Remedial Investigation Addendum
King County Metro South Facilities

Prepared for

King County METRO

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Prepared by

Parametrix

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Prepared for

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CERTIFICATION

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned, whose seal, as a professional hydrogeologist licensed to practice as such, is affixed below.

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ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
COPCs	Contaminants of Potential Concern
cPAH	Carcinogenic Polycyclic Aromatic Hydrocarbons
CSM	Conceptual Site Model
CUL	Cleanup Level
Ecology	Washington State Department of Ecology
EPA	Environmental Protection Agency
FS	Feasibility Study
HWA	HWA Geosciences, Inc.
mg/kg	Milligram per kilogram
MTCA	Model Toxics Control Act
NAVD 88	North American Vertical Datum of 1988
PCB	Polychlorinated Biphenyl
POC	Point of Compliance
Property	King County Metro Transit's South Facilities and South Annex
Qal	Quaternary Alluvium
Qp	Quaternary Peat
Qyal	Quaternary Younger Alluvium
RI	Remedial Investigation
Site	King County Metro Transit's South Facility
Site Hazard Assessment	SHA
TEE	Terrestrial Ecological Evaluation
TPH	Total Petroleum Hydrocarbons
TPH-D	Diesel-Range Total Petroleum Hydrocarbons
TPH-G	Gasoline-Range Total Petroleum Hydrocarbons
TPH-O	Oil-Range Total Petroleum Hydrocarbons
µg/L	Micrograms per liter
UST	Underground Storage Tank
VCP	Voluntary Cleanup Program
WAC	Washington Administrative Code

1. INTRODUCTION

This Draft Remedial Investigation (RI) Addendum has been developed to address recommendations included in the 2020 *RI/FS Summary Report for Voluntary Cleanup Program Application, South Facilities, South Annex* (RI/FS Summary Report; Parametrix 2020b; provided in Appendix A), conducted at King County Metro's South Facilities/South Annex, located at 11911 E Marginal Way S, Tukwila, WA to support Metro's Voluntary Cleanup Program (VCP) application to the Washington State Department of Ecology (Ecology). The 2020 RI/FS recommendations, summarized in Section 1.6 of this report, are limited to the South Facilities portion of the Property. Therefore, for the purposes of this addendum, South Facilities is considered the Site, and South Facilities and South Annex together are considered the Property. Parametrix' services were performed under Work Order No. 31 to Contract No. E0035E19.

1.1 General Property Information

The Property encompasses King County Assessor's Parcel No 1023049066, located between State Route 599 and East Marginal Way South, approximately 1/4 mile south of the Duwamish River in Tukwila, Washington (see Figure 1). The parcel is 16.93 acres in size. The Property is zoned by the City of Tukwila as Manufacturing Industrial Center/Heavy. The Property is west-northwest of Metro Transit's existing South Base, located at 12200 East Marginal Way South.

King County Metro has been the occupant of the Property since 1987. The Property includes two separate facilities. The smaller western portion is referred to as South Facilities (Site), which houses Metro's approximately 35,000 square foot Facilities Operations Building. The larger eastern portion is referred to as the South Annex and operates as the Training and Safety Facility which currently contains several structures, parking lots, open storage, and a training yard (Figure 1). The South Annex is not considered a part of the Site for the purposes of this addendum report.

1.2 Physical Setting

The elevation of the Property is approximately 15-feet above mean sea level. Topographically the Property is generally flat, with a slight slope to the west within the South Facilities portion of the Property, with overall slope toward the north (King County GIS iMap Application 2020; USGS 2017). The Property is located in the Duwamish River valley south of the Duwamish River (Figure 1).

1.2.1 Surface Water

The Property lies on a flat area within the river plain of the Duwamish River, which bends around the Property approximately 1,100 feet to the north and 1,400 feet to the east. A perennial drainage (Riverton Creek) runs through and along the north boundary of the Property and discharges to the Duwamish River (see Figure 1). The portions of the creek that run through the Property are referred to as the West and East branches of Riverton Creek and are partially piped; the remaining channelized flow is within concrete lined ditches. The West Branch of Riverton Creek divides the South Facilities and South Annex portions of the Property (Figures 1 and 2).

1.2.2 Soil

Soils at the Property are classified as Urban Land by the National Resources Conservation Service (NRCS, 2020). The natural soil profile below the Property was buried during redevelopment of the Property in the 1980s. Up to 12 feet of sand and gravel fill, which includes utility trench backfill, underly the pavement of the Property.

1.2.3 Geology

Native soils below the Property contain a substantial component of organic material. Organic soils have been observed during excavations (Converse Consultants 1984; Parametrix 2020, PBS 2020b). The *Geologic Map of Seattle – a Progress Report* (Troost et al. 2005) maps the surface geology of the Property as Quaternary peat (Qp) deposits. Quaternary alluvium (Qal) and Quaternary younger alluvium (Qyal) are mapped adjacent north of the Property. An outcrop of Tertiary bedrock is mapped southeast of the Property underlying the neighboring King County Metro South Base property.

Converse Consultants performed a geotechnical investigation of the Property prior to development in 1984. The borehole logs from the geotechnical investigation identified up to 7 feet of peat and clayey silt prior to encountering black alluvial sands. The sands intermixed with silty layers and clayey silt down to a depth of at least 90 feet below ground surface (bgs).

Borehole and well logs completed during site investigations (discussed below and provided in Appendix E) have encountered shallow fill (0-8.5 feet bgs) below the Site, including pea gravel/utility backfill in places, followed by layered silty peat and organics (5-13 ft bgs), followed by black alluvial sands (below 13 ft bgs).

The subsurface geology observed at the Property is consistent with the geologic mapping of the area.

1.2.4 Groundwater

Groundwater is shallow and occurs at depths ranging from approximately 2.5 to 6.5 feet bgs across the Site throughout the year. The direction of shallow unconfined groundwater was previously inferred to flow toward the northwest based on topography, and west-northwest by historical reports (Woodward-Clyde 1995; AGI 1997); however, more recent groundwater elevations measured in 2019 through 2022 (see Table 1) indicate a general northeasterly flow direction (HWA 2022b through 2022d). Interpreted groundwater potentiometric surface contours from February, May, August, and November 2022 measurements are included as Figures 3 through 6. The water table below the Site may be tidally influenced due to the proximity to the Duwamish River. Preliminary vibrating wire piezometer data for the South Annex portion of the Property provided by Jacobs suggests there may be multiple confined aquifers at depths ranging from 25 to 85 feet bgs (Jacobs 2022).

1.3 Site History and Use

1.3.1 South Facilities

Prior to development of the Site, the area was predominantly low-lying farmland. Aerial photographs dating to 1936 (King County GIS iMap Application 2020) show the Property as farmland with the West Branch of Riverton Creek diverted into an irrigation canal routed north-south across the Site. A copy of the aerial is provided in Attachment A. The current configuration of the West Branch of Riverton Creek (Figures 1 and 2) was completed during grading and filling of the Site in 1985 and flows through the Site

within pipes and a concrete lined ditch that is located just east of the historical irrigation canal alignment. Surface water at the Property is further discussed in Section 3.3.1.

The Property is on Ecology's Confirmed and Suspected Contaminated Sites List and is identified by Facility Site ID 8422289 and Cleanup Site ID 7790. Three underground storage tanks (USTs; one 550-gallon engine oil UST, one 10,000-gallon unleaded gasoline UST, and one 10,000-gallon UST partitioned for gasoline and diesel) in the southwest South Facilities portion of the Property were removed in 1997 and were replaced with one 6,000-gallon UST (Ecology UST Site ID 10103) containing unleaded gasoline.

The South Annex portion of the Property is in the process of being redeveloped. In order to support its new approximately 250-bus fleet, South Annex will include vehicle maintenance bays, steam bays, inspection bays, bus wash bays, bus fueling, full electric charging infrastructure, and approximately 8,400 square feet of maintenance offices and spaces. The project will include probable daylighting of both branches of Riverton Creek and culvert replacements beneath South 120th Place and beneath the internal access driveway and parking lot on the Site (i.e., South Facilities).

1.3.2 Surrounding Area

The area surrounding the Property is primarily developed for transportation and industrial land use. The neighboring site to the west was developed as highway infrastructure in the mid-1960s when the West Marginal Way ramp was constructed (Kennedy Jenks 2015). At that time surface water was routed through a culvert beneath West Marginal Way easterly towards the historical West Branch of Riverton Creek. A stormwater ditch was also constructed on the east side of West Marginal Way along the west side of the Site carrying roadway runoff north towards the Duwamish (see Attachment A in Appendix A).

Highway 599, north of the Property, was developed in the mid-1960s and has remained largely unchanged through the present. The area further north of Highway 599 was developed into an industrial park in the 1990s (King County iMap 2020). Neighboring properties to the south were developed into industrial warehouse buildings in 1986 (King County iMap 2020) during a similar timeframe as development of the Property. The neighboring property southeast was developed into the South Base in 1980. The Property and surrounding properties were annexed by the City of Tukwila in 1989 (Tukwila 2020a).

2. PREVIOUS INVESTIGATIONS

2.1 South Annex

In 1993, a total of 4,000 cubic yards of soil was reportedly excavated from the neighboring South Annex during removal of USTs and remediated via thin spread over an asphalt surface in the south-central area of the South Annex portion of the Property (Enviros 1994; Black and Veach 1995). After 1 year the soil was re-sampled and all concentrations were reportedly below the Model Toxics Control Act (MTCA; Washington Administrative Code [WAC] 173-340) Method A cleanup levels (CULs). The 'clean' soil was used as fill on the South Annex portion of the Property and the remaining contaminated material was reportedly transferred off the Property.

In April 2020, a Phase II ESA was conducted by PBS (PBS 2020b). Borings E-1 and E-2 were placed near the western boundary of the South Annex adjacent to the South Facilities in order to identify any potential migration of soil and groundwater contamination from the former UST area. Borings E-3 through E-6 were located throughout the vehicle storage yards and within the presumed 1994 remediation area to assess any existing impacts to soil and groundwater from those historical uses. A total of twelve soil samples and six grab groundwater samples were analyzed for diesel and oil-range total petroleum hydrocarbons (TPH-D and TPH-O, respectively) by Environmental Protection Agency (EPA) Method NWTPH-Dx, gasoline-range TPH (TPH-G) by EPA Method NWTPH-Gx, and benzene, Toluene, ethylbenzene, and Xylenes (BTEX) by EPA test method 8021B. No soil contamination was identified in any of the borings. Groundwater contamination of TPH-D was identified at location E-1 on the northwest corner of the South Annex. The exceedances were removed by silica gel cleanup indicating the detected TPH-D were either naturally decaying organic material or highly weathered.

2.2 South Facilities

Two site assessments were conducted at the Site (i.e., South Facilities portion of the Property) in the 1990s: Woodward-Clyde (1995) conducted a pre-construction UST site assessment study in 1994 related to upgrading the USTs. The site assessment found soil contamination of undifferentiated TPH up to 8,710 milligram per kilogram (mg/kg) at location SB-2 at depth of approximately 7.5 to 9 feet bgs, and groundwater contamination up to 0.723 milligrams per liter (mg/L) of TPH-D and TPH-O at location SB-7.

AGI Technologies (1997) conducted a site assessment during removal of three USTs. No soil contamination was found above MTCA Method A CULs; however, one groundwater sample from well DW-4 was found to contain benzene up to 9.5 micrograms per liter (µg/L).

In 2015, Ecology conducted a Site Hazard Assessment (SHA) and assigned a ranking of 1 (highest priority) related to these two historical documented releases on the Site (Ecology, 2015). Parametrix was retained to assist with sampling of four wells at the Site including DW-3, DW-4, SB-7, and SB-8. The sampling found TPH constituents were below laboratory detection limits in the groundwater samples except for well SB-8 where TPH-D and TPH-O were detected at 0.47 mg/L and 0.67 mg/L, respectively, above the MTCA Method A CUL of 0.500 mg/L for combined TPH-D and TPH-O (Parametrix 2019).

Based on the results, PBS was contracted to conduct well redevelopment and resampling of these four wells. The results showed that TPH-O was detected in sample SB-8 at a concentration of 0.399 mg/L, below (i.e., compliant with) the MTCA Method A CUL (0.500 mg/L). No analytes were detected above the laboratory reporting limits in the other samples (PBS 2020a).

In 2020, Parametrix conducted a push probe investigation at the Site with sampling of soil and groundwater at nine locations (20B1 through 20B9). TPH-D and TPH-O were found in seven of the nine groundwater samples, with four of the samples located in the northeastern portion of the Site having concentrations greater than the MTCA Method A CUL of 0.500 mg/L. However, the TPH detected in groundwater was believed to primarily reflect biogenic interference as it was removed by silica gel/acid cleanup. This interpretation was consistent with the geologic mapping as peat (Troost et al. 2005) in the areas of TPH detections greater than CULs, and the observations of organic soil during the 2020 and previous investigations (Parametrix 2020a)

2.3 RI and VCP Opinion

Based on the results of the Phase II ESA, King County Metro applied to the Ecology's VCP. Parametrix summarized the conceptual site model, results of previous investigations, and tabulated historical and recent analytical data from the Property in the RI/FS Summary Report (Parametrix 2020b). Two primary exposure pathways were identified: 1) shallow groundwater contamination via contact with residual contaminated soils and discharge to surface water, and 2) vapor contamination via releases from residual soil and groundwater. The soil exposure pathway was determined to not be an exposure route as all soils below the Site are below paved areas. The RI/FS Summary Report contained recommendations for additional work necessary to confirm the environmental status of the Site. Some of the additional work included:

- Conduct an additional push probe investigation at the Site to investigate the status of undifferentiated TPH located near SB-2 and to collect groundwater samples west and northwest of the building downgradient from the former USTs and along the northern border, the recommended point of compliance (POC), to confirm the absence of contaminants.
- Convert two of the proposed push probes to monitoring wells.
- Conduct four quarters of sampling of the two new and four existing monitoring wells and analyze samples for TPH-D, TPH-O, TPH-G, BTEX, and naphthalene to determine seasonality, and further refine the relationship of the peat biogenic interference with the TPH analysis and address the groundwater to vapor pathway.
- Survey the two new wells and conduct four quarters of water level monitoring at the six wells.
- Analyze water level data from the South Annex study along with water levels from the South Facilities to evaluate seasonal groundwater flow directions.

Ecology provided a letter of opinion dated May 7, 2021 (Ecology 2021a) with the following items recommended:

- Investigate the status of the elevated historical TPH concentrations in boring SB-2, directly west of the former USTs, using push probes.
- Conduct four consecutive quarters of groundwater level measurements and sampling of the two proposed and four existing monitoring wells.
- Analyze water level data from the quarterly monitoring events, and from an ongoing groundwater study on the South Annex part of the Property, to evaluate seasonal changes in groundwater flow directions, gradients, and potential interaction of groundwater with Riverton Creek.
- Survey monitoring well elevations and elevations of the Riverton Creek channel relative to the North American Vertical Datum of 1988 (NAVD 88).
- Preparation and submittal of a RI Report addendum.

3. DECEMBER 2021 EXPLORATION AND WELL INSTALLATION

On December 20, 2021, HWA field staff observed the drilling at four locations at the Site completed by direct-push drilling techniques. A brief summary of these activities is included below. Further details are provided in the Well Installation Memorandum attached in Appendix B. All four drilling locations were continuously logged in 5-foot intervals and were completed to depths of approximately 15 feet bgs. Temporary wells were constructed in borings 21B1 and 21B2, while permanent wells were constructed at locations 21MW-1 and 21MW-2. Reconnaissance groundwater samples were collected from the temporary wells, and on January 5, 2022, HWA returned to the site to collect groundwater samples from the newly installed permanent wells 21MW-1 and 21MW-2. Soil and groundwater samples were analyzed by Friedman & Bruya, Inc. in Seattle, Washington for TPH-G, TPH-D and TPH-O (both with and without silica gel cleanup); BTEX, and naphthalene. One soil sample and one groundwater sample were additionally analyzed for polychlorinated biphenyls (PCBs) and carcinogenic polycyclic aromatic hydrocarbons (CPAHs).

Analytical results for the December 2021 drilling and January 2022 sampling events are summarized in Table 2 and discussed in the Well Installation Memorandum provided in Appendix B. Analytical results indicated that no contaminants of potential concern (COPCs) were detected above laboratory reporting limits in reconnaissance soil samples, including a soil sample collected at boring 21B1, less than 8 lineal feet from historical location SB-2, the location of the residual soil contamination detected in 1994 (see Section 1.5 for details). TPH-D was detected in the reconnaissance groundwater samples collected from boring 21B1 at a concentration of 0.072 mg/L, and monitoring well 21MW-2 at a concentration of 0.096 mg/L, both below the MCTA Method A CUL of 0.500 mg/L. However, these samples were both x-flagged by the laboratory indicating that the diesel results did not match the fuel standard. These samples were also analyzed using silica gel cleanup treatment, which removes polar compounds and resulted in no TPH-D detections in either sample. No other COPCs were detected in reconnaissance groundwater samples.

Encountered stratigraphy was generally consistent with the findings of previous studies at South Facilities and South Annex (Converse Consultants 1984; Parametrix 2020, PBS 2020b), as well as surface geology maps (Troost et al. 2005).

4. SURVEY

The location of wells 21MW-1, 21MW-2, DW-3R, DW-4R, SB-7, SB-8, and the West Branch of Riverton Creek were surveyed by Parametrix licensed surveyors. The resulting well survey report is provided in Appendix C. Monitoring well elevation data were measured at the ground surface, as well as top of casing referenced to the North American Vertical Datum 1988 (NAVD 88). Elevation survey data for B-25 was provided by Jacobs Engineering, referenced to NAVD 88 (no formal report provided).

5. QUARTERLY GROUNDWATER MONITORING

Four rounds of quarterly groundwater monitoring were conducted as part of the RI Addendum. The results were presented in quarterly technical memoranda presented in Appendix D. An overall summary is presented below.

As part of each monitoring event groundwater levels were measured and samples were collected from monitoring wells 21MW-1, 21MW-2, DW-3R, DW-4R, SB-7, and SB-8, all located on the Site (i.e., South Facilities portion of the Property). Additionally, depth to water was measured at a surveyed location of Riverton Creek and well B-25 (located on the South Annex portion of the Property), A blind field duplicate sample was also collected and identified as '21MW-3'.

Groundwater samples were analyzed by Friedman & Bruya, Inc. in Seattle, Washington for TPH-G, TPH-D and TPH-O (both with and without silica gel cleanup), BTEX, and naphthalene. Analytical results are summarized in Table 2 and copies of the final laboratory reports are included in the quarterly event memoranda provided in Appendix D.

Analytical results from quarterly monitoring detected TPH-D in samples from 21MW-1, 21MW-2, DW-3R, DW-4R, SB-7, and SB-8 (all wells) and TPH-O in 21MW-2, SB-8, and a duplicate sample associated with SB-8. However, all of the TPH-D and TPH-O detections were x-flagged by the laboratory indicating that the diesel results did not match the fuel standard. These samples were also analyzed using silica gel cleanup, which resulted in only one TPH-D detection at a concentration of 0.12 mg/L in SB-8 and one detection of TPH-O at a concentration of 0.27 mg/L, below the MTCA Method A CUL. TPH-O was not detected in the duplicate of SB-8. No other COPCs were detected above laboratory reporting limits during the four quarters of monitoring.

5.1 Groundwater Gradient

Quarterly groundwater elevations are presented in Table 1 along with data from the previous events dating back to 2019. Interpreted potentiometric surface maps, for each quarterly monitoring event are referenced to NAVD 88 vertical datum and provided as Figures 3 through 6.

Groundwater measurements and interpreted potentiometric surfaces indicate a northeasterly gradient. Seasonal variation in groundwater elevations of individual wells ranged from 0.51 to 0.98 feet and the West Branch of Riverton Creek was observed to vary approximately 2.8 feet seasonally. Groundwater measurements and potentiometric surfaces also suggest that the creek, which is concrete lined across the majority of the site, is not immediately hydraulically connected to groundwater beneath the Site.

At the time of this RI Addendum, Jacobs Engineering is currently conducting a vibrating wire piezometer study at South Annex portion of the Property. Preliminary vibrating wire piezometer data for South Annex provided by Jacobs suggests there may be multiple confined aquifers underneath the Site with differing gradients than those interpreted for the shallow subsurface as presented in this study.

6. UPDATED CONCEPTUAL SITE MODEL

The 2020 RI/FS Summary Report provided a conceptual site model (CSM) that identified the known source of hazardous substances at the Property as residual TPH-impacted soils present in the vicinity of the former USTs that were removed from the southwestern corner of the Site in 1994. The 2020 CSM noted potentially contaminated media as soil, groundwater, surface water, and air. Potential exposure pathways were thought to consist of shallow groundwater contamination via contact with residual contaminated soils and discharge to surface water, and vapor contamination via release from residual soil and groundwater impacts.

No COPCs were detected in the additional soil samples analyzed as part of this RI Addendum. When analyzed with silica gel cleanup, reconnaissance groundwater samples from the drilling event and subsequent groundwater monitoring event samples had only one detection of TPH-D at a concentration of 0.12 mg/L and TPH-O at a concentration of 0.27 mg/L, below the MTCA Method A CUL, in a sample analyzed from SB-8. No other CPOCs were detected in any of the groundwater samples analyzed except for some additional low-level x-flagged results.

No soil or groundwater plumes were identified by this study. The historical area of SB-2 was found to no longer have TPH concentrations with potential for exposure hazards. The results of the additional RI show exposure pathways at the Site are limited to nonexistent. Peat and organics found in the shallow soils below the site contribute to the concentrations of dissolved TPH-D and TPH-O in the form of natural interference. Concentrations of TPH-D and TPH-O are present below MTCA Method A cleanup levels, but all concentrations of groundwater at the Site in recent monitoring have been identified well below the risk-based concentrations (3 mg/L for weathered diesel) protective of freshwater (Ecology 2021b).

Groundwater measurements and potentiometric surfaces obtained from the additional monitoring events also indicate that Riverton Creek is not immediately hydraulically connected to the groundwater below the Site. Based on this additional information and the data indicating lack of groundwater contamination, the potential exposure pathway the groundwater migration pathway to drinking water and discharge to surface water does not appear complete.

In addition, TPH-G, BTEX and other COPCs were not identified within soil or groundwater within 30 feet of occupied building. These results confirm that the vapor intrusion pathway does not appear complete.

6.1 Subsurface Site Conditions

Subsurface information from prior to site development through the recent monitoring well installations and explorational borings were compiled to develop simplified hydrogeologic cross sections of the Site. Figure 2 displays the locations of the cross sections. Cross section A-A' (Figure 6) is predominantly southwest to northeast, crossing the existing UST and South Facilities Operations Building. Cross section B-B' (Figure 7) is predominantly west to east across the southern portion of the Site, crossing the UST area and West Branch of Riverton Creek.

The well and borehole logs indicate that the stratigraphy across the Site is relatively uniform with five primary layers:

- **Concrete:** Concrete panels approximately 8 to 12 inches thick, which cover the majority of the Site and generally serve as a cap preventing direct contact with or infiltration into the subsurface.

- **Gravel Fill:** Coarse-grained gravel fill, consistent with pea gravel. Limited to the areas near utilities. Approximately 4 to 10 feet of gravel fill around underground utilities, observed primarily in the southwest portion of the Site.
- **Pea Gravel Fill:** Very coarse-grained pea gravel surrounding the USTs
- **Sandy and Silty Gravel Fill:** Fine-grained sandy and silty gravel fill, located throughout the Site and ranging from 3 to 10 feet thick. Gray to olive brown-gray colored.
- **Clayey Silt with Sand Layers:** Gray to brown silt and some clay with organics and sand layers that are approximately 0 to 12 feet thick and present below the fill layers. Peat common in central and eastern portions of the Site. These deposits appear to correlate with historical surface soils of the Site prior to development. Sand layers and lenses are predominantly at the base of the unit indicating a transition from a near-fluvial environment to a wetland/lowland environment.
- **Sand:** Grey to black alluvial sand located below the clayey silt with sand layers and containing fine and medium-grained facies. The sand extends beyond the total depth of recent explorations; however, previous deeper explorations (e.g., B-5) indicate the sand can be up to approximately 35 feet thick, and is underlain by thick sequences of silts, clays, and other sands. The sand likely correlates with alluvium and outwash deposits.

As shown in the cross sections, several feet of fill have been placed across the site to bring the Property to the current grade. The depth of the fill varies across the Site prior to encountering the native clayey silt and sand layers that were the original surface deposits of the site. The clayey silt and sand layers contain peat and are consistent with flood and over bank deposits of the Green-Duwamish River. These are deposited directly above and slightly intermingled with the alluvial sands below. The alluvial deposits are consistent with historical channel depositions of the Green-Duwamish River. The sands are predominantly dark gray to black in color and contain andesitic volcanic facies.

Groundwater conditions were assessed utilizing subsurface information from prior to development of the Site through the recent monitoring well installations and are shown on the hydrogeologic cross sections. Shallow groundwater was measured below the Site during this RI Addendum investigation at elevations ranging from approximately 4 to 7 feet bgs and predominantly flowing to the northeast. The West Branch of Riverton Creek runs north along the eastern boundary of the Site and was measured at depths ranging from approximately 7 to 10 feet (NAVD 88). While the elevations may appear consistent with groundwater, the West Riverton Creek was observed as higher than both upgradient and downgradient wells during the first quarter, and lower than both upgradient and downgradient wells in the subsequent three quarters, suggesting no immediate hydraulic connection between groundwater below the Site and surface water in the creek. The UST excavation area appears to have a small, localized mound, evidenced by consistently lower elevations in SB-7 and DW-3R, relative to the downgradient DW-4R (see Figures 3 through 6). However, this mound, if present, is minimal, may be influenced by local fill and utilities, and likely has minimal impact on fate and transport at the Site. Overall, groundwater beneath the Site discharges northerly towards the Duwamish River and may be in hydraulic connection with Riverton Creek outside of areas identified by this study.

6.2 Terrestrial Ecological Evaluation

As part of the 2020 RI/FS Summary Report, Parametrix completed a Terrestrial Ecological Evaluation (TEE) form to document the results of the TEE described in the 2020 Summary Report, including any supporting data and maps.

Based on the additional data obtained during the 2021/2022 subsurface investigation, there are no areas of soil contamination and the Site qualifies for a simplified evaluation. The TEE form has been updated and is included as Appendix E.

7. ENVIRONMENTAL INFORMATION MANAGEMENT

The Consultant performed quality assurance/quality control on the environmental data collected for the project and submitted the data to Ecology's Environmental Information Management (EIM) database. This includes the sample results of the probe and well drilling and quarterly monitoring.

8. CLEANUP LEVELS

8.1 Cleanup Levels

Considering the current land use and potential future land use, MTCA level A CULs (WAC 173-340-720(3) for groundwater and WAC 173-340-730(2) for soil) are the adopted criteria for site cleanup levels. Method A may be used to establish CULs at sites that have few hazardous substances and that meet one of the following criteria:(a) Sites undergoing a routine cleanup action as defined in WAC 173-340-200; or(b) Sites where numerical standards are available in this chapter or applicable state and federal laws for all indicator hazardous substances in the media for which the Method A CUL is being used. Additionally, MTCA Method A cleanup levels for groundwater are more stringent than risk-based surface water screening levels (Ecology 2021b) and are therefore more appropriate for the site.

Soils at the Property contain a substantial component of organic material. As per the guidance on contaminated site assessments (Ecology 2016a), when analyzing for NWTPH-Dx it is permissible to use silica gel cleanup methods if the waters contain a significant amount of naturally occurring non-petroleum organics which may contribute to biogenic interferences. Organic soils have consistently been observed during Property excavations (Converse Consultants 1984; Parametrix 2020, PBS 2020b, HWA 2022a). Published geologic mapping shows soils along the northern portion of the Property as peat (Troost et al. 2005). The native soils and dissolved organics from the soils can and do impact groundwater analysis for TPH-D and TPH-O compliance. Concentrations of TPH-D and TPH-O have been observed at the Site including in areas where there is no suspected contamination. The physical setting and laboratory results confirm that biogenic interference occurs at the Site and complicates the compliance analysis with regard to weathered diesel and oil concentrations in groundwater.

As part of the November 2020 RI/FS Summary Report, vapor intrusion risk to the on-site building from historical contamination was examined and the pathway did not appear to be complete based upon vapor intrusion screening levels, but did not include analysis of naphthalene. As part of the current study, soil samples and reconnaissance groundwater samples from the push probe investigation and four quarters of groundwater samples included naphthalene analysis with no naphthalene detected in any of the samples analyzed. Similarly, no benzene was identified in soil or groundwater below the Site during the analysis. Based on the absence of benzene and naphthalene in soil and groundwater at the Site, the assumptions of the 2020 vapor intrusion assessment are confirmed, and the vapor intrusion pathway is not complete.

8.2 Point of Compliance

In accordance with WAC 173-340-200, POC means the point or points where CULs established in accordance with WAC 173-340-720 through 173-340-760 shall be attained. The 2020 RI/FS Summary Report recommended that the POC be established at the northern boundary of the Property. Based on the groundwater measurements and potentiometric surfaces indicating that Riverton Creek is not hydraulically connected to the groundwater from the Site, the northern boundary of the Property is considered an appropriate POC.

9. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

9.1 Conclusions

Soil and groundwater samples collected from boring 21B1 near previous boring SB-2 did not detect any TPH above laboratory detection limits with or without silica gel treatment. Quarterly groundwater monitoring detected TPH-D in samples collected from all the wells, and TPH-O in northern wells 21MW-2 and SB-8. However, all the TPH-D and TPH-O detections were x-flagged by the laboratory indicating that the diesel and oil results did not match the fuel standard since the diesel-range hydrocarbon fingerprint appears slightly shifted toward the right (longer retention) and overlapping with the heavier oil-range hydrocarbons. This is consistent with potential biogenic interference related to the natural content of peat and organics below the Site. These samples were also analyzed using silica gel cleanup, which resulted in only one TPH-D detection and one TPH-O detection of in a sample from SB-8 at a concentration of 0.12 mg/L and 0.27 mg/L, respectively, below the MTCA Method A CUL for TPH-D and TPH-O.

The prevalence of x-flags, combined with the occurrence of organic silts and/or peat in explorations throughout the Site suggest biogenic interference is likely responsible for a great portion of TPH detections in the present, and possibly in the past. No other COPCs were detected above laboratory reporting limits during the reconnaissance soil and groundwater sampling or four quarterly groundwater monitoring events including no detections of benzene or naphthalene in soil or groundwater.

Quarterly monitoring of groundwater levels indicates northeasterly groundwater flow and suggest that the West Branch of Riverton Creek is not hydraulically connected with groundwater immediately below the Site. Preliminary vibrating wire piezometer data for the South Annex portion of the Property provided by Jacobs suggest there may be multiple confined aquifers, at depths ranging from 25 to 85 feet bgs that do not appear consistent with the shallow hydrogeologic flow observed for this study.

Based on this additional information, the potential exposure pathway via direct contact with contaminated soils, groundwater and soil to vapor, groundwater to drinking water, and groundwater to surface water pathways do not appear complete.

9.2 Recommendations

The results of the RI Addendum are consistent with the previous investigation and no additional investigation is recommended.

9.3 Request for No Further Action

Based on the historical cleanup actions performed at the Property and the recent 2019 to 2022 observations, residual soil and groundwater impacts at the Property are minimal and below the MTCA Method A CULs. Based on the results of this investigation and previous work, we recommend seeking a formal opinion from the Washington State Department of Ecology as the interpretation of results appear consistent with no further actions.

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Figures

Date: 10/10/2019 Author: worshaly Path: U:\PSO\Projects\Clients\1521-KingCo\554-1521-214 EnviroTransitFTAOnCall\99Svcs\GIS\MapDocs\SouthBase_VicinityMap.mxd

Parametrix

Source: King County

0 50 100 200 Feet

Project Location

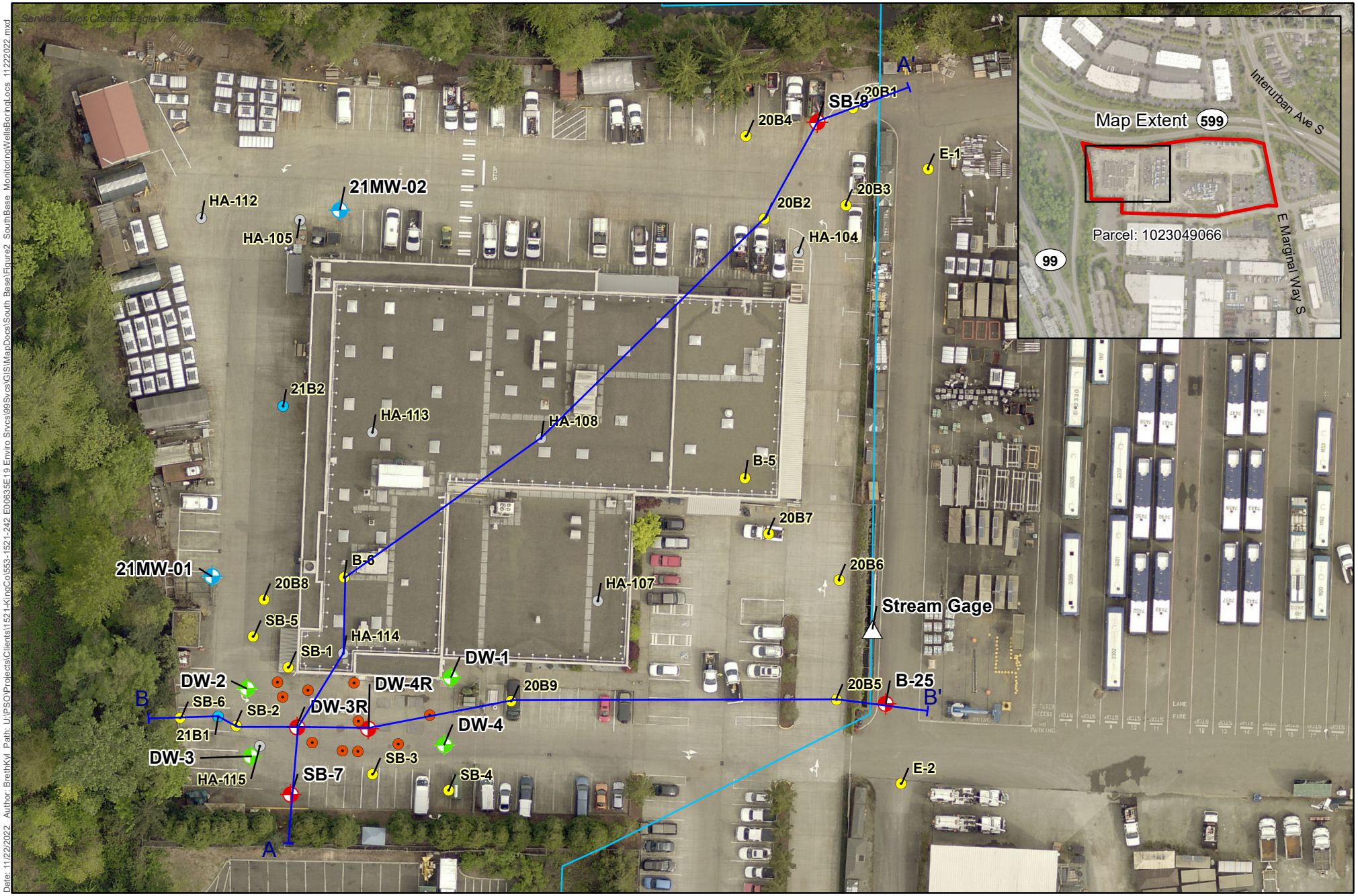
Stream

Figure 1

Site Location Map

King County Metro Transit South Base Facility Annex

Tukwila, WA



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Source: King County

Parametrix

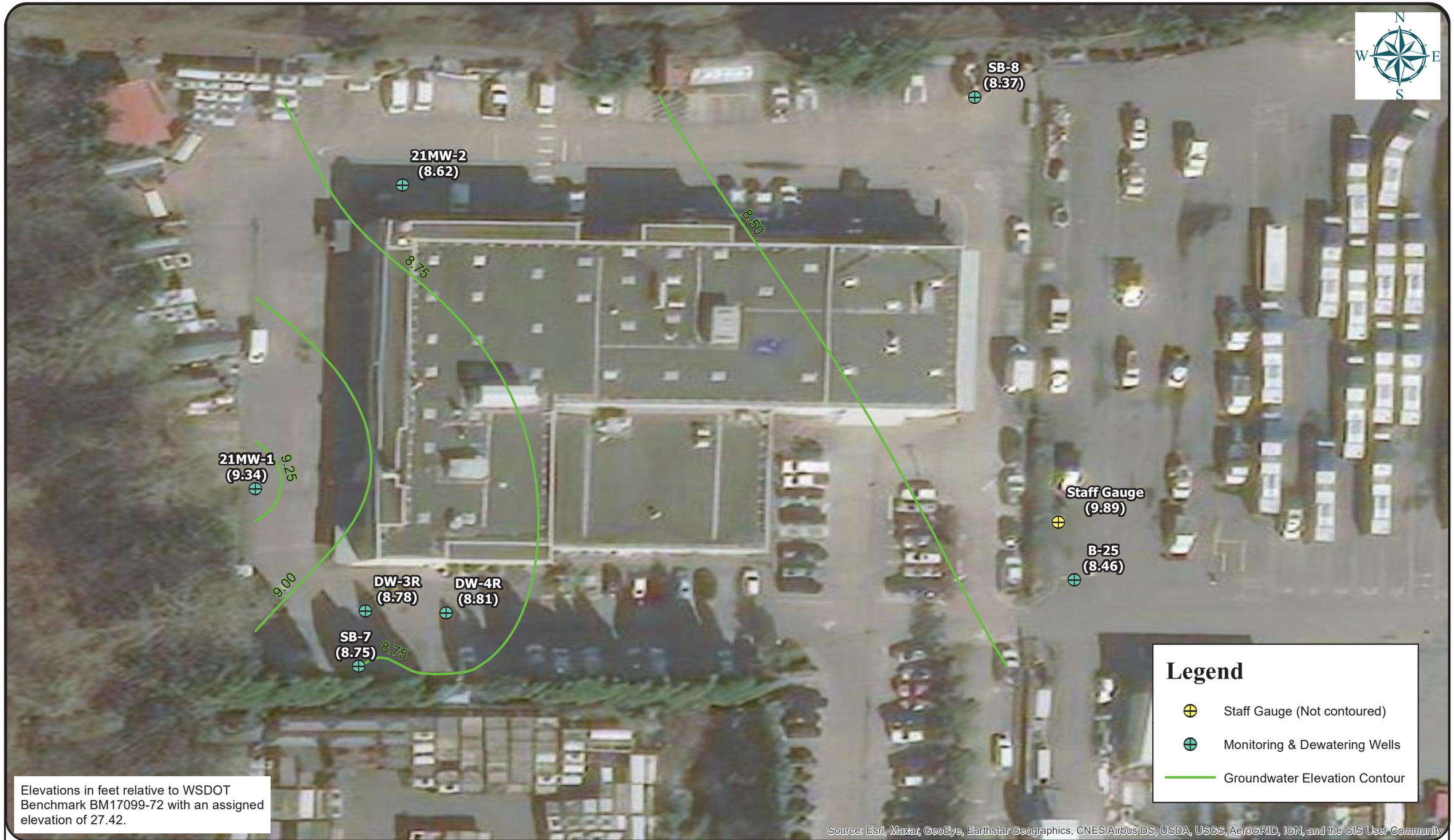
0 20 40 80 Feet

Project Location
Stream
Previous Borehole
Soil Sample (AGI 1997)
New Borehole
Stream Gage Location
Previous Hand Auger
Monitoring Well (Existing)
Monitoring Well (Historical)
Monitoring Well (New)
Cross Section

Figure 2

Historical and Current Monitoring Locations
King County Metro Transit S Facilities RI Addendum

Tukwila, WA



HWA GEOSCIENCES INC.
DBE/MWBE

0 37.5 75 150 Feet

King County Metro South Facilities
Remedial Investigation
Tukwila, WA

POTENTIOMETRIC SURFACE MAP, FEBRUARY 22 AND 23, 2022

FIGURE # 3

PROJECT # 2021-062

HWA GEOSCIENCES INC.
DBE/MWBE

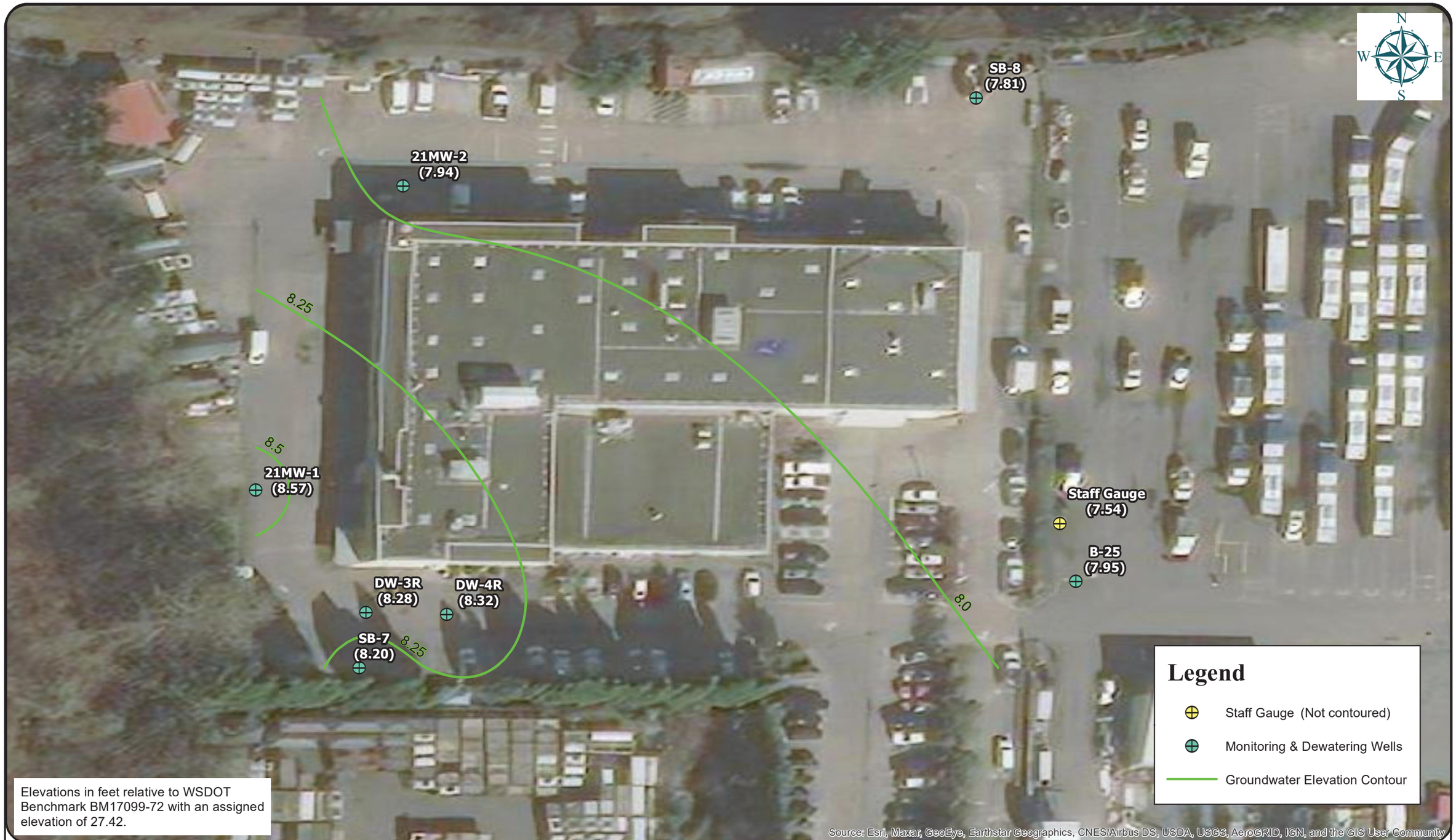
0 37.5 75 150 Feet

King County Metro South Facilities
Remedial Investigation
Tukwila, WA

POTENTIOMETRIC SURFACE MAP, MAY 10, 2022

FIGURE # 4

PROJECT # 2021-062



HWA GEOSCIENCES INC.
DBE/MWBE

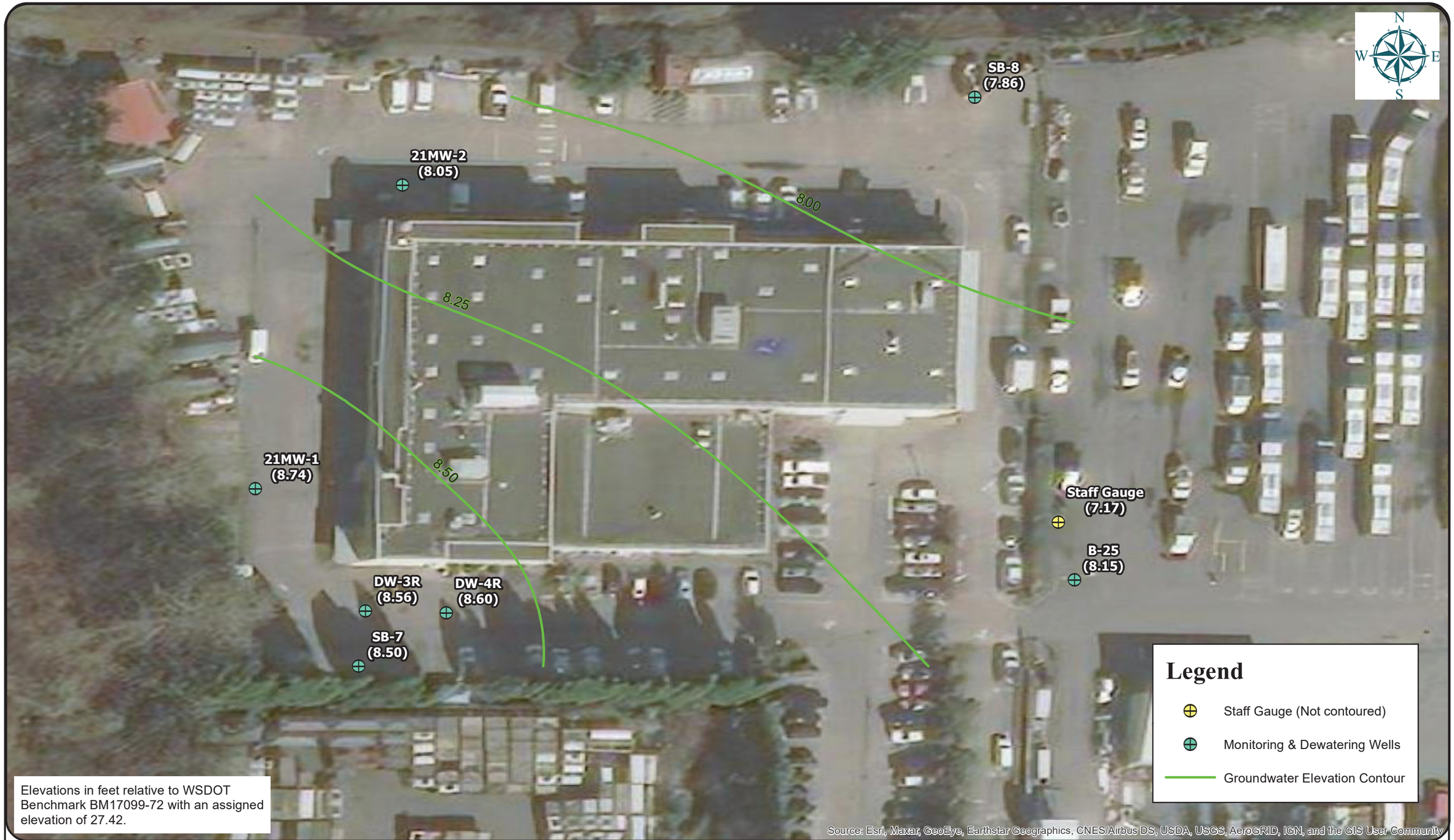
0 37.5 75 150 Feet

King County Metro South Facilities
Remedial Investigation
Tukwila, WA

POTENTIOMETRIC
SURFACE MAP,
AUGUST 25, 2022

FIGURE # 5

PROJECT # 2021-062



HWA GEOSCIENCES INC.
DBE/MWBE

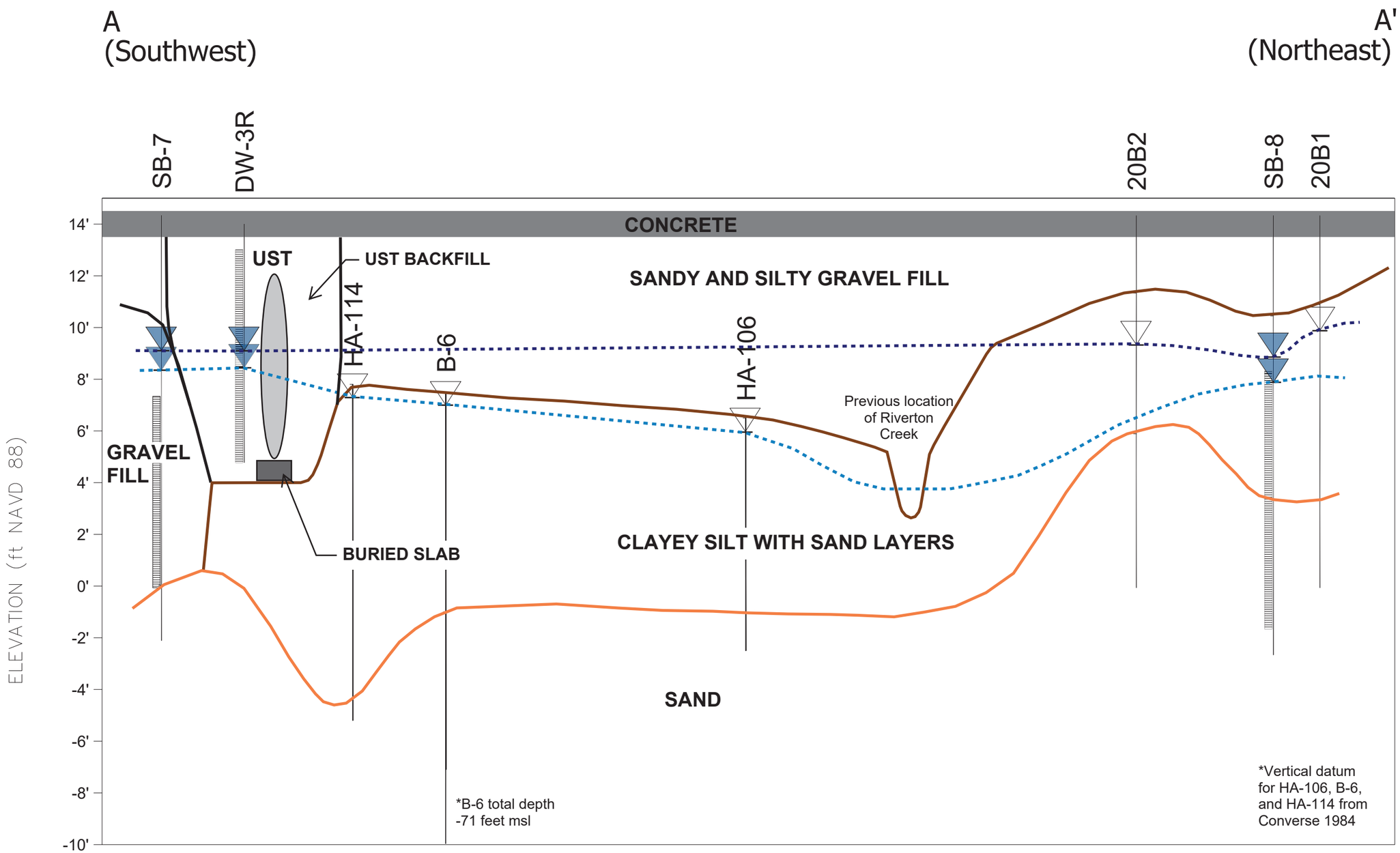
0 37.5 75 150 Feet

King County Metro South Facilities
Remedial Investigation
Tukwila, WA

POTENTIOMETRIC
SURFACE MAP,
NOVEMBER 1, 2022

FIGURE # 6

PROJECT # 2021-062



LEGEND

- APPROXIMATE CONTACT
- CONCRETE
- WATER LEVEL
- WATER LEVEL AT TIME OF EXPLORATION
- SCREEN INTERVAL

0 20 40 60 80

HORIZ. SCALE: 1" = 40'
VERTICAL EXAGGERATION 10

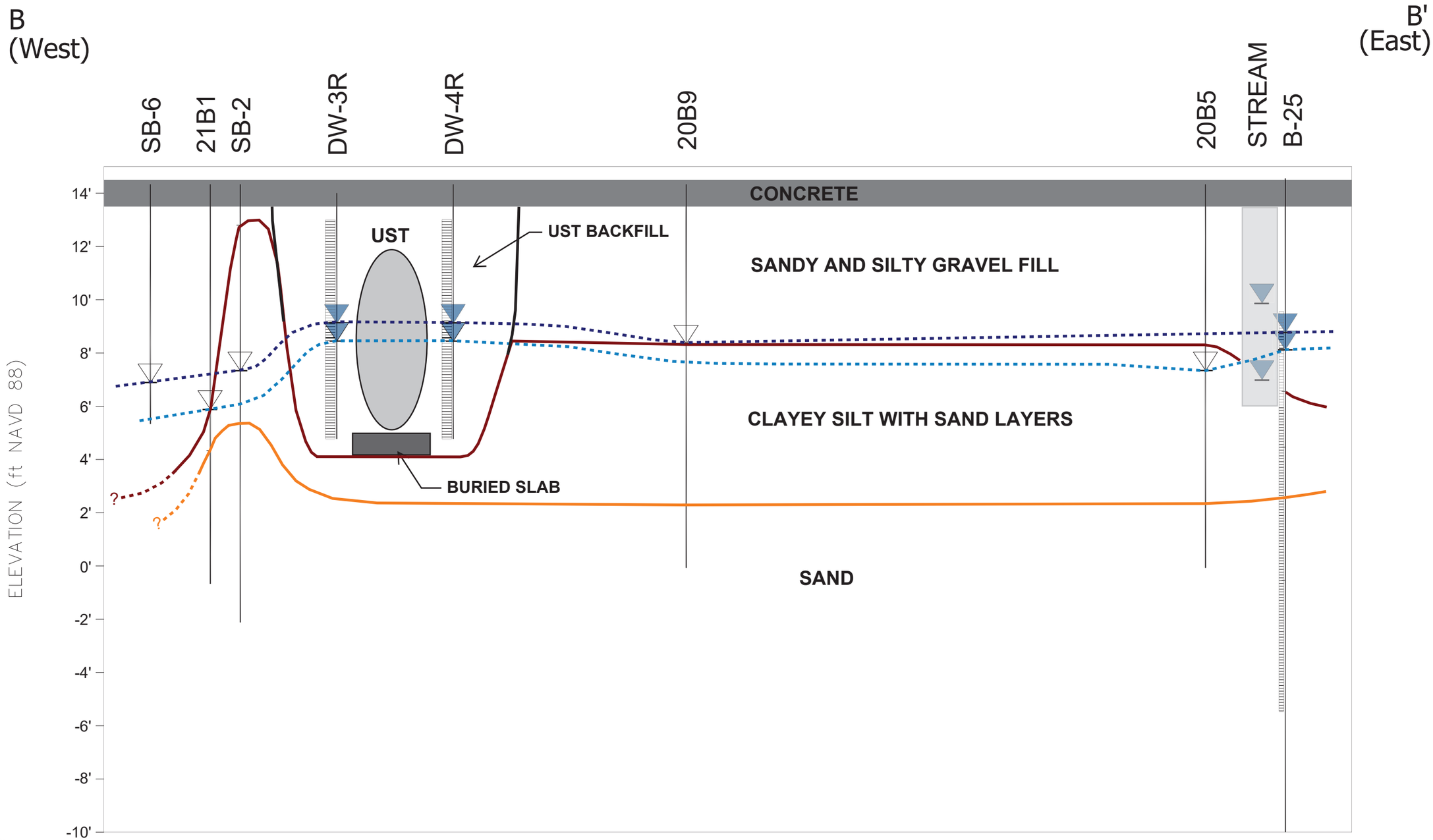
HWA GEOSCIENCES INC. DBE/MWBE

KING COUNTY METRO SOUTH FACILITIES
REMEDIAL INVESTIGATION
TUKWILA, WASHINGTON

CROSS SECTION A-A'

DRAWN BY:	FIGURE NO.:
CF	7
CHECK BY:	PROJECT NO.:
CB	2021-062-WO31

C:\USERS\CFRY\DESKTOP\2021-062-T31 SOUTH FACILITIES REMEDIAL INVESTIGATION\2021-062-T31 SOUTH FACILITIES REMEDIAL INVESTIGATION.DWG <7> Plotted: 12/8/2022 4:58 PM



LEGEND

- APPROXIMATE CONTACT
- CONCRETE
- WATER LEVEL
- WATER LEVEL AT TIME OF EXPLORATION
- SCREEN INTERVAL

0 15 30 45 60

HORIZ. SCALE: 1" = 30'
VERTICAL EXAGGERATION 8

HWA GEOSCIENCES INC. DBE/MWBE

KING COUNTY METRO SOUTH FACILITIES
REMEDIAL INVESTIGATION
TUKWILA, WASHINGTON

CROSS SECTION B-B'

DRAWN BY:	FIGURE NO.:
CF	8
CHECK BY:	PROJECT NO.:
CB	2021-062-WO31

C:\USERS\CFRY\DESKTOP\2021-062-T31 SOUTH FACILITIES REMEDIAL INVESTIGATION\2021-062-T31 SOUTH FACILITIES REMEDIAL INVESTIGATION.DWG <8> Plotted: 12/8/2022 4:56 PM

Tables

Table 1. Groundwater Elevations, King County Metro South Facilities, 11911 E Marginal Way S, Tukwila, WA.

		September 23, 2019		December 17, 2019		April 1, 2020		February 22 and 23, 2022		May 10, 2022		August 25, 2022		November 1, 2022	
Well	**Reference Elevation[1]**	**Depth to Ground-water (ft)**	**Ground-water Elevation (ft NAVD88)**	**Depth to Ground-water (ft)**	**Ground-water Elevation (ft NAVD88)**	**Depth to Ground-water (ft)**	**Ground-water Elevation (ft NAVD88)**	**Depth to Ground-water** (ft)**	**Ground-water Elevation** (ft NAVD88)**	**Depth to Ground-water** (ft)**	**Ground-water Elevation** (ft NAVD88)**	**Depth to Groundwater (ft) (time-synch)**	**Groundwater Elevation (ft NAVD88) (time-synch)**	**Depth to Groundwater (ft) (time-synch)**	**Groundwater Elevation (ft NAVD88) (time-synch)**
DW-3R*	13.63	5.21	8.42	4.84	8.79	4.48	9.15	4.85	8.78	4.56	9.07	4.52	9.11	5.07	8.56
DW-4R	14.00	5.58	8.42	5.15	8.85	4.82	9.18	5.19	8.81	4.91	9.09	4.89	9.11	5.40	8.60
SB-7	14.05	5.66	8.39	5.23	8.82	4.86	9.19	5.30	8.75	5.02	9.03	5	9.05	5.55	8.50
SB-8	14.19	6.28	7.91	5.80	8.39	5.33	8.86	5.82	8.37	5.71	8.48	5.35	8.84	6.33	7.86
B-25	14.12	--	--	--	--	--	--	5.66	8.46	5.41	8.71	5.41	8.71	5.97	8.15
Staff Gauge	15.94	--	--	--	--	--	--	6.05	9.89	8.85	7.09	8.85	7.09	8.77	7.17
21MW-1	13.44	--	--	--	--	--	--	4.10	9.34	4.05	9.39	4.41	9.03	4.70	8.74
21MW-2	13.72	--	--	--	--	--	--	5.10	8.62	5.00	8.72	5.11	8.61	5.67	8.05

Notes:

[1] N rim PVC (wells) or marked measurement reference point (stream gauge), in ft NAVD88**

*Well has been damaged and casing is not vertical

** Groundwater elevation measurement collected at time of sampling. Other groundwater elevation measurements are synchronous.

-- Not measured.

Table 2. Summary of Groundwater Analytical Results, King County Metro South Facilities Groundwater Monitoring Tukwila, Washington

	Date Sampled	Method A Cleanup Level [a]	Sample I.D. DW-1	DW-2	DW-3	DW-3R	DW-4	DW-4 Dup	DW-4R	DW-4R Dup	SB-5	SB-6	SB-7	SB-8	SB-8 Dup	21MW-1	21MW-1 Dup	21MW-2	21MW-2 Dup
NWTPH-Gx (µg/L)																			
Gasoline	10/11/1994	800/1,000 [b]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	<100	--	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<100	--	--	<100	--	--	--	<100	<400	--	--	--	--	--
	12/17/2019		--	--	--	<50	--	--	<50	--	--	--	<50	<50	--	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	<100	--	<100	--
	2/22/2022		--	--	--	<100	--	--	<100	--	--	--	<100	<500	--	<100	--	<100	<100
	5/10/2022		--	--	--	<100	--	--	<100	--	--	--	<100	<100	--	<100	<100	<100	--
	8/25/2022		--	--	--	<100	--	--	<100	<100	--	--	<100	<100	--	<100	--	<100	--
	11/1/2022		--	--	--	<100	--	--	<100	--	--	--	<100	<100	<100	<100	--	<100	--
NWTPH-Dx (mg/L)																			
Diesel	10/11/1994	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	<0.2	<0.2	0.55	0.495	--	--	--	--	--
	4/23/1997		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<0.26	--	--	<0.27	--	--	--	<0.28	0.47	--	--	--	--	--
	12/17/2019		--	--	--	<0.0499	--	--	<0.0497	--	--	--	<0.0498	<0.0498	--	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	<0.05	--	0.096 x	--
	2/22/2022		--	--	--	<0.05	--	--	0.058 x	--	--	--	0.059 x	0.35 x	--	0.15 x	--	0.27 x	0.25 x
	5/10/2022		--	--	--	0.13 x	--	--	0.080 x	--	--	--	0.071 x	0.15 x	--	0.16 x	0.14 x	0.18 x	--
	8/25/2022		--	--	--	0.10 x	--	--	0.053 x	0.063 x	--	--	<0.050	0.44 x	--	0.14 x	--	0.24 x	--
	11/1/2022		--	--	--	<0.10	--	--	0.10 x	--	--	--	<0.100	0.44 x	0.49 x	0.19 x	--	0.30 x	--
Diesel w/ SGC	1/5/2022	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.050	--	<0.050	--
	2/3/2022		--	--	--	<0.050	--	--	<0.050	--	--	--	<0.050	<0.050	--	<0.050	--	<0.050	<0.050
	5/10/2022		--	--	--	<0.050	--	--	<0.050	--	--	--	<0.050	<0.050	--	<0.050	<0.050	<0.050	--
	8/25/2022		--	--	--	<0.050	--	--	<0.050	<0.050	--	--	<0.050	<0.050	--	<0.050	--	0.065 x	--
	11/1/2022		--	--	--	<0.10	--	--	<0.10	--	--	--	<0.10	0.12	0.12	<0.10	--	<0.10	--
Lube Oil	10/11/1994	0.5	<0.2	<0.2	<0.2	--	<0.2	<0.2	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	<0.2	0	0.723	0.326	--	--	--	--	--
	4/23/1997		--	--	--	--	<0.5	--	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<0.41	--	--	<0.43	--	--	--	<0.44	**0.67**	--	--	--	--	--
	12/17/2019		--	--	--	<0.0998	--	--	<0.0994	--	--	--	<0.0997	0.399	--	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	<0.25	--	<0.25	--
	2/22/2022		--	--	--	<0.25	--	--	<0.25	--	--	--	<0.25	0.31 x	--	<0.25	--	<0.25	<0.25
	5/10/2022		--	--	--	<0.25	--	--	<0.25	--	--	--	<0.25	<0.25	--	<0.25	<0.25	<0.25	--
	8/25/2022		--	--	--	<0.25	--	--	<0.25	<0.25	--	--	<0.25	0.49 x	--	<0.25	--	<0.25	--
	11/1/2022		--	--	--	<0.25	--	--	<0.25	--	--	--	<0.25	**0.67** x	**0.61** x	<0.25	--	0.29 x	--
Lube Oil w/ SGC	1/5/2022	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.25	--	<0.25	--
	2/22/2022		--	--	--	<0.25	--	--	<0.25	--	--	--	<0.25	<0.25	--	<0.25	--	<0.25	<0.25
	5/10/2022		--	--	--	<0.25	--	--	<0.25	--	--	--	<0.25	<0.25	--	<0.25	<0.25	<0.25	--
	8/25/2022		--	--	--	<0.25	--	--	<0.25	<0.25	--	--	<0.25	<0.25	--	<0.25	--	<0.25	--
	11/1/2022		--	--	--	<0.25	--	--	<0.25	--	--	--	<0.25	0.27	<0.25	<0.25	--	<0.25	--
BTEX (µg/L)																			
Benzene	10/11/1994	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	**9.5**	--	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<4	--	--	--	--	--
	12/17/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<1	--	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	<0.35	--	<0.35	--
	2/22/2022		--	--	--	<0.35	--	--	<0.35	--	--	--	<0.35	<0.35	--	<0.35	--	<0.35	<0.35
	5/10/2022		--	--	--	<0.35	--	--	<0.35	--	--	--	<0.35	<0.35	--	<0.35	<0.35	<0.35	--
	8/25/2022		--	--	--	<0.35	--	--	<0.35	<0.35	--	--	<0.35	<0.35	--	<0.35	--	<0.35	--
	11/1/2022		--	--	--	<0.35	--	--	<0.35	--	--	--	<0.35	<0.35	<0.35	<0.35	--	<0.35	--
Toluene	10/11/1994	1,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	2.3	--	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<4	--	--	--	--	--
	12/17/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<1	--	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	<1	--	<1	--
	2/22/2022		--	--	--	<1	--	--	<1	--	--	--	<1	<1	--	<1	--	<1	<1
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	8/25/2022		--	--	--	<1	--	--	<1	<1	--	--	<1	<1	--	<1	--	<1	--
	11/1/2022		--	--	--	<1	--	--	<1	--	--	--	<1	<1	<1	<1	--	<1	--
Ethylbenzene	10/11/1994	700	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	<1	--	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<4	--	--	--	--	--
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	5/10/2022		--	--	--	<1	--	--	<1	--	--	--	<1	<1	--	<1	<1	<1	--
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	11/1/2022		--	--	--	<1	--	--	<1	--	--	--	<1	<1	<1	<1	--	<1	--
m,p-Xylene	10/11/1994	1,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	<1	--	--	--	--	--	--	--	--	--	--	--	--
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o-xylene	10/11/1994	1,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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Naphthalene (µg/L)	10/11/1994	160													--				
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/17/2019		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
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Lead (µg/L)																			
Lead	10/11/1994	15	<3	<3	<3	--	<3	<3	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/17/2019		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	2/22/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	5/10/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	8/25/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/1/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

Bold values exceed MTCA Method A cleanup levels.

[a] Washington Administrative Code Chapter 173-340, Model Toxics Control Act (MTCA) Cleanup Regulation, Method A suggested soil cleanup level for groundwater; updated August 15, 2001.

[b] 800 µg/L if benzene is present in groundwater; 1,000 µg/L if no detectable benzene in groundwater.

mg/L - milligrams per liter.

µg/L - micrograms per liter.

SGC - silica gel cleanup

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation

-- not analyzed.

< - analyte not detected at or greater than the listed concentration (practical quantitation limit [PQL]).

Appendix A

Parametrix RI/FS Summary Report for Voluntary Cleanup Program Application

RI/FS Summary Report for Voluntary Cleanup Program Application, South Facilities, South Annex

Prepared for
King County Metro Transit

King County

November 2020

Prepared by
Parametrix

RI/FS Summary Report for Voluntary Cleanup Program Application, South Facilities, South Annex

Prepared for

King County Metro Transit
201 S. Jackson St.
Seattle, WA 98104

Prepared by

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Seattle, WA 98104
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www.parametrix.com

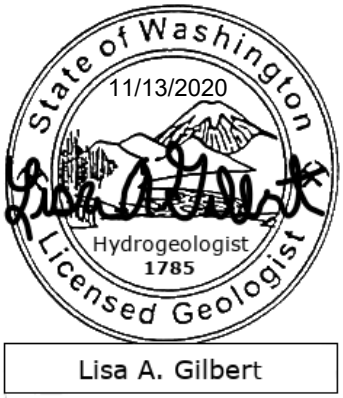
November 2020 | 553-1521-242

CITATION

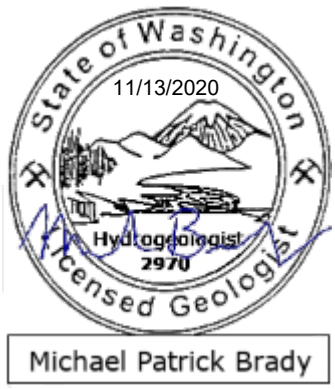
Parametrix. 2020. RI/FS Summary Report for Voluntary Cleanup Program Application, South Facilities, South Annex. Prepared by Parametrix, Seattle, WA. November 2020.

CERTIFICATION

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned, whose seal, as a professional hydrogeologist licensed to practice as such, is affixed below.



Prepared by Lisa Gilbert



Reviewed by Mike Brady

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FIGURES

TABLES

ATTACHMENTS

ACRONYMS AND ABBREVIATIONS

BTEX	benzene, toluene, ethylbenzene, xylenes
CSCSL	confirmed and suspected contaminated sites list
CSM	conceptual site model
CUL	cleanup level
Ecology	Washington State Department of Ecology
MTCA	Model Toxics Control Act
NFA	no further action
NOEC	No Observed Effects Concentration
POC	point of compliance
TEE	terrestrial ecological evaluation
TPH	total petroleum hydrocarbons
USGS	U.S. Geological Survey
UST	underground storage tank
VCP	voluntary cleanup program
WDFW	Washington Department of Fish and Wildlife

1. INTRODUCTION

This report provides a summary of site characterization and cleanup activities that have been conducted at King County Metro's South Facilities/South Annex, located at 11911 E Marginal Way S, Tukwila, WA 98168 (the Property) to support Metro's Voluntary Cleanup Program (VCP) application to the Washington State Department of Ecology (Ecology). The VCP application seeks a No Further Action (NFA) determination by Ecology. Parametrix' services were performed under Work Order No. 13 to Contract No. E00635E19.

1.1 General Property Information

The Property encompasses King County Assessor's Parcel No 1023049066, located between State Route 599 and East Marginal Way South, approximately 1/4 mile south of the Duwamish River in the city of Tukwila (see Figure 1). The parcel is 16.93 acres in size. The property is zoned by the City of Tukwila as Manufacturing Industrial Center/Heavy (MIC/H). The Property is west-northwest of Metro Transit's existing South Base, located at 12200 East Marginal Way South.

King County Metro has been the occupant of the Property since 1987. The Property includes two separate facilities. The smaller western portion is referred to as the South Facilities and houses Metro's approximately 35,000 square foot Facilities Operations building. The larger eastern portion is referred to as the South Annex and operates as the Training and Safety Facility which currently contains several structures, parking lots, open storage, and a training yard (Figure 2).

1.2 Physical Setting

The elevation of the Property is approximately 15-feet above mean sea level. Topographically the Property is generally flat, with a slight slope to the west in the westernmost edge of the Property with overall slope toward the north (King County GIS; USGS 2017). The Property is located in the Duwamish River valley south of the Duwamish River (Figure 1).

1.2.1 Surface Water

The Property lies on a flat area within the river plain of the Duwamish River, which bends around the property approximately 1,100 feet to the north and 1,400 feet to the east. An intermittent drainage (Riverton Creek) runs through and along the north boundary of the Property and discharges to the Duwamish River (see Figure 1). The portions of the creek that run through the Property are referred to as the West and East branches of Riverton Creek and are partially piped; the remaining channelized flow is within concrete lined ditches (Figure 2).

1.2.2 Soil

Soils at the Property are classified as Urban Land by the National Resources Conservation Service (NRCS, 2020). The natural soil profile below the Property was buried during redevelopment of the Property in the 1980's. Up to five feet of sand and gravel fill underly the pavement of the Property.

1.2.3 Geology

Native soils below the Property contain a substantial component of organic material. Organic soils have been observed during excavations (Converse Consultants 1984; Parametrix 2020, PBS 2020b). Troost et al (2005) maps the surface geology of the Property as Quaternary peat (Qp) deposits. Quaternary alluvium (Qal) and Quaternary younger alluvium (Qyal) are mapped adjacent north of the Property. An outcrop of Tertiary bedrock is mapped southeast of the Property underlying the neighboring King County Metro South Base property.

Converse Consultants performed a geotechnical investigation of the South Base Annex prior to development in 1984. The borehole logs from the geotechnical investigation identified up to seven feet of peat and clayey silt prior to encountering black alluvial sands. The sands intermixed with silty layers and clayey silt down to a depth of at least 90 feet below ground surface.

Borehole and well logs completed during site investigations (discussed below) have encountered shallow fill (0-5 feet bgs) below the Property followed by layered silty peat and organics (5-13 ft bgs), followed by black alluvial sands (below 13 ft bgs).

The subsurface geology observed at the Property is consistent with the geologic mapping of the area.

1.2.4 Groundwater

Groundwater is shallow and occurs at a depth of approximately 5 ft below ground surface. The direction of shallow unconfined groundwater flow is inferred to be toward the north-northwest based on topography. Although historical reports (Woodward-Clyde 1995; AGI 1997) indicated the groundwater gradient was in a west-northwest direction, more recent groundwater elevations measured in 2019 (see Table 1) indicate a general northerly flow direction (Parametrix 2020). The water table below the Property may be tidally influenced due to the proximity to the Duwamish River. As discussed in Section 2.7 below, a water level study is underway to evaluate the seasonal gradient below the Property.

1.3 Property History and Use

Prior to development of the Property, the area was predominantly low-lying farmland. Aerial photographs dating to 1936 (King County iMAP 2020a) show the Property as farmland with the West Branch of Riverton Creek diverted into an irrigation canal routed north-south across the Property. A copy of the aerial is provided in Attachment A. The current West Branch of Riverton Creek (Figure 2) was completed during grading and filling of the Property in 1985 and flows through the Property within pipes and a concrete lined ditch that is located just east of the historical irrigation canal alignment. Surface water at the Property is further discussed in Section 3.3.1.

The Property is on Ecology's Confirmed and Suspected Contaminated Sites List (CSCSL) and is identified by Facility Site ID 8422289 and Cleanup Site Property ID 7790. Three USTs (one 550-gallon engine oil UST, one 10,000-gallon unleaded gasoline UST, and one 10,000-gallon UST partitioned for gasoline and diesel) in the South Facilities portion of the Property were removed in 1997 and were replaced with one 6,000-gallon UST (Site No 10103) containing unleaded gasoline.

The South Annex portion of the Property is in the process of being redeveloped. In order to support its new 250-bus (approximately) fleet, South Annex Base will include vehicle maintenance bays, steam bays, inspection bays, bus wash bays, bus fueling, full electric charging infrastructure, and approximately 8,400 square feet of maintenance offices and spaces. The project will include probable daylighting of

Riverton Creek and culvert replacements beneath South 120th Place and beneath the internal access driveway and parking lot on the South Facilities.

1.4 Surrounding Area History and Use

The area surrounding the Property is primarily developed for transportation and industrial land use. The neighboring site to the west was developed as Highway infrastructure in the mid-1960's when the West Marginal Way ramp was constructed (Kennedy Jenks 2015). At that time surface water was routed through a culvert beneath West Marginal Way easterly towards the historical West Branch of Riverton Creek. A stormwater ditch was also constructed on the east side of West Marginal Way along the west side of the Metro property carrying roadway runoff north towards the Duwamish (see Attachment A).

Highway 599 north of the Property was developed in the mid-1960's and has remained largely unchanged through the present. The area further north of Highway 599 was developed into an industrial park in the 1990's (King County Assessors records 2020). Neighboring properties to the south were developed into industrial warehouse buildings in 1986 (King County Assessors records 2020) during a similar timeframe as development of the Property. The neighboring property southeast was developed into the South Base in 1980. The Property and surrounding properties were annexed by the City of Tukwila in 1989 (Tukwila 2020a).

2. FIELD INVESTIGATIONS

In 1993, a total of 4,000 cubic yards of soil was reportedly excavated from the neighboring South Base during removal of USTs and remediated via thin spread over an asphalt surface in the south-central area of the South Annex portion of the Property (Enviros 1994; Black and Veach 1995). After one year the soil was re-sampled and all concentrations were reportedly below the Model Toxics Control Act (MTCA; WAC 173-340) Method A cleanup levels (CULs). The 'clean' soil was used as fill on the South Annex portion of the Property and the remaining contaminated material was reportedly transferred off the Property.

Two site assessments were conducted in the South Facilities portion of the Property in the 1990s: Woodward-Clyde (1995), a pre-construction site assessment study conducted in 1994 related to upgrade of the USTs; and AGI Technologies (1997) documenting site assessment actions performed in April 1997 during removal of three underground storage tanks (USTs). During the site investigations, TPH was detected in soil and groundwater and benzene was detected above the MTCA Method A CUL in one monitoring well. The data are summarized in Tables 2 and 3.

In 2015, Ecology conducted a Site Hazard Assessment (SHA) and assigned a ranking of 1 (highest priority). Ecology's SHA is provided in Attachment B. The SHA findings were based on the results of the site assessment studies conducted in the 1990's at the South Facility portion of the Property in the vicinity of the former USTs, including concentrations of benzene above the MTCA Method A CUL.

More recent investigations were conducted in 2019 and 2020. In the South Facilities portion of the Property, the investigations consisted of an initial resampling of four wells (DW-3, DW-4, SB-7 and SB-8) in September 2019 (Parametrix 2019), redevelopment and resampling of the wells in December 2019 (PBS 2020a), and a push probe investigation in April 2020 (Parametrix 2020). In the South Annex portion of the Property, a Phase II Environmental Site Assessment was conducted in 2020 (PBS 2020b) and a water level study is ongoing.

Key findings from each of these investigations are summarized in the sections below. The locations of site explorations are shown on Figures 2 and 3.

2.1 Pre-Construction Site Assessment, South Facilities (Woodward-Clyde 1995)

Soil and groundwater contamination were discovered during a pre-construction site assessment conducted in the vicinity of the former USTs prior to tank replacement.

In October 1994, soil was sampled from four borings (SB-1 through SB-4) and groundwater samples were collected from four dewatering wells (DW-1 through DW-4) installed within the original UST excavation. Soil samples were tested for gasoline-range total petroleum hydrocarbons (TPH-G), except for SB-2 which was tested for TPH using Method 418.1. Groundwater samples were tested for TPH diesel-range extended (TPH-Dx). All soil results were <5 mg/kg with the exception of the undifferentiated TPH was detected in soil at SB-2 (8,710 mg/kg) near the former oil tank, above the MTCA Method A CUL of 2,000 mg/kg. All groundwater results were <200 mg/L for heavy oil range (TPH-O; >C24), with no evidence of gasoline components noted.

In December 1994, one additional soil boring (SB-6) and three groundwater monitoring wells (SB-5, -7, and -8) were installed and soil and groundwater samples were tested for TPH-Dx. TPH-D

and TPH-O concentrations were detected in groundwater at SB-7 (550 ug/L and 723 ug/L, respectively) above the MTCA Method A CUL (500 ug/L).

2.2 Underground Storage Tank Closure Assessment Report, South Facilities (AGI Technologies 1997)

The three USTs were removed in 1997. Ten confirmation soil samples (S-1 through S-10) were collected and tested for TPH-G/BTEX (benzene, toluene, ethylbenzene, and xylenes) and TPH-Dx. All soil results were less than MTCA Method A CULs. A groundwater sample was collected from well DW-4, within the tank area, and tested for TPH-G/BTEX and TPH-Dx. The benzene concentration (9.5 ug/L) was above the MTCA Method A CUL (5 ug/L).

2.3 September 2019 Groundwater Sampling, South Facilities (Parametrix 2019)

On September 23, 2019, the four existing monitoring wells at the South Facilities (DW-4R [replacement for well DW-4], DW-3R [replacement for well DW-3], SB-7, and SB-8) were sampled on September 23, 2019. Samples were analyzed for TPH-G and BTEX by Method NWTPH Gx/EPA 8021B, and for TPH-D and TPH-O by Method NWTPH-Dx. The results showed that TPH constituents were below laboratory detection limits in the groundwater samples except for well SB 8 where TPH-D and TPH-O were detected at 470 ug/L and 670 ug/L, respectively, slightly above the MTCA Method A CUL (500 ug/L).

2.4 December 2019 Well Redevelopment and Groundwater Sampling, South Facilities (PBS 2020a)

On December 6, 2019, the four monitoring wells at the South Facilities (DW-4R, DW-3R, SB-7, and SB-8) were redeveloped and resampled. Samples were analyzed for TPH-G and BTEX by Method NWTPH Gx/EPA 8021B, and for TPH-D and TPH-O by Method NWTPH-Dx. The results showed that TPH-O was detected in sample SB-8 at a concentration of 399 µg/L, below (i.e. compliant with) the MTCA Method A CUL (500 µg/L). No analytes were detected above the laboratory reporting limits in the other samples.

2.5 2020 Push Probe Study (Parametrix 2020), South Facilities

On April 1, 2020, a push probe investigation was conducted at the South Facilities, consisting of sampling soil and groundwater at nine boring locations (20B1 through 20B9) shown on Figures 2 and 3. One groundwater sample from each location (20B1-W through 20B9-W) was analyzed for TPH-G and BTEX by Method NWTPH Gx/EPA 8021B, and for TPH-D and TPH-O by Method NWTPH-Dx. Six soil samples were collected, and four of the samples (20B1-5, 20B2-3.5, 20B3-4.5, and 20B4-4.5) were tested for TPH-D and TPH-O by Method NWTPH-Dx. The data are summarized in Table 4.

The findings of the push probe study were as follows:

- Diesel and oil-range hydrocarbons were present in groundwater in seven of the nine groundwater samples, and four of the samples, located in the northeastern portion of the Property, had concentrations greater than MTCA Method A CULs.

- No downgradient contamination above MTCA Method A CULs was observed in the one boring downgradient from the former UST area (20B8).
- The TPH detected in groundwater is believed to primarily reflect biogenic interference because it was removed by silica gel/acid cleanup. This interpretation is consistent with the geologic mapping as peat (Troost et al 2005) in the areas of TPH detections greater than CULs, and the observations of organic soil during this and previous investigations (Converse Consultants 1984).
- If highly organic soils (peat) were not present at the Property, the results from the investigation likely would be below MTCA Method A CULs since the magnitudes of the exceedances are less than the values expected to be attributable to biogenic interference.
- The biogenic interference from peat in the TPH-D and TPH-O groundwater analysis was consistent across the property and in areas of no suspected historical contamination.

2.6 2020 Phase II Environmental Site Assessment, South Annex (PBS 2020b)

In April 2020, a Phase II ESA was conducted at the South Annex portion of the Property. Borings E-1 and E-2 were placed near the western boundary of the Property adjacent to the South Facilities in order to identify any potential migration of soil and groundwater contamination from the former UST area. Borings E-3 through E-6 were located throughout the vehicle storage yards and within the presumed 1994 remediation area to assess any existing impacts to soil and groundwater from those historical uses. A total of twelve soil samples and six grab groundwater samples were analyzed for TPH-D by EPA Method NWTPH-Dx, TPH-G by EPA Method NWTPH-Gx, and BTEX.

The data are summarized in Attachment C and a summary of the pertinent findings of the Phase II Environmental Site Assessment are presented below:

- All contaminant concentrations in soil were below the laboratory method detection limit and/or MTCA CULs.
- TPH-D concentrations in groundwater exceeded the MTCA CUL in one location (E-1) in the northwest corner of the South Annex. The detections of diesel range TPH in groundwater in boring E-1 may be the results of migration of contaminants from the former UST system. However, analysis of sample E-1-W by Method NWTPH-Dx with silica gel cleanup did not detect diesel or heavy oil range TPH above laboratory reporting limits. The lack of diesel detections after silica gel cleanup suggests that the detected hydrocarbons are either naturally decaying organic material or a highly weathered or degraded petroleum product. This conclusion is further supported by the observance of organic rich silty soils in the 5 to 10-foot depth range in environmental and geotechnical soil borings across the Property, and peat mapped in the vicinity of boring E-1.

2.7 Water Level Study, South Facilities (PBS, ongoing)

A water level study is currently being conducted at the South Annex portion of the Property. These data are expected to be available in early 2021.

3. CONCEPTUAL SITE MODEL

A conceptual site model (CSM) is a conceptual understanding of a site that identifies potential or suspected sources of hazardous substances, types and concentrations of hazardous substances, potentially contaminated media, and actual and potential exposure pathways and receptors. The media evaluated are groundwater, surface water, soil, and air.

3.1 Sources and Types of Hazardous Substances

The known source of hazardous substances is petroleum released from the former USTs that were removed in 1994 located in southwestern corner of the Property. An additional potential source of hazardous substances is the 1994 soils remediation area in the South Annex portion of the Property.

3.2 Potentially Contaminated Media

Potentially contaminated media include soil, groundwater, surface water, and air.

Although primary remediation of TPH-contaminated soils was conducted by excavation at the time of the UST removal, information presented in Section 2 indicates that minor residual TPH may still be present in the soils. Residual TPH in soil may be continuing to impact groundwater which is believed to discharge to Riverton Creek along the northern border of the Property and ultimately to the Duwamish River.

3.3 Exposure Pathways and Receptors

Potential exposure pathways consist of shallow groundwater contamination via contact with residual contaminated soils and discharge to surface water, and vapor contamination via releases from residual soil and groundwater.

3.3.1 Groundwater and Surface Water

Groundwater exposure could occur in downgradient drinking water wells and surface water exposure could occur in Riverton Creek and the Duwamish River. The East and West branches of Riverton Creek flow through the Property and discharge northward into Riverton Creek (Figure 2) which flows westward along the northern border of the Property and discharges into the Duwamish River. Flow through the Property is piped except for a portion of the West Branch which is channelized within a concrete lined ditch. The ability of salmon to access the Duwamish River downstream from the Property is uncertain. Groundwater flows in a northerly direction beneath the Property and discharges into Riverton Creek.

The SHA showed a Class 3 (seasonal or intermittent) stream along the west side of the Property and a Class 2 Salmonid stream traversing the east portion of the South Facilities. The Priority Habitats and Species (PHS) database maintained by the Washington Department of Fish and Wildlife (WDFW 2019) shows a fish-bearing stream on the west side, although fish passage south of the Property is shown as blocked (see map in Attachment A). King County defines Class 3 streams as those that are intermittent or ephemeral during years of normal rainfall and are not used by salmonids (King County, 2020).The Class 3 stream mapped along the west side of the Property appears to correlate with a stormwater ditch constructed in 1966 during roadway improvements. This Class 3 stormwater conveyance is likely not in hydraulic continuity with the local groundwater.

The location of the Class 2 salmonid stream in the SHA appears to have been mis-located but generally corresponds to the West Branch of Riverton Creek which now traverses the Property as displayed on Figure 2. City of Tukwila maps (Tukwila 2020b; Attachment A) display the East and West branches of Riverton Creek which correlate with the current stream locations presented on Figure 2.

Potential receptors include humans and aquatic organisms. However, concentrations of TPH in groundwater at the Property have been shown to be below MTCA Method A CULs and lower than the 3.04 mg/L no observed effects concentrations (NOECs) determined for weathered NWTPH-Dx in surface waters (Ecology 2020b).

3.3.2 Vapor Intrusion

Vapor intrusion could impact the Facilities Operation building. For petroleum releases, the measured benzene and TPH concentrations in soil and groundwater can be used to initially assess the vapor intrusion pathway (Ecology 2009, 2016b, 2018; EPA 2015). The Property is zoned as Industrial under WAC 173-340-745.

Current groundwater concentrations of BTEX are low, with recent benzene concentrations non-detect at less than 1 ug/L (below the minimum MTCA Method B residential screening level for vapor intrusion of 2.4 ug/L) and the highest historical benzene concentration measured in groundwater (9.5 ug/L) below the minimum MTCA Method C (industrial land use) groundwater screening level for vapor intrusion of 24 ug/L (Ecology 2020a). Although naphthalene concentrations have not been assessed per Ecology guidance (Ecology 2018), naphthalene concentrations are not expected to be above screening levels based on measured TPH concentrations. However, confirmation of naphthalene concentrations in groundwater should be completed during additional studies to compare with the MTCA Method C (89 ug/L) screening levels for the groundwater to vapor pathway.

In addition to the measured groundwater concentrations below MTCA Method C screening levels, the residual undifferentiated TPH near SB-2 occurs below the water table and is located approximately 40 ft from the adjacent building, greater than the 30 ft applicable separation distance. Therefore, the vapor intrusion pathway is minor and not considered complete based on screening criteria.

3.4 Terrestrial Ecological Evaluation

The Property qualifies for a Simplified Terrestrial Ecological Evaluation (TEE) in accordance with WAC 173-3407492(2)(i) since the total area that may still contain undifferentiated TPH above MTCA A CULs (see Figure 3) is not expected to be more than 350 square feet.

The Property is fully paved, preventing contact of terrestrial organisms to contaminated soil or groundwater. The West Branch of Riverton Creek traverses the South Facilities portion of the Property within a pipe and concrete lined channel. Therefore, there is no direct groundwater-surface water interaction in the area near the historical release. As noted above, the levels of TPH-D and TPH-O are below the NOECs, suggesting a restrictive covenant may be appropriate if residual soil contamination is found surrounding SB-2.

4. CLEANUP LEVELS

4.1 Cleanup Levels

Considering the current land use and potential future land use, MTCA level A CULs (WAC 173-340-720(3) for groundwater and WAC 173-340-730(2) for soil are the adopted criteria for screening levels. Method A may be used to establish CULs at sites that have few hazardous substances and that meet one of the following criteria:(a) Sites undergoing a routine cleanup action as defined in WAC 173-340-200; or(b) Sites where numerical standards are available in this chapter or applicable state and federal laws for all indicator hazardous sub-stances in the media for which the Method A CUL is being used.

Soils at the Property contain a substantial component of organic material. As per the guidance on contaminated site assessments (Ecology 2016), when analyzing for NWTPH-Dx it is permissible to use silica gel cleanup methods if the waters contain a significant amount of naturally occurring non-petroleum organics which may contribute to biogenic interferences. Organic soils have consistently been observed during Property excavations (Converse Consultants 1984; Parametrix 2020, PBS 2020b). Published geologic mapping shows soils along the northern portion of the Property in the area of TPH detections great than CULs as peat (Troost et al 2005).

Since the Property is zoned Industrial, MTCA Method C groundwater screening levels for vapor intrusion are appropriate.

4.2 Point of Compliance

In accordance with WAC 173-340-200, Point of compliance (POC) means the point or points where CULs established in accordance with WAC 173-340-720 through 173-340-760 shall be attained. It is recommended that the POC be established at the northern boundary of the Property.

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The following conclusions can be drawn based on the site investigations conducted:

- The SHA ranking of 1 was based largely on the Woodward Clyde (1995) and AGI (1997) reports addressing the UST removal area in the South Facilities portion of the Property that found benzene in groundwater at a concentration above the CUL. More recent data have shown that the groundwater concentrations used to prepare the SHA have been attenuated. Subsequent site characterization activities in 2019 and 2020 did not detect benzene in groundwater in wells (DW-3R, DW-4R, SB-7, SB-8) or in temporary borings.
- The SHA noted the presence of a Class 3 stream west of and adjacent to the Property and a Class 2 salmon-bearing stream traversing the South Facilities portion of the property. Some of the SHA's assumptions regarding the Property's environmental setting have been further clarified. Class 3 streams are not fish-bearing and the Class 3 stream mapped is actually a manmade stormwater ditch constructed in 1966 that is likely not in hydraulic continuity with the groundwater. The SHA referenced a northwesterly groundwater flow direction toward this Class 3 stream. The groundwater flow direction observed in 2019 and 2020 is primarily more northerly than previously reported. The Class 2 salmon-bearing stream identified in the SHA appears to align with the West Branch of Riverton Creek which is either piped or conveyed in a concrete-lined ditch through the Property and is therefore never in connection with contaminated soil or groundwater. The ability of salmon to access the Duwamish River from Riverton Creek downstream from the Property is also uncertain.
- In the South Facilities portion of the Property, remaining groundwater concentrations above MTCA Method A CULs include TPH-D and TPH-O in the vicinity of well SB-8. However, in 2020, samples were collected both upgradient and downgradient of SB-8. TPH-D and TPH-O were found in several samples slightly above MTCA Method A CULs. The samples were also analyzed for TPH-D and TPH-O using silica gel cleanup which indicated biogenic interference because the samples were non-detect following the use of silica gel. This interpretation is consistent with observed organic soils and geologic mapping as peat and occurring in areas where no suspected contamination is present. Some undifferentiated TPH may also still be present in saturated soils near SB-2 where the 1994 soil sample result for undifferentiated TPH (8,710 mg/kg using Method 418.1 without silica gel cleanup) was above the MTCA A CUL and has an estimated area of approximately 200 sq ft. However, this sample was collected below the water table and was likely similarly affected by biogenic interference.
- In the South Annex portion of the Property, no TPH or benzene above MTCA Method A CULs have been detected other than one soil sample (E-1). E-1 reported concentrations of TPH-D and TPH-O in groundwater that was likely influenced by biogenic interference, and benzene was not detected. Following silica gel treatment sample E-1 was non-detect for TPH-D and TPH-O.
- Current groundwater concentrations at both the South Facilities and South Annex properties for TPH-D and TPH-O prior to silica gel treatment are below the 3.04 mg/L NOECs related to weathered TPH-D and TPH-O for freshwater aquatic life, with no detections of benzene. This indicates the groundwater to surface water pathway is not complete.

- The vapor intrusion risk to the on-site building from historical contamination was examined and the pathway does not appear to be complete based upon vapor intrusion screening levels. However, further analysis of naphthalene should be completed to completely eliminate the pathway.
- The Property has met the eligibility criteria and individual provisions for Model Remedy 1 (Ecology 2016c), and therefore it is not necessary to conduct a Feasibility Study or Disproportionate Cost Analysis.

5.2 Recommendations

The following additional activities are recommended to confirm the environmental status of the Property:

- Conduct an additional push probe investigation at the South Facilities to investigate the status of the undifferentiated TPH located near SB-2 and to collect groundwater samples west and northwest of the building downgradient from the former USTs and along the POC to confirm the absence of contaminants. Convert two of the push probes to monitoring wells. Figure 4 displays the approximate location of the planned boreholes and wells.
- If soil contamination remains near SB-2, develop a restrictive covenant to enable a NFA determination from Ecology.
- Conduct four quarters of sampling of the two new and four existing monitoring wells and analyze samples for TPH-Dx, TPH-G, BTEX, and naphthalene determine seasonality, and further refine the relationship of the peat biogenic interference with the TPH analysis and address the groundwater to vapor pathway.
- Survey the two new wells and conduct four quarters of water level monitoring at the six wells.
- Analyze water level data from the South Annex study along with water levels from the South Facilities to evaluate seasonal groundwater flow directions.

5.3 VCP Opinion Request

Parametrix on behalf of our client, King County Metro, is seeking a VCP opinion on the historical cleanup actions performed at the Property, the recent observations, and the planned future investigation of the Property required to achieve a NFA determination from Ecology.

