CENTER AT LEAST TWO (2) BUSINESS DAYS PRIOR TO EXCAVATING. CALL 811 OR 800-332-2344.
9. THE INSTALLATION OF NEW OR RELOCATION OF EXISTING ELECTRICAL, TELEPHONE, GAS, AND CABLE SERVICE SHALL BE COORDINATED BY THE CONTRACTOR WITH THE APPROPRIATE UTILITY COMPANY.
10. CONTRACTOR SHALL PROVIDE ALL MATERIALS, LABOR AND EQUIPMENT NECESSARY TO ADEQUATELY SHORE TRENCHES TO PROTECT THE WORK, EXISTING PROPERTY, UTILITIES, PAVEMENT, ETC., AND TO PROVIDE SAFE WORKING CONDITIONS IN THE TRENCH. THE METHOD OF SHORING SHALL BE ACCORDING TO THE CONTRACTOR S DESIGN. THE CONTRACTOR MAY ELECT TO USE A COMBINATION OF SHORING AND OVERBREAK, TUNNELING, BORING, SLIDING TRENCH SHIELDS OR OTHER METHODS OF ACCOMPLISHING THE WORK, PROVIDED THE METHOD CONFORMS WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL SAFETY CODES. REMOVAL OF ANY CRIBBING AND SHEETING FROM THE TRENCH SHALL BE ACCOMPLISHED IN SUCH A MANNER AS TO FULFILL THE ABOVE REQUIREMENTS. DAMAGES RESULTING FROM IMPROPER CRIBBING OR FROM FAILURE TO CRIB SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
11. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN AMPLE MEANS AND DEVICES WITH WHICH TO PROMPTLY REMOVE AND DISPOSE OF ALL WATER ENTERING THE TRENCH EXCAVATION DURING THE TIME THE TRENCH IS BEING PREPARED FOR THE PIPE LAYING, DURING THE LAYING OF THE PIPE AND UNTIL THE BACKFILL AT THE PIPE ZONE HAS BEEN COMPLETED. THE CONTRACTOR SHALL DISPOSE OF THE WATER IN A SUITABLE MANNER WITHOUT DAMAGE TO ADJACENT PROPERTY.

CONSTRUCTION NOTES 3 C-1



EXISTING (E) CONDITIONS SITE PLAN 4 C-1
SCALE: 1" 30

3RO3ERTY OWNER/$DDRESS:

HDNG5 NW INDUST5IAL LLC
1750 NW FRONT AVE #106
PORTLAND, OR 97209

3ROJECT MANAGER:

EV5EN NO5THWEST INC
PO BOX 14488
PORTLAND, OR 97293
LYNN GREEN RG, C.E.G.
503.452.5561

3ROJECT ENGINEER:

AQUA5IUS ENVI5ONMENTAL LLC
2117 NE OREGON ST, STE 502
PORTLAND, OREGON 97232
DANIEL A SCARPINE, P.E.
503.828.0265

KEY, ABBREVIATIONS, NOTES 1 C-1

KEY

BUILDING
D5AINAGE BASIN A (DB-A)
DRAINAGE BASIN B (DB-B
(E) ROOF DOWNSPOUT (EXTERNAL
(E) ROOF DOWNSPOUT (INTERNAL
(E) SD CB
(E) SD GRAVITY PIPE
(P) FM
(P) SD GRAVITY PIPE
PARCEL BOUNDARY

ABBREVIATIONS

CB	CATCH BASIN
DB	D5AINAGE BASIN
(E	EXISTING
EG	EXISTING GRADE
EOP	EDGE OF PAVEMENT
FM	FORCE MAIN
GPM	GALLONS PER MINUTE
ID	INNER DIAMETER
IE	INVERT ELEVATION
LF	LINEAR FEET
MH	MAN or MAINTENANCE HOLE
NTS	NOT TO SCALE
(P	PROPOSED
SD	STORM DRAIN

3RO3ERTY DATA

ADD5ESS: 4000 NW ST HELENS RD
PROPERTY ID: R315814
TAX ROLL: SECTION 19 1N 1E, TL 1100 1.77 ACRES
PROPERTY ZONING: IHk (HEAVY INDUSTRIAL, PRIME INDUSTRIAL OVERLAY

Per www.portlandmaps.com property database.

BASEMA3 ERIL NOTES

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2018 AND EVREN NORTHWEST FIELD NOTES.
2. AERIAL IMAGE (DETAIL 3, THIS SHEET) FROM 2020 MAXAR CNES DISTRIBUTION AIRBUS DS (2020 MICROSOFT CORPORATION .
3. VICINITY MAP FROM GOOGLE MAPS (2020 AND GOOGLE EARTH PRO (2020 .
4. ALL BUILDING, STREET, AND FEATURE LOCATIONS ARE APPROXIMATE.
5. SYMBOLS REPRESENT LOCATION AND DO NOT ALWAYS REPRESENT EXACT SHAPE, SIZE, OR ORIENTATION.

