2023 ANNUAL PROGRESS REPORT

SWMU 14 – OILY WATER SEWER

PHILLIPS 66 FERNDALE REFINERY

MARCH 28, 2024

PREPARED BY:

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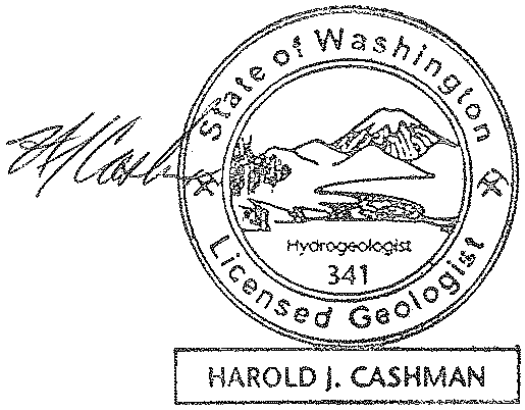
Bellingham, WA 98225

PREPARED FOR:

Phillips 66 Ferndale Refinery
3901 Unick Rd
Ferndale, Washington 98248

CERTIFICATION STATEMENT

All geologic and hydrogeologic work performed pursuant to this report was conducted under the supervision and direction of the geologist listed below:



3/28/2024

Harold Cashman P.G. Date

All engineering work performed pursuant to this report was conducted under the supervision and direction of the engineer listed below:

3/28/2024

Eric Libolt P.E. Date

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LIST OF APPENDICES

ACRONYMS AND ABBREVIATIONS

AO	-	Agreed Order
AOC	-	Area of Concern
bgs	-	below ground surface
BTEX	-	Benzene, Toluene, Ethylbenzene, and Xylenes
CCTV	-	Closed Circuit Television
CLARC	-	Cleanup Levels and Risk Calculation
CUL	-	Clean-up levels
Ecology	-	Washington State Department of Ecology
EPH	-	Extractable Petroleum Hydrocarbons
ER	-	Environmental Rating
GW	-	Groundwater
IRP	-	Investigation and Response Plan
MH	-	Manhole
MTCA	-	Model Toxics Control Act
NASSCO		National Association of Sewer Service Companies
OWS	-	Oily Water Sewer
PAH	-	Polycyclic Aromatic Hydrocarbons
PID	-	Photoionization Detector
PVC	-	Polyvinyl Chloride
QA/QC	-	Quality Assurance/Quality Control
SAP	-	Sampling and Analysis Plan
TPH	-	Total Petroleum Hydrocarbons
VOC	-	Volatile Organic Compounds
VPH	-	Volatile Petroleum Hydrocarbons
WAC	-	Washington State Administrative Code

1. INTRODUCTION

This annual progress report has been prepared in accordance with the requirements in Section VII.C. of Agreed Order No DE 16297 (AO). The AO was entered into by the Washington State Department of Ecology (Ecology) and Phillips 66 Ferndale Refinery. The objective of the AO is to investigate and conduct remedial actions to the Phillips 66 Ferndale Refinery's oily water sewer (OWS) system, also referred to as Solid Waste Management Unit 14 (SWMU-14).

Per the AO, an Investigation and Response Plan (IRP) was prepared to provide a framework to investigate the integrity of the OWS and respond to any potential releases of contamination to soil and/or groundwater (GW). The IRP described four inspection phases of the major OWS trunk lines to be completed by December 31, 2029. Inspections required by Phase I were completed in 2021. The Phase I inspections completed in 2021 identified six locations with an environmental rating (ER) of ER=4. As described in the 2021 annual report two soil samples contained petroleum concentrations which exceeded the target cleanup levels, this area was identified as Area of Concern-1 (AOC-1). As described in the 2022 annual report, further site characterization and remediation at the AOC-1 site was completed in 2022.

Per the IRP, all accessible Phase II inspections were completed in 2023. This report summarizes the completion of groundwater monitoring remediation of AOC-1, final repairs of the Phase I trunk line sections, and inspection findings for Phase II trunklines. All Figures referenced in this report are provided in Appendix A. All Tables referenced in this report are provided in Appendix B.

1.1 GENERAL SITE INFORMATION

The Phillips 66 Ferndale Refinery is located at 3901 Unick Road in Ferndale, Washington (parcel 390133197340). The refinery is in Section 32 in Township 39 North, Range 1 East. The refinery is situated on the Strait of Georgia approximately 6.03 miles west of I-5. The refinery has a median elevation of approximately 200 feet above mean sea level and the site topography generally slopes from the east/northeast to the west/southwest. A site location map is provided as Figure 1.

1.2 CONTACT INFORMATION

Contact information for the Ecology site manager, project consultant and property owner/facility operator are included below.

- Ecology Site Manager: Liem Nguyen
  - Address: 300 Desmond Drive SE, Lacey, WA 98503
  - Phone: (360) 790-4730
  - Email: lngu461@ecy.wa.gov
- Project Consultant: ALL4, LLC.
  - Address: 228 E Champion St #101, Bellingham, WA 98225
  - Contact: Eric Libolt
  - Phone: (360) 385-8326
  - Email: elibolt@all4inc.com
- Property Owner/Facility Operator: Phillips 66
  - Address: 3901 Unick Road, Ferndale, WA 98248
  - Contact: Josh Gardner
  - Phone: (360) 384-7165
  - Email: Josh.Gardner@p66.com

2. AOC-1 SITE CHARACTERIZATION

As described in the 2021 annual report, two soil samples contained petroleum concentrations that exceeded the target cleanup levels. This area was identified as AOC-1 and is shown on Figure 2.

As described in 2022 annual report, site characterization of the AOC-1 site was initiated. Site characterization was conducted to determine the horizontal and vertical extent of release at AOC-1 and potential impacts to GW. As part of the site characterization, soil samples were collected, and three GW monitoring wells were installed to determine potential impacts to GW.

2.1 GROUNDWATER SAMPLING 2022

Groundwater monitoring wells MW-OWS-1, MW-OWS-2, and MW-OWS-3 were installed to a depth of 15 feet below ground surface (bgs) and were constructed with machine slotted, 2-inch diameter PVC pipe. The first three quarters of GW monitoring were completed on June 6, 2022, August 24, 2022, November 14 & 16, 2022, and December 15, 2022. All sample results meet groundwater MCTA Method A Cleanup Levels. The ground water monitoring well details and groundwater results are summarized in the 2022 annual report.

2.2 GROUNDWATER SAMPLING 2023

Groundwater sampling was completed by using a low-flow (minimal drawdown) groundwater sampling technique, recommended by the U.S. Environmental Protection Agency and can be found at epa.gov. This technique minimizes the impact of the purging process on GW chemistry which provides an accurate representation of the GW condition at the time of sampling. Depth to water is measured prior to purging and sample collection. Purging is considered adequate when water chemistry parameters stabilize. All samples were stored in laboratory supplied containers and immediately placed on ice in a cooler.

Fourth quarter GW sampling was completed on February 28, 2023, and March 1, 2023. Groundwater samples were sent to Pace Analytical Laboratory in Minneapolis, Minnesota. Pace Analytical Laboratory is

accredited by the Washington State Department of Ecology. Strict chain-of custody and QA/QC protocols were followed for each sample. The following laboratory methods were used to analyze the GW samples:

NWTPH-Gx: Gasoline Range Total Petroleum Hydrocarbons

NWTPH-Dx: Diesel Range Total Petroleum Hydrocarbons

EPA Method 8260: Benzene, toluene, ethylbenzene, and total xylenes (BTEX) and halogenated volatile organic compounds (VOC)

EPA Method 8270 SIM: Naphthalenes and Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAH)

EPA Method 6020: Arsenic, Cadmium, Chromium VI, Chromium III, Lead, Nickel, Mercury, and Zinc

EPA Method 7470: Mercury

2.3 2023 GROUNDWATER SAMPLING RESULTS

Fourth quarter sampling, including the first three quarters, had no results that exceeded the groundwater cleanup levels specified in the IRP (MTCA Method A Cleanup Levels for all contaminants of concern). The petroleum results are in Table 1. The metal results are in Table 2. The cPAH results are in Table 3. The PAH results are in Table 4. The GW chemistry parameters are in Table 5. GW results are shown on Figure 3. The 4th quarter original AOC-1 groundwater laboratory analytical data report is provided in Appendix C.

2.4 QUALITY ASSURANCE REVIEW

A quality assurance review has been performed on all GW data generated during this investigation. The data set is 100% complete. The data review included an evaluation of:

- Field collection and handling
- Completeness
- Reporting limits
- Acceptability of test results for:
    - Method blanks
    - Analytical replicates
    - Laboratory control samples (blank spikes)
    - Surrogate recoveries

- Matrix spikes and matrix spike duplicates

The surrogate recovery for parameters 2-Fluorophenol, Phenol-d5, nitrobenzene, 2-fluorobiphenyl, 2,4,6-tribromophenol, and p-terphenyl-d14 were below the laboratory control limits and results may be biased low. The bias of this qualifier is believed to not significantly change the outcome of the samples.

The quality assurance review has established confidence that accepted project data are of known and appropriate quality and sufficient to support their intended use. Data qualifiers were added where appropriate. No data were rejected.

3. OILY WATER SEWER INSPECTIONS

Inspections of accessible sections of the Phase II OWS trunklines were completed in 2023. Inspections were conducted by Industrial Inspection Analysis (formerly Atlas Inspections) using CCTV equipment. All inspection videos were provided to TRC Environmental Corporation (TRC) for assessment using the National Association of Sewer Service Companies (NASSCO) rating system.

3.1 PHASE II OILY WATER SEWER INSPECTIONS

TRC assigned each defect an environmental rating (ER) based on potential for release. The ER system is based on a 1 - 5 scale. The scale indicates the level of prioritization for follow-up actions. For example, an ER=5 would indicate a significant structural defect with a confirmed release, whereas an ER=1 would be a minor structural defect with no potential for a release. ER=4 and ER=5 ratings require further site investigation due to the severity of the defect where a high potential or a confirmed release is identified. Due to refinery process and accessibility, four additional segments of the K street trunkline were included in the Phase II inspections. These segments are located north of MH 5K-RE. Phase II inspection trunklines are shown on Figure 4. The Oily Water Sewer Phase II Manhole Inspection schedule is on Table 6. The Oily Water Sewer Phase II sewer line segment inspection schedule is on Table 7.

Due to operational and safety considerations, sections 2-8, 2-14, 2-21, 2-22, manhole (MH) 1M and MH 5-T were unable to be inspected and will be rescheduled during a later inspection phase. Due to obstructions and reduction in pipe diameter, approximately 32 feet of section 2-10 and approximately 147 feet of section 2-12 were unable to be inspected. These sections will be included as part of the repairs to adjacent pipes.

There were no reported ER=5 ratings for the Phase II trunkline inspections. Eleven (11) potential release points were identified with an ER=4 rating. The following sections of trunkline have been identified for a potential release.

Location 2-1, 0.1 ft south of MH-5K-RE

Location 2-2, 145 ft south of MH-5K-RE

Location 2-6, 5ft north of MH-11K-RE

Location 2-7, 5 ft south of MH-11K-RE

Location 2-10, 142 ft south of MH-1L-FS

Location 2-11, 35 ft south of MH-6L-RE

Location 2-12, 153 ft north of MH-7L-FS

Location 2-13, 15 ft south of MH-7L-FS

Location 2-23, 0.3 ft south of MH-1K-RE

Location 2-24, 77.5ft south of MH-2K-FS

Location 2-25, 34.5 ft south of MH-4K-RE

The TRC Phase II Oily Water Sewer Inspections and Repair Recommendations Report is provided in Appendix D.

4. PHASE II SITE CHARACTERIZATION

Per the IRP, Phase II site characterization of potential release locations was initiated in 2023 and followed procedures stated in the sampling and analysis plan (SAP). Potential release locations occur where an ER=4 sewer defect was observed and there is the potential for contaminants to impact soil or groundwater.

4.1 SOIL SAMPLE COLLECTION

Soil samples were collected from nine of the eleven reported ER=4 rated locations. The soil samples were collected at the depth of the sewer line. Soil sample results are shown on Figure 5. The soil sample descriptions, depths of collection and field screening results are included on Table 8.

One soil sample was collected from each soil boring location via EPA Method 5035A in sample containers provided by the lab. Soil samples were stored on ice in a cooler immediately after collection. Standard industry protocols regarding sample collection, preservation, chain-of-custody, and shipping were followed. The samples were identified by both the boring number from which they originated and the year the sample was collected (i.e. B-1-23). Due to inaccessibility, two of the eleven soil samples (location 2-6 and 2-7) were unable to be collected due to the depth of the pipe and safety concerns with overhead lines. These two locations are scheduled to be sampled in 2024.

Soil samples were sent to Pace Analytical Laboratory in Minneapolis, Minnesota, Pace National Analytical Laboratory in Mount Juliet, Tennessee, and Fremont Analytical in Seattle, Washington in order to analyze all requested analyses. All laboratories are accredited by the Washington State Department of Ecology. Strict chain-of custody and QA/QC protocols were followed for each sample. The following laboratory methods were used to analyze the soil samples:

EPA Method 8260: Benzene, toluene, ethylbenzene, and total xylenes (BTEX)

EPA Method 8270 SIM: Naphthalenes and Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAH)

EPA Method 7471: Arsenic, Cadmium, Chromium VI, Chromium III, Lead, Nickel, and Mercury

EPA Method 9045: pH

NWTPH-EPH: Extractable Petroleum Hydrocarbons

NWTPH-VPH: Volatile Petroleum Hydrocarbons

It should be noted that fuel additives, polychlorinated biphenyl (PCB), and PFAS were not analyzed per Table 7.2 of Ecology's Guidance for Remediation of Petroleum Contaminated Sites because the contaminants are not suspected to be in the Phase II sewer segments.

4.2 SOIL SAMPLE RESULTS

Nine soil samples were collected in September and October (B-1-23 through B-9-23) at various depths. The hazard index, risk, and TPH results are provided in Table 9. The BTEX results are provided in Table 10. The soil metal results are provided in Table 11. The cPAH results are provided in Table 12. The chlorinated volatile organic compounds results are provided in Table 13. The original soil laboratory analytical data reports are provided in Appendix E.

One soil sample, B-2-23, exceeded the protection to groundwater (vadose zone) for benzene with a concentration of 0.858 mg/kg and a cancer risk with a value of 1.59E-05. Ecology was notified on January 11, 2024 of the confirmed release.

B-2-23 soil sample was collected 77.5ft south of MH 2K-FS. The release location will be identified as Area of Concern – 2 (AOC-2). Soil sample results are shown on Figure 5.

4.3 QUALITY ASSURANCE REVIEW

A quality assurance review has been performed on all soil data generated during this investigation. The data set is 100% complete. The data review included an evaluation of:

- Field collection and handling
- Completeness
- Reporting limits
- Acceptability of test results for:
    - Method blanks

- Analytical replicates
- Laboratory control samples (blank spikes)
- Surrogate recoveries
- Matrix spikes and matrix spike duplicates

The following qualifiers are noted in the lab reports. Sample B-1-23 hexavalent chromium matrix spike recovery and/or matrix spike duplicate was below the laboratory control limit, and results may be biased low. Sample B-2-23 toluene and n-hexane results exceeded the calibration limit and are estimated. Sample B-4-23 total xylenes were analyzed outside of the recognized hold time. Sample B-8-23 dibenzofuran result was below the QC limit and may be biased low; and all of method 8260D was analyzed outside of the recognized hold time. Sample B-9-23 analyte recovery of Dibenzofuran was below the QC limit and may be biased low; and analyte recovery for acetone and 1,1,1,2-Tetrachloroethane was outside the QC limits. The laboratory control sample had relative percent differences that were outside the control limits and matric spike recovery that exceeded QC limits, but the batch was accepted based on the laboratory control sample recovery.

The bias of these qualifiers is believed to not significantly change the outcome of the samples. The quality assurance review has established confidence that accepted project data are of known and appropriate quality and sufficient to support their intended use. Data qualifiers were added where appropriate. No data were rejected.

5. OILY WATER SEWER REPAIRS

In the spring and summer of 2021 Phase I trunk line inspections identified three areas of ER=4 ratings. In summer of 2022 repairs to AOC-1 were completed, MH 3-4-1, adjacent sewer pipe and offset joints were removed and replaced. The 2022 annual report summarizes the repairs to AOC-1.

In the summer of 2023 repairs for the remaining Phase I trunkline ER=4 ratings were completed. Trunk line section 1-1, section 1-2, and MH X-12.2 were completed by Motivo and included sleeving the inside of the pipe with an Omega Liner. Liner specifications are provided in Appendix F. Sections 1-1 and 1-2 are located between MH 4-C-1 and MH 2-4-1, a total of 493 feet of 8-inch trunk line was sleeved. At MH X-12.2 a crack was identified on the south discharge pipe and 36 inches of the pipe was sleeved.

For the Phase II sewer inspections, TRC provided Phillips 66 with repair recommendations for all ER=3 and ER=4 sewer segment and manhole defects identified. Repairs to all ER=4 and adjacent ER=3 defects are scheduled to take place in 2024.

6. CLEANUP STANDARDS

Per the IRP, the soil cleanup standards were set using the MTCA Method C methodology as specified in WAC 173-340-745. MTCA Method C cleanup levels are based on the reasonable maximum exposure expected to occur at the site and were developed to evaluate direct contact, leaching, and vapor pathways using equations provided in WAC 173-340.

Direct contact cleanup levels for individual compounds are listed in the Cleanup Levels and Risk Calculation (CLARC) and shown on Tables 1-4 and Tables 9-13. The MTCATPH Workbook for Calculating Cleanup Levels for a Petroleum Mixture (available at https://ecology.wa.gov/) was used to calculate the site risk (under current conditions) and to calculate the Method C direct contact TPH cleanup level for the site. The MTCATPH workbook uses pre-established chemical and toxicity data, risk-based exposure assumptions, and user-defined site-specific information to calculate the site risk under current conditions. The risk and hazard index calculated by MTCATPH are shown for each sample in Table 9. The MTCATPH output worksheets for all samples are included in Appendix G.

The soil cleanup levels used for GW protection were obtained from the CLARC tables. The values in CLARC were calculated using the fixed parameter three-phase partitioning model for the vadose (unsaturated) zone as described in WAC 173-340-747(4) and based on Equation 747-1. However, the following analytes use the MTCA Method A Soil Cleanup Levels for protection of GW because they are applicable and relevant and appropriate requirements (ARARs) and are already adjusted for leaching and natural background concentrations:

- Benzene
- Arsenic
- Chromium IV
- Naphthalenes

7. SITE HYDROGEOLOGY

The hydrogeology of the Ferndale Refinery site has been characterized through the installation of numerous soil borings and monitoring wells, as well as the completion of bail tests, laboratory permeability tests, and grain size distribution tests.

The Ferndale Refinery area is underlain by a regionally continuous stratigraphic unit known as glaciomarine drift, or diamicton. The diamicton unit consists of moderately sorted to unsorted diamicton with lenses and discontinuous beds of moderately to well-sorted gravel, sand, silt, and clay. Bedding is massive to poorly stratified. Color is blue-gray to olive-gray depending on oxidation state. Thickness ranges to as much as 90 meters. Permeability is low and infiltration of precipitation is very poor.

Geotechnical samples have been collected in the diamicton. The data revealed that a fining-downward sequence is evident in the stratigraphic column. The average percentage of sand decreases with depth and the average percentage of silt and clay increases with depth. The bulk density of the samples increases with depth. The average vertical hydraulic conductivity decreases with depth from 1.26x10-07 cm/s in the upper weathered portion of the diamicton to 7.86x10-08 cm/s in the deeper portion of the unit. The average horizontal saturated hydraulic conductivity in the deeper portion of the unit is 1.70x10-06 cm/s. The fining-downward grain-size distribution, the increasing bulk density with depth, and the decreasing vertical conductivity with depth all support the conclusion that the diamicton acts as a sufficient aquitard to inhibit the downward migration of precipitation and accidentally spilled petroleum products.

The uppermost zone of saturation consists of saturated portions of native deposits and fill material located above the diamicton. The diamicton at the site is known to be firm and dry and consists of brown silty clay with minor gravel. The unit acts as an aquitard impeding the vertical migration of contaminants and occurs at approximately 6-10 feet below grade at the site.

Groundwater contained in the shallow surficial deposits is perched atop the relatively impermeable silt and clay of the diamicton (Units III and IV). The unconfined perched water is contained in the fill material, Unit IIA soil layer, and Unit IIB sand layer. Water percolates downward and becomes perched above Unit

III as a result of the textural disconformity between the diamicton and the overlying surficial units. The flow direction of the perched water atop the diamicton follows the structural contours of the upper surface of the diamicton.

The perched water above the diamicton would not be classified as potable per the definition in WAC 173-340-720 (2). The perched water at the site does not serve as a current source of drinking water and is not a potential future source of drinking water because the GW is likely present in insufficient quantity to yield greater than 0.5 gallons per minute on a sustainable basis.

The regional water table occurs within the Cherry Point Silt (Unit VI) at approximately 160 feet below ground surface. The direction of flow in the Cherry Point Silt is toward the west-northwest, where flowing GW discharges to the Strait of Georgia. The Cherry Point aquifer is not believed to be used as a water supply downgradient of the Ferndale Refinery as the flow direction is to the west-northwest toward the Strait of Georgia.

Based on the Phase I site characterization findings, the release documented at AOC-1 has occurred in the surficial deposits located above the diamicton. The groundwater flow direction was towards the northeast during the February sampling event. The 4th quarter groundwater contour map is shown on Figure 6.

8. INACCESSIBLE CONTAMINATION

There was no inaccessible contamination identified in 2023.

9. CONCLUSIONS

Site characterization and remediation was completed at the AOC-1 location in 2022 and GW monitoring was completed in Winter of 2023. Groundwater samples collected in 2022 and 2023 did not exceed the MTCA Method A Cleanup Levels and therefore, no further action is required at the site because the AOC-1 site does not pose a threat to human health of the environment. Additional Phase I trunkline repairs were completed in summer of 2023 by sleeving the ER=4 sections of pipe.

Initial characterization activities were conducted at the potential release locations identified in the Phase II video inspections in accordance with WAC 173-340 and Ecology's Guidance for Remediation of Petroleum Contaminated Sites (Publication 10-09-057). In the Fall of 2023, nine of the eleven locations with ER=4 ratings were investigated by collecting and analyzing soil samples. The remaining potential release locations (2-6 and 2-7) will be investigated in 2024.

One confirmed release, identified as AOC-2, is located 77.5ft south of MH 2K-FS. Soil data collected at the location indicates that the soil exceeded the protection to groundwater (vadose zone) for benzene and cancer risk. Further site characterization and remediation of AOC-2 and repairs on the sewer with identified ER=4 defects will take place in 2024.

10. REFERENCES

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APPENDIX A -
Figures

LIST OF FIGURES

Prepared for:

Phillips 66 Company

Ferndale Refinery

Prepared by:

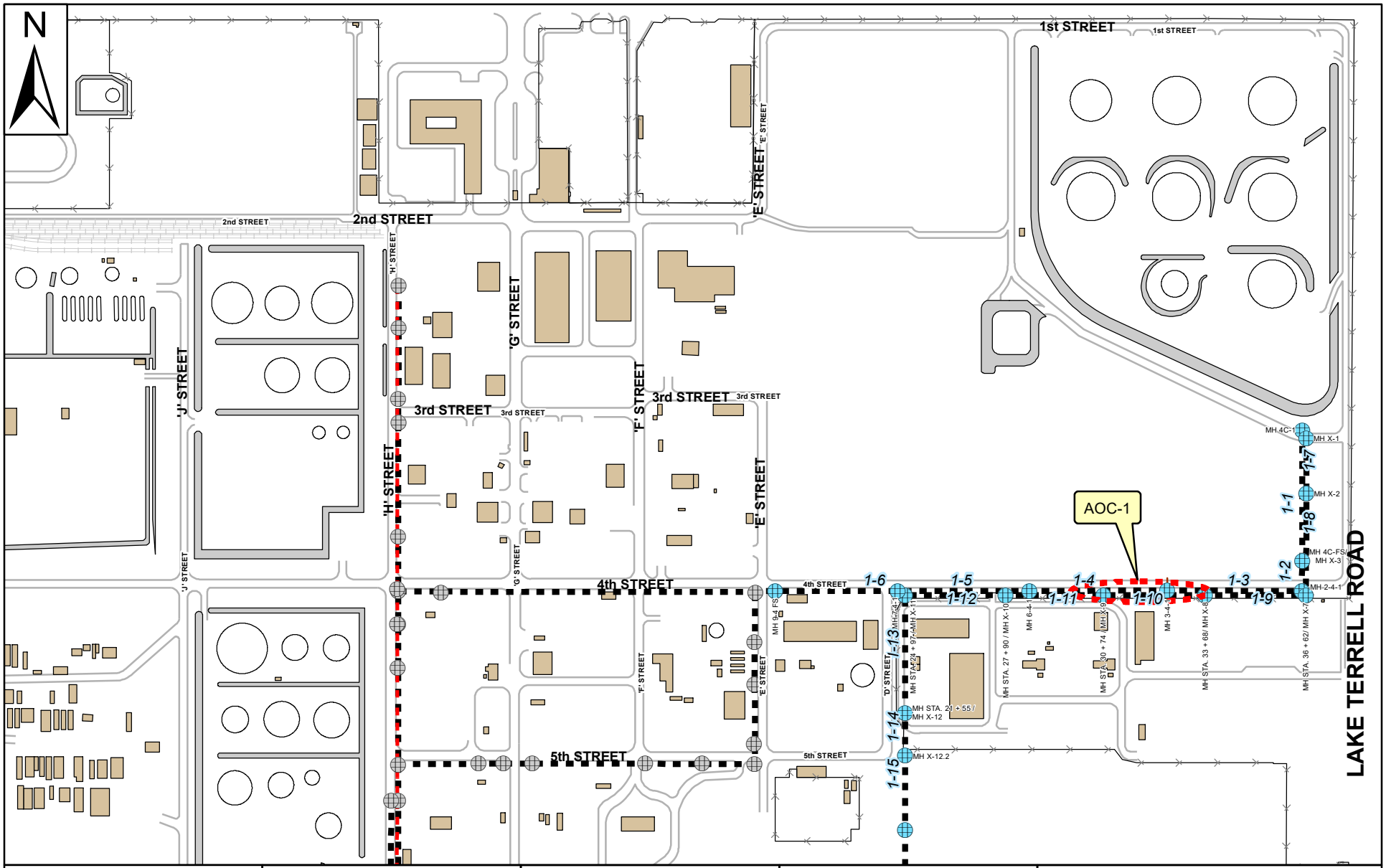
ALL4

Site Location Map

Oily Water Sewer Investigation

2/29/2024

Figure 1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LAKE TERRELL ROAD
AOC-1
MH X-1
MH X-2
MH X-12
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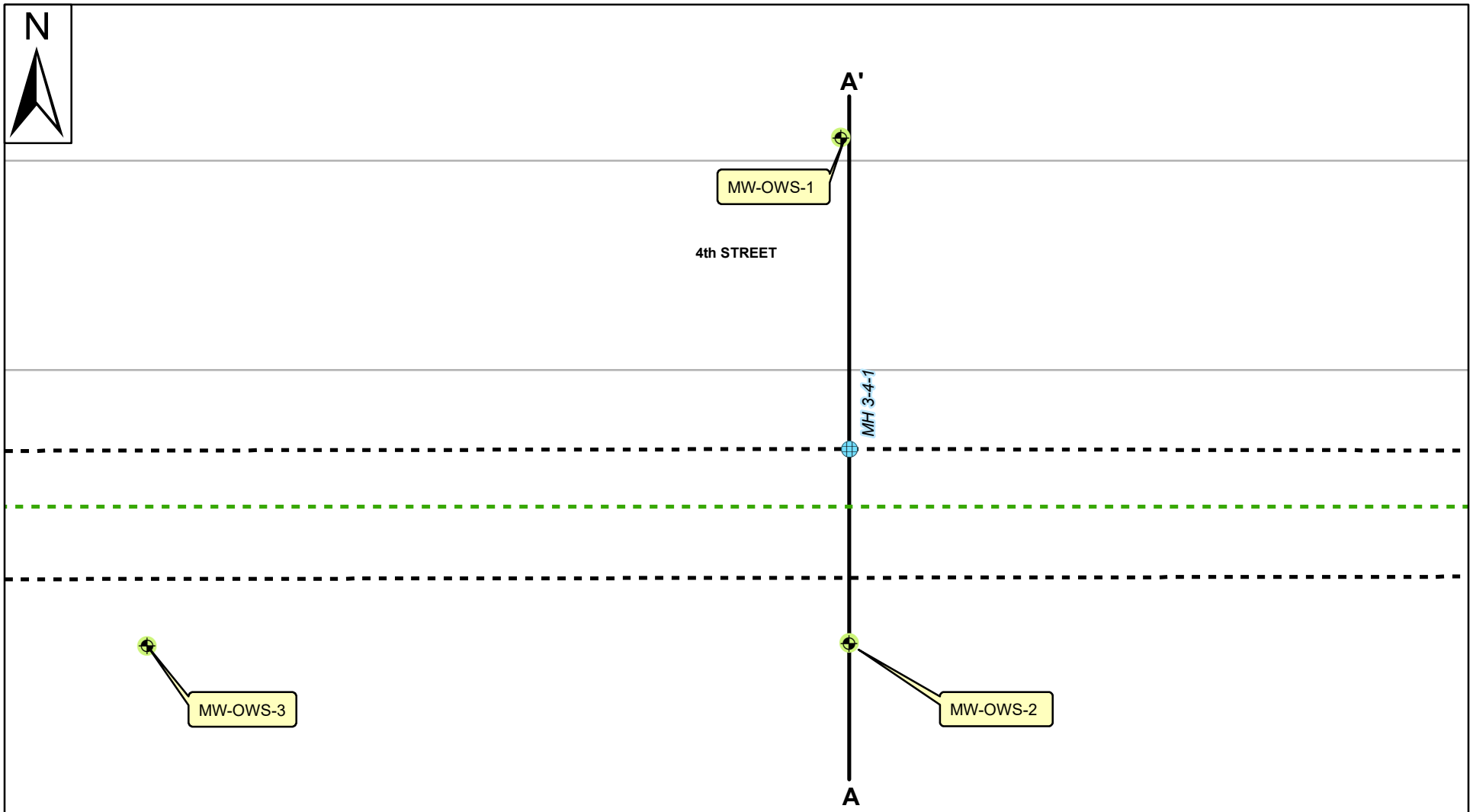
1-1
1-2
1-3
1-4
1-5
1-6
1-7
1-8
1-9
1-10
1-11
1-12
1-13
1-14
1-15
Manholes
Phase I Manholes
Sewer Major Trunk Lines
Area of Concern (AOC-1)
0 100 200 400
Feet
1 inch = 400 feet
All data are approximate and should be used for relative location reference only.
Prepared for:
Phillips 66 Company
Ferndale Refinery
Prepared by:
ALL4
AOC-1 Location Map
Oily Water Sewer Investigation
2/29/2024
Figure 2



GW Results Met CULs
Manholes
Phase I Manholes
OWS Major Trunk Lines
Storm Sewer Trunk Lines

0 5 10 15 Feet

1 inch = 15 feet

All data are approximate and should be used for relative location reference only.

Prepared for:

Phillips 66 Company

Ferndale Refinery

Prepared by:

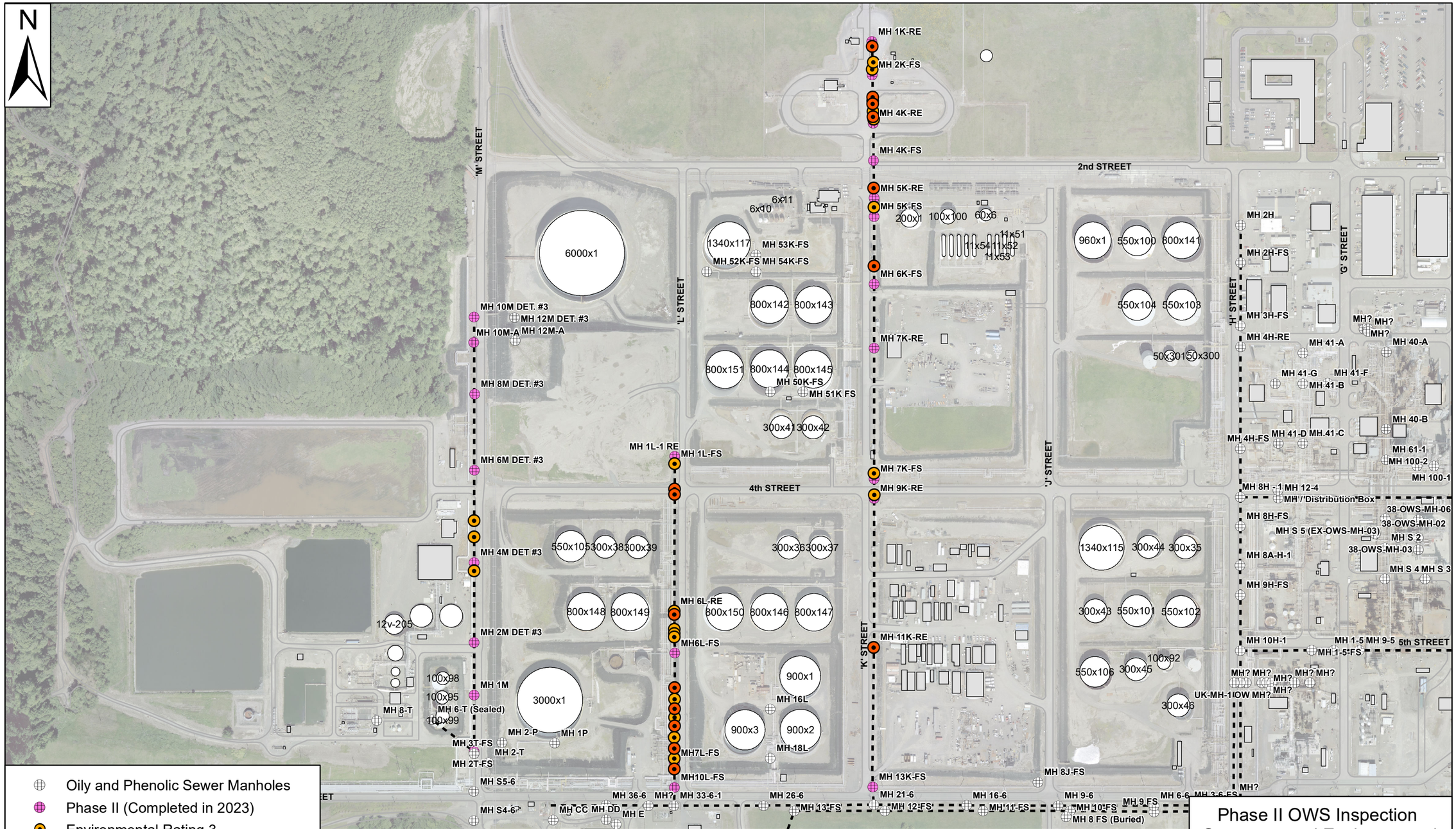
ALL4

AOC-1 Groundwater Sample Results Map

Oily Water Sewer Investigation

2/29/2024

Figure 3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MH 9K-RE
MH 11K-RE
MH 13K-FS
MH 1L-1 RE
MH 1L-FS
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MH 2H-FS
MH 3H-FS
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MH 9H-FS
MH 10H-1
MH 1-5
MH 9-5
MH 1-5-FS
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MH 12M DET. #3
MH 10M-A
MH 12M-A
MH 8M DET. #3
MH 6M DET. #3
MH 4M DET #3
MH 2M DET #3
MH 1M
MH 6-T (Sealed)
MH 8-T
MH 3T-FS
MH 2T-FS
MH 2-T
MH 2-P
MH 1P
MH S5-6
MH S4-6
MH 53K-FS
MH 52K-FS
MH 54K-FS
MH 50K-FS
MH 51K FS
MH 16L
MH 18L
MH 41-A
MH 41-B
MH 41-C
MH 41-D
MH 41-F
MH 41-G
MH 40-A
MH 40-B
MH 61-1
MH 100-1
MH 100-2
MH S 2
MH S 3
MH S 4
MH S 5 (EX-OWS-MH-03)
38-OWS-MH-02
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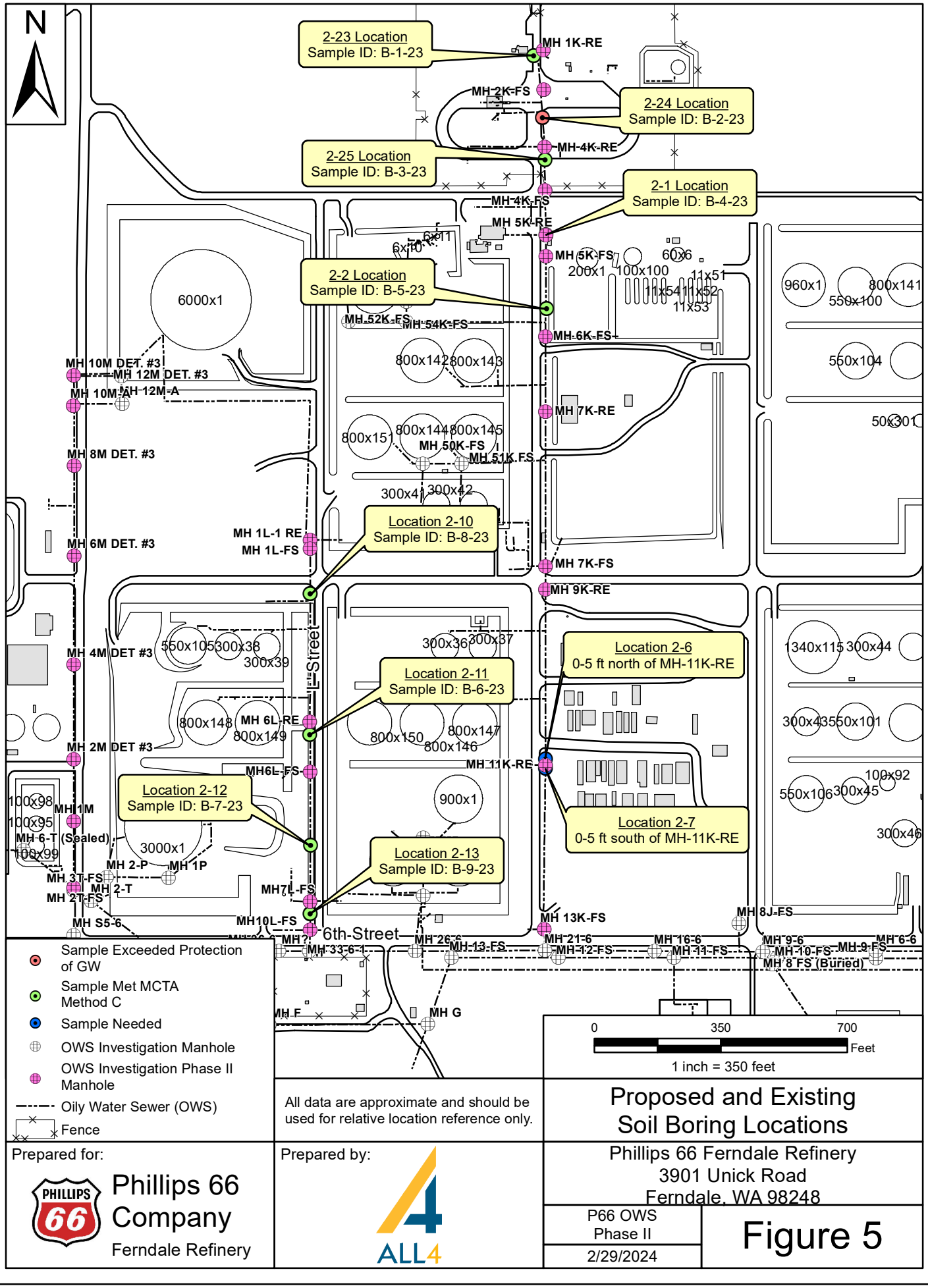
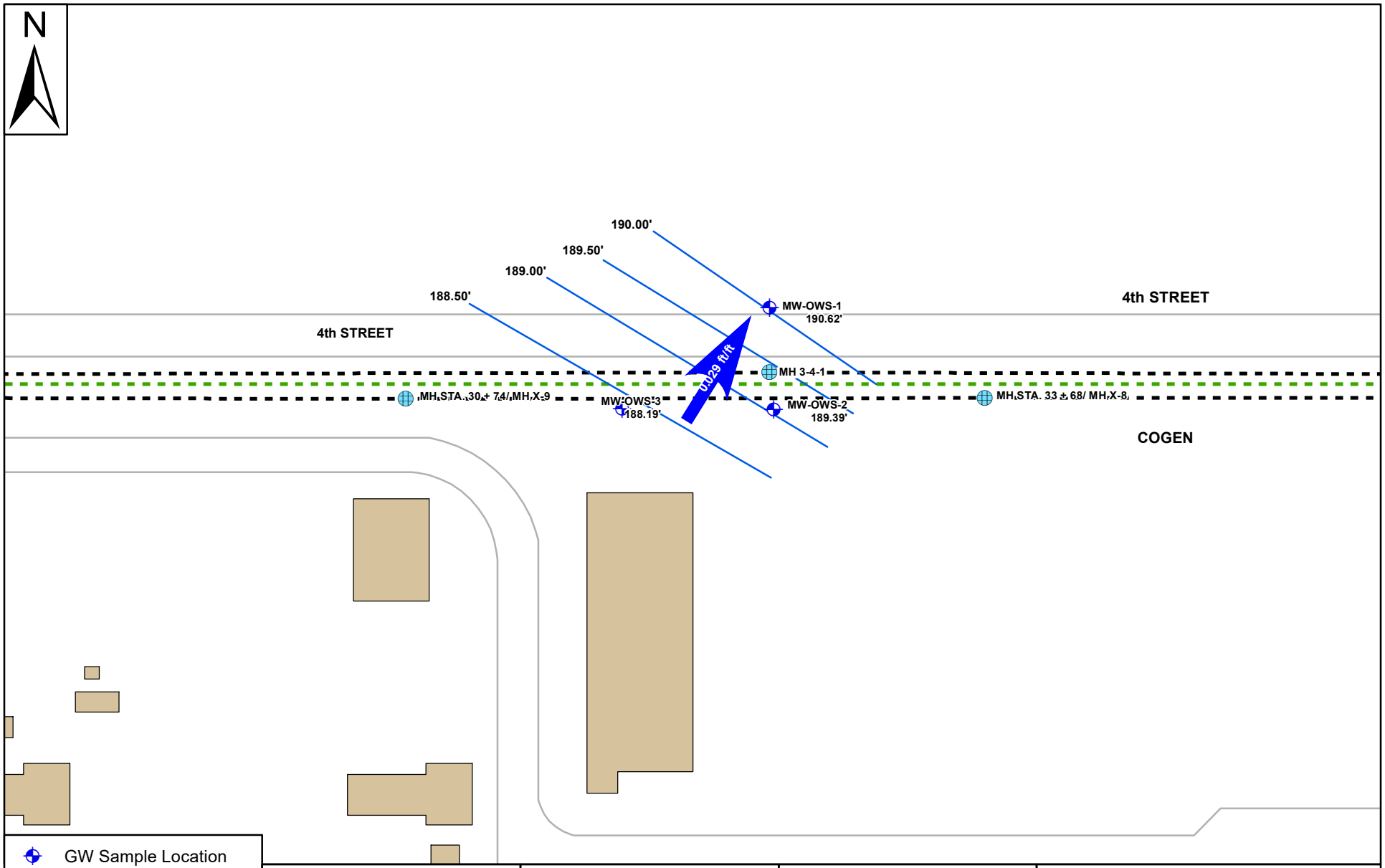
38-OWS-MH-06
MH 8 FS (Buried)
MH 36-6
MH 33-6-1
MH 26-6
MH 21-6
MH 16-6
MH 9-6
MH 6-6
MH 3-6-FS
MH 13-FS
MH 12-FS
MH 11-FS
MH 10-FS
MH 9 FS
MH CC
MH DD
MH E
6000x1
3000x1
1340x117
6x10
6x11
200x1
100x100
60x6
11x51
11x54
11x52
11x53
960x1
550x100
800x141
550x104
550x103
50x300
1340x115
300x44
300x35
300x43
550x101
550x102
550x106
300x45
100x92
300x46
800x142
800x143
800x151
800x144
800x145
300x41
300x42
550x105
300x38
300x39
300x36
300x37
800x148
800x149
800x150
800x146
800x147
12v-205
100x98
100x95
100x99
900x1
900x3
900x2
UK-MH-1
OW MH?
MH?
Oily and Phenolic Sewer Manholes
Phase II (Completed in 2023)
Environmental Rating 3
Environmental Rating 4
Oily Water Sewer Major Trunk Lines
1-# Sewer Segment ID
0 150 300 600 Feet
1 inch = 300 feet
All data are approximate and should be used for relative location reference only.
Prepared for:
PHILLIPS 66
Phillips 66 Company
Ferndale Refinery
Prepared by:
ALL4
Phase II OWS Inspection Segments and Environmental Rated Defects 3 & 4 Locations
Oily Sewer Investigation
2/29/24
Figure 4


N
2-23 Location
Sample ID: B-1-23
MH 1K-RE
MH-2K-FS
2-24 Location
Sample ID: B-2-23
2-25 Location
Sample ID: B-3-23
MH-4K-RE
2-1 Location
Sample ID: B-4-23
MH-4K-FS
MH 5K-RE
MH 5K-FS
2-2 Location
Sample ID: B-5-23
MH-52K-FS
MH-54K-FS
MH-6K-FS
MH 7K-RE
MH 7K-FS
MH 9K-RE
MH 10M DET. #3
MH 12M DET. #3
MH 10M-A
MH 12M-A
MH 8M DET. #3
MH 6M DET. #3
MH 1L-1 RE
MH 1L-FS
MH-50K-FS
MH-51K-FS
Location 2-10
Sample ID: B-8-23
MH 4M DET #3
MH 2M DET #3
L Street
Location 2-11
Sample ID: B-6-23
MH 6L-RE
MH6L-FS
MH 11K-RE
Location 2-6
0-5 ft north of MH-11K-RE
Location 2-12
Sample ID: B-7-23
MH 1M
MH-6-T (Sealed)
MH 2-P
MH 1P
MH 3T-FS
MH 2-T
MH 2T-FS
MH S5-6
MH7L-FS
MH10L-FS
Location 2-13
Sample ID: B-9-23
Location 2-7
0-5 ft south of MH-11K-RE
MH 13K-FS
MH 8J-FS
6th Street
MH 33-6-1
MH 26-6
MH-13-FS
MH 21-6
MH-12-FS
MH 16-6
MH-11-FS
MH 9-6
MH-10-FS
MH-9-FS
MH 6-6
MH 8 FS (Buried)
MH F
MH G
6000x1
3000x1
900x1
Sample Exceeded Protection of GW
Sample Met MCTA Method C
Sample Needed
OWS Investigation Manhole
OWS Investigation Phase II Manhole
Oily Water Sewer (OWS)
Fence
0
350
700
Feet
1 inch = 350 feet
All data are approximate and should be used for relative location reference only.
Proposed and Existing Soil Boring Locations
Prepared for:
Phillips 66 Company
Ferndale Refinery
Prepared by:
ALL4
Phillips 66 Ferndale Refinery
3901 Unick Road
Ferndale, WA 98248
P66 OWS Phase II
2/29/2024
Figure 5


N
190.00'
189.50'
189.00'
188.50'
4th STREET
4th STREET
MW-OWS-1
190.62'
MH 3-4-1
MW-OWS-3
188.19'
MW-OWS-2
189.39'
0.029 ft/ft
COGEN
GW Sample Location
Phase I Manholes
OWS Major Trunk Lines
Storm Sewer Trunk Lines
November Groundwater Contours
0 35 70
Feet
1 inch = 70 feet
All data are approximate and should be used for relative location reference only.
Prepared for:
Phillips 66 Company
Ferndale Refinery
Prepared by:
ALL4
November 2023
Groundwater Contour Map
Oily Water Sewer Investigation
2/29/2024
Figure 6

APPENDIX B-
Tables

LIST OF TABLES

Table 1
Groundwater Sample Petroleum Analytical Results
Phillips 66 Ferndale Refinery

Well ID	Date	NWTPH-Gx Volatile Range (µg/L)	NWTPH-Dx Diesel Range (mg/L)	NWTPH-Dx Motor-Oil Range (mg/L)	Benzene (µg/L)	Volatile Organic Compounds (VOC) (EPA-8260)				
						Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	n-Hexane (µg/L)	All Other VOCs[b] (µg/L)
MTCA Method A Cleanup Levels:		**1,000/800[a]**	**500**	**500**	**5**	**1,000**	**700**	**1,000**	**-**	**-**
MW-OWS-1	6/6/2022	ND(<100)	ND(<0.42)	ND(<0.42)	ND(<1.0)	ND(<1.0)	ND(<1.0)	ND(<3.0)	ND(<10)	Below CUL
	8/24/2022	ND(<100)	ND(>0.45)	ND(>0.45)	ND(<1.0)	ND(<1.0)	ND(<1.0)	ND(<3.0)	ND(<10)	Below CUL
	11/16/2022	ND(<100)	ND(<0.40)	ND(<0.40)	ND (<1.0)	ND(<1.0)	ND(<1.0)	ND(<3.0)	ND(<10)	Below CUL
	11/16/2022 (WES-DUP-1)	ND(<100)	R	R	ND(<1.0)	ND(<1.0)	ND(<1.0)	ND(<3.0)	ND(<10)	Below CUL
	12/15/2022	NA	ND(<0.41)	ND(<0.41)	NA	NA	NA	NA	NA	Below CUL
	12/15/2022 (WES-DUP-1)	NA	ND(<0.41)	ND(<0.41)	NA	NA	NA	NA	NA	Below CUL
	3/1/2023	ND(<100)	ND(<0.34)	ND(<0.34)	ND(<1.0)	ND(<1.0)	ND(<1.0)	ND(<3.0)	ND(<10)	Below CUL
MW-OWS-2	6/6/2022	ND(<100)	ND(<0.43)	ND(<0.43)	ND(<1.0)	ND(<1.0)	ND(<1.0)	ND(<3.0)	ND(<10)	Below CUL
	6/6/2022 (WES-DUP-1)	ND(<100)	ND(<0.43)	ND(<0.43)	ND(<1.0)	ND(<1.0)	ND(<1.0)	ND(<3.0)	ND(<10)	Below CUL
	8/24/2022	ND(<100)	ND(<0.48)	ND(<0.48)	ND(<1.0)	ND(<1.0)	ND(<1.0)	ND(<3.0)	ND(<10)	Below CUL
	11/14/2022	ND(<100)	R	R	ND(<1.0)	ND(<1.0)	ND(<1.0)	ND(<3.0)	ND(<10)	Below CUL
	12/15/2022	NA	ND(<0.40)	ND(<0.40)	NA	NA	NA	NA	NA	Below CUL
	3/1/2023	ND(<100)	ND(<0.34)	ND(<0.34)	ND(<1.0)	ND(<1.0)	ND(<1.0)	ND(<3.0)	ND(<10)	Below CUL
	3/1/2023 (WES-DUP-1)	ND(<100)	ND(<0.34)	ND(<0.34)	ND(<1.0)	ND(<1.0)	ND(<1.0)	ND(<3.0)	ND(<10)	Below CUL
MW-OWS-3	6/6/2022	ND(<100)	ND(<0.42)	ND(<0.42)	ND(<1.0)	ND(<1.0)	ND(<1.0)	ND(<3.0)	ND(<10)	Below CUL
	8/24/2022	ND(<100)	ND(<0.45)	ND(<0.45)	ND(<1.0)	ND(<1.0)	ND(<1.0)	ND(<3.0)	ND(<10)	Below CUL
	8/24/2022 (WES-DUP-1)	ND(<100)	ND(<0.48)	ND(<0.48)	ND(<1.0)	ND(<1.0)	ND(<1.0)	ND(<3.0)	ND(<10)	Below CUL
	11/16/2022	ND(<100)	R	R	ND(<1.0)	ND(<1.0)	ND(<1.0)	ND(<3.0)	ND(<10)	Below CUL
	12/15/2022	NA	ND(<0.42)	ND(<0.42)	NA	NA	NA	NA	NA	Below CUL
	2/28/2023	ND(<100)	ND(<0.34)	ND(<0.34)	ND(<1.0)	ND(<1.0)	ND(<1.0)	ND(<3.0)	ND(<10)	Below CUL
WES-FEB-1	6/6/2022	ND(<100)	ND(<0.42)	ND(<0.42)	ND(<1.0)	ND(<1.0)	ND(<1.0)	ND(<3.0)	ND(<10)	Below CUL
	8/24/2022	ND(<100)	ND(<0.56)	ND(<0.56)	ND(<1.0)	ND(<1.0)	ND(<1.0)	ND(<3.0)	ND(<10)	Below CUL
	11/14/2022	ND(<100)	R	R	ND(<1.0)	ND(<1.0)	ND(<1.0)	ND(<3.0)	ND(<10)	Below CUL
	12/15/2022	NA	ND(<0.39)	ND(<0.39)	NA	NA	NA	NA	NA	Below CUL
	2/28/2023	ND(<100)	ND(<0.34)	ND(<0.34)	ND(<1.0)	ND(<1.0)	ND(<1.0)	ND(<3.0)	ND(<10)	Below CUL

[a] Cleanup level dependent on BTEX concentrations

[b] See laboratory data reports for result of individual analytes per EPA Method 8260 not listed in the data table.

ND - indicates that sample was non-detect for analyte at level indicated in parenthesis

R - indicates results were rejected due to quality assurance review of laboratory results. Resampling was conducted on 12/15/22.