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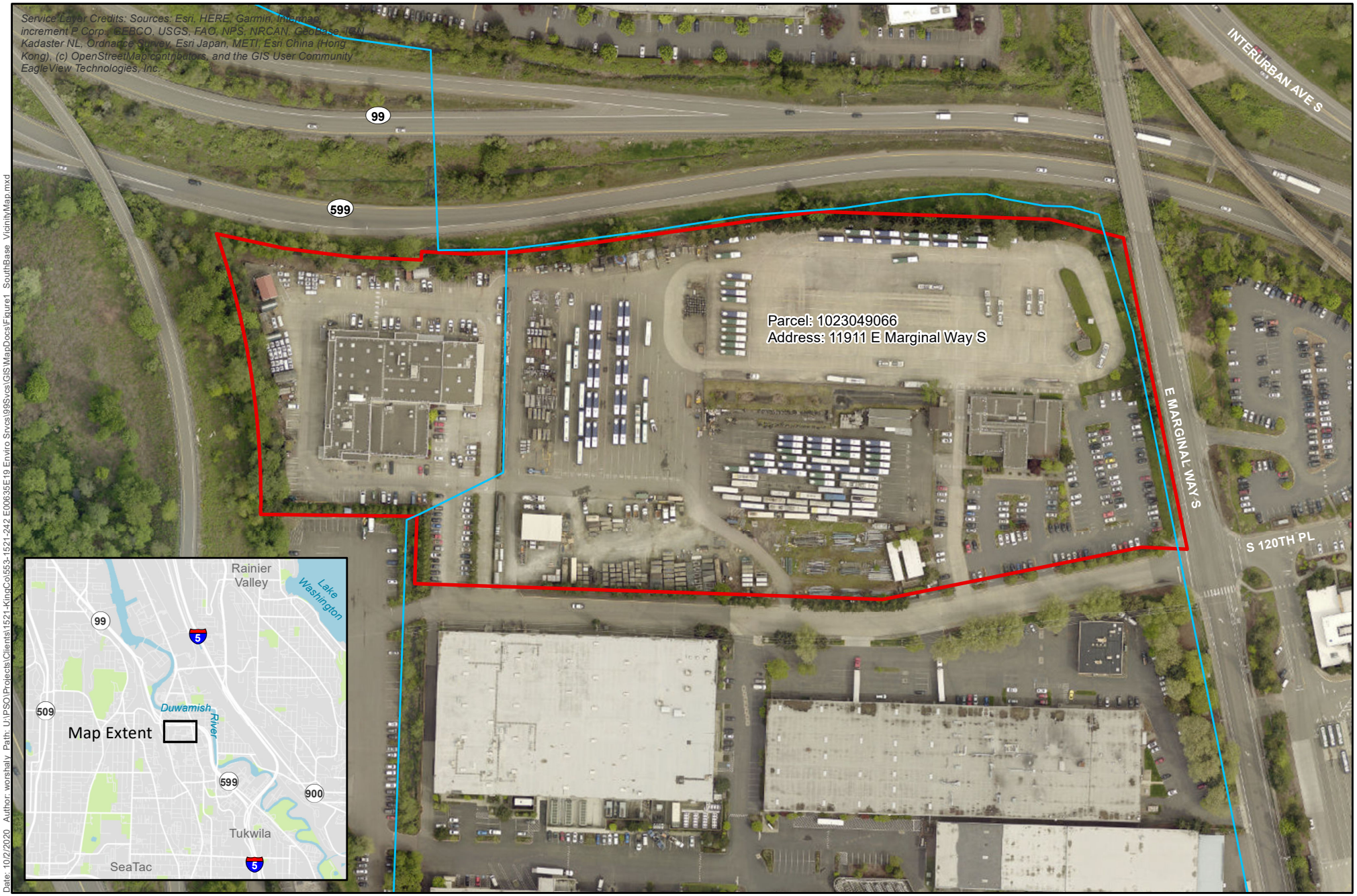
FIGURES

TABLES

ATTACHMENTS

Figures



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Parametrix

Source: King County

0 50 100 200 Feet

Project Location

Stream

Figure 1

Site Map

King County Metro Transit S Facilities/S Annex

Tukwila, WA

Date: 10/2/2020 Author: worshaly Path: U:\PSO\Projects\Clients\1521-KingCo\553-1521-242 E00635E19 Enviro Srvcs\99Svcs\GIS\MapDocs\Figure2_SouthBase_MonitoringWellsBoringLocs.mxd

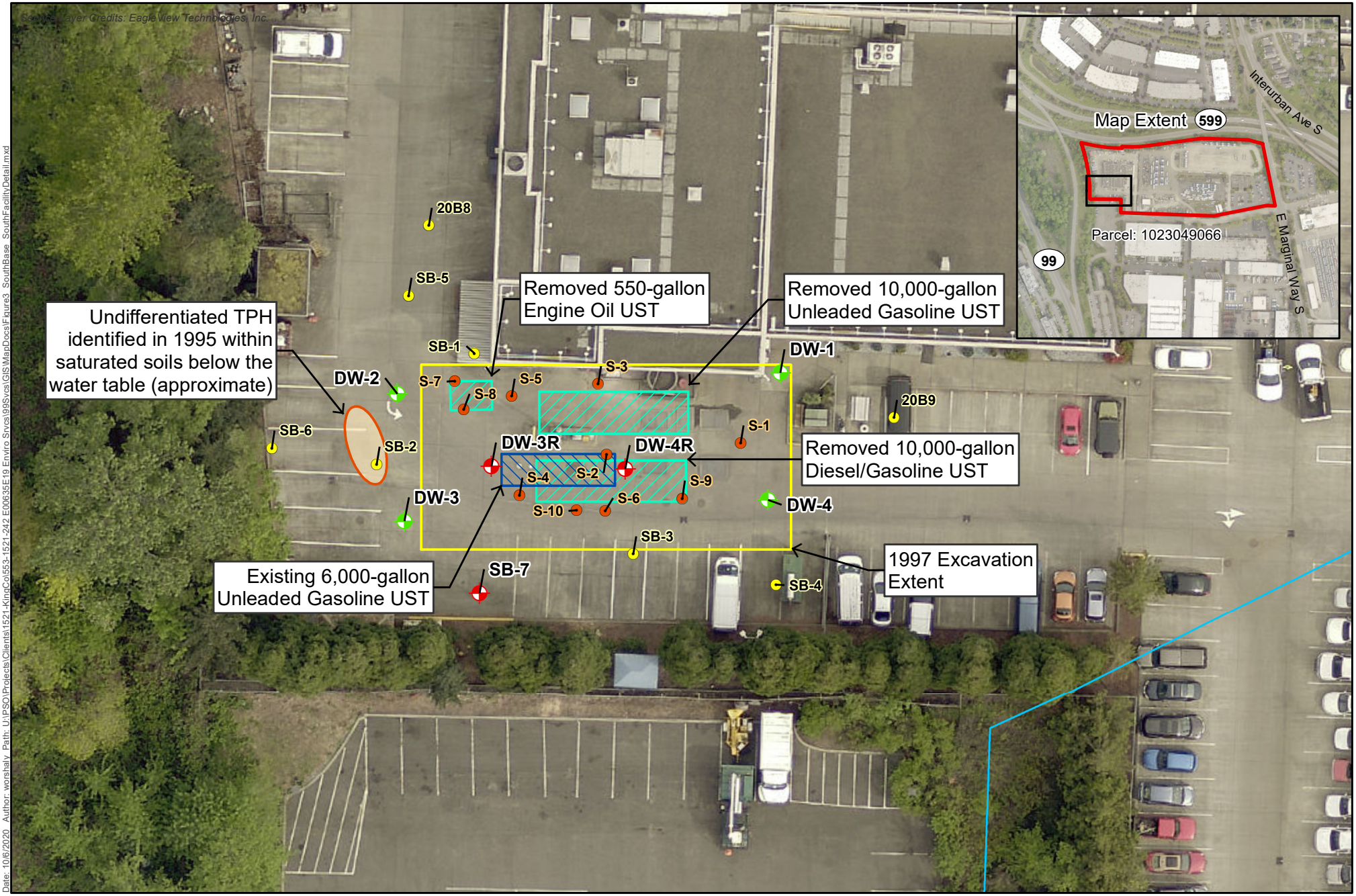
Source: King County

Project Location
Stream
Borehole
Soil Sample
Monitoring Well (Existing)
Monitoring Well (Historical)

0 35 70 140 Feet

Figure 2
Monitoring Well and Soil Sample Locations
King County Metro Transit S Facilities/S Annex

Tukwila, WA



Date: 10/6/2020 Author: worshaly Path: U:\PSO\Projects\Clients\1521-KingCo\553-1521-242 E00635E19 Enviro Srvcs\99Svcs\GIS\MapDocs\Figure3_SouthBase_SouthFacilityDetail.mxd

Source: King County

Project Location
Stream
1997 Excavation Extent
Existing UST
Removed UST
Undifferentiated TPH below water table (approximate)
Borehole
Soil Sample
Monitoring Well (Existing)
Monitoring Well (Historical)

0 10 20 40 Feet

Figure 3
South Facility Area Detail
King County Metro Transit S Facilities/S Annex

Tukwila, WA

Date: 11/12/2020 Author: worshaly Path: U:\PSO\Projects\Clients\1521-KingCo\553-1521-242 E00635E19 Enviro Srvcs\99Svcs\GIS\MapDocs\Figure4 SouthBase ProposedLocs.mxd

Source: King County

Project Location
Stream

Borehole
Soil Sample
Proposed Borehole

Monitoring Well (Existing)
Monitoring Well (Historical)
Proposed Well

0 35 70 140 Feet

Figure 4
Proposed Borehole and Monitoring Well Locations
King County Metro Transit S Facilities/S Annex

Tukwila, WA

Tables

Table 1. Groundwater Elevations, King County Metro South Facilities, 11911 E Marginal Way S, Tukwila, WA

		September 23, 2019		December 17, 2019		April 1, 2020	
Well	Reference Elevation[1]	Depth to Groundwater (ft)	Groundwater Elevation (ft NAVD88)	Depth to Groundwater (ft)	Groundwater Elevation (ft NAVD88)	Depth to Groundwater (ft)	Groundwater Elevation (ft NAVD88)
DW-3R*	13.63	5.21	8.42	4.84	8.79	4.48	9.15
DW-4R	14.00	5.58	8.42	5.15	8.85	4.82	9.18
SB-7	14.05	5.66	8.39	5.23	8.82	4.86	9.19
SB-8	14.19	6.28	7.91	5.80	8.39	5.33	8.86

Notes:

[1] N rim PVC in ft NAVD88**

*Well has been damaged and casing is not vertical

Table 2. Groundwater Analytical Data, King County Metro South Facilities, 11911 E Marginal Way S, Tukwila, WA

Well ID	Date Sampled	pH	Conductivity µmhos/cm	Temperature deg C	Diesel Range Organics mg/L	Heavy Oil Range Organics mg/L	Gasoline Range Organics µg/L	Lead, Total mg/L	Benzene µg/L	Toluene µg/L	Ethylbenzene µg/L	m, p-Xylene µg/L	o-Xylene µg/L
Cleanup Level					**0.5**	**0.5**	**1000**	**0.015**	**5**	**1000**	**700**	**1000**	**1000**
DW-1	10/11/94	6.81	484	18.6	- -	0.2 U	- -	0.003 U	- -	- -	- -	- -	- -
DW-2	10/11/94	6.46	449	18.9	- -	0.2 U	- -	0.003 U	- -	- -	- -	- -	- -
DW-3	10/11/94	6.60	474	19.2	- -	0.2 U	- -	0.003 U	- -	- -	- -	- -	- -
DW-4	10/11/94	6.61	501	19.6	- -	0.2 U	- -	0.003 U	- -	- -	- -	- -	- -
DW-4 Dup (MW-5)	10/11/94	- -	- -	- -	- -	0.2 U	- -	0.003 U	- -	- -	- -	- -	- -
DW-4	04/23/97	- -	- -	- -	0.5 U	- -	100 U	- -	**9.5**	2.3	1 U	1 U	1 U
DW-3R	09/23/19	- -	- -	- -	0.26 U	0.41 U	100 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
DW-3R	12/17/19	- -	- -	- -	0.0499 U	0.0998 U	50 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
DW-4R	09/23/19	- -	- -	- -	0.27 U	0.43 U	100 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
DW-4R	12/17/19	- -	- -	- -	0.0497 U	0.0994 U	50 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
SB-5	12/19/94	6.45	541	14.0	0.2 U	0.2 U	- -	- -	- -	- -	- -	- -	- -
SB-6	12/19/94	- -	- -	- -	0.2 U	0.236	- -	- -	- -	- -	- -	- -	- -
SB-7	12/19/94	6.29	498	10.8	**0.55**	**0.723**	- -	- -	- -	- -	- -	- -	- -
SB-7	09/23/19	- -	- -	- -	0.28 U	0.44 U	100 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
SB-7	12/17/19	- -	- -	- -	0.0498 U	0.0997 U	50 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
SB-8	12/19/94	6.15	700	14.3	0.495	0.326	- -	- -	- -	- -	- -	- -	- -
SB-8	09/23/19	- -	- -	- -	0.47	**0.67**	400 U	- -	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
SB-8	12/17/19	- -	- -	- -	0.0498 U	0.399	50 U	- -	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

concentration is above Model Toxics Control Act WAC 173-340 (MTCA) Method A Cleanup Level

- - = not analyzed

Gasoline cleanup level is presented for the circumstance in which benzene is not detected

Table 3. Soil Analytical Data, King County Metro South Facilities, 11911 E Marginal Way S, Tukwila, WA

Well ID	Date Sampled	Sample Depth ft	Lead, Total mg/Kg	Diesel Range Organics mg/Kg	Heavy Oil Range Organics mg/Kg	Gasoline Range Organics mg/Kg	Total Petroleum Hydrocarbons mg/Kg	Benzene mg/Kg	Ethylbenzene mg/Kg	Toluene mg/Kg	m, p-Xylene mg/Kg	o-Xylene mg/Kg
Cleanup Level			**250**	**2000**	**2000**	**100**	**2000**	**0.03**	**6**	**7**	**9**	**9**
SB-1	10/11/94	10-11.5	1.2 J	- -	- -	5 U	- -	- -	- -	- -	- -	- -
SB-2	10/11/94	7.5-9	- -	- -	- -	- -	**8710**	- -	- -	- -	- -	- -
SB-3	10/11/94	7.5-9	- -	- -	- -	5 U	- -	- -	- -	- -	- -	- -
SB-4	10/11/94	7.5-9	- -	- -	- -	5 U	- -	- -	- -	- -	- -	- -
SB-4 Dup (SB-5)	10/11/94	7.5-9	- -	- -	- -	5 U	- -	- -	- -	- -	- -	- -
SB-5	12/12/94	5-6.5	- -	25 U	54.7	- -	- -	- -	- -	- -	- -	- -
SB-6	12/12/94	7-9	- -	25 U	25 U	- -	- -	- -	- -	- -	- -	- -
SB-7	12/12/94	5-6.5	- -	25 U	25 U	- -	- -	- -	- -	- -	- -	- -
SB-8	12/12/94	10-11.5	- -	25 U	25.5	- -	- -	- -	- -	- -	- -	- -
SB-8 Dup (SB-9)	12/12/94	10-11.5	- -	25 U	25 U	- -	- -	- -	- -	- -	- -	- -
S-1	04/23/97	5	- -	27 U	55 U	5.5 U	- -	0.055 U	0.055 U	0.055 U	0.055 U	0.055 U
S-3	04/23/97	6	- -	26 U	52 U	5.3 U	- -	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U
S-4	04/23/97	7	- -	26 U	53 U	5.6 U	- -	0.056 U	0.056 U	0.15	0.087	0.62
S-5	04/23/97	4	- -	28 U	56 U	5.2 U	- -	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U
S-6	04/23/97	3	- -	26 U	52 U	5.1 U	- -	0.051 U	0.051 U	0.051 U	0.051 U	0.051 U
S-7	04/23/97	7	- -	26 U	51 U	5.2 U	- -	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U
S-8	04/23/97	6	- -	26 U	52 U	5.4 U	- -	0.054 U	0.054 U	0.054 U	0.054 U	0.054 U
S-9	04/28/97	13	- -	35 U	70 U	7 U	- -	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
S-10	04/28/97	13	- -	33 U	67 U	6.7 U	- -	0.067 U	0.067 U	0.067 U	0.067 U	0.067 U

concentration is above Model Toxics Control Act WAC 173-340 (MTCA) Method A Cleanup Level

- - = not analyzed

Table 4. Push Probe Investigation Results, April 1, 2020, King County Metro South Facilities, 11911 E Marginal Way S, Tukwila, WA

Sample ID	TPH-Diesel	TPH-Heavy Oil	TPH-Gasoline	Benzene	Toluene	Ethylbenzene	m,p-Xylene	o-Xylene
Groundwater								
MTCA Method A Cleanup Level	**0.5**	**0.5**	**1000**	**5**	**1000**	**700**	**1000**	**1000**
Units	**mg/L**	**mg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**	**µg/L**
20B1-W	<0.23	**0.52**	<100	<1	<1	<1	<1	<1
reanalysis*	<0.22	<0.22	- -	- -	- -	- -	- -	- -
20B2-W	**0.24**	**0.27**	140	<1	<1	<1	<1	<1
reanalysis*	<0.22	<0.22	- -	- -	- -	- -	- -	- -
20B3-W	<0.23	**0.57**	<100	<1	<1	<1	<1	<1
reanalysis*	<0.23	<0.23	- -	- -	- -	- -	- -	- -
20B4-W	<0.25	**0.53**	<100	<1	<1	<1	<1	<1
reanalysis*	<0.25	<0.25	- -	- -	- -	- -	- -	- -
20B5-W	<0.24	0.25	<100	<1	<1	<1	<1	<1
reanalysis*	<0.24	<0.24	- -	- -	- -	- -	- -	- -
20B6-W	<0.24	<0.24	<100	<1	<1	<1	<1	<1
20B7-W	<0.22	0.49	<100	<1	<1	<1	<1	<1
reanalysis*	<0.22	<0.22	- -	- -	- -	- -	- -	- -
20B8-W	<0.24	0.43	<100	<1	<1	<1	<1	<1
reanalysis*	<0.24	<0.24	- -	- -	- -	- -	- -	- -
20B9-W	<0.24	<0.24	<100	<1	<1	<1	<1	<1
Soil (mg/kg)								
MTCA Method A Cleanup Level	**2000**	**2000**						
Units	**mg/kg**	**mg/kg**						
20B1-5	<32	68	- -	- -	- -	- -	- -	- -
20B2-3.5	<43	<86	- -	- -	- -	- -	- -	- -
20B3-4.5	<32	<64	- -	- -	- -	- -	- -	- -
20B4-4.5	<31	<62	- -	- -	- -	- -	- -	- -

concentration is above Model Toxics Control Act WAC 173-340 (MTCA) Method A Cleanup Level

Gasoline cleanup level is presented for the circumstance in which benzene is not detected

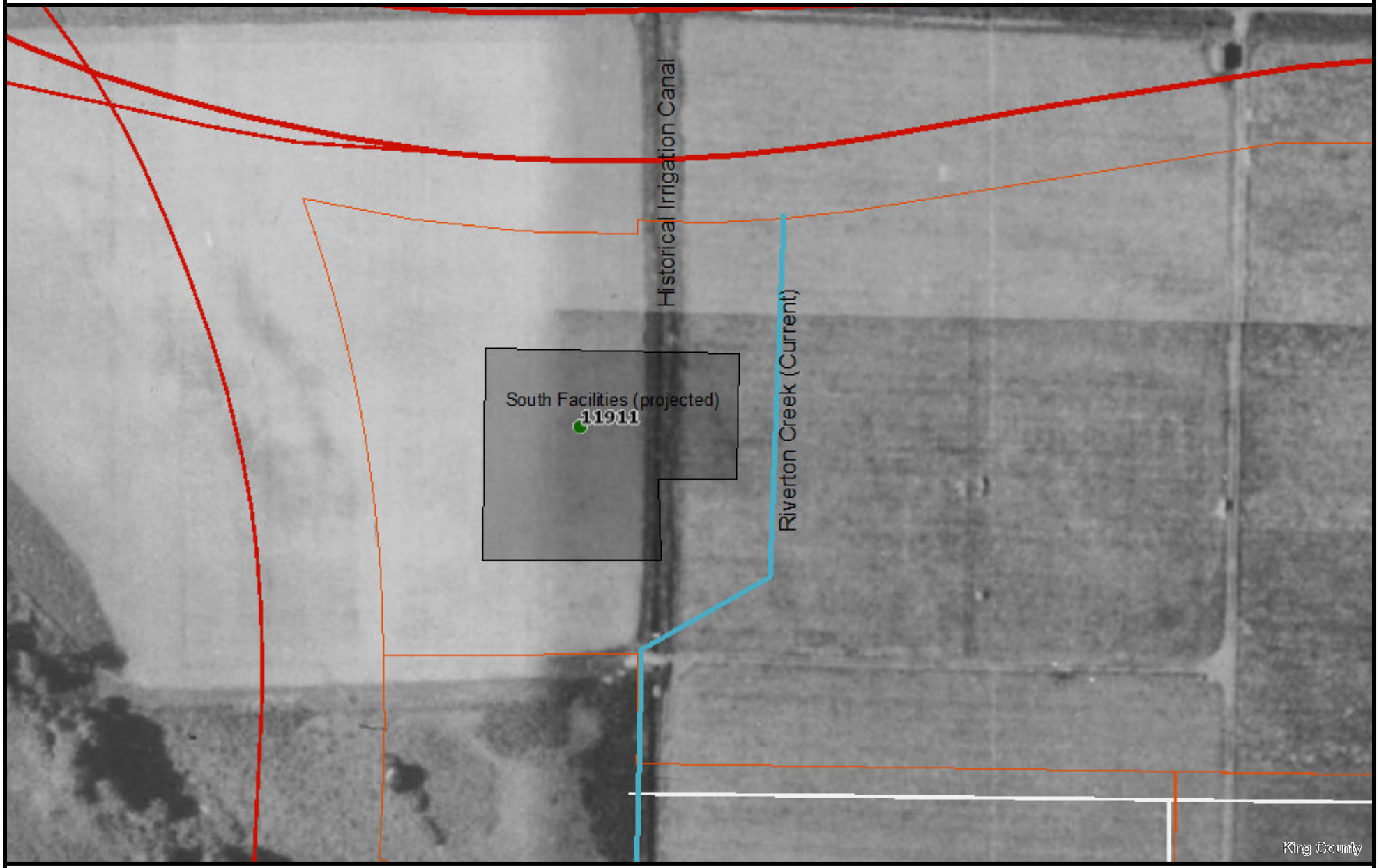
*Reanalysis after silica gel/acid cleanup

- - = not analyzed

Attachment A

Stream Mapping

King County iMap 1936



Date: 11/11/2020 Notes:

N

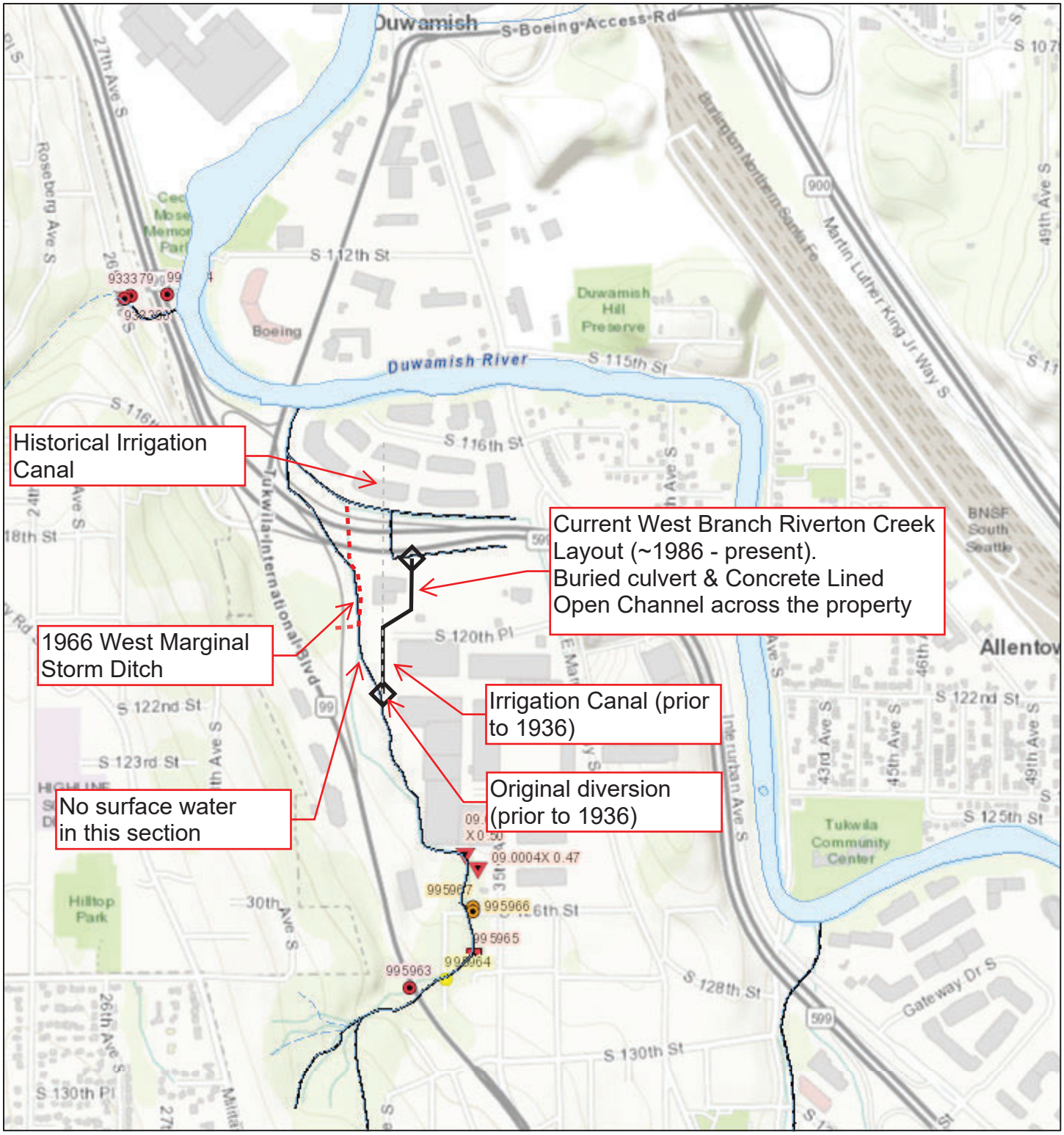
King County

0 0.0225 0.045 0.09 Miles

N

WASHINGTON STATE DEPARTMENT OF
NATURAL RESOURCES
WASHINGTON GEOLOGICAL SURVEY

Geology Portal



September 10, 2019

1:18,056

0 0.15 0.3 0.6 mi

0 0.25 0.5 1 km

All SalmonScape Species

Culverts

Total Blockage

Total Blockage, Fishway Present

Partial Blockage

Partial Blockage, Fishway Present

Unknown Blockage

Unknown Blockage, Fishway Present

USGS/NHD

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Tukwila iMap

11/2/2020, 12:54:10 PM

WaterBodies

Streams

1:4,514

0 0.03 0.05 0.1 mi

0 0.04 0.08 0.16 km

Pictometry International Corp., Tukwila Technology Services

City of Tukwila

Attachment B

2015 Ecology Site Hazardous Assessment

SITE HAZARD ASSESSMENT
Worksheet 1
Summary Score Sheet

SITE INFORMATION:

Cleanup Site ID: 7790

Facility/Site ID: 8422289

King County Metro Transit S Annex

11911 East Marginal Way S

Seattle, King County, WA 98168

Section:	10	Latitude:	47.49588
Township:	23N	Longitude:	-122.28676
Range:	4E	Tax/Parcel ID:	1023049066

Site scored/ranked for the Hazardous Sites List Publication: August 2015

SITE DESCRIPTION:

The King County Metro Transit S Annex site (Site) is a former Metro bus parking, fueling, and maintenance garage facility located in Seattle, King County, Washington. The 16.15-acre property is located approximately 1,350 feet from the Lower Duwamish Waterway (LDW), and zoned for Manufacturing Industrial Center/Heavy Industrial (MIC/H) use.

Two streams that discharge to the LDW are located near the area where hazardous substances were released (see the Site Overview Map), including a Class 3 stream located approximately 50 feet west of the Site, and a Class 2 stream located under the Site (presumably in a culvert).

Adjacent properties include: The main Metro South Base site to the southeast [Site Identification (CSID) 7077] across East Marginal Way; general manufacturing/industrial and warehouse facilities to the north and south (properties to the north are located on the opposite side of Highway 599 from the Site); and greenbelt space and highway interchange to the west.

The Site is currently operated as a Metro bus parking, fueling, and maintenance facility by King County Transit.

Current activities performed at the property generally include: Bus parking, fueling, and maintenance; facilities maintenance; general materials storage and vehicle parking; and administration.

Parking and storage areas are generally located in the central and northern portions of the property, administrative offices are located in the southeastern portion of the property, and maintenance facilities are located in the western portion of the property.

The property area where hazardous substances associated with CSID 7790 were released (i.e., the "Site"; discussed in the following sections) is located near the southwestern portion of the maintenance building in the western portion of the property, as shown on the attached Site Overview Map.

SITE BACKGROUND:

A summary of prior operations/tenants at the subject property is presented below.

From	To	Operator/Tenant	Activity
1994	2015	King County Transit	Metro maintenance and administration

SITE CONTAMINATION:

In 1995 the King County Metro Transit S Annex site was reported to Washington State Department of Ecology (Ecology) and placed on the Leaking Underground Storage Tank (LUST) list.

Four soil borings (SB-1 through SB-4) were advanced, and soil samples collected, in the vicinity of three underground storage tanks (USTs) in October 1994 (Woodward Clyde, 1995). The three USTs included one 550-gallon engine oil UST, one 10,000-gallon unleaded gasoline UST, and one 10,000-gallon UST (partitioned for gasoline and diesel), and were located south of the southwestern portion of the facility stores and

maintenance building. AGI Technologies (1997) indicated that the USTs were installed in 1986 and were constructed of fiberglass. Groundwater samples were collected in October 1994 from four existing de-watering wells located in the UST cavity (reportedly installed at the same time as the USTs).

Soil samples from three borings (SB-1, -3, and -4) were submitted for laboratory analysis of gasoline-range total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene, and xylenes (BTEX), and lead (SB-1 only). The soil sample from boring SB-2 was submitted for analysis of undifferentiated TPH. Four dewatering well samples were submitted for analysis of diesel- and oil-range TPH, and total lead.

Undifferentiated TPH was detected in SB-2 (soil) at a concentration 8,710 mg/kg, above the MTCA Method A soil cleanup level for diesel- and oil- range petroleum hydrocarbons. No other analytes were detected in the October 1994 soil or groundwater samples at concentrations above the laboratory reporting limits.

Four additional soil borings (SB-5 through SB-8) were advanced in December 1994 (Note: SB-8 is located northeast of the facility Sotres and Maintenance Building). Three of the borings (SB-5, -7, and -8) were reportedly completed as groundwater monitoring wells (Woodward Clyde, 1995); however, the maps provided in the report show the locations as soil borings only and it is unclear if these were temporary or permanent wells. Soil and groundwater samples collected from each of the borings, and were analyzed for diesel- and oil-range TPH.

Diesel-range TPH was detected in soil samples from SB-5 and SB-8 at a maximum concentration of 54.7 mg/kg, below the MTCA Method A soil cleanup level. Oil-range TPH was detected in three groundwater samples at concentrations above the laboratory reporting limit [maximum concentration of 723 micrograms per liter (ug/L) at SB-7], and diesel-range TPH in two samples (maximum concentration of 550 ug/L at SB-7). The diesel- and oil-range TPH concentrations detected in groundwater sample SB-7 were above the MTCA Method A groundwater cleanup level.

PAST REMEDIATION ACTIVITIES:

The three USTs described in the previous section were removed from the Site in April 1997 (AGI Technologies, 1997). Soil samples were collected from the excavation area margins following UST removal and were analyzed for gasoline-, diesel-, and oil-range TPH and BTEX constituents. Ten soil samples were collected from the vicinity of the former 10,000-gallon diesel and gasoline USTs, and three from the vicinity of the former 550-gallon oil UST. No analytes were detected in soil samples at concentrations above the laboratory reporting limits except toluene at a concentration of 0.15 mg/kg, and total xylenes at a concentration of 0.71 mg/kg, both below the MTCA Method A soil cleanup level.

One groundwater sample was collected from dewatering well DW-4 and contained toluene (2.3 ug/L) and benzene (9.5 ug/L) at concentrations above the laboratory reporting limits. The detected benzene concentration was above the MTCA Method A groundwater cleanup level.

No additional information regarding subsequent soil sampling or groundwater monitoring was available in Ecology’s Site file.

Following removal of the three USTs in 1997, one new unleaded gasoline UST was installed at the same approximate location as the previous 10,000-gallon USTs, and is listed in Ecology's UST database as "operational" with a capacity of 5,000-9,999 gallons.

CURRENT SITE CONDITIONS:

The most recent sampling data available is for the UST removal performed in April 1997. Confirmational soil samples collected following UST removal contained concentrations of toluene and xylenes above the laboratory reporting limits, but below the MTCA Method A soil cleanup levels. However, a groundwater sample collected down-gradient from the UST area in 1997 contained benzene at a concentration above the MTCA Method A groundwater cleanup level. In addition, groundwater samples collected from borings SB-6, -7, and -8 contained TPH at concentrations above the laboratory reporting limits, including diesel- and oil-range concentrations above the MTCA Method A groundwater cleanup level at SB-7.

Based on the available information, soil with TPH concentrations above MTCA Method A soil cleanup levels was excavated from the immediate vicinity of the USTs during removal, but analytical results for previous samples

collected outside the excavation margins suggest that residual impacts to soil and groundwater remain at the Site.

The King County GIS website depicts two streams in the vicinity of the UST area at the Site. Both are generally oriented north-south and drain to the LDW either directly or via a drainage ditch located north of the site across Highway 599. A stream listed as Class 3 (most likely seasonal or intermittent) is shown adjacent to the western property margin and identified as part of the Duwamish River basin. Sections of the streambed are visible on recent aerial photographs, but it is mostly obscured by vegetation. The Class 3 stream is located down-gradient and within approximately 50 feet of the former UST area, indicating a potential for migration of soil and groundwater contaminants to surface water.

The second stream, located east of the UST area, is listed as a Class 2 Salmonid stream (unnamed) by King County and identified as an SAO (Sensitive Areas Ordinance) stream. This stream is located approximately 150 feet east and northeast of the UST area, but is not visible on recent aerial photographs and is presumably located in a culvert beneath the Site (the areas where the stream is shown are either paved or have a graded gravel surface). The Class 2 stream appears to be located up-gradient from the UST area; however, its proximity to impacted soil and groundwater indicates a potential for migration of soil and groundwater contaminants to surface water, although to a lesser degree than the Class 3 stream west of the Site.

Listings for both of these streams are provided in the Priority Habitats and Species (PHS) database maintained by the Washington Department of Fish and Wildlife. The Class 3 stream located west of the former UST area (i.e., down-gradient) is listed as a priority area for the occurrence and migration of coho and coastal cutthroat salmon, and the Class 2 stream located east of the former UST area (i.e., up-gradient) is listed as a priority area for the occurrence of coho salmon. Both streams are also listed as a priority area for the occurrence of the western pond turtle, which is also listed by the State as an endangered species.

Site contaminants inlcude diesel- and oil-range TPH in soil and groundwater, and benzene in groundwater.

The approximate depth to groundwater is 7 feet below ground surface, with groundwater flowing to the west-northwest (based on map included in Woodward Clyde, 1995). Subsurface soils are sand, silty sand, and silt (based on boring logs and excavations).

SPECIAL CONSIDERATIONS:

Checked boxes indicate routes applicable for Washington Ranking Method (WARM) scoring

☑ **Surface Water**

A Class 3 stream adjacent to the western property margin dicharges to the LDW. The stream is located approximately 50 feet down-gradient of the former UST area, indicating a potential for contaminant transport via the surface water pathway.

☑ **Air**

Volatile compound (benzene) detected in groundwater at a concentration above the MTCA Method A cleanup level indicates a potential for contaminant transport via the air pathway.

☑ **Groundwater**

Concentrations of diesel-range TPH, oil-range TPH, and benzene were detected in groundwater samples above MTCA Method A groundwater cleanup levels.

ROUTE SCORES:

Surface Water/ Human Health:	19.5	Surface Water/ Environment:	26.4
Air/ Human Health:	23.5	Air/ Environment:	1.5
Groundwater/ Human Health:	55.2		

Overall Rank: 1

SITE HAZARD ASSESSMENT
Worksheet 1
Summary Score Sheet

REFERENCES:

1 AGI Technologies, 1997, Underground Storage Tank Closure Assessment Report, Facilities Maintenance South UST Project, June 18th 1997.

2 Ecology Water Resources Explorer, accessed June 2015. https://fortress.wa.gov/ecy/waterresources/map/WaterResourcesExplorer.aspx

3 King County GIS Center iMAP application, Property Information, Groundwater Program, and Sensitive Areas mapsets. Accessed June 2015. http://www.kingcounty.gov/operations/GIS/Maps/iMAP.aspx

4 Missouri Census Data Center, Circular Area Profiles - 2010 census data around a point location. http://mcdc.missouri.edu/websas/caps10c.html. Accessed June 2015.

5 National Climatic Data Center 2011 Local Climatological Data for Seattle, Seattle Tacoma Airport. http://www1.ncdc.noaa.gov/pub/orders/IPS-90B1F39F-6CFA-4A6B-AA82-5ED1FF897CCC.pdf

6 WARM Scoring Manual

7 WARM Toxicological Database

8 Washington Department of Fish and Wildlife, online Priority Habitats and Species database. Accessed June 2015. http://wdfw.wa.gov/mapping/phs/disclaimer.html

9 Washington Department of Transportation 24-hour Isopluvial Maps, January 2006 update. http://www.wsdot.wa.gov/publications/fulltext/Hydraulics/Wa24hrIspoluvials.pdf

10 Woodward-Clyde, 1995, Pre-Construction Site Assessment Report, South Operating Base Facility Annex, January 1995.

SITE HAZARD ASSESSMENT
Worksheet 2
Route Documentation

Cleanup Site ID: 7790 King County Metro Transit S Annex

Facility/Site ID: 8422289

1. SURFACE WATER ROUTE

List those substances to be considered for scoring:

Benzene, diesel (oil not scored as toxicity data is not available in WARM)

Explain the basis for choice of substances to be used in scoring:

Confirmed releases to soil and groundwater based on analytical tests; close proximity to surface water (stream drainging to LDW down-gradient of former UST area).

List those management units to be considered for scoring:

Surface water

Explain basis for choice of unit to be used in scoring:

Potential for transport of contaminants in soil and groudwater to surface water

2. AIR ROUTE

List those substances to be considered for scoring:

Benzene

Explain the basis for choice of substances to be used in scoring:

Confimed release of volatile compound to groundwater based on analytical tests; potential for transport via the air pathway

List those management units to be considered for scoring:

Soil vapor

Explain basis for choice of unit to be used in scoring:

Potential for vapor transport

3. GROUNDWATER ROUTE

List those substances to be considered for scoring:

Benzene, diesel (oil not scored as toxicity data is not available in WARM)

Explain the basis for choice of substances to be used in scoring:

Confirmed release to groundwater based on analytical tests

List those management units to be considered for scoring:

Groundwater

Explain basis for choice of unit to be used in scoring:

Prior detection of contaminants at concentrations above MTCA cleanup levels

Worksheet 4

Surface Water Route

CSID: 7790 **Site Name:** King County Metro Transit S Annex

1.0 Substance Characteristics

1.1 Human Toxicity

Substance	Drinking Water Standard Value	Acute Toxicity Value	Chronic Toxicity Value	Carcinogenicity Value
benzene	8	3	X	5
TPH (as diesel)	4	5	3	X

Highest Value	8
Bonus Points?	0
Human Health Toxicity Value	8

1.2 Environmental Toxicity

Substance	Acute Water Quality Criteria		Non-human Mammalian Acute Toxicity	
	ug/L	Value	mg/kg	Value
benzene	5,300	2	3,306	3
TPH (as diesel)	2,300	2	490	5

Environmental Toxicity Value: 2

1.3 Substance Quantity

Amount: approximately 600 square feet

Basis: estimated aerial extent of soil and groundwater impacts described in available reports

Substance Quantity Value: 5

2.0 Migration Potential

2.1 Containment Containment Value: 10

Explain Basis: potential for impacted groundwater discharge to surface water

2.2 Surface Soil Permeability Soil Permeability Value: 3

medium permeability; sand, silty sand, and silt

2.3 Total Annual Precipitation Total Precipitation Value: 3

37 inches

2.4 Max 2-yr/24-hour Precipitation 2YR/24HR Precipitation Value: 3

2.4 inches

2.5 Floodplain Floodplain Value: 0

not in 100-year or 500-year flood plain

2.6 Terrain Slope Slope Value: 1

less than 2%

Worksheet 4

Surface Water Route

CSID: 7790 **Site Name:** King County Metro Transit S Annex

3.0 Targets

3.1 Distance to Surface Water <50 feet Surface Water Distance Value 10

distance to stream located west of the release area

3.2 Population Served within 2 miles Population Value 2

3 people

3.3 Area Irrigated within 2 miles Irrigation Value 11

200 acres

3.4 Distance to Nearest Fishery Resource <50 feet Fishery Value 12

stream located along western property margin

3.5 Distance to and Name of Nearest Sensitive Environment Sensitive Environment Value 12

<50 feet

stream located along western property margin

4.0 Release Release to Surface Water Value 0

Explain basis for scoring a release to surface water

No confirmed release to surface water; potential for groundwater to discharge to surface water

Pathway Scoring - Surface Water Route, Human Health Pathway

$SW_H = (SUB_{SH}*40/175)*[(MIG_S*25/24) + REL_S + (TAR_{SH}*30/115)]/24$

Where:

SUB_{SH} = (Human Toxicity Value + 3)*(Containment + 1) + Substance Quantity	SUB_{SH}	126
MIG_S = Soil Permeability + Annual Precip + Rainfall Frequency + Floodplain + Slope	MIG_S	10
REL_S = Release to Surface Water	REL_S	0
TAR_{SH} = Distance to Surface Water + Population Served by Surface Water + Area Irrigated	TAR_{SH}	22.3
	SW_H	19.5

Pathway Scoring -Surface Water Route, Environmental Pathway

$SW_E = (SUB_{SE}*40/153)*[(MIG_S*25/24) + REL_S + (TAR_{SE}*30/34)]/24$

Where:

SUB_{SE} = (Env Tox Value + 3) * (Containment + 1) + Substance Qty	SUB_{SE}	60
MIG_S = Soil Permeability + Annual Precip + Rainfall Frequency + Floodplain + Slope	MIG_S	10
REL_S = Release to Surface Water	REL_S	0
TAR_{SE} = Distance to Surface Water + Distance to Fishery + Distance to Sensitive Environment	TAR_{SE}	34.0
	SW_E	26.4

Worksheet 5

Air Route

CSID: 7790 **Site Name:** King County Metro Transit S Annex

1.0 Substance Characteristics

1.1 Introduction (WARM Scoring Manual) - Please Review before scoring

1.2 Human Toxicity

Substance	Ambient Air Standard Value	Acute Toxicity Value	Chronic Toxicity Value	Carcinogenicity Value
benzene	10	3	X	5

Highest Value	10
Bonus Points?	0
Toxicity Value	10

1.3 Mobility

Gaseous Mobility	Max Value:	4
Particulate Mobility	Soil Type:	
	Erodibility:	
	Climatic Factor:	

Mobility Value 4

1.4 Final Human Health Toxicity/Mobility Matrix Value **HH Final Matrix Value** 20

1.5 Environmental Toxicity/Mobility

Substance	Non-human Mammalian Inhalation Toxicity (mg/m3)	Acute Value	Mobility Value	Table A-7 Matrix Value
benzene	31,947	3	4	6

Env. Final Matrix Value 6

1.6 Substance Quantity

Amount: approximately 600 square feet

Basis: Footprint of estimated area of soil impacts from reports

Substance Quantity Value 4

Worksheet 5

Air Route

CSID: 7790 **Site Name:** King County Metro Transit S Annex

2.0 Migration Potential

2.1 Containment Containment Value 5

Explain Basis: Spill/discharge to subsurface only with no vapor collection system

3.0 Targets

3.1 Nearest Population Population Distance Value 10

300 feet Workers at adjoining property

3.2 Distance to and name of nearest sensitive environments Sensitive Environment Value 7

<50 feet habitat for State Endangered species (western pond turtle)

3.3 Population within 0.5 miles Population Value 39

1498 population

4.0 Release Release to Air Value 0

Explain basis for scoring a release to air:

No confirmed release to air

Pathway Scoring - Air Route, Human Health Pathway

$AIR_H = (SUB_{AH}*60/329)*[REL_A+(TAR_{AH}*35/85)]/24$

Where:

SUB_{AH} =(Human toxicity + 5) * (Containment + 1) + Substance Qty	SUB_{AH}	154
REL_A = Release to Air	REL_A	0
TAR_{AH} = Nearest Population + Population within 1/2 mile	TAR_{AH}	48.7
	AIR_H	23.5

Pathway Scoring - Air Route, Environmental Pathway

$AIR_E = (SUB_{AE}*60/329)*[REL_A+(TAR_{AE}*35/85)]/24$

Where:

SUB_{AE} =(Environmental Toxicity Value +5)*(Containment +1) +Substance Qty	SUB_{AE}	70
REL_A = Release to Air	REL_A	0
TAR_{AE} = Nearest Sensitive Environment	TAR_{AE}	7.0
	AIR_E	1.5

Worksheet 6

Groundwater Route

CSID: 7790 **Site Name:** King County Metro Transit S Annex

1.0 Substance Characteristics

1.1 Human Toxicity

Substance	Drinking Water Standard Value	Acute Toxicity Value	Chronic Toxicity Value	Carcinogenicity Value
benzene	8	3	X	5
TPH (as diesel)	4	5	3	X

Highest Value	8
Bonus Points?	0
Toxicity Value	8

1.2 Mobility

Cations/Anions Max Value:

Solubility Max Value: 3 Mobility Value 3

1.3 Substance Quantity

Amount: >10-100 cubic yards

Basis: Residual impacted soil quantity based on site reports

Substance Quantity Value 2

2.0 Migration Potential

2.1 Containment Containment Value 10

Explain Basis: Contaminated soil present

2.2 Net Precipitation >10-20 inches Net Precipitation Value 2

2.3 Subsurface Hydraulic Conductivity Conductivity Value 3

Primarily sand and silt

2.4 Vertical Depth to Groundwater 7 feet

Confirmed release: Yes Depth to Aquifer Value 8

3.0 Targets

3.1 Groundwater Usage Private supply with alternate sources Aquifer Use Value 4

3.2 Distance to Nearest Drinking Water Well 4,200 feet

City of Seattle municipal well Well Distance Value 2

3.3 Population Served within 2 Miles Population Served Value 100

10,000 people

Worksheet 6

Groundwater Route

CSID: 7790 **Site Name:** King County Metro Transit S Annex

3.4 Area Irrigated by GW Wells within 2 miles Area Irrigated Value 4

35 acres

4.0 Release Release to Groundwater Value 5

Explain basis for scoring a release to groundwater:

Release confirmed by analytical results for groundwater samples

Pathway Scoring - Groundwater Route, Human Health Pathway

$GW_H = (SUB_{GH}*40/208)*[(MIG_G*25/17)+REL_G+(TAR_{GH}*30/165)]/24$

Where:

SUB_{GH} =(Human toxicity + mobility + 3) * (Containment + 1) + Substance Qty	SUB_{GH}	156
MIG_G=Depth to Aquifer+Net Precip + Hydraulic Conductivity	MIG_G	13
REL_G = Release to Groundwater	REL_G	5
TAR_{GH} = Aquifer Use + Well Distance + Population Served + Area Irrigated	TAR_{GH}	110.4
	GW_H	55.2

Washington Ranking Method

Route Scores Summary and Ranking Calculation Sheet

Site Name: King County Metro Transit S Annex **CSID:** 7790

Site Address: 11911 East Marginal Way S, Seattle, WA 98168 **FSID:** 8422289

HUMAN HEALTH ROUTE SCORES

Enter Human Health Route Scores for all Applicable Routes:

Pathway	Route Score	Quintile Group
Surface Water	19.5	3
Air	23.5	3
Groundwater	55.2	5

H=	5
M=	3
L=	3

$$\frac{H^2 + 2M + L}{8} = \frac{25 + 6 + 3}{8}$$

Human Health Priority Bin Score: **5**

rounded up to next whole number

ENVIRONMENT ROUTE SCORES

Enter Environment Route Scores for all Applicable Routes:

Pathway	Route Score	Quintile Group
Surface Water	26.4	3
Air	1.5	1

H=	3
L=	1

$$\frac{H^2 + 2L}{7} = \frac{9 + 2}{7}$$

Environment Priority Bin Score: **2**

rounded up to next whole number

Comments/Notes:

FINAL MATRIX RANKING **1**

FOR REFERENCE:

Final WARM Bin Ranking Matrix

Human Health Priority	Environment Priority					
	5	**4**	**3**	**2**	**1**	**N/A**
5	1	1	1	1	1	1
4	1	2	2	2	3	2
3	1	2	3	4	4	3
2	2	3	4	4	5	3
1	2	3	4	5	5	5
N/A	3	4	5	5	5	NFA

Quintile Values for Route Scores - February 2015 Values

Quintile	Human Health			Environment	
	Surface Water	Air	Ground Water	Surface Water	Air
5	>= 30.7	>= 37.6	>= 51.6	>= 50.9	>= 29.9
4	>= 23.1	>= 23.8	>= 40.9	>= 31.2	>= 22.5
3	>= 14.1	>= 15.5	>= 33.2	>= 23.6	>= 14.0
2	>= 7.0	>= 8.5	>= 23.5	>= 11.0	>= 1.6
1	<= 6.9	<= 8.4	<= 23.4	<= 10.9	<= 1.5

Quintile value associated with each route score entered above

Legend:

- Property location (approximate)
- Former underground storage tank (UST) location
- Soil boring location (approximate) for soil and groundwater samples
- UST removal excavation area soil sample location (approximate)
- Dewatering well location (approximate)
- Sample with soil or groundwater concentrations above MTCA
- Approximate estimated area of impacted soil (Woodward-Clyde, 1995)

Notes:

1. All locations are approximate. Scale is approximate.

N

KC Metro Transit S Annex
11911 E Marginal Way S
Seattle, WA 98168

DEPARTMENT OF ECOLOGY
State of Washington

Site Overview Map

CSID 7790

CSID7790.vsd

Attachment C

South Annex Data Table

TABLE 1
ANALYTICAL RESULTS FOR SOIL AND GROUNDWATER
King County Metro South Base Annex Phase II Investigation
11911 E Marginal Way, Tukwila, Washington
PBS Project No. 41484.004

Location	Depth (feet bgs)	Result								
		TPH					BTEX			
		Gasoline	Diesel	Diesel *with SGC* [a]	Heavy Oil	Heavy Oil *with SGC* [a]	Benzene	Toluene	Ethyl-Benzene	Total Xylenes
Soil Samples (mg/kg)										
Adopted Criteria[b]		**100**	**2,000**	**2,000**	**2,000**	**2,000**	**0.03**	**7**	**6**	**9**
E-1	4	< 5	< 50	--	< 250	--	< 0.02	< 0.02	< 0.02	< 0.06
	11	< 5	< 50	--	< 250	--	< 0.02	< 0.02	< 0.02	< 0.06
E-2	5	< 5	< 50	--	< 250	--	< 0.02	< 0.02	< 0.02	< 0.06
	11	< 5	< 50	--	< 250	--	< 0.02	< 0.02	< 0.02	< 0.06
E-3	6	< 5	< 50	--	< 250	--	< 0.02	< 0.02	< 0.02	< 0.06
	12	< 5	< 50	--	< 250	--	< 0.02	< 0.02	< 0.02	< 0.06
E-4	5.5	< 5	< 50	--	< 250	--	< 0.02	< 0.02	< 0.02	< 0.06
	12	< 5	< 50	--	< 250	--	< 0.02	< 0.02	< 0.02	< 0.06
E-5	5.5	< 5	< 50	--	< 250	--	< 0.02	< 0.02	< 0.02	< 0.06
	11	< 5	< 50	--	< 250	--	< 0.02	< 0.02	< 0.02	< 0.06
E-6	6	< 5	< 50	--	< 250	--	< 0.02	< 0.02	< 0.02	< 0.06
	12	< 5	< 50	--	< 250	--	< 0.02	< 0.02	< 0.02	< 0.06
Groundwater Grab Samples (µg/L)										
Adopted Criteria[b]		**1,000**	**500**	**500**	**500**	**500**	**5**	**1,000**	**700**	**1,000**
E-1	--	< 100	**640[c]**	< 50	480[c]	< 250	< 1	< 1	< 1	< 3
E-2	--	< 100	140[c]	--	< 250	--	< 1	< 1	< 1	< 3
E-3	6.9[d]	< 100	86[c]	--	< 250	--	< 1	< 1	< 1	< 3
E-4	6.6[d]	< 100	450[c]	--	440[c]	--	< 1	< 1	< 1	< 3
E-5	7.2[d]	< 100	310[c]	--	330[c]	--	< 1	< 1	< 1	< 3
E-6	7.1[d]	< 100	89[c]	--	< 250	--	< 1	< 1	< 1	< 3

Notes:
Gasoline range TPH analyzed by Northwest Total Petroleum Hydrocarbon Method - Volatile Petroleum Products (Extended) (NWTPH-Gx)
Diesel and heavy oil range TPH analyzed by Northwest Total Petroleum Hydrocarbon Method - Semi-volatile Petroleum Products (Extended) (NWTPH-Dx)
BTEX analyzed by Environmental Protection Agency Method 8021B
bold indicates concentration exceeds Adopted Criteria
< Analyte not detected at or above the indicated laboratory reporting limit
-- Not Analyzed / Not Measured

Abbreviations & Acronyms:
BTEX - Benzene, toluene, ethylbenzene and xylenes
mg/kg - milligrams per kilogram
µg/L - microgram per liter
bgs - below ground surface
toc - top of casing
SGC - Silica Gel Cleanup
TPH - total petroleum hydrocarbons

Footnotes:
[a] Sample extracts passed through a silica gel column prior to analysis (Silica Gel Cleanup)
[b] Washington State Department of Ecology Model Toxics Control Act Method A Cleanup Level for Unrestricted Land Use as established in WAC 173-340-900
[c] The sample chromatographic pattern does not resemble the fuel standard used for quantitation
[d] Depth to static groundwater from ground surface, measured in temporary well

Appendix B

HWA Well Installation Memorandum

July 26, 2022
HWA Project No. 2021-062-22

King County Metro Transit Capital Division
Transit Real Estate and Environmental
201 South Jackson Street, M.S. KSC-TR-0431
Seattle, WA 98104-3856

Attention: John Greene

Subject: **Well Installation Memorandum**
King County Metro Transit - South Facilities
Tukwila, Washington

Dear Mr. Greene,

As approved in the Contract E00635E19 Work Order #31 scope, HWA GeoSciences Inc (HWA) has performed additional site characterization work at the King County Metro Transit - South Facilities (South Facilities) addressed at 11911 East Marginal Way South, Tukwila, Washington. This memorandum includes a brief summary of field explorations and monitoring well installation activities that occurred as part of the additional site characterization work proposed in the Work Order #31 scope. Upon completion of all of the approved site investigation work, a Remedial Investigation (RI) Report Addendum will be provided. This work task was coordinated by HWA as part of HWA's contract with Parametrix for environmental services.

SUBSURFACE EXPLORATIONS AND WELL INSTALLATION

On December 20, 2021, HWA field staff observed the drilling of four probe borings at the South Facilities in Tukwila, Washington. Drilling and concrete coring was performed by Cascade Drilling (Driller), of Woodinville, Washington. All four borings were continuously logged in 5-foot intervals, and were completed to depths of approximately 15 feet below ground surface (bgs). Soil was screened for contamination using a photoionization detector (PID) and water sheen test. Environmental soil samples were collected from each boring location and temporary wells were constructed in borings 21B1 and 21B2, while permanent wells were constructed in borings 21MW-1 and 21MW-2. Reconnaissance soil and groundwater samples were submitted for analysis at Friedman & Bruya, Inc. (F&B), a third-party Ecology-accredited laboratory under contract with HWA.

Temporary wells were decommissioned in accordance with Chapter 173-160 Washington Administrative Code (WAC). Permanent wells were constructed at 21MW-1 and 21MW-2 following Chapter 173-160 WAC, and were developed by the driller using surge and pump techniques until the groundwater was relatively free of turbidity. Monitoring wells were sampled on January 5, 2022 with samples submitted to F&B for analysis.

Soil cuttings, coring wastewater, and purge and decontamination water were stored in three separate 55-gallon drums, at a location designated by the King County Metro staff.

SITE CONDITIONS

The results of our subsurface explorations indicate that the project site is underlain by sequences of alluvial, organic-rich silts, which are underlain and often interbedded with alluvial sands. Brief descriptions of the major soil units observed in our explorations are presented below in order of deposition, beginning with the most recently deposited.

- Concrete – Concrete thicknesses encountered at the boring locations ranged between approximately 7 to 9 inches.
- Fill/Disturbed Native – Undocumented fill and/or disturbed native soils were encountered in all borings, to depths of approximately 4.5 to 6.7 feet bgs. The fill consisted primarily of slightly silty to very silty gravel with small cobbles.
- Pea Gravel Fill – Pea gravel was encountered from 4.1 to 9.7 feet bgs at 21B1, which is located adjacent to a mapped water utility line.
- Alluvium – Alluvial deposits that consisted of organic-rich silts underlain by, and often interbedded with, fine dark grey/black sands to the termination depth of all borings (approximately 15 feet bgs). Sand sequences first encountered from 10 to 13.8 feet bgs in all borings, and persisted to termination depths.

Depth to groundwater was noted while drilling, with groundwater elevations recorded at time of drilling that varied from 4.7 to 9.5 feet bgs.

RECONNAISSANCE SOIL AND GROUNDWATER SAMPLING

Encountered soils exhibited few-to-no indications of contamination. No visual indications (e.g., sheen) of contamination were observed, and only one sampled interval exhibited a PID reading above 0 (reading of 0.1 ppm from 7.1 to 9.50 feet bgs at 21MW-1). No clear olfactory indications of contamination were observed; although several intervals exhibited an organic-like smell. Soil samples were collected at the perceived capillary fringe of all borings, as well as intervals exhibiting indications of potential contamination (e.g., PID reading, suspect odors). Following purging of the temporary wells 21B1 and 21B2 until relatively free of turbidity, reconnaissance groundwater samples were collected using low flow sampling methods with a peristaltic pump and new polyethylene and silicone tubing. Groundwater from 21B1 exhibited a faint petroleum odor, and sheen-like discoloration; groundwater from 21B2 was free of any odors or sheen.

Soil and groundwater samples were collected in analysis-appropriate, clean, laboratory supplied containers, and placed in a cooler with ice. Samples were kept in a cooler with ice and held at temperatures below four degrees Celsius until submittal to the laboratory for analysis with standard turnaround time. Analytical results are summarized in Tables 1 & 2, and copies of the final laboratory reports including chain-of custody documents are included in Appendix C.

GROUNDWATER MONITORING WELL SAMPLING

On January 5, 2022, HWA returned to the site to collect groundwater samples from permanent wells 21MW-1 and 21MW-2 using low-flow sampling techniques with a peristaltic pump and new polyethylene and silicone tubing. Prior to the start of low flow purging, depth to groundwater was measured at 2.54 feet bgs in 21MW-1 and 4.7 feet bgs in 21MW-2. During purging, field parameters pH, specific conductance, oxidation-reduction potential, dissolved oxygen and temperature were measured until stabilization was achieved. Field indications of contamination including odor, discoloration, and sheen were observed and documented. Groundwater purged and sampled from 21MW-1 was clear and free of odor and sheen. At 21MW-2 a vibrant orange sludge was observed at the surface of groundwater in the well, and purged water was turbid with a yellow-brown hue and sulfur/hydrocarbon odor. Groundwater samples were collected in analysis-appropriate, clean, laboratory supplied containers and placed in a cooler with ice. Samples were kept in a cooler with ice and held at temperatures below four degrees Celsius until submittal to the laboratory for analysis with standard turnaround time. Analytical results are summarized in Tables 1 & 2, and copies of the final laboratory reports including chain-of custody documents are included in Appendix C.

FUTURE GROUNDWATER MONITORING

Four consecutive quarters of groundwater level measurements, and sampling of newly installed wells 21MW-1, 21MW-2, and the four existing wells (SB-7, SB-8, DW-3R, and DW-4R) are planned as part of the additional site characterization activities. Upon completion of all additional site characterization activities, an RI Report Addendum will be provided.

We appreciate the opportunity to provide environmental services on this project. Should you have any questions or comments, or if we may be of further service, please do not hesitate to contact the undersigned at your convenience.

Sincerely,

HWA GEOSCIENCES INC.

Chris Bourgeois
Staff Geologist

Nicole Kapise
Senior Environmental Geologist

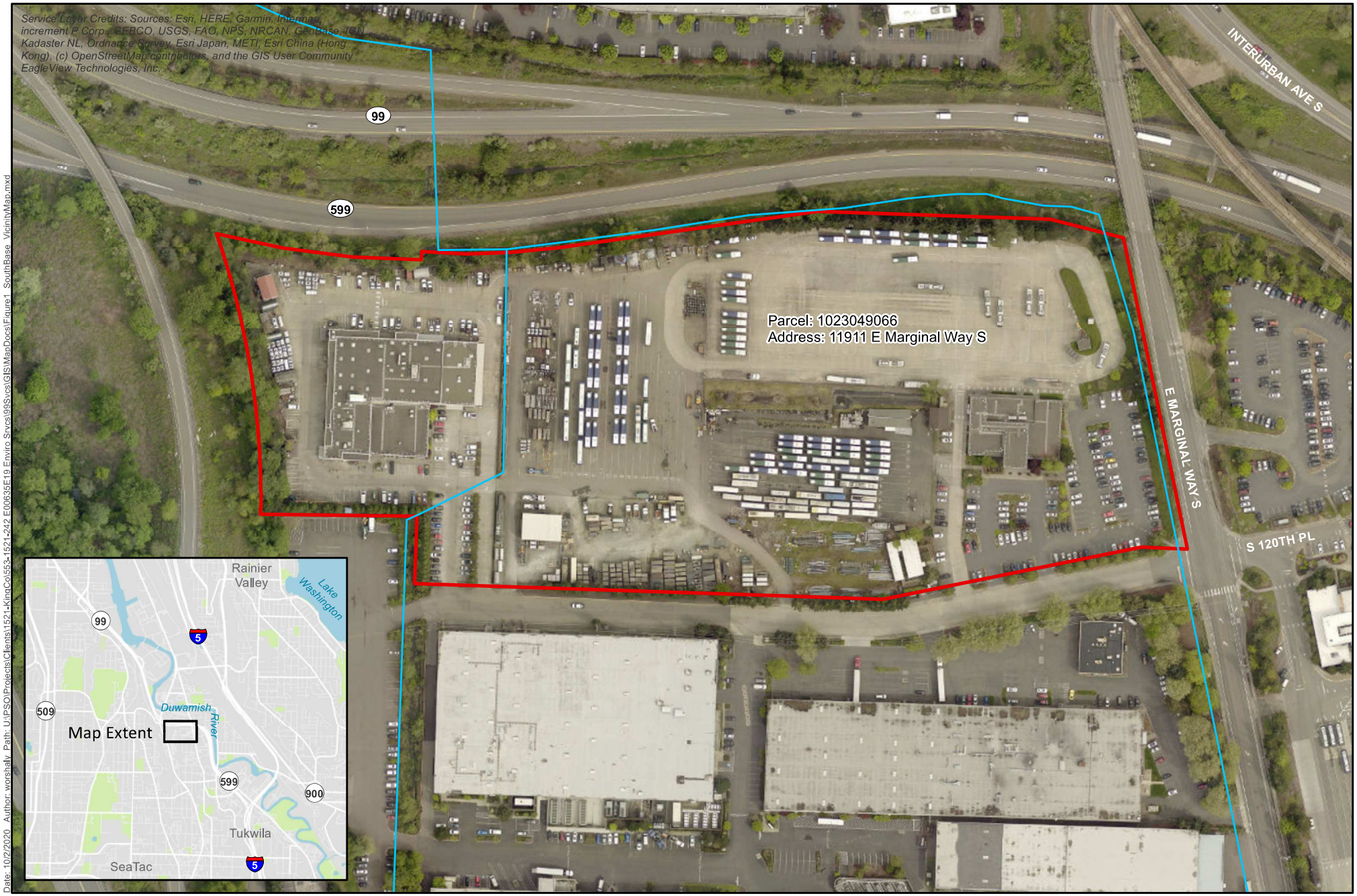
FIGURES (Following Text)

TABLES (Following Text)

Appendix A:

Appendix B:

Appendix C:



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Parametrix

Source: King County

0 50 100 200 Feet

Project Location

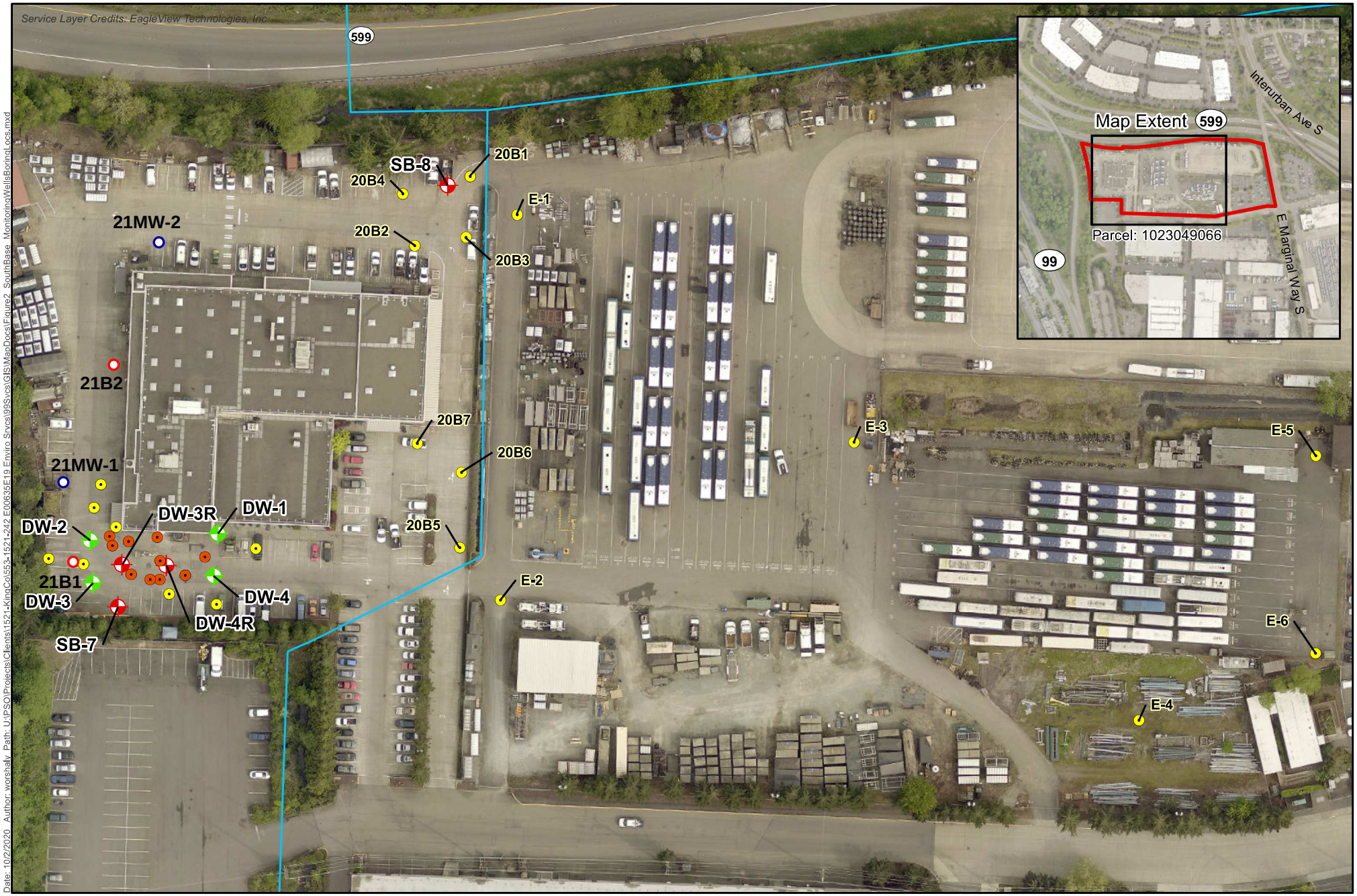
Stream

Figure 1

Site Map

King County Metro Transit S Facilities/S Annex

Tukwila, WA



Date: 10/2/2020 Author: worshaly Path: U:\PSO\Projects\Clients\1521-KingCo\553-1521-242 E00635E19 Enviro Srvcs\99Svcs\GIS\MapDocs\Figure2_SouthBase_MonitoringWellsBoringLocs.mxd

Source: King County

Project Location
Stream
Installed monitoring well (2021)
Borehole
Soil Sample
Drilled boring (2021)
Monitoring Well (Existing)
Monitoring Well (Historical)

0 35 70 140 Feet

Figure 2
Monitoring Well and Soil Sample Locations
King County Metro Transit S Facilities/S Annex
(adapted 2/3/2022)

Tukwila, WA

King County Metro South Facilities 200.01 Table 1- Soil Sampling Results All values in milligrams per kilogram (mg/kg)						
	Boring	**21B1**	**21B2**	**21MW-1**	**21MW-2**	**MTCA Method A/B Cleanup Levels**
	Date Sampled	**12/20/2021**	**12/20/2021**	**12/20/2021**	**12/20/2021**	
	Sample interval, ft bgs	9.8	4.0	6.5	4.5	
Petroleum Hydrocarbons	**Gasoline Range**	<5	<5	<5	<5	100/30[1]
	Diesel Range	<50	<50	<50	<50	2,000
	Diesel Range w/ SGC	<50	<50	<50	<50	2,000
	Lube Oil Range	<250	<250	<250	<250	2,000
	Lube Oil Range w/ SGC	<250	<250	<250	<250	2,000
BTEX + Naphthalene	**Benzene**	<0.03	<0.03	<0.03	<0.03	0.03
	Toluene	<0.05	<0.05	<0.05	<0.05	7
	Ethylbenzene	<0.05	<0.05	<0.05	<0.05	6
	Xylenes	<0.1	<0.1	<0.1	<0.1	9
	Naphthalene	<0.05	<0.05	<0.05	<0.05	5
CPAHs	**Multiple Analytes[2]**	ND	--	--	--	0.1[3]
PCBs	**Multiple Analytes[2]**	<0.02	--	--	--	1

Notes:

MTCA A / B – Ecology MTCA Method A / B soil cleanup levels, Chapter 173-340 WAC, shown for reference only. These cleanup apply at the Site, and are provided as a screening level indication of the environmental quality of the Site only.

1 - The Method A soil cleanup levels for gasoline mixtures without benzene and the total of ethylbenzene, toluene, and xylenes a the gasoline mixture is 100 mg/kg; all other mixtures are 30 mg/kg.

2 - See laboratory report for full list of CPAH and PCB analytes.

3 - Toxicity Equivalency Factor (TEF) method evaluates the toxicity of a mixture of structurally related chemicals with common me A TEF is an estimate of the relative toxicity of a chemical compared to a reference chemical. A Toxic Equivalence (TEQ) is a sir from the product of concentration of the individual TEFs. For mixtures of cPAHs, the established reference chemical is benzo(a)p MTCA Method A soil cleanup level of 0.1 mg/kg. Therefore, the calculated total cPAHs TEQ is compared to MTCA Method A soi benzo(a)pyrene of 0.1 mg/kg.

ND – None of the selected analytes detected.

< - Analyte not detected at listed reporting limit

Bold – Analyte Detected

King County Metro South Facilities Task 200.01 Table 2- Groundwater Sampling Results All values in in micrograms per liter (ug/L)						
	Boring	**21B1**	**21B2**	**21MW-1**	**21MW-2**	**MTCA Method A/B Cleanup Levels**
	Date Sampled	**12/20/2021**	**12/20/2021**	**1/5/2022**	**1/5/2022**	
Approximate Depth to Groundwater (feet bgs)		9.5	10.0	2.5	3.7	
Petroleum Hydrocarbons	**Gasoline Range**	<100	<100	<100	<100	800/1,000[1]
	Diesel Range	<50	**72**	<50	**96**	500
	Diesel Range w/ SGC	<50	<50	<50	<50	500
	Lube Oil Range	<250	<250	<250	<250	500
	Lube Oil Range w/ SGC	<250	<250	<250	<250	500
BTEX + Naphthalene	**Benzene**	<0.35	<0.35	<0.35	<0.35	5
	Toluene	<1	<1	<1	<1	1,000
	Ethylbenzene	<1	<1	<1	<1	700
	Xylenes	<2	<2	<2	<2	1,000
	Naphthalene	<1	<1	<1	<1	160
CPAHs	**Multiple Analytes[2]**	ND	--	--	--	0.1[3]
PCBs	**Multiple Analytes[2]**	<0.1	--	--	--	0.1

Notes:

MTCA A / B – Ecology MTCA Method A / B groundwater cleanup levels, Chapter 173-340 WAC, shown for reference only. These cleanup levels may not apply at the Site, and are provided as a screening level indication of the environmental quality of the Site only.

1 - The Method A Groundwater cleanup level for gasoline mixtures with benzene present is 800 ug/L, and without benzene is 1,000 ug/L.

2 - See laboratory report for full list of CPAH and PCB analytes.

3 - Toxicity Equivalency Factor (TEF) method evaluates the toxicity of a mixture of structurally related chemicals with common mechanism of action. A TEF is an estimate of the relative toxicity of a chemical compared to a reference chemical. A Toxic Equivalence (TEQ) is a single value resulting from the product of concentration of the individual TEFs. For mixtures of cPAHs, the established reference chemical is benzo(a)pyrene, which has a MTCA Method A groundwater cleanup level of 0.1 mg/kg. Therefore, the calculated total cPAHs TEQ is compared to MTCA Method A groundwater table value for benzo(a)pyrene of 0.1 mg/kg.

ND – None of the selected analytes detected.

< - Analyte not detected at listed reporting limit

Bold – Analyte Detected

APPENDIX A:

SITE EXPLORATION BORING AND WELL LOGS

DRILLING COMPANY: Cascade Drilling, Inc.
DRILLING METHOD: Geoprobe Track Mounted Rig
SAMPLING METHOD: Direct Push
LOCATION: See Figure 2

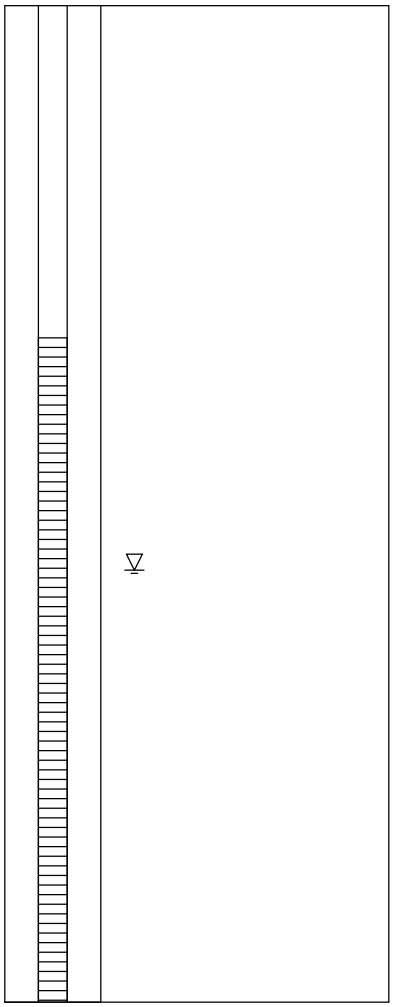
DATE STARTED: 12/20/2021
DATE COMPLETED: 12/20/2021
LOGGED BY: C. Bourgeois

DEPTH (feet)	USCS SOIL CLASS	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	PEN. RESISTANCE (blows/6 inches)	OTHER TESTS	PID (ppm)
0		Concrete pavement, 9 inches thick. **(PORTLAND CEMENT CONCRETE)**					
		No recovery.					
	GM	Olive brown, very silty angular GRAVEL, moist. **(FILL)** Becomes less silty, crushed cobbles observed.					
	GP	Pea gravel, moist. Clean.					
5	GP	Pea gravel, moist. Clean.					
	GM	GRAVEL with rust brown silt, moist.					
	ML	Dark olive gray SILT. Petroleum odor noted, wet. **(NATIVE ALLUVIUM)**					
		Low recovery.					
10	SM	Dark gray/black silty fine SAND, wet.		21B1-9.8			0.0
	ML	Olive gray SILT, moist.					
	SM	Dark gray/black silty fine SAND, moist.					
	ML	Olive gray SILT, moist.					
15	SM	Dark gray/black silty fine SAND, moist.					

21B1 completed to 15 feet below ground surface (bgs). Temporary well constructed for reconnaissance groundwater samples. Temporary well removed and borehole backfilled 12/20/2021.

Slight petroleum odor noted in groundwater.
No PID readings >0.0, odor, or sheen unless noted in description.

WELL COMPLETION SCHEMATIC



NOTES

NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

GEOSCIENCES INC.

King County Metro South Facilities
Tukwila, WA

TEMPORARY WELL/BORING
21B1

PROJECT NO.: 2021-062-WO31

DRILLING COMPANY: Cascade Drilling, Inc.
DRILLING METHOD: Geoprobe Track Mounted Rig
SAMPLING METHOD: Direct Push
LOCATION: See Figure 2

DATE STARTED: 12/20/2021
DATE COMPLETED: 12/20/2021
LOGGED BY: C. Bourgeois

DEPTH (feet)	SYMBOL	USCS SOIL CLASS	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	PEN. RESISTANCE (blows/6 inches)	OTHER TESTS	PID (ppm)	WELL COMPLETION SCHEMATIC	NOTES	DEPTH (feet)
0			Concrete pavement, 8 inches thick. **(PORTLAND CEMENT CONCRETE)**								0
			No recovery								
		GM	Silty GRAVEL **(FILL)**								
					21B2-4			0.0			
5			Slough								5
		ML	Chocolate brown SILT with long roots, moist, wet at surface. **(NATIVE ALLUVIUM)**								
		ML	Olive brown/gray SILT with roots, moist								
10			Slough.								10
			Olive brown slightly sandy SILT with some organics, moist.								
		SM	Dark gray/black silty SAND with some organics, moist.								
			Olive brown slightly sandy SILT with some organics, moist.								
		SW	Dark gray/black SAND with some organics, moist.								
			No recovery.								
15											15

21B2 completed to 15 feet below ground surface (bgs).
Temporary well constructed for reconnaissance groundwater.
Temporary well removed and borehole backfilled 12/20/2021.

No PID readings >0.0, odor, or sheen unless noted in description.
Groundwater measured at approximately 4.5 feet bgs after temp well installed.

NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

GeoSciences Inc.

King County Metro South Facilities
Tukwila, WA

TEMPORARY WELL/BORING
21B2

PROJECT NO.: 2021-062-WO31

DRILLING COMPANY: Cascade Drilling, Inc.
DRILLING METHOD: Geoprobe Track Mounted Rig
SAMPLING METHOD: Direct Push
LOCATION: See Figure 2

SURFACE ELEVATION: 13.69 ± feet
CASING ELEVATION 13.44 ± feet

DATE STARTED: 12/20/2021
DATE COMPLETED: 12/20/2021
LOGGED BY: C. Bourgeois

DEPTH (feet)	SYMBOL	USCS SOIL CLASS	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	PEN. RESISTANCE (blows/6 inches)	OTHER TESTS	PID (ppm)	WELL COMPLETION SCHEMATIC	NOTES	DEPTH (feet)
0			Concrete pavement, 9 inches thick. **(PORTLAND CEMENT CONCRETE)**								0
			No recovery.								
		GW	Well graded GRAVEL with pieces of crushed cobble, moist. **(FILL)**							1/5/2022	
5			No recovery.								5
		GM	Silty GRAVEL, wet								
			Olive gray gravelly SILT, moist.		22MW-1-6.5			0.1			
		ML	**(NATIVE ALLUVIUM)** Olive/chocolate brown organic SILT, moist. PID reading of 0.1.								
			Becomes sandy.		22MW-1-9.5			0.0			
10			Slough, wet. Olive brown fine sandy SILT with organics, wet.								10
			Dark olive/chocolate brown slightly sandy SILT with organics, wet.								
		SM	Becomes sandier.								
		SM	Black silty SAND, very few organics, moist.								
15											15

21MW-1 completed to 15 feet below ground surface (bgs). Permanent well installed to 15 feet bgs 12/20/2021.

No PID readings >0, odor, or sheen unless noted in description. Groundwater observed at 6 and 10 feet bgs during drilling. Groundwater measured at 2.54 feet bgs on 1/5/2022.

NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

GeoSciences Inc.

King County Metro South Facilities
Tukwila, WA

MONITORING WELL:
21MW-1

PROJECT NO.: 2021-062-WO31

DRILLING COMPANY: Cascade Drilling, Inc.
DRILLING METHOD: Geoprobe Track Mounted Rig
SAMPLING METHOD: Direct Push
LOCATION: See Figure 2

SURFACE ELEVATION: 14.02 ± feet
CASING ELEVATION 13.72 ± feet

DATE STARTED: 12/20/2021
DATE COMPLETED: 12/20/2021
LOGGED BY: C. Bourgeois

DEPTH (feet)	SYMBOL	USCS SOIL CLASS	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	PEN. RESISTANCE (blows/6 inches)	OTHER TESTS	PID (ppm)	WELL COMPLETION SCHEMATIC	NOTES	DEPTH (feet)
0			Concrete pavement, 7 inches thick. **(PORTLAND CEMENT CONCRETE)**								0
			No recovery.								
		GM	Silty GRAVEL, moist. **(FILL)**							1/5/2022	
			Dark olive brown find sandy SILT with oxidations and organics, moist. **(NATIVE ALLUVIUM)**		22MW-2-4.5			0.0			5
			No recovery, interval lost Dark olive gray sandy SILT with organics observed on probe sleeve								
10		SM	Dark olive gray very silty fine SAND with organics, moist.		22MW-2-10			0.0			10
		ML	Chocolate brown SILT with lots of yellow-brown organics which decrease with depth, moist.								
		SM	Dary gray/black silty fine SAND, moist.								
15											15

21MW-2 completed to 15 feet below ground surface (bgs).
Permanent well installed to 15 feet bgs 12/20/2021.

No PID readings >0, odor, or sheen unless noted in description. Saturated/wet soils not observed during drilling.
Groundwater measured at 3.70 feet bgs on 1/5/2022.

NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

GEOSCIENCES INC.

King County Metro South Facilities
Tukwila, WA

MONITORING WELL:
21MW-2

PROJECT NO.: 2021-062-WO31

APPENDIX B:

FIELD DATA SHEETS

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.1 Date: 1/5/2022 Well ID: 21MW-1

Project Name: King County METRO South Facilities South Annex Project Address: 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences Samplers: Chris Bourgeois

Purge Data

Purge Equipment: Peristaltic pump Depth of Well (ft below TOC): 15.0

Pump Intake Depth (ft below TOC): 7.5 Well Casing/Diameter: 2"

Initial Depth to Water (ft below TOC): 2.54 Purge Time (from/to): 1045 – 1118

Time	Depth to Water (ft below TOC)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance ~~(mg/cm)~~ mS/cm	pH (units)	ORP (mv)	Turbidity (visual)	Comments
~~1037~~	~~2.54~~					~~[illegible]~~		5.44			pump setting 3'
1045	2.74	3	280		6.06	~~[illegible]~~ 3.97	0.689	~~[illegible]~~	176.0	clear	
1048	3.01	" "	" "		6.08	2.77	0.678	5.68	148.5	clear	
1051	3.04	" "	280		6.04	1.83	0.666	5.80	130.0	" "	
1054	" "	" "	" "		5.92	1.58	0.662	5.84	120.8	" "	
1057	3.06	" "	" "		6.03	1.44	0.664	5.87	112.8	" "	
1100	3.07	" "	" "		5.83	1.20	0.675	5.89	107.5	" "	
1103	3.07	" "	280		5.86	1.19	0.673	5.91	104.3	" "	
1106	3.10	" "	" "		5.83	1.08	0.677	5.93	99.9	" "	
1109	3.08	" "	" "		5.85	1.06	0.671	5.93	96.5	" "	
1112	3.10	" "	" "		5.92	~~[illegible]~~ 0.94	0.670	5.94	94.0	" "	
1115	3.10	" "	" "		5.67	0.89	0.662	5.95	91.7	" "	
1118	" "	" "	" "		5.72	0.89	0.660	5.95	90.3	" "	No odor, No sheen
				~4 gallons							
Stabilization Criteria					3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sampling Data

Sample ID: 21MW-1 Time Collected: 1130 Weather: 38°F overcast

Sample Description (Color, Turbidity, Odor, Other): clear, odorless

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene; PCBs, cPAHs (HOLD)

Laboratory: Friedman & Bruya Lab Dropoff Method: in-person Lab Dropoff Date: 1/5/2021

Additional Information/Comments

iron bacteria in monument, none observed in well or ~~sample~~ purged water

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.1 Date: 1/5/2022 Well ID: 21MW-2

Project Name: King County METRO South Facilities South Annex Project Address: 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences Samplers: Chris Bourgeois

Purge Data

Purge Equipment: Peristaltic pump Depth of Well (ft below TOC): 15.0

Pump Intake Depth (ft below TOC): 8.0 Well Casing/Diameter: 2"

Initial Depth to Water (ft below TOC): 3.7 Purge Time (from/to): 1222 - 1246

Time	Depth to Water (ft below TOC)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (visual)	Comments
1222	3.90	2.5	260		9.41	2.14	1.178	6.11	7.2	slightly	
1225	3.91		"		9.90	1.12	1.175	6.16	-13.9		
1228	3.91		"		10.07	0.94	1.174	6.19	-33.7	pale yellow	su
1231	3.91		"		10.26	0.78	1.172	6.20	-43.3		es
1234	3.91		"		10.33	0.66	1.172	6.22	-56.5		sn
1237	3.91		"		10.41	0.66	1.167	6.23	-60.4		
1240	3.91		260		10.54	0.66	1.164	6.23	-67.4	clearer	less od
1243	3.91		"		10.60	0.66	1.161	6.24	-72.3		
1246	3.91		"		10.61	0.71	1.153	6.25	-76.2	clear	
				~3 gallons							
			Stabilization Criteria		3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sampling Data

Sample ID: 21MW-2 Time Collected: 1250 Weather: 38°F OVERCAST

Sample Description (Color, Turbidity, Odor, Other): yellow/brown color & odor first gallon purge

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene; PCBs, cPAHs (HOLD)

Laboratory: Friedman & Bruya Lab Dropoff Method: in-person Lab Dropoff Date: 1/5/2021

Additional Information/Comments

- Sample has some orange flakes + slight yellow hue
- sheen in purge bucket while sampling (iron bacteria)

Parametrix

PARAMETRIX Form 07-EN-215/Rev. 02/07

Field Report/Well Data

TO:

Lisa Gilbert

Mike Brady

John Greene

DATE 1/5/2021	JOB NO. 553-1521-242 WO31 Task 200.1
PROJECT King County METRO South Facilities South Annex	
LOCATION 11911 E Marginal Way S, Tukwila, WA	
CONTRACTOR Parametrix in Assoc. with HWA Geosciences	OWNER King County METRO
WEATHER 38° overcast	TEMP ° at AM ° at PM
PRESENT AT SITE Chris Bourgeois	
Cierra Wilson	
Al Thatcher	

THE FOLLOWING WAS NOTED:

WN (WELL NUMBER)	Time	DTW (DEPTH TO WATER)	MP (MEASURE POINT)	SU (STICK UP OF WELL CASING)	TD (TOTAL DEPTH OF WELL)	WD (WELL DIAMETER)	
21MW-1	1017	2.54'	PVC			2"	
21MW-2	1220	3.70'				2"	
SB-7	928	3.43'		-0.07'	11.64'	2"	ODOR
SB-8	0843	4.29'					
DW-3R	940	3.12'		-0.45'	8.79'	0.9' ID	Air
DW-4R	948	3.45'		-0.38'		0.65' ID	
E-1	VWP						
E-2	905	3.90'		-4.6"	15.76'	2"	
Stream G.	0859	6.58'					

TOC (Top of Locking Casing) TOW (Top of Well Casing)

3 COPIES _____ SIGNED CW

VWP - vibrating wire piezometer installed. Measurement impossible.

APPENDIX C:

LABORATORY REPORTS

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

April 14, 2022

Chris Bourgeois, Project Manager
HWA Geosciences, Inc
21312 30th Dr SE
Bothell, WA 98021

Dear Ms Kapise:

Included is the amended report from the testing of material submitted on December 21, 2021 from the King County Metro South Facilities W031 2021-062-W021, F&BI 112414 project. Per your request, the project name has been updated.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Mike Brady (Parametrix), Lisa Gilbert (Parametrix)
HWA0104R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

January 4, 2022

Chris Bourgeois, Project Manager
HWA Geosciences, Inc
21312 30th Dr SE
Bothell, WA 98021

Dear Ms Kapise:

Included are the results from the testing of material submitted on December 21, 2021 from the King County Metro South Facilities W031 2021-062-W021, F&BI 112414 project. There are 39 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Mike Brady (Parametrix), Lisa Gilbert (Parametrix)
HWA0104R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on December 21, 2020 by Friedman & Bruya, Inc. from the HWA Geosciences, Inc King County Metro South Facilities W031 2021-062-W021, F&BI 112414 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	HWA Geosciences, Inc
112414 -01	21B1
112414 -02	21B2
112414 -03	21B1-9.8
112414 -04	21MW-1-9.5
112414 -05	21MW-2-10
112414 -06	21B2-4
112414 -07	21MW-1-6.5
112414 -08	21MW-2-4.5

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 01/04/22
Date Received: 12/21/21
Project: King County Metro South Facilities W031 2021-062-W021, F&BI 112414
Date Extracted: 12/23/21
Date Analyzed: 12/23/21

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
21B1-9.8 112414-03	<5	88
21B2-4 112414-06	<5	87
21MW-1-6.5 112414-07	<5	75
21MW-2-4.5 112414-08	<5	88
Method Blank 01-2680 MB	<5	135

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 01/04/22
Date Received: 12/21/21
Project: King County Metro South Facilities W031 2021-062-W021, F&BI 112414
Date Extracted: 12/23/21
Date Analyzed: 12/23/21

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 51-134)
21B1 112414-01	<100	83
21B2 112414-02	<100	83
Method Blank 01-2681 MB	<100	81

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 01/04/22
Date Received: 12/21/21
Project: King County Metro South Facilities W031 2021-062-W021, F&BI 112414
Date Extracted: 12/22/21
Date Analyzed: 12/22/21

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 48-168)
21B1-9.8 112414-03	<50	<250	105
21B2-4 112414-06	<50	<250	100
21MW-1-6.5 112414-07	<50	<250	97
21MW-2-4.5 112414-08	<50	<250	100
Method Blank 01-2916 MB	<50	<250	103

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 01/04/22
Date Received: 12/21/21
Project: King County Metro South Facilities W031 2021-062-W021, F&BI 112414
Date Extracted: 12/22/21
Date Analyzed: 12/22/21

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx
Sample Extracts Passed Through a Silica Gel Column Prior to Analysis
Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 56-165)
21B1-9.8 112414-03	<50	<250	108
21B2-4 112414-06	<50	<250	104
21MW-1-6.5 112414-07	<50	<250	109
21MW-2-4.5 112414-08	<50	<250	107
Method Blank 01-2914 MB	<50	<250	143

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 01/04/22
Date Received: 12/21/21
Project: King County Metro South Facilities W031 2021-062-W021, F&BI 112414
Date Extracted: 12/22/21
Date Analyzed: 12/22/21

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
21B1 112414-01	<50	<250	127
21B2 112414-02	72 x	<250	127
Method Blank 01-2912 MB2	<50	<250	108

Date of Report: 01/04/22
Date Received: 12/21/21
Project: King County Metro South Facilities W031 2021-062-W021, F&BI 112414
Date Extracted: 12/22/21
Date Analyzed: 12/22/21

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx
Sample Extracts Passed Through a Silica Gel Column Prior to Analysis
Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 47-140)
21B1 112414-01	<50	<250	111
21B2 112414-02	<50	<250	129
Method Blank 01-2912 MB2	<50	<250	113

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	21B1-9.8	Client:	HWA Geosciences, Inc
Date Received:	12/21/21	Project:	King County Metro South Facilities
Date Extracted:	12/22/21	Lab ID:	112414-03
Date Analyzed:	12/23/21	Data File:	122245.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	90	109
Toluene-d8	99	89	112
4-Bromofluorobenzene	100	84	115

Compounds:	Concentration mg/kg (ppm)
Benzene	<0.03
Toluene	<0.05
Ethylbenzene	<0.05
m,p-Xylene	<0.1
o-Xylene	<0.05
Naphthalene	<0.05

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	21B2-4	Client:	HWA Geosciences, Inc
Date Received:	12/21/21	Project:	King County Metro South Facilities
Date Extracted:	12/22/21	Lab ID:	112414-06
Date Analyzed:	12/23/21	Data File:	122246.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	90	109
Toluene-d8	103	89	112
4-Bromofluorobenzene	101	84	115

Compounds:	Concentration mg/kg (ppm)
Benzene	<0.03
Toluene	<0.05
Ethylbenzene	<0.05
m,p-Xylene	<0.1
o-Xylene	<0.05
Naphthalene	<0.05

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	21MW-1-6.5	Client:	HWA Geosciences, Inc
Date Received:	12/21/21	Project:	King County Metro South Facilities
Date Extracted:	12/22/21	Lab ID:	112414-07
Date Analyzed:	12/23/21	Data File:	122247.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	93	90	109
Toluene-d8	99	89	112
4-Bromofluorobenzene	99	84	115

Compounds:	Concentration mg/kg (ppm)
Benzene	<0.03
Toluene	<0.05
Ethylbenzene	<0.05
m,p-Xylene	<0.1
o-Xylene	<0.05
Naphthalene	<0.05

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	21MW-2-4.5	Client:	HWA Geosciences, Inc
Date Received:	12/21/21	Project:	King County Metro South Facilities
Date Extracted:	12/22/21	Lab ID:	112414-08
Date Analyzed:	12/23/21	Data File:	122248.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	90	109
Toluene-d8	100	89	112
4-Bromofluorobenzene	98	84	115

Compounds:	Concentration mg/kg (ppm)
Benzene	<0.03
Toluene	<0.05
Ethylbenzene	<0.05
m,p-Xylene	<0.1
o-Xylene	<0.05
Naphthalene	<0.05

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	HWA Geosciences, Inc
Date Received:	Not Applicable	Project:	King County Metro South Facilities
Date Extracted:	12/22/21	Lab ID:	01-2847 mb
Date Analyzed:	12/22/21	Data File:	122239.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	90	109
Toluene-d8	100	89	112
4-Bromofluorobenzene	102	84	115

Compounds:	Concentration mg/kg (ppm)
Benzene	<0.03
Toluene	<0.05
Ethylbenzene	<0.05
m,p-Xylene	<0.1
o-Xylene	<0.05
Naphthalene	<0.05

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	21B1	Client:	HWA Geosciences, Inc
Date Received:	12/21/21	Project:	King County Metro South Facilities
Date Extracted:	12/22/21	Lab ID:	112414-01
Date Analyzed:	12/23/21	Data File:	122325.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	85	117
Toluene-d8	94	88	112
4-Bromofluorobenzene	103	90	111

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	21B2	Client:	HWA Geosciences, Inc
Date Received:	12/21/21	Project:	King County Metro South Facilities
Date Extracted:	12/22/21	Lab ID:	112414-02
Date Analyzed:	12/23/21	Data File:	122326.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	111	85	117
Toluene-d8	98	88	112
4-Bromofluorobenzene	100	90	111

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	HWA Geosciences, Inc
Date Received:	Not Applicable	Project:	King County Metro South Facilities
Date Extracted:	12/22/21	Lab ID:	01-2848 mb
Date Analyzed:	12/22/21	Data File:	122207.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	108	85	117
Toluene-d8	95	88	112
4-Bromofluorobenzene	102	90	111

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	21B1-9.8	Client:	HWA Geosciences, Inc
Date Received:	12/21/21	Project:	King County Metro South Facilities
Date Extracted:	12/22/21	Lab ID:	112414-03 1/5
Date Analyzed:	12/23/21	Data File:	122317.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	75	24	111
Phenol-d6	84	37	116
Nitrobenzene-d5	94	38	117
2-Fluorobiphenyl	83	45	117
2,4,6-Tribromophenol	84	11	158
Terphenyl-d14	95	50	124

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	HWA Geosciences, Inc
Date Received:	Not Applicable	Project:	King County Metro South Facilities
Date Extracted:	12/22/21	Lab ID:	01-2920 mb 1/5
Date Analyzed:	12/23/21	Data File:	122308.D
Matrix:	Soil	Instrument:	GCMS12
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	77	39	103
Phenol-d6	88	48	109
Nitrobenzene-d5	85	23	138
2-Fluorobiphenyl	89	50	150
2,4,6-Tribromophenol	89	40	127
Terphenyl-d14	102	50	150

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	21B1	Client:	HWA Geosciences, Inc
Date Received:	12/21/21	Project:	King County Metro South Facilities
Date Extracted:	12/22/21	Lab ID:	112414-01 1/2
Date Analyzed:	12/23/21	Data File:	122313.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	41	10	60
Phenol-d6	31	10	49
Nitrobenzene-d5	112	15	144
2-Fluorobiphenyl	89	25	128
2,4,6-Tribromophenol	98	10	142
Terphenyl-d14	103	41	138

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.4
2-Methylnaphthalene	<0.4
1-Methylnaphthalene	<0.4
Acenaphthylene	<0.04
Acenaphthene	<0.04
Fluorene	<0.04
Phenanthrene	<0.04
Anthracene	<0.04
Fluoranthene	<0.04
Pyrene	<0.04
Benz(a)anthracene	<0.04
Chrysene	<0.04
Benzo(a)pyrene	<0.04
Benzo(b)fluoranthene	<0.04
Benzo(k)fluoranthene	<0.04
Indeno(1,2,3-cd)pyrene	<0.04
Dibenz(a,h)anthracene	<0.04
Benzo(g,h,i)perylene	<0.08

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	HWA Geosciences, Inc
Date Received:	Not Applicable	Project:	King County Metro South Facilities
Date Extracted:	12/22/21	Lab ID:	01-2918 mb
Date Analyzed:	12/23/21	Data File:	122309.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	26	10	60
Phenol-d6	18	10	49
Nitrobenzene-d5	110	15	144
2-Fluorobiphenyl	95	25	128
2,4,6-Tribromophenol	87	10	142
Terphenyl-d14	112	41	138

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.2
2-Methylnaphthalene	<0.2
1-Methylnaphthalene	<0.2
Acenaphthylene	<0.02
Acenaphthene	<0.02
Fluorene	<0.02
Phenanthrene	<0.02
Anthracene	<0.02
Fluoranthene	<0.02
Pyrene	<0.02
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02
Benzo(g,h,i)perylene	<0.04

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	21B1-9.8	Client:	HWA Geosciences, Inc
Date Received:	12/21/21	Project:	King County Metro South Facilities
Date Extracted:	12/28/21	Lab ID:	112414-03 1/6
Date Analyzed:	12/29/21	Data File:	122906.D
Matrix:	Soil	Instrument:	GC9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	85	23	120

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	Method Blank	Client:	HWA Geosciences, Inc
Date Received:	Not Applicable	Project:	King County Metro South Facilities
Date Extracted:	12/28/21	Lab ID:	01-2940 mb 1/6
Date Analyzed:	12/29/21	Data File:	122904.D
Matrix:	Soil	Instrument:	GC9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	104	23	120

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	21B1	Client:	HWA Geosciences, Inc
Date Received:	12/21/21	Project:	King County Metro South Facilities
Date Extracted:	12/22/21	Lab ID:	112414-01
Date Analyzed:	12/22/21	Data File:	122231.D
Matrix:	Water	Instrument:	GC9
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	42	25	160

Compounds:	Concentration ug/L (ppb)
Aroclor 1221	<0.1
Aroclor 1232	<0.1
Aroclor 1016	<0.1
Aroclor 1242	<0.1
Aroclor 1248	<0.1
Aroclor 1254	<0.1
Aroclor 1260	<0.1
Aroclor 1262	<0.1
Aroclor 1268	<0.1

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	Method Blank	Client:	HWA Geosciences, Inc
Date Received:	Not Applicable	Project:	King County Metro South Facilities
Date Extracted:	12/22/21	Lab ID:	01-2917 mb2
Date Analyzed:	12/22/21	Data File:	122225.D
Matrix:	Water	Instrument:	GC9
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	57	25	160

Compounds:	Concentration ug/L (ppb)
Aroclor 1221	<0.1
Aroclor 1232	<0.1
Aroclor 1016	<0.1
Aroclor 1242	<0.1
Aroclor 1248	<0.1
Aroclor 1254	<0.1
Aroclor 1260	<0.1
Aroclor 1262	<0.1
Aroclor 1268	<0.1

Date of Report: 01/04/22
Date Received: 12/21/21
Project: King County Metro South Facilities W031 2021-062-W021, F&BI 112414

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 112423-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	95	71-131

Date of Report: 01/04/22
Date Received: 12/21/21
Project: King County Metro South Facilities W031 2021-062-W021, F&BI 112414

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 112410-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	86	69-134

Date of Report: 01/04/22
Date Received: 12/21/21
Project: King County Metro South Facilities W031 2021-062-W021, F&BI 112414

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 112414-03 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	108	102	73-135	6

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	100	74-139

Date of Report: 01/04/22
Date Received: 12/21/21
Project: King County Metro South Facilities W031 2021-062-W021, F&BI 112414

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 112414-03 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	110	112	63-146	2

Laboratory Code: Laboratory Control Silica Gel Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	102	79-144

Date of Report: 01/04/22
Date Received: 12/21/21
Project: King County Metro South Facilities W031 2021-062-W021, F&BI 112414

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Silica Gel Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	128	120	61-133	8

Date of Report: 01/04/22
Date Received: 12/21/21
Project: King County Metro South Facilities W031 2021-062-W021, F&BI 112414

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	108	104	63-142	4

Date of Report: 01/04/22
Date Received: 12/21/21
Project: King County Metro South Facilities W031 2021-062-W021, F&BI 112414

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 112396-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Benzene	mg/kg (ppm)	1	<0.03	90	85	29-129	6
Toluene	mg/kg (ppm)	1	<0.05	92	85	35-130	8
Ethylbenzene	mg/kg (ppm)	1	<0.05	94	88	32-137	7
m,p-Xylene	mg/kg (ppm)	2	<0.1	96	88	34-136	9
o-Xylene	mg/kg (ppm)	1	<0.05	95	90	33-134	5
Naphthalene	mg/kg (ppm)	1	<0.05	94	87	14-157	8

Date of Report: 01/04/22
Date Received: 12/21/21
Project: King County Metro South Facilities W031 2021-062-W021, F&BI 112414

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	mg/kg (ppm)	1	94	71-118
Toluene	mg/kg (ppm)	1	97	66-126
Ethylbenzene	mg/kg (ppm)	1	97	64-123
m,p-Xylene	mg/kg (ppm)	2	96	78-122
o-Xylene	mg/kg (ppm)	1	97	77-124
Naphthalene	mg/kg (ppm)	1	97	63-140

Date of Report: 01/04/22
Date Received: 12/21/21
Project: King County Metro South Facilities W031 2021-062-W021, F&BI 112414

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 112409-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Benzene	ug/L (ppb)	10	<0.35	98	50-150
Toluene	ug/L (ppb)	10	<1	100	50-150
Ethylbenzene	ug/L (ppb)	10	<1	101	50-150
m,p-Xylene	ug/L (ppb)	20	<2	104	50-150
o-Xylene	ug/L (ppb)	10	<1	101	50-150
Naphthalene	ug/L (ppb)	10	<1	93	50-150

Date of Report: 01/04/22
Date Received: 12/21/21
Project: King County Metro South Facilities W031 2021-062-W021, F&BI 112414

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Benzene	ug/L (ppb)	10	95	97	70-130	2
Toluene	ug/L (ppb)	10	96	100	70-130	4
Ethylbenzene	ug/L (ppb)	10	99	102	70-130	3
m,p-Xylene	ug/L (ppb)	20	102	104	70-130	2
o-Xylene	ug/L (ppb)	10	98	102	70-130	4
Naphthalene	ug/L (ppb)	10	91	96	70-130	5

Date of Report: 01/04/22
Date Received: 12/21/21
Project: King County Metro South Facilities W031 2021-062-W021, F&BI 112414

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270E

Laboratory Code: 112423-01 1/5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	mg/kg (ppm)	0.83	<0.01	75	73	50-150	3
2-Methylnaphthalene	mg/kg (ppm)	0.83	<0.01	79	77	50-150	3
1-Methylnaphthalene	mg/kg (ppm)	0.83	<0.01	77	76	50-150	1
Acenaphthylene	mg/kg (ppm)	0.83	<0.01	82	81	50-150	1
Acenaphthene	mg/kg (ppm)	0.83	<0.01	79	79	50-150	0
Fluorene	mg/kg (ppm)	0.83	<0.01	83	82	50-150	1
Phenanthrene	mg/kg (ppm)	0.83	<0.01	82	83	50-150	1
Anthracene	mg/kg (ppm)	0.83	<0.01	81	83	50-150	2
Fluoranthene	mg/kg (ppm)	0.83	<0.01	85	82	50-150	4
Pyrene	mg/kg (ppm)	0.83	<0.01	92	86	50-150	7
Benz(a)anthracene	mg/kg (ppm)	0.83	<0.01	85	87	50-150	2
Chrysene	mg/kg (ppm)	0.83	<0.01	87	87	50-150	0
Benzo(a)pyrene	mg/kg (ppm)	0.83	<0.01	89	90	50-150	1
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	<0.01	88	86	50-150	2
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	<0.01	85	86	50-150	1
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	<0.01	97	97	50-150	0
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	<0.01	95	96	50-150	1
Benzo(g,h,i)perylene	mg/kg (ppm)	0.83	<0.01	95	96	50-150	1

Date of Report: 01/04/22
Date Received: 12/21/21
Project: King County Metro South Facilities W031 2021-062-W021, F&BI 112414

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270E

Laboratory Code: Laboratory Control Sample 1/5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Naphthalene	mg/kg (ppm)	0.83	83	61-102
2-Methylnaphthalene	mg/kg (ppm)	0.83	84	62-108
1-Methylnaphthalene	mg/kg (ppm)	0.83	83	62-108
Acenaphthylene	mg/kg (ppm)	0.83	92	61-111
Acenaphthene	mg/kg (ppm)	0.83	90	61-110
Fluorene	mg/kg (ppm)	0.83	91	62-114
Phenanthrene	mg/kg (ppm)	0.83	90	64-112
Anthracene	mg/kg (ppm)	0.83	90	63-111
Fluoranthene	mg/kg (ppm)	0.83	90	66-115
Pyrene	mg/kg (ppm)	0.83	100	65-112
Benz(a)anthracene	mg/kg (ppm)	0.83	94	64-116
Chrysene	mg/kg (ppm)	0.83	95	66-119
Benzo(a)pyrene	mg/kg (ppm)	0.83	97	62-116
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	100	61-118
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	92	65-119
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	102	64-130
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	102	67-131
Benzo(g,h,i)perylene	mg/kg (ppm)	0.83	102	67-126

Date of Report: 01/04/22
Date Received: 12/21/21
Project: King County Metro South Facilities W031 2021-062-W021, F&BI 112414

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270E

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	5	86	85	66-94	1
2-Methylnaphthalene	ug/L (ppb)	5	85	87	68-98	2
1-Methylnaphthalene	ug/L (ppb)	5	84	87	67-97	4
Acenaphthylene	ug/L (ppb)	5	95	96	70-130	1
Acenaphthene	ug/L (ppb)	5	90	90	70-130	0
Fluorene	ug/L (ppb)	5	92	93	70-130	1
Phenanthrene	ug/L (ppb)	5	92	90	70-130	2
Anthracene	ug/L (ppb)	5	97	94	70-130	3
Fluoranthene	ug/L (ppb)	5	98	98	70-130	0
Pyrene	ug/L (ppb)	5	98	98	70-130	0
Benz(a)anthracene	ug/L (ppb)	5	95	95	70-130	0
Chrysene	ug/L (ppb)	5	98	97	70-130	1
Benzo(a)pyrene	ug/L (ppb)	5	103	103	70-130	0
Benzo(b)fluoranthene	ug/L (ppb)	5	97	98	62-130	1
Benzo(k)fluoranthene	ug/L (ppb)	5	104	104	70-130	0
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	5	110	108	70-130	2
Dibenz(a,h)anthracene	ug/L (ppb)	5	113	110	70-130	3
Benzo(g,h,i)perylene	ug/L (ppb)	5	111	108	70-130	3

Date of Report: 01/04/22
Date Received: 12/21/21
Project: King County Metro South Facilities W031 2021-062-W021, F&BI 112414

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR POLYCHLORINATED BIPHENYLS AS AROCLOR 1016/1260 BY EPA METHOD 8082A

Laboratory Code: 112423-01 1/6 (Matrix Spike) 1/6

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Control Limits	RPD (Limit 20)
Aroclor 1016	mg/kg (ppm)	0.25	<0.02	95	88	44-107	8
Aroclor 1260	mg/kg (ppm)	0.25	<0.02	96	90	38-124	6

Laboratory Code: Laboratory Control Sample 1/6

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Aroclor 1016	mg/kg (ppm)	0.25	96	47-158
Aroclor 1260	mg/kg (ppm)	0.25	100	69-147

Date of Report: 01/04/22
Date Received: 12/21/21
Project: King County Metro South Facilities W031 2021-062-W021, F&BI 112414

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR POLYCHLORINATED BIPHENYLS AS AROCLOR 1016/1260 BY EPA METHOD 8082A

Laboratory Code: Laboratory Control Sample 1/0.5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Aroclor 1016	ug/L (ppb)	0.13	60	68	25-165	12
Aroclor 1260	ug/L (ppb)	0.13	60	68	25-163	12

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

112414

SAMPLE CHAIN OF CUSTODY

12-21-21

E03/WW2/VS1/D01

Page # 1 of 1

Report To Chris Bourgeois

Company HWA Geosciences

Address 21312 30th Drive SE

City, State, ZIP Bothell, WA 98021

Phone 206 794 3145 Email cbourgeois@hwageo.com

SAMPLERS (*signature*) Chris B

PROJECT NAME: King County Metro South ~~base~~ WO31

PO #: 2021-062 WO31

REMARKS: Facilities per MB 4/13/22 See note for Dx – wr and wro sec.