SHEET INDEX

BES SOU5CE Control Note - DEQ RULE AUTHORIZATION REQUIRED FOR PRIVATE STORM FACILITY

21-015823-DR

SUBMITTED 04/21/2021

EVREN NORTHWEST INC

ISSUE FO5 PE5MIT

REGISTERED PROFESSIONAL ENGINEER 65720PE OREGON JULY 13, 2004 DANIEL A SCARPINE
RENEWAL DATE: 6/30/2022

5EV	DATE	DESC5IPTION	DWN BY	DES BY	CHK BY	APP BY

DATE OF ISSUE 2/11/21
DWN BY K5K
DES BY DS
CHK BY
APP BY

AQUARIUS environmental
www.aquariusenv.com

INTREPID MARBLE AND GRANITE
4000 NW ST HELENS RD
PORTLAND, OREGON 97210

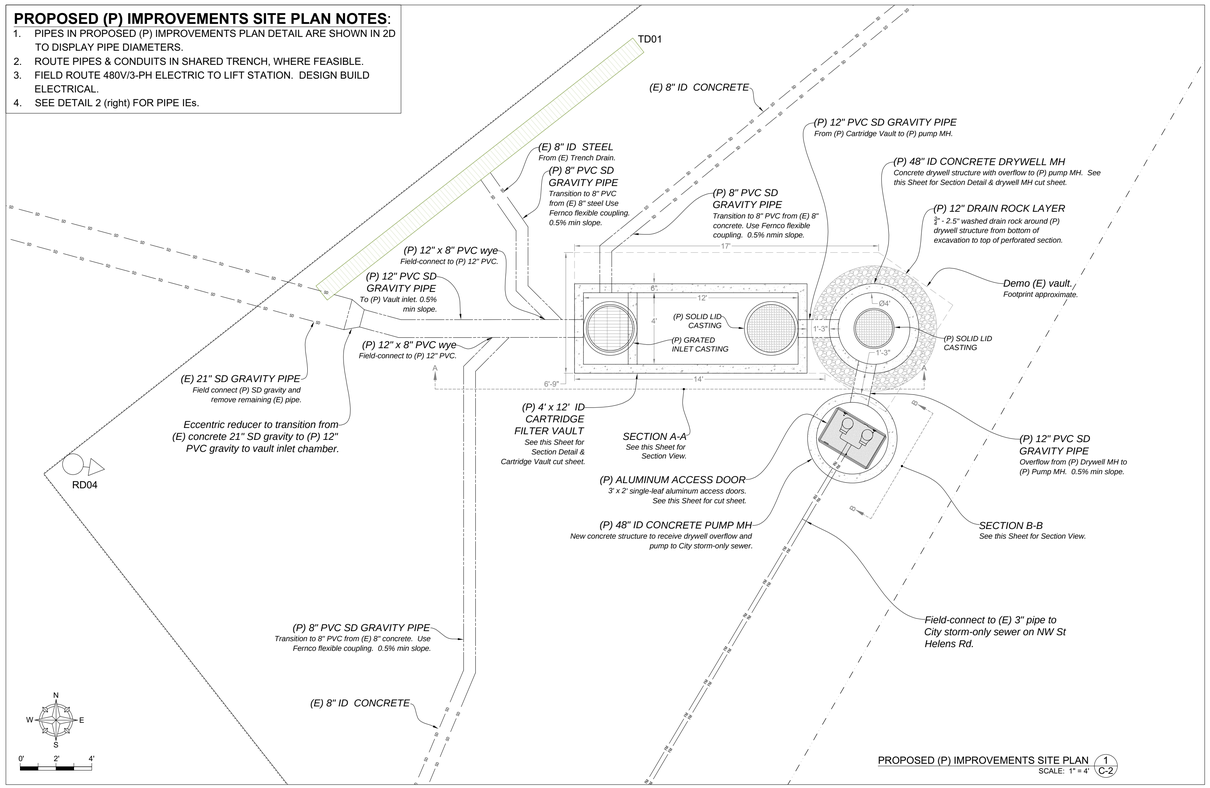
TITLE SHEET: VICINITY MAPS, EXISTING (E CONDITIONS SITE PLAN, NOTES

DRAWING NO. 1

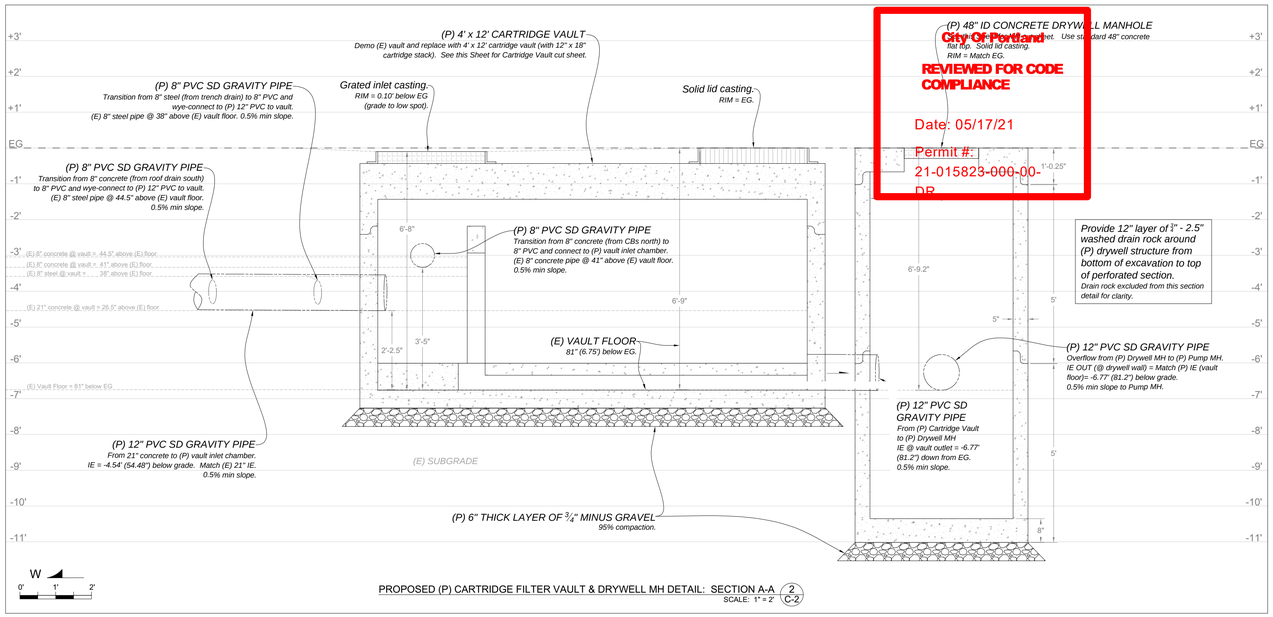
P5OJECT NO. 0350

PROPOSED (P) IMPROVEMENTS SITE PLAN NOTES:

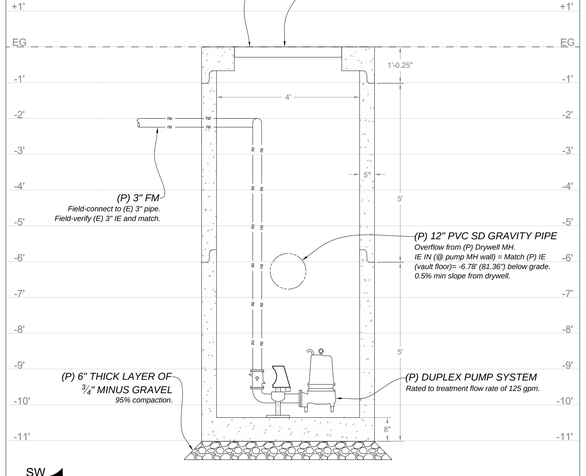
1. PIPES IN PROPOSED (P) IMPROVEMENTS PLAN DETAIL ARE SHOWN IN 2D TO DISPLAY PIPE DIAMETERS.
2. ROUTE PIPES & CONDUITS IN SHARED TRENCH, WHERE FEASIBLE.
3. FIELD ROUTE 480V/3-PH ELECTRIC TO LIFT STATION. DESIGN BUILD ELECTRICAL.
4. SEE DETAIL 2 (right) FOR PIPE IEs.



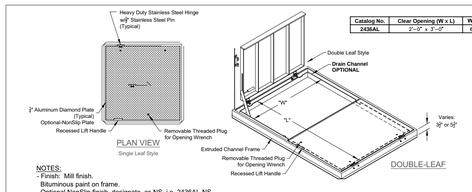
PROPOSED (P) IMPROVEMENTS SITE PLAN (1 C-2)
SCALE: 1" = 4'



PROPOSED (P) CARTRIDGE FILTER VAULT & DRYWELL MH DETAIL: SECTION A-A (2 C-2)
SCALE: 1" = 2'



PROPOSED (P) PUMP MH DETAIL: SECTION B-B (3 C-2)
SCALE: 1" = 2'

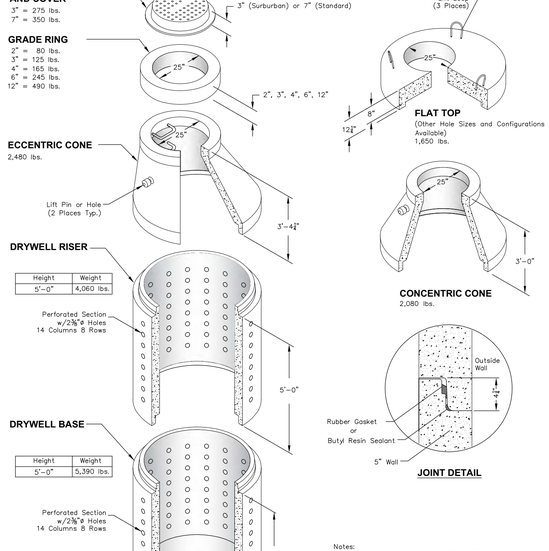


Catalog No.	Clear Opening (W x L)	Weight	Single/Double Leaf
2436AL	2'-0" x 3'-0"	60 lbs.	Single

NOTES:
- Finish: Mill finish.
  Bituminous paint on frame.
  Optional NonSlip finish, designate as NS, i.e. 2436AL-NS
- Loading: Standard unit designed for minimum live load of 300 psf (pedestrian rated). Available in heavy duty design for H-20 wheel load where not subjected to high density traffic.
- Options: Drain channel with 1½" threaded drain coupler for pipe connection.
- Stainless steel hardware.
- Recessed padlock clip.

ALUMINUM ACCESS DOOR CUT SHEET (4 C-2)
NTS

48" DRYWELL MANHOLE

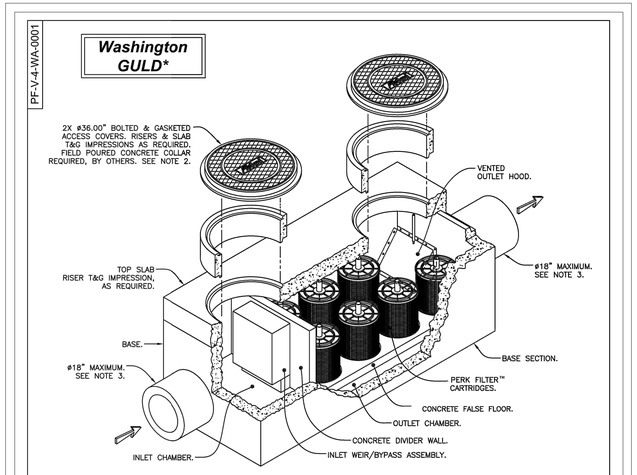


Notes:
- Manholes per Specification: ASTM C478
- Rubber Gasket: ASTM C443
- Holes: Cored as Required.
- Frame & Cover: Gray Cast Iron ASTM A48 Class 30, Watertight/Tamperproof Cover Available.
- Optional Extended Base Available.

Oldcastle Precast®	48" DRYWELL MANHOLE	48" DRYWELL MANHOLE
PO Box 323, Wilsonville, Oregon 97070-0323	File Name: 020-48MH-D	
Tel: (503) 682-2844 Fax: (503) 682-2657	Issue Date: 2016	
	oldcastleprecast.com/wilsonville	

2.0

48" DRYWELL CUT SHEET (5 C-2)
NTS



Notes:

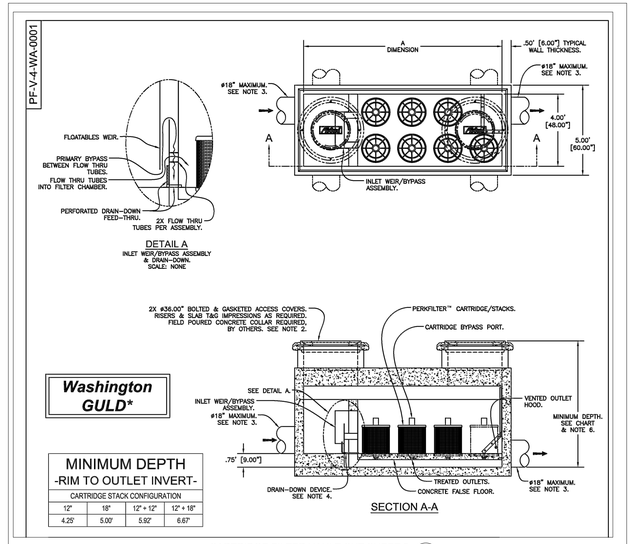
1. Precast concrete structure shall be manufactured in accordance with ASTM Designation C857 and C858.
2. Filter system shall be supplied with traffic rated (H20) bolted & gasketed Ø36" circular access covers with risers as required. Shallow applications may require configurations with (H20) bolted & gasketed square/rectangular access hatches. Field poured concrete collars required, by others.
3. Inlet & outlet pipe(s) (Ø 18" maximum) may enter device on all three sides of the inlet & outlet chambers respectively.
4. Inlet chamber shall be supplied with a drain-down device designed to remove standing water between storm events.
5. For depths less than specified minimums contact Oldcastle® Stormwater Solutions for engineering assistance.

★ **Treatment Flow Rates shown conform to Washington State GULD Specifications**

Media Filtration	*PerkFilter™* *4' Wide Concrete Vault* *Three to Eight Cartridges / Stacks*	Oldcastle Infrastructure™ A CRH COMPANY

DRAWING NO.	REV	DATE	
PF-V-WA-4-0001	E	MJT 12/7/20	SHEET 1 OF 2

CARTRIDGE FILTER VAULT CUT SHEET (6 C-2)
NTS



MINIMUM DEPTH
-RIM TO OUTLET INVERT-

CARTRIDGE STACK CONFIGURATION			
12"	18"	12" + 12"	12" + 18"
4.25'	5.00'	5.92'	6.67'

CARTRIDGE FILTER VAULT CUT SHEET 2 (7 C-2)
NTS

EVREN NORTHWEST, INC.
environmental, natural resource consultants

ISSUE FOR PERMIT

REGISTERED PROFESSIONAL ENGINEER 65720PE DANIEL A. SCARPITE JULY 13, 2021
RENEWAL DATE: 6/30/2022

REV	DATE	DESCRIPTION	DWN BY	DES BY	CHK BY	APP BY

DATE OF ISSUE 2/11/21
DWN BY KRK
DES BY DS
CHK BY
APP BY

AQUARIUS environmental
www.aquariusenv.com

INTREPID MARBLE AND GRANITE
4000 NW ST HELENS RD
PORTLAND, OREGON 97210

PROPOSED (P) IMPROVEMENTS SITE PLAN, SECTION DETAILS, & CUTSHEETS

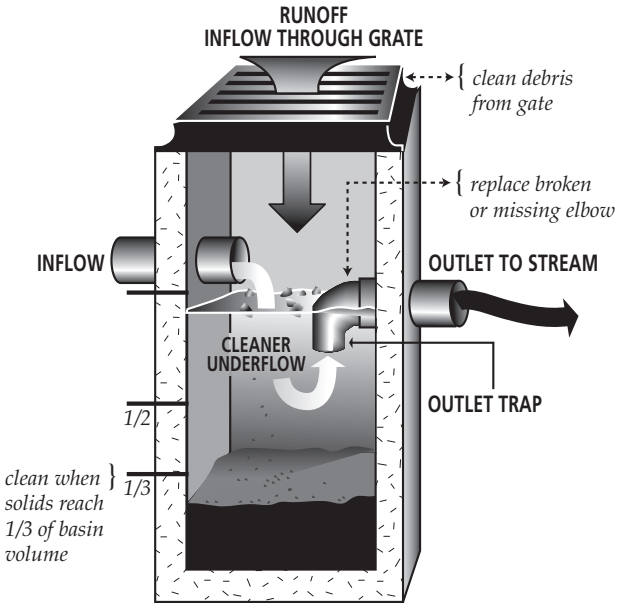
DRAWING NO. 2
PROJECT NO. 0350

Environmentally Responsible Best Management Practices

17 Maintaining Catch Basins

A catch basin is an inlet to a storm drain system that typically includes a grate where stormwater enters the catch basin, and a basin to capture sediment, debris, and associated pollutants. The purpose of the basin is to help prevent the downstream pipes from becoming clogged and to reduce the amount of sediment and debris being discharged into our rivers and streams. Many catch basins are installed with a downturned elbow or tee to trap floatable material. Storm drain inlets that do not contain basins or outlet traps are not effective in reducing pollutants in stormwater.

Catch basins must be cleaned periodically to maintain their ability to trap sediment and provide drainage for stormwater. The removal of sediment, decaying debris, and associated pollutants from catch basins has aesthetic and water quality benefits. The benefits include reducing foul odors, solids, and other pollutants that reach receiving waters.



Grates:

- Remove leaves and trash so the grate doesn't clog.
- Consider marking the message "Dump No Waste, Drains to Stream" next to your grates in areas that may be at risk. Vendors can be found in the telephone directories or on the web.

Catch Basin:

- The more frequently a catch basin is cleaned, the more pollutants it removes. The U.S. Environmental Protection Agency (EPA) recommends cleaning if the depth of solids reaches one-third the depth from the basin bottom to the invert of the lowest pipe into or out of the basin.
- To clean the catch basin you can hire a contractor by looking in a telephone directory or you can do it yourself by lifting the grate and using a bucket (to remove water) and a shovel to remove the sediment.
- Dispose of the water in a sanitary sewer through a shop drain or sink. Otherwise, use a toilet or other appropriate drain. Let the removed solids dry out, then properly dispose of them. When deciding how to dispose of the sediment, you need to consider the types of activities and pollutants on site. Catch basins in areas used for chemical or hazardous waste storage, material handling or equipment maintenance may collect the chemicals used in these activities from spills or via stormwater runoff. Solids removed from catch basins at commercial or industrial sites are usually not considered hazardous waste and may be disposed of as solid waste.
However, as the "generator" of this waste, you are responsible for making that decision and deciding how to properly manage the solids. If you need assistance deciding whether the solids should be managed as a hazardous waste, contact the Oregon Department of Environmental Quality at 503-229-5263. Make sure the removed solids don't wash back into your catch basin, and don't dispose of them on your or someone else's property.

continued on back

Be sure to follow safety precautions:

- Use caution in removing the grate as it may be heavy.
- Don't leave an open catch basin unattended.
- Never enter a catch basin or other drainage structure unless you are properly trained.
- Ensure proper traffic safety is in place.