CUL - Cleanup level

Table 2
Groundwater Sample Metal Analytical Results
Phillips 66 Ferndale Refinery

Well ID	Date	EPA-6020B Arsenic (Total) µg/L	EPA-6020B Arsenic (Dissolved) µg/L	EPA-6020B Cadmium (Total) µg/L	EPA-6020B Cadmium (Dissolved) µg/L	EPA-6020B Chromium (Total) µg/L	EPA-6020B Chromium (Dissolved) µg/L	EPA-6020B Lead (Total) µg/L	EPA-6020B Lead (Dissolved) µg/L	EPA-6020B Nickel (Total) µg/L	EPA-6020B Nickel (Dissolved) µg/L	EPA-7470A Mercury (Total) µg/L	EPA-7470A Mercury (Dissolved) µg/L	EPA-6020B Zinc (Total) µg/L	EPA-6020B Zinc (Dissolved) µg/L
MTCA Method A Cleanup Levels:		5	5	5	5	50	50	15	15	-	-	2	2	-	-
EPA Drinking Water MCL[(a)]:		10	10	-	-	-	-	-	-	-	-	-	-	-	-
MTCA Method B Cleanup Levels[(b)]:		-	-	-	-	-	-	-	-	320	320	-	-	4,800	4,800
MW-OWS-1	6/6/2022	9.3	9.6	ND(<0.08)	ND(<0.08)	3.8	ND(<2.0)	1.5	0.56	4.10	1.20	ND(<0.20)	ND(<0.20)	6.6	ND(<5.0)
	8/24/2022	8.1	8.2	ND(<0.08)	ND(<0.08)	ND(<2.0)	ND(<2.0)	ND(<0.50)	ND(<0.50)	0.74	0.55	ND(<0.20)	ND(<0.20)	ND(<5.0)	ND(<5.0)
	11/16/2022	5.4	5.5	ND(<0.08)	ND(<0.08)	ND(<2.0)	ND(<2.0)	ND(<0.50)	ND(<0.50)	ND(<0.5)	ND(<0.50)	ND(<0.20)	ND(<0.20)	ND(<5.0)	ND(<5.0)
	11/16/2022 (WES-DUP-1)	5.4	5.6	ND(<0.08)	ND(<0.08)	ND(<2.0)	ND(<2.0)	ND(<0.50)	ND(<0.50)	ND(<0.5)	ND(<0.50)	ND(<0.20)	ND(<0.20)	ND(<5.0)	ND(<5.0)
	3/1/2023	4.4	4.9	ND(<0.08)	ND(<0.08)	ND(<2.0)	ND(<2.0)	ND(<0.50)	ND(<0.50)	0.62	ND(<0.50)	ND(<0.20)	ND(<0.20)	ND(<5.0)	ND(<5.0)
MW-OWS-2	6/6/2022	1.9	1.8	ND(<0.08)	ND(<0.08)	ND(<2.0)	ND(<2.0)	ND(<0.50)	ND(<0.50)	0.91	0.65	ND(<0.20)	ND(<0.20)	ND(<5.0)	ND(<5.0)
	6/6/2022 (WES-DUP-1)	1.9	1.8	ND(<0.08)	ND(<0.08)	ND(<2.0)	ND(<2.0)	ND(<0.50)	ND(<0.50)	0.97	0.62	ND(<0.20)	ND(<0.20)	ND(<5.0)	ND(<5.0)
	8/24/2022	2.7	2.8	ND(<0.08)	ND(<0.08)	ND(<2.0)	ND(<2.0)	ND(<0.50)	ND(<0.50)	0.79	0.70	ND(<0.20)	ND(<0.20)	ND(<5.0)	ND(<5.0)
	11/14/2022	2.1	2.2	ND(<0.08)	ND(<0.08)	ND(<2.0)	ND(<2.0)	ND(<0.50)	ND(<0.50)	0.60	ND(<0.50)	ND(<0.20)	ND(<0.20)	ND(<5.0)	ND(<5.0)
	3/1/2023	1.4	1.4	ND(<0.08)	ND(<0.08)	ND(<2.0)	ND(<2.0)	ND(<0.50)	ND(<0.50)	ND(<0.50)	ND(<0.50)	ND(<0.20)	ND(<0.20)	ND(<5.0)	ND(<5.0)
	3/1/2023 (WES-DUP-1)	1.5	1.4	ND(<0.08)	ND(<0.08)	ND(<2.0)	ND(<2.0)	ND(<0.50)	ND(<0.50)	ND(<0.50)	ND(<0.50)	ND(<0.20)	ND(<0.20)	ND(<5.0)	ND(<5.0)
MW-OWS-3	6/6/2022	2.3	2.5	ND(<0.08)	ND(<0.08)	ND(<2.0)	ND(<2.0)	ND(<0.50)	ND(<0.50)	0.73	0.68	ND(<0.20)	ND(<0.20)	ND(<5.0)	ND(<5.0)
	8/24/2022	3.2	3.1	ND(<0.08)	ND(<0.08)	ND(<2.0)	ND(<2.0)	ND(<0.50)	ND(<0.50)	1.30	0.97	ND(<0.20)	ND(<0.20)	ND(<5.0)	ND(<5.0)
	8/24/2022 (WES-DUP-1)	5.1	2.8	ND(<0.08)	ND(<0.08)	14.40	ND(<2.0)	2.7	ND(<0.50)	16.20	0.75	ND(<0.20)	ND(<0.20)	20.9	5.0
	11/16/2022	2.1	2.3	ND(<0.08)	ND(<0.08)	ND(<2.0)	ND(<2.0)	ND(<0.50)	ND(<0.50)	1.00	0.74	ND(<0.20)	ND(<0.20)	ND(<5.0)	ND(<5.0)
	2/28/2023	2.0	2.1	ND(<0.08)	ND(<0.08)	ND(<2.0)	ND(<2.0)	ND(<0.50)	ND(<0.50)	0.50	ND(<0.50)	ND(<0.20)	ND(<0.20)	ND(<5.0)	ND(<5.0)
WES-FEB-1	6/6/2022	ND(<0.50)	ND(<0.50)	ND(<0.08)	ND(<0.08)	ND(<2.0)	ND(<2.0)	ND(<0.50)	ND(<0.50)	ND(<0.50)	ND(<0.50)	ND(<0.20)	ND(<0.20)	ND(<5.0)	ND(<5.0)
	8/24/2022	ND(<0.50)	ND(<0.50)	ND(<0.08)	ND(<0.08)	ND(<2.0)	ND(<2.0)	ND(<0.50)	ND(<0.50)	ND(<0.50)	ND(<0.50)	ND(<0.20)	ND(<0.20)	ND(<5.0)	ND(<5.0)
	11/14/2022	ND(<0.50)	ND(<0.50)	ND(<0.08)	ND(<0.08)	ND(<2.0)	ND(<2.0)	ND(<0.50)	ND(<0.50)	ND(<0.50)	ND(<0.50)	ND(<0.20)	ND(<0.20)	ND(<5.0)	ND(<5.0)
	2/28/2023	ND(<0.50)	ND(<0.50)	ND(<0.08)	ND(<0.08)	ND(<2.0)	ND(<2.0)	ND(<0.50)	ND(<0.50)	ND(<0.50)	ND(<0.50)	ND(<0.20)	ND(<0.20)	ND(<5.0)	ND(<5.0)

[(a)] EPA's current arsenic drinking water maximum contaminant level (MCL) was chosen as the cleanup level because it is an ARAR. EPA's MCL protects consumers from the effects of long-term, chronic exposure to arsenic.

[(b)] Method B cleanup levels obtained from CLARC tables calculated from WAC 173-340-720, Equation 720-2 (carcinogens) based on drinking water beneficial use. If no carcinogenic value was listed then the non-carcinogenic value was applied.

BOLD & shaded - indicates that the concentration in the sample exceeds the most stringent cleanup level.

ND - indicates analyte was not detected at level above reporting limit (shown in parentheses)

Table 3
Groundwater Sample cPAH Analytical Results
Phillips 66 Ferndale Refinery

Sample ID	Date	EPA - 8270 Benzo[A]Anthracene	EPA - 8270 Benzo[A]Pyrene	EPA - 8270 Benzo[B]Fluoranthene	EPA - 8270 Benzo[K]fluoranthene	EPA - 8270 Chrysene	EPA - 8270 Dibenz[A,H]Anthracene	EPA - 8270 Indeno[1,2,3-Cd]Pyrene	Total cPAH Equivalent (TEq)[a]
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Toxicity Equivalency Factor (TEF):		0.1	1	0.1	0.1	0.01	0.1	0.1	--
MTCA Method A Cleanup Level:		--	--	--	--	--	--	--	0.1[b]
MW-OWS-1	6/6/2022	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	0.044
	8/24/2022	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	0.044
	11/16/2022	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	0.044
	11/16/2022 (WES-DUP-1)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	0.044
	3/1/2023	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	0.044
MW-OWS-2	6/6/2022	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	0.044
	6/6/2022 (WES-DUP-1)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	0.044
	8/24/2022	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	0.044
	11/14/2022	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	0.044
	3/1/2023	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	0.044
	3/1/2023 (WES-DUP-1)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	0.044
MW-OWS-3	6/6/2022	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	0.044
	8/24/2022	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	0.044
	8/24/2022 (WES-DUP-1)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	0.044
	11/16/2022	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	0.044
	2/28/2023	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	0.044
WES-FEB-1	6/6/2022	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	0.044
	8/24/2022	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	0.044
	11/14/2022	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	0.044
	2/28/2023	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	0.044

[a] cPAH level calculated using Toxicity equivalency methodology provided in WAC 173-340-708(8)

use. If no carcinogenic value was listed then the non-carcinogenic value was applied.

[b] Method A cleanup level of Benzo(a)pyrene

ND - indicates analyte was not detected at level above reporting limit (shown in parentheses)

For ND values, the TEF was multiplied by one half the reporting limit

TEF - Toxicity Equivalency Factor (WAC 173-340-900 table 708.2)

TEq - Toxicity Equivalency to benzo(a)pyrene, calculated by multiplying result by appropriate TEF.

Table 4
Groundwater Sample PAH Analytical Results
Phillips 66 Ferndale Refinery

Sample ID	Date	EPA-8270 Acenaphthene	EPA-8270 Acenaphthylene	EPA-8270 Anthracene	EPA-8270 Benzo[G,H,I]Perylene	EPA-8270 Fluoranthene	EPA-8270 Fluorene	EPA-8270 Naphthalenes[(b)]	EPA-8270 Phenanthrene	EPA-8270 Pyrene
		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MTCA Method B Cleanup Level[(a)]:		480	-	2400	-	640	320	160	-	240
MW-OWS-1	6/6/2022	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)
	8/24/2022	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)
	11/16/2022	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)
	11/16/2022 (WES-DUP-1)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)
	3/1/2023	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)
MW-OWS-2	6/6/2022	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)
	6/6/2022 (WES-DUP-1)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)
	8/24/2022	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)
	11/14/2022	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)
	3/1/2023	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)
	3/1/2023 (WES-DUP-1)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)
MW-OWS-3	6/6/2022	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)
	8/24/2022	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)
	8/24/2022 (WES-DUP-1)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)
	11/16/2022	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)
	2/28/2023	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)
WES-FEB-1	6/6/2022	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)
	8/24/2022	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)
	11/14/2022	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)
	2/28/2023	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)	ND(<0.04)

[(a)] Method B cleanup levels obtained from CLARC tables calculated from WAC 173-340-720, Equation 720-2 (carcinogens) based on drinking water beneficial use. If no carcinogenic value was listed then the non-carcinogenic value was applied.

[(b)] Sum of naphthalene, 1-methylnaphthalene and 2-methylnaphthalene.

ND - indicates analyte was not detected at level above reporting limit (shown in parentheses)

Table 5
Groundwater Chemistry Parameters
Phillips 66 Ferndale

Well ID	Date	DTW	GW Elevation	Temp	EC	TDS	Salinity	DO	pH	ORP	Turbidity
		(ft)	(ft)	(°C)	(mS/cm)	(g/L)	(ppt)	(mg/L)		(mV)	(NTU)
MW-OWS-1	6/6/2022	2.29	189.67	15.58	0.256	0.166	0.12	3.95	9.49	-5.6	29.6
	8/24/2022	4.78	187.18	20.30	0.288	0.187	0.14	1.42	7.29	190.7	5.06
	11/16/2022	1.79	190.17	12.90	0.323	0.211	0.16	1.98	7.85	154	2.45
	2/13/2023	3.6	188.36	9.50	0.266	0.173	0.13	2.73	8.56	202.3	9.39
	3/1/2023	1.34	190.62	8.40	0.247	0.161	0.12	6.41	9.93	178.9	4.68
MW-OWS-2	6/6/2022	6.37	189.47	16.91	1.135	0.738	0.57	4.21	8.18	29.8	1.75
	8/24/2022	8.63	187.21	20.33	0.891	0.579	0.44	0.62	7.00	109.4	3.62
	11/14/2022	6.82	189.02	9.80	0.943	0.613	0.47	4.90	7.89	237.5	1.63
	2/13/2023	6.67	189.17	9.30	0.622	0.4039	0.30	2.19	8.37	149.5	0.59
	3/1/2023	6.45	189.39	5.90	0.577	0.3749	0.28	3.66	9.50	220.5	0.78
MW-OWS-3	6/6/2022	6.77	188.19	15.91	1.565	1.017	0.79	4.03	7.99	41.3	0.47
	8/24/2022	8.63	186.33	20.59	0.992	0.693	0.49	0.6	7.18	90.4	2.99
	11/16/2022	6.82	188.14	14	0.712	0.462	0.35	4.17	7.12	207.9	0.94
	2/13/2023	6.82	188.14	9.5	0.536	0.348	0.26	1.4	8.13	107	0.49
	2/28/2023	6.77	188.19	5	0.613	0.3984	0.3	1.9	8.47	159.7	0.65

Table 6

Phase II Manhole Inspection Schedule

Phillips 66 Ferndale Refinery

Manhole ID	Associated Sewer	Location Description	Plant Coordinates (x)	Plant	Reference Map	Rim Elevation	Invert Elevation (in)	Invert Elevation (out)
Phase II - Completed in 2023								
MH 1K-RE	OWS	Truck rack, E of truck scale	4004	185	27-AS-137	205.2	NS	NS
MH 2K-FS	OWS	Truck rack, E of loading station	3996	294	27-AS-137	202.00	NS	NS
MH 4K-RE	OWS	Truck rack, N of refinery security gate	3984	450	27-AS-137	197.6	190.62	190.46
MH 4K-FS	OWS	K St., N of rail tracks	3986	571	27-AS-137	196.00	NS	NS
MH 5K-RE	OWS	K St., east of LPG tanks	3986	694	27-AS-150	195.00	186.82	186.03
MH 5K-FS	OWS	K St., east of LPG tanks	3986	754	27-AS-150	194.25	NS	NS
MH 6K-FS	OWS	K St., NE of Tank 800x143	3986	976	27-AS-150	192.50	184.09	184.09
MH 7K-RE	OWS	K. St., NE of Tank 800x145	3986	1185	27-AS-161	191.50	181.70	181.60
MH 7K-FS	OWS	N of 4th and K St intersection	3986	1612	27-AS-161	187.72	179.06	179.06
MH 9K-RE	OWS	S of 4th and K St intersection	3986	1676	27-AS-174	187.00	178.66	178.56
MH 11K-RE	OWS	K St., NE of Tank 900x1	3986	2162	27-AS-188	189.54	175.65	175.55
MH 13K-FS	OWS	6th and K St. intersection	3986	2620	27-AS-188	183.72	NS	NS
MH 1L-1 RE	OWS	6th and K St. intersection	3986	1549	27-AS-160	NS	NS	NS
MH 1L-FS	OWS	NW of 4th and L St.	4637	1564	27-AS-160	185.34	NS	NS
MH 6L-RE	OWS	L St., W. of 800x150	4637	2044	27-AS-175	115.5	171.85	171.75
MH 6L-FS	OWS	L St., E of Tank 100x91	4637	2181	27-AS-187	175.19	NS	NS
MH 7L-FS	OWS	M St., SW of Tank 900x3	4637	2540	27-AS-187	171.5	167.25	166.29
MH 10L-FS	OWS	6th and L St. intersection	4637	2620	27-AS-187	174.96	NS	NS
MH 10M	OWS	M St., SW of Tank 6000x1	5292	1084	27-AS-152	167	162.6	162.6
MH 10M-A	OWS	M St., SW of Tank 6000x1	NLR	NLR	27-AS-159	NS	165.19	165.19
MH 8M	OWS	M St., North of 4th Street	5292	1334	27-AS-159	166	160.74	160.72
MH 6M	OWS	M St., north of Dewatering Basin	5292	1586	27-AS-159	166	158.86	158.84
MH 4M	OWS	M St., SW of Tank 550x105	5292	1884	27-AS-176	163	156.61	156.59
MH 2M	OWS	M St., at WWTP entrance	5292	2143	27-AS-176	160	154.59	154.59
MH 1M	OWS	M St., East of Tank 100x95	5292	2318	27-AS-186	158	152.28	152.25

Table 7

Phase II Sewer Line Segment Inspection Schedule

Phillips 66 Ferndale Refinery

Segment ID	Sewer Trunk Segment (MH to MH)	Associated Sewer	Location Description	Plant Coordinates ((x) MH to MH)	Plant Coordinates ((y) MH to MH)	Sewer Segment Type	Sewer Diameter (in)
Phase II - Completed in 2023							
2-23	MH 1K-RE to MH 2K-FS	OWS	Truck rack, E of truck scale and loading station	3996	185 to 294	Vitrified Clay	10
2-24	MH 2K-FS to MH 4K-RE	OWS	Truck rack, E of loading station	3996	294 to 450	Vitrified Clay	10
2-25	MH 4K -RE to MH 4K-FS	OWS	Truck rack, N of refinery security gate	3984	450 to 571	Vitrified Clay	10
2-26	MH 4K-FS to MH 5K-RE	OWS	K St., rail tracks	3986	571 to 694	Vitrified Clay	10
2-1	MH 5K-RE to MH 5K-FS	OWS	K St., east of LPG tanks	3986	694 to 754	Vitrified Clay	10
2-2	MH 5K-FS to MH 6K-FS	OWS	K St., east of LPG tanks	3986	754 to 976	Vitrified Clay	10
2-3	MH 6K-FS to MH 7K-RE	OWS	K St., NE of Tank 800x143	3986	976 to 1185	Vitrified Clay	10
2-4	MH 7K-RE to MH 7K-FS	OWS	K. St., NE of Tank 800x145	3986	1185 to 1612	Vitrified Clay	10
2-5	MH 7K-RE to MH 9K-RE	OWS	4th and K St intersection	3986	1612 to 1676	Vitrified Clay	10
2-6	MH 9K-RE to MH 11K-RE	OWS	S of 4th and K St intersection	3986	1676 to 2162	Vitrified Clay	10
2-7	MH 11K-RE to MH 13K -FS	OWS	N of 6th and K St. intersection	3986	2162 to 2620	Vitrified Clay	10
2-9	MH 1L-RE to MH 1L-FS	OWS	4th and L St. intersection	4637	1549 to 1564	Carbon Steel	10
2-10	MH 1L-FS to MH 6L-RE	OWS	L St., W. of 800x150	4637	1564 to 2044	Carbon Steel	10
2-11	MH 6L-RE to MH 6L-FS	OWS	L St., E of Tank 100x91	4637	2044 to 2181	Carbon Steel	10
2-12	MH 6L-FS to MH 7L-FS	OWS	M St., SW of Tank 900x3	4637	2181 to 2540	Vitrified Clay	10
2-13	MH 7L-FS to MH 10L-FS	OWS	6th and L St. intersection	4637	2540 to 2620	Vitrified Clay	10
2-15	MH 10M to MH 10M-A	OWS	M St., SW of Tank 6000x1	5292	1084 to 1168	Ductile Iron	12
2-16	MH 10M-A to MH 8M	OWS	M St., north of 4th Street	5292	1168 to 1334	Ductile Iron	12
2-17	MH 8M to MH 6M	OWS	M St., north of Dewatering Basin	5292	1334 to 1586	Ductile Iron	12
2-18	MH 6M to MH 4M	OWS	M St., SW of Tank 550x105	5292	1586 to 1884	Ductile Iron	12
2-19	MH 4M to MH 2M	OWS	M St., at WWTP entrance	5292	1884 to 2143	Ductile Iron	12
2-20	MH 2M to MH 1M	OWS	M St., East of Tank 100x95	5292	2143 to 2318	Ductile Iron	12

Table 8
Soil Sample Descriptions
Phillips 66 Ferndale Refinery

Sample ID	Date	Depth (feet)	Soil Sample Description	PID (ppm)	Sheen Test[(a)]
B-1-23	9/21/2023	7.5	Sand, brown, loose, moist.	18.7	NS
B-2-23	9/20/2023	7.0	Silty sand with gravel, brown, firm, wet.	150.0	NS
B-3-23	9/21/2023	7.0	Silty clay, brown, firm, wet.	22.5	NS
B-4-23	9/20/2023	9.0	Silty sand with clay and gravel, gray, firm, moist.	8.2	NS
B-5-23	9/21/2023	8.5	Silty clay, gray, firm, moist.	42.8	VSS
B-6-23	9/21/2023	4.5	Sand, grayish brown, loose, moist.	37.0	VSS
B-7-23	9/21/2023	4.0	Silty sand, grayish brown, loose, moist.	9.8	NS
B-8-23	11/16/2023	5.5	Sandy gravel with rocks, brown, loose, saturated	153.3	VSS
B-9-23	11/16/2023	5.0	Sand with rocks, brown, loose, saturated	0.7	NS

[(a)] NS = No Sheen; VSS = Very Slight Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

Table 9
Soil Sample MCTATPH Analytical Results
Phillips 66 Ferndale Refinery

Sample ID	Date	Depth (feet)	Method C Soil Direct Contact Hazard Index	Method C Soil Direct Contact Cancer Risk	Method A Soil Groundwater Hazard Index	Method A Soil Groundwater Cancer Risk
MTCA Method C Direct Contant Cleanup Level[a]:			1	1.00E-05	-	-
Protection of Groundwater (Vadose)[b]:			-	-	1	1.00E-05
B-1-23	9/21/2023	7.5	0.00096	2.70E-09	0.049	1.31E-07
B-2-23	9/20/2023	7.0	0.00140	3.70E-09	0.658	**1.59E-05**
B-3-23	9/21/2023	7.0	0.00437	3.20E-09	0.050	1.35E-07
B-4-23	9/20/2023	9.0	0.00093	3.10E-09	0.630	3.29E-07
B-5-23	9/21/2023	8.5	0.00539	3.10E-09	0.788	1.28E-07
B-6-23	9/21/2023	4.5	0.00138	3.00E-09	0.037	1.42E-07
B-7-23	9/21/2023	4.0	0.00096	3.11E-09	0.068	1.47E-07
B-8-23	11/16/2023	5.5	0.03000	2.30E-08	-[c]	Pass[c]
B-9-23	11/16/2023	5.0	0.00290	1.10E-07	-[c]	Pass[c]

[a] Method C cleanup levels obtained from CLARC tables calculated from WAC 173-370-745, Equation 745-2 (carcinogens) based on soil direct contact. If no carcinogenic value was listed then the non-carcinogenic value was applied.

[b] Protection of groundwater values obtained from CLARC tables unless otherwise noted.

[c] New CLARC tables provided in November 2023 do not provide a value for protection to groundwater hazard index and cancer risk.

BOLD & shaded - indicates that the concentration in the sample exceeds the most stringent cleanup level.

ND - indicates analyte was not detected at level above reporting limit (shown in parentheses)

Table 10
Soil Sample BTEX Analytical Results
Phillips 66 Ferndale Refinery

Sample ID	Date	Depth	EPA-8260 Benzene	EPA-8260 Toluene	EPA-8260 Ethylbenzene	EPA-8260 Xylenes	EPA-8260 n-Hexane
		(feet)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
MTCA Method C Direct Contact Cleanup Level[a]:			2,400	280,000	350,000	700,000	210,000
Protection of Groundwater (Vadose)[b]:			0.03[c]	4.5	5.9	14	72
B-1-23	9/21/2023	7.5	ND(<0.00107)	ND(<0.00534)	ND(<0.00107)	ND(<0.0032)	ND(<0.0107)
B-2-23	9/20/2023	7.0	**0.0858**	0.345	0.121	0.527	0.253
B-3-23	9/21/2023	7.0	ND(<0.00123)	ND(<0.00614)	ND(<0.00123)	ND(<0.00368)	0.0152
B-4-23	9/20/2023	9.0	0.00159	ND(<0.00606)	ND(<0.00121)	ND(<0.00364)	ND(<0.0121)
B-5-23	9/21/2023	8.5	ND(<0.00119)	ND(<0.00597)	ND(<0.00119)	ND(<0.00358)	ND(<0.0199)
B-6-23	9/21/2023	4.5	ND(<0.00122)	ND(<0.00608)	ND(<0.00122)	ND(<0.00365)	ND(<0.0122)
B-7-23	9/21/2023	4.0	ND(<0.00119)	ND(<0.00595)	ND(<0.00119)	ND(<0.00357)	ND(<0.0199)
B-8-23	11/16/2023	5.5	ND(<0.0501)	ND(<0.251)	ND(<0.0501)	ND(<0.150)	ND(<0.501)
B-9-23	11/16/2023	5.0	ND(<0.281)	ND(<1.40)	ND(<0.281)	ND(<0.843)	ND(<2.81)

[a] Method C cleanup levels obtained from CLARC tables calculated from WAC 173-340-745, Equation 745-2 (carcinogens) based on soil direct contact. If no carcinogenic value was listed then the non-carcinogenic value was applied.

[b] Protection of groundwater values obtained from CLARC tables unless otherwise noted.

[c] MTCA A cleanup level for industrial properties was chosen because it is an ARAR. MTCA A cleanup levels are already adjusted for leaching and natural background concentrations.

BOLD & shaded - indicates that the concentration in the sample exceeds the most stringent cleanup level.

Table 11
Soil Sample Metal Analytical Results
Phillips 66 Ferndale Refinery

Sample ID	Date	Depth	EPA 6020B Arsenic	EPA 6020B Cadmium	EPA 6020B Chromium (VI)	- Chromium (III)	EPA 6020B Lead	EPA 6020B Nickel	EPA 6020B Zinc	EPA-7471B Mercury
		(feet)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
MTCA Method C Direct Contant Cleanup Level[a]:			88	3,500	260	5,300,000	1000[d]	70,000	1,100,000	2[d]
Protection of Groundwater (Vadose)[b]:			20[d]	0.69	19[d]	480,000	3,000	130	6,000	2.1
Priority Contaminants of Ecological Concern[c]:			260	36	-	135	220	1850		9
B-1-23	9/21/2023	7.5	2.5	0.098	ND(<2.14)	19.9	2.1	21.9	34.7	ND(<0.019)
B-2-23	9/20/2023	7.0	4.8	ND(<0.091)	ND(<2.43)	32.9	3.2	30.5	45.9	0.025
B-3-23	9/21/2023	7.0	4.3	0.160	ND(<2.46)	37.9	15.1	35.7	54.9	0.031
B-4-23	9/20/2023	9.0	5.6	ND(<0.094)	ND(<2.42)	41.8	4.1	31.1	44.9	0.029
B-5-23	9/21/2023	8.5	4.9	0.130	ND(<2.39)	39.1	7.4	38.9	56.5	0.031
B-6-23	9/21/2023	4.5	1.6	ND(<0.087)	ND(<2.43)	15.2	1.3	16.5	24.0	ND(<0.021)
B-7-23	9/21/2023	4.0	3.4	ND(<0.094)	ND(<2.38)	26.5	2.6	25.2	37.2	ND(<0.023)
B-8-23	11/16/2023	5.5	3.7	ND(<0.093)	ND(<2.31)	22.1	2.4	25.4	38.8	ND(<0.023)
B-9-23	11/16/2023	5.0	2.3	ND(<0.10)	ND(<2.33)	20.0	2.3	22.1	32.9	ND(<0.025)

[a] Method C cleanup levels obtained from CLARC tables calculated from WAC 173-370-745, Equation 745-2 (carcinogens) based on soil direct contact. If no carcinogenic value was listed then the non-carcinogenic value was applied.

[b] Protection of groundwater values obtained from CLARC tables unless otherwise noted.

[c] Values obtained from WAC 173-340-900, Table 749-2 for industrial or commercial sites.

[d] MTCA A cleanup level for industrial properties was chosen because it is an ARAR. MTCA A cleanup levels are already adjusted for leaching and natural background concentrations.

BOLD & shaded - indicates that the concentration in the sample exceeds the most stringent cleanup level.

ND - indicates analyte was not detected at level above reporting limit (shown in parentheses)

Table 12
Soil Sample cPAH Analytical Results
Phillips 66 Ferndale Refinery

Sample ID		MTCA Method C Direct Contant Cleanup Level[a]:	Priority Contaminants of Ecological Concern[b]:	Protection of Groundwater (Vadose)[c]:	Toxicity Equivalency Factor (TEF):	B-1-23	B-2-23	B-3-23	B-4-23	B-5-23	B-6-23	B-7-23	B-8-23	B-9-23
Depth (feet)						**7.5**	**7.0**	**7.0**	**9.0**	**8.5**	**4.5**	**4.0**	**5.5**	**5.0**
Date						**9/21/2023**	**9/20/2023**	**9/21/2023**	**9/20/2023**	**9/21/2023**	**9/21/2023**	**9/21/2023**	**11/16/2023**	**11/16/2023**
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) (EPA-8270 SIM)														
Benzo[A]Anthracene	mg/kg	-	-	0.72[d]	0.1	ND(<0.0053)	ND(<0.0060)	ND(<0.0063)	ND(<0.0061)	ND(<0.0061)	ND(<0.0058)	ND(<0.0062)	0.0234	0.133
Benzo[A]Pyrene	mg/kg	130	300	3.9	1	ND(<0.0053)	ND(<0.0060)	ND(<0.0063)	ND(<0.0061)	ND(<0.0061)	ND(<0.0058)	ND(<0.0062)	ND(<0.0125)	0.133
Benzo[B]Fluoranthene	mg/kg	-	-	2.46[d]	0.1	ND(<0.0053)	ND(<0.0060)	ND(<0.0063)	ND(<0.0061)	ND(<0.0061)	ND(<0.0058)	ND(<0.0062)	ND(<0.0125)	0.198
Benzo[K]fluoranthene	mg/kg	-	-	2.46[d]	0.1	ND(<0.0053)	ND(<0.0060)	ND(<0.0063)	ND(<0.0061)	ND(<0.0061)	ND(<0.0058)	ND(<0.0062)	ND(<0.0125)	0.0674
Chrysene	mg/kg	-	-	0.8[d]	0.01	ND(<0.0053)	ND(<0.0060)	ND(<0.0063)	ND(<0.0061)	ND(<0.0061)	0.0249	ND(<0.0062)	0.0144	0.242
Dibenz[A,H]Anthracene	mg/kg	-	-	3.57[d]	0.1	ND(<0.0053)	ND(<0.0060)	ND(<0.0063)	ND(<0.0061)	ND(<0.0061)	ND(<0.0058)	ND(<0.0062)	ND(<0.0125)	ND(<0.063)
Indeno[1,2,3-Cd]Pyrene	mg/kg	-	-	6.94[d]	0.1	ND(<0.0053)	ND(<0.0060)	ND(<0.0063)	ND(<0.0061)	ND(<0.0061)	ND(<0.0058)	ND(<0.0062)	ND(<0.0125)	0.1
Total cPAH Equivalent (TEq)[e]	mg/kg	130	-	-	-	0.011	0.011	0.011	0.011	0.011	0.011	0.011	0.012	0.186
Polycyclic Aromatic Hydrocarbons (PAHs) (EPA-8270 SIM)														
Naphthalenes[f]	mg/kg	70,000	-	5[g]	-	ND(<0.0053)	0.071	ND(<0.0063)	ND(<0.0061)	0.034	ND(<0.0058)	ND(<0.0062)	2.306	ND(<0.063)

[a] Method C cleanup levels obtained from CLARC tables calculated from WAC 173-370-745, Equation 745-2 (carcinogens) based on soil direct contact. If no carcinogenic value was listed then the non-carcinogenic value was applied.

[b] Values obtained from WAC 173-340-900, Table 749-2 for industrial or commercial sites.

[c] Protection of groundwater values obtained from CLARC tables unless otherwise noted.

[d] Values calculated from WAC 173-340-747, Equation 747-1. cPAHs were calculated using the MTCA Method A groundwater cleanup level for benzo[a]pyrene.

[e] cPAH level calculated using Toxicity equivalency methodology provided in WAC 173-340-708(8)

[f] Sum of naphthalene, 1-methylnaphthalene and 2-methylnaphthalene.

[g] MTCA A cleanup level for industrial properties was chosen because it is an ARAR. MTCA A cleanup levels are already adjusted for leaching and natural background concentrations.

BOLD & shaded - indicates that the concentration in the sample exceeds the most stringent cleanup level.

ND - indicates analyte was not detected at level above reporting limit (shown in parentheses)

For ND values, the TEF was multiplied by one half the reporting limit

TEF - Toxicity Equivalency Factor (WAC 173-340-900 table 708.2)

TEq - Toxicity Equivalency to benzo(a)pyrene, calculated by multiplying result by appropriate TEF.

Table 13
Soil Sample Chlorinated Volatile Organic Compounds Analytical Results
Phillips 66 Ferndale Refinery

Sample ID		MTCA Method C Direct Contact Cleanup Level[a]:	Protection of Groundwater (Vadose)[b]:	B-1-23	B-2-23	B-3-23	B-4-23	B-5-23	B-6-23	B-7-23	B-8-23	B-9-23
Depth (feet)				7.5	7.0	7.0	9.0	8.5	4.5	4.0	5.5ft	5.0ft
Date		(mg/kg)	(mg/kg)	9/21/2023	9/20/2023	9/21/2023	9/20/2023	9/21/2023	9/21/2023	9/21/2023	11/16/2023	11/16/2023
Chlorinated Volatile Organic Compounds (EPA-8260)												
Acetone	mg/kg	3,200,000	29	ND(<0.0534)	ND(<0.0607)	ND(<0.0614)	ND(<0.0606)	ND(<0.0597)	ND(<0.0608)	ND(<0.0595)	ND(<2.51)	D(<14.0)
Allyl Chloride	mg/kg	6,300	0.011	ND(<0.00534)	ND(<0.00607)	ND(<0.00614)	ND(<0.00606)	ND(<0.00597)	ND(<0.00608)	ND(<0.00595)	ND(<0.251)	ND(<1.40)
Bromobenzene	mg/kg	28,000	0.56	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
Bromochloromethane	mg/kg	-	-	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
Bromodichloromethane	mg/kg	2,100	0.033	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
Bromoform	mg/kg	17,000	0.36	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
Bromomethane	mg/kg	4,900	0.051	ND(<0.00534)	ND(<0.00607)	ND(<0.00614)	ND(<0.00606)	ND(<0.00597)	ND(<0.00608)	ND(<0.00595)	ND(<0.251)	ND(<1.40)
n-Butylbenzene	mg/kg	180,000	14	ND(<0.00107)	0.0159	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
sec-Butylbenzene	mg/kg	350,000	25	ND(<0.00107)	0.00929	ND(<0.00123)	ND(<0.00121)	0.00134	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	0.305
tert-Butylbenzene	mg/kg	350,000	20	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
Carbon Tetrachloride	mg/kg	1,900	0.041	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
Chlorobenzene	mg/kg	70,000	0.86	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
Dibromochloromethane	mg/kg	1,600	0.024	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00597)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
Chloroethane	mg/kg	-	-	ND(<0.00534)	ND(<0.00607)	ND(<0.00614)	ND(<0.00606)	ND(<0.00597)	ND(<0.00608)	ND(<0.00595)	ND(<0.251)	ND(<1.40)
Chloroform	mg/kg	4,200	0.074	ND(<0.00534)	ND(<0.00607)	ND(<0.00614)	ND(<0.00606)	ND(<0.00299)	ND(<0.00608)	ND(<0.00595)	ND(<0.251)	ND(<1.40)
Chloromethane	mg/kg	-	-	ND(<0.00267)	ND(<0.00304)	ND(<0.00307)	ND(<0.00303)	ND(<0.00119)	ND(<0.00304)	ND(<0.00298)	ND(<0.125)	ND(<0.702)
2-Chlorotoluene	mg/kg	70,000	1.9	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
4-Chlorotoluene	mg/kg	-	-	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
1,2-Dibromoethane (EDB)	mg/kg	66	0.00027	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00597)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
1,2-Dibromo-3-chloropropane	mg/kg	160	0.00091	ND(<0.00534)	ND(<0.00607)	ND(<0.00614)	ND(<0.00606)	ND(<0.00119)	ND(<0.00608)	ND(<0.00595)	ND(<0.251)	ND(<1.40)
Dibromomethane	mg/kg	35,000	0.36	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
1,2-Dichlorobenzene	mg/kg	320,000	7	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
1,3-Dichlorobenzene	mg/kg	-	-	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
1,4-Dichlorobenzene	mg/kg	24,000	1.2	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00597)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
Dichlorodifluoromethane	mg/kg	700,000	38	ND(<0.00534)	ND(<0.00607)	ND(<0.00614)	ND(<0.00606)	ND(<0.00597)	ND(<0.00608)	ND(<0.00595)	ND(<0.251)	ND(<1.40)
Dichlorofluoromethane	mg/kg	-	-	ND(<0.00534)	ND(<0.00607)	ND(<0.00614)	ND(<0.00606)	ND(<0.00119)	ND(<0.00608)	ND(<0.00595)	ND(<0.251)	ND(<1.40)
1,1-Dichloroethane	mg/kg	23,000	0.041	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
1,2-Dichloroethane	mg/kg	1,400	0.023	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
1,1-Dichloroethene	mg/kg	180,000	0.046	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
cis-1,2-Dichloroethene	mg/kg	7,000	0.079	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
trans-1,2-dichloroethene	mg/kg	70,000	0.52	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
1,2-Dichloropropane	mg/kg	3,500	0.025	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
1,3-Dichloropropane	mg/kg	70,000	0.88	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
2,2-Dichloropropane	mg/kg	-	-	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
1,1-Dichloropropene	mg/kg	-	-	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
cis-1,3-Dichloropropene	mg/kg	-	-	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)

trans-1,3-Dichloropropene	mg/kg	-	-	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
Diethyl ether	mg/kg	700,000	6.8	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
Hexachloro-1,3-butadiene	mg/kg	1,700	0.012	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
Cumene	mg/kg	350,000	15	ND(<0.00107)	0.0101	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
p-Isopropyltoluene	mg/kg	-	-	ND(<0.00107)	0.0031	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
2-Butanone (MEK)	mg/kg	2,100,000	20	ND(<0.0107)	ND(<0.00121)	ND(<0.00123)	ND(<0.0121)	ND(<0.0119)	ND(<0.0122)	ND(<0.0119)	ND(<0.501)	ND(<2.81)
Methylene Chloride	mg/kg	66,000	0.022	ND(<0.00534)	ND(<0.00607)	ND(<0.00614)	ND(<0.00606)	ND(<0.00597)	ND(<0.00608)	ND(<0.00595)	ND(<0.251)	ND(<1.40)
4-Methyl-2-pentanone (MIBK)	mg/kg	280,000	2.7	ND(<0.0107)	ND(<0.00121)	ND(<0.00123)	ND(<0.0121)	ND(<0.0119)	ND(<0.0122)	ND(<0.0119)	ND(<0.501)	ND(<2.81)
Methyl-tert-butyl ether (MTBE)	mg/kg	73,000	0.1	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
n-Propylbenzene	mg/kg	350,000	16	ND(<0.00107)	0.0360	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
Styrene	mg/kg	700,000	2.2	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
1,1,1,2-Tetrachloroethane	mg/kg	5,000	0.0098	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
1,1,2,2-Tetrachloroethane	mg/kg	660	0.0012	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
Tetrachloroethene	mg/kg	63,000	0.05	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
Tetrahydrofuran	mg/kg	3,200,000	30	ND(<0.00534)	ND(<0.00607)	ND(<0.00614)	ND(<0.00606)	ND(<0.00597)	ND(<0.00608)	ND(<0.00595)	ND(<0.251)	ND(<0.281)
1,2,3-Trichlorobenzene	mg/kg	2,800	0.2	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
1,2,4-Trichlorobenzene	mg/kg	4,500	0.56	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
1,2,4-Trimethylbenzene	mg/kg	35,000	1.3	ND(<0.00107)	0.149	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
1,3,5-Trimethylbenzene	mg/kg	35,000	1.3	ND(<0.00107)	0.0439	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
1,1,1-Trichloroethane	mg/kg	7,000,000	1.5	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
1,1,2-Trichloroethane	mg/kg	2,300	0.017	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
Trichloroethene	mg/kg	2,900	0.025	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
Trichlorofluoromethane	mg/kg	1,100,000	23	ND(<0.00534)	ND(<0.00607)	ND(<0.00614)	ND(<0.00606)	ND(<0.00597)	ND(<0.00608)	ND(<0.00595)	ND(<0.251)	ND(<1.40)
1,1,2-Trichlorotrifluoroethane	mg/kg	110,000,000	7,600	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)
1,2,3-Trichloropropane	mg/kg	4	0.0000024	ND(<0.00267)	ND(<0.00304)	ND(<0.00307)	ND(<0.00303)	ND(<0.00299)	ND(<0.00304)	ND(<0.00298)	ND(<0.125)	ND(<0.702)
Vinyl chloride	mg/kg	88	0.0017	ND(<0.00107)	ND(<0.00121)	ND(<0.00123)	ND(<0.00121)	ND(<0.00119)	ND(<0.00122)	ND(<0.00119)	ND(<0.0501)	ND(<0.281)

[(a)] Method C cleanup levels obtained from CLARC tables calculated from WAC 173-340-745, Equation 745-2 (carcinogens) based on soil direct contact. If no carcinogenic value was listed then the non-carcinogenic value was applied.

[(b)] Protection of groundwater values obtained from CLARC tables unless otherwise noted.

E - Analyte concentration exceeded the calibration range. The reported result is estimated.

L0 - Analyte recovery in the laboratory control sample (LCS) was outside QC limits.

ND - indicates analyte was not detected at level above reporting limit (shown in parentheses)

APPENDIX C -
AOC-1 GROUNDWATER LABORATORY ANALYTICAL REPORT

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

March 15, 2023

Joe Sumera
Phillips 66
3901 Unick Road
Ferndale, WA 98248

RE: Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Dear Joe Sumera:

Enclosed are the analytical results for sample(s) received by the laboratory on March 02, 2023. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace National - Mt. Juliet
- Pace Analytical Services - Minneapolis

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jennifer Gross
jennifer.gross@pacelabs.com
(612)607-1700
Project Manager

Enclosures

cc: Eric Libolt, Whatcom Environmental Services

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Pace Analytical Services, LLC - Minneapolis MN

1700 Elm Street SE, Minneapolis, MN 55414
1800 Elm Street SE, Minneapolis, MN 55414--Satellite Air Lab
A2LA Certification #: 2926.01*
Alabama Certification #: 40770
Alaska Contaminated Sites Certification #: 17-009*
Alaska DW Certification #: MN00064
Arizona Certification #: AZ0014*
Arkansas DW Certification #: MN00064
Arkansas WW Certification #: 88-0680
California Certification #: 2929
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8 Tribal Water Systems+Wyoming DW Certification #: via MN 027-053-137
Florida Certification #: E87605*
Georgia Certification #: 959
GMP+ Certification #: GMP050884
Hawaii Certification #: MN00064
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification #: C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky DW Certification #: 90062
Kentucky WW Certification #: 90062
Louisiana DEQ Certification #: AI-03086*
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064*
Maryland Certification #: 322
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137*
Minnesota Dept of Ag Approval: via MN 027-053-137
Minnesota Petrofund Registration #: 1240*
Mississippi Certification #: MN00064
Missouri Certification #: 10100
Montana Certification #: CERT0092
Nebraska Certification #: NE-OS-18-06
Nevada Certification #: MN00064
New Hampshire Certification #: 2081*
New Jersey Certification #: MN002
New York Certification #: 11647*
North Carolina DW Certification #: 27700
North Carolina WW Certification #: 530
North Dakota Certification (A2LA) #: R-036
North Dakota Certification (MN) #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification (1700) #: CL101
Ohio VAP Certification (1800) #: CL110*
Oklahoma Certification #: 9507*
Oregon Primary Certification #: MN300001
Oregon Secondary Certification #: MN200001*
Pennsylvania Certification #: 68-00563
Puerto Rico Certification #: MN00064
South Carolina Certification #:74003001
Tennessee Certification #: TN02818
Texas Certification #: T104704192*
Utah Certification #: MN00064*
Vermont Certification #: VT-027053137
Virginia Certification #: 460163*
Washington Certification #: C486*
West Virginia DEP Certification #: 382
West Virginia DW Certification #: 9952 C
Wisconsin Certification #: 999407970
Wyoming UST Certification #: via A2LA 2926.01
USDA Permit #: P330-19-00208
*Please Note: Applicable air certifications are denoted with an asterisk (*).

Pace Analytical Services National

12065 Lebanon Road, Mt. Juliet, TN 37122
Alabama Certification #: 40660
Alaska Certification 17-026
Arizona Certification #: AZ0612
Arkansas Certification #: 88-0469
California Certification #: 2932
Canada Certification #: 1461.01
Colorado Certification #: TN00003
Connecticut Certification #: PH-0197
DOD Certification: #1461.01
EPA# TN00003
Florida Certification #: E87487
Georgia DW Certification #: 923
Georgia Certification: NELAP
Idaho Certification #: TN00003
Illinois Certification #: 200008
Indiana Certification #: C-TN-01
Iowa Certification #: 364
Kansas Certification #: E-10277
Kentucky UST Certification #: 16
Kentucky Certification #: 90010
Louisiana Certification #: AI30792
Louisiana DW Certification #: LA180010
Maine Certification #: TN0002
Maryland Certification #: 324
Massachusetts Certification #: M-TN003
Michigan Certification #: 9958
Minnesota Certification #: 047-999-395
Mississippi Certification #: TN00003
Missouri Certification #: 340

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Pace Analytical Services National

Montana Certification #: CERT0086
Nebraska Certification #: NE-OS-15-05
Nevada Certification #: TN-03-2002-34
New Hampshire Certification #: 2975
New Jersey Certification #: TN002
New Mexico DW Certification
New York Certification #: 11742
North Carolina Aquatic Toxicity Certification #: 41
North Carolina Drinking Water Certification #: 21704
North Carolina Environmental Certificate #: 375
North Dakota Certification #: R-140
Ohio VAP Certification #: CL0069
Oklahoma Certification #: 9915
Oregon Certification #: TN200002
Pennsylvania Certification #: 68-02979
Rhode Island Certification #: LAO00356
South Carolina Certification #: 84004
South Dakota Certification
Tennessee DW/Chem/Micro Certification #: 2006
Texas Certification #: T 104704245-17-14
Texas Mold Certification #: LAB0152
USDA Soil Permit #: P330-15-00234
Utah Certification #: TN00003
Virginia Certification #: VT2006
Vermont Dept. of Health: ID# VT-2006
Virginia Certification #: 460132
Washington Certification #: C847
West Virginia Certification #: 233
Wisconsin Certification #: 998093910
Wyoming UST Certification #: via A2LA 2926.01
A2LA-ISO 17025 Certification #: 1461.01
A2LA-ISO 17025 Certification #: 1461.02
AIHA-LAP/LLC EMLAP Certification #:100789

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SAMPLE SUMMARY

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10644453001	**MW-OWS-1**	Water	03/01/23 12:50	03/02/23 08:50
10644453002	**MW-OWS-2**	Water	03/01/23 10:40	03/02/23 08:50
10644453003	**MW-OWS-3**	Water	02/28/23 10:35	03/02/23 08:50
10644453004	**WES-DUP-1**	Water	03/01/23 09:00	03/02/23 08:50
10644453005	**WES-FEB-1**	Water	02/28/23 08:00	03/02/23 08:50
10644453006	**Trip Blank**	Water	02/28/23 00:00	03/02/23 08:50

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SAMPLE ANALYTE COUNT

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10644453001	**MW-OWS-1**	NWTPH-Dx	TT2	4	PASI-M
		NWTPH-Gx	TM2	2	PASI-M
		EPA 6020B	NN2	6	PASI-M
		EPA 6020B	NN2	6	PASI-M
		EPA 7470A	LMW	1	PASI-M
		EPA 7470A	LMW	1	PASI-M
		EPA 8270E	DSH	7	PAN
		EPA 8270E by SIM	JNG	22	PASI-M
		EPA 8260D	PAB	73	PASI-M
10644453002	**MW-OWS-2**	NWTPH-Dx	TT2	4	PASI-M
		NWTPH-Gx	TM2	2	PASI-M
		EPA 6020B	NN2	6	PASI-M
		EPA 6020B	NN2	6	PASI-M
		EPA 7470A	LMW	1	PASI-M
		EPA 7470A	LMW	1	PASI-M
		EPA 8270E	DSH	7	PAN
		EPA 8270E by SIM	JNG	22	PASI-M
		EPA 8260D	PAB	73	PASI-M
10644453003	**MW-OWS-3**	NWTPH-Dx	EB3	4	PASI-M
		NWTPH-Gx	TM2	2	PASI-M
		EPA 6020B	NN2	6	PASI-M
		EPA 6020B	NN2	6	PASI-M
		EPA 7470A	LMW	1	PASI-M
		EPA 7470A	LMW	1	PASI-M
		EPA 8270E	DSH	7	PAN
		EPA 8270E by SIM	JNG	22	PASI-M
		EPA 8260D	PAB	73	PASI-M
10644453004	**WES-DUP-1**	NWTPH-Dx	TT2	4	PASI-M
		NWTPH-Gx	TM2	2	PASI-M
		EPA 6020B	NN2	6	PASI-M
		EPA 6020B	NN2	6	PASI-M
		EPA 7470A	LMW	1	PASI-M
		EPA 7470A	LMW	1	PASI-M
		EPA 8270E	DSH	7	PAN
		EPA 8270E by SIM	JNG	22	PASI-M
		EPA 8260D	PAB	73	PASI-M
10644453005	**WES-FEB-1**	NWTPH-Dx	TT2	4	PASI-M

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SAMPLE ANALYTE COUNT

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		NWTPH-Gx	TM2	2	PASI-M
		EPA 6020B	NN2	6	PASI-M
		EPA 6020B	NN2	6	PASI-M
		EPA 7470A	LMW	1	PASI-M
		EPA 7470A	LMW	1	PASI-M
		EPA 8270E	DSH	7	PAN
		EPA 8270E by SIM	JNG	22	PASI-M
		EPA 8260D	PAB	73	PASI-M
10644453006	**Trip Blank**	NWTPH-Gx	TM2	2	PASI-M
		EPA 8260D	PAB	73	PASI-M

PAN = Pace National - Mt. Juliet
PASI-M = Pace Analytical Services - Minneapolis

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Sample: MW-OWS-1 **Lab ID: 10644453001** Collected: 03/01/23 12:50 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS LV	Analytical Method: NWTPH-Dx Preparation Method: EPA 3510C Pace Analytical Services - Minneapolis							
Diesel Fuel Range	ND	mg/L	0.34	1	03/03/23 08:40	03/03/23 18:45	68334-30-5	
Motor Oil Range	ND	mg/L	0.34	1	03/03/23 08:40	03/03/23 18:45		
Surrogates								
o-Terphenyl (S)	87	%.	50-150	1	03/03/23 08:40	03/03/23 18:45	84-15-1	
n-Triacontane (S)	77	%.	50-150	1	03/03/23 08:40	03/03/23 18:45		
NWTPH-Gx GCV	Analytical Method: NWTPH-Gx Pace Analytical Services - Minneapolis							
TPH as Gas	ND	ug/L	100	1		03/03/23 20:11		
Surrogates								
a,a,a-Trifluorotoluene (S)	94	%.	50-150	1		03/03/23 20:11	98-08-8	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis							
Arsenic	**4.4**	ug/L	0.50	1	03/09/23 07:00	03/09/23 16:27	7440-38-2	
Cadmium	ND	ug/L	0.080	1	03/09/23 07:00	03/09/23 16:27	7440-43-9	
Chromium	ND	ug/L	2.0	1	03/09/23 07:00	03/09/23 16:27	7440-47-3	
Lead	ND	ug/L	0.50	1	03/09/23 07:00	03/09/23 16:27	7439-92-1	
Nickel	**0.62**	ug/L	0.50	1	03/09/23 07:00	03/09/23 16:27	7440-02-0	
Zinc	ND	ug/L	5.0	1	03/09/23 07:00	03/09/23 16:27	7440-66-6	
6020B MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis							
Arsenic, Dissolved	**4.9**	ug/L	0.50	1	03/09/23 06:59	03/09/23 18:30	7440-38-2	
Cadmium, Dissolved	ND	ug/L	0.080	1	03/09/23 06:59	03/09/23 18:30	7440-43-9	
Chromium, Dissolved	ND	ug/L	2.0	1	03/09/23 06:59	03/09/23 18:30	7440-47-3	
Lead, Dissolved	ND	ug/L	0.50	1	03/09/23 06:59	03/09/23 18:30	7439-92-1	
Nickel, Dissolved	ND	ug/L	0.50	1	03/09/23 06:59	03/09/23 18:30	7440-02-0	
Zinc, Dissolved	ND	ug/L	5.0	1	03/09/23 06:59	03/09/23 18:30	7440-66-6	
7470A Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Minneapolis							
Mercury	ND	ug/L	0.20	1	03/09/23 07:08	03/15/23 11:55	7439-97-6	
7470A Mercury, Dissolved	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Minneapolis							
Mercury, Dissolved	ND	ug/L	0.20	1	03/09/23 07:08	03/15/23 11:37	7439-97-6	
SVOA (GC/MS) 8270E	Analytical Method: EPA 8270E Preparation Method: 3510C Pace National - Mt. Juliet							
Biphenyl (Diphenyl)	ND	ug/L	10.5	1.05	03/08/23 07:01	03/08/23 16:07	92-52-4	
Surrogates								
2-Fluorophenol (S)	22.7	%	10.0-120	1.05	03/08/23 07:01	03/08/23 16:07	367-12-4	
Phenol-d5 (S)	13.1	%	10.0-120	1.05	03/08/23 07:01	03/08/23 16:07	4165-62-2	
Nitrobenzene-d5 (S)	41.2	%	10.0-127	1.05	03/08/23 07:01	03/08/23 16:07	4165-60-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Sample: MW-OWS-1 **Lab ID: 10644453001** Collected: 03/01/23 12:50 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
SVOA (GC/MS) 8270E	Analytical Method: EPA 8270E Preparation Method: 3510C Pace National - Mt. Juliet							
Surrogates								
2-Fluorobiphenyl (S)	48.1	%	10.0-130	1.05	03/08/23 07:01	03/08/23 16:07	321-60-8	
2,4,6-Tribromophenol (S)	48.6	%	10.0-155	1.05	03/08/23 07:01	03/08/23 16:07	118-79-6	
p-Terphenyl-d14 (S)	66.5	%	10.0-128	1.05	03/08/23 07:01	03/08/23 16:07	1718-51-0	
8270E MSSV PAH by SIM LV	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3511 Pace Analytical Services - Minneapolis							
1-Methylnaphthalene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:30	90-12-0	
2-Chloronaphthalene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:30	91-58-7	
2-Methylnaphthalene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:30	91-57-6	
Acenaphthene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:30	83-32-9	
Acenaphthylene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:30	208-96-8	
Anthracene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:30	120-12-7	
Benzo(a)anthracene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:30	56-55-3	
Benzo(a)pyrene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:30	50-32-8	
Benzo(b)fluoranthene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:30	205-99-2	
Benzo(g,h,i)perylene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:30	191-24-2	
Benzo(k)fluoranthene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:30	207-08-9	
Chrysene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:30	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:30	53-70-3	
Dibenzofuran	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:30	132-64-9	
Fluoranthene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:30	206-44-0	
Fluorene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:30	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:30	193-39-5	
Naphthalene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:30	91-20-3	
Phenanthrene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:30	85-01-8	
Pyrene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:30	129-00-0	
Surrogates								
2-Fluorobiphenyl (S)	80	%.	30-150	1	03/03/23 11:28	03/06/23 17:30	321-60-8	
p-Terphenyl-d14 (S)	108	%.	30-150	1	03/03/23 11:28	03/06/23 17:30	1718-51-0	
8260D MSV	Analytical Method: EPA 8260D Pace Analytical Services - Minneapolis							
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	1		03/03/23 14:30	630-20-6	
1,1,1-Trichloroethane	ND	ug/L	1.0	1		03/03/23 14:30	71-55-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	1		03/03/23 14:30	79-34-5	
1,1,2-Trichloroethane	ND	ug/L	1.0	1		03/03/23 14:30	79-00-5	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	1		03/03/23 14:30	76-13-1	
1,1-Dichloroethane	ND	ug/L	1.0	1		03/03/23 14:30	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		03/03/23 14:30	75-35-4	
1,1-Dichloropropene	ND	ug/L	1.0	1		03/03/23 14:30	563-58-6	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	1		03/03/23 14:30	87-61-6	
1,2,3-Trichloropropane	ND	ug/L	2.5	1		03/03/23 14:30	96-18-4	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	1		03/03/23 14:30	120-82-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	1		03/03/23 14:30	95-63-6	
1,2-Dibromo-3-chloropropane	ND	ug/L	2.5	1		03/03/23 14:30	96-12-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Sample: MW-OWS-1 **Lab ID: 10644453001** Collected: 03/01/23 12:50 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260D MSV	Analytical Method: EPA 8260D Pace Analytical Services - Minneapolis							
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	1		03/03/23 14:30	106-93-4	
1,2-Dichlorobenzene	ND	ug/L	1.0	1		03/03/23 14:30	95-50-1	
1,2-Dichloroethane	ND	ug/L	1.0	1		03/03/23 14:30	107-06-2	
1,2-Dichloropropane	ND	ug/L	1.0	1		03/03/23 14:30	78-87-5	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	1		03/03/23 14:30	108-67-8	
1,3-Dichlorobenzene	ND	ug/L	1.0	1		03/03/23 14:30	541-73-1	
1,3-Dichloropropane	ND	ug/L	1.0	1		03/03/23 14:30	142-28-9	
1,4-Dichlorobenzene	ND	ug/L	1.0	1		03/03/23 14:30	106-46-7	
2,2-Dichloropropane	ND	ug/L	1.0	1		03/03/23 14:30	594-20-7	
2-Butanone (MEK)	ND	ug/L	10.0	1		03/03/23 14:30	78-93-3	
2-Chlorotoluene	ND	ug/L	1.0	1		03/03/23 14:30	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	1		03/03/23 14:30	106-43-4	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10.0	1		03/03/23 14:30	108-10-1	
Acetone	ND	ug/L	10.0	1		03/03/23 14:30	67-64-1	
Allyl chloride	ND	ug/L	2.5	1		03/03/23 14:30	107-05-1	
Benzene	ND	ug/L	1.0	1		03/03/23 14:30	71-43-2	
Bromobenzene	ND	ug/L	1.0	1		03/03/23 14:30	108-86-1	
Bromochloromethane	ND	ug/L	1.0	1		03/03/23 14:30	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	1		03/03/23 14:30	75-27-4	
Bromoform	ND	ug/L	1.0	1		03/03/23 14:30	75-25-2	
Bromomethane	ND	ug/L	2.5	1		03/03/23 14:30	74-83-9	
Carbon tetrachloride	ND	ug/L	1.0	1		03/03/23 14:30	56-23-5	
Chlorobenzene	ND	ug/L	1.0	1		03/03/23 14:30	108-90-7	
Chloroethane	ND	ug/L	1.0	1		03/03/23 14:30	75-00-3	
Chloroform	ND	ug/L	1.0	1		03/03/23 14:30	67-66-3	
Chloromethane	ND	ug/L	1.0	1		03/03/23 14:30	74-87-3	
Dibromochloromethane	ND	ug/L	1.0	1		03/03/23 14:30	124-48-1	
Dibromomethane	ND	ug/L	1.0	1		03/03/23 14:30	74-95-3	
Dichlorodifluoromethane	ND	ug/L	1.0	1		03/03/23 14:30	75-71-8	
Dichlorofluoromethane	ND	ug/L	1.0	1		03/03/23 14:30	75-43-4	
Diethyl ether (Ethyl ether)	ND	ug/L	2.5	1		03/03/23 14:30	60-29-7	
Ethylbenzene	ND	ug/L	1.0	1		03/03/23 14:30	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	1		03/03/23 14:30	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	1		03/03/23 14:30	98-82-8	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		03/03/23 14:30	1634-04-4	
Methylene Chloride	ND	ug/L	1.0	1		03/03/23 14:30	75-09-2	
Naphthalene	ND	ug/L	1.0	1		03/03/23 14:30	91-20-3	
Styrene	ND	ug/L	1.0	1		03/03/23 14:30	100-42-5	
Tetrachloroethene	ND	ug/L	1.0	1		03/03/23 14:30	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	1		03/03/23 14:30	109-99-9	
Toluene	ND	ug/L	1.0	1		03/03/23 14:30	108-88-3	
Trichloroethene	ND	ug/L	1.0	1		03/03/23 14:30	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	1		03/03/23 14:30	75-69-4	
Vinyl chloride	ND	ug/L	1.0	1		03/03/23 14:30	75-01-4	
Xylene (Total)	ND	ug/L	3.0	1		03/03/23 14:30	1330-20-7	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		03/03/23 14:30	156-59-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Sample: MW-OWS-1 **Lab ID: 10644453001** Collected: 03/01/23 12:50 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260D MSV	Analytical Method: EPA 8260D Pace Analytical Services - Minneapolis							
cis-1,3-Dichloropropene	ND	ug/L	1.0	1		03/03/23 14:30	10061-01-5	
m&p-Xylene	ND	ug/L	2.0	1		03/03/23 14:30	179601-23-1	
n-Butylbenzene	ND	ug/L	1.0	1		03/03/23 14:30	104-51-8	
n-Hexane	ND	ug/L	10.0	1		03/03/23 14:30	110-54-3	
n-Propylbenzene	ND	ug/L	1.0	1		03/03/23 14:30	103-65-1	
o-Xylene	ND	ug/L	1.0	1		03/03/23 14:30	95-47-6	
p-Isopropyltoluene	ND	ug/L	1.0	1		03/03/23 14:30	99-87-6	
sec-Butylbenzene	ND	ug/L	1.0	1		03/03/23 14:30	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	1		03/03/23 14:30	98-06-6	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		03/03/23 14:30	156-60-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	1		03/03/23 14:30	10061-02-6	
Surrogates								
1,2-Dichlorobenzene-d4 (S)	102	%.	75-125	1		03/03/23 14:30	2199-69-1	
4-Bromofluorobenzene (S)	102	%.	75-125	1		03/03/23 14:30	460-00-4	
Toluene-d8 (S)	100	%.	75-125	1		03/03/23 14:30	2037-26-5	