Project specific RLs? - Yes / No

INVOICE TO: HWA

TURNAROUND TIME
- ☑ Standard turnaround
- ☐ RUSH
- Rush charges authorized by:

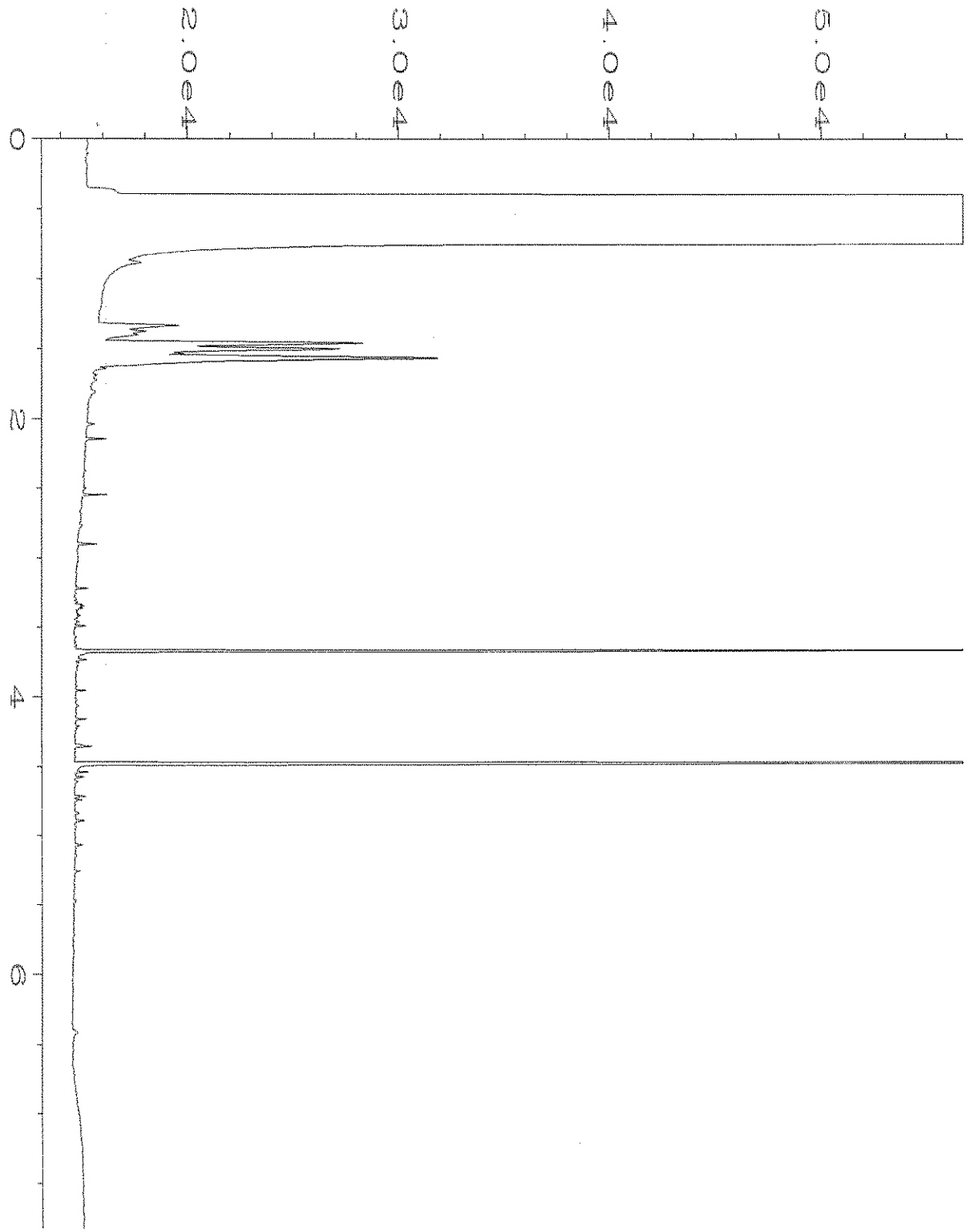
SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

MBrady @ pwanalytical.com Chris

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	BTEX + Naphthalene		HoLD		Notes
21B1	01A-I	12/20/21	1120	water	9	X	X				X	X	X				Dx both wr & wro sec
21B2	02A-G	↓	1635	water	7	X	X						X				"
21B1-9.8	03A-F	↓	1105	soil	6	X	X				X	X	X				"
21MW-1-9.5	04 ↓	↓	1320	soil	6	X	X			CB	~~X~~	~~X~~	X		X		"
21MW-2-10	05A-E	↓	1515	soil	5	X	X						X		X		"
21B2-4	06A-F	↓	1625	soil	6	X	X						X				"
21MW-1-6.5	07A-E	↓	1330	soil	5	X	X						X		~~X~~	CB	"
21MW-2-4.5	08 ↓	↓	1510	soil	5	X	X						X		~~X~~		"

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Chris B	Chris Bourgeois	HWA	12/21/21	1344
Received by: D. M.	Liz Webber-Bruya	F?B	12/21/21	1344
Relinquished by:				
Received by:		Samples received at 5 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282



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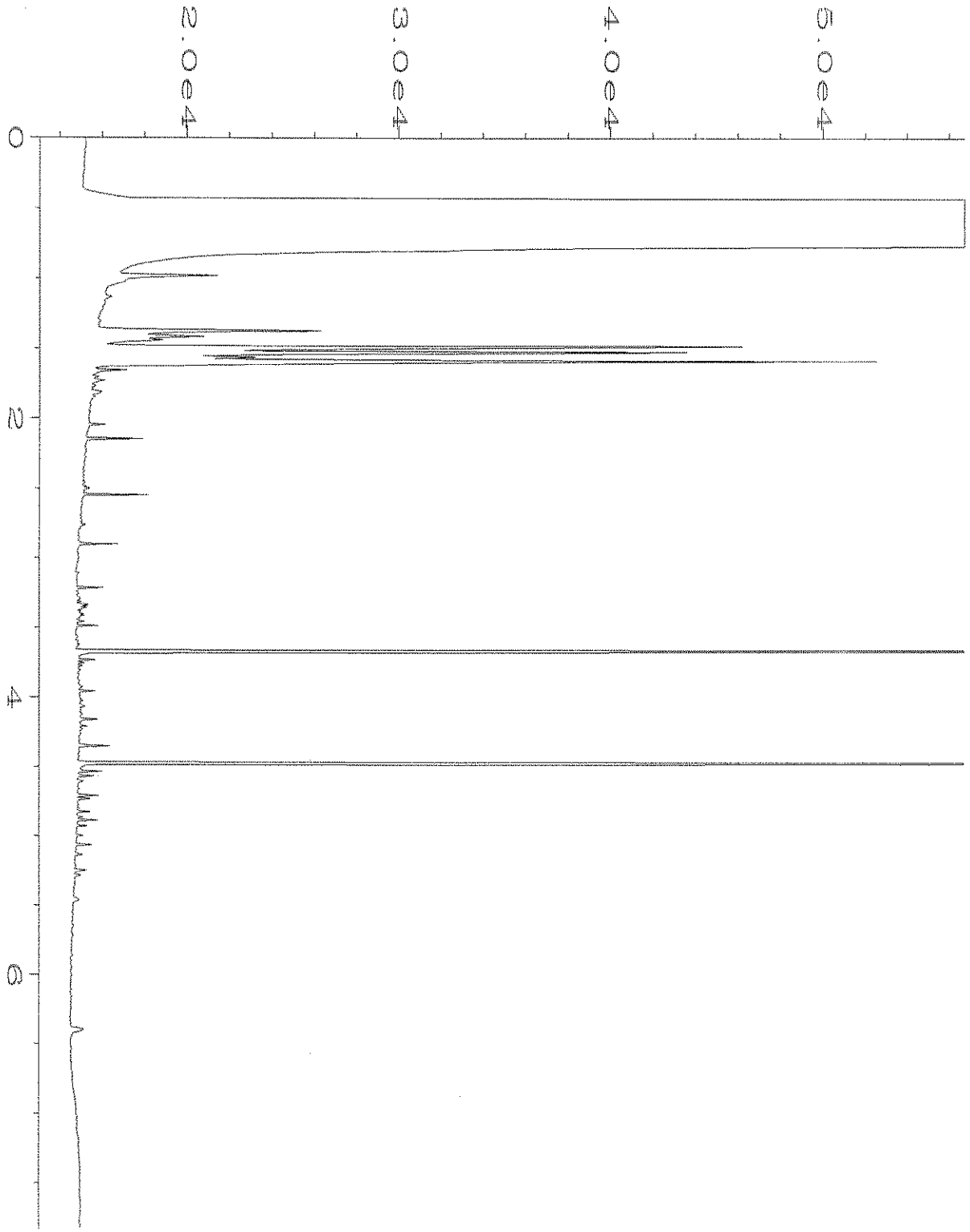
Operator	: TL	Page Number	: 1
Instrument	: GC#4	Vial Number	: 38
Sample Name	: 112414-01 sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 11
Acquired on	: 22 Dec 21 05:28 PM	Instrument Method	: DX.MTH
Report Created on:	22 Jul 22 01:05 PM	Analysis Method	: DX.MTH



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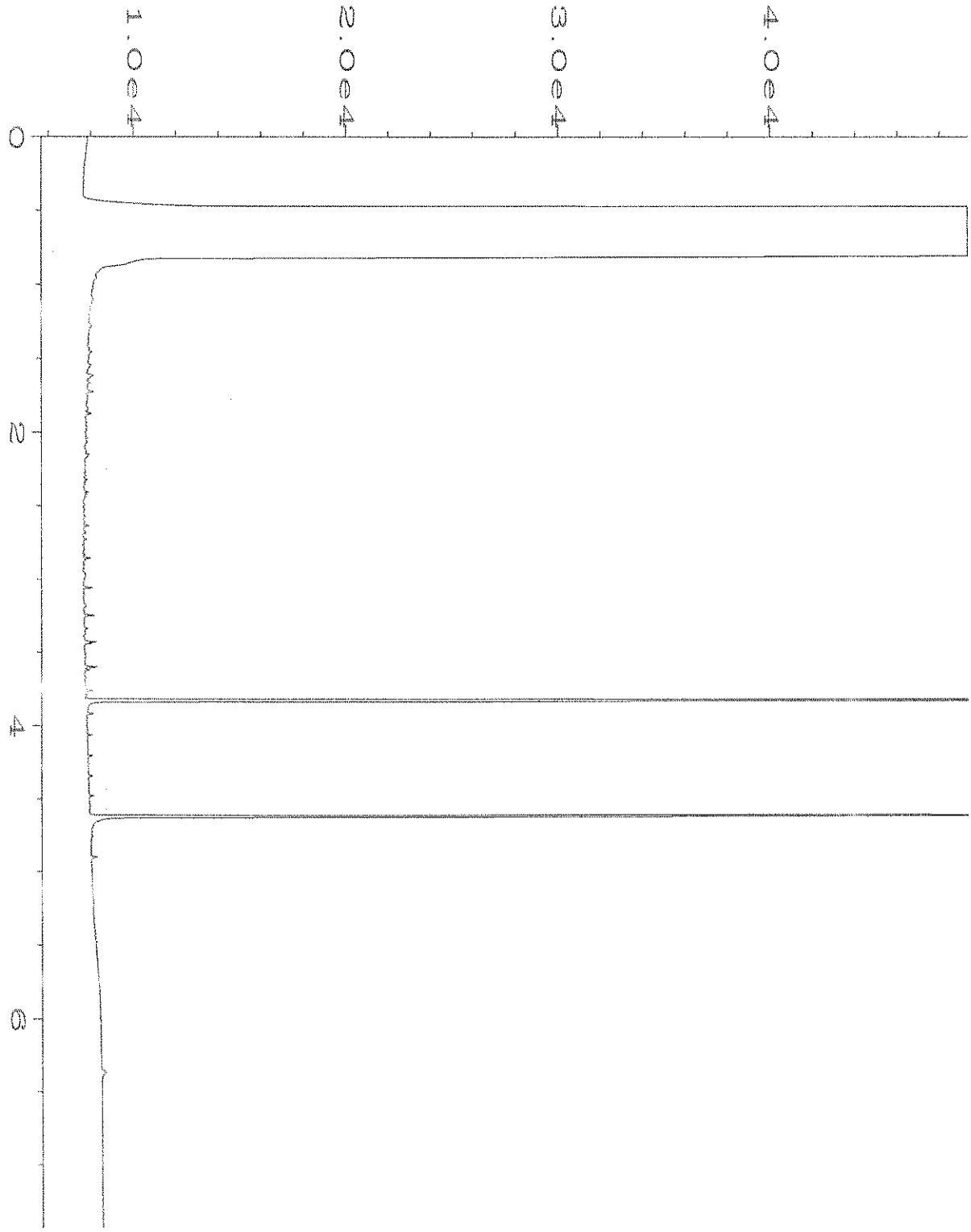
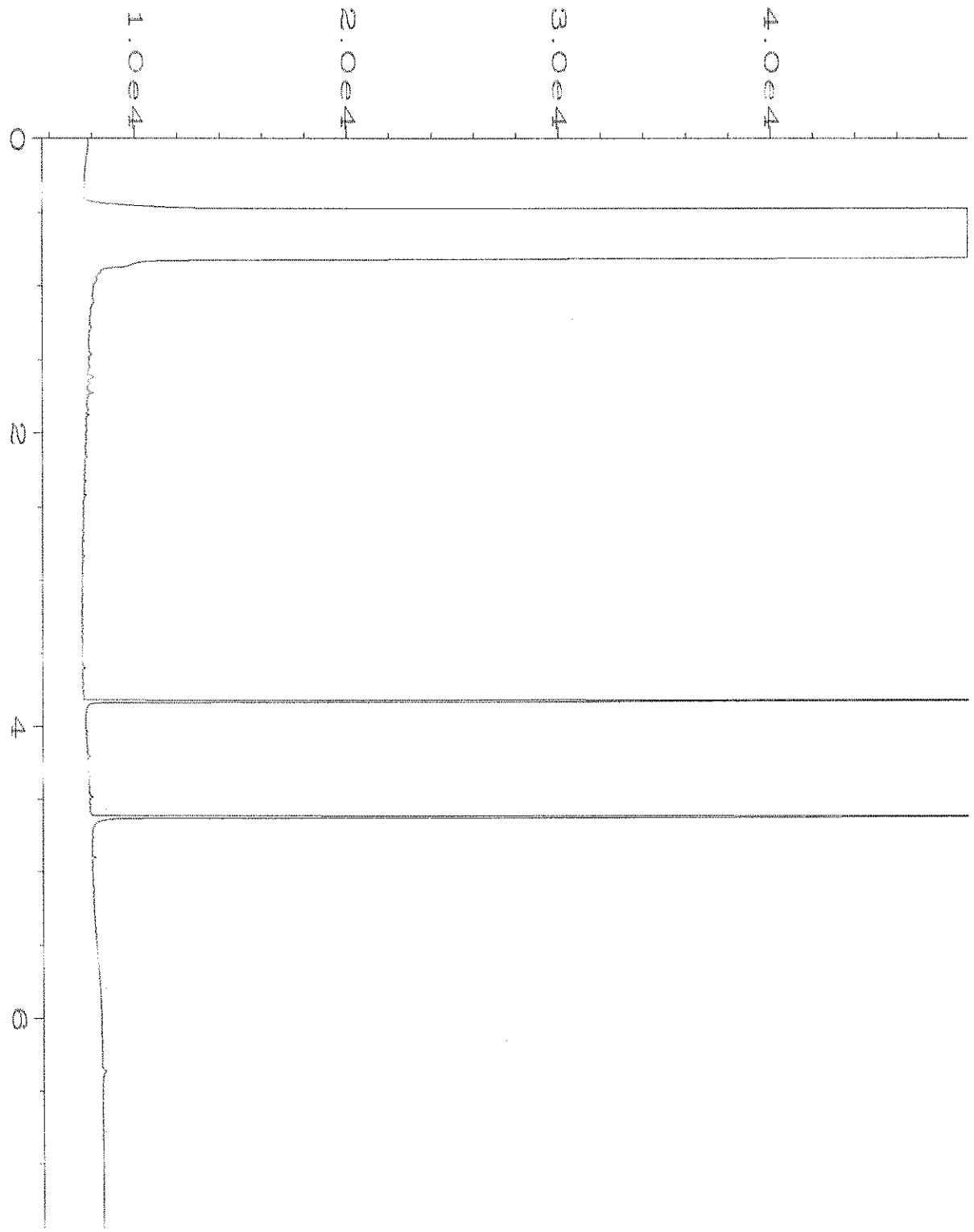
Operator	: TL	Page Number	: 1
Instrument	: GC#4	Vial Number	: 39
Sample Name	: 112414-02 sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 11
Acquired on	: 22 Dec 21 05:41 PM	Instrument Method	: DX.MTH
Report Created on:	22 Jul 22 01:05 PM	Analysis Method	: DX.MTH



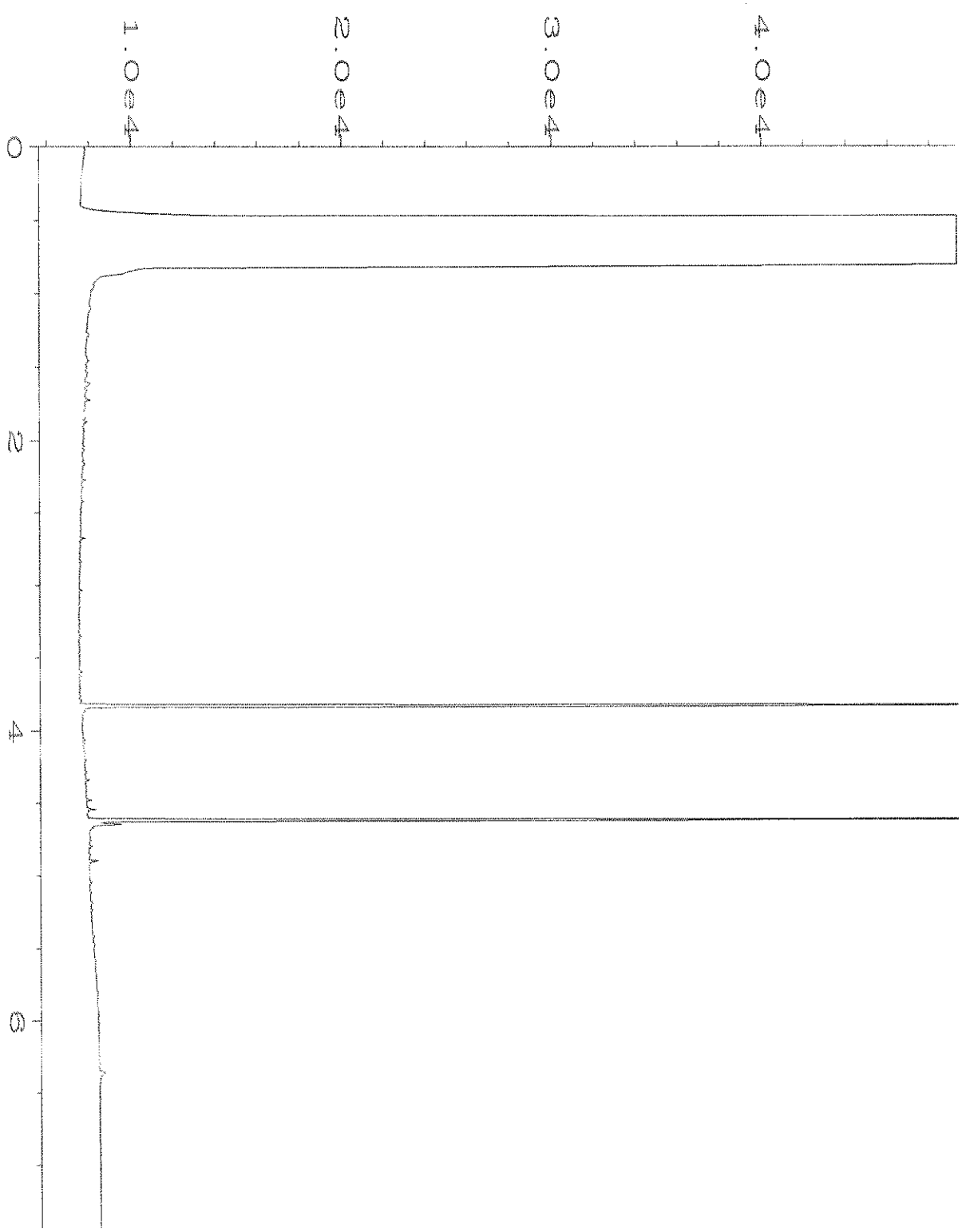
Data File Name : C:\HPCHEM\1\DATA\12-22-21\011F0601.D
Operator : TL
Instrument : GC1
Sample Name : 112414-03 sg
Run Time Bar Code:
Acquired on : 22 Dec 21 10:53 AM
Report Created on: 22 Jul 22 01:21 PM

Page Number : 1
Vial Number : 11
Injection Number : 1
Sequence Line : 6
Instrument Method: DX.MTH
Analysis Method : DX.MTH

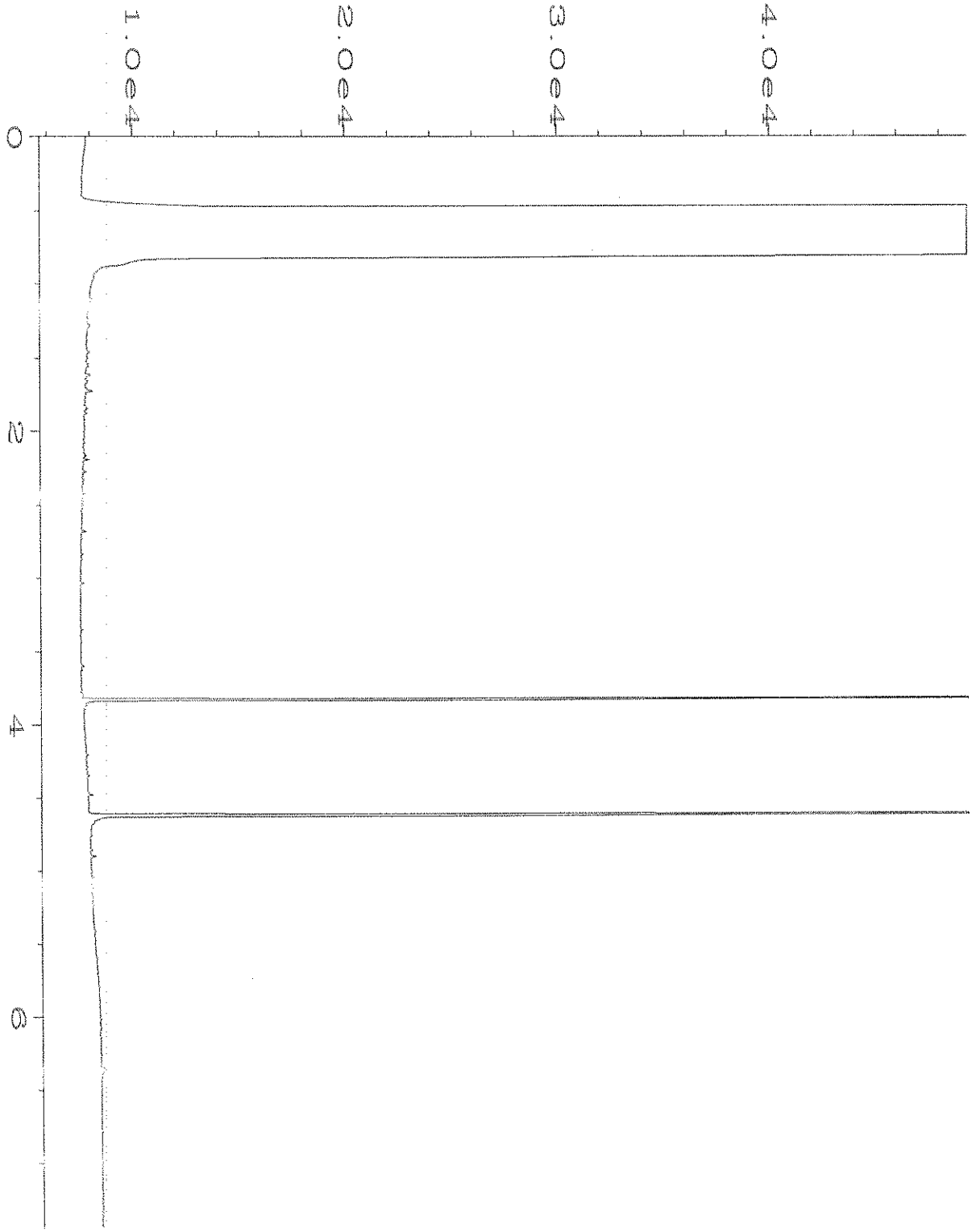


Data File Name : C:\HPCHEM\1\DATA\12-22-21\012F0601.D

Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 12
Sample Name	: 112414-06 sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 6
Acquired on	: 22 Dec 21 11:07 AM	Instrument Method	: DX.MTH
Report Created on	: 22 Jul 22 01:22 PM	Analysis Method	: DX.MTH

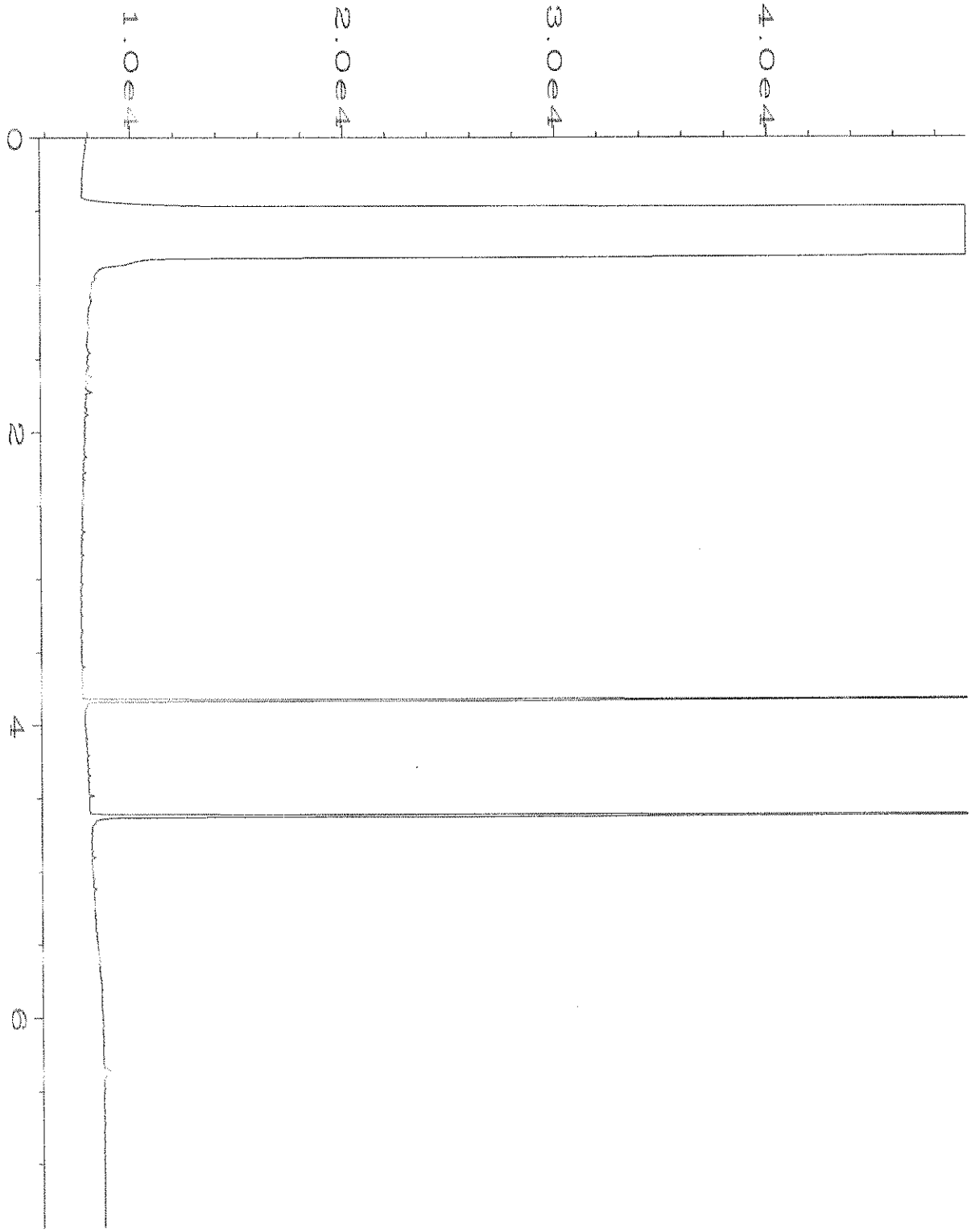


Data File Name	: C:\HPCHEM\1\DATA\12-22-21\013F0601.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 13
Sample Name	: 112414-07 sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 6
Acquired on	: 22 Dec 21 11:22 AM	Instrument Method	: DX.MTH
Report Created on	: 22 Jul 22 01:22 PM	Analysis Method	: DX.MTH



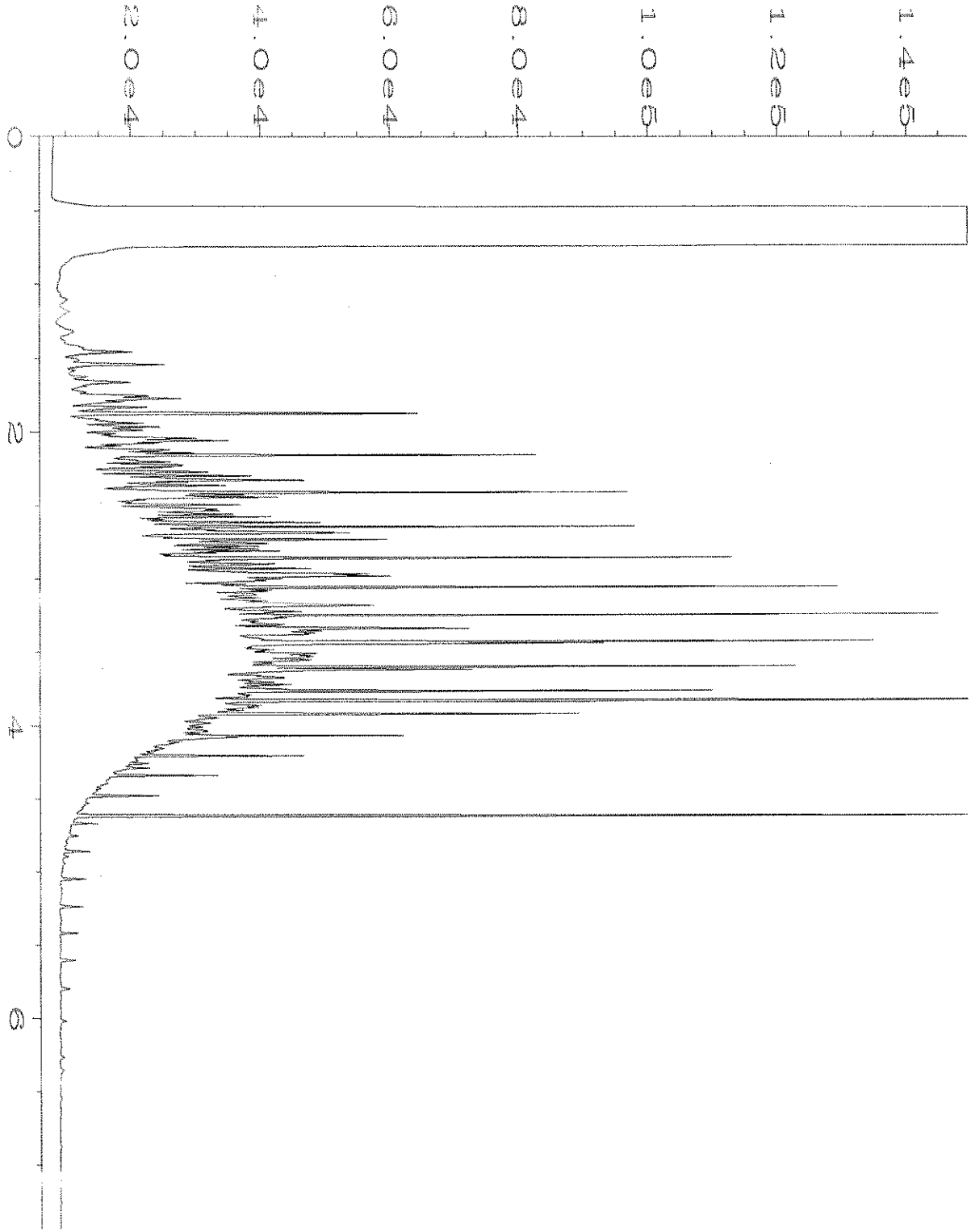
Data File Name : C:\HPCHEM\1\DATA\12-22-21\014F0601.D
Operator : TL
Instrument : GC1
Sample Name : 112414-08 sg
Run Time Bar Code:
Acquired on : 22 Dec 21 11:36 AM
Report Created on: 22 Jul 22 01:22 PM

Page Number : 1
Vial Number : 14
Injection Number : 1
Sequence Line : 6
Instrument Method: DX.MTH
Analysis Method : DX.MTH

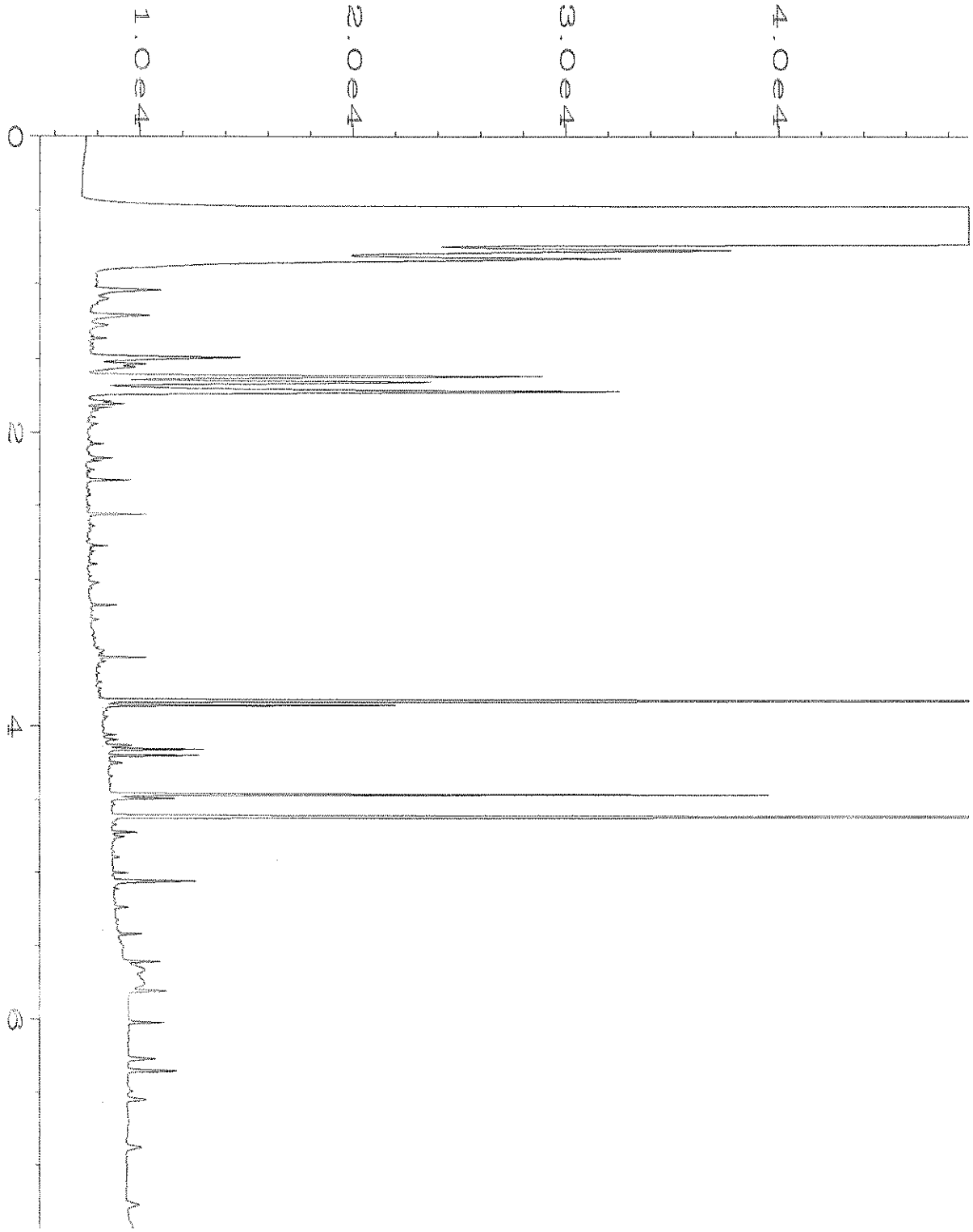


Data File Name : C:\HPCHEM\1\DATA\12-22-21\007F0601.D
Operator : TL
Instrument : GC1
Sample Name : 01-2916 mb sg
Run Time Bar Code:
Acquired on : 22 Dec 21 09:55 AM
Report Created on: 22 Jul 22 01:22 PM

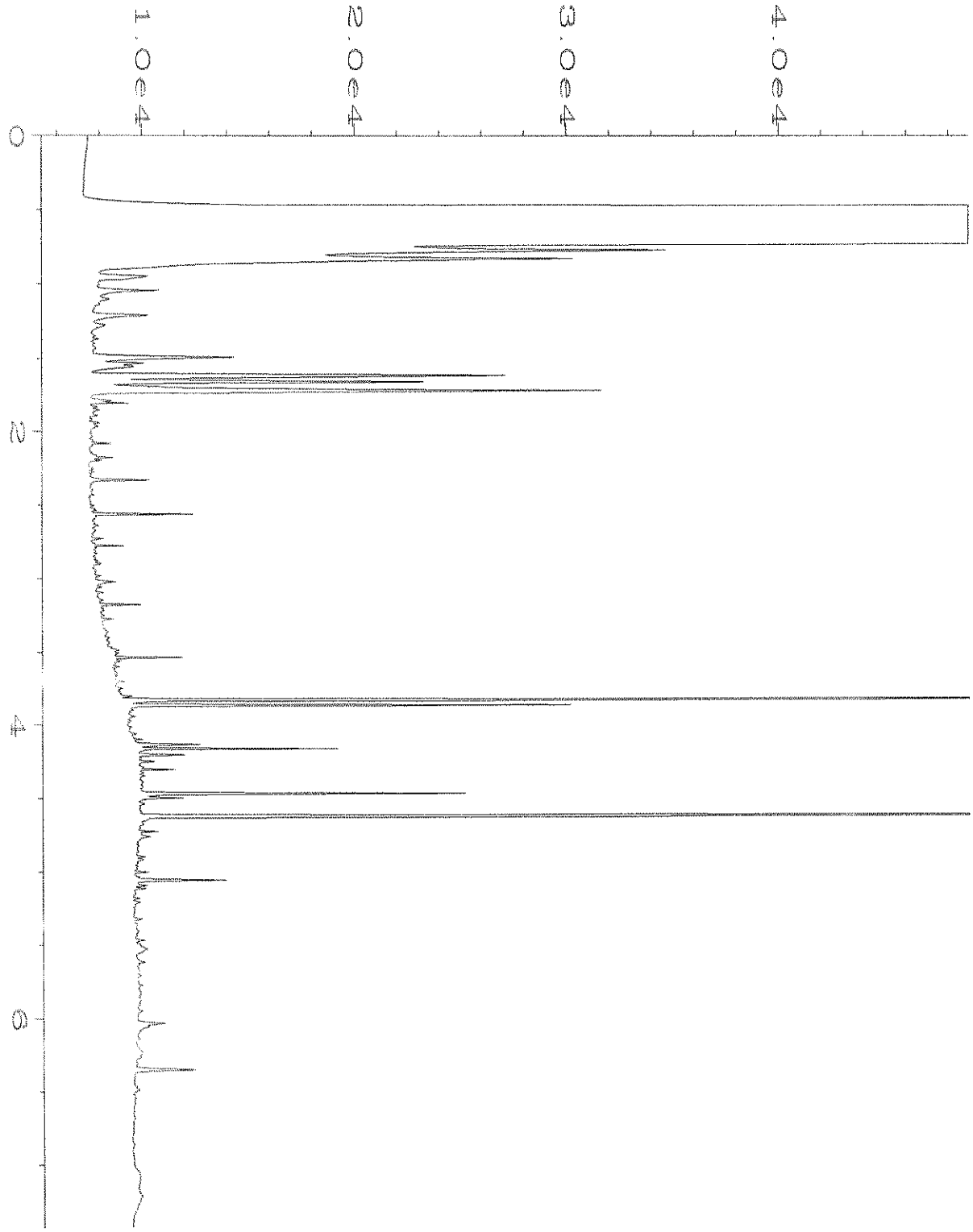
Page Number : 1
Vial Number : 7
Injection Number : 1
Sequence Line : 6
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name	: C:\HPCHEM\1\DATA\12-22-21\003F0201.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 3
Sample Name	: 500 Dx 64-13H	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 2
Acquired on	: 22 Dec 21 06:20 AM	Instrument Method	: DX.MTH
Report Created on	: 22 Jul 22 01:22 PM	Analysis Method	: DX.MTH

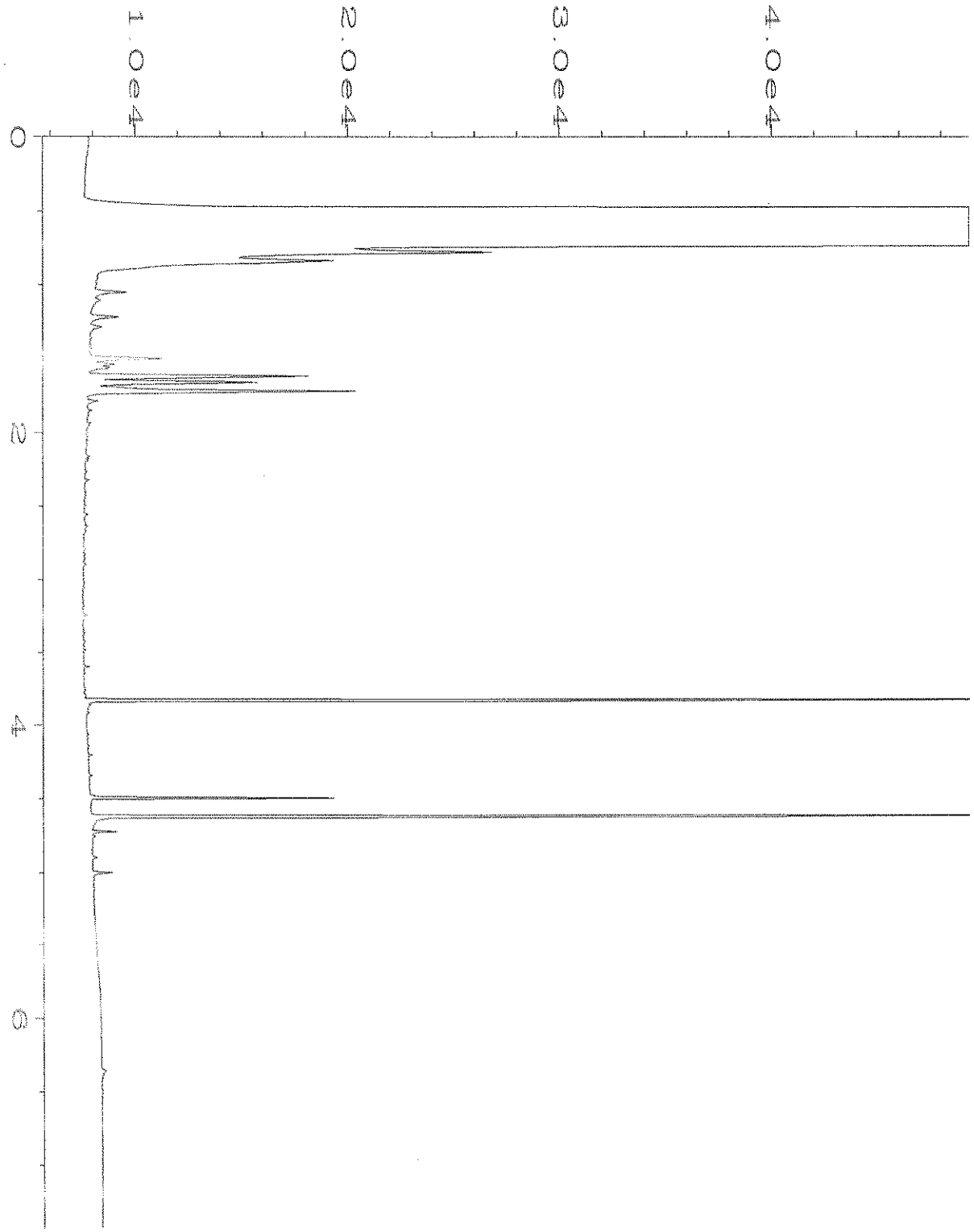


Data File Name	: C:\HPCHEM\1\DATA\12-22-21\045F1401.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 45
Sample Name	: 112414-01	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 14
Acquired on	: 22 Dec 21 10:20 PM	Instrument Method	: DX.MTH
Report Created on:	22 Jul 22 01:23 PM	Analysis Method	: DX.MTH



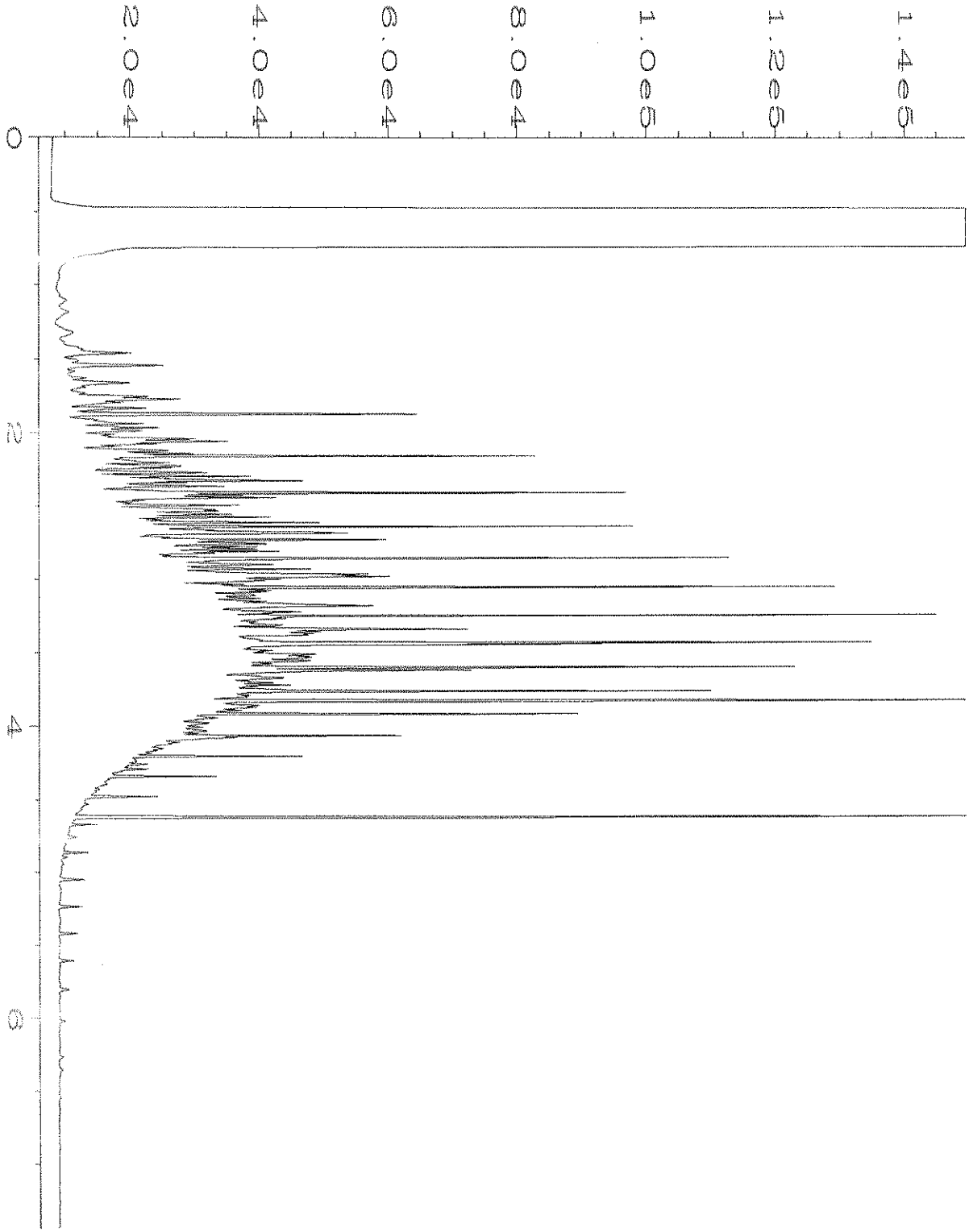
Data File Name : C:\HPCHEM\1\DATA\12-22-21\046F1401.D

Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 46
Sample Name	: 112414-02	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 14
Acquired on	: 22 Dec 21 10:34 PM	Instrument Method	: DX.MTH
Report Created on	: 22 Jul 22 01:23 PM	Analysis Method	: DX.MTH

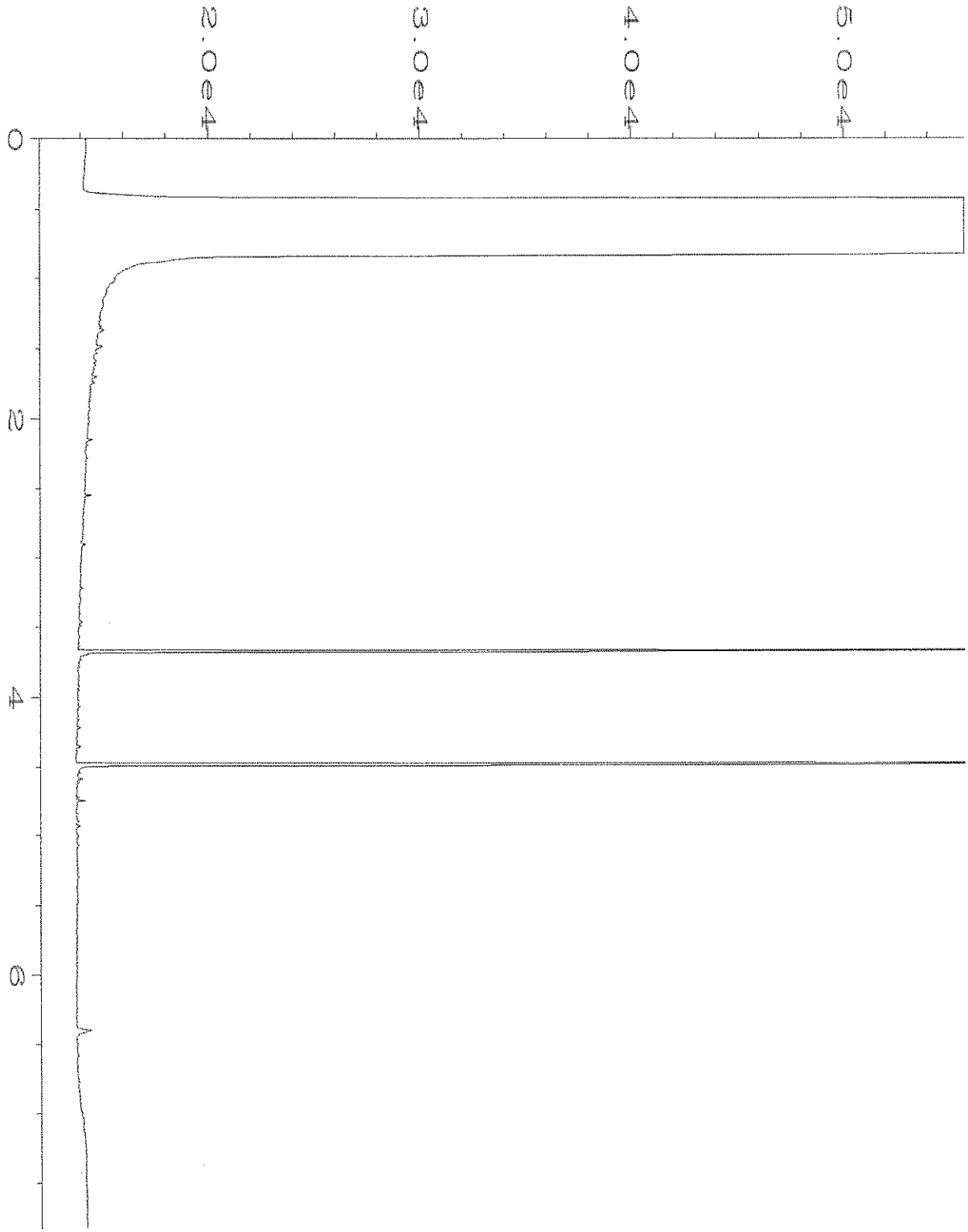


Data File Name : C:\HPCHEM\1\DATA\12-22-21\015F0601.D
Operator : TL
Instrument : GC1
Sample Name : 01-2912 mb2
Run Time Bar Code:
Acquired on : 22 Dec 21 11:50 AM
Report Created on: 22 Jul 22 01:23 PM

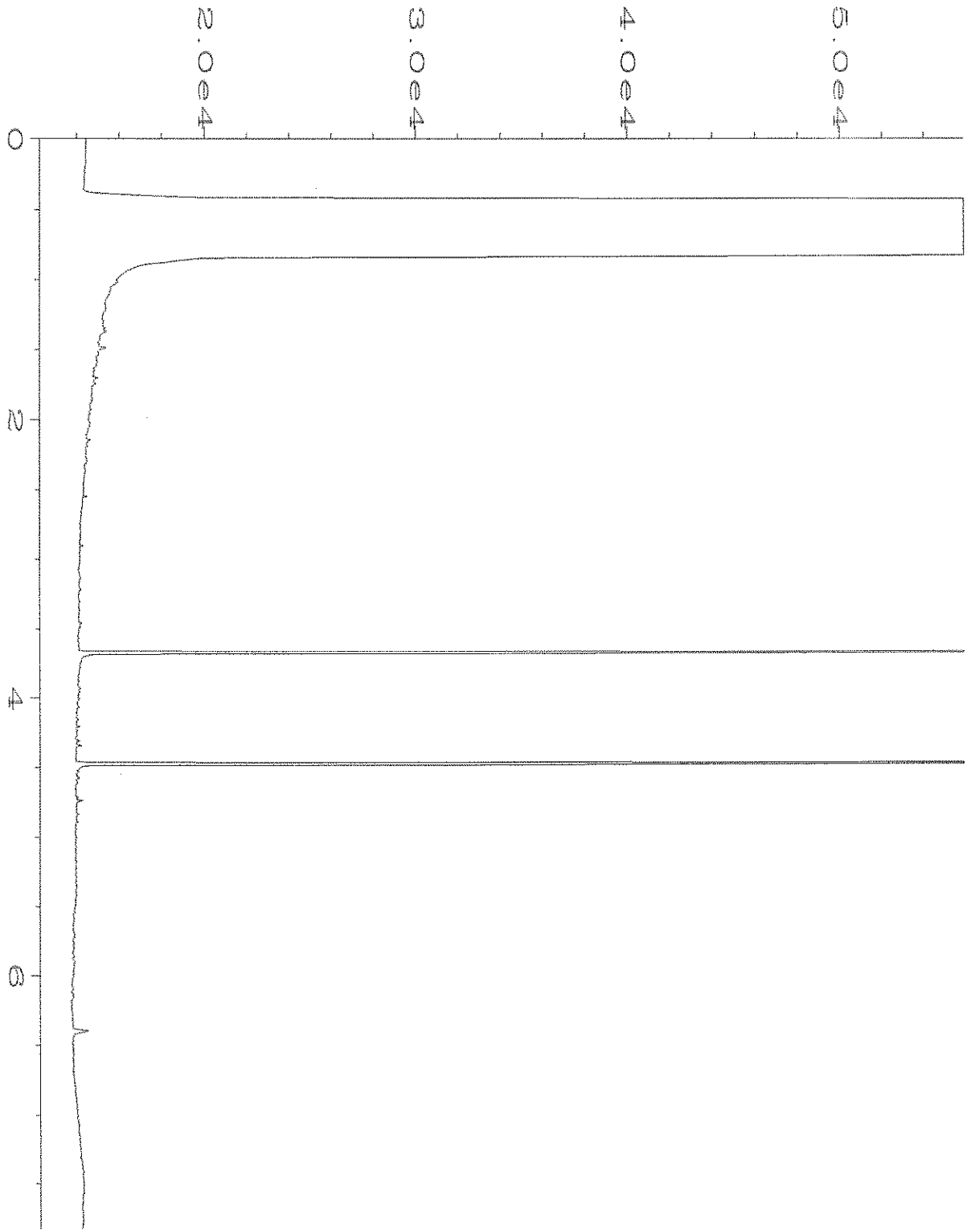
Page Number : 1
Vial Number : 15
Injection Number : 1
Sequence Line : 6
Instrument Method: DX.MTH
Analysis Method : DX.MTH



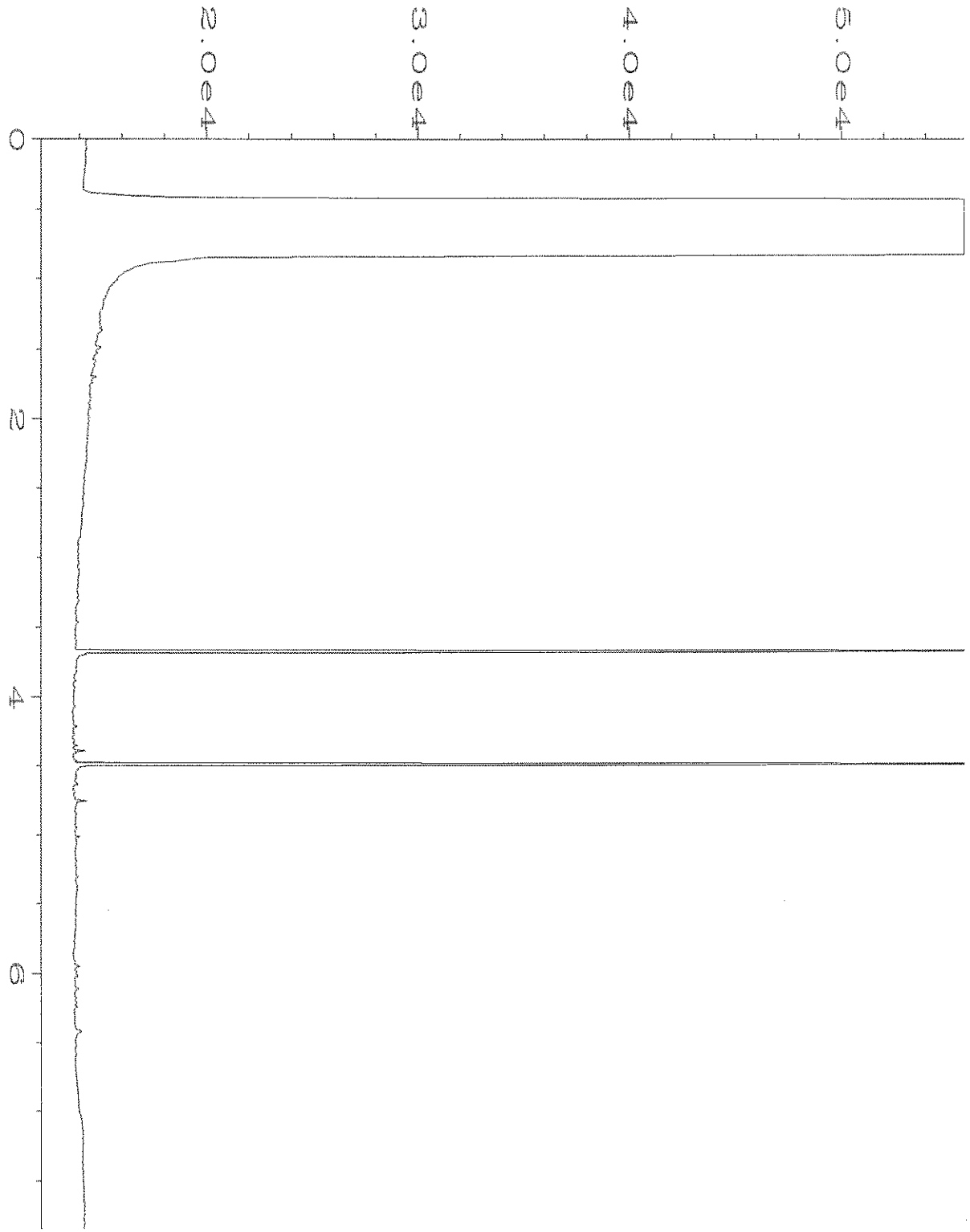
Data File Name	: C:\HPCHEM\1\DATA\12-22-21\003F0201.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 3
Sample Name	: 500 Dx 64-13H	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 2
Acquired on	: 22 Dec 21 06:20 AM	Instrument Method	: DX.MTH
Report Created on:	22 Jul 22 01:28 PM	Analysis Method	: DX.MTH



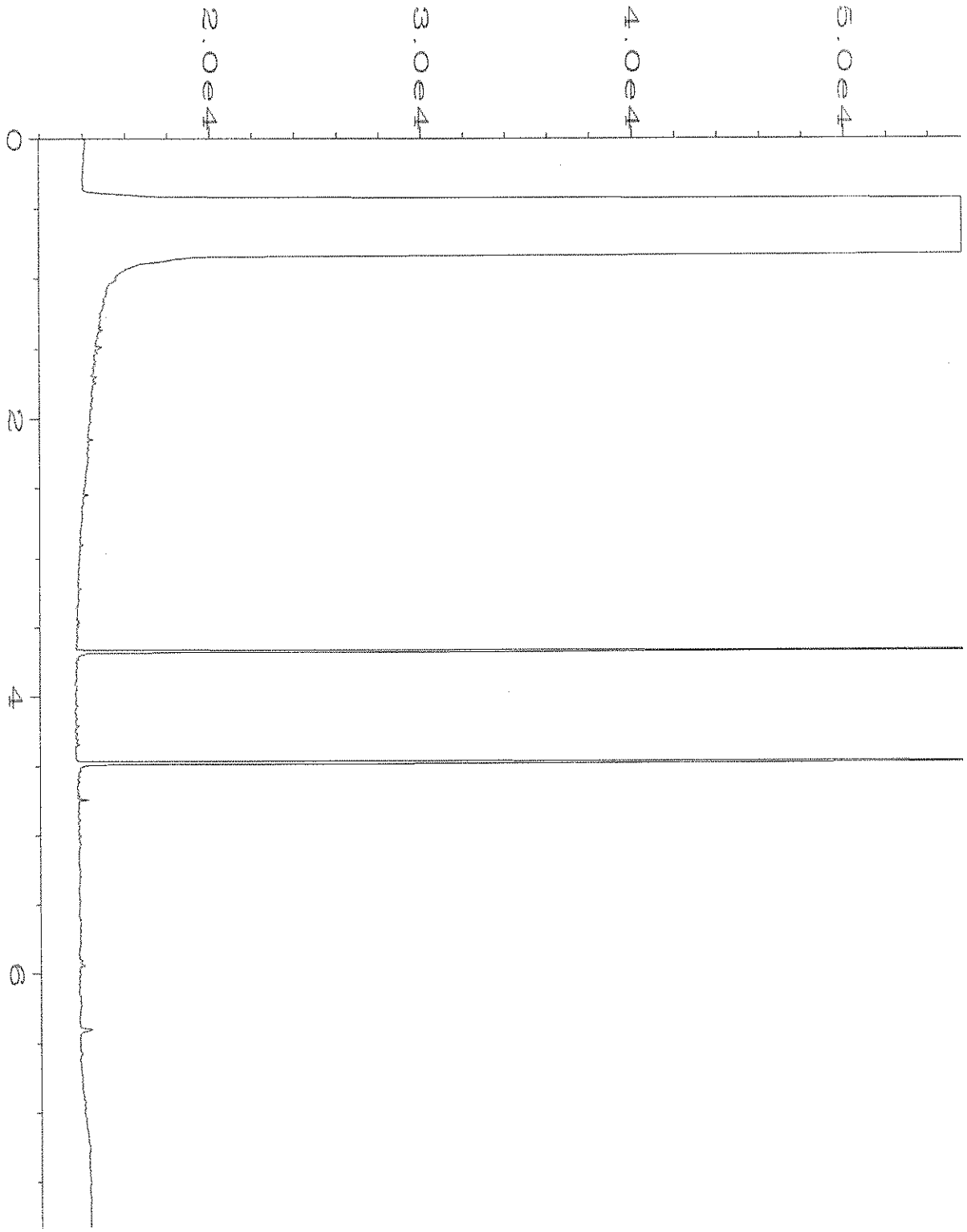
Data File Name	: C:\HPCHEM\4\DATA\12-22-21\022F0301.D		
Operator	: TL	Page Number	: 1
Instrument	: GC#4	Vial Number	: 22
Sample Name	: 112414-03	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 3
Acquired on	: 22 Dec 21 11:27 AM	Instrument Method	: DX.MTH
Report Created on:	22 Jul 22 01:04 PM	Analysis Method	: DX.MTH



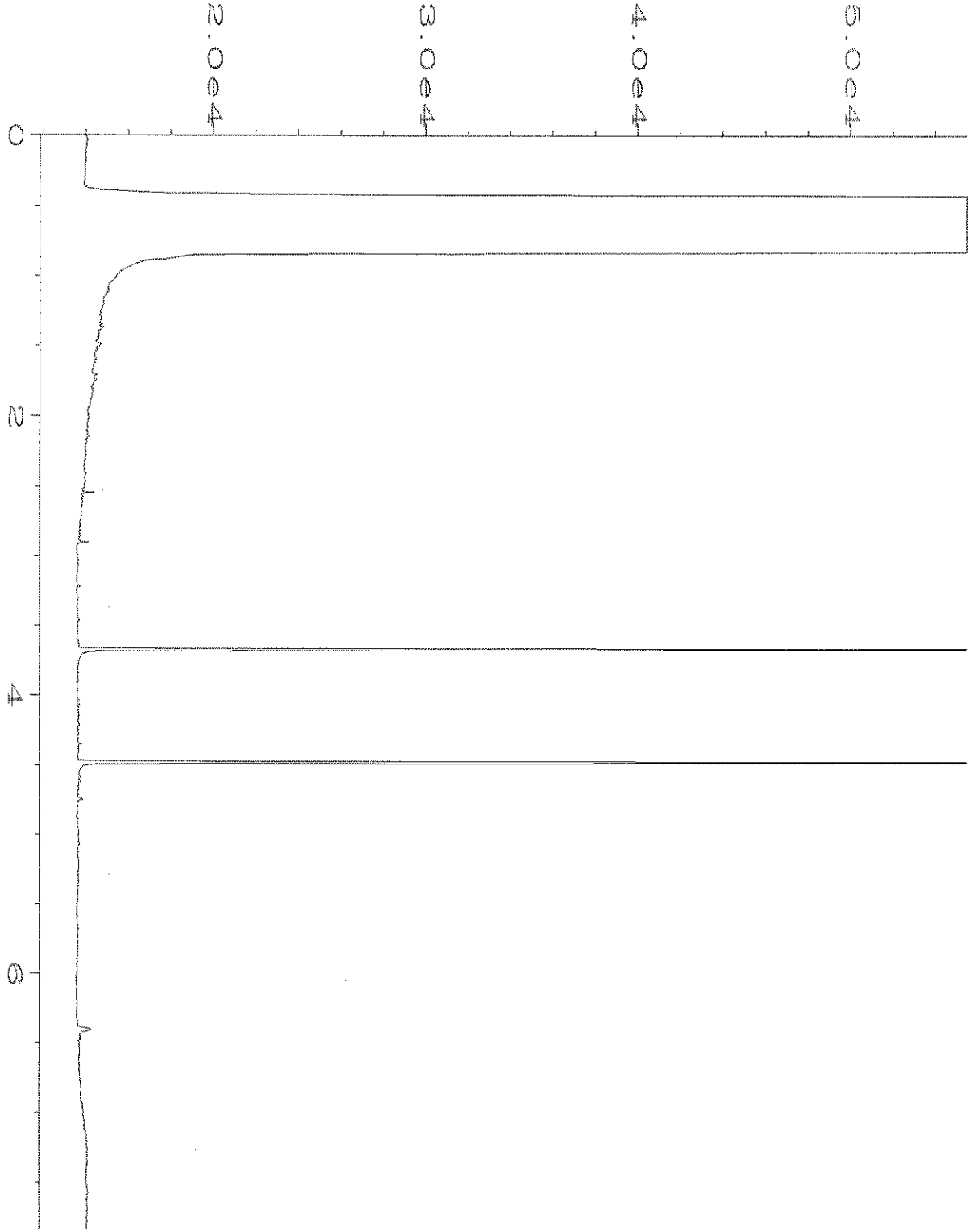
Data File Name	: C:\HPCHEM\4\DATA\12-22-21\023F0301.D		
Operator	: TL	Page Number	: 1
Instrument	: GC#4	Vial Number	: 23
Sample Name	: 112414-06	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 3
Acquired on	: 22 Dec 21 11:40 AM	Instrument Method	: DX.MTH
Report Created on:	22 Jul 22 01:04 PM	Analysis Method	: DX.MTH



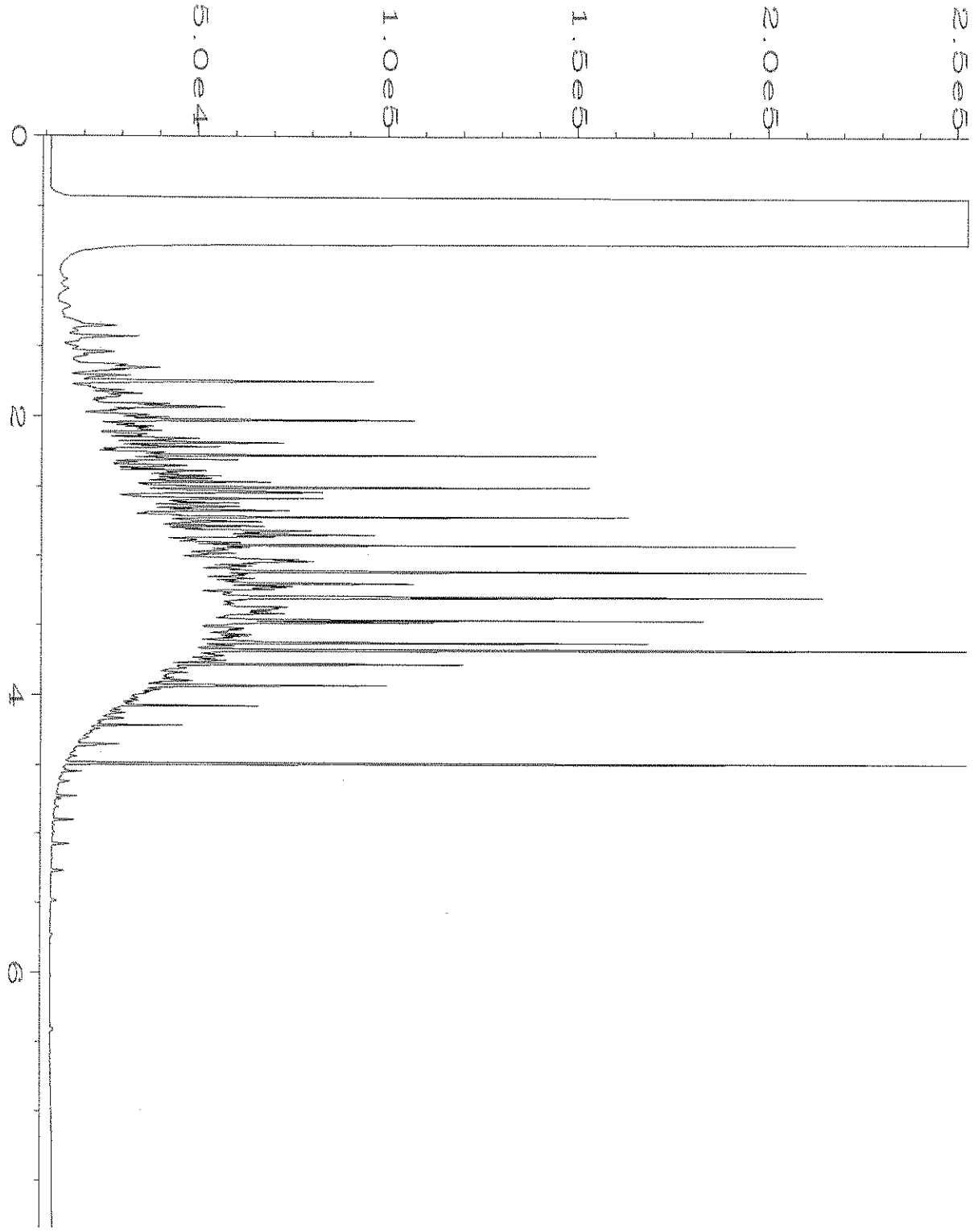
Data File Name	: C:\HPCHEM\4\DATA\12-22-21\024F0301.D		
Operator	: TL	Page Number	: 1
Instrument	: GC#4	Vial Number	: 24
Sample Name	: 112414-07	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 3
Acquired on	: 22 Dec 21 11:56 AM	Instrument Method	: DX.MTH
Report Created on:	22 Jul 22 01:04 PM	Analysis Method	: DX.MTH



Data File Name	: C:\HPCHEM\4\DATA\12-22-21\025F0301.D		
Operator	: TL	Page Number	: 1
Instrument	: GC#4	Vial Number	: 25
Sample Name	: 112414-08	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 3
Acquired on	: 22 Dec 21 12:06 PM	Instrument Method:	DX.MTH
Report Created on:	22 Jul 22 01:04 PM	Analysis Method	: DX.MTH



Data File Name	: C:\HPCHEM\4\DATA\12-22-21\018F0301.D		
Operator	: TL	Page Number	: 1
Instrument	: GC#4	Vial Number	: 18
Sample Name	: 01-2916 mb	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 3
Acquired on	: 22 Dec 21 10:38 AM	Instrument Method	: DX.MTH
Report Created on	: 22 Jul 22 01:05 PM	Analysis Method	: DX.MTH



Data File Name	: C:\HPCHEM\4\DATA\12-22-21\003F0201.D		
Operator	: TL	Page Number	: 1
Instrument	: GC#4	Vial Number	: 3
Sample Name	: 500 Dx 64-13H	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 2
Acquired on	: 22 Dec 21 06:17 AM	Instrument Method	: DX.MTH
Report Created on:	22 Jul 22 01:05 PM	Analysis Method	: DX.MTH

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Vineta Mills, M.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

April 14, 2022

Chris Bourgeois, Project Manager
HWA Geosciences, Inc
21312 30th Dr SE
Bothell, WA 98021

Dear Mr. Bourgeois:

Included is the amended report from the testing of material submitted on January 5, 2022 from the King County Metro South Facilities W031, 2021-062 W031, F&BI 201038 project. Per your request, the project name has been updated.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Lisa Gilbert (Parametrix), Mike Brady (Parametrix)
HWA0111R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

January 11, 2022

Chris Bourgeois, Project Manager
HWA Geosciences, Inc
21312 30th Dr SE
Bothell, WA 98021

Dear Mr. Bourgeois:

Included are the results from the testing of material submitted on January 5, 2022 from the King County Metro South Facilities W031, 2021-062 W031, F&BI 201038 project. There are 12 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Lisa Gilbert (Parametrix), Mike Brady (Parametrix)
HWA0111R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on January 5, 2022 by Friedman & Bruya, Inc. from the HWA Geosciences, Inc King County Metro South Facilities WO31 2021-062 W031, F&BI 201038 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	HWA Geosciences, Inc
201038 -01	21 MW-1
201038 -02	21 MW-2
201038 -03	Trip Blanks

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 01/11/22
Date Received: 01/05/22
Project: King County Metro South Facilities W031, 2021-062 W031, F&BI 201038
Date Extracted: 01/07/22
Date Analyzed: 01/07/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 51-134)
21 MW-1 201038-01	<100	81
21 MW-2 201038-02	<100	82
Method Blank 02-044 MB	<100	79

Date of Report: 01/11/22
Date Received: 01/05/22
Project: King County Metro South Facilities W031, 2021-062 W031, F&BI 201038
Date Extracted: 01/06/22
Date Analyzed: 01/07/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx
Sample Extracts Passed Through a Silica Gel Column Prior to Analysis
Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 47-140)
21 MW-1 201038-01	<50	<250	122
21 MW-2 201038-02	<50	<250	111
Method Blank 02-078 MB	<50	<250	109

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 01/11/22
Date Received: 01/05/22
Project: King County Metro South Facilities W031, 2021-062 W031, F&BI 201038
Date Extracted: 01/06/22
Date Analyzed: 01/06/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
21 MW-1 201038-01	<50	<250	120
21 MW-2 201038-02	96 x	<250	105
Method Blank 02-078 MB	<50	<250	72

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	21 MW-1	Client:	HWA Geosciences, Inc
Date Received:	01/05/22	Project:	2021-062 W031, F&BI 201038
Date Extracted:	01/06/22	Lab ID:	201038-01
Date Analyzed:	01/06/22	Data File:	010609.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	85	117
Toluene-d8	90	88	112
4-Bromofluorobenzene	105	90	111

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	21 MW-2	Client:	HWA Geosciences, Inc
Date Received:	01/05/22	Project:	2021-062 W031, F&BI 201038
Date Extracted:	01/06/22	Lab ID:	201038-02
Date Analyzed:	01/06/22	Data File:	010610.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	85	117
Toluene-d8	97	88	112
4-Bromofluorobenzene	106	90	111

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	HWA Geosciences, Inc
Date Received:	Not Applicable	Project:	2021-062 W031, F&BI 201038
Date Extracted:	01/06/22	Lab ID:	02-053 mb
Date Analyzed:	01/06/22	Data File:	010607.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	91	85	117
Toluene-d8	96	88	112
4-Bromofluorobenzene	101	90	111

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Date of Report: 01/11/22
Date Received: 01/05/22
Project: King County Metro South Facilities W031, 2021-062 W031, F&BI 201038

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 201038-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Gasoline	ug/L (ppb)	<10	<10	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	86	69-134

Date of Report: 01/11/22
Date Received: 01/05/22
Project: King County Metro South Facilities W031, 2021-062 W031, F&BI 201038

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	120	120	61-133	0

Date of Report: 01/11/22
Date Received: 01/05/22
Project: King County Metro South Facilities W031, 2021-062 W031, F&BI 201038

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	96	104	63-142	8

Date of Report: 01/11/22
Date Received: 01/05/22
Project: King County Metro South Facilities W031, 2021-062 W031, F&BI 201038

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 201038-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Benzene	ug/L (ppb)	10	<0.35	97	50-150
Toluene	ug/L (ppb)	10	<1	100	50-150
Ethylbenzene	ug/L (ppb)	10	<1	104	50-150
m,p-Xylene	ug/L (ppb)	20	<2	106	50-150
o-Xylene	ug/L (ppb)	10	<1	104	50-150
Naphthalene	ug/L (ppb)	10	<1	104	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Benzene	ug/L (ppb)	10	98	96	70-130	2
Toluene	ug/L (ppb)	10	102	97	70-130	5
Ethylbenzene	ug/L (ppb)	10	105	101	70-130	4
m,p-Xylene	ug/L (ppb)	20	111	105	70-130	6
o-Xylene	ug/L (ppb)	10	107	102	70-130	5
Naphthalene	ug/L (ppb)	10	98	98	70-130	0

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

201038

SAMPLE CHAIN OF CUSTODY

01-05-22

E04|VW1

Page # 1 of 1

Report To Chris Bourgeois + L. Gilbert + M. Brady

Company HWA Geosciences & Parametrix

Address 21312 30th Drive SE

City, State, ZIP Bothell, WA 98021

Phone 206-779-3145 Email cbourgeois@hwageo.com

SAMPLERS (*signature*)

PROJECT NAME King County Metro South Facilities Base W031 — pr MB 4/13/21

PO # 2021-062 W031

REMARKS Dx w/ & w/o silica gel cleanup

Project specific RLs? - Yes / No

INVOICE TO HWA

TURNAROUND TIME
- ☑ Standard turnaround
- ☐ RUSH
- Rush charges authorized by:

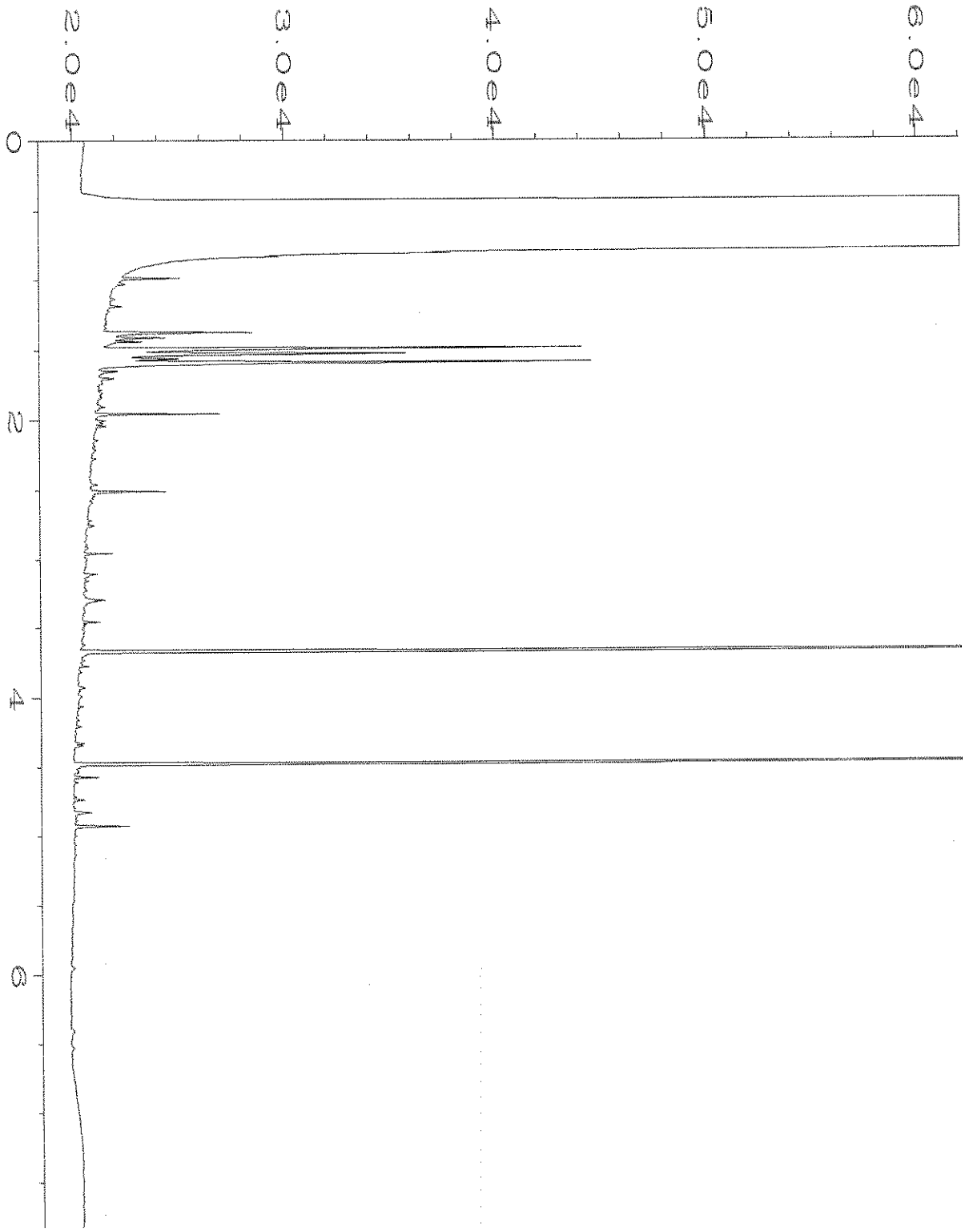
SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	~~BTEX + Naphthalene~~	BTEX + Naphthalene	HCLD		Notes
21 MW-1	01A-I	1/5/21	1130	water	9	X	X							X			Dx w/ & w/o SGC
21 MW-2	02 ↓	1/5/21	1250	water	9	X	X							X			"
Trip Blanks	03AB			water	2										X		

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Chris	Chris Bourgeois	HWA	1/5/2021	1511
Received by:	[illegible]	Khoi Hoang	FBI	1/5/22	1511
Relinquished by:					
Received by:			Samples received at 4 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282



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Operator : TL
Instrument : GC#4
Sample Name : 201038-01 sg
Run Time Bar Code:
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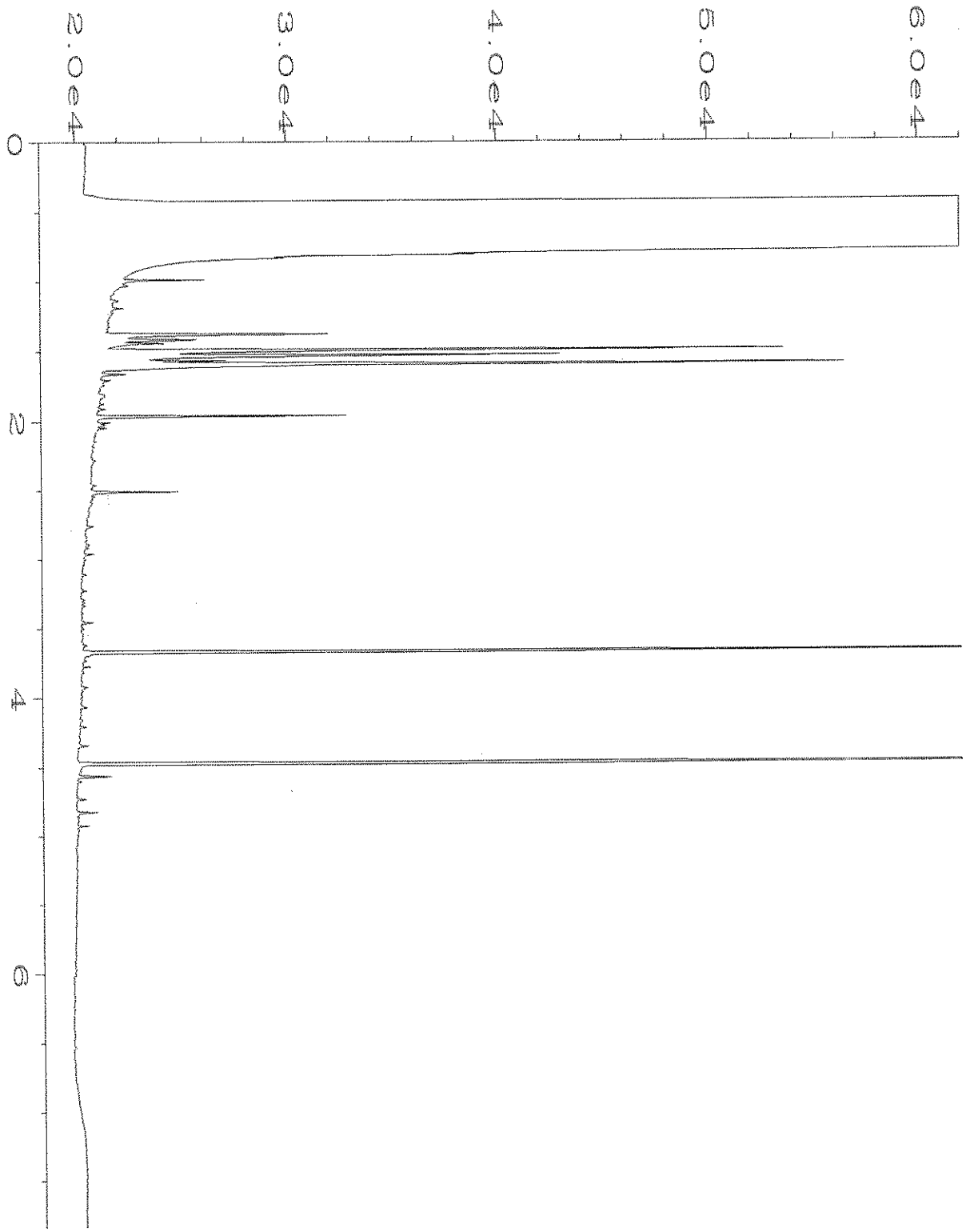
Report Created on: 22 Jul 22 01:06 PM

Page Number : 1
Vial Number : 24
Injection Number : 1
Sequence Line : 8
Instrument Method: DX.MTH
Analysis Method : DX.MTH



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Operator	: TL	Page Number	: 1
Instrument	: GC#4	Vial Number	: 25
Sample Name	: 201038-02 sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 8
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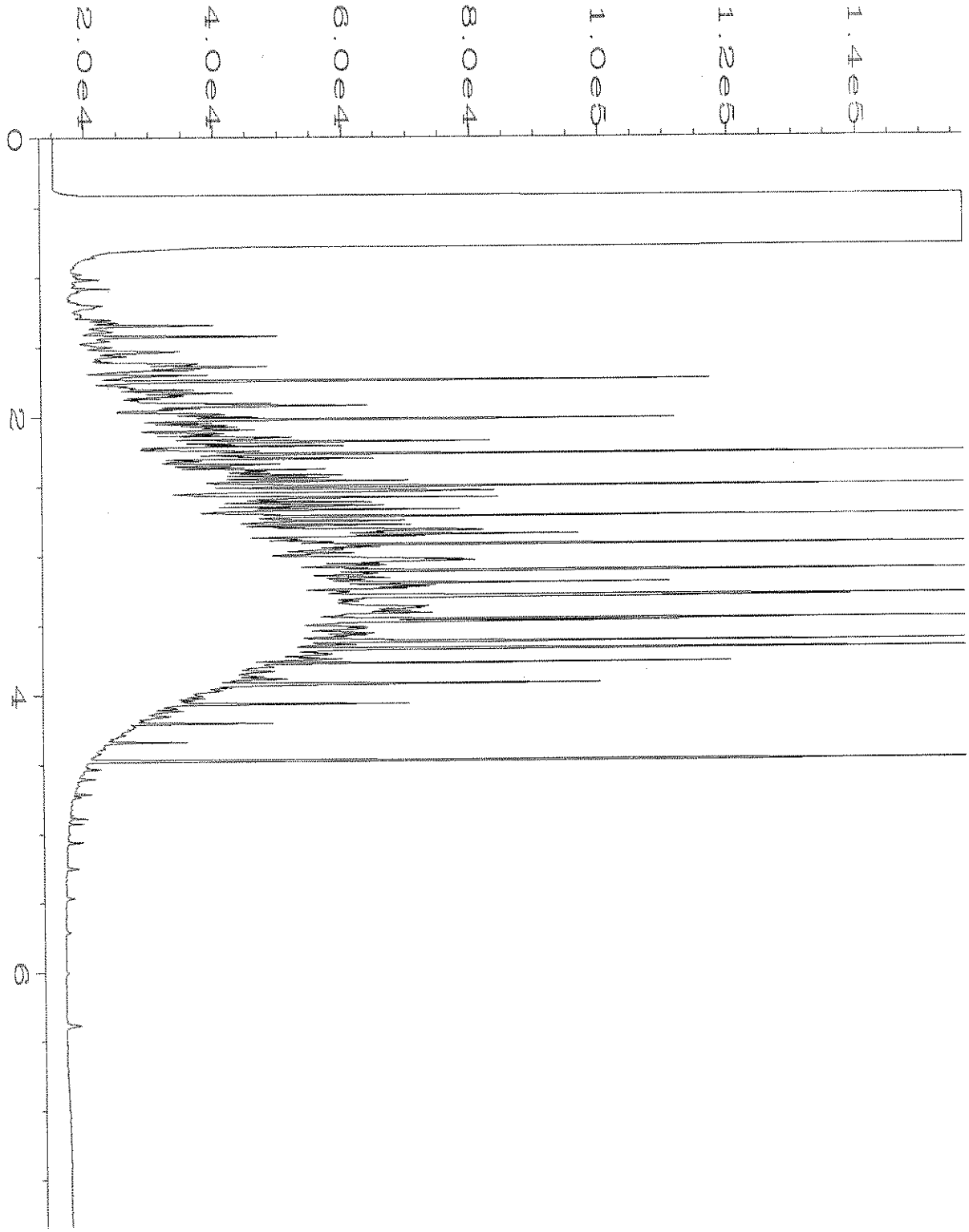
Report Created on	: 22 Jul 22 01:06 PM	Analysis Method	: DX.MTH



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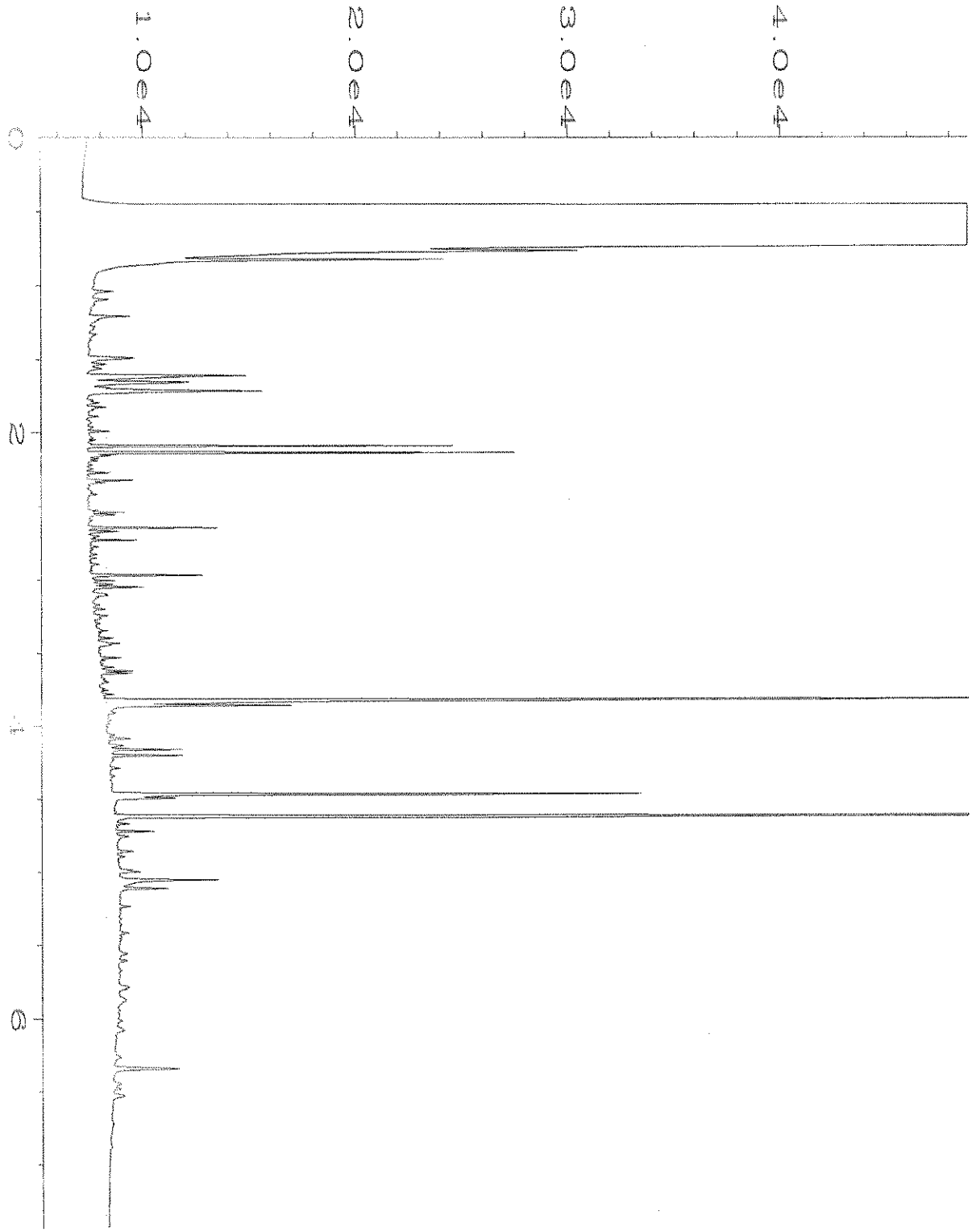
Operator	: TL	Page Number	: 1
Instrument	: GC#4	Vial Number	: 3
Sample Name	: 500 Dx 64-13H	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 2
Acquired on	: 07 Jan 22 06:21 AM	Instrument Method	: DX.MTH
Report Created on:	22 Jul 22 01:07 PM	Analysis Method	: DX.MTH



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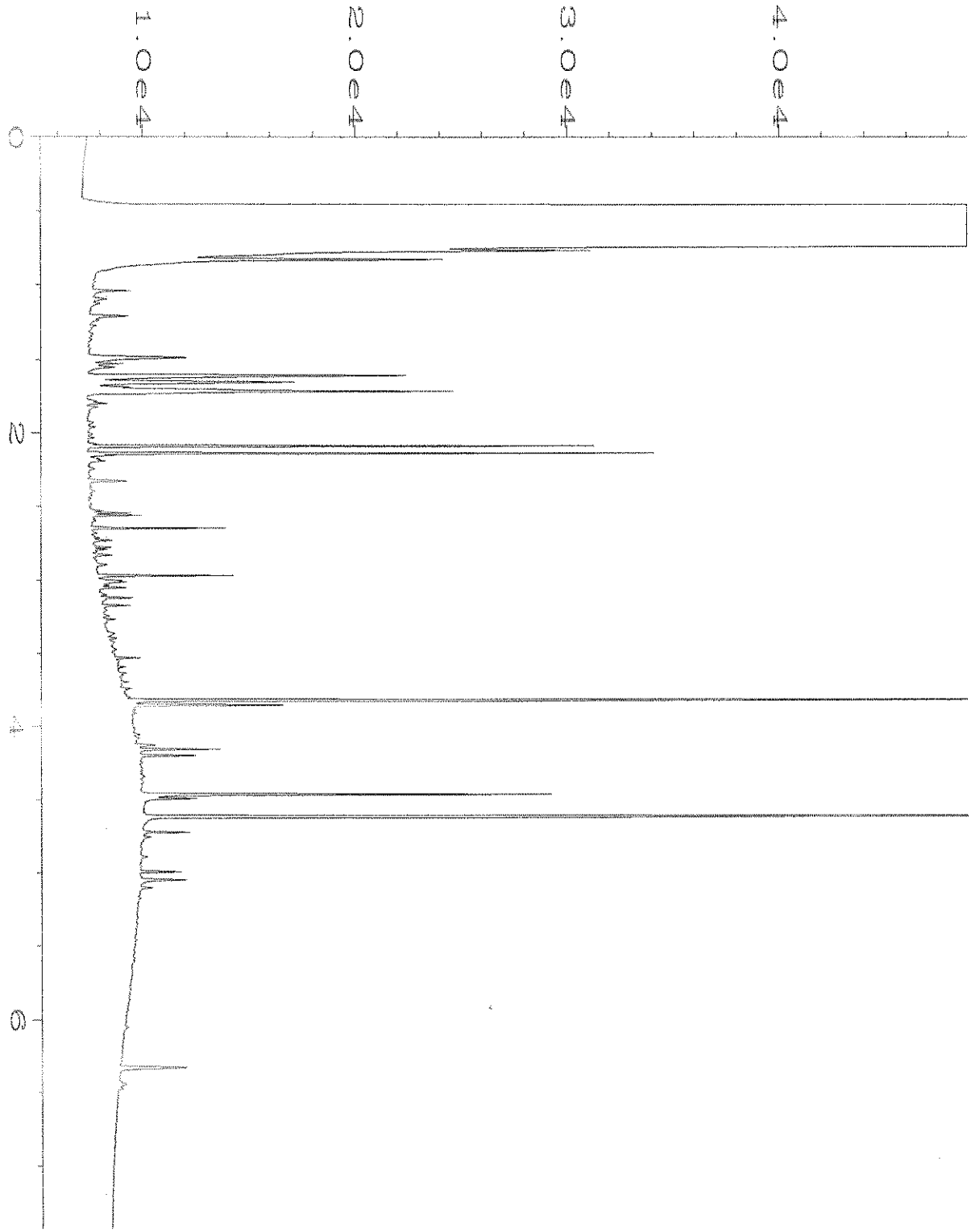
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 28
Sample Name	: 201038-01	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 7
Acquired on	: 06 Jan 22 07:12 PM	Instrument Method	: DX.MTH
Report Created on	: 22 Jul 22 01:25 PM	Analysis Method	: DX.MTH



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Instrument	: GC1	Vial Number	: 29
Sample Name	: 201038-02	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 7
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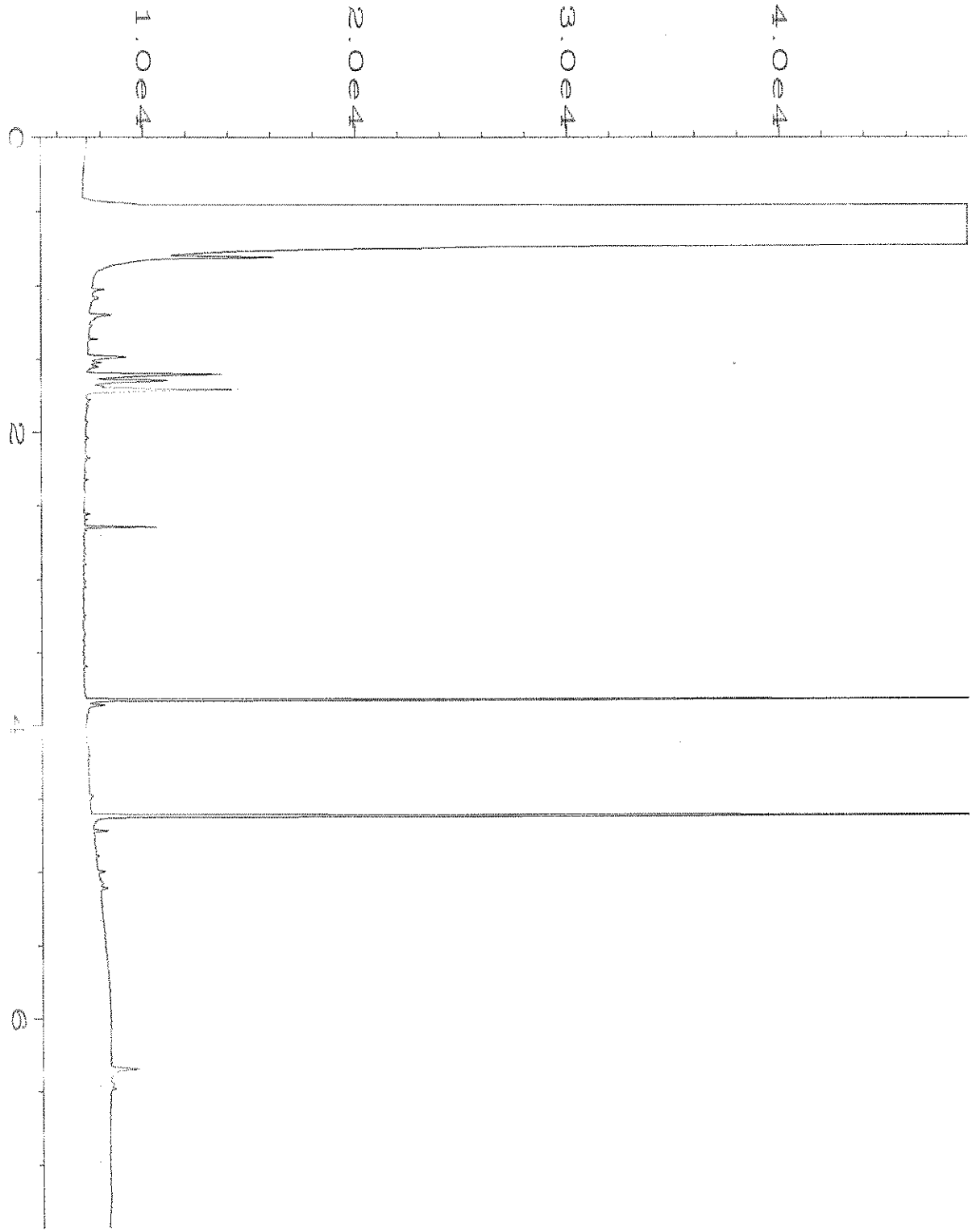
Report Created on:	22 Jul 22 01:25 PM	Analysis Method	: DX.MTH



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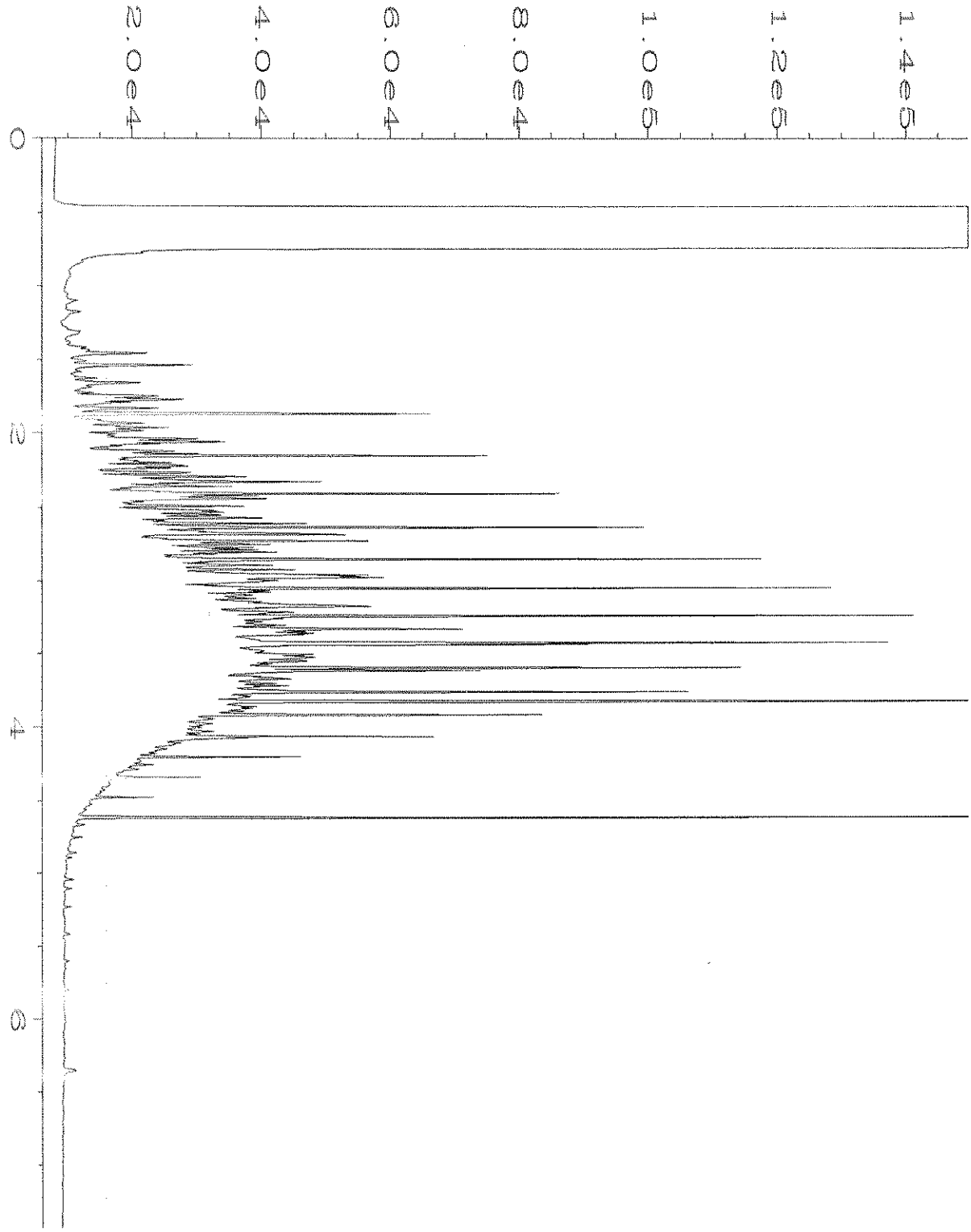
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 25
Sample Name	: 02-078 mb	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 7
Acquired on	: 06 Jan 22 06:28 PM	Instrument Method	: DX.MTH
Report Created on	: 22 Jul 22 01:26 PM	Analysis Method	: DX.MTH



Data File Name	: C:\HPCHEM\1\DATA\01-06-22\003F0201.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 3
Sample Name	: 500 Dx 64-13H	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 2
Acquired on	: 06 Jan 22 06:08 AM	Instrument Method	: DX.MTH
Report Created on:	22 Jul 22 01:26 PM	Analysis Method	: DX.MTH

Appendix C

Parametrix Well Survey

MONITORING WELL EXHIBIT

KING COUNTY METRO

SOUTH BASE FACILITIES MONITORING WELLS

HORIZONTAL DATUM

HORIZONTAL DATUM FOR THIS SURVEY IS NAD 83(11), WASHINGTON STATE PLANE, NORTH ZONE, U.S. SURVEY FEET, BASED ON THE WASHINGTON STATE REFERENCE NETWORK (WSRN)

VERTICAL DATUM

NAVD 88'
REF: WSDOT BENCHMARK BM17099-72 ELEV.=27.42

LEGEND

◉ MONITORING WELL LOCATION

Parametrix

ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

SURVEYED 12/11	0 — 1 ONE INCHES AT FULL SCALE IF NOT SCALE ACCORDINGLY	SHEET NO. 1 OF 1
DRAWN 12/20		
PROJECT NUMBER 554-1521-214	SCALE 1"=40'	
	DATE 12/20/19	

King County Metro South Base Facilities monitoring wells 12/20/19

Project #554-1521-214

VERTICAL DATUM NAVD 88’

REF: WSDOT BENCHMARK: BM17099-72

ELEV.=27.415

DW-3

MW DW-3
N. RIM=14.09'
N. PVC=13.63'
GND ON CONC.=14.03'
N 184352.09’
E 1279804.97’

DW-4

MW DW-4
N. RIM=14.37'
N. PVC=14.00'
GND ON CONC.=14.35'
N 184350.16’
E 1279837.43’

SB-7

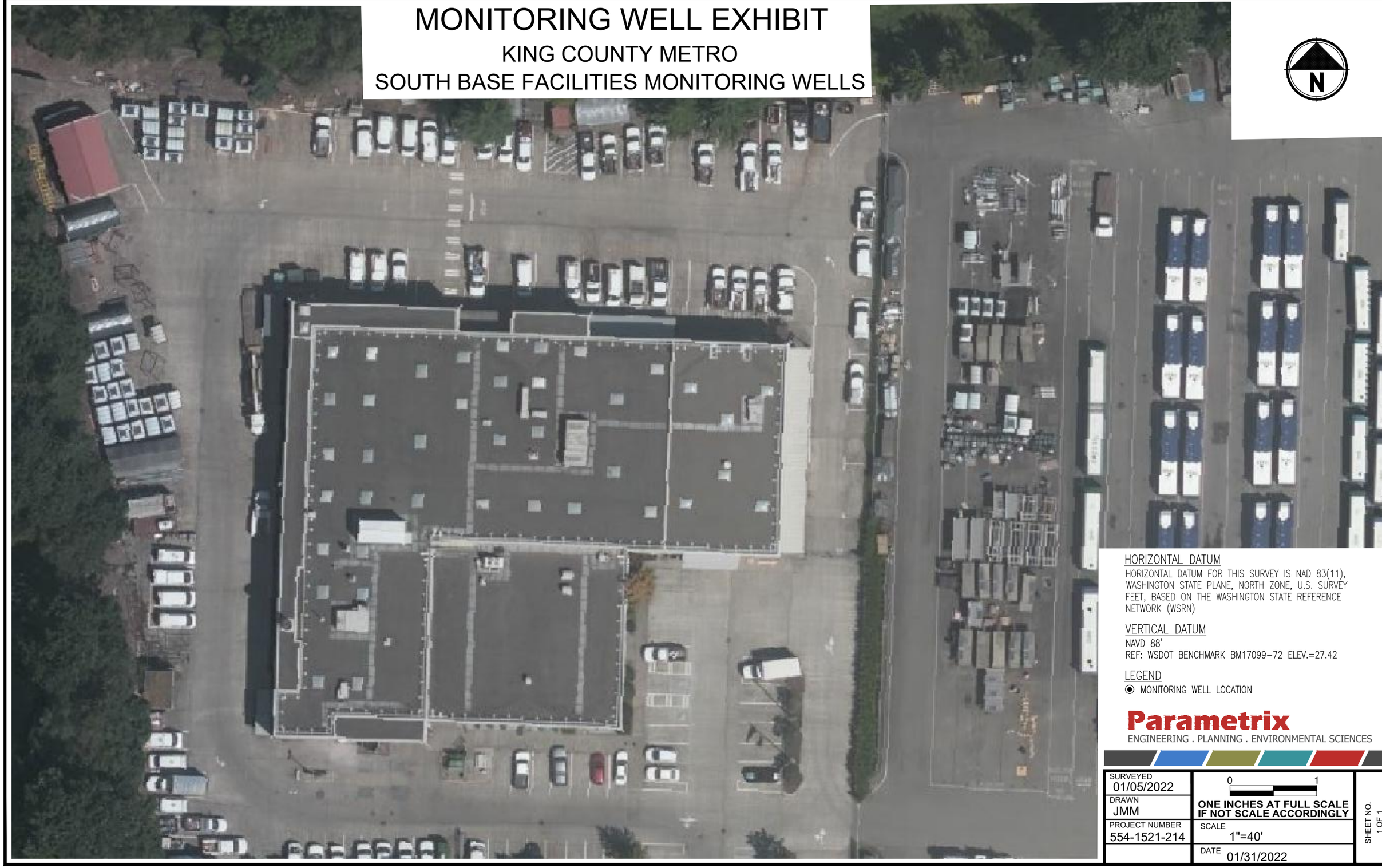
MW SB-7
N. RIM=14.42'
N. PVC=14.05'
GND ON CONC.=14.36'
N 184319.13’
E 1279801.71’

SB-8

MW SB-8
N. RIM=14.36'
N. PVC=14.19'
GND ON CONC.=14.34'
N 184650.89’
E 1280054.85’

MONITORING WELL EXHIBIT

KING COUNTY METRO
SOUTH BASE FACILITIES MONITORING WELLS



N

HORIZONTAL DATUM

HORIZONTAL DATUM FOR THIS SURVEY IS NAD 83(11), WASHINGTON STATE PLANE, NORTH ZONE, U.S. SURVEY FEET, BASED ON THE WASHINGTON STATE REFERENCE NETWORK (WSRN)

VERTICAL DATUM

NAVD 88'
REF: WSDOT BENCHMARK BM17099-72 ELEV.=27.42

LEGEND

◉ MONITORING WELL LOCATION

Parametrix

ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

SURVEYED 01/05/2022	0 — 1 ONE INCHES AT FULL SCALE IF NOT SCALE ACCORDINGLY	SHEET NO. 1 OF 1
DRAWN JMM		
PROJECT NUMBER 554-1521-214	SCALE 1"=40'	
	DATE 01/31/2022	

King County Metro South Base Facilities monitoring wells 01/31/2022

Project #554-1521-242

VERTICAL DATUM NAVD 88’

REF: WSDOT BENCHMARK: BM17099-72

ELEV.=27.415

20MW-01

N. RIM=13.69’
N. PVC=13.44'
GND ON CONC.=13.65’
N 184424.99’
E 1279762.43’

20MW-02

N. RIM=14.02’
N. PVC=13.72’
GND ON CONC.=14.02'
N 184603.05’
E 1279824.65’

STREAM GAUGE

SCRIBED “X” ON CONC. WALL
ELEV.=15.94'
N 184399.15’
E 1280083.38’

Appendix D

HWA 2022 Quarterly Groundwater Sampling Event Memoranda

July 26, 2022

HWA Project No. 2021-062-22

King County Metro Transit Capital Division

Transit Real Estate and Environmental
201 South Jackson Street, M.S. KSC-TR-0431
Seattle, WA 98104-3856

Attention: John Greene

Subject: **2022 Quarter 1 & Quarter 2 Groundwater Sampling Event Memorandum**
King County Metro Transit - South Facilities
Tukwila, Washington

Dear Mr. Greene,

As approved in the Contract E00635E19 Work Order #31 scope, HWA GeoSciences Inc (HWA) has completed the first and second 2022 quarterly monitoring events at the King County Metro Transit - South Facilities / Annex (South Facilities) addressed at 11911 East Marginal Way South, Tukwila, Washington (as shown on Figure 1). The site is known as Washington State Department of Ecology (Ecology) Cleanup Site Identification number 7790 and Voluntary Cleanup Program (VCP) number NW3301. This memorandum includes a brief summary of quarterly groundwater monitoring completed as part of the Work Order #31 scope. This work task was coordinated by HWA as part of HWA's contract with Parametrix for environmental services.

