SOUNDTRANSIT

June 19, 2020

Jing Song
Site Manager
NWRO Toxics Cleanup Program
State of Washington Department of Ecology
3190 160th Avenue Southeast
Bellevue, Washington 98008-5452

Subject: Selection of Preferred Alternative
Y Pay Mor Drycleaner
VCP Project No. NW3265
Federal Way Link Extension Parcel FL-358

Dear Jing,

Sound Transit has completed the supplemental investigation and evaluation of remedial alternatives as discussed with you during our June 8, 2020 phone call. We identified six remedial alternatives, three that include soil excavation which would be completed before placement of fill associated with the Federal Way Transit Center (FWTC), and three that use thermal treatment technologies. This package presents a compilation of the supplemental investigation results and data supporting the Conceptual Site Model (CSM), along with the results of our remedial alternatives evaluation. Sound Transit requests Ecology's opinion on the proposed cleanup action and written approval to move forward with the interim action and related activities under the existing Environmental Covenants (EC) by June 26.

Sound Transit also requests Ecology's opinion by June 26 that the area subject to the existing environmental covenants as identified in the Ecology letter dated April 24, 2020 be reduced to the area of the perchloroethylene (PCE) and associated breakdown products groundwater plume shown in the attached figures.

Sound Transit proposes to implement "Alternative 1, Hot Spot Remedial Excavation" as an interim action to remove the highest concentrations of halogenated volatile organic compounds (HVOCs)-contaminated soil associated with releases at the former dry cleaner. Two "hot spot" remedial excavations will be completed, one situated in the building footprint where the 1991 spills occurred, and the second below and surrounding the parking lot catch basin within the loading dock north of the building, near the "back door" of the former

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dry cleaner. Both excavations will remove readily-accessible soil in the upper 8 to 10 feet below existing grade. Storm drain pipes in the vicinity of the northern hot spot will also be removed. The estimated quantity of HVOC-contaminated soil that will be removed during the interim action is 1,600 tons. Following the hot spot soil removal, the excavations will be backfilled to current grade, and then approximately 15 additional feet of fill will be placed across the entire Site surface.

The hot spot soil removal coupled with the extensive layer of fill to be placed will prevent direct contact exposure to residual contaminated soil within the upper 15 feet (the point of compliance for soil direct contact).

The "final remedy" associated with Alternative 1 is surface capping (as part of future site use), groundwater monitored natural attenuation (MNA), and an Environmental Covenant (EC). Groundwater at the Site is not currently used for beneficial purposes and beneficial uses would be prohibited through the future EC. Therefore, the only remaining potential exposure pathway is soil vapor to indoor air. The current plan for the source area of the Site is to be developed as a bus turn-around area without any surface structures. If future structures are likely to overlie residual contaminated soil or groundwater that could pose a risk for indoor air vapor intrusion, a chemically-resistant vapor barrier would be designed in conjunction with future structures.

The attached "Summary Table, Comparison of Remedial Alternatives" and "Remedial Alternatives Comparison Cost and Schedule" provide explanation of the benefits and costs associated with the alternatives. Based on the evaluation of costs and benefits of the six remedial alternatives considered, Alternative 1 was selected as the preferred alternative because Alternative 1 can be implemented in a way that meets the minimum threshold requirements of MTCA[1], and it provides a permanent solution.

The FWTC is planned to be open for service in 2024. An EC can be in place at the Site once the groundwater MNA has started (in late 2020) or subsequently in connection with Site development, with Ecology concurrence. Therefore, Alternative 1 provides for a reasonable restoration time frame. Once source material is removed by hot spot remedial excavation, the HVOC plume in groundwater is expected to continue to reduce in size and concentration given that this plume appears to have reached equilibrium and was managed under ECs since 1994.

We appreciate Ecology's expedited review of the attached information and opinion on the proposed remedial alternative. We understand that Ecology anticipates providing an opinion by June 26, 2020 so we can move forward with the interim action under the EC. We are also requesting Ecology's concurrence by June 26 that the area subject to the existing environmental

[1] Protect human health and the environment; comply with cleanup standards; comply with applicable state and federal laws; and provide compliance monitoring (protection monitoring, performance monitoring and confirmation monitoring).

covenants can be reduced. GeoEngineers and Sound Transit are available to discuss this further and answer any questions you may have. I can be reached at (206) 370-5531.

Sincerely,

DocuSigned by:
Susan Penoyar
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Susan Penoyar, PE, LEG
Environmental Manager
Planning, Environment and Project Development
Sound Transit

cc:
Mike Warfel, Washington State Department of Ecology
Tricia DeOme, GeoEngineers

Attachments:
Attachment 1. Conceptual Site Model
Attachment 2. Data Analytical Tables
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Attachment 3. Overview, Subsurface Conditions and Data Analytical Figures
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- Figure 3. Cross-Section A-A'
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Attachment 4. Federal Way Transit Center Conceptual Design with Approximate Extent of Groundwater Plume
Attachment 5. Remedial Alternative Screening and Rough Order of Magnitude Cost Estimates
- Comparative Summary of Remedial Alternatives
- Ballpark Rough Order of Magnitude Remediation Cost Estimates – Summary
- Minimum Requirements of Cleanup Actions – WAC 173-340-360

Attachment 6. Figure Summary of Interim Action

Attachment 1
Conceptual Site Model

CONCEPTUAL SITE MODEL – Y PAY MOR DRY CLEANERS

SURFACE CONDITIONS

The Site is currently within an active construction site. The building has been demolished and the majority of the asphalt and concrete has been removed. Utilities have been disconnected but remain beneath the subsurface. The current ground surface elevations range from approximately Elevation 423 to 426 Feet (North American Vertical Datum of 1988). Approximately 15 feet of fill is planned to be placed on top of the existing surface in connection with development of the Federal Way Link Extension Project, which would bring final subgrades up to approximately Elevation 440 Feet.

SUBSURFACE CONDITIONS

Geology

The four general soil units at the Site consist of fill, glacial till, silt layer (semi-confining to confining), and potentially advance outwash. Approximately 15 feet of fill is planned to be placed on top of the existing surface in connection with development of the Federal Way Link Extension Project (approximately Elevation 440 Feet).

The uppermost soil layer consists of 5 to 8 feet of sand and gravel fill. A 2- to 3-foot thick seam of high organic content silt (based on visual observation) is present below the fill in a portion of the Site, including beneath the former dry cleaner space. The fill and silt are underlain by dense silty sand and sandy silt (glacial till) to depths of approximately 26 feet below ground surface (bgs). The gravel content of this material increases with depth at approximately 20 feet bgs (corresponds to Elevation 405 Feet). The glacial till is underlain by a hard silt layer from approximately 26 feet bgs (Elevation 400 Feet). The silt layer appears to be semi-confining to confining. Sand with silt and gravel was observed in one boring (B10) beneath the hard silt at approximately Elevation 379 Feet.

Hydrogeology

Shallow groundwater is approximately 8 to 12 feet bgs (Elevation 416 to 419 Feet). The shallow groundwater appears perched on top of the semi-confining to confining silt layer at Elevation 400 Feet. The groundwater gradient appears to be relatively flat (for example, there is 2 feet of groundwater elevation change across a 180 feet horizontal distance between FL358-MW1 and YPayMor-MW3) and towards the southwest. At two locations on the Site, the May 2020 groundwater elevation data showed lower than anticipated groundwater elevations; these two areas are north of the former dry cleaner (at 358-B3 – Elevation 413.2 Feet) and southwest of the former dry cleaner (at 358-B13 – Elevation 413.91 Feet). The two wells with lower groundwater elevations may be influenced by nearby underground utilities, or these elevations may be artifacts resulting from the flat gradient or because the measurements were obtained from temporary well screens.

NATURE AND EXTENT OF CONTAMINATION

The Y Pay Mor dry cleaner operated from the late 1980s to 1994. Perchloroethylene (PCE) is present in the shallow soil in two source areas. PCE and associated degradation compounds are present in deeper soil between Elevation 415 and 400 Feet and in groundwater.

Source Areas of Shallow Contaminated Soil (Above 10 Feet Bgs)

There are two source areas where PCE was apparently released to the soil and groundwater at the Site. The two source areas are:

- Beneath the former dry cleaner tenant space where two PCE spills occurred in 1991.
- Parking lot storm drain on the north side of the building.

The nature and extent of contamination at each source area is discussed below. Across the Site in general, the vertical extent of soil with contaminant concentrations greater than Model Toxics Control Act (MTCA) cleanup levels appears to be limited to 25 to 26 feet bgs (approximately Elevation 400 Feet), based on soil chemical analytical data at B10 and B12 and the presence of the semi-confining to confining silt layer.

1991 Spills

Two PCE spills occurred in 1991 inside the western portion of the building near building floor drains. The former dry cleaning equipment appears to have been situated next to the 1991 spill location. An emergency spill response was completed to remove the majority of the spill (free product).

A remedial investigation was completed in 1991 and PCE-contaminated soil was observed to depths of 7.5 feet bgs in the fill material. The maximum depth investigated during prior environmental studies between 1991-1994 was 20 feet bgs.

A soil vapor extraction (SVE) system was installed beneath the dry cleaner tenant space and operated between 1991 and 1994; the SVE wells were screened to a maximum of 7.5 feet bgs. Following SVE operation, PCE-contaminated soil (1.3 milligrams per kilogram [mg/kg] in CB-4 at 5 to 6.5 feet bgs) was left in place beneath the building floor. Borings 358-B8 and 358-B7 and test pits PH1, PH2, PH3, PH4 and PH8 were completed in the area of the 1991 spill in 2020 to evaluate the current extent of remaining PCE-contaminated soil in the spill area.

PCE and associated breakdown products in soil appear to be limited to the area of test pits PH3, PH2, PH4 and PH8 and borings CB-4 and 358-B8. The majority of the concentrations of PCE in this area range between 0.039 mg/kg and 0.269 mg/kg in soil samples from ground surface down to 7 feet bgs. PCE was also detected in one soil sample at 15.3 mg/kg in from PH8 at 5 feet bgs, located adjacent to the former floor drain. The vertical extent of PCE-contaminated soil in the 1991 spill area appears to be limited to a depth of 7 feet bgs. The lateral extent of contaminated soil appears to be bounded to the east between boring 358-B8 and FL358-MW2, to the south by test pit 358-PH1, to the north by test pit 358-PH5 and to the west by boring 358-B7.

PCE was detected at concentrations less than the MTCA cleanup level in soil samples from test pit PH5 at 2 feet bgs; this sample was obtained from the alignment and depth of the former building floor drain line. PCE was not detected in soil samples from PH6 located adjacent to the building floor drain north of the

1991 spill location. Based the interpretation of recent soil vapor sampling data and test pit data, it does not appear that backfill soil historically placed in trenches around the shallow floor drain system is a major contaminant pathway under current conditions.

Storm Drain on North Side of Building

A parking storm drain was located on the north side of the building, within the loading dock area associated with former building tenant spaces. The source of the PCE in the soil in this area is likely historical waste disposal practices associated with the former dry cleaner. PCE was detected at concentrations greater than the MTCA cleanup level in the soil samples from test pit 358-PH7 between 4 and 15 feet bgs, with the highest PCE concentration (400 mg/kg) in the sample at 9 feet bgs.

The vertical limit of PCE-contaminated soil at test pit PH7 was not confirmed; however, the vertical extent of PCE-contaminated soil was verified at downgradient boring B12 at between 25 and 30 feet bgs, within the semi-confining to confining silt layer. The lateral extent of PCE-contaminated soil in soil above 10 feet bgs appears to be bounded by FL358-B1 to the north, 358-B3 to the west, 358-B5 to the south and FL358-MW1 to the southeast.