Sample: MW-OWS-2 **Lab ID: 10644453002** Collected: 03/01/23 10:40 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS LV	Analytical Method: NWTPH-Dx Preparation Method: EPA 3510C Pace Analytical Services - Minneapolis							
Diesel Fuel Range	ND	mg/L	0.34	1	03/03/23 08:40	03/03/23 18:56	68334-30-5	
Motor Oil Range	ND	mg/L	0.34	1	03/03/23 08:40	03/03/23 18:56		
Surrogates								
o-Terphenyl (S)	72	%.	50-150	1	03/03/23 08:40	03/03/23 18:56	84-15-1	
n-Triacontane (S)	67	%.	50-150	1	03/03/23 08:40	03/03/23 18:56		
NWTPH-Gx GCV	Analytical Method: NWTPH-Gx Pace Analytical Services - Minneapolis							
TPH as Gas	ND	ug/L	100	1		03/03/23 21:25		
Surrogates								
a,a,a-Trifluorotoluene (S)	95	%.	50-150	1		03/03/23 21:25	98-08-8	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis							
Arsenic	**1.4**	ug/L	0.50	1	03/09/23 07:00	03/09/23 16:33	7440-38-2	
Cadmium	ND	ug/L	0.080	1	03/09/23 07:00	03/09/23 16:33	7440-43-9	
Chromium	ND	ug/L	2.0	1	03/09/23 07:00	03/09/23 16:33	7440-47-3	
Lead	ND	ug/L	0.50	1	03/09/23 07:00	03/09/23 16:33	7439-92-1	
Nickel	ND	ug/L	0.50	1	03/09/23 07:00	03/09/23 16:33	7440-02-0	
Zinc	ND	ug/L	5.0	1	03/09/23 07:00	03/09/23 16:33	7440-66-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Sample: MW-OWS-2 **Lab ID: 10644453002** Collected: 03/01/23 10:40 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis							
Arsenic, Dissolved	**1.4**	ug/L	0.50	1	03/09/23 06:59	03/09/23 18:59	7440-38-2	
Cadmium, Dissolved	ND	ug/L	0.080	1	03/09/23 06:59	03/09/23 18:59	7440-43-9	
Chromium, Dissolved	ND	ug/L	2.0	1	03/09/23 06:59	03/09/23 18:59	7440-47-3	
Lead, Dissolved	ND	ug/L	0.50	1	03/09/23 06:59	03/09/23 18:59	7439-92-1	
Nickel, Dissolved	ND	ug/L	0.50	1	03/09/23 06:59	03/09/23 18:59	7440-02-0	
Zinc, Dissolved	ND	ug/L	5.0	1	03/09/23 06:59	03/09/23 18:59	7440-66-6	
7470A Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Minneapolis							
Mercury	ND	ug/L	0.20	1	03/09/23 07:08	03/15/23 11:56	7439-97-6	
7470A Mercury, Dissolved	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Minneapolis							
Mercury, Dissolved	ND	ug/L	0.20	1	03/09/23 07:08	03/15/23 11:39	7439-97-6	
SVOA (GC/MS) 8270E	Analytical Method: EPA 8270E Preparation Method: 3510C Pace National - Mt. Juliet							
Biphenyl (Diphenyl)	ND	ug/L	10.0	1	03/08/23 07:01	03/08/23 19:39	92-52-4	
Surrogates								
2-Fluorophenol (S)	21.3	%	10.0-120	1	03/08/23 07:01	03/08/23 19:39	367-12-4	
Phenol-d5 (S)	12.3	%	10.0-120	1	03/08/23 07:01	03/08/23 19:39	4165-62-2	
Nitrobenzene-d5 (S)	40.5	%	10.0-127	1	03/08/23 07:01	03/08/23 19:39	4165-60-0	
2-Fluorobiphenyl (S)	45.7	%	10.0-130	1	03/08/23 07:01	03/08/23 19:39	321-60-8	
2,4,6-Tribromophenol (S)	57.0	%	10.0-155	1	03/08/23 07:01	03/08/23 19:39	118-79-6	
p-Terphenyl-d14 (S)	71.8	%	10.0-128	1	03/08/23 07:01	03/08/23 19:39	1718-51-0	
8270E MSSV PAH by SIM LV	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3511 Pace Analytical Services - Minneapolis							
1-Methylnaphthalene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:55	90-12-0	
2-Chloronaphthalene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:55	91-58-7	
2-Methylnaphthalene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:55	91-57-6	
Acenaphthene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:55	83-32-9	
Acenaphthylene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:55	208-96-8	
Anthracene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:55	120-12-7	
Benzo(a)anthracene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:55	56-55-3	
Benzo(a)pyrene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:55	50-32-8	
Benzo(b)fluoranthene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:55	205-99-2	
Benzo(g,h,i)perylene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:55	191-24-2	
Benzo(k)fluoranthene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:55	207-08-9	
Chrysene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:55	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:55	53-70-3	
Dibenzofuran	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:55	132-64-9	
Fluoranthene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:55	206-44-0	
Fluorene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:55	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:55	193-39-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Sample: MW-OWS-2 **Lab ID: 10644453002** Collected: 03/01/23 10:40 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270E MSSV PAH by SIM LV	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3511 Pace Analytical Services - Minneapolis							
Naphthalene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:55	91-20-3	
Phenanthrene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:55	85-01-8	
Pyrene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 17:55	129-00-0	
Surrogates								
2-Fluorobiphenyl (S)	83	%.	30-150	1	03/03/23 11:28	03/06/23 17:55	321-60-8	
p-Terphenyl-d14 (S)	108	%.	30-150	1	03/03/23 11:28	03/06/23 17:55	1718-51-0	
8260D MSV	Analytical Method: EPA 8260D Pace Analytical Services - Minneapolis							
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	1		03/03/23 14:47	630-20-6	
1,1,1-Trichloroethane	ND	ug/L	1.0	1		03/03/23 14:47	71-55-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	1		03/03/23 14:47	79-34-5	
1,1,2-Trichloroethane	ND	ug/L	1.0	1		03/03/23 14:47	79-00-5	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	1		03/03/23 14:47	76-13-1	
1,1-Dichloroethane	ND	ug/L	1.0	1		03/03/23 14:47	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		03/03/23 14:47	75-35-4	
1,1-Dichloropropene	ND	ug/L	1.0	1		03/03/23 14:47	563-58-6	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	1		03/03/23 14:47	87-61-6	
1,2,3-Trichloropropane	ND	ug/L	2.5	1		03/03/23 14:47	96-18-4	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	1		03/03/23 14:47	120-82-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	1		03/03/23 14:47	95-63-6	
1,2-Dibromo-3-chloropropane	ND	ug/L	2.5	1		03/03/23 14:47	96-12-8	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	1		03/03/23 14:47	106-93-4	
1,2-Dichlorobenzene	ND	ug/L	1.0	1		03/03/23 14:47	95-50-1	
1,2-Dichloroethane	ND	ug/L	1.0	1		03/03/23 14:47	107-06-2	
1,2-Dichloropropane	ND	ug/L	1.0	1		03/03/23 14:47	78-87-5	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	1		03/03/23 14:47	108-67-8	
1,3-Dichlorobenzene	ND	ug/L	1.0	1		03/03/23 14:47	541-73-1	
1,3-Dichloropropane	ND	ug/L	1.0	1		03/03/23 14:47	142-28-9	
1,4-Dichlorobenzene	ND	ug/L	1.0	1		03/03/23 14:47	106-46-7	
2,2-Dichloropropane	ND	ug/L	1.0	1		03/03/23 14:47	594-20-7	
2-Butanone (MEK)	ND	ug/L	10.0	1		03/03/23 14:47	78-93-3	
2-Chlorotoluene	ND	ug/L	1.0	1		03/03/23 14:47	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	1		03/03/23 14:47	106-43-4	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10.0	1		03/03/23 14:47	108-10-1	
Acetone	ND	ug/L	10.0	1		03/03/23 14:47	67-64-1	
Allyl chloride	ND	ug/L	2.5	1		03/03/23 14:47	107-05-1	
Benzene	ND	ug/L	1.0	1		03/03/23 14:47	71-43-2	
Bromobenzene	ND	ug/L	1.0	1		03/03/23 14:47	108-86-1	
Bromochloromethane	ND	ug/L	1.0	1		03/03/23 14:47	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	1		03/03/23 14:47	75-27-4	
Bromoform	ND	ug/L	1.0	1		03/03/23 14:47	75-25-2	
Bromomethane	ND	ug/L	2.5	1		03/03/23 14:47	74-83-9	
Carbon tetrachloride	ND	ug/L	1.0	1		03/03/23 14:47	56-23-5	
Chlorobenzene	ND	ug/L	1.0	1		03/03/23 14:47	108-90-7	
Chloroethane	ND	ug/L	1.0	1		03/03/23 14:47	75-00-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Sample: MW-OWS-2 **Lab ID: 10644453002** Collected: 03/01/23 10:40 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260D MSV	Analytical Method: EPA 8260D Pace Analytical Services - Minneapolis							
Chloroform	ND	ug/L	1.0	1		03/03/23 14:47	67-66-3	
Chloromethane	ND	ug/L	1.0	1		03/03/23 14:47	74-87-3	
Dibromochloromethane	ND	ug/L	1.0	1		03/03/23 14:47	124-48-1	
Dibromomethane	ND	ug/L	1.0	1		03/03/23 14:47	74-95-3	
Dichlorodifluoromethane	ND	ug/L	1.0	1		03/03/23 14:47	75-71-8	
Dichlorofluoromethane	ND	ug/L	1.0	1		03/03/23 14:47	75-43-4	
Diethyl ether (Ethyl ether)	ND	ug/L	2.5	1		03/03/23 14:47	60-29-7	
Ethylbenzene	ND	ug/L	1.0	1		03/03/23 14:47	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	1		03/03/23 14:47	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	1		03/03/23 14:47	98-82-8	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		03/03/23 14:47	1634-04-4	
Methylene Chloride	ND	ug/L	1.0	1		03/03/23 14:47	75-09-2	
Naphthalene	ND	ug/L	1.0	1		03/03/23 14:47	91-20-3	
Styrene	ND	ug/L	1.0	1		03/03/23 14:47	100-42-5	
Tetrachloroethene	ND	ug/L	1.0	1		03/03/23 14:47	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	1		03/03/23 14:47	109-99-9	
Toluene	ND	ug/L	1.0	1		03/03/23 14:47	108-88-3	
Trichloroethene	ND	ug/L	1.0	1		03/03/23 14:47	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	1		03/03/23 14:47	75-69-4	
Vinyl chloride	ND	ug/L	1.0	1		03/03/23 14:47	75-01-4	
Xylene (Total)	ND	ug/L	3.0	1		03/03/23 14:47	1330-20-7	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		03/03/23 14:47	156-59-2	
cis-1,3-Dichloropropene	ND	ug/L	1.0	1		03/03/23 14:47	10061-01-5	
m&p-Xylene	ND	ug/L	2.0	1		03/03/23 14:47	179601-23-1	
n-Butylbenzene	ND	ug/L	1.0	1		03/03/23 14:47	104-51-8	
n-Hexane	ND	ug/L	10.0	1		03/03/23 14:47	110-54-3	
n-Propylbenzene	ND	ug/L	1.0	1		03/03/23 14:47	103-65-1	
o-Xylene	ND	ug/L	1.0	1		03/03/23 14:47	95-47-6	
p-Isopropyltoluene	ND	ug/L	1.0	1		03/03/23 14:47	99-87-6	
sec-Butylbenzene	ND	ug/L	1.0	1		03/03/23 14:47	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	1		03/03/23 14:47	98-06-6	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		03/03/23 14:47	156-60-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	1		03/03/23 14:47	10061-02-6	
Surrogates								
1,2-Dichlorobenzene-d4 (S)	99	%.	75-125	1		03/03/23 14:47	2199-69-1	
4-Bromofluorobenzene (S)	102	%.	75-125	1		03/03/23 14:47	460-00-4	
Toluene-d8 (S)	100	%.	75-125	1		03/03/23 14:47	2037-26-5	

Sample: MW-OWS-3 **Lab ID: 10644453003** Collected: 02/28/23 10:35 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS LV	Analytical Method: NWTPH-Dx Preparation Method: EPA 3510C Pace Analytical Services - Minneapolis							
Diesel Fuel Range	ND	mg/L	0.34	1	03/03/23 08:40	03/06/23 09:48	68334-30-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Sample: MW-OWS-3 **Lab ID: 10644453003** Collected: 02/28/23 10:35 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS LV	Analytical Method: NWTPH-Dx Preparation Method: EPA 3510C Pace Analytical Services - Minneapolis							
Motor Oil Range	ND	mg/L	0.34	1	03/03/23 08:40	03/06/23 09:48		
Surrogates								
o-Terphenyl (S)	85	%.	50-150	1	03/03/23 08:40	03/06/23 09:48	84-15-1	
n-Triacontane (S)	78	%.	50-150	1	03/03/23 08:40	03/06/23 09:48		
NWTPH-Gx GCV	Analytical Method: NWTPH-Gx Pace Analytical Services - Minneapolis							
TPH as Gas	ND	ug/L	100	1		03/03/23 21:40		
Surrogates								
a,a,a-Trifluorotoluene (S)	94	%.	50-150	1		03/03/23 21:40	98-08-8	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis							
Arsenic	**2.0**	ug/L	0.50	1	03/09/23 07:00	03/09/23 16:39	7440-38-2	
Cadmium	ND	ug/L	0.080	1	03/09/23 07:00	03/09/23 16:39	7440-43-9	
Chromium	ND	ug/L	2.0	1	03/09/23 07:00	03/09/23 16:39	7440-47-3	
Lead	ND	ug/L	0.50	1	03/09/23 07:00	03/09/23 16:39	7439-92-1	
Nickel	**0.50**	ug/L	0.50	1	03/09/23 07:00	03/09/23 16:39	7440-02-0	
Zinc	ND	ug/L	5.0	1	03/09/23 07:00	03/09/23 16:39	7440-66-6	
6020B MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis							
Arsenic, Dissolved	**2.1**	ug/L	0.50	1	03/09/23 06:59	03/09/23 19:05	7440-38-2	
Cadmium, Dissolved	ND	ug/L	0.080	1	03/09/23 06:59	03/09/23 19:05	7440-43-9	
Chromium, Dissolved	ND	ug/L	2.0	1	03/09/23 06:59	03/09/23 19:05	7440-47-3	
Lead, Dissolved	ND	ug/L	0.50	1	03/09/23 06:59	03/09/23 19:05	7439-92-1	
Nickel, Dissolved	ND	ug/L	0.50	1	03/09/23 06:59	03/09/23 19:05	7440-02-0	
Zinc, Dissolved	ND	ug/L	5.0	1	03/09/23 06:59	03/09/23 19:05	7440-66-6	
7470A Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Minneapolis							
Mercury	ND	ug/L	0.20	1	03/09/23 07:08	03/15/23 12:01	7439-97-6	
7470A Mercury, Dissolved	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Minneapolis							
Mercury, Dissolved	ND	ug/L	0.20	1	03/09/23 07:08	03/15/23 11:43	7439-97-6	
SVOA (GC/MS) 8270E	Analytical Method: EPA 8270E Preparation Method: 3510C Pace National - Mt. Juliet							
Biphenyl (Diphenyl)	ND	ug/L	10.0	1	03/06/23 06:19	03/07/23 12:36	92-52-4	
Surrogates								
2-Fluorophenol (S)	26.8	%	10.0-120	1	03/06/23 06:19	03/07/23 12:36	367-12-4	
Phenol-d5 (S)	18.2	%	10.0-120	1	03/06/23 06:19	03/07/23 12:36	4165-62-2	
Nitrobenzene-d5 (S)	55.7	%	10.0-127	1	03/06/23 06:19	03/07/23 12:36	4165-60-0	
2-Fluorobiphenyl (S)	62.1	%	10.0-130	1	03/06/23 06:19	03/07/23 12:36	321-60-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Sample: MW-OWS-3 **Lab ID: 10644453003** Collected: 02/28/23 10:35 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
SVOA (GC/MS) 8270E	Analytical Method: EPA 8270E Preparation Method: 3510C Pace National - Mt. Juliet							
Surrogates								
2,4,6-Tribromophenol (S)	53.5	%	10.0-155	1	03/06/23 06:19	03/07/23 12:36	118-79-6	
p-Terphenyl-d14 (S)	78.8	%	10.0-128	1	03/06/23 06:19	03/07/23 12:36	1718-51-0	
8270E MSSV PAH by SIM LV	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3511 Pace Analytical Services - Minneapolis							
1-Methylnaphthalene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:24	90-12-0	
2-Chloronaphthalene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:24	91-58-7	
2-Methylnaphthalene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:24	91-57-6	
Acenaphthene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:24	83-32-9	
Acenaphthylene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:24	208-96-8	
Anthracene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:24	120-12-7	
Benzo(a)anthracene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:24	56-55-3	
Benzo(a)pyrene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:24	50-32-8	
Benzo(b)fluoranthene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:24	205-99-2	
Benzo(g,h,i)perylene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:24	191-24-2	
Benzo(k)fluoranthene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:24	207-08-9	
Chrysene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:24	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:24	53-70-3	
Dibenzofuran	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:24	132-64-9	
Fluoranthene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:24	206-44-0	
Fluorene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:24	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:24	193-39-5	
Naphthalene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:24	91-20-3	
Phenanthrene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:24	85-01-8	
Pyrene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:24	129-00-0	
Surrogates								
2-Fluorobiphenyl (S)	76	%.	30-150	1	03/03/23 11:28	03/06/23 15:24	321-60-8	
p-Terphenyl-d14 (S)	103	%.	30-150	1	03/03/23 11:28	03/06/23 15:24	1718-51-0	
8260D MSV	Analytical Method: EPA 8260D Pace Analytical Services - Minneapolis							
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	1		03/03/23 13:58	630-20-6	
1,1,1-Trichloroethane	ND	ug/L	1.0	1		03/03/23 13:58	71-55-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	1		03/03/23 13:58	79-34-5	
1,1,2-Trichloroethane	ND	ug/L	1.0	1		03/03/23 13:58	79-00-5	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	1		03/03/23 13:58	76-13-1	
1,1-Dichloroethane	ND	ug/L	1.0	1		03/03/23 13:58	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		03/03/23 13:58	75-35-4	
1,1-Dichloropropene	ND	ug/L	1.0	1		03/03/23 13:58	563-58-6	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	1		03/03/23 13:58	87-61-6	
1,2,3-Trichloropropane	ND	ug/L	2.5	1		03/03/23 13:58	96-18-4	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	1		03/03/23 13:58	120-82-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	1		03/03/23 13:58	95-63-6	
1,2-Dibromo-3-chloropropane	ND	ug/L	2.5	1		03/03/23 13:58	96-12-8	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	1		03/03/23 13:58	106-93-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Sample: MW-OWS-3 **Lab ID: 10644453003** Collected: 02/28/23 10:35 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260D MSV	Analytical Method: EPA 8260D Pace Analytical Services - Minneapolis							
1,2-Dichlorobenzene	ND	ug/L	1.0	1		03/03/23 13:58	95-50-1	
1,2-Dichloroethane	ND	ug/L	1.0	1		03/03/23 13:58	107-06-2	
1,2-Dichloropropane	ND	ug/L	1.0	1		03/03/23 13:58	78-87-5	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	1		03/03/23 13:58	108-67-8	
1,3-Dichlorobenzene	ND	ug/L	1.0	1		03/03/23 13:58	541-73-1	
1,3-Dichloropropane	ND	ug/L	1.0	1		03/03/23 13:58	142-28-9	
1,4-Dichlorobenzene	ND	ug/L	1.0	1		03/03/23 13:58	106-46-7	
2,2-Dichloropropane	ND	ug/L	1.0	1		03/03/23 13:58	594-20-7	
2-Butanone (MEK)	ND	ug/L	10.0	1		03/03/23 13:58	78-93-3	
2-Chlorotoluene	ND	ug/L	1.0	1		03/03/23 13:58	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	1		03/03/23 13:58	106-43-4	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10.0	1		03/03/23 13:58	108-10-1	
Acetone	ND	ug/L	10.0	1		03/03/23 13:58	67-64-1	
Allyl chloride	ND	ug/L	2.5	1		03/03/23 13:58	107-05-1	
Benzene	ND	ug/L	1.0	1		03/03/23 13:58	71-43-2	
Bromobenzene	ND	ug/L	1.0	1		03/03/23 13:58	108-86-1	
Bromochloromethane	ND	ug/L	1.0	1		03/03/23 13:58	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	1		03/03/23 13:58	75-27-4	
Bromoform	ND	ug/L	1.0	1		03/03/23 13:58	75-25-2	
Bromomethane	ND	ug/L	2.5	1		03/03/23 13:58	74-83-9	
Carbon tetrachloride	ND	ug/L	1.0	1		03/03/23 13:58	56-23-5	
Chlorobenzene	ND	ug/L	1.0	1		03/03/23 13:58	108-90-7	
Chloroethane	ND	ug/L	1.0	1		03/03/23 13:58	75-00-3	
Chloroform	ND	ug/L	1.0	1		03/03/23 13:58	67-66-3	
Chloromethane	ND	ug/L	1.0	1		03/03/23 13:58	74-87-3	
Dibromochloromethane	ND	ug/L	1.0	1		03/03/23 13:58	124-48-1	
Dibromomethane	ND	ug/L	1.0	1		03/03/23 13:58	74-95-3	
Dichlorodifluoromethane	ND	ug/L	1.0	1		03/03/23 13:58	75-71-8	
Dichlorofluoromethane	ND	ug/L	1.0	1		03/03/23 13:58	75-43-4	
Diethyl ether (Ethyl ether)	ND	ug/L	2.5	1		03/03/23 13:58	60-29-7	
Ethylbenzene	ND	ug/L	1.0	1		03/03/23 13:58	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	1		03/03/23 13:58	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	1		03/03/23 13:58	98-82-8	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		03/03/23 13:58	1634-04-4	
Methylene Chloride	ND	ug/L	1.0	1		03/03/23 13:58	75-09-2	
Naphthalene	ND	ug/L	1.0	1		03/03/23 13:58	91-20-3	
Styrene	ND	ug/L	1.0	1		03/03/23 13:58	100-42-5	
Tetrachloroethene	ND	ug/L	1.0	1		03/03/23 13:58	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	1		03/03/23 13:58	109-99-9	
Toluene	ND	ug/L	1.0	1		03/03/23 13:58	108-88-3	
Trichloroethene	ND	ug/L	1.0	1		03/03/23 13:58	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	1		03/03/23 13:58	75-69-4	
Vinyl chloride	ND	ug/L	1.0	1		03/03/23 13:58	75-01-4	
Xylene (Total)	ND	ug/L	3.0	1		03/03/23 13:58	1330-20-7	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		03/03/23 13:58	156-59-2	
cis-1,3-Dichloropropene	ND	ug/L	1.0	1		03/03/23 13:58	10061-01-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Sample: MW-OWS-3 **Lab ID: 10644453003** Collected: 02/28/23 10:35 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260D MSV	Analytical Method: EPA 8260D Pace Analytical Services - Minneapolis							
m&p-Xylene	ND	ug/L	2.0	1		03/03/23 13:58	179601-23-1	
n-Butylbenzene	ND	ug/L	1.0	1		03/03/23 13:58	104-51-8	
n-Hexane	ND	ug/L	10.0	1		03/03/23 13:58	110-54-3	
n-Propylbenzene	ND	ug/L	1.0	1		03/03/23 13:58	103-65-1	
o-Xylene	ND	ug/L	1.0	1		03/03/23 13:58	95-47-6	
p-Isopropyltoluene	ND	ug/L	1.0	1		03/03/23 13:58	99-87-6	
sec-Butylbenzene	ND	ug/L	1.0	1		03/03/23 13:58	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	1		03/03/23 13:58	98-06-6	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		03/03/23 13:58	156-60-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	1		03/03/23 13:58	10061-02-6	
Surrogates								
1,2-Dichlorobenzene-d4 (S)	103	%.	75-125	1		03/03/23 13:58	2199-69-1	
4-Bromofluorobenzene (S)	101	%.	75-125	1		03/03/23 13:58	460-00-4	
Toluene-d8 (S)	100	%.	75-125	1		03/03/23 13:58	2037-26-5	

Sample: WES-DUP-1 **Lab ID: 10644453004** Collected: 03/01/23 09:00 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS LV	Analytical Method: NWTPH-Dx Preparation Method: EPA 3510C Pace Analytical Services - Minneapolis							
Diesel Fuel Range	ND	mg/L	0.34	1	03/03/23 08:40	03/03/23 19:07	68334-30-5	
Motor Oil Range	ND	mg/L	0.34	1	03/03/23 08:40	03/03/23 19:07		
Surrogates								
o-Terphenyl (S)	75	%.	50-150	1	03/03/23 08:40	03/03/23 19:07	84-15-1	
n-Triacontane (S)	68	%.	50-150	1	03/03/23 08:40	03/03/23 19:07		
NWTPH-Gx GCV	Analytical Method: NWTPH-Gx Pace Analytical Services - Minneapolis							
TPH as Gas	ND	ug/L	100	1		03/03/23 21:55		
Surrogates								
a,a,a-Trifluorotoluene (S)	95	%.	50-150	1		03/03/23 21:55	98-08-8	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis							
Arsenic	**1.5**	ug/L	0.50	1	03/09/23 07:00	03/09/23 16:45	7440-38-2	
Cadmium	ND	ug/L	0.080	1	03/09/23 07:00	03/09/23 16:45	7440-43-9	
Chromium	ND	ug/L	2.0	1	03/09/23 07:00	03/09/23 16:45	7440-47-3	
Lead	ND	ug/L	0.50	1	03/09/23 07:00	03/09/23 16:45	7439-92-1	
Nickel	ND	ug/L	0.50	1	03/09/23 07:00	03/09/23 16:45	7440-02-0	
Zinc	ND	ug/L	5.0	1	03/09/23 07:00	03/09/23 16:45	7440-66-6	
6020B MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis							
Arsenic, Dissolved	**1.4**	ug/L	0.50	1	03/09/23 06:59	03/09/23 19:11	7440-38-2	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Sample: WES-DUP-1 **Lab ID: 10644453004** Collected: 03/01/23 09:00 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis							
Cadmium, Dissolved	ND	ug/L	0.080	1	03/09/23 06:59	03/09/23 19:11	7440-43-9	
Chromium, Dissolved	ND	ug/L	2.0	1	03/09/23 06:59	03/09/23 19:11	7440-47-3	
Lead, Dissolved	ND	ug/L	0.50	1	03/09/23 06:59	03/09/23 19:11	7439-92-1	
Nickel, Dissolved	ND	ug/L	0.50	1	03/09/23 06:59	03/09/23 19:11	7440-02-0	
Zinc, Dissolved	ND	ug/L	5.0	1	03/09/23 06:59	03/09/23 19:11	7440-66-6	
7470A Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Minneapolis							
Mercury	ND	ug/L	0.20	1	03/09/23 07:08	03/15/23 12:02	7439-97-6	
7470A Mercury, Dissolved	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Minneapolis							
Mercury, Dissolved	ND	ug/L	0.20	1	03/09/23 07:08	03/15/23 11:45	7439-97-6	
SVOA (GC/MS) 8270E	Analytical Method: EPA 8270E Preparation Method: 3510C Pace National - Mt. Juliet							
Biphenyl (Diphenyl)	ND	ug/L	11.1	1.11	03/08/23 07:01	03/08/23 20:00	92-52-4	
Surrogates								
2-Fluorophenol (S)	26.4	%	10.0-120	1.11	03/08/23 07:01	03/08/23 20:00	367-12-4	
Phenol-d5 (S)	14.9	%	10.0-120	1.11	03/08/23 07:01	03/08/23 20:00	4165-62-2	
Nitrobenzene-d5 (S)	44.3	%	10.0-127	1.11	03/08/23 07:01	03/08/23 20:00	4165-60-0	
2-Fluorobiphenyl (S)	50.5	%	10.0-130	1.11	03/08/23 07:01	03/08/23 20:00	321-60-8	
2,4,6-Tribromophenol (S)	59.0	%	10.0-155	1.11	03/08/23 07:01	03/08/23 20:00	118-79-6	
p-Terphenyl-d14 (S)	69.5	%	10.0-128	1.11	03/08/23 07:01	03/08/23 20:00	1718-51-0	
8270E MSSV PAH by SIM LV	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3511 Pace Analytical Services - Minneapolis							
1-Methylnaphthalene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 18:20	90-12-0	
2-Chloronaphthalene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 18:20	91-58-7	
2-Methylnaphthalene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 18:20	91-57-6	
Acenaphthene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 18:20	83-32-9	
Acenaphthylene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 18:20	208-96-8	
Anthracene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 18:20	120-12-7	
Benzo(a)anthracene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 18:20	56-55-3	
Benzo(a)pyrene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 18:20	50-32-8	
Benzo(b)fluoranthene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 18:20	205-99-2	
Benzo(g,h,i)perylene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 18:20	191-24-2	
Benzo(k)fluoranthene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 18:20	207-08-9	
Chrysene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 18:20	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 18:20	53-70-3	
Dibenzofuran	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 18:20	132-64-9	
Fluoranthene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 18:20	206-44-0	
Fluorene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 18:20	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 18:20	193-39-5	
Naphthalene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 18:20	91-20-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Sample: WES-DUP-1 **Lab ID: 10644453004** Collected: 03/01/23 09:00 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270E MSSV PAH by SIM LV	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3511 Pace Analytical Services - Minneapolis							
Phenanthrene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 18:20	85-01-8	
Pyrene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 18:20	129-00-0	
Surrogates								
2-Fluorobiphenyl (S)	76	%.	30-150	1	03/03/23 11:28	03/06/23 18:20	321-60-8	
p-Terphenyl-d14 (S)	104	%.	30-150	1	03/03/23 11:28	03/06/23 18:20	1718-51-0	
8260D MSV	Analytical Method: EPA 8260D Pace Analytical Services - Minneapolis							
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	1		03/03/23 15:03	630-20-6	
1,1,1-Trichloroethane	ND	ug/L	1.0	1		03/03/23 15:03	71-55-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	1		03/03/23 15:03	79-34-5	
1,1,2-Trichloroethane	ND	ug/L	1.0	1		03/03/23 15:03	79-00-5	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	1		03/03/23 15:03	76-13-1	
1,1-Dichloroethane	ND	ug/L	1.0	1		03/03/23 15:03	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		03/03/23 15:03	75-35-4	
1,1-Dichloropropene	ND	ug/L	1.0	1		03/03/23 15:03	563-58-6	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	1		03/03/23 15:03	87-61-6	
1,2,3-Trichloropropane	ND	ug/L	2.5	1		03/03/23 15:03	96-18-4	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	1		03/03/23 15:03	120-82-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	1		03/03/23 15:03	95-63-6	
1,2-Dibromo-3-chloropropane	ND	ug/L	2.5	1		03/03/23 15:03	96-12-8	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	1		03/03/23 15:03	106-93-4	
1,2-Dichlorobenzene	ND	ug/L	1.0	1		03/03/23 15:03	95-50-1	
1,2-Dichloroethane	ND	ug/L	1.0	1		03/03/23 15:03	107-06-2	
1,2-Dichloropropane	ND	ug/L	1.0	1		03/03/23 15:03	78-87-5	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	1		03/03/23 15:03	108-67-8	
1,3-Dichlorobenzene	ND	ug/L	1.0	1		03/03/23 15:03	541-73-1	
1,3-Dichloropropane	ND	ug/L	1.0	1		03/03/23 15:03	142-28-9	
1,4-Dichlorobenzene	ND	ug/L	1.0	1		03/03/23 15:03	106-46-7	
2,2-Dichloropropane	ND	ug/L	1.0	1		03/03/23 15:03	594-20-7	
2-Butanone (MEK)	ND	ug/L	10.0	1		03/03/23 15:03	78-93-3	
2-Chlorotoluene	ND	ug/L	1.0	1		03/03/23 15:03	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	1		03/03/23 15:03	106-43-4	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10.0	1		03/03/23 15:03	108-10-1	
Acetone	ND	ug/L	10.0	1		03/03/23 15:03	67-64-1	
Allyl chloride	ND	ug/L	2.5	1		03/03/23 15:03	107-05-1	
Benzene	ND	ug/L	1.0	1		03/03/23 15:03	71-43-2	
Bromobenzene	ND	ug/L	1.0	1		03/03/23 15:03	108-86-1	
Bromochloromethane	ND	ug/L	1.0	1		03/03/23 15:03	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	1		03/03/23 15:03	75-27-4	
Bromoform	ND	ug/L	1.0	1		03/03/23 15:03	75-25-2	
Bromomethane	ND	ug/L	2.5	1		03/03/23 15:03	74-83-9	
Carbon tetrachloride	ND	ug/L	1.0	1		03/03/23 15:03	56-23-5	
Chlorobenzene	ND	ug/L	1.0	1		03/03/23 15:03	108-90-7	
Chloroethane	ND	ug/L	1.0	1		03/03/23 15:03	75-00-3	
Chloroform	ND	ug/L	1.0	1		03/03/23 15:03	67-66-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Sample: WES-DUP-1 **Lab ID: 10644453004** Collected: 03/01/23 09:00 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260D MSV	Analytical Method: EPA 8260D Pace Analytical Services - Minneapolis							
Chloromethane	ND	ug/L	1.0	1		03/03/23 15:03	74-87-3	
Dibromochloromethane	ND	ug/L	1.0	1		03/03/23 15:03	124-48-1	
Dibromomethane	ND	ug/L	1.0	1		03/03/23 15:03	74-95-3	
Dichlorodifluoromethane	ND	ug/L	1.0	1		03/03/23 15:03	75-71-8	
Dichlorofluoromethane	ND	ug/L	1.0	1		03/03/23 15:03	75-43-4	
Diethyl ether (Ethyl ether)	ND	ug/L	2.5	1		03/03/23 15:03	60-29-7	
Ethylbenzene	ND	ug/L	1.0	1		03/03/23 15:03	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	1		03/03/23 15:03	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	1		03/03/23 15:03	98-82-8	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		03/03/23 15:03	1634-04-4	
Methylene Chloride	ND	ug/L	1.0	1		03/03/23 15:03	75-09-2	
Naphthalene	ND	ug/L	1.0	1		03/03/23 15:03	91-20-3	
Styrene	ND	ug/L	1.0	1		03/03/23 15:03	100-42-5	
Tetrachloroethene	ND	ug/L	1.0	1		03/03/23 15:03	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	1		03/03/23 15:03	109-99-9	
Toluene	ND	ug/L	1.0	1		03/03/23 15:03	108-88-3	
Trichloroethene	ND	ug/L	1.0	1		03/03/23 15:03	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	1		03/03/23 15:03	75-69-4	
Vinyl chloride	ND	ug/L	1.0	1		03/03/23 15:03	75-01-4	
Xylene (Total)	ND	ug/L	3.0	1		03/03/23 15:03	1330-20-7	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		03/03/23 15:03	156-59-2	
cis-1,3-Dichloropropene	ND	ug/L	1.0	1		03/03/23 15:03	10061-01-5	
m&p-Xylene	ND	ug/L	2.0	1		03/03/23 15:03	179601-23-1	
n-Butylbenzene	ND	ug/L	1.0	1		03/03/23 15:03	104-51-8	
n-Hexane	ND	ug/L	10.0	1		03/03/23 15:03	110-54-3	
n-Propylbenzene	ND	ug/L	1.0	1		03/03/23 15:03	103-65-1	
o-Xylene	ND	ug/L	1.0	1		03/03/23 15:03	95-47-6	
p-Isopropyltoluene	ND	ug/L	1.0	1		03/03/23 15:03	99-87-6	
sec-Butylbenzene	ND	ug/L	1.0	1		03/03/23 15:03	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	1		03/03/23 15:03	98-06-6	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		03/03/23 15:03	156-60-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	1		03/03/23 15:03	10061-02-6	
Surrogates								
1,2-Dichlorobenzene-d4 (S)	100	%.	75-125	1		03/03/23 15:03	2199-69-1	
4-Bromofluorobenzene (S)	101	%.	75-125	1		03/03/23 15:03	460-00-4	
Toluene-d8 (S)	101	%.	75-125	1		03/03/23 15:03	2037-26-5	

Sample: WES-FEB-1 **Lab ID: 10644453005** Collected: 02/28/23 08:00 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS LV	Analytical Method: NWTPH-Dx Preparation Method: EPA 3510C Pace Analytical Services - Minneapolis							
Diesel Fuel Range	ND	mg/L	0.34	1	03/03/23 08:40	03/03/23 18:34	68334-30-5	
Motor Oil Range	ND	mg/L	0.34	1	03/03/23 08:40	03/03/23 18:34		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Sample: WES-FEB-1 **Lab ID: 10644453005** Collected: 02/28/23 08:00 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Dx GCS LV	Analytical Method: NWTPH-Dx Preparation Method: EPA 3510C Pace Analytical Services - Minneapolis							
Surrogates								
o-Terphenyl (S)	73	%.	50-150	1	03/03/23 08:40	03/03/23 18:34	84-15-1	
n-Triacontane (S)	69	%.	50-150	1	03/03/23 08:40	03/03/23 18:34		
NWTPH-Gx GCV	Analytical Method: NWTPH-Gx Pace Analytical Services - Minneapolis							
TPH as Gas	ND	ug/L	100	1		03/03/23 22:10		
Surrogates								
a,a,a-Trifluorotoluene (S)	94	%.	50-150	1		03/03/23 22:10	98-08-8	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis							
Arsenic	ND	ug/L	0.50	1	03/09/23 07:00	03/09/23 16:57	7440-38-2	
Cadmium	ND	ug/L	0.080	1	03/09/23 07:00	03/09/23 16:57	7440-43-9	
Chromium	ND	ug/L	2.0	1	03/09/23 07:00	03/09/23 16:57	7440-47-3	
Lead	ND	ug/L	0.50	1	03/09/23 07:00	03/09/23 16:57	7439-92-1	
Nickel	ND	ug/L	0.50	1	03/09/23 07:00	03/09/23 16:57	7440-02-0	
Zinc	ND	ug/L	5.0	1	03/09/23 07:00	03/09/23 16:57	7440-66-6	
6020B MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis							
Arsenic, Dissolved	ND	ug/L	0.50	1	03/09/23 06:59	03/09/23 19:17	7440-38-2	
Cadmium, Dissolved	ND	ug/L	0.080	1	03/09/23 06:59	03/09/23 19:17	7440-43-9	
Chromium, Dissolved	ND	ug/L	2.0	1	03/09/23 06:59	03/09/23 19:17	7440-47-3	
Lead, Dissolved	ND	ug/L	0.50	1	03/09/23 06:59	03/09/23 19:17	7439-92-1	
Nickel, Dissolved	ND	ug/L	0.50	1	03/09/23 06:59	03/09/23 19:17	7440-02-0	
Zinc, Dissolved	ND	ug/L	5.0	1	03/09/23 06:59	03/09/23 19:17	7440-66-6	
7470A Mercury	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Minneapolis							
Mercury	ND	ug/L	0.20	1	03/09/23 07:08	03/15/23 12:04	7439-97-6	
7470A Mercury, Dissolved	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Pace Analytical Services - Minneapolis							
Mercury, Dissolved	ND	ug/L	0.20	1	03/09/23 07:08	03/15/23 11:46	7439-97-6	
SVOA (GC/MS) 8270E	Analytical Method: EPA 8270E Preparation Method: 3510C Pace National - Mt. Juliet							
Biphenyl (Diphenyl)	ND	ug/L	10.0	1	03/06/23 06:19	03/07/23 12:58	92-52-4	
Surrogates								
2-Fluorophenol (S)	25.9	%	10.0-120	1	03/06/23 06:19	03/07/23 12:58	367-12-4	
Phenol-d5 (S)	17.3	%	10.0-120	1	03/06/23 06:19	03/07/23 12:58	4165-62-2	
Nitrobenzene-d5 (S)	50.8	%	10.0-127	1	03/06/23 06:19	03/07/23 12:58	4165-60-0	
2-Fluorobiphenyl (S)	57.1	%	10.0-130	1	03/06/23 06:19	03/07/23 12:58	321-60-8	
2,4,6-Tribromophenol (S)	53.5	%	10.0-155	1	03/06/23 06:19	03/07/23 12:58	118-79-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Sample: WES-FEB-1 **Lab ID: 10644453005** Collected: 02/28/23 08:00 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
SVOA (GC/MS) 8270E	Analytical Method: EPA 8270E Preparation Method: 3510C Pace National - Mt. Juliet							
Surrogates								
p-Terphenyl-d14 (S)	82.4	%	10.0-128	1	03/06/23 06:19	03/07/23 12:58	1718-51-0	
8270E MSSV PAH by SIM LV	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3511 Pace Analytical Services - Minneapolis							
1-Methylnaphthalene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:49	90-12-0	
2-Chloronaphthalene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:49	91-58-7	
2-Methylnaphthalene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:49	91-57-6	
Acenaphthene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:49	83-32-9	
Acenaphthylene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:49	208-96-8	
Anthracene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:49	120-12-7	
Benzo(a)anthracene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:49	56-55-3	
Benzo(a)pyrene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:49	50-32-8	
Benzo(b)fluoranthene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:49	205-99-2	
Benzo(g,h,i)perylene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:49	191-24-2	
Benzo(k)fluoranthene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:49	207-08-9	
Chrysene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:49	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:49	53-70-3	
Dibenzofuran	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:49	132-64-9	
Fluoranthene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:49	206-44-0	
Fluorene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:49	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:49	193-39-5	
Naphthalene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:49	91-20-3	
Phenanthrene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:49	85-01-8	
Pyrene	ND	ug/L	0.040	1	03/03/23 11:28	03/06/23 15:49	129-00-0	
Surrogates								
2-Fluorobiphenyl (S)	75	%.	30-150	1	03/03/23 11:28	03/06/23 15:49	321-60-8	
p-Terphenyl-d14 (S)	103	%.	30-150	1	03/03/23 11:28	03/06/23 15:49	1718-51-0	
8260D MSV	Analytical Method: EPA 8260D Pace Analytical Services - Minneapolis							
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	1		03/03/23 14:14	630-20-6	
1,1,1-Trichloroethane	ND	ug/L	1.0	1		03/03/23 14:14	71-55-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	1		03/03/23 14:14	79-34-5	
1,1,2-Trichloroethane	ND	ug/L	1.0	1		03/03/23 14:14	79-00-5	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	1		03/03/23 14:14	76-13-1	
1,1-Dichloroethane	ND	ug/L	1.0	1		03/03/23 14:14	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		03/03/23 14:14	75-35-4	
1,1-Dichloropropene	ND	ug/L	1.0	1		03/03/23 14:14	563-58-6	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	1		03/03/23 14:14	87-61-6	
1,2,3-Trichloropropane	ND	ug/L	2.5	1		03/03/23 14:14	96-18-4	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	1		03/03/23 14:14	120-82-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	1		03/03/23 14:14	95-63-6	
1,2-Dibromo-3-chloropropane	ND	ug/L	2.5	1		03/03/23 14:14	96-12-8	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	1		03/03/23 14:14	106-93-4	
1,2-Dichlorobenzene	ND	ug/L	1.0	1		03/03/23 14:14	95-50-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Sample: WES-FEB-1 **Lab ID: 10644453005** Collected: 02/28/23 08:00 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260D MSV	Analytical Method: EPA 8260D Pace Analytical Services - Minneapolis							
1,2-Dichloroethane	ND	ug/L	1.0	1		03/03/23 14:14	107-06-2	
1,2-Dichloropropane	ND	ug/L	1.0	1		03/03/23 14:14	78-87-5	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	1		03/03/23 14:14	108-67-8	
1,3-Dichlorobenzene	ND	ug/L	1.0	1		03/03/23 14:14	541-73-1	
1,3-Dichloropropane	ND	ug/L	1.0	1		03/03/23 14:14	142-28-9	
1,4-Dichlorobenzene	ND	ug/L	1.0	1		03/03/23 14:14	106-46-7	
2,2-Dichloropropane	ND	ug/L	1.0	1		03/03/23 14:14	594-20-7	
2-Butanone (MEK)	ND	ug/L	10.0	1		03/03/23 14:14	78-93-3	
2-Chlorotoluene	ND	ug/L	1.0	1		03/03/23 14:14	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	1		03/03/23 14:14	106-43-4	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10.0	1		03/03/23 14:14	108-10-1	
Acetone	ND	ug/L	10.0	1		03/03/23 14:14	67-64-1	
Allyl chloride	ND	ug/L	2.5	1		03/03/23 14:14	107-05-1	
Benzene	ND	ug/L	1.0	1		03/03/23 14:14	71-43-2	
Bromobenzene	ND	ug/L	1.0	1		03/03/23 14:14	108-86-1	
Bromochloromethane	ND	ug/L	1.0	1		03/03/23 14:14	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	1		03/03/23 14:14	75-27-4	
Bromoform	ND	ug/L	1.0	1		03/03/23 14:14	75-25-2	
Bromomethane	ND	ug/L	2.5	1		03/03/23 14:14	74-83-9	
Carbon tetrachloride	ND	ug/L	1.0	1		03/03/23 14:14	56-23-5	
Chlorobenzene	ND	ug/L	1.0	1		03/03/23 14:14	108-90-7	
Chloroethane	ND	ug/L	1.0	1		03/03/23 14:14	75-00-3	
Chloroform	ND	ug/L	1.0	1		03/03/23 14:14	67-66-3	
Chloromethane	ND	ug/L	1.0	1		03/03/23 14:14	74-87-3	
Dibromochloromethane	ND	ug/L	1.0	1		03/03/23 14:14	124-48-1	
Dibromomethane	ND	ug/L	1.0	1		03/03/23 14:14	74-95-3	
Dichlorodifluoromethane	ND	ug/L	1.0	1		03/03/23 14:14	75-71-8	
Dichlorofluoromethane	ND	ug/L	1.0	1		03/03/23 14:14	75-43-4	
Diethyl ether (Ethyl ether)	ND	ug/L	2.5	1		03/03/23 14:14	60-29-7	
Ethylbenzene	ND	ug/L	1.0	1		03/03/23 14:14	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	1		03/03/23 14:14	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	1		03/03/23 14:14	98-82-8	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		03/03/23 14:14	1634-04-4	
Methylene Chloride	ND	ug/L	1.0	1		03/03/23 14:14	75-09-2	
Naphthalene	ND	ug/L	1.0	1		03/03/23 14:14	91-20-3	
Styrene	ND	ug/L	1.0	1		03/03/23 14:14	100-42-5	
Tetrachloroethene	ND	ug/L	1.0	1		03/03/23 14:14	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	1		03/03/23 14:14	109-99-9	
Toluene	ND	ug/L	1.0	1		03/03/23 14:14	108-88-3	
Trichloroethene	ND	ug/L	1.0	1		03/03/23 14:14	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	1		03/03/23 14:14	75-69-4	
Vinyl chloride	ND	ug/L	1.0	1		03/03/23 14:14	75-01-4	
Xylene (Total)	ND	ug/L	3.0	1		03/03/23 14:14	1330-20-7	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		03/03/23 14:14	156-59-2	
cis-1,3-Dichloropropene	ND	ug/L	1.0	1		03/03/23 14:14	10061-01-5	
m&p-Xylene	ND	ug/L	2.0	1		03/03/23 14:14	179601-23-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Sample: WES-FEB-1 **Lab ID: 10644453005** Collected: 02/28/23 08:00 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260D MSV	Analytical Method: EPA 8260D Pace Analytical Services - Minneapolis							
n-Butylbenzene	ND	ug/L	1.0	1		03/03/23 14:14	104-51-8	
n-Hexane	ND	ug/L	10.0	1		03/03/23 14:14	110-54-3	
n-Propylbenzene	ND	ug/L	1.0	1		03/03/23 14:14	103-65-1	
o-Xylene	ND	ug/L	1.0	1		03/03/23 14:14	95-47-6	
p-Isopropyltoluene	ND	ug/L	1.0	1		03/03/23 14:14	99-87-6	
sec-Butylbenzene	ND	ug/L	1.0	1		03/03/23 14:14	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	1		03/03/23 14:14	98-06-6	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		03/03/23 14:14	156-60-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	1		03/03/23 14:14	10061-02-6	
Surrogates								
1,2-Dichlorobenzene-d4 (S)	102	%.	75-125	1		03/03/23 14:14	2199-69-1	
4-Bromofluorobenzene (S)	100	%.	75-125	1		03/03/23 14:14	460-00-4	
Toluene-d8 (S)	100	%.	75-125	1		03/03/23 14:14	2037-26-5	

Sample: Trip Blank **Lab ID: 10644453006** Collected: 02/28/23 00:00 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
NWTPH-Gx GCV	Analytical Method: NWTPH-Gx Pace Analytical Services - Minneapolis							
TPH as Gas	ND	ug/L	100	1		03/03/23 22:25		
Surrogates								
a,a,a-Trifluorotoluene (S)	94	%.	50-150	1		03/03/23 22:25	98-08-8	
8260D MSV	Analytical Method: EPA 8260D Pace Analytical Services - Minneapolis							
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	1		03/03/23 13:25	630-20-6	
1,1,1-Trichloroethane	ND	ug/L	1.0	1		03/03/23 13:25	71-55-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	1		03/03/23 13:25	79-34-5	
1,1,2-Trichloroethane	ND	ug/L	1.0	1		03/03/23 13:25	79-00-5	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	1		03/03/23 13:25	76-13-1	
1,1-Dichloroethane	ND	ug/L	1.0	1		03/03/23 13:25	75-34-3	
1,1-Dichloroethene	ND	ug/L	1.0	1		03/03/23 13:25	75-35-4	
1,1-Dichloropropene	ND	ug/L	1.0	1		03/03/23 13:25	563-58-6	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	1		03/03/23 13:25	87-61-6	
1,2,3-Trichloropropane	ND	ug/L	2.5	1		03/03/23 13:25	96-18-4	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	1		03/03/23 13:25	120-82-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	1		03/03/23 13:25	95-63-6	
1,2-Dibromo-3-chloropropane	ND	ug/L	2.5	1		03/03/23 13:25	96-12-8	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	1		03/03/23 13:25	106-93-4	
1,2-Dichlorobenzene	ND	ug/L	1.0	1		03/03/23 13:25	95-50-1	
1,2-Dichloroethane	ND	ug/L	1.0	1		03/03/23 13:25	107-06-2	
1,2-Dichloropropane	ND	ug/L	1.0	1		03/03/23 13:25	78-87-5	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	1		03/03/23 13:25	108-67-8	
1,3-Dichlorobenzene	ND	ug/L	1.0	1		03/03/23 13:25	541-73-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Sample: Trip Blank **Lab ID: 10644453006** Collected: 02/28/23 00:00 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260D MSV	Analytical Method: EPA 8260D Pace Analytical Services - Minneapolis							
1,3-Dichloropropane	ND	ug/L	1.0	1		03/03/23 13:25	142-28-9	
1,4-Dichlorobenzene	ND	ug/L	1.0	1		03/03/23 13:25	106-46-7	
2,2-Dichloropropane	ND	ug/L	1.0	1		03/03/23 13:25	594-20-7	
2-Butanone (MEK)	ND	ug/L	10.0	1		03/03/23 13:25	78-93-3	
2-Chlorotoluene	ND	ug/L	1.0	1		03/03/23 13:25	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	1		03/03/23 13:25	106-43-4	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	10.0	1		03/03/23 13:25	108-10-1	
Acetone	ND	ug/L	10.0	1		03/03/23 13:25	67-64-1	
Allyl chloride	ND	ug/L	2.5	1		03/03/23 13:25	107-05-1	
Benzene	ND	ug/L	1.0	1		03/03/23 13:25	71-43-2	
Bromobenzene	ND	ug/L	1.0	1		03/03/23 13:25	108-86-1	
Bromochloromethane	ND	ug/L	1.0	1		03/03/23 13:25	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	1		03/03/23 13:25	75-27-4	
Bromoform	ND	ug/L	1.0	1		03/03/23 13:25	75-25-2	
Bromomethane	ND	ug/L	2.5	1		03/03/23 13:25	74-83-9	
Carbon tetrachloride	ND	ug/L	1.0	1		03/03/23 13:25	56-23-5	
Chlorobenzene	ND	ug/L	1.0	1		03/03/23 13:25	108-90-7	
Chloroethane	ND	ug/L	1.0	1		03/03/23 13:25	75-00-3	
Chloroform	ND	ug/L	1.0	1		03/03/23 13:25	67-66-3	
Chloromethane	ND	ug/L	1.0	1		03/03/23 13:25	74-87-3	
Dibromochloromethane	ND	ug/L	1.0	1		03/03/23 13:25	124-48-1	
Dibromomethane	ND	ug/L	1.0	1		03/03/23 13:25	74-95-3	
Dichlorodifluoromethane	ND	ug/L	1.0	1		03/03/23 13:25	75-71-8	
Dichlorofluoromethane	ND	ug/L	1.0	1		03/03/23 13:25	75-43-4	
Diethyl ether (Ethyl ether)	ND	ug/L	2.5	1		03/03/23 13:25	60-29-7	
Ethylbenzene	ND	ug/L	1.0	1		03/03/23 13:25	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	1		03/03/23 13:25	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	1		03/03/23 13:25	98-82-8	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		03/03/23 13:25	1634-04-4	
Methylene Chloride	ND	ug/L	1.0	1		03/03/23 13:25	75-09-2	
Naphthalene	ND	ug/L	1.0	1		03/03/23 13:25	91-20-3	
Styrene	ND	ug/L	1.0	1		03/03/23 13:25	100-42-5	
Tetrachloroethene	ND	ug/L	1.0	1		03/03/23 13:25	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	1		03/03/23 13:25	109-99-9	
Toluene	ND	ug/L	1.0	1		03/03/23 13:25	108-88-3	
Trichloroethene	ND	ug/L	1.0	1		03/03/23 13:25	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	1		03/03/23 13:25	75-69-4	
Vinyl chloride	ND	ug/L	1.0	1		03/03/23 13:25	75-01-4	
Xylene (Total)	ND	ug/L	3.0	1		03/03/23 13:25	1330-20-7	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		03/03/23 13:25	156-59-2	
cis-1,3-Dichloropropene	ND	ug/L	1.0	1		03/03/23 13:25	10061-01-5	
m&p-Xylene	ND	ug/L	2.0	1		03/03/23 13:25	179601-23-1	
n-Butylbenzene	ND	ug/L	1.0	1		03/03/23 13:25	104-51-8	
n-Hexane	ND	ug/L	10.0	1		03/03/23 13:25	110-54-3	
n-Propylbenzene	ND	ug/L	1.0	1		03/03/23 13:25	103-65-1	
o-Xylene	ND	ug/L	1.0	1		03/03/23 13:25	95-47-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Sample: Trip Blank **Lab ID: 10644453006** Collected: 02/28/23 00:00 Received: 03/02/23 08:50 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260D MSV	Analytical Method: EPA 8260D Pace Analytical Services - Minneapolis							
p-Isopropyltoluene	ND	ug/L	1.0	1		03/03/23 13:25	99-87-6	
sec-Butylbenzene	ND	ug/L	1.0	1		03/03/23 13:25	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	1		03/03/23 13:25	98-06-6	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		03/03/23 13:25	156-60-5	
trans-1,3-Dichloropropene	ND	ug/L	1.0	1		03/03/23 13:25	10061-02-6	
Surrogates								
1,2-Dichlorobenzene-d4 (S)	102	%.	75-125	1		03/03/23 13:25	2199-69-1	
4-Bromofluorobenzene (S)	102	%.	75-125	1		03/03/23 13:25	460-00-4	
Toluene-d8 (S)	101	%.	75-125	1		03/03/23 13:25	2037-26-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
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QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