GROUNDWATER MONITORING WELL SAMPLING

HWA collected groundwater samples from monitoring wells DW-3R, DW-4R, SB-7, SB-8, 21MW-1, and 21MW-2, in two separate quarterly events; on February 22 & 23, and May 10, 2022. Well locations are shown on Figure 2.

Prior to the start of low-flow purging, depth to groundwater was measured and recorded at each of the above wells, as well as at the stream gauge and well B-25. Depth to groundwater measurements are presented on the field data sheets included in Appendices A and B (February and May events, respectively). Groundwater elevations are presented in Table 1 along with data from previous events. Interpreted potentiometric surface maps for the sampling events are provided in Figures 3 and 4.

Groundwater samples were collected using low-flow purging and sampling techniques with a peristaltic pump and new polyethylene tube. During purging, field parameters of pH, specific conductance, oxidation-reduction potential, dissolved oxygen and temperature were measured until stabilization was achieved. Field sampling sheets are included in Appendices A and B. No indications of contamination including odor, discoloration, or sheen were observed. Groundwater samples were collected in analysis-appropriate, clean, laboratory supplied containers and placed in a cooler with ice. Samples were kept in a cooler with ice and held at temperatures below 6 degrees Celsius until submittal to the laboratory for analysis with standard turnaround time. Analytical results are summarized in Table 2, and copies of the final laboratory reports including chain-of custody documents are included in Appendices A and B.

Samples were analyzed by Friedman & Bruya, Inc. in Seattle, Washington for gasoline range total petroleum hydrocarbons (TPH) by Method NWTPH-G; diesel and oil-range TPH by Method NWTPH-Dx (both with and without silica gel cleanup); and benzene, toluene, ethylbenzene, xylenes, and naphthalene (BTEXN) by EPA Method 8260D. All samples were analyzed within method specific holding times.

RESULTS

Results from both monitoring events, along with data from previous events are summarized in Table 2, and laboratory reports can be found in Appendices A and B. Analytical results indicate that diesel and/or oil-range TPH were detected below MTCA cleanup levels in wells DW-3R, DW-4R, SB-7, SB-8, 21MW-1, and 21MW-2. However, these samples were all X-flagged by the laboratory indicating that the diesel and oil results did not match the fuel standard. Based on the data presented in previous reports, the x-flags are likely related to biogenic interference from the natural peat deposits in the area. These samples were also analyzed using silica gel cleanup treatment, which removes polar compounds and resulted in no diesel or oil-range TPH detections in these samples. This is consistent with interference from the natural peat deposits.

FUTURE GROUNDWATER MONITORING

Two additional quarters of groundwater level measurements and sampling of these wells are planned as part of the additional site characterization activities. Upon completion of all additional site characterization activities, an RI Report Addendum will be provided.

We appreciate the opportunity to provide environmental services on this project. Should you have any questions or comments, or if we may be of further service, please do not hesitate to contact the undersigned at your convenience.

Sincerely,

HWA GeoSciences Inc.

Chris Bourgeois
Staff Geologist

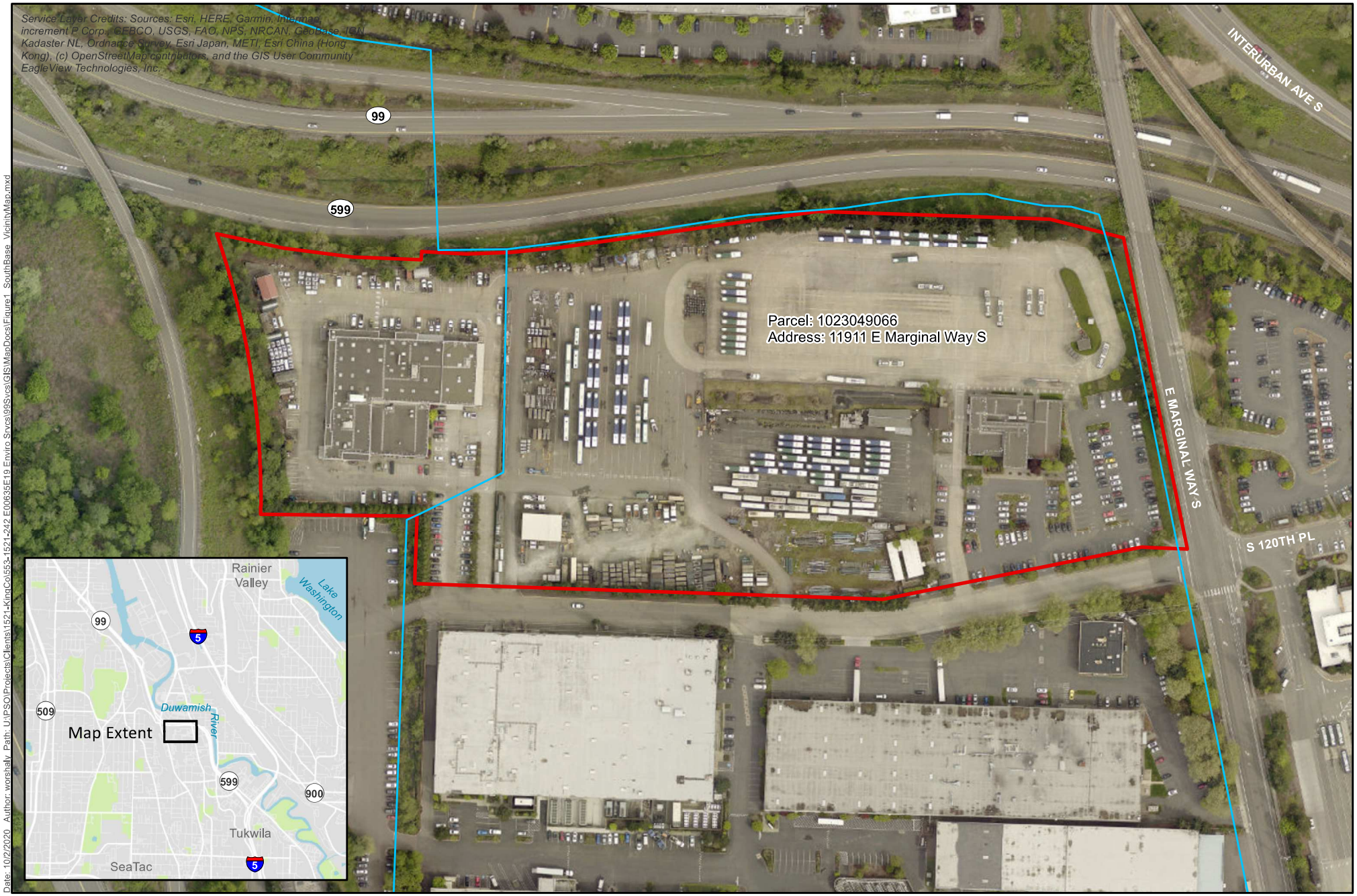
Nicole Kapise
Senior Environmental Geologist

FIGURES (Following Text)

TABLES (Following Text)

Appendix A:

Appendix B:



Date: 10/2/2020 Author: worshaly Path: U:\PSO\Projects\Clients\1521-KingCo\553-1521-242 E00635E19 Enviro Srvcs\99Svcs\GIS\MapDocs\Figure1_SouthBase_VicinityMap.mxd

Parametrix

Source: King County

0 50 100 200 Feet

Project Location

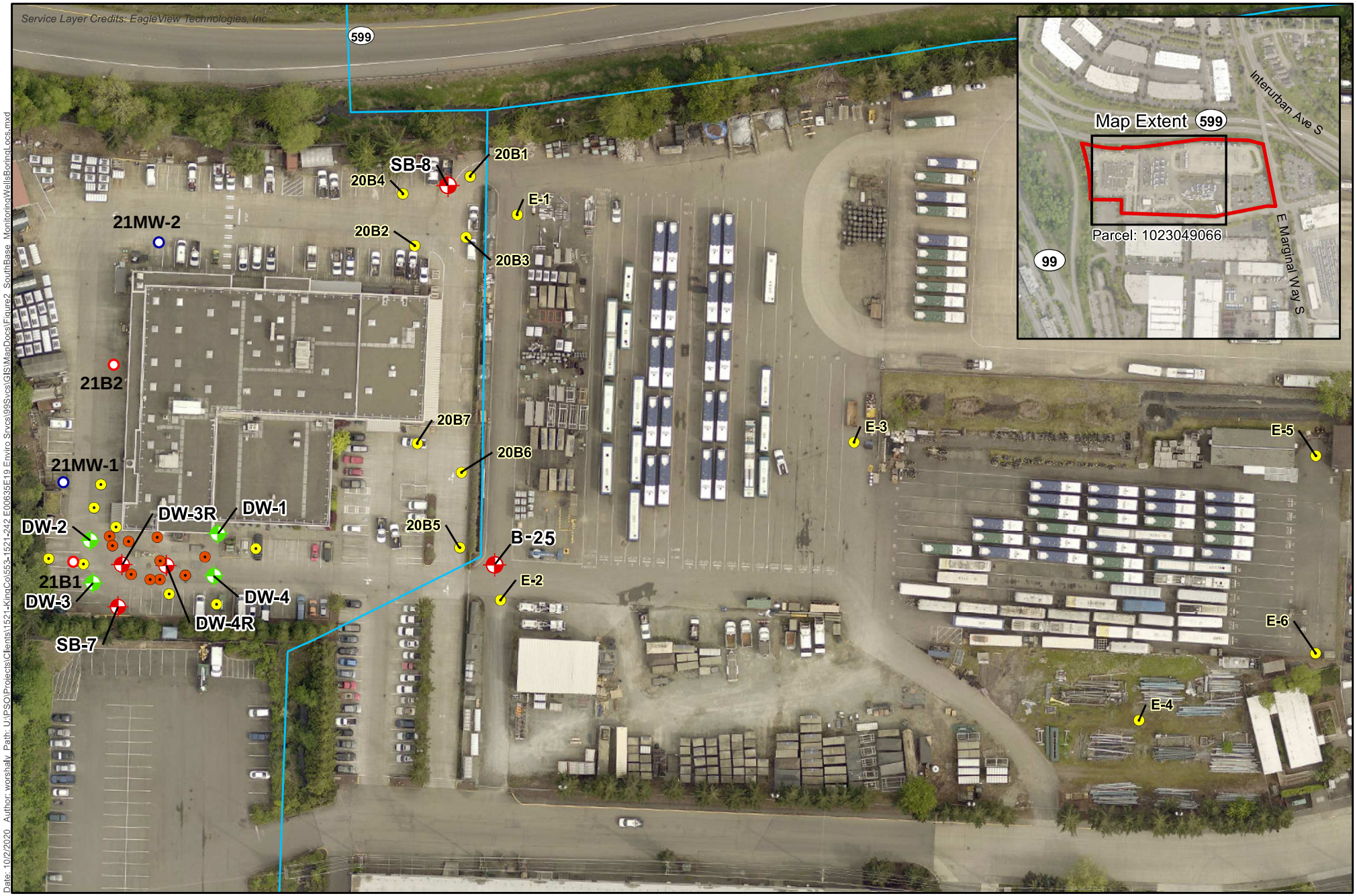
Stream

Figure 1

Site Map

King County Metro Transit S Facilities/S Annex

Tukwila, WA



Date: 10/2/2020 Author: worshaly Path: U:\PSO\Projects\Clients\1521-KingCo\553-1521-242 E0636SE19 Enviro Srvcs\99Svcs\GIS\MapDocs\Figure2_SouthBase_MonitoringWellsBoringLocs.mxd

Source: King County

Project Location
Stream
Installed monitoring well (2021)
Borehole
Soil Sample
Drilled boring (2021)
Monitoring Well (Existing)
Monitoring Well (Historical)

0 35 70 140 Feet

Figure 2
Monitoring Well and Soil Sample Locations
King County Metro Transit S Facilities/S Annex
(adapted 2/3/2022)

Tukwila, WA

HWA GEOSCIENCES INC.
DBE/MWBE

0 37.5 75 150 Feet

King County Metro South Facilities
Remedial Investigation
Tukwila, WA

POTENTIOMETRIC SURFACE MAP, FEBRUARY 22 AND 23, 2022

FIGURE # 3

PROJECT # 2021-062

HWA GEOSCIENCES INC.
DBE/MWBE

0 37.5 75 150 Feet

King County Metro South Facilities
Remedial Investigation
Tukwila, WA

POTENTIOMETRIC SURFACE MAP, MAY 10, 2022

FIGURE # 4

PROJECT # 2021-062

Table 1. Groundwater Elevations, King County Metro South Facilities, 11911 E Marginal Way S, Tukwila, WA.

		September 23, 2019		December 17, 2019		April 1, 2020		February 22 and 23, 2022		May 10, 2022	
Well	**Reference Elevation[1]**	**Depth to Groundwater (ft)**	**Groundwater Elevation (ft NAVD88)**	**Depth to Groundwater (ft)**	**Groundwater Elevation (ft NAVD88)**	**Depth to Groundwater (ft)**	**Groundwater Elevation (ft NAVD88)**	**Depth to Groundwater** (ft)**	**Groundwater Elevation** (ft NAVD88)**	**Depth to Groundwater** (ft)**	**Groundwater Elevation** (ft NAVD88)**
DW-3R*	13.63	5.21	8.42	4.84	8.79	4.48	9.15	4.85	8.78	4.56	9.07
DW-4R	14.00	5.58	8.42	5.15	8.85	4.82	9.18	5.19	8.81	4.91	9.09
SB-7	14.05	5.66	8.39	5.23	8.82	4.86	9.19	5.30	8.75	5.02	9.03
SB-8	14.19	6.28	7.91	5.80	8.39	5.33	8.86	5.82	8.37	5.71	8.48
B-25	14.12	--	--	--	--	--	--	5.66	8.46	5.41	8.71
Staff Gauge	15.94	--	--	--	--	--	--	6.05	9.89	8.85	7.09
21MW-1	13.44	--	--	--	--	--	--	4.10	9.34	4.05	9.39
21MW-2	13.72	--	--	--	--	--	--	5.10	8.62	5.00	8.72

Notes:

[1] N rim PVC (wells), marked measurement reference point (stream gauge), or ground surface (vibrating wire piezometers) in ft NAVD88**

*Well has been damaged and casing is not vertical

** Groundwater elevation measurement collected at time of sampling.

-- Not measured.

Table 2. Summary of Groundwater Analytical Results, King County Metro South Facilities Groundwater Monitoring Tukwila, Washington

	Date Sampled	Method A Cleanup Level [a]	Sample I.D.														
			DW-1	DW-2	DW-3	DW-3R	DW-4	DW-4 Dup	DW-4R	SB-5	SB-6	SB-7	SB-8	21MW-1	21MW-1 Dup	21MW-2	21MW-2 Dup
NWTPH-Gx (µg/L)																	
Gasoline	10/11/1994	800/1,000 [b]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	<100	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<100	--	--	<100	--	--	<100	<400	--	--	--	--
	12/17/2019		--	--	--	<50	--	--	<50	--	--	<50	<50	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	<100	--	<100	--
	2/22/2022		--	--	--	<100	--	--	<100	--	--	<100	<500	<100	--	<100	<100
	5/10/2022		--	--	--	<100	--	--	<100	--	--	<100	<100	<100	<100	<100	--
NWTPH-Dx (mg/L)																	
Diesel	10/11/1994	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	<0.2	<0.2	0.55	0.495	--	--	--	--
	4/23/1997		--	--	--	--	--	--	--	--	--			--	--	--	--
	9/23/2019		--	--	--	<0.26	--	--	<0.27	--	--	<0.28	0.47	--	--	--	--
	12/17/2019		--	--	--	<0.0499	--	--	<0.0497	--	--	<0.0498	<0.0498	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	<0.05	--	0.096 x	--
	2/22/2022		--	--	--	<0.05	--	--	0.058 x	--	--	0.059 x	0.350 x	0.150 x	--	0.270 x	0.250 x
	5/10/2022		--	--	--	0.130 x	--	--	0.080 x	--	--	0.071 x	0.150 x	0.160 x	0.140 x	0.180 x	--
Diesel w/ SGC	1/5/2022	0.5	--	--	--	--	--	--	--	--	--	--	--	<0.05	--	<0.05	--
	2/3/2022		--	--	--	<0.05	--	--	<0.05	--	--	<0.05	<0.05	<0.05	--	<0.05	<0.05
	05/10/22		--	--	--	<0.05	--	--	<0.05	--	--	<0.05	<0.05	<0.05	<0.05	<0.05	--
Lube Oil	10/11/1994	0.5	<0.2	<0.2	<0.2	--	<0.2	<0.2	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	<0.2	0	0.723	0.326	--	--	--	--
	4/23/1997		--	--	--	--	<0.5	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<0.41	--	--	<0.43	--	--	<0.44	**0.67**	--	--	--	--
	12/17/2019		--	--	--	<0.0998	--	--	<0.0994	--	--	<0.0997	0.399	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	<0.25	--	<0.25	--
	2/22/2022		--	--	--	<0.25	--	--	<0.25	--	--	<0.25	0.310 x	<0.25	--	<0.25	<0.25
	05/10/22		--	--	--	<0.25	--	--	<0.25	--	--	<0.25	0.25	<0.25	<0.25	<0.25	--
Lube Oil w/ SGC	1/5/2022	0.5	--	--	--	--	--	--	--	--	--	--	--	<0.25	--	<0.25	--
	2/22/2022		--	--	--	<0.25	--	--	<0.25	--	--	<0.25	<0.25	<0.25	--	<0.25	<0.25
	05/10/22		--	--	--	<0.25	--	--	<0.25	--	--	<0.25	<0.25	<0.25	<0.25	<0.25	--
BTEX (µg/L)																	
Benzene	10/11/1994	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	**9.5**	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<1	--	--	<1	--	--	<1	<4	--	--	--	--
	12/17/2019		--	--	--	<1	--	--	<1	--	--	<1	<1	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	<0.35	--	<0.35	--
	2/22/2022		--	--	--	<0.35	--	--	<0.35	--	--	<0.35	<0.35	<0.35	--	<0.35	<0.35
	5/10/2022		--	--	--	<0.35	--	--	<0.35	--	--	<0.35	<0.35	<0.35	<0.35	<0.35	--
Toluene	10/11/1994	1,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	2.3	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<1	--	--	<1	--	--	<1	<4	--	--	--	--
	12/17/2019		--	--	--	<1	--	--	<1	--	--	<1	<1	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	<1	--	<1	--
	2/22/2022		--	--	--	<1	--	--	<1	--	--	<1	<1	<1	--	<1	<1
	5/10/2022		--	--	--	<1	--	--	<1	--	--	<1	<1	<1	<1	<1	--
Ethylbenzene	10/11/1994	700	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	<1	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<1	--	--	<1	--	--	<1	<4	--	--	--	--
	12/17/2019		--	--	--	<1	--	--	<1	--	--	<1	<1	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	<1	--	<1	--
	2/22/2022		--	--	--	<1	--	--	<1	--	--	<1	<1	<1	--	<1	<1
	5/10/2022		--	--	--	<1	--	--	<1	--	--	<1	<1	<1	<1	<1	--
m,p-Xylene	10/11/1994	1,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	<1	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<1	--	--	<1	--	--	<1	<4	--	--	--	--
	12/17/2019		--	--	--	<1	--	--	<1	--	--	<1	<1	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	<2	--	<2	--
	2/22/2022		--	--	--	<2	--	--	<2	--	--	<2	<2	<2	--	<2	<2
	05/10/22		--	--	--	<2	--	--	<2	--	--	<2	<2	<2	<2	<2	--
o-xylene	10/11/1994	1,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	<1	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<1	--	--	<1	--	--	<1	<4	--	--	--	--
	12/17/2019		--	--	--	<1	--	--	<1	--	--	<1	<1	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	<1	--	<1	--
	2/22/2022		--	--	--	<1	--	--	<1	--	--	<1	<1	<1	--	<1	<1
	5/10/2022		--	--	--	<1	--	--	<1	--	--	<1	<1	<1	<1	<1	--
Naphthalene (µg/L)	10/11/1994	160	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/17/2019		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	<1	--	<1	--
	2/22/2022		--	--	--	<1	--	--	<1	--	--	<1	<1	<1	--	<1	<1
	5/10/2022		--	--	--	<1	--	--	<1	--	--	<1	<1	<1	<1	<1	--
Lead (µg/L)																	
Lead	10/11/1994	15	<3	<3	<3	--	<3	<3	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/17/2019		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	2/22/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	5/10/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

Bold values exceed MTCA Method A cleanup levels.

[a] Washington Administrative Code Chapter 173-340, Model Toxics Control Act (MTCA) Cleanup Regulation, Method A suggested soil cleanup level for groundwater; updated August 15, 2001.

[b] 800 µg/L if benzene is present in groundwater; 1,000 µg/L if no detectable benzene in groundwater.

mg/L - milligrams per liter.

µg/L - micrograms per liter.

SGC - silica gel cleanup

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation

-- not analyzed.

< - analyte not detected at or greater than the listed concentration (practical quantitation limit [PQL]).

APPENDIX A:

FEBRUARY 2022 FIELD DATA SHEETS & LABORATORY REPORTS

PARAMETRIX

Form 07-EN-215/Rev. 02/07

Field Report/Well Data

TO:

Lisa Gilbert

Mike Brady

John Greene

DATE 2/22/2022	JOB NO. 553-1521-242 WO31 Task 200.02
PROJECT King County METRO South Facilities South Annex	
LOCATION 11911 E Marginal Way S, Tukwila, WA	
CONTRACTOR Parametrix in Assoc. with HWA Geosciences	OWNER King County METRO
WEATHER SNOW	TEMP 32 ° at 0820 AM ° at PM
PRESENT AT SITE Cierra Wilson	

THE FOLLOWING WAS NOTED:

WN (WELL NUMBER)	Time	DTW ft (DEPTH TO WATER)	MP (MEASURE POINT)	SU in (STICK UP OF WELL CASING)	TD ft (TOTAL DEPTH OF WELL)	WD (WELL DIAMETER)	
21MW-1	0914	3.70	TOC	3.59	14.56	2"	14.85
21MW-2	0927	5.05	TOC	3.1[illegible]	14.90	2"	15.16
SB-7	0903	5.21	TOC	5.0[illegible]	11.56	2"	11.[illegible]6
SB-8	0945	5.82	TOC	2.94	13.70	2"	13.94
DW-3R	0857	4.75	TOC	~~6.55~~ LOW END	~~8.75~~	7.75"	DROPPED
DW-4R	0849	5.10	TOC	4.79	9.21	7.75"	
Staff Gauge	0937	6.05	Top of Concrete Pad	0.30	~~N/A~~	~~N/A~~"	7.35
EZ	0838	5.66	TOC	~~5.5~~	15.9	2"	

TOC (Top of Locking Casing) TOW (Top of Well Casing)

COPIES 1/1

SIGNED [illegible]

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.02 **Date:** 2/22/22 **Well ID:** 21MW-1

Project Name: King County METRO South Facilities South Annex **Project Address:** 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences **Samplers:** Cierra Wilson

Purge Data

Purge Equipment: Peristaltic pump

Depth of Well (ft below TOC): 15.0

Pump Intake Depth (ft below TOC): 6.0 ft

Well Casing/Diameter: 2"

Initial Depth to Water (ft below TOC): 4.10

Purge Time (from/to): 1402 - 1450

Time	Depth to Water (ft below TOC)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance mS/cm ~~(mg/cm)~~	pH (units)	ORP (mv)	Turbidity (visual)	Comments
1405	4.40	2.5	240		8.67	7.32	0.579	6.73	-40.1	none	slightly y
1408	5.0	2.5	240		8.90	3.79	0.581	6.70	-43.7	↓	↓
1411	" "	" "	240		9.10	2.62	0.584	6.68	-47.6		
1414	5.05	" "	" "		9.36	1.99	0.585	6.67	-49.3		
1417	5.09	" "	" "		9.46	1.74	0.584	6.66	-50.4		
1420	5.10	" "	" "		9.66	1.40	0.583	6.65	-53.1		
1423	" "	" "	" "		9.72	1.21	0.582	6.65	-53.8		
1426	" "	" "	" "		9.81	0.99	0.579	6.64	-53.9		
1429	" "	" "	" "		9.87	0.88	0.578	6.64	-54.7		
1432	" "	" "	" "		9.92	0.79	0.577	6.64	-55.1		clear
1435	" "	" "	" "		9.93	0.72	0.576	6.64	-55.7		↓
1438	" "	" "	" "		9.97	0.65	0.574	6.63	-57.9		
1441	5.11	" "	" "		10.08	0.59	0.572	6.63	-59.5		
1444	" "	" "	" "		10.08	0.57	0.571	6.63	-59.1		
1447	" "	" "	" "		10.06	0.54	0.571	6.63	-58.1		
1450											
				Stabilization Criteria	3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sampling Data

Sample ID: 21MW-1 Time Collected: 1455 Weather: 30s CLOUDY

Sample Description (Color, Turbidity, Odor, Other): ~~light yellow hue,~~ faint petroleum odor

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene

Laboratory: Friedman & Bruya Lab Dropoff Method: in person Lab Dropoff Date: 2/23/22

Additional Information/Comments

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.02 Date: 2/22/22 Well ID: 21MW-2

Project Name: King County METRO South Facilities South Annex Project Address: 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences Samplers: Cierra Wilson

Purge Data

Purge Equipment: Peristaltic pump Depth of Well (ft below TOC): 15.0

Pump Intake Depth (ft below TOC): 6.5 Well Casing/Diameter: 2"

Initial Depth to Water (ft below TOC): 5.10 Purge Time (from/to): 1146 – 1240

Time	Depth to Water (ft below TOC)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance S/cm ~~(mg/cm)~~	pH (units)	ORP (mv)	Turbidity (visual)	Comments
1153	5.30	2.75	240		10.62	4.44	0.830	6.39	-44.3	none	light yellow
1156	" "	" "	" "		11.09	3.08	0.827	6.38	-45.4	" "	
1159	" "	" "	260		11.37	2.10	0.829	6.38	-49.9	orange	debris (1
1202	" "	" "	" "		11.50	1.60	0.829	6.38	-57.6		
1205	" "	" "	" "		11.62	1.22	0.829	6.38	-50.9		
1208	" "	" "	" "		11.55	1.10	0.832	6.38	-52.5		
1211	" "	" "	" "		11.88	0.93	0.828	6.38	-56.8		
1214	" "	" "	" "		12.04	0.77	0.829	6.38	-59.3		
1217	" "	" "	" "		12.06	0.66	0.829	6.38	-59.9		
1220	" "	" "	" "		12.18	0.57	0.828	6.38	-61.3		
1223	" "	" "	" "		12.26	0.56	0.827	6.37	-61.5		
1226	" "	" "	" "		12.26	0.50	0.828	6.38	-61.3		
1229	" "	" "	" "		12.10	0.48	0.829	6.38	-60.7		
1232	" "	" "	" "		12.25	0.45	0.827	6.37	-61.3		
1235	" "	" "	" "	3 gal	12.28	0.42	0.828	6.37	-61.3		
Stabilization Criteria					3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sampling Data

Sample ID: 21MW-2 Time Collected: 1245 Weather: 30s cloudy

Sample Description (Color, Turbidity, Odor, Other): light yellow color, small orange material, slight petroleum odor

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene

Laboratory: Friedman & Bruya Lab Dropoff Method: in person Lab Dropoff Date: 2/23/22

Additional Information/Comments

slight petroleum odor

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.02 Date: 2/23/22 Well ID: DW-3R

Project Name: King County METRO South Facilities South Annex Project Address: 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences Samplers: Cierra Wilson

Purge Data

Purge Equipment: Peristaltic pump Depth of Well (ft below TOC): 8.80

Pump Intake Depth (ft below TOC): 6.0 ft Well Casing/Diameter: 0.9'

Initial Depth to Water (ft below TOC): 4.85 Purge Time (from/to): 1115 - 1150

Time	Depth to Water (ft below TOC)	Pump Setting	mL/min Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific mS/cm Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (visual)	Comments
1119	4.85	275	260		9.23	3.59	0.630	6.85	6.6		
1122	" "	" "	" "		9.53	3.26	0.631	6.84	7.5		
1125	" "	" "	" "		9.57	3.02	0.636	6.82	9.5		black spe
1128	" "	" "	" "		9.66	2.68	0.637	6.81	10.9		
1131	" "	" "	" "		9.55	2.54	0.637	6.80	12.9		
1134	" "	" "	" "		9.54	2.25	0.636	6.80	15.2		
1137	" "	" "	" "		9.56	2.16	0.636	6.79	17.1		
1140	" "	" "	" "		9.53	2.18	0.636	6.79	19.2		
1143	" "	" "	" "	2 gals	9.52	2.16	0.635	6.79	21.1		
			Stabilization Criteria		3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sampling Data

Sample ID: DW-3R Time Collected: 1150 Weather: 30's CLEAR

Sample Description (Color, Turbidity, Odor, Other): black specks, no odor

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene

Laboratory: Friedman & Bruya Lab Dropoff Method: in person Lab Dropoff Date: 2/23/22

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.02 Date: 2/23/22 Well ID: DW-4R

Project Name: King County METRO South Facilities South Annex Project Address: 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences Samplers: Cierra Wilson

Purge Data

Purge Equipment: Peristaltic pump Depth of Well (ft below TOC): 9.21

Pump Intake Depth (ft below TOC): 6.5 ± Well Casing/Diameter: 0.65'

Initial Depth to Water (ft below TOC): 5.19 Purge Time (from/to): 1222 – 1250

Time	Depth to Water (ft below TOC)	Pump Setting	Purge Rate (mL/min)	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (visual)	Comments
1226	5.19	2.75	240		10.74	6.47	0.721	7.28	15.3		
1229	" "	" "	" "		11.00	5.78	0.722	7.26	18.1		
1232	" "	" "	" "		11.15	5.27	0.724	7.22	20.5		
1235	" "	" "	" "		11.25	5.15	0.725	7.21	21.9		
1238	" "	" "	" "		11.30	4.92	0.725	7.20	22.7		
1241	" "	" "	" "		11.36	4.84	0.725	7.19	23.1		
1244	" "	" "	" "	2 gals	11.36	4.71	0.725	7.18	23.4		
1253											
Stabilization Criteria					3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sampling Data

Sample ID: DW-4R Time Collected: 1250 Weather: 30s CLEAR

Sample Description (Color, Turbidity, Odor, Other): ~~clear~~ no odor, black specks

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene

Laboratory: Friedman & Bruya Lab Dropoff Method: in person Lab Dropoff Date: 2/23/22

Additional Information/Comments

- black specks visible upon sampling

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.02 Date: 2/23/22 Well ID: SB-7

Project Name: King County METRO South Facilities South Annex Project Address: 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences Samplers: Cierra Wilson

Purge Data

Purge Equipment: Peristaltic pump Depth of Well (ft below TOC): 11.64

Pump Intake Depth (ft below TOC): 8.0 ft Well Casing/Diameter: 2"

Initial Depth to Water (ft below TOC): 5.30 Purge Time (from/to): 0930 – 1020

Time	Depth to Water (ft below TOC)	Pump Setting	mL/min Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific mS/cm Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (visual)	Comments
0934	5.32	2.75	240		7.51	6.80	0.449	6.66	-57.4	low	
0937	5.35	2.75	260		7.65	4.19	0.450	6.64	-60.2		
0940	" "	" "	" "		7.91	2.75	0.449	6.62	-63.7		
0943	" "	" "	" "		8.09	1.93	0.449	6.62	-67.5		
0946	" "	" "	" "		8.07	1.55	0.450	6.61	-68.9		
0949	" "	" "	" "		8.12	1.38	0.450	6.61	-70.1		
0952	" "	" "	" "		8.10	1.16	0.451	6.61	-71.7		
0955	" "	" "	" "		8.13	1.02	0.451	6.60	-72.2		
0958	" "	" "	" "		8.11	0.89	0.453	6.60	-72.5		
1001	" "	" "	" "		8.14	0.87	0.453	6.60	-73.1		
1004	" "	" "	" "		8.15	0.78	0.453	6.60	-73.0		
1007	" "	" "	" "		8.20	0.77	0.454	6.59	-71.7	clear	
1010	" "	" "	" "		8.22	0.67	0.454	6.59	-70.7		
1013	" "	" "	" "		8.21	0.66	0.455	6.58	-70.3		
1016	" "	" "	" "	2.5gal	8.21	0.62	0.456	6.58	-69.8		
			Stabilization Criteria		3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sampling Data

Sample ID: SB-7 Time Collected: 1020 Weather: 30's CLEAR

Sample Description (Color, Turbidity, Odor, Other): clear, no odor

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene

Laboratory: Friedman & Bruya Lab Dropoff Method: in person Lab Dropoff Date: 2/23/22

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.02
Date: 2/22/22
Well ID: SB-8
Project Name: King County METRO South Facilities South Annex
Project Address: 11911 E Marginal Way S, Tukwila, WA
Sampling Organization: Parametrix in Assoc. with HWA Geosciences
Samplers: Cierra Wilson

Purge Data

Purge Equipment: Peristaltic pump
Depth of Well (ft below TOC): 13.70
Pump Intake Depth (ft below TOC): ~~7.00~~ 12.00
Well Casing/Diameter: 2"
Initial Depth to Water (ft below TOC): 5.82
Purge Time (from/to): 1010 - 1055, 1535-155
2/2

Time	Depth to Water (ft below TOC)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (visual)	Comments
1015	7.45	2.5	260		11.96	6.88	0.932	6.00	-92.2	none	yellow
* 1020	8.10	2.5	260		12.12	4.77	0.935	6.09	-92.2	↓	
1030	9.10	2.25	240		12.09	3.04	0.905	6.11	-77.7		
1033		↓	↓		12.34	2.31	0.920	6.12	-88.0		strong odo
1036	9.45				12.16	2.85	0.930	6.13	-86.0		
* 1039	—				11.95	3.19	0.929	6.15	—	~~air~~	pumpi
1046	—				11.52	2.56	0.915	6.25	-55.7	↓	
1049	11.5				12.24	1.60	0.923	6.22	-50.5		
1052	11.5				12.70	1.24	0.927	6.14	-63.4		
1055	12.85			1.5 gal	13.01	0.94	0.930	6.13	-87.9	stopped pump	
1535	8.40	2.75	240		10.87	3.25	0.857	6.28	-37.9	↓	
1538	8.81	" "	" "		11.08	2.80	0.850	6.27	-39.1		
1541	9.60	" "	" "		11.48	2.31	0.841	6.25	-39.4		
1544	10.35	" "	" "		11.25	2.28	0.843	6.22	-45.4		
1547	" "	" "	" "		11.90	1.92	0.857	6.22	-52.7		
1550	"11.65"	" "	" "		12.36	1.15	0.871	6.22	-56.6		
1553	12.42	" "	" "		12.54	1.02	0.881	6.22	-58.9		
1556	13.20	" "	" "		12.73	1.15	0.898	6.22	-61.6		
1559				1.5 gal		1.27	0.920	6.22	-75.0	stopped pumpin	
			Stabilization Criteria		3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sampling Data

Sample ID: SB-8
Time Collected: 0830 2/23/22
Weather: 30's snow
Sample Description (Color, Turbidity, Odor, Other): yellow, white specks, sulfur-like smell
Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene
Laboratory: Friedman & Bruya
Lab Dropoff Method: in person
Lab Dropoff Date: 2/23/22

Additional Information/Comments

* pump pulled as air came into tube; replaced at 12 ft. L.
revisited later on 2/22 + samples taken 2/23 w/o purge
-sheen on water surface - no break up
- ~~very~~ agitated - many bubbles present
* (6.28 starting GW elevation 2/23/22)

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
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Michael Erdahl, B.S.
Vineta Mills, M.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

April 14, 2022

Chris Bourgeois, Project Manager
HWA Geosciences, Inc
21312 30th Dr SE
Bothell, WA 98021

Dear Mr Bourgeois:

Included is the amended report from the testing of material submitted on February 23, 2022 from the King County Metro South Facilities 2021-062 W031 Task 200.02, F&BI 202432 project. Per your request, the project name has been updated.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Mike Brady (PMX), Lisa Gilbert (PMX)
HWA0303R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Vineta Mills, M.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
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March 3, 2022

Chris Bourgeois, Project Manager
HWA Geosciences, Inc
21312 30th Dr SE
Bothell, WA 98021

Dear Mr Bourgeois:

Included are the results from the testing of material submitted on February 23, 2022 from the King County Metro South Facilities 2021-062 W031 Task 200.02, F&BI 202432 project. There are 18 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Mike Brady (PMX), Lisa Gilbert (PMX)
HWA0303R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on February 23, 2022 by Friedman & Bruya, Inc. from the HWA Geosciences, Inc King County Metro South Facilities 2021-062 W031 Task 200.02, F&BI 202432 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	HWA Geosciences, Inc
202432-01	DW-3R
202432-02	DW-4R
202432-03	SB-7
202432-04	SB-8
202432-05	21MW-1
202432-06	21MW-2
202432-07	21MW-3
202432-08	Trip Blanks

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/03/22
Date Received: 02/23/22
Project: King County Metro South Facilities 2021-062 W031 Task 200.02, F&BI 202432
Date Extracted: 02/28/22
Date Analyzed: 02/28/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 51-134)
DW-3R 202432-01	<100	79
DW-4R 202432-02	<100	82
SB-7 202432-03	<100	81
SB-8 202432-04 1/5	<500	78
21MW-1 202432-05	<100	79
21MW-2 202432-06	<100	80
21MW-3 202432-07	<100	80
Trip Blanks 202432-08	<100	79
Method Blank 02-344 MB	<100	79

Date of Report: 03/03/22
Date Received: 02/23/22
Project: King County Metro South Facilities 2021-062 W031 Task 200.02, F&BI 202432
Date Extracted: 02/25/22
Date Analyzed: 02/25/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx
Sample Extracts Passed Through a Silica Gel Column Prior to Analysis
Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
DW-3R 202432-01	<50	<250	126
DW-4R 202432-02	<50	<250	128
SB-7 202432-03	<50	<250	129
SB-8 202432-04	<50	<250	85
21MW-1 202432-05	<50	<250	132
21MW-2 202432-06	<50	<250	124
21MW-3 202432-07	<50	<250	113
Method Blank 02-515 MB	<50	<250	111

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 03/03/22
Date Received: 02/23/22
Project: King County Metro South Facilities 2021-062 W031 Task 200.02, F&BI 202432
Date Extracted: 02/24/22
Date Analyzed: 02/24/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
DW-3R 202432-01	<50	<250	125
DW-4R 202432-02	58 x	<250	124
SB-7 202432-03	59 x	<250	121
SB-8 202432-04	350 x	310 x	84
21MW-1 202432-05	150 x	<250	136
21MW-2 202432-06	270 x	<250	125
21MW-3 202432-07	250 x	<250	126
Method Blank 02-515 MB	<50	<250	111

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	DW-3R	Client:	HWA Geosciences, Inc
Date Received:	02/23/22	Project:	W031 Task 200.02, F&BI 202432
Date Extracted:	03/01/22	Lab ID:	202432-01
Date Analyzed:	03/01/22	Data File:	030112.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	116	78	126
Toluene-d8	99	84	115
4-Bromofluorobenzene	93	72	130

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	DW-4R	Client:	HWA Geosciences, Inc
Date Received:	02/23/22	Project:	W031 Task 200.02, F&BI 202432
Date Extracted:	03/01/22	Lab ID:	202432-02
Date Analyzed:	03/01/22	Data File:	030113.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	111	78	126
Toluene-d8	99	84	115
4-Bromofluorobenzene	91	72	130

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	SB-7	Client:	HWA Geosciences, Inc
Date Received:	02/23/22	Project:	W031 Task 200.02, F&BI 202432
Date Extracted:	03/01/22	Lab ID:	202432-03
Date Analyzed:	03/01/22	Data File:	030114.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	111	78	126
Toluene-d8	98	84	115
4-Bromofluorobenzene	93	72	130

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	SB-8	Client:	HWA Geosciences, Inc
Date Received:	02/23/22	Project:	W031 Task 200.02, F&BI 202432
Date Extracted:	03/01/22	Lab ID:	202432-04
Date Analyzed:	03/02/22	Data File:	030210.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	78	126
Toluene-d8	96	84	115
4-Bromofluorobenzene	93	72	130

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	21MW-1	Client:	HWA Geosciences, Inc
Date Received:	02/23/22	Project:	W031 Task 200.02, F&BI 202432
Date Extracted:	03/01/22	Lab ID:	202432-05
Date Analyzed:	03/01/22	Data File:	030115.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	78	126
Toluene-d8	98	84	115
4-Bromofluorobenzene	89	72	130

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	21MW-2	Client:	HWA Geosciences, Inc
Date Received:	02/23/22	Project:	W031 Task 200.02, F&BI 202432
Date Extracted:	03/01/22	Lab ID:	202432-06
Date Analyzed:	03/01/22	Data File:	030116.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	109	78	126
Toluene-d8	98	84	115
4-Bromofluorobenzene	91	72	130

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	21MW-3	Client:	HWA Geosciences, Inc
Date Received:	02/23/22	Project:	W031 Task 200.02, F&BI 202432
Date Extracted:	03/01/22	Lab ID:	202432-07
Date Analyzed:	03/02/22	Data File:	030211.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	112	78	126
Toluene-d8	98	84	115
4-Bromofluorobenzene	89	72	130

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Trip Blanks	Client:	HWA Geosciences, Inc
Date Received:	02/23/22	Project:	W031 Task 200.02, F&BI 202432
Date Extracted:	03/01/22	Lab ID:	202432-08
Date Analyzed:	03/01/22	Data File:	030111.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	109	78	126
Toluene-d8	100	84	115
4-Bromofluorobenzene	89	72	130

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	HWA Geosciences, Inc
Date Received:	Not Applicable	Project:	W031 Task 200.02, F&BI 202432
Date Extracted:	03/01/22	Lab ID:	02-479 mb
Date Analyzed:	03/01/22	Data File:	030107.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	113	78	126
Toluene-d8	98	84	115
4-Bromofluorobenzene	94	72	130

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Date of Report: 03/03/22
Date Received: 02/23/22
Project: King County Metro South Facilities 2021-062 W031 Task 200.02, F&BI 202432

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 202432-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	110	69-134

Date of Report: 03/03/22
Date Received: 02/23/22
Project: King County Metro South Facilities 2021-062 W031 Task 200.02, F&BI 202432

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	128	120	61-133	6

Date of Report: 03/03/22
Date Received: 02/23/22
Project: King County Metro South Facilities 2021-062 W031 Task 200.02, F&BI 202432

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	132	132	63-142	0

Date of Report: 03/03/22
Date Received: 02/23/22
Project: King County Metro South Facilities 2021-062 W031 Task 200.02, F&BI 202432

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 202427-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Benzene	ug/L (ppb)	10	<0.35	92	50-150
Toluene	ug/L (ppb)	10	<1	103	50-150
Ethylbenzene	ug/L (ppb)	10	<1	94	50-150
m,p-Xylene	ug/L (ppb)	20	<2	99	50-150
o-Xylene	ug/L (ppb)	10	<1	95	50-150
Naphthalene	ug/L (ppb)	10	<1	87	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Benzene	ug/L (ppb)	10	94	95	70-130	1
Toluene	ug/L (ppb)	10	102	104	70-130	2
Ethylbenzene	ug/L (ppb)	10	96	98	70-130	2
m,p-Xylene	ug/L (ppb)	20	101	103	70-130	2
o-Xylene	ug/L (ppb)	10	96	98	70-130	2
Naphthalene	ug/L (ppb)	10	88	93	70-130	6

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

202432 +M. Brady

VW4/D02

SAMPLE CHAIN OF CUSTODY

02.23.22

Report To C. Bourgeois + L. Gilbert

Company HWA Geosciences + PMX

Address 21312 30th Dr SE

City, State, ZIP Bothell, WA, 98021

Phone 206-794-3145 Email cbourgeois@hwageo.com

SAMPLERS (signature) [signature]

PROJECT NAME: King County Metro South ~~Base~~ Facilities

PO #: 2021-062 W031 Task 200.02

REMARKS: per MB 02/23/22

Project specific RLs? - Yes / No

INVOICE TO: HWA

Page # 1 of 1

TURNAROUND TIME
- ☑ Standard turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

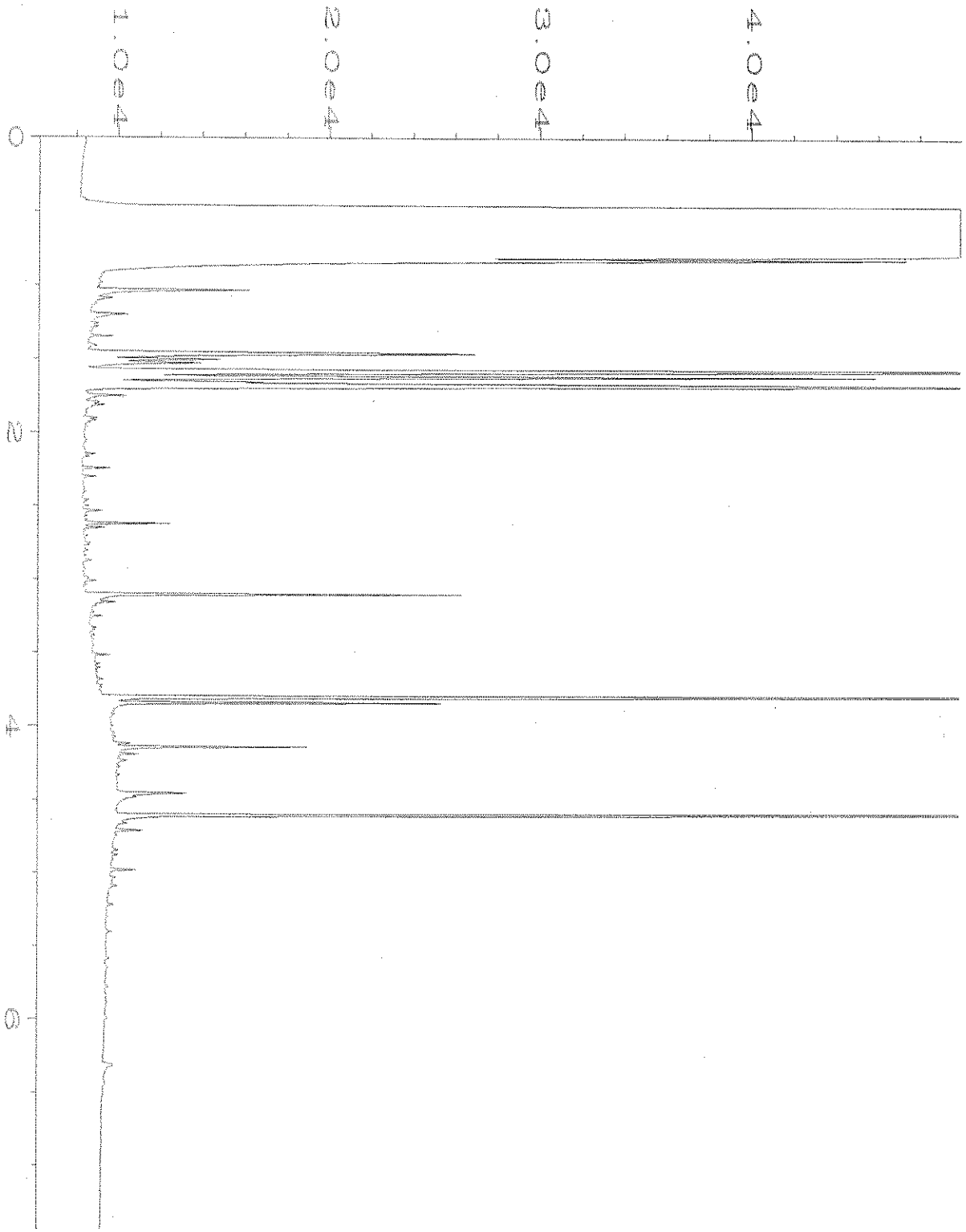
ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	BTEX + Naphthalene				Notes
DW-3R	01A-G	2/23/22	1150	GW	7	X	X						X				Dx w/ + w/o SGC
DW-4R	02	2/23/22	1250	GW	7	X	X						X				
SB-7	03	2/23/22	1020	GW	7	X	X						X				
SB-8	04	2/23/22	0830	GW	7	X	X						X				
21MW-1	05	2/22/22	1455	GW	7	X	X						X				
21MW-2	06	2/22/22	1245	GW	7	X	X						X				
~~MW~~																	
21MW-3	07A-G	2/22/22	1305	GW	7	X	X						X				
Trip Blanks	08A-D			GW	~~2~~ 4		X						X				
					TWC 02/23												

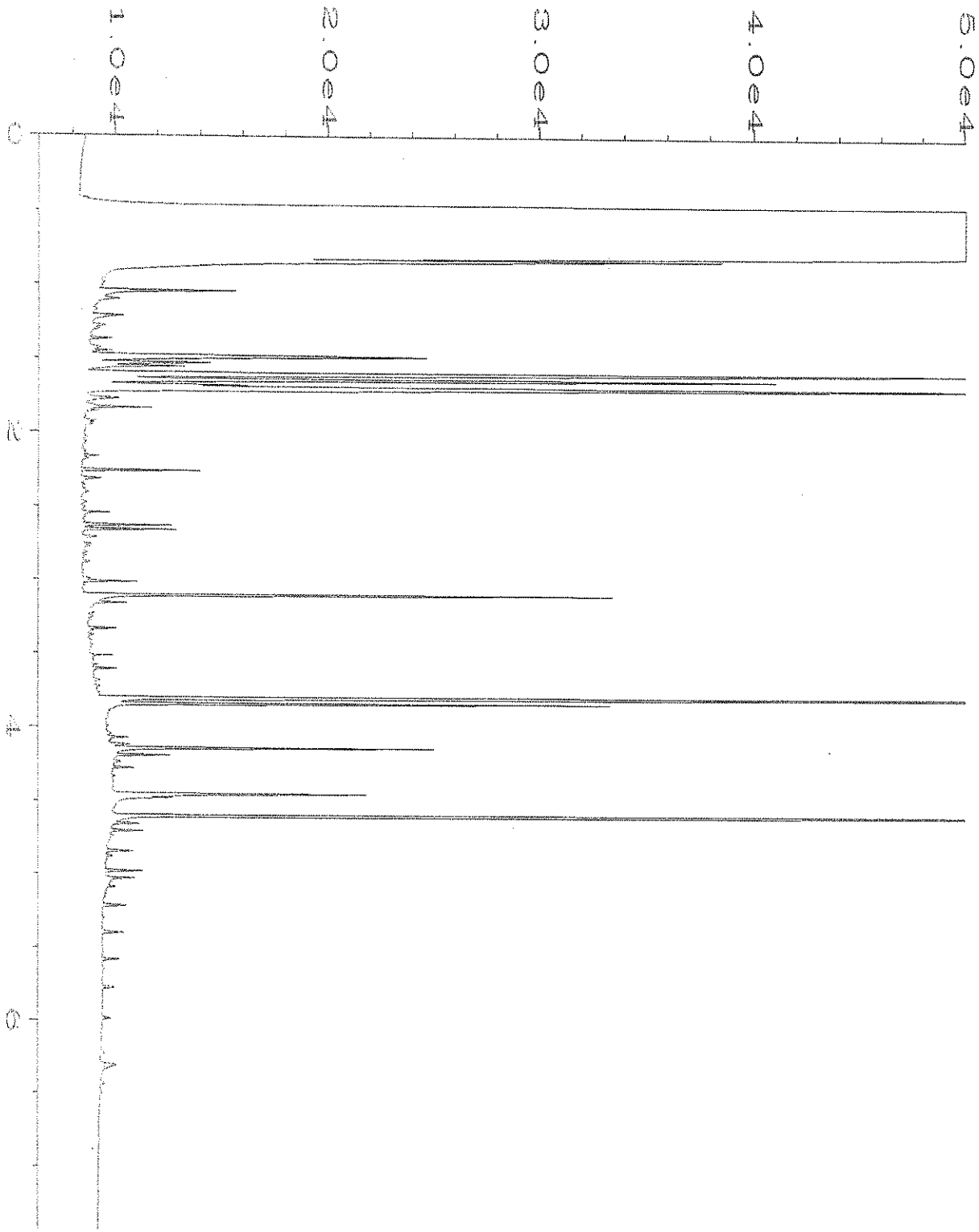
SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: [signature]	Cierra Wilson	HWA	2/23/22	1420
Received by: Tokala C.	Tokala Christensen	FTB	02-23-22	14:26
Relinquished by:				
Received by:				

Samples received at 2 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282



Data File Name	: C:\HPCHEM\1\DATA\02-24-22\020F0801.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 20
Sample Name	: 202432-01	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 8
Acquired on	: 24 Feb 22 05:08 PM	Instrument Method	: DX.MTH
Report Created on	: 07 Mar 22 10:55 AM	Analysis Method	: DEFAULT.MTH



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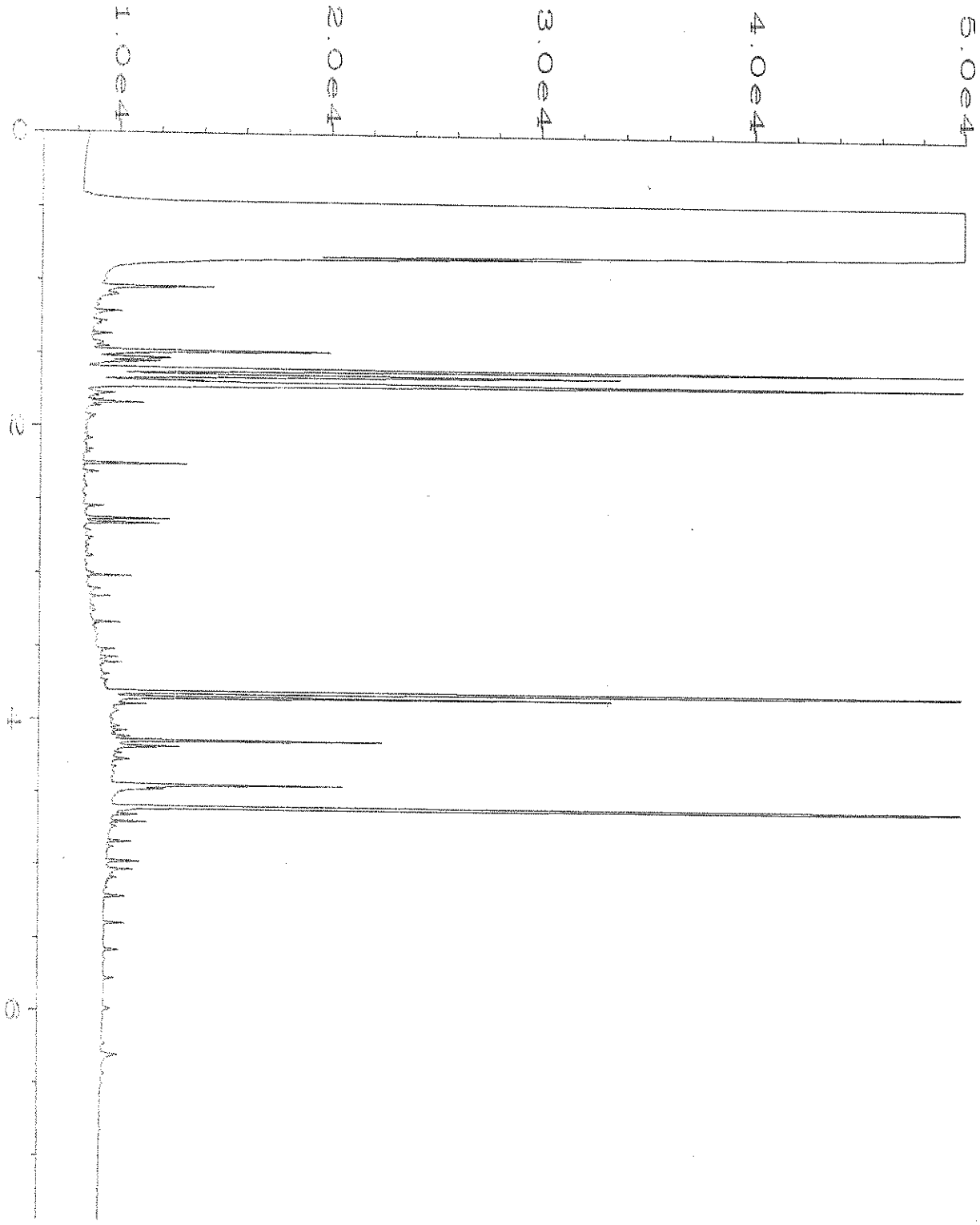
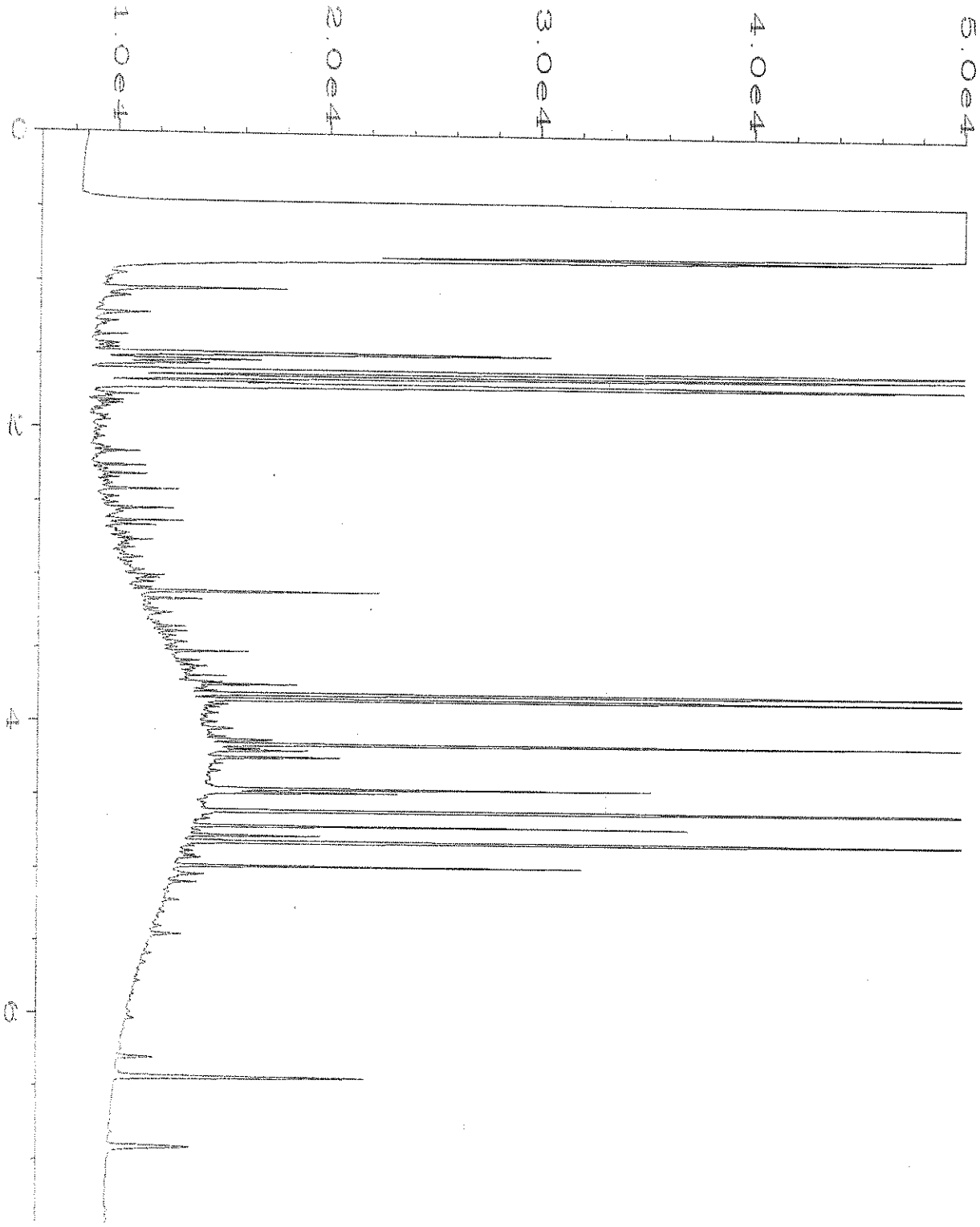
Operator : TL
Instrument : GC1
Sample Name : 202432-02
Run Time Bar Code:
Acquired on : 24 Feb 22 05:17 PM
Report Created on: 25 Feb 22 10:23 AM

Page Number : 1
Vial Number : 21
Injection Number : 1
Sequence Line : 8
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



Data File Name	: C:\HPCHEM\1\DATA\02-24-22\022F0801.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 22
Sample Name	: 202432-03	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 8
Acquired on	: 24 Feb 22 05:31 PM	Instrument Method	: DX.MTH
Report Created on	: 25 Feb 22 10:24 AM	Analysis Method	: DEFAULT.MTH



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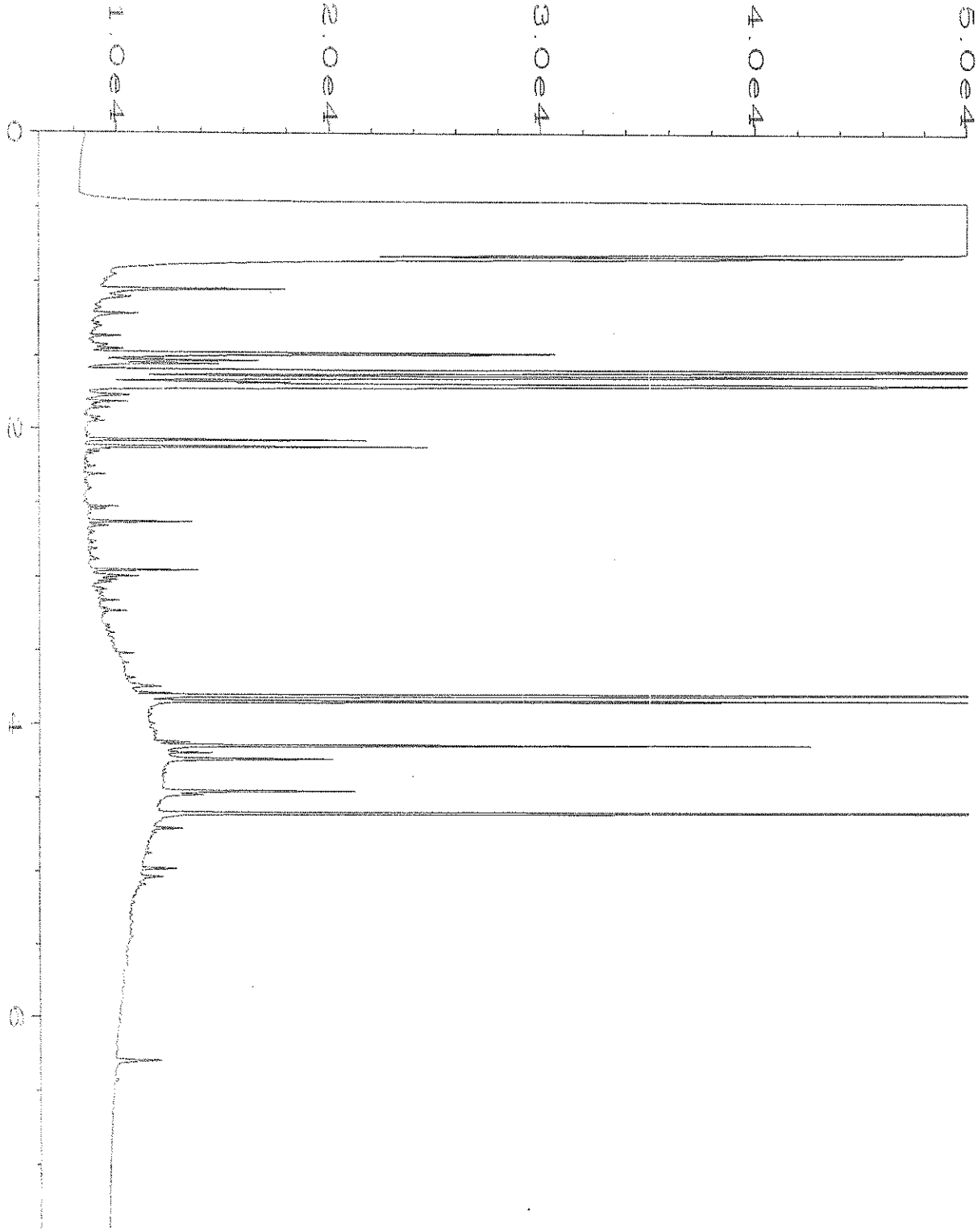
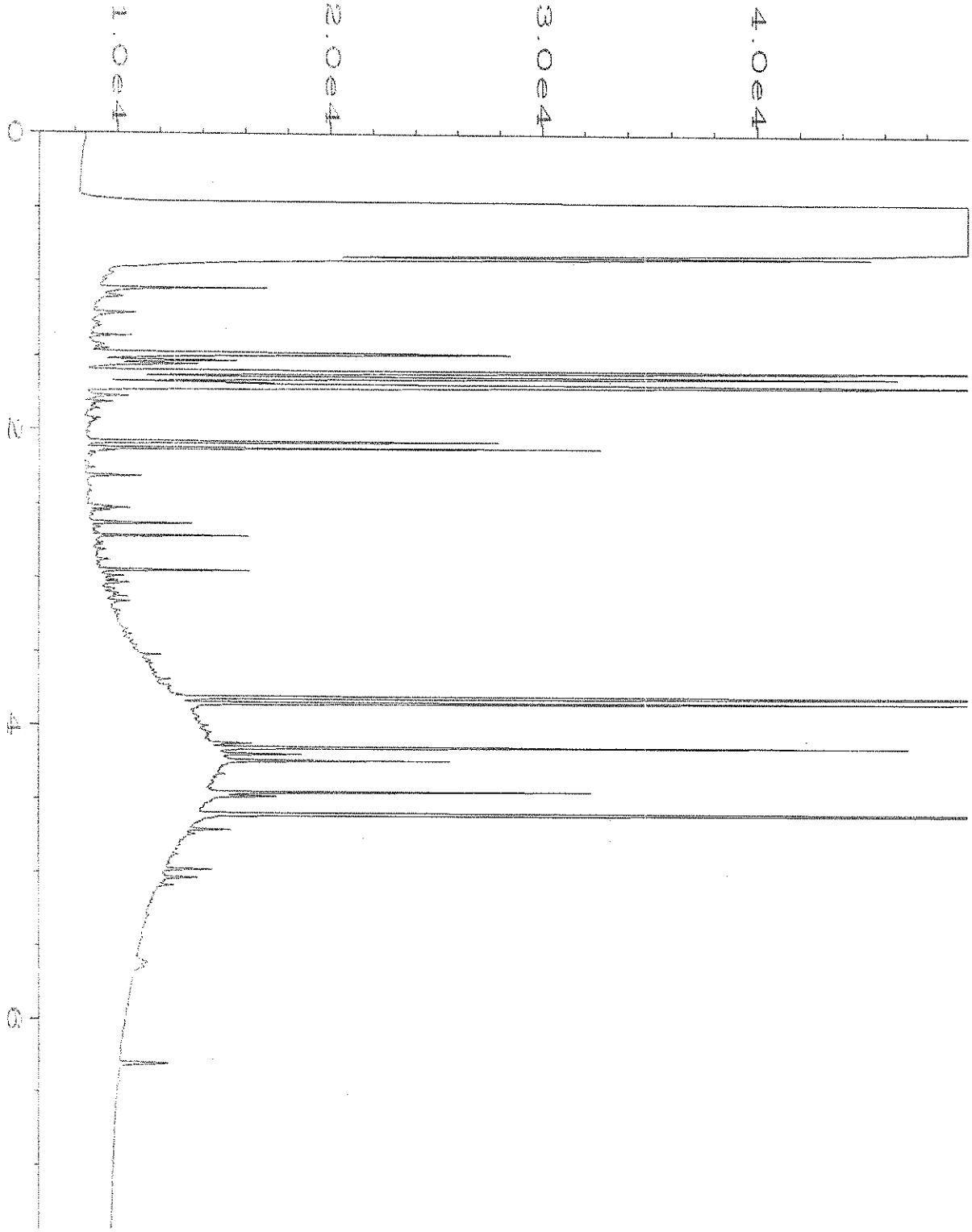
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 23
Sample Name	: 202432-04	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 8
Acquired on	: 24 Feb 22 05:45 PM	Instrument Method	: DX.MTH
Report Created on	: 25 Feb 22 10:24 AM	Analysis Method	: DEFAULT.MTH



Data File Name	: C:\HPCHEM\1\DATA\02-24-22\024F0801.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 24
Sample Name	: 202432-05	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 8
Acquired on	: 24 Feb 22 06:00 PM	Instrument Method	: DX.MTH
Report Created on	: 25 Feb 22 10:24 AM	Analysis Method	: DEFAULT.MTH



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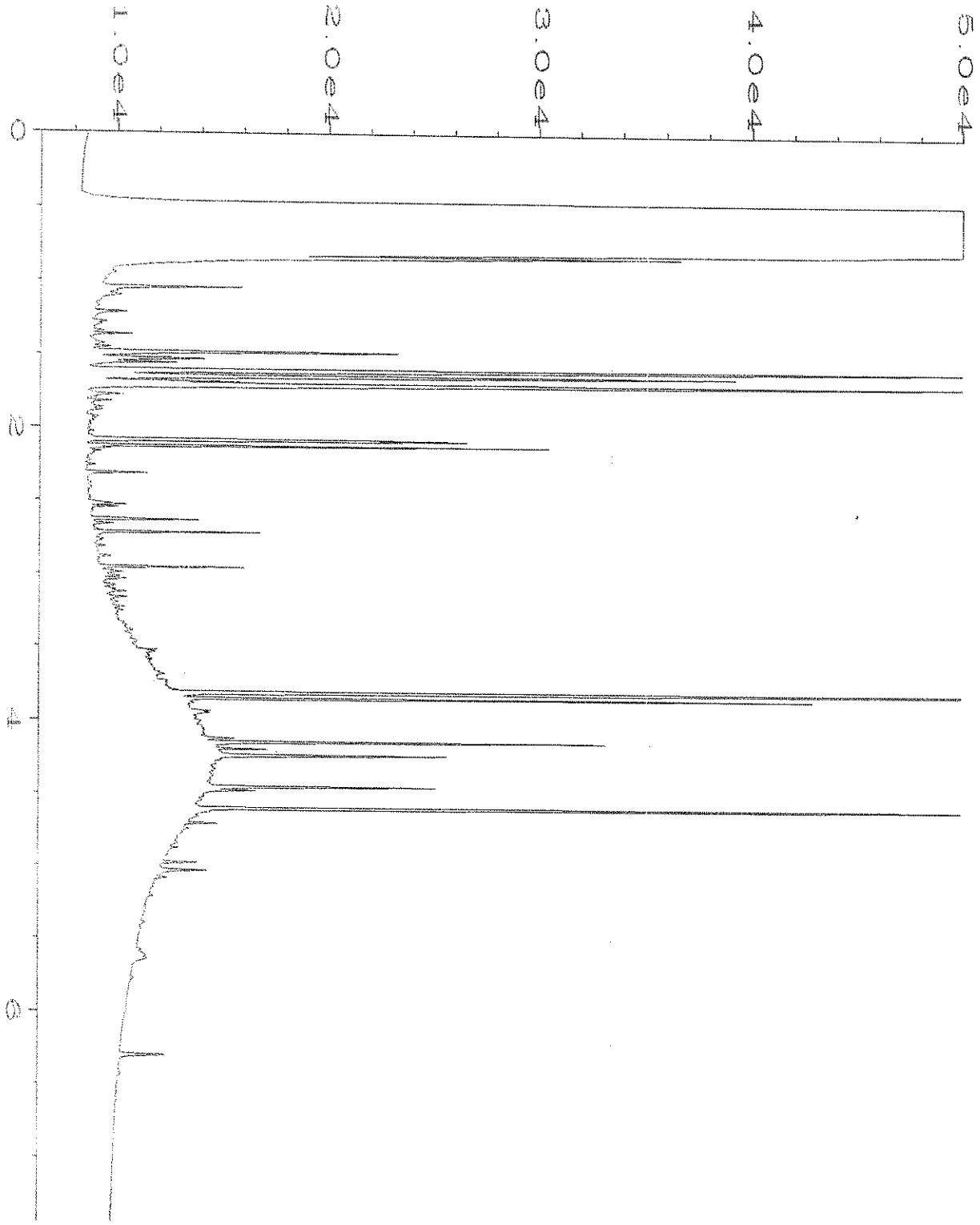
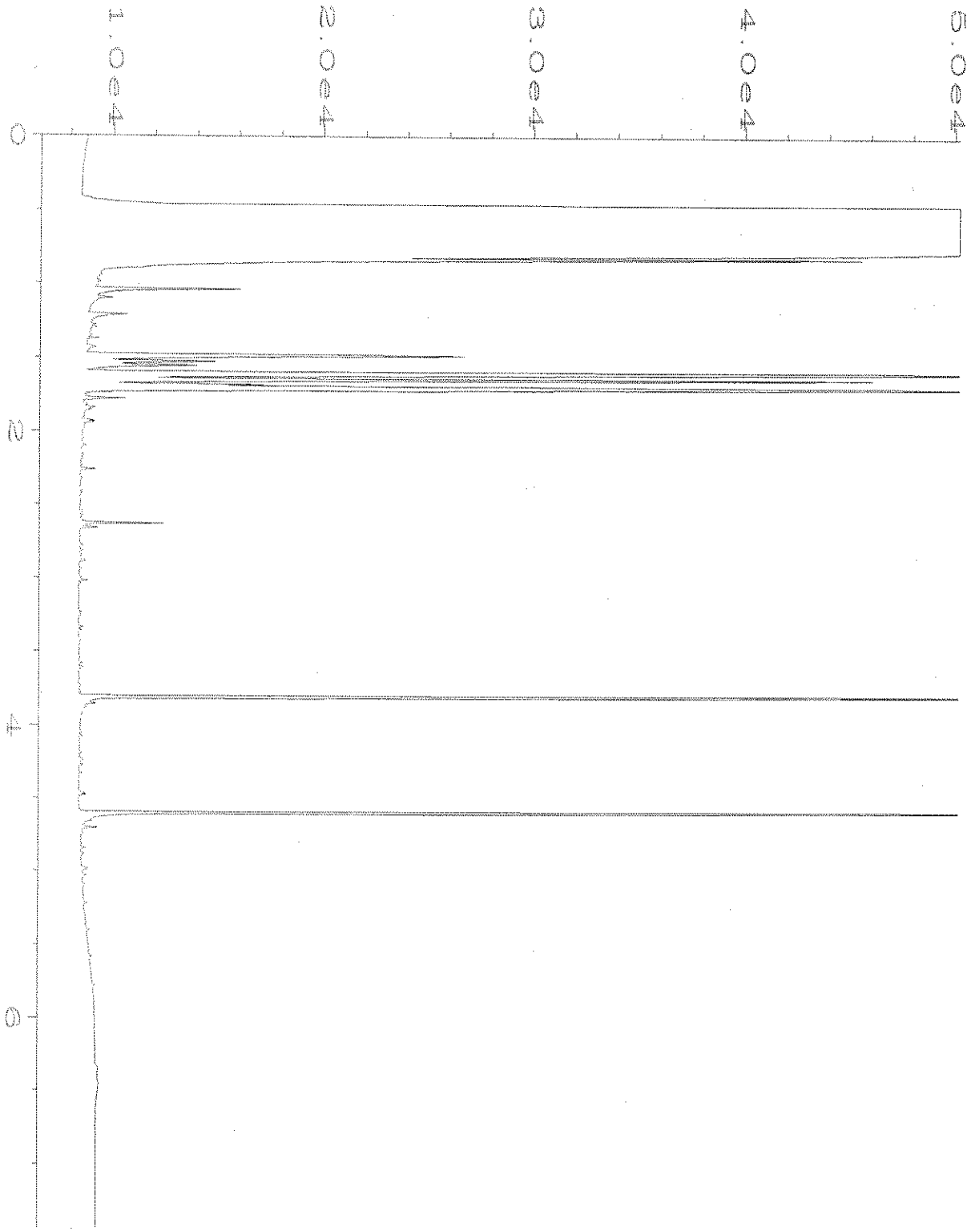
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 25
Sample Name	: 202432-06	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 8
Acquired on	: 24 Feb 22 06:14 PM	Instrument Method	: DX.MTH
Report Created on	: 25 Feb 22 10:24 AM	Analysis Method	: DEFAULT.MTH

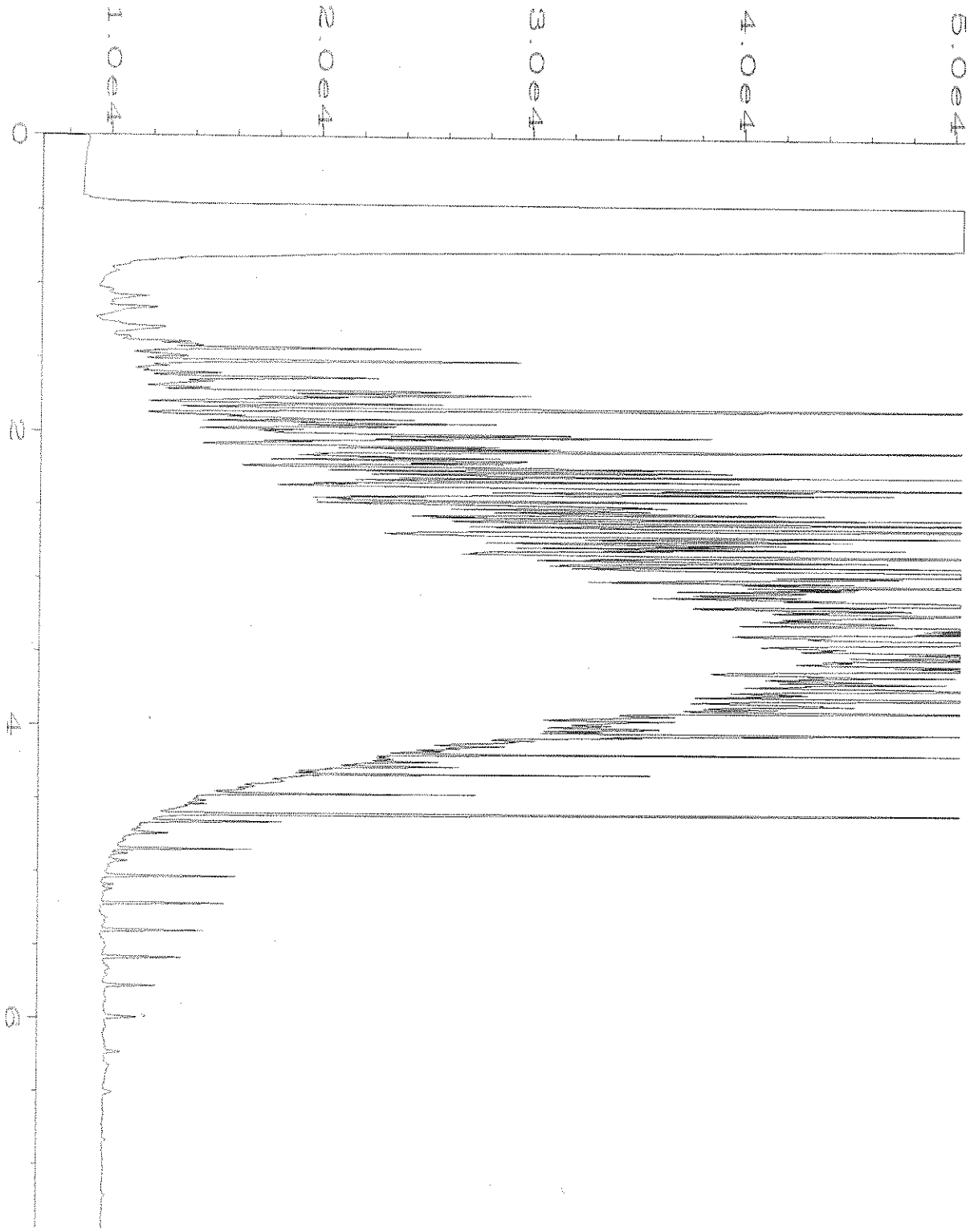


Data File Name	: C:\HPCHEM\1\DATA\02-24-22\026F0801.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 26
Sample Name	: 202432-07	Injection Number	: 1
Bar Code:		Sequence Line	: 8
Acquired on	: 24 Feb 22 06:28 PM	Instrument Method	: DX.MTH
Report Created on	: 25 Feb 22 10:24 AM	Analysis Method	: DEFAULT.MTH

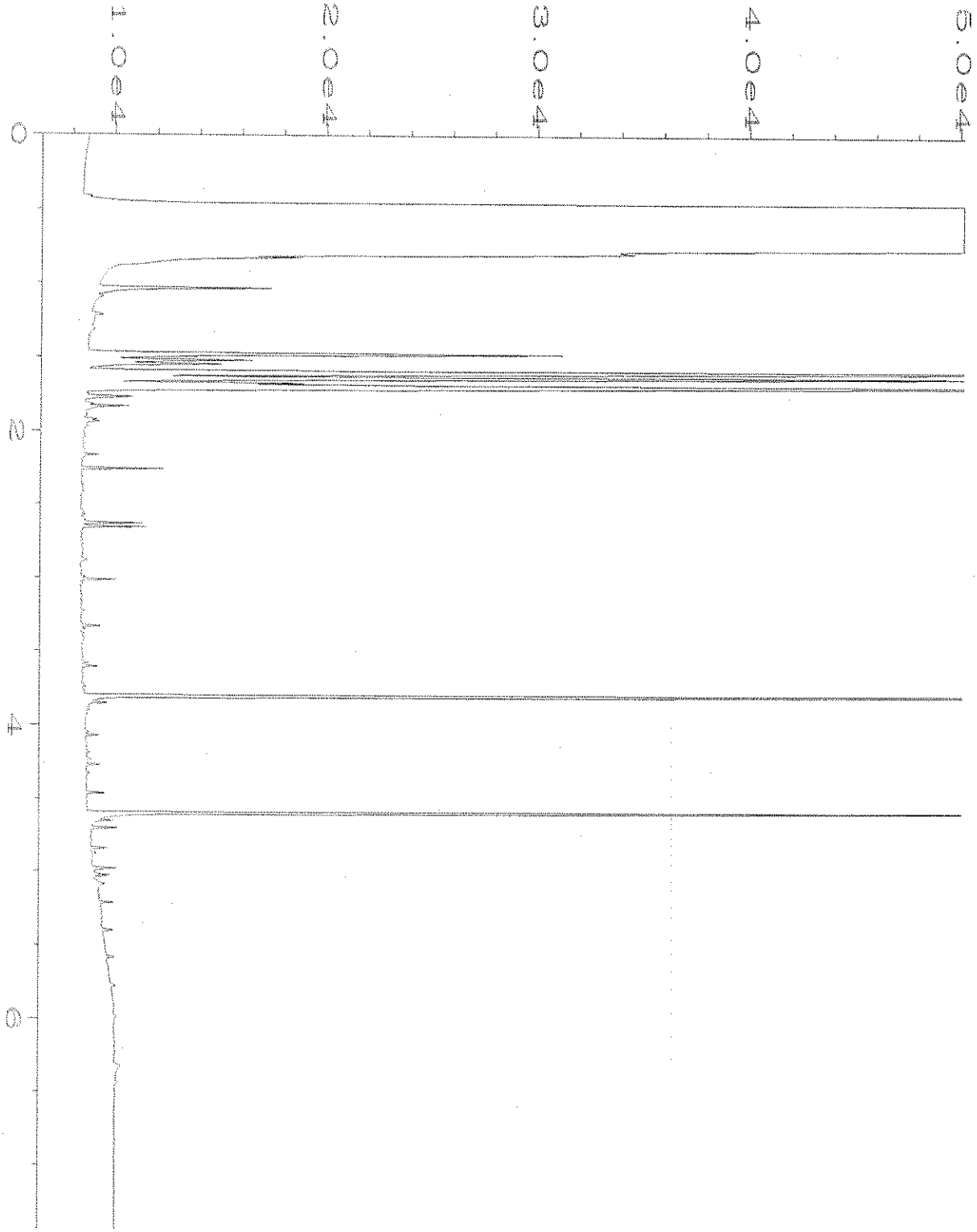


Data File Name : C:\HPCHEM\1\DATA\02-24-22\009F0401.D
Operator : TL
Instrument : GC1
Sample Name : 02-515 mb
Run Time Bar Code:
Acquired on : 24 Feb 22 01:17 PM
Report Created on: 07 Mar 22 10:55 AM

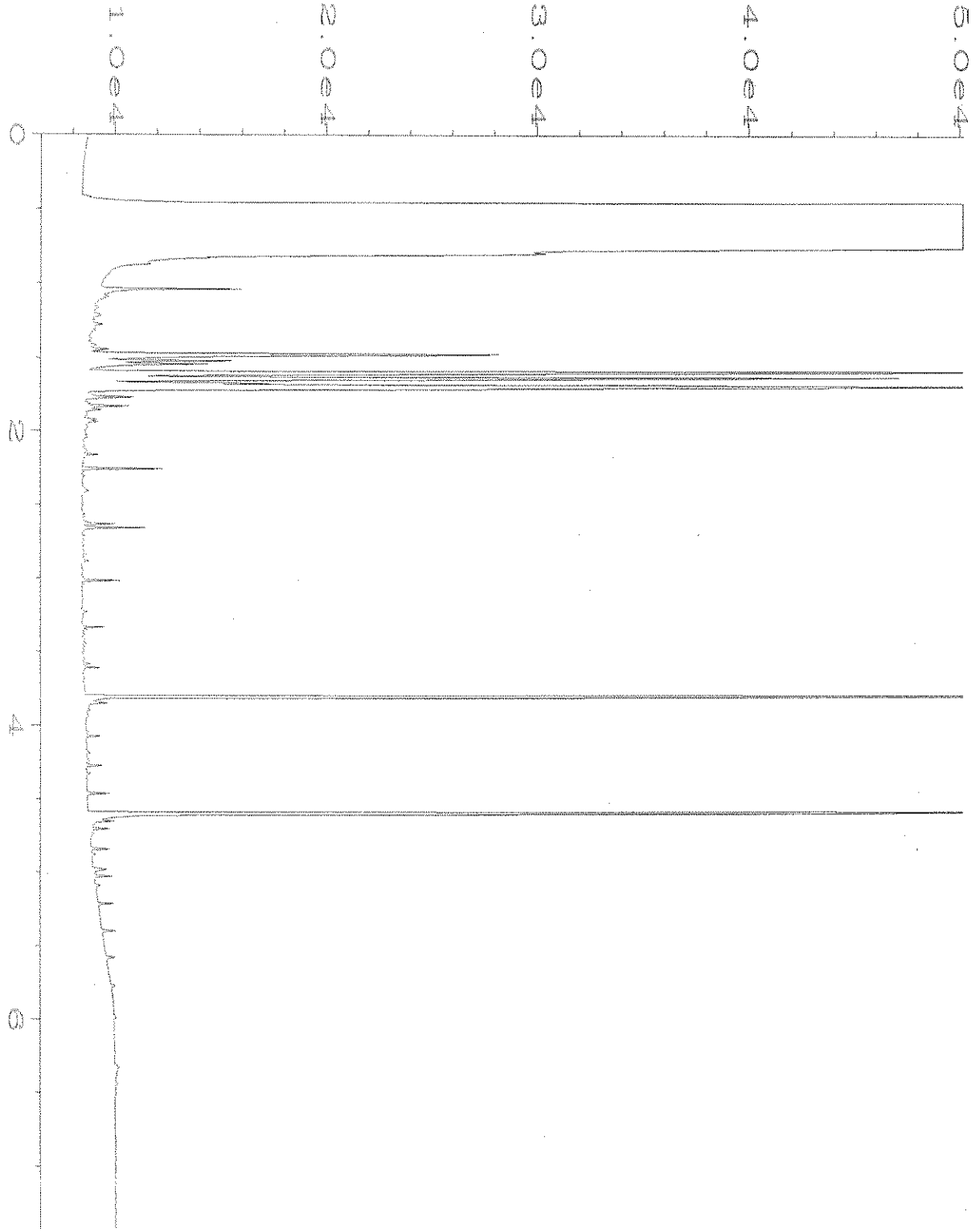
Page Number : 1
Vial Number : 9
Injection Number : 1
Sequence Line : 4
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



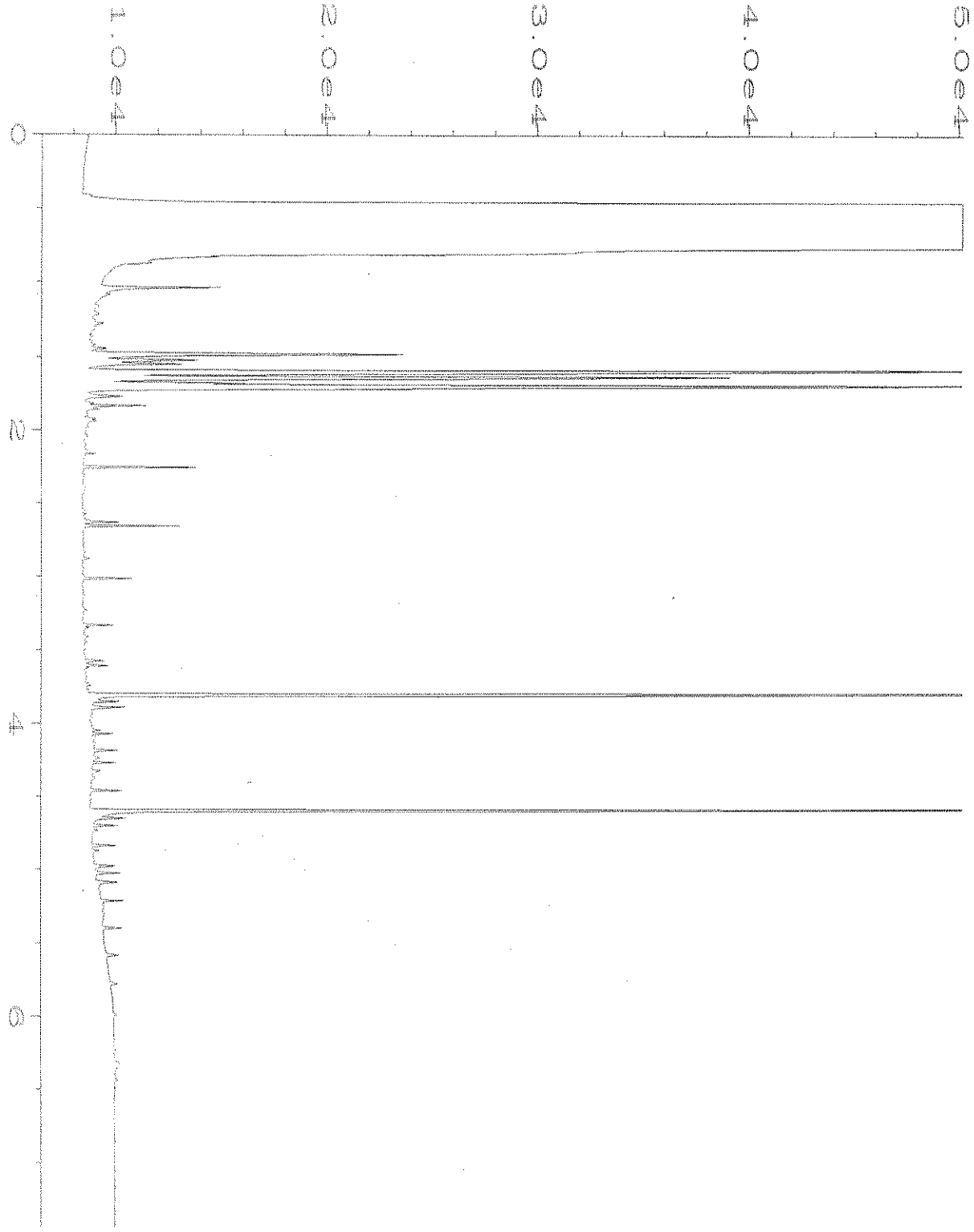
Data File Name	: C:\HPCHEM\1\DATA\02-24-22\003F0201.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 3
Sample Name	: 500 Dx 65-27F	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 2
Acquired on	: 24 Feb 22 06:16 AM	Instrument Method	: DX.MTH
Report Created on	: 07 Mar 22 10:55 AM	Analysis Method	: DEFAULT.MTH



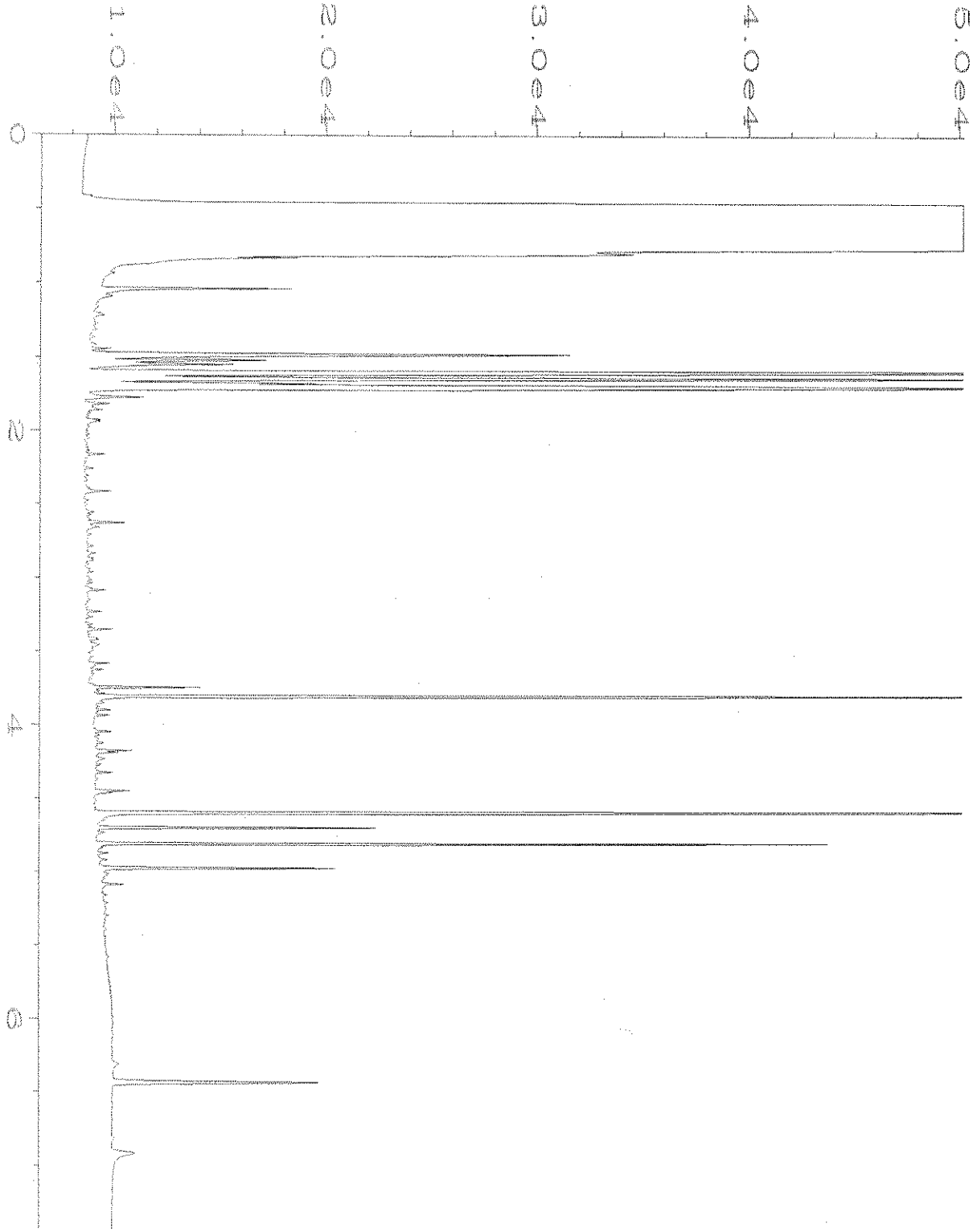
Data File Name	: C:\HPCHEM\1\DATA\02-25-22\048F1301.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 48
Sample Name	: 202432-01 sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 13
Acquired on	: 25 Feb 22 09:50 PM	Instrument Method	: DX.MTH
Report Created on	: 07 Mar 22 10:52 AM	Analysis Method	: DEFAULT.MTH



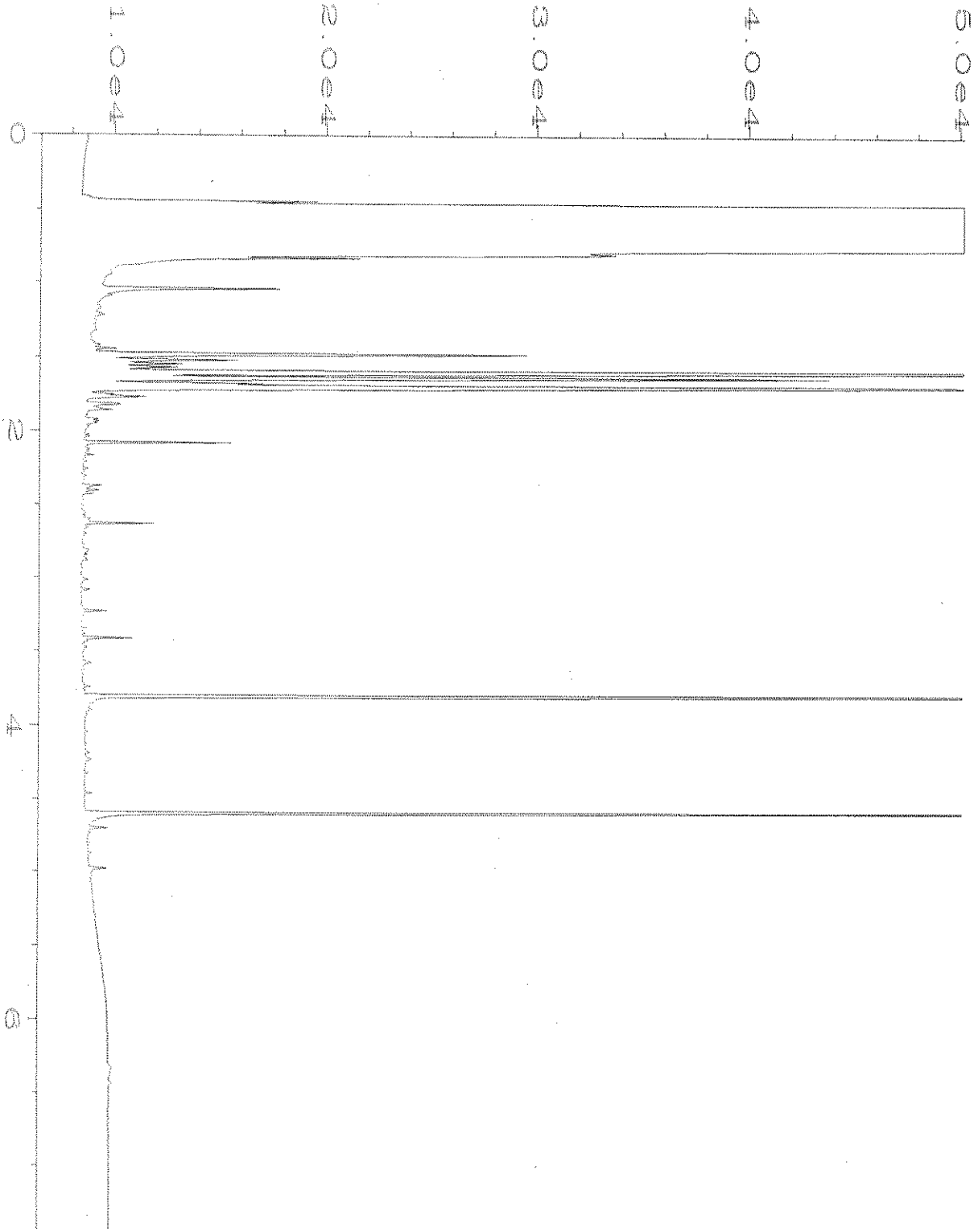
Data File Name	: C:\HPCHEM\1\DATA\02-25-22\049F1301.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 49
Sample Name	: 202432-02 sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 13
Acquired on	: 25 Feb 22 10:04 PM	Instrument Method:	DX.MTH
Report Created on:	07 Mar 22 10:52 AM	Analysis Method	: DEFAULT.MTH



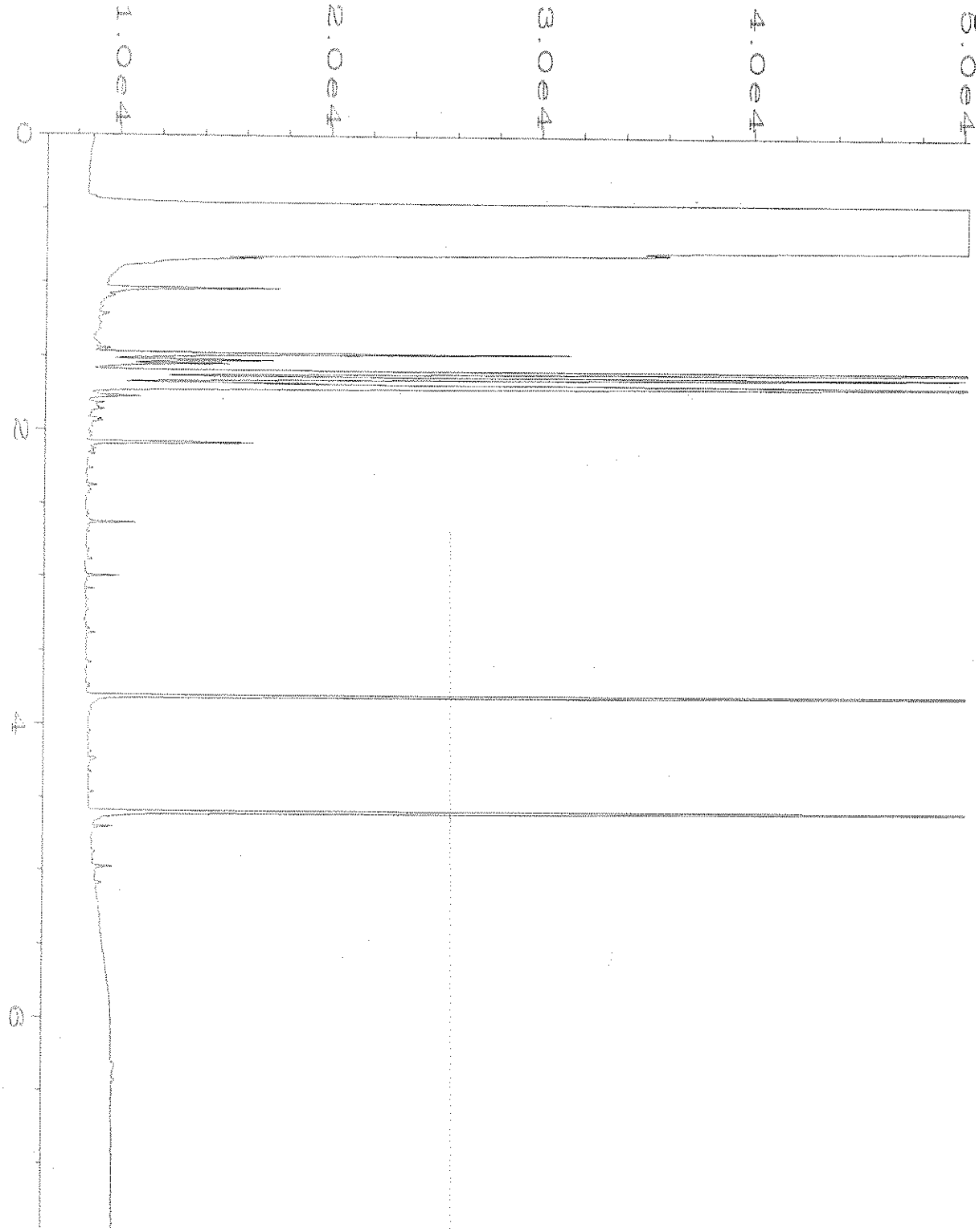
Data File Name	: C:\HPCHEM\1\DATA\02-25-22\050F1301.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 50
Sample Name	: 202432-03 sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 13
Acquired on	: 25 Feb 22 10:18 PM	Instrument Method	: DX.MTH
Report Created on:	07 Mar 22 10:52 AM	Analysis Method	: DEFAULT.MTH



Data File Name	: C:\HPCHEM\1\DATA\02-25-22\051F1301.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 51
Sample Name	: 202432-04 sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 13
Acquired on	: 25 Feb 22 10:32 PM	Instrument Method:	DX.MTH
Report Created on:	07 Mar 22 10:52 AM	Analysis Method	: DEFAULT.MTH

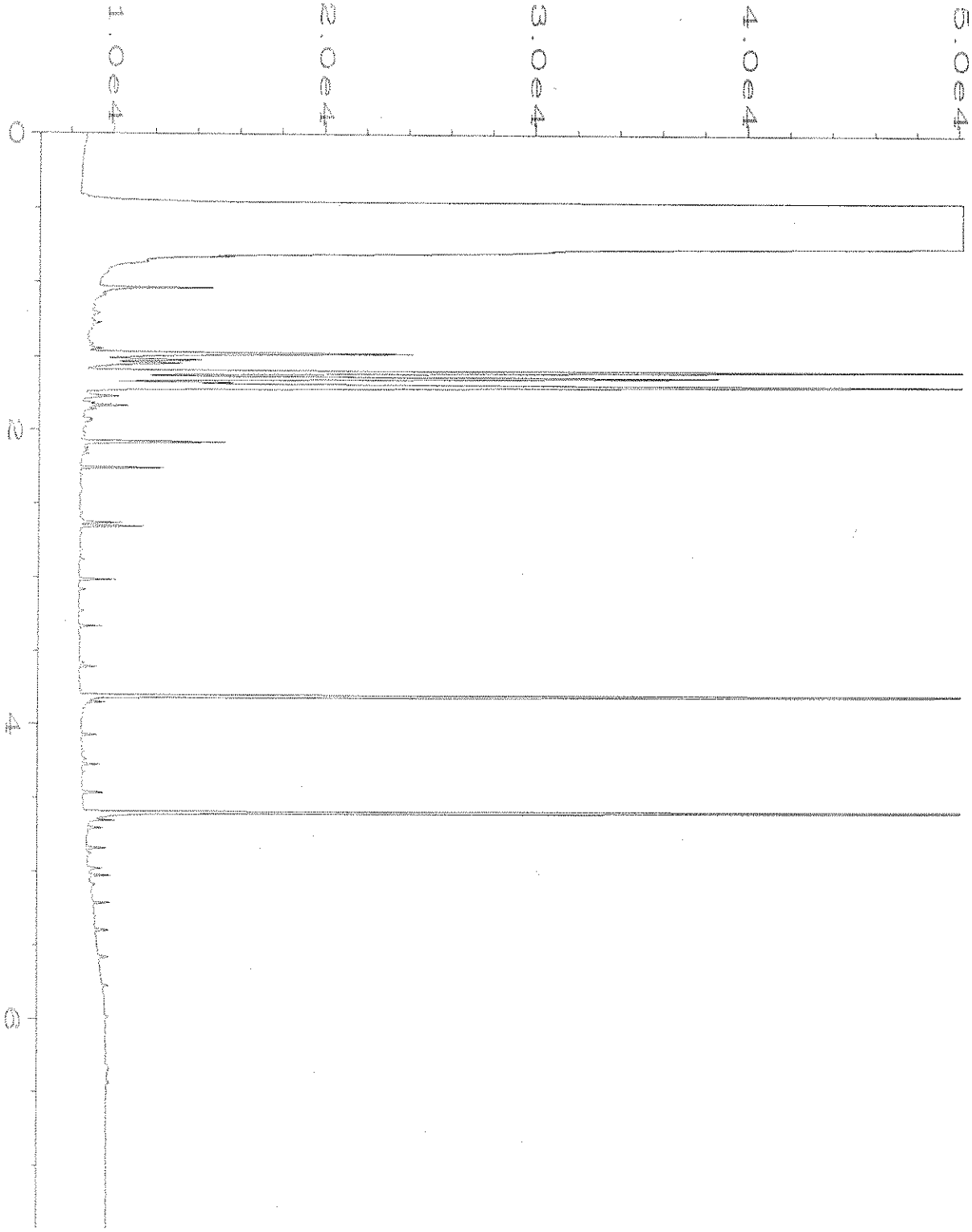


Data File Name	: C:\HPCHEM\1\DATA\02-25-22\052F1301.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 52
Sample Name	: 202432-05 sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 13
Acquired on	: 25 Feb 22 10:47 PM	Instrument Method:	DX.MTH
Report Created on:	07 Mar 22 10:52 AM	Analysis Method	: DEFAULT.MTH

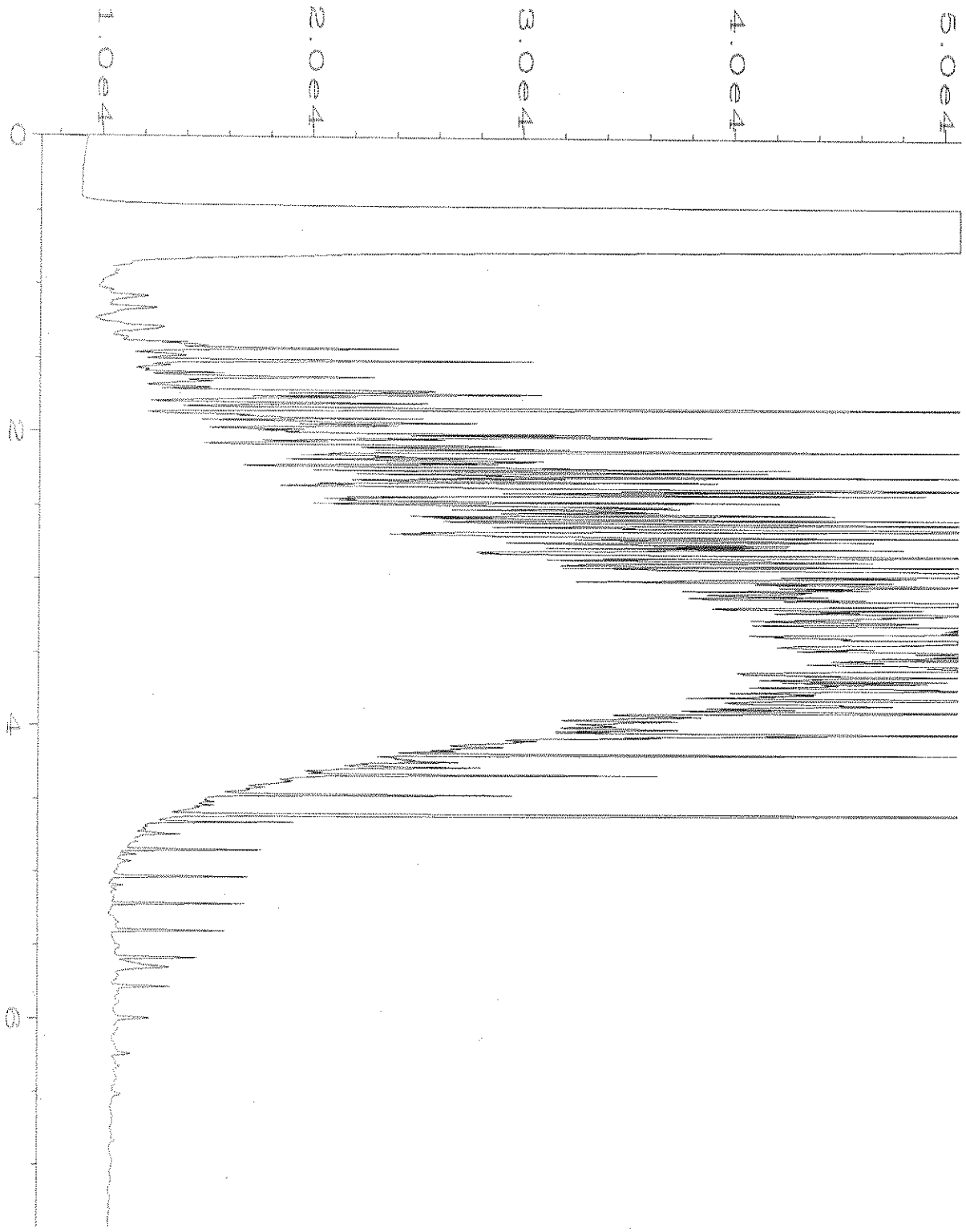


Data File Name : C:\HPCHEM\1\DATA\02-25-22\053F1301.D
Operator : TL
Instrument : GC1
Sample Name : 202432-06 sg
Run Time Bar Code:
Acquired on : 25 Feb 22 11:01 PM
Report Created on: 07 Mar 22 10:52 AM

Page Number : 1
Vial Number : 53
Injection Number : 1
Sequence Line : 13
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



Data File Name	: C:\HPCHEM\1\DATA\02-25-22\054F1301.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 54
Sample Name	: 202432-07 sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 13
Acquired on	: 25 Feb 22 11:15 PM	Instrument Method	: DX.MTH
Report Created on	: 07 Mar 22 10:52 AM	Analysis Method	: DEFAULT.MTH



Data File Name : C:\HPCHEM\1\DATA\02-25-22\003F0201.D
Operator : TL
Instrument : GC1
Sample Name : 500 Dx 65-27F
Run Time Bar Code:
Acquired on : 25 Feb 22 06:15 AM
Report Created on: 07 Mar 22 10:53 AM

Page Number : 1
Vial Number : 3
Injection Number : 1
Sequence Line : 2
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH

APPENDIX B:

MAY 2022 FIELD DATA SHEETS & LABORATORY REPORTS

PARAMETRIX

Form 07-EN-215/Rev. 02/07

Field Report/Well Data

TO:

Lisa Gilbert

Mike Brady

John Greene

DATE	JOB NO.
5/10/2022	553-1521-242 WO31 Task 200.02
PROJECT: King County METRO South Facilities South Annex	
LOCATION: 11911 E Marginal Way S, Tukwila, WA	
CONTRACTOR: Parametrix in Assoc. with HWA Geosciences	OWNER: King County METRO
WEATHER: clear/partly cloudy	TEMP ~~[illegible]~~ 45° at 7:35 AM; mid 50's °at 8:40 PM
PRESENT AT SITE: Chris Bourgeois + Al Thatcher	

THE FOLLOWING WAS NOTED:

WN (WELL NUMBER)	Time	DTW (DEPTH TO WATER)	MP (MEASURE POINT)	SU (STICK UP OF WELL CASING)	TD (TOTAL DEPTH OF WELL)	WD (WELL DIAMETER)	
21MW-1	800	4.41'	PVC				
21MW-2	808	5.11'	PVC				Significant iron bact.
SB-7	752	5.00'	PVC				bad bolts, iron bact.
SB-8	850	5.35'	PVC				3/4" bolt.
DW-3R	749	4.52'	PVC Lowend chartn)				Petro odor
DW-4R	745	4.89'	PVC				Petro odor
Staff Gauge	822	8.85'	Top of conc. w/ "x"				Right next to PVC w/ Plug
~~E2~~ or B25 (NF 195)	840	5.41'	TOC				5/8" Socket,

TOC (Top of Locking Casing) TOW (Top of Well Casing)

COPIES 1 SIGNED [illegible]

DW-3R & 4R: bolts spin freely. (SB-7, too)

21MW-1, 21MW-2; 9/16" bolt.