Deeper Soil and Groundwater Contamination (Below 10 Feet Bgs)

PCE likely migrated vertically from the 1991 spill source location within the building and from discharges north of the building and spread laterally to a degree, depending on the spill quantities and sorption capacity of unsaturated soil.

Upon reaching the water table, PCE continued migrating laterally and vertically downward into groundwater. Vertical migration was likely impeded in most areas by the silt layer at depths of 25 to 26 feet bgs (approximate Elevation 400 Feet). As groundwater flowed within PCE-contaminated soil at the source area, PCE and associated byproducts dissolved into the groundwater and continued migrating downgradient to the southwest. Detected PCE concentrations of soil and groundwater below the groundwater table do not indicate the likely presence of dense non-aqueous phase liquid (DNAPL). Evidence of halogenated volatile organic compound (HVOC) biodegradation is apparent based on the detections of dichloroethene (DCE) and vinyl chloride.

Attachment 2
Data Analytical Tables

Table 1
Soil Analytical Results
Former Y Pay Mor Drycleaner
2200 S 320th St
Federal Way, Washington

Lab Report ID	Date	Sample ID	Depth (ft bgs)	VOCs[1] (mg/kg)				
				PCE	TCE	Cis-1,2-DCE	Trans-1,2-DCE	Vinyl Chloride
94081902	11/16/94	**CB3/S1**	4-5	<0.1	<0.1	**0.11**	<0.1	<0.1
94081902	11/16/94	**CB4/S1**	4-5	**1.3**	<0.1	**0.33**	<0.1	<0.1
94081902	11/16/94	**CB5/S1**	4-5	<0.1	<0.1	**71**	**0.59**	<0.1
94081902	11/16/94	**CB7/S1**	4-5	<0.1	<0.1	**0.75**	<0.1	<0.1
1710-072	10/5/17	**FL358-B1-5-6**	5-6	<0.00097	<0.00097	**0.0053**	<0.00097	<0.00097
1710-072	10/5/17	**FL358-B1-10-11**	10-11	**0.016**	**0.0076**	**0.014**	<0.0010	<0.0010
1710-072	10/5/17	**FL358-B1-13-14**	13-14	**0.066**	**0.0022**	**0.0043**	<0.00080	<0.00080
1710-010	10/2/17	**FL358-MW1-1.5-2.5**	1.5-2.5	<0.00098	<0.00098	<0.00098	<0.00098	<0.00098
1710-010	10/2/17	**FL358-MW1-5-6**	5-6	<0.00091	<0.00091	<0.00091	<0.00091	<0.00091
1710-010	10/2/17	**FL358-MW1-12-13**	12-13	<0.00099	<0.00099	<0.00099	<0.00099	<0.00099
1710-010	10/2/17	**FL358-MW1-19-20**	19-20	**0.0049**	**0.0033**	**0.0016**	<0.00084	<0.00084
1710-010	10/2/17	**FL358-MW2-1.5-2.5**	1.5-2.5	<0.0011	<0.0011	<0.0011	<0.0011	<0.0011
1710-010	10/2/17	**FL358-MW2-9-10**	9-10	<0.00087	<0.00087	<0.00087	<0.00087	<0.00087
1710-010	10/2/17	**FL358-MW2-13-14**	13-14	<0.00088	<0.00088	<0.00088	<0.00088	<0.00088
2005069	5/7/20	**358-B1-10**	10-11	< 0.0280	< 0.0224	< 0.0224	<0.0224	<0.0224
2005069	5/7/20	**358-B1-20**	20-20.5	<0.0224	<0.0179	<0.0179	<0.0179	<0.0224
2005069	5/7/20	**358-B2-12.5**	12-13	<0.0317	<0.0253	<0.0253	<0.0253	<0.0317
2005069	5/7/20	**358-B2-25**	25-25.5	<0.0297	<0.0238	<0.0238	<0.0238	<0.0297
2005069	5/7/20	**358-B3-10**	10-11	<0.0254	<0.0204	<0.0204	<0.0204	<0.0254
2005069	5/7/20	**358-B3-12.5**	12-13.5	**0.083**	<0.0196	**0.0235**	<0.0196	<0.0244
2005069	5/7/20	**358-B3-15**	15-16.5	**0.121**	**0.0379**	**0.0669**	<0.0171	<0.0214
2005069	5/7/20	**358-B3-20**	20-20.5	**0.0384**	<0.0189	<0.0189	<0.0189	<0.0236
2005085	5/8/20	**358-B4-15**	15-16	<0.0344	<0.0275	<0.0275	<0.0275	<0.0344
2005085	5/8/20	**358-B4-20**	20-21.5	<0.0294	<0.0235	<0.0235	<0.0235	<0.0294
2005085	5/8/20	**358-B5-2.5**	2.5-4	<0.0382	<0.0306	<0.0306	<0.0306	<0.0382
2005085	5/8/20	**358-B5-5**	5-6.5	<0.0321	<0.0257	**0.081**	<0.0257	<0.0321
2005085	5/8/20	**358-B5-10**	10-11.5	<0.0281	<0.0225	<0.0225	<0.0225	<0.0281
2005085	5/8/20	**358-B5-15**	15-16.5	<0.0275	<0.0220	<0.0220	<0.0220	<0.0275
2005085	5/8/20	**358-B5-20**	20-21	**0.358**	<0.0188	<0.0188	<0.0188	<0.0234
2005085	5/8/20	**358-B5-25**	25-25.5	**0.123**	<0.0236	<0.0236	<0.0236	<0.0295
2005085	5/8/20	**358-B6-5**	5-6.5	<0.0395	<0.0316	**0.0949**	<0.0316	<0.0395
2005085	5/8/20	**358-B6-10**	10-11.5	<0.0233	<0.0187	<0.0187	<0.0187	<0.0233
2005085	5/8/20	**358-B6-20**	20-20.5	**0.0269**	<0.0197	<0.0197	<0.0197	<0.0246
2005098	5/11/20	**358-B7-5**	5-6.5	**0.0438**	<0.0185	**0.0509**	<0.0185	<0.0231
2005098	5/11/20	**358-B7-10**	10-11	<0.0218	<0.0174	<0.0174	<0.0174	<0.0218
2005098	5/11/20	**358-B7-20**	20-21	<0.0213	<0.0170	**0.0245**	<0.0170	<0.0213
2005098	5/11/20	**358-B8-2.5**	2.5-4	**0.0539**	<0.0208	<0.0208	<0.0208	<0.0260
2005098	5/11/20	**358-B8-5**	5-6.5	<0.0331	<0.0265	**0.205**	<0.0265	<0.0331
2005098	5/11/20	**358-B8-12.5**	12.5-13	<0.0249	<0.0199	<0.0199	<0.0199	<0.0249
2005098	5/11/20	**358-B8-20**	20-20.5	<0.0305	<0.0244	<0.0244	<0.0244	<0.0305
2005098	5/11/20	**358-B9-2.5**	2.5-4	<0.0396	<0.0317	<0.0317	<0.0317	<0.0396
2005098	5/11/20	**358-B9-7.5**	7.5-9	<0.0124	<0.00989	<0.00989	<0.00989	<0.0124
2005098	5/11/20	**358-B9-12.5**	12.5-13.5	<0.0219	<0.0175	<0.0175	<0.0175	<0.0219
2005098	5/11/20	**358-B9-20**	20-20.5	<0.0276	<0.0221	<0.0221	<0.0221	<0.0276
2006154	6/9/20	**358-B10-0.5**	0.5-2	<0.0282	<0.0226	<0.0226	<0.0226	<0.0282
2006154	6/9/20	**358-B10-25**	25-25.5	<0.0122	<0.00976	<0.00976	<0.00976	<0.0122
2006154	6/9/20	**358-B10-30**	30-30.5	<0.0227	<0.0182	<0.0182	<0.0182	<0.0227
2006154	6/9/20	**358-B10-35**	35-36	<0.0209	<0.0167	<0.0167	<0.0167	<0.0209
2006154	6/9/20	**358-B10-40**	40-40.75	<0.0224	<0.0179	<0.0179	<0.0179	<0.0224
2006154	6/9/20	**358-B10-45**	45-45.75	<0.0262	<0.0209	<0.0209	<0.0209	<0.0262
2006154	6/9/20	**358-B10-50**	50-50.5	<0.0311	<0.0249	<0.00249	<0.0249	<0.0311