QC Batch: 869513 Analysis Method: NWTPH-Gx
QC Batch Method: NWTPH-Gx Analysis Description: NWTPH-Gx Water
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10644453001, 10644453002, 10644453003, 10644453004, 10644453005, 10644453006

METHOD BLANK: 4586287 Matrix: Water
Associated Lab Samples: 10644453001, 10644453002, 10644453003, 10644453004, 10644453005, 10644453006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
TPH as Gas	ug/L	ND	100	03/03/23 15:13	
a,a,a-Trifluorotoluene (S)	%.	105	50-150	03/03/23 15:13	

METHOD BLANK: 4586288 Matrix: Water
Associated Lab Samples: 10644453001, 10644453002, 10644453003, 10644453004, 10644453005, 10644453006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
TPH as Gas	ug/L	ND	100	03/03/23 19:12	
a,a,a-Trifluorotoluene (S)	%.	96	50-150	03/03/23 19:12	

LABORATORY CONTROL SAMPLE & LCSD: 4586289 4586290

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
TPH as Gas	ug/L	1000	938	851	94	85	68-125	10	20	
a,a,a-Trifluorotoluene (S)	%.				106	94	50-150			

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4588134 4588135

Parameter	Units	10644453001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
TPH as Gas	ug/L	ND	1000	1000	884	879	86	86	57-132	1	30	
a,a,a-Trifluorotoluene (S)	%.						95	94	50-150			

SAMPLE DUPLICATE: 4586291

Parameter	Units	10644725001 Result	Dup Result	RPD	Max RPD	Qualifiers
TPH as Gas	ug/L	139	142	2	30	
a,a,a-Trifluorotoluene (S)	%.	101	101			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

SAMPLE DUPLICATE: 4587094

Parameter	Units	10643985010 Result	Dup Result	RPD	Max RPD	Qualifiers
TPH as Gas	ug/L	48.1J	47J		30	
a,a,a-Trifluorotoluene (S)	%.	95	95			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

QC Batch: 870300 Analysis Method: EPA 7470A
QC Batch Method: EPA 7470A Analysis Description: 7470A Mercury Water
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10644453001, 10644453002, 10644453003, 10644453004, 10644453005

METHOD BLANK: 4590325 Matrix: Water
Associated Lab Samples: 10644453001, 10644453002, 10644453003, 10644453004, 10644453005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	ug/L	ND	0.20	03/15/23 11:52	

LABORATORY CONTROL SAMPLE: 4590326

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	ug/L	5	5.4	109	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4590327 4590328

Parameter	Units	10644453002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	ug/L	ND	5	5	5.4	5.5	108	110	80-120	2	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
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QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

QC Batch: 870298
QC Batch Method: EPA 7470A
Analysis Method: EPA 7470A
Analysis Description: 7470A Mercury Water Dissolved
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10644453001, 10644453002, 10644453003, 10644453004, 10644453005

METHOD BLANK: 4590317 Matrix: Water
Associated Lab Samples: 10644453001, 10644453002, 10644453003, 10644453004, 10644453005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	ug/L	ND	0.20	03/15/23 11:35	

LABORATORY CONTROL SAMPLE: 4590318

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	ug/L	5	5.4	109	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4590319 4590320

Parameter	Units	10644453002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	ug/L	ND	5	5	5.3	5.2	106	105	80-120	2	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

QC Batch: 870293
QC Batch Method: EPA 3020A
Analysis Method: EPA 6020B
Analysis Description: 6020B Water UPD5
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10644453001, 10644453002, 10644453003, 10644453004, 10644453005

METHOD BLANK: 4590295 Matrix: Water
Associated Lab Samples: 10644453001, 10644453002, 10644453003, 10644453004, 10644453005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	ug/L	ND	0.50	03/09/23 15:46	
Cadmium	ug/L	ND	0.080	03/09/23 15:46	
Chromium	ug/L	ND	2.0	03/09/23 15:46	
Lead	ug/L	ND	0.50	03/09/23 15:46	
Nickel	ug/L	ND	0.50	03/09/23 15:46	
Zinc	ug/L	ND	5.0	03/09/23 15:46	

LABORATORY CONTROL SAMPLE: 4590296

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	ug/L	100	104	104	80-120	
Cadmium	ug/L	100	104	104	80-120	
Chromium	ug/L	100	111	111	80-120	
Lead	ug/L	100	104	104	80-120	
Nickel	ug/L	100	114	114	80-120	
Zinc	ug/L	100	112	112	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4590297 4590298

Parameter	Units	10644440004 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	ug/L	4.4	100	100	107	108	103	104	75-125	1	20	
Cadmium	ug/L	ND	100	100	103	104	103	104	75-125	0	20	
Chromium	ug/L	ND	100	100	107	109	106	108	75-125	2	20	
Lead	ug/L	ND	100	100	106	105	106	105	75-125	1	20	
Nickel	ug/L	ND	100	100	109	107	108	107	75-125	1	20	
Zinc	ug/L	ND	100	100	106	110	102	107	75-125	4	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

QC Batch: 870291
QC Batch Method: EPA 3020A
Analysis Method: EPA 6020B
Analysis Description: 6020B Water Dissolved UPD5
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10644453001, 10644453002, 10644453003, 10644453004, 10644453005

METHOD BLANK: 4590287 Matrix: Water
Associated Lab Samples: 10644453001, 10644453002, 10644453003, 10644453004, 10644453005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	ug/L	ND	0.50	03/09/23 18:24	
Cadmium, Dissolved	ug/L	ND	0.080	03/09/23 18:24	
Chromium, Dissolved	ug/L	ND	2.0	03/09/23 18:24	
Lead, Dissolved	ug/L	ND	0.50	03/09/23 18:24	
Nickel, Dissolved	ug/L	ND	0.50	03/09/23 18:24	
Zinc, Dissolved	ug/L	ND	5.0	03/09/23 18:24	

LABORATORY CONTROL SAMPLE: 4590288

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	ug/L	100	103	103	80-120	
Cadmium, Dissolved	ug/L	100	104	104	80-120	
Chromium, Dissolved	ug/L	100	108	108	80-120	
Lead, Dissolved	ug/L	100	108	108	80-120	
Nickel, Dissolved	ug/L	100	114	114	80-120	
Zinc, Dissolved	ug/L	100	107	107	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4590289 4590290

Parameter	Units	10644453001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	ug/L	4.9	100	100	108	108	103	103	75-125	0	20	
Cadmium, Dissolved	ug/L	ND	100	100	102	101	102	101	75-125	1	20	
Chromium, Dissolved	ug/L	ND	100	100	108	109	107	107	75-125	0	20	
Lead, Dissolved	ug/L	ND	100	100	104	105	104	105	75-125	1	20	
Nickel, Dissolved	ug/L	ND	100	100	110	110	109	110	75-125	0	20	
Zinc, Dissolved	ug/L	ND	100	100	106	107	104	105	75-125	1	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

QC Batch: 2017259
QC Batch Method: 3510C
Analysis Method: EPA 8270E
Analysis Description: SVOA (GC/MS) 8270E
Laboratory: Pace National - Mt. Juliet
Associated Lab Samples: 10644453003, 10644453005

METHOD BLANK: R3898541-3 Matrix: Water
Associated Lab Samples: 10644453003, 10644453005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Biphenyl (Diphenyl)	ug/L	ND	10.0	03/07/23 11:10	
2-Fluorophenol (S)	%	33.9	10.0-120	03/07/23 11:10	
Phenol-d5 (S)	%	21.3	10.0-120	03/07/23 11:10	
Nitrobenzene-d5 (S)	%	73.4	10.0-127	03/07/23 11:10	
2-Fluorobiphenyl (S)	%	81.6	10.0-130	03/07/23 11:10	
2,4,6-Tribromophenol (S)	%	53	10.0-155	03/07/23 11:10	
p-Terphenyl-d14 (S)	%	91	10.0-128	03/07/23 11:10	

LABORATORY CONTROL SAMPLE: R3898541-1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Biphenyl (Diphenyl)	ug/L	50.0	47.0	94.0	38.0-120	
2-Fluorophenol (S)	%			49.0	10.0-120	
Phenol-d5 (S)	%			28.0	10.0-120	
Nitrobenzene-d5 (S)	%			74.1	10.0-127	
2-Fluorobiphenyl (S)	%			91.3	10.0-130	
2,4,6-Tribromophenol (S)	%			103	10.0-155	
p-Terphenyl-d14 (S)	%			93.4	10.0-128	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: R3898541-4 R3898541-5

Parameter	Units	L1591716-12 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Biphenyl (Diphenyl)	ug/L	ND	45.5	45.5	35.0	34.8	76.9	76.5	29.0-120	0.573	33	
2-Fluorophenol (S)	%						33.0	30.2	10.0-120			
Phenol-d5 (S)	%						21.3	19.9	10.0-120			
Nitrobenzene-d5 (S)	%						62.4	62.2	10.0-127			
2-Fluorobiphenyl (S)	%						75.7	76.3	10.0-130			
2,4,6-Tribromophenol (S)	%						79.1	72.0	10.0-155			
p-Terphenyl-d14 (S)	%						70.2	69.2	10.0-128			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

QC Batch: 2017260
QC Batch Method: 3510C
Analysis Method: EPA 8270E
Analysis Description: SVOA (GC/MS) 8270E
Laboratory: Pace National - Mt. Juliet
Associated Lab Samples: 10644453001, 10644453002, 10644453004

METHOD BLANK: R3899075-3 Matrix: Water
Associated Lab Samples: 10644453001, 10644453002, 10644453004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Biphenyl (Diphenyl)	ug/L	ND	10.0	03/08/23 15:24	
2-Fluorophenol (S)	%	28.9	10.0-120	03/08/23 15:24	
Phenol-d5 (S)	%	16.6	10.0-120	03/08/23 15:24	
Nitrobenzene-d5 (S)	%	52.4	10.0-127	03/08/23 15:24	
2-Fluorobiphenyl (S)	%	60.3	10.0-130	03/08/23 15:24	
2,4,6-Tribromophenol (S)	%	60	10.0-155	03/08/23 15:24	
p-Terphenyl-d14 (S)	%	76.5	10.0-128	03/08/23 15:24	

METHOD BLANK: R3899236-2 Matrix: Water
Associated Lab Samples: 10644453001, 10644453002, 10644453004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Biphenyl (Diphenyl)	ug/L	ND	10.0	03/09/23 10:34	
2-Fluorophenol (S)	%	26.5	10.0-120	03/09/23 10:34	
Phenol-d5 (S)	%	16.5	10.0-120	03/09/23 10:34	
Nitrobenzene-d5 (S)	%	51	10.0-127	03/09/23 10:34	
2-Fluorobiphenyl (S)	%	57	10.0-130	03/09/23 10:34	
2,4,6-Tribromophenol (S)	%	60.5	10.0-155	03/09/23 10:34	
p-Terphenyl-d14 (S)	%	80	10.0-128	03/09/23 10:34	

LABORATORY CONTROL SAMPLE & LCSD: R3899075-1 R3899075-2

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Biphenyl (Diphenyl)	ug/L	50.0	34.8	30.2	69.6	60.4	38.0-120	14.2	27	
2-Fluorophenol (S)	%				32.0	0.00	10.0-120			SR
Phenol-d5 (S)	%				18.7	0.00	10.0-120			SR
Nitrobenzene-d5 (S)	%				51.0	0.00	10.0-127			SR
2-Fluorobiphenyl (S)	%				70.2	0.534	10.0-130			SR
2,4,6-Tribromophenol (S)	%				79.5	0.00	10.0-155			SR
p-Terphenyl-d14 (S)	%				79.6	0.595	10.0-128			SR

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

QC Batch: 869830 Analysis Method: EPA 8260D
QC Batch Method: EPA 8260D Analysis Description: 8260D MSV
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10644453001, 10644453002, 10644453003, 10644453004, 10644453005, 10644453006

METHOD BLANK: 4587925 Matrix: Water
Associated Lab Samples: 10644453001, 10644453002, 10644453003, 10644453004, 10644453005, 10644453006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	1.0	03/03/23 12:30	
1,1,1-Trichloroethane	ug/L	ND	1.0	03/03/23 12:30	
1,1,2,2-Tetrachloroethane	ug/L	ND	1.0	03/03/23 12:30	
1,1,2-Trichloroethane	ug/L	ND	1.0	03/03/23 12:30	
1,1,2-Trichlorotrifluoroethane	ug/L	ND	1.0	03/03/23 12:30	
1,1-Dichloroethane	ug/L	ND	1.0	03/03/23 12:30	
1,1-Dichloroethene	ug/L	ND	1.0	03/03/23 12:30	
1,1-Dichloropropene	ug/L	ND	1.0	03/03/23 12:30	
1,2,3-Trichlorobenzene	ug/L	ND	1.0	03/03/23 12:30	
1,2,3-Trichloropropane	ug/L	ND	2.5	03/03/23 12:30	
1,2,4-Trichlorobenzene	ug/L	ND	1.0	03/03/23 12:30	
1,2,4-Trimethylbenzene	ug/L	ND	1.0	03/03/23 12:30	
1,2-Dibromo-3-chloropropane	ug/L	ND	2.5	03/03/23 12:30	
1,2-Dibromoethane (EDB)	ug/L	ND	1.0	03/03/23 12:30	
1,2-Dichlorobenzene	ug/L	ND	1.0	03/03/23 12:30	
1,2-Dichloroethane	ug/L	ND	1.0	03/03/23 12:30	
1,2-Dichloropropane	ug/L	ND	1.0	03/03/23 12:30	
1,3,5-Trimethylbenzene	ug/L	ND	1.0	03/03/23 12:30	
1,3-Dichlorobenzene	ug/L	ND	1.0	03/03/23 12:30	
1,3-Dichloropropane	ug/L	ND	1.0	03/03/23 12:30	
1,4-Dichlorobenzene	ug/L	ND	1.0	03/03/23 12:30	
2,2-Dichloropropane	ug/L	ND	1.0	03/03/23 12:30	
2-Butanone (MEK)	ug/L	ND	10.0	03/03/23 12:30	
2-Chlorotoluene	ug/L	ND	1.0	03/03/23 12:30	
4-Chlorotoluene	ug/L	ND	1.0	03/03/23 12:30	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	10.0	03/03/23 12:30	
Acetone	ug/L	ND	10.0	03/03/23 12:30	
Allyl chloride	ug/L	ND	2.5	03/03/23 12:30	
Benzene	ug/L	ND	1.0	03/03/23 12:30	
Bromobenzene	ug/L	ND	1.0	03/03/23 12:30	
Bromochloromethane	ug/L	ND	1.0	03/03/23 12:30	
Bromodichloromethane	ug/L	ND	1.0	03/03/23 12:30	
Bromoform	ug/L	ND	1.0	03/03/23 12:30	
Bromomethane	ug/L	ND	2.5	03/03/23 12:30	
Carbon tetrachloride	ug/L	ND	1.0	03/03/23 12:30	
Chlorobenzene	ug/L	ND	1.0	03/03/23 12:30	
Chloroethane	ug/L	ND	1.0	03/03/23 12:30	
Chloroform	ug/L	ND	1.0	03/03/23 12:30	
Chloromethane	ug/L	ND	1.0	03/03/23 12:30	
cis-1,2-Dichloroethene	ug/L	ND	1.0	03/03/23 12:30	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

METHOD BLANK: 4587925 Matrix: Water
Associated Lab Samples: 10644453001, 10644453002, 10644453003, 10644453004, 10644453005, 10644453006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
cis-1,3-Dichloropropene	ug/L	ND	1.0	03/03/23 12:30	
Dibromochloromethane	ug/L	ND	1.0	03/03/23 12:30	
Dibromomethane	ug/L	ND	1.0	03/03/23 12:30	
Dichlorodifluoromethane	ug/L	ND	1.0	03/03/23 12:30	
Dichlorofluoromethane	ug/L	ND	1.0	03/03/23 12:30	
Diethyl ether (Ethyl ether)	ug/L	ND	2.5	03/03/23 12:30	
Ethylbenzene	ug/L	ND	1.0	03/03/23 12:30	
Hexachloro-1,3-butadiene	ug/L	ND	1.0	03/03/23 12:30	
Isopropylbenzene (Cumene)	ug/L	ND	1.0	03/03/23 12:30	
m&p-Xylene	ug/L	ND	2.0	03/03/23 12:30	
Methyl-tert-butyl ether	ug/L	ND	1.0	03/03/23 12:30	
Methylene Chloride	ug/L	ND	1.0	03/03/23 12:30	
n-Butylbenzene	ug/L	ND	1.0	03/03/23 12:30	
n-Hexane	ug/L	ND	10.0	03/03/23 12:30	
n-Propylbenzene	ug/L	ND	1.0	03/03/23 12:30	
Naphthalene	ug/L	ND	1.0	03/03/23 12:30	
o-Xylene	ug/L	ND	1.0	03/03/23 12:30	
p-Isopropyltoluene	ug/L	ND	1.0	03/03/23 12:30	
sec-Butylbenzene	ug/L	ND	1.0	03/03/23 12:30	
Styrene	ug/L	ND	1.0	03/03/23 12:30	
tert-Butylbenzene	ug/L	ND	1.0	03/03/23 12:30	
Tetrachloroethene	ug/L	ND	1.0	03/03/23 12:30	
Tetrahydrofuran	ug/L	ND	10.0	03/03/23 12:30	
Toluene	ug/L	ND	1.0	03/03/23 12:30	
trans-1,2-Dichloroethene	ug/L	ND	1.0	03/03/23 12:30	
trans-1,3-Dichloropropene	ug/L	ND	1.0	03/03/23 12:30	
Trichloroethene	ug/L	ND	1.0	03/03/23 12:30	
Trichlorofluoromethane	ug/L	ND	1.0	03/03/23 12:30	
Vinyl chloride	ug/L	ND	1.0	03/03/23 12:30	
Xylene (Total)	ug/L	ND	3.0	03/03/23 12:30	
1,2-Dichlorobenzene-d4 (S)	%.	101	75-125	03/03/23 12:30	
4-Bromofluorobenzene (S)	%.	102	75-125	03/03/23 12:30	
Toluene-d8 (S)	%.	101	75-125	03/03/23 12:30	

LABORATORY CONTROL SAMPLE: 4587926

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	20	20.6	103	75-125	
1,1,1-Trichloroethane	ug/L	20	20.3	102	75-125	
1,1,2,2-Tetrachloroethane	ug/L	20	21.2	106	71-125	
1,1,2-Trichloroethane	ug/L	20	19.2	96	75-125	
1,1,2-Trichlorotrifluoroethane	ug/L	20	21.9	110	69-125	
1,1-Dichloroethane	ug/L	20	20.9	104	75-125	
1,1-Dichloroethene	ug/L	20	20.3	102	69-125	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

LABORATORY CONTROL SAMPLE: 4587926

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloropropene	ug/L	20	20.1	100	74-125	
1,2,3-Trichlorobenzene	ug/L	20	18.0	90	70-131	
1,2,3-Trichloropropane	ug/L	20	19.9	100	73-125	
1,2,4-Trichlorobenzene	ug/L	20	18.3	91	75-125	
1,2,4-Trimethylbenzene	ug/L	20	19.9	99	75-125	
1,2-Dibromo-3-chloropropane	ug/L	20	21.5	108	68-129	
1,2-Dibromoethane (EDB)	ug/L	20	20.4	102	75-125	
1,2-Dichlorobenzene	ug/L	20	18.9	95	75-125	
1,2-Dichloroethane	ug/L	20	21.8	109	75-125	
1,2-Dichloropropane	ug/L	20	20.2	101	75-125	
1,3,5-Trimethylbenzene	ug/L	20	20.1	101	75-125	
1,3-Dichlorobenzene	ug/L	20	19.4	97	75-125	
1,3-Dichloropropane	ug/L	20	19.8	99	75-125	
1,4-Dichlorobenzene	ug/L	20	19.2	96	75-125	
2,2-Dichloropropane	ug/L	20	22.0	110	65-125	
2-Butanone (MEK)	ug/L	100	102	102	61-131	
2-Chlorotoluene	ug/L	20	20.0	100	75-125	
4-Chlorotoluene	ug/L	20	20.3	101	75-125	
4-Methyl-2-pentanone (MIBK)	ug/L	100	112	112	62-142	
Acetone	ug/L	100	111	111	57-137	
Allyl chloride	ug/L	20	21.6	108	73-125	
Benzene	ug/L	20	19.4	97	75-125	
Bromobenzene	ug/L	20	18.4	92	75-125	
Bromochloromethane	ug/L	20	19.0	95	75-125	
Bromodichloromethane	ug/L	20	20.8	104	75-125	
Bromoform	ug/L	20	19.9	100	75-134	
Bromomethane	ug/L	20	22.8	114	32-150	
Carbon tetrachloride	ug/L	20	20.8	104	73-126	
Chlorobenzene	ug/L	20	19.0	95	75-125	
Chloroethane	ug/L	20	22.4	112	70-125	
Chloroform	ug/L	20	18.7	94	75-125	
Chloromethane	ug/L	20	23.7	118	65-125	
cis-1,2-Dichloroethene	ug/L	20	19.7	99	75-125	
cis-1,3-Dichloropropene	ug/L	20	21.7	109	75-125	
Dibromochloromethane	ug/L	20	21.2	106	75-125	
Dibromomethane	ug/L	20	19.1	95	75-125	
Dichlorodifluoromethane	ug/L	20	25.1	126	65-135	
Dichlorofluoromethane	ug/L	20	21.8	109	75-125	
Diethyl ether (Ethyl ether)	ug/L	20	20.6	103	75-125	
Ethylbenzene	ug/L	20	19.5	97	75-125	
Hexachloro-1,3-butadiene	ug/L	20	20.6	103	63-128	
Isopropylbenzene (Cumene)	ug/L	20	19.7	99	75-125	
m&p-Xylene	ug/L	40	38.7	97	75-125	
Methyl-tert-butyl ether	ug/L	20	19.7	99	75-125	
Methylene Chloride	ug/L	20	21.2	106	72-125	
n-Butylbenzene	ug/L	20	18.8	94	68-125	
n-Hexane	ug/L	20	22.8	114	52-140	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

LABORATORY CONTROL SAMPLE: 4587926

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
n-Propylbenzene	ug/L	20	20.6	103	74-125	
Naphthalene	ug/L	20	18.3	91	67-140	
o-Xylene	ug/L	20	19.4	97	75-125	
p-Isopropyltoluene	ug/L	20	19.5	97	75-126	
sec-Butylbenzene	ug/L	20	19.9	100	75-126	
Styrene	ug/L	20	19.7	98	75-139	
tert-Butylbenzene	ug/L	20	19.6	98	75-125	
Tetrachloroethene	ug/L	20	19.2	96	70-125	
Tetrahydrofuran	ug/L	100	105	105	63-145	
Toluene	ug/L	20	18.3	92	74-125	
trans-1,2-Dichloroethene	ug/L	20	20.2	101	75-125	
trans-1,3-Dichloropropene	ug/L	20	22.5	112	75-127	
Trichloroethene	ug/L	20	18.8	94	74-125	
Trichlorofluoromethane	ug/L	20	21.4	107	72-125	
Vinyl chloride	ug/L	20	23.3	117	66-125	
Xylene (Total)	ug/L	60	58.2	97	75-125	
1,2-Dichlorobenzene-d4 (S)	%.			101	75-125	
4-Bromofluorobenzene (S)	%.			102	75-125	
Toluene-d8 (S)	%.			99	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4587963 4587964

Parameter	Units	10644453003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1,2-Tetrachloroethane	ug/L	ND	20	20	20.7	20.6	103	103	75-125	0	30	
1,1,1-Trichloroethane	ug/L	ND	20	20	19.5	19.7	97	98	70-133	1	30	
1,1,2,2-Tetrachloroethane	ug/L	ND	20	20	20.6	20.9	103	104	71-125	1	30	
1,1,2-Trichloroethane	ug/L	ND	20	20	19.0	19.4	95	97	75-125	2	30	
1,1,2-Trichlorotrifluoroethane	ug/L	ND	20	20	19.0	19.3	95	97	50-150	2	30	
1,1-Dichloroethane	ug/L	ND	20	20	20.2	20.3	101	101	71-125	0	30	
1,1-Dichloroethene	ug/L	ND	20	20	18.0	17.9	90	90	60-136	0	30	
1,1-Dichloropropene	ug/L	ND	20	20	19.0	19.3	95	96	70-134	1	30	
1,2,3-Trichlorobenzene	ug/L	ND	20	20	17.8	18.2	89	91	66-131	2	30	
1,2,3-Trichloropropane	ug/L	ND	20	20	19.5	18.7	97	93	73-125	4	30	
1,2,4-Trichlorobenzene	ug/L	ND	20	20	17.8	18.6	89	93	66-125	4	30	
1,2,4-Trimethylbenzene	ug/L	ND	20	20	19.7	19.9	99	100	61-143	1	30	
1,2-Dibromo-3-chloropropane	ug/L	ND	20	20	19.1	20.3	95	101	61-137	6	30	
1,2-Dibromoethane (EDB)	ug/L	ND	20	20	19.8	19.9	99	99	75-125	1	30	
1,2-Dichlorobenzene	ug/L	ND	20	20	18.6	18.8	93	94	75-125	1	30	
1,2-Dichloroethane	ug/L	ND	20	20	22.0	21.8	110	109	71-133	1	30	
1,2-Dichloropropane	ug/L	ND	20	20	20.0	20.2	100	101	75-125	1	30	
1,3,5-Trimethylbenzene	ug/L	ND	20	20	19.6	19.6	98	98	70-134	0	30	
1,3-Dichlorobenzene	ug/L	ND	20	20	18.7	19.0	93	95	74-125	2	30	
1,3-Dichloropropane	ug/L	ND	20	20	19.8	20.0	99	100	75-125	1	30	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4587963 4587964

Parameter	Units	10644453003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,4-Dichlorobenzene	ug/L	ND	20	20	18.8	18.8	94	94	75-125	0	30	
2,2-Dichloropropane	ug/L	ND	20	20	17.4	17.7	87	88	52-140	1	30	
2-Butanone (MEK)	ug/L	ND	100	100	92.5	91.6	93	92	57-142	1	30	
2-Chlorotoluene	ug/L	ND	20	20	19.3	19.5	97	98	72-125	1	30	
4-Chlorotoluene	ug/L	ND	20	20	19.8	20.1	99	101	69-128	2	30	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	100	100	110	109	110	109	59-149	1	30	
Acetone	ug/L	ND	100	100	92.8	95.2	91	93	57-137	3	30	
Allyl chloride	ug/L	ND	20	20	18.9	19.8	95	99	47-139	5	30	
Benzene	ug/L	ND	20	20	18.9	19.0	95	95	66-127	1	30	
Bromobenzene	ug/L	ND	20	20	18.2	18.4	91	92	74-125	1	30	
Bromochloromethane	ug/L	ND	20	20	18.9	18.8	95	94	69-126	1	30	
Bromodichloromethane	ug/L	ND	20	20	19.7	20.7	99	103	75-125	5	30	
Bromoform	ug/L	ND	20	20	18.3	18.8	91	94	66-134	3	30	
Bromomethane	ug/L	ND	20	20	20.1	25.3	101	127	30-150	23	30	
Carbon tetrachloride	ug/L	ND	20	20	18.8	19.6	94	98	73-135	4	30	
Chlorobenzene	ug/L	ND	20	20	18.8	18.7	94	93	75-125	0	30	
Chloroethane	ug/L	ND	20	20	21.9	21.3	110	106	54-143	3	30	
Chloroform	ug/L	ND	20	20	18.8	18.9	93	94	75-125	0	30	
Chloromethane	ug/L	ND	20	20	22.6	22.5	113	112	52-131	0	30	
cis-1,2-Dichloroethene	ug/L	ND	20	20	19.6	20.0	98	100	72-125	2	30	
cis-1,3-Dichloropropene	ug/L	ND	20	20	20.2	20.9	101	104	73-125	3	30	
Dibromochloromethane	ug/L	ND	20	20	20.6	20.1	103	100	73-125	2	30	
Dibromomethane	ug/L	ND	20	20	18.6	18.9	93	94	67-129	1	30	
Dichlorodifluoromethane	ug/L	ND	20	20	21.5	21.8	107	109	54-150	1	30	
Dichlorofluoromethane	ug/L	ND	20	20	21.5	21.1	107	105	63-136	2	30	
Diethyl ether (Ethyl ether)	ug/L	ND	20	20	19.7	20.0	99	100	70-125	1	30	
Ethylbenzene	ug/L	ND	20	20	19.1	19.2	95	96	74-128	1	30	
Hexachloro-1,3-butadiene	ug/L	ND	20	20	17.5	18.2	88	91	54-133	4	30	
Isopropylbenzene (Cumene)	ug/L	ND	20	20	18.9	19.1	95	96	75-129	1	30	
m&p-Xylene	ug/L	ND	40	40	37.9	38.2	95	96	70-131	1	30	
Methyl-tert-butyl ether	ug/L	ND	20	20	19.6	19.3	98	96	65-132	1	30	
Methylene Chloride	ug/L	ND	20	20	21.0	21.1	105	105	67-125	1	30	
n-Butylbenzene	ug/L	ND	20	20	18.0	18.5	90	92	64-130	3	30	
n-Hexane	ug/L	ND	20	20	18.5	19.0	92	95	52-150	3	30	
n-Propylbenzene	ug/L	ND	20	20	19.4	19.5	97	97	72-127	0	30	
Naphthalene	ug/L	ND	20	20	19.4	19.6	97	98	61-150	1	30	
o-Xylene	ug/L	ND	20	20	18.9	19.3	94	97	75-127	2	30	
p-Isopropyltoluene	ug/L	ND	20	20	18.7	19.1	93	96	71-130	2	30	
sec-Butylbenzene	ug/L	ND	20	20	18.6	19.2	93	96	73-130	3	30	
Styrene	ug/L	ND	20	20	19.3	19.6	96	98	73-139	2	30	
tert-Butylbenzene	ug/L	ND	20	20	19.1	19.0	95	95	73-125	0	30	
Tetrachloroethene	ug/L	ND	20	20	18.1	18.3	91	91	69-129	1	30	
Tetrahydrofuran	ug/L	ND	100	100	96.4	97.5	96	97	63-145	1	30	
Toluene	ug/L	ND	20	20	18.1	18.2	91	91	66-125	1	30	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4587963 4587964

Parameter	Units	10644453003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
trans-1,2-Dichloroethene	ug/L	ND	20	20	19.4	18.6	97	93	69-126	4	30	
trans-1,3-Dichloropropene	ug/L	ND	20	20	20.6	21.2	103	106	75-127	3	30	
Trichloroethene	ug/L	ND	20	20	17.9	17.8	90	89	69-127	0	30	
Trichlorofluoromethane	ug/L	ND	20	20	19.2	19.5	96	97	58-150	1	30	
Vinyl chloride	ug/L	ND	20	20	22.1	21.7	110	108	54-146	2	30	
Xylene (Total)	ug/L	ND	60	60	56.7	57.6	95	96	75-126	1	30	
1,2-Dichlorobenzene-d4 (S)	%.						99	101	75-125			
4-Bromofluorobenzene (S)	%.						102	103	75-125			
Toluene-d8 (S)	%.						101	100	75-125			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

QC Batch: 869824
QC Batch Method: EPA 3511
Analysis Method: EPA 8270E by SIM
Analysis Description: 8270E Water PAH by SIM MSSV LV
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10644453001, 10644453002, 10644453003, 10644453004, 10644453005

METHOD BLANK: 4587883 Matrix: Water
Associated Lab Samples: 10644453001, 10644453002, 10644453003, 10644453004, 10644453005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1-Methylnaphthalene	ug/L	ND	0.040	03/06/23 10:49	
2-Chloronaphthalene	ug/L	ND	0.040	03/06/23 10:49	
2-Methylnaphthalene	ug/L	ND	0.040	03/06/23 10:49	
Acenaphthene	ug/L	ND	0.040	03/06/23 10:49	
Acenaphthylene	ug/L	ND	0.040	03/06/23 10:49	
Anthracene	ug/L	ND	0.040	03/06/23 10:49	
Benzo(a)anthracene	ug/L	ND	0.040	03/06/23 10:49	
Benzo(a)pyrene	ug/L	ND	0.040	03/06/23 10:49	
Benzo(b)fluoranthene	ug/L	ND	0.040	03/06/23 10:49	
Benzo(g,h,i)perylene	ug/L	ND	0.040	03/06/23 10:49	
Benzo(k)fluoranthene	ug/L	ND	0.040	03/06/23 10:49	
Chrysene	ug/L	ND	0.040	03/06/23 10:49	
Dibenz(a,h)anthracene	ug/L	ND	0.040	03/06/23 10:49	
Dibenzofuran	ug/L	ND	0.040	03/06/23 10:49	
Fluoranthene	ug/L	ND	0.040	03/06/23 10:49	
Fluorene	ug/L	ND	0.040	03/06/23 10:49	
Indeno(1,2,3-cd)pyrene	ug/L	ND	0.040	03/06/23 10:49	
Naphthalene	ug/L	ND	0.040	03/06/23 10:49	
Phenanthrene	ug/L	ND	0.040	03/06/23 10:49	
Pyrene	ug/L	ND	0.040	03/06/23 10:49	
2-Fluorobiphenyl (S)	%.	90	30-150	03/06/23 10:49	
p-Terphenyl-d14 (S)	%.	110	30-150	03/06/23 10:49	

LABORATORY CONTROL SAMPLE: 4587884

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1-Methylnaphthalene	ug/L	2	1.7	83	53-133	
2-Chloronaphthalene	ug/L	2	1.9	95	70-130	
2-Methylnaphthalene	ug/L	2	1.7	84	56-132	
Acenaphthene	ug/L	2	1.8	91	64-129	
Acenaphthylene	ug/L	2	1.7	85	61-131	
Anthracene	ug/L	2	1.9	96	59-134	
Benzo(a)anthracene	ug/L	2	1.7	83	56-131	
Benzo(a)pyrene	ug/L	2	1.6	79	62-134	
Benzo(b)fluoranthene	ug/L	2	1.7	87	62-137	
Benzo(g,h,i)perylene	ug/L	2	1.7	85	69-129	
Benzo(k)fluoranthene	ug/L	2	1.9	96	69-134	
Chrysene	ug/L	2	1.8	90	66-131	
Dibenz(a,h)anthracene	ug/L	2	1.5	76	62-138	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

LABORATORY CONTROL SAMPLE: 4587884

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Dibenzofuran	ug/L	2	1.8	91	70-130	
Fluoranthene	ug/L	2	1.7	85	59-135	
Fluorene	ug/L	2	1.9	93	63-132	
Indeno(1,2,3-cd)pyrene	ug/L	2	1.4	72	61-136	
Naphthalene	ug/L	2	1.7	85	66-126	
Phenanthrene	ug/L	2	1.9	93	64-125	
Pyrene	ug/L	2	1.9	93	62-133	
2-Fluorobiphenyl (S)	%.			88	30-150	
p-Terphenyl-d14 (S)	%.			95	30-150	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4587885 4587886

Parameter	Units	10644490005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1-Methylnaphthalene	ug/L	ND	2	2	1.5	1.4	76	72	30-150	5	30	
2-Chloronaphthalene	ug/L	ND	2	2	1.7	1.6	84	82	70-130	3	30	
2-Methylnaphthalene	ug/L	ND	2	2	1.5	1.4	74	71	30-150	4	30	
Acenaphthene	ug/L	ND	2	2	1.7	1.7	85	84	30-146	1	30	
Acenaphthylene	ug/L	ND	2	2	1.7	1.7	84	83	58-131	1	30	
Anthracene	ug/L	ND	2	2	1.9	1.9	95	92	30-150	3	30	
Benzo(a)anthracene	ug/L	ND	2	2	1.8	1.7	89	86	30-150	4	30	
Benzo(a)pyrene	ug/L	ND	2	2	1.6	1.6	80	78	30-150	3	30	
Benzo(b)fluoranthene	ug/L	ND	2	2	1.8	1.7	88	84	30-150	5	30	
Benzo(g,h,i)perylene	ug/L	ND	2	2	1.6	1.6	82	78	30-150	5	30	
Benzo(k)fluoranthene	ug/L	ND	2	2	1.9	1.7	94	87	30-150	7	30	
Chrysene	ug/L	ND	2	2	1.8	1.7	89	86	30-150	4	30	
Dibenz(a,h)anthracene	ug/L	ND	2	2	1.6	1.5	78	74	30-150	6	30	
Dibenzofuran	ug/L	ND	2	2	1.7	1.7	87	85	70-130	2	30	
Fluoranthene	ug/L	ND	2	2	1.8	1.7	88	84	30-150	5	30	
Fluorene	ug/L	ND	2	2	1.8	1.8	90	89	30-146	1	30	
Indeno(1,2,3-cd)pyrene	ug/L	ND	2	2	1.5	1.4	74	69	30-150	6	30	
Naphthalene	ug/L	ND	2	2	1.5	1.4	75	72	30-150	5	30	
Phenanthrene	ug/L	ND	2	2	1.9	1.8	94	90	30-143	4	30	
Pyrene	ug/L	ND	2	2	1.8	1.7	91	87	30-150	5	30	
2-Fluorobiphenyl (S)	%.						73	69	30-150			
p-Terphenyl-d14 (S)	%.						92	88	30-150			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

QC Batch: 869757
QC Batch Method: EPA 3510C
Analysis Method: NWTPH-Dx
Analysis Description: NWTPH-Dx GCS LV
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10644453001, 10644453002, 10644453003, 10644453004, 10644453005

METHOD BLANK: 4587660 Matrix: Water
Associated Lab Samples: 10644453001, 10644453002, 10644453003, 10644453004, 10644453005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Diesel Fuel Range	mg/L	ND	0.40	03/03/23 17:38	
Motor Oil Range	mg/L	ND	0.40	03/03/23 17:38	
n-Triacontane (S)	%.	69	50-150	03/03/23 17:38	
o-Terphenyl (S)	%.	84	50-150	03/03/23 17:38	

LABORATORY CONTROL SAMPLE & LCSD: 4587661 4587662

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Diesel Fuel Range	mg/L	2	1.3	1.5	65	77	50-150	17	20	
Motor Oil Range	mg/L	2	1.5	1.7	76	86	50-150	13	20	
n-Triacontane (S)	%.				50	57	50-150			
o-Terphenyl (S)	%.				74	87	50-150			

SAMPLE DUPLICATE: 4587663

Parameter	Units	10644453003 Result	Dup Result	RPD	Max RPD	Qualifiers
Diesel Fuel Range	mg/L	ND	ND		30	
Motor Oil Range	mg/L	ND	ND		30	
n-Triacontane (S)	%.	78	83			
o-Terphenyl (S)	%.	85	91			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

WORKORDER QUALIFIERS

WO: 10644453

[1] 8270 samples will be reporting from a batch with no surrogate in the LCSD. The LCSD passes for target spike. Data is not impacted.

BATCH QUALIFIERS

Batch: 869830

[1] The continuing calibration verification was above the method acceptance limit for dichlorodifluoromethane. Any detection for the analyte in the associated samples may have a high bias.

ANALYTE QUALIFIERS

SR Surrogate recovery was below laboratory control limits. Results may be biased low.

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10644453001	**MW-OWS-1**	EPA 3510C	869757	NWTPH-Dx	869962
10644453002	**MW-OWS-2**	EPA 3510C	869757	NWTPH-Dx	869962
10644453003	**MW-OWS-3**	EPA 3510C	869757	NWTPH-Dx	869962
10644453004	**WES-DUP-1**	EPA 3510C	869757	NWTPH-Dx	869962
10644453005	**WES-FEB-1**	EPA 3510C	869757	NWTPH-Dx	869962
10644453001	**MW-OWS-1**	NWTPH-Gx	869513		
10644453002	**MW-OWS-2**	NWTPH-Gx	869513		
10644453003	**MW-OWS-3**	NWTPH-Gx	869513		
10644453004	**WES-DUP-1**	NWTPH-Gx	869513		
10644453005	**WES-FEB-1**	NWTPH-Gx	869513		
10644453006	**Trip Blank**	NWTPH-Gx	869513		
10644453001	**MW-OWS-1**	EPA 3020A	870293	EPA 6020B	870615
10644453002	**MW-OWS-2**	EPA 3020A	870293	EPA 6020B	870615
10644453003	**MW-OWS-3**	EPA 3020A	870293	EPA 6020B	870615
10644453004	**WES-DUP-1**	EPA 3020A	870293	EPA 6020B	870615
10644453005	**WES-FEB-1**	EPA 3020A	870293	EPA 6020B	870615
10644453001	**MW-OWS-1**	EPA 3020A	870291	EPA 6020B	870642
10644453002	**MW-OWS-2**	EPA 3020A	870291	EPA 6020B	870642
10644453003	**MW-OWS-3**	EPA 3020A	870291	EPA 6020B	870642
10644453004	**WES-DUP-1**	EPA 3020A	870291	EPA 6020B	870642
10644453005	**WES-FEB-1**	EPA 3020A	870291	EPA 6020B	870642
10644453001	**MW-OWS-1**	EPA 7470A	870300	EPA 7470A	870655
10644453002	**MW-OWS-2**	EPA 7470A	870300	EPA 7470A	870655
10644453003	**MW-OWS-3**	EPA 7470A	870300	EPA 7470A	870655
10644453004	**WES-DUP-1**	EPA 7470A	870300	EPA 7470A	870655
10644453005	**WES-FEB-1**	EPA 7470A	870300	EPA 7470A	870655
10644453001	**MW-OWS-1**	EPA 7470A	870298	EPA 7470A	870649
10644453002	**MW-OWS-2**	EPA 7470A	870298	EPA 7470A	870649
10644453003	**MW-OWS-3**	EPA 7470A	870298	EPA 7470A	870649
10644453004	**WES-DUP-1**	EPA 7470A	870298	EPA 7470A	870649
10644453005	**WES-FEB-1**	EPA 7470A	870298	EPA 7470A	870649
10644453001	**MW-OWS-1**	3510C	2017260	EPA 8270E	2017260
10644453002	**MW-OWS-2**	3510C	2017260	EPA 8270E	2017260
10644453003	**MW-OWS-3**	3510C	2017259	EPA 8270E	2017259
10644453004	**WES-DUP-1**	3510C	2017260	EPA 8270E	2017260
10644453005	**WES-FEB-1**	3510C	2017259	EPA 8270E	2017259
10644453001	**MW-OWS-1**	EPA 3511	869824	EPA 8270E by SIM	869975
10644453002	**MW-OWS-2**	EPA 3511	869824	EPA 8270E by SIM	869975
10644453003	**MW-OWS-3**	EPA 3511	869824	EPA 8270E by SIM	869975
10644453004	**WES-DUP-1**	EPA 3511	869824	EPA 8270E by SIM	869975
10644453005	**WES-FEB-1**	EPA 3511	869824	EPA 8270E by SIM	869975
10644453001	**MW-OWS-1**	EPA 8260D	869830		
10644453002	**MW-OWS-2**	EPA 8260D	869830		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: P66: Oily Water Sewer
Pace Project No.: 10644453

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10644453003	**MW-OWS-3**	EPA 8260D	869830		
10644453004	**WES-DUP-1**	EPA 8260D	869830		
10644453005	**WES-FEB-1**	EPA 8260D	869830		
10644453006	**Trip Blank**	EPA 8260D	869830		

WO# : 10644453

10644453

Pace Analytical

CHAIN-OF-CUSTODY / Analytical Request D

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must

Page : 1 of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Phillips 66 Ferndale Refinery	Report To:	Joe Sumera	Attention:	Joe Sumera
Address:	PO Box 8	Copy To:	Eric Libolt	Company Name:	Phillips 66
	Ferndale, WA 98248		elibolt@whatcom-es.com / 360-752-9571	Address:	PO Box 8, Ferndale, WA 98248
Email To:	Joe.E.Sumera@p66.com	Purchase Order No.	Contact P66	Pace Quote Reference:	
Phone:	(360) 384-8377 Fax (360) 384-8422	Client Project ID:	P66: Oily Water Sewer	Pace Project Manager:	
Requested Due Date/TAT:	Standard TAT	Container Order Number:		Pace Profile #:	

Regulatory Agency

State / Location

Requested Analysis Filtered (Y/N)

ITEM#	SAMPLE ID (One Character per box. (A-Z, 0-9 / , -) Sample Ids must be unique)	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED START DATE	COLLECTED START TIME	COLLECTED END DATE	COLLECTED END TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H2SO4	HNO3	HCl	NaOH	Na2S2O3	Methanol	Other	Analyses Test Y/N	BTEX - EPA 8260	n-Hexane EPA 8260	NWTPH - Gx	NWTPH - Dx	PAHs/cPAHs - 8270 SIM (see attached list)	Naphthalenes 8270 SIM	As, Cd, Cr, Pb, Ni, Zn (total and dissolved)	Mercury (total and dissolved)	Chlorinated VOCs EPA 8260				Residual Chlorine (Y/N)	
1	MW-OWS-1	wt	G	3/1/23	12:50	-	-		16	6		2	8					X	X	X	X	X	X	X	X					Requesting that all metals
2	MW-OWS-2	wt	G	3/1/23	10:40	-	-		16	6		2	8					X	X	X	X	X	X	X	X					be analyzed for total and
3	MW-OWS-3	wt	G	2/28/23	10:35	-	-		16	6		2	8					X	X	X	X	X	X	X	X					dissolved. Two HNO3 poly's
4	WES-DUP-1	wt	G	3/1/23	9:00	-	-		16	6		2	8					X	X	X	X	X	X	X	X					have been filled. One is not
5	WES-FEB-1	wt	G	2/28/23	8:00	-	-		16	6		2	8					X	X	X	X	X	X	X	X					filtered and the other one is
6						-	-																							filtered (both are marked).
7						-	-																							
8						-	-																							
9						-	-																							
10						-	-																							

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
Please email results to both Phillips 66, and Whatcom Environmental	Megan Everson / Whatcom Environmental	3/1/23	1450	[signature] Pace	3/2/23	8:40		Y	Y	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Megan Everson

SIGNATURE of SAMPLER: [signature] DATE Signed: 3/1/23

TEMP in C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

MATRIX CODE: Drinking Water DW; Water WT; Waste Water WW; Product P; Soil/Solid SL; Oil OL; Wipe WP; Air AR; Other OT; Tissue TS

DC#_Title: Excel Form Template
Effective Date:

Sample Condition Upon Receipt

Client Name: Philips 66 Ferndale Refinery

Project #: **WO#: 10644453**

PM: JMG **Due Date:** 03/16/23
CLIENT: COP

Courier: ☑ FedEx ☐ UPS ☐ USPS ☐ Client ☐ Pace ☐ SpeeDee ☐ Commercial

Tracking Number: 770454054400 ☐ See Exceptions ENV-FRM-MIN4-0142

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Packing Material: ☑ Bubble Wrap ☑ Bubble Bags ☐ None ☐ Other **Temp Blank?** ☑ Yes ☐ No

Thermometer: ☐ T1 (0461) ☐ T2 (1336) ☐ T3 (0459) ☐ T4 (0254) ☐ T5 (0178) ☑ T6 (0235) ☐ T7 (0042) ☐ T8 (0775) ☐ T9(0727) ☐ 01339252/1710 **Type of Ice:** ☑ Wet ☐ Blue ☐ Dry ☐ None ☑ Melted

Did Samples Originate in West Virginia? ☐ Yes ☑ No **Were All Container Temps Taken?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6 °C **Cooler temp Read w/Temp Blank:** 4.1, 3.2, 5.4

Correction Factor: Sub 0.1 **Cooler Temp Corrected w/temp blank:** 4.0, 3.1, 5.3

Average Corrected Temp (no temp blank only): _____ °C ☐ See Exceptions ENV-FRM-MIN4-0142 ☐ 1 Container

USDA Regulated Soil: (☑ N/A, water sample/other: _____) **Date/Initials of Person Examining Contents:** 3/2/23 APC

Did samples originate in a quarantine zone within the United States: AL, AR, AZ CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX, or VA (check maps)? ☐ Yes ☐ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☐ No

If Yes to either question, fill out a Regulated Soil Checklist (ENV-FRM-MIN4-0154) and include with SCUR/COC paperwork.

Location (Check one): ☐ Duluth ☑ Minneapolis ☐ Virginia

				COMMENTS
Chain of Custody Present and Filled Out?	☑ Yes	☐ No		1.
Chain of Custody Relinquished?	☑ Yes	☐ No		2.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	3.
Samples Arrived within Hold Time?	☑ Yes	☐ No		4. If fecal: ☐ <8 hrs ☐ >8 hr, <24 ☐ No
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No		5. ☐ Fecal Coliform ☐ HPC ☐ Total Coliform/E.coli ☐ BOD/cBOD ☐ Hex Chrom ☐ Turbidity ☐ Nitrate ☐ Nitrite ☐ Orthophos ☐ Other _____
Rush Turn Around Time Requested?	☐ Yes	☑ No		6.
Sufficient Sample Volume?	☑ Yes	☐ No		7.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	8. Broken Trip Blank 1-VOAH
-Pace Containers Used?	☑ Yes	☐ No		
Containers Intact?	☑ Yes	☐ No	APC	9.
Field Filtered Volume Received for Dissolved Tests?	☑ Yes	☐ No	☒ N/A	10. Is sediment visible in the dissolved container? ☐ Yes ☐ No
Is sufficient information available to reconcile the samples to the COC?	☑ Yes	☐ No		11. **If no, write ID/Date/Time of container below:** ☐ See Exceptions ENV-FRM-MIN4-0142
Matrix: ☑ Water ☐ Soil ☐ Oil ☐ Other				
All containers needing acid/base preservation have been checked?	☑ Yes	☐ No	☐ N/A	12. Sample # 001-005
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO3, H2SO4, <2pH, NaOH >9 Sulfide, NaOH>10 Cyanide)	☑ Yes	☐ No	☐ N/A	☐ NaOH ☑ HNO3 ☐ H2SO4 ☐ Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxins/PFAS (*If adding preservative to a container, it must be added to associated field and equipment blanks--verify with PM first.)	☑ Yes	☐ No	☐ N/A	Positive for Residual Chlorine? ☐ Yes ☐ No ☐ See Exceptions ENV-FRM-MIN4-0142
				pH Paper Lot #
				Residual Chlorine: 0-6 Roll 206827 / 0-6 Strip / 0-14 Strip
Headspace in Methyl Mercury Container?	☐ Yes	☐ No	☑ N/A	13.
Extra labels present on soil VOA or WIDRO containers?	☐ Yes	☐ No	☑ N/A	14. ☐ See Exceptions ENV-FRM-MIN4-0142
Headspace in VOA Vials (greater than 6mm)?	☐ Yes	☐ No	☑ N/A	
3 Trip Blanks Present?	☑ Yes	☐ No	☐ N/A	15.
Trip Blank Custody Seals Present?	☑ Yes	☐ No	☐ N/A	Pace Trip Blank Lot # (if purchased): 403254 (8)

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: Jenni Gross **Date:** 3/2/23

NOTE: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e., out of hold, incorrect preservative, out of temp, incorrect containers).

Labeled By: APC **Line:** 3

G053

Internal Transfer Chain of Custody

Pace Analytical®
www.pacelabs.com

☐ Samples Pre-Logged into eCOC.

State Of Origin: WA
Cert. Needed: [X] Yes ☐ No
Owner Received Date: 3/2/2023 Results Requested By: 3/16/2023

Workorder: 10644453 **Workorder Name:** P66: Oily Water Sewer

Report To	Subcontract To
Jennifer Gross Pace Analytical Minnesota 1700 Elm Street Minneapolis, MN 55414 Phone (612)607-1700	Pace National 12065 Lebanon Rd Mt. Juliet, TN 37122 Phone (615) 758-5858

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: Unpreserved AG5U	8270E Biphenyl (PACE-TN)	Requested Analysis	LAB USE ONLY
1	MW-OWS-1	PS	3/1/2023 12:50	10644453001	Water	2	X		-01
2	MW-OWS-2	PS	3/1/2023 10:40	10644453002	Water	2	X		-02
3	MW-OWS-3	PS	2/28/2023 10:35	10644453003	Water	2	X		-03
4	WES-DUP-1	PS	3/1/2023 09:00	10644453004	Water	2	X		-04
5	WES-FEB-1	PS	2/28/2023 08:00	10644453005	Water	2	X		-05

LISGlevel

Transfers	Released By	Date/Time	Received By	Date/Time
1	CSM/Pace	3/3/23 12:05	HANNA MWECHIWA	03-04-23 0845
2				
3				

Comments: SHORT HOLD

Cooler Temperature on Receipt °C | **Custody Seal** Y or N | **Received on Ice** Y or N | **Samples Intact** Y or N

****In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.*
This chain of custody is considered complete as is since this information is available in the owner laboratory.

Sample Receipt Checklist

COC Seal Present/Intact:	Y N	If Applicable	
COC Signed/Accurate:	Y N	VOA Zero Headspace:	Y N
Bottles arrive intact:	Y N	Pres.Correct/Check:	Y N
Correct bottles used:	Y N		
Sufficient volume sent:	Y N		
RAD Screen <0.5 mR/hr:	Y N		

5466 8888 4715
0.8 10 = 0.8

APPENDIX D -
TRC REPORT

Phase II Oily Water Sewer Inspections and Repair Recommendations

Date: March 14, 2024

Prepared For: Phillips 66 Ferndale Refinery

Prepared By: TRC

Contents

Figures

Tables

Attachments

1. Phase II Field Inspections

1.1. Background

The Phillips 66 (P66) Ferndale Refinery's ("Refinery") Oily Water Sewer (OWS), also referred to as Solid Waste Management Unit (SWMU) 14, has been in operation since constructed in 1953. The OWS is the underground piping system that consists of drain hubs, manholes, hatches, and other access points, which conveys process wastewater, stormwater runoff from process areas, and fire water to the Refinery's wastewater treatment system.