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.02 Date: 5/10/22 Well ID: 21MW-1

Project Name: King County METRO South Facilities South Annex Project Address: 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences Samplers: Chris Bourgeois

Purge Data

Purge Equipment: Peristaltic pump Depth of Well (ft below TOC): 15.0

Pump Intake Depth (ft below TOC): 6.0 Well Casing/Diameter: 2"

Initial Depth to Water (ft below TOC): 4.05 Purge Time (from/to): 1145 - 1210

Time	Depth to Water (ft below TOC)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (visual)	Comments
1145	4.05	2.25	265 mL/min	0	13.5	5.50	586.6	6.54	77.2	slightly	
1150	4.94	"	"		12.0	0.12	583.2	6.43	59.1	clear/	petro odor
1155	5.14	"	"		11.6	0.11	572.1	6.44	48.2	yellow	
1200	5.22	"	"		11.7	0.10	566.6	6.44	42.6	"	"
1205	"	"	"		11.5	0.08	560.9	6.43	37.1		
1210	"	"	"	~1.25 gal	11.6	0.09	558.8	6.43	33.5	less odor	
Stabilization Criteria					3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sampling Data

Sample ID: 21MW-1 Time Collected: 1215 Weather: sunny & warm

Sample Description (Color, Turbidity, Odor, Other): clear, minor odor (petro)

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene

Laboratory: Friedman & Bruya Lab Dropoff Method: in-person. Lab Dropoff Date: 5/10/22

Additional Information/Comments

DUP: 21MW-3 collected @ 1230

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.02 Date: ~~8/10~~ 5/10/22 Well ID: 21MW-2

Project Name: King County METRO South Facilities South Annex Project Address: 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences Samplers: Chris Bourgeois

Purge Data

Purge Equipment: Peristaltic pump Depth of Well (ft below TOC): 15.0

Pump Intake Depth (ft below TOC): 6.5 Well Casing/Diameter: 2"

Initial Depth to Water (ft below TOC): 5.00 Purge Time (from/to): 1005 - 1040

Time	Depth to Water (ft below TOC)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (visual)	Comments
1005	5.00	2.25	260 mL/min	0	13.5	1.22	1088	6.07	20.9	light yellow/orange hue w/	
1010	5.14	"	"		13.4	0.38	1083	6.07	-6.6	"	orange flecks.
1015	"	"	"		13.4	0.14	1069	6.08	-26.2	"	"
1020	"	"	"		13.3	0.10	1028	6.12	-35.2	"	"
1025	"	"	"		13.6	0.09	989	6.15	-39.4	"	"
1030	"	"	"		13.5	0.12	963	6.16	-40.4	"	"
1035	"	"	"		13.4	0.10	943	6.16	-40.7	"	"
1040	"	"	"	~2.5 gal.	13.5	0.11	931	6.18	-41.5	turbidity/color improve	
			Stabilization Criteria		3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sampling Data

Sample ID: 21MW-2 Time Collected: 1045 Weather: sunny/partly cloudy, high 50's.

Sample Description (Color, Turbidity, Odor, Other): orange flecks/turbidity, light yellow/orange hue.

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene

Laboratory: Friedman & Bruya Lab Dropoff Method: in-person. Lab Dropoff Date: 5/11/22

Additional Information/Comments

lots of orange iron bacteria on sounder

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.02 Date: ~~05~~ 5/10/22 Well ID: SB-7

Project Name: King County METRO South Facilities South Annex Project Address: 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences Samplers: Chris Bourgeois

Purge Data

Purge Equipment: Peristaltic pump Depth of Well (ft below TOC): 11.64

Pump Intake Depth (ft below TOC): 8.0 Well Casing/Diameter: 2"

Initial Depth to Water (ft below TOC): 5.02' Purge Time (from/to): 1250 - 1320

Time	Depth to Water (ft below TOC)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (visual)	Comments
1250	5.02	2.25	200 mL/min	0	11.0	0.78	177.0	6.43	52.6	pale yellow	slight petro odor.
1255	5.05	"	"		10.5	0.13	467.1	6.37	37.4	"	"
1300	"	"	"		10.4	0.10	466.9	6.37	25.4	"	"
1305	"	"	"		10.4	0.08	466.7	6.36	17.7	"	"
1310	"	"	"		10.4	0.07	467.3	6.37	11.2	"	"
1315	"	"	"		10.4	0.06	467.2	6.37	5.4	"	"
1320					10.5	0.06	467.0	6.36	1.7		
						10%, or 3					
			Stabilization Criteria		3%	<0.5	3%	± 0.1	± 10 mv		

~1.25 gal, but noticed many cracks/leaks in bucket.

Sampling Data

Sample ID: SB-7 Time Collected: 1325 Weather: sunny/partly cloudy, cool.

Sample Description (Color, Turbidity, Odor, Other): slight pale yellow hue, minor petro odor.

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene

Laboratory: Friedman & Bruya Lab Dropoff Method: in-person Lab Dropoff Date: 5/10/22

Additional Information/Comments

bolts spin freely.

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.02 Date: 5/10/22 Well ID: SB-8

Project Name: King County METRO South Facilities South Annex Project Address: 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences Samplers: Chris Bourgeois

Purge Data

Purge Equipment: Peristaltic pump Depth of Well (ft below TOC): 13.70

Pump Intake Depth (ft below TOC): 7 → 13 Well Casing/Diameter: 2"

Initial Depth to Water (ft below TOC): dropped from 5.35-5.71 while setting up Purge Time (from/to): 915 - 946

Time	Depth to Water (ft below TOC)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (visual)	Comments
915	5.71	2.5	290 mL/min	0	13.6	0.98	963	5.57	95	yellow/brown hue	
920	7.95	2.25	260		13.5	0.78	945	5.71	29.6	"	"
925	9.15	"	"		13.6	0.93	941	5.79	4.3	"	"
930	9.82	"	"		13.7	0.22	949	5.85	-11.6	"	not improving.
935	11.2	"	"		13.8	0.20	945	5.88	-23.3	sulfur odor	
940	12.52	"	"		13.8	0.33	938	5.93	-27.9		
945	13.50	"	"	~2 gal.	14.1	0.61	933	5.97	-26		
			went dry @ 946.								
	samples at 1105; gw @ 10.5' before sampling										
Stabilization Criteria					3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sampling Data

Sample ID: SB-8 Time Collected: 1105 Weather: sunny / partly cloudy

Sample Description (Color, Turbidity, Odor, Other): dark yellow brown, frothy.

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene

Laboratory: Friedman & Bruya Lab Dropoff Method: in-person Lab Dropoff Date: 5/10/22

Additional Information/Comments

lowered tubing almost every interval, ~2' prior, other 5-min.

iron redox (sheen, not orange) on surface of purged water.

* Pump intake @ 13' when sampled.

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.02 Date: 5/10/22 Well ID: DW-3R

Project Name: King County METRO South Facilities South Annex Project Address: 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences Samplers: Chris Bourgeois

Purge Data

Purge Equipment: Peristaltic pump Depth of Well (ft below TOC): 8.80

Pump Intake Depth (ft below TOC): 6.0 Well Casing/Diameter: 0.9'

Initial Depth to Water (ft below TOC): 4.56 Purge Time (from/to): 1340 – 1405

Time	Depth to Water (ft below TOC)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (visual)	Comments
1348	4.56	2.25	260 mL/min	0	14.1	1.68	544.3	6.40	43.6	minor black turbidity	
1345	"	"	"		13.8	0.20	557.2	6.27	42.9	no hue, no odor.	
1350	"	"	"		13.8	0.12	587.5	6.24	44.0	"	"
1355	"	"	"		13.7	0.10	599.7	6.23	44.1	no more turbidity.	
1400	"	"	"		13.8	0.08	605.9	6.23	44.4	"	"
1405	"	"	"	~1.75 gal	13.7	0.08	607.5	6.23	44.9	"	"
			Stabilization Criteria		3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sampling Data

Sample ID: DW-3R Time Collected: 1405 Weather: sunny / partly cloudy warm.

Sample Description (Color, Turbidity, Odor, Other): clear w/ minor turbidity

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene

Laboratory: Friedman & Bruya Lab Dropoff Method: In-person. Lab Dropoff Date: 5/10/22

Additional Information/Comments

Sample time and purge times are correct. sampled immediately after 1405 parameters.

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.02 Date: 5/10/22 Well ID: DW-4R

Project Name: King County METRO South Facilities South Annex Project Address: 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences Samplers: Chris Bourgeois

Purge Data

Purge Equipment: Peristaltic pump Depth of Well (ft below TOC): 9.21 (not measured)

Pump Intake Depth (ft below TOC): 6.5 Well Casing/Diameter: 0.65'

Initial Depth to Water (ft below TOC): 4.91 Purge Time (from/to): 1425

Time	Depth to Water (ft below TOC)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (visual)	Comments
1425	4.91	2.25	260 mL/min	0	14.2	1.92	639	6.94	60.2	small black flecks,	
1430	"	"	"		14.0	1.37	640	6.91	61.4	no color no odor	
1435	"	"	"		14.0	1.31	638	6.90	60.5	"	"
1440	"	"	"	~1.25 gal	14.0	1.27	636	6.90	59.5	"	"
			Stabilization Criteria		3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sampling Data

Sample ID: DW-4R Time Collected: 1445 Weather: sunny, warm.

Sample Description (Color, Turbidity, Odor, Other): clear, odorless; lots of small black flecks.

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene

Laboratory: Friedman & Bruya Lab Dropoff Method: in-person Lab Dropoff Date: 5/10/22

Additional Information/Comments

bolts spin freely

Parametrix

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
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www.friedmanandbruya.com

May 25, 2022

Chris Bourgeois, Project Manager
HWA Geosciences, Inc
21312 30th Dr SE
Bothell, WA 98021

Dear Mr Bourgeois:

Included are the results from the testing of material submitted on May 10, 2022 from the King County Metro South Facilities 2021-062 WO31 Task 200.02, F&BI 205170 project. There are 18 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Mike Brady (Parametrix), Lisa Gilbert (Parametrix)
HWA0525R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on May 10, 2022 by Friedman & Bruya, Inc. from the HWA Geosciences, Inc King County Metro South Facilities 2021-062 WO31 Task 200.02, F&BI 205170 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	HWA Geosciences, Inc
205170 -01	21 MW-1
205170 -02	21 MW-2
205170 -03	21-MW-3
205170 -04	DW-3R
205170 -05	DW-4R
205170 -06	SB-7
205170 -07	SB-8
205170 -08	Trip Blanks

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/25/22
Date Received: 05/10/22
Project: King County Metro South Facilities 2021-062 WO31 Task 200.02, F&BI 205170
Date Extracted: 05/11/22
Date Analyzed: 05/12/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 51-134)
21 MW-1 205170-01	<100	77
21 MW-2 205170-02	<100	77
21-MW-3 205170-03	<100	73
DW-3R 205170-04	<100	79
DW-4R 205170-05	<100	73
SB-7 205170-06	<100	71
SB-8 205170-07	<100	74
Trip Blanks 205170-08	<100	76
Method Blank 02-912 MB	<100	69

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/25/22
Date Received: 05/10/22
Project: King County Metro South Facilities 2021-062 WO31 Task 200.02, F&BI 205170
Date Extracted: 05/12/22
Date Analyzed: 05/12/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
21 MW-1 205170-01	160 x	<250	138
21 MW-2 205170-02	180 x	<250	148
21-MW-3 205170-03	140 x	<250	150
DW-3R 205170-04	130 x	<250	135
DW-4R 205170-05	80 x	<250	135
SB-7 205170-06	71 x	<250	130
SB-8 205170-07	150 x	<250	68
Method Blank 02-1183 MB	<50	<250	139

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 05/25/22
Date Received: 05/10/22
Project: King County Metro South Facilities 2021-062 WO31 Task 200.02, F&BI 205170
Date Extracted: 05/12/22
Date Analyzed: 05/20/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx
Sample Extracts Passed Through a Silica Gel Column Prior to Analysis
Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
21 MW-1 205170-01	<50	<250	140
21 MW-2 205170-02	<50	<250	131
21-MW-3 205170-03	<50	<250	ip
DW-3R 205170-04	<50	<250	153
DW-4R 205170-05	<50	<250	142
SB-7 205170-06	<50	<250	134
SB-8 205170-07	<50	<250	65
Method Blank 02-1183 MB	<50	<250	140

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	21 MW-1	Client:	HWA Geosciences, Inc
Date Received:	05/10/22	Project:	King County Metro 2021-062
Date Extracted:	05/18/22	Lab ID:	205170-01
Date Analyzed:	05/18/22	Data File:	051814.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	95	71	132
Toluene-d8	95	68	139
4-Bromofluorobenzene	93	62	136

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	21 MW-2	Client:	HWA Geosciences, Inc
Date Received:	05/10/22	Project:	King County Metro 2021-062
Date Extracted:	05/18/22	Lab ID:	205170-02
Date Analyzed:	05/18/22	Data File:	051815.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	71	132
Toluene-d8	102	68	139
4-Bromofluorobenzene	95	62	136

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	21-MW-3	Client:	HWA Geosciences, Inc
Date Received:	05/10/22	Project:	King County Metro 2021-062
Date Extracted:	05/18/22	Lab ID:	205170-03
Date Analyzed:	05/18/22	Data File:	051816.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	94	71	132
Toluene-d8	99	68	139
4-Bromofluorobenzene	96	62	136

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	DW-3R	Client:	HWA Geosciences, Inc
Date Received:	05/10/22	Project:	King County Metro 2021-062
Date Extracted:	05/18/22	Lab ID:	205170-04
Date Analyzed:	05/18/22	Data File:	051817.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	116	71	132
Toluene-d8	107	68	139
4-Bromofluorobenzene	94	62	136

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	DW-4R	Client:	HWA Geosciences, Inc
Date Received:	05/10/22	Project:	King County Metro 2021-062
Date Extracted:	05/18/22	Lab ID:	205170-05
Date Analyzed:	05/18/22	Data File:	051818.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	91	71	132
Toluene-d8	104	68	139
4-Bromofluorobenzene	98	62	136

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	SB-7	Client:	HWA Geosciences, Inc
Date Received:	05/10/22	Project:	King County Metro 2021-062
Date Extracted:	05/18/22	Lab ID:	205170-06
Date Analyzed:	05/18/22	Data File:	051819.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	71	132
Toluene-d8	101	68	139
4-Bromofluorobenzene	89	62	136

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	SB-8	Client:	HWA Geosciences, Inc
Date Received:	05/10/22	Project:	King County Metro 2021-062
Date Extracted:	05/18/22	Lab ID:	205170-07
Date Analyzed:	05/18/22	Data File:	051820.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	95	71	132
Toluene-d8	103	68	139
4-Bromofluorobenzene	94	62	136

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Trip Blanks	Client:	HWA Geosciences, Inc
Date Received:	05/10/22	Project:	King County Metro 2021-062
Date Extracted:	05/18/22	Lab ID:	205170-08
Date Analyzed:	05/18/22	Data File:	051813.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	71	132
Toluene-d8	100	68	139
4-Bromofluorobenzene	90	62	136

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	HWA Geosciences, Inc
Date Received:	Not Applicable	Project:	King County Metro 2021-062
Date Extracted:	05/18/22	Lab ID:	02-1207 mb
Date Analyzed:	05/18/22	Data File:	051807.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	RF

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	71	132
Toluene-d8	100	68	139
4-Bromofluorobenzene	94	62	136

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Date of Report: 05/25/22
Date Received: 05/10/22
Project: King County Metro South Facilities 2021-062 WO31 Task 200.02, F&BI 205170

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 205101-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	105	69-134

Date of Report: 05/25/22
Date Received: 05/10/22
Project: King County Metro South Facilities 2021-062 WO31 Task 200.02, F&BI 205170

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	116	116	63-142	0

Date of Report: 05/25/22
Date Received: 05/10/22
Project: King County Metro South Facilities 2021-062 WO31 Task 200.02, F&BI 205170

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	120	116	63-142	3

Date of Report: 05/25/22
Date Received: 05/10/22
Project: King County Metro South Facilities 2021-062 WO31 Task 200.02, F&BI 205170

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 205111-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Benzene	ug/L (ppb)	10	<0.35	95	50-150
Toluene	ug/L (ppb)	10	<1	94	50-150
Ethylbenzene	ug/L (ppb)	10	<1	98	50-150
m,p-Xylene	ug/L (ppb)	20	<2	99	50-150
o-Xylene	ug/L (ppb)	10	<1	100	50-150
Naphthalene	ug/L (ppb)	10	<1	96	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Benzene	ug/L (ppb)	10	95	96	70-130	1
Toluene	ug/L (ppb)	10	95	94	70-130	1
Ethylbenzene	ug/L (ppb)	10	98	97	70-130	1
m,p-Xylene	ug/L (ppb)	20	100	98	70-130	2
o-Xylene	ug/L (ppb)	10	100	99	70-130	1
Naphthalene	ug/L (ppb)	10	95	101	70-130	6

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

205170

SAMPLE CHAIN OF CUSTODY

05-10-22

E03/W04

Page # 1 of 1

Report To C. Bourgeois (HWA) + M. Brady & L. Gilbert (PMX)

Company HWA Geosciences & Parametrix

Address 21312 30th Dr. SE

City, State, ZIP Bothell, WA 98021

Phone 206-794-3145 Email cbourgeois@hwageo.com

SAMPLERS (*signature*) [signature]

PROJECT NAME: King County Metro South Facilities

PO #: 2021-062 WO 31 Task 200.02

REMARKS

Project specific RLs? - Yes / No

INVOICE TO: HWA

TURNAROUND TIME
- ☑ Standard turnaround
- ☐ RUSH
- Rush charges authorized by:

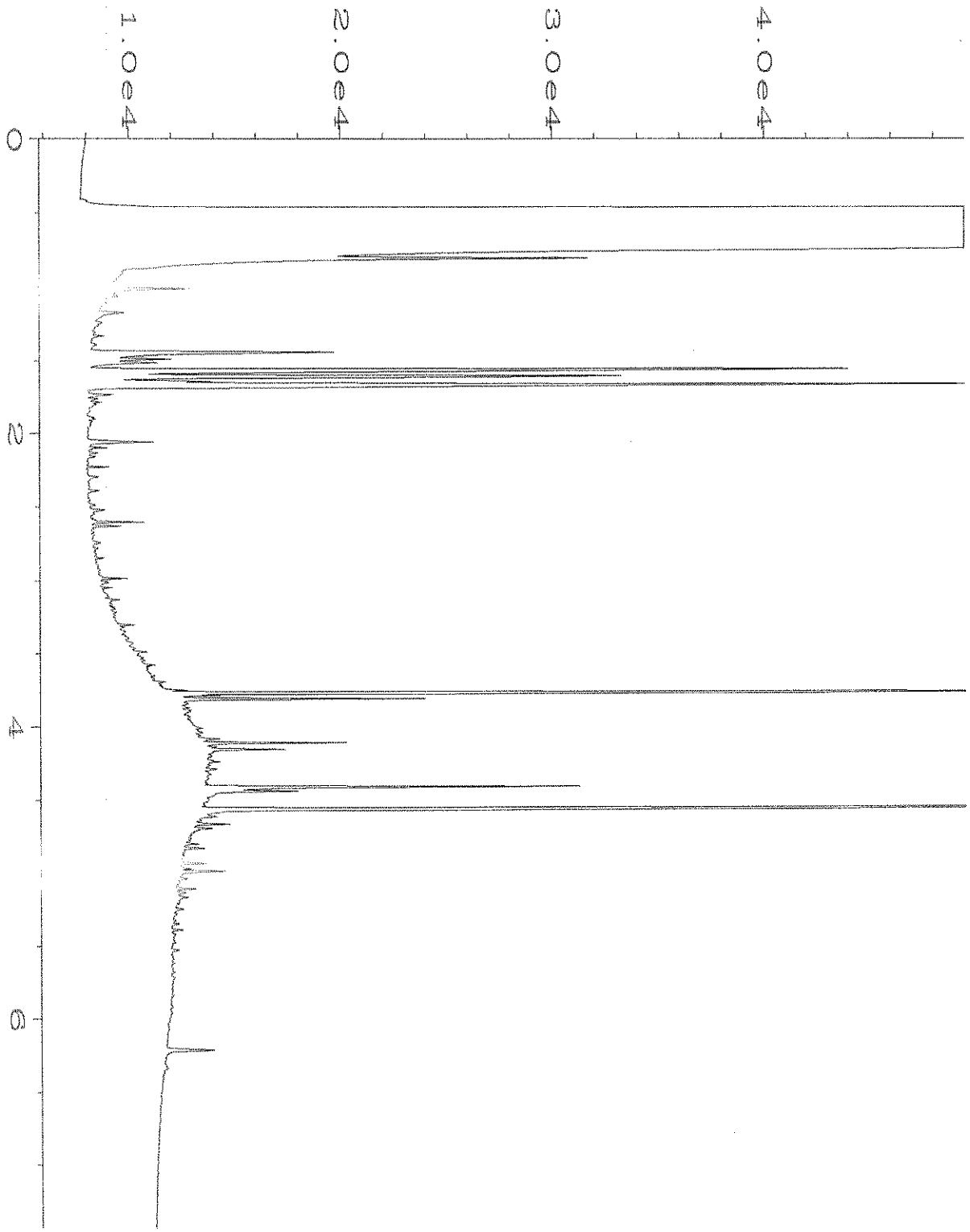
SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	BTEX + Naphthalene				Notes
~~02~~ 21MW-1	01A-B	5/10/22	1215	GW	7	X	X						X				Dx w/ & w/o SGC
21MW-2	02		1045		7	X	X						X				" "
21MW-3	03		1230		7	X	X						X				" "
DW-3R	04		1405		7	X	X						X				" "
DW-4R	05		1445		7	X	X						X				" "
SB-7	06		1325		7	X	X						X				" "
SB-8	07		1105		7	X	X						X				" "
TRIP BLANKS	08A-B				~~4~~ 2 08		X						X				

ANALYSES REQUESTED

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: [signature]	Chris Bourgeois	HWA	5/10/22	1550
Received by: [signature]	HONG NGUYE	F&B	5/10/22	1550
Relinquished by:				
Received by:		Samples received at 4 °C		

Friedman & Bruya, Inc.
Ph. (206) 285-8282



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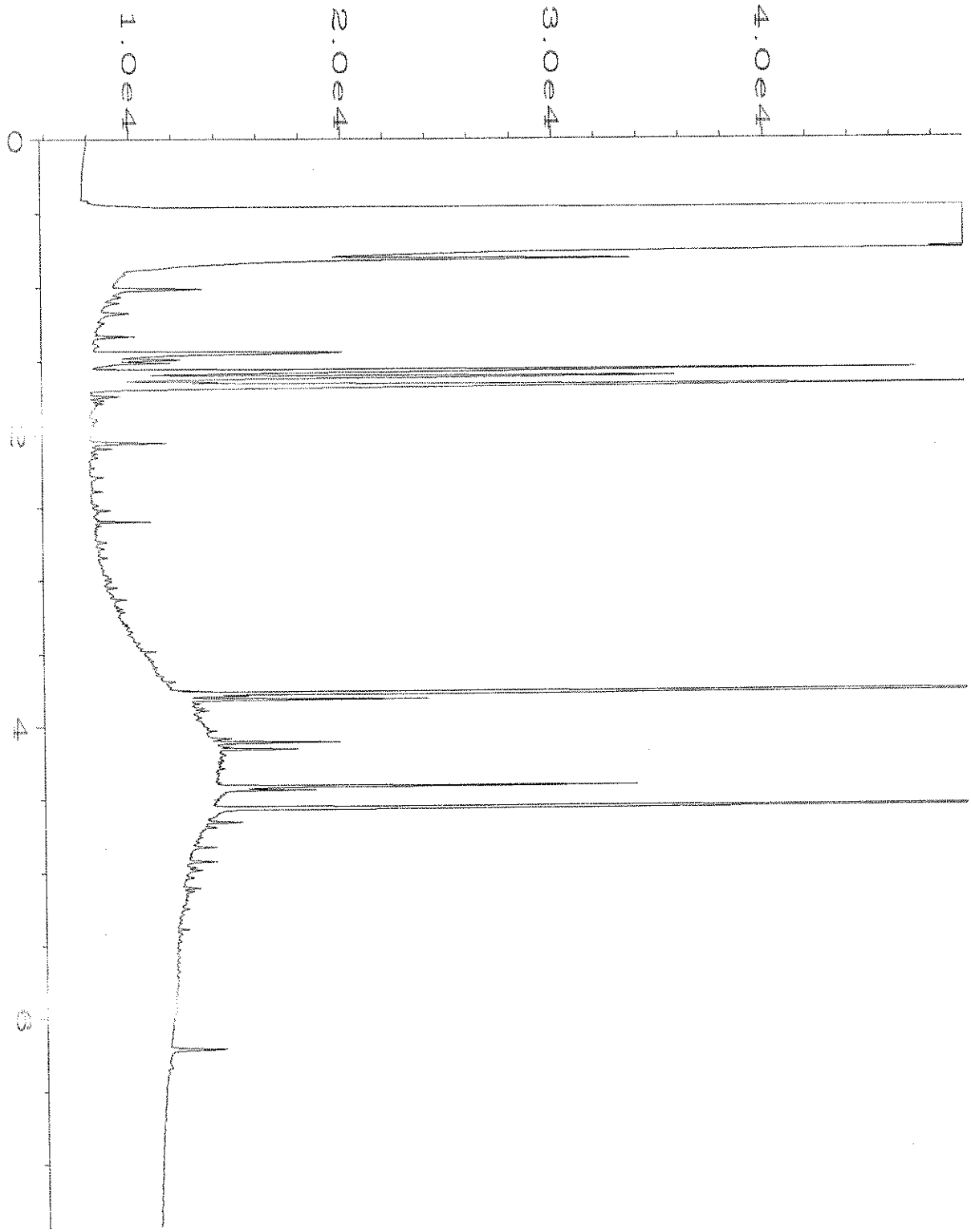
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 42
Sample Name	: 205170-01	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 9
Acquired on	: 12 May 22 08:15 PM	Instrument Method	: DX.MTH
Report Created on:	22 Jul 22 01:18 PM	Analysis Method	: DX.MTH



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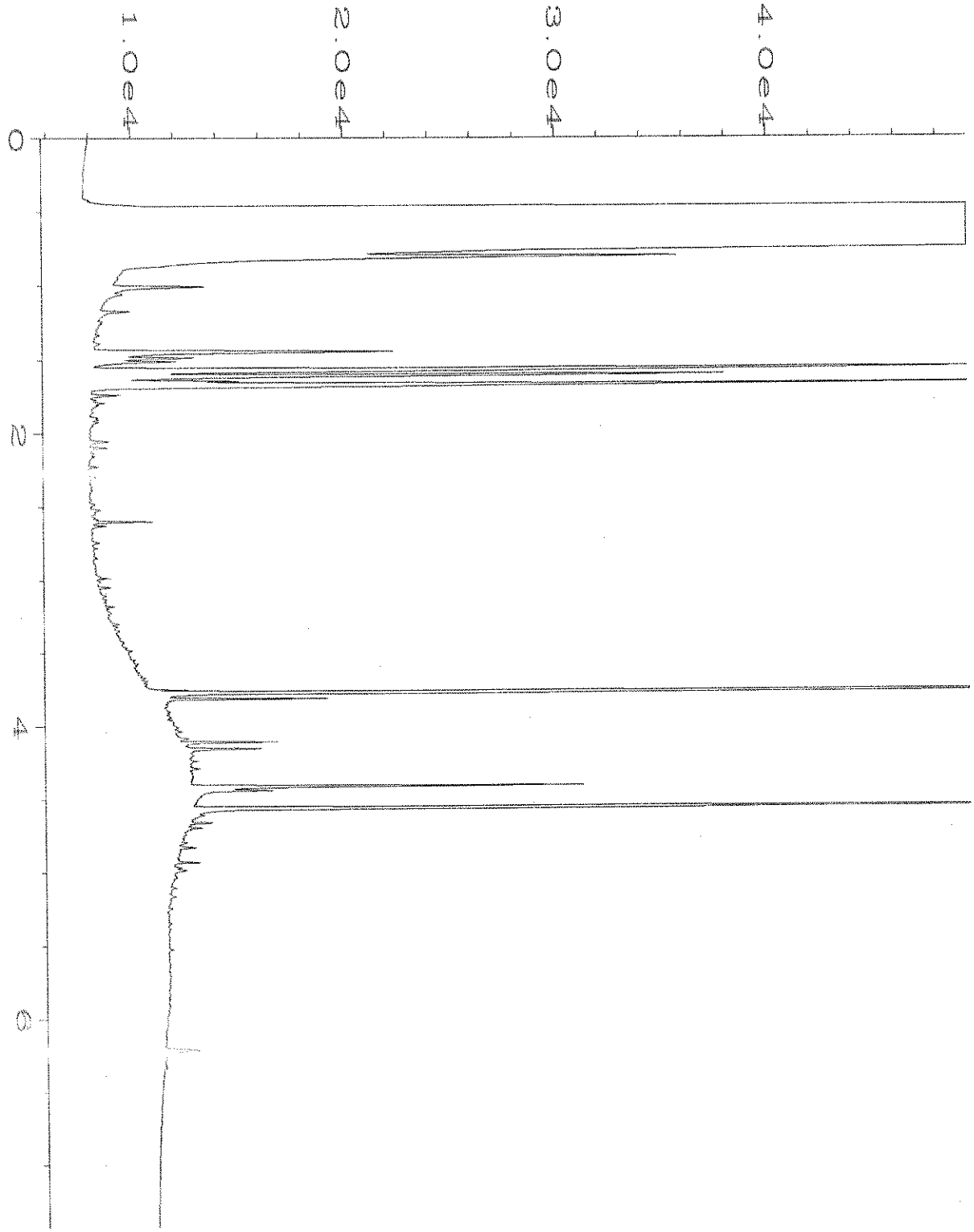
Operator : TL
Instrument : GC1
Sample Name : 205170-02
Run Time Bar Code:
Acquired on : 12 May 22 08:30 PM
Report Created on: 22 Jul 22 01:18 PM

Page Number : 1
Vial Number : 43
Injection Number : 1
Sequence Line : 9
Instrument Method: DX.MTH
Analysis Method : DX.MTH



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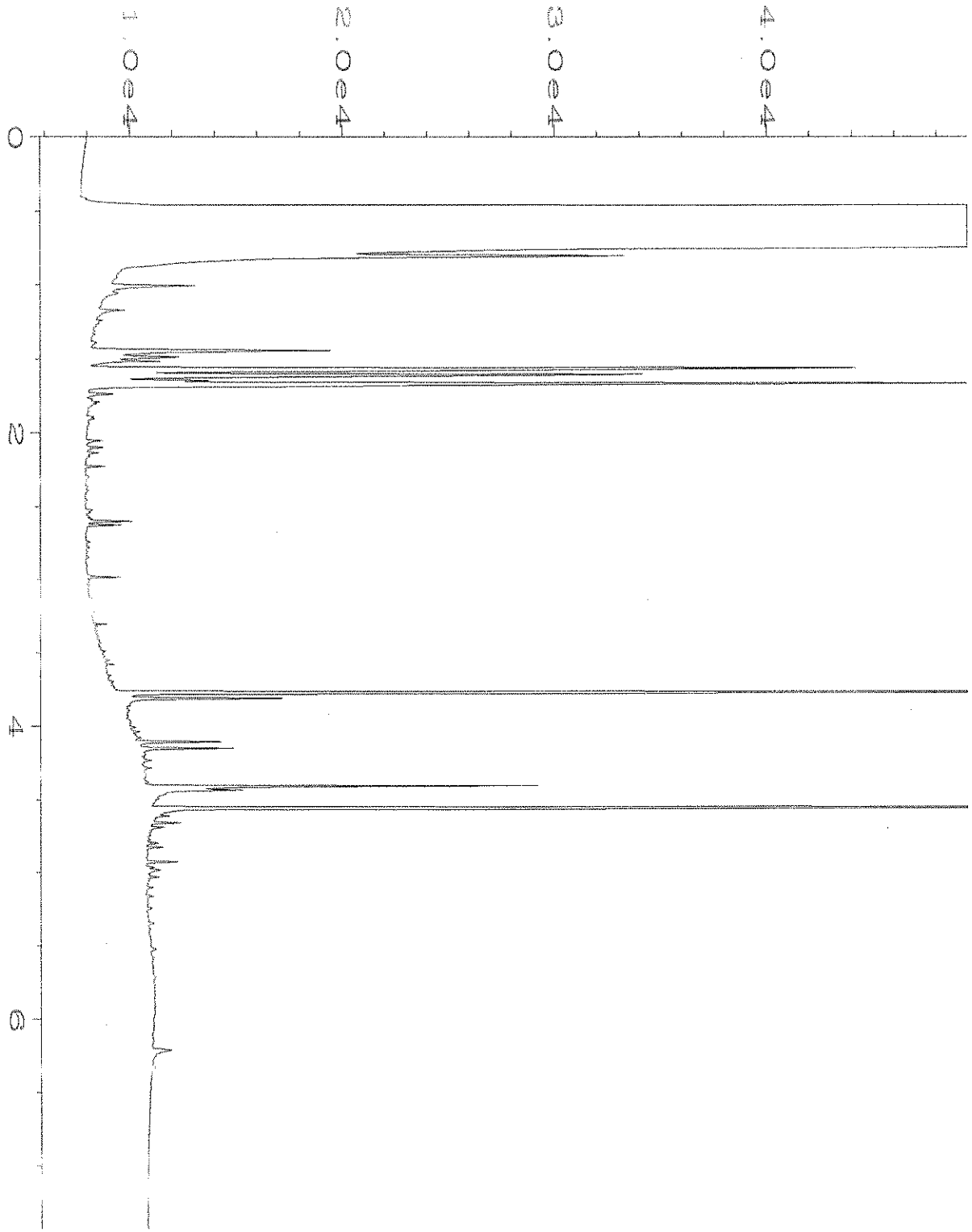
Operator : TL
Instrument : GC1
Sample Name : 205170-03
Run Time Bar Code:
Acquired on : 12 May 22 08:44 PM
Report Created on: 22 Jul 22 01:18 PM

Page Number : 1
Vial Number : 44
Injection Number : 1
Sequence Line : 9
Instrument Method: DX.MTH
Analysis Method : DX.MTH



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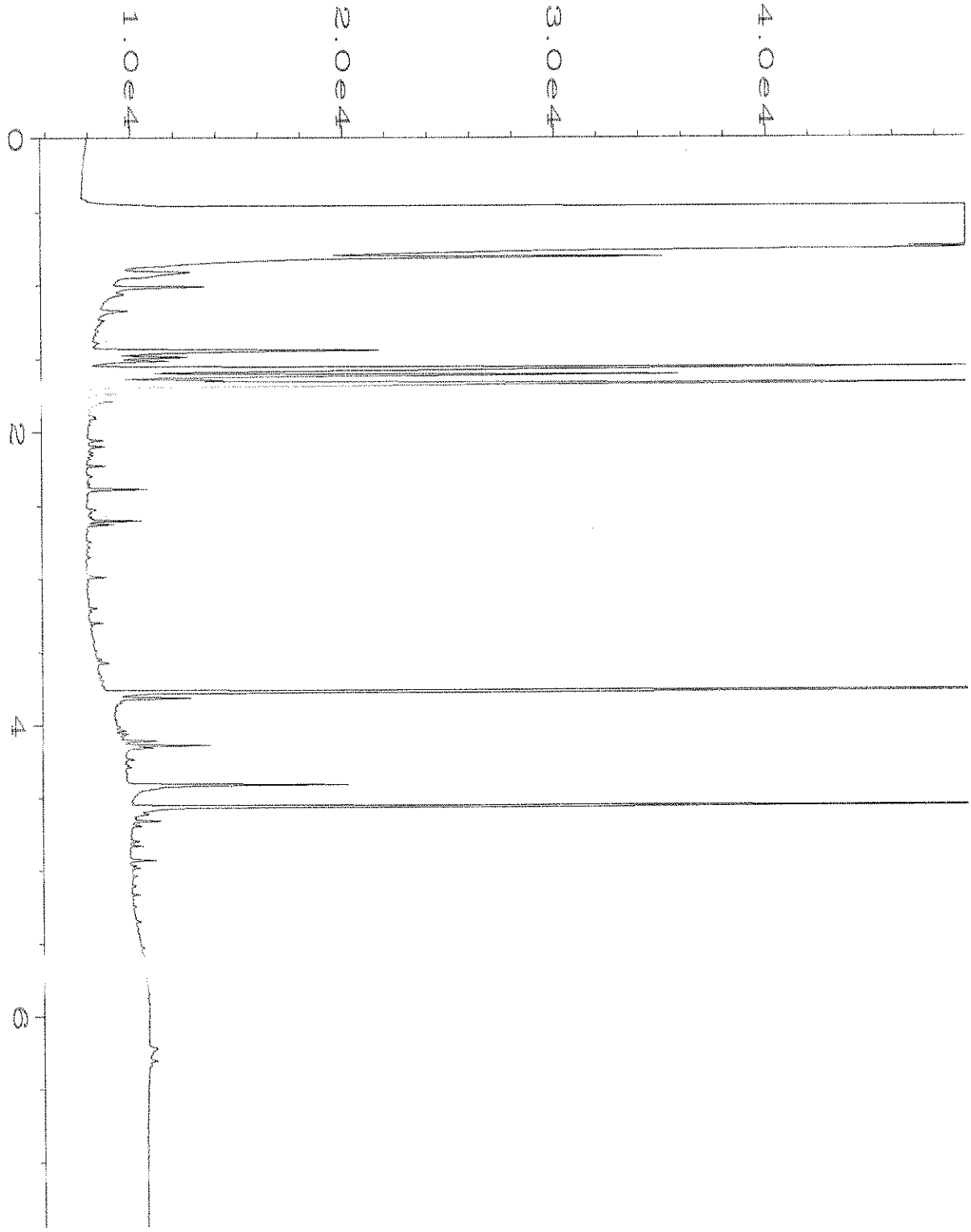
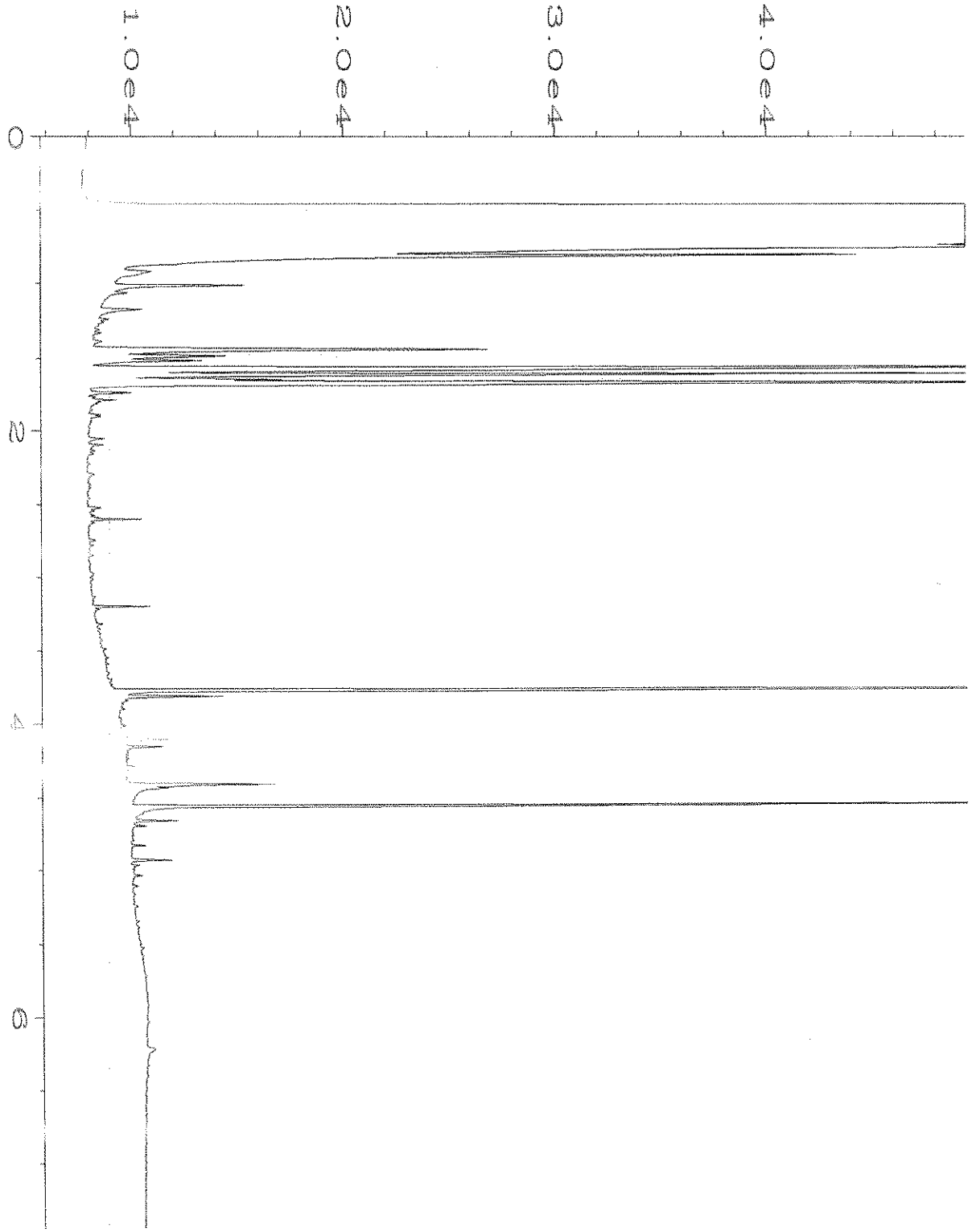
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 45
Sample Name	: 205170-04	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 9
Acquired on	: 12 May 22 08:59 PM	Instrument Method	: DX.MTH
Report Created on:	22 Jul 22 01:19 PM	Analysis Method	: DX.MTH



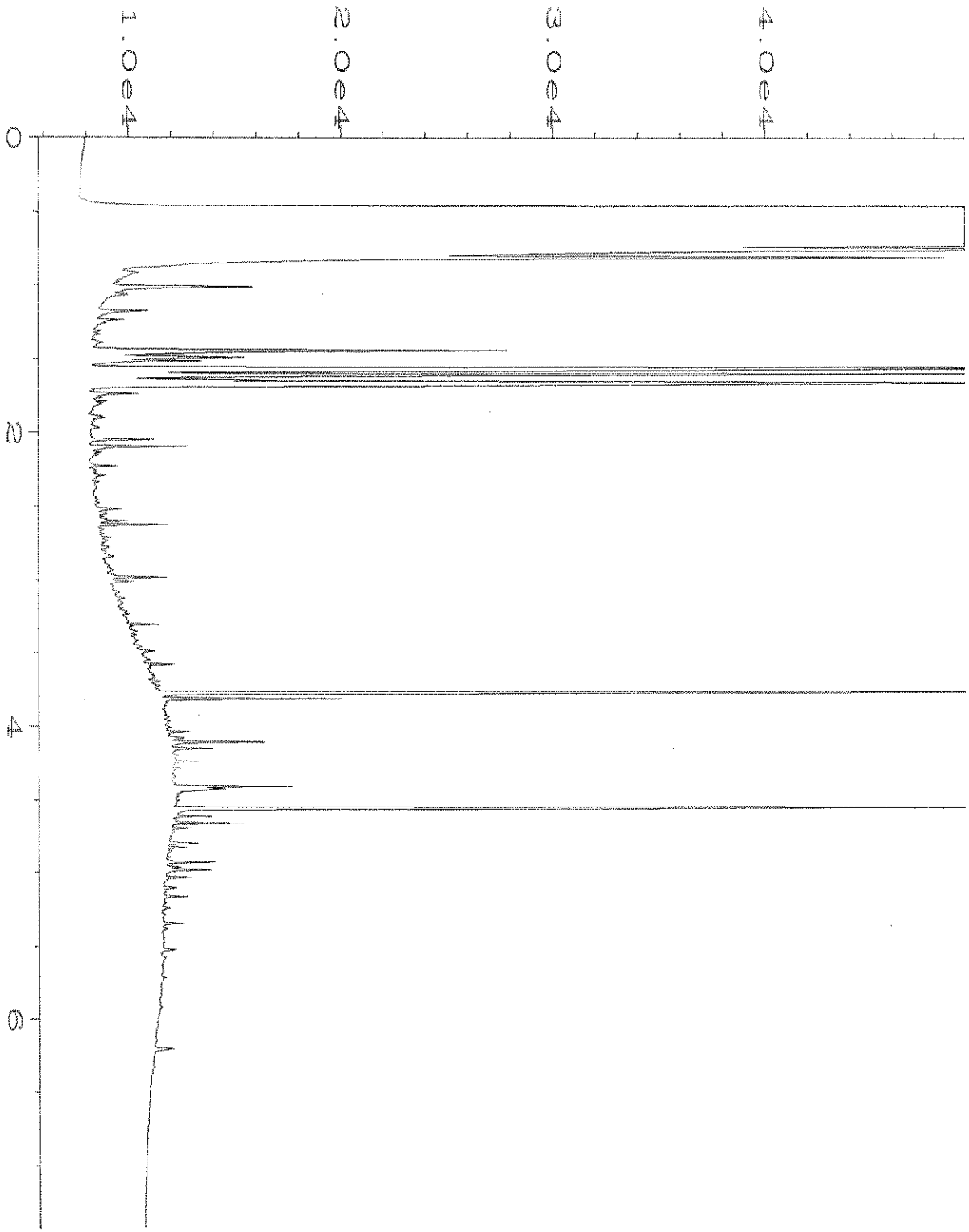
Data File Name : C:\HPCHEM\1\DATA\05-12-22\046F0901.D
Operator : TL
Instrument : GC1
Sample Name : 205170-05
Run Time Bar Code:
Acquired on : 12 May 22 09:13 PM
Report Created on: 22 Jul 22 01:19 PM

Page Number : 1
Vial Number : 46
Injection Number : 1
Sequence Line : 9
Instrument Method: DX.MTH
Analysis Method : DX.MTH



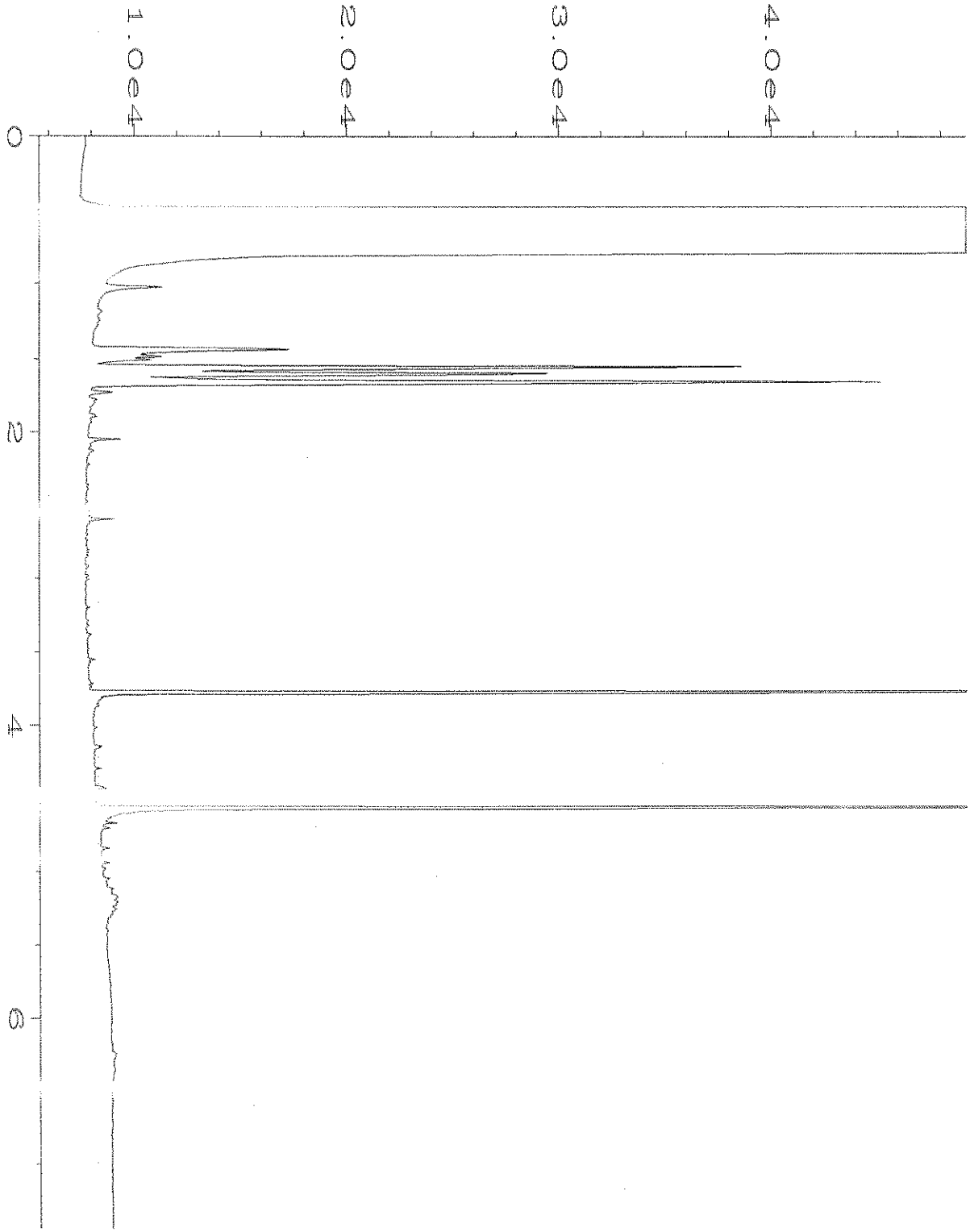
Data File Name : C:\HPCHEM\1\DATA\05-12-22\047F0901.D
Operator : TL
Instrument : GC1
Sample Name : 205170-06
Run Time Bar Code:
Acquired on : 12 May 22 09:28 PM
Report Created on: 22 Jul 22 01:19 PM

Page Number : 1
Vial Number : 47
Injection Number : 1
Sequence Line : 9
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name : C:\HPCHEM\1\DATA\05-12-22\048F0901.D
Operator : TL
Instrument : GC1
Sample Name : 205170-07
Run Time Bar Code:
Acquired on : 12 May 22 09:42 PM
Report Created on: 22 Jul 22 01:19 PM

Page Number : 1
Vial Number : 48
Injection Number : 1
Sequence Line : 9
Instrument Method: DX.MTH
Analysis Method : DX.MTH



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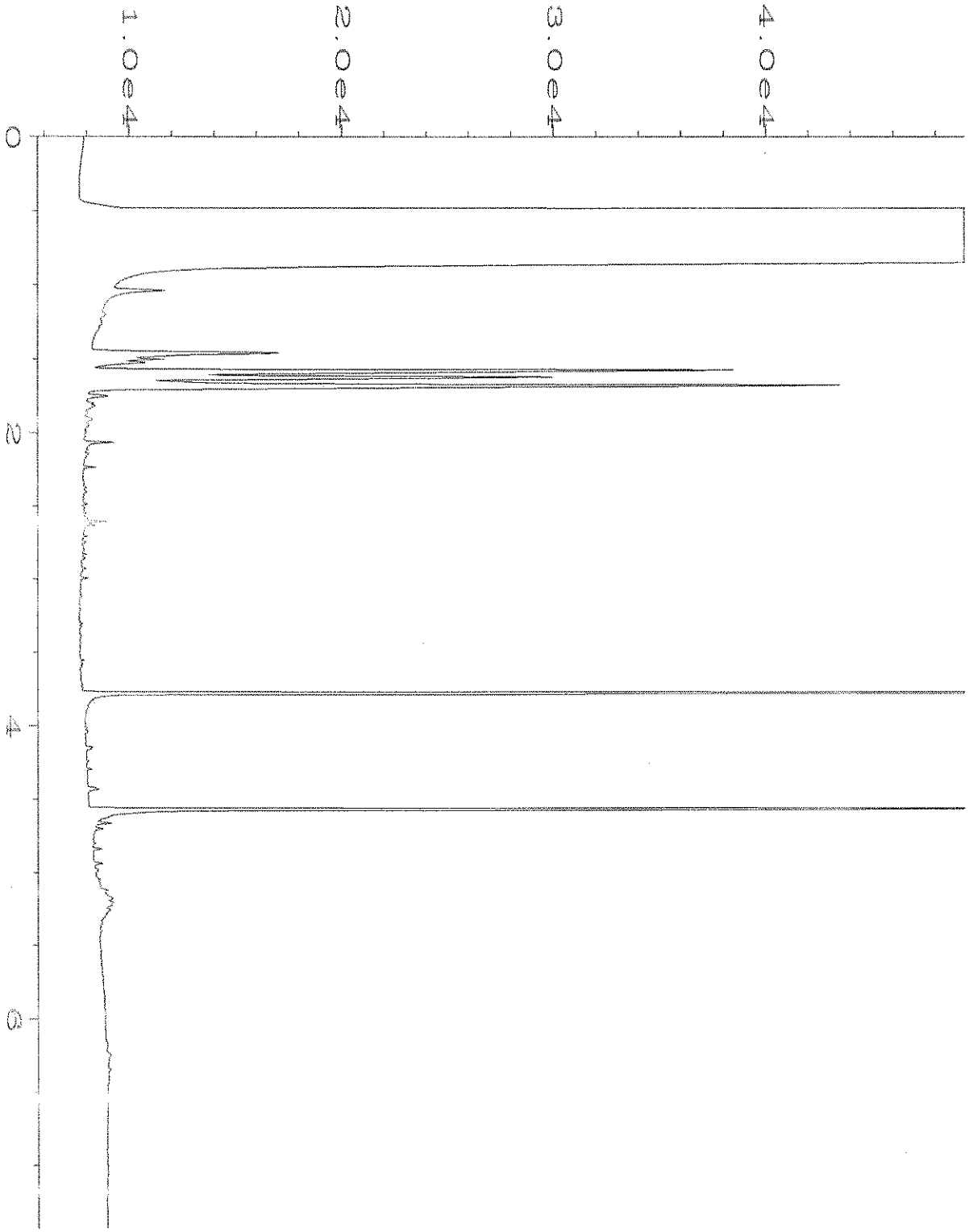
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 39
Sample Name	: 205170-01 sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 11
Acquired on	: 20 May 22 07:14 PM	Instrument Method	: DX.MTH
Report Created on	: 22 Jul 22 01:20 PM	Analysis Method	: DX.MTH



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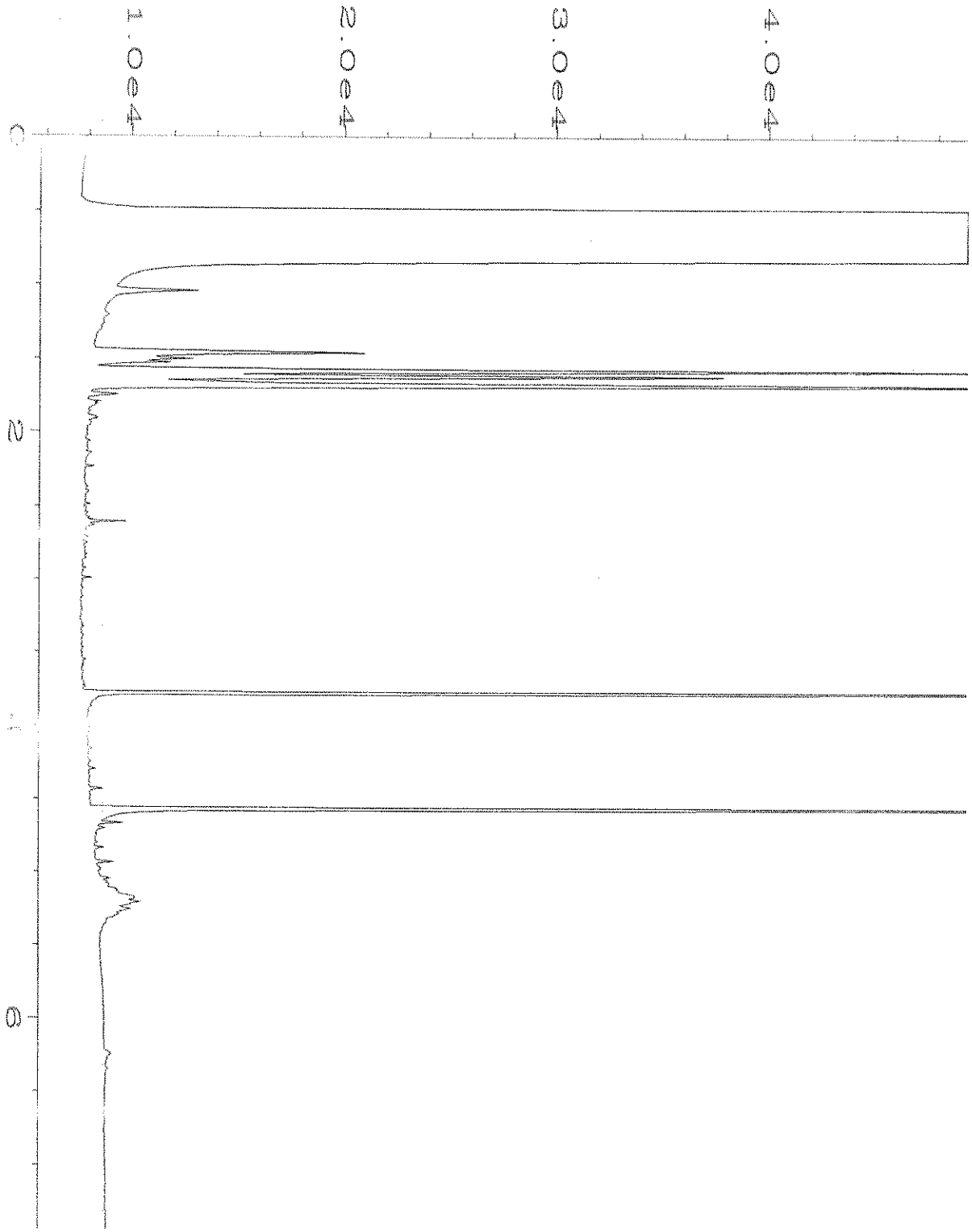
Operator : TL
Instrument : GC1
Sample Name : 205170-02 sg
Run Time Bar Code:
Acquired on : 20 May 22 07:23 PM
Report Created on: 22 Jul 22 01:20 PM

Page Number : 1
Vial Number : 40
Injection Number : 1
Sequence Line : 11
Instrument Method: DX.MTH
Analysis Method : DX.MTH



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Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 41
Sample Name	: 205170-03 sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 11
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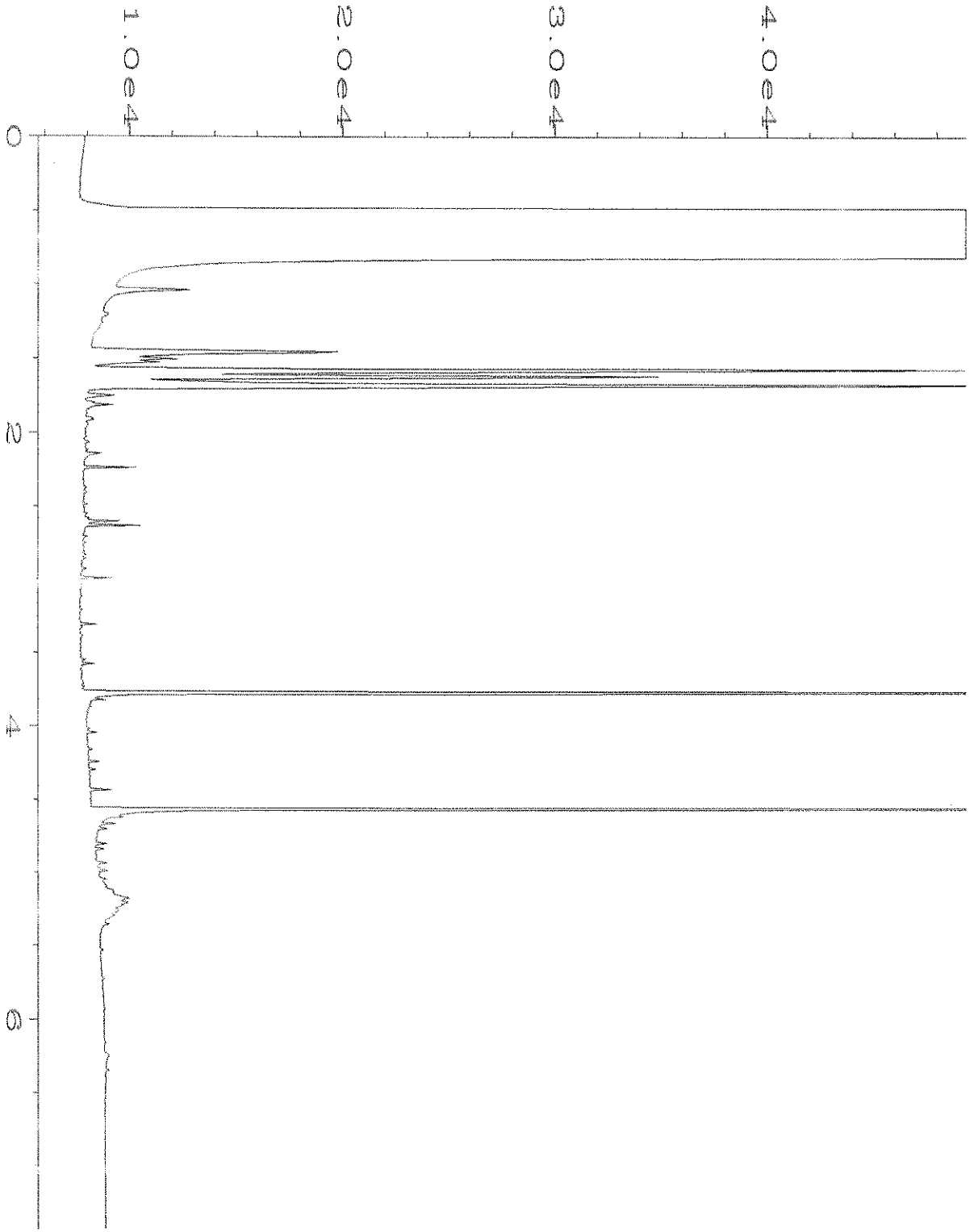
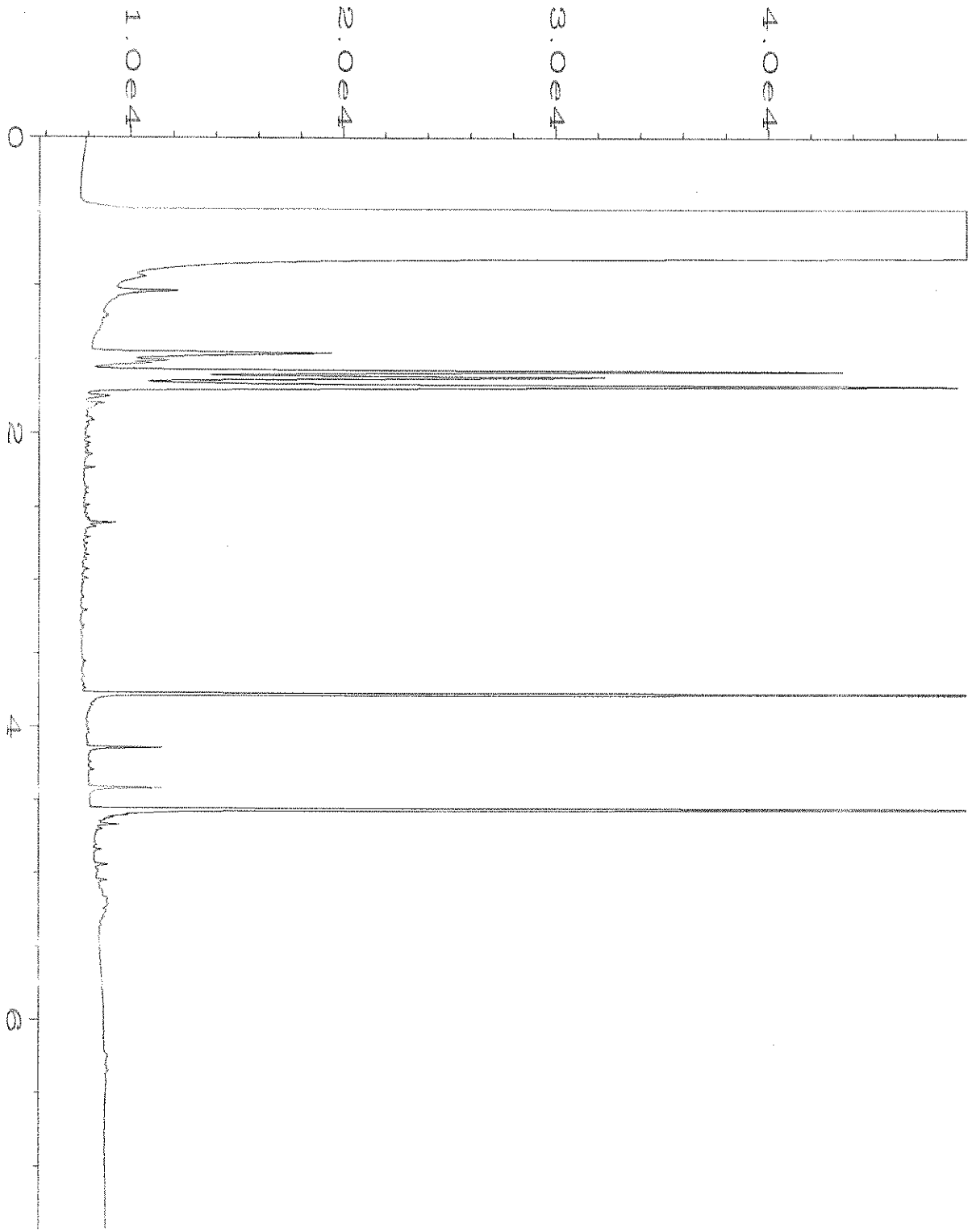
Report Created on:	22 Jul 22 01:20 PM	Analysis Method	: DX.MTH



Data File Name : C:\HPCHEM\1\DATA\05-20-22\042F1101.D
Operator : TL
Instrument : GC1
Sample Name : 205170-04 sg
Run Time Bar Code:
Acquired on : 20 May 22 07:52 PM
Report Created on: 22 Jul 22 01:20 PM

Page Number : 1
Vial Number : 42
Injection Number : 1
Sequence Line : 11
Instrument Method: DX.MTH
Analysis Method : DX.MTH



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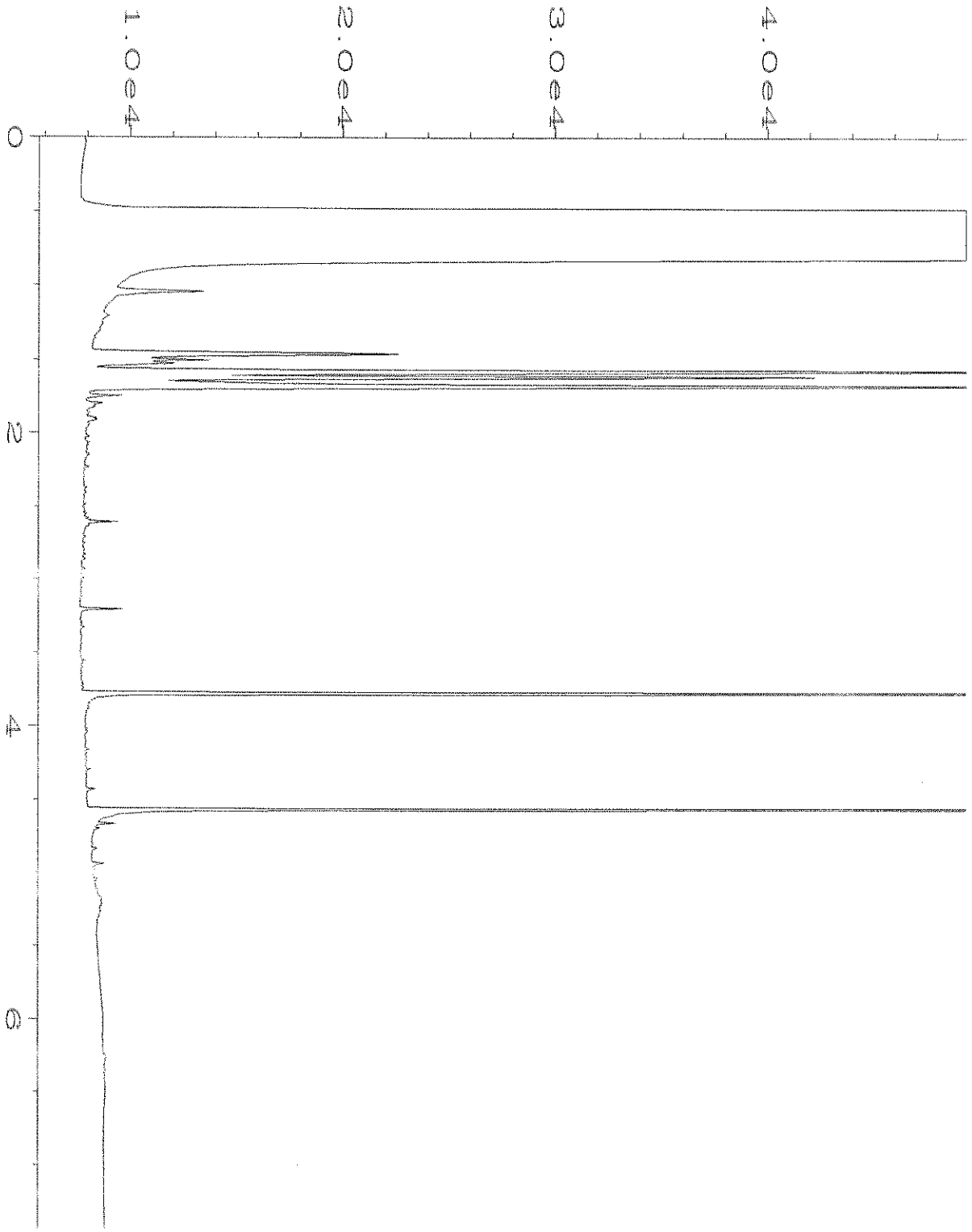
Instrument	: GC1	Vial Number	: 43
Sample Name	: 205170-05 sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 11
Acquired on	: 20 May 22 08:07 PM	Instrument Method	: DX.MTH
Report Created on	: 22 Jul 22 01:20 PM	Analysis Method	: DX.MTH



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Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 44
Sample Name	: 205170-06 sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 11
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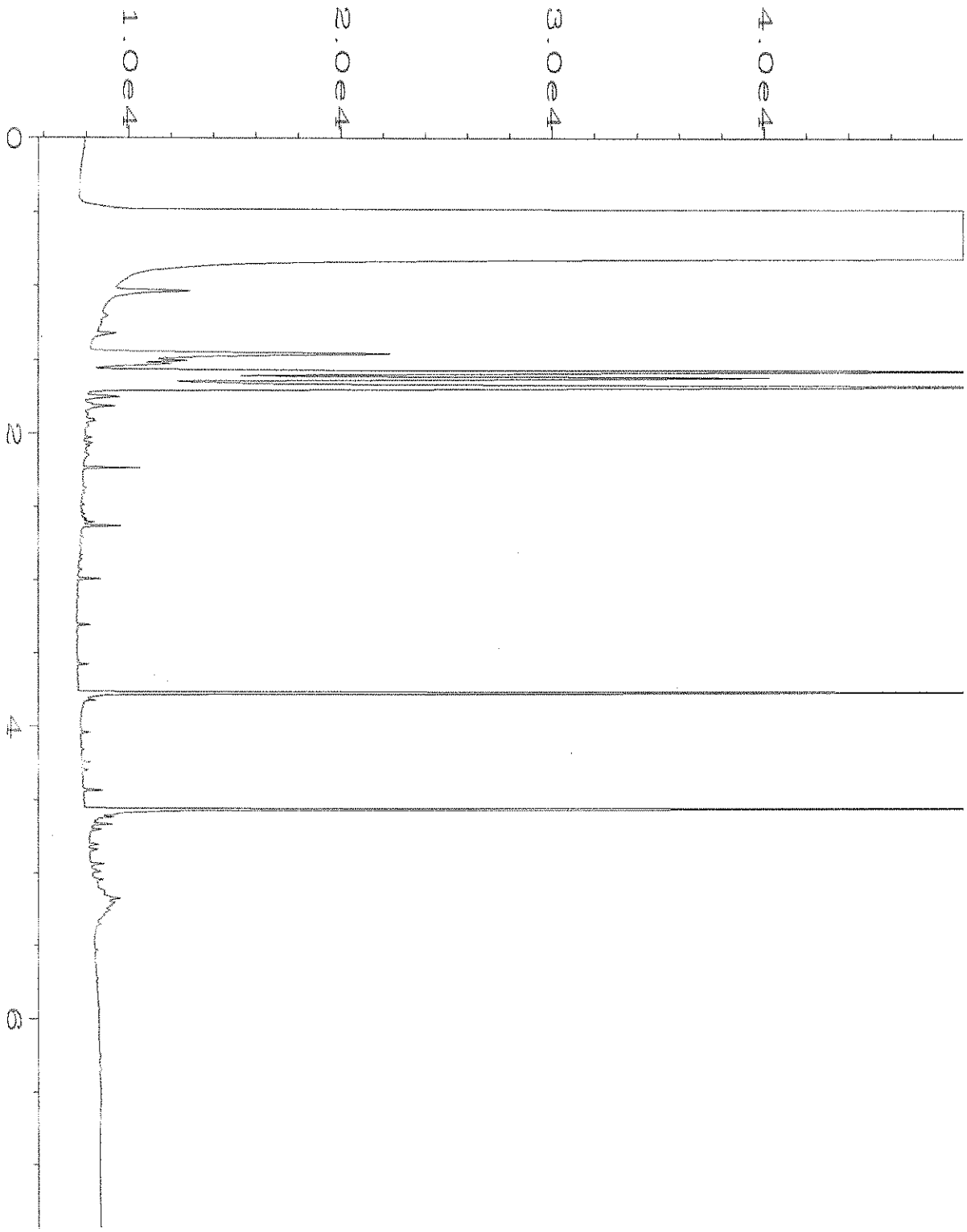
Report Created on	: 22 Jul 22 01:20 PM	Analysis Method	: DX.MTH



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Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 45
Sample Name	: 205170-07 sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 11
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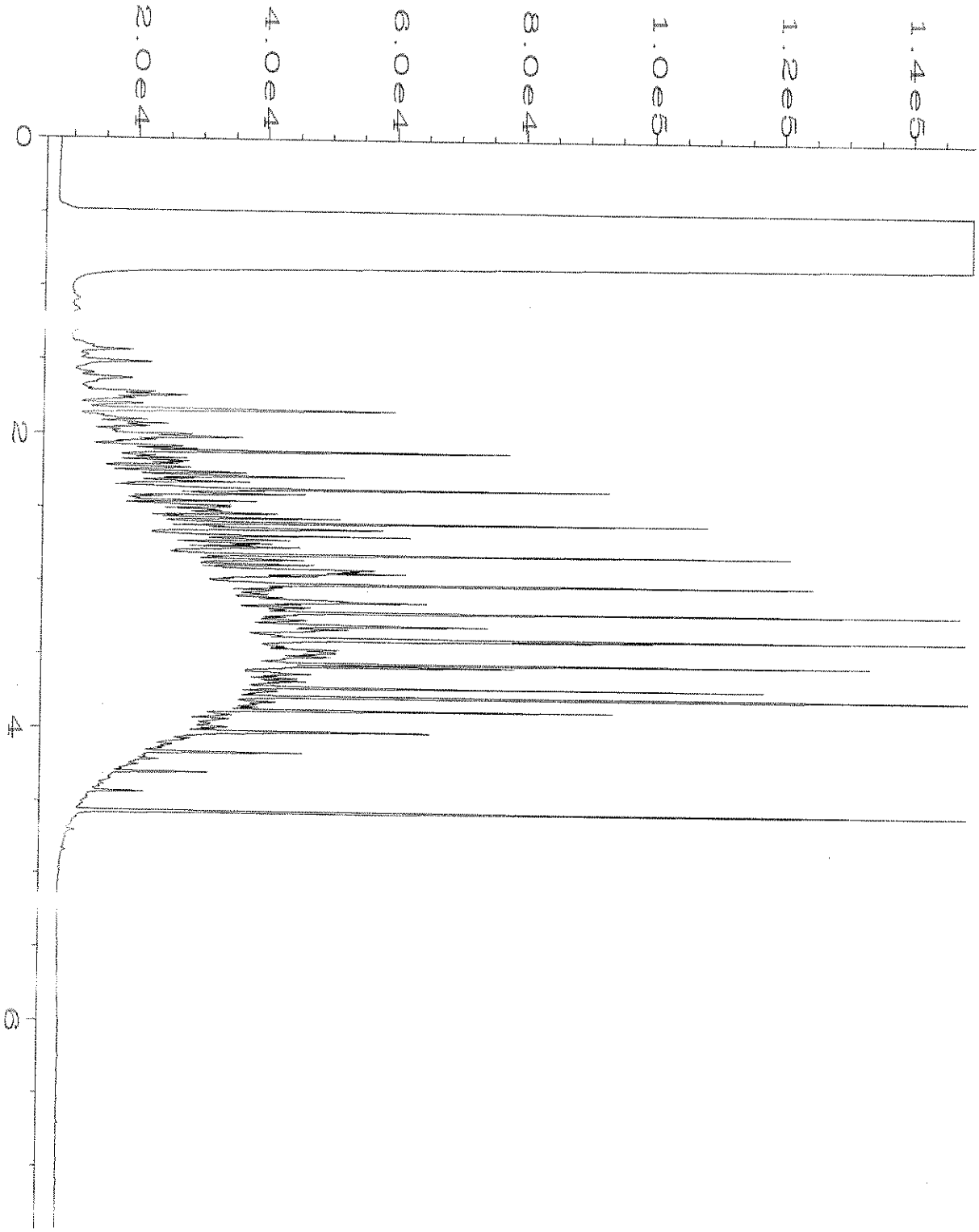
Report Created on	: 22 Jul 22 01:20 PM	Analysis Method	: DX.MTH



Data File Name	: C:\HPCHEM\1\DATA\05-20-22\003F0801.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 3
Sample Name	: 500 Dx 66-122F	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 8
Acquired on	: 20 May 22 03:23 PM	Instrument Method	: DX.MTH
Report Created on:	22 Jul 22 01:21 PM	Analysis Method	: DX.MTH

Parametrix
ENGINEERING . PLANNING . ENVIRONMENTAL SCIENCES

719 2ND AVENUE, SUITE 200 | SEATTLE, WA 98104 | P 206.394.3700

TRANSMITTAL

TO: John Greene
King County Metro Transit
201 South Jackson Street
KSC-TR-0431
Seattle, WA 98104

DATE: September 22, 2022
PROJECT NUMBER: 553-1521-242
PROJECT NAME: WO 31

THESE ARE:		SENT VIA:		
	☐ PER YOUR REQUEST		☐ U.S. MAIL	☐ EXPRESS SECOND DAY
	☐ FOR YOUR INFORMATION		☒ EMAIL/ELECTRONIC	☐ COURIER
	☐ FOR YOUR REVIEW AND APPROVAL		☐ FTP	☐ HAND DELIVERY/PICK UP
	☒ FOR YOUR FILES		☐ GROUND SERVICE	☐ INTEROFFICE MAIL
	☐ FOR YOUR ACTION		☐ EXPRESS OVERNIGHT	

WE ARE TRANSMITTING THE FOLLOWING MATERIALS:

South Facilities 3rd Quarter 2022 Groundwater Sampling Event Memorandum

COMMENTS/MESSAGE:

Please review and provide comments on the report at your earliest convenience.

Sincerely,
Parametrix

Michael Brady

September 21, 2022

HWA Project No. 2021-062-22

King County Metro Transit Capital Division

Transit Real Estate and Environmental
201 South Jackson Street, M.S. KSC-TR-0431
Seattle, WA 98104-3856

Attention: John Greene

Subject: **2022 Quarter 3 Groundwater Sampling Event Memorandum**
King County Metro Transit - South Facilities
Tukwila, Washington

Dear Mr. Greene,

As approved in the Contract E00635E19 Work Order #31 scope, HWA GeoSciences Inc (HWA) has completed the third 2022 quarterly monitoring event at the King County Metro Transit - South Facilities / Annex (South Facilities) addressed at 11911 East Marginal Way South, Tukwila, Washington (as shown on Figure 1). The site is known as Washington State Department of Ecology (Ecology) Cleanup Site Identification number 7790 and Voluntary Cleanup Program (VCP) number NW3301. This memorandum includes a brief summary of quarterly groundwater monitoring completed as part of the Work Order #31 scope. This work task was coordinated by HWA as part of HWA's contract with Parametrix for environmental services.

GROUNDWATER MONITORING WELL SAMPLING

On August 25, 2022, HWA collected groundwater samples from monitoring wells DW-3R, DW-4R, SB-7, SB-8, 21MW-1, and 21MW-2. Well locations are shown on Figure 2.

Prior to the start of low-flow purging, depth to groundwater was measured and recorded at each of the above wells, as well as at the stream gauge and well B-25. Depth to groundwater measurements are presented on the field data sheets included in Appendix A. Groundwater elevations are presented in Table 1 along with data from the previous events. An interpreted potentiometric surface map for the monitoring event is provided in Figure 3.

Groundwater samples were collected using low-flow purging and sampling techniques with a peristaltic pump and new polyethylene tubing. During purging, field parameters of pH, specific

conductance, oxidation-reduction potential, dissolved oxygen, and temperature were measured until stabilization was achieved. Any field indications of contamination including odor, discoloration, and/or sheen that were observed are documented on the field sampling sheets included in Appendix A. Groundwater samples were collected in analysis-appropriate, clean, laboratory supplied containers and placed in a cooler with ice. Samples were kept in a cooler with ice and held at temperatures below 6 degrees Celsius until submittal to the laboratory for analysis with standard turnaround time. Analytical results are summarized in Table 2, and copies of the final laboratory report including the chain-of custody document and chromatograms are included in Appendix B.

Samples were analyzed by Friedman & Bruya, Inc. in Seattle, Washington for gasoline range total petroleum hydrocarbons (TPH) by Method NWTPH-Gx; diesel and oil-range TPH by Method NWTPH-Dx (both with and without silica gel cleanup); and benzene, toluene, ethylbenzene, xylenes, and naphthalene (BTEXN) by EPA Method 8260D. All samples were analyzed within method specific holding times.

RESULTS

Analytical results for the third 2022 quarterly monitoring event, along with data from previous events are summarized in Table 2, and the laboratory report with chromatograms can be found in Appendix B. Analytical results indicate that diesel and/or oil-range TPH were detected below MTCA cleanup levels in wells DW-3R, DW-4R, SB-8, 21MW-1, and 21MW-2. However, these samples were all x-flagged by the laboratory indicating that the diesel and oil results did not match the fuel standard since the diesel-range hydrocarbon fingerprint appears slightly shifted toward the right (longer retention) and overlapping with the heavier oil-range hydrocarbons. These samples were also analyzed using silica gel cleanup treatment, which removes polar compounds and resulted in no diesel or oil-range TPH detections except for the sample analyzed from 21MW-2. The 21MW-2 sample analyzed using silica gel cleanup treatment had no oil-range TPH detected and a diesel detection of 0.065 milligrams per liter (mg/L), which was lower than the 0.240 mg/L detection in this sample without the silica gel cleanup treatment. The 0.065 mg/L diesel detection was still x-flagged. Based on the data presented in previous reports, the TPH detected likely reflects biogenic interference from the natural peat deposits in the area or very weathered petroleum hydrocarbons.

FUTURE GROUNDWATER MONITORING

One additional quarter of groundwater level measurements and sampling of these wells are planned as part of the additional site characterization activities. Upon completion of all additional site characterization activities, an RI Report Addendum will be provided.

We appreciate the opportunity to provide environmental services on this project. Should you have any questions or comments, or if we may be of further service, please do not hesitate to contact the undersigned at your convenience.

Sincerely,

HWA GeoSciences Inc.

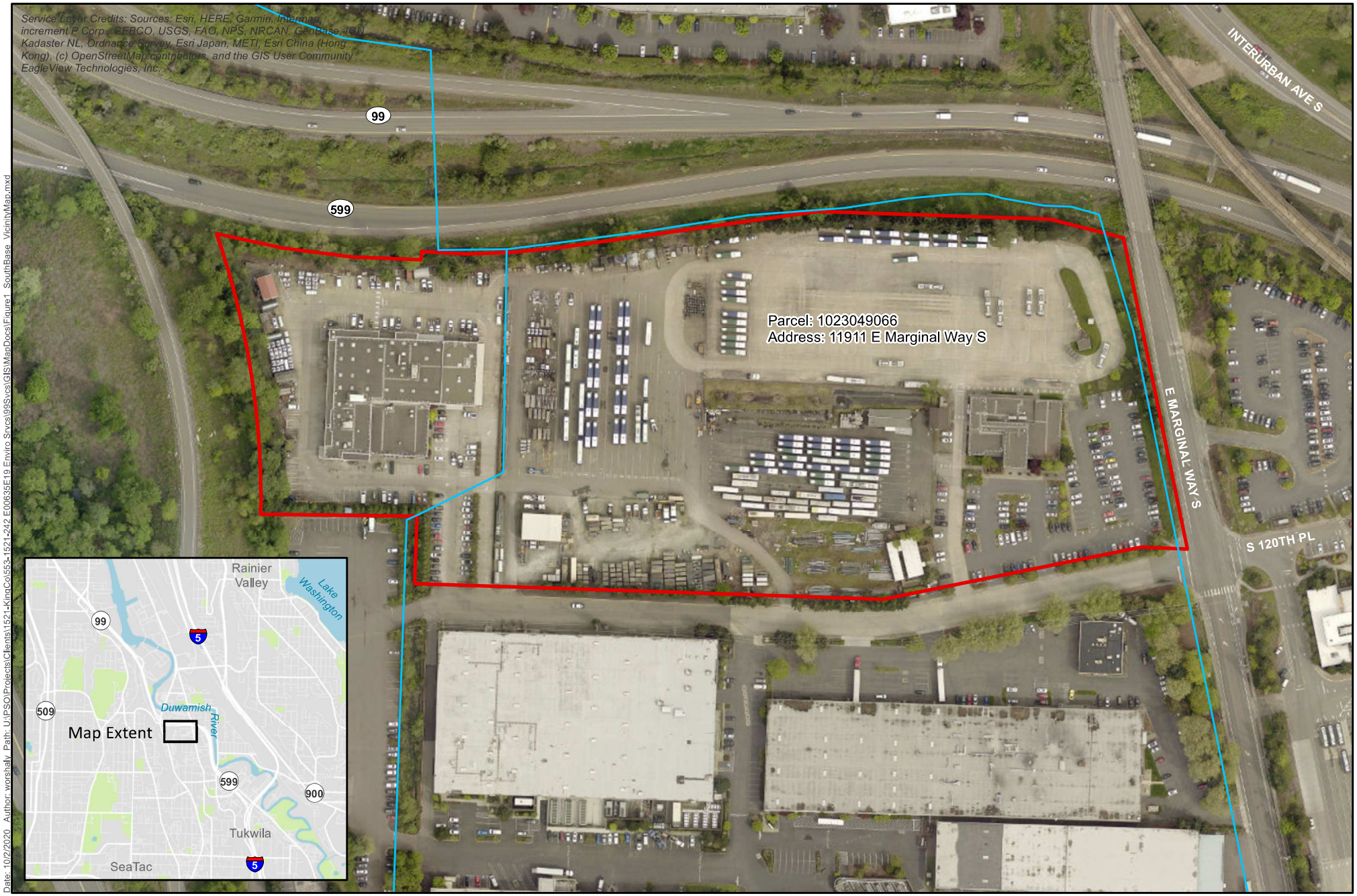
Chris Bourgeois
Staff Geologist

Nicole Kapise
Senior Environmental Geologist

FIGURES (Following Text)

TABLES (Following Text)

Appendices:



Date: 10/2/2020 Author: worshaly Path: U:\PSO\Projects\Clients\1521-KingCo\553-1521-242 E00635E19 Enviro Srvcs\99Svcs\GIS\MapDocs\Figure1_SouthBase_VicinityMap.mxd

Parametrix

Source: King County

0 50 100 200 Feet

Project Location

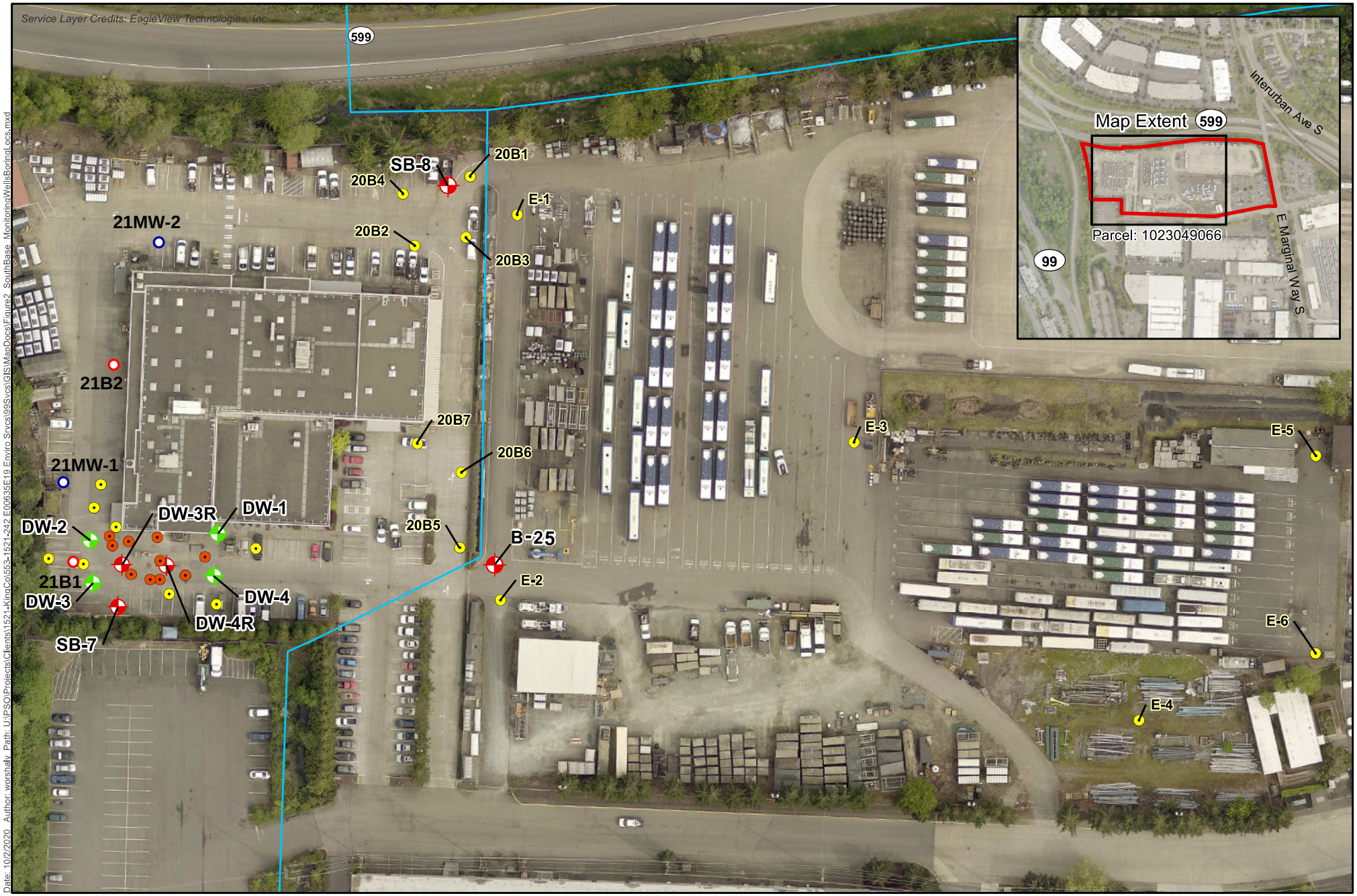
Stream

Figure 1

Site Map

King County Metro Transit S Facilities/S Annex

Tukwila, WA



Date: 10/2/2020 Author: worshaly Path: U:\PSO\Projects\Clients\1521-KingCo\553-1521-242 E0636SE19 Enviro Srvcs\99Svcs\GIS\MapDocs\Figure2_SouthBase_MonitoringWellsBoringLocs.mxd

Source: King County

Project Location
Stream
Installed monitoring well (2021)
Borehole
Soil Sample
Drilled boring (2021)
Monitoring Well (Existing)
Monitoring Well (Historical)

0 35 70 140 Feet

Figure 2
Monitoring Well and Soil Sample Locations
King County Metro Transit S Facilities/S Annex
(adapted 2/3/2022)

Tukwila, WA

HWA GEOSCIENCES INC.
DBE/MWBE

0 37.5 75 150 Feet

King County Metro South Facilities
Remedial Investigation
Tukwila, WA

POTENTIOMETRIC
SURFACE MAP,
AUGUST 25, 2022

FIGURE # 3

PROJECT # 2021-062

Table 1. Groundwater Elevations, King County Metro South Facilities, 11911 E Marginal Way S, Tukwila, WA.