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Lab Report ID	Date	Sample ID	Depth (ft bgs)	VOCs[1] (mg/kg)				
				PCE	TCE	Cis-1,2-DCE	Trans-1,2-DCE	Vinyl Chloride
2006195	6/10/20	358-B11-1	1-2.5	<0.099	<0.0159	<0.0159	<0.0159	<0.0199
2006195	6/10/20	358-B11-2.5	2.5-4	<0.0368	<0.0294	<0.0294	<0.0294	<0.0368
2006195	6/10/20	358-B11-10	10-11.5	<0.0235	<0.0206	<0.0206	<0.0206	<0.0235
2006195	6/10/20	358-B11-25	25-26.5	<0.0279	<0.0223	<0.0223	<0.0223	<0.0279
2006195	6/10/20	358-B12-2.5	2.5-4	<0.0257	<0.0206	<0.0206	<0.0206	<0.0257
2006195	6/10/20	358-B12-7.5	7.5-9	**0.319**	**0.11**	**0.0289**	<0.0207	<0.0259
2006195	6/10/20	358-B12-15	15-16.5	**0.387**	**0.0612**	<0.0186	<0.0186	<0.0232
2006195	6/10/20	358-B12-25	25-26	**0.06**	<0.0270	<0.0270	<0.0270	<0.0338
2006195	6/10/20	358-B12-30	30-30.75	<0.0254	<0.0203	<0.0203	<0.0203	<0.0254
2006220	6/11/20	358-B13-2.5	2.5-4	<0.0328	<0.0263	<0.0263	<0.0263	<0.0328
2006220	6/11/20	358-B13-10	10-11.5	<0.0286	<0.0229	<0.0229	<0.0229	<0.0286
2006220	6/11/20	358-B13-20	20-21.5	<0.0233	<0.0187	<0.0187	<0.0187	<0.0233
2006220	6/11/20	358-B13-25	25-26.5	<0.0227	<0.0182	<0.0182	<0.0182	<0.0227
2006216	6/11/20	358-B14-7.5	7.5-9	<0.0216	<0.0173	<0.0173	<0.0173	<0.0216
2006216	6/11/20	358-B14-10	10-11.5	<0.0225	<0.0180	<0.0180	<0.0180	<0.0225
2006216	6/11/20	358-B14-12.5	12.5-14	<0.0316	<0.0253	<0.0253	<0.0253	<0.0316
2006216	6/11/20	358-B14-15	15-16.5	<0.0387	<0.0310	<0.0310	<0.0310	<0.0387
2006216	6/11/20	358-B14-20	20-20.75	<0.0249	<0.0199	<0.0199	<0.0199	<0.0249
2006216	6/11/20	358-B14-25	25-26.5	<0.0292	<0.0233	<0.0233	<0.0233	<0.0292
2006216	6/11/20	358-B15-1	1-2.5	<0.0251	<0.0200	<0.0200	<0.0200	<0.0251
2006216	6/11/20	358-B15-5	5-6.5	<0.0342	<0.0274	<0.0274	<0.0274	<0.0342
2006216	6/11/20	358-B15-10	10-12.5	<0.0217	<0.0174	<0.0174	<0.0174	<0.0217
2006216	6/11/20	358-B15-20	20-21.5	<0.0168	<0.0134	<0.0134	<0.0134	<0.0168
2006216	6/11/20	358-B15-25	25-26.5	<0.0275	<0.0220	**0.038**	<0.0220	<0.0275
2006155	6/9/20	358-PH1-1	0-1	<0.00275	<0.0220	<0.0220	<0.0220	<0.00275
2006155	6/9/20	358-PH1-2	1-2	<0.0244	<0.0196	<0.0196	<0.0196	<0.0244
2006155	6/9/20	358-PH1-4	3-4	<0.0255	<0.0204	**0.0233**	<0.0204	<0.0255
2006155	6/9/20	358-PH1-7	6-7	<0.0280	<0.0224	<0.0224	<0.0224	<0.0280
2006155	6/9/20	358-PH1-10	9-10	<0.0226	<0.0180	<0.0180	<0.0180	<0.0226
2006190	6/10/20	358-PH2-1	0-1	**0.0905**	<0.0251	<0.0251	<0.0251	<0.0313
2006190	6/10/20	358-PH2-2	1-2	<0.0274	<0.0219	<0.0219	<0.0219	<0.0274
2006190	6/10/20	358-PH2-4	3-4	<0.0300	<0.0240	**0.136**	<0.0240	<0.0300
2006190	6/10/20	358-PH2-7	6-7	<0.0374	<0.0299	**0.551**	<0.0299	<0.0374
2006190	6/10/20	358-PH2-10	9-10	<0.0318	<0.0255	<0.0255	<0.0255	<0.0318
2006155	6/9/20	358-PH3-1	0-1	<0.0305	<0.0244	<0.0244	<0.0244	<0.0305
2006155	6/9/20	358-PH3-2	1-2	<0.0296	<0.0237	<0.0237	<0.0237	<0.0296
2006155	6/9/20	358-PH3-4	3-4	**0.269**	**0.124**	**5.71**	**0.153**	**0.12**
2006155	6/9/20	358-PH3-7	6-7	<0.0366	<0.0293	**10.7**	**0.219**	**0.19**
2006155	6/9/20	358-PH3-10	9-10	<0.0261	<0.0209	**0.0407**	<0.0209	<0.0261
2006155	6/9/20	358-PH4-1	0-1	**0.0351**	<0.0198	<0.0198	<0.0198	<0.0248
2006155	6/9/20	358-PH4-2	1-2	**0.0758**	<0.0219	<0.0219	<0.0219	<0.0273
2006155	6/9/20	358-PH4-4	3-4	**0.0286**	<0.0197	**0.0993**	<0.0197	<0.0246
2006155	6/9/20	358-PH4-7	6-7	<0.0324	<0.0259	<0.0259	<0.0259	<0.0324
2006155	6/9/20	358-PH4-10	9-10	<0.0287	<0.0230	<0.0230	<0.0230	<0.0287
2006190	6/10/20	358-PH5-1	0-1	**0.0471**	<0.0238	<0.0238	<0.0238	<0.0297
2006190	6/10/20	358-PH5-2	1-2	**0.0415**	<0.0238	<0.0238	<0.0238	<0.0298
2006190	6/10/20	358-PH5-4	3-4	<0.0269	<0.0215	<0.0215	<0.0215	<0.0269
2006190	6/10/20	358-PH5-7	6-7	<0.0495	<0.0396	<0.0396	<0.0396	<0.0495
2006190	6/10/20	358-PH5-10	9-10	<0.0281	<0.0225	<0.0225	<0.0225	<0.0281
2006190	6/10/20	358-PH6-1	0-1	<0.0291	<0.0233	<0.0233	<0.0233	<0.0291
2006190	6/10/20	358-PH6-2	1-2	<0.0251	<0.0201	<0.0201	<0.0201	<0.0251

Table 1
Soil Analytical Results
Former Y Pay Mor Drycleaner
2200 S 320th St
Federal Way, Washington

Lab Report ID	Date	Sample ID	Depth (ft bgs)	VOCs[1] (mg/kg)				
				PCE	TCE	Cis-1,2-DCE	Trans-1,2-DCE	Vinyl Chloride
2006190	6/10/20	**358-PH6-4**	3-4	<0.0262	<0.0209	<0.0209	<0.0209	<0.0262
2006190	6/10/20	**358-PH6-7**	6-7	<0.0293	<0.0235	<0.0235	<0.0235	<0.0293
2006190	6/10/20	**358-PH6-10**	9-10	<0.0326	<0.0260	**0.0554**	<0.0260	<0.0326
2006190	6/10/20	**358-PH7-1**	0-1	<0.0348	<0.0278	<0.0278	<0.0278	<0.0348
2006190	6/10/20	**358-PH7-2**	1-2	<0.0296	<0.0237	<0.0237	<0.0237	<0.0296
2006190	6/10/20	**358-PH7-4**	3-4	**0.683**	**0.161**	**0.0733**	<0.0253	<0.0317
2006190	6/10/20	**358-PH7-7**	6-7	**1.05**	**0.118**	**0.124**	<0.0249	<0.0311
2006190	6/10/20	**358-PH7-9**	9-10	**400**	**1.01**	**0.0747**	<0.0236	<0.0295
2006190	6/10/20	**358-PH7-12**	11-12	**1.95**	**0.0968**	**0.186**	<0.0264	<0.0331
2006190	6/10/20	**358-PH7-15**	14-15	**10.1**	**0.403**	**0.757**	<0.0329	<0.0411
2006190	6/10/20	**358-PH8-5**	4-5	**15.3**	**16.9**	**8.91**	**0.305**	**0.0365**
MTCA Method A Soil Cleanup Level, Unrestricted (Ecology, 2013)				0.05	0.03	n/a	n/a	n/a
	MTCA Method B Soil Cleanup Level (Ecology, 2015)			476.19	40	160	1600	240
WAC 173-303 Dangerous Waste Limit (mg/l, TCLP Methodology)				0.7	0.5	n/a	n/a	0.2
WAC 173-303 Dangerous Waste Screening (mg/kg, 20 times TCLP limit)				14	10	n/a	n/a	4
	EPA Land Disposal Restriction Limit, mg/kg			60	60	n/a	n/a	60

Notes:
< - Not detected at listed laboratory reporting limit
Bold - Analyte detected
Bold/Highlighted - Concentration exceeds MTCA Method A Cleanup Level for soil
1 - Samples analyzed for VOCs by EPA Method 8260. See laboratory report for complete list.

Table 2
Groundwater Analytical Results
Former Y Pay Mor Drycleaner
2210 S 320th St
Federal Way, Washington

Lab Report ID	Date	Sample ID	Screened interval (ft bgs)	Ground surface Elevation (ft NAVD88)[2]	Top of Casing Elevation (ft NAVD88)	Depth to Water (ft below TOC)	Water level Elevation (ft NAVD88)	Field Parameters					VOCs (ug/l)[1]			
								Temp (°C)	pH	Dissolved Oxygen (mg/l)	Conductivity (µS/cm)	Turbidity (NTU)	PCE	TCE	Cis-1,2-DCE	Vinyl Chloride
1710-083	10/6/17	**FL358-MW1**	**6-25**	**425.59**	**425.18**	7.18	418	NA	NA	NA	NA	--	**0.21**	**1.0**	**0.61**	<0.20
2004413	4/29/20					6.61	418.57	13.2	5.94	0.09	545	--	<1.0	<0.50	<1.0	<0.20
1710-083	10/6/17	**FL358-MW2**	**6-24**	**425.37**	**424.99**	7.12	417.87	NA	NA	NA	NA	--	<0.20	<0.20	<0.20	<0.20
2004413	4/29/20					6.0	418.99	13.5	5.34	0.22	447	--	<1.0	<0.50	<1.0	<0.20
1710-105	10/9/17	**FL358-MW3**	**8-19.5**	**425.55**	**425.13**	7.65	417.48	NA	NA	NA	NA	--	<0.20	<0.20	<0.20	<0.20
2004413	4/29/20					7.4	417.73	14.1	59	0.15	503	--	<1.0	<0.50	<1.0	<0.20
1710-083	10/6/17	**FL358-MW4**	**8-19.5**	**424.34**	**423.92**	9.36	414.56	NA	NA	NA	NA	--	<0.20	<0.20	**0.34**	<0.20
2004413	4/29/20					8.98	414.94	13.5	5.79	0.19	610	--	<1.0	<0.50	<1.0	<0.20
1710-031	10/3/17	**YPayMor-MW3**	**5-15?**	**424.8**	**424.3**	7.81	416.49	NA	NA	NA	NA	--	<0.20	<0.20	**0.2**	<0.20
2004413	4/29/20					7.0	417.3	14.1	5.87	0.13	517	--	<1.0	<0.50	<1.0	<0.20
2005086	5/8/20	**358-B3-GW**	**10-20**	**423**	--	9.8	413.2	13	6.42	6.26	714	--	**5.71**	**2.08**	**6.41**	<0.20
2005086	5/8/20	**358-B4-GW**	**15-25**	**427**	--	8.1	418.9	14.4	6.58	5.7	1750	--	<1.0	<0.50	<1.0	<0.20
2005086	5/8/20	**358-B5-GW**	**15-25**	**426.37**	--	9.3	417.07	16.5	6.93	6.61	2406	--	**136**	**69.9**	**68.3**	**2.2**
2005099	5/11/20	**358-B6-GW**	**15-25**	**426.37**	--	8.8	417.57	15.7	6.07	0.3	1422	--	**6.08**	**6.24**	**17.8**	<0.20
2005099	5/11/20	**358-B7-GW**	**15-25**	**426.37**	--	8.9	417.47	17.7	5.91	1.15	901	--	<1.0	**2.99**	**33.6**	**18.8**
2006234	6/12/20	**358-B11-GW**	**15-25**	**425.06**	**424.93**	7.63	417.3	13.3	6.34	4.49	597	1.66	<1.0	<0.5	**3.37**	<0.2
2006234	6/12/20	**358-B13-GW**	**15-25**	**425.51**	**425.51**	11.6	413.91	16.5	6.23	7.13	523	12	<1.0	<0.5	<1.0	<0.2
2006234	6/12/20	**358-B14-GW**	**15-25**	**426.47**	**426.99**	7.8	419.19	13.9	6.29	0.83	493	452	<1.0	<0.5	<1.0	<0.2
2006234	6/12/20	**358-B15-GW**	**15-25**	**425.61**	**426.04**	8.9	417.14	16.8	6.1	0.31	850	--	<1.0	**1.89**	**9.95**	<0.2
MTCA Method A or B Cleanup Level (ug/l)													5	5	16 (B)	0.2

Notes:

< - Not detected at listed laboratory reporting limit

Bold - Analyte detected

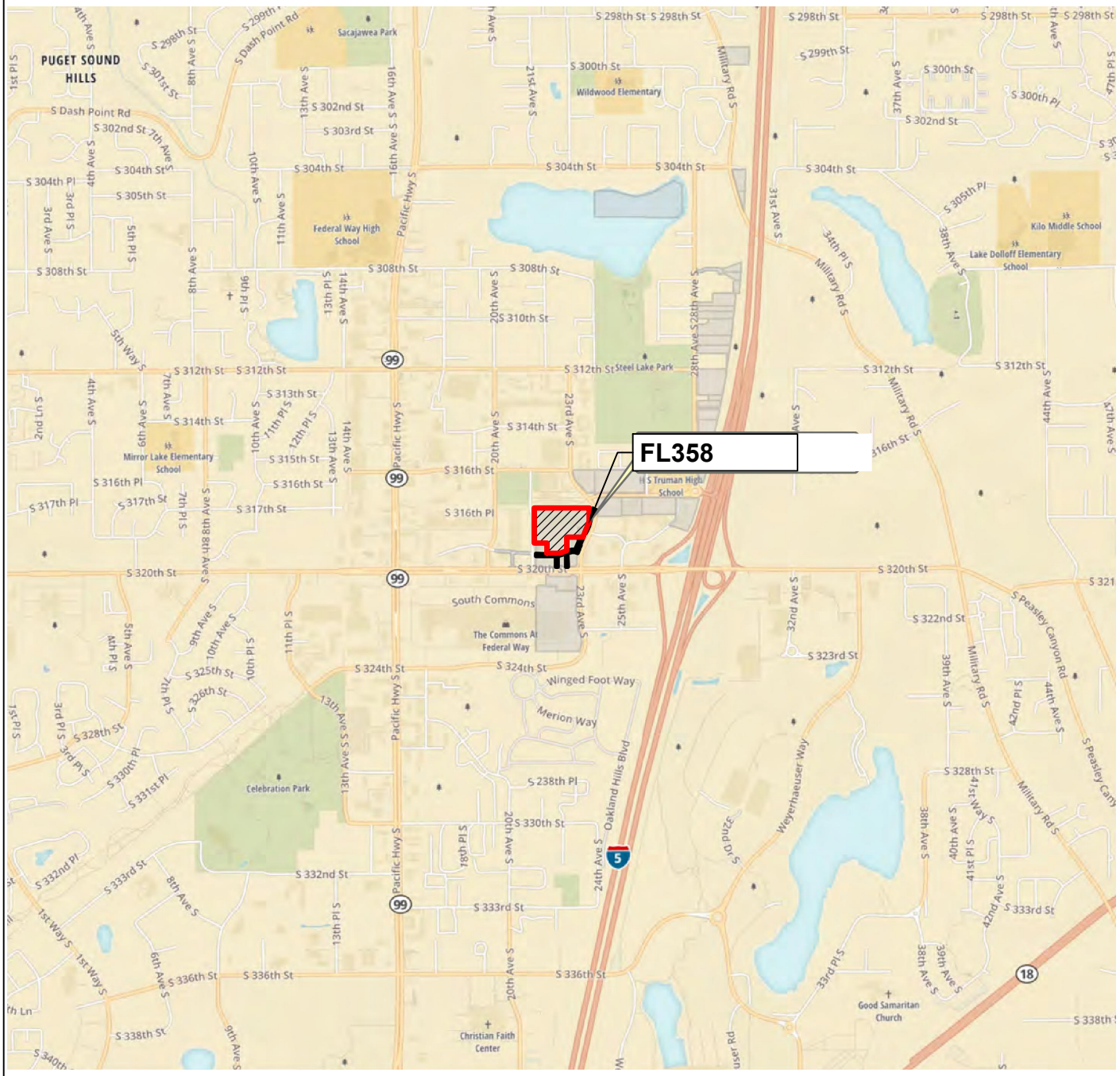
Bold/Highlighted - Analyte exceeds MTCA Method A or B cleanup level

1 - Samples analyzed for VOCs by EPA Method 8260. See laboratory report for complete list.

2 - NAVD88 - The North American vertical datum of 1988, derived from benchmarks published by the Washington State Department of Transportation.

Attachment 3
Overview, Subsurface Conditions and Data Analytical Figures

6/19/2020 6:10 AM



N

Not to Scale

Reference: Base file Vicinity Map FL358, FL361, FL363 by GeoEngineers, dated 11-28-17.

O'Neill Service Group

FEDERAL WAY LINK EXTENSION
PARCEL FL358, FEDERAL WAY
KING COUNTY, WASHINGTON

VICINITY MAP

Drawn By:	J. Stewart
Reviewed By:	V. Atkins
Approved By:	V. Atkins
Date:	June 2020
Project No.:	2021

FIGURE

1

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A
A'
358-B14
358-B4
358-B11
358-B3
FL358-B1
358-PH7
AREA OF LOADING DOCK AND STAINING AROUND CATCH BASIN
358-B12
APPROXIMATE EXTENT OF FORMER DRY CLEANERS
358-PH6
BUILDING FLOOR DRAIN AND LINES (APPROXIMATE)
358-B6
358-B5
358-B10
358-B15
358-PH5
FL358-MW1
358-B2
358-PH4
358-PH8
358-PH3
AREA OF 1991 SPILLS
358-B7
358-B8
358-PH2
358-B1
FL358
358-PH1
B-12 (1991)
CB-4 (1994)
FL358-MW2
CB-5 (1994)
358-B9
358-B13
FL358-MW3
Y PAY MOR-MW3
FL358-MW4
FL358-B3
FL361
FL363

LEGEND

- 1991-1994 SAMPLE LOCATIONS
- SOIL BORINGS WITH TEMP WELL, EST. 25' DEPTH
- SOIL BORING, EST. 50' DEPTH
- SOIL BORING - EST. 25' DEPTH
- MONITORING WELL
- TEST PIT - EST. 10' DEPTH
- BUILDING FLOOR DRAIN AND LINES (APPROXIMATE)
- CROSS SECTION LOCATION

N

15 0 15 30
SCALE IN FEET

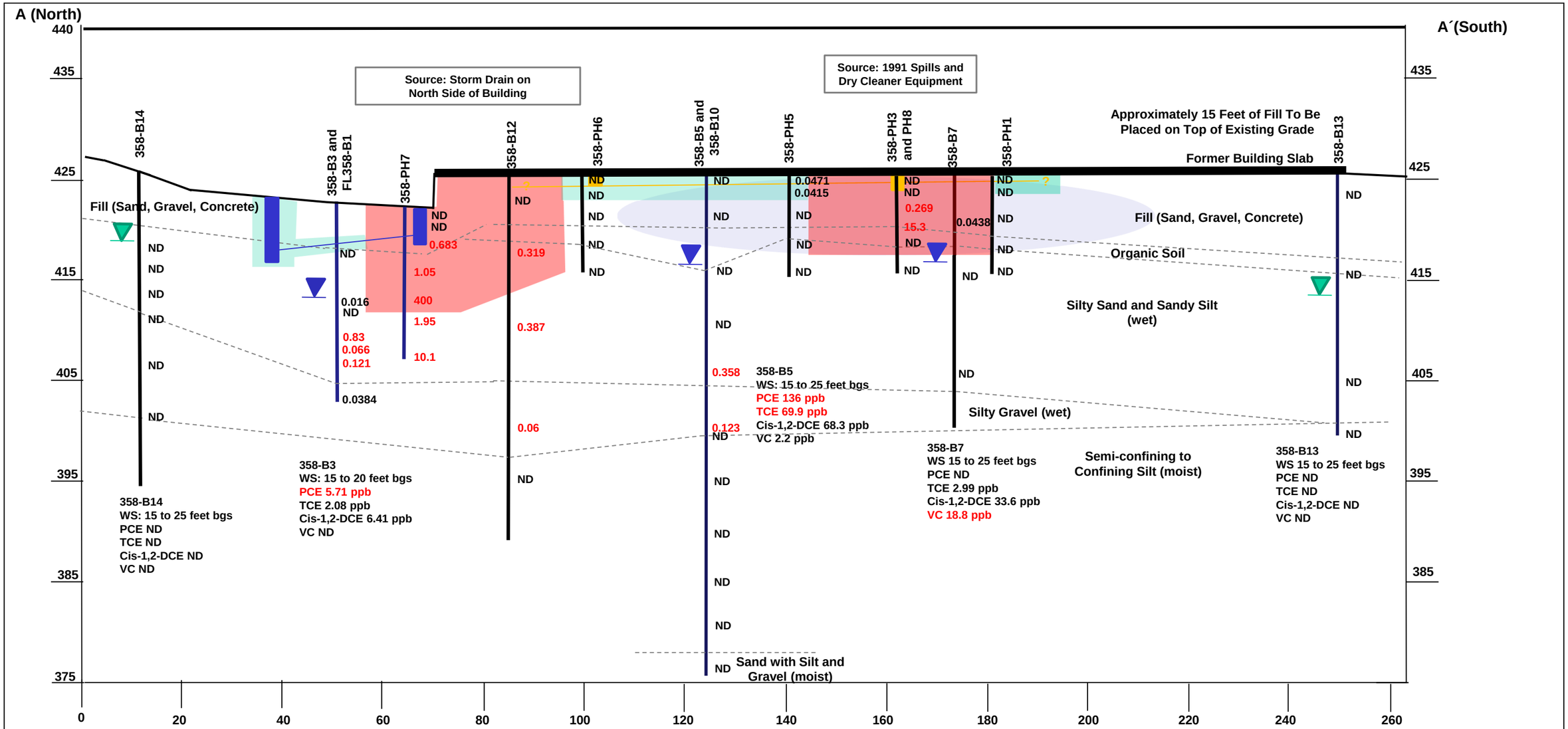
O'Neill Service Group

FEDERAL WAY LINK EXTENSION
PARCEL FL358, FEDERAL WAY
KING COUNTY, WASHINGTON

OVERVIEW SITE PLAN

Drawn By:	J. Stewart
Reviewed By:	V. Atkins
Approved By:	S. Darst
Date:	June 2020
Project No.:	2021

FIGURE 2



Legend

- May 2020 Groundwater Level in Well at Time of Sampling
- June 2020 Groundwater Level in Well at Time of Sampling
- Interpreted Soil Contact
- Approximate Extent of Soil Vapor Extraction System Influence (1991 to 1994)
- Storm Catch Basin and Line
- Building Floor Drain and Line
- 0.358/ND — PCE Concentration in Soil Sample (mg/kg) or Groundwater (ppb) – Red = Detected Concentration is Greater Than the MTCA Method A ULU Cleanup Level
- Soil Remediation If PCE/TCE Detected in Confirmation Samples Exceed MTCA Method A ULU Cleanup Level During Utility Removal
- Planned Interim Action Remedial Excavation Area

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

PCE = tetrachloroethene, TCE = trichloroethene, Cis-1,2-DCE = cis-1,2-dichloroethene, VC = vinyl chloride
MTCA = Model Toxics Control Act, ULU = unrestricted land use, WS = well screen, bgs = below ground surface, ppb = parts per billion
mg/kg = milligram per kilogram, ND = not detected at concentration greater than laboratory reporting limits
Vertical Datum: North American Vertical datum of 1988

Horizontal Scale: 1 inch = 20 feet
Vertical Scale: 1 inch = 10 feet

Cross Section A to A'

Y Pay Mor Dry Cleaner
Federal Way Link Extension Project
Federal Way, Washington

GeoEngineers

Figure 3

4082-039-03 Date Exported: 6/18/2020

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6/19/2020 1:14 PM

358-B14	PCE
7.5-9	<0.0216
10-11.5	<0.0225
12.5-14	<0.0316
15-16.5	<0.0387
20-20.75	<0.0249
25-26.5	<0.0292

358-B3	PCE	TCE	Cis-1,2-DCE
10-11	<0.0254	<0.0204	<0.0204
12-13.5	**0.083**	<0.0196	**0.0235**
15-16.5	**0.121**	**0.0379**	**0.0669**
20-20.5	**0.0384**	<0.0189	<0.0189