Tips:

- Sweep your lot regularly to reduce the need for catch basin cleaning.
- Consider installing and maintaining catch basin inserts or an oil-absorbent pillow.
- Repair or replace damaged outlet traps.
- Install an outlet trap if there isn't one already. They're inexpensive and make it easier and cheaper to remove any floatable pollutants that spill into your catch basin.
- Make sure your chemical and waste storage practices aren't exposed to rainfall and stormwater runoff.
- Don't wash vehicles or equipment to the storm sewer system.

For additional Best Management Practices to minimize pollution from other site activities, call 503-823-5320.

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
working for clean rivers

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Oldcastle Infrastructure™
A CRH COMPANY

PERKFILTER™

Inspection and Maintenance Guide

Water

PerkFilter™ Media Filtration System

Description

The PerkFilter is a stormwater treatment device used to remove pollutants from urban runoff. Impervious surfaces and other urban and suburban landscapes generate a variety of contaminants that can enter stormwater and pollute downstream receiving waters. The PerkFilter is a media-filled cartridge filtration device designed to capture and retain sediment, gross solids, metals, nutrients, hydrocarbons, and trash and debris. As with any stormwater treatment system, the PerkFilter requires periodic maintenance to sustain optimum system performance.

Function

The PerkFilter is a water quality treatment system consisting of three chambers: an inlet chamber, a filter cartridge treatment chamber, and an outlet chamber (Figure 1). Stormwater runoff enters the inlet chamber through an inlet pipe, curb opening, or grated inlet. Gross solids are settled out, and floating trash and debris are trapped in the inlet chamber. Pretreated flow is then directed to the treatment chamber through an opening in the baffle wall between the inlet chamber and treatment chamber. The treatment chamber contains media-filled filter cartridges (Figure 2) that use physical and chemical processes to remove pollutants. During a storm event, runoff pools in the treatment chamber before passing radially through the cylindrical cartridges from the outside surface, through the media for treatment, and into the center of the cartridge. At the center of the cartridge is a center tube assembly designed to distribute the hydraulic load evenly across the surface of the filter cartridge and control the treatment flow rate. The center tube assembly discharges treated flow through the false floor and into the outlet chamber. A draindown feature built into each cartridge allows the treatment chamber to dewater between storm events.

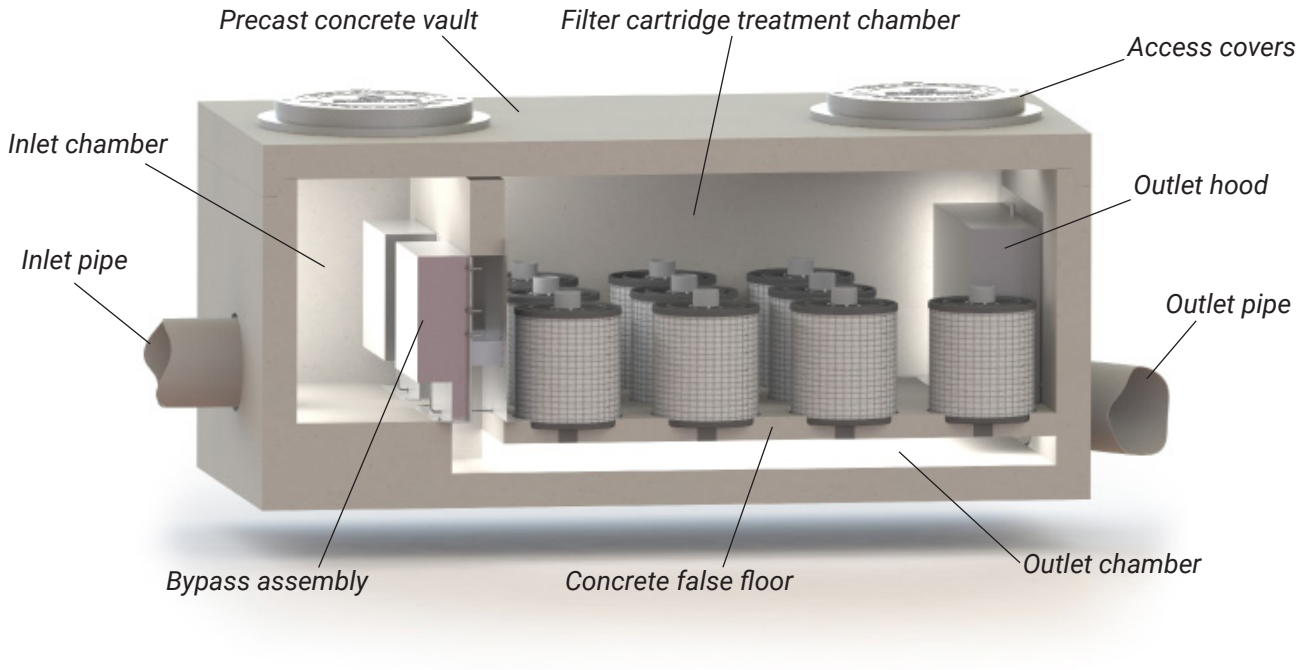

Figure 1. Schematic of the PerkFilter system.