An Investigation and Response Plan (Plan), dated January 26, 2021, was prepared for the Refinery in accordance with the requirements in the Agreed Order No. DE 16297 (AO), Section VII.A. The Plan describes measures to investigate the OWS and respond to releases or threatened releases, if any, discovered during the investigation. The OWS inspection process was divided into four (4) phases covering a ten (10)-year cycle shown on **Figure 1**. This report describes sections of the OWS inspected during Phase II, in accordance with the Plan, and findings from those inspections.

1.2. Oily Water Sewer Field Inspections

During Phase II, approximately 4,460 linear feet (LF) of sewer line segments and 25 manholes were inspected. Field inspections were completed by Atlas Inspection (a subsidiary or Industrial Inspection & Analysis, Inc.) ("Atlas"). Data were processed and segment identifiers (IDs) and locations were confirmed in the field daily with Refinery personnel. Locations of Phase II inspections are presented in **Figure 2A through 2E**. The following **Table 1** and **Table 2** presents segments and manholes inspected during Phase II, with Table 1 also presenting comments associated with the video footage. Segments 2-8, 2-14, 2-21, and 2-22, and manholes 2T-FS and 5-T were not inspected in Phase II due to Refinery operations. These segments will be inspected in a later phase.

Table 1. Phase II Inspected Segments

Setup ID[1]	Segment ID	Pipe Dia. (IN)	Inspected Footage (LF)	Comments
2-1	5K-RE:5K-FS	12	49.7	
2-2	5K-FS:6K-FS	12	179.5	
2-3	6K-FS:7K-RE	12	202.5	
2-4	7K-RE:7K-FS	12	420.4	
2-4 R1	7K-RE:7K-FS	12	23.6	Reinspection of 2-4 from 179.9 to 203.5 ft.
2-4 R2	7K-RE:7K-FS	12	87.2	Reinspection of 2-4 from 333.6 to 420.8 ft.
2-4 R3	7K-RE:7K-FS	12	89.7	Reinspection of 2-4 from 330.3 to 420 ft.
2-5	9K-RE:7K-FS	12	61	

Setup ID[1]	Segment ID	Pipe Dia. (IN)	Inspected Footage (LF)	Comments
2-6 D	9K-RE:11K-RE	12	366.8	Downstream inspection of 2-6. Survey abandoned due to shortage of available cable.
2-6 D R	9K-RE:11K-RE	12	81.3	Reinspection of 2-6 downstream from 70 to 151.3 ft.
2-6 U	11K-RE:9K-RE	12	151.3	Reverse inspection of 2-6 upstream.
2-7	11K-RE:13K-FS	12	420.8	
2-7 R	11K-RE:13K-FS	12	460	Reinspection of 2-7 from 0 to approximately 460 ft.
2-9	1L-1RE:1L-FS	12	9.5	
2-10 D	1L-FS:6L-RE	12	212.7	Downstream inspection of 2-10. Survey abandoned due to pipe diameter reduction.
2-10 U	6L-RE:1L-FS	12	230	Reverse inspection of 2-10 upstream. Survey abandoned due to impassable high-water level.
2-10 U R	6L-RE:1L-FS	12	28.2	Reverse reinspection of 2-10 upstream from 208.7 to 236.9 ft. Survey abandoned due to pipe diameter reduction. Reverse inspection did not capture entire segment, approximately 32 ft of pipe not inspected.
2-11	6L-RE:6L-FS	12	113.5	
2-12 D	6L-FS:7L-FS	12	4.2	Downstream inspection of 2-12. Survey abandoned due to impassable bend in pipe.
2-12 U	7L-FS:6L-FS	12	209.7	Reverse inspection of 2-12 upstream. Survey abandoned due to hole in pipe. Reverse inspection did not capture entire segment, approximately 145 ft not inspected.
2-13	7L-FS:10L-FS	12	77	
2-15	10M:10M-A	12	78.2	
2-16	10M-A:8M	12	162.7	
2-17	8M:6M	12	242.7	
2-18	6M:4M	12	295.8	
2-19 D	4M:2M	12	250.7	Downstream inspection of 2-19 from 0 to 250.7 ft.
2-19 U	2M:4M	12	32	Reverse inspection of 2-19 upstream from 0 to 32 ft. Reverse inspection segment complete.

Setup ID[1]	Segment ID	Pipe Dia. (IN)	Inspected Footage (LF)	Comments
2-20	2M:1M	12	230.5	
2-23	1K:2K-FS	12	97.8	
2-24 D	2K-FS:4K	12	77.5	Downstream inspection of 2-24 from 0 to 77.5 ft. Survey abandoned due to impassable object in pipe.
2-24 U	4K:2K-FS	12	79.8	Reverse inspection of 2-24 upstream from 0 to 79.8 ft. Reverse inspection segment complete. Survey abandoned due to impassable object in pipe.
2-25	4K:4K-FS	12	111	
2-26	5K-RE:4K-FS	12	117.9	

[1] R = Reinspection, D = Downstream Inspection, and U = Upstream Inspection

Table 2. Phase II Inspected Manholes

Setup ID	Manhole ID
2-ST-1	1M
2-ST-2	2M
2-ST-3	4M
2-ST-4	6M
2-ST-5	8M
2-ST-6	10M
2-ST-7	10M-A
2-ST-8	6L-RE
2-ST-9	6L-FS
2-ST-10	1L-1RE
2-ST-11	1L-FS
2-ST-12	1K
2-ST-13	2K-FS
2-ST-14	4K-FS

Setup ID	Manhole ID
2-ST-15	4K
2-ST-16	5K-FS
2-ST-17	5K-RE
2-ST-18	6K-FS
2-ST-19	7K-RE
2-ST-20	7K-FS
2-ST-21	9K-RE
2-ST-22	11K-RE
2-ST-23	13K-FS
2-ST-24	7L-FS
2-ST-25	10L-FS

2. Phase II Field Data Review

2.1. Video Review

Sewer segment and manhole inspection videos for the listed segments and manholes in **Table 1** and **Table 2** were provided to TRC by Atlas and the Refinery between July 11, 2023, and August 8, 2023. Following receipt of sewer inspection videos, TRC's team of certified National Association of Sewer Service Companies (NASSCO) staff reviewed videos for completeness and quality and provided an initial identification of defects using a NASSCO certified software. Sewer segments and manholes were reviewed using NASSCO's Pipeline Assessment Certification Program (PACP) and Manhole Assessment Certification Program (MACP) structural rating (SR) system to structurally rate sewer defects (e.g., cracking, deformities, etc.).

Following structural rating, TRC assigned defects a separate environmental rating (ER) considering the potential for release. This rating system was made specifically for the Refinery and can be found in **Attachment 1**. Each ER category is based on defect characteristics and the prioritization for follow-up actions and documentation.

Summary inspection reports, including ER identifiers and photos of defects, for segments and manholes are available upon request.

2.2. Repair Recommendations

Cleaning and inspection activities for the sewers revealed that some locations required further analysis or rehabilitation. Defects rated with an ER of 3 or 4 are grouped together in repair areas (e.g., Repair Area 1, Repair Area 2, etc.) based on proximity and are shown on **Figure 3A through Figure 3E.**

Repair Area 1 (2-1 and 2-26)

- 2-1 (5K-RE:5K-FS)
  - Repair sewer segment for ER=4 offset joint between approximately 0 and 5 ft south of MH 5K-RE.
  - Repair or investigate further sewer segment for ER=3 infiltration dripper and fracture between approximately 45 and 50 ft south of MH 5K-RE.
- 2-26 (5K-RE:4K-FS)
  - Continue monitoring, or scope for future repair, sewer segment for ER=3 fracture between approximately 0 and 5 ft north of MH 5K-RE.

Repair Area 2 (2-2)

- 2-2 (5K-FS:6K-FS)
  - Repair sewer segment for ER=4 broken pipe between approximately 143 and 148 ft south of MH 5K-FS.

Repair Area 3 (2-5, 2-6 D, and MH 7K-FS)

- 2-5 (9K-RE:7K-FS)
  - Continue monitoring, or scope for future repair, sewer segments for ER=3 fractures between approximately 0 and 5 ft, and 55 and 60 ft north of MH 9K-RE.
- 2-6 D (9K-RE:11K-RE)
  - Continue monitoring, or scope for future repair, sewer segment for ER=3 fractures between approximately 0 and 3 ft south of MH 9K-RE.
- MH 7K-FS
  - Continue monitoring, or scope for future repair, ER=3 surface damage with reinforcement visible along interior wall of 7K-FS between approximately 9 and 10 ft below top of manhole.

Repair Area 4 (2-6 U and 2-7)

- 2-6 U (11K-RE:9K-RE)
  - Repair sewer segment for ER=3 joint offset and fractures and ER=4 broken pipe between approximately 0 and 5 ft north of MH 11K-RE.
- 2-7 (11K-RE:13K-FS)
  - Repair sewer segment for ER=4 joint offset between approximately 0 and 5 ft south of MH 11K-RE.

Repair Area 5 (2-10 D)

- 2-10 D (1L-FS:6L-RE)
  - Repair sewer segment from 0 to approximately 53 ft where previous repair with HDPE begins, for ER=3 fractures.
  - Repair from approximately 101 to 142 ft, where a second repair was made with steel pipe, for ER=3 fractures and offset joint and ER=4 holes.
  - Steel pipe repair ends at 201 ft where inspection showed adequate clay pipe, but inspection was abandoned at 212 ft due to diameter change. Approximately 32 ft of the line was not able to be inspected that encompasses the diameter change

section. Assess need to continue repair of diameter change section to provide consistent diameter size and slope for this drain line. Remaining pipe to MH 6L-RE appears to be in good condition.

Repair Area 6 (2-11)

- 2-11 (6L-RE:6L-FS)
  - Repair entire segment from 6L-RE to 6L-FS for ER=3 and ER=4 fractures and broken pipe.

Repair Area 7 (2-12 U and 2-13)

- 2-12 U (7L-FS:6L-FS)
  - Repair entire segment from 7L-FS to 6L-FS for ER=3 fractures and ER=4 holes and broken pipe between approximately 0 and 210 ft north of MH 7L-FS. Inspection was abandoned at 210 ft due to an impassable hole in the pipe. Approximately 145 ft of the line was not able to be inspected but is assumed to be in similar condition as the inspected section.
- 2-13 (7L-FS:10L-FS)
  - Repair sewer segment for ER=3 fracture and offset joint, and ER=4 broken pipe between approximately 0 and 5 ft south of MH 7L-FS.
  - Repair sewer segment for ER=3 fractures and ER=4 broken pipe between approximately 30 and 40 ft south of MH 7L-FS.

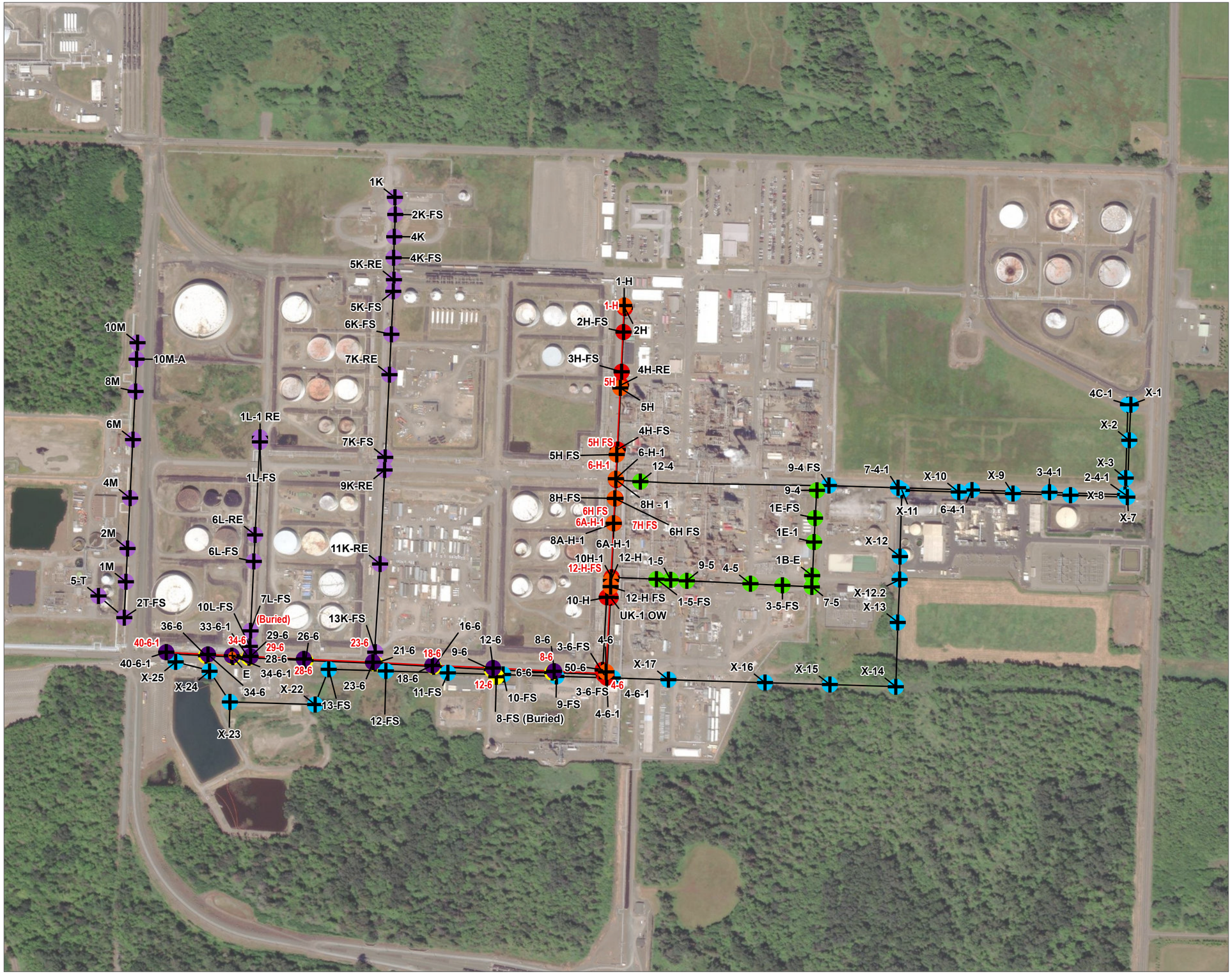
Repair Area 8 (2-18 and 2-19 D)

- 2-18 (6M:4M)
  - Continue monitoring, or scope for future repair, sewer segment for ER=3 fracture between approximately 205 and 210 ft south of MH 6M.
  - Repair or investigate further sewer segment for ER=3 infiltration between approximately 240 and 245 ft south of MH 6M.
- 2-19 D (4M:2M)
  - Continue monitoring, or scope for future repair, sewer segment for ER=3 fracture between approximately 15 and 20 ft south of MH 4M.

Repair Area 9 (2-23, 2-24, and 2-25)

- 2-23 (1K:2K-FS)
  - Repair sewer segments for ER=4 offset joint between approximately 0 and 5 ft and ER=3 fracture between approximately 40 and 45 ft south of MH 1K.
  - Repair or investigate further sewer segment for ER=3 infiltration between approximately 65 and 70 ft south of MH 1K.
- 2-24 D (2K-FS:4K) and 2-24 U (4K:2K-FS)
  - Repair and investigate further entire segment for ER=3 and ER=4 fractures, broken pipe, obstruction punctured through pipe between approximately 75 and 80 ft north of MH 4K, and potentially oily infiltration between approximately 15 and 25 ft north of MH 4K.
- 2-25 (4K:4K-FS)
  - Repair sewer segment for ER=3 fractures and ER=4 broken pipe between approximately 0 to 60 ft south of 4K.

Figures



PHENOLIC SEWER MAJOR TRUNK LINE

OILY WATER SEWER MAJOR TRUNK LINE

1-A-X PHENOLIC MANHOLE

OILY AND PHENOLIC SEWER MANHOLE

PHASE I

PHASE II

PHASE III

PHASE IVA

PHASE IVB

PHASE IVC

PHASE IVD

BASE MAP: ESRI "WORLD IMAGERY" ONLINE SERVICE LAYER.
DATA SOURCES: TRC

1:6,000
1" = 500'

0 250 500 FEET

PROJECT:
PHILLIPS 66
PHASE II OILY WATER SEWER INSPECTIONS AND REPAIR RECOMMENDATIONS

TITLE:
OILY WATER SEWER INSPECTIONS OVERVIEW

DRAWN BY:	S. RAY	PROJ. NO.:	423514.0001.0000
CHECKED BY:	N. LONGTIN		**FIGURE 1**
APPROVED BY:	J. ALLEN		
DATE:	JANUARY 2024		

505 EAST HUNTLAND DRIVE
SUITE #250
AUSTIN, TX 78752
PHONE: 512.329.6080

FILE: 423514_Ferndale.aprx

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet; Map Rotation: 0
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OILY WATER SEWER MAJOR TRUNK LINE

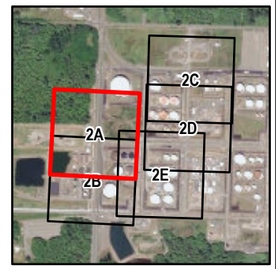
SEWER INSPECTION ROUTE

INSPECTED STRUCTURE

OILY AND PHENOLIC SEWER MANHOLE

PHASE II

BASE MAP: ESRI "WORLD IMAGERY" ONLINE SERVICE LAYER.
DATA SOURCES: TRC



N

1:1,500
1" = 125'

0 62.5 125 FEET

PROJECT:
PHILLIPS 66
PHASE II OILY WATER SEWER INSPECTIONS AND REPAIR RECOMMENDATIONS

TITLE:
PHASE II COMPLETED SEWER INSPECTIONS

DRAWN BY:	S. RAY	PROJ. NO.:	423514.0001.0000
CHECKED BY:	N. LONGTIN		
APPROVED BY:	J. ALLEN		**FIGURE 2A**
DATE:	JANUARY 2024		

TRC
1180 NW MAPLE STREET, SUITE 310
ISSAQUAH, WA 98027
PHONE: 425.395.0010

FILE: P2_Completed_Sewer_Inspection.aprx

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet; Map Rotation: 0
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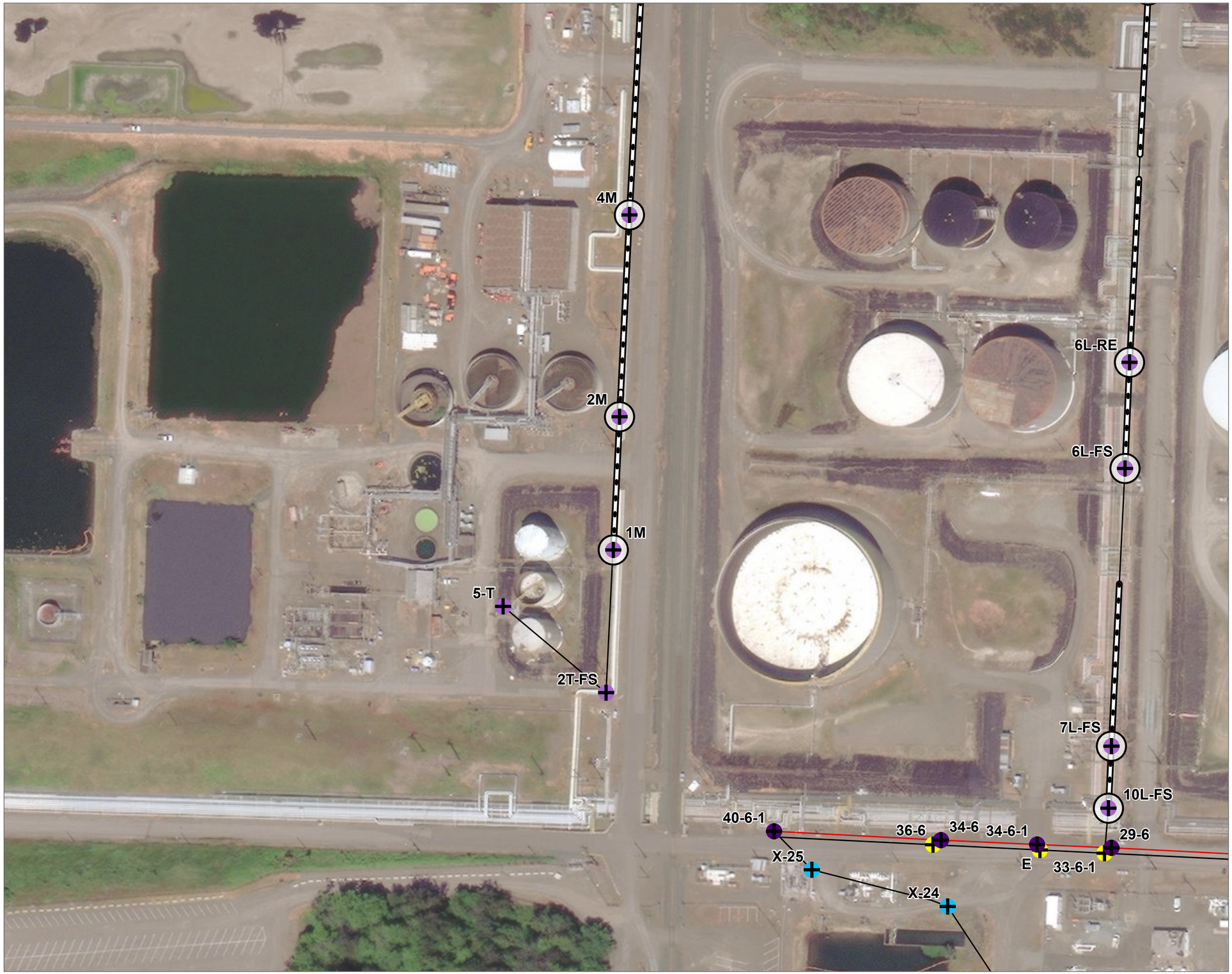
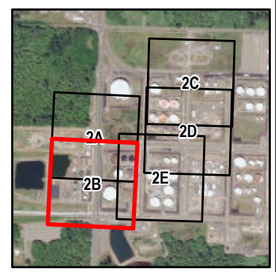


PHENOLIC SEWER MAJOR TRUNK LINE
OILY WATER SEWER MAJOR TRUNK LINE
SEWER INSPECTION ROUTE
INSPECTED STRUCTURE
OILY AND PHENOLIC SEWER MANHOLE
PHASE I
PHASE II
PHASE IVC
PHASE IVD

BASE MAP: ESRI "WORLD IMAGERY" ONLINE SERVICE LAYER.
DATA SOURCES: TRC



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1:1,500
1" = 125'
0 62.5 125 FEET

PROJECT:
PHILLIPS 66
PHASE II OILY WATER SEWER INSPECTIONS AND REPAIR RECOMMENDATIONS

TITLE:
PHASE II COMPLETED SEWER INSPECTIONS

DRAWN BY:	S. RAY	PROJ. NO.:	423514.0001.0000
CHECKED BY:	N. LONGTIN		**FIGURE 2B**
APPROVED BY:	J. ALLEN		
DATE:	JANUARY 2024		

TRC
1180 NW MAPLE STREET, SUITE 310
ISSAQUAH, WA 98027
PHONE: 425.395.0010

FILE: P2_Completed_Sewer_Inspection.aprx

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet - Map Rotation: 0
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OILY WATER SEWER MAJOR TRUNK LINE

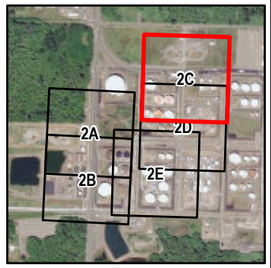
SEWER INSPECTION ROUTE

INSPECTED STRUCTURE

OILY AND PHENOLIC SEWER MANHOLE

PHASE II

BASE MAP: ESRI "WORLD IMAGERY" ONLINE SERVICE LAYER.
DATA SOURCES: TRC



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1:1,500
1" = 125'

0 62.5 125 FEET

PROJECT:
PHILLIPS 66
PHASE II OILY WATER SEWER INSPECTIONS AND REPAIR RECOMMENDATIONS

TITLE:
PHASE II COMPLETED SEWER INSPECTIONS

DRAWN BY:	S. RAY	PROJ. NO.:	423514.0001.0000
CHECKED BY:	N. LONGTIN		**FIGURE 2C**
APPROVED BY:	J. ALLEN		
DATE:	JANUARY 2024		

TRC
1180 NW MAPLE STREET, SUITE 310
ISSAQUAH, WA 98027
PHONE: 425.395.0010

FILE: P2_Completed_Sewer_Inspection.aprx

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet; Map Rotation: 0
Saved By ASLINE on 1/29/2024 10:57:28 AM; File Path: T:\1-PROJECTS\Phillips66_Ca\423514.Ferndale\2-APRX\P2_Completed_Sewer_Inspection.aprx; Layout Name: Figure 2 Completed P2 Sewer Inspection

OILY WATER SEWER MAJOR TRUNK LINE

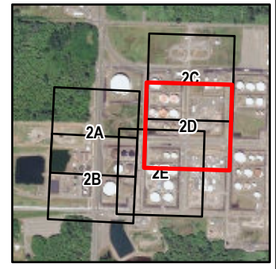
SEWER INSPECTION ROUTE

INSPECTED STRUCTURE

OILY AND PHENOLIC SEWER MANHOLE

PHASE II

BASE MAP: ESRI "WORLD IMAGERY" ONLINE SERVICE LAYER.
DATA SOURCES: TRC



1:1,500
1" = 125'

0 62.5 125 FEET

PROJECT:
PHILLIPS 66
PHASE II OILY WATER SEWER INSPECTIONS AND REPAIR RECOMMENDATIONS

TITLE:
PHASE II COMPLETED SEWER INSPECTIONS

DRAWN BY:	S. RAY	PROJ. NO.:	423514.0001.0000
CHECKED BY:	N. LONGTIN		**FIGURE 2D**
APPROVED BY:	J. ALLEN		
DATE:	JANUARY 2024		

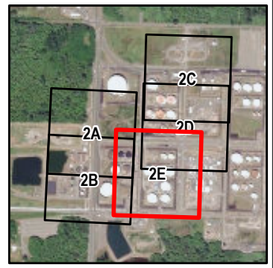
TRC
1180 NW MAPLE STREET, SUITE 310
ISSAQUAH, WA 98027
PHONE: 425.395.0010

FILE: P2_Completed_Sewer_Inspection.aprx

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet; Map Rotation: 0
Saved By: ASLINE on 1/29/2024, 10:57:28 AM; File Path: T:\1_PROJECTS\Phillips66_Co\423514.Ferndale\2.APRX\P2_Completed_Sewer_Inspection.aprx; Layout Name: Figure 2 Completed P2 Sewer Inspection

PHENOLIC SEWER MAJOR TRUNK LINE
OILY WATER SEWER MAJOR TRUNK LINE
SEWER INSPECTION ROUTE
INSPECTED STRUCTURE
OILY AND PHENOLIC SEWER MANHOLE
PHASE I
PHASE II
PHASE IVC
PHASE IVD

BASE MAP: ESRI "WORLD IMAGERY" ONLINE SERVICE LAYER.
DATA SOURCES: TRC



N

1:1,500
1" = 125'
0 62.5 125 FEET

PROJECT:
PHILLIPS 66
PHASE II OILY WATER SEWER INSPECTIONS AND REPAIR RECOMMENDATIONS

TITLE:
PHASE II COMPLETED SEWER INSPECTIONS

DRAWN BY:	S. RAY	PROJ. NO.:	423514.0001.0000
CHECKED BY:	N. LONGTIN		**FIGURE 2E**
APPROVED BY:	J. ALLEN		
DATE:	JANUARY 2024		

TRC
1180 NW MAPLE STREET, SUITE 310
ISSAQUAH, WA 98027
PHONE: 425.395.0010

FILE: P2_Completed_Sewer_Inspection.aprx

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet; Map Rotation: 0
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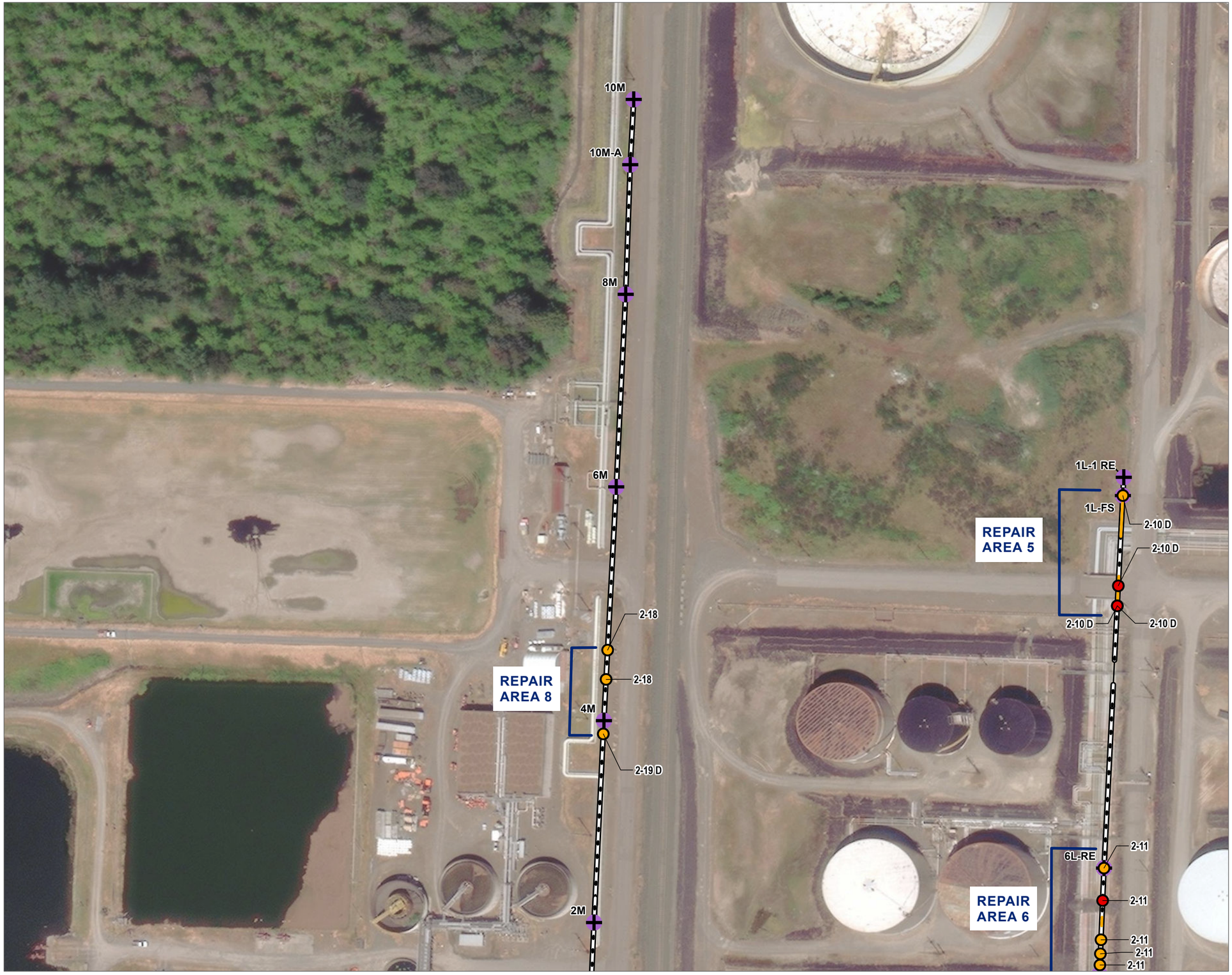


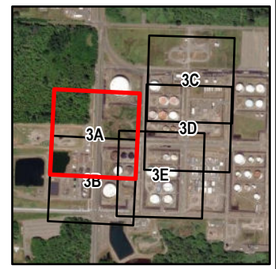
POINT DEFECTS

- ENVIRONMENTAL RATING = 4
- ENVIRONMENTAL RATING = 3

CONTINUOUS DEFECTS

- ENVIRONMENTAL RATING = 3
- OILY WATER SEWER MAJOR TRUNK LINE
- SEWER INSPECTION ROUTE
- OILY AND PHENOLIC SEWER MANHOLE
- PHASE II

BASE MAP: ESRI "WORLD IMAGERY" ONLINE SERVICE LAYER.
DATA SOURCES: TRC



N

1:1,500
1" = 125'

0 62.5 125 FEET

PROJECT:
PHILLIPS 66
PHASE II OILY WATER SEWER INSPECTIONS AND REPAIR RECOMMENDATIONS

TITLE: **PHASE II SEWER INSPECTION REPAIR AREAS AND ENVIRONMENTAL RATED DEFECTS 3 & 4**

DRAWN BY:	S. RAY	PROJ. NO.:	423514.0001.0000
CHECKED BY:	D. FORD		**FIGURE 3A**
APPROVED BY:	J. ALLEN		
DATE:	JANUARY 2024		

TRC
1180 NW MAPLE STREET, SUITE 310
ISSAQUAH, WA 98027
PHONE: 425.395.0010

FILE: 423514_Ferndale.aprx

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet. Map Rotation: 0
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REPAIR AREA 8

REPAIR AREA 5

REPAIR AREA 6

REPAIR AREA 7

2-18
2-18
4M
2-19 D
2M
1M
5-T
2T-FS
2-10 D
2-10 D
2-10 D
6L-RE
2-11
2-11
2-11
2-11
2-11
6L-FS
2-12 U
2-12 U
2-12 U
2-12 U
2-12 U
2-12 U
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2-12 U
2-12 U
2-12 U
2-12 U
2-12 U
7L-FS
2-13
2-13
2-13
10L-FS
2-13
40-6-1
36-6
34-6
34-6-1
33-6-1
29-6
X-25
E
X-24

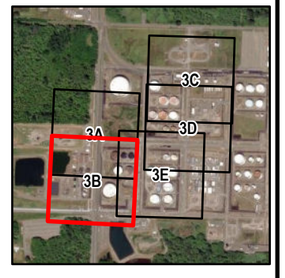
POINT DEFECTS

- ENVIRONMENTAL RATING = 4
- ENVIRONMENTAL RATING = 3

CONTINUOUS DEFECTS

- ENVIRONMENTAL RATING = 3
- PHENOLIC SEWER MAJOR TRUNK LINE
- OILY WATER SEWER MAJOR TRUNK LINE
- SEWER INSPECTION ROUTE
- OILY AND PHENOLIC SEWER MANHOLE
- PHASE I
- PHASE II
- PHASE IVC
- PHASE IVD

BASE MAP: ESRI "WORLD IMAGERY" ONLINE SERVICE LAYER.
DATA SOURCES: TRC



N

1:1,500
1" = 125'

0 62.5 125 FEET

PROJECT: PHILLIPS 66
PHASE II OILY WATER SEWER INSPECTIONS AND REPAIR RECOMMENDATIONS

TITLE: PHASE II SEWER INSPECTION REPAIR AREAS AND ENVIRONMENTAL RATED DEFECTS 3 & 4

DRAWN BY:	S. RAY	PROJ. NO.:	423514.0001.0000
CHECKED BY:	D. FORD		FIGURE 3B
APPROVED BY:	J. ALLEN		
DATE:	JANUARY 2024		

TRC
1180 NW MAPLE STREET, SUITE 310
ISSAQUAH, WA 98027
PHONE: 425.395.0010

FILE: 423514_Ferndale.aprx

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet. Map Rotation: 0
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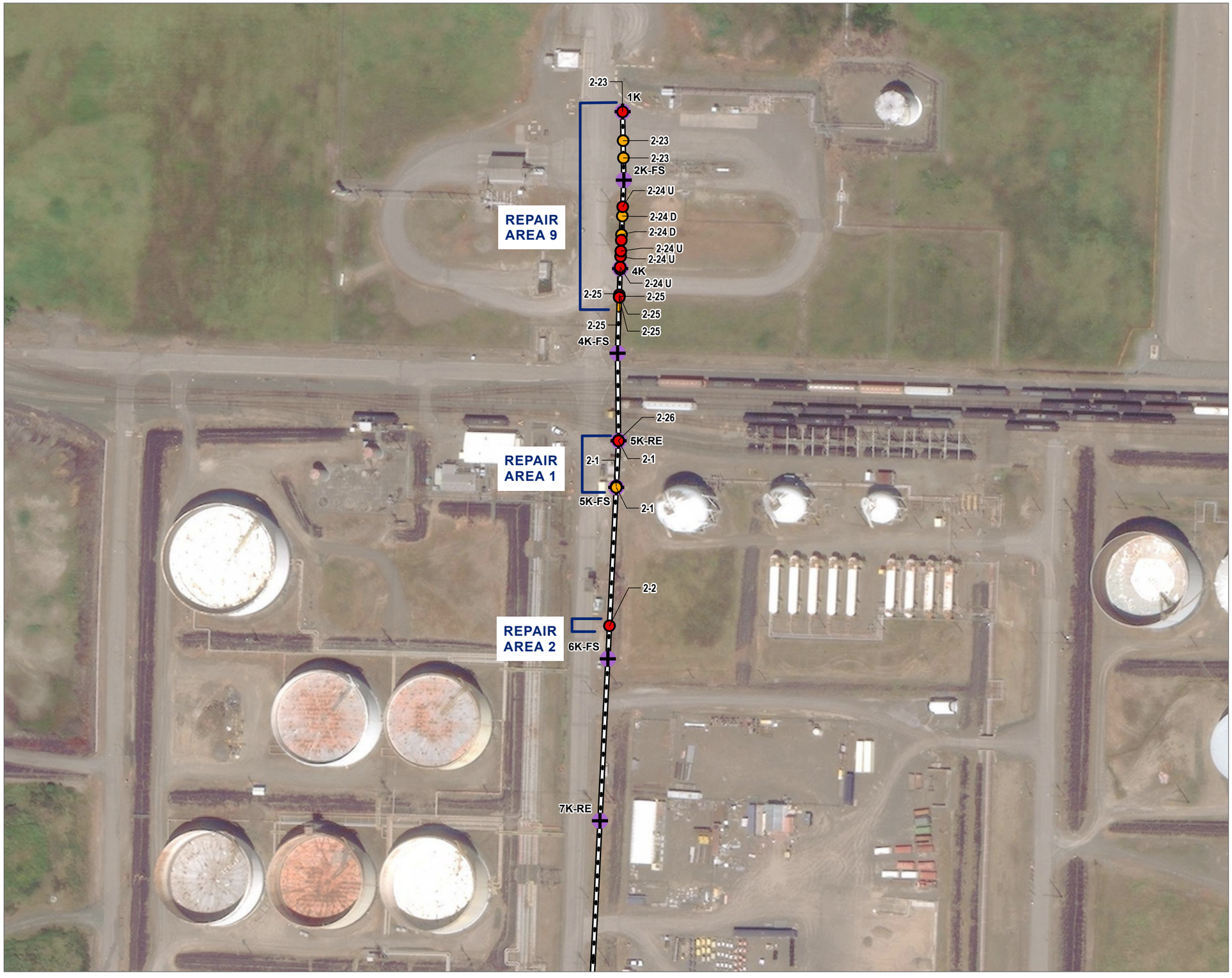


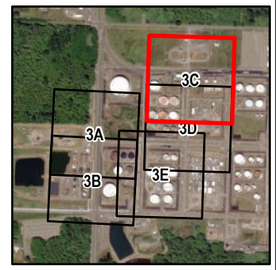
POINT DEFECTS

- ENVIRONMENTAL RATING = 4
- ENVIRONMENTAL RATING = 3

CONTINUOUS DEFECTS

- ENVIRONMENTAL RATING = 3
- OILY WATER SEWER MAJOR TRUNK LINE
- SEWER INSPECTION ROUTE
- OILY AND PHENOLIC SEWER MANHOLE
- PHASE II

BASE MAP: ESRI "WORLD IMAGERY" ONLINE SERVICE LAYER.
DATA SOURCES: TRC



N

1:1,500
1" = 125'

0 62.5 125 FEET

PROJECT: PHILLIPS 66
PHASE II OILY WATER SEWER INSPECTIONS AND REPAIR RECOMMENDATIONS

TITLE: PHASE II SEWER INSPECTION REPAIR AREAS AND ENVIRONMENTAL RATED DEFECTS 3 & 4

DRAWN BY:	S. RAY	PROJ. NO.:	423514.0001.0000
CHECKED BY:	D. FORD		FIGURE 3C
APPROVED BY:	J. ALLEN		
DATE:	JANUARY 2024		

TRC
1180 NW MAPLE STREET, SUITE 310
ISSAQUAH, WA 98027
PHONE: 425.395.0010

FILE: 423514_Ferndale.aprx

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet; Map Rotation: 0
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POINT DEFECTS

- ENVIRONMENTAL RATING = 4
- ENVIRONMENTAL RATING = 3

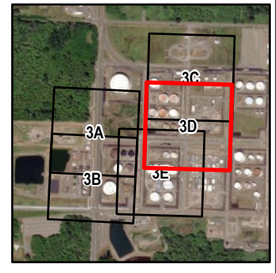
MANHOLE DEFECTS

- MAX ENVIRONMENTAL RATING = 3

CONTINUOUS DEFECTS

- ENVIRONMENTAL RATING = 3
- OILY WATER SEWER MAJOR TRUNK LINE
- SEWER INSPECTION ROUTE
- OILY AND PHENOLIC SEWER MANHOLE
- PHASE II

BASE MAP: ESRI "WORLD IMAGERY" ONLINE SERVICE LAYER.
DATA SOURCES: TRC



1:1,500
1" = 125'

0 62.5 125 FEET

PROJECT:
PHILLIPS 66
PHASE II OILY WATER SEWER INSPECTIONS AND REPAIR RECOMMENDATIONS

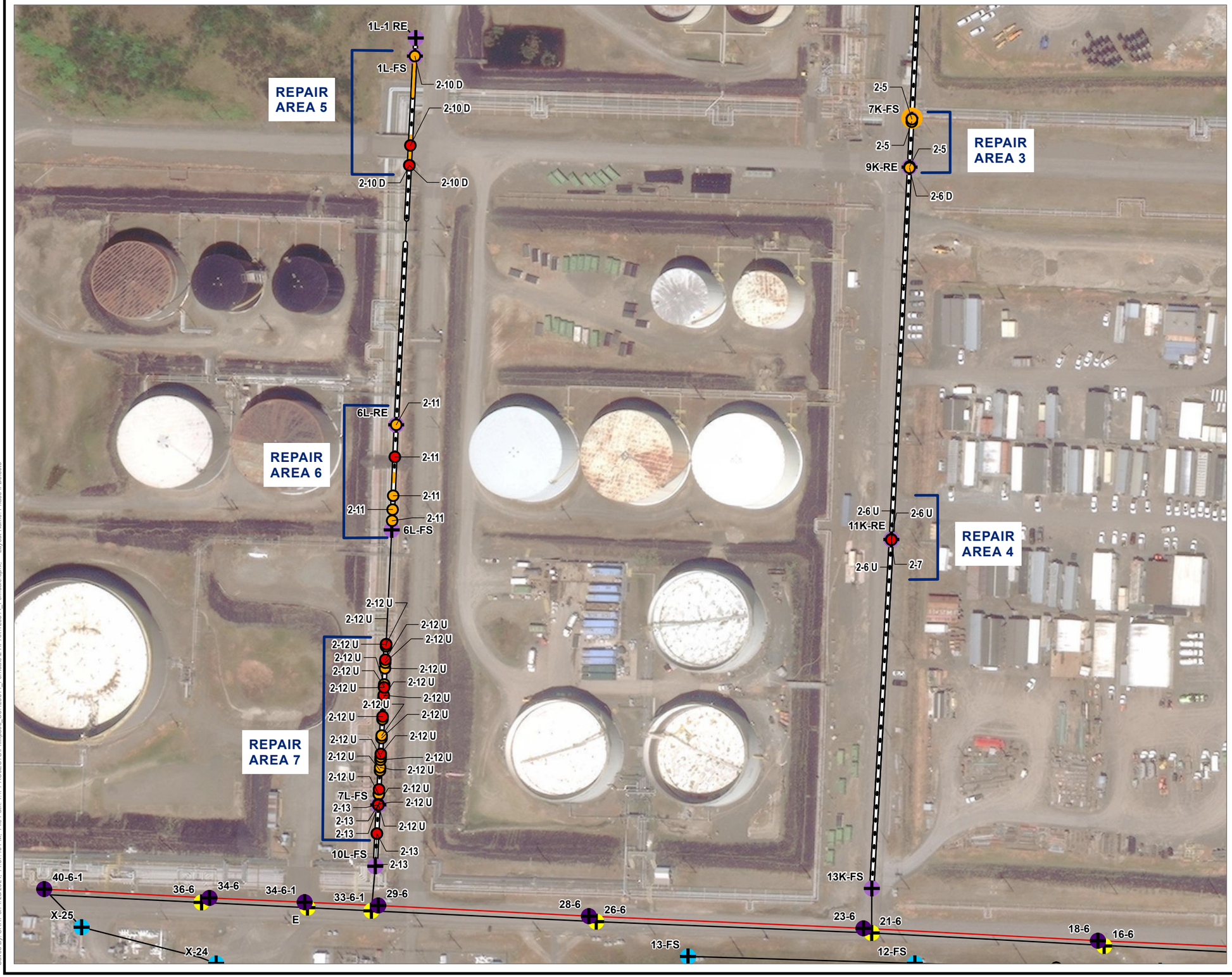
TITLE: **PHASE II SEWER INSPECTION REPAIR AREAS AND ENVIRONMENTAL RATED DEFECTS 3 & 4**

DRAWN BY:	S. RAY	PROJ. NO.:	423514.0001.0000
CHECKED BY:	D. FORD		**FIGURE 3D**
APPROVED BY:	J. ALLEN		
DATE:	JANUARY 2024		

TRC
1180 NW MAPLE STREET, SUITE 310
ISSAQUAH, WA 98027
PHONE: 425.395.0010

FILE: 423514_Ferndale.aprx

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet; Map Rotation: 0
Saved By: SRAY on 1/25/2024 - 4:57:46 PM; File Path: T:_PROJECTS\Phillips66 Co\423514_Ferndale\2-APRX\423514_Ferndale.aprx; Layout Name: Phase II Defects



POINT DEFECTS

- ENVIRONMENTAL RATING = 4
- ENVIRONMENTAL RATING = 3

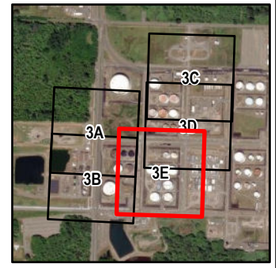
MANHOLE DEFECTS

- MAX ENVIRONMENTAL RATING = 3

CONTINUOUS DEFECTS

- ENVIRONMENTAL RATING = 3
- PHENOLIC SEWER MAJOR TRUNK LINE
- OILY WATER SEWER MAJOR TRUNK LINE
- SEWER INSPECTION ROUTE
- OILY AND PHENOLIC SEWER MANHOLE
- PHASE I
- PHASE II
- PHASE IVC
- PHASE IVD

BASE MAP: ESRI "WORLD IMAGERY" ONLINE SERVICE LAYER.
DATA SOURCES: TRC



1:1,500
1" = 125'

0 62.5 125 FEET

PROJECT:
PHILLIPS 66
PHASE II OILY WATER SEWER INSPECTIONS AND REPAIR RECOMMENDATIONS

TITLE: **PHASE II SEWER INSPECTION REPAIR AREAS AND ENVIRONMENTAL RATED DEFECTS 3 & 4**

DRAWN BY:	S. RAY	PROJ. NO.:	423514.0001.0000
CHECKED BY:	D. FORD		**FIGURE 3E**
APPROVED BY:	J. ALLEN		
DATE:	JANUARY 2024		

TRC
1180 NW MAPLE STREET, SUITE 310
ISSAQUAH, WA 98027
PHONE: 425.395.0010

FILE: 423514_Ferndale.aprx

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet; Map Rotation: 0
Saved By: SRAY on 1/26/2024 - 14:57:46 PM; File Path: T:\1-PROJECTS\Phillips66_Con\423514_Ferndale\2-APRX\423514_Ferndale.aprx; Layout Name: Phase II Defects

Attachment 1: Phillips 66 Ferndale OWS Environmental Rating System

Phillips 66 - Ferndale Refinery
Sewer Environmental Ratings

Environmental Rating (ER)	Characteristic / Examples	Actions and Documentation
5	Significant structural defect with confirmed release. Examples: Large holes at or below the segment/manhole flow line and above groundwater table; completely separated joints with exposed surrounding soil above groundwater table; collapsed pipe sections.	Initial investigation confirmed soil or groundwater exceedance of cleanup levels specified in Section 3.1 of IRP. Confirmed release from OWS will be reported to Ecology 90 days after discovery. Conduct site characterization and schedule for high priority mitigation effort (repair, ongoing monitoring for inaccessible sewers, etc.) If soil surrounding significant defect appears impacted due to a potential release from the OWS, then immediate response actions will be initiated to stop the source of the potential release and begin clean-up activities.
4	Significant structural defect with potential for release. Examples: Same as ER = 5.	Conduct initial release investigation involving the collection of soil and/or shallow groundwater sample(s). Groundwater samples will be collected only if the potential release occurred at or below the shallow groundwater table elevation. Increase to ER=5 if soil or groundwater concentrations exceed cleanup levels specified in Section 3.1 of IRP. Schedule for moderate priority mitigation effort (primarily repair based on Refinery operational needs and accessibility or reinspection to monitor defect condition).
3	Moderate structural defect. Examples: Significant fractures/cracks at or below the pipe/manhole flow line; groundwater infiltration at defect; significant corrosion. Defects that both higher risk for future potential release or structural failure.	Document in the Refinery record. Schedule for low priority mitigation effort (primarily repair based on Refinery operational needs and accessibility or reinspection to monitor defect condition).
2	Small to moderate structural defect. Examples: Moderate fractures/cracks above the pipe/manhole flow line; joint improperly seated; pipe reinforcement visible, moderate corrosion in pipe.	Document in the Refinery record.
1	Small structural defect. Examples: Hairline cracks; minor corrosion/deterioration of pipe/manhole material; visible aggregate; small offset joint; missing sealing rings.	Document in the Refinery record.