FL358-B1	PCE	TCE	Cis-1,2-DCE
5-6	<0.00097	<0.00097	**0.0053**
10-11	**0.016**	**0.0076**	**0.014**
13-14	**0.066**	**0.0022**	**0.0043**

358-B4	PCE
15-16	<0.0344
20-21.5	<0.0294

358-B12	PCE	TCE	Cis-1,2-DCE
2.5-4	<0.0257	<0.0206	<0.0206
7.5-9	**0.319**	**0.11**	**0.0289**
15-16.5	**0.387**	**0.0612**	<0.0186
25-26	**0.06**	<0.0270	<0.0270
30-30.75	<0.0254	<0.0203	<0.0203

358-PH7	PCE	TCE	Cis-1,2-DCE
0-1	<0.0348	<0.0278	<0.0278
1-2	<0.0296	<0.0237	<0.0237
3-4	**0.683**	**0.161**	**0.0733**
6-7	**1.05**	**0.118**	**0.124**
9-10	**400**	**1.01**	**0.0747**
11-12	**1.95**	**0.0968**	**0.186**
14-15	**10.1**	**0.403**	**0.757**

358-B11	PCE
1-2.5	<0.099
2.5-4	<0.0368
5-6.5	<0.0235
7.5-8	<0.0279
10-11.5	<0.0235
25-26.5	<0.0279

358-B10	PCE
0.5-2	<0.0282
25-25.5	<0.0122
30-30.5	<0.0227
35-36	<0.0209
40-40.75	<0.0224
45-45.75	<0.0262
50-50.5	<0.0311

358-B5	PCE	Cis-1,2-DCE
2.5-4	<0.0382	<0.0306
5-6.5	<0.0321	**0.081**
10-11.5	<0.0281	<0.0225
15-16.5	<0.0275	<0.0220
20-21	**0.358**	<0.0188
25-25.5	**0.123**	<0.0236

358-B6	PCE	Cis-1,2-DCE
5-6.5	<0.0395	**0.0949**
10-11.5	<0.0233	<0.0187
20-20.5	**0.0269**	<0.0197

358-B2	PCE
12-13	<0.0317
25-25.5	<0.0297

358-B15	PCE
1-2.5	<0.0251
5-6.5	<0.0342
10-12.5	<0.0217
20-21.5	<0.0168
25-26.5	<0.0275

358-B7	PCE	Cis-1,2-DCE
5-6.5	**0.0438**	**0.0509**
10-11	<0.0218	<0.0174
20-21	<0.0213	**0.0245**

FL358-MW1	PCE	TCE	Cis-1,2-DCE
1.5-2.5	<0.00098	<0.00098	<0.00098
5-6	<0.00091	<0.00091	<0.00091
12-13	<0.00099	<0.00099	<0.00099
19-20	**0.0049**	**0.0033**	**0.0016**

358-B1	PCE
10-11	<0.0280
20-20.5	<0.0224

FL358-MW2	PCE
1.5-2.5	<0.0011
9-10	<0.00087
13-14	<0.00088

358-B8	PCE	Cis-1,2-DCE
2.5-4	**0.0539**	<0.0208
5-6.5	<0.0331	**0.205**
12.5-13	<0.0249	<0.0199
20-20.5	<0.0305	<0.0244

358-B13	PCE
2.5-4	<0.0328
10-11.5	<0.0286
20-21.5	<0.0233
25-26.5	<0.0227

358-B9	PCE
2.5-4	<0.0396
7.5-9	<0.0124
12.5-13.5	<0.0219
20-20.5	<0.0276

FL358

SEE FIGURE 4

Boring ID	Analyte
Sample Depth, ft bgs	Concentration, mg/kg
	Exceeds MTCA Cleanup Level

LEGEND

- 1991-1994 SAMPLE LOCATIONS
- SOIL BORINGS WITH TEMP WELL, EST. 25' DEPTH
- SOIL BORING, EST. 50' DEPTH
- SOIL BORING - EST. 25' DEPTH
- MONITORING WELL
- TEST PIT - EST. 10' DEPTH
- BUILDING FLOOR DRAIN AND LINES (APPROXIMATE)

N

15 0 15 30

SCALE IN FEET

O'Neill Service Group

FEDERAL WAY LINK EXTENSION
PARCEL FL358, FEDERAL WAY
KING COUNTY, WASHINGTON

SITE SPECIFIC SOIL SAMPLE RESULTS

Drawn By: J. Stewart
Reviewed By: V. Atkins
Approved By: S. Darst
Date: June 2020
Project No.: 2021

FIGURE 4

358-B12

?

358-PH6	PCE
0-1	<0.0291
1-2	<0.0251
3-4	<0.0262
6-7	<0.0293
9-10	<0.0326

358-PH6

358-B6	PCE	Cis-1,2-DCE
5-6.5	<0.0395	**0.0949**
10-11.5	<0.0233	<0.0187
20-20.5	**0.0269**	<0.0197

358-B6

358-B5

358-B5	PCE	Cis-1,2-DCE
2.5-4	<0.0382	<0.0306
5-6.5	<0.0321	**0.081**
10-11.5	<0.0281	<0.0225
15-16.5	<0.0275	<0.0220
20-21	**0.358**	<0.0188
25-25.5	**0.123**	<0.0236

FL358-MW1

358-PH5	PCE
0-1	**0.0471**
1-2	**0.0415**
3-4	<0.0269
6-7	<0.0495
9-10	<0.0281

358-PH5

358-B10

358-PH4	PCE	Cis-1,2-DCE
0-1	**0.0351**	<0.0198
1-2	**0.0758**	<0.0219
3-4	**0.0286**	**0.0993**
6-7	<0.0324	<0.0259
9-10	<0.0287	<0.0230

358-PH8	PCE	TCE	Cis-1,2-DCE	Trans-1,2-DCE	Vinyl Chloride
4-5	**15.3**	**16.9**	**8.91**	**0.305**	**0.0365**

358-PH4

358-PH8

358-PH3

358-PH3	PCE	TCE	Cis-1,2-DCE	Trans-1,2-DCE	Vinyl Chloride
0-1	<0.0305	<0.0244	<0.0244	<0.0244	<0.0305
1-2	<0.0296	<0.0237	<0.0237	<0.0237	<0.0296
3-4	**0.269**	**0.124**	**5.71**	**0.153**	**0.12**
6-7	<0.0366	<0.0293	**10.7**	**0.219**	**0.19**
9-10	<0.0261	<0.0209	**0.0407**	<0.0209	<0.0261

358-B7

358-B8

358-B8	PCE	Cis-1,2-DCE
2.5-4	**0.0539**	<0.0208
5-6.5	<0.0331	**0.205**
12.5-13	<0.0249	<0.0199
20-20.5	<0.0305	<0.0244

358-B7	PCE	Cis-1,2-DCE
5-6.5	**0.0438**	**0.0509**
10-11	<0.0218	<0.0174
20-21	<0.0213	**0.0245**

358-PH2	PCE	Cis-1,2-DCE
0-1	**0.0905**	<0.0251
1-2	<0.0274	<0.0219
3-4	<0.0300	**0.136**
6-7	<0.0374	**0.551**
9-10	<0.0318	<0.0255

358-PH2

FL358-MW2

358-PH1

B-12 (1991)

CB-4 (1994)

CB-5 (1994)

358-PH1	PCE	Cis-1,2-DCE
0-1	<0.00275	<0.0220
1-2	<0.0244	<0.0196
3-4	<0.0255	**0.0233**
6-7	<0.0280	<0.0224
9-10	<0.0226	<0.0180

CB4/S1	PCE	Cis-1,2-DCE
4-5	**1.3**	0.33

Boring ID	Analyte
Sample Depth, ft bgs	Concentration, mg/kg
	Exceeds MTCA Cleanup Level

SD

LEGEND

- 1991-1994 SAMPLE LOCATIONS
- SOIL BORINGS WITH TEMP WELL, EST. 25' DEPTH
- SOIL BORING, EST. 50' DEPTH
- SOIL BORING - EST. 25' DEPTH
- MONITORING WELL
- TEST PIT - EST. 10' DEPTH
- BUILDING FLOOR DRAIN AND LINES (APPROXIMATE)

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O'Neill Service Group

FEDERAL WAY LINK EXTENSION
PARCEL FL358, FEDERAL WAY
KING COUNTY, WASHINGTON

SOIL SAMPLE RESULTS - 1991 SPILL AREA

Drawn By:	J. Stewart
Reviewed By:	V. Atkins
Approved By:	S. Darst
Date:	June 2020
Project No.:	2021

FIGURE 5

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419

418

417

416

415

358-B14
358-B14
6/12/2020: 419.19 feet

358-B4
358-B4
5/8/2020: 418.9 feet

358-B11
358-B11
6/12/2020: 417.30 feet

358-B3
358-B3
6/12/2020: 413.20 feet
Not Included in Contour

AREA OF LOADING DOCK
AND STAINING AROUND
CATCH BASIN

APPROXIMATE EXTENT OF
FORMER DRY CLEANERS

358-B12

358-PH6

BUILDING FLOOR DRAIN AND
LINES (APPROXIMATE)

358-B5
5/8/2020: 417.07 feet

358-B6
358-B6
5/8/2020: 417.57 feet

358-B5

358-B10

358-B15
358-B15
6/12/2020: 417.14 feet

358-PH5

358-PH4

358-PH8

358-PH3

AREA OF
1991 SPILLS

358-B7

358-B8

358-PH2

358-B7
5/8/2020: 417.47 feet

CB-4 (1994)

CB-5 (1994)

FL358

358-B9

358-B13
358-B13
6/12/2020: 413.91 feet
Not Included In Contour

FL358-MW1
FL358-MW1
10/6/2017: 418.00 feet
4/29/2020: 418.57 feet

358-B2

358-B1

FL358-MW2
FL358-MW2
10/6/2017: 417.57 feet
4/29/2020: 418.99 feet

FL358-MW3
FL358-MW3
10/9/2017: 417.48 feet
4/29/2020: 417.73 feet

Y PAY MOR-MW3
Y-Pay-MOR-MW3
10/3/2017: 416.49 feet
4/29/2020: 417.30 feet

FL358-MW4
FL358-MW4
10/6/2017: 414.56 feet
4/29/2020: 414.94 feet

FL358-B3

FL363

FL361

LEGEND

- 1991-1994 SAMPLE LOCATIONS
- SOIL BORINGS WITH TEMP WELL, EST. 25' DEPTH
- SOIL BORING, EST. 50' DEPTH
- SOIL BORING - EST. 25' DEPTH
- MONITORING WELL
- TEST PIT - EST. 10' DEPTH
- BUILDING FLOOR DRAIN AND LINES (APPROXIMATE)
- GROUNDWATER FLOW DIRECTION

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SCALE IN FEET

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Reference: Background obtained from O'neill Service Group Figure 7. Elevations obtained from O'neill Service Group Table 2.
Vertical Datum North American Vertical Datum of 1988).