All PerkFilter systems include a high-flow bypass assembly to divert flow exceeding the treatment capacity of the filter cartridges around the treatment chamber. The bypass assembly routes peak flow from the inlet chamber directly to the outlet chamber, bypassing the treatment chamber to prevent sediment and other captured pollutants from being scoured and re-entrained by high flow. Treated flow and bypass flow merge in the outlet chamber for discharge by a single outlet pipe.

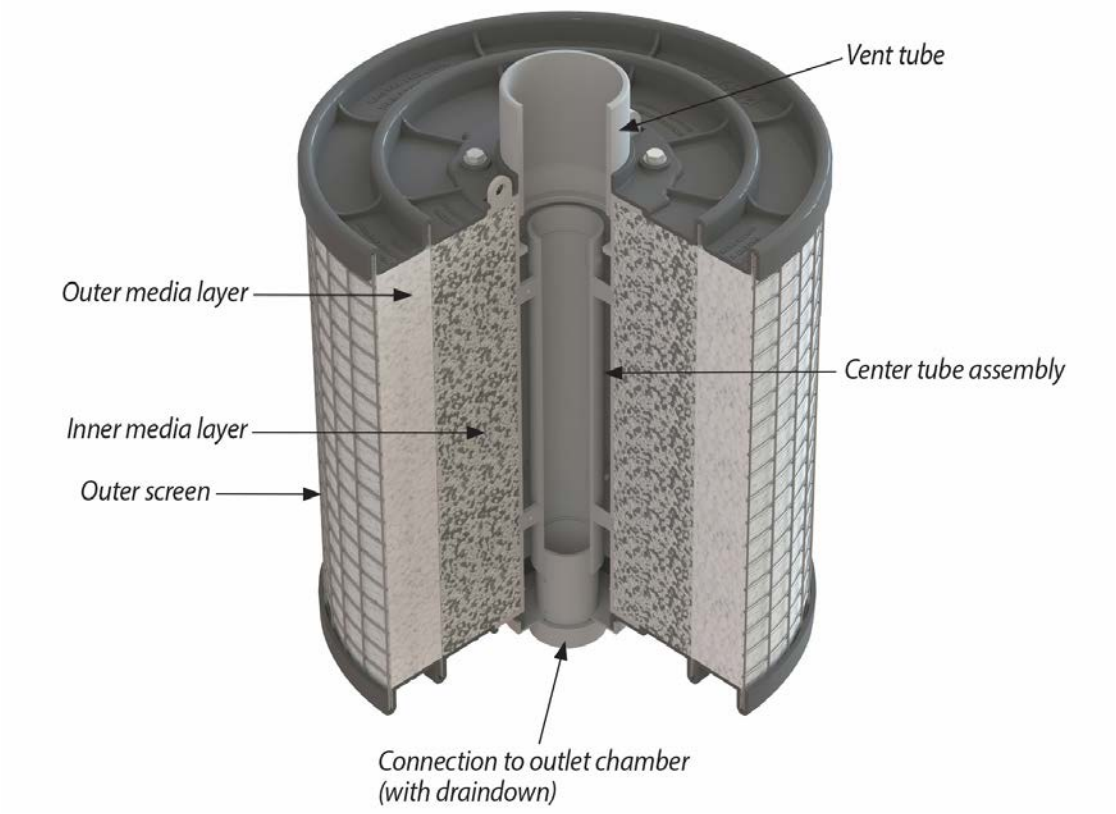

Figure 2. Schematic of PerkFilter cartridge.

Configuration

The PerkFilter structure may consist of a vault, manhole, or catch basin configuration. Catch basin units may be fabricated from concrete or steel. Internal components including the PerkFilter cartridges are manufactured from durable plastic and stainless steel components and hardware. All cartridges are 18 inches in diameter and are available in two heights: 12-inch and 18-inch. Cartridges may be used alone or may be stacked (Figure 3) to provide 24-inch and 30-inch combinations. The capacity of each cartridge or cartridge combination is dictated by the allowable operating rate of the media and the outer surface area of the cartridge. Thus, taller cartridges have greater treatment capacity than shorter cartridges, but they also require more hydraulic drop across the system. Cartridges may be filled with a wide variety of media but the standard mix is composed of zeolite, perlite and carbon (ZPC).

Access to an installed PerkFilter system is typically provided by ductile iron castings or hatch covers. The location and number of access appurtenances is dependent on the size and configuration of the system.