Notes:

1. ER = Environmental Rating.
2. IRP = Investigation and Response Plan dated January 26, 2021.
3. OWS = Oily Water Sewer

APPENDIX E -
ORIGINAL SOIL LABORATORY ANALYTICAL DATA REPORT

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

October 13, 2023

Joe Sumera
Phillips 66
3901 Unick Road
Ferndale, WA 98248

RE: Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Dear Joe Sumera:

Enclosed are the analytical results for sample(s) received by the laboratory on September 23, 2023. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

Some analyses were subcontracted outside of the Pace Network. The test report from the external subcontractor is attached to this report in its entirety.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace National - Mt. Juliet
- Pace Analytical Services - Minneapolis

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jenni Gross

Jennifer Gross
jennifer.gross@pacelabs.com
(612)607-1700
Project Manager

Enclosures

cc: Eric Libolt, Whatcom Environmental Services

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Pace Analytical Services, LLC - Minneapolis MN
1700 Elm Street SE, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #: 40770
Alaska Contaminated Sites Certification #: 17-009
Alaska DW Certification #: MN00064
Arizona Certification #: AZ0014
Arkansas DW Certification #: MN00064
Arkansas WW Certification #: 88-0680
California Certification #: 2929
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8 Tribal Water Systems+Wyoming DW Certification #: via MN 027-053-137
Florida Certification #: E87605
Georgia Certification #: 959
GMP+ Certification #: GMP050884
Hawaii Certification #: MN00064
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification #: C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky DW Certification #: 90062
Kentucky WW Certification #: 90062
Louisiana DEQ Certification #: AI-03086
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064
Maryland Certification #: 322
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137
Minnesota Dept of Ag Approval: via MN 027-053-137
Minnesota Petrofund Registration #: 1240
Mississippi Certification #: MN00064
Missouri Certification #: 10100
Montana Certification #: CERT0092
Nebraska Certification #: NE-OS-18-06
Nevada Certification #: MN00064
New Hampshire Certification #: 2081
New Jersey Certification #: MN002
New York Certification #: 11647
North Carolina DW Certification #: 27700
North Carolina WW Certification #: 530
North Dakota Certification (A2LA) #: R-036
North Dakota Certification (MN) #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification (1700) #: CL101
Oklahoma Certification #: 9507
Oregon Primary Certification #: MN300001
Oregon Secondary Certification #: MN200001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification #: MN00064
South Carolina Certification #:74003001
Tennessee Certification #: TN02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Vermont Certification #: VT-027053137
Virginia Certification #: 460163
Washington Certification #: C486
West Virginia DEP Certification #: 382
West Virginia DW Certification #: 9952 C
Wisconsin Certification #: 999407970
Wyoming UST Certification #: via A2LA 2926.01
USDA Permit #: P330-19-00208

Pace Analytical Services National
12065 Lebanon Road, Mt. Juliet, TN 37122
Alabama Certification #: 40660
Alaska Certification 17-026
Arizona Certification #: AZ0612
Arkansas Certification #: 88-0469
California Certification #: 2932
Canada Certification #: 1461.01
Colorado Certification #: TN00003
Connecticut Certification #: PH-0197
DOD Certification: #1461.01
EPA# TN00003
Florida Certification #: E87487
Georgia DW Certification #: 923
Georgia Certification: NELAP
Idaho Certification #: TN00003
Illinois Certification #: 200008
Indiana Certification #: C-TN-01
Iowa Certification #: 364
Kansas Certification #: E-10277
Kentucky UST Certification #: 16
Kentucky Certification #: 90010
Louisiana Certification #: AI30792
Louisiana DW Certification #: LA180010
Maine Certification #: TN0002
Maryland Certification #: 324
Massachusetts Certification #: M-TN003
Michigan Certification #: 9958
Minnesota Certification #: 047-999-395
Mississippi Certification #: TN00003
Missouri Certification #: 340
Montana Certification #: CERT0086
Nebraska Certification #: NE-OS-15-05
Nevada Certification #: TN-03-2002-34
New Hampshire Certification #: 2975

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Pace Analytical Services National

New Jersey Certification #: TN002
New Mexico DW Certification
New York Certification #: 11742
North Carolina Aquatic Toxicity Certification #: 41
North Carolina Drinking Water Certification #: 21704
North Carolina Environmental Certificate #: 375
North Dakota Certification #: R-140
Ohio VAP Certification #: CL0069
Oklahoma Certification #: 9915
Oregon Certification #: TN200002
Pennsylvania Certification #: 68-02979
Rhode Island Certification #: LAO00356
South Carolina Certification #: 84004
South Dakota Certification
Tennessee DW/Chem/Micro Certification #: 2006
Texas Mold Certification #: LAB0152
Texas Certification #: T 104704245-17-14
USDA Soil Permit #: P330-15-00234
Utah Certification #: TN00003
Virginia Certification #: VT2006
Vermont Dept. of Health: ID# VT-2006
Virginia Certification #: 460132
Washington Certification #: C847
West Virginia Certification #: 233
Wisconsin Certification #: 998093910
Wyoming UST Certification #: via A2LA 2926.01
A2LA-ISO 17025 Certification #: 1461.01
A2LA-ISO 17025 Certification #: 1461.02
AIHA-LAP/LLC EMLAP Certification #:100789

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10669887001	**B-1-23, 7.5ft**	Solid	09/21/23 13:30	09/23/23 09:40
10669887002	**B-2-23, 7ft**	Solid	09/20/23 12:25	09/23/23 09:40
10669887003	**B-3-23, 7ft**	Solid	09/21/23 14:00	09/23/23 09:40
10669887004	**B-4-23, 9ft**	Solid	09/20/23 14:40	09/23/23 09:40
10669887005	**B-5-23, 8.5ft**	Solid	09/21/23 09:00	09/23/23 09:40
10669887006	**B-6-23, 4.5ft**	Solid	09/21/23 10:30	09/23/23 09:40
10669887007	**B-7-23, 4ft**	Solid	09/21/23 11:30	09/23/23 09:40
10669887008	**Trip Blank**	Solid	09/20/23 00:00	09/23/23 09:40

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

SAMPLE ANALYTE COUNT

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10669887001	**B-1-23, 7.5ft**	EPA 6010D	DM	7	PASI-M
		EPA 6020B	GAS1	6	PASI-M
		EPA 7470A	LMW	1	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270E by SIM	KJ3	12	PASI-M
		EPA 8260D	ADM	71	PAN
		EPA 8260D	PAB	4	PASI-M
		SM 2540G	CMK	1	PAN
		EPA 7196A	CAH	1	PAN
		Trivalent Chromium Calculation	KEO	1	PASI-M
10669887002	**B-2-23, 7ft**	EPA 6010D	DM	7	PASI-M
		EPA 6020B	GAS1	6	PASI-M
		EPA 7470A	LMW	1	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270E by SIM	KJ3	12	PASI-M
		EPA 8260D	JAH	71	PAN
		EPA 8260D	PAB	4	PASI-M
		SM 2540G	CMK	1	PAN
		EPA 7196A	CAH	1	PAN
		Trivalent Chromium Calculation	KEO	1	PASI-M
10669887003	**B-3-23, 7ft**	EPA 6010D	DM	7	PASI-M
		EPA 6020B	GAS1	6	PASI-M
		EPA 7470A	LMW	1	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270E by SIM	KJ3	12	PASI-M
		EPA 8260D	ADM	71	PAN
		EPA 8260D	PAB	4	PASI-M
		SM 2540G	CMK	1	PAN
		EPA 7196A	CAH	1	PAN
		Trivalent Chromium Calculation	KEO	1	PASI-M
10669887004	**B-4-23, 9ft**	EPA 6010D	DM	7	PASI-M
		EPA 6020B	GAS1	6	PASI-M
		EPA 7470A	LMW	1	PASI-M
		EPA 7471B	LMW	1	PASI-M

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

SAMPLE ANALYTE COUNT

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		ASTM D2974	JDL	1	PASI-M
		EPA 8270E by SIM	KJ3	12	PASI-M
		EPA 8260D	ADM	71	PAN
		EPA 8260D	PAB	4	PASI-M
		SM 2540G	CMK	1	PAN
		EPA 7196A	CAH	1	PAN
		Trivalent Chromium Calculation	KEO	1	PASI-M
10669887005	**B-5-23, 8.5ft**	EPA 6010D	DM	7	PASI-M
		EPA 6020B	GAS1	6	PASI-M
		EPA 7470A	LMW	1	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270E by SIM	KJ3	12	PASI-M
		EPA 8260D	ADM	71	PAN
		EPA 8260D	PAB	4	PASI-M
		SM 2540G	CMK	1	PAN
		EPA 7196A	CAH	1	PAN
		Trivalent Chromium Calculation	KEO	1	PASI-M
10669887006	**B-6-23, 4.5ft**	EPA 6010D	DM	7	PASI-M
		EPA 6020B	GAS1, NN2	6	PASI-M
		EPA 7470A	LMW	1	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270E by SIM	KJ3	12	PASI-M
		EPA 8260D	ADM	71	PAN
		EPA 8260D	PAB	4	PASI-M
		SM 2540G	CMK	1	PAN
		EPA 7196A	CAH	1	PAN
		Trivalent Chromium Calculation	KEO	1	PASI-M
10669887007	**B-7-23, 4ft**	EPA 6010D	DM	7	PASI-M
		EPA 6020B	GAS1	6	PASI-M
		EPA 7470A	LMW	1	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270E by SIM	KJ3	12	PASI-M
		EPA 8260D	ADM	71	PAN
		EPA 8260D	PAB	4	PASI-M

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
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SAMPLE ANALYTE COUNT

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		SM 2540G	CMK	1	PAN
		EPA 7196A	CAH	1	PAN
		Trivalent Chromium Calculation	KEO	1	PASI-M
10669887008	**Trip Blank**	EPA 8260D	ADM	71	PAN

PAN = Pace National - Mt. Juliet
PASI-M = Pace Analytical Services - Minneapolis

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: B-1-23, 7.5ft **Lab ID: 10669887001** Collected: 09/21/23 13:30 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP, TCLP MICRO	Analytical Method: EPA 6010D Preparation Method: EPA 3015A Leachate Method/Date: EPA 1311; 10/11/23 16:17 Pace Analytical Services - Minneapolis							
Arsenic	ND	mg/L	0.20	1	10/12/23 14:33	10/13/23 10:34	7440-38-2	
Barium	**0.25**	mg/L	0.10	1	10/12/23 14:33	10/13/23 10:34	7440-39-3	
Cadmium	ND	mg/L	0.030	1	10/12/23 14:33	10/13/23 10:34	7440-43-9	
Chromium	ND	mg/L	0.10	1	10/12/23 14:33	10/13/23 10:34	7440-47-3	
Lead	ND	mg/L	0.10	1	10/12/23 14:33	10/13/23 10:34	7439-92-1	
Selenium	ND	mg/L	0.20	1	10/12/23 14:33	10/13/23 10:34	7782-49-2	
Silver	ND	mg/L	0.10	1	10/12/23 14:33	10/13/23 10:34	7440-22-4	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.5**	mg/kg	0.51	1	09/27/23 15:53	09/29/23 12:19	7440-38-2	
Cadmium	**0.098**	mg/kg	0.082	1	09/27/23 15:53	09/29/23 12:19	7440-43-9	
Chromium	**19.9**	mg/kg	2.0	1	09/27/23 15:53	09/29/23 12:19	7440-47-3	
Lead	**2.1**	mg/kg	0.51	1	09/27/23 15:53	09/29/23 12:19	7439-92-1	
Nickel	**21.9**	mg/kg	0.51	1	09/27/23 15:53	09/29/23 12:19	7440-02-0	
Zinc	**34.7**	mg/kg	5.1	1	09/27/23 15:53	09/29/23 12:19	7440-66-6	
7470A Mercury, TCLP	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Leachate Method/Date: EPA 1311; 10/11/23 16:17 Pace Analytical Services - Minneapolis							
Mercury	ND	mg/L	0.00060	1	10/12/23 14:22	10/12/23 17:12	7439-97-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis							
Mercury	ND	mg/kg	0.019	1	10/02/23 14:40	10/02/23 16:54	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**6.4**	%	0.10	1		10/05/23 15:43		N2
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3546 Pace Analytical Services - Minneapolis							
1-Methylnaphthalene	ND	ug/kg	10.6	1	09/27/23 12:51	10/03/23 16:00	90-12-0	
2-Methylnaphthalene	ND	ug/kg	10.6	1	09/27/23 12:51	10/03/23 16:00	91-57-6	
Benzo(a)anthracene	ND	ug/kg	10.6	1	09/27/23 12:51	10/03/23 16:00	56-55-3	
Benzo(a)pyrene	ND	ug/kg	10.6	1	09/27/23 12:51	10/03/23 16:00	50-32-8	
Benzo(b)fluoranthene	ND	ug/kg	10.6	1	09/27/23 12:51	10/03/23 16:00	205-99-2	
Benzo(k)fluoranthene	ND	ug/kg	10.6	1	09/27/23 12:51	10/03/23 16:00	207-08-9	
Chrysene	ND	ug/kg	10.6	1	09/27/23 12:51	10/03/23 16:00	218-01-9	
Dibenz(a,h)anthracene	ND	ug/kg	10.6	1	09/27/23 12:51	10/03/23 16:00	53-70-3	
Indeno(1,2,3-cd)pyrene	ND	ug/kg	10.6	1	09/27/23 12:51	10/03/23 16:00	193-39-5	
Naphthalene	ND	ug/kg	10.6	1	09/27/23 12:51	10/03/23 16:00	91-20-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: B-1-23, 7.5ft **Lab ID: 10669887001** Collected: 09/21/23 13:30 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3546 Pace Analytical Services - Minneapolis							
Surrogates								
2-Fluorobiphenyl (S)	74	%.	54-125	1	09/27/23 12:51	10/03/23 16:00	321-60-8	
p-Terphenyl-d14 (S)	98	%.	60-125	1	09/27/23 12:51	10/03/23 16:00	1718-51-0	
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
Acetone	ND	mg/kg	0.0534	1	10/05/23 12:34	10/05/23 12:34	67-64-1	
Allyl chloride	ND	mg/kg	0.00534	1	10/05/23 12:34	10/05/23 12:34	107-05-1	
Benzene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	71-43-2	
Bromobenzene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	108-86-1	
Bromochloromethane	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	74-97-5	
Bromodichloromethane	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	75-27-4	
Bromoform	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	75-25-2	
Bromomethane	ND	mg/kg	0.00534	1	10/05/23 12:34	10/05/23 12:34	74-83-9	
n-Butylbenzene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	56-23-5	
Chlorobenzene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	108-90-7	
Dibromochloromethane	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	124-48-1	
Chloroethane	ND	mg/kg	0.00534	1	10/05/23 12:34	10/05/23 12:34	75-00-3	
Chloroform	ND	mg/kg	0.00534	1	10/05/23 12:34	10/05/23 12:34	67-66-3	
Chloromethane	ND	mg/kg	0.00267	1	10/05/23 12:34	10/05/23 12:34	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	106-43-4	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	106-93-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.00534	1	10/05/23 12:34	10/05/23 12:34	96-12-8	
Dibromomethane	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.00534	1	10/05/23 12:34	10/05/23 12:34	75-71-8	
Dichlorofluoromethane	ND	mg/kg	0.00534	1	10/05/23 12:34	10/05/23 12:34	75-43-4	
1,1-Dichloroethane	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	156-60-5	
1,2-Dichloropropane	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	10061-01-5	
trans-1,3-Dichloropropene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	10061-02-6	
Ethylbenzene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	100-41-4	

Pace Analytical Services, LLC
1700 Elm Street
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ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: B-1-23, 7.5ft **Lab ID: 10669887001** Collected: 09/21/23 13:30 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
Diethyl ether (Ethyl ether)	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	60-29-7	
Hexachloro-1,3-butadiene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	87-68-3	
n-Hexane	ND	mg/kg	0.0107	1	10/05/23 12:34	10/05/23 12:34	110-54-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	99-87-6	
2-Butanone (MEK)	ND	mg/kg	0.0107	1	10/05/23 12:34	10/05/23 12:34	78-93-3	
Methylene Chloride	ND	mg/kg	0.00534	1	10/05/23 12:34	10/05/23 12:34	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.0107	1	10/05/23 12:34	10/05/23 12:34	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	1634-04-4	
Naphthalene	ND	mg/kg	0.00534	1	10/05/23 12:34	10/05/23 12:34	91-20-3	
n-Propylbenzene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	103-65-1	
Styrene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	79-34-5	
Tetrachloroethene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	127-18-4	
Tetrahydrofuran	ND	mg/kg	0.00534	1	10/05/23 12:34	10/05/23 12:34	109-99-9	
Toluene	ND	mg/kg	0.00534	1	10/05/23 12:34	10/05/23 12:34	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	120-82-1	
1,2,4-Trimethylbenzene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	108-67-8	
1,1,1-Trichloroethane	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	79-00-5	
Trichloroethene	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.00534	1	10/05/23 12:34	10/05/23 12:34	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	76-13-1	
1,2,3-Trichloropropane	ND	mg/kg	0.00267	1	10/05/23 12:34	10/05/23 12:34	96-18-4	
Vinyl chloride	ND	mg/kg	0.00107	1	10/05/23 12:34	10/05/23 12:34	75-01-4	
Xylene (Total)	ND	mg/kg	0.00320	1	10/05/23 12:34	10/05/23 12:34	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	111	%	70.0-130	1	10/05/23 12:34	10/05/23 12:34	17060-07-0	
Toluene-d8 (S)	99.6	%	75.0-131	1	10/05/23 12:34	10/05/23 12:34	2037-26-5	
4-Bromofluorobenzene (S)	102	%	67.0-138	1	10/05/23 12:34	10/05/23 12:34	460-00-4	
8260D MSV TCLP	Analytical Method: EPA 8260D Leachate Method/Date: EPA 1311; 10/03/23 14:32 Pace Analytical Services - Minneapolis							
Benzene	ND	ug/L	25.0	1		10/04/23 19:39	71-43-2	
Surrogates								
1,2-Dichlorobenzene-d4 (S)	99	%.	75-125	1		10/04/23 19:39	2199-69-1	
4-Bromofluorobenzene (S)	103	%.	75-125	1		10/04/23 19:39	460-00-4	
Toluene-d8 (S)	99	%.	75-125	1		10/04/23 19:39	2037-26-5	
Total Solids 2540 G-2011	Analytical Method: SM 2540G Preparation Method: SM 2540 G Pace National - Mt. Juliet							
Total Solids	**93.7**	%		1	10/02/23 13:47	10/02/23 13:53		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: B-1-23, 7.5ft **Lab ID: 10669887001** Collected: 09/21/23 13:30 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Wet Chemistry 3060A/7196A	Analytical Method: EPA 7196A Preparation Method: 3060A Pace National - Mt. Juliet							
Chromium, Hexavalent	ND	mg/kg	2.14	1	10/01/23 15:30	10/02/23 12:29		ML
Trivalent Chromium Calculation	Analytical Method: Trivalent Chromium Calculation Pace Analytical Services - Minneapolis							
Chromium, Trivalent	**19.9**	mg/kg	1.0	1		10/12/23 09:10		

Sample: B-2-23, 7ft **Lab ID: 10669887002** Collected: 09/20/23 12:25 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP, TCLP MICRO	Analytical Method: EPA 6010D Preparation Method: EPA 3015A Leachate Method/Date: EPA 1311; 10/11/23 16:17 Pace Analytical Services - Minneapolis							
Arsenic	ND	mg/L	0.20	1	10/12/23 14:33	10/13/23 10:43	7440-38-2	
Barium	**0.31**	mg/L	0.10	1	10/12/23 14:33	10/13/23 10:43	7440-39-3	
Cadmium	ND	mg/L	0.030	1	10/12/23 14:33	10/13/23 10:43	7440-43-9	
Chromium	ND	mg/L	0.10	1	10/12/23 14:33	10/13/23 10:43	7440-47-3	
Lead	ND	mg/L	0.10	1	10/12/23 14:33	10/13/23 10:43	7439-92-1	
Selenium	ND	mg/L	0.20	1	10/12/23 14:33	10/13/23 10:43	7782-49-2	
Silver	ND	mg/L	0.10	1	10/12/23 14:33	10/13/23 10:43	7440-22-4	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**4.8**	mg/kg	0.57	1	09/27/23 15:53	09/29/23 12:25	7440-38-2	
Cadmium	ND	mg/kg	0.091	1	09/27/23 15:53	09/29/23 12:25	7440-43-9	
Chromium	**32.9**	mg/kg	2.3	1	09/27/23 15:53	09/29/23 12:25	7440-47-3	
Lead	**3.2**	mg/kg	0.57	1	09/27/23 15:53	09/29/23 12:25	7439-92-1	
Nickel	**30.5**	mg/kg	0.57	1	09/27/23 15:53	09/29/23 12:25	7440-02-0	
Zinc	**45.9**	mg/kg	5.7	1	09/27/23 15:53	09/29/23 12:25	7440-66-6	
7470A Mercury, TCLP	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Leachate Method/Date: EPA 1311; 10/11/23 16:17 Pace Analytical Services - Minneapolis							
Mercury	ND	mg/L	0.00060	1	10/12/23 14:22	10/12/23 17:16	7439-97-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis							
Mercury	**0.025**	mg/kg	0.021	1	10/02/23 14:40	10/02/23 16:56	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**16.0**	%	0.10	1		10/05/23 15:43		N2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: B-2-23, 7ft **Lab ID: 10669887002** Collected: 09/20/23 12:25 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3546 Pace Analytical Services - Minneapolis							
1-Methylnaphthalene	**16.0**	ug/kg	11.9	1	09/27/23 12:51	10/03/23 16:20	90-12-0	
2-Methylnaphthalene	**42.5**	ug/kg	11.9	1	09/27/23 12:51	10/03/23 16:20	91-57-6	
Benzo(a)anthracene	ND	ug/kg	11.9	1	09/27/23 12:51	10/03/23 16:20	56-55-3	
Benzo(a)pyrene	ND	ug/kg	11.9	1	09/27/23 12:51	10/03/23 16:20	50-32-8	
Benzo(b)fluoranthene	ND	ug/kg	11.9	1	09/27/23 12:51	10/03/23 16:20	205-99-2	
Benzo(k)fluoranthene	ND	ug/kg	11.9	1	09/27/23 12:51	10/03/23 16:20	207-08-9	
Chrysene	ND	ug/kg	11.9	1	09/27/23 12:51	10/03/23 16:20	218-01-9	
Dibenz(a,h)anthracene	ND	ug/kg	11.9	1	09/27/23 12:51	10/03/23 16:20	53-70-3	
Indeno(1,2,3-cd)pyrene	ND	ug/kg	11.9	1	09/27/23 12:51	10/03/23 16:20	193-39-5	
Naphthalene	**12.5**	ug/kg	11.9	1	09/27/23 12:51	10/03/23 16:20	91-20-3	
Surrogates								
2-Fluorobiphenyl (S)	70	%.	54-125	1	09/27/23 12:51	10/03/23 16:20	321-60-8	
p-Terphenyl-d14 (S)	98	%.	60-125	1	09/27/23 12:51	10/03/23 16:20	1718-51-0	
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
Acetone	ND	mg/kg	0.0607	1	10/04/23 23:32	10/04/23 23:32	67-64-1	
Allyl chloride	ND	mg/kg	0.00607	1	10/04/23 23:32	10/04/23 23:32	107-05-1	
Benzene	**0.0858**	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	71-43-2	
Bromobenzene	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	108-86-1	
Bromochloromethane	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	74-97-5	
Bromodichloromethane	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	75-27-4	
Bromoform	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	75-25-2	
Bromomethane	ND	mg/kg	0.00607	1	10/04/23 23:32	10/04/23 23:32	74-83-9	
n-Butylbenzene	**0.0159**	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	104-51-8	
sec-Butylbenzene	**0.00929**	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	56-23-5	
Chlorobenzene	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	108-90-7	
Dibromochloromethane	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	124-48-1	
Chloroethane	ND	mg/kg	0.00607	1	10/04/23 23:32	10/04/23 23:32	75-00-3	
Chloroform	ND	mg/kg	0.00607	1	10/04/23 23:32	10/04/23 23:32	67-66-3	
Chloromethane	ND	mg/kg	0.00304	1	10/04/23 23:32	10/04/23 23:32	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	106-43-4	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	106-93-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.00607	1	10/04/23 23:32	10/04/23 23:32	96-12-8	
Dibromomethane	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.00607	1	10/04/23 23:32	10/04/23 23:32	75-71-8	
Dichlorofluoromethane	ND	mg/kg	0.00607	1	10/04/23 23:32	10/04/23 23:32	75-43-4	
1,1-Dichloroethane	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	107-06-2	

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: B-2-23, 7ft **Lab ID: 10669887002** Collected: 09/20/23 12:25 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
1,1-Dichloroethene	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	156-60-5	
1,2-Dichloropropane	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	10061-01-5	
trans-1,3-Dichloropropene	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	10061-02-6	
Ethylbenzene	**0.121**	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	100-41-4	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	60-29-7	
Hexachloro-1,3-butadiene	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	87-68-3	
n-Hexane	**0.253**	mg/kg	0.0121	1	10/04/23 23:32	10/04/23 23:32	110-54-3	E
Isopropylbenzene (Cumene)	**0.0101**	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	98-82-8	
p-Isopropyltoluene	**0.00310**	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	99-87-6	
2-Butanone (MEK)	ND	mg/kg	0.0121	1	10/04/23 23:32	10/04/23 23:32	78-93-3	
Methylene Chloride	ND	mg/kg	0.00607	1	10/04/23 23:32	10/04/23 23:32	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.0121	1	10/04/23 23:32	10/04/23 23:32	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	1634-04-4	
Naphthalene	**0.0318**	mg/kg	0.00607	1	10/04/23 23:32	10/04/23 23:32	91-20-3	
n-Propylbenzene	**0.0360**	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	103-65-1	
Styrene	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	79-34-5	
Tetrachloroethene	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	127-18-4	
Tetrahydrofuran	ND	mg/kg	0.00607	1	10/04/23 23:32	10/04/23 23:32	109-99-9	
Toluene	**0.345**	mg/kg	0.00607	1	10/04/23 23:32	10/04/23 23:32	108-88-3	E
1,2,3-Trichlorobenzene	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	120-82-1	
1,2,4-Trimethylbenzene	**0.149**	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	95-63-6	
1,3,5-Trimethylbenzene	**0.0439**	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	108-67-8	
1,1,1-Trichloroethane	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	79-00-5	
Trichloroethene	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.00607	1	10/04/23 23:32	10/04/23 23:32	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	76-13-1	
1,2,3-Trichloropropane	ND	mg/kg	0.00304	1	10/04/23 23:32	10/04/23 23:32	96-18-4	
Vinyl chloride	ND	mg/kg	0.00121	1	10/04/23 23:32	10/04/23 23:32	75-01-4	
Xylene (Total)	**0.527**	mg/kg	0.00364	1	10/04/23 23:32	10/04/23 23:32	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	129	%	70.0-130	1	10/04/23 23:32	10/04/23 23:32	17060-07-0	
Toluene-d8 (S)	79.1	%	75.0-131	1	10/04/23 23:32	10/04/23 23:32	2037-26-5	
4-Bromofluorobenzene (S)	88.7	%	67.0-138	1	10/04/23 23:32	10/04/23 23:32	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: B-2-23, 7ft **Lab ID: 10669887002** Collected: 09/20/23 12:25 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260D MSV TCLP	Analytical Method: EPA 8260D Leachate Method/Date: EPA 1311; 10/03/23 14:32 Pace Analytical Services - Minneapolis							
Benzene	ND	ug/L	25.0	1		10/04/23 19:55	71-43-2	
Surrogates								
1,2-Dichlorobenzene-d4 (S)	99	%.	75-125	1		10/04/23 19:55	2199-69-1	
4-Bromofluorobenzene (S)	103	%.	75-125	1		10/04/23 19:55	460-00-4	
Toluene-d8 (S)	99	%.	75-125	1		10/04/23 19:55	2037-26-5	
Total Solids 2540 G-2011	Analytical Method: SM 2540G Preparation Method: SM 2540 G Pace National - Mt. Juliet							
Total Solids	**82.3**	%		1	10/02/23 13:47	10/02/23 13:53		
Wet Chemistry 3060A/7196A	Analytical Method: EPA 7196A Preparation Method: 3060A Pace National - Mt. Juliet							
Chromium, Hexavalent	ND	mg/kg	2.43	1	10/01/23 15:30	10/02/23 12:30		
Trivalent Chromium Calculation	Analytical Method: Trivalent Chromium Calculation Pace Analytical Services - Minneapolis							
Chromium, Trivalent	**32.9**	mg/kg	1.0	1		10/12/23 09:10		

Sample: B-3-23, 7ft **Lab ID: 10669887003** Collected: 09/21/23 14:00 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP, TCLP MICRO	Analytical Method: EPA 6010D Preparation Method: EPA 3015A Leachate Method/Date: EPA 1311; 10/11/23 16:17 Pace Analytical Services - Minneapolis							
Arsenic	ND	mg/L	0.20	1	10/12/23 14:33	10/13/23 10:50	7440-38-2	
Barium	**0.29**	mg/L	0.10	1	10/12/23 14:33	10/13/23 10:50	7440-39-3	
Cadmium	ND	mg/L	0.030	1	10/12/23 14:33	10/13/23 10:50	7440-43-9	
Chromium	ND	mg/L	0.10	1	10/12/23 14:33	10/13/23 10:50	7440-47-3	
Lead	ND	mg/L	0.10	1	10/12/23 14:33	10/13/23 10:50	7439-92-1	
Selenium	ND	mg/L	0.20	1	10/12/23 14:33	10/13/23 10:50	7782-49-2	
Silver	ND	mg/L	0.10	1	10/12/23 14:33	10/13/23 10:50	7440-22-4	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**4.3**	mg/kg	0.61	1	09/27/23 15:53	09/29/23 12:32	7440-38-2	
Cadmium	**0.16**	mg/kg	0.098	1	09/27/23 15:53	09/29/23 12:32	7440-43-9	
Chromium	**37.9**	mg/kg	2.4	1	09/27/23 15:53	09/29/23 12:32	7440-47-3	
Lead	**15.1**	mg/kg	0.61	1	09/27/23 15:53	09/29/23 12:32	7439-92-1	
Nickel	**35.7**	mg/kg	0.61	1	09/27/23 15:53	09/29/23 12:32	7440-02-0	
Zinc	**54.9**	mg/kg	6.1	1	09/27/23 15:53	09/29/23 12:32	7440-66-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: B-3-23, 7ft **Lab ID: 10669887003** Collected: 09/21/23 14:00 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
7470A Mercury, TCLP	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Leachate Method/Date: EPA 1311; 10/11/23 16:17 Pace Analytical Services - Minneapolis							
Mercury	ND	mg/L	0.00060	1	10/12/23 14:22	10/12/23 17:18	7439-97-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis							
Mercury	**0.031**	mg/kg	0.022	1	10/02/23 14:40	10/02/23 17:00	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**21.1**	%	0.10	1		10/05/23 15:43		N2
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3546 Pace Analytical Services - Minneapolis							
1-Methylnaphthalene	ND	ug/kg	12.5	1	09/27/23 12:51	10/03/23 16:39	90-12-0	
2-Methylnaphthalene	ND	ug/kg	12.5	1	09/27/23 12:51	10/03/23 16:39	91-57-6	
Benzo(a)anthracene	ND	ug/kg	12.5	1	09/27/23 12:51	10/03/23 16:39	56-55-3	
Benzo(a)pyrene	ND	ug/kg	12.5	1	09/27/23 12:51	10/03/23 16:39	50-32-8	
Benzo(b)fluoranthene	ND	ug/kg	12.5	1	09/27/23 12:51	10/03/23 16:39	205-99-2	
Benzo(k)fluoranthene	ND	ug/kg	12.5	1	09/27/23 12:51	10/03/23 16:39	207-08-9	
Chrysene	ND	ug/kg	12.5	1	09/27/23 12:51	10/03/23 16:39	218-01-9	
Dibenz(a,h)anthracene	ND	ug/kg	12.5	1	09/27/23 12:51	10/03/23 16:39	53-70-3	
Indeno(1,2,3-cd)pyrene	ND	ug/kg	12.5	1	09/27/23 12:51	10/03/23 16:39	193-39-5	
Naphthalene	ND	ug/kg	12.5	1	09/27/23 12:51	10/03/23 16:39	91-20-3	
Surrogates								
2-Fluorobiphenyl (S)	67	%.	54-125	1	09/27/23 12:51	10/03/23 16:39	321-60-8	
p-Terphenyl-d14 (S)	91	%.	60-125	1	09/27/23 12:51	10/03/23 16:39	1718-51-0	
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
Acetone	ND	mg/kg	0.0614	1	10/05/23 12:56	10/05/23 12:56	67-64-1	
Allyl chloride	ND	mg/kg	0.00614	1	10/05/23 12:56	10/05/23 12:56	107-05-1	
Benzene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	71-43-2	
Bromobenzene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	108-86-1	
Bromochloromethane	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	74-97-5	
Bromodichloromethane	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	75-27-4	
Bromoform	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	75-25-2	
Bromomethane	ND	mg/kg	0.00614	1	10/05/23 12:56	10/05/23 12:56	74-83-9	
n-Butylbenzene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	56-23-5	
Chlorobenzene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	108-90-7	
Dibromochloromethane	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	124-48-1	
Chloroethane	ND	mg/kg	0.00614	1	10/05/23 12:56	10/05/23 12:56	75-00-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: B-3-23, 7ft **Lab ID: 10669887003** Collected: 09/21/23 14:00 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
Chloroform	ND	mg/kg	0.00614	1	10/05/23 12:56	10/05/23 12:56	67-66-3	
Chloromethane	ND	mg/kg	0.00307	1	10/05/23 12:56	10/05/23 12:56	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	106-43-4	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	106-93-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.00614	1	10/05/23 12:56	10/05/23 12:56	96-12-8	
Dibromomethane	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.00614	1	10/05/23 12:56	10/05/23 12:56	75-71-8	
Dichlorofluoromethane	ND	mg/kg	0.00614	1	10/05/23 12:56	10/05/23 12:56	75-43-4	
1,1-Dichloroethane	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	156-60-5	
1,2-Dichloropropane	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	10061-01-5	
trans-1,3-Dichloropropene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	10061-02-6	
Ethylbenzene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	100-41-4	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	60-29-7	
Hexachloro-1,3-butadiene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	87-68-3	
n-Hexane	**0.0152**	mg/kg	0.0123	1	10/05/23 12:56	10/05/23 12:56	110-54-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	99-87-6	
2-Butanone (MEK)	ND	mg/kg	0.0123	1	10/05/23 12:56	10/05/23 12:56	78-93-3	
Methylene Chloride	ND	mg/kg	0.00614	1	10/05/23 12:56	10/05/23 12:56	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.0123	1	10/05/23 12:56	10/05/23 12:56	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	1634-04-4	
Naphthalene	ND	mg/kg	0.00614	1	10/05/23 12:56	10/05/23 12:56	91-20-3	
n-Propylbenzene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	103-65-1	
Styrene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	79-34-5	
Tetrachloroethene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	127-18-4	
Tetrahydrofuran	ND	mg/kg	0.00614	1	10/05/23 12:56	10/05/23 12:56	109-99-9	
Toluene	ND	mg/kg	0.00614	1	10/05/23 12:56	10/05/23 12:56	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	120-82-1	
1,2,4-Trimethylbenzene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	108-67-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: B-3-23, 7ft **Lab ID: 10669887003** Collected: 09/21/23 14:00 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
1,1,1-Trichloroethane	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	79-00-5	
Trichloroethene	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.00614	1	10/05/23 12:56	10/05/23 12:56	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	76-13-1	
1,2,3-Trichloropropane	ND	mg/kg	0.00307	1	10/05/23 12:56	10/05/23 12:56	96-18-4	
Vinyl chloride	ND	mg/kg	0.00123	1	10/05/23 12:56	10/05/23 12:56	75-01-4	
Xylene (Total)	ND	mg/kg	0.00368	1	10/05/23 12:56	10/05/23 12:56	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	110	%	70.0-130	1	10/05/23 12:56	10/05/23 12:56	17060-07-0	
Toluene-d8 (S)	97.9	%	75.0-131	1	10/05/23 12:56	10/05/23 12:56	2037-26-5	
4-Bromofluorobenzene (S)	101	%	67.0-138	1	10/05/23 12:56	10/05/23 12:56	460-00-4	
8260D MSV TCLP	Analytical Method: EPA 8260D Leachate Method/Date: EPA 1311; 10/03/23 14:32 Pace Analytical Services - Minneapolis							
Benzene	ND	ug/L	25.0	1		10/04/23 20:11	71-43-2	
Surrogates								
1,2-Dichlorobenzene-d4 (S)	99	%.	75-125	1		10/04/23 20:11	2199-69-1	
4-Bromofluorobenzene (S)	104	%.	75-125	1		10/04/23 20:11	460-00-4	
Toluene-d8 (S)	99	%.	75-125	1		10/04/23 20:11	2037-26-5	
Total Solids 2540 G-2011	Analytical Method: SM 2540G Preparation Method: SM 2540 G Pace National - Mt. Juliet							
Total Solids	**81.4**	%		1	10/02/23 13:47	10/02/23 13:53		
Wet Chemistry 3060A/7196A	Analytical Method: EPA 7196A Preparation Method: 3060A Pace National - Mt. Juliet							
Chromium, Hexavalent	ND	mg/kg	2.46	1	10/01/23 15:30	10/02/23 12:30		
Trivalent Chromium Calculation	Analytical Method: Trivalent Chromium Calculation Pace Analytical Services - Minneapolis							
Chromium, Trivalent	**37.9**	mg/kg	1.0	1		10/12/23 09:10		

Sample: B-4-23, 9ft **Lab ID: 10669887004** Collected: 09/20/23 14:40 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP, TCLP MICRO	Analytical Method: EPA 6010D Preparation Method: EPA 3015A Leachate Method/Date: EPA 1311; 10/11/23 16:17 Pace Analytical Services - Minneapolis							
Arsenic	ND	mg/L	0.20	1	10/12/23 14:33	10/13/23 10:52	7440-38-2	
Barium	**0.56**	mg/L	0.10	1	10/12/23 14:33	10/13/23 10:52	7440-39-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: B-4-23, 9ft **Lab ID: 10669887004** Collected: 09/20/23 14:40 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP, TCLP MICRO	Analytical Method: EPA 6010D Preparation Method: EPA 3015A Leachate Method/Date: EPA 1311; 10/11/23 16:17 Pace Analytical Services - Minneapolis							
Cadmium	ND	mg/L	0.030	1	10/12/23 14:33	10/13/23 10:52	7440-43-9	
Chromium	ND	mg/L	0.10	1	10/12/23 14:33	10/13/23 10:52	7440-47-3	
Lead	ND	mg/L	0.10	1	10/12/23 14:33	10/13/23 10:52	7439-92-1	
Selenium	ND	mg/L	0.20	1	10/12/23 14:33	10/13/23 10:52	7782-49-2	
Silver	ND	mg/L	0.10	1	10/12/23 14:33	10/13/23 10:52	7440-22-4	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**5.6**	mg/kg	0.59	1	09/27/23 15:53	09/29/23 12:38	7440-38-2	
Cadmium	ND	mg/kg	0.094	1	09/27/23 15:53	09/29/23 12:38	7440-43-9	
Chromium	**41.8**	mg/kg	2.3	1	09/27/23 15:53	09/29/23 12:38	7440-47-3	
Lead	**4.1**	mg/kg	0.59	1	09/27/23 15:53	09/29/23 12:38	7439-92-1	
Nickel	**31.1**	mg/kg	0.59	1	09/27/23 15:53	09/29/23 12:38	7440-02-0	
Zinc	**44.9**	mg/kg	5.9	1	09/27/23 15:53	09/29/23 12:38	7440-66-6	
7470A Mercury, TCLP	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Leachate Method/Date: EPA 1311; 10/11/23 16:17 Pace Analytical Services - Minneapolis							
Mercury	ND	mg/L	0.00060	1	10/12/23 14:22	10/12/23 17:19	7439-97-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis							
Mercury	**0.029**	mg/kg	0.023	1	10/02/23 14:40	10/02/23 17:02	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**19.2**	%	0.10	1		10/05/23 15:44		N2
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3546 Pace Analytical Services - Minneapolis							
1-Methylnaphthalene	ND	ug/kg	12.1	1	09/27/23 12:51	10/03/23 16:59	90-12-0	
2-Methylnaphthalene	ND	ug/kg	12.1	1	09/27/23 12:51	10/03/23 16:59	91-57-6	
Benzo(a)anthracene	ND	ug/kg	12.1	1	09/27/23 12:51	10/03/23 16:59	56-55-3	
Benzo(a)pyrene	ND	ug/kg	12.1	1	09/27/23 12:51	10/03/23 16:59	50-32-8	
Benzo(b)fluoranthene	ND	ug/kg	12.1	1	09/27/23 12:51	10/03/23 16:59	205-99-2	
Benzo(k)fluoranthene	ND	ug/kg	12.1	1	09/27/23 12:51	10/03/23 16:59	207-08-9	
Chrysene	ND	ug/kg	12.1	1	09/27/23 12:51	10/03/23 16:59	218-01-9	
Dibenz(a,h)anthracene	ND	ug/kg	12.1	1	09/27/23 12:51	10/03/23 16:59	53-70-3	
Indeno(1,2,3-cd)pyrene	ND	ug/kg	12.1	1	09/27/23 12:51	10/03/23 16:59	193-39-5	
Naphthalene	ND	ug/kg	12.1	1	09/27/23 12:51	10/03/23 16:59	91-20-3	
Surrogates								
2-Fluorobiphenyl (S)	66	%.	54-125	1	09/27/23 12:51	10/03/23 16:59	321-60-8	
p-Terphenyl-d14 (S)	99	%.	60-125	1	09/27/23 12:51	10/03/23 16:59	1718-51-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: B-4-23, 9ft **Lab ID: 10669887004** Collected: 09/20/23 14:40 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
Acetone	ND	mg/kg	0.0606	1	10/04/23 23:55	10/04/23 23:55	67-64-1	
Allyl chloride	ND	mg/kg	0.00606	1	10/04/23 23:55	10/04/23 23:55	107-05-1	
Benzene	**0.00159**	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	71-43-2	
Bromobenzene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	108-86-1	
Bromochloromethane	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	74-97-5	
Bromodichloromethane	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	75-27-4	
Bromoform	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	75-25-2	
Bromomethane	ND	mg/kg	0.00606	1	10/04/23 23:55	10/04/23 23:55	74-83-9	
n-Butylbenzene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	56-23-5	
Chlorobenzene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	108-90-7	
Dibromochloromethane	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	124-48-1	
Chloroethane	ND	mg/kg	0.00606	1	10/04/23 23:55	10/04/23 23:55	75-00-3	
Chloroform	ND	mg/kg	0.00606	1	10/04/23 23:55	10/04/23 23:55	67-66-3	
Chloromethane	ND	mg/kg	0.00303	1	10/04/23 23:55	10/04/23 23:55	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	106-43-4	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	106-93-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.00606	1	10/04/23 23:55	10/04/23 23:55	96-12-8	
Dibromomethane	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.00606	1	10/04/23 23:55	10/04/23 23:55	75-71-8	
Dichlorofluoromethane	ND	mg/kg	0.00606	1	10/04/23 23:55	10/04/23 23:55	75-43-4	
1,1-Dichloroethane	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	156-60-5	
1,2-Dichloropropane	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	10061-01-5	
trans-1,3-Dichloropropene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	10061-02-6	
Ethylbenzene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	100-41-4	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	60-29-7	
Hexachloro-1,3-butadiene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	87-68-3	
n-Hexane	ND	mg/kg	0.0121	1	10/04/23 23:55	10/04/23 23:55	110-54-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	99-87-6	
2-Butanone (MEK)	ND	mg/kg	0.0121	1	10/04/23 23:55	10/04/23 23:55	78-93-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: B-4-23, 9ft **Lab ID: 10669887004** Collected: 09/20/23 14:40 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
Methylene Chloride	ND	mg/kg	0.00606	1	10/04/23 23:55	10/04/23 23:55	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.0121	1	10/04/23 23:55	10/04/23 23:55	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	1634-04-4	
Naphthalene	ND	mg/kg	0.00606	1	10/04/23 23:55	10/04/23 23:55	91-20-3	
n-Propylbenzene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	103-65-1	
Styrene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	79-34-5	
Tetrachloroethene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	127-18-4	
Tetrahydrofuran	ND	mg/kg	0.00606	1	10/04/23 23:55	10/04/23 23:55	109-99-9	
Toluene	ND	mg/kg	0.00606	1	10/04/23 23:55	10/04/23 23:55	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	120-82-1	
1,2,4-Trimethylbenzene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	108-67-8	
1,1,1-Trichloroethane	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	79-00-5	
Trichloroethene	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.00606	1	10/04/23 23:55	10/04/23 23:55	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	76-13-1	
1,2,3-Trichloropropane	ND	mg/kg	0.00303	1	10/04/23 23:55	10/04/23 23:55	96-18-4	
Vinyl chloride	ND	mg/kg	0.00121	1	10/04/23 23:55	10/04/23 23:55	75-01-4	
Xylene (Total)	ND	mg/kg	0.00364	1	10/06/23 01:04	10/06/23 01:04	1330-20-7	H1
Surrogates								
1,2-Dichloroethane-d4 (S)	115	%	70.0-130	1	10/04/23 23:55	10/04/23 23:55	17060-07-0	
1,2-Dichloroethane-d4 (S)	117	%	70.0-130	1	10/06/23 01:04	10/06/23 01:04	17060-07-0	
Toluene-d8 (S)	97.0	%	75.0-131	1	10/04/23 23:55	10/04/23 23:55	2037-26-5	
Toluene-d8 (S)	98.3	%	75.0-131	1	10/06/23 01:04	10/06/23 01:04	2037-26-5	
4-Bromofluorobenzene (S)	101	%	67.0-138	1	10/04/23 23:55	10/04/23 23:55	460-00-4	
4-Bromofluorobenzene (S)	98.6	%	67.0-138	1	10/06/23 01:04	10/06/23 01:04	460-00-4	
8260D MSV TCLP	Analytical Method: EPA 8260D Leachate Method/Date: EPA 1311; 10/03/23 14:32 Pace Analytical Services - Minneapolis							
Benzene	ND	ug/L	25.0	1		10/04/23 20:27	71-43-2	
Surrogates								
1,2-Dichlorobenzene-d4 (S)	98	%.	75-125	1		10/04/23 20:27	2199-69-1	
4-Bromofluorobenzene (S)	104	%.	75-125	1		10/04/23 20:27	460-00-4	
Toluene-d8 (S)	98	%.	75-125	1		10/04/23 20:27	2037-26-5	
Total Solids 2540 G-2011	Analytical Method: SM 2540G Preparation Method: SM 2540 G Pace National - Mt. Juliet							
Total Solids	**82.5**	%		1	10/02/23 13:47	10/02/23 13:53		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: B-4-23, 9ft **Lab ID: 10669887004** Collected: 09/20/23 14:40 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Wet Chemistry 3060A/7196A	Analytical Method: EPA 7196A Preparation Method: 3060A Pace National - Mt. Juliet							
Chromium, Hexavalent	ND	mg/kg	2.42	1	10/01/23 15:30	10/02/23 12:30		
Trivalent Chromium Calculation	Analytical Method: Trivalent Chromium Calculation Pace Analytical Services - Minneapolis							
Chromium, Trivalent	**41.8**	mg/kg	1.0	1		10/12/23 09:10		

Sample: B-5-23, 8.5ft **Lab ID: 10669887005** Collected: 09/21/23 09:00 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP, TCLP MICRO	Analytical Method: EPA 6010D Preparation Method: EPA 3015A Leachate Method/Date: EPA 1311; 10/11/23 16:17 Pace Analytical Services - Minneapolis							
Arsenic	ND	mg/L	0.20	1	10/12/23 14:33	10/13/23 10:57	7440-38-2	
Barium	**0.39**	mg/L	0.10	1	10/12/23 14:33	10/13/23 10:57	7440-39-3	
Cadmium	ND	mg/L	0.030	1	10/12/23 14:33	10/13/23 10:57	7440-43-9	
Chromium	ND	mg/L	0.10	1	10/12/23 14:33	10/13/23 10:57	7440-47-3	
Lead	ND	mg/L	0.10	1	10/12/23 14:33	10/13/23 10:57	7439-92-1	
Selenium	ND	mg/L	0.20	1	10/12/23 14:33	10/13/23 10:57	7782-49-2	
Silver	ND	mg/L	0.10	1	10/12/23 14:33	10/13/23 10:57	7440-22-4	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**4.9**	mg/kg	0.56	1	09/27/23 15:53	09/29/23 12:51	7440-38-2	
Cadmium	**0.13**	mg/kg	0.090	1	09/27/23 15:53	09/29/23 12:51	7440-43-9	
Chromium	**39.1**	mg/kg	2.2	1	09/27/23 15:53	09/29/23 12:51	7440-47-3	
Lead	**7.4**	mg/kg	0.56	1	09/27/23 15:53	09/29/23 12:51	7439-92-1	
Nickel	**38.9**	mg/kg	0.56	1	09/27/23 15:53	09/29/23 12:51	7440-02-0	
Zinc	**56.5**	mg/kg	5.6	1	09/27/23 15:53	09/29/23 12:51	7440-66-6	
7470A Mercury, TCLP	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Leachate Method/Date: EPA 1311; 10/11/23 16:17 Pace Analytical Services - Minneapolis							
Mercury	ND	mg/L	0.00060	1	10/12/23 14:22	10/12/23 17:24	7439-97-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis							
Mercury	**0.031**	mg/kg	0.024	1	10/02/23 14:40	10/02/23 17:04	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**18.0**	%	0.10	1		10/05/23 15:44		N2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: B-5-23, 8.5ft **Lab ID: 10669887005** Collected: 09/21/23 09:00 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3546 Pace Analytical Services - Minneapolis							
1-Methylnaphthalene	ND	ug/kg	12.1	1	09/27/23 12:51	10/03/23 17:18	90-12-0	
2-Methylnaphthalene	**12.5**	ug/kg	12.1	1	09/27/23 12:51	10/03/23 17:18	91-57-6	
Benzo(a)anthracene	ND	ug/kg	12.1	1	09/27/23 12:51	10/03/23 17:18	56-55-3	
Benzo(a)pyrene	ND	ug/kg	12.1	1	09/27/23 12:51	10/03/23 17:18	50-32-8	
Benzo(b)fluoranthene	ND	ug/kg	12.1	1	09/27/23 12:51	10/03/23 17:18	205-99-2	
Benzo(k)fluoranthene	ND	ug/kg	12.1	1	09/27/23 12:51	10/03/23 17:18	207-08-9	
Chrysene	ND	ug/kg	12.1	1	09/27/23 12:51	10/03/23 17:18	218-01-9	
Dibenz(a,h)anthracene	ND	ug/kg	12.1	1	09/27/23 12:51	10/03/23 17:18	53-70-3	
Indeno(1,2,3-cd)pyrene	ND	ug/kg	12.1	1	09/27/23 12:51	10/03/23 17:18	193-39-5	
Naphthalene	**21.4**	ug/kg	12.1	1	09/27/23 12:51	10/03/23 17:18	91-20-3	
Surrogates								
2-Fluorobiphenyl (S)	62	%.	54-125	1	09/27/23 12:51	10/03/23 17:18	321-60-8	
p-Terphenyl-d14 (S)	91	%.	60-125	1	09/27/23 12:51	10/03/23 17:18	1718-51-0	
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
Acetone	ND	mg/kg	0.0597	1	10/05/23 13:19	10/05/23 13:19	67-64-1	
Allyl chloride	ND	mg/kg	0.00597	1	10/05/23 13:19	10/05/23 13:19	107-05-1	
Benzene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	71-43-2	
Bromobenzene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	108-86-1	
Bromochloromethane	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	74-97-5	
Bromodichloromethane	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	75-27-4	
Bromoform	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	75-25-2	
Bromomethane	ND	mg/kg	0.00597	1	10/05/23 13:19	10/05/23 13:19	74-83-9	
n-Butylbenzene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	104-51-8	
sec-Butylbenzene	**0.00134**	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	56-23-5	
Chlorobenzene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	108-90-7	
Dibromochloromethane	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	124-48-1	
Chloroethane	ND	mg/kg	0.00597	1	10/05/23 13:19	10/05/23 13:19	75-00-3	
Chloroform	ND	mg/kg	0.00597	1	10/05/23 13:19	10/05/23 13:19	67-66-3	
Chloromethane	ND	mg/kg	0.00299	1	10/05/23 13:19	10/05/23 13:19	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	106-43-4	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	106-93-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.00597	1	10/05/23 13:19	10/05/23 13:19	96-12-8	
Dibromomethane	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.00597	1	10/05/23 13:19	10/05/23 13:19	75-71-8	
Dichlorofluoromethane	ND	mg/kg	0.00597	1	10/05/23 13:19	10/05/23 13:19	75-43-4	
1,1-Dichloroethane	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	107-06-2	

Pace Analytical Services, LLC
1700 Elm Street
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ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: B-5-23, 8.5ft **Lab ID: 10669887005** Collected: 09/21/23 09:00 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
1,1-Dichloroethene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	156-60-5	
1,2-Dichloropropane	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	10061-01-5	
trans-1,3-Dichloropropene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	10061-02-6	
Ethylbenzene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	100-41-4	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	60-29-7	
Hexachloro-1,3-butadiene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	87-68-3	
n-Hexane	ND	mg/kg	0.0119	1	10/05/23 13:19	10/05/23 13:19	110-54-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	99-87-6	
2-Butanone (MEK)	ND	mg/kg	0.0119	1	10/05/23 13:19	10/05/23 13:19	78-93-3	
Methylene Chloride	ND	mg/kg	0.00597	1	10/05/23 13:19	10/05/23 13:19	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.0119	1	10/05/23 13:19	10/05/23 13:19	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	1634-04-4	
Naphthalene	ND	mg/kg	0.00597	1	10/05/23 13:19	10/05/23 13:19	91-20-3	
n-Propylbenzene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	103-65-1	
Styrene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	79-34-5	
Tetrachloroethene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	127-18-4	
Tetrahydrofuran	ND	mg/kg	0.00597	1	10/05/23 13:19	10/05/23 13:19	109-99-9	
Toluene	ND	mg/kg	0.00597	1	10/05/23 13:19	10/05/23 13:19	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	120-82-1	
1,2,4-Trimethylbenzene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	108-67-8	
1,1,1-Trichloroethane	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	79-00-5	
Trichloroethene	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.00597	1	10/05/23 13:19	10/05/23 13:19	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	76-13-1	
1,2,3-Trichloropropane	ND	mg/kg	0.00299	1	10/05/23 13:19	10/05/23 13:19	96-18-4	
Vinyl chloride	ND	mg/kg	0.00119	1	10/05/23 13:19	10/05/23 13:19	75-01-4	
Xylene (Total)	ND	mg/kg	0.00358	1	10/05/23 13:19	10/05/23 13:19	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	83.3	%	70.0-130	1	10/05/23 13:19	10/05/23 13:19	17060-07-0	
Toluene-d8 (S)	79.8	%	75.0-131	1	10/05/23 13:19	10/05/23 13:19	2037-26-5	
4-Bromofluorobenzene (S)	120	%	67.0-138	1	10/05/23 13:19	10/05/23 13:19	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: B-5-23, 8.5ft **Lab ID: 10669887005** Collected: 09/21/23 09:00 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260D MSV TCLP	Analytical Method: EPA 8260D Leachate Method/Date: EPA 1311; 10/03/23 14:32 Pace Analytical Services - Minneapolis							
Benzene	ND	ug/L	25.0	1		10/04/23 20:43	71-43-2	
Surrogates								
1,2-Dichlorobenzene-d4 (S)	99	%.	75-125	1		10/04/23 20:43	2199-69-1	
4-Bromofluorobenzene (S)	105	%.	75-125	1		10/04/23 20:43	460-00-4	
Toluene-d8 (S)	99	%.	75-125	1		10/04/23 20:43	2037-26-5	
Total Solids 2540 G-2011	Analytical Method: SM 2540G Preparation Method: SM 2540 G Pace National - Mt. Juliet							
Total Solids	**83.7**	%		1	10/02/23 13:47	10/02/23 13:53		
Wet Chemistry 3060A/7196A	Analytical Method: EPA 7196A Preparation Method: 3060A Pace National - Mt. Juliet							
Chromium, Hexavalent	ND	mg/kg	2.39	1	10/01/23 15:30	10/02/23 12:30		
Trivalent Chromium Calculation	Analytical Method: Trivalent Chromium Calculation Pace Analytical Services - Minneapolis							
Chromium, Trivalent	**39.1**	mg/kg	1.0	1		10/12/23 09:10		

Sample: B-6-23, 4.5ft **Lab ID: 10669887006** Collected: 09/21/23 10:30 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP, TCLP MICRO	Analytical Method: EPA 6010D Preparation Method: EPA 3015A Leachate Method/Date: EPA 1311; 10/11/23 16:17 Pace Analytical Services - Minneapolis							
Arsenic	ND	mg/L	0.20	1	10/12/23 14:33	10/13/23 10:59	7440-38-2	
Barium	**0.18**	mg/L	0.10	1	10/12/23 14:33	10/13/23 10:59	7440-39-3	
Cadmium	ND	mg/L	0.030	1	10/12/23 14:33	10/13/23 10:59	7440-43-9	
Chromium	ND	mg/L	0.10	1	10/12/23 14:33	10/13/23 10:59	7440-47-3	
Lead	ND	mg/L	0.10	1	10/12/23 14:33	10/13/23 10:59	7439-92-1	
Selenium	ND	mg/L	0.20	1	10/12/23 14:33	10/13/23 10:59	7782-49-2	
Silver	ND	mg/L	0.10	1	10/12/23 14:33	10/13/23 10:59	7440-22-4	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.6**	mg/kg	0.54	1	09/27/23 15:53	09/29/23 12:58	7440-38-2	
Cadmium	ND	mg/kg	0.087	1	09/27/23 15:53	09/29/23 12:58	7440-43-9	
Chromium	**15.2**	mg/kg	2.2	1	09/27/23 15:53	09/29/23 12:58	7440-47-3	
Lead	**1.3**	mg/kg	0.54	1	09/27/23 15:53	09/29/23 12:58	7439-92-1	
Nickel	**16.5**	mg/kg	0.54	1	09/27/23 15:53	10/02/23 14:24	7440-02-0	
Zinc	**24.0**	mg/kg	5.4	1	09/27/23 15:53	09/29/23 12:58	7440-66-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: B-6-23, 4.5ft **Lab ID: 10669887006** Collected: 09/21/23 10:30 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
7470A Mercury, TCLP	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Leachate Method/Date: EPA 1311; 10/11/23 16:17 Pace Analytical Services - Minneapolis							
Mercury	ND	mg/L	0.00060	1	10/12/23 14:22	10/12/23 17:25	7439-97-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis							
Mercury	ND	mg/kg	0.021	1	10/02/23 14:40	10/02/23 17:05	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**15.1**	%	0.10	1		10/05/23 15:44		N2
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3546 Pace Analytical Services - Minneapolis							
1-Methylnaphthalene	ND	ug/kg	11.5	1	09/27/23 12:51	10/03/23 17:37	90-12-0	
2-Methylnaphthalene	ND	ug/kg	11.5	1	09/27/23 12:51	10/03/23 17:37	91-57-6	
Benzo(a)anthracene	ND	ug/kg	11.5	1	09/27/23 12:51	10/03/23 17:37	56-55-3	
Benzo(a)pyrene	ND	ug/kg	11.5	1	09/27/23 12:51	10/03/23 17:37	50-32-8	
Benzo(b)fluoranthene	ND	ug/kg	11.5	1	09/27/23 12:51	10/03/23 17:37	205-99-2	
Benzo(k)fluoranthene	ND	ug/kg	11.5	1	09/27/23 12:51	10/03/23 17:37	207-08-9	
Chrysene	**24.9**	ug/kg	11.5	1	09/27/23 12:51	10/03/23 17:37	218-01-9	
Dibenz(a,h)anthracene	ND	ug/kg	11.5	1	09/27/23 12:51	10/03/23 17:37	53-70-3	
Indeno(1,2,3-cd)pyrene	ND	ug/kg	11.5	1	09/27/23 12:51	10/03/23 17:37	193-39-5	
Naphthalene	ND	ug/kg	11.5	1	09/27/23 12:51	10/03/23 17:37	91-20-3	
Surrogates								
2-Fluorobiphenyl (S)	78	%.	54-125	1	09/27/23 12:51	10/03/23 17:37	321-60-8	
p-Terphenyl-d14 (S)	101	%.	60-125	1	09/27/23 12:51	10/03/23 17:37	1718-51-0	
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
Acetone	ND	mg/kg	0.0608	1	10/05/23 13:41	10/05/23 13:41	67-64-1	
Allyl chloride	ND	mg/kg	0.00608	1	10/05/23 13:41	10/05/23 13:41	107-05-1	
Benzene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	71-43-2	
Bromobenzene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	108-86-1	
Bromochloromethane	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	74-97-5	
Bromodichloromethane	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	75-27-4	
Bromoform	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	75-25-2	
Bromomethane	ND	mg/kg	0.00608	1	10/05/23 13:41	10/05/23 13:41	74-83-9	
n-Butylbenzene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	56-23-5	
Chlorobenzene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	108-90-7	
Dibromochloromethane	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	124-48-1	
Chloroethane	ND	mg/kg	0.00608	1	10/05/23 13:41	10/05/23 13:41	75-00-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: B-6-23, 4.5ft **Lab ID: 10669887006** Collected: 09/21/23 10:30 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
Chloroform	ND	mg/kg	0.00608	1	10/05/23 13:41	10/05/23 13:41	67-66-3	
Chloromethane	ND	mg/kg	0.00304	1	10/05/23 13:41	10/05/23 13:41	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	106-43-4	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	106-93-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.00608	1	10/05/23 13:41	10/05/23 13:41	96-12-8	
Dibromomethane	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.00608	1	10/05/23 13:41	10/05/23 13:41	75-71-8	
Dichlorofluoromethane	ND	mg/kg	0.00608	1	10/05/23 13:41	10/05/23 13:41	75-43-4	
1,1-Dichloroethane	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	156-60-5	
1,2-Dichloropropane	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	10061-01-5	
trans-1,3-Dichloropropene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	10061-02-6	
Ethylbenzene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	100-41-4	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	60-29-7	
Hexachloro-1,3-butadiene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	87-68-3	
n-Hexane	ND	mg/kg	0.0122	1	10/05/23 13:41	10/05/23 13:41	110-54-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	99-87-6	
2-Butanone (MEK)	ND	mg/kg	0.0122	1	10/05/23 13:41	10/05/23 13:41	78-93-3	
Methylene Chloride	ND	mg/kg	0.00608	1	10/05/23 13:41	10/05/23 13:41	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.0122	1	10/05/23 13:41	10/05/23 13:41	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	1634-04-4	
Naphthalene	ND	mg/kg	0.00608	1	10/05/23 13:41	10/05/23 13:41	91-20-3	
n-Propylbenzene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	103-65-1	
Styrene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	79-34-5	
Tetrachloroethene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	127-18-4	
Tetrahydrofuran	ND	mg/kg	0.00608	1	10/05/23 13:41	10/05/23 13:41	109-99-9	
Toluene	ND	mg/kg	0.00608	1	10/05/23 13:41	10/05/23 13:41	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	120-82-1	
1,2,4-Trimethylbenzene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	108-67-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: B-6-23, 4.5ft **Lab ID: 10669887006** Collected: 09/21/23 10:30 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
1,1,1-Trichloroethane	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	79-00-5	
Trichloroethene	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.00608	1	10/05/23 13:41	10/05/23 13:41	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	76-13-1	
1,2,3-Trichloropropane	ND	mg/kg	0.00304	1	10/05/23 13:41	10/05/23 13:41	96-18-4	
Vinyl chloride	ND	mg/kg	0.00122	1	10/05/23 13:41	10/05/23 13:41	75-01-4	
Xylene (Total)	ND	mg/kg	0.00365	1	10/05/23 13:41	10/05/23 13:41	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	108	%	70.0-130	1	10/05/23 13:41	10/05/23 13:41	17060-07-0	
Toluene-d8 (S)	102	%	75.0-131	1	10/05/23 13:41	10/05/23 13:41	2037-26-5	
4-Bromofluorobenzene (S)	100	%	67.0-138	1	10/05/23 13:41	10/05/23 13:41	460-00-4	
8260D MSV TCLP	Analytical Method: EPA 8260D Leachate Method/Date: EPA 1311; 10/03/23 14:32 Pace Analytical Services - Minneapolis							
Benzene	ND	ug/L	25.0	1		10/04/23 20:59	71-43-2	
Surrogates								
1,2-Dichlorobenzene-d4 (S)	100	%.	75-125	1		10/04/23 20:59	2199-69-1	
4-Bromofluorobenzene (S)	103	%.	75-125	1		10/04/23 20:59	460-00-4	
Toluene-d8 (S)	98	%.	75-125	1		10/04/23 20:59	2037-26-5	
Total Solids 2540 G-2011	Analytical Method: SM 2540G Preparation Method: SM 2540 G Pace National - Mt. Juliet							
Total Solids	**82.2**	%		1	10/02/23 13:29	10/02/23 13:36		
Wet Chemistry 3060A/7196A	Analytical Method: EPA 7196A Preparation Method: 3060A Pace National - Mt. Juliet							
Chromium, Hexavalent	ND	mg/kg	2.43	1	10/01/23 15:30	10/02/23 12:31		
Trivalent Chromium Calculation	Analytical Method: Trivalent Chromium Calculation Pace Analytical Services - Minneapolis							
Chromium, Trivalent	**15.2**	mg/kg	1.0	1		10/12/23 09:10		