Groundwater Contours

Y Pay Mor Dry Cleaner
Federal Way Link Extension Project
Federal Way, Washington

GeoEngineers

Figure 6

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358-B11-GW	PCE	TCE	Cis-1,2-DCE	Vinyl Chloride
6/12/2020	<1.0	<0.5	**3.37**	<0.2

358-B14-GW	PCE	TCE	Cis-1,2-DCE	Vinyl Chloride
6/12/2020	<1.0	<0.5	<1.0	<0.2

358-B4-GW	PCE	TCE	Cis-1,2-DCE	Vinyl Chloride
5/8/20	<1.0	<0.50	<1.0	<0.20

358-B3-GW	PCE	TCE	Cis-1,2-DCE	Vinyl Chloride
5/8/20	**5.71**	**2.08**	**6.41**	<0.200

358-B6-GW	PCE	TCE	Cis-1,2-DCE	Vinyl Chloride
5/11/20	**6.08**	**6.24**	**17.8**	<0.20

358-B15-GW	PCE	TCE	Cis-1,2-DCE	Vinyl Chloride
6/12/2020	<1.0	**1.89**	**9.95**	<0.2

358-B5-GW	PCE	TCE	Cis-1,2-DCE	Vinyl Chloride
5/8/20	**136**	**69.9**	**68.3**	**2.2**

FL358-MW1	PCE	TCE	Cis-1,2-DCE	Vinyl Chloride
10/6/17	**0.21**	**1.0**	**0.61**	<0.20
4/29/20	<1.0	<0.50	<1.0	<0.20

FL358-MW2	PCE	TCE	Cis-1,2-DCE	Vinyl Chloride
10/6/17	<0.20	<0.20	<0.20	<0.20
4/29/20	<1.0	<0.50	<1.0	<0.20

358-B7-GW	PCE	TCE	Cis-1,2-DCE	Vinyl Chloride
5/11/20	<1.0	**2.99**	**33.6**	**18.8**

358-B13-GW	PCE	TCE	Cis-1,2-DCE	Vinyl Chloride
6/12/2020	<1.0	<0.5	<1.0	<0.2

FL358-MW3	PCE	TCE	Cis-1,2-DCE	Vinyl Chloride
10/9/17	<0.20	<0.20	<0.20	<0.20
4/29/20	<1.0	<0.50	<1.0	<0.20

YPayMor-MW3	PCE	TCE	Cis-1,2-DCE	Vinyl Chloride
10/3/17	<0.20	<0.20	**0.2**	<0.20
4/29/20	<1.0	<0.50	<1.0	<0.20

FL358-MW4	PCE	TCE	Cis-1,2-DCE	Vinyl Chloride
10/6/17	<0.20	<0.20	**0.34**	<0.20
4/29/20	<1.0	<0.50	<1.0	<0.20

358-B11, 358-B14, 358-B4, 358-B3, FL358-B1, 358-PH7, 358-B12, 358-PH6, 358-B6, 358-B5, 358-B10, FL358-MW1, 358-B2, 358-B15, 358-PH5, 358-PH4, 358-PH8, 358-PH3, 358-B7, 358-B8, 358-PH2, 358-PH1, B-12 (1991), CB-4 (1994), CB-5 (1994), 358-B1, FL358-MW2, 358-B9, 358-B13, FL358-MW3, Y PAY MOR-MW3, FL358-MW4, FL358-B3

FL358

FL363

FL361

Well ID	Analyte
Date	Concentration, ug/l
	Exceeds MTCA Cleanup Level

LEGEND

APPROXIMATE EXTENT OF GROUNDWATER VOC EXCEEDANCES

APPROXIMATE GROUNDWATER FLOW DIRECTION

NOTE: NORTHINGS/EASTINGS ARE APPROXIMATE AND PROVIDED FOR REFERENCE ONLY.

N

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SCALE IN FEET

O'Neill Service Group

FEDERAL WAY LINK EXTENSION
PARCEL FL358, FEDERAL WAY
KING COUNTY, WASHINGTON

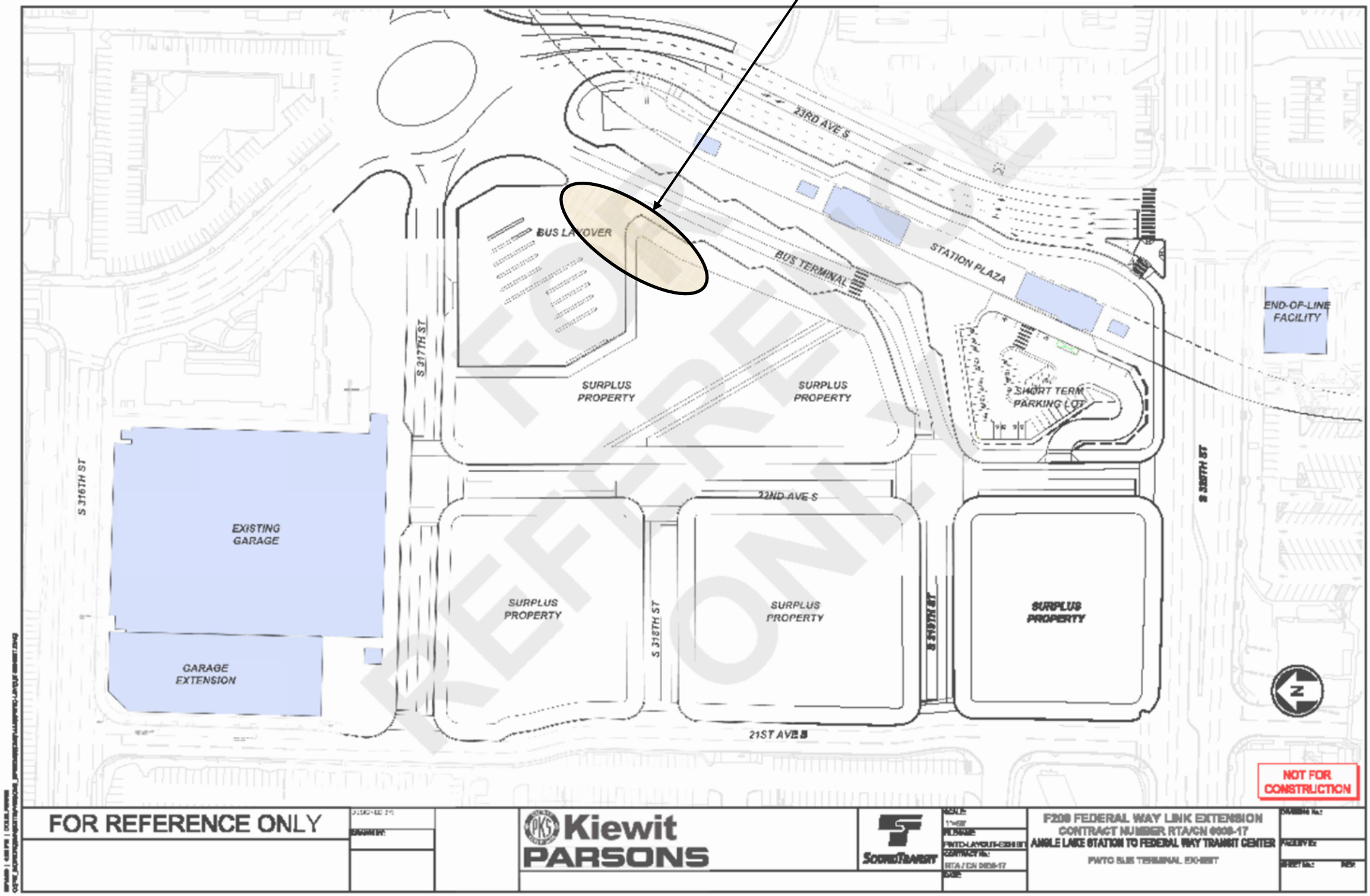
SITE SPECIFIC GROUNDWATER SAMPLE RESULTS

Drawn By: *J. Stewart*
Reviewed By: *V. Atkins*
Approved By: *S. Darst*
Date: *May 2020*
Project No.: *2021*

FIGURE **7**

Attachment 4
Federal Way Transit Center Conceptual Design with Approximate Extent of Groundwater Plume

Approximate Extent of
PCE-Contaminated Groundwater



Kiewit PARSONS

SOUNDTRANSIT

F208 FEDERAL WAY LINK EXTENSION
CONTRACT NUMBER RTA/CN 0609-17
AUBURN STATION TO FEDERAL WAY TRANSIT CENTER
FWTC BUS TERMINAL EXCERPT

Attachment 5
Remedial Alternative Screening and Rough Order of Magnitude Cost Estimates

Comparative Summary of Remedial Alternatives

Former Y Pay Mor Dry Cleaner
Federal Way Link Extension Parcel FL-358
Federal Way, Washington

Remedial Alternative	Description	Advantages	Limitations	Restoration Time Frame
Alternative 1 – Hot Spot Excavation Remedial excavation of only the two source areas to 8-10 feet bgs as an Interim Action to remove readily-accessible contaminated soil above the water table and removal of storm drain pipe adjacent to the northern hot spot. Final remedy to include surface capping, monitored natural attenuation (MNA), Engineering and Institutional Controls (environmental covenant). 1,600 Tons of Contaminated Soil Removed.	Remedial excavation of contaminated soil greater than MTCA cleanup levels to maximum depth of 10 feet bgs. The interim Action would include removal of the storm drain pipe adjacent to the northern hot spot. Excavated soil includes F-002 Listed Waste and possibly Characteristic Waste. Quantity and cost estimates assume Land Ban Haz Waste (incineration, disposal Subtitle C facility), Haz Waste (Subtitle C landfill), and CID (Subtitle D landfill) based on available data. Backfill excavation upon completion. Remaining contaminated soil and groundwater addressed through MNA including routine groundwater monitoring, and environmental covenant (EC). Costs include assumption that a chemical vapor barrier will need to be installed beneath the floor slab for future structure that may be completed on the TOD parcel.	Excavation removes areas with the highest concentrations of PCE and related contaminants in shallow accessible soil at the source areas and removal of the storm drain pipe next to source area. No dewatering required. Excavation methods allow compliance sampling at the excavation limits, which enables better certainty regarding contaminants removed and concentrations and locations where contaminants remain. Once source material is removed by hot spot remedial excavation, the plume should continue to shrink given that the groundwater plume appears to have been relatively stable and managed under an EC since 1994.	Compared to other alternatives below, this alternative **leaves the largest footprint/mass of contaminants at depth** (deeper than 10 feet below existing ground surface, 26 feet below filled grade). Material to be excavated contains **hazardous waste**. Contract with Kiewit does not account for hazardous waste handling costs. **Long-term monitoring** could extend into future when the site is redeveloped for new uses (e.g., roadway, parking, TOD parcel). Recording ECs in areas including future road, public-owned parcels (parking), and privately-owned parcels (i.e., TOD) **may be complicated and restrict TOD opportunities**.	Before FWTC Fill Placement: Excavate and backfill (interim action), assume < 2 weeks duration After FWTC Fill Placement: Long-term MNA/GW monitoring (costs assume 25 years of monitoring). EC may be established after fill placement or during long-term monitoring, depending on long term site use and Ecology input.
Alternative 1A – Hot Spot Excavation and Low Temperature Thermal Treatment[1] for Plume Excavation same as Alternative 1, supplement remediation with Low Temperature (LT) thermal technologies within the plume. No long-tail, MNA or EC. 1,600 Tons of Contaminated Soil Removed. 20,000 Tons of Contaminated Soil Treated.	Following remedial excavation of source areas to 10 feet bgs as in Alt 1, subsequently install and operate in-situ low temperature (LT) thermal to treat the plume below the base of excavation and surrounding areas where soil or groundwater > MTCA CULs. LT thermal enhances contaminant biodegradation and does not necessitate need for SVE wells.	Thermal technologies have been used successfully at former dry cleaner sites in the Seattle area. SVE not needed for LT thermal. Significantly more aggressive than excavation alone and treatment throughout plume leads to assumption of no reliance on MNA or EC to mitigate for residual contaminants. LT thermal footprint allows use of site for staging during the 24 months period of operation.	Material to be excavated contains **hazardous waste**. Contract with Kiewit does not account for hazardous waste handling costs. **Soil compliance monitoring needed** post thermal treatment to determine residual concentrations.	Before FWTC Fill Placement: Excavate and backfill, assume < 2 weeks duration After FWTC Fill Placement: Install and operate LT thermal (24 months), followed by groundwater monitoring, assume 2 years.
Alternative 1B - Full Excavation of Soil Greater Than MTCA Method A Remedial Excavation to 26 feet bgs where contaminated soil exceeds CULs. MNA and/or EC if needed. 15,500 Tons of Contaminated Soil Removed.	Removes known contaminated soil exceeding MTCA CULs by completing a much larger and deeper excavation than Alt 1 and 1A, which will necessitate dewatering, excavation sloping and possibly vertical shoring to the north or west. Excavated soil includes F-002 Listed Waste at different levels (land ban, Subtitle C and CID) as noted for Alternative 1. Handle saturated soil in the plume area as F002-listed waste (disposal under a CID). Excavation dewatering via well points or dewatering wells; manage dewatering fluids as F-002 listed waste including on-site water storage, treatment and permitted discharge to sewer. Backfill excavation upon completion. Perform soil compliance sampling at the excavation sidewalls and base; performed groundwater compliance monitoring post excavation.	Excavation methods allow compliance sampling at the excavation limits, which enables better certainty regarding contaminants removed and concentrations and locations where contaminants remain. Compared to Alt 1A, contaminated soil > CULs is removed in a shorter time frame than the thermal treatment.	**Additional mass of contaminants** represented by the larger quantity of contaminated soil is **relatively low** in comparison to Alt 1. **Difficult to implement** with large quantities of waste soil to segregate and handle; large quantities of hazardous waste groundwater to contain, treat and manage. **Excavation and construction safety risks** are increased compared to smaller excavation that does not go below the water table. Costs assume dewatering fluids can be discharged to sanitary sewer after treatment. Currently, Kiewit does not have a permit to discharge wastewater to the sanitary sewer. **All saturated soil** that is removed from the water table to depth of excavation must be assumed to have detectable PCE because in contact with contaminated groundwater and therefore handled as contaminated (**CID**) even though it may be below cleanup levels. Unsaturated soil also assumed to be CID soil. Kiewit has stated that planning an excavation of this size will take approximately 2 months. Length of excavation likely 3 weeks. Tonnage is estimated to be 15,500 which exceeds PR tonnage by 8,000 tons. May require MNA monitoring and/or EC.	Before FWTC Fill Placement: Planning excavate and backfill (interim action), assume 3 month duration. Delays start of fill. After FWTC Fill Placement: MNA monitoring and quarterly groundwater monitoring, assume 10 years. EC may be established after fill placement or during long-term monitoring, depending on long term site use and Ecology input.