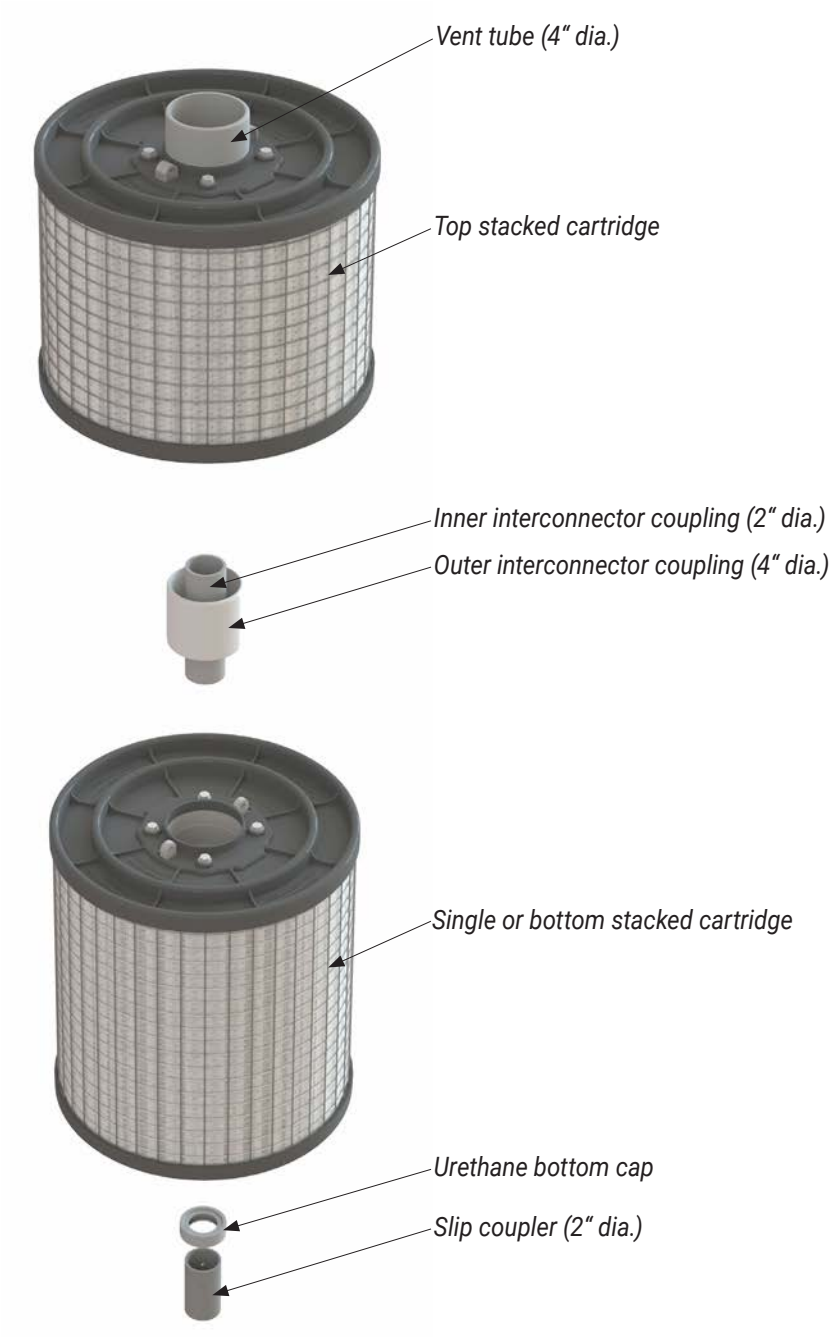

Figure 3. Schematic of stacked cartridges and connector components.

Maintenance Overview

State and local regulations require all stormwater management systems to be inspected on a periodic basis and maintained as necessary to ensure performance and protect downstream receiving waters. Maintenance prevents excessive pollutant buildup that can limit system performance by reducing the operating capacity and increasing the potential for scouring of pollutants during periods of high flow.

Inspection and Maintenance Frequency

The PerkFilter should be inspected on a periodic basis, typically twice per year, and maintained as required. Initially, inspections of a new system should be conducted more frequently to help establish an appropriate site-specific inspection frequency. The maintenance frequency will be driven by the amount of runoff and pollutant loading encountered by a given system. In most cases, the optimum maintenance interval will be one to three years. Inspection and maintenance activities should be performed only during dry weather periods.

Inspection Equipment

The following equipment is helpful when conducting PerkFilter inspections:

- Recording device (pen and paper form, voice recorder, iPad, etc.)
- Suitable clothing (appropriate footwear, gloves, hardhat, safety glasses, etc.)
- Traffic control equipment (cones, barricades, signage, flagging, etc.)
- Socket and wrench for bolt-down access covers
- Manhole hook or pry bar
- Flashlight
- Tape measure
- Measuring stick or sludge sampler
- Long-handled net (optional)

Inspection Procedures

PerkFilter inspections are visual and may be conducted from the ground surface without entering the unit. To complete an inspection, safety measures including traffic control should be deployed before the access covers are removed. Once the covers have been removed, the following items should be checked and recorded (see form provided at the end of this document) to determine whether maintenance is required:

- Inspect the internal components and note whether there are any broken or missing parts. In the unlikely event that internal parts are broken or missing, contact Oldcastle Infrastructure at (800) 579-8819 to determine appropriate corrective action.
- Note whether the inlet pipe is blocked or obstructed. The outlet pipe is covered by a removable outlet hood and cannot be observed without entering the unit.
- Observe, quantify and record the accumulation of floating trash and debris in the inlet chamber. The significance of accumulated floating trash and debris is a matter of judgment. A long-handled net may be used to retrieve the bulk of trash and debris at the time of inspection if full maintenance due to accumulation of floating oils or settled sediment is not yet warranted.

- Observe, quantify and record the accumulation of oils in the inlet chamber. The significance of accumulated floating oils is a matter of judgment. However, if there is evidence of an oil or fuel spill, immediate maintenance by appropriate certified personnel is warranted.
- Observe, quantify and record the average accumulation of sediment in the inlet chamber and treatment chamber. A calibrated dipstick, tape measure, or sludge sampler may be used to determine the amount of accumulated sediment in each chamber. The depth of sediment may be determined by calculating the difference between the measurement from the rim of the PerkFilter to the top of the accumulated sediment, and the measurement from the rim of the PerkFilter to the bottom of the PerkFilter structure. Finding the top of the accumulated sediment below standing water takes some practice and a light touch, but increased resistance as the measuring device is lowered toward the bottom of the unit indicates the top of the accumulated sediment.
- Finally, observe, quantify and record the amount of standing water in the treatment chamber around the cartridges. If standing water is present, do not include the depth of sediment that may have settled out below the standing water in the measurement.

Maintenance Triggers

Maintenance should be scheduled if any of the following conditions are identified during the inspection:

- Internal components are broken or missing.
- Inlet piping is obstructed.
- The accumulation of floating trash and debris that cannot be retrieved with a net and/or oil in the inlet chamber is significant.
- There is more than 6” of accumulated sediment in the inlet chamber.
- There is more than 4” of accumulated sediment in the treatment chamber.
- There is more than 4” of standing water in the treatment chamber more than 24 hours after end of rain event.
- A hazardous material release (e.g. automotive fluids) is observed or reported.
- The system has not been maintained for 3 years (wet climates) to 5 years (dry climates).