		September 23, 2019		December 17, 2019		April 1, 2020		February 22 and 23, 2022		May 10, 2022		August 25, 2022	
Well	**Reference Elevation[1]**	**Depth to Ground-water (ft)**	**Ground-water Elevation (ft NAVD88)**	**Depth to Ground-water (ft)**	**Ground-water Elevation (ft NAVD88)**	**Depth to Ground-water (ft)**	**Ground-water Elevation (ft NAVD88)**	**Depth to Ground-water** (ft)**	**Ground-water Elevation** (ft NAVD88)**	**Depth to Ground-water** (ft)**	**Ground-water Elevation** (ft NAVD88)**	**Depth to Ground-water (ft)**	**Ground-water Elevation (ft NAVD88)**
DW-3R*	13.63	5.21	8.42	4.84	8.79	4.48	9.15	4.85	8.78	4.56	9.07	5.35	8.28
DW-4R	14.00	5.58	8.42	5.15	8.85	4.82	9.18	5.19	8.81	4.91	9.09	5.68	8.32
SB-7	14.05	5.66	8.39	5.23	8.82	4.86	9.19	5.30	8.75	5.02	9.03	5.85	8.20
SB-8	14.19	6.28	7.91	5.80	8.39	5.33	8.86	5.82	8.37	5.71	8.48	6.38	7.81
B-25	14.12	--	--	--	--	--	--	5.66	8.46	5.41	8.71	6.17	7.95
Staff Gauge	15.94	--	--	--	--	--	--	6.05	9.89	8.85	7.09	8.40	7.54
21MW-1	13.44	--	--	--	--	--	--	4.10	9.34	4.05	9.39	4.87	8.57
21MW-2	13.72	--	--	--	--	--	--	5.10	8.62	5.00	8.72	5.78	7.94

Notes:

[1] N rim PVC (wells), marked measurement reference point (stream gauge), or ground surface (vibrating wire piezometers) in ft NAVD88**

*Well has been damaged and casing is not vertical

** Groundwater elevation measurement collected at time of sampling. Other groundwater elevation measurements are synchronous.

-- Not measured.

Table 2. Summary of Groundwater Analytical Results, King County Metro South Facilities Groundwater Monitoring Tukwila, Washington

	Date Sampled	Method A Cleanup Level [a]	Sample I.D. DW-1	DW-2	DW-3	DW-3R	DW-4	DW-4 Dup	DW-4R	DW-4R Dup	SB-5	SB-6	SB-7	SB-8	21MW-1	21MW-1 Dup	21MW-2	21MW-2 Dup
NWTPH-Gx (µg/L)																		
Gasoline	10/11/1994	800/1,000 [b]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	<100	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<100	--	--	<100	--	--	--	<100	<400	--	--	--	--
	12/17/2019		--	--	--	<50	--	--	<50	--	--	--	<50	<50	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	<100	--	<100	--
	2/22/2022		--	--	--	<100	--	--	<100	--	--	--	<100	<500	<100	--	<100	<100
	5/10/2022		--	--	--	<100	--	--	<100	--	--	--	<100	<100	<100	<100	<100	--
	8/25/2022		--	--	--	<100	--	--	<100	<100	--	--	<100	<100	<100	--	<100	--
NWTPH-Dx (mg/L)																		
Diesel	10/11/1994	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	<0.2	<0.2	0.55	0.495	--	--	--	--
	4/23/1997		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<0.26	--	--	<0.27	--	--	--	<0.28	0.47	--	--	--	--
	12/17/2019		--	--	--	<0.0499	--	--	<0.0497	--	--	--	<0.0498	<0.0498	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	<0.05	--	0.096 x	--
	2/22/2022		--	--	--	<0.05	--	--	0.058	x	--	--	0.059 x	0.350 x	0.150 x	--	0.270 x	0.250 x
	5/10/2022		--	--	--	0.130 x	--	--	0.080	x	--	--	0.071 x	0.150 x	0.160 x	0.140 x	0.180 x	--
	8/25/2022		--	--	--	0.100 x	--	--	0.053 x	0.063 x	--	--	<0.05	0.440 x	0.140 x	--	0.240 x	--
Diesel w/ SGC	1/5/2022	0.5	--	--	--	--	--	--	--	--	--	--	--	--	<0.05	--	<0.05	--
	2/3/2022		--	--	--	<0.05	--	--	<0.05	--	--	--	<0.05	<0.05	<0.05	--	<0.05	<0.05
	05/10/22		--	--	--	<0.05	--	--	<0.05	--	--	--	<0.05	<0.05	<0.05	<0.05	<0.05	--
	08/25/22		--	--	--	<0.05	--	--	<0.05	<0.05	--	--	<0.05	<0.05	<0.05	--	0.065 x	--
Lube Oil	10/11/1994	0.5	<0.2	<0.2	<0.2	--	<0.2	<0.2	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	<0.2	0	0.723	0.326	--	--	--	--
	4/23/1997		--	--	--	--	<0.5	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<0.41	--	--	<0.43	--	--	--	<0.44	**0.67**	--	--	--	--
	12/17/2019		--	--	--	<0.0998	--	--	<0.0994	--	--	--	<0.0997	0.399	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	<0.25	--	<0.25	--
	2/22/2022		--	--	--	<0.25	--	--	<0.25	--	--	--	<0.25	0.310 x	<0.25	--	<0.25	<0.25
	05/10/22		--	--	--	<0.25	--	--	<0.25	--	--	--	<0.25	0.25	<0.25	<0.25	<0.25	--
	08/25/22		--	--	--	<0.25	--	--	<0.25	<0.25	--	--	<0.25	0.490 x	<0.25	--	<0.25	--
Lube Oil w/ SGC	1/5/2022	0.5	--	--	--	--	--	--	--	--	--	--	--	--	<0.25	--	<0.25	--
	2/22/2022		--	--	--	<0.25	--	--	<0.25	--	--	--	<0.25	<0.25	<0.25	--	<0.25	<0.25
	05/10/22		--	--	--	<0.25	--	--	<0.25	--	--	--	<0.25	<0.25	<0.25	<0.25	<0.25	--
	08/25/22		--	--	--	<0.25	--	--	<0.25	<0.25	--	--	<0.25	<0.25	<0.25	--	<0.25	--
BTEX (µg/L)																		
Benzene	10/11/1994	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	**9.5**	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<4	--	--	--	--
	12/17/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<1	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	<0.35	--	<0.35	--
	2/22/2022		--	--	--	<0.35	--	--	<0.35	--	--	--	<0.35	<0.35	<0.35	--	<0.35	<0.35
	5/10/2022		--	--	--	<0.35	--	--	<0.35	--	--	--	<0.35	<0.35	<0.35	<0.35	<0.35	--
	8/25/2022		--	--	--	<0.35	--	--	<0.35	<0.35	--	--	<0.35	<0.35	<0.35	--	<0.35	--
Toluene	10/11/1994	1,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	2.3	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<4	--	--	--	--
	12/17/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<1	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	<1	--	<1	--
	2/22/2022		--	--	--	<1	--	--	<1	--	--	--	<1	<1	<1	--	<1	<1
	5/10/2022		--	--	--	<1	--	--	<1	--	--	--	<1	<1	<1	<1	<1	--
	8/25/2022		--	--	--	<1	--	--	<1	<1	--	--	<1	<1	<1	--	<1	--
Ethylbenzene	10/11/1994	700	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	<1	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<4	--	--	--	--
	12/17/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<1	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	<1	--	<1	--
	2/22/2022		--	--	--	<1	--	--	<1	--	--	--	<1	<1	<1	--	<1	<1
	5/10/2022		--	--	--	<1	--	--	<1	--	--	--	<1	<1	<1	<1	<1	--
	8/25/2022		--	--	--	<1	--	--	<1	<1	--	--	<1	<1	<1	--	<1	--
m,p-Xylene	10/11/1994	1,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	<1	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<4	--	--	--	--
	12/17/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<1	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	<2	--	<2	--
	2/22/2022		--	--	--	<2	--	--	<2	--	--	--	<2	<2	<2	--	<2	<2
	05/10/22		--	--	--	<2	--	--	<2	--	--	--	<2	<2	<2	<2	<2	--
	08/25/22		--	--	--	<2	--	--	<2	<2	--	--	<2	<2	<2	--	<2	--
o-xylene	10/11/1994	1,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	<1	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<4	--	--	--	--
	12/17/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<1	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	<1	--	<1	--
	2/22/2022		--	--	--	<1	--	--	<1	--	--	--	<1	<1	<1	--	<1	<1
	5/10/2022		--	--	--	<1	--	--	<1	--	--	--	<1	<1	<1	<1	<1	--
	8/25/2022		--	--	--	<1	--	--	<1	<1	--	--	<1	<1	<1	--	<1	--
Naphthalene (µg/L)	10/11/1994	160																
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/17/2019		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	<1	--	<1	--
	2/22/2022		--	--	--	<1	--	--	<1	--	--	--	<1	<1	<1	--	<1	<1
	5/10/2022		--	--	--	<1	--	--	<1	--	--	--	<1	<1	<1	<1	<1	--
	8/25/2022		--	--	--	<1	--	--	<1	<1	--	--	<1	<1	<1	--	<1	--
Lead (µg/L)																		
Lead	10/11/1994	15	<3	<3	<3	--	<3	<3	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/17/2019		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	2/22/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	5/10/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	8/25/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

Bold values exceed MTCA Method A cleanup levels.

[a] Washington Administrative Code Chapter 173-340, Model Toxics Control Act (MTCA) Cleanup Regulation, Method A suggested soil cleanup level for groundwater; updated August 15, 2001.

[b] 800 µg/L if benzene is present in groundwater; 1,000 µg/L if no detectable benzene in groundwater.

mg/L - milligrams per liter.

µg/L - micrograms per liter.

SGC - silica gel cleanup

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation

-- not analyzed.

< - analyte not detected at or greater than the listed concentration (practical quantitation limit [PQL]).

APPENDIX A:

AUGUST 2022 FIELD DATA SHEETS

SAMPLE CHAIN OF CUSTODY

Report To C. Bourgeois (HWA), M. Brady, L. Gibert (PMX)
Company HWA GeoSciences + Parametrix
Address 21312 30th Dr SE Ste. 110
City, State, ZIP Bothell, WA 98021
Phone 206-794-3145 Email cbourgeois@hwageo.com

SAMPLERS (*signature*)

PROJECT NAME: King County Metro South Facilities

PO #: 2021-062 W031 Task 200.02

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

Page # 1 of 1

TURNAROUND TIME
☑ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Archive samples
☐ Other
Default: Dispose after 30 days

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	BTEX + Naphthalene				Notes
21MW-1		8/25/22	1145	GW	7	X	X						X				Dx w/+ w/o SEG
21MW-2		↓	1040	↓	7	X	X						X				" "
21MW-3		↓	1610	↓	7	X	X						X				" "
DW-3R		↓	1425	↓	7	X	X						X				" "
DW-4R		↓	1550	↓	7	X	X						X				" "
SB-7		↓	1330	↓	7	X	X						X				" "
SB-8		↓	1225	↓	7	X	X						X				" "
TRIP BLANKS		↓	NA	↓	2		X						X				

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Chris B	Chris Bourgeois	HWA	8/25/22	1710
Received by:	W. Madden	W. Madden	F+B	8/25/22	1715
Relinquished by:					
Received by:					

Friedman & Bruya, Inc.
Ph. (206) 285-8282

PARAMETRIX

Form 07-EN-215/Rev. 02/07

Field Report/Well Data

TO:

Lisa Gilbert

Mike Brady

John Greene

DATE 2/~~22~~25/2022	JOB NO. 553-1521-242 WO31 Task 200.02
PROJECT King County METRO South Facilities South Annex	
LOCATION 11911 E Marginal Way S, Tukwila, WA	
CONTRACTOR Parametrix in Assoc. with HWA Geosciences	OWNER King County METRO
WEATHER Sunny, warm	TEMP Low 70's ° at 8:00 AM; Mid 70's ° at 915 AM PM
PRESENT AT SITE ~~Cierra Wilson~~ C. Bourgeois	

THE FOLLOWING WAS NOTED:

WN (WELL NUMBER)	Time	DTW (DEPTH TO WATER)	MP (MEASURE POINT)	SU (STICK UP OF WELL CASING)	TD (TOTAL DEPTH OF WELL)	WD (WELL DIAMETER)
21MW-1	857	4.87	N. PVC			
21MW-2	911	5.78	N. PVC			
SB-~~7~~ 8 (SB-8V)	915	6.38	N. PVC			
~~SB-8~~ SB-7	853	5.85	N. PVC			
DW-3R	851	5.35	N. PVC			
DW-4R	846	5.68	N. PVC.			
Staff Gauge	906	8.40	X on Cover			
B-25	838	6.17.	N. PVC			

← looks like this is leaning slightly North

TOC (Top of Locking Casing) TOW (Top of Well Casing)

COPIES 1

SIGNED ~~Chris~~ Chris

all wells/plugs opened between 8:00 AM and 8:20 AM.

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.02 Date: 8/25/22 Well ID: 21MW-1

Project Name: King County METRO South Facilities South Annex Project Address: 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences Samplers: ~~Cierra Wilson~~ C. Bourgeois

Purge Data

Purge Equipment: Peristaltic pump Depth of Well (ft below TOC): 15.0

Pump Intake Depth (ft below TOC): 5.05 Well Casing/Diameter: 2"

Initial Depth to Water (ft below TOC): 9' Purge Time (from/to): 1111 – 1140

Time	Depth to Water (ft below TOC)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (visual)	Comments
	5.38										
1115	~~5.45~~	2.5	290	1	20.1	1.45	0.533	6.61	-56.1	clear	sweet odor
1120	5.76	2.25	250	1.75	19.2	0.48	0.530	6.63	-73.6	"	"
1125	5.86	"	"	3.1	17.8	0.34	0.527	6.64	-75.8	"	"
1130	5.91	"	"	4.1	17.2	0.28	0.526	6.65	-79.2	"	"
1135	5.91	"	"	5.1	16.7	0.23	0.521	6.66	-83.3	"	"
1140	"	"	"	6.1	16.8	0.23	0.520	6.66	-88.9 ←	-88.9	
Stabilization Criteria					3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sampling Data

Sample ID: 21MW-1 Time Collected: 1145 Weather: Sunny, warm

Sample Description (Color, Turbidity, Odor, Other): clear, faint odor

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene

Laboratory: Friedman & Bruya Lab Dropoff Method: in person Lab Dropoff Date: 8/25/22

Additional Information/Comments

initial DTW measured after pumping ~~[illegible]~~ 1 minute.

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.02 Date: 8/25/22 Well ID: 21MW-2

Project Name: King County METRO South Facilities South Annex Project Address: 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences Samplers: ~~Cierra Wilson~~ C. Bourgeois.

Purge Data

Purge Equipment: Peristaltic pump Depth of Well (ft below TOC): 15.0

Pump Intake Depth (ft below TOC): ~~5.80~~ 11' Well Casing/Diameter: 2"

Initial Depth to Water (ft below TOC): ~~5.80~~ 5.80' Purge Time (from/to): 1012 — 1035

Time	Depth to Water (ft below TOC)	Pump Setting	Purge Rate	Cum. Vol. Purged (from SB-8 L.)	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (visual)	Comments
1015	5.96	2.75	300	5	18.2	0.90	0.84	6.34	-39.6	earth odor	
1020	"	2.20	260		17.9	0.41	0.83	6.39	-57.0	orange turbid.	
1025	"	"	"	7.5	17.3	0.29	0.84	6.41	-61.7	less turbid	
1030	"	"	"		17.2	0.25	0.83	6.40	-65.4	no change	
1035	"	"	"	9.25	17.2	0.22	0.82	6.42	-70.6		
Stabilization Criteria					3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sampling Data

Sample ID: 21MW-2 Time Collected: 1040 Weather: Sunny, warm

Sample Description (Color, Turbidity, Odor, Other): sparse orange turbid.

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene

Laboratory: Friedman & Bruya Lab Dropoff Method: in-person Lab Dropoff Date: 8/25/22

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.02 Date: 8/25/22 Well ID: DW-3R

Project Name: King County METRO South Facilities South Annex Project Address: 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences Samplers: ~~Sierra Wilson~~ C. Bourgeois

Purge Data

Purge Equipment: Peristaltic pump Depth of Well (ft below TOC): 8.80

Pump Intake Depth (ft below TOC): 7 Well Casing/Diameter: 0.9'

Initial Depth to Water (ft below TOC): 5.37 Purge Time (from/to): 1403 - 1425

Time	Depth to Water (ft below TOC)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (visual)	Comments
1405	5.37	2.25	250	0.25	22.1	1.12	0.66	6.53	9.8	clear	no odor
1410	"	"	"	1.75	21.3	0.36	0.67	6.63	-47.4	"	"
1415	"	"	"	2.8	21.6	0.26	0.67	6.64	-62.2	"	"
1420	"	"	"	3.5	21.8	0.22	0.67	6.63	-59.2	"	"
1425	"	"	"	4.7	21.4	0.19	0.67	6.62	-52.9	"	"
			Stabilization Criteria		3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sampling Data

Sample ID: DW-3R Time Collected: 1425 Weather: Sunny, hot.

Sample Description (Color, Turbidity, Odor, Other): Sparkle orange turbidity

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene

Laboratory: Friedman & Bruya Lab Dropoff Method: Sin-person Lab Dropoff Date: 8/25/22

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.02 Date: 8/25/22 Well ID: DW-4R

Project Name: King County METRO South Facilities South Annex Project Address: 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences Samplers: ~~Cierra Wilson~~ C. Gorgeois

Purge Data

Purge Equipment: Peristaltic pump Depth of Well (ft below TOC):

Pump Intake Depth (ft below TOC): 8 Well Casing/Diameter: 0.65'

Initial Depth to Water (ft below TOC): 5.70' Purge Time (from/to): 1516 - 1545

Time	Depth to Water (ft below TOC)	Pump Setting	mL/min Purge Rate	Cum. L Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (visual)	Comments
1520	5.70	2.5	240	2.0	21.3	0.87	0.60	7.05	-61.3	clear,	no odor
1525	"	2.7	240	1.8	21.2	0.35	0.60	7.06	-81.0	"	"
1530	"	"	"		21.3	0.25	0.60	7.07	-90.0	"	"
1535	"	"	"	3.9	21.2	0.22	0.59	7.04	-97.7	Sparse	black turbid.
1540	"	"	"		21.2	0.19	0.59	7.04	-102.0	"	"
1545	"	"	"	5.3	21.3	0.19	0.59	7.04	-107.0	"	"
			Stabilization Criteria		3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sampling Data

Sample ID: DW-4R Time Collected: 1550; 1610 Weather: sunny, hot

Sample Description (Color, Turbidity, Odor, Other): clear w/ black turbidity, no odor

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene

Laboratory: Friedman & Bruya Lab Dropoff Method: in-person Lab Dropoff Date: 8/25/22

Additional Information/Comments

Dup 21MW-3 @ 1616

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.02 Date: 8/25/22 Well ID: SB-7

Project Name: King County METRO South Facilities South Annex Project Address: 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences Samplers: ~~Cierra Wilson~~ C. Bourgois

Purge Data

Purge Equipment: Peristaltic pump Depth of Well (ft below TOC): 11.64

Pump Intake Depth (ft below TOC): ~~6~~ 9' Well Casing/Diameter: 2"

Initial Depth to Water (ft below TOC): 5.85' Purge Time (from/to): 1300 - 1325

Time	Depth to Water (ft below TOC)	Pump Setting	Purge Rate (ml/min)	Cum. Vol. Purged (L)	Temp (°C)	DO (mg/L)	Specific Conductance (mS/cm) (mg/cm)	pH (units)	ORP (mv)	Turbidity (visual)	Comments
1305	5.90	2.25	240	0.7	16.8	0.85	0.491	6.57	-80.4	clear	Slight odor
1310	5.91	"	"	1.7	16.9	0.50	0.493	6.61	-95.1	"	"
1315	"	"	"	3	17.1	0.40	0.492	6.61	-96.7	"	"
1320	"	"	"	4	17.2	0.33	0.491	6.61	-103.2	"	"
1325	"	"	"	5.1	17.3	0.27	0.491	6.58	-103.2	"	"
Stabilization Criteria					3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sampling Data

Sample ID: SB-7 Time Collected: 1330 Weather: Sunny, hot.

Sample Description (Color, Turbidity, Odor, Other): sparkle orange & black turbidity

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene

Laboratory: Friedman & Bruya Lab Dropoff Method: in-person Lab Dropoff Date: 8/25/22

Additional Information/Comments

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.02 Date: 8/25/22 Well ID: SB-8

Project Name: King County METRO South Facilities South Annex Project Address: 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences Samplers: ~~Cierra Wilson~~ C. Bourgeois

Purge Data

Purge Equipment: Peristaltic pump Depth of Well (ft below TOC):

Pump Intake Depth (ft below TOC): ~~[illegible]~~ 9.3 Well Casing/Diameter: 2"

Initial Depth to Water (ft below TOC): 6.38 Purge Time (from/to): 928 - 945

Time	Depth to Water (ft below TOC)	Pump Setting	mL/min. Purge Rate	Cum. Liters. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (visual)	Comments
930	7.36	2.75	265		17.5	0.80	0.80	6.09	-70.9	yellow color	
935	9.02	"	"		17.7	0.42	0.80	6.04	-66.6	no turbidity, just a	
940	10.60	"	"		18.1	0.31	0.78	6.02	-69.6	color + sweet odor.	
945	12.20	"	"		18.6	0.28	0.78	6.03	-72.8	~~[illegible]~~	
			DRY								
Stabilization Criteria					3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sampling Data

Sample ID: SB-8 Time Collected: ~~[illegible]~~ 1225 Weather: Sunny, warm.

Sample Description (Color, Turbidity, Odor, Other): very silty / turbid.

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene

Laboratory: Friedman & Bruya Lab Dropoff Method: ~~[illegible]~~ Lab Dropoff Date: 8/25/22

Additional Information/Comments

* P.I. = pump intake.

Parametrix

APPENDIX B:

AUGUST 2022 LAB REPORT

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Vineta Mills, M.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

September 7, 2022

Chris Bourgeois, Project Manager
HWA Geosciences, Inc
21312 30th Dr SE
Bothell, WA 98021

Dear Mr Bourgeois:

Included are the results from the testing of material submitted on August 25, 2022 from the King County Metro South Facilities 2021-062 W031 Task 200.02, F&BI 208400 project. There are 18 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Mike Brady (PMX), and Lisa Gilbert (PMX)
HWA0907R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on August 25, 2022 by Friedman & Bruya, Inc. from the HWA Geosciences, Inc King County Metro South Facilities 2021-062 W031 Task 200.02 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	HWA Geosciences, Inc
208400 -01	21MW-1
208400 -02	21MW-2
208400 -03	21MW-3
208400 -04	DW-3R
208400 -05	DW-4R
208400 -06	SB-7
208400 -07	SB-8
208400 -08	Trip Blanks

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/07/22
Date Received: 08/25/22
Project: King County Metro South Facilities 2021-062 W031 Task 200.02, F&BI 208400
Date Extracted: 08/31/22
Date Analyzed: 08/31/22 and 09/01/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 51-134)
21MW-1 208400-01	<100	97
21MW-2 208400-02	<100	102
21MW-3 208400-03	<100	102
DW-3R 208400-04	<100	99
DW-4R 208400-05	<100	102
SB-7 208400-06	<100	101
SB-8 208400-07	<100	98
Trip Blanks 208400-08	<100	101
Method Blank 02-1757 MB	<100	100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/07/22
Date Received: 08/25/22
Project: King County Metro South Facilities 2021-062 W031 Task 200.02, F&BI 208400
Date Extracted: 08/26/22
Date Analyzed: 09/01/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx
Sample Extracts Passed Through a Silica Gel Column Prior to Analysis
Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
21MW-1 208400-01	<50	<250	83
21MW-2 208400-02	65 x	<250	94
21MW-3 208400-03	<50	<250	93
DW-3R 208400-04	<50	<250	96
DW-4R 208400-05	<50	<250	84
SB-7 208400-06	<50	<250	91
SB-8 208400-07	<50	<250	83
Method Blank 02-2040 MB	<50	<250	93

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/07/22
Date Received: 08/25/22
Project: King County Metro South Facilities 2021-062 W031 Task 200.02, F&BI 208400
Date Extracted: 08/26/22
Date Analyzed: 08/26/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
21MW-1 208400-01	140 x	<250	85
21MW-2 208400-02	240 x	<250	95
21MW-3 208400-03	63 x	<250	82
DW-3R 208400-04	100 x	<250	95
DW-4R 208400-05	53 x	<250	90
SB-7 208400-06	<50	<250	92
SB-8 208400-07	440 x	490 x	81
Method Blank 02-2040 MB	<50	<250	86

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	21MW-1	Client:	HWA Geosciences, Inc
Date Received:	08/25/22	Project:	King County Metro South Facilities
Date Extracted:	08/27/22	Lab ID:	208400-01
Date Analyzed:	08/27/22	Data File:	082710.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	78	126
Toluene-d8	93	84	115
4-Bromofluorobenzene	98	72	130

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	21MW-2	Client:	HWA Geosciences, Inc
Date Received:	08/25/22	Project:	King County Metro South Facilities
Date Extracted:	08/27/22	Lab ID:	208400-02
Date Analyzed:	08/27/22	Data File:	082711.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	78	126
Toluene-d8	94	84	115
4-Bromofluorobenzene	98	72	130

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	21MW-3	Client:	HWA Geosciences, Inc
Date Received:	08/25/22	Project:	King County Metro South Facilities
Date Extracted:	08/27/22	Lab ID:	208400-03
Date Analyzed:	08/27/22	Data File:	082712.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	95	78	126
Toluene-d8	94	84	115
4-Bromofluorobenzene	97	72	130

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	DW-3R	Client:	HWA Geosciences, Inc
Date Received:	08/25/22	Project:	King County Metro South Facilities
Date Extracted:	08/27/22	Lab ID:	208400-04
Date Analyzed:	08/27/22	Data File:	082713.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	96	78	126
Toluene-d8	98	84	115
4-Bromofluorobenzene	96	72	130

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	DW-4R	Client:	HWA Geosciences, Inc
Date Received:	08/25/22	Project:	King County Metro South Facilities
Date Extracted:	08/27/22	Lab ID:	208400-05
Date Analyzed:	08/27/22	Data File:	082714.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	78	126
Toluene-d8	95	84	115
4-Bromofluorobenzene	100	72	130

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	SB-7	Client:	HWA Geosciences, Inc
Date Received:	08/25/22	Project:	King County Metro South Facilities
Date Extracted:	08/27/22	Lab ID:	208400-06
Date Analyzed:	08/27/22	Data File:	082715.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	78	126
Toluene-d8	95	84	115
4-Bromofluorobenzene	98	72	130

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	SB-8	Client:	HWA Geosciences, Inc
Date Received:	08/25/22	Project:	King County Metro South Facilities
Date Extracted:	08/27/22	Lab ID:	208400-07
Date Analyzed:	08/27/22	Data File:	082716.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	96	78	126
Toluene-d8	91	84	115
4-Bromofluorobenzene	96	72	130

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Trip Blanks	Client:	HWA Geosciences, Inc
Date Received:	08/25/22	Project:	King County Metro South Facilities
Date Extracted:	08/27/22	Lab ID:	208400-08
Date Analyzed:	08/27/22	Data File:	082717.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	96	78	126
Toluene-d8	91	84	115
4-Bromofluorobenzene	96	72	130

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	HWA Geosciences, Inc
Date Received:	Not Applicable	Project:	King County Metro South Facilities
Date Extracted:	08/27/22	Lab ID:	02-1951 mb
Date Analyzed:	08/27/22	Data File:	082709.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	78	126
Toluene-d8	91	84	115
4-Bromofluorobenzene	96	72	130

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Date of Report: 09/07/22
Date Received: 08/25/22
Project: King County Metro South Facilities 2021-062 W031 Task 200.02, F&BI 208400

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 208396-05 Matrix Spike

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Gasoline	ug/L (ppb)	1,000	1,092	93	94	53-117	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	99	69-134

Date of Report: 09/07/22
Date Received: 08/25/22
Project: King County Metro South Facilities 2021-062 W031 Task 200.02, F&BI 208400

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 208373-02 (Matrix Spike) Silica Gel

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	<50	112	104	50-150	7

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	ug/L (ppb)	2,500	116	63-142

Date of Report: 09/07/22
Date Received: 08/25/22
Project: King County Metro South Facilities 2021-062 W031 Task 200.02, F&BI 208400

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 208373-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	<50	132	116	50-150	13

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	ug/L (ppb)	2,500	116	63-142

Date of Report: 09/07/22
Date Received: 08/25/22
Project: King County Metro South Facilities 2021-062 W031 Task 200.02, F&BI 208400

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 208400-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Benzene	ug/L (ppb)	10	<0.35	107	50-150
Toluene	ug/L (ppb)	10	<1	110	50-150
Ethylbenzene	ug/L (ppb)	10	<1	104	50-150
m,p-Xylene	ug/L (ppb)	20	<2	104	50-150
o-Xylene	ug/L (ppb)	10	<1	105	50-150
Naphthalene	ug/L (ppb)	10	<1	99	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Benzene	ug/L (ppb)	10	104	92	70-130	12
Toluene	ug/L (ppb)	10	109	99	70-130	10
Ethylbenzene	ug/L (ppb)	10	101	92	70-130	9
m,p-Xylene	ug/L (ppb)	20	101	92	70-130	9
o-Xylene	ug/L (ppb)	10	103	93	70-130	10
Naphthalene	ug/L (ppb)	10	96	87	70-130	10

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

SAMPLE CHAIN OF CUSTODY

208400

Report To C. Bourgeois (HWA), M. Brady, L. Gibert (FMX)

Company HWA GeoSciences + Parametrix

Address 21312 30th Dr SE Ste. 110

City, State, ZIP Bothell, WA 98021

Phone 206 794-3145 Email cbourgeois@hwageo.com

SAMPLERS (signature) 8/25/22

PROJECT NAME: King County Metro South Facilities

PO #: 2021-062 W031 Task 200.02

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

Page # 1 of EDM/VWS

TURNAROUND TIME
- ☑ Standard turnaround
- ☐ RUSH
- Rush charges authorized by:

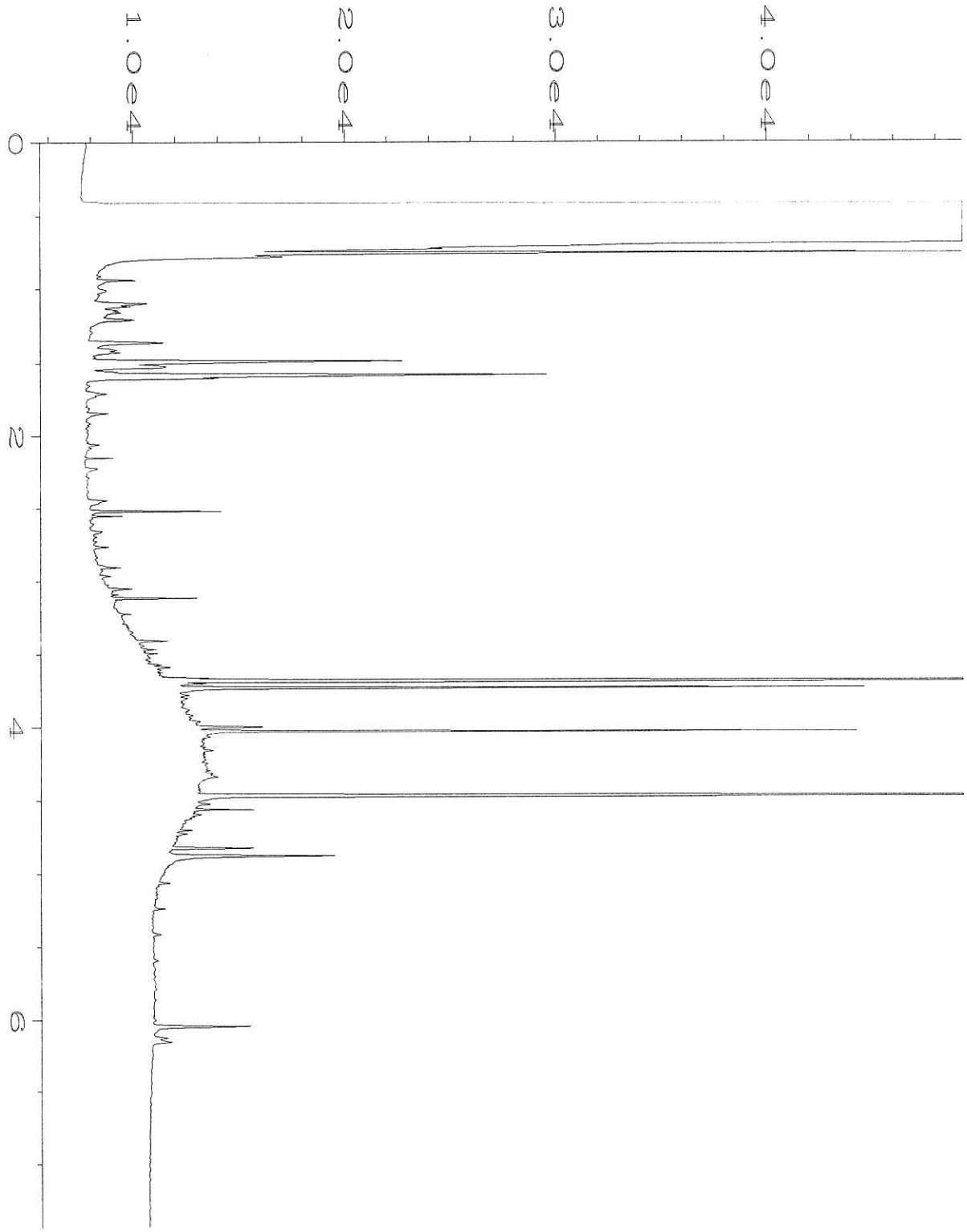
SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	BTEX + Naphthalene				Notes
21MW-1	01A-G	8/25/22	1145	GW	7	X	X						X				Dx w/+ w/o SEG
21MW-2	02		1040		7	X	X						X				" "
21MW-3	03		1610		7	X	X						X				" "
DW-3R	04		1425		7	X	X						X				" "
DW-4R	05		1550		7	X	X						X				" "
SB-7	06		1330		7	X	X						X				" "
SB-8	07		1225		7	X	X						X				" "
TRIP BLANKS	08A-B		NA		2		X						X				

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Chris B.	Chris Bourgeois	HWA	8/25/22	1710
Received by: W. Madden	W. Madden	F+BI	8/25/22	1715
Relinquished by:		Samples received at 0 °C		
Received by:				

Friedman & Bruya, Inc.
Ph. (206) 285-8282



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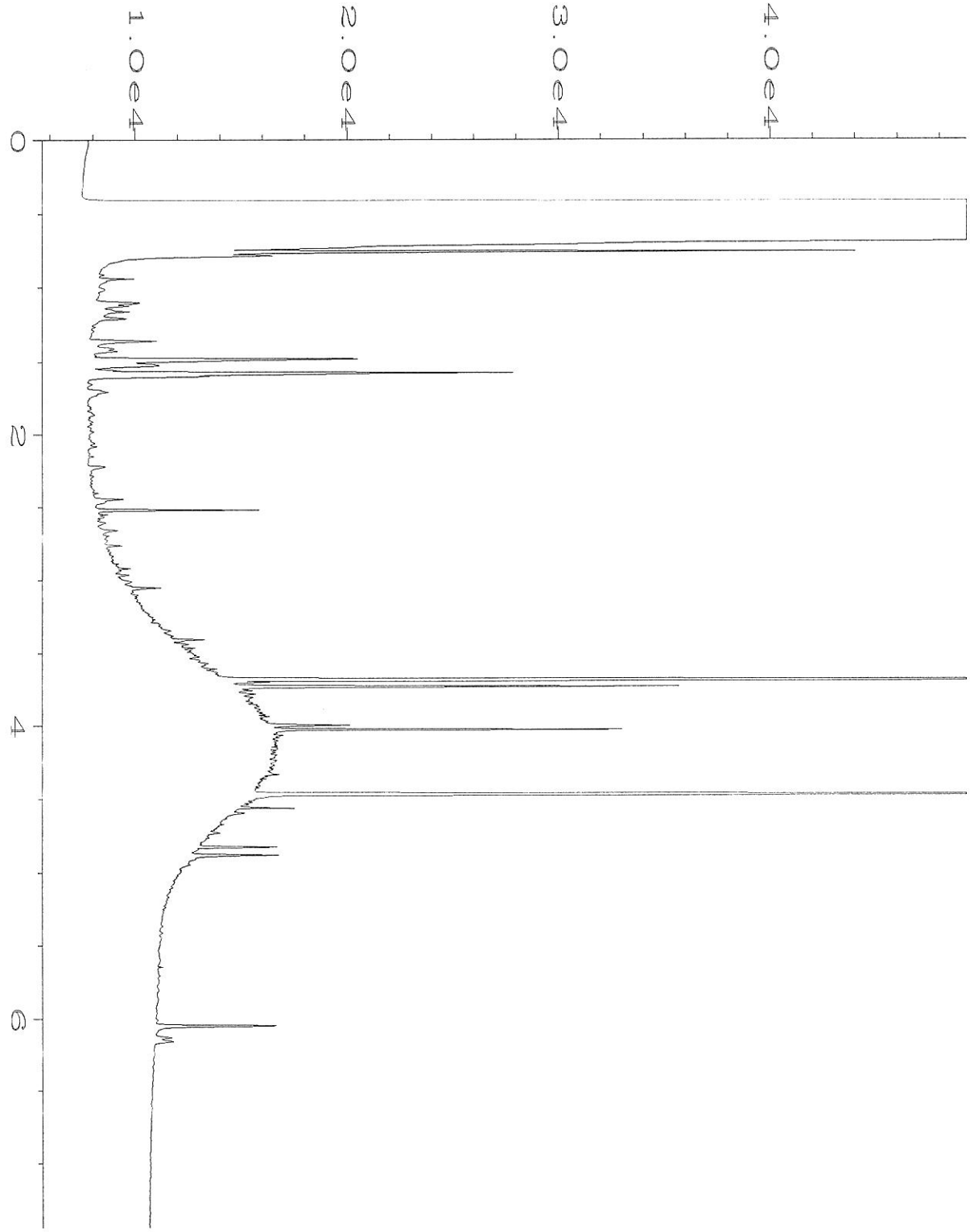
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 45
Sample Name	: 208400-01	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 12
Acquired on	: 26 Aug 22 06:50 PM	Instrument Method	: DX.MTH
Report Created on:	12 Sep 22 02:55 PM	Analysis Method	: DEFAULT.MTH



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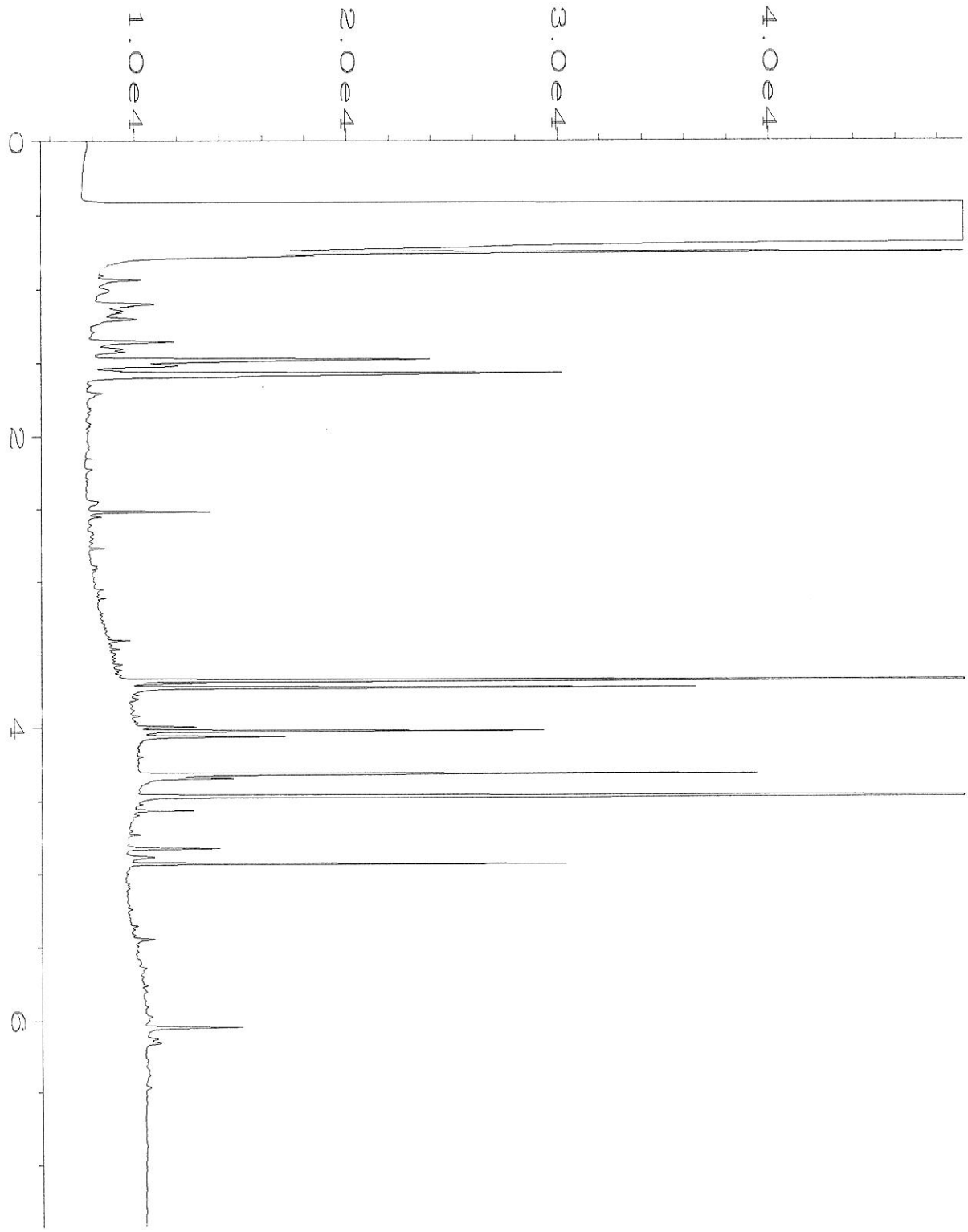
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 46
Sample Name	: 208400-02	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 12
Acquired on	: 26 Aug 22 07:05 PM	Instrument Method	: DX.MTH
Report Created on	: 12 Sep 22 02:56 PM	Analysis Method	: DEFAULT.MTH



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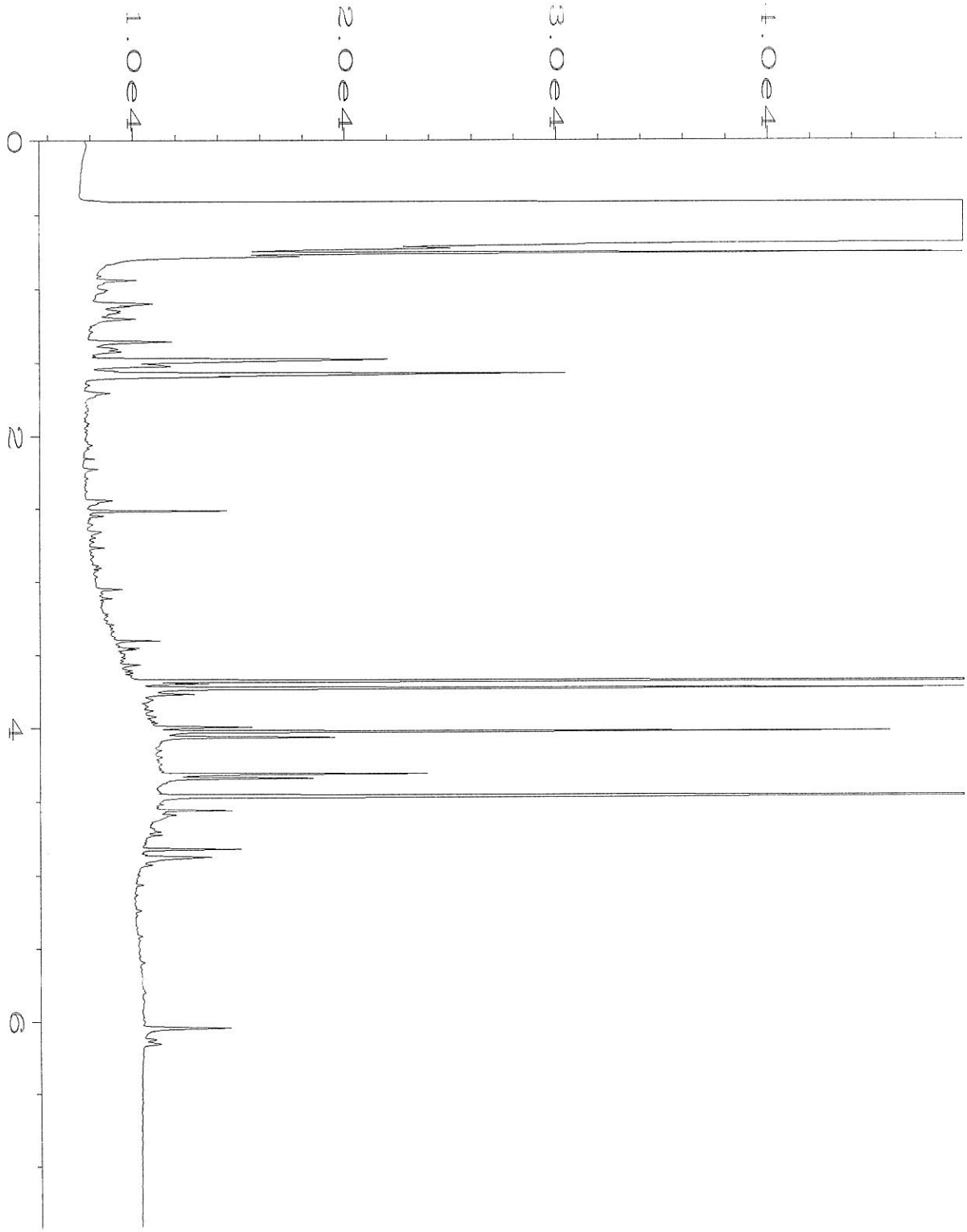
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 47
Sample Name	: 208400-03	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 12
Acquired on	: 26 Aug 22 07:20 PM	Instrument Method	: DX.MTH
Report Created on	: 12 Sep 22 02:56 PM	Analysis Method	: DEFAULT.MTH



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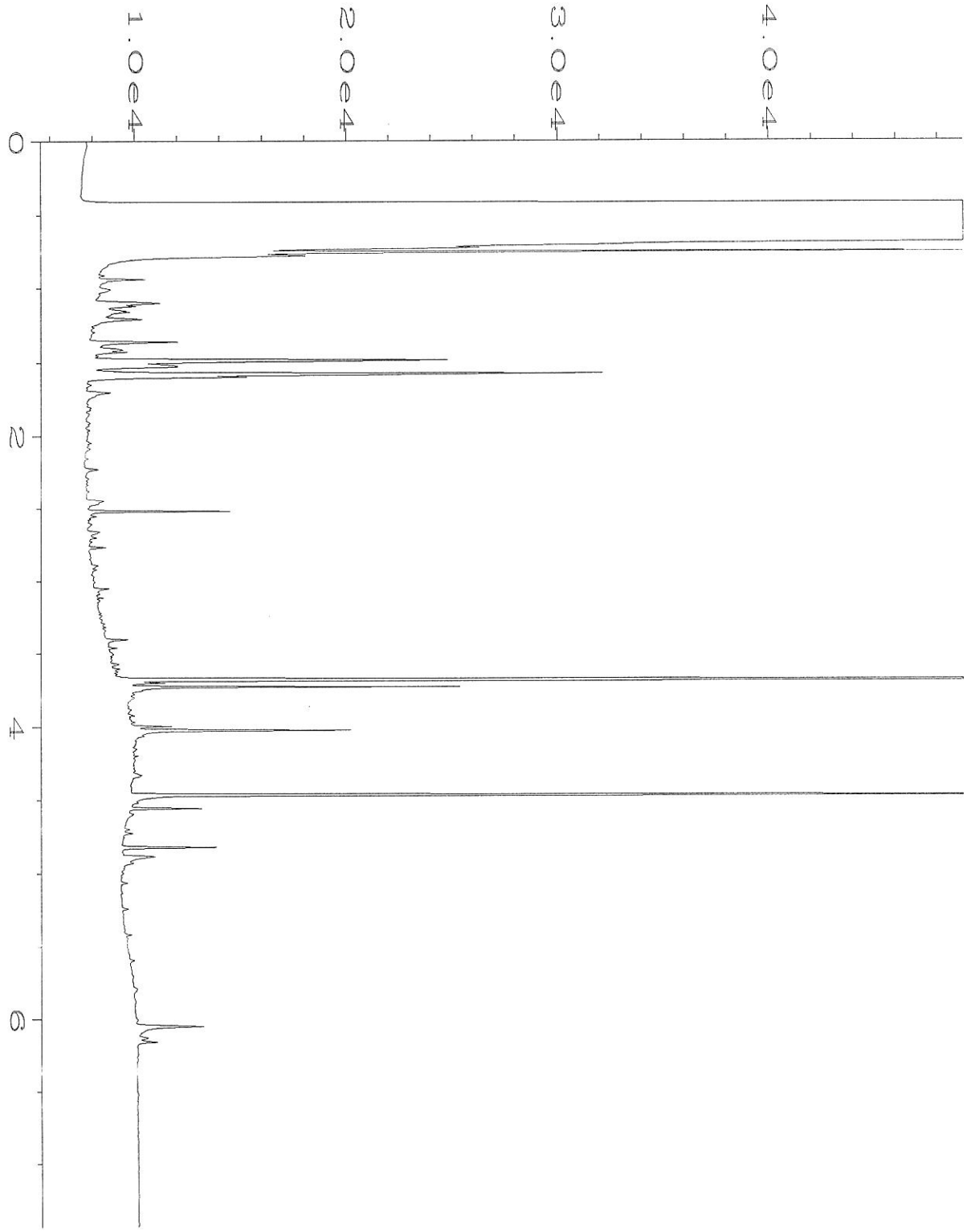
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 48
Sample Name	: 208400-04	Injection Number	: 1
Run Time Bar Code	:	Sequence Line	: 12
Acquired on	: 26 Aug 22 07:35 PM	Instrument Method	: DX.MTH
Report Created on	: 12 Sep 22 02:56 PM	Analysis Method	: DEFAULT.MTH



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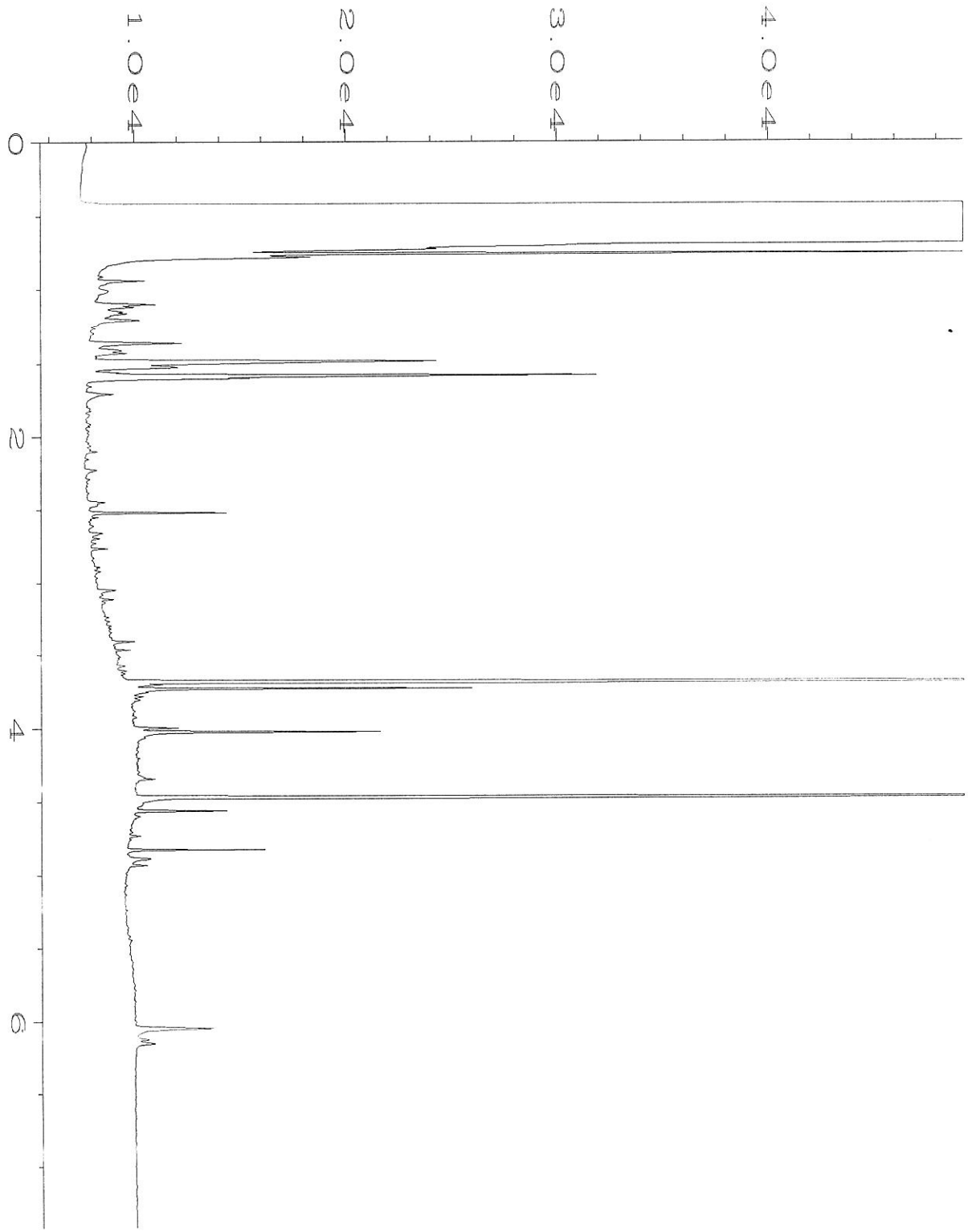
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 49
Sample Name	: 208400-05	Injection Number	: 1
Run Time Bar Code	:	Sequence Line	: 12
Acquired on	: 26 Aug 22 07:50 PM	Instrument Method	: DX.MTH
Report Created on	: 12 Sep 22 02:56 PM	Analysis Method	: DEFAULT.MTH



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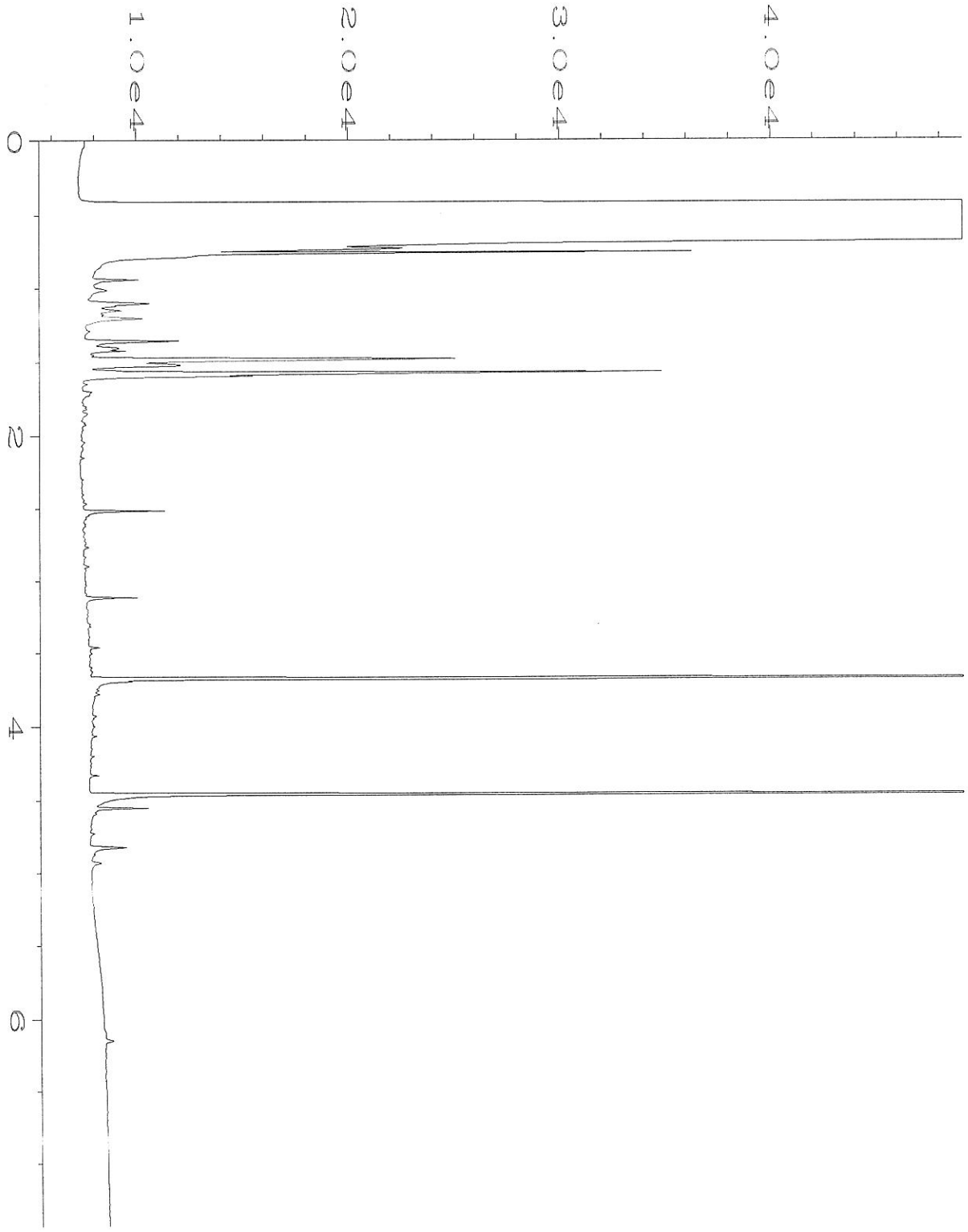
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 50
Sample Name	: 208400-06	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 12
Acquired on	: 26 Aug 22 08:05 PM	Instrument Method	: DX.MTH
Report Created on:	12 Sep 22 02:56 PM	Analysis Method	: DEFAULT.MTH



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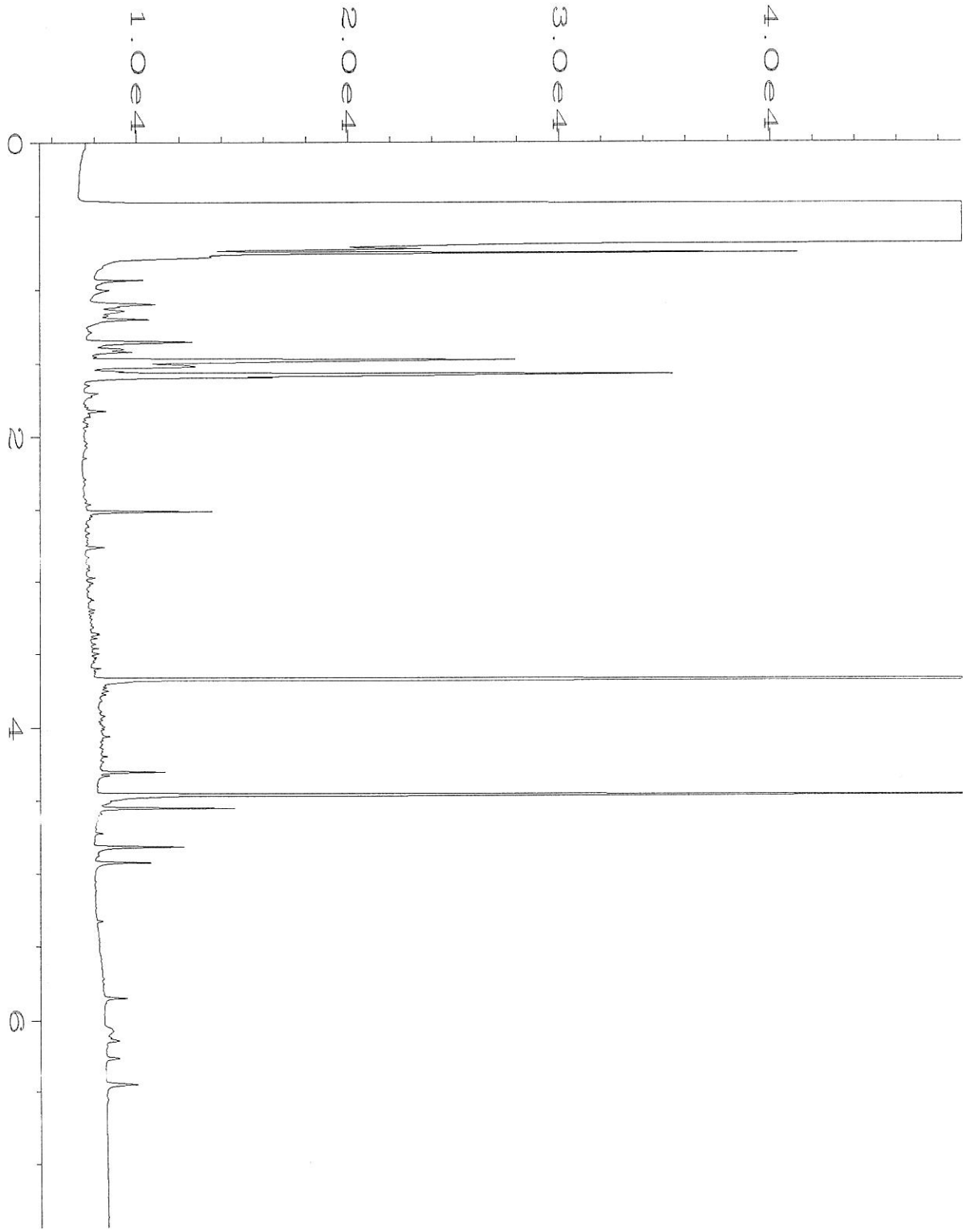
Operator : TL
Instrument : GC1
Sample Name : 208400-01 sg
Run Time Bar Code:
Acquired on : 31 Aug 22 10:19 PM
Report Created on: 12 Sep 22 03:00 PM

Page Number : 1
Vial Number : 41
Injection Number : 1
Sequence Line : 14
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



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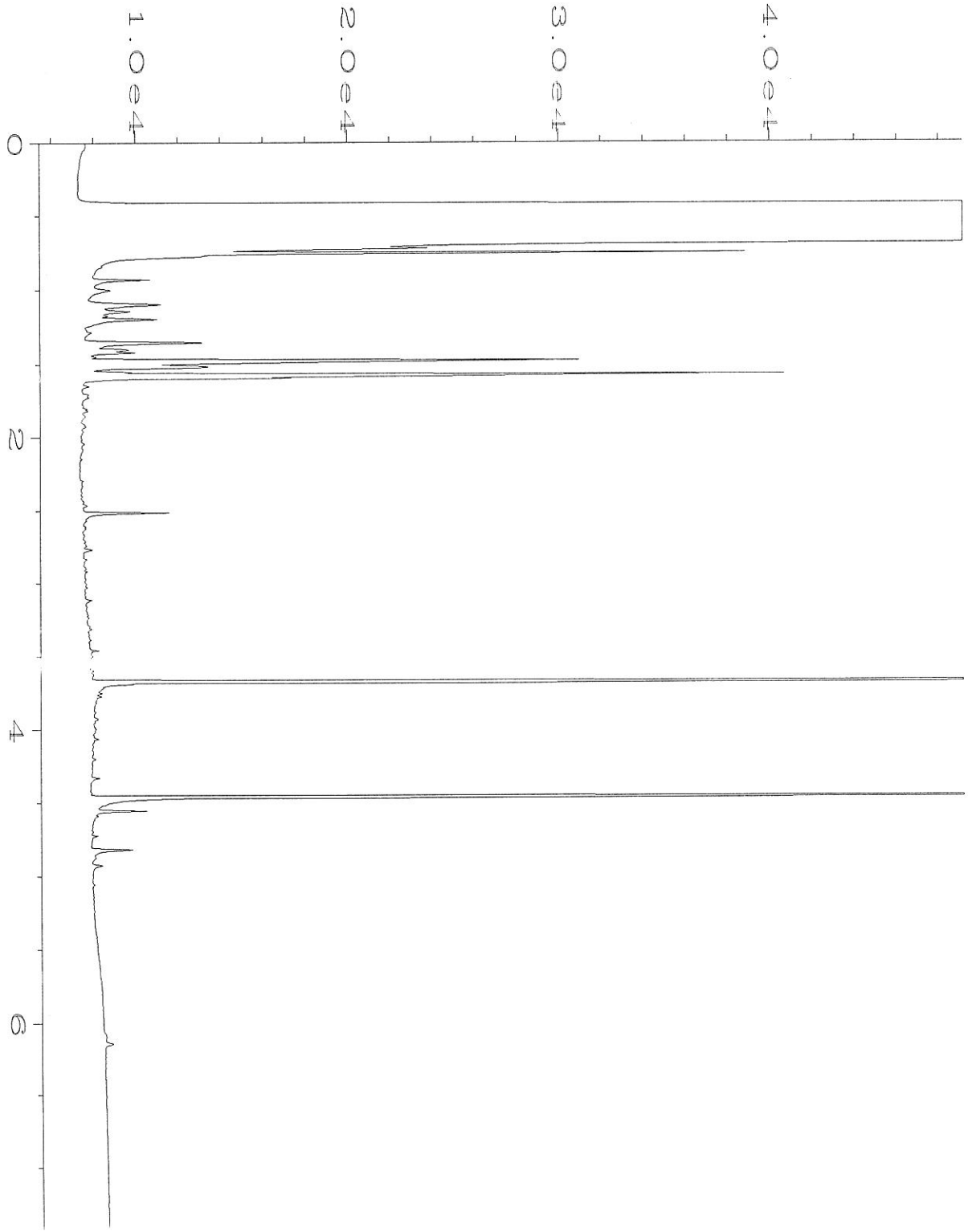
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 42
Sample Name	: 208400-02 sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 14
Acquired on	: 31 Aug 22 10:34 PM	Instrument Method	: DX.MTH
Report Created on	: 12 Sep 22 03:00 PM	Analysis Method	: DEFAULT.MTH



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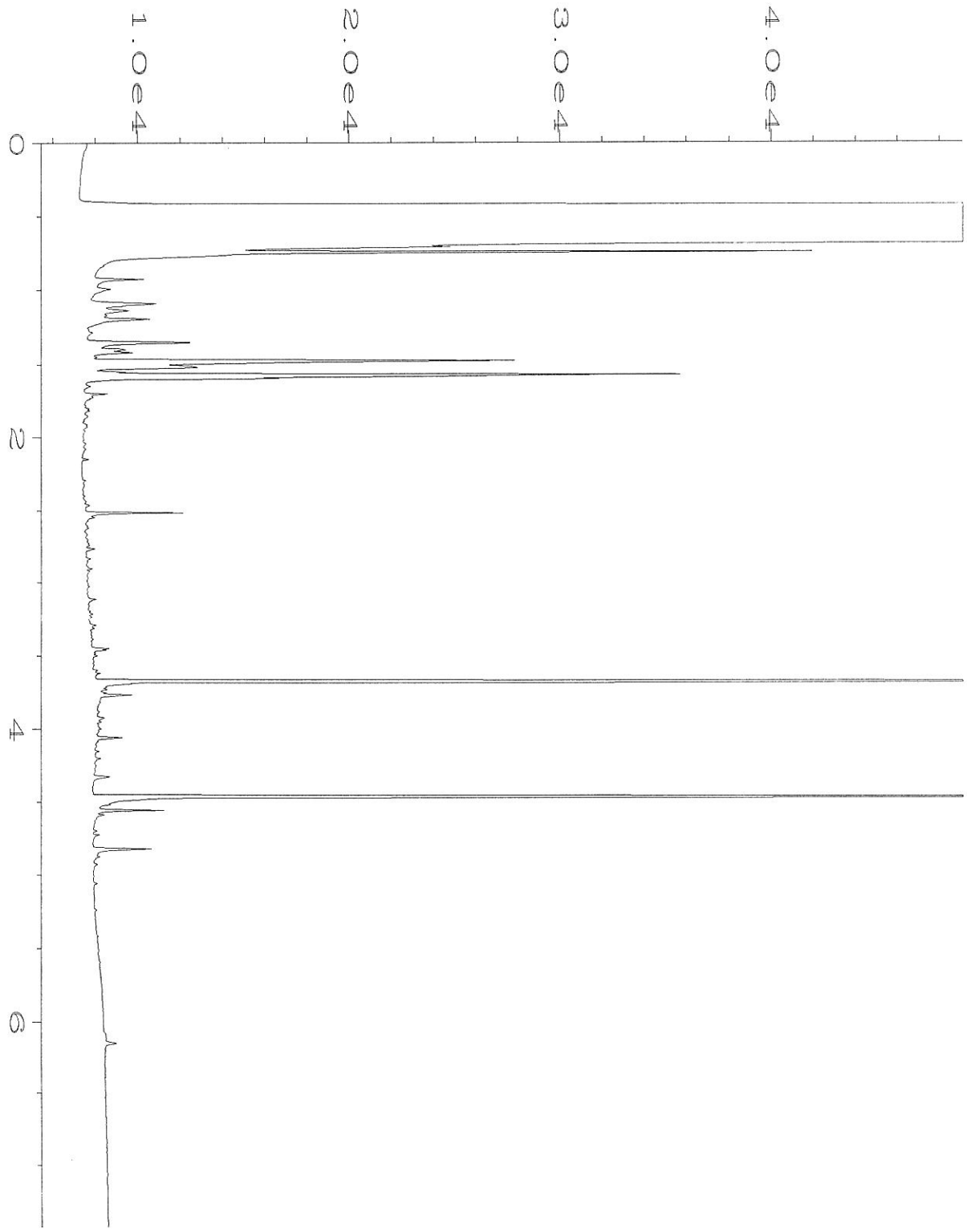
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 43
Sample Name	: 208400-03 sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 14
Acquired on	: 31 Aug 22 10:49 PM	Instrument Method	: DX.MTH
Report Created on	: 12 Sep 22 03:00 PM	Analysis Method	: DEFAULT.MTH



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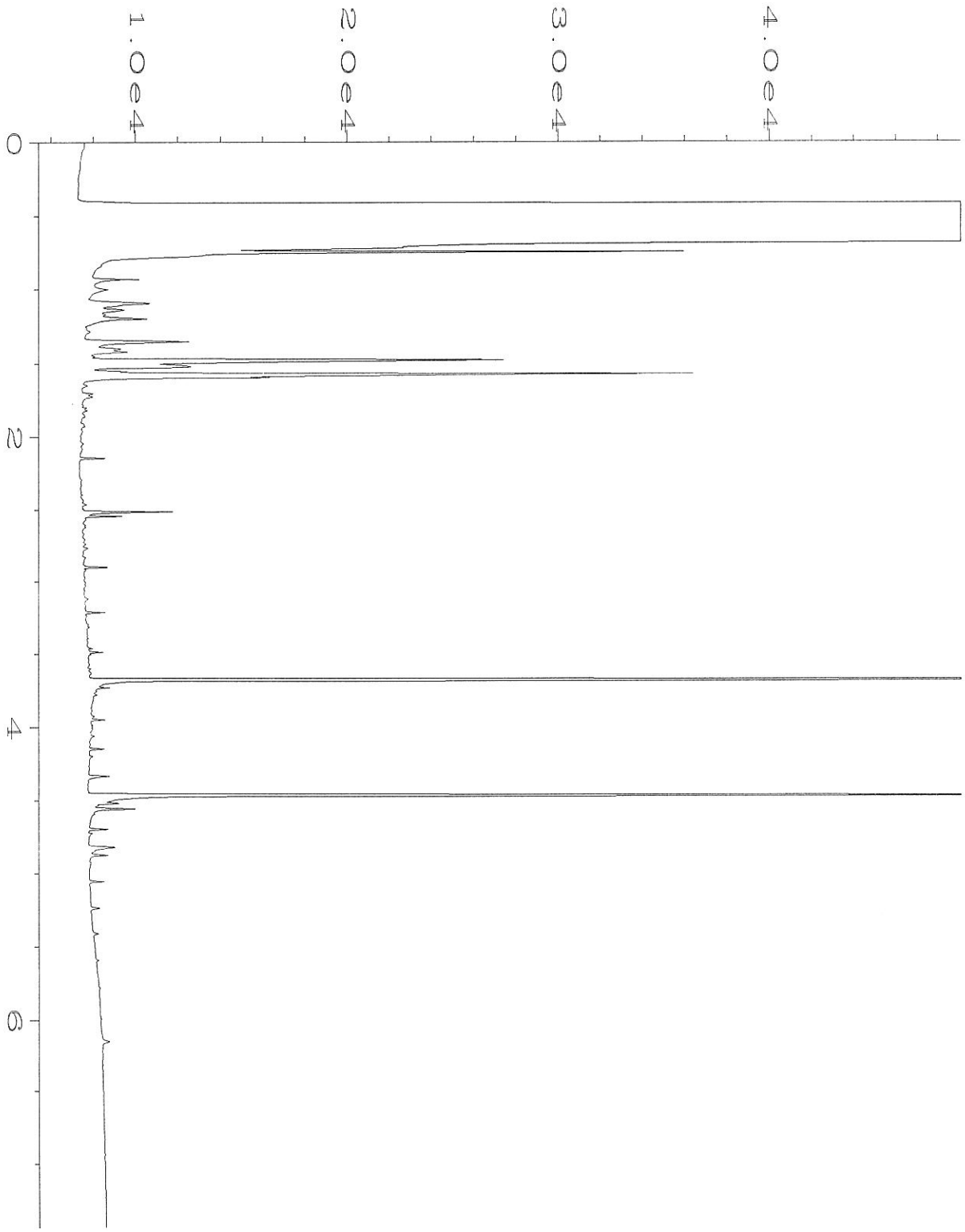
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 44
Sample Name	: 208400-04 sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 14
Acquired on	: 31 Aug 22 11:04 PM	Instrument Method	: DX.MTH
Report Created on:	12 Sep 22 03:01 PM	Analysis Method	: DEFAULT.MTH



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Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 45
Sample Name	: 208400-05 sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 14
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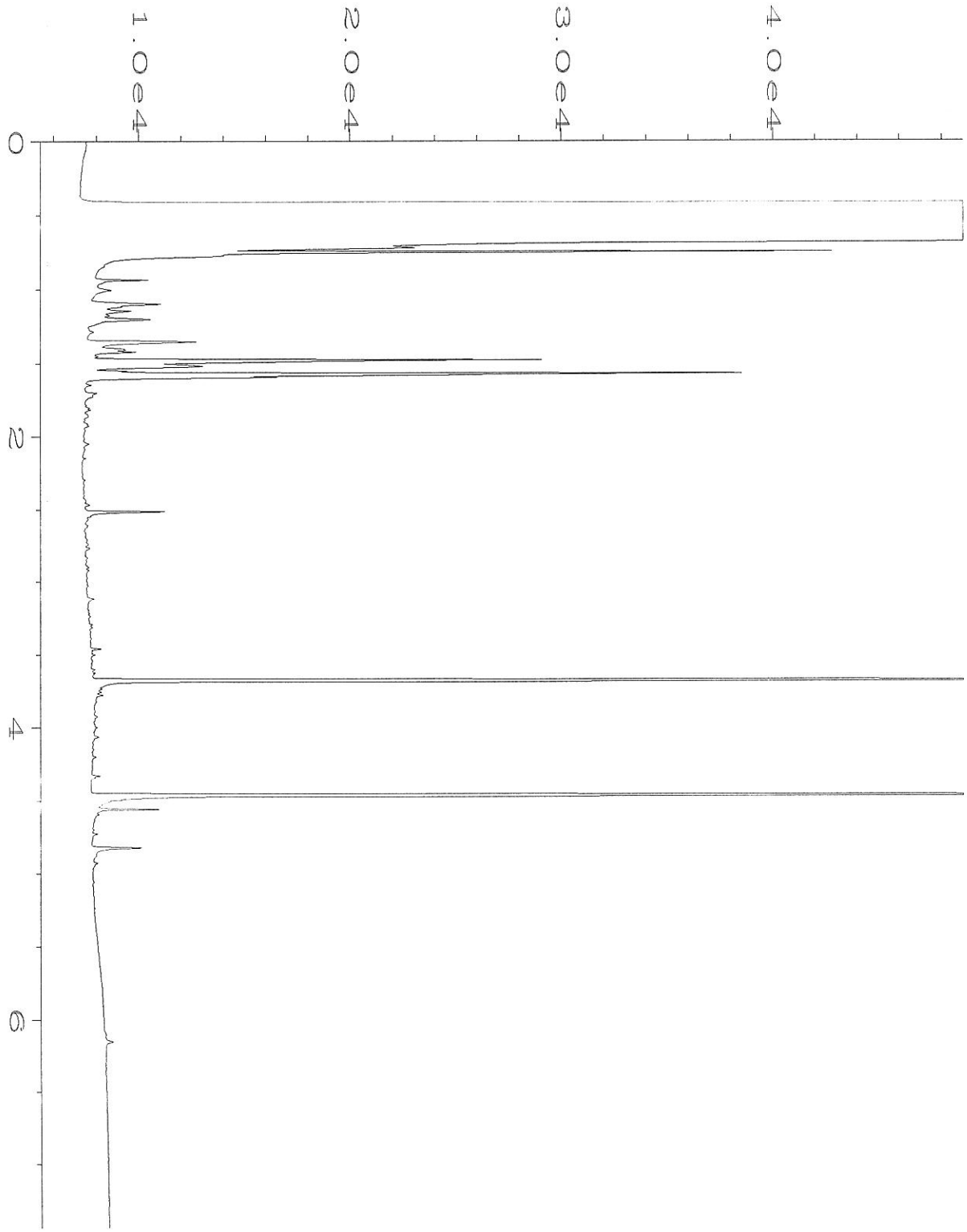
Report Created on:	12 Sep 22 03:01 PM	Analysis Method	: DEFAULT.MTH



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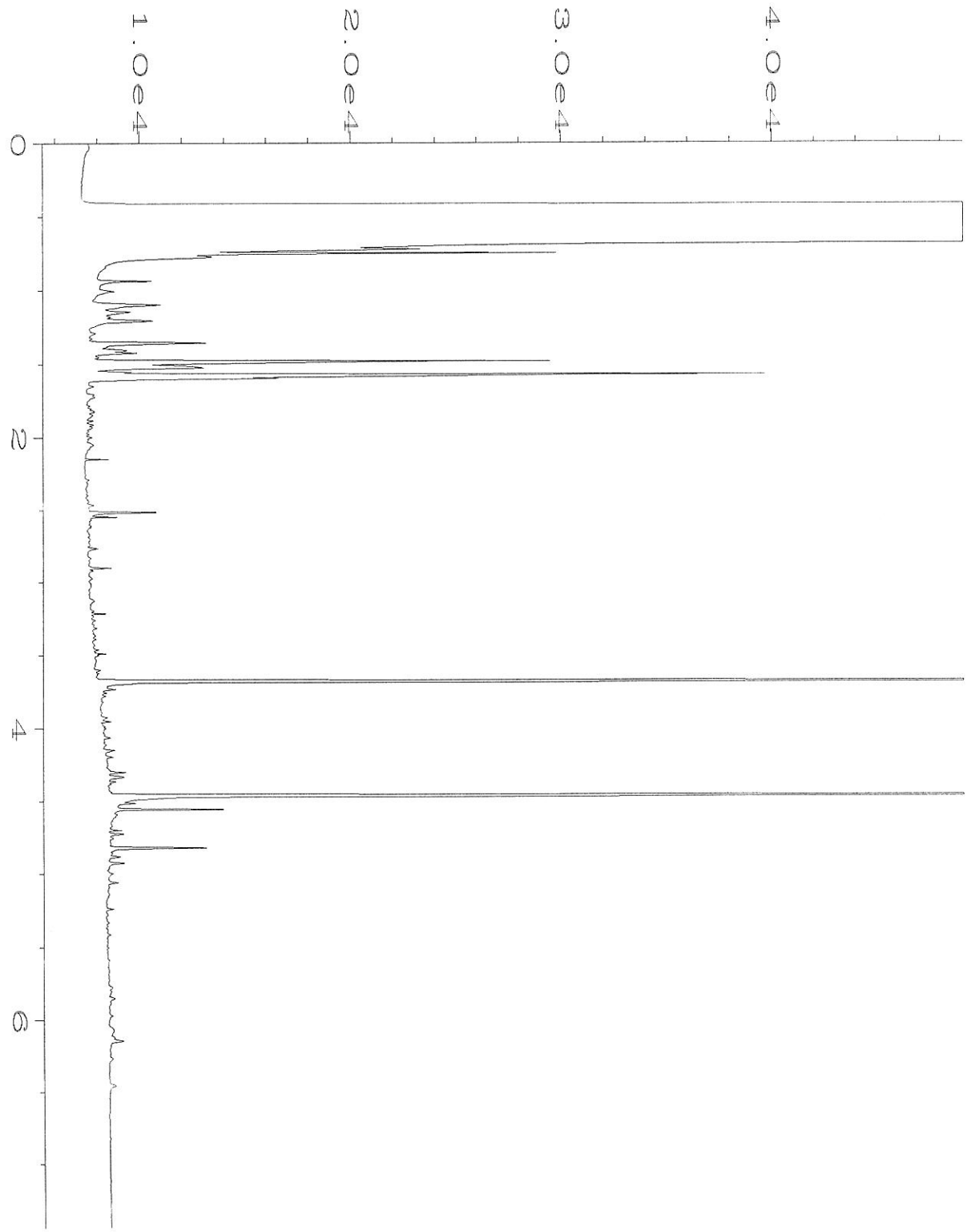

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Sample Name	: 208400-07 sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 14
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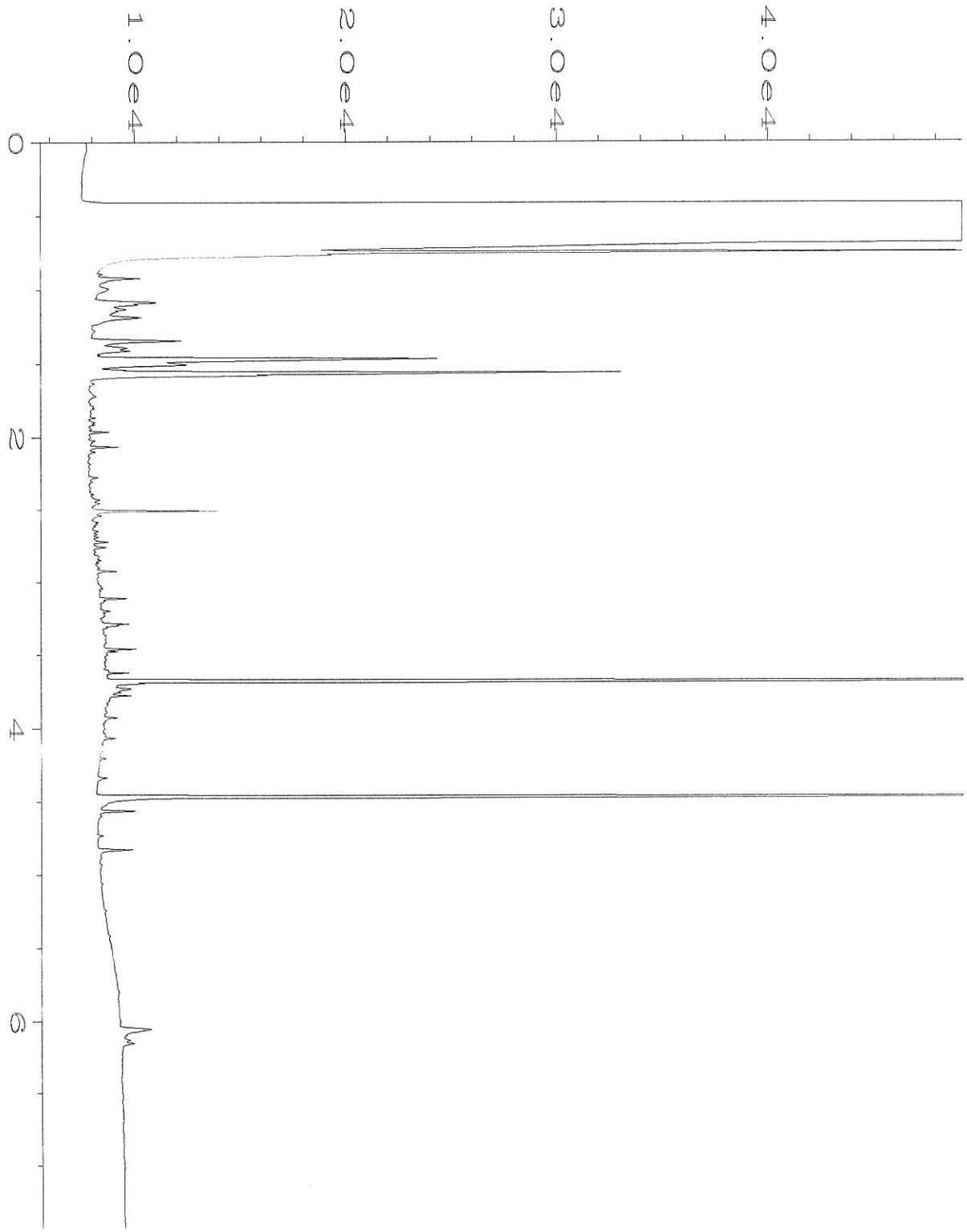

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Sample Name	: 02-2040 mb	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 8
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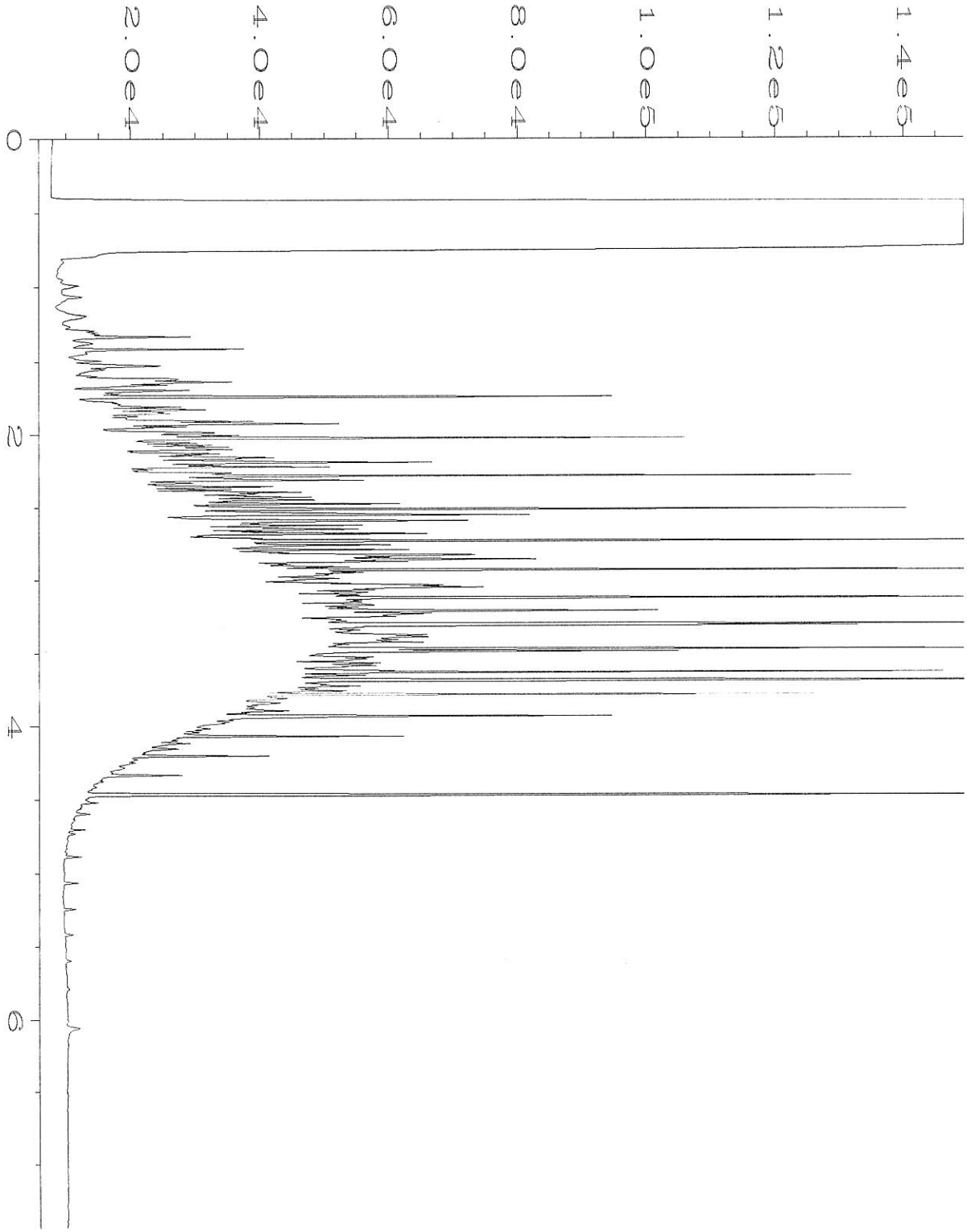

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Sample Name	: 500 Dx 66-186F	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 2
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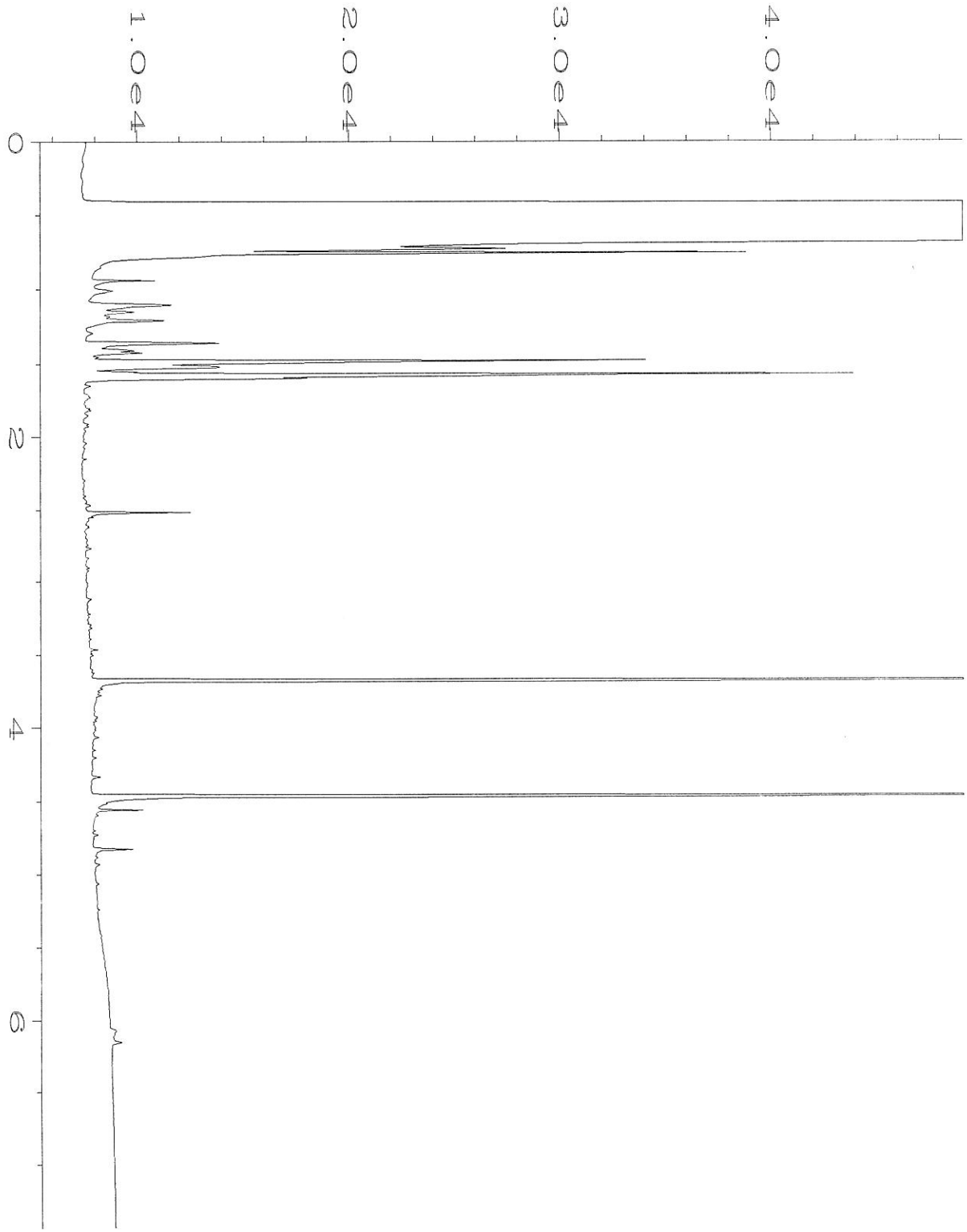
Report Created on:	12 Sep 22 02:59 PM	Analysis Method	: DEFAULT.MTH



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Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 14
Sample Name	: 02-2040 mb sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 5
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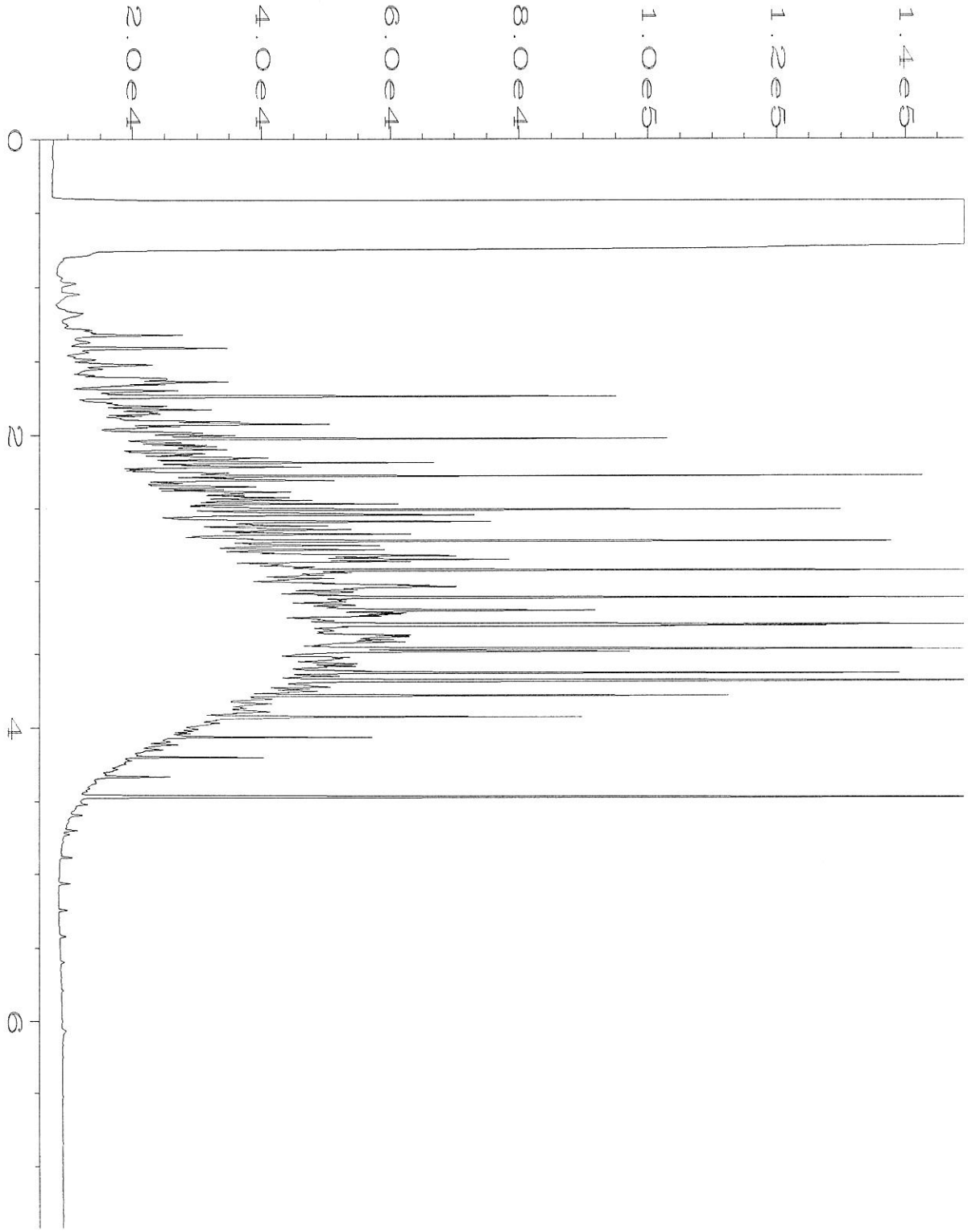
Report Created on:	12 Sep 22 03:01 PM	Analysis Method	: DEFAULT.MTH



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Instrument	: GC1	Vial Number	: 3
Sample Name	: 500 Dx 66-186F	Injection Number	: 1
Run Time Bar Code	:	Sequence Line	: 2
Acquired on	: 31 Aug 22 05:45 AM	Instrument Method	: DX.MTH
Report Created on	: 12 Sep 22 03:01 PM	Analysis Method	: DEFAULT.MTH

December 9, 2022

HWA Project No. 2021-062-22

King County Metro Transit Capital Division
Transit Real Estate and Environmental
201 South Jackson Street, M.S. KSC-TR-0431
Seattle, WA 98104-3856

Attention: John Greene

Subject: **2022 Quarter 4 Groundwater Sampling Event Memorandum**
King County Metro Transit - South Facilities
Tukwila, Washington

Dear Mr. Greene,

As approved in the Contract E00635E19 Work Order #31 scope, HWA GeoSciences Inc (HWA) has completed the fourth 2022 quarterly monitoring event at the King County Metro Transit - South Facilities / Annex (South Facilities) addressed at 11911 East Marginal Way South, Tukwila, Washington (as shown on Figure 1). The site is known as Washington State Department of Ecology (Ecology) Cleanup Site Identification number 7790 and Voluntary Cleanup Program (VCP) number NW3301. This memorandum includes a brief summary of quarterly groundwater monitoring completed as part of the Work Order #31 scope. This work task was coordinated by HWA as part of HWA's contract with Parametrix for environmental services.

GROUNDWATER MONITORING WELL SAMPLING

On November 1, 2022, HWA collected groundwater samples from monitoring wells DW-3R, DW-4R, SB-7, SB-8, 21MW-1, and 21MW-2. Well locations are shown on Figure 2.

Prior to the start of low-flow purging, depth to groundwater was measured and recorded at each of the above wells, as well as at the stream gauge and well B-25. Depth to groundwater measurements are presented on the field data sheets included in Appendix A. Groundwater elevations are presented in Table 1 along with data from the previous events. An interpreted potentiometric surface map for the monitoring event is provided in Figure 3.

Groundwater samples were collected using low-flow purging and sampling techniques with a peristaltic pump and new polyethylene tubing. During purging, field parameters of pH, specific

conductance, oxidation-reduction potential, dissolved oxygen, and temperature were measured until stabilization was achieved. Any field indications of contamination including odor, discoloration, and/or sheen that were observed are documented on the field sampling sheets included in Appendix A. Groundwater samples were collected in analysis-appropriate, clean, laboratory supplied containers and placed in a cooler with ice. Samples were kept in a cooler with ice and held at temperatures below 6 degrees Celsius until submittal to the laboratory for analysis with standard turnaround time. Analytical results are summarized in Table 2, and copies of the final laboratory report including the chain-of custody document and chromatograms are included in Appendix B.

Samples were analyzed by Friedman & Bruya, Inc. in Seattle, Washington for gasoline range total petroleum hydrocarbons (TPH) by Method NWTPH-Gx; diesel and oil-range TPH by Method NWTPH-Dx (both with and without silica gel cleanup); and benzene, toluene, ethylbenzene, xylenes, and naphthalene (BTEXN) by EPA Method 8260D. All samples were analyzed within method specific holding times.

RESULTS

Analytical results for the fourth 2022 quarterly monitoring event, along with data from previous events are summarized in Table 2, and the laboratory report with chromatograms can be found in Appendix B. Fourth quarter analytical results indicate that diesel- and oil-range TPH were detected below MTCA cleanup levels in wells DW-4R, 21MW-1, and 21MW-2. Concentrations of diesel- and oil-range TPH were above the MTCA cleanup level in well SB-8. However, these samples were all x-flagged by the laboratory indicating that the diesel and oil results did not match the fuel standard since the diesel-range hydrocarbon fingerprint appears slightly shifted toward the right (longer retention) and overlapping with the heavier oil-range hydrocarbons.

These samples were also analyzed using silica gel cleanup treatment, which removes polar compounds and resulted in no diesel or oil-range TPH detections except for the sample analyzed from SB-8 and associated blind duplicate sample identified as 21MW-3. The SB-8 sample analyzed using silica gel cleanup treatment had oil-range TPH detected at 0.27 milligrams per liter (mg/L) and a diesel-range TPH detection of 0.12 mg/L, which were lower than the 0.67 mg/L oil-range detection and 0.44 mg/L diesel-range detections in this sample without the silica gel cleanup treatment. The 21MW-3 sample (duplicate of SB-8) analyzed using silica gel cleanup treatment detected diesel-range TPH at 0.12 mg/L, which was lower than the 0.49 mg/L diesel detection in this sample without the silica gel cleanup treatment. Oil-range TPH was not detected above the reporting limit in the 21MW-3 sample analyzed using silica gel cleanup treatment. Based on the data presented in previous reports, the TPH detected likely reflects biogenic interference from the natural peat deposits in the area in addition to a minor amount of very weathered petroleum hydrocarbons.

FUTURE GROUNDWATER MONITORING

Recommendations concerning future groundwater monitoring at the site will be provided in the Remedial Investigation Addendum Report.

We appreciate the opportunity to provide environmental services on this project. Should you have any questions or comments, or if we may be of further service, please do not hesitate to contact the undersigned at your convenience.

Sincerely,

HWA GeoSciences Inc.