[1] TerraTherm Treatment Scenario 1

Remedial Alternative	Description	Advantages	Limitations	Restoration Time Frame
Alternative 2 – High Temp Thermal[2] in Spill Areas with MNA High Temperature (HT) thermal treatment at the source area as an Interim Action to treat contaminated soil and groundwater in the source areas to depth. Final remedy includes surface capping, MNA, and EC. 9,200 Tons of Contaminated Soil Treated.	Treats unsaturated and saturated zone contaminated soil and groundwater at the source areas using high-temperature TCH to approximately 212 degrees F. Soil vapors recovered through SVE wells and treated with GAC before discharge (to atmosphere). Costs include assumption that a chemical vapor barrier will need to be installed beneath the floor slab for future structure that may be completed on the TOD parcel.	Thermal methods eliminate excavation and hazardous waste handling. Thermal technologies overall have a higher preference under MTCA remedy selection (e.g., "relative degree of long-term effectiveness") as compared to landfill disposal. Possible to treat soil within the target treatment zone to non-detect. Deeper soil treatment and heated water from thermal operation will address groundwater contaminants over time.	Area of treatment will have multiple thermal and recovery wells and manifolds, making the **treatment area and equipment support areas unusable during the treatment time-frame (5 months)**. Soil **compliance monitoring needed** post treatment to confirm CULs achieved. **Longer-term monitoring** than the other thermal alternatives, Alt 2, Alt 3 and 4.	After FWTC Fill Placement: Install and operate HT thermal (5 months), followed by MNA and quarterly monitoring, assume 15 years. EC may be established after fill placement or during long-term monitoring depending on long term site use and Ecology input.
Alternative 3 High Temp Thermal in Spill Areas and Low Temp Thermal in Plume Area[3] Alternative 2 supplemented with LT thermal treatment throughout the remainder of the plume area. No long-tail, MNA or EC. 23,000 Tons of Contaminated Soil Treated.	Similar to Alt 2, but extends footprint of thermal treatment to full plume area, and extends duration of thermal treatment compared to Alt 2 and Alt 4. However, the extended treatment duration uses low temperatures to enhance biodegradation and thus does not require SVE wells for vapor recovery, thus allowing site use as a lay down yard once the HT thermal treatment at the source is complete.	Thermal methods eliminate excavation and hazardous waste handling. HT thermal allows relatively short and effective treatment of highest contaminant concentrations at the spill areas and LT thermal footprint allows use of site for staging during the remaining 21 months period of operation. Shorter duration of post treatment groundwater monitoring compared to Alt 2 and Alt 4. No long tail of monitoring and/or EC.	Area of high temperature treatment will have multiple thermal and recovery wells and manifolds, making the **treatment area and equipment support areas unusable during the HT thermal time-frame (5 months)**. **Soil compliance monitoring needed** post treatment to determine residual concentrations.	After FWTC Fill Placement: Install and operate HT and LT thermal (5 months for HT and 21 more months LT only), followed by groundwater monitoring, assume 2 years.
Alternative 4. High Temp Thermal in Spill and Plume Areas[4] HT thermal treatment to treat deep contaminated soil and groundwater exceeding CULs in source and plume areas. No long-tail, MNA or EC. 23,000 Tons of Contaminated Soil Treated.	Significantly larger footprint of thermal treatment to lateral margin where groundwater exceeds CULs. Soil vapors recovered through SVE wells and treated with GAC before discharge (to atmosphere).	Thermal methods eliminate excavation and hazardous waste handling. Significantly shorter duration than Alt 3, treating the largest mass of contaminants in the shortest time period compared to other alternatives. No long tail of monitoring and/or EC.	Area of treatment will have multiple thermal and recovery wells and manifolds, making the **treatment area and equipment support areas unusable during the treatment time-frame (6 months)**. **Soil compliance monitoring needed** post treatment to determine residual concentrations.	After FWTC Fill Placement: Install and operate HT thermal (6 months), followed by 2 years quarterly monitoring.

Notes:
bgs = below existing ground surface
CID = Contained In Determination – soil classification applied by Ecology that allows soil that would otherwise be classified as a Listed Dangerous Waste (because it has detectable concentrations of dry cleaning contaminants) to be managed as "non-hazardous waste" at a significantly lower disposal cost than the disposal cost for Dangerous/Hazardous waste contaminated soil.
CULs = Cleanup Levels
EC = Environmental Covenant
FWTC = Federal Way Transit Center
GAC = Granular Activated Carbon
LT = Low temperature Thermal (TCH)
HT = High Low temperature Thermal (TCH)
MNA = Monitored Natural Attenuation
MTCA = Model Toxics Control Act
NFA = No Further Action

[2] TerraTherm Treatment Scenario 2

[3] TerraTherm Treatment Scenario 3

[4] TerraTherm Treatment Scenario 4

Ballpark Rough Order of Magnitude Remediation Cost Estimates - Summary

Remedial Alternatives
Former Y Pay Mor Dry Cleaner
Federal Way Link Extension Parcel FL-358
Federal Way, Washington
Developed June 19, 2020

Alternative	Rough Order of Magnitude Remediation Cost Subtotal Pre-Contingency	Contingency	Total Including Contingency	Estimated Year of Closure
1 - Hot Spot Excavation, with MNA and EC	$ 921,000	$ 142,700	$ 1,064,000	EC Indefinitely (Costs Assume MNA Monitoring to 2045)
1A - Hot Spot Excavation, Low-Temp Thermal Treatment for Plume	$ 2,767,000	$ 789,600	$ 3,557,000	2024
1B - Full Excavation of Soil Greater than MTCA, with MNA and EC	$ 3,038,000	$ 844,350	$ 3,882,000	EC Indefinitely (Costs Assume MNA Monitoring to 2030)
2 - High-Temp Thermal Treatment in Spill Areas, with MNA and EC	$ 2,167,000	$ 547,900	$ 2,715,000	EC Indefinitely (Costs Assume MNA Monitoring to 2035)
3 - High-Temp Thermal Treatment in Spill Areas and Low-Temp Thermal Treatment in Plume Area	$ 3,235,000	$ 930,000	$ 4,165,000	2024
4 - High-Temp Thermal in Spill and Plume Areas	$ 3,784,000	$ 1,096,900	$ 4,881,000	2023

Alternative 1 Cost Summary (Hot Spot Excavation, with MNA and EC)

Task Description	Estimated Cost - Rounded to Nearest $1,000)	Contingency	Subtotal With Contingency (Rounded to Nearest $1,000)
Remedial Excavation	$ 317,000	30%	$ 412,000
RI Data Gaps and New Compliance Wells, Post Fill - Capital Cost	$ 85,000	10%	$ 94,000
FS and/or CAP Post Fill - Capital Cost	$ 28,000	10%	$ 31,000
Total Annual Groundwater MNA Monitoring	$ 396,000	5%	$ 416,000
Total Quarterly Groundwater Compliance Monitoring	$ -	5%	$ -
Environmental Covenant - Legal and Consulting	$ 10,000	5%	$ 11,000
Total VCP Documentation and Oversight	$ 22,000	10%	$ 24,000
Future Chemical Vapor Barrier - TOD Parcel	$ 50,000	25%	$ 63,000
Post Closure Well Decommissioning - Capital Cost	$ 13,000	10%	$ 14,000
			$ -
Totals	$ 921,000	$ 142,700	$ 1,064,000

Alternative 1A Cost Summary (Hot Spot Excavation, Low-Temp Thermal Treatment for Plume)

Task Description	Estimated Cost - Rounded to Nearest $1,000)	Contingency	Subtotal With Contingency (Rounded to Nearest $1,000)
Remedial Excavation	$ 402,000	30%	$ 523,000
RI Data Gaps and New Compliance Wells, Post Fill - Capital Cost	$ 85,000	10%	$ 94,000
FS and/or CAP Post Fill - Capital Cost	$ 17,000	15%	$ 20,000
Thermal Treatment	$ 2,171,000	30%	$ 2,822,000
Total Annual Groundwater MNA Monitoring	$ -	5%	$ -
Total Quarterly Groundwater Compliance Monitoring	$ 51,000	5%	$ 54,000
Environmental Covenant	$ -	10%	$ -
Total VCP Documentation and Oversight	$ 28,000	10%	$ 31,000
Post Closure Well Decommissioning - Capital Cost	$ 13,000	10%	$ 14,000
			$ -
Totals	$ 2,767,000	$ 789,600	$ 3,557,000

Alternative 1B Cost Summary (Full Excavation of Soil Greater than MTCA, with MNA and EC)