Sample: B-7-23, 4ft **Lab ID: 10669887007** Collected: 09/21/23 11:30 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP, TCLP MICRO	Analytical Method: EPA 6010D Preparation Method: EPA 3015A Leachate Method/Date: EPA 1311; 10/11/23 16:17 Pace Analytical Services - Minneapolis							
Arsenic	ND	mg/L	0.20	1	10/12/23 14:33	10/13/23 11:00	7440-38-2	
Barium	**0.25**	mg/L	0.10	1	10/12/23 14:33	10/13/23 11:00	7440-39-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: B-7-23, 4ft **Lab ID: 10669887007** Collected: 09/21/23 11:30 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP, TCLP MICRO	Analytical Method: EPA 6010D Preparation Method: EPA 3015A Leachate Method/Date: EPA 1311; 10/11/23 16:17 Pace Analytical Services - Minneapolis							
Cadmium	ND	mg/L	0.030	1	10/12/23 14:33	10/13/23 11:00	7440-43-9	
Chromium	ND	mg/L	0.10	1	10/12/23 14:33	10/13/23 11:00	7440-47-3	
Lead	ND	mg/L	0.10	1	10/12/23 14:33	10/13/23 11:00	7439-92-1	
Selenium	ND	mg/L	0.20	1	10/12/23 14:33	10/13/23 11:00	7782-49-2	
Silver	ND	mg/L	0.10	1	10/12/23 14:33	10/13/23 11:00	7440-22-4	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**3.4**	mg/kg	0.59	1	09/27/23 15:53	09/29/23 13:04	7440-38-2	
Cadmium	ND	mg/kg	0.094	1	09/27/23 15:53	09/29/23 13:04	7440-43-9	
Chromium	**26.5**	mg/kg	2.4	1	09/27/23 15:53	09/29/23 13:04	7440-47-3	
Lead	**2.6**	mg/kg	0.59	1	09/27/23 15:53	09/29/23 13:04	7439-92-1	
Nickel	**25.2**	mg/kg	0.59	1	09/27/23 15:53	09/29/23 13:04	7440-02-0	
Zinc	**37.2**	mg/kg	5.9	1	09/27/23 15:53	09/29/23 13:04	7440-66-6	
7470A Mercury, TCLP	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Leachate Method/Date: EPA 1311; 10/11/23 16:17 Pace Analytical Services - Minneapolis							
Mercury	ND	mg/L	0.00060	1	10/12/23 14:22	10/12/23 17:26	7439-97-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis							
Mercury	ND	mg/kg	0.023	1	10/02/23 14:40	10/02/23 17:07	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**19.8**	%	0.10	1		10/05/23 15:44		N2
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3546 Pace Analytical Services - Minneapolis							
1-Methylnaphthalene	ND	ug/kg	12.3	1	09/27/23 12:51	10/03/23 17:57	90-12-0	
2-Methylnaphthalene	ND	ug/kg	12.3	1	09/27/23 12:51	10/03/23 17:57	91-57-6	
Benzo(a)anthracene	ND	ug/kg	12.3	1	09/27/23 12:51	10/03/23 17:57	56-55-3	
Benzo(a)pyrene	ND	ug/kg	12.3	1	09/27/23 12:51	10/03/23 17:57	50-32-8	
Benzo(b)fluoranthene	ND	ug/kg	12.3	1	09/27/23 12:51	10/03/23 17:57	205-99-2	
Benzo(k)fluoranthene	ND	ug/kg	12.3	1	09/27/23 12:51	10/03/23 17:57	207-08-9	
Chrysene	ND	ug/kg	12.3	1	09/27/23 12:51	10/03/23 17:57	218-01-9	
Dibenz(a,h)anthracene	ND	ug/kg	12.3	1	09/27/23 12:51	10/03/23 17:57	53-70-3	
Indeno(1,2,3-cd)pyrene	ND	ug/kg	12.3	1	09/27/23 12:51	10/03/23 17:57	193-39-5	
Naphthalene	ND	ug/kg	12.3	1	09/27/23 12:51	10/03/23 17:57	91-20-3	
Surrogates								
2-Fluorobiphenyl (S)	64	%.	54-125	1	09/27/23 12:51	10/03/23 17:57	321-60-8	
p-Terphenyl-d14 (S)	100	%.	60-125	1	09/27/23 12:51	10/03/23 17:57	1718-51-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
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ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: B-7-23, 4ft **Lab ID: 10669887007** Collected: 09/21/23 11:30 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
Acetone	ND	mg/kg	0.0595	1	10/05/23 14:03	10/05/23 14:03	67-64-1	
Allyl chloride	ND	mg/kg	0.00595	1	10/05/23 14:03	10/05/23 14:03	107-05-1	
Benzene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	71-43-2	
Bromobenzene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	108-86-1	
Bromochloromethane	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	74-97-5	
Bromodichloromethane	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	75-27-4	
Bromoform	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	75-25-2	
Bromomethane	ND	mg/kg	0.00595	1	10/05/23 14:03	10/05/23 14:03	74-83-9	
n-Butylbenzene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	56-23-5	
Chlorobenzene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	108-90-7	
Dibromochloromethane	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	124-48-1	
Chloroethane	ND	mg/kg	0.00595	1	10/05/23 14:03	10/05/23 14:03	75-00-3	
Chloroform	ND	mg/kg	0.00595	1	10/05/23 14:03	10/05/23 14:03	67-66-3	
Chloromethane	ND	mg/kg	0.00298	1	10/05/23 14:03	10/05/23 14:03	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	106-43-4	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	106-93-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.00595	1	10/05/23 14:03	10/05/23 14:03	96-12-8	
Dibromomethane	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.00595	1	10/05/23 14:03	10/05/23 14:03	75-71-8	
Dichlorofluoromethane	ND	mg/kg	0.00595	1	10/05/23 14:03	10/05/23 14:03	75-43-4	
1,1-Dichloroethane	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	156-60-5	
1,2-Dichloropropane	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	10061-01-5	
trans-1,3-Dichloropropene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	10061-02-6	
Ethylbenzene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	100-41-4	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	60-29-7	
Hexachloro-1,3-butadiene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	87-68-3	
n-Hexane	ND	mg/kg	0.0119	1	10/05/23 14:03	10/05/23 14:03	110-54-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	99-87-6	
2-Butanone (MEK)	ND	mg/kg	0.0119	1	10/05/23 14:03	10/05/23 14:03	78-93-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: B-7-23, 4ft **Lab ID: 10669887007** Collected: 09/21/23 11:30 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
Methylene Chloride	ND	mg/kg	0.00595	1	10/05/23 14:03	10/05/23 14:03	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.0119	1	10/05/23 14:03	10/05/23 14:03	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	1634-04-4	
Naphthalene	ND	mg/kg	0.00595	1	10/05/23 14:03	10/05/23 14:03	91-20-3	
n-Propylbenzene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	103-65-1	
Styrene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	79-34-5	
Tetrachloroethene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	127-18-4	
Tetrahydrofuran	ND	mg/kg	0.00595	1	10/05/23 14:03	10/05/23 14:03	109-99-9	
Toluene	ND	mg/kg	0.00595	1	10/05/23 14:03	10/05/23 14:03	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	120-82-1	
1,2,4-Trimethylbenzene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	108-67-8	
1,1,1-Trichloroethane	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	79-00-5	
Trichloroethene	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.00595	1	10/05/23 14:03	10/05/23 14:03	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	76-13-1	
1,2,3-Trichloropropane	ND	mg/kg	0.00298	1	10/05/23 14:03	10/05/23 14:03	96-18-4	
Vinyl chloride	ND	mg/kg	0.00119	1	10/05/23 14:03	10/05/23 14:03	75-01-4	
Xylene (Total)	ND	mg/kg	0.00357	1	10/05/23 14:03	10/05/23 14:03	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	111	%	70.0-130	1	10/05/23 14:03	10/05/23 14:03	17060-07-0	
Toluene-d8 (S)	99.2	%	75.0-131	1	10/05/23 14:03	10/05/23 14:03	2037-26-5	
4-Bromofluorobenzene (S)	102	%	67.0-138	1	10/05/23 14:03	10/05/23 14:03	460-00-4	
8260D MSV TCLP	Analytical Method: EPA 8260D Leachate Method/Date: EPA 1311; 10/03/23 14:32 Pace Analytical Services - Minneapolis							
Benzene	ND	ug/L	25.0	1		10/04/23 21:15	71-43-2	
Surrogates								
1,2-Dichlorobenzene-d4 (S)	99	%.	75-125	1		10/04/23 21:15	2199-69-1	
4-Bromofluorobenzene (S)	104	%.	75-125	1		10/04/23 21:15	460-00-4	
Toluene-d8 (S)	98	%.	75-125	1		10/04/23 21:15	2037-26-5	
Total Solids 2540 G-2011	Analytical Method: SM 2540G Preparation Method: SM 2540 G Pace National - Mt. Juliet							
Total Solids	**84.0**	%		1	10/02/23 13:29	10/02/23 13:36		
Wet Chemistry 3060A/7196A	Analytical Method: EPA 7196A Preparation Method: 3060A Pace National - Mt. Juliet							
Chromium, Hexavalent	ND	mg/kg	2.38	1	10/01/23 15:30	10/02/23 12:31		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: B-7-23, 4ft **Lab ID: 10669887007** Collected: 09/21/23 11:30 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Trivalent Chromium Calculation	Analytical Method: Trivalent Chromium Calculation Pace Analytical Services - Minneapolis							
Chromium, Trivalent	**26.5**	mg/kg	1.0	1		10/12/23 09:10		

Sample: Trip Blank **Lab ID: 10669887008** Collected: 09/20/23 00:00 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
Acetone	ND	mg/kg	1.25	25	10/04/23 18:42	10/04/23 18:42	67-64-1	
Allyl chloride	ND	mg/kg	0.125	25	10/04/23 18:42	10/04/23 18:42	107-05-1	
Benzene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	71-43-2	
Bromobenzene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	108-86-1	
Bromochloromethane	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	74-97-5	
Bromodichloromethane	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	75-27-4	
Bromoform	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	75-25-2	
Bromomethane	ND	mg/kg	0.125	25	10/04/23 18:42	10/04/23 18:42	74-83-9	
n-Butylbenzene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	56-23-5	
Chlorobenzene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	108-90-7	
Dibromochloromethane	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	124-48-1	
Chloroethane	ND	mg/kg	0.125	25	10/04/23 18:42	10/04/23 18:42	75-00-3	
Chloroform	ND	mg/kg	0.125	25	10/04/23 18:42	10/04/23 18:42	67-66-3	
Chloromethane	ND	mg/kg	0.0625	25	10/04/23 18:42	10/04/23 18:42	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	106-43-4	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	106-93-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.125	25	10/04/23 18:42	10/04/23 18:42	96-12-8	
Dibromomethane	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.125	25	10/04/23 18:42	10/04/23 18:42	75-71-8	
Dichlorofluoromethane	ND	mg/kg	0.125	25	10/04/23 18:42	10/04/23 18:42	75-43-4	
1,1-Dichloroethane	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	156-60-5	
1,2-Dichloropropane	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	594-20-7	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Sample: Trip Blank **Lab ID: 10669887008** Collected: 09/20/23 00:00 Received: 09/23/23 09:40 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
1,1-Dichloropropene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	10061-01-5	
trans-1,3-Dichloropropene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	10061-02-6	
Ethylbenzene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	100-41-4	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	60-29-7	
Hexachloro-1,3-butadiene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	87-68-3	
n-Hexane	ND	mg/kg	0.250	25	10/04/23 18:42	10/04/23 18:42	110-54-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	99-87-6	
2-Butanone (MEK)	ND	mg/kg	0.250	25	10/04/23 18:42	10/04/23 18:42	78-93-3	
Methylene Chloride	ND	mg/kg	0.125	25	10/04/23 18:42	10/04/23 18:42	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.250	25	10/04/23 18:42	10/04/23 18:42	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	1634-04-4	
Naphthalene	ND	mg/kg	0.125	25	10/04/23 18:42	10/04/23 18:42	91-20-3	
n-Propylbenzene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	103-65-1	
Styrene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	79-34-5	
Tetrachloroethene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	127-18-4	
Tetrahydrofuran	ND	mg/kg	0.125	25	10/04/23 18:42	10/04/23 18:42	109-99-9	
Toluene	ND	mg/kg	0.125	25	10/04/23 18:42	10/04/23 18:42	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	120-82-1	
1,2,4-Trimethylbenzene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	108-67-8	
1,1,1-Trichloroethane	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	79-00-5	
Trichloroethene	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.125	25	10/04/23 18:42	10/04/23 18:42	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	76-13-1	
1,2,3-Trichloropropane	ND	mg/kg	0.0625	25	10/04/23 18:42	10/04/23 18:42	96-18-4	
Vinyl chloride	ND	mg/kg	0.0250	25	10/04/23 18:42	10/04/23 18:42	75-01-4	
Xylene (Total)	ND	mg/kg	0.0750	25	10/04/23 18:42	10/04/23 18:42	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	98.3	%	70.0-130	25	10/04/23 18:42	10/04/23 18:42	17060-07-0	
Toluene-d8 (S)	98.7	%	75.0-131	25	10/04/23 18:42	10/04/23 18:42	2037-26-5	
4-Bromofluorobenzene (S)	101	%	67.0-138	25	10/04/23 18:42	10/04/23 18:42	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

QC Batch: 911520 | Analysis Method: EPA 7470A
QC Batch Method: EPA 7470A | Analysis Description: 7470A Mercury TCLP
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10669887001, 10669887002, 10669887003, 10669887004, 10669887005, 10669887006, 10669887007

METHOD BLANK: 4797346 Matrix: Water
Associated Lab Samples: 10669887001, 10669887002, 10669887003, 10669887004, 10669887005, 10669887006, 10669887007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00060	10/12/23 17:09	

LABORATORY CONTROL SAMPLE: 4797347

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.015	0.015	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4797348 4797349

Parameter	Units	10669887001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	0.015	0.015	0.015	0.016	103	105	80-120	2	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

QC Batch: 909257
QC Batch Method: EPA 7471B
Analysis Method: EPA 7471B
Analysis Description: 7471B Mercury Solids
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10669887001, 10669887002, 10669887003, 10669887004, 10669887005, 10669887006, 10669887007

METHOD BLANK: 4787118 Matrix: Solid
Associated Lab Samples: 10669887001, 10669887002, 10669887003, 10669887004, 10669887005, 10669887006, 10669887007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/kg	ND	0.020	10/02/23 16:38	

LABORATORY CONTROL SAMPLE: 4787119

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	0.48	0.48	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4787120 4787121

Parameter	Units	10669836001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/kg	1.3	0.58	0.54	1.7	0.99	77	-55	80-120	55	20	M1,R1

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

QC Batch: 911521
QC Batch Method: EPA 3015A
Analysis Method: EPA 6010D
Analysis Description: 6010D MET ICP, TCLP MICRO
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10669887001, 10669887002, 10669887003, 10669887004, 10669887005, 10669887006, 10669887007

METHOD BLANK: 4797350 Matrix: Water
Associated Lab Samples: 10669887001, 10669887002, 10669887003, 10669887004, 10669887005, 10669887006, 10669887007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.20	10/13/23 10:31	
Barium	mg/L	ND	0.10	10/13/23 10:31	
Cadmium	mg/L	ND	0.030	10/13/23 10:31	
Chromium	mg/L	ND	0.10	10/13/23 10:31	
Lead	mg/L	ND	0.10	10/13/23 10:31	
Selenium	mg/L	ND	0.20	10/13/23 10:31	
Silver	mg/L	ND	0.10	10/13/23 10:31	

LABORATORY CONTROL SAMPLE: 4797351

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	5	4.7	95	80-120	
Barium	mg/L	5	4.8	97	80-120	
Cadmium	mg/L	5	4.9	99	80-120	
Chromium	mg/L	5	4.8	96	80-120	
Lead	mg/L	5	4.7	95	80-120	
Selenium	mg/L	5	4.9	98	80-120	
Silver	mg/L	2.5	2.4	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4797352 4797353

Parameter	Units	10669887001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	ND	5	5	4.7	4.8	95	96	75-125	1	20	
Barium	mg/L	0.25	5	5	5.0	5.1	95	97	75-125	2	20	
Cadmium	mg/L	ND	5	5	4.9	4.9	97	98	75-125	1	20	
Chromium	mg/L	ND	5	5	4.7	4.8	95	96	75-125	2	20	
Lead	mg/L	ND	5	5	4.7	4.8	93	95	75-125	2	20	
Selenium	mg/L	ND	5	5	4.9	5.0	98	99	75-125	1	20	
Silver	mg/L	ND	2.5	2.5	2.4	2.4	95	97	75-125	2	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

QC Batch: 908370
QC Batch Method: EPA 3050B
Analysis Method: EPA 6020B
Analysis Description: 6020B Solids UPD5
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10669887001, 10669887002, 10669887003, 10669887004, 10669887005, 10669887006, 10669887007

METHOD BLANK: 4782249 Matrix: Solid
Associated Lab Samples: 10669887001, 10669887002, 10669887003, 10669887004, 10669887005, 10669887006, 10669887007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/kg	ND	0.50	09/29/23 10:53	
Cadmium	mg/kg	ND	0.079	09/29/23 10:53	
Chromium	mg/kg	ND	2.0	09/29/23 10:53	
Lead	mg/kg	ND	0.50	09/29/23 10:53	
Nickel	mg/kg	ND	0.50	10/02/23 13:57	
Zinc	mg/kg	ND	5.0	09/29/23 10:53	

LABORATORY CONTROL SAMPLE: 4782250

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	48.4	53.9	111	80-120	
Cadmium	mg/kg	48.4	52.9	109	80-120	
Chromium	mg/kg	48.4	57.3	118	80-120	
Lead	mg/kg	48.4	54.2	112	80-120	
Nickel	mg/kg	48.4	54.9	114	80-120	
Zinc	mg/kg	48.4	54.1	112	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4782251 4782252

Parameter	Units	10669812001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	2.5	48.8	49.3	56.3	56.9	110	111	75-125	1	20	
Cadmium	mg/kg	0.11	48.8	49.3	53.0	54.0	108	109	75-125	2	20	
Chromium	mg/kg	11.1	48.8	49.3	69.2	69.7	119	119	75-125	1	20	
Lead	mg/kg	2.6	48.8	49.3	57.2	58.1	112	113	75-125	2	20	
Nickel	mg/kg	10.2	48.8	49.3	67.6	69.1	118	120	75-125	2	20	
Zinc	mg/kg	15.9	48.8	49.3	74.2	74.9	120	120	75-125	1	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

QC Batch: 909693
QC Batch Method: ASTM D2974
Analysis Method: ASTM D2974
Analysis Description: Dry Weight / %M by ASTM D2974
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10669887001, 10669887002, 10669887003, 10669887004, 10669887005, 10669887006, 10669887007

SAMPLE DUPLICATE: 4788921

Parameter	Units	10670206001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	19.8	19.7	0	30	N2

SAMPLE DUPLICATE: 4788922

Parameter	Units	10669887004 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	19.2	17.5	9	30	N2

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

QC Batch: 2144565
QC Batch Method: 5035A
Analysis Method: EPA 8260D
Analysis Description: VOA (GC/MS) 8260D
Laboratory: Pace National - Mt. Juliet
Associated Lab Samples: 10669887002, 10669887004

METHOD BLANK: R3982154-5 Matrix: Solid
Associated Lab Samples: 10669887002, 10669887004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Acetone	mg/kg	ND	0.0500	10/04/23 17:35	
Allyl chloride	mg/kg	ND	0.00500	10/04/23 17:35	
Benzene	mg/kg	ND	0.00100	10/04/23 17:35	
Bromobenzene	mg/kg	ND	0.00100	10/04/23 17:35	
Bromochloromethane	mg/kg	ND	0.00100	10/04/23 17:35	
Bromodichloromethane	mg/kg	ND	0.00100	10/04/23 17:35	
Bromoform	mg/kg	ND	0.00100	10/04/23 17:35	
Bromomethane	mg/kg	ND	0.00500	10/04/23 17:35	
n-Butylbenzene	mg/kg	ND	0.00100	10/04/23 17:35	
sec-Butylbenzene	mg/kg	ND	0.00100	10/04/23 17:35	
tert-Butylbenzene	mg/kg	ND	0.00100	10/04/23 17:35	
Carbon tetrachloride	mg/kg	ND	0.00100	10/04/23 17:35	
Chlorobenzene	mg/kg	ND	0.00100	10/04/23 17:35	
Dibromochloromethane	mg/kg	ND	0.00100	10/04/23 17:35	
Chloroethane	mg/kg	ND	0.00500	10/04/23 17:35	
Chloroform	mg/kg	ND	0.00500	10/04/23 17:35	
Chloromethane	mg/kg	ND	0.00250	10/04/23 17:35	
2-Chlorotoluene	mg/kg	ND	0.00100	10/04/23 17:35	
4-Chlorotoluene	mg/kg	ND	0.00100	10/04/23 17:35	
1,2-Dibromoethane (EDB)	mg/kg	ND	0.00100	10/04/23 17:35	
1,2-Dibromo-3-chloropropane	mg/kg	ND	0.00500	10/04/23 17:35	
Dibromomethane	mg/kg	ND	0.00100	10/04/23 17:35	
1,2-Dichlorobenzene	mg/kg	ND	0.00100	10/04/23 17:35	
1,3-Dichlorobenzene	mg/kg	ND	0.00100	10/04/23 17:35	
1,4-Dichlorobenzene	mg/kg	ND	0.00100	10/04/23 17:35	
Dichlorodifluoromethane	mg/kg	ND	0.00500	10/04/23 17:35	
Dichlorofluoromethane	mg/kg	ND	0.00500	10/04/23 17:35	
1,1-Dichloroethane	mg/kg	ND	0.00100	10/04/23 17:35	
1,2-Dichloroethane	mg/kg	ND	0.00100	10/04/23 17:35	
1,1-Dichloroethene	mg/kg	ND	0.00100	10/04/23 17:35	
cis-1,2-Dichloroethene	mg/kg	ND	0.00100	10/04/23 17:35	
trans-1,2-Dichloroethene	mg/kg	ND	0.00100	10/04/23 17:35	
1,2-Dichloropropane	mg/kg	ND	0.00100	10/04/23 17:35	
1,3-Dichloropropane	mg/kg	ND	0.00100	10/04/23 17:35	
2,2-Dichloropropane	mg/kg	ND	0.00100	10/04/23 17:35	
1,1-Dichloropropene	mg/kg	ND	0.00100	10/04/23 17:35	
cis-1,3-Dichloropropene	mg/kg	ND	0.00100	10/04/23 17:35	
trans-1,3-Dichloropropene	mg/kg	ND	0.00100	10/04/23 17:35	
Ethylbenzene	mg/kg	ND	0.00100	10/04/23 17:35	
Diethyl ether (Ethyl ether)	mg/kg	ND	0.00100	10/04/23 17:35	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

METHOD BLANK: R3982154-5 Matrix: Solid
Associated Lab Samples: 10669887002, 10669887004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Hexachloro-1,3-butadiene	mg/kg	ND	0.00100	10/04/23 17:35	
n-Hexane	mg/kg	ND	0.0100	10/04/23 17:35	
Isopropylbenzene (Cumene)	mg/kg	ND	0.00100	10/04/23 17:35	
p-Isopropyltoluene	mg/kg	ND	0.00100	10/04/23 17:35	
2-Butanone (MEK)	mg/kg	ND	0.0100	10/04/23 17:35	
Methylene Chloride	mg/kg	ND	0.00500	10/04/23 17:35	
4-Methyl-2-pentanone (MIBK)	mg/kg	ND	0.0100	10/04/23 17:35	
Methyl-tert-butyl ether	mg/kg	ND	0.00100	10/04/23 17:35	
Naphthalene	mg/kg	ND	0.00500	10/04/23 17:35	
n-Propylbenzene	mg/kg	ND	0.00100	10/04/23 17:35	
Styrene	mg/kg	ND	0.00100	10/04/23 17:35	
1,1,1,2-Tetrachloroethane	mg/kg	ND	0.00100	10/04/23 17:35	
1,1,2,2-Tetrachloroethane	mg/kg	ND	0.00100	10/04/23 17:35	
Tetrachloroethene	mg/kg	ND	0.00100	10/04/23 17:35	
Tetrahydrofuran	mg/kg	ND	0.00500	10/04/23 17:35	
Toluene	mg/kg	ND	0.00500	10/04/23 17:35	
1,2,3-Trichlorobenzene	mg/kg	ND	0.00100	10/04/23 17:35	
1,2,4-Trichlorobenzene	mg/kg	ND	0.00100	10/04/23 17:35	
1,2,4-Trimethylbenzene	mg/kg	ND	0.00100	10/04/23 17:35	
1,3,5-Trimethylbenzene	mg/kg	ND	0.00100	10/04/23 17:35	
1,1,1-Trichloroethane	mg/kg	ND	0.00100	10/04/23 17:35	
1,1,2-Trichloroethane	mg/kg	ND	0.00100	10/04/23 17:35	
Trichloroethene	mg/kg	ND	0.00100	10/04/23 17:35	
Trichlorofluoromethane	mg/kg	ND	0.00500	10/04/23 17:35	
1,1,2-Trichlorotrifluoroethane	mg/kg	ND	0.00100	10/04/23 17:35	
1,2,3-Trichloropropane	mg/kg	ND	0.00250	10/04/23 17:35	
Vinyl chloride	mg/kg	ND	0.00100	10/04/23 17:35	
Xylene (Total)	mg/kg	ND	0.00300	10/04/23 17:35	
1,2-Dichloroethane-d4 (S)	%	102	70.0-130	10/04/23 17:35	
Toluene-d8 (S)	%	99.2	75.0-131	10/04/23 17:35	
4-Bromofluorobenzene (S)	%	95.5	67.0-138	10/04/23 17:35	

LABORATORY CONTROL SAMPLE & LCSD: R3982154-1 R3982154-2

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Acetone	mg/kg	0.125	0.130	0.130	104	104	10.0-160	0.00	31	
Allyl chloride	mg/kg	0.125	0.135	0.132	108	106	68.0-135	2.25	20	
Benzene	mg/kg	0.0250	0.0244	0.0241	97.6	96.4	70.0-123	1.24	20	
Bromobenzene	mg/kg	0.0250	0.0252	0.0248	101	99.2	73.0-121	1.60	20	
Bromochloromethane	mg/kg	0.0250	0.0255	0.0255	102	102	77.0-128	0.00	20	
Bromodichloromethane	mg/kg	0.0250	0.0236	0.0232	94.4	92.8	73.0-121	1.71	20	
Bromoform	mg/kg	0.0250	0.0212	0.0220	84.8	88.0	64.0-132	3.70	20	
Bromomethane	mg/kg	0.0250	0.0314	0.0306	126	122	56.0-147	2.58	20	
n-Butylbenzene	mg/kg	0.0250	0.0268	0.0267	107	107	68.0-135	0.374	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

LABORATORY CONTROL SAMPLE & LCSD: R3982154-1 R3982154-2

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
sec-Butylbenzene	mg/kg	0.0250	0.0260	0.0260	104	104	74.0-130	0.00	20	
tert-Butylbenzene	mg/kg	0.0250	0.0256	0.0260	102	104	75.0-127	1.55	20	
Carbon tetrachloride	mg/kg	0.0250	0.0244	0.0239	97.6	95.6	66.0-128	2.07	20	
Chlorobenzene	mg/kg	0.0250	0.0244	0.0245	97.6	98.0	76.0-128	0.409	20	
Dibromochloromethane	mg/kg	0.0250	0.0232	0.0227	92.8	90.8	74.0-127	2.18	20	
Chloroethane	mg/kg	0.0250	0.0274	0.0252	110	101	61.0-134	8.37	20	
Chloroform	mg/kg	0.0250	0.0244	0.0242	97.6	96.8	72.0-123	0.823	20	
Chloromethane	mg/kg	0.0250	0.0271	0.0264	108	106	51.0-138	2.62	20	
2-Chlorotoluene	mg/kg	0.0250	0.0252	0.0259	101	104	75.0-124	2.74	20	
4-Chlorotoluene	mg/kg	0.0250	0.0253	0.0254	101	102	75.0-124	0.394	20	
1,2-Dibromoethane (EDB)	mg/kg	0.0250	0.0239	0.0237	95.6	94.8	74.0-128	0.840	20	
1,2-Dibromo-3-chloropropane	mg/kg	0.0250	0.0215	0.0231	86.0	92.4	59.0-130	7.17	20	
Dibromomethane	mg/kg	0.0250	0.0249	0.0246	99.6	98.4	75.0-122	1.21	20	
1,2-Dichlorobenzene	mg/kg	0.0250	0.0264	0.0261	106	104	76.0-124	1.14	20	
1,3-Dichlorobenzene	mg/kg	0.0250	0.0256	0.0258	102	103	76.0-125	0.778	20	
1,4-Dichlorobenzene	mg/kg	0.0250	0.0258	0.0256	103	102	77.0-121	0.778	20	
Dichlorodifluoromethane	mg/kg	0.0250	0.0266	0.0264	106	106	43.0-156	0.755	20	
Dichlorofluoromethane	mg/kg	0.0250	0.0261	0.0258	104	103	65.0-137	1.16	20	
1,1-Dichloroethane	mg/kg	0.0250	0.0264	0.0257	106	103	70.0-127	2.69	20	
1,2-Dichloroethane	mg/kg	0.0250	0.0257	0.0253	103	101	65.0-131	1.57	20	
1,1-Dichloroethene	mg/kg	0.0250	0.0255	0.0247	102	98.8	65.0-131	3.19	20	
cis-1,2-Dichloroethene	mg/kg	0.0250	0.0247	0.0243	98.8	97.2	73.0-125	1.63	20	
trans-1,2-Dichloroethene	mg/kg	0.0250	0.0255	0.0250	102	100	71.0-125	1.98	20	
1,2-Dichloropropane	mg/kg	0.0250	0.0248	0.0245	99.2	98.0	74.0-125	1.22	20	
1,3-Dichloropropane	mg/kg	0.0250	0.0243	0.0237	97.2	94.8	80.0-125	2.50	20	
2,2-Dichloropropane	mg/kg	0.0250	0.0231	0.0229	92.4	91.6	59.0-135	0.870	20	
1,1-Dichloropropene	mg/kg	0.0250	0.0244	0.0242	97.6	96.8	73.0-125	0.823	20	
cis-1,3-Dichloropropene	mg/kg	0.0250	0.0242	0.0237	96.8	94.8	76.0-127	2.09	20	
trans-1,3-Dichloropropene	mg/kg	0.0250	0.0231	0.0232	92.4	92.8	73.0-127	0.432	20	
Ethylbenzene	mg/kg	0.0250	0.0239	0.0238	95.6	95.2	74.0-126	0.419	20	
Diethyl ether (Ethyl ether)	mg/kg	0.0250	0.0255	0.0252	102	101	64.0-137	1.18	20	
Hexachloro-1,3-butadiene	mg/kg	0.0250	0.0271	0.0273	108	109	57.0-150	0.735	20	
n-Hexane	mg/kg	0.0250	0.0258	0.0253	103	101	55.0-137	1.96	20	
Isopropylbenzene (Cumene)	mg/kg	0.0250	0.0240	0.0244	96.0	97.6	72.0-127	1.65	20	
p-Isopropyltoluene	mg/kg	0.0250	0.0266	0.0268	106	107	72.0-133	0.749	20	
2-Butanone (MEK)	mg/kg	0.125	0.118	0.117	94.4	93.6	30.0-160	0.851	24	
Methylene Chloride	mg/kg	0.0250	0.0267	0.0259	107	104	68.0-123	3.04	20	
4-Methyl-2-pentanone (MIBK)	mg/kg	0.125	0.116	0.118	92.8	94.4	56.0-143	1.71	20	
Methyl-tert-butyl ether	mg/kg	0.0250	0.0248	0.0246	99.2	98.4	66.0-132	0.810	20	
Naphthalene	mg/kg	0.0250	0.0252	0.0259	101	104	59.0-130	2.74	20	
n-Propylbenzene	mg/kg	0.0250	0.0261	0.0262	104	105	74.0-126	0.382	20	
Styrene	mg/kg	0.0250	0.0245	0.0243	98.0	97.2	72.0-127	0.820	20	
1,1,1,2-Tetrachloroethane	mg/kg	0.0250	0.0237	0.0232	94.8	92.8	74.0-129	2.13	20	
1,1,2,2-Tetrachloroethane	mg/kg	0.0250	0.0251	0.0254	100	102	68.0-128	1.19	20	
Tetrachloroethene	mg/kg	0.0250	0.0236	0.0238	94.4	95.2	70.0-136	0.844	20	
Tetrahydrofuran	mg/kg	0.0250	0.0230	0.0235	92.0	94.0	37.0-146	2.15	24	
Toluene	mg/kg	0.0250	0.0234	0.0237	93.6	94.8	75.0-121	1.27	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

LABORATORY CONTROL SAMPLE & LCSD: R3982154-1 R3982154-2

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,2,3-Trichlorobenzene	mg/kg	0.0250	0.0266	0.0272	106	109	59.0-139	2.23	20	
1,2,4-Trichlorobenzene	mg/kg	0.0250	0.0267	0.0270	107	108	62.0-137	1.12	20	
1,2,4-Trimethylbenzene	mg/kg	0.0250	0.0252	0.0257	101	103	70.0-126	1.96	20	
1,3,5-Trimethylbenzene	mg/kg	0.0250	0.0254	0.0257	102	103	73.0-127	1.17	20	
1,1,1-Trichloroethane	mg/kg	0.0250	0.0243	0.0237	97.2	94.8	69.0-126	2.50	20	
1,1,2-Trichloroethane	mg/kg	0.0250	0.0237	0.0246	94.8	98.4	78.0-123	3.73	20	
Trichloroethene	mg/kg	0.0250	0.0249	0.0241	99.6	96.4	76.0-126	3.27	20	
Trichlorofluoromethane	mg/kg	0.0250	0.0288	0.0283	115	113	61.0-142	1.75	20	
1,1,2-Trichlorotrifluoroethane	mg/kg	0.0250	0.0266	0.0260	106	104	61.0-139	2.28	20	
1,2,3-Trichloropropane	mg/kg	0.0250	0.0257	0.0263	103	105	67.0-129	2.31	20	
Vinyl chloride	mg/kg	0.0250	0.0279	0.0277	112	111	63.0-134	0.719	20	
Xylene (Total)	mg/kg	0.0750	0.0717	0.0728	95.6	97.1	72.0-127	1.52	20	
1,2-Dichloroethane-d4 (S)	%				104	105	70.0-130			
Toluene-d8 (S)	%				98.3	101	75.0-131			
4-Bromofluorobenzene (S)	%				98.3	97.3	67.0-138			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

QC Batch: 2145012
QC Batch Method: 5035A
Analysis Method: EPA 8260D
Analysis Description: VOA (GC/MS) 8260D
Laboratory: Pace National - Mt. Juliet
Associated Lab Samples: 10669887001, 10669887003, 10669887005, 10669887006, 10669887007

METHOD BLANK: R3982482-5 Matrix: Solid
Associated Lab Samples: 10669887001, 10669887003, 10669887005, 10669887006, 10669887007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Acetone	mg/kg	ND	0.0500	10/05/23 06:14	
Allyl chloride	mg/kg	ND	0.00500	10/05/23 06:14	
Benzene	mg/kg	ND	0.00100	10/05/23 06:14	
Bromobenzene	mg/kg	ND	0.00100	10/05/23 06:14	
Bromochloromethane	mg/kg	ND	0.00100	10/05/23 06:14	
Bromodichloromethane	mg/kg	ND	0.00100	10/05/23 06:14	
Bromoform	mg/kg	ND	0.00100	10/05/23 06:14	
Bromomethane	mg/kg	ND	0.00500	10/05/23 06:14	
n-Butylbenzene	mg/kg	ND	0.00100	10/05/23 06:14	
sec-Butylbenzene	mg/kg	ND	0.00100	10/05/23 06:14	
tert-Butylbenzene	mg/kg	ND	0.00100	10/05/23 06:14	
Carbon tetrachloride	mg/kg	ND	0.00100	10/05/23 06:14	
Chlorobenzene	mg/kg	ND	0.00100	10/05/23 06:14	
Dibromochloromethane	mg/kg	ND	0.00100	10/05/23 06:14	
Chloroethane	mg/kg	ND	0.00500	10/05/23 06:14	
Chloroform	mg/kg	ND	0.00500	10/05/23 06:14	
Chloromethane	mg/kg	ND	0.00250	10/05/23 06:14	
2-Chlorotoluene	mg/kg	ND	0.00100	10/05/23 06:14	
4-Chlorotoluene	mg/kg	ND	0.00100	10/05/23 06:14	
1,2-Dibromoethane (EDB)	mg/kg	ND	0.00100	10/05/23 06:14	
1,2-Dibromo-3-chloropropane	mg/kg	ND	0.00500	10/05/23 06:14	
Dibromomethane	mg/kg	ND	0.00100	10/05/23 06:14	
1,2-Dichlorobenzene	mg/kg	ND	0.00100	10/05/23 06:14	
1,3-Dichlorobenzene	mg/kg	ND	0.00100	10/05/23 06:14	
1,4-Dichlorobenzene	mg/kg	ND	0.00100	10/05/23 06:14	
Dichlorodifluoromethane	mg/kg	ND	0.00500	10/05/23 06:14	
Dichlorofluoromethane	mg/kg	ND	0.00500	10/05/23 06:14	
1,1-Dichloroethane	mg/kg	ND	0.00100	10/05/23 06:14	
1,2-Dichloroethane	mg/kg	ND	0.00100	10/05/23 06:14	
1,1-Dichloroethene	mg/kg	ND	0.00100	10/05/23 06:14	
cis-1,2-Dichloroethene	mg/kg	ND	0.00100	10/05/23 06:14	
trans-1,2-Dichloroethene	mg/kg	ND	0.00100	10/05/23 06:14	
1,2-Dichloropropane	mg/kg	ND	0.00100	10/05/23 06:14	
1,3-Dichloropropane	mg/kg	ND	0.00100	10/05/23 06:14	
2,2-Dichloropropane	mg/kg	ND	0.00100	10/05/23 06:14	
1,1-Dichloropropene	mg/kg	ND	0.00100	10/05/23 06:14	
cis-1,3-Dichloropropene	mg/kg	ND	0.00100	10/05/23 06:14	
trans-1,3-Dichloropropene	mg/kg	ND	0.00100	10/05/23 06:14	
Ethylbenzene	mg/kg	ND	0.00100	10/05/23 06:14	
Diethyl ether (Ethyl ether)	mg/kg	ND	0.00100	10/05/23 06:14	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

METHOD BLANK: R3982482-5 Matrix: Solid
Associated Lab Samples: 10669887001, 10669887003, 10669887005, 10669887006, 10669887007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Hexachloro-1,3-butadiene	mg/kg	ND	0.00100	10/05/23 06:14	
n-Hexane	mg/kg	ND	0.0100	10/05/23 06:14	
Isopropylbenzene (Cumene)	mg/kg	ND	0.00100	10/05/23 06:14	
p-Isopropyltoluene	mg/kg	ND	0.00100	10/05/23 06:14	
2-Butanone (MEK)	mg/kg	ND	0.0100	10/05/23 06:14	
Methylene Chloride	mg/kg	ND	0.00500	10/05/23 06:14	
4-Methyl-2-pentanone (MIBK)	mg/kg	ND	0.0100	10/05/23 06:14	
Methyl-tert-butyl ether	mg/kg	ND	0.00100	10/05/23 06:14	
Naphthalene	mg/kg	ND	0.00500	10/05/23 06:14	
n-Propylbenzene	mg/kg	ND	0.00100	10/05/23 06:14	
Styrene	mg/kg	ND	0.00100	10/05/23 06:14	
1,1,1,2-Tetrachloroethane	mg/kg	ND	0.00100	10/05/23 06:14	
1,1,2,2-Tetrachloroethane	mg/kg	ND	0.00100	10/05/23 06:14	
Tetrachloroethene	mg/kg	ND	0.00100	10/05/23 06:14	
Tetrahydrofuran	mg/kg	ND	0.00500	10/05/23 06:14	
Toluene	mg/kg	ND	0.00500	10/05/23 06:14	
1,2,3-Trichlorobenzene	mg/kg	ND	0.00100	10/05/23 06:14	
1,2,4-Trichlorobenzene	mg/kg	ND	0.00100	10/05/23 06:14	
1,2,4-Trimethylbenzene	mg/kg	ND	0.00100	10/05/23 06:14	
1,3,5-Trimethylbenzene	mg/kg	ND	0.00100	10/05/23 06:14	
1,1,1-Trichloroethane	mg/kg	ND	0.00100	10/05/23 06:14	
1,1,2-Trichloroethane	mg/kg	ND	0.00100	10/05/23 06:14	
Trichloroethene	mg/kg	ND	0.00100	10/05/23 06:14	
Trichlorofluoromethane	mg/kg	ND	0.00500	10/05/23 06:14	
1,1,2-Trichlorotrifluoroethane	mg/kg	ND	0.00100	10/05/23 06:14	
1,2,3-Trichloropropane	mg/kg	ND	0.00250	10/05/23 06:14	
Vinyl chloride	mg/kg	ND	0.00100	10/05/23 06:14	
Xylene (Total)	mg/kg	ND	0.00300	10/05/23 06:14	
1,2-Dichloroethane-d4 (S)	%	109	70.0-130	10/05/23 06:14	
Toluene-d8 (S)	%	98.8	75.0-131	10/05/23 06:14	
4-Bromofluorobenzene (S)	%	98.9	67.0-138	10/05/23 06:14	

LABORATORY CONTROL SAMPLE & LCSD: R3982482-1 R3982482-2

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Acetone	mg/kg	0.125	0.128	0.127	102	102	10.0-160	0.784	31	
Allyl chloride	mg/kg	0.125	0.137	0.140	110	112	68.0-135	2.17	20	
Benzene	mg/kg	0.0250	0.0241	0.0249	96.4	99.6	70.0-123	3.27	20	
Bromobenzene	mg/kg	0.0250	0.0253	0.0254	101	102	73.0-121	0.394	20	
Bromochloromethane	mg/kg	0.0250	0.0260	0.0262	104	105	77.0-128	0.766	20	
Bromodichloromethane	mg/kg	0.0250	0.0240	0.0247	96.0	98.8	73.0-121	2.87	20	
Bromoform	mg/kg	0.0250	0.0232	0.0232	92.8	92.8	64.0-132	0.00	20	
Bromomethane	mg/kg	0.0250	0.0324	0.0336	130	134	56.0-147	3.64	20	
n-Butylbenzene	mg/kg	0.0250	0.0268	0.0275	107	110	68.0-135	2.58	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

LABORATORY CONTROL SAMPLE & LCSD: R3982482-1 R3982482-2

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
sec-Butylbenzene	mg/kg	0.0250	0.0262	0.0265	105	106	74.0-130	1.14	20	
tert-Butylbenzene	mg/kg	0.0250	0.0262	0.0264	105	106	75.0-127	0.760	20	
Carbon tetrachloride	mg/kg	0.0250	0.0240	0.0251	96.0	100	66.0-128	4.48	20	
Chlorobenzene	mg/kg	0.0250	0.0254	0.0261	102	104	76.0-128	2.72	20	
Dibromochloromethane	mg/kg	0.0250	0.0243	0.0247	97.2	98.8	74.0-127	1.63	20	
Chloroethane	mg/kg	0.0250	0.0274	0.0282	110	113	61.0-134	2.88	20	
Chloroform	mg/kg	0.0250	0.0246	0.0252	98.4	101	72.0-123	2.41	20	
Chloromethane	mg/kg	0.0250	0.0262	0.0262	105	105	51.0-138	0.00	20	
2-Chlorotoluene	mg/kg	0.0250	0.0255	0.0261	102	104	75.0-124	2.33	20	
4-Chlorotoluene	mg/kg	0.0250	0.0255	0.0257	102	103	75.0-124	0.781	20	
1,2-Dibromoethane (EDB)	mg/kg	0.0250	0.0253	0.0261	101	104	74.0-128	3.11	20	
1,2-Dibromo-3-chloropropane	mg/kg	0.0250	0.0238	0.0229	95.2	91.6	59.0-130	3.85	20	
Dibromomethane	mg/kg	0.0250	0.0252	0.0254	101	102	75.0-122	0.791	20	
1,2-Dichlorobenzene	mg/kg	0.0250	0.0264	0.0268	106	107	76.0-124	1.50	20	
1,3-Dichlorobenzene	mg/kg	0.0250	0.0260	0.0266	104	106	76.0-125	2.28	20	
1,4-Dichlorobenzene	mg/kg	0.0250	0.0260	0.0258	104	103	77.0-121	0.772	20	
Dichlorodifluoromethane	mg/kg	0.0250	0.0253	0.0258	101	103	43.0-156	1.96	20	
Dichlorofluoromethane	mg/kg	0.0250	0.0263	0.0269	105	108	65.0-137	2.26	20	
1,1-Dichloroethane	mg/kg	0.0250	0.0264	0.0270	106	108	70.0-127	2.25	20	
1,2-Dichloroethane	mg/kg	0.0250	0.0259	0.0261	104	104	65.0-131	0.769	20	
1,1-Dichloroethene	mg/kg	0.0250	0.0253	0.0259	101	104	65.0-131	2.34	20	
cis-1,2-Dichloroethene	mg/kg	0.0250	0.0244	0.0249	97.6	99.6	73.0-125	2.03	20	
trans-1,2-Dichloroethene	mg/kg	0.0250	0.0256	0.0263	102	105	71.0-125	2.70	20	
1,2-Dichloropropane	mg/kg	0.0250	0.0247	0.0255	98.8	102	74.0-125	3.19	20	
1,3-Dichloropropane	mg/kg	0.0250	0.0253	0.0255	101	102	80.0-125	0.787	20	
2,2-Dichloropropane	mg/kg	0.0250	0.0227	0.0236	90.8	94.4	59.0-135	3.89	20	
1,1-Dichloropropene	mg/kg	0.0250	0.0241	0.0247	96.4	98.8	73.0-125	2.46	20	
cis-1,3-Dichloropropene	mg/kg	0.0250	0.0243	0.0252	97.2	101	76.0-127	3.64	20	
trans-1,3-Dichloropropene	mg/kg	0.0250	0.0250	0.0250	100	100	73.0-127	0.00	20	
Ethylbenzene	mg/kg	0.0250	0.0246	0.0251	98.4	100	74.0-126	2.01	20	
Diethyl ether (Ethyl ether)	mg/kg	0.0250	0.0272	0.0276	109	110	64.0-137	1.46	20	
Hexachloro-1,3-butadiene	mg/kg	0.0250	0.0281	0.0285	112	114	57.0-150	1.41	20	
n-Hexane	mg/kg	0.0250	0.0257	0.0262	103	105	55.0-137	1.93	20	
Isopropylbenzene (Cumene)	mg/kg	0.0250	0.0247	0.0258	98.8	103	72.0-127	4.36	20	
p-Isopropyltoluene	mg/kg	0.0250	0.0267	0.0273	107	109	72.0-133	2.22	20	
2-Butanone (MEK)	mg/kg	0.125	0.121	0.122	96.8	97.6	30.0-160	0.823	24	
Methylene Chloride	mg/kg	0.0250	0.0290	0.0294	116	118	68.0-123	1.37	20	
4-Methyl-2-pentanone (MIBK)	mg/kg	0.125	0.126	0.125	101	100	56.0-143	0.797	20	
Methyl-tert-butyl ether	mg/kg	0.0250	0.0261	0.0263	104	105	66.0-132	0.763	20	
Naphthalene	mg/kg	0.0250	0.0280	0.0277	112	111	59.0-130	1.08	20	
n-Propylbenzene	mg/kg	0.0250	0.0258	0.0264	103	106	74.0-126	2.30	20	
Styrene	mg/kg	0.0250	0.0252	0.0260	101	104	72.0-127	3.13	20	
1,1,1,2-Tetrachloroethane	mg/kg	0.0250	0.0247	0.0253	98.8	101	74.0-129	2.40	20	
1,1,2,2-Tetrachloroethane	mg/kg	0.0250	0.0261	0.0262	104	105	68.0-128	0.382	20	
Tetrachloroethene	mg/kg	0.0250	0.0243	0.0245	97.2	98.0	70.0-136	0.820	20	
Tetrahydrofuran	mg/kg	0.0250	0.0244	0.0249	97.6	99.6	37.0-146	2.03	24	
Toluene	mg/kg	0.0250	0.0241	0.0249	96.4	99.6	75.0-121	3.27	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

LABORATORY CONTROL SAMPLE & LCSD: R3982482-1 R3982482-2

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,2,3-Trichlorobenzene	mg/kg	0.0250	0.0281	0.0281	112	112	59.0-139	0.00	20	
1,2,4-Trichlorobenzene	mg/kg	0.0250	0.0286	0.0280	114	112	62.0-137	2.12	20	
1,2,4-Trimethylbenzene	mg/kg	0.0250	0.0255	0.0260	102	104	70.0-126	1.94	20	
1,3,5-Trimethylbenzene	mg/kg	0.0250	0.0257	0.0262	103	105	73.0-127	1.93	20	
1,1,1-Trichloroethane	mg/kg	0.0250	0.0239	0.0244	95.6	97.6	69.0-126	2.07	20	
1,1,2-Trichloroethane	mg/kg	0.0250	0.0249	0.0251	99.6	100	78.0-123	0.800	20	
Trichloroethene	mg/kg	0.0250	0.0243	0.0253	97.2	101	76.0-126	4.03	20	
Trichlorofluoromethane	mg/kg	0.0250	0.0278	0.0288	111	115	61.0-142	3.53	20	
1,1,2-Trichlorotrifluoroethane	mg/kg	0.0250	0.0264	0.0272	106	109	61.0-139	2.99	20	
1,2,3-Trichloropropane	mg/kg	0.0250	0.0271	0.0279	108	112	67.0-129	2.91	20	
Vinyl chloride	mg/kg	0.0250	0.0275	0.0283	110	113	63.0-134	2.87	20	
Xylene (Total)	mg/kg	0.0750	0.0742	0.0764	98.9	102	72.0-127	2.92	20	
1,2-Dichloroethane-d4 (S)	%				106	103	70.0-130			
Toluene-d8 (S)	%				101	100	75.0-131			
4-Bromofluorobenzene (S)	%				100	100	67.0-138			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

QC Batch: 2145434
QC Batch Method: 5035A
Analysis Method: EPA 8260D
Analysis Description: VOA (GC/MS) 8260D
Laboratory: Pace National - Mt. Juliet

Associated Lab Samples: 10669887008

METHOD BLANK: R3982157-5 Matrix: Solid
Associated Lab Samples: 10669887008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Acetone	mg/kg	ND	1.25	10/04/23 17:57	
Allyl chloride	mg/kg	ND	0.125	10/04/23 17:57	
Benzene	mg/kg	ND	0.0250	10/04/23 17:57	
Bromobenzene	mg/kg	ND	0.0250	10/04/23 17:57	
Bromochloromethane	mg/kg	ND	0.0250	10/04/23 17:57	
Bromodichloromethane	mg/kg	ND	0.0250	10/04/23 17:57	
Bromoform	mg/kg	ND	0.0250	10/04/23 17:57	
Bromomethane	mg/kg	ND	0.125	10/04/23 17:57	
n-Butylbenzene	mg/kg	ND	0.0250	10/04/23 17:57	
sec-Butylbenzene	mg/kg	ND	0.0250	10/04/23 17:57	
tert-Butylbenzene	mg/kg	ND	0.0250	10/04/23 17:57	
Carbon tetrachloride	mg/kg	ND	0.0250	10/04/23 17:57	
Chlorobenzene	mg/kg	ND	0.0250	10/04/23 17:57	
Dibromochloromethane	mg/kg	ND	0.0250	10/04/23 17:57	
Chloroethane	mg/kg	ND	0.125	10/04/23 17:57	
Chloroform	mg/kg	ND	0.125	10/04/23 17:57	
Chloromethane	mg/kg	ND	0.0625	10/04/23 17:57	
2-Chlorotoluene	mg/kg	ND	0.0250	10/04/23 17:57	
4-Chlorotoluene	mg/kg	ND	0.0250	10/04/23 17:57	
1,2-Dibromoethane (EDB)	mg/kg	ND	0.0250	10/04/23 17:57	
1,2-Dibromo-3-chloropropane	mg/kg	ND	0.125	10/04/23 17:57	
Dibromomethane	mg/kg	ND	0.0250	10/04/23 17:57	
1,2-Dichlorobenzene	mg/kg	ND	0.0250	10/04/23 17:57	
1,3-Dichlorobenzene	mg/kg	ND	0.0250	10/04/23 17:57	
1,4-Dichlorobenzene	mg/kg	ND	0.0250	10/04/23 17:57	
Dichlorodifluoromethane	mg/kg	ND	0.125	10/04/23 17:57	
Dichlorofluoromethane	mg/kg	ND	0.125	10/04/23 17:57	
1,1-Dichloroethane	mg/kg	ND	0.0250	10/04/23 17:57	
1,2-Dichloroethane	mg/kg	ND	0.0250	10/04/23 17:57	
1,1-Dichloroethene	mg/kg	ND	0.0250	10/04/23 17:57	
cis-1,2-Dichloroethene	mg/kg	ND	0.0250	10/04/23 17:57	
trans-1,2-Dichloroethene	mg/kg	ND	0.0250	10/04/23 17:57	
1,2-Dichloropropane	mg/kg	ND	0.0250	10/04/23 17:57	
1,3-Dichloropropane	mg/kg	ND	0.0250	10/04/23 17:57	
2,2-Dichloropropane	mg/kg	ND	0.0250	10/04/23 17:57	
1,1-Dichloropropene	mg/kg	ND	0.0250	10/04/23 17:57	
cis-1,3-Dichloropropene	mg/kg	ND	0.0250	10/04/23 17:57	
trans-1,3-Dichloropropene	mg/kg	ND	0.0250	10/04/23 17:57	
Ethylbenzene	mg/kg	ND	0.0250	10/04/23 17:57	
Diethyl ether (Ethyl ether)	mg/kg	ND	0.0250	10/04/23 17:57	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