Chris Bourgeois
Staff Geologist

Nicole Kapise
Senior Environmental Geologist

FIGURES (Following Text)

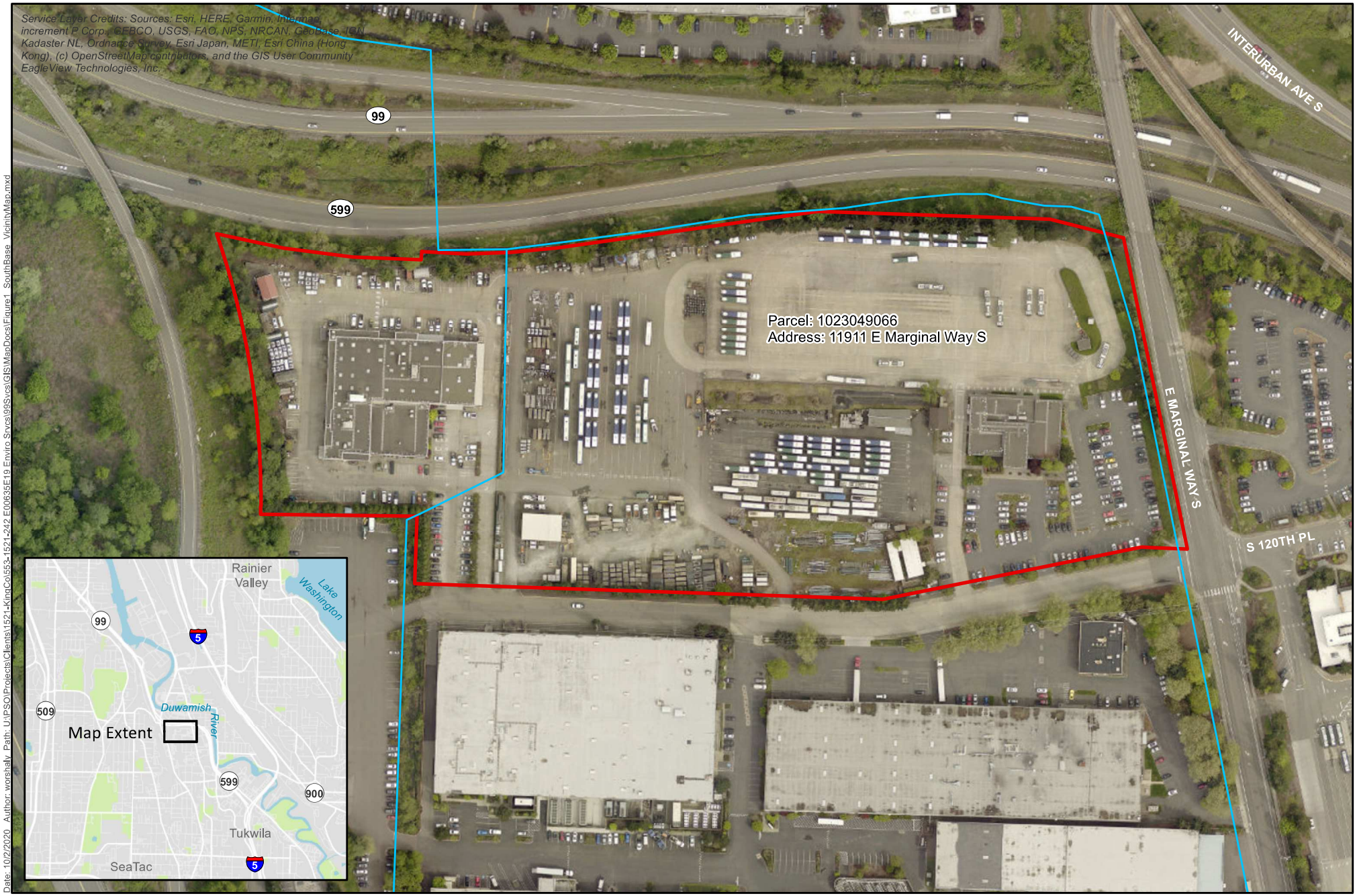
Figure 1	Site Map
Figure 2	Locations Map
Figure 3	Potentiometric Surface Map, November 1, 2022

TABLES (Following Text)

Table 1	Groundwater Elevation Data
Table 2	Groundwater Sampling Results

Appendices:

Appendix A	November 2022 Field Data Sheets
Appendix B	November 2022 Lab Report



Date: 10/2/2020 Author: worshaly Path: U:\PSO\Projects\Clients\1521-KingCo\553-1521-242 E00635E19 Enviro Srvcs\99Svcs\GIS\MapDocs\Figure1_SouthBase_VicinityMap.mxd

Parametrix

Source: King County

0 50 100 200 Feet

Project Location

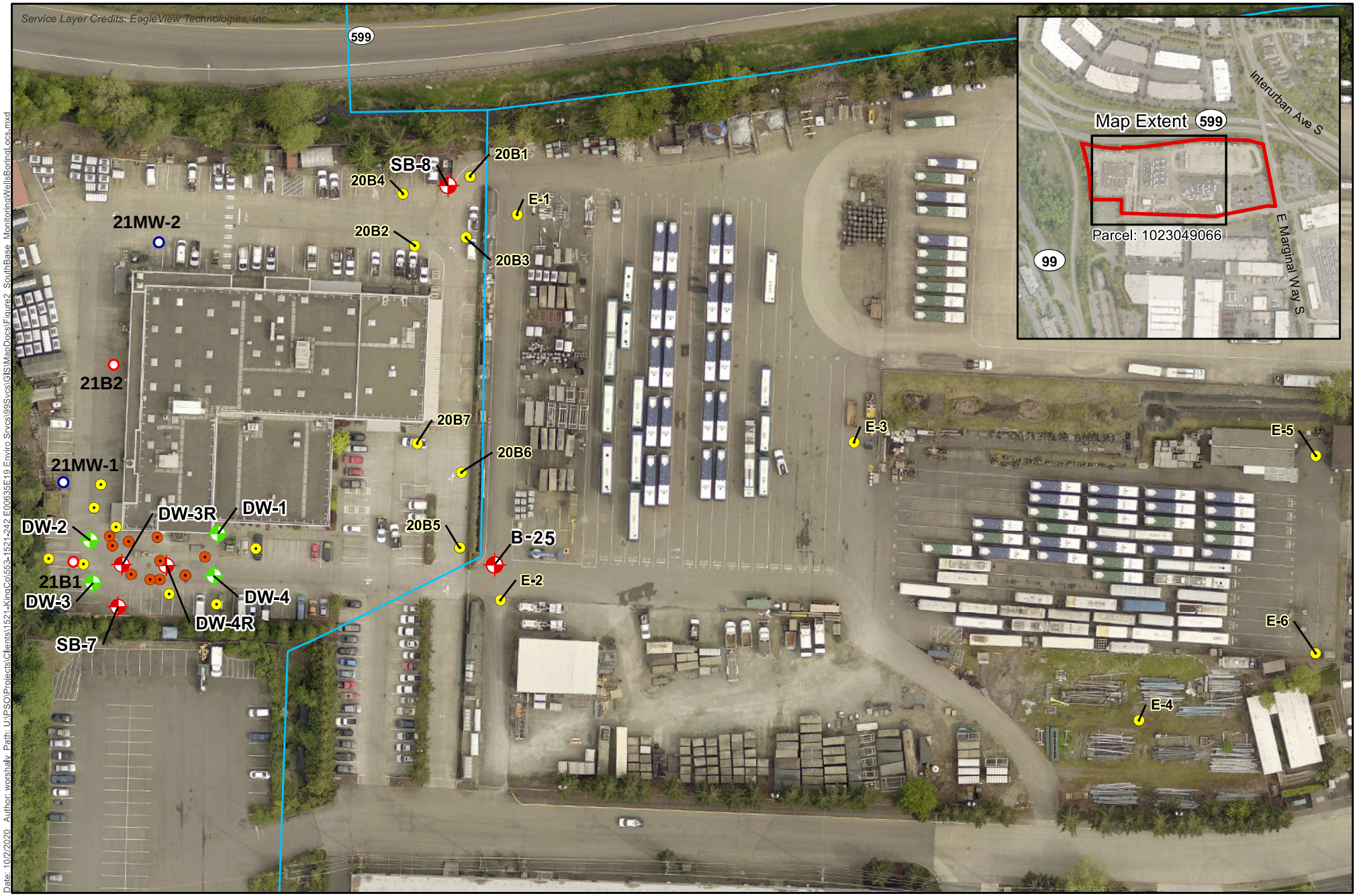
Stream

Figure 1

Site Map

King County Metro Transit S Facilities/S Annex

Tukwila, WA



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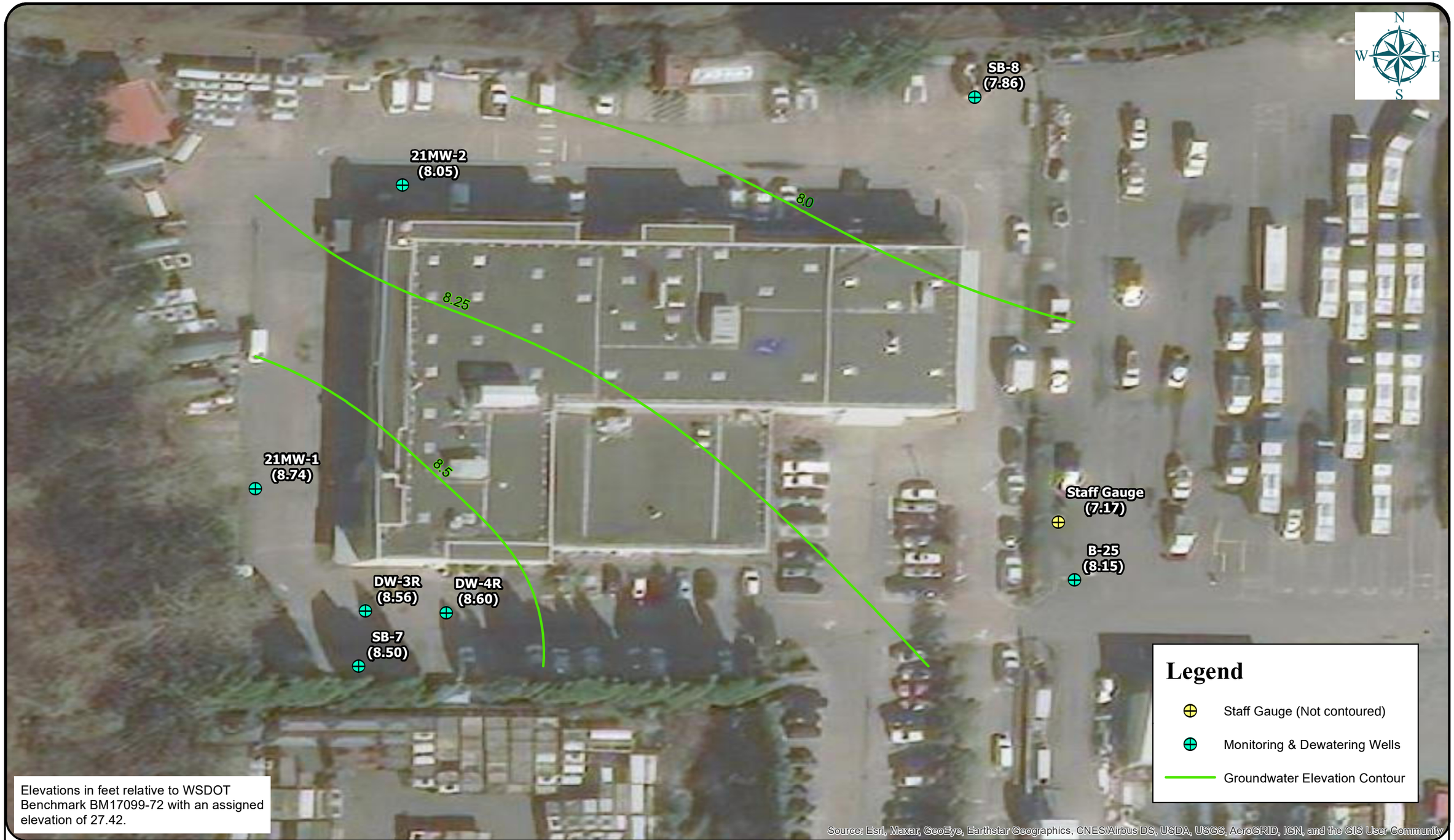
Source: King County

Project Location
Stream
Installed monitoring well (2021)
Borehole
Soil Sample
Drilled boring (2021)
Monitoring Well (Existing)
Monitoring Well (Historical)

0 35 70 140 Feet

Figure 2
Monitoring Well and Soil Sample Locations
King County Metro Transit S Facilities/S Annex
(adapted 2/3/2022)

Tukwila, WA



HWA GEOSCIENCES INC.
DBE/MWBE

0 37.5 75 150 Feet

King County Metro South Facilities
Remedial Investigation
Tukwila, WA

POTENTIOMETRIC SURFACE MAP, NOVEMBER 1, 2022

FIGURE # 3

PROJECT # 2021-062

Table 1. Groundwater Elevations, King County Metro South Facilities, 11911 E Marginal Way S, Tukwila, WA.

		September 23, 2019		December 17, 2019		April 1, 2020		February 22 and 23, 2022		May 10, 2022		August 25, 2022		November 1, 2022	
Well	**Reference Elevation[1]**	**Depth to Ground-water (ft)**	**Ground-water Elevation (ft NAVD88)**	**Depth to Ground-water (ft)**	**Ground-water Elevation (ft NAVD88)**	**Depth to Ground-water (ft)**	**Ground-water Elevation (ft NAVD88)**	**Depth to Ground-water** (ft)**	**Ground-water Elevation** (ft NAVD88)**	**Depth to Ground-water** (ft)**	**Ground-water Elevation** (ft NAVD88)**	**Depth to Groundwater (ft) (time-synch)**	**Groundwater Elevation (ft NAVD88) (time-synch)**	**Depth to Groundwater (ft) (time-synch)**	**Groundwater Elevation (ft NAVD88) (time-synch)**
DW-3R*	13.63	5.21	8.42	4.84	8.79	4.48	9.15	4.85	8.78	4.56	9.07	4.52	9.11	5.07	8.56
DW-4R	14.00	5.58	8.42	5.15	8.85	4.82	9.18	5.19	8.81	4.91	9.09	4.89	9.11	5.40	8.60
SB-7	14.05	5.66	8.39	5.23	8.82	4.86	9.19	5.30	8.75	5.02	9.03	5	9.05	5.55	8.50
SB-8	14.19	6.28	7.91	5.80	8.39	5.33	8.86	5.82	8.37	5.71	8.48	5.35	8.84	6.33	7.86
B-25	14.12	--	--	--	--	--	--	5.66	8.46	5.41	8.71	5.41	8.71	5.97	8.15
Staff Gauge	15.94	--	--	--	--	--	--	6.05	9.89	8.85	7.09	8.85	7.09	8.77	7.17
21MW-1	13.44	--	--	--	--	--	--	4.10	9.34	4.05	9.39	4.41	9.03	4.70	8.74
21MW-2	13.72	--	--	--	--	--	--	5.10	8.62	5.00	8.72	5.11	8.61	5.67	8.05

Notes:

[1] N rim PVC (wells) or marked measurement reference point (stream gauge), in ft NAVD88**

*Well has been damaged and casing is not vertical

** Groundwater elevation measurement collected at time of sampling. Other groundwater elevation measurements are synchronous.

-- Not measured.

Table 2. Summary of Groundwater Analytical Results, King County Metro South Facilities Groundwater Monitoring Tukwila, Washington

	Date Sampled	Method A Cleanup Level [a]	Sample I.D. DW-1	DW-2	DW-3	DW-3R	DW-4	DW-4 Dup	DW-4R	DW-4R Dup	SB-5	SB-6	SB-7	SB-8	SB-8 Dup	21MW-1	21MW-1 Dup	21MW-2	21MW-2 Dup
NWTPH-Gx (µg/L)																			
Gasoline	10/11/1994	800/1,000 [b]	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	<100	--	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<100	--	--	<100	--	--	--	<100	<400	--	--	--	--	--
	12/17/2019		--	--	--	<50	--	--	<50	--	--	--	<50	<50	--	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	<100	--	<100	--
	2/22/2022		--	--	--	<100	--	--	<100	--	--	--	<100	<500	--	<100	--	<100	<100
	5/10/2022		--	--	--	<100	--	--	<100	--	--	--	<100	<100	--	<100	<100	<100	--
	8/25/2022		--	--	--	<100	--	--	<100	<100	--	--	<100	<100	--	<100	--	<100	--
	11/1/2022		--	--	--	<100	--	--	<100	--	--	--	<100	<100	<100	<100	--	<100	--
NWTPH-Dx (mg/L)																			
Diesel	10/11/1994	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	<0.2	<0.2	0.55	0.495	--	--	--	--	--
	4/23/1997		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<0.26	--	--	<0.27	--	--	--	<0.28	0.47	--	--	--	--	--
	12/17/2019		--	--	--	<0.0499	--	--	<0.0497	--	--	--	<0.0498	<0.0498	--	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	<0.05	--	0.096 x	--
	2/22/2022		--	--	--	<0.05	--	--	0.058 x	--	--	--	0.059 x	0.35 x	--	0.15 x	--	0.27 x	0.25 x
	5/10/2022		--	--	--	0.13 x	--	--	0.080 x	--	--	--	0.071 x	0.15 x	--	0.16 x	0.14 x	0.18 x	--
	8/25/2022		--	--	--	0.10 x	--	--	0.053 x	0.063 x	--	--	<0.050	0.44 x	--	0.14 x	--	0.24 x	--
	11/1/2022		--	--	--	<0.10	--	--	0.10 x	--	--	--	<0.100	0.44 x	0.49 x	0.19 x	--	0.30 x	--
Diesel w/ SGC	1/5/2022	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.050	--	<0.050	--
	2/3/2022		--	--	--	<0.050	--	--	<0.050	--	--	--	<0.050	<0.050	--	<0.050	--	<0.050	<0.050
	5/10/2022		--	--	--	<0.050	--	--	<0.050	--	--	--	<0.050	<0.050	--	<0.050	<0.050	<0.050	--
	8/25/2022		--	--	--	<0.050	--	--	<0.050	<0.050	--	--	<0.050	<0.050	--	<0.050	--	0.065 x	--
	11/1/2022		--	--	--	<0.10	--	--	<0.10	--	--	--	<0.10	0.12	0.12	<0.10	--	<0.10	--
Lube Oil	10/11/1994	0.5	<0.2	<0.2	<0.2	--	<0.2	<0.2	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	<0.2	0	0.723	0.326	--	--	--	--	--
	4/23/1997		--	--	--	--	<0.5	--	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<0.41	--	--	<0.43	--	--	--	<0.44	**0.67**	--	--	--	--	--
	12/17/2019		--	--	--	<0.0998	--	--	<0.0994	--	--	--	<0.0997	0.399	--	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	<0.25	--	<0.25	--
	2/22/2022		--	--	--	<0.25	--	--	<0.25	--	--	--	<0.25	0.31 x	--	<0.25	--	<0.25	<0.25
	5/10/2022		--	--	--	<0.25	--	--	<0.25	--	--	--	<0.25	<0.25	--	<0.25	<0.25	<0.25	--
	8/25/2022		--	--	--	<0.25	--	--	<0.25	<0.25	--	--	<0.25	0.49 x	--	<0.25	--	<0.25	--
	11/1/2022		--	--	--	<0.25	--	--	<0.25	--	--	--	<0.25	**0.67** x	**0.61** x	<0.25	--	0.29 x	--
Lube Oil w/ SGC	1/5/2022	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.25	--	<0.25	--
	2/22/2022		--	--	--	<0.25	--	--	<0.25	--	--	--	<0.25	<0.25	--	<0.25	--	<0.25	<0.25
	5/10/2022		--	--	--	<0.25	--	--	<0.25	--	--	--	<0.25	<0.25	--	<0.25	<0.25	<0.25	--
	8/25/2022		--	--	--	<0.25	--	--	<0.25	<0.25	--	--	<0.25	<0.25	--	<0.25	--	<0.25	--
	11/1/2022		--	--	--	<0.25	--	--	<0.25	--	--	--	<0.25	0.27	<0.25	<0.25	--	<0.25	--
BTEX (µg/L)																			
Benzene	10/11/1994	5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	**9.5**	--	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<4	--	--	--	--	--
	12/17/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<1	--	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	<0.35	--	<0.35	--
	2/22/2022		--	--	--	<0.35	--	--	<0.35	--	--	--	<0.35	<0.35	--	<0.35	--	<0.35	<0.35
	5/10/2022		--	--	--	<0.35	--	--	<0.35	--	--	--	<0.35	<0.35	--	<0.35	<0.35	<0.35	--
	8/25/2022		--	--	--	<0.35	--	--	<0.35	<0.35	--	--	<0.35	<0.35	--	<0.35	--	<0.35	--
	11/1/2022		--	--	--	<0.35	--	--	<0.35	--	--	--	<0.35	<0.35	<0.35	<0.35	--	<0.35	--
Toluene	10/11/1994	1,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	2.3	--	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<4	--	--	--	--	--
	12/17/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<1	--	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	<1	--	<1	--
	2/22/2022		--	--	--	<1	--	--	<1	--	--	--	<1	<1	--	<1	--	<1	<1
	5/10/2022		--	--	--	<1	--	--	<1	--	--	--	<1	<1	--	<1	<1	<1	--
	8/25/2022		--	--	--	<1	--	--	<1	<1	--	--	<1	<1	--	<1	--	<1	--
	11/1/2022		--	--	--	<1	--	--	<1	--	--	--	<1	<1	<1	<1	--	<1	--
Ethylbenzene	10/11/1994	700	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	<1	--	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<4	--	--	--	--	--
	12/17/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<1	--	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	<1	--	<1	--
	2/22/2022		--	--	--	<1	--	--	<1	--	--	--	<1	<1	--	<1	--	<1	<1
	5/10/2022		--	--	--	<1	--	--	<1	--	--	--	<1	<1	--	<1	<1	<1	--
	8/25/2022		--	--	--	<1	--	--	<1	<1	--	--	<1	<1	--	<1	--	<1	--
	11/1/2022		--	--	--	<1	--	--	<1	--	--	--	<1	<1	<1	<1	--	<1	--
m,p-Xylene	10/11/1994	1,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	<1	--	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<4	--	--	--	--	--
	12/17/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<1	--	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	<2	--	<2	--
	2/22/2022		--	--	--	<2	--	--	<2	--	--	--	<2	<2	--	<2	--	<2	<2
	5/10/2022		--	--	--	<2	--	--	<2	--	--	--	<2	<2	--	<2	<2	<2	--
	8/25/2022		--	--	--	<2	--	--	<2	<2	--	--	<2	<2	--	<2	--	<2	--
	11/1/2022		--	--	--	<2	--	--	<2	--	--	--	<2	<2	<2	<2	--	<2	--
o-xylene	10/11/1994	1,000	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	<1	--	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<4	--	--	--	--	--
	12/17/2019		--	--	--	<1	--	--	<1	--	--	--	<1	<1	--	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	<1	--	<1	--
	2/22/2022		--	--	--	<1	--	--	<1	--	--	--	<1	<1	--	<1	--	<1	<1
	5/10/2022		--	--	--	<1	--	--	<1	--	--	--	<1	<1	--	<1	<1	<1	--
	8/25/2022		--	--	--	<1	--	--	<1	<1	--	--	<1	<1	--	<1	--	<1	--
	11/1/2022		--	--	--	<1	--	--	<1	--	--	--	<1	<1	<1	<1	--	<1	--
Naphthalene (µg/L)	10/11/1994	160													--				
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/17/2019		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	<1	--	<1	--
	2/22/2022		--	--	--	<1	--	--	<1	--	--	--	<1	<1	--	<1	--	<1	<1
	5/10/2022		--	--	--	<1	--	--	<1	--	--	--	<1	<1	--	<1	<1	<1	--
	8/25/2022		--	--	--	<1	--	--	<1	<1	--	--	<1	<1	--	<1	--	<1	--
	11/1/2022		--	--	--	<1	--	--	<1	--	--	--	<1	<1	<1	<1	--	<1	--
Lead (µg/L)																			
Lead	10/11/1994	15	<3	<3	<3	--	<3	<3	--	--	--	--	--	--	--	--	--	--	--
	12/19/1994		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	4/23/1997		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	9/23/2019		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	12/17/2019		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	1/5/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	2/22/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	5/10/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	8/25/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	11/1/2022		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes:

Bold values exceed MTCA Method A cleanup levels.

[a] Washington Administrative Code Chapter 173-340, Model Toxics Control Act (MTCA) Cleanup Regulation, Method A suggested soil cleanup level for groundwater; updated August 15, 2001.

[b] 800 µg/L if benzene is present in groundwater; 1,000 µg/L if no detectable benzene in groundwater.

mg/L - milligrams per liter.

µg/L - micrograms per liter.

SGC - silica gel cleanup

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation

-- not analyzed.

< - analyte not detected at or greater than the listed concentration (practical quantitation limit [PQL]).

APPENDIX A:

NOVEMBER FIELD DATA SHEETS

SAMPLE CHAIN OF CUSTODY

Report To C. Bourgeois + N. Kapise (HWA). M.B. + L.G. (PMX)

Company HWA GeoSciences + Parametrix

Address 21312 30th Dr SE Ste 110

City, State, ZIP Bothell, WA 98021

Phone 206-794-3145 Email cbourgeois@hwageo.com

SAMPLERS (*signature*)

PROJECT NAME: King County Metro South Facilities

PO #: 2021-062 W031 Task 200.02

REMARKS: Please include cgrams

Project specific RLs? - Yes / No

INVOICE TO

Page # 1 of 1

TURNAROUND TIME
- ☑ Standard turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	BTEX + Naphthalene				Notes
21MW-1		11/1/22	1215	GW	7	X	X						X				Dx w/ + w/o SEG
21MW-2		11/1/22	1110		7	X	X						X				" "
21MW-3		11/1/22	1610		6 ~~7~~	X	X						X				" "
DW-3R		11/1/22	1310		7	X	X						X				" "
DW-4R		11/1/22	1400		7	X	X						X				" "
SB-7		11/1/22	1500		7	X	X						X				" "
SB-8		11/1/22	1545		6 ~~7~~	X	X						X				" "
TRIP BLANKS			N/A		2		X						X				

Friedman & Bruya, Inc.
Ph. (206) 285-8282

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Chris Bourgeois	HWA	11/2/22	818
Received by:		Michael Erdahl	F&B Inc.	11/2/22	818
Relinquished by:					
Received by:					

PARAMETRIX Form 07-EN-215/Rev. 02/07

Field Report/Well Data

TO:

Lisa Gilbert

Mike Brady

John Greene

DATE	JOB NO.
11/01/2022	553-1521-242 WO31 Task 200.02
PROJECT: King County METRO South Facilities South Annex	
LOCATION: 11911 E Marginal Way S, Tukwila, WA	
CONTRACTOR: Parametrix in Assoc. with HWA Geosciences	OWNER: King County METRO
WEATHER: overcast	TEMP hi 40's °at 815 AM; low 50's °at 930 PM
PRESENT AT SITE: ~~Sierra Wilson~~ C. Bourgeois	

opened @

THE FOLLOWING WAS NOTED:

	WN (WELL NUMBER)	Time	DTW (DEPTH TO WATER)	MP (MEASURE POINT)	SU (STICK UP OF WELL CASING)	TD (TOTAL DEPTH OF WELL)	WD (WELL DIAMETER)
837	21MW-1	853	4.70	N. TOC			
834	21MW-2	849	5.67'	N. TOC			
823	SB-7	856	5.55'	N. TOC			
~~834~~ 843	SB-8	928	6.33	N. TOC			
—	DW-3R	902	5.07	N. TOC			
—	DW-4R	905	5.40	N. TOC			
—	Staff Gauge	913	8.77	"X"			
829	B-25	910	5.97	N. TOC			

TOC (Top of Locking Casing) TOW (Top of Well Casing)

COPIES 1 SIGNED [signature]

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.02 **Date:** 11 / 1 / 2022 **Well ID:** 21MW-1

Project Name: King County METRO South Facilities South Annex **Project Address:** 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences **Samplers:** Chris Bourgeois

Purge Data

Purge Equipment: Peristaltic pump

Depth of Well (ft below TOC): 15.0

Pump Intake Depth (ft below TOC): 8'

Well Casing/Diameter: 2"

Initial Depth to Water (ft below TOC): 4.68'

Purge Time (from/to): 1143-1210

Time	Depth to Water (ft below TOC)	Pump Setting	ml/min Purge Rate	Cum. liter Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (visual)	Comments
1145	5.34	2.5	260		15.7	2.2	596.9	6.20	21.6	clear	strong earth odor.
1150	5.61	"	"	2.5	15.9	1.3	608	6.30	14.2	"	"
~~1145~~ 1155	5.69	"	"	3.9	15.7	1.1	602.7	6.30	9.9	"	"
1200	5.73	"	"	5.0	15.3	0.8	585.5	6.27	9.0	"	"
1205	5.74	"	"	6.1	15.0	0.8	576.5	6.25	9.0	"	"
1210	5.74	"	"	7.5	14.9	0.8	575.5	6.24	8.8	"	"
			Stabilization Criteria		3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sampling Data

Sample ID: 21MW-1 Time Collected: 1215 Weather: partly cloudy, cool

Sample Description (Color, Turbidity, Odor, Other): clear, mild earth odor

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene

Laboratory: Friedman & Bruya Lab Dropoff Method: in-person Lab Dropoff Date: 11/2/22

Additional Information/Comments

water in monument up to TOC. .. actually justtt below TOC.

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.02 **Date:** 11 / 1 / 2022 **Well ID:** 21MW-2

Project Name: King County METRO South Facilities South Annex **Project Address:** 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences **Samplers:** Chris Bourgeois

Purge Data

Purge Equipment: Peristaltic pump Depth of Well (ft below TOC): 15.0

Pump Intake Depth (ft below TOC): 9' Well Casing/Diameter: 2"

Initial Depth to Water (ft below TOC): 5.57 Purge Time (from/to): 1043 – 1105

Time	Depth to Water (ft below TOC)	Pump Setting	Purge Rate	Cum. L Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (visual)	Comments
1045 ~~1043~~	~~5.57~~ 5.72	2.5	250		17.1	4.6	859	6.02	29.9	orange flecks	
1050	5.75	"	"	2.1	16.9	2.9	864	6.08	17.3	"	
1055	5.75	"	"	3.1	16.6	2.9	861	6.07	13.2	"	+ earth odor
1100	5.75	"	"	4.1	16.4	3.0	856	6.07	10.1	"	"
1105	5.75	"	"	5.5	16.3	3.1	852	6.07	6.3	"	"
			Stabilization Criteria		3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sampling Data

Sample ID: 21MW-2 Time Collected: 1110 Weather: partly cloudy, cool

Sample Description (Color, Turbidity, Odor, Other): large orange flecks

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene

Laboratory: Friedman & Bruya Lab Dropoff Method: in-person Lab Dropoff Date: 11/2/22

Additional Information/Comments

purge water yellow brown

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.02 **Date:** 11 / 1 / 2022 **Well ID:** DW-3R

Project Name: King County METRO South Facilities South Annex **Project Address:** 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences **Samplers:** Chris Bourgeois

Purge Data

Purge Equipment: Peristaltic pump Depth of Well (ft below TOC): 8.80

Pump Intake Depth (ft below TOC): 7.0' Well Casing/Diameter: 0.9'

Initial Depth to Water (ft below TOC): 5.09 Purge Time (from/to): 1244 – 1310

Time	Depth to Water (ft below TOC)	Pump Setting	Purge Rate (ml/min)	Cum. Vol. Purged (liters)	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (visual)	Comments
1245	5.09	2.5	250		15.6	3.93	471.9	6.53	67.9	Small	black flecks
1250	5.09	"	"		15.7	3.95	474.6	6.52	52.7	"	"
1255	5.09	"	"		15.8	3.73	474.2	6.52	50.2	"	"
1300	5.09	"	"		15.7	3.50	478.3	6.50	51.4	"	"
1305	5.09	"	"	5.5	15.8	3.33	478.6	6.47	53.5	"	"
1310	5.09	"	"	7.0	15.8	3.20	480.4	6.45	~~[illegible]~~ 54.8	"	"
			Stabilization Criteria		3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sampling Data

Sample ID: DW-3R Time Collected: 1310 Weather: partly cloudy, cool

Sample Description (Color, Turbidity, Odor, Other): large black flecks, mild earth odor.

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene

Laboratory: Friedman & Bruya Lab Dropoff Method: in-person Lab Dropoff Date: 11/2/22

Additional Information/Comments

YSI keeps restarting. No clue why. Battery is fine.

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.02 **Date:** 11 / 1 / 2022 **Well ID:** DW-4R

Project Name: King County METRO South Facilities South Annex **Project Address:** 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences **Samplers:** Chris Bourgeois

Purge Data

Purge Equipment: Peristaltic pump Depth of Well (ft below TOC):

Pump Intake Depth (ft below TOC): 8.0' Well Casing/Diameter: 0.65'

Initial Depth to Water (ft below TOC): 5.40 Purge Time (from/to): 1338 - 1355

Time	Depth to Water (ft below TOC)	Pump Setting	mL/min Purge Rate	Cum. Liter Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (visual)	Comments
1340	5.40	2.5	255		16.2	6.82	571.4	6.55	65.2	clear	
1345	5.40	"	"		16.3	0.17	606	6.64	60.7		
1350	5.40	"	"	3.6	16.2	0.13	610	6.64	59.7		
1355	5.40	"	"	4.6	16.2	0.11	611	6.63	58.8		
Stabilization Criteria					3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sampling Data

Sample ID: DW-4R Time Collected: 1400 Weather: partly cloudy, cool

Sample Description (Color, Turbidity, Odor, Other): clear, mild earthy smell

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene

Laboratory: Friedman & Bruya Lab Dropoff Method: in-person Lab Dropoff Date: 11/2/22

Additional Information/Comments

YSI worked much better / perfect.

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.02 **Date:** 11 / 1 / 2022 **Well ID:** SB-7

Project Name: King County METRO South Facilities South Annex **Project Address:** 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences **Samplers:** Chris Bourgeois

Purge Data

Purge Equipment: Peristaltic pump Depth of Well (ft below TOC): 11.64

Pump Intake Depth (ft below TOC): ~~5.53~~' 8.0' Well Casing/Diameter: 2"

Initial Depth to Water (ft below TOC): 5.53 Purge Time (from/to): 1427 - 1455

Time	Depth to Water (ft below TOC)	Pump Setting	Purge Rate (ml/min)	Cum. Vol. Purged (L)	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (visual)	Comments
1430	5.63	2.5	250		14.5	0.24	499.0	6.22	39.2	minor orange flecks	
1435	5.62	"	"	2.3	14.5	0.14	498.8	6.23	30.1	"	"
1440	5.60	"	"	3.8	14.5	0.12	499.0	6.23	21.6	fewer	flecks
1445	~~5.60~~ 5.59	"	"		14.5	0.07	500.6	6.23	14.9	no turbidity	
1450	5.59	"	"	6.0	14.5	0.07	501.5	6.21	10.4	"	earth odor
1455	5.62	"	"	7.0	14.6	0.05	500.7	6.20	7.0	"	"
			Stabilization Criteria		3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sampling Data

Sample ID: SB-7 Time Collected: 1500 Weather: partly cloudy, cool

Sample Description (Color, Turbidity, Odor, Other): minor earthy odor, ~~no~~ little-to-no turbidity

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene

Laboratory: Friedman & Bruya Lab Dropoff Method: in-person Lab Dropoff Date: 11/2/22

Additional Information/Comments

Van parked over well (1/2). Slight Auto/petro odor in air.

Parametrix

GROUNDWATER SAMPLE COLLECTION FORM

Project No.: 553-1521-242 WO31 Task 200.02 **Date:** 11/ 1 /2022 **Well ID:** SB-8

Project Name: King County METRO South Facilities South Annex **Project Address:** 11911 E Marginal Way S, Tukwila, WA

Sampling Organization: Parametrix in Assoc. with HWA Geosciences **Samplers:** Chris Bourgeois

Purge Data

Purge Equipment: Peristaltic pump

Depth of Well (ft below TOC):

Pump Intake Depth (ft below TOC): 12.0' - 13.75

Well Casing/Diameter: 2"

Initial Depth to Water (ft below TOC): 6.33'

Purge Time (from/to): 940-1005

Time	Depth to Water (ft below TOC)	Pump Setting	mL/min Purge Rate	Cum. L Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductance (mg/cm)	pH (units)	ORP (mv)	Turbidity (visual)	Comments
943	7.70	2.5	225		16.7	4.2	843	5.51	115.2	Brown/yellow	sulfur odor
946	8.57	"	"	1.75	17.0	3.5	825	5.65	88.9	"	"
949	9.48	"	"	2	17.1	2.2	816	5.70	77.1	STRONG	ODOR
952	10.66	"	"	3	17.3	1.7	814	5.73	70.2	"	"
955	11.34	"	"		17.5	2.0	812	5.74	63.8	"	"
958	12.15	"	"		17.5	2.4	812	5.76	57.7	"	"
1001	13.00				17.6	2.0	812	5.77	51.7	"	"
1003	13.62			5.3	17.5	1.9	814	5.78	48.1	"	"
1006											
			DRY								
1530	7.95'										
			Stabilization Criteria		3%	10%, or 3 <0.5	3%	± 0.1	± 10 mv		

Sample quality for 21MW-3 & SB-8 fairly poor. Water kept running dry and there was fairly significant sand in samples.

21MW-3 Dx sample likely higher quality because it was sampled with continuous flow.

Sampling Data

Sample ID: SB-8

Time Collected: 1545

Weather: Sunny, cool

Sample Description (Color, Turbidity, Odor, Other): poor quality. Yellow hue (Strong) & black sand

Sample Analyses: NWTPH-Dx (w/ & w/o SGC), NWTPH-Gx, BTEX w/ Naphthalene

Laboratory: Friedman & Bruya

Lab Dropoff Method: in-person

Lab Dropoff Date: 11/2/22

Additional Information/Comments

odor is atypical petro/ ~~the~~ sulfur/ earth smell. very strong.
Iron redox ~~at~~ in purge bucket.
Dup "21MW-3" collected @ 1610

meaning abnormal.

APPENDIX B:

NOVEMBER 2022 LAB REPORT

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Vineta Mills, M.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

November 21, 2022

Nicole Kapise, Project Manager
HWA Geosciences, Inc
21312 30th Dr SE
Bothell, WA 98021

Dear Ms Kapise:

Included is the amended report from the testing of material submitted on November 2, 2022 from the King County Metro South Facilities 2021-062-W031 Task 200.02, F&BI 211024 project. "x" qualifiers were added to the non silica gel treated NWTPH-Dx results of sample SB-8.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Chris Bourgeois, Mike Brady (PMX), Lisa Gilbert (PMX)
HWA1114R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Vineta Mills, M.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

November 14, 2022

Nicole Kapise, Project Manager
HWA Geosciences, Inc
21312 30th Dr SE
Bothell, WA 98021

Dear Ms Kapise:

Included are the results from the testing of material submitted on November 2, 2022 from the King County Metro South Facilities 2021-062-W031 Task 200.02, F&BI 211024 project. There are 18 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Chris Bourgeois, Mike Brady (PMX), Lisa Gilbert (PMX)
HWA1114R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on November 2, 2022 by Friedman & Bruya, Inc. from the HWA Geosciences, Inc King County Metro South Facilities 2021-062-W031 Task 200.02 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	HWA Geosciences, Inc
211024 -01	21MW-1
211024 -02	21MW-2
211024 -03	21MW-3
211024 -04	DW-3R
211024 -05	DW-4R
211024 -06	SB-7
211024 -07	SB-8
211024 -08	TRIP BLANKS

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/14/22
Date Received: 11/02/22
Project: King County Metro South Facilities 2021-062-W031 Task 200.02, F&BI 211024
Date Extracted: 11/02/22
Date Analyzed: 11/02/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 51-134)
21MW-1 211024-01	<100	88
21MW-2 211024-02	<100	87
21MW-3 211024-03	<100	88
DW-3R 211024-04	<100	88
DW-4R 211024-05	<100	87
SB-7 211024-06	<100	85
SB-8 211024-07	<100	88
TRIP BLANKS 211024-08	<100	86
Method Blank 02-2579 MB	<100	88

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/14/22
Date Received: 11/02/22
Project: King County Metro South Facilities 2021-062-W031 Task 200.02, F&BI 211024
Date Extracted: 11/09/22
Date Analyzed: 11/09/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx
Sample Extracts Passed Through a Silica Gel Column Prior to Analysis
Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
21MW-1 211024-01	<100	<250	130
21MW-2 211024-02	<100	<250	120
21MW-3 211024-03	120	<250	82
DW-3R 211024-04	<100	<250	130
DW-4R 211024-05	<100	<250	130
SB-7 211024-06	<100	<250	140
SB-8 211024-07	120	270	67
Method Blank 02-2689 MB	<100	<250	120

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/14/22
Date Received: 11/02/22
Project: King County Metro South Facilities 2021-062-W031 Task 200.02, F&BI 211024
Date Extracted: 11/03/22
Date Analyzed: 11/03/22

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
21MW-1 211024-01	190 x	<250	109
21MW-2 211024-02	300 x	290 x	128
21MW-3 211024-03	490 x	610 x	84
DW-3R 211024-04	<100	<250	125
DW-4R 211024-05	100 x	<250	121
SB-7 211024-06	<100	<250	140
SB-8 211024-07	440 x	670 x	65
Method Blank 02-2689 MB	<100	<250	120

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	21MW-1	Client:	HWA Geosciences, Inc
Date Received:	11/02/22	Project:	King County Metro South Facilities
Date Extracted:	11/02/22	Lab ID:	211024-01
Date Analyzed:	11/02/22	Data File:	110216.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	LM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	86	113
Toluene-d8	97	88	114
4-Bromofluorobenzene	96	88	112

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	21MW-2	Client:	HWA Geosciences, Inc
Date Received:	11/02/22	Project:	King County Metro South Facilities
Date Extracted:	11/02/22	Lab ID:	211024-02
Date Analyzed:	11/02/22	Data File:	110217.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	LM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	86	113
Toluene-d8	96	88	114
4-Bromofluorobenzene	105	88	112

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	21MW-3	Client:	HWA Geosciences, Inc
Date Received:	11/02/22	Project:	King County Metro South Facilities
Date Extracted:	11/02/22	Lab ID:	211024-03
Date Analyzed:	11/02/22	Data File:	110218.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	LM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	86	113
Toluene-d8	97	88	114
4-Bromofluorobenzene	106	88	112

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	DW-3R	Client:	HWA Geosciences, Inc
Date Received:	11/02/22	Project:	King County Metro South Facilities
Date Extracted:	11/02/22	Lab ID:	211024-04
Date Analyzed:	11/02/22	Data File:	110219.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	LM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	86	113
Toluene-d8	96	88	114
4-Bromofluorobenzene	105	88	112

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	DW-4R	Client:	HWA Geosciences, Inc
Date Received:	11/02/22	Project:	King County Metro South Facilities
Date Extracted:	11/02/22	Lab ID:	211024-05
Date Analyzed:	11/02/22	Data File:	110220.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	LM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	86	113
Toluene-d8	95	88	114
4-Bromofluorobenzene	103	88	112

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	SB-7	Client:	HWA Geosciences, Inc
Date Received:	11/02/22	Project:	King County Metro South Facilities
Date Extracted:	11/02/22	Lab ID:	211024-06
Date Analyzed:	11/02/22	Data File:	110221.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	LM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	86	113
Toluene-d8	96	88	114
4-Bromofluorobenzene	106	88	112

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	SB-8	Client:	HWA Geosciences, Inc
Date Received:	11/02/22	Project:	King County Metro South Facilities
Date Extracted:	11/02/22	Lab ID:	211024-07
Date Analyzed:	11/02/22	Data File:	110222.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	LM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	86	113
Toluene-d8	97	88	114
4-Bromofluorobenzene	104	88	112

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	TRIP BLANKS	Client:	HWA Geosciences, Inc
Date Received:	11/02/22	Project:	King County Metro South Facilities
Date Extracted:	11/02/22	Lab ID:	211024-08
Date Analyzed:	11/02/22	Data File:	110213.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	LM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	86	113
Toluene-d8	96	88	114
4-Bromofluorobenzene	106	88	112

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	HWA Geosciences, Inc
Date Received:	Not Applicable	Project:	King County Metro South Facilities
Date Extracted:	11/02/22	Lab ID:	02-2624 mb
Date Analyzed:	11/02/22	Data File:	110207.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	LM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	78	126
Toluene-d8	103	84	115
4-Bromofluorobenzene	97	72	130

Compounds:	Concentration ug/L (ppb)
Benzene	<0.35
Toluene	<1
Ethylbenzene	<1
m,p-Xylene	<2
o-Xylene	<1
Naphthalene	<1

Date of Report: 11/14/22
Date Received: 11/02/22
Project: King County Metro South Facilities 2021-062-W031 Task 200.02, F&BI 211024

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 211024-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	104	69-134

Date of Report: 11/14/22
Date Received: 11/02/22
Project: King County Metro South Facilities 2021-062-W031 Task 200.02, F&BI 211024

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	92	96	70-130	4

Date of Report: 11/14/22
Date Received: 11/02/22
Project: King County Metro South Facilities 2021-062-W031 Task 200.02, F&BI 211024

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	80	84	63-142	5

Date of Report: 11/14/22
Date Received: 11/02/22
Project: King County Metro South Facilities 2021-062-W031 Task 200.02, F&BI 211024

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Benzene	ug/L (ppb)	10	100	91	70-130	9
Toluene	ug/L (ppb)	10	98	87	70-130	12
Ethylbenzene	ug/L (ppb)	10	97	86	70-130	12
m,p-Xylene	ug/L (ppb)	20	97	86	70-130	12
o-Xylene	ug/L (ppb)	10	93	80	70-130	15
Naphthalene	ug/L (ppb)	10	88	73	70-130	19

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

211024

SAMPLE CHAIN OF CUSTODY

11-02-22 VW5/EQ4

Page # 1 of 1

Report To C. Bourgeois + N. Kapise (HWA). M.B. + L.G. (PMX)

Company HWA GeoSciences + Parametrix

Address 21312 30th Dr SE Ste 110

City, State, ZIP Bothell, WA 98021

Phone 206-794-3145 Email cbourgeois@hwageo.com

SAMPLERS (*signature*)

PROJECT NAME: King County Metro South Facilities

PO #: 2021-062 W031 Task 200.02

REMARKS: Please include cgrams

Project specific RLs? - Yes / No

INVOICE TO

TURNAROUND TIME
- ☑ Standard turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

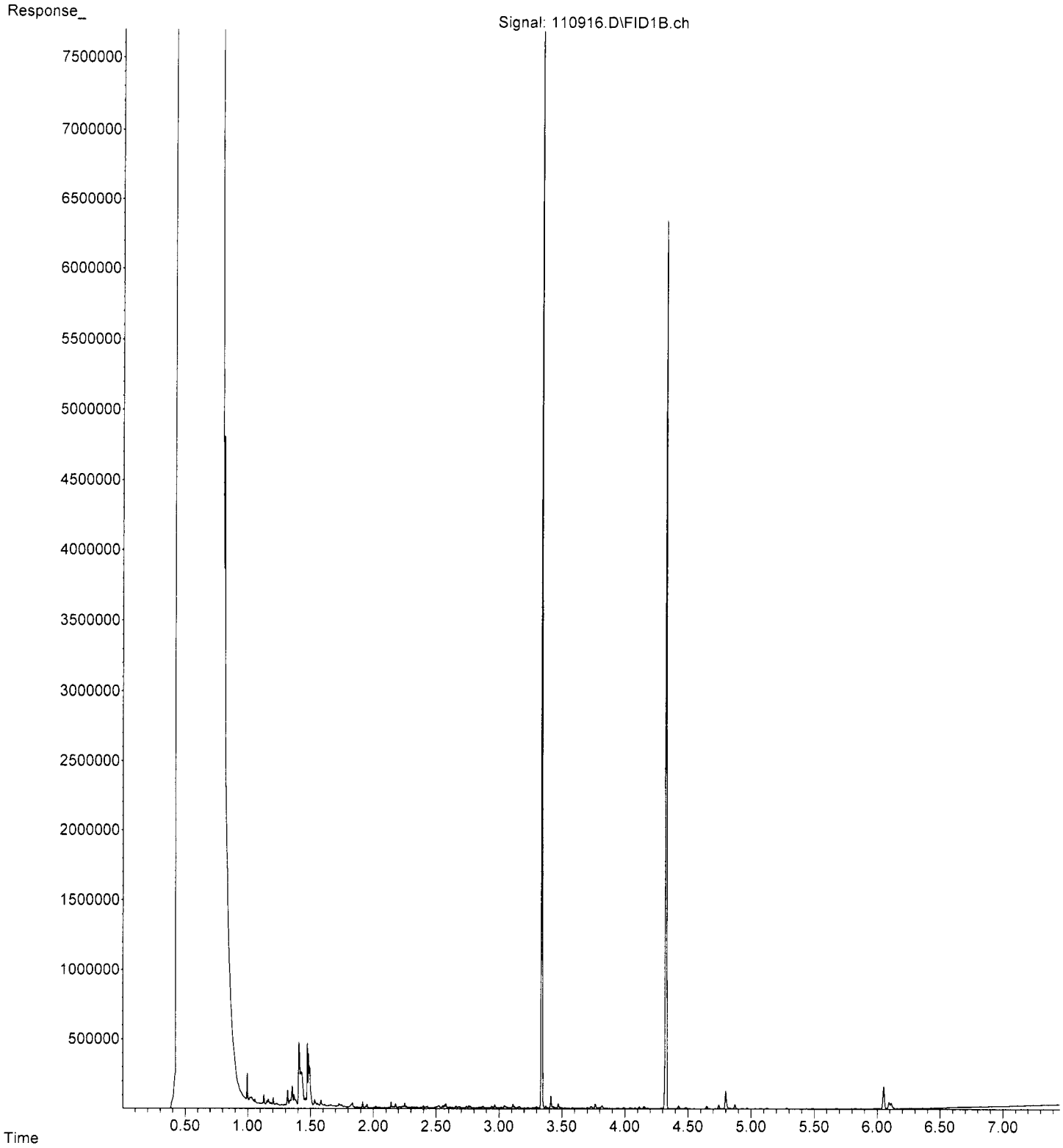
ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	BTEX + Naphthalene				Notes
21MW-1	01 A-G	11/1/22	1215	GW	7	X	X						X				Dx w/ + w/o SEG
21MW-2	02 A-G	11/1/22	1110		7	X	X						X				" "
21MW-3	03 A-F	11/1/22	1610		6 ~~7~~	X	X						X				" "
DW-3R	04 A-G	11/1/22	1310		cg 7	X	X						X				" "
DW-4R	05	11/1/22	1400		7	X	X						X				" "
SB-7	06	11/1/22	1500		7	X	X						X				" "
SB-8	07 A-F	11/1/22	1545		cg 6 ~~7~~	X	X						X				" "
TRIP BLANKS	08 AB		N/A		2		X						X				

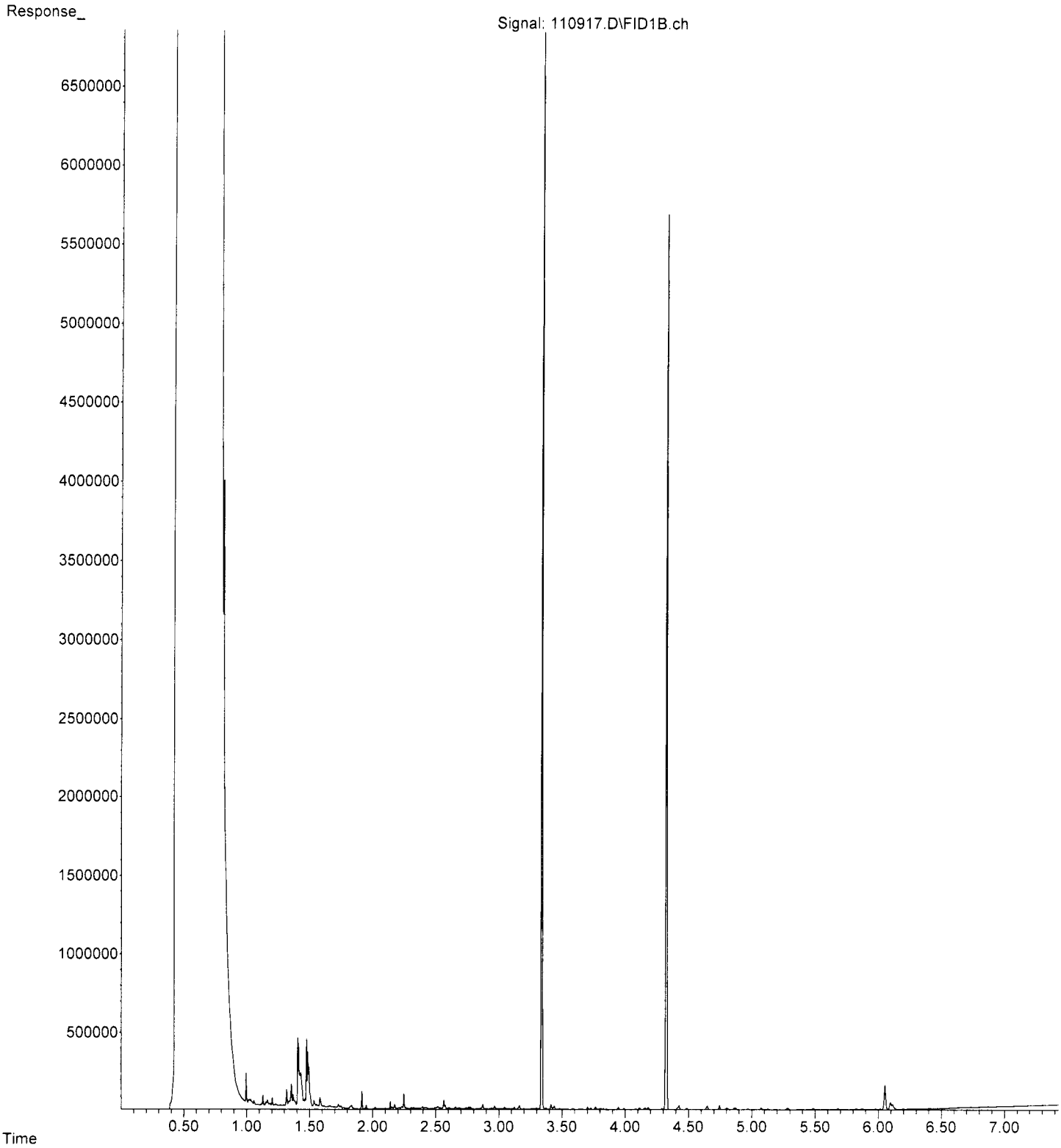
SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Chris Bourgeois	HWA	11/2/22	818
Received by:	Michael Erdahl	F&B Inc.	11/2/22	818
Relinquished by:		Samples received at 2 °C		
Received by:				

Friedman & Bruya, Inc.
Ph. (206) 285-8282

File :D:\GC14\GC14_Data\11-09-22\110916.D
Operator : TL
Acquired : 09 Nov 2022 01:03 pm using AcqMethod DX.M
Instrument : GC14
Sample Name: 211024-01 sg
Misc Info : ERR
Vial Number: 15

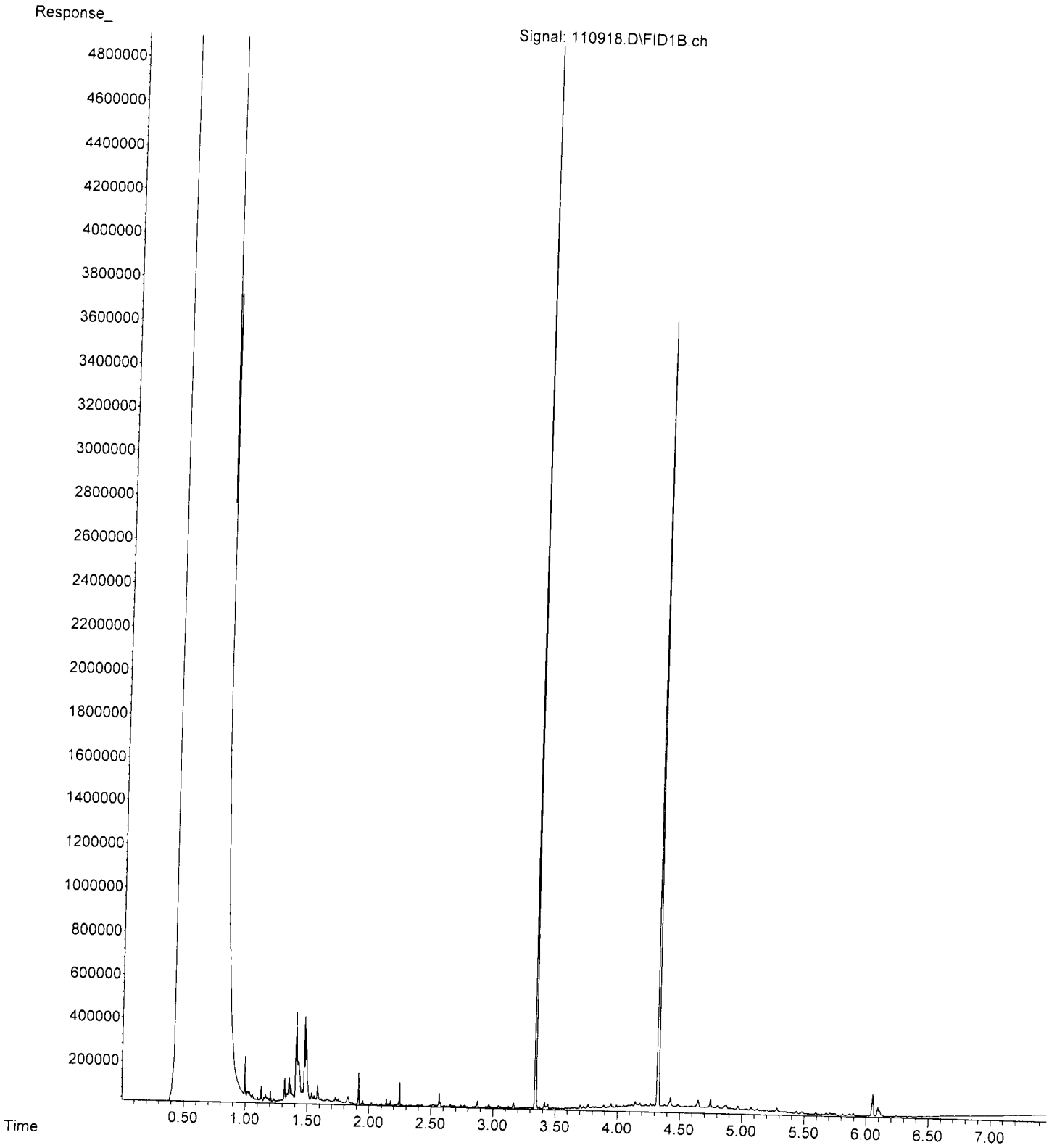


File :D:\GC14\GC14_Data\11-09-22\110917.D
Operator : TL
Acquired : 09 Nov 2022 01:15 pm using AcqMethod DX.M
Instrument : GC14
Sample Name: 211024-02 sg
Misc Info : ERR
Vial Number: 16



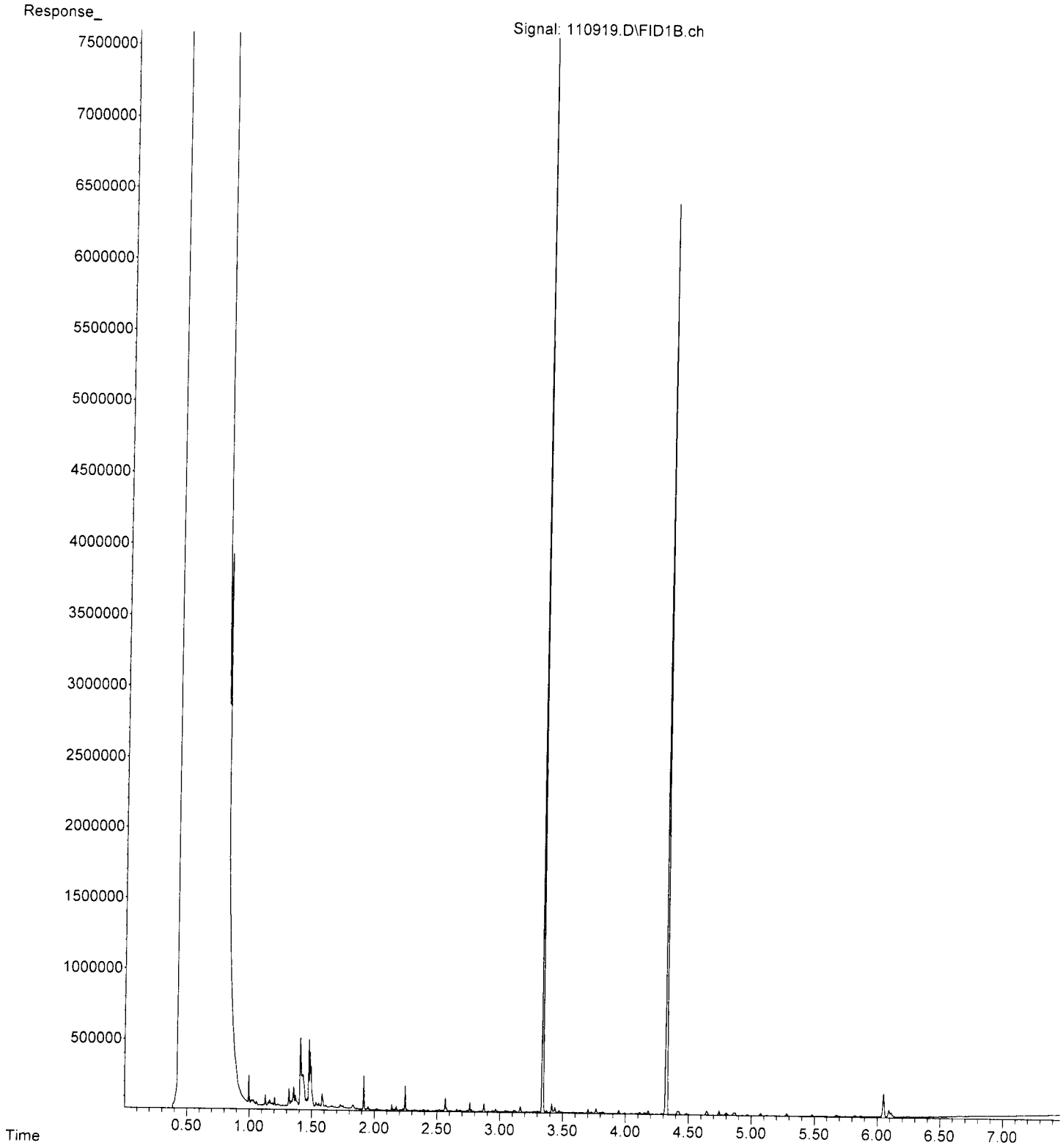
File :D:\GC14\GC14_Data\11-09-22\110918.D
Operator : TL
Acquired : 09 Nov 2022 01:27 pm using AcqMethod DX.M
Instrument : GC14
Sample Name: 211024-03 sg
Misc Info :
Vial Number: 17

ERR



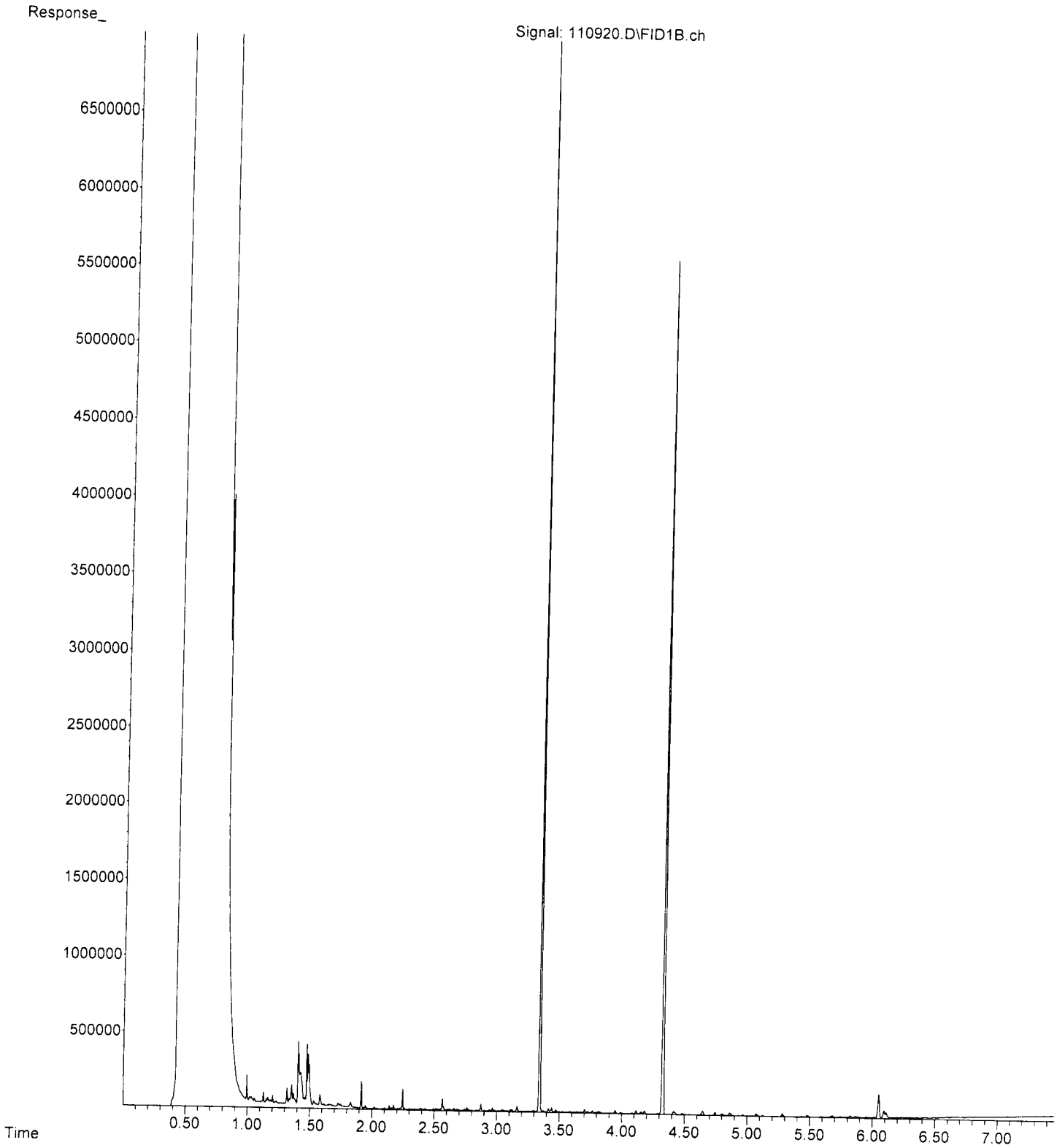
File :D:\GC14\GC14_Data\11-09-22\110919.D
Operator : TL
Acquired : 09 Nov 2022 01:38 pm using AcqMethod DX.M
Instrument : GC14
Sample Name: 211024-04 sg
Misc Info :
Vial Number: 18

ERR

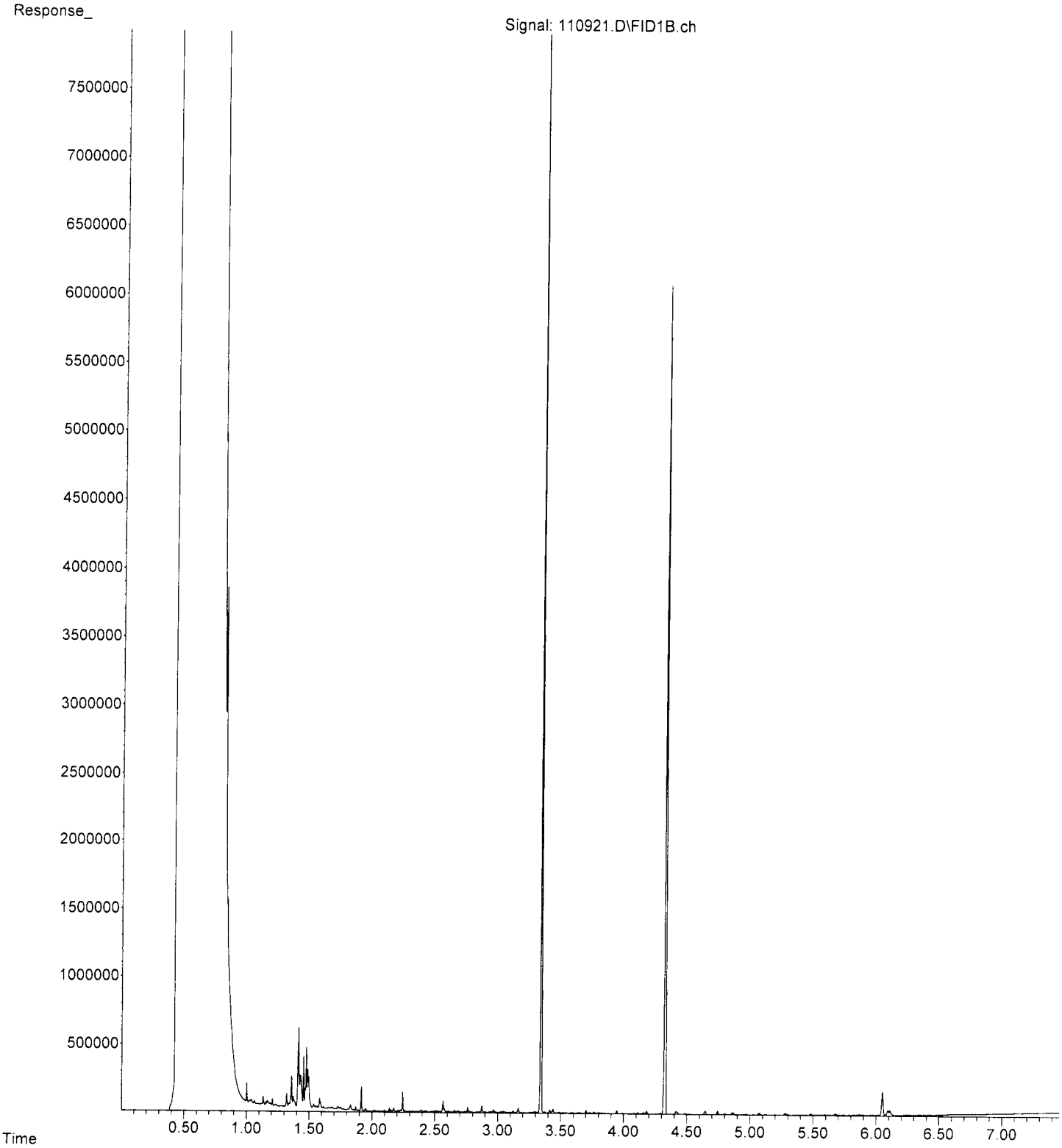


File :D:\GC14\GC14_Data\11-09-22\110920.D
Operator : TL
Acquired : 09 Nov 2022 01:50 pm using AcqMethod DX.M
Instrument : GC14
Sample Name: 211024-05 sg
Misc Info :
Vial Number: 19

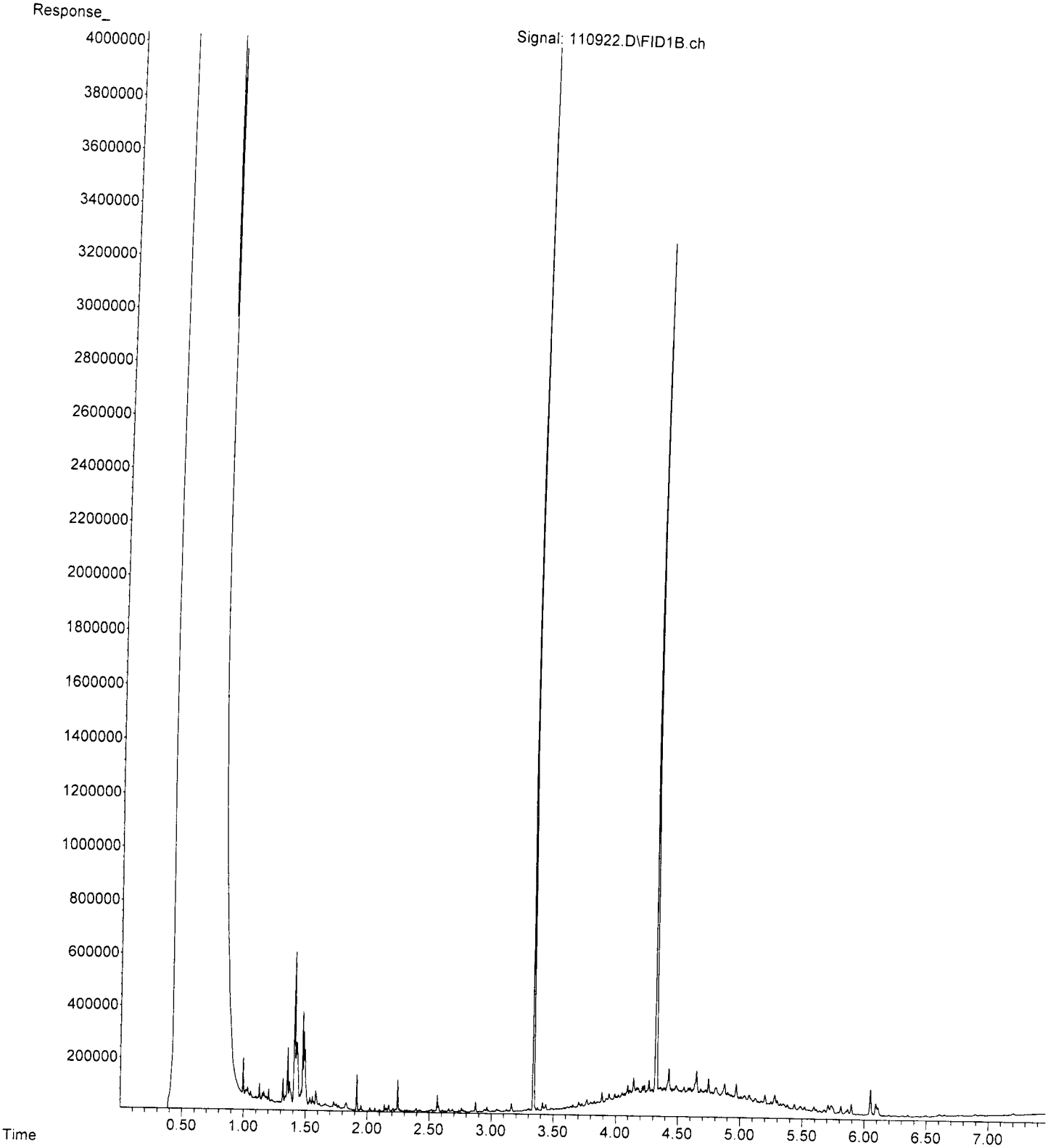
ERR



File :D:\GC14\GC14_Data\11-09-22\110921.D
Operator : TL
Acquired : 09 Nov 2022 02:02 pm using AcqMethod DX.M
Instrument : GC14
Sample Name: 211024-06 sg
Misc Info : ERR
Vial Number: 20

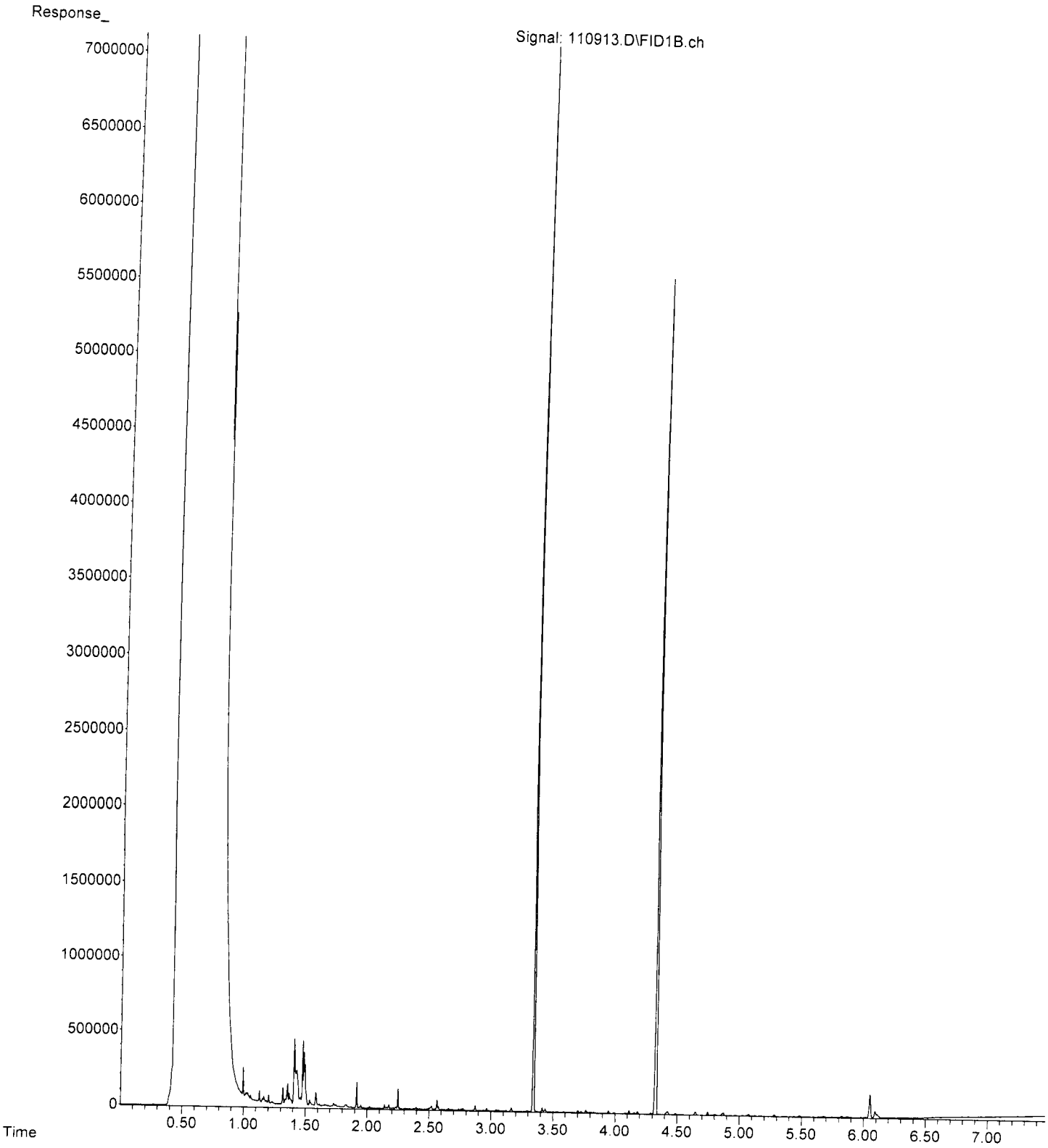


File :D:\GC14\GC14_Data\11-09-22\110922.D
Operator : TL
Acquired : 09 Nov 2022 02:13 pm using AcqMethod DX.M
Instrument : GC14
Sample Name: 211024-07 sg
Misc Info :
Vial Number: 21 ERR



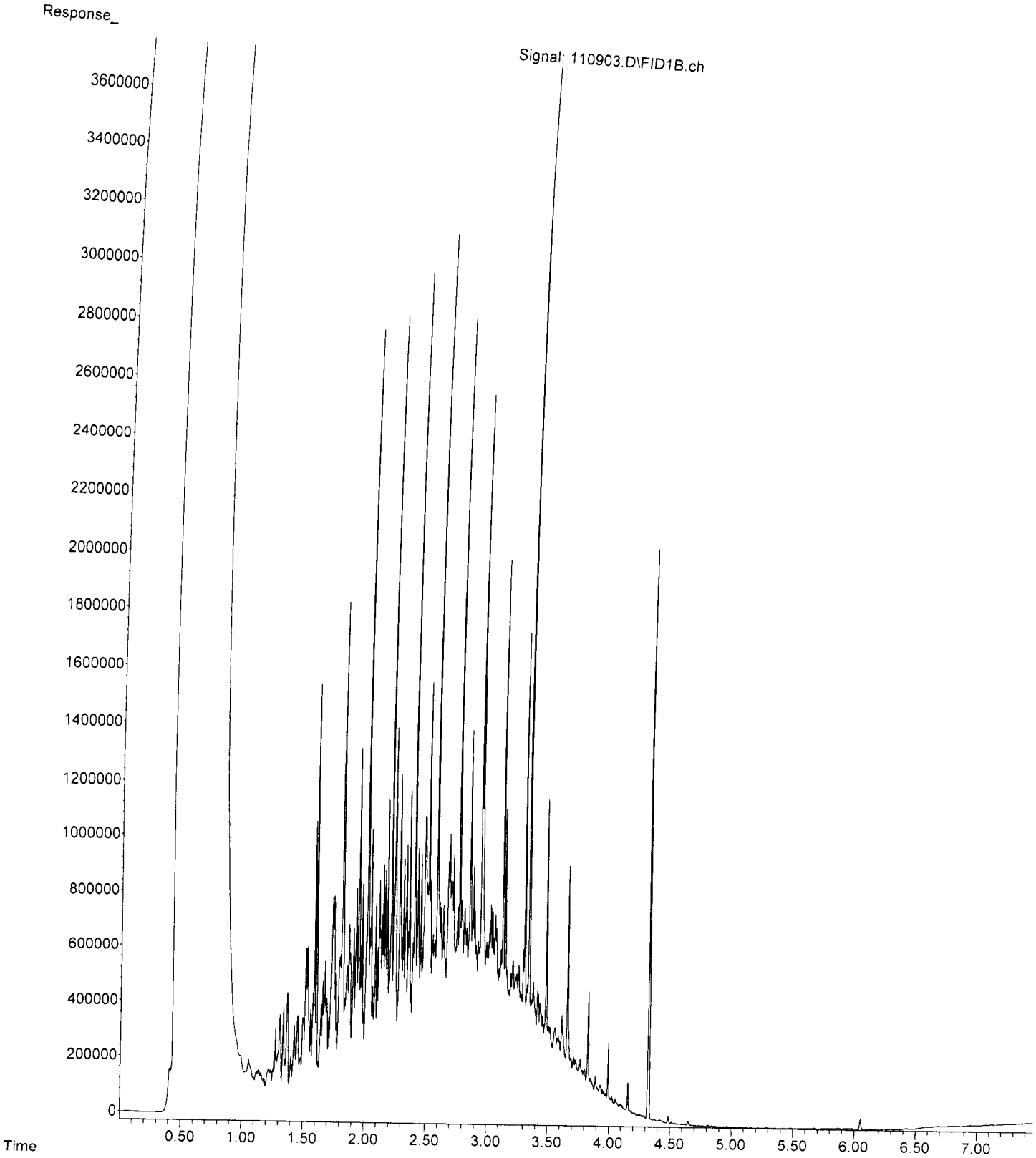
File :D:\GC14\GC14_Data\11-09-22\110913.D
Operator : TL
Acquired : 09 Nov 2022 12:27 pm using AcqMethod DX.M
Instrument : GC14
Sample Name: 02-2689 mb sg
Misc Info :
Vial Number: 12

ERR

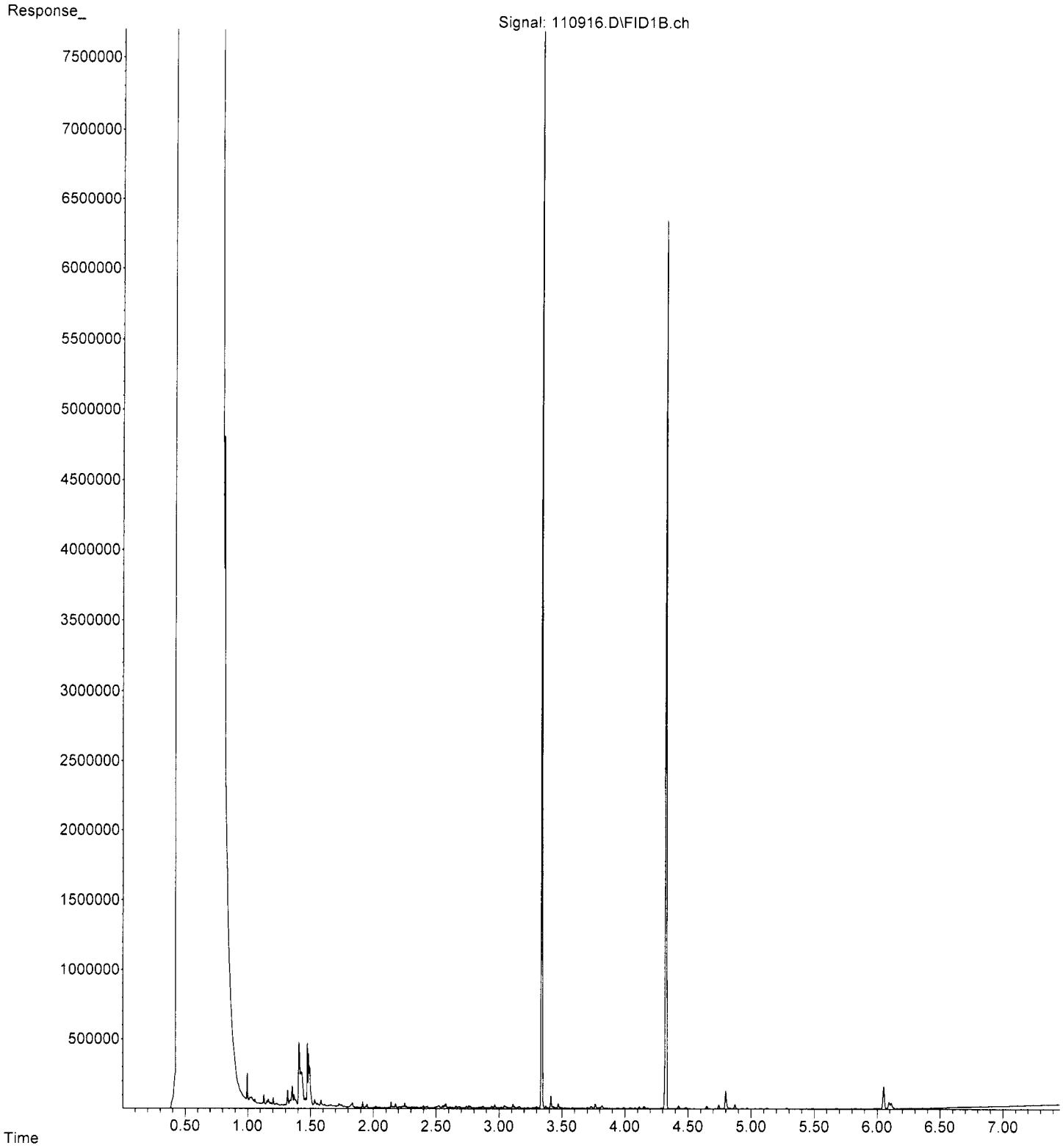


File :D:\GC14\GC14_Data\11-09-22\110903.D
Operator : TL
Acquired : 09 Nov 2022 09:23 am using AcqMethod DX.M
Instrument : GC14
Sample Name: 500 Dx 66-186M
Misc Info :
Vial Number: 3

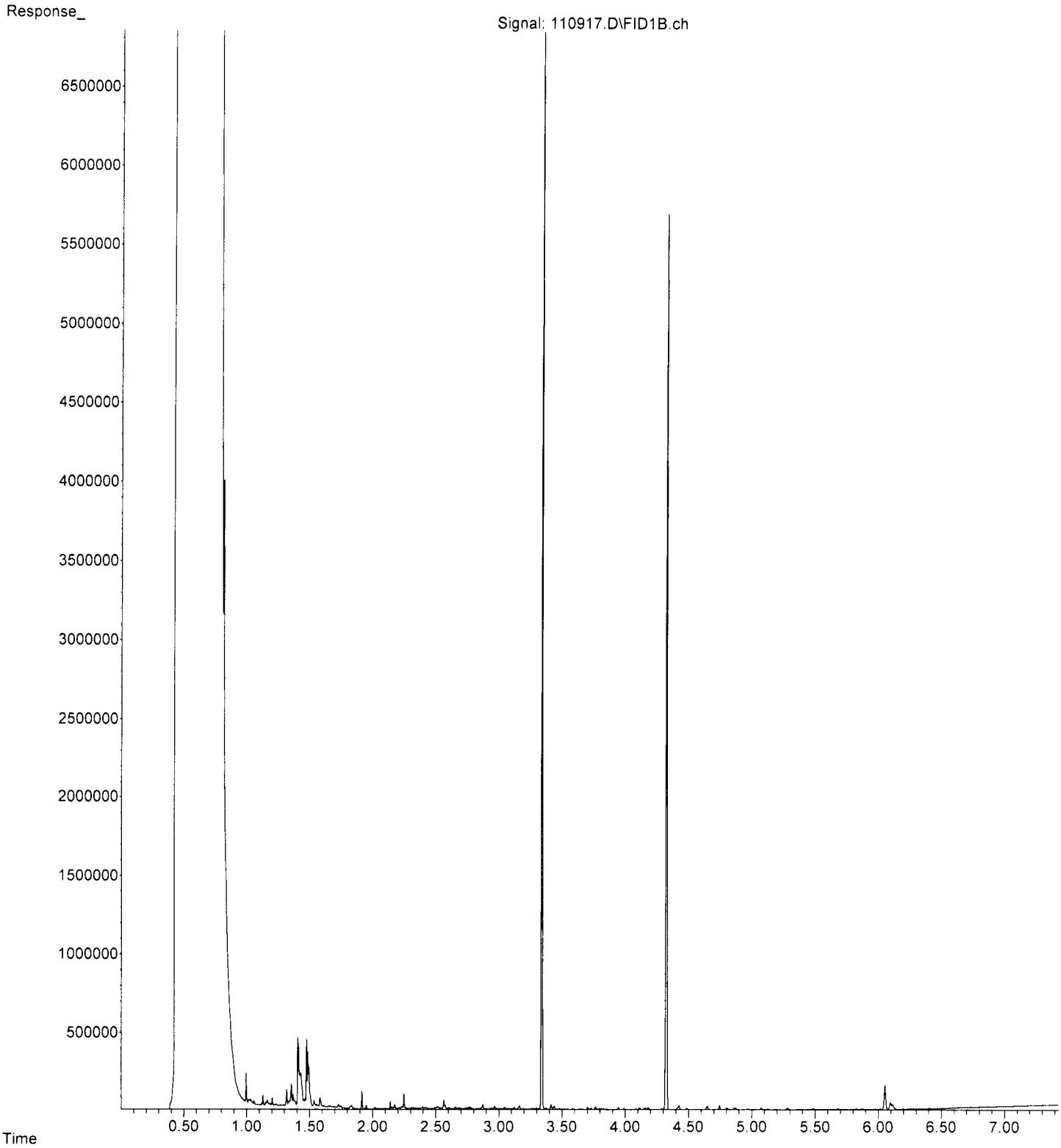
ERR



File :D:\GC14\GC14_Data\11-09-22\110916.D
Operator : TL
Acquired : 09 Nov 2022 01:03 pm using AcqMethod DX.M
Instrument : GC14
Sample Name: 211024-01 sg
Misc Info : ERR
Vial Number: 15

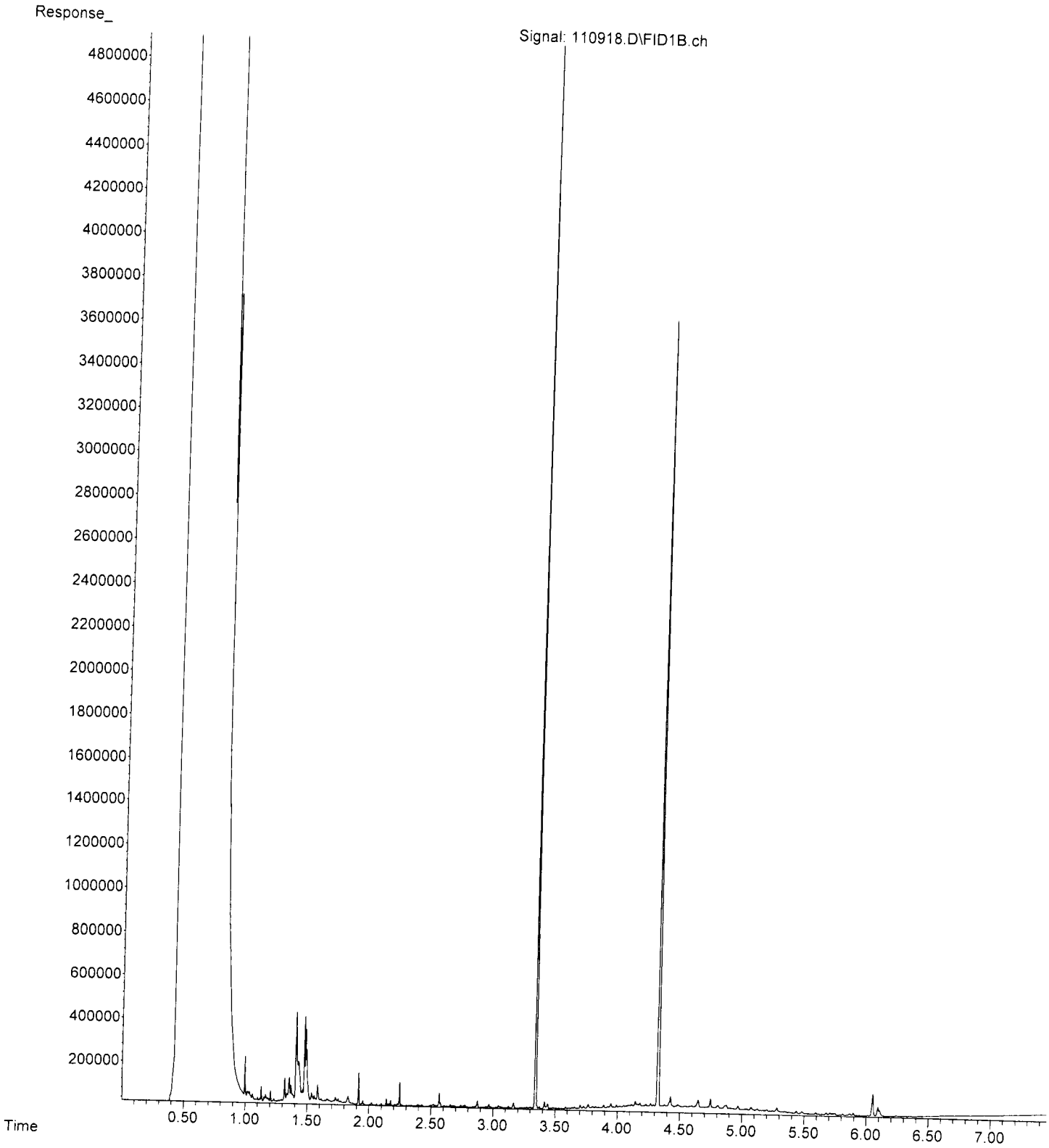


File :D:\GC14\GC14_Data\11-09-22\110917.D
Operator : TL
Acquired : 09 Nov 2022 01:15 pm using AcqMethod DX.M
Instrument : GC14
Sample Name: 211024-02 sg
Misc Info : ERR
Vial Number: 16



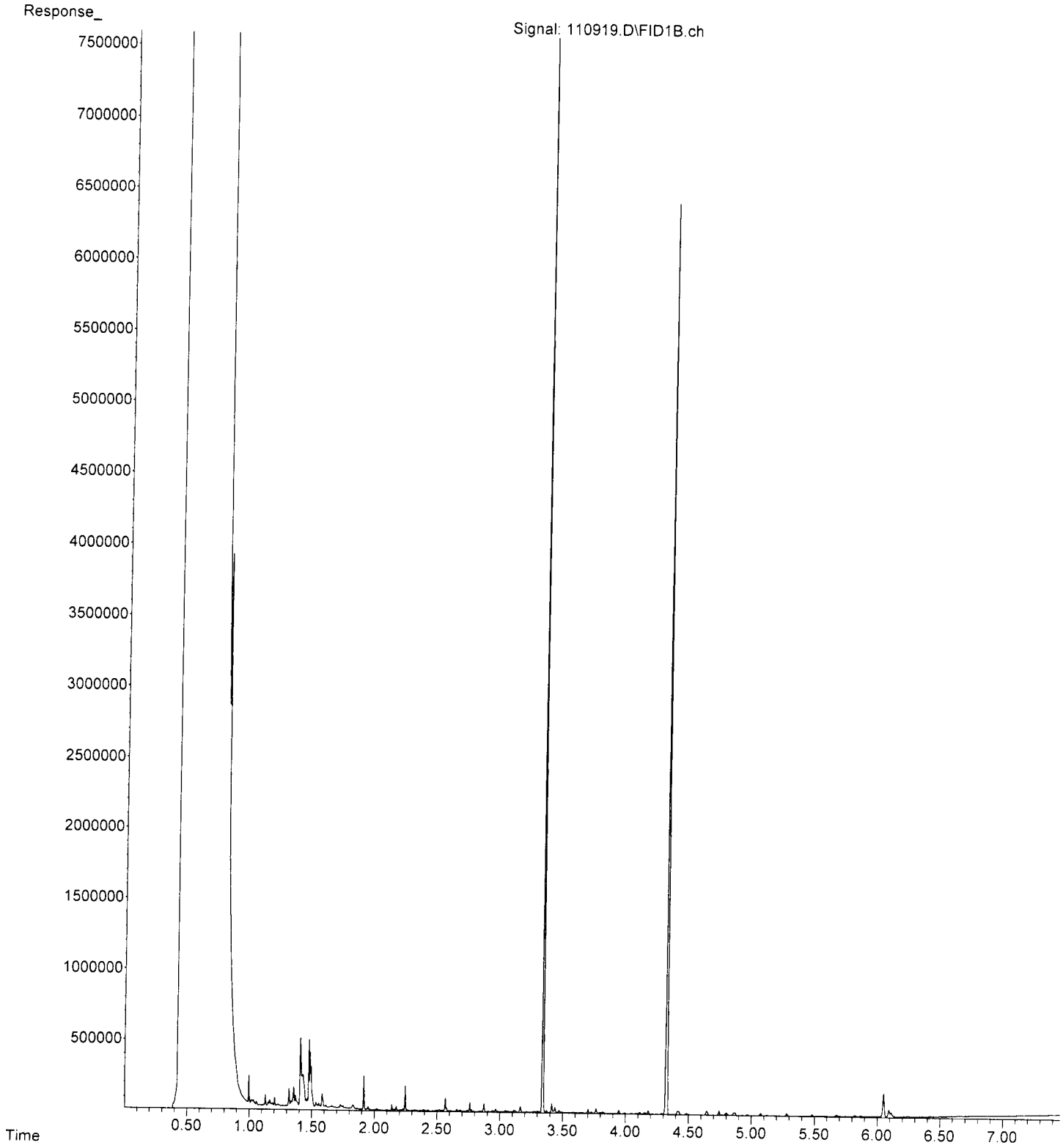
File :D:\GC14\GC14_Data\11-09-22\110918.D
Operator : TL
Acquired : 09 Nov 2022 01:27 pm using AcqMethod DX.M
Instrument : GC14
Sample Name: 211024-03 sg
Misc Info :
Vial Number: 17

ERR



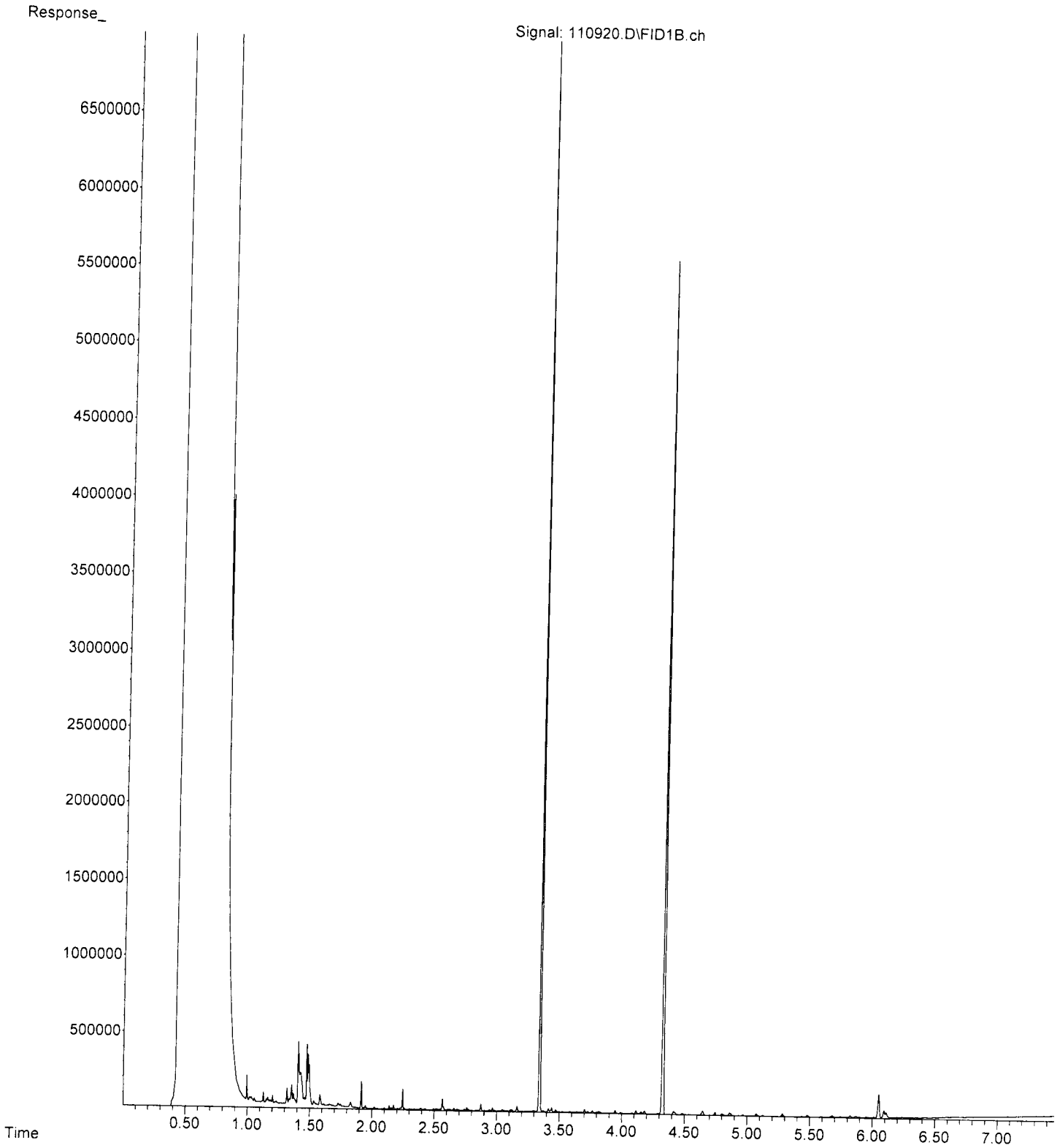
File :D:\GC14\GC14_Data\11-09-22\110919.D
Operator : TL
Acquired : 09 Nov 2022 01:38 pm using AcqMethod DX.M
Instrument : GC14
Sample Name: 211024-04 sg
Misc Info :
Vial Number: 18

ERR

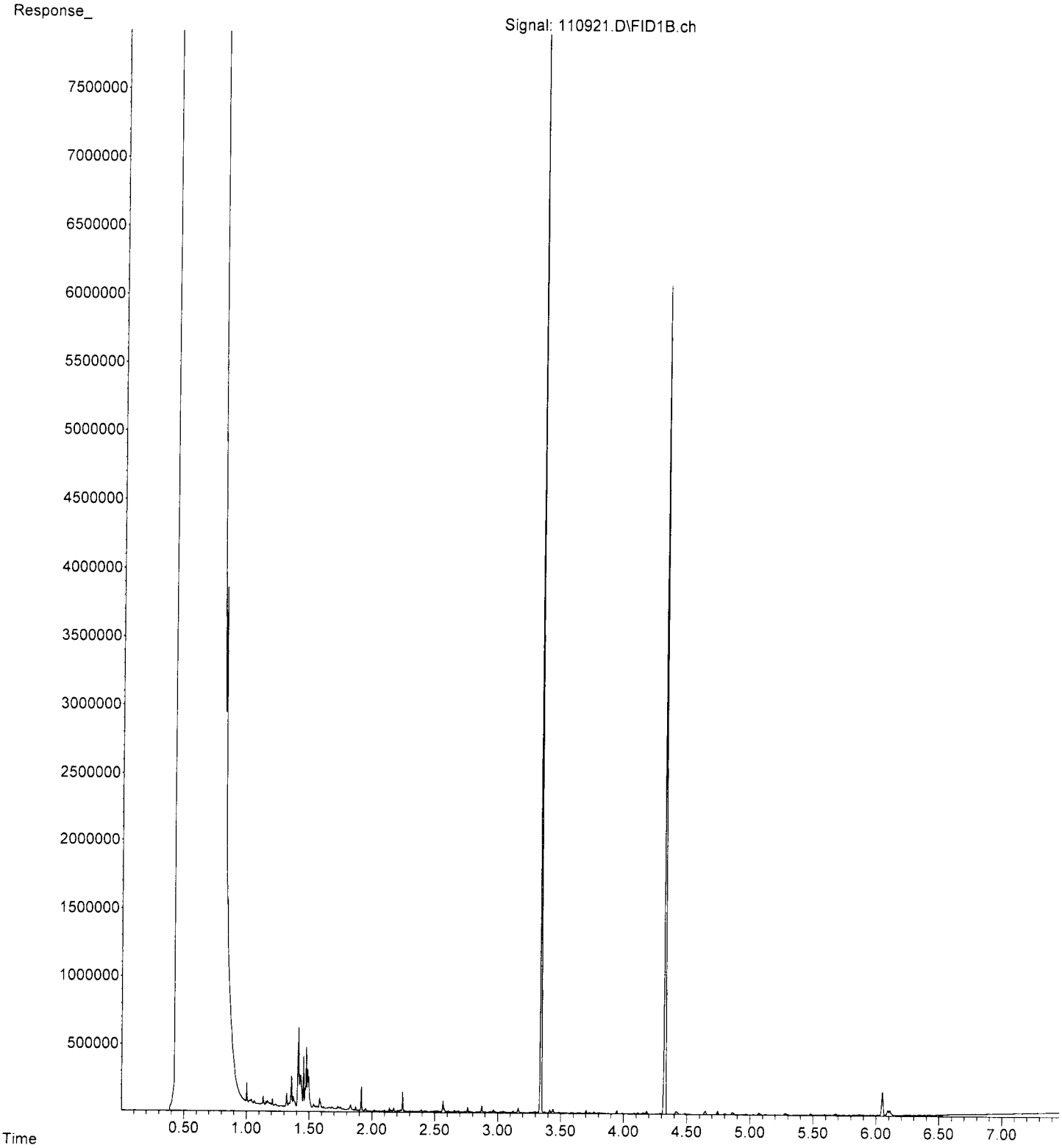


File :D:\GC14\GC14_Data\11-09-22\110920.D
Operator : TL
Acquired : 09 Nov 2022 01:50 pm using AcqMethod DX.M
Instrument : GC14
Sample Name: 211024-05 sg
Misc Info :
Vial Number: 19

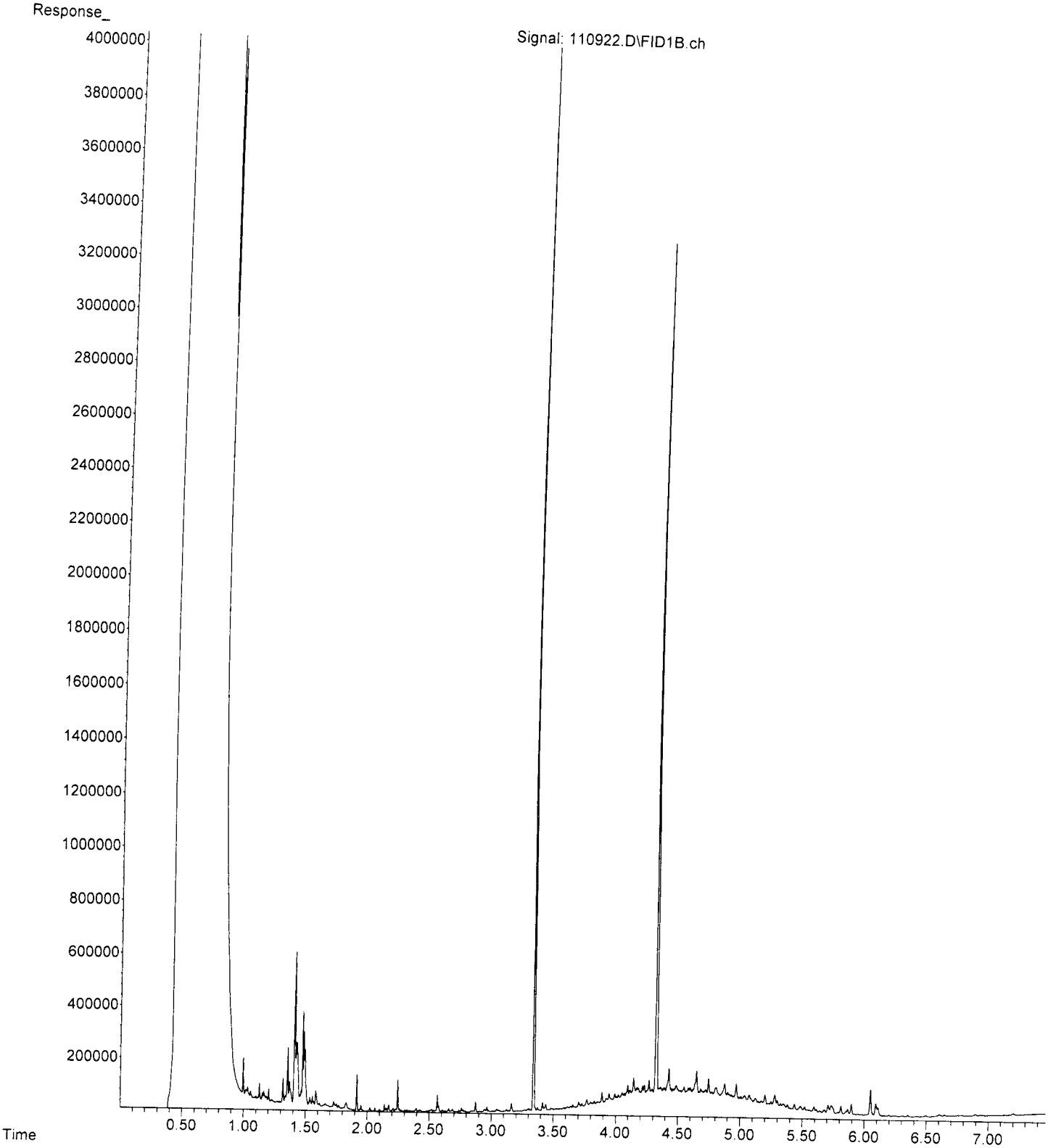
ERR



File :D:\GC14\GC14_Data\11-09-22\110921.D
Operator : TL
Acquired : 09 Nov 2022 02:02 pm using AcqMethod DX.M
Instrument : GC14
Sample Name: 211024-06 sg
Misc Info : ERR
Vial Number: 20