Task Description	Estimated Cost - Rounded to Nearest $1,000)	Contingency	Subtotal With Contingency (Rounded to Nearest $1,000)
Remedial Excavation	$ 2,738,000	30%	$ 3,559,000
RI Data Gaps and New Compliance Wells, Post Fill - Capital Cost	$ 85,000	10%	$ 94,000
IF REQUIRED BY ECY: FS and/or Final Cleanup Action Plan (CAP) Post Fill - Capital Cost	$ 17,000	15%	$ 20,000
Total Annual Groundwater MNA Monitoring	$ 158,000	5%	$ 166,000
Total Quarterly Groundwater Compliance Monitoring	$ -	5%	$ -
Environmental Covenant - Legal and Consulting	$ 10,000	10%	$ 11,000
Total VCP Documentation and Oversight	$ 17,000	10%	$ 19,000
Post Closure Well Decommissioning - Capital Cost	$ 13,000	10%	$ 10,000
Totals	$ 3,038,000	$ 844,350	$ 3,882,000

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Alternative 2 Cost Summary (High-Temp Thermal Treatment in Spill Areas with MNA and EC)			
Task Description	Estimated Cost - Rounded to Nearest $1,000)	Contingency	Subtotal With Contingency (Rounded to Nearest $1,000)
RI Data Gaps and New Compliance Wells, Post Fill - Capital Cost	$ 85,000	10%	$ 94,000
FS and/or CAP Post Fill - Capital Cost	$ 28,000	15%	$ 32,000
Thermal Treatment	$ 1,671,000	30%	$ 2,172,000
Total Annual Groundwater MNA Monitoring	$ 238,000	5%	$ 250,000
Total Quarterly Groundwater Compliance Monitoring	$ -	5%	$ -
Environmental Covenant - Legal and Consulting	$ 10,000	10%	$ 11,000
Total VCP Documentation and Oversight	$ 72,000	10%	$ 79,000
Future Chemical Vapor Barrier - TOD Parcel	$ 50,000	25%	$ 63,000
Post Closure Well Decommissioning - Capital Cost	$ 13,000	10%	$ 14,000
			$ -
Totals	$ 2,167,000	$ 547,900	$ 2,715,000

Alternative 3 Cost Summary (High-Temp Thermal Treatment in Spill Areas and Low-Temp Thermal Treatment in Plume Area)			
Task Description	Estimated Cost - Rounded to Nearest $1,000)	Contingency	Subtotal With Contingency (Rounded to Nearest $1,000)
RI Data Gaps and New Compliance Wells, Post Fill - Capital Cost	$ 85,000	10%	$ 94,000
IF REQUIRED BY ECY: FS and/or Final Cleanup Action Plan (CAP) Post Fill - Capital Cost	$ 17,000	15%	$ 20,000
Thermal Treatment	$ 3,041,000	30%	$ 3,953,000
Total Annual Groundwater MNA Monitoring	$ -	5%	$ -
Total Quarterly Groundwater Compliance Monitoring	$ 51,000	5%	$ 54,000
Environmental Covenant - Legal and Consulting	$ -	10%	$ -
Total VCP Documentation and Oversight	$ 28,000	10%	$ 31,000
Post Closure Well Decommissioning - Capital Cost	$ 13,000	10%	$ 14,000
			$ -
Totals	$ 3,235,000	$ 930,000	$ 4,165,000

Alternative 4 Cost Summary (High-Temp Thermal in Spill and Plume Areas)			
Task Description	Estimated Cost - Rounded to Nearest $1,000)	Contingency	Subtotal With Contingency (Rounded to Nearest $1,000)
RI Data Gaps and New Compliance Wells, Post Fill - Capital Cost	$ 85,000	10%	$ 94,000
IF REQUIRED BY ECY: FS and/or Final Cleanup Action Plan (CAP) Post Fill - Capital Cost	$ 17,000	15%	$ 20,000
Thermal Treatment	$ 3,601,000	30%	$ 4,681,000
Total Annual Groundwater MNA Monitoring	$ -	5%	$ -
Total Quarterly Groundwater Compliance Monitoring	$ 51,000	5%	$ 54,000
Environmental Covenant	$ -	10%	$ -
Total VCP Documentation and Oversight	$ 17,000	10%	$ 19,000
Post Closure Well Decommissioning - Capital Cost	$ 13,000	10%	$ 14,000
			$ -
Totals	$ 3,784,000	$ 1,096,900	$ 4,881,000

Notes/Limitations:

Costs are presented in $2020 and do not account for future cost escalation or net present value (NPV) of future costs. Rough Order of Magnitude (ROM) cost estimates as presented are typically +/- 30%. Costs for thermal treatment were based on estimates by TerraTherm "Preliminary Site Evaluation" dated June 12, 2020; TerraTherm indicates a +/-30% price accuracy which is reflected in these cost estimates by using a +30% contingency for the thermal treatment costs. Please refer to TerraTherm's June 12, 2020 document for additional assumptions.

Cleanup sites have uncertainties associated with variabilities in subsurface soil, groundwater, and contaminant distribution conditions. Environmental cleanup cost estimating customarily addresses uncertainties by applying a “contingency” to environmental cost estimates. Contingencies were added as shown to account for subsurface uncertainties, regulatory uncertainties, scope and quantity uncertainties and to account for differences between unit costs identified at the time this estimate is prepared and actual unit costs at the time the work is performed.

Contaminated soil volume estimates are based on explorations and sampling data. We have used our best professional judgment in developing volume estimates. However, volume estimates are subject to the inherent limitations of subsurface data collected from discrete locations. It is possible that soil contamination may exist in areas on or adjacent to the Site not identified at this time. Volumes assumed should not be understood as a guaranteed volume to be treated or excavated.

The costs presented in this document are based on multiple assumptions, many but not all of which, are described herein. The costs identified will be different, and could vary significantly, if conditions change that affect one or more of these assumptions. Unit costs are based on currently available data, our experience with similar projects, recent contractor costs for projects with some similar aspects, and best professional judgment; we did not obtain quotes from contractors except as noted for thermal treatment costs. Actual costs will vary and could be higher or lower than the estimates presented depending on variables (some of which are currently not defined) such as future regulatory changes under MTCA, costs at the time the actual cleanup work is performed, actual duration of the remedial action, degree of institutional controls and future site use. Costs assumed should not be understood as guaranteed.

MINIMUM REQUIREMENTS FOR CLEANUP ACTIONS – WAC 173-340-360

THRESHOLD REQUIREMENTS:

- Protect human health and the environment.
- Comply with cleanup standards.
- Comply with applicable state and federal laws. The term "applicable state and federal laws" includes legally applicable requirements and those requirements that Ecology determines to be relevant and appropriate as described in WAC 173-340-710.
- Provide compliance monitoring. Compliance monitoring for a cleanup action includes the following elements: (1) *protection monitoring* confirms that human health and the environment are adequately protected during the cleanup action; (2) *performance monitoring* confirms that the cleanup levels have been achieved; and (3) *confirmation monitoring* confirms the long-term effectiveness of the cleanup action once cleanup levels and other performance standards have been reached.

OTHER MTCA REQUIREMENTS - UNDER MTCA, WHEN SELECTING FROM THE ALTERNATIVES THAT MEET THE THRESHOLD REQUIREMENTS DESCRIBED ABOVE, THE ALTERNATIVES SHALL BE FURTHER EVALUATED AGAINST THE FOLLOWING ADDITIONAL CRITERIA:

- Use permanent solutions to the maximum extent practicable. MTCA specifies that the permanence of qualifying alternatives be evaluated by balancing the costs and benefits of each of the alternatives using a "disproportionate cost analysis" in accordance with WAC 173-340-360(3)(e).
- Provide a reasonable restoration time frame. MTCA requires that several factors be considered when evaluating whether a remedial alternative provides a reasonable restoration time frame (WAC 173-340-360[4]). Collectively, these factors characterize how an alternative is anticipated to perform over the long term, particularly for alternatives that leave hazardous substances in-place at concentrations greater than cleanup levels. The practicability of achieving a shorter restoration time frame is also considered.
- Consideration of public concerns. Ecology will seek public comments during the RI/FS process prior to making a preliminary selection of a preferred remedial alternative. This preliminary selection is subject to further public review and comment when the proposed remedy is published in the draft CAP.

Attachment 6
Figure Summary of Interim Action

Estimated Extent of Storm Drain Pipe That May Be Impacted by F-listed Solvents. Interim Action Plan:
1. Remove Storm Pipe, Stockpile Soil and Concrete Separately.
2. Sample Stockpiled Soil and Concrete.
3. Collect Confirmation Samples at Base and Sidewall of Trench Every 40 feet or Areas of Potential Contamination Based on Field Screening.
4. Continue Excavation Beyond What is Shown Along Storm Pipe if PCE and Breakdown Products Detected.
5. Remediate by Expanding Trench Laterally to Remove Soil With PCE/TCE Greater than the MTCA Method A ULU Cleanup Level in Confirmation Soil Samples Collected Within Trench.

Remedial Excavation (Extend As Necessary Until Lateral and Base Confirmation Samples are <60 mg/kg)
Estimated Excavation Extent: 10 by 10 feet
CID Soil: 0 to 7 feet bgs
Hazardous Waste Soil (Land banned PCE > 60 mg/kg): 7 to 10 feet bgs

Remedial Excavation (Extend As Necessary Until Lateral and Base Confirmation Samples are <14 mg/kg [If CID is Not Obtained])
Estimated Excavation Extent: 10 by 10 feet
CID Soil: 0 to 4 feet bgs and 6 to 8 feet bgs
Potential Hazardous Waste Soil: 4 to 6 feet bgs

Remedial Excavation (Extend As Necessary Until Lateral Confirmation Samples Are Less Than MTCA Method A ULU Cleanup Level Between Ground Surface and 10 feet bgs)
Estimated Excavation Extent: 40 by 40 feet
CID Soil: 0 to 10 feet bgs

Remedial Excavation (Extend As Necessary Until Lateral Confirmation Samples Are Less Than MTCA Method A ULU Cleanup Level Between Ground Surface and 10 feet bgs)
Estimated Excavation Extent: 35 by 35 feet
CID soil: 0 to 8 feet bgs

358-B14
358-B4
358-B3
FL358-B1
358-PH7
358-B12
AREA OF LOADING DOCK AND STAINING AROUND CATCH BASIN
APPROXIMATE EXTENT OF FORMER DRY CLEANERS
358-PH6
BUILDING FLOOR DRAIN AND LINES (APPROXIMATE)
358-B6
358-B5
358-B10
FL358-MW1
358-B15
358-PH5
358-PH4
358-PH8
358-PH3
AREA OF 1991 SPILLS
358-B7
358-B8
358-PH2
358-PH1
B-12 (1991)
CB-4 (1994)
CB-5 (1994)
FL358-MW2
358-B9
358-B13
FL358-MW3
Y PAY MOR-MW3
FL358-MW4
FL358-B3
FL363
FL361

LEGEND
- 1991-1994 SAMPLE LOCATIONS
- SOIL BORINGS WITH TEMP WELL, EST. 25' DEPTH
- SOIL BORING, EST. 50' DEPTH
- SOIL BORING - EST. 25' DEPTH
- MONITORING WELL
- TEST PIT - EST. 10' DEPTH
- BUILDING FLOOR DRAIN AND LINES (APPROXIMATE)
- PIPE FLOW DIRECTION

N

15 0 15 30
SCALE IN FEET

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: O'Neill Service Group, "Federal Way Link Extension, Parcel FL358, Federal Way, King County, Washington, Figure 2, "Overview" dated June 2020.

Summary of Interim Action

Y Pay Mor Dry Cleaner
Federal Way Link Extension
Federal Way, Washington

GeoEngineers