Maintenance Equipment

The following equipment is helpful when conducting PerkFilter maintenance:

- Suitable clothing (appropriate footwear, gloves, hardhat, safety glasses, etc.)
- Traffic control equipment (cones, barricades, signage, flagging, etc.)
- Socket and wrench for bolt-down access covers
- Manhole hook or pry bar
- Confined space entry equipment, if needed
- Flashlight
- Tape measure
- 9/16” socket and wrench to remove hold-down struts and filter cartridge tops
- Replacement filter cartridges
- Vacuum truck with water supply and water jet

Contact Oldcastle Infrastructure at (800) 579-8819 for replacement filter cartridges. A lead time of four weeks is recommended.

Maintenance Procedures

Maintenance should be conducted during dry weather when no flow is entering the system. Confined space entry is necessary to maintain vault and manhole PerkFilter configurations. Only personnel that are OSHA Confined Space Entry trained and certified may enter underground structures. Confined space entry is not required for catch basin PerkFilter configurations. Once safety measures such as traffic control are deployed, the access covers may be removed and the following activities may be conducted to complete maintenance:

- Remove floating trash, debris and oils from the water surface in the inlet chamber using the extension nozzle on the end of the boom hose of the vacuum truck. Continue using the vacuum truck to completely dewater the inlet chamber and evacuate all accumulated sediment from the inlet chamber. Some jetting may be required to fully remove sediment. The inlet chamber does not need to be refilled with water after maintenance is complete. The system will fill with water when the next storm event occurs.
- Remove the hold-down strut from each row of filter cartridges and then remove the top of each cartridge (the top is held on by four 9/16" bolts) and use the vacuum truck to evacuate the spent media. When empty, the spent cartridges may be easily lifted off their slip couplers and removed from the vault. The couplers may be left inserted into couplings cast into the false floor to prevent sediment and debris from being washed into the outlet chamber during washdown.
- Once all the spent cartridges have been removed from the structure, the vacuum truck may be used to evacuate all accumulated sediment from the treatment chamber. Some jetting may be required to fully remove sediment. Take care not to wash sediment and debris through the openings in the false floor and into the outlet chamber. All material removed from the PerkFilter during maintenance including the spent media must be disposed of in accordance with local, state, and/or federal regulations. In most cases, the material may be handled in the same manner as disposal of material removed from sumped catch basins or manholes.
- Place a fresh cartridge in each cartridge position using the existing slip couplers and urethane bottom caps. If the vault is equipped with stacked cartridges, the existing outer and inner interconnector couplers must be used between the stacked cartridges to provide hydraulic connection. Transfer the existing vent tubes from the spent cartridges to the fresh cartridges. Finally, refit the struts to hold the fresh cartridges in place.
- Securely replace access covers, as appropriate.
- Make arrangements to return the empty spent cartridges to Oldcastle Infrastructure.

PerkFilter
Inspection and Maintenance Log

Location_____

Structure Configuration and Size:

Inspection Date_____

☐ Vault _____feet x _____feet
☐ Manhole _____feet diameter
☐ Catch Basin _____feet x _____feet

Number and Height of Cartridge Stacks:

Count____each ☐12" ☐ 18" ☐ 24" ☐ 30"

Media Type:

☐ ZPC ☐ Perlite ☐ Other_____

Condition of Internal Components ☐ Good ☐ Damaged ☐ Missing	Notes:
Inlet or Outlet Blockage or Obstruction ☐ Yes ☐ No	Notes:
Floating Trash and Debris ☐ Significant ☐ Not Significant	Notes:
Floating Oils ☐ Significant ☐ Not Significant ☐ Spill	Notes:
Sediment Depth in Inlet Chamber ☐ Inches of Sediment:_____	Notes:
Sediment Depth in Treatment Chamber ☐ Inches of Sediment:_____	Notes:
Standing Water in Treatment Chamber ☐ Inches of Standing Water:_____	Notes:

Maintenance Required

☐ **Yes - Schedule Maintenance** ☐ **No - Inspect Again in _____ Months**

PERKFILTER™

OUR MARKETS

BUILDING STRUCTURES

COMMUNICATIONS

WATER

ENERGY

TRANSPORTATION

STANDARD O&M PLAN FOR THE SIMPLIFIED APPROACH

3.1.1.11. Drywells and Soakage Trenches

Structural components must be operated and maintained in accordance with the design specifications.		
	MAINTENANCE INDICATOR	**CORRECTIVE ACTION**
	Clogged inlets, manholes, catch basins, or silt traps	Clean gutters, rain drains, catch basins, or silt traps at least twice a year. Remove sediment, debris, and blockages from catch basins, trench drains, curb inlets, and pipes to maintain at least 50% conveyance at all times.
	Cracked drain pipes, catch basins or manholes	Repair or seal cracks. Replace when repair is insufficient.
	Vegetation encroachment	Prevent large root systems from trees and bushes from damaging subsurface structural components.
	Ponding water	Remove sediment and debris from all accessible components. Repeated ponding in the system may indicate end of facility life. Consult with City prior to decommissioning or replacement activities.

Annual Maintenance Schedule

Summer	**Make structural repairs. Clear drains, inlets and catch basins.**
Fall	Clean gutters and rain drains; remove sediment and plant debris.
Winter	Monitor infiltration rates.
Spring	Clean gutters and rain drains

Maintenance Records: All facility operators are required to keep an inspection and maintenance log. Record date, description, and contractor (if applicable) for all repairs, landscape maintenance, and facility cleanout activities. Keep work orders and invoices on file and make available upon request of the City inspector.

Access: Maintain ingress/egress per design standards.

Infiltration/Flow Control: All facilities must drain within 48 hours. Record time/date, weather, and site conditions when ponding occurs.

Pollution Prevention: All sites must implement Best Management Practices to prevent contamination of stormwater. Call 503-823-7180 to report spills. Never wash spills into a stormwater facility. If contamination occurs, document the circumstances and the corrective action taken; include the time/date, weather, and site conditions.

Vectors (Mosquitoes and Rats): Stormwater facilities must not harbor mosquito larvae or rodents that pose a threat to public health or that undermine the facility structure. Record the time/date, weather, and site conditions when vector activity observed. Record when vector abatement started and ended.