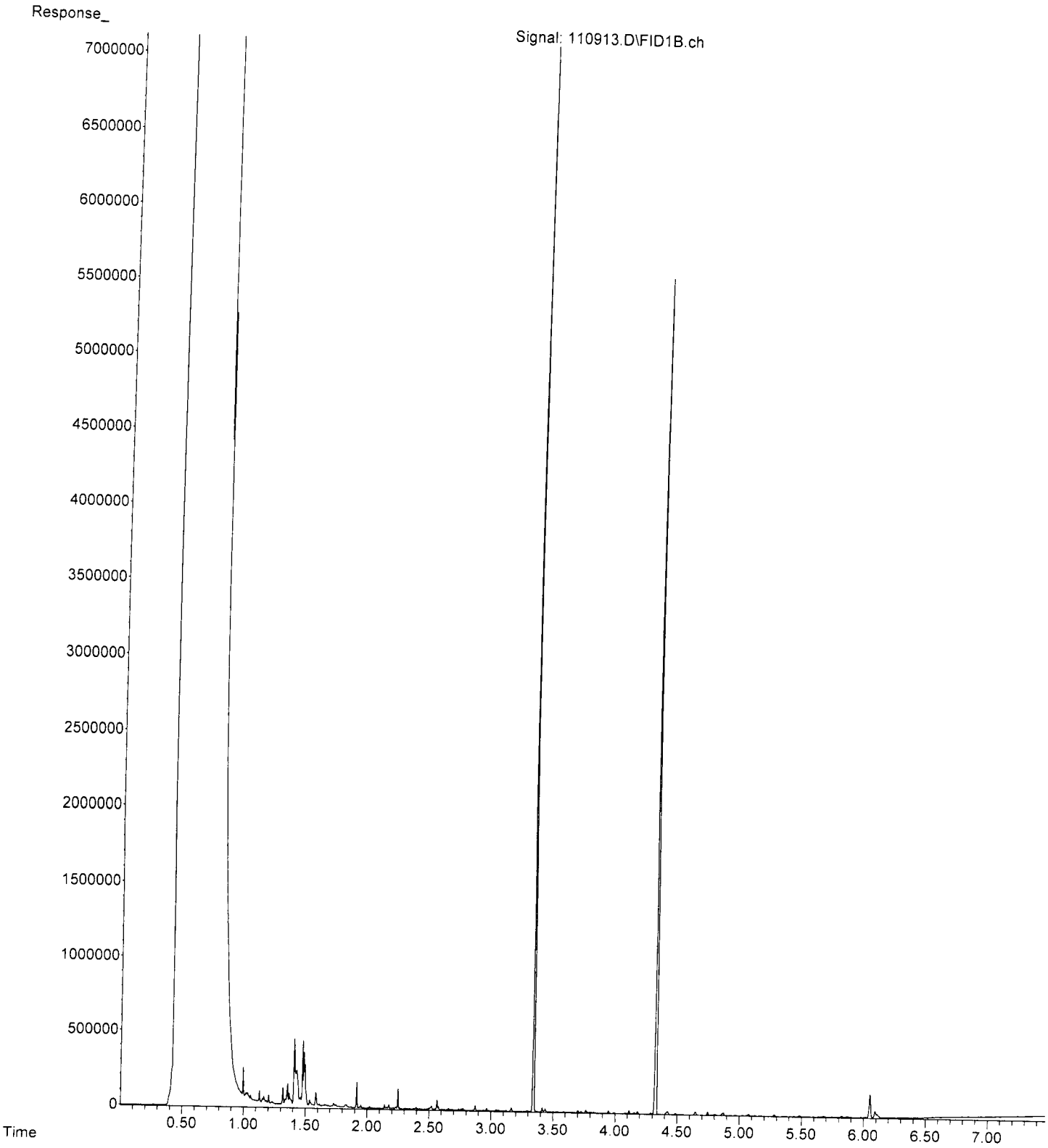


File :D:\GC14\GC14_Data\11-09-22\110922.D
Operator : TL
Acquired : 09 Nov 2022 02:13 pm using AcqMethod DX.M
Instrument : GC14
Sample Name: 211024-07 sg
Misc Info :
Vial Number: 21 ERR



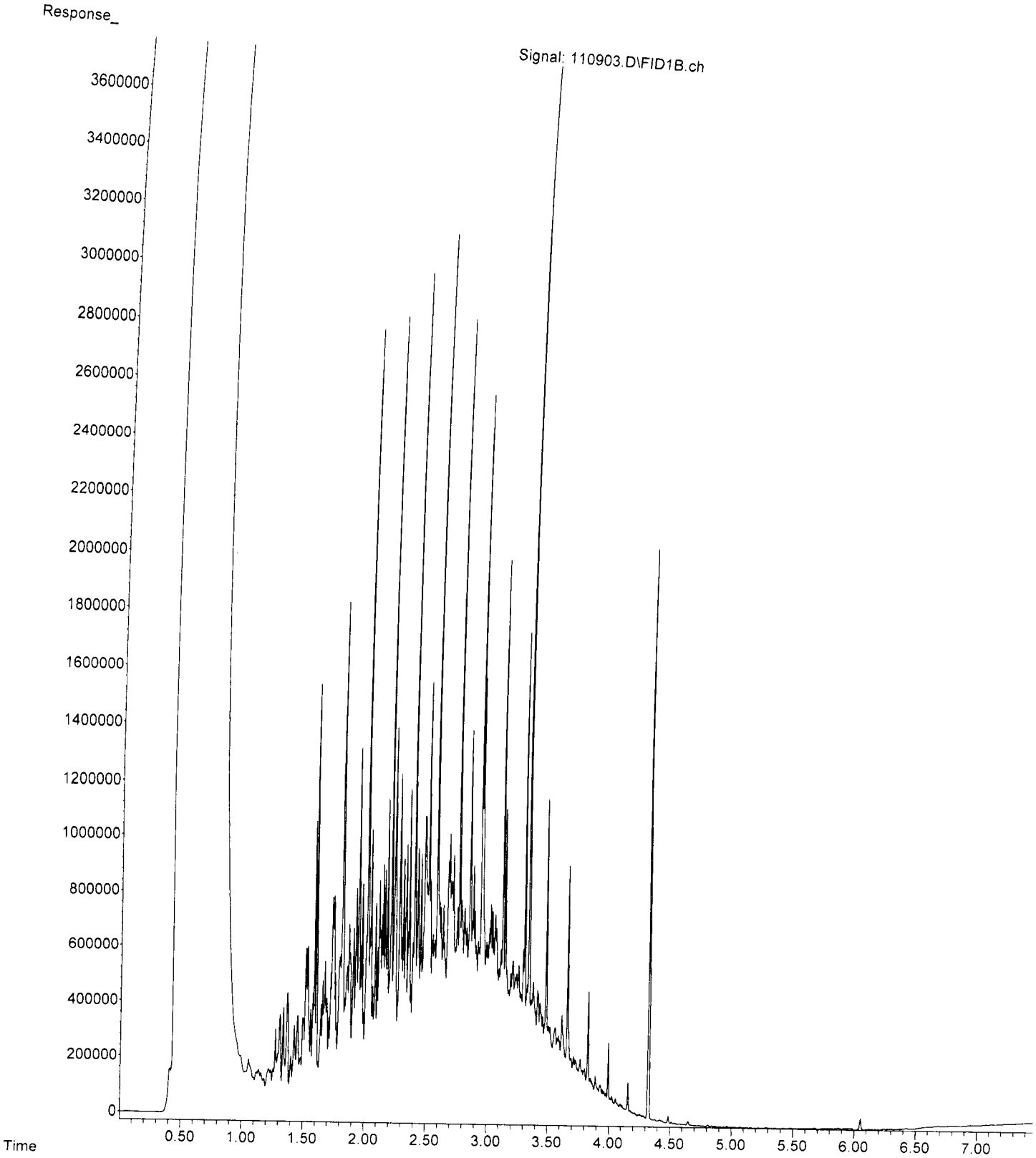
File :D:\GC14\GC14_Data\11-09-22\110913.D
Operator : TL
Acquired : 09 Nov 2022 12:27 pm using AcqMethod DX.M
Instrument : GC14
Sample Name: 02-2689 mb sg
Misc Info :
Vial Number: 12

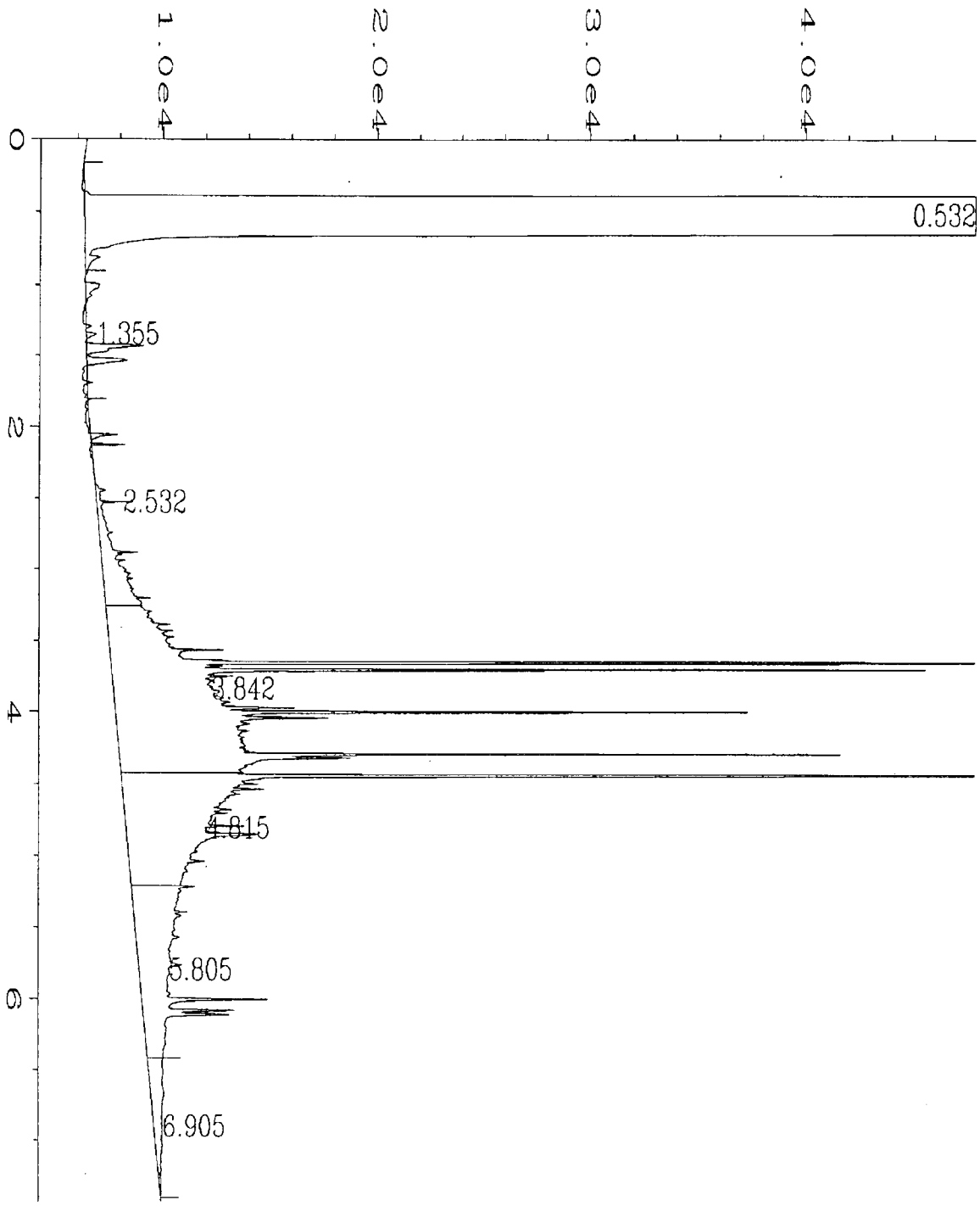
ERR



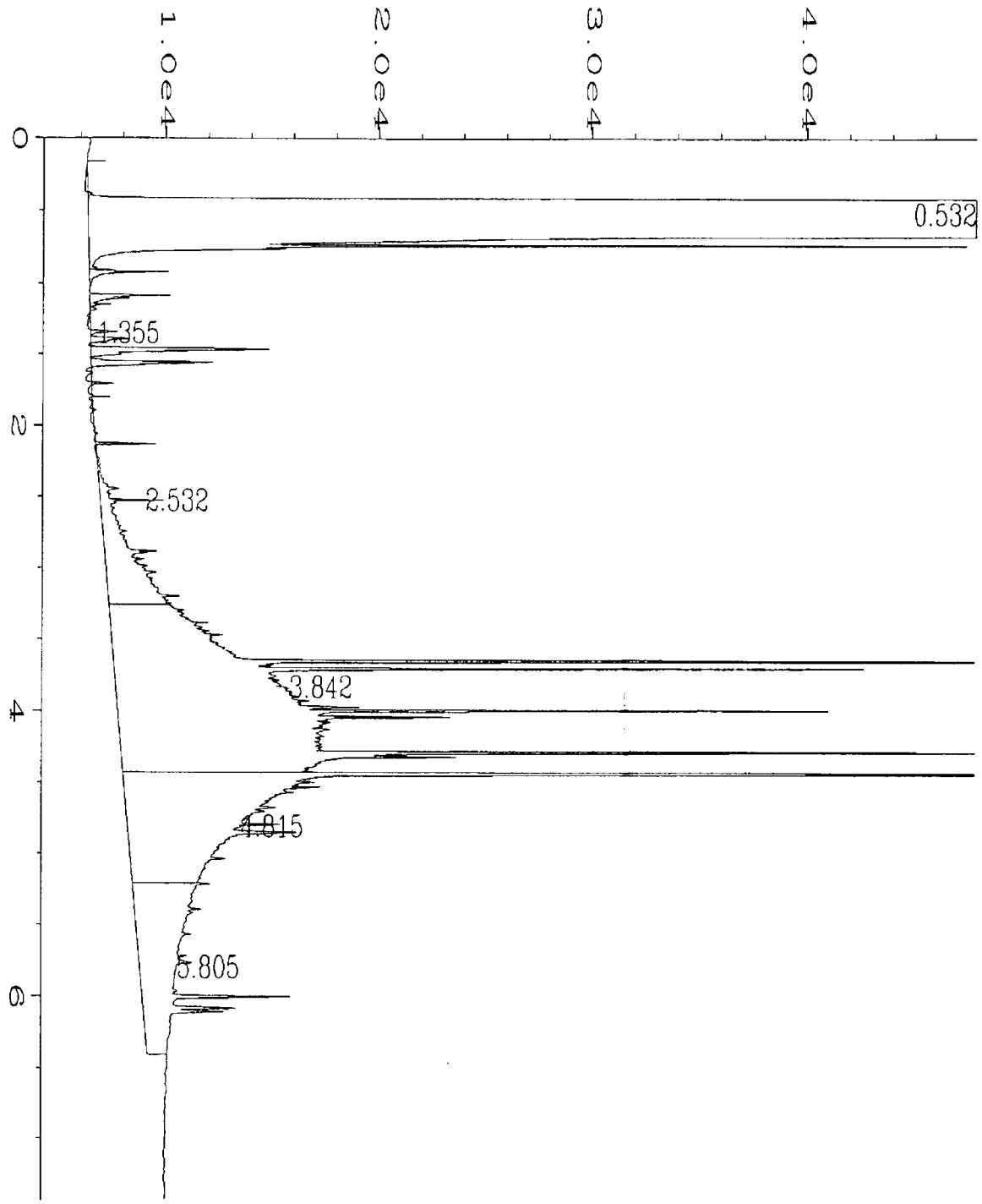
File :D:\GC14\GC14_Data\11-09-22\110903.D
Operator : TL
Acquired : 09 Nov 2022 09:23 am using AcqMethod DX.M
Instrument : GC14
Sample Name: 500 Dx 66-186M
Misc Info :
Vial Number: 3

ERR

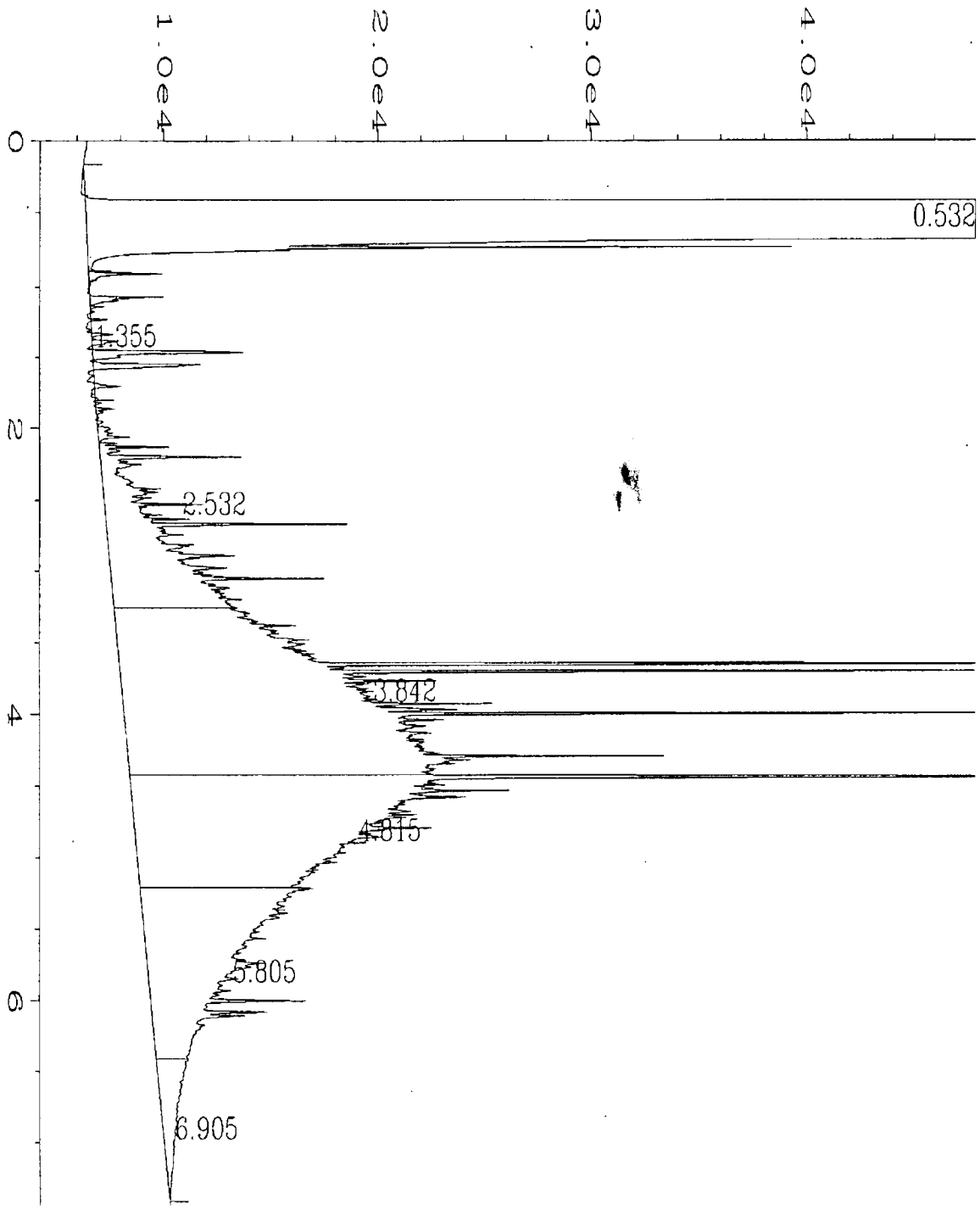




Data File Name	: C:\HPCHEM\1\DATA\11-03-22\030F0901.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 30
Sample Name	: 211024-01	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 9
Acquired on	: 03 Nov 22 08:13 PM	Instrument Method	: DX.MTH
Report Created on:	03 Nov 22 08:27 PM	Analysis Method	: DX.MTH

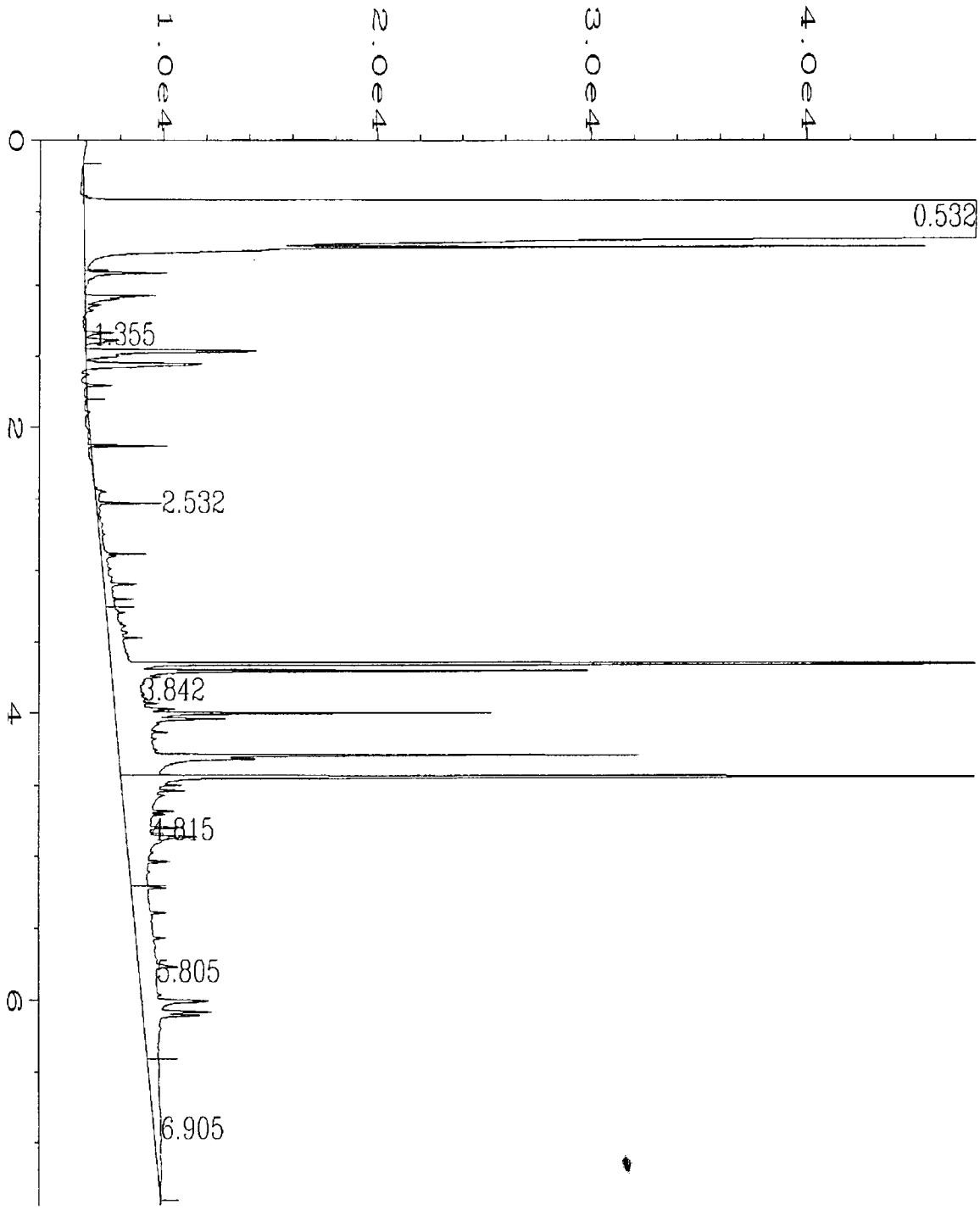


Data File Name	: C:\HPCHEM\1\DATA\11-03-22\031F0901.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 31
Sample Name	: 211024-02	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 9
Acquired on	: 03 Nov 22 08:27 PM	Instrument Method	: DX.MTH
Report Created on:	03 Nov 22 08:41 PM	Analysis Method	: DX.MTH

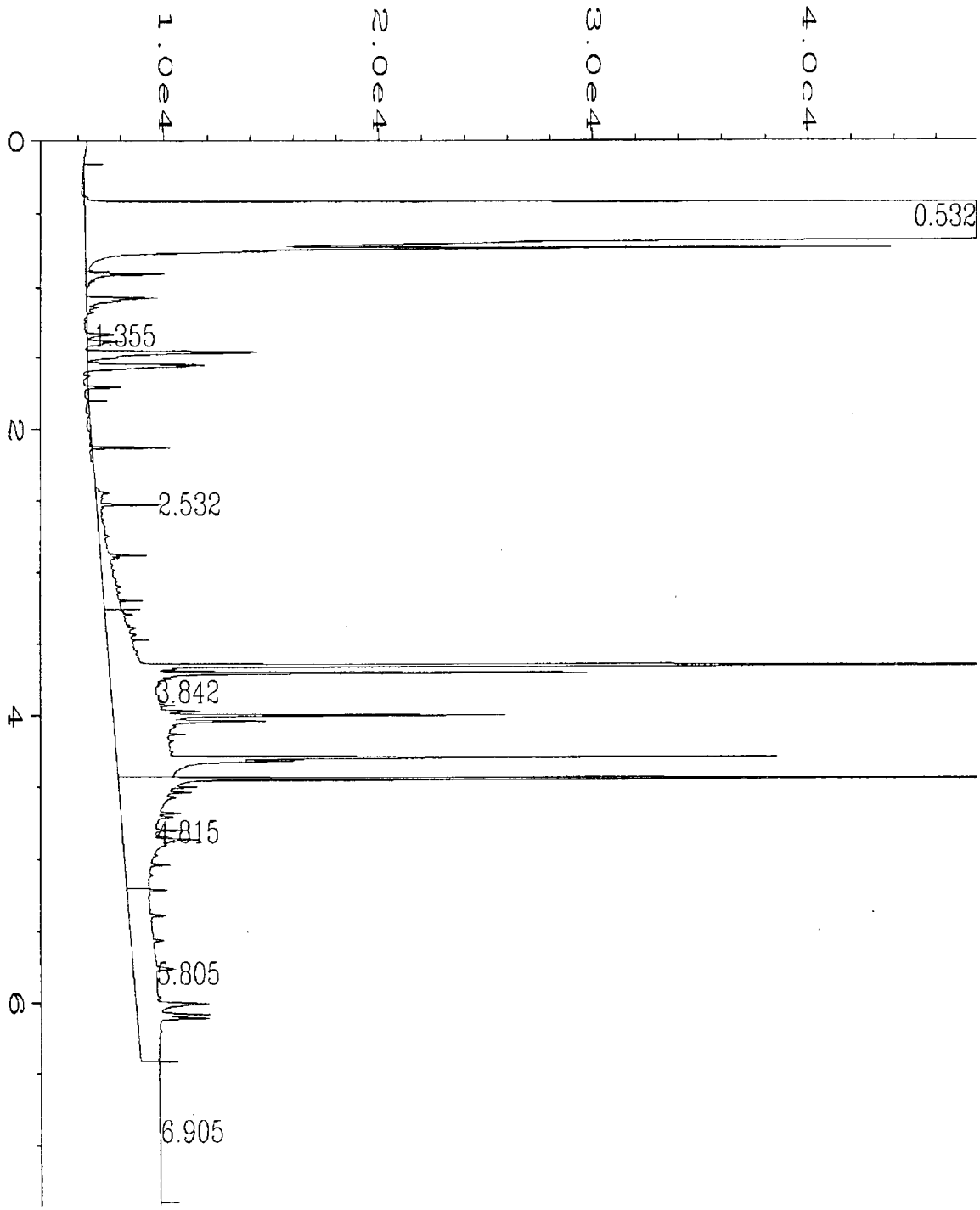


Data File Name : C:\HPCHEM\1\DATA\11-03-22\032F0901.D

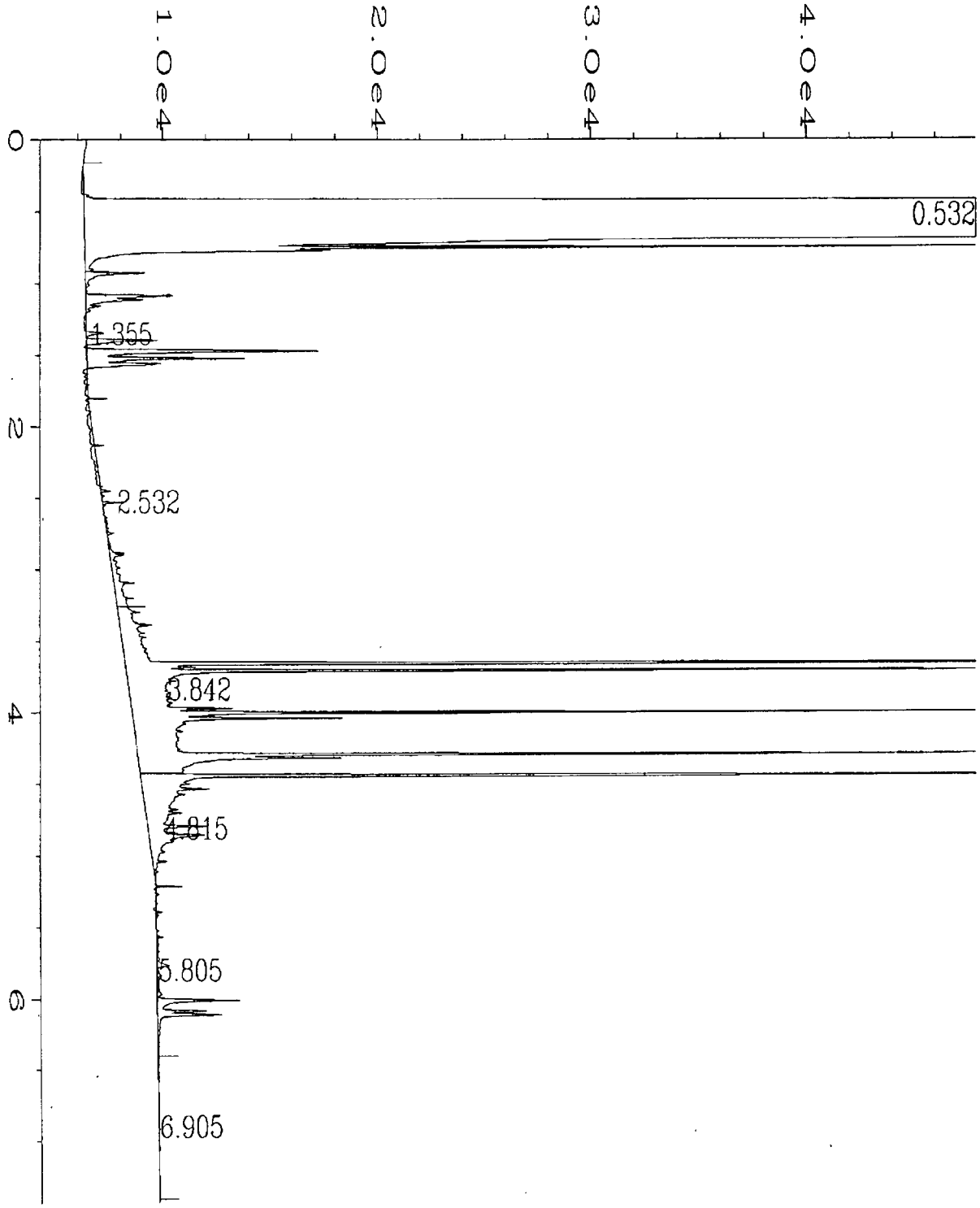
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 32
Sample Name	: 211024-03	Injection Number	: 1
Run Time Bar Code	:	Sequence Line	: 9
Acquired on	: 03 Nov 22 08:41 PM	Instrument Method	: DX.MTH
Report Created on	: 03 Nov 22 08:55 PM	Analysis Method	: DX.MTH



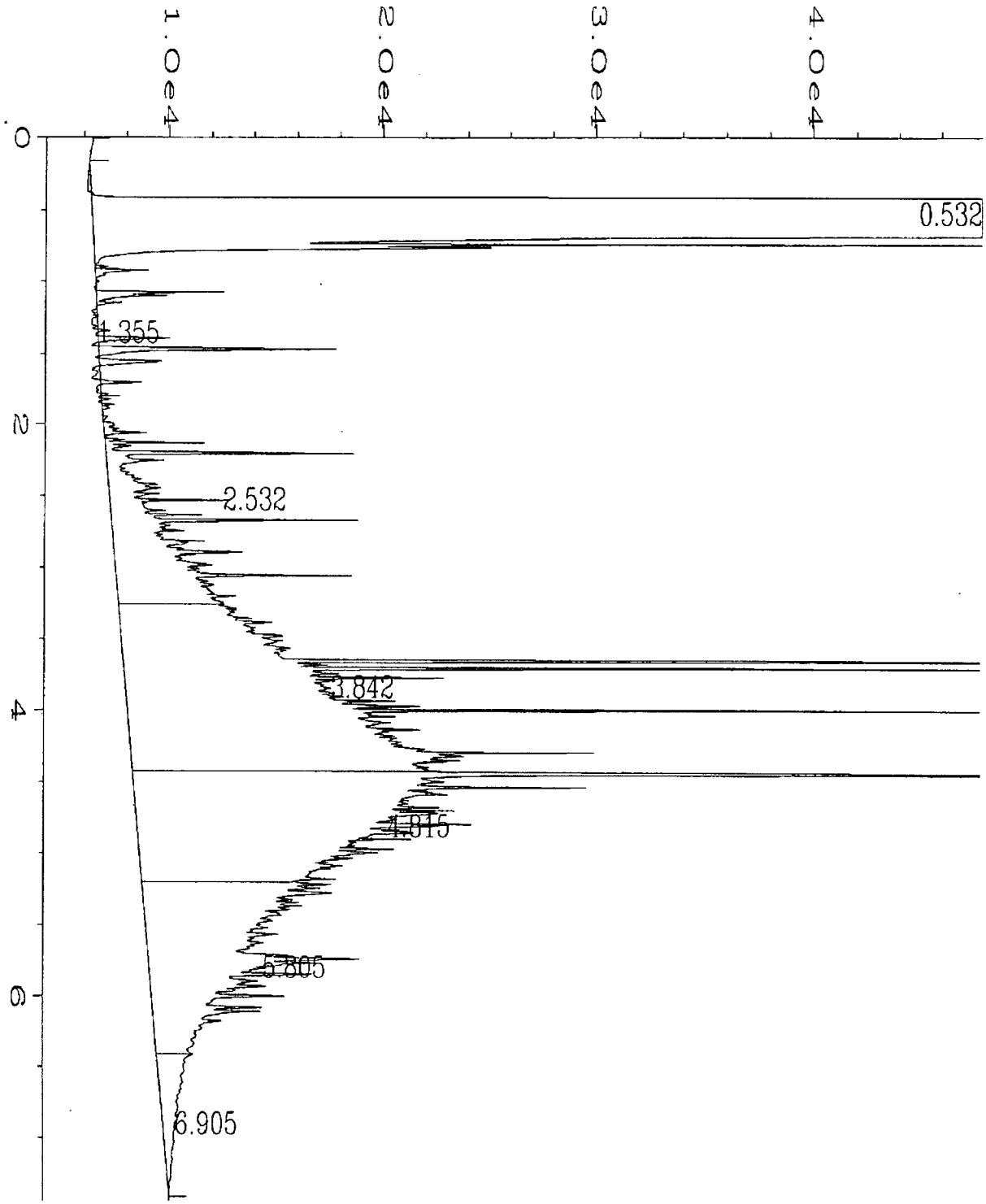
Data File Name	: C:\HPCHEM\1\DATA\11-03-22\033F0901.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 33
Sample Name	: 211024-04	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 9
Acquired on	: 03 Nov 22 08:55 PM	Instrument Method	: DX.MTH
Report Created on	: 03 Nov 22 09:09 PM	Analysis Method	: DX.MTH



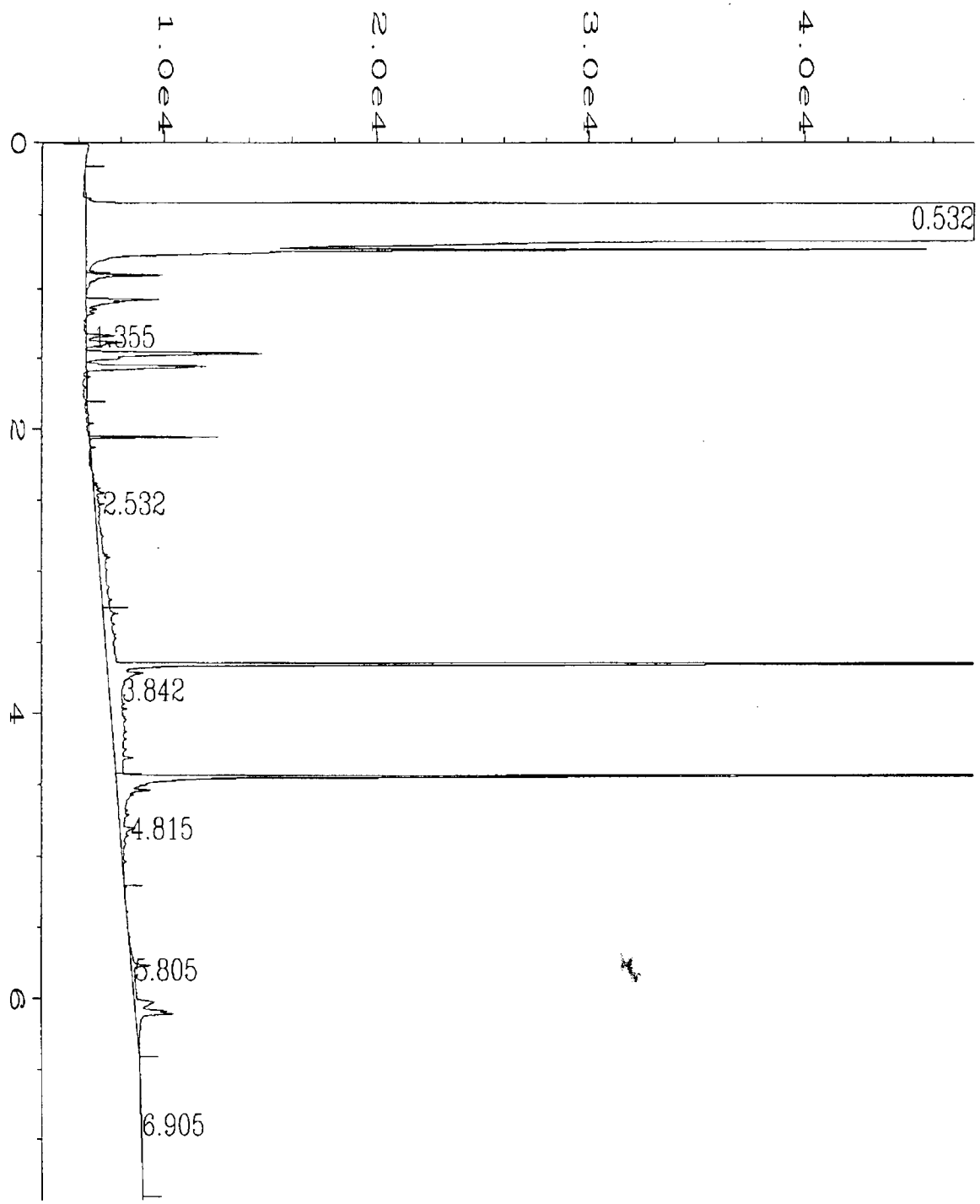
Data File Name	: C:\HPCHEM\1\DATA\11-03-22\034F0901.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 34
Sample Name	: 211024-05	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 9
Acquired on	: 03 Nov 22 09:09 PM	Instrument Method	: DX.MTH
Report Created on	: 03 Nov 22 09:23 PM	Analysis Method	: DX.MTH



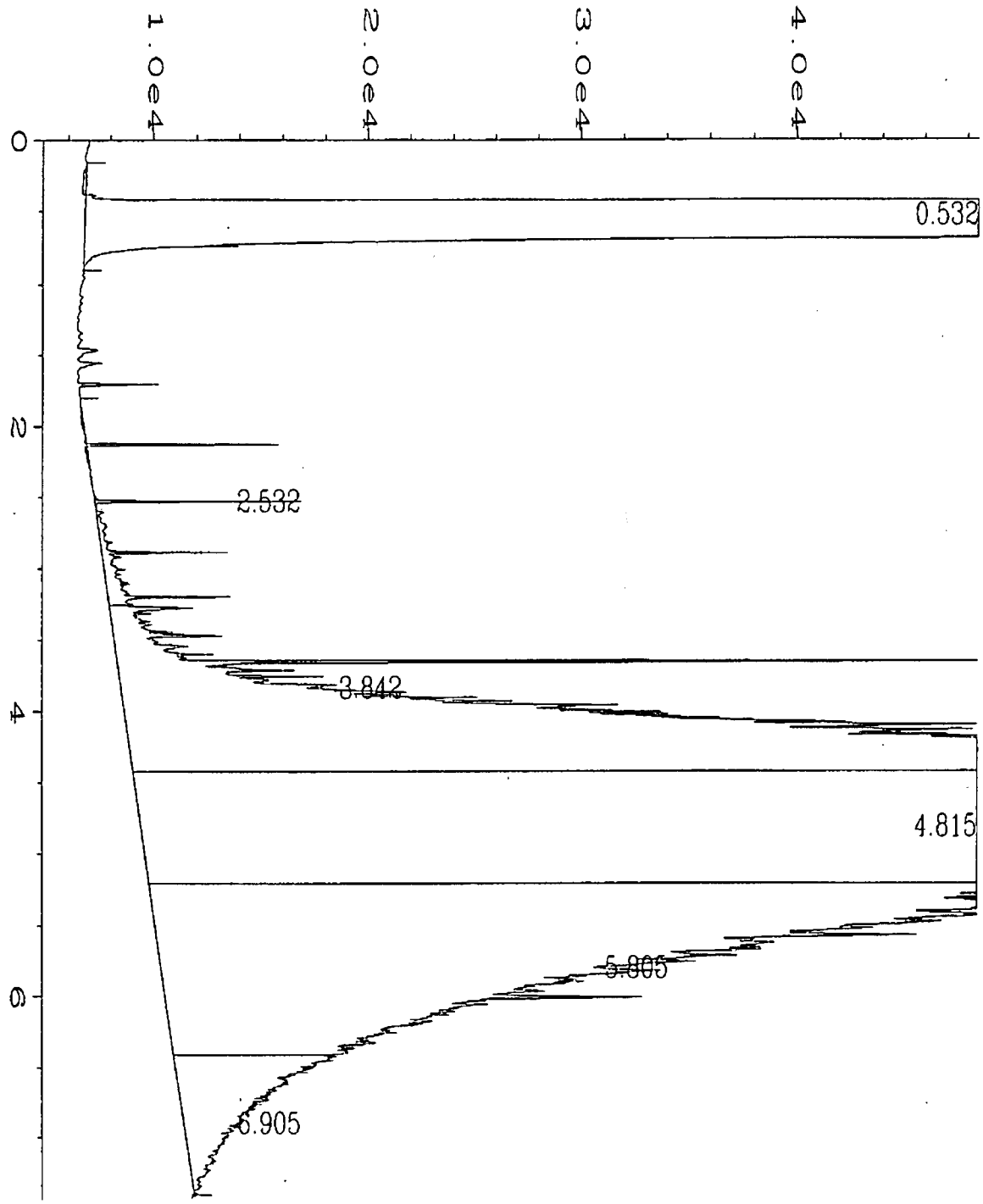
Data File Name	: C:\HPCHEM\1\DATA\11-03-22\035F0901.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 35
Sample Name	: 211024-06	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 9
Acquired on	: 03 Nov 22 09:24 PM	Instrument Method	: DX.MTH
Report Created on:	03 Nov 22 09:37 PM	Analysis Method	: DX.MTH



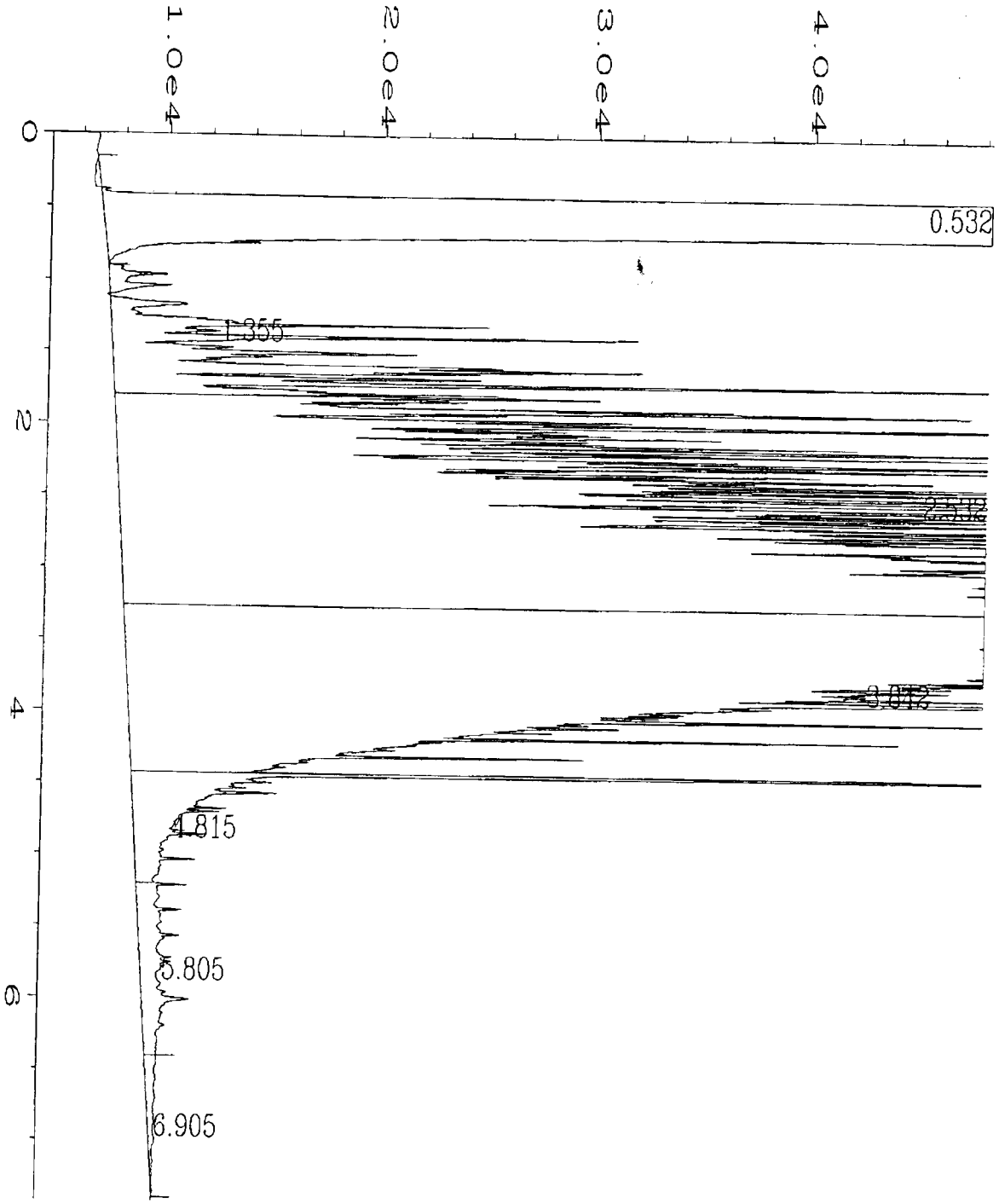
Data File Name	: C:\HPCHEM\1\DATA\11-03-22\036F0901.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 36
Sample Name	: 211024-07	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 9
Acquired on	: 03 Nov 22 09:38 PM	Instrument Method	: DX.MTH
Report Created on	: 03 Nov 22 09:51 PM	Analysis Method	: DX.MTH



Data File Name	: C:\HPCHEM\1\DATA\11-03-22\023F0901.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 23
Sample Name	: 02-2689 mb	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 9
Acquired on	: 03 Nov 22 06:35 PM	Instrument Method	: DX.MTH
Report Created on:	03 Nov 22 06:48 PM	Analysis Method	: DX.MTH



Data File Name	: C:\HPCHEM\1\DATA\11-03-22\002F0201.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 2
Sample Name	: 500 MO 67-100D	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 2
Acquired on	: 03 Nov 22 08:33 AM	Instrument Method	: DX.MTH
Report Created on:	03 Nov 22 08:46 AM	Analysis Method	: DX.MTH



Data File Name : C:\HPCHEM\1\DATA\11-03-22\003F0201.D
Operator : TL
Instrument : GC1
Sample Name : 500 Dx 66-186M
Run Time Bar Code:
Acquired on : 03 Nov 22 08:47 AM
Report Created on: 03 Nov 22 09:00 AM

Page Number : 1
Vial Number : 3
Injection Number : 1
Sequence Line : 2
Instrument Method: DX.MTH
Analysis Method : DX.MTH

Appendix E

Boring & Monitoring Well Logs

DRILLING COMPANY: Cascade Drilling, Inc.
DRILLING METHOD: Geoprobe Track Mounted Rig
SAMPLING METHOD: Direct Push
LOCATION: See Figure 2

DATE STARTED: 12/20/2021
DATE COMPLETED: 12/20/2021
LOGGED BY: C. Bourgeois

DEPTH (feet)	SYMBOL	USCS SOIL CLASS	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	PEN. RESISTANCE (blows/6 inches)	OTHER TESTS	PID (ppm)	WELL COMPLETION SCHEMATIC	NOTES
0			Concrete pavement, 9 inches thick. **(PORTLAND CEMENT CONCRETE)**							
			No recovery.							
		GM	Olive brown, very silty angular GRAVEL, moist. **(FILL)** Becomes less silty, crushed cobbles observed.							
		GP	Pea gravel, moist. Clean.							
5		GP	Pea gravel, moist. Clean.							
		GM	GRAVEL with rust brown silt, moist.							
		ML	Dark olive gray SILT. Petroleum odor noted, wet. **(NATIVE ALLUVIUM)**							
			Low recovery.							
10		SM	Dark gray/black silty fine SAND, wet.		21B1-9.8			0.0		
		ML	Olive gray SILT, moist.							
		SM	Dark gray/black silty fine SAND, moist.							
		ML	Olive gray SILT, moist.							
		SM	Dark gray/black silty fine SAND, moist.							
15			21B1 completed to 15 feet below ground surface (bgs). Temporary well constructed for reconnaissance groundwater samples. Temporary well removed and borehole backfilled 12/20/2021. Slight petroleum odor noted in groundwater. No PID readings >0.0, odor, or sheen unless noted in description.							

NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

GeoSciences Inc.

King County Metro South Facilities
Bellevue, WA

TEMPORARY WELL/BORING
21B1

PROJECT NO.: 2021-062-WO31

DRILLING COMPANY: Cascade Drilling, Inc.
DRILLING METHOD: Geoprobe Track Mounted Rig
SAMPLING METHOD: Direct Push
LOCATION: See Figure 2

DATE STARTED: 12/20/2021
DATE COMPLETED: 12/20/2021
LOGGED BY: C. Bourgeois

DEPTH (feet)	USCS SOIL CLASS	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	PEN. RESISTANCE (blows/6 inches)	OTHER TESTS	PID (ppm)	WELL COMPLETION SCHEMATIC	NOTES
0		Concrete pavement, 8 inches thick. **(PORTLAND CEMENT CONCRETE)**							
		No recovery							
	GM	Silty GRAVEL **(FILL)**							
				21B2-4			0.0		
5		Slough							
	ML	Chocolate brown SILT with long roots, moist, wet at surface. **(NATIVE ALLUVIUM)**							
	ML	Olive brown/gray SILT with roots, moist							
10		Slough.							
		Olive brown slightly sandy SILT with some organics, moist.							
	SM	Dark gray/black silty SAND with some organics, moist.							
		Olive brown slightly sandy SILT with some organics, moist.							
	SW	Dark gray/black SAND with some organics, moist.							
		No recovery.							
15									

21B2 completed to 15 feet below ground surface (bgs).
Temporary well constructed for reconnaissance groundwater.
Temporary well removed and borehole backfilled 12/20/2021.

No PID readings >0.0, odor, or sheen unless noted in description.
Groundwater measured at approximately 4.5 feet bgs after temp well installed.

NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

GeoSciences Inc.

King County Metro South Facilities
Bellevue, WA

TEMPORARY WELL/BORING
21B2

PROJECT NO.: 2021-062-WO31

DRILLING COMPANY: Cascade Drilling, Inc.
DRILLING METHOD: Geoprobe Track Mounted Rig
SAMPLING METHOD: Direct Push
LOCATION: See Figure 2

SURFACE ELEVATION: 13.69 ± feet
CASING ELEVATION 13.44 ± feet

DATE STARTED: 12/20/2021
DATE COMPLETED: 12/20/2021
LOGGED BY: C. Bourgeois

DEPTH (feet)	SYMBOL	USCS SOIL CLASS	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	PEN. RESISTANCE (blows/6 inches)	OTHER TESTS	PID (ppm)	WELL COMPLETION SCHEMATIC	NOTES	DEPTH (feet)
0			Concrete pavement, 9 inches thick. **(PORTLAND CEMENT CONCRETE)**								0
			No recovery.								
		GW	Well graded GRAVEL with pieces of crushed cobble, moist. **(FILL)**							1/5/2022	
5			No recovery.								5
		GM	Silty GRAVEL, wet								
			Olive gray gravelly SILT, moist.		22MW-1-6.5			0.1			
		ML	**(NATIVE ALLUVIUM)** Olive/chocolate brown organic SILT, moist. PID reading of 0.1.								
			Becomes sandy.		22MW-1-9.5			0.0			
10			Slough, wet. Olive brown fine sandy SILT with organics, wet.								10
			Dark olive/chocolate brown slightly sandy SILT with organics, wet.								
		SM	Becomes sandier.								
		SM	Black silty SAND, very few organics, moist.								
15											15

21MW-1 completed to 15 feet below ground surface (bgs). Permanent well installed to 15 feet bgs 12/20/2021.

No PID readings >0, odor, or sheen unless noted in description. Groundwater observed at 6 and 10 feet bgs during drilling. Groundwater measured at 2.54 feet bgs on 1/5/2022.

NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

GeoSciences Inc.

King County Metro South Facilities
Bellevue, WA

MONITORING WELL:
21MW-1

PROJECT NO.: 2021-062-WO31

DRILLING COMPANY: Cascade Drilling, Inc.
DRILLING METHOD: Geoprobe Track Mounted Rig
SAMPLING METHOD: Direct Push
LOCATION: See Figure 2

SURFACE ELEVATION: 14.02 ± feet
CASING ELEVATION 13.72 ± feet

DATE STARTED: 12/20/2021
DATE COMPLETED: 12/20/2021
LOGGED BY: C. Bourgeois

DEPTH (feet)	SYMBOL	USCS SOIL CLASS	DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	PEN. RESISTANCE (blows/6 inches)	OTHER TESTS	PID (ppm)	WELL COMPLETION SCHEMATIC	NOTES	DEPTH (feet)
0			Concrete pavement, 7 inches thick. **(PORTLAND CEMENT CONCRETE)**								0
			No recovery.								
		GM	Silty GRAVEL, moist. **(FILL)**							1/5/2022	
			Dark olive brown find sandy SILT with oxidations and organics, moist. **(NATIVE ALLUVIUM)**		22MW-2-4.5			0.0			5
			No recovery, interval lost Dark olive gray sandy SILT with organics observed on probe sleeve								
10		SM	Dark olive gray very silty fine SAND with organics, moist.		22MW-2-10			0.0			10
		ML	Chocolate brown SILT with lots of yellow-brown organics which decrease with depth, moist.								
		SM	Dary gray/black silty fine SAND, moist.								
15											15

21MW-2 completed to 15 feet below ground surface (bgs).
Permanent well installed to 15 feet bgs 12/20/2021.

No PID readings >0, odor, or sheen unless noted in description. Saturated/wet soils not observed during drilling.
Groundwater measured at 3.70 feet bgs on 1/5/2022.

NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

GeoSciences Inc.

King County Metro South Facilities
Bellevue, WA

MONITORING WELL:
21MW-2

PROJECT NO.: 2021-062-WO31

BORING LOG SUMMARY - King County Metro South Facilities, April 1, 2020

Depth (feet)

BORING ID		0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10	10.5	11	11.5	12	12.5	13	13.5	14	14.5	15
		Description of Materials, Samples, and Recovery																														
20B1	Description	Concrete		Gray Sand and Gravel, Fill					Black to Brown Silt and Clayey Silt with organics, peat, moist to wet														Black Fine Sand and Gray Silt, water-bearing (interpretted, no recovery)										Bottom @ 15 ft
	Recovery (ft)	60%										80%										0%										
	Sample ID	20B1-5																				20B1-W										
20B2	Description	Concrete		Gr.-Br. Sand and Gravel, Fill				Black Silt, moist to wet				Gray Sandy Silt, wet				Brown Silt, Clayey Silt, peat, moist			Black Sand, W.B.	Brown Silt, Clayey Silt, moist		Black Fine to Medium Sand, water-bearing (W.B.)				Gray Sandy Silt, wet		Black Fine to Medium Sand, water-bearing				Bottom @ 15 ft
	Recovery (ft)	40%										100%										100%										
	Sample ID	20B2-W																														
		0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10	10.5	11	11.5	12	12.5	13	13.5	14	14.5	15
20B3	Description	Concrete		Gray Sand and Gravel, Fill					Black to Brown Silt and Clayey Silt with organics, peat, moist to wet			Gray Sandy Silt, wet				Brown Silt, Clayey Silt, peat, moist						Gray Silty Sand and Gravel, wet		Brown Silt with organics, moist		Gray Fine Sand grading to Sandy Silt, water-bearing				Gray Fine to Medium Sand, water-bearing		Bottom @ 15 ft
	Recovery (ft)	60%										95%										100%										
	Sample ID	20B3-4.5										20B3-W																				
20B4	Description	Concrete		Gray Sand and Gravel, Fill				Brown-Gray Silt, moist			Black Fine Sand, water-bearing							Black-Brown Silt, Clayey Silt, peat, moist to wet				Bottom @ 10 ft										
	Recovery (ft)	60%										100%																				
	Sample ID	20B4-4.5										20B4-W																				
		0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10	10.5	11	11.5	12	12.5	13	13.5	14	14.5	15
20B5	Description	Concrete		Brown-Gray Sand and Gravel, Fill										Brown Silt, Clayey Silt, with organics, peat, moist		Gray Silt and Sandy Silt, occassional clay, moist/wet						Gray Silt, some Sandy Silt, wet				Black Fine Sand to Silty Sand, water-bearing		Gray Silt, some Sandy Silt, wet			Black Fine Sand, W.B.	Bottom @ 15 ft
	Recovery (ft)	60%										100%										100%										
	Sample ID	20B5-W																														
B20B6	Description	Concrete		Gray Sand and Gravel, Fill												Black-Gray Silt, moist to wet						Gray Silty Sand and Gravel, wet		Brown Silt, Clayey Silt, peat, wet			Black F. - M. Sand, W.B.	Gray Sandy Silt, wet		Black Fine to Medium Sand, water-bearing			Bottom @ 15 ft
	Recovery (ft)	60%										70%										80%										
	Sample ID	20B6-7																				20B6-W										

BORING LOG SUMMARY - King County Metro South Facilities, April 1, 2020

Depth (feet)

BORING ID		0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10	10.5	11	11.5	12	12.5	13	13.5	14	14.5	15
		Description of Materials, Samples, and Recovery																														
20B7	Description	Concrete		Gray Sand and Gravel, Fill												Gray Silt, moist (interpretted, no recovery)						Brown-Gray Silt, wet					Black Fine Sand, water-bearing		Gray Sandy Silt, wet		Black Fine Sand, W.B.	Bottom @ 15 ft
	Recovery (ft)	50%										0%										100%										
	Sample ID	20B7-W																														
20B8	Description	Concrete		Gray Sand and Gravel, Fill						Gray Silt, moist to wet				Brown Silt, Clayey Silt, with organics,peat, moist							Black Fine Sand to Sandy Silt, water-bearing							Gray Silt, wet		Black Fine Sand, W.B.	Bottom @ 15 ft
	Recovery (ft)	60%										90%										100%										
	Sample ID	20B8-4																			20B8-W											
		0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10	10.5	11	11.5	12	12.5	13	13.5	14	14.5	15
20B9	Description	Concrete		Gray Sand and Gravel, Fill										Brown-Gray Silt, Clayey Silt, with organics, peat, wet												Black Fine Sand, water bearing		Gray Silt, Clayey Silt, wet			Black Fine Sand, W.B.	Bottom @ 15 ft
	Recovery (ft)	60%										100%										100%										
	Sample ID	20B9-W																														

[redacted] N 2400, E 600 Elev. 8.0

Depth	Elev.	Description
0.0 - 2.0	8.0 - 6.0	brown, silty SAND with occasional organics and roots (possible topsoil or fill); loose, moist
2.0 - 3.5	6.0 - 4.5	brown, silty PEAT; soft, wet
3.5 - 10.5	4.5 - -2.5	gray, silty CLAY with some organics; soft, wet
at 10.5	-2.5	black, medium SAND with some silt; loose, wet
		groundwater at depth 3.1' (el. 4.9) completed 12/4/83

[redacted] N 2300, E 700 Elev. 6.5

Depth	Elev.	Description
0.0 - 3.2	6.5 - 3.3	brown, silty PEAT; soft, wet
3.2 - 7.5	3.3 - -1.0	gray, silty CLAY with occasional organics and thin sand layers; soft, wet
7.5 - 9.0	-1.0 - -2.5	gray, silty SAND; loose, wet
		groundwater at depth 2.8' (el. 3.7) completed 12/4/83

LOG OF HAND AUGER HOLES

PROPOSED SOUTH BASE ANNEX
King County, Washington
for Arthur M. James - Engineers, Inc.

Project No.
83-5123-02

Converse Consultants Geotechnical Engineering and Applied Sciences

Drawing No.
A-9

HA-114 N 2200, E 635 Elev. 7.8

Depth	Elev.	Description
0.0 - 1.2	7.8 - 6.6	brown, fine, sandy SILT, trace roots; very soft, wet
1.2 - 1.8	6.6 - 6.0	gray SILT, trace sand; soft, wet
1.8 - 3.8	6.0 - 4.0	gray, silty SAND, lenses of organics; loose, wet
3. 8 - 5.2	4.0 - 2.6	interbedded gray, silty SAND and sandy SILT, numerous organics; loose, wet
5.2 - 7.8	2.6 - 0.0	gray-brown, silty PEAT, trace clay and sand; soft, wet
7.8 - 12.2	0.0 - -4.4	gray, clayey SILT, organic, trace fine sand; soft, wet
12.2 - 13.0	-4.4 - -5.2	gray, fine SAND; loose, wet
		groundwater at 1.9' depth (elev. 5.9) completed 12/14/83

HA-115 N 2125, E 560 Elev. 13.2

Depth	Elev.	Description
0.0 - 1.2	13.2 - 12.0	gray-brown, fine sandy SILT, trace gravel and organics; soft, very moist
1.2 - 1.5	12.0 - 11.7	brown SILT, lenses of organics; soft, wet
1.5 - 5.2	11.7 - 8.0	gray, interbedded SAND/SILT, organic layers, woody in places; loose, wet
5.2 - 7.8	8.0 - 5.4	gray-brown, sandy SILT, pockets of peat; soft, wet
7.8 - 10.4	5.4 - 2.8	gray-brown, clayey SILT, some organics; soft, wet
10.4 - 12.4	2.8 - 0.8	gray, fine SAND; loose, wet
		groundwater at 5.2' depth (elev. 8.0) completed 12/14/83

LOG OF HAND AUGER HOLES

PROPOSED SOUTH BASE ANNEX
King County, Washington
for Arthur M. James - Engineers, Inc.

Project No.
83-5123-02

Converse Consultants Geotechnical Engineering and Applied Sciences

Drawing No.
A-14

DATE DRILLED: 11/30/83

SUMMARY: BORING NO. 5

ELEVATION: Approx. 6.6

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF ACTUAL CONDITIONS ENCOUNTERED.

DEPTH IN FEET	SAMPLE NO.*	SAMPLE	BLOWS/6"	OTHER TESTS**	FIELD MOISTURE % OF DRY WEIGHT	DRY DENSITY PCF	DESCRIPTION	SYMBOL	MOISTURE	CONSISTENCY	ELEV.
											6
					23		**SANDY SILT**; gray-brown, with thin peat layers, little gravel	ML	wet	soft	
	1A	■	9/18"	C	89	43					
5											
							brown, organic silt				0
			25								
	2A	■	34		23	94					
10			50/6"				**SAND**; black, fine	SP	wet	very dense	
											5
	3A	■	6/18"				gray-brown			loose	
15											
											10
			8								
	4A	■	24								
20			19				black			dense	
											15
			3								
	5A	■	18							very dense	
25			55/6"								
											20
			21								
	6A	■	35								
30			42								
											25
			13								
	7A	■	21				1-1/2" layer sandy silt at 33.8'				
35			50/3"								
							increasing silt content				30
			7								
	8A	■	11				very fine, with trace silt, trace gravel			dense	
40			24								
											35
			5								
	9A	■	7		41						
			14				**CLAYEY SILT**; gray (Continued)	MH	wet	stiff	

* A. 2" split-spoon sampler
B. 3" O.D. thin-wall sampler C. 3-1/4" O.D. x 2-1/2" liner
D. 3-1/2" O.D. split barrel sampler X. sample not recovered

**A - Atterberg, C - consolidation, DS - direct shear, G - grain size, T - triaxial, P - permeability

▽ water level
impervious seal
piezometer tip

PROPOSED SOUTH BASE ANNEX
King County, Washington
for Arthur M. James - Engineers, Inc.

Project No.
83-5123-02

Drawing No.
A-5

Converse Consultants Geotechnical Engineering and Applied Sciences

DATE DRILLED:

SUMMARY: BORING NO. 5 (Cont.)

ELEVATION:

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF ACTUAL CONDITIONS ENCOUNTERED.

DEPTH IN FEET	SAMPLE NO.*	SAMPLE	BLOWS/6"	OTHER TESTS**	FIELD MOISTURE % OF DRY WEIGHT	DRY DENSITY PCF	DESCRIPTION	SYMBOL	MOISTURE	CONSISTENCY	ELEV.
45							**CLAYEY SILT**; gray	MH	wet	stiff	-40
	10A	■	1/18"		38		**SANDY SILT**; dark gray	ML	wet	very soft	-45
50											
	11A	■	1/18"		57		**CLAYEY SILT**; dark gray, trace sand	MH	wet	very soft	-50
55											
	12A	■	8 9 10		42		**SANDY SILT**; dark gray	ML	wet	very stiff	-55
60											
	13A	■	1/18"		48		**CLAYEY SILT**; dark gray, with trace sand	MH	wet	soft	-60
65											
	14A	■	1/18"		53						-65
70											
	15A	■	0/18"		28		grades to: **SANDY SILT**; with shell fragments, and trace gravel	ML			-70
75											
	16A	■	8 17 41		16		**SILTY SAND**; gray, fine to medium, with some gravel and shell fragments	SM	wet	very dense	-75
80											
	17A	■	50/4"		11		**SAND**; gray, medium to coarse, with trace gravel and shell fragments fine to medium	SP	wet	very dense	-80
85											
	18A	■	129/6"		16						
90											

Bottom of boring at depth 88.5'
Groundwater encountered at depth 1.3'

PROPOSED SOUTH BASE ANNEX
King County, Washington
for Arthur M. James - Engineers, Inc.

Project No.
83-5123-02

Drawing No.
A-5 (CONT.)

Converse Consultants Geotechnical Engineering and Applied Sciences

DATE DRILLED: 12/2/83

SUMMARY: BORING NO. 6

ELEVATION: Approx. 7.5

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF ACTUAL CONDITIONS ENCOUNTERED.

DEPTH IN FEET	SAMPLE NO.*	SAMPLE	BLOWS/6"	OTHER TESTS**	FIELD MOISTURE % OF DRY WEIGHT	DRY DENSITY PCF	DESCRIPTION	SYMBOL	MOISTURE	CONSISTENCY	ELEV.
											7
							SANDY SILT; brown, with organics	ML	wet	medium stiff	
	1C	■	2/12" 4/6"		54						
5											
							layer of sand with some silt at 4.5			medium dense	0
	2C	■	8 30 50/6"	DS	30	94					
10							**SAND**; brown, fine, with some silt, with trace roots	SP	wet	very dense	
											-5
	3A	■	8 15 11				grades slightly coarser to fine sand with trace silt			medium dense	
15											
											-10
	4A	■	1 8 23							dense	
20											
											-15
	5A	■	15 27 42				with shell fragments and organic fibers			very dense	
25											
											-20
	6A	■	32 42 50/5"								
30											
											-25
	7A	■	24 27 44								
35											
											-30
	8A	■	15 18 17				(Continued)				
40											

* A. 2" split-spoon sampler
B. 3" O.D. thin-wall sampler C. 3-1/4" O.D. x 2-1/2" liner
D. 3-1/2" O.D. split barrel sampler X. sample not recovered

**A - Atterberg, C - consolidation, DS - direct shear, G - grain size, T - triaxial, P - permeability

water level
impervious seal
piezometer tip

PROPOSED SOUTH BASE ANNEX
King County, Washington
for Arthur M. James - Engineers, Inc.

Project No. 83-5123-02

Drawing No. A-6

Converse Consultants Geotechnical Engineering and Applied Sciences

DATE DRILLED:

SUMMARY: BORING NO. 6 (Cont.)

ELEVATION:

THIS SUMMARY APPLIES ONLY AT THE LOCATION OF THIS BORING AND AT THE TIME OF DRILLING. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND MAY CHANGE AT THIS LOCATION WITH THE PASSAGE OF TIME. THE DATA PRESENTED IS A SIMPLIFICATION OF ACTUAL CONDITIONS ENCOUNTERED.

DEPTH IN FEET	SAMPLE NO.*	SAMPLE	BLOWS/6"	OTHER TESTS**	FIELD MOISTURE % OF DRY WEIGHT	DRY DENSITY PCF	DESCRIPTION	SYMBOL	MOISTURE	CONSISTENCY	ELEV.
40							**SAND**; brown, fine, with some silt, with trace roots	SP		very dense	-35
45	9A	■	6 2/12"		39		**SILT**; gray, with trace sand	ML	wet	very soft	-40
50	10	■	push	C	34	83	grades finer to **CLAYEY SILT**	MH		soft	-45
55	11	■	push								-50
60	12	■	push								-55
65	13	■	push	C	57	67					-60
70	14A	■	75 80/4"				**SILTY SAND AND GRAVEL**; gray, fine to coarse sand	SM GM	wet	very dense	-65
75	15A	■	29 76				grades cleaner to **SILTY SAND**, with little gravel	SM	wet	very dense	-70
80	16A	■	100/ 4"				**SILTY SAND**; gray, fine to medium, trace gravel				

Bottom of boring at depth 78.5'
Groundwater encountered at depth 6.0'

* A. 2" split-spoon sampler
B. 3" O.D. thin-wall sampler C. 3-1/4" O.D. x 2-1/2" liner
D. 3-1/2" O.D. split barrel sampler X. sample not recovered

**A - Atterberg, C - consolidation, DS - direct shear, G - grain size, T - triaxial, P - permeability

water level
impervious seal
piezometer tip

PROPOSED SOUTH BASE ANNEX
King County, Washington
for Arthur M. James - Engineers, Inc.

Project No.
83-5123-02

Converse Consultants Geotechnical Engineering and Applied Sciences

Drawing No.
A-6 (CONT.)

Project: METRO SOUTH BASE ANNEX **Project Location:** TUKWILA, WA **Project Number:** 944039NA	**Log of Boring SB-1** Sheet 1 of 1

Date(s) Drilled	10/11/94	Logged By	S. Dunnigan	Checked By	D. Walker
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	8" O.D. HSA	Total Depth Drilled (feet)	18.0
Drill Rig Type	450 Canterra	Drilled By	Ramlo Well Drilling	Hammer Weight/ Drop (lbs/in.)	140#/30"
Apparent Groundwater Depth	7 ft			Surface Elevation (feet)	
Comments		Borehole Backfill	Bentonite Chips	Elevation Datum	Not Surveyed

Depth, feet	SAMPLES Type	Number	Blows per 1/2 foot	Recovery(%)	Moisture Content (%)	Graphic Log	MATERIAL DESCRIPTION	FIELD NOTES
0							Concrete (12"), Pea Gravel (6")	
							Loose, organic clayey SILT (OL), with root material, brown	No evidence of TPH contamination
5		1	3 5 7					
							Medium dense silty SAND (SM), with some organic matter, saturated	
10		2	4 5 10					Sample sent to lab
							Medium dense SAND (SP), dark with red and white grains, saturated	No evidence of TPH contamination
15		3	3 6 4					
							Boring terminated at 18 ft bgs.	
20								
25								

Project: METRO SOUTH BASE ANNEX **Project Location:** TUKWILA, WA **Project Number:** 944039NA	**Log of Boring SB-2** Sheet 1 of 1

Date(s) Drilled	10/11/94	Logged By	S. Dunnigan	Checked By	D. Walker
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	8" O.D. HSA	Total Depth Drilled (feet)	16.5
Drill Rig Type	450 Canterra	Drilled By	Ramlo Well Drilling	Hammer Weight/ Drop (lbs/in.)	140#/30"
Apparent Groundwater Depth	7 ft			Surface Elevation (feet)	
Comments		Borehole Backfill	Bentonite Chips	Elevation Datum	Not Surveyed

Depth, feet	SAMPLES Type	Number	Blows per 1/2 foot	Recovery(%)	Moisture Content (%)	Graphic Log	MATERIAL DESCRIPTION	FIELD NOTES
0							Concrete (12"), Pea gravel (6")	
							Dense clayey SILT (ML), grey, dry	No evidence of TPH contamination
5		1	3 4 3					
							▽ Silty SAND (SM), gray, saturated below 7'	Possible TPH odor
		2	1 1 2					Sample submitted to lab
10		3	3 2 3				SAND (SP), with red and white grains, very dark, saturated	
15		4	2 4 4					
							Boring terminated at 16.5 ft bgs.	
20								
25								

Project: METRO SOUTH BASE ANNEX **Project Location:** TUKWILA, WA **Project Number:** 944039NA	**Log of Boring SB-3** Sheet 1 of 1

Date(s) Drilled	10/11/94	Logged By	S. Dunnigan	Checked By	D. Walker
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	8" O.D. HSA	Total Depth Drilled (feet)	16.5
Drill Rig Type	450 Canterra	Drilled By	Ramlo Well Drilling	Hammer Weight/ Drop (lbs/in.)	140#/30"
Apparent Groundwater Depth	7 ft			Surface Elevation (feet)	
Comments		Borehole Backfill	Bentonite Chips	Elevation Datum	Not Surveyed

Depth, feet	SAMPLES Type	Number	Blows per 1/2 foot	Recovery(%)	Moisture Content (%)	Graphic Log	MATERIAL DESCRIPTION	FIELD NOTES
0							Concrete (12"), Pea Gravel (6")	
							Sandy GRAVEL (GP), backfill material	
5		1	4 5 7					No evidence of impact
		2						Sample sent to lab
10		3	3 3 4				SAND (SP), with white and red grains, dark, saturated	
15		4	2 2 2					
							Boring terminated at 16.5 ft bgs	
20								
25								

Project: METRO SOUTH BASE ANNEX **Project Location:** TUKWILA, WA **Project Number:** 944039NA	**Log of Boring SB-4** Sheet 1 of 1

Date(s) Drilled	10/11/94	Logged By	S. Dunnigan	Checked By	D. Walker
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type	8" O.D. HSA	Total Depth Drilled (feet)	16.5
Drill Rig Type	450 Canterra	Drilled By	Ramlo Well Drilling	Hammer Weight/ Drop (lbs/in.)	140#/30"
Apparent Groundwater Depth	7 ft			Surface Elevation (feet)	
Comments		Borehole Backfill	Bentonite Chips	Elevation Datum	Not Surveyed

Depth, feet	SAMPLES Type	Number	Blows per 1/2 foot	Recovery(%)	Moisture Content (%)	Graphic Log	MATERIAL DESCRIPTION	FIELD NOTES
0							Concrete (12"), Pea Gravel (6")	
							Sandy Gravel (GP), backfill material	No evidence of TPH contamination
5		1	1 3 2					
		2	1 2 1					Sample sent to lab
10		3						
15		4						
							Boring terminated at 16.5 ft bgs.	
20								
25								

Project: METRO, SOUTH BASE **Project Location:** TUKWILA, WA **Project Number:** 944032NA	**Log of Boring SB-5** Sheet 1 of 1

Date(s) Drilled	12/12/94	Logged By	BH	Checked By	JB
Drilling Method	HOLLOW STEM AUGER	Top of PVC Elevation (feet)	FLUSH MOUNT	Total Depth Drilled (feet)	16.5
Drill Rig Type	MOBILE-B61	Drilled By	TACOMA PUMP AND DRILL	Hammer Weight/ Drop (lbs/in.)	140/30
Groundwater Level (ft bgs)	7.75	Sampler Type	SPLIT SPOON	Approx. Surface Elevation (feet)	98
Diameter of Hole (inches)	8 — Diameter of Well (inches) 2	Type of Well Casing	SCH 40 PVC	Screen Perforation	0.020"
Type of Sand Pack	10/20 SILICA	Type/Thickness of Seal(s)	BENTONITE CHIPS 1-3 FEET		
Comments					

Depth, feet	Elevation, feet	SAMPLES Type	Number	Blows/6in	Graphic Log	MATERIAL DESCRIPTION	Well Completion Log	OVA (ppm) Headspace	Background	Drilling Rate (time)	REMARKS
0						Ground Surface - Concrete				1335	
				40 30		1 - 2.0' SANDY GRAVEL (GP) - Brown to gray, angular gravel, medium grained sand.		1	0		
	95					2-4' Gravels become rounded (FILL)					
5			SB-5	1 2 4		5.0 - 6.5 CLAYEY SILT (ML), brown to gray, moist, abundnant organics.		6	0		Sample sent to lab
	90					6.5 - 16.5 SAND (SM), Brown to black, fine grained, minor organics. Wet at 7.5-8.0					
10				8 3 6				4	0		
	85										
15				6 9 10		Same as above; sand becomes finer grained		5	0	1400	
	80					Boring terminated at 16.5'BGS.					
20											

Project: METRO, SOUTH BASE **Project Location:** TUKWILA, WA **Project Number:** 944032NA	**Log of Boring SB-6** Sheet 1 of 1

Date(s) Drilled	12/12/94	Logged By	BH	Checked By	JB
Drilling Method	HOLLOW STEM AUGER	Drill Bit Size/Type	8"	Total Depth Drilled (feet)	16.0
Drill Rig Type	MOBILE-B61	Drilled By	TACOMA PUMP AND DRILL	Hammer Weight/ Drop (lbs/in.)	140/30
Apparent Groundwater Depth	7.5 ft			Surface Elevation (feet)	100
Comments		Borehole Backfill	BENTONITE CHIPS	Elevation Datum	RELATIVE

Depth, feet	SAMPLES Type	Number	Blows per 1/2 foot	Recovery(%)	Moisture Content (%)	Graphic Log	MATERIAL DESCRIPTION	FIELD NOTES
0							Ground Surface - Concrete	
							1 - 9.0' SANDY GRAVEL (GP) - Brown to gray, fine to medium grained sand	Cobble encountered at 2 ft. Sample spoon refusal
5		SB6-1	17 22 14		0			
			2 4 8		0		▽ Groundwater level approximately 7.5 feet.	Collect lab sample from 7-9 ft, poor recovery, abandon boring
10							Boring Terminated at 9.0'BGS.	
15								
20								

Project: METRO, SOUTH BASE **Project Location:** TUKWILA, WA **Project Number:** 944032NA	**Log of Boring SB-7** Sheet 1 of 1

Date(s) Drilled	12/12/94 12/13/94	Logged By	BH	Checked By	JB
Drilling Method	HOLLOW STEM AUGER	Top of PVC Elevation (feet)	FLUSH MOUNT	Total Depth Drilled (feet)	16.5
Drill Rig Type	MOBILE-B61	Drilled By	TACOMA PUMP AND DRILL	Hammer Weight/ Drop (lbs/in.)	140/30
Groundwater Level (ft bgs)	7.0	Sampler Type	SPLIT SPOON	Approx. Surface Elevation (feet)	98
Diameter of Hole (inches)	8 / Diameter of Well (inches) 2	Type of Well Casing	SCH 40 PVC	Screen Perforation	0.020"
Type of Sand Pack	10/20 SILICA	Type/Thickness of Seal(s)	BENTONITE CHIPS 1-3 FEET		
Comments					

Depth, feet	Elevation, feet	SAMPLES Type	Number	Blows/6in	Graphic Log	MATERIAL DESCRIPTION	Well Completion Log	OVA (ppm) Headspace	Background	Drilling Rate (time)	REMARKS
0						Ground Surface - Concrete				1530	
				50 60		0 - 4' GRAVEL (GP) - Brown to gray, angular gravel.		1	0		
	95					(FILL)					
5			SB-7	11 12 8		4-14' SANDY GRAVEL (GW), Brown, with fine to coarse grained sand, sand becomes finer grained towards bottom of interval.		3	0		Sample sent to lab
						Wet at 7.0					
	90										
10				12 19 5				3	0		
	85										
15				5 5 12		SAND (SM) - Light to dark gray, fine to medium grained, wet, dark colored due to organics.		4	0		
						Boring terminated at 16.5'BGS.				0730	
	80										
20											

Project: METRO, SOUTH BASE **Project Location:** TUKWILA, WA **Project Number:** 944032NA	**Log of Boring SB-8** Sheet 1 of 1

Date(s) Drilled	12/12/94	Logged By	BH	Checked By	JB
Drilling Method	HOLLOW STEM AUGER	Top of PVC Elevation (feet)	FLUSH MOUNT	Total Depth Drilled (feet)	17.0
Drill Rig Type	MOBILE-B61	Drilled By	TACOMA PUMP AND DRILL	Hammer Weight/ Drop (lbs/in.)	140/30
Groundwater Level (ft bgs)	11.00	Sampler Type	SPLIT SPOON	Approx. Surface Elevation (feet)	98
Diameter of Hole (inches)	8 — Diameter of Well (inches) 2	Type of Well Casing	SCH 40 PVC	Screen Perforation	0.020"
Type of Sand Pack	10/20 SILICA	Type/Thickness of Seal(s)	BENTONITE CHIPS 1-3 FEET		
Comments					

Depth, feet	Elevation, feet	SAMPLES Type	Number	Blows/6in	Graphic Log	MATERIAL DESCRIPTION	Well Completion Log	OVA (ppm) Headspace	Background	Drilling Rate (time)	REMARKS
0						Ground Surface - Concrete				1100	
				29 60		1 - 4' GRAVEL (GP), Angular gravel to .5" in diameter.		0	0		
	95					(FILL) 4 - 5' SILTY SAND (SM), Brown to black, fine grained, abundant organics.					
5				1 2 4		5-11' SILTY SAND, Brown to gray, fine to medium grained sand, moist, natural organic odor.		1	0		
	90										
10			SB-8	4 8 6		Wet at 11'		0	0		Sample sent to lab
						11-17' SAND (SW) - Grey to dark grey, medium grained, water at contact with sand.					
	85										
15				6 9 10					0	1200	
	80					Boring terminated at 17.0'BGS.					
20											

GROUNDWATER SAMPLING DATA SHEET

Well Number: MW-1 Sample Number: MW-1 Date: 10/4/94

Project: South Base Annex Project Number: 944039NA Task: 200

Well Depth: 11.50'

Water Depth: 6.72'

Feet of Water: 4.78'

Gallons per Foot: 2.61 gal/ft

Well Volume: 12.5 gal

Purge Volume: 40 gal

Measuring Point (MP): —

Elevation of MP: —

Elevation of Water: —

Well Diameter: 8"

Well Diameter	Gallons per casing foot
2 inches	0.16
4 inches	0.65

Purge Method: Bailer (Disposable)

Sample Method: Bailer

Water Disposal: On Site Oil/Water Separator

Weather: Partly Cloudy

Sampler(s): S. Dunnigan / C. Garrison

pH meter: —

Eh meter: —

Conductivity meter: —

Calibration Date: —

QA/QC samples: —

Field Parameters	Before Purging	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Sample
Time		9:45	10:00	10:20			10:30
pH		6.82	6.82	6.81			6.81
Conductivity		405 µmhos	432 µmhos	488 µmhos			484 µmhos
Eh		—	—	—			—
Temperature		18.5°C	18.5°C	18.6°C			18.6°C

GROUNDWATER SAMPLING DATA SHEET

Well Number: MW-2 Sample Number: MW-2 Date: 10/4/94

Project: South Base Annex Project Number: 944039NA Task: 200

Well Depth: 11.30'

Water Depth: 6.56'

Feet of Water: 4.74

Gallons per Foot: 2.61 gal/ft

Well Volume: 12.4 gal

Purge Volume: 40 gallons

Measuring Point (MP): —

Elevation of MP: —

Elevation of Water: —

Well Diameter: —

Well Diameter	Gallons per casing foot
2 inches	0.16
4 inches	0.65

Purge Method: Bailer (Disposable)

Sample Method: Bailer

Water Disposal: On Site Oil/Water Separator

Weather: Partly Cloudy

Sampler(s): S. Dunnigan / C. Garrison

pH meter: —

Eh meter: —

Conductivity meter: —

Calibration Date: —

QA/QC samples: —

Field Parameters	Before Purging	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Sample
Time		1:40	1:50	2:10			2:20
pH		6.55	6.55	6.46			6.46
Conductivity		414 µmhos	424 µmhos	447 µmhos			449 µmhos
Eh		—	—	—			—
Temperature		19.9°C	19.9°C	18.9°C			18.9°C

GROUNDWATER SAMPLING DATA SHEET

Well Number: MW-3 Sample Number: MW-3 Date: 10/11/94

Project: South Base Annex Project Number: 944039NA Task: 200

Well Depth: 11.30'

Water Depth: 5.98'

Feet of Water: 5.32'

Gallons per Foot: 2.61 gal/ft

Well Volume: 13.8 gal

Purge Volume: 40 gallons

Measuring Point (MP): —

Elevation of MP: —

Elevation of Water: —

Well Diameter: —

Well Diameter	Gallons per casing foot
2 inches	0.16
4 inches	0.65

Purge Method: Bailer (Disposable)

Sample Method: Bailer

Water Disposal: On Site Oil/Water Separator

Weather: Partly Cloudy

Sampler(s): S. Dunnigan/C. Garrison

pH meter: —

Eh meter: —

Conductivity meter: —

Calibration Date: —

QA/QC samples: —

Field Parameters	Before Purging	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Sample
Time		10:20	10:30	10:40			10:55
pH		6.80	6.65	6.65			6.60
Conductivity		455 µmhos	487 µmhos	475 µmhos			474 µmhos
Eh		—	—	—			—
Temperature		18.9°C	19.0°C	19.0°C			19.2°C

GROUNDWATER SAMPLING DATA SHEET

Well Number: MW-4 Sample Number: MW-4 Date: 10/11/94

Project: South Base Annex Project Number: 944039NA Task: 200

Well Depth: 11.16'

Water Depth: 6.36'

Feet of Water: 4.80'

Gallons per Foot: 2.61 gal/ft

Well Volume: 12.5 gal

Purge Volume: 40 gallons

Measuring Point (MP): –

Elevation of MP: –

Elevation of Water: –

Well Diameter: 8"

Well Diameter	Gallons per casing foot
2 inches	0.16
4 inches	0.65

Purge Method: Bailer (Disposable)

Sample Method: Bailer

Water Disposal: On site Oil/Water Separator

Weather: Cloudy / Partly Sunny

Sampler(s): S. Dunnigan / C. Garrison

pH meter: –

Eh meter: –

Conductivity meter: –

Calibration Date: –

QA/QC samples: –

Field Parameters	Before Purging	Volume 1	Volume 2	Volume 3	Volume 4	Volume 5	Sample
Time		12:10	12:15	12:20			12:45
pH		6.78	6.78	6.78			6.61
Conductivity		518 µmhos	522 µmhos	524 µmhos			501 µmhos
Eh		–	–	–			–
Temperature		19.3°C	19.3°C	19.3°C			19.6°C

GROUNDWATER SAMPLING DATA SHEET

Well Number:	SB-5	Sample Number:	SB-5
Project Name:	METRA S. BASIC	Project/Task:	9440.39NA/1000
		Date:	12-17-94
Well Depth:	14.10	Measuring Point (MP):	TOC
Water Depth:	~~7.50~~ 6.66	Elevation of MP:	NA
Feet of Water:	7.50	Elevation of Water:	NA
Gallons per Foot:	0.16		
		Well Diameter:	2 INCHES
Well Volume:	1.20		
Purge Volume:	6.0		

Well Diameter	Gallons per casing foot
2 inches	0.16
4 inches	0.65

Purge Method:	POLYETHYLENE BAILER	pH meter:	BECKMAN
Sample Method:	POLYETHYLENE BAILER	Eh meter:	NA
Water Disposal:	OIL SEPERATOR	Conductivity meter:	HANNAH
Weather:	RAINING MID 40'S	D.O. Meter:	NA
Sampler(s):	RICHARD GOGGINS	Calibration Date:	12-19-94

QA/QC Samples

Blind Duplicate	NA
MS/MSD	NA
Replicate	NA
Blank	NA

Field Parameters	0 Volumes	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes	Sample
Temperature	14.0	14.0	14.0	14.0			
pH	6.45	6.46	6.45	6.45			
Conductivity	540	536	541	541			
Eh	NA	NA	NA	NA	NA	NA	
Dissolved Oxygen	NA	NA	NA	NA	NA	NA	
Turbidity	HIGH	HIGH	HIGH	HIGH			
Time	1235	1237	1239	1241			

BOTTLE REQUIREMENTS

Analysis	Bottle Type	Number	Number MS/MSD	Bottle Type	Bottle Number	Number MS/MSD

GROUNDWATER SAMPLING DATA SHEET

Well Number:	SB-7	Sample Number:	SB-7
Project Name:	METRO S. BASE	Project/Task:	944039NA/1000
		Date:	12-19-94
Well Depth:	12.00	Measuring Point (MP):	TOC
Water Depth:	4.80	Elevation of MP:	NA
Feet of Water:	7.20	Elevation of Water:	NA
Gallons per Foot:	0.16		
		Well Diameter:	2 INCHES
Well Volume:	1.15		
Purge Volume:	5.75		

Well Diameter	Gallons per casing foot
2 inches	0.16
4 inches	0.65

Purge Method:	POLYETHYLENE BAILER	pH meter:	BECKMAN
Sample Method:	POLYETHYLENE BAILER	Eh meter:	NA
Water Disposal:	OIL SEPERATOR	Conductivity meter:	HANNAH
Weather:	RAINING MID 40'S	D.O. Meter:	NA
Sampler(s):	RICHARD GOGGINS	Calibration Date:	12-19-94

QA/QC Samples

Blind Duplicate	SB-6
MS/MSD	NA
Replicate	NA
Blank	NA

Field Parameters	0 Volumes	1 Volume	2 Volumes	3 Volumes	4 Volumes	5 Volumes	Sample
Temperature	11.6	11.0	10.9	10.8	11.3	10.8	
pH	6.49	6.40	6.35	6.32	6.27	6.29	
Conductivity	639	621	582	537	567	498	
Eh	NA	NA	NA	NA	NA	NA	
Dissolved Oxygen	NA	NA	NA	NA	NA	NA	
Turbidity	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH	
Time	1145	1150	1155	1200	1205	1210	

BOTTLE REQUIREMENTS

Analysis	Bottle Type	Number	Number MS/MSD	Bottle Type	Bottle Number	Number MS/MSD

GROUNDWATER SAMPLING DATA SHEET

Well Number:	SB-8	Sample Number:	SB-8
Project Name:	METRO S. BASE	Project/Task:	944039NA/1000
		Date:	12-19-94
Well Depth:	11.10	Measuring Point (MP):	TOC
Water Depth:	4.28	Elevation of MP:	NA
Feet of Water:	6.82	Elevation of Water:	NA
Gallons per Foot:	0.16		
		Well Diameter:	2 INCHES
Well Volume:	1.09		
Purge Volume:	5.45		

Well Diameter	Gallons per casing foot
2 inches	0.16
4 inches	0.65

Purge Method:	polyethylene BAILER	pH meter:	BECKMAN
Sample Method:	polyethylene BAILER	Eh meter:	NA
Water Disposal:	OIL SEPARATOR	Conductivity meter:	HANNAH
Weather:	RAINING MID 40'S	D.O. Meter:	NA
Sampler(s):	RICHARD GOGGINS	Calibration Date:	12-19-94

QA/QC Samples

Blind Duplicate	NA
MS/MSD	NA
Replicate	NA
Blank	NA

Field Parameters	**0 Volumes**	**1 Volume**	**2 Volumes**	**3 Volumes**	**4 Volumes**	**5 Volumes**	**Sample**
Temperature	14.2	14.3					
pH	6.13	6.15					
Conductivity	705	700					
Eh	NA	NA					
Dissolved Oxygen	NA	NA					
Turbidity	HIGH	HIGH					
Time	1025	1030					

BOTTLE REQUIREMENTS

Analysis	**Bottle Type**	**Number**	**Number MS/MSD**	**Bottle Type**	**Bottle Number**	**Number MS/MSD**

DEPARTMENT OF ECOLOGY
State of Washington

Resource Protection Well Report

Submit one well report per well installed. See page two for instructions.

Type of Work:

☒ Construction
☐ Decommission ⇨ Original NOI No. _____

Ecology Well ID Tag No. BNF195

Site Well Name B-25

Consulting Firm _____

Was a variance approved for this well/boring? ☐ Yes ☐ No

If yes, what was the variance for? _____

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported are true to my best knowledge and belief.

☒ Driller ☐ Trainee ☐ Engineer

Name (Print Last, First Name) Thompson, Jerrod

Driller/Engineer/Trainee Signature _____

License No. 2823

Company Name Holocene Drilling Inc.

If trainee box is checked, sponsor's license number: _____

Sponsor's signature _____

Notice of Intent No. RE19268

Type of Well:

☒ Resource Protection Well ☐ Injection Point
☐ Remediation Well ☐ Grounding Well
☐ Geotechnical Soil Boring ☐ Ground Source Heat Pump
☐ Environmental Boring ☐ Other _____
↳ ☐ Soil- ☐ Vapor- ☐ Water-sampling

Property Owner King County Transit

Well Street Address 11911 E Marginal Way S

City Tukwila County King

Tax Parcel No. _____

Location (see instructions): WWM ☐ or EWM ☒

SW ¼-¼ NW ¼, Section 10 Town 23 Range 4E

Latitude (Example: 47.12345) _____

Longitude (Example: -120.12345) _____

(WGS 84 Coordinate System)

Borehole diameter 6 inches Casing diameter 2 inches

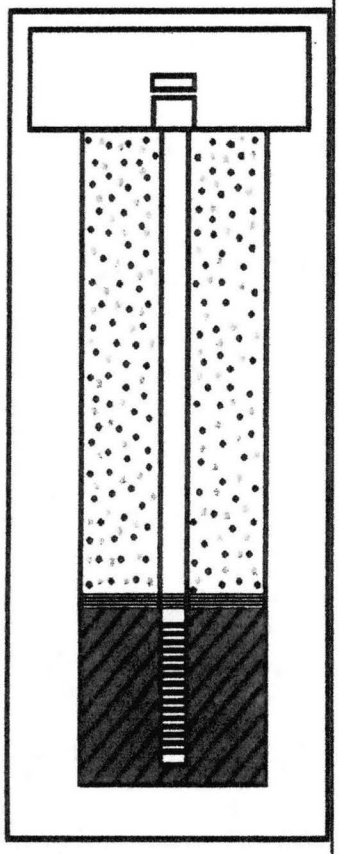
Static water level _____ ft below top of casing Date _____

☐ Above-ground completion with bollards ☒ Flush monument

↳ Stick-up of top of well casing _____ ft above ground surface

Start Date 4-21-2020 Completed Date 4-21-2020

Construction Design



Vault 0 FT to 2 FT

Seal 2 FT to 3 FT

Filter Pack 3 FT to 20 FT

Well Data

Casing Diameter 2"

Casing Material PVC

☐ Welded ☒ Threaded ☐ Glued

Well Seal Material: Bentonite chips

Borehole Diameter:
6 From 0 to 36.5
____ From ____ to ____

Screen:

Material 2" PVC

From 5 to 20

Slot Size 20

Filter Pack:

Material Colorado Sand

Size 12/20

Driller's Log

Fill

0 FT - 8 FT

sand & silt

8 FT - 36.5 FT

____ FT - ____ FT

____ FT - ____ FT

Received
Department of Ecology
MAY 26 2020
Water Resources Program
NWRO

ECY 050-12

Appendix F

TEE Form

Voluntary Cleanup Program

Washington State Department of Ecology
Toxics Cleanup Program

TERRESTRIAL ECOLOGICAL EVALUATION FORM

Under the Model Toxics Control Act (MTCA), a terrestrial ecological evaluation is necessary if hazardous substances are released into the soils at a Site. In the event of such a release, you must take one of the following three actions as part of your investigation and cleanup of the Site:

1. Document an exclusion from further evaluation using the criteria in WAC 173-340-7491.
2. Conduct a simplified evaluation as set forth in WAC 173-340-7492.
3. Conduct a site-specific evaluation as set forth in WAC 173-340-7493.

When requesting a written opinion under the Voluntary Cleanup Program (VCP), you must complete this form and submit it to the Department of Ecology (Ecology). The form documents the type and results of your evaluation.

Completion of this form is not sufficient to document your evaluation. You still need to document your analysis and the basis for your conclusion in your cleanup plan or report.

If you have questions about how to conduct a terrestrial ecological evaluation, please contact the Ecology site manager assigned to your Site. For additional guidance, please refer to https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Terrestrial-ecological-evaluation.

Step 1: IDENTIFY HAZARDOUS WASTE SITE	
Please identify below the hazardous waste site for which you are documenting an evaluation.	
Facility/Site Name: King County METRO Transit S Facilities/S Annex	
Facility/Site Address: 11911 E Marginal Way, Tukwila, WA 98168	
Facility/Site No: 8422289	VCP Project No.:

Step 2: IDENTIFY EVALUATOR			
Please identify below the person who conducted the evaluation and their contact information.			
Name: Lisa Gilbert			Title: Senior Hydrogeologist
Organization: Parametrix, Inc.			
Mailing address: 719 2nd Avenue, Suite 200			
City: Seattle		State: WA	Zip code: 98104
Phone: 206.394-3667	Fax:	E-mail: lgilbert@parametrix.com	

Step 3: DOCUMENT EVALUATION TYPE AND RESULTS

A. Exclusion from further evaluation.

1. Does the Site qualify for an exclusion from further evaluation?

☐ Yes *If you answered **"YES,"** then answer **Question 2**.*

☒ No or Unknown *If you answered **"NO" or "UNKNOWN,"** then skip to **Step 3B** of this form.*

2. What is the basis for the exclusion? *Check all that apply. Then skip to **Step 4** of this form.*

Point of Compliance: WAC 173-340-7491(1)(a)

☐ All soil contamination is, or will be,* at least 15 feet below the surface.

☐ All soil contamination is, or will be,* at least 6 feet below the surface (or alternative depth if approved by Ecology), and institutional controls are used to manage remaining contamination.

Barriers to Exposure: WAC 173-340-7491(1)(b)

☐ All contaminated soil, is or will be,* covered by physical barriers (such as buildings or paved roads) that prevent exposure to plants and wildlife, and institutional controls are used to manage remaining contamination.

Undeveloped Land: WAC 173-340-7491(1)(c)

☐ There is less than 0.25 acres of contiguous# undeveloped± land on or within 500 feet of any area of the Site and any of the following chemicals is present: chlorinated dioxins or furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, heptachlor epoxide, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, or pentachlorobenzene.

☐ For sites not containing any of the chemicals mentioned above, there is less than 1.5 acres of contiguous# undeveloped± land on or within 500 feet of any area of the Site.

Background Concentrations: WAC 173-340-7491(1)(d)

☐ Concentrations of hazardous substances in soil do not exceed natural background levels as described in WAC 173-340-200 and 173-340-709.

* An exclusion based on future land use must have a completion date for future development that is acceptable to Ecology.

± "Undeveloped land" is land that is not covered by building, roads, paved areas, or other barriers that would prevent wildlife from feeding on plants, earthworms, insects, or other food in or on the soil.

"Contiguous" undeveloped land is an area of undeveloped land that is not divided into smaller areas of highways, extensive paving, or similar structures that are likely to reduce the potential use of the overall area by wildlife.

B. Simplified evaluation.

1. Does the Site qualify for a simplified evaluation?

☒ Yes *If you answered **"YES,"** then answer **Question 2** below.*

☐ No or Unknown *If you answered **"NO"** or **"UNKNOWN,"** then skip to **Step 3C** of this form.*

2. Did you conduct a simplified evaluation?

☒ Yes *If you answered **"YES,"** then answer **Question 3** below.*

☐ No *If you answered **"NO,"** then skip to **Step 3C** of this form.*

3. Was further evaluation necessary?

☒ Yes *If you answered **"YES,"** then answer **Question 4** below.*

☐ No *If you answered **"NO,"** then answer **Question 5** below.*

4. If further evaluation was necessary, what did you do?

☒ Used the concentrations listed in Table 749-2 as cleanup levels. *If so, then skip to **Step 4** of this form.*

☐ Conducted a site-specific evaluation. *If so, then skip to **Step 3C** of this form.*

5. If no further evaluation was necessary, what was the reason? *Check all that apply. Then skip to **Step 4** of this form.*

Exposure Analysis: WAC 173-340-7492(2)(a)

☐ Area of soil contamination at the Site is not more than 350 square feet.

☐ Current or planned land use makes wildlife exposure unlikely. Used Table 749-1.

Pathway Analysis: WAC 173-340-7492(2)(b)

☐ No potential exposure pathways from soil contamination to ecological receptors.

Contaminant Analysis: WAC 173-340-7492(2)(c)

☐ No contaminant listed in Table 749-2 is, or will be, present in the upper 15 feet at concentrations that exceed the values listed in Table 749-2.

☐ No contaminant listed in Table 749-2 is, or will be, present in the upper 6 feet (or alternative depth if approved by Ecology) at concentrations that exceed the values listed in Table 749-2, and institutional controls are used to manage remaining contamination.

☐ No contaminant listed in Table 749-2 is, or will be, present in the upper 15 feet at concentrations likely to be toxic or have the potential to bioaccumulate as determined using Ecology-approved bioassays.

☐ No contaminant listed in Table 749-2 is, or will be, present in the upper 6 feet (or alternative depth if approved by Ecology) at concentrations likely to be toxic or have the potential to bioaccumulate as determined using Ecology-approved bioassays, and institutional controls are used to manage remaining contamination.

C. Site-specific evaluation. A site-specific evaluation process consists of two parts: (1) formulating the problem, and (2) selecting the methods for addressing the identified problem. Both steps require consultation with and approval by Ecology. *See* WAC 173-340-7493(1)(c).

1. Was there a problem? *See* WAC 173-340-7493(2).

☐ Yes *If you answered **"YES,"** then answer **Question 2** below.*

☐ No *If you answered **"NO,"** then identify the reason here and then skip to **Question 5** below:*

☐ No issues were identified during the problem formulation step.

☐ While issues were identified, those issues were addressed by the cleanup actions for protecting human health.

2. What did you do to resolve the problem? *See* WAC 173-340-7493(3).

☐ Used the concentrations listed in Table 749-3 as cleanup levels. *If so, then skip to **Question 5** below.*

☐ Used one or more of the methods listed in WAC 173-340-7493(3) to evaluate and address the identified problem. *If so, then answer **Questions 3 and 4** below.*

3. If you conducted further site-specific evaluations, what methods did you use? *Check all that apply. See* WAC 173-340-7493(3).

☐ Literature surveys.

☐ Soil bioassays.

☐ Wildlife exposure model.

☐ Biomarkers.

☐ Site-specific field studies.

☐ Weight of evidence.

☐ Other methods approved by Ecology. If so, please specify:

4. What was the result of those evaluations?

☐ Confirmed there was no problem.

☐ Confirmed there was a problem and established site-specific cleanup levels.

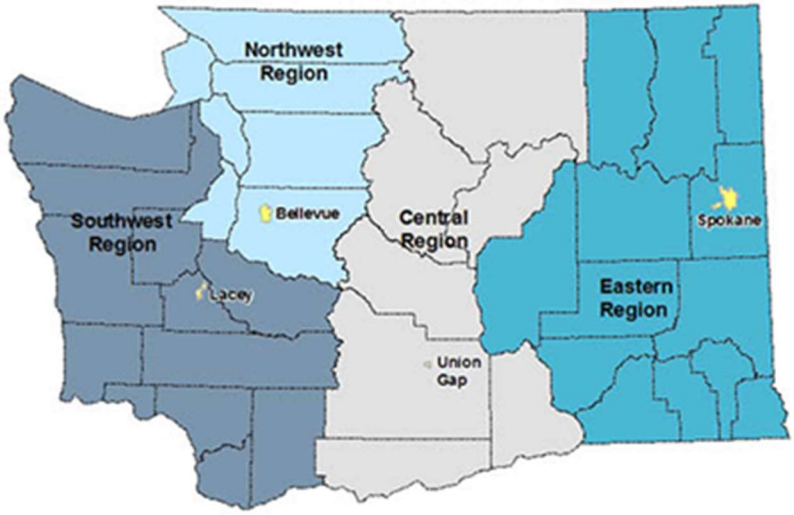
5. Have you already obtained Ecology's approval of both your problem formulation and problem resolution steps?

☐ Yes If so, please identify the Ecology staff who approved those steps:

☐ No

Step 4: SUBMITTAL

Please mail your completed form to the Ecology site manager assigned to your Site. If a site manager has not yet been assigned, please mail your completed form to the Ecology regional office for the County in which your Site is located.



Northwest Region: Attn: VCP Coordinator 3190 160th Ave. SE Bellevue, WA 98008-5452	**Central Region:** Attn: VCP Coordinator 1250 West Alder St. Union Gap, WA 98903-0009
Southwest Region: Attn: VCP Coordinator P.O. Box 47775 Olympia, WA 98504-7775	**Eastern Region:** Attn: VCP Coordinator N. 4601 Monroe Spokane WA 99205-1295

If you need this publication in an alternate format, please call the Toxics Cleanup Program at 360-407-7170. People with hearing loss can call 711 for Washington Relay Service. People with a speech disability can call 877-833-6341.