METHOD BLANK: R3982157-5 Matrix: Solid
Associated Lab Samples: 10669887008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Hexachloro-1,3-butadiene	mg/kg	ND	0.0250	10/04/23 17:57	
n-Hexane	mg/kg	ND	0.250	10/04/23 17:57	
Isopropylbenzene (Cumene)	mg/kg	ND	0.0250	10/04/23 17:57	
p-Isopropyltoluene	mg/kg	ND	0.0250	10/04/23 17:57	
2-Butanone (MEK)	mg/kg	ND	0.250	10/04/23 17:57	
Methylene Chloride	mg/kg	ND	0.125	10/04/23 17:57	
4-Methyl-2-pentanone (MIBK)	mg/kg	ND	0.250	10/04/23 17:57	
Methyl-tert-butyl ether	mg/kg	ND	0.0250	10/04/23 17:57	
Naphthalene	mg/kg	ND	0.125	10/04/23 17:57	
n-Propylbenzene	mg/kg	ND	0.0250	10/04/23 17:57	
Styrene	mg/kg	ND	0.0250	10/04/23 17:57	
1,1,1,2-Tetrachloroethane	mg/kg	ND	0.0250	10/04/23 17:57	
1,1,2,2-Tetrachloroethane	mg/kg	ND	0.0250	10/04/23 17:57	
Tetrachloroethene	mg/kg	ND	0.0250	10/04/23 17:57	
Tetrahydrofuran	mg/kg	ND	0.125	10/04/23 17:57	
Toluene	mg/kg	ND	0.125	10/04/23 17:57	
1,2,3-Trichlorobenzene	mg/kg	ND	0.0250	10/04/23 17:57	
1,2,4-Trichlorobenzene	mg/kg	ND	0.0250	10/04/23 17:57	
1,2,4-Trimethylbenzene	mg/kg	ND	0.0250	10/04/23 17:57	
1,3,5-Trimethylbenzene	mg/kg	ND	0.0250	10/04/23 17:57	
1,1,1-Trichloroethane	mg/kg	ND	0.0250	10/04/23 17:57	
1,1,2-Trichloroethane	mg/kg	ND	0.0250	10/04/23 17:57	
Trichloroethene	mg/kg	ND	0.0250	10/04/23 17:57	
Trichlorofluoromethane	mg/kg	ND	0.125	10/04/23 17:57	
1,1,2-Trichlorotrifluoroethane	mg/kg	ND	0.0250	10/04/23 17:57	
1,2,3-Trichloropropane	mg/kg	ND	0.0625	10/04/23 17:57	
Vinyl chloride	mg/kg	ND	0.0250	10/04/23 17:57	
Xylene (Total)	mg/kg	ND	0.0750	10/04/23 17:57	
1,2-Dichloroethane-d4 (S)	%	98.5	70.0-130	10/04/23 17:57	
Toluene-d8 (S)	%	100	75.0-131	10/04/23 17:57	
4-Bromofluorobenzene (S)	%	102	67.0-138	10/04/23 17:57	

LABORATORY CONTROL SAMPLE & LCSD: R3982157-1 R3982157-2

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Acetone	mg/kg	0.125	0.130	0.130	104	104	10.0-160	0.00	31	
Allyl chloride	mg/kg	0.125	0.135	0.132	108	106	68.0-135	2.25	20	
Benzene	mg/kg	0.0250	0.0244	0.0241	97.6	96.4	70.0-123	1.24	20	
Bromobenzene	mg/kg	0.0250	0.0252	0.0248	101	99.2	73.0-121	1.60	20	
Bromochloromethane	mg/kg	0.0250	0.0255	0.0255	102	102	77.0-128	0.00	20	
Bromodichloromethane	mg/kg	0.0250	0.0236	0.0232	94.4	92.8	73.0-121	1.71	20	
Bromoform	mg/kg	0.0250	0.0212	0.0220	84.8	88.0	64.0-132	3.70	20	
Bromomethane	mg/kg	0.0250	0.0314	0.0306	126	122	56.0-147	2.58	20	
n-Butylbenzene	mg/kg	0.0250	0.0268	0.0267	107	107	68.0-135	0.374	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

LABORATORY CONTROL SAMPLE & LCSD: R3982157-1 R3982157-2

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
sec-Butylbenzene	mg/kg	0.0250	0.0260	0.0260	104	104	74.0-130	0.00	20	
tert-Butylbenzene	mg/kg	0.0250	0.0256	0.0260	102	104	75.0-127	1.55	20	
Carbon tetrachloride	mg/kg	0.0250	0.0244	0.0239	97.6	95.6	66.0-128	2.07	20	
Chlorobenzene	mg/kg	0.0250	0.0244	0.0245	97.6	98.0	76.0-128	0.409	20	
Dibromochloromethane	mg/kg	0.0250	0.0232	0.0227	92.8	90.8	74.0-127	2.18	20	
Chloroethane	mg/kg	0.0250	0.0274	0.0252	110	101	61.0-134	8.37	20	
Chloroform	mg/kg	0.0250	0.0244	0.0242	97.6	96.8	72.0-123	0.823	20	
Chloromethane	mg/kg	0.0250	0.0271	0.0264	108	106	51.0-138	2.62	20	
2-Chlorotoluene	mg/kg	0.0250	0.0252	0.0259	101	104	75.0-124	2.74	20	
4-Chlorotoluene	mg/kg	0.0250	0.0253	0.0254	101	102	75.0-124	0.394	20	
1,2-Dibromoethane (EDB)	mg/kg	0.0250	0.0239	0.0237	95.6	94.8	74.0-128	0.840	20	
1,2-Dibromo-3-chloropropane	mg/kg	0.0250	0.0215	0.0231	86.0	92.4	59.0-130	7.17	20	
Dibromomethane	mg/kg	0.0250	0.0249	0.0246	99.6	98.4	75.0-122	1.21	20	
1,2-Dichlorobenzene	mg/kg	0.0250	0.0264	0.0261	106	104	76.0-124	1.14	20	
1,3-Dichlorobenzene	mg/kg	0.0250	0.0256	0.0258	102	103	76.0-125	0.778	20	
1,4-Dichlorobenzene	mg/kg	0.0250	0.0258	0.0256	103	102	77.0-121	0.778	20	
Dichlorodifluoromethane	mg/kg	0.0250	0.0266	0.0264	106	106	43.0-156	0.755	20	
Dichlorofluoromethane	mg/kg	0.0250	0.0261	0.0258	104	103	65.0-137	1.16	20	
1,1-Dichloroethane	mg/kg	0.0250	0.0264	0.0257	106	103	70.0-127	2.69	20	
1,2-Dichloroethane	mg/kg	0.0250	0.0257	0.0253	103	101	65.0-131	1.57	20	
1,1-Dichloroethene	mg/kg	0.0250	0.0255	0.0247	102	98.8	65.0-131	3.19	20	
cis-1,2-Dichloroethene	mg/kg	0.0250	0.0247	0.0243	98.8	97.2	73.0-125	1.63	20	
trans-1,2-Dichloroethene	mg/kg	0.0250	0.0255	0.0250	102	100	71.0-125	1.98	20	
1,2-Dichloropropane	mg/kg	0.0250	0.0248	0.0245	99.2	98.0	74.0-125	1.22	20	
1,3-Dichloropropane	mg/kg	0.0250	0.0243	0.0237	97.2	94.8	80.0-125	2.50	20	
2,2-Dichloropropane	mg/kg	0.0250	0.0231	0.0229	92.4	91.6	59.0-135	0.870	20	
1,1-Dichloropropene	mg/kg	0.0250	0.0244	0.0242	97.6	96.8	73.0-125	0.823	20	
cis-1,3-Dichloropropene	mg/kg	0.0250	0.0242	0.0237	96.8	94.8	76.0-127	2.09	20	
trans-1,3-Dichloropropene	mg/kg	0.0250	0.0231	0.0232	92.4	92.8	73.0-127	0.432	20	
Ethylbenzene	mg/kg	0.0250	0.0239	0.0238	95.6	95.2	74.0-126	0.419	20	
Diethyl ether (Ethyl ether)	mg/kg	0.0250	0.0255	0.0252	102	101	64.0-137	1.18	20	
Hexachloro-1,3-butadiene	mg/kg	0.0250	0.0271	0.0273	108	109	57.0-150	0.735	20	
n-Hexane	mg/kg	0.0250	0.0258	0.0253	103	101	55.0-137	1.96	20	
Isopropylbenzene (Cumene)	mg/kg	0.0250	0.0240	0.0244	96.0	97.6	72.0-127	1.65	20	
p-Isopropyltoluene	mg/kg	0.0250	0.0266	0.0268	106	107	72.0-133	0.749	20	
2-Butanone (MEK)	mg/kg	0.125	0.118	0.117	94.4	93.6	30.0-160	0.851	24	
Methylene Chloride	mg/kg	0.0250	0.0267	0.0259	107	104	68.0-123	3.04	20	
4-Methyl-2-pentanone (MIBK)	mg/kg	0.125	0.116	0.118	92.8	94.4	56.0-143	1.71	20	
Methyl-tert-butyl ether	mg/kg	0.0250	0.0248	0.0246	99.2	98.4	66.0-132	0.810	20	
Naphthalene	mg/kg	0.0250	0.0252	0.0259	101	104	59.0-130	2.74	20	
n-Propylbenzene	mg/kg	0.0250	0.0261	0.0262	104	105	74.0-126	0.382	20	
Styrene	mg/kg	0.0250	0.0245	0.0243	98.0	97.2	72.0-127	0.820	20	
1,1,1,2-Tetrachloroethane	mg/kg	0.0250	0.0237	0.0232	94.8	92.8	74.0-129	2.13	20	
1,1,2,2-Tetrachloroethane	mg/kg	0.0250	0.0251	0.0254	100	102	68.0-128	1.19	20	
Tetrachloroethene	mg/kg	0.0250	0.0236	0.0238	94.4	95.2	70.0-136	0.844	20	
Tetrahydrofuran	mg/kg	0.0250	0.0230	0.0235	92.0	94.0	37.0-146	2.15	24	
Toluene	mg/kg	0.0250	0.0234	0.0237	93.6	94.8	75.0-121	1.27	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

LABORATORY CONTROL SAMPLE & LCSD: R3982157-1 R3982157-2

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,2,3-Trichlorobenzene	mg/kg	0.0250	0.0266	0.0272	106	109	59.0-139	2.23	20	
1,2,4-Trichlorobenzene	mg/kg	0.0250	0.0267	0.0270	107	108	62.0-137	1.12	20	
1,2,4-Trimethylbenzene	mg/kg	0.0250	0.0252	0.0257	101	103	70.0-126	1.96	20	
1,3,5-Trimethylbenzene	mg/kg	0.0250	0.0254	0.0257	102	103	73.0-127	1.17	20	
1,1,1-Trichloroethane	mg/kg	0.0250	0.0243	0.0237	97.2	94.8	69.0-126	2.50	20	
1,1,2-Trichloroethane	mg/kg	0.0250	0.0237	0.0246	94.8	98.4	78.0-123	3.73	20	
Trichloroethene	mg/kg	0.0250	0.0249	0.0241	99.6	96.4	76.0-126	3.27	20	
Trichlorofluoromethane	mg/kg	0.0250	0.0288	0.0283	115	113	61.0-142	1.75	20	
1,1,2-Trichlorotrifluoroethane	mg/kg	0.0250	0.0266	0.0260	106	104	61.0-139	2.28	20	
1,2,3-Trichloropropane	mg/kg	0.0250	0.0257	0.0263	103	105	67.0-129	2.31	20	
Vinyl chloride	mg/kg	0.0250	0.0279	0.0277	112	111	63.0-134	0.719	20	
Xylene (Total)	mg/kg	0.0750	0.0717	0.0728	95.6	97.1	72.0-127	1.52	20	
1,2-Dichloroethane-d4 (S)	%				104	105	70.0-130			
Toluene-d8 (S)	%				98.3	101	75.0-131			
4-Bromofluorobenzene (S)	%				98.3	97.3	67.0-138			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

QC Batch: 2145541
QC Batch Method: 5035A
Analysis Method: EPA 8260D
Analysis Description: VOA (GC/MS) 8260D
Laboratory: Pace National - Mt. Juliet
Associated Lab Samples: 10669887004

METHOD BLANK: R3982724-3 Matrix: Solid
Associated Lab Samples: 10669887004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Xylene (Total)	mg/kg	ND	0.00300	10/05/23 17:06	
1,2-Dichloroethane-d4 (S)	%	100	70.0-130	10/05/23 17:06	
Toluene-d8 (S)	%	100	75.0-131	10/05/23 17:06	
4-Bromofluorobenzene (S)	%	97.7	67.0-138	10/05/23 17:06	

LABORATORY CONTROL SAMPLE & LCSD: R3982724-1 R3982724-2

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Xylene (Total)	mg/kg	0.0750	0.0791	0.0759	105	101	72.0-127	4.13	20	
1,2-Dichloroethane-d4 (S)	%				99.1	105	70.0-130			
Toluene-d8 (S)	%				102	101	75.0-131			
4-Bromofluorobenzene (S)	%				99.1	98.5	67.0-138			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

QC Batch: 909904
QC Batch Method: EPA 8260D
Analysis Method: EPA 8260D
Analysis Description: 8260D MSV TCLP
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10669887001, 10669887002, 10669887003, 10669887004, 10669887005, 10669887006, 10669887007

METHOD BLANK: 4789715 Matrix: Water
Associated Lab Samples: 10669887001, 10669887002, 10669887003, 10669887004, 10669887005, 10669887006, 10669887007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	25.0	10/04/23 17:46	
1,2-Dichlorobenzene-d4 (S)	%.	98	75-125	10/04/23 17:46	
4-Bromofluorobenzene (S)	%.	103	75-125	10/04/23 17:46	
Toluene-d8 (S)	%.	99	75-125	10/04/23 17:46	

METHOD BLANK: 4787762 Matrix: Solid
Associated Lab Samples: 10669887001, 10669887002, 10669887003, 10669887004, 10669887005, 10669887006, 10669887007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Benzene	ug/L	ND	25.0	10/04/23 17:46	
1,2-Dichlorobenzene-d4 (S)	%.	98	75-125	10/04/23 17:46	
4-Bromofluorobenzene (S)	%.	103	75-125	10/04/23 17:46	
Toluene-d8 (S)	%.	99	75-125	10/04/23 17:46	

LABORATORY CONTROL SAMPLE: 4789716

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Benzene	ug/L	500	470	94	75-125	
1,2-Dichlorobenzene-d4 (S)	%.			99	75-125	
4-Bromofluorobenzene (S)	%.			103	75-125	
Toluene-d8 (S)	%.			98	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4789717 4789718

Parameter	Units	10669606001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzene	ug/L	ND	500	500	477	485	95	97	66-127	2	30	
1,2-Dichlorobenzene-d4 (S)	%.						98	99	75-125			
4-Bromofluorobenzene (S)	%.						104	104	75-125			
Toluene-d8 (S)	%.						97	98	75-125			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

QC Batch: 908505
QC Batch Method: EPA 3546
Analysis Method: EPA 8270E by SIM
Analysis Description: 8270E Solid PAH by SIM MSSV
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10669887001, 10669887002, 10669887003, 10669887004, 10669887005, 10669887006, 10669887007

METHOD BLANK: 4782878 Matrix: Solid
Associated Lab Samples: 10669887001, 10669887002, 10669887003, 10669887004, 10669887005, 10669887006, 10669887007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1-Methylnaphthalene	ug/kg	ND	10.0	10/02/23 10:42	
2-Methylnaphthalene	ug/kg	ND	10.0	10/02/23 10:42	
Benzo(a)anthracene	ug/kg	ND	10.0	10/02/23 10:42	
Benzo(a)pyrene	ug/kg	ND	10.0	10/02/23 10:42	
Benzo(b)fluoranthene	ug/kg	ND	10.0	10/02/23 10:42	
Benzo(k)fluoranthene	ug/kg	ND	10.0	10/02/23 10:42	
Chrysene	ug/kg	ND	10.0	10/02/23 10:42	
Dibenz(a,h)anthracene	ug/kg	ND	10.0	10/02/23 10:42	
Indeno(1,2,3-cd)pyrene	ug/kg	ND	10.0	10/02/23 10:42	
Naphthalene	ug/kg	ND	10.0	10/02/23 10:42	
2-Fluorobiphenyl (S)	%.	74	54-125	10/02/23 10:42	
p-Terphenyl-d14 (S)	%.	105	60-125	10/02/23 10:42	

LABORATORY CONTROL SAMPLE: 4782879

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1-Methylnaphthalene	ug/kg	100	78.8	79	41-125	
2-Methylnaphthalene	ug/kg	100	77.8	78	45-125	
Benzo(a)anthracene	ug/kg	100	93.0	93	55-125	
Benzo(a)pyrene	ug/kg	100	89.4	89	69-125	
Benzo(b)fluoranthene	ug/kg	100	94.6	95	54-125	
Benzo(k)fluoranthene	ug/kg	100	90.4	90	65-125	
Chrysene	ug/kg	100	91.1	91	62-125	
Dibenz(a,h)anthracene	ug/kg	100	95.9	96	64-125	
Indeno(1,2,3-cd)pyrene	ug/kg	100	89.9	90	54-125	
Naphthalene	ug/kg	100	78.5	78	49-125	
2-Fluorobiphenyl (S)	%.			76	54-125	
p-Terphenyl-d14 (S)	%.			97	60-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4782880 4782881

Parameter	Units	10669868024 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1-Methylnaphthalene	ug/kg	26.0	221	218	305	262	126	108	30-125	15	30	M1
2-Methylnaphthalene	ug/kg	46.4	221	218	389	315	155	123	30-150	21	30	M1
Benzo(a)anthracene	ug/kg	179	221	218	682	541	228	166	30-131	23	30	M1
Benzo(a)pyrene	ug/kg	193	221	218	640	536	202	157	30-150	18	30	M1

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4782880 4782881

Parameter	Units	10669868024 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Benzo(b)fluoranthene	ug/kg	223	221	218	759	628	242	185	30-150	19	30	M1
Benzo(k)fluoranthene	ug/kg	111	221	218	473	401	164	133	41-130	16	30	M1
Chrysene	ug/kg	175	221	218	716	549	245	171	30-135	26	30	M1
Dibenz(a,h)anthracene	ug/kg	32.1	221	218	241	235	95	93	50-129	3	30	
Indeno(1,2,3-cd)pyrene	ug/kg	112	221	218	447	390	152	127	30-148	14	30	M1
Naphthalene	ug/kg	259	221	218	991	727	331	214	30-125	31	30	M1,R1
2-Fluorobiphenyl (S)	%.						74	72	54-125			
p-Terphenyl-d14 (S)	%.						85	88	60-125			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

QC Batch: 2143004
QC Batch Method: SM 2540 G
Analysis Method: SM 2540G
Analysis Description: Total Solids 2540 G-2011
Laboratory: Pace National - Mt. Juliet
Associated Lab Samples: 10669887001, 10669887002, 10669887003, 10669887004, 10669887005

METHOD BLANK: R3980842-1 Matrix: Solid
Associated Lab Samples: 10669887001, 10669887002, 10669887003, 10669887004, 10669887005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Solids	%	0.00100		10/02/23 13:53	

LABORATORY CONTROL SAMPLE: R3980842-2

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Solids	%	50.0	50.0	99.9	85.0-115	

SAMPLE DUPLICATE: R3980842-3

Parameter	Units	L1660457-41 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Solids	%	72.0	73.6	2.27	10	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

QC Batch: 2143008
QC Batch Method: SM 2540 G
Analysis Method: SM 2540G
Analysis Description: Total Solids 2540 G-2011
Laboratory: Pace National - Mt. Juliet
Associated Lab Samples: 10669887006, 10669887007

METHOD BLANK: R3980835-1 Matrix: Solid
Associated Lab Samples: 10669887006, 10669887007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Solids	%	0.00200		10/02/23 13:36	

LABORATORY CONTROL SAMPLE: R3980835-2

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Solids	%	50.0	50.0	100	85.0-115	

SAMPLE DUPLICATE: R3980835-3

Parameter	Units	L1660605-04 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Solids	%	91.4	90.7	0.747	10	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

QC Batch: 2142726
QC Batch Method: 3060A
Analysis Method: EPA 7196A
Analysis Description: Wet Chemistry 3060A/7196A
Laboratory: Pace National - Mt. Juliet
Associated Lab Samples: 10669887001, 10669887002, 10669887003, 10669887004, 10669887005, 10669887006, 10669887007

METHOD BLANK: R3980447-1 Matrix: Solid
Associated Lab Samples: 10669887001, 10669887002, 10669887003, 10669887004, 10669887005, 10669887006, 10669887007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chromium, Hexavalent	mg/kg	ND	2.00	10/02/23 12:26	

LABORATORY CONTROL SAMPLE: R3980447-2

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	mg/kg	24.0	21.9	91.4	80.0-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: R3980447-4 R3980447-5

Parameter	Units	10669887001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chromium, Hexavalent	mg/kg	ND	21.4	21.4	15.0	17.3	70.2	81.0	75.0-125	14.2	20	ML

MATRIX SPIKE SAMPLE: R3980447-6

Parameter	Units	10669887001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	mg/kg	ND	690	512	74.2	75.0-125	ML

SAMPLE DUPLICATE: R3980447-3

Parameter	Units	L1658367-02 Result	Dup Result	RPD	Max RPD	Qualifiers
Chromium, Hexavalent	mg/kg	ND	ND	0.00	20	

SAMPLE DUPLICATE: R3980447-8

Parameter	Units	10669887007 Result	Dup Result	RPD	Max RPD	Qualifiers
Chromium, Hexavalent	mg/kg	ND	ND	0.00	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

SAMPLE QUALIFIERS

Sample: R3980447-4

[1] Wet Chemistry by Method 3060A/7196A - MS failure due to matrix interference

Sample: R3980447-6

[1] Wet Chemistry by Method 3060A/7196A - MS failure due to matrix interference

ANALYTE QUALIFIERS

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
H1	Analysis conducted outside the recognized method holding time.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
ML	Matrix spike recovery and/or matrix spike duplicate recovery was below laboratory control limits. Result may be biased low.
N2	The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request.
R1	RPD value was outside control limits.

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10669887001	**B-1-23, 7.5ft**	EPA 3015A	911521	EPA 6010D	911602
10669887002	**B-2-23, 7ft**	EPA 3015A	911521	EPA 6010D	911602
10669887003	**B-3-23, 7ft**	EPA 3015A	911521	EPA 6010D	911602
10669887004	**B-4-23, 9ft**	EPA 3015A	911521	EPA 6010D	911602
10669887005	**B-5-23, 8.5ft**	EPA 3015A	911521	EPA 6010D	911602
10669887006	**B-6-23, 4.5ft**	EPA 3015A	911521	EPA 6010D	911602
10669887007	**B-7-23, 4ft**	EPA 3015A	911521	EPA 6010D	911602
10669887001	**B-1-23, 7.5ft**	EPA 3050B	908370	EPA 6020B	908636
10669887002	**B-2-23, 7ft**	EPA 3050B	908370	EPA 6020B	908636
10669887003	**B-3-23, 7ft**	EPA 3050B	908370	EPA 6020B	908636
10669887004	**B-4-23, 9ft**	EPA 3050B	908370	EPA 6020B	908636
10669887005	**B-5-23, 8.5ft**	EPA 3050B	908370	EPA 6020B	908636
10669887006	**B-6-23, 4.5ft**	EPA 3050B	908370	EPA 6020B	908636
10669887007	**B-7-23, 4ft**	EPA 3050B	908370	EPA 6020B	908636
10669887001	**B-1-23, 7.5ft**	EPA 7470A	911520	EPA 7470A	911614
10669887002	**B-2-23, 7ft**	EPA 7470A	911520	EPA 7470A	911614
10669887003	**B-3-23, 7ft**	EPA 7470A	911520	EPA 7470A	911614
10669887004	**B-4-23, 9ft**	EPA 7470A	911520	EPA 7470A	911614
10669887005	**B-5-23, 8.5ft**	EPA 7470A	911520	EPA 7470A	911614
10669887006	**B-6-23, 4.5ft**	EPA 7470A	911520	EPA 7470A	911614
10669887007	**B-7-23, 4ft**	EPA 7470A	911520	EPA 7470A	911614
10669887001	**B-1-23, 7.5ft**	EPA 7471B	909257	EPA 7471B	909357
10669887002	**B-2-23, 7ft**	EPA 7471B	909257	EPA 7471B	909357
10669887003	**B-3-23, 7ft**	EPA 7471B	909257	EPA 7471B	909357
10669887004	**B-4-23, 9ft**	EPA 7471B	909257	EPA 7471B	909357
10669887005	**B-5-23, 8.5ft**	EPA 7471B	909257	EPA 7471B	909357
10669887006	**B-6-23, 4.5ft**	EPA 7471B	909257	EPA 7471B	909357
10669887007	**B-7-23, 4ft**	EPA 7471B	909257	EPA 7471B	909357
10669887001	**B-1-23, 7.5ft**	ASTM D2974	909693		
10669887002	**B-2-23, 7ft**	ASTM D2974	909693		
10669887003	**B-3-23, 7ft**	ASTM D2974	909693		
10669887004	**B-4-23, 9ft**	ASTM D2974	909693		
10669887005	**B-5-23, 8.5ft**	ASTM D2974	909693		
10669887006	**B-6-23, 4.5ft**	ASTM D2974	909693		
10669887007	**B-7-23, 4ft**	ASTM D2974	909693		
10669887001	**B-1-23, 7.5ft**	EPA 3546	908505	EPA 8270E by SIM	909219
10669887002	**B-2-23, 7ft**	EPA 3546	908505	EPA 8270E by SIM	909219
10669887003	**B-3-23, 7ft**	EPA 3546	908505	EPA 8270E by SIM	909219
10669887004	**B-4-23, 9ft**	EPA 3546	908505	EPA 8270E by SIM	909219
10669887005	**B-5-23, 8.5ft**	EPA 3546	908505	EPA 8270E by SIM	909219
10669887006	**B-6-23, 4.5ft**	EPA 3546	908505	EPA 8270E by SIM	909219
10669887007	**B-7-23, 4ft**	EPA 3546	908505	EPA 8270E by SIM	909219
10669887001	**B-1-23, 7.5ft**	5035A	2145012	EPA 8260D	2145012
10669887002	**B-2-23, 7ft**	5035A	2144565	EPA 8260D	2144565
10669887003	**B-3-23, 7ft**	5035A	2145012	EPA 8260D	2145012

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: P66 Oily Water Sewer
Pace Project No.: 10669887

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10669887004	**B-4-23, 9ft**	5035A	2144565	EPA 8260D	2144565
10669887004	**B-4-23, 9ft**	5035A	2145541	EPA 8260D	2145541
10669887005	**B-5-23, 8.5ft**	5035A	2145012	EPA 8260D	2145012
10669887006	**B-6-23, 4.5ft**	5035A	2145012	EPA 8260D	2145012
10669887007	**B-7-23, 4ft**	5035A	2145012	EPA 8260D	2145012
10669887008	**Trip Blank**	5035A	2145434	EPA 8260D	2145434
10669887001	**B-1-23, 7.5ft**	EPA 8260D	909904		
10669887002	**B-2-23, 7ft**	EPA 8260D	909904		
10669887003	**B-3-23, 7ft**	EPA 8260D	909904		
10669887004	**B-4-23, 9ft**	EPA 8260D	909904		
10669887005	**B-5-23, 8.5ft**	EPA 8260D	909904		
10669887006	**B-6-23, 4.5ft**	EPA 8260D	909904		
10669887007	**B-7-23, 4ft**	EPA 8260D	909904		
10669887001	**B-1-23, 7.5ft**	SM 2540 G	2143004	SM 2540G	2143004
10669887002	**B-2-23, 7ft**	SM 2540 G	2143004	SM 2540G	2143004
10669887003	**B-3-23, 7ft**	SM 2540 G	2143004	SM 2540G	2143004
10669887004	**B-4-23, 9ft**	SM 2540 G	2143004	SM 2540G	2143004
10669887005	**B-5-23, 8.5ft**	SM 2540 G	2143004	SM 2540G	2143004
10669887006	**B-6-23, 4.5ft**	SM 2540 G	2143008	SM 2540G	2143008
10669887007	**B-7-23, 4ft**	SM 2540 G	2143008	SM 2540G	2143008
10669887001	**B-1-23, 7.5ft**	3060A	2142726	EPA 7196A	2142726
10669887002	**B-2-23, 7ft**	3060A	2142726	EPA 7196A	2142726
10669887003	**B-3-23, 7ft**	3060A	2142726	EPA 7196A	2142726
10669887004	**B-4-23, 9ft**	3060A	2142726	EPA 7196A	2142726
10669887005	**B-5-23, 8.5ft**	3060A	2142726	EPA 7196A	2142726
10669887006	**B-6-23, 4.5ft**	3060A	2142726	EPA 7196A	2142726
10669887007	**B-7-23, 4ft**	3060A	2142726	EPA 7196A	2142726
10669887001	**B-1-23, 7.5ft**	Trivalent Chromium Calculation	911376		
10669887002	**B-2-23, 7ft**	Trivalent Chromium Calculation	911376		
10669887003	**B-3-23, 7ft**	Trivalent Chromium Calculation	911376		
10669887004	**B-4-23, 9ft**	Trivalent Chromium Calculation	911376		
10669887005	**B-5-23, 8.5ft**	Trivalent Chromium Calculation	911376		
10669887006	**B-6-23, 4.5ft**	Trivalent Chromium Calculation	911376		
10669887007	**B-7-23, 4ft**	Trivalent Chromium Calculation	911376		

REPORT OF LABORATORY ANALYSIS

Pace® Location Requested (City/State):
Pace Analytical Minnesota
1700 Elm Street, Suite 200
Minneapolis, MN 55414

CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

WO# : 10669887

10669887

Company Name:	Phillips66_Whatcom Environmental	Contact/Report To:	Joe Sumera
Street Address:	3901 Unick Road, Ferndale, WA 98248	Phone #:	(360)384-7870
		E-Mail:	joe.e.sumera@p66.com
		Cc E-Mail:	
Customer Project #:		Invoice To:	Joe Sumera
Project Name:	P66 Oily Water Sewer	Invoice E-Mail:	joe.e.sumera@p66.com
Site Collection Info/Facility ID (as applicable):		Purchase Order # (if applicable):	
		Quote #:	
Time Zone Collected: [ ] AK [ ] PT [ ] MT [ ] CT [ ] ET		County / State origin of sample(s):	Washington

Data Deliverables:
[ ] Level II [ ] Level III [ ] Level IV
[ ] EQUIS
[ ] Other_____

Regulatory Program (DW, RCRA, etc.) as applicable:

Rush (Pre-approval required):
[ ] 2 Day [ ] 3 day [ ] 5 day [ ] Other_____

DW PWSID # or WW Permit # as applicable:

Date Results Requested:

Field Filtered (if applicable): [ ] Yes [ ] No
Analysis:

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Waste Water (WW), Product (P), Soil/Solid (SS), Oil (OL), Wipe (WP), Tissue (TS), Bioassay (B), Vapor (V), Other (OT), Surface Water (SW),Sediment (SED), Sludge (SL), Caulk

Specify Container Size **
Identify Container Preservative Type***
Analysis Requested

**Container Size: (1) 1L, (2) 500mL, (3) 250mL, (4) 125mL, (5) 100mL, (6) 40mL vial, (7) EnCore, (8) TerraCore, (9) Other

*** Preservative Types: (1) None, (2) HNO3, (3) H2SO4, (4) HCl, (5) NaOH, (6) Zn Acetate, (7) NaHSO4, (8) Sod. Thiosulfate, (9) Ascorbic Acid, (10) MeOH, (11) Other

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res. Cl2	Number & Type of Containers Plastic	Number & Type of Containers Glass	- EPA Method 8260 – BTEXs and HVOCs	8270E SIMNaphthalenes & cPAHs	Dry Weight / %M by ASTM D2974	EPA Method 6020/7471 As,Cd,Cr,Pb,Ni,Zn,Hg	Cr VI	NWTPH-EPH	NWTPH-VPH	TCLP Benzene	TCLP metals	Sample Comment
B-1-23, 7.5ft	SS	G	9/21/2023	1:30pm				1	13	X	X	X	X	X	X	X	X	X	001
B-2-23, 7ft	SS	G	9/20/2023	12:25pm				1	13	X	X	X	X	X	X	X	X	X	002
B-3-23, 7ft	SS	G	9/21/2023	2:00pm				1	13	X	X	X	X	X	X	X	X	X	003
B-4-23, 9ft	SS	G	9/20/2023	2:40pm				1	13	X	X	X	X	X	X	X	X	X	004
B-5-23, 8.5ft	SS	G	9/21/2023	9:00am				1	13	X	X	X	X	X	X	X	X	X	005
B-6-23, 4.5ft	SS	G	9/21/2023	10:30am				1	13	X	X	X	X	X	X	X	X	X	006
B-7-23, 4ft	SS	G	9/21/2023	11:30am				1	13	X	X	X	X	X	X	X	X	X	007

Lab Use Only
Proj. Mgr: Jennifer Gross
AcctNum / Client ID:
Table #:
Profile / Template: 33194
Prelog / Bottle Ord. ID: EZ 3002119

Preservation non-conformance identified for sample.

Customer Remarks / Special Conditions / Possible Hazards:
Standard time

Collected By:
Printed Name: Meagan Everson
Signature:

Additional Instructions from Pace®:

# Coolers:	Thermometer ID:	Correction Factor (°C):	Obs. Temp. (°C)	Corrected Temp. (°C)

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Meagan Everson / WES	9/22/23 1430		9/23/23 940
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

Tracking Number:

Delivered by: [ ] In- Person [ ] Courier [ ] FedEx [ ] UPS [ ] Other

Page: 1 of 2

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace® Terms and Conditions found at https://www.pacelabs.com/resource-library/resource/pace-terms-and-conditions/

ENV-FRM-CORQ-0019_v01_082123 ©

0.8, 0.9, 1.3

Sample Condition Upon Receipt

Client Name: Phillips 66

Project #: WO#: 10669887

PM: JMG Due Date: 10/09/23
CLIENT: COP

Courier: [X] FedEx [ ] UPS [ ] USPS [ ] Client [ ] Pace [ ] SpeeDee [ ] Commercial

Tracking Number: 7734 7883 1678 [ ] See Exceptions ENV-FRM-MIN4-0142

Custody Seal on Cooler/Box Present? [X] Yes [ ] No **Seals Intact?** [X] Yes [ ] No **Biological Tissue Frozen?** [ ] Yes [ ] No [X] N/A

Packing Material: [X] Bubble Wrap [X] Bubble Bags [ ] None [ ] Other **Temp Blank?** [X] Yes [ ] No

Thermometer: [ ] T1 (0461) [ ] T2 (0436) [ ] T3 (0459) [X] T4 (0402) [ ] T5 (0178) [ ] T6 (0235) [ ] T7 (0042) [ ] T8 (0775) [ ] T9(0727) [ ] 01339252/1710 **Type of Ice:** [X] Wet [ ] Blue [ ] Dry [ ] None [ ] Melted

Did Samples Originate in West Virginia? [ ] Yes [X] No **Were All Container Temps Taken?** [ ] Yes [ ] No [X] N/A

Temp should be above freezing to 6 °C **Cooler temp Read w/Temp Blank:** 1.3 0.8 °C

Correction Factor: True **Cooler Temp Corrected w/temp blank:** 1.3 0.8

Average Corrected Temp (no temp blank only): _____ °C [ ] See Exceptions ENV-FRM-MIN4-0142 [ ] 1 Container

USDA Regulated Soil: ([ ] N/A, water sample/other: _____)

Date/Initials of Person Examining Contents: MKZ 9/25/23

Did samples originate in a quarantine zone within the United States: AL, AR, AZ CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX, or VA (check maps)? [ ] Yes [X] No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? [ ] Yes [X] No

If Yes to either question, fill out a Regulated Soil Checklist (ENV-FRM-MIN4-0154) and include with SCUR/COC paperwork.

Location (Check one): [ ] Duluth [X] Minneapolis [ ] Virginia				**COMMENTS**
Chain of Custody Present and Filled Out?	[X] Yes	[ ] No		1.
Chain of Custody Relinquished?	[X] Yes	[ ] No		2.
Sampler Name and/or Signature on COC?	[X] Yes	[ ] No	[ ] N/A	3.
Samples Arrived within Hold Time?	[X] Yes	[ ] No		4. If fecal: [ ] <8 hrs [ ] >8 hr, <24 [ ] No
Short Hold Time Analysis (<72 hr)?	[ ] Yes	[X] No		5. [ ] Fecal Coliform [ ] HPC [ ] Total Coliform/E.coli [ ] BOD/cBOD [ ] Hex Chrom [ ] Turbidity [ ] Nitrate [ ] Nitrite [ ] Orthophos [ ] Other
Rush Turn Around Time Requested?	[ ] Yes	[X] No		6.
Sufficient Sample Volume?	[X] Yes	[ ] No		7.
Correct Containers Used?	[X] Yes	[ ] No	[ ] N/A	8.
-Pace Containers Used?	JMG 9/25/23 [X] Yes	[ ] No		
Containers Intact?	[X] Yes	[ ] No		9.
Field Filtered Volume Received for Dissolved Tests?	[ ] Yes	[ ] No	[X] N/A	10. Is sediment visible in the dissolved container? [ ] Yes [ ] No
Is sufficient information available to reconcile the samples to the COC?	[X] Yes	[ ] No		11. **If no, write ID/Date/Time of container below:** [ ] See Exceptions ENV-FRM-MIN4-0142
Matrix: [ ] Water [X] Soil [ ] Oil [ ] Other				
All containers needing acid/base preservation have been checked?	[ ] Yes	[ ] No	[X] N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO3, H2SO4, <2pH, NaOH >9 Sulfide, NaOH>10 Cyanide)	[ ] Yes	[ ] No	[X] N/A	[ ] NaOH [ ] HNO3 [ ] H2SO4 [ ] Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxins/PFAS (*If adding preservative to a container, it must be added to associated field and equipment blanks--verify with PM first.)	[ ] Yes	[ ] No	[X] N/A	Positive for Residual Chlorine? [ ] Yes [ ] No [ ] See Exceptions ENV-FRM-MIN4-0142
				pH Paper Lot #
				Residual Chlorine | 0-6 Roll | 0-6 Strip | 0-14 Strip
Headspace in Methyl Mercury Container?	[ ] Yes	[ ] No	[X] N/A	13.
Extra labels present on soil VOA or WIDRO containers?	[X] Yes	[ ] No	[ ] N/A	14. [ ] See Exceptions ENV-FRM-MIN4-0142
Headspace in VOA Vials (greater than 6mm)?	[ ] Yes	[ ] No	[X] N/A	
3 Trip Blanks Present?	[X] Yes	[ ] No	[ ] N/A	15. 4 MEOH
Trip Blank Custody Seals Present?	[X] Yes	[ ] No	[ ] N/A	Pace Trip Blank Lot # (if purchased): 07277.3

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** [ ] Yes [ ] No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: Jenni Gross **Date:** 9/25/23

NOTE: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e., out of hold, incorrect preservative, out of temp, incorrect containers).

Labeled By: MKZ **Line:** 1

RE: P66 Oily Water Sewer

Eric Libolt <elibolt@whatcom-es.com>

Mon 9/25/2023 4:30 PM

To:Matt Roberts <MRoberts@whatcom-es.com>;Jennifer Gross <Jennifer.Gross@pacelabs.com>;Megan Everson <meverson@whatcom-es.com>;Henry Cade <hcade@whatcom-es.com>

The TCLP Metals should by the RCRA 8 list.

For the 8270SIM we want the various cPAHs and naphthalene including 1-methlynaphthalene and 2-methlynaphthalene. Here is a list of the cPAHs that we need:

Benzo[A]Anthracene
Benzo[A]Pyrene
Benzo[B]Fluoranthene
Benzo[K]fluoranthene
Chrysene
Dibenz[A,H]Anthracene
Indeno[1,2,3-Cd]Pyrene

Eric

From: Matt Roberts <MRoberts@whatcom-es.com>
Sent: Monday, September 25, 2023 3:54 PM
To: Jennifer Gross <Jennifer.Gross@pacelabs.com>; Eric Libolt <elibolt@whatcom-es.com>; Megan Everson <meverson@whatcom-es.com>; Henry Cade <hcade@whatcom-es.com>
Subject: RE: P66 Oily Water Sewer

Hi Jenni,

For the 8270SIM we want the various cPAHs and naphthalene including 1-methlynaphthalene and 2-methlynaphthalene.

The TCLP Metals should be for the same metals that were extracted for in the 7471 run (arsenic, cadmium, chromium III, chromium IV, lead, nickel, mercury, and zinc).

For NWTPH-VPH we want all the various petroleum fractions as documented in the Guidance for Remediation of Petroleum Contaminated Sites and MTCA (Aliphatic EC 5-6, Aliphatic EC>6-8, Aliphatic EC>8-10, Aliphatic EC>10-12, Aromatic EC>8-10, Aromatic EC>10-12, Aromatic EC>12-13)

Does this sound correct Eric?

Thanks,
Matt Roberts

Whatcom Environmental Services
228 E. Champion St. #101
Bellingham, WA 98225

Internal Transfer Chain of Custody

1165

☐ Samples Pre-Logged into eCOC.

State Of Origin: WA

Cert. Needed: [x] Yes ☐ No

Workorder: 10669887 **Workorder Name:** P66 Oily Water Sewer **Owner Received Date:** 9/23/2023 **Results Requested By:** 10/9/2023

Report To	Subcontract To
Jennifer Gross Pace Analytical Minnesota 1700 Elm Street Minneapolis, MN 55414 Phone (612)607-1700	Pace National 12065 Lebanon Rd Mt. Juliet, TN 37122 Phone (615) 758-5858

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers: JGCU	VG9B	VG9M				7196A Cr VI (PACE-TN)	8260D Low Level VOCs (PACE-TN)	Total Solids (PACE-TN)	Use bisulfate vials first									L1660512 LAB USE ONLY
1	B-1-23, 7.5ft	PS	9/21/2023 13:30	10669887001	Solid	1	2	2				X	X	X	X									01
2	B-2-23, 7ft	PS	9/20/2023 12:25	10669887002	Solid	1	2	2				X	X	X	X									02
3	B-3-23, 7ft	PS	9/21/2023 14:00	10669887003	Solid	1	2	2				X	X	X	X									03
4	B-4-23, 9ft	PS	9/20/2023 14:40	10669887004	Solid	1	2	2				X	X	X	X									04
5	B-5-23, 8.5ft	PS	9/21/2023 09:00	10669887005	Solid	1	2	2				X	X	X	X									05
6	B-6-23, 4.5ft	PS	9/21/2023 10:30	10669887006	Solid	1	2	2				X	X	X	X									06
7	B-7-23, 4ft	PS	9/21/2023 11:30	10669887007	Solid	1	2	2				X	X	X	X									07
8	Trip Blank	PS	9/20/2023 00:00	10669887008	Solid			2					X											08

Transfers	Released By	Date/Time	Received By	Date/Time
1	Brian Coen/PACE	9/27/23 11:45	Taylor Newell	9.28.23 0900
2				
3				

Comments

8260 AP9, use bisulfate vials first

Cooler Temperature on Receipt	Custody Seal	Received on Ice	Samples Intact
DRAFT 3.2= 1.3 °C	~~Y~~ or N	~~Y~~ or N	Y or N

***In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document.
This chain of custody is considered complete as is since this information is available in the owner laboratory.

Sample Receipt Checklist

COC Seal Present/Intact:	Y N	If Applicable	
COC Signed/Accurate:	Y N	VOA Zero Headspace:	Y N
Bottles arrive intact:	Y N	Pres. Correct/Check:	Y N
Correct bottles used:	Y N		
Sufficient volume sent:	Y N		
RA Screen <0.5 mR/hr:	Y N	641765639 8641	

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Pace Analytical Minnesota
Jenni Gross
1700 Elm Street, Ste. 200
Minneapolis, MN 55414

RE: P66 Oily Water Sewer
Work Order Number: 2309498

October 12, 2023

Attention Jenni Gross:

Fremont Analytical, Inc. received 7 sample(s) on 9/28/2023 for the analyses presented in the following report.

Extractable Petroleum Hydrocarbons by NWEPH
Sample Moisture (Percent Moisture)
Volatile Petroleum Hydrocarbons by NWVPH

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

Date: *10/12/2023*

CLIENT: Pace Analytical Minnesota
Project: P66 Oily Water Sewer
Work Order: 2309498

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2309498-001	B-1-23, 7.5ft	09/21/2023 1:30 PM	09/28/2023 11:15 AM
2309498-002	B-2-23, 7ft	09/20/2023 12:25 PM	09/28/2023 11:15 AM
2309498-003	B-3-23, 7ft	09/21/2023 2:00 PM	09/28/2023 11:15 AM
2309498-004	B-4-23, 9ft	09/20/2023 2:40 PM	09/28/2023 11:15 AM
2309498-005	B-5-23, 8.5ft	09/21/2023 9:00 AM	09/28/2023 11:15 AM
2309498-006	B-6-23, 4.5ft	09/21/2023 10:30 AM	09/28/2023 11:15 AM
2309498-007	B-7-23, 4ft	09/21/2023 11:30 AM	09/28/2023 11:15 AM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Original

Case Narrative

WO#: **2309498**

Date: **10/12/2023**

CLIENT: Pace Analytical Minnesota

Project: P66 Oily Water Sewer

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
DUP - Sample Duplicate
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MCL - Maximum Contaminant Level
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
REP - Sample Replicate
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **2309498**
Date Reported: **10/12/2023**

CLIENT: Pace Analytical Minnesota
Project: P66 Oily Water Sewer

Lab ID: 2309498-001 **Collection Date:** 9/21/2023 1:30:00 PM
Client Sample ID: **B-1-23, 7.5ft** **Matrix:** Soil

Analyses	Result	MDL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 41591		Analyst: AP
Aliphatic Hydrocarbon (C8-C10)	ND	10.3		mg/Kg-dry	1	10/11/2023 11:03:05 AM
Aliphatic Hydrocarbon (C10-C12)	ND	4.67		mg/Kg-dry	1	10/11/2023 11:03:05 AM
Aliphatic Hydrocarbon (C12-C16)	ND	1.99		mg/Kg-dry	1	10/11/2023 11:03:05 AM
Aliphatic Hydrocarbon (C16-C21)	ND	3.98		mg/Kg-dry	1	10/11/2023 11:03:05 AM
Aliphatic Hydrocarbon (C21-C34)	7.47	6.39	J	mg/Kg-dry	1	10/11/2023 11:03:05 AM
Aromatic Hydrocarbon (C8-C10)	ND	7.09		mg/Kg-dry	1	10/11/2023 3:24:22 PM
Aromatic Hydrocarbon (C10-C12)	ND	3.32		mg/Kg-dry	1	10/11/2023 3:24:22 PM
Aromatic Hydrocarbon (C12-C16)	ND	2.29		mg/Kg-dry	1	10/11/2023 3:24:22 PM
Aromatic Hydrocarbon (C16-C21)	5.29	5.28	J	mg/Kg-dry	1	10/11/2023 3:24:22 PM
Aromatic Hydrocarbon (C21-C34)	9.99	7.80	J	mg/Kg-dry	1	10/11/2023 3:24:22 PM
Surr: 1-Chlorooctadecane	60.8	50 - 150		%Rec	1	10/11/2023 11:03:05 AM
Surr: o-Terphenyl	71.3	50 - 150		%Rec	1	10/11/2023 3:24:22 PM
Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 41637		Analyst: MS
Aliphatic Hydrocarbon (C5-C6)	0.641	0.335	J	mg/Kg-dry	1	9/29/2023 6:01:00 PM
Aliphatic Hydrocarbon (C6-C8)	ND	0.548		mg/Kg-dry	1	9/29/2023 6:01:00 PM
Aliphatic Hydrocarbon (C8-C10)	ND	1.46		mg/Kg-dry	1	9/29/2023 6:01:00 PM
Aliphatic Hydrocarbon (C10-C12)	ND	0.387		mg/Kg-dry	1	9/29/2023 6:01:00 PM
Aromatic Hydrocarbon (C8-C10)	0.382	0.224	J	mg/Kg-dry	1	9/29/2023 6:01:00 PM
Aromatic Hydrocarbon (C10-C12)	ND	0.440		mg/Kg-dry	1	9/29/2023 6:01:00 PM
Aromatic Hydrocarbon (C12-C13)	ND	0.731		mg/Kg-dry	1	9/29/2023 6:01:00 PM
Surr: 2,5-dibromotoluene	90.7	60 - 140		%Rec	1	9/29/2023 6:01:00 PM
Sample Moisture (Percent Moisture)				Batch ID: R86856		Analyst: MP
Percent Moisture	6.87	0.100		wt%	1	10/2/2023 8:41:07 AM

Analytical Report

Work Order: **2309498**
Date Reported: **10/12/2023**

CLIENT: Pace Analytical Minnesota
Project: P66 Oily Water Sewer

Lab ID: 2309498-002 **Collection Date:** 9/20/2023 12:25:00 PM
Client Sample ID: **B-2-23, 7ft** **Matrix:** Soil

Analyses	Result	MDL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 41591		Analyst: AP
Aliphatic Hydrocarbon (C8-C10)	ND	11.5		mg/Kg-dry	1	10/11/2023 11:24:43 AM
Aliphatic Hydrocarbon (C10-C12)	ND	5.22		mg/Kg-dry	1	10/11/2023 11:24:43 AM
Aliphatic Hydrocarbon (C12-C16)	2.24	2.22	J	mg/Kg-dry	1	10/11/2023 11:24:43 AM
Aliphatic Hydrocarbon (C16-C21)	ND	4.44		mg/Kg-dry	1	10/11/2023 11:24:43 AM
Aliphatic Hydrocarbon (C21-C34)	7.69	7.14	J	mg/Kg-dry	1	10/11/2023 11:24:43 AM
Aromatic Hydrocarbon (C8-C10)	ND	7.92		mg/Kg-dry	1	10/11/2023 3:46:05 PM
Aromatic Hydrocarbon (C10-C12)	ND	3.71		mg/Kg-dry	1	10/11/2023 3:46:05 PM
Aromatic Hydrocarbon (C12-C16)	4.09	2.55	J	mg/Kg-dry	1	10/11/2023 3:46:05 PM
Aromatic Hydrocarbon (C16-C21)	10.2	5.89	J	mg/Kg-dry	1	10/11/2023 3:46:05 PM
Aromatic Hydrocarbon (C21-C34)	10.8	8.71	J	mg/Kg-dry	1	10/11/2023 3:46:05 PM
Surr: 1-Chlorooctadecane	57.4	50 - 150		%Rec	1	10/11/2023 11:24:43 AM
Surr: o-Terphenyl	52.8	50 - 150		%Rec	1	10/11/2023 3:46:05 PM
Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 41637		Analyst: MS
Aliphatic Hydrocarbon (C5-C6)	1.48	0.318	J	mg/Kg-dry	1	9/29/2023 6:37:00 PM
Aliphatic Hydrocarbon (C6-C8)	2.65	0.519		mg/Kg-dry	1	9/29/2023 6:37:00 PM
Aliphatic Hydrocarbon (C8-C10)	ND	1.39		mg/Kg-dry	1	9/29/2023 6:37:00 PM
Aliphatic Hydrocarbon (C10-C12)	1.48	0.366	J	mg/Kg-dry	1	9/29/2023 6:37:00 PM
Aromatic Hydrocarbon (C8-C10)	2.00	0.213	J	mg/Kg-dry	1	9/29/2023 6:37:00 PM
Aromatic Hydrocarbon (C10-C12)	1.87	0.416	J	mg/Kg-dry	1	9/29/2023 6:37:00 PM
Aromatic Hydrocarbon (C12-C13)	1.93	0.692	J	mg/Kg-dry	1	9/29/2023 6:37:00 PM
Surr: 2,5-dibromotoluene	81.4	60 - 140		%Rec	1	9/29/2023 6:37:00 PM
Sample Moisture (Percent Moisture)				Batch ID: R86856		Analyst: MP
Percent Moisture	17.8	0.100		wt%	1	10/2/2023 8:41:07 AM

Analytical Report

Work Order: **2309498**
Date Reported: **10/12/2023**

CLIENT: Pace Analytical Minnesota
Project: P66 Oily Water Sewer

Lab ID: 2309498-003 **Collection Date:** 9/21/2023 2:00:00 PM
Client Sample ID: **B-3-23, 7ft** **Matrix:** Soil

Analyses	Result	MDL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 41591		Analyst: AP
Aliphatic Hydrocarbon (C8-C10)	ND	13.1		mg/Kg-dry	1	10/11/2023 11:46:23 AM
Aliphatic Hydrocarbon (C10-C12)	ND	5.97		mg/Kg-dry	1	10/11/2023 11:46:23 AM
Aliphatic Hydrocarbon (C12-C16)	26.8	2.54		mg/Kg-dry	1	10/11/2023 11:46:23 AM
Aliphatic Hydrocarbon (C16-C21)	35.6	5.08		mg/Kg-dry	1	10/11/2023 11:46:23 AM
Aliphatic Hydrocarbon (C21-C34)	9.22	8.16	J	mg/Kg-dry	1	10/11/2023 11:46:23 AM
Aromatic Hydrocarbon (C8-C10)	ND	9.05		mg/Kg-dry	1	10/11/2023 4:07:49 PM
Aromatic Hydrocarbon (C10-C12)	ND	4.24		mg/Kg-dry	1	10/11/2023 4:07:49 PM
Aromatic Hydrocarbon (C12-C16)	3.57	2.92	J	mg/Kg-dry	1	10/11/2023 4:07:49 PM
Aromatic Hydrocarbon (C16-C21)	ND	6.74		mg/Kg-dry	1	10/11/2023 4:07:49 PM
Aromatic Hydrocarbon (C21-C34)	11.1	9.96	J	mg/Kg-dry	1	10/11/2023 4:07:49 PM
Surr: 1-Chlorooctadecane	60.6	50 - 150		%Rec	1	10/11/2023 11:46:23 AM
Surr: o-Terphenyl	62.3	50 - 150		%Rec	1	10/11/2023 4:07:49 PM
Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 41637		Analyst: MS
Aliphatic Hydrocarbon (C5-C6)	1.14	0.363	J	mg/Kg-dry	1	9/29/2023 7:49:00 PM
Aliphatic Hydrocarbon (C6-C8)	ND	0.593		mg/Kg-dry	1	9/29/2023 7:49:00 PM
Aliphatic Hydrocarbon (C8-C10)	ND	1.59		mg/Kg-dry	1	9/29/2023 7:49:00 PM
Aliphatic Hydrocarbon (C10-C12)	0.422	0.419	J	mg/Kg-dry	1	9/29/2023 7:49:00 PM
Aromatic Hydrocarbon (C8-C10)	0.845	0.243	J	mg/Kg-dry	1	9/29/2023 7:49:00 PM
Aromatic Hydrocarbon (C10-C12)	0.482	0.476	J	mg/Kg-dry	1	9/29/2023 7:49:00 PM
Aromatic Hydrocarbon (C12-C13)	ND	0.792		mg/Kg-dry	1	9/29/2023 7:49:00 PM
Surr: 2,5-dibromotoluene	94.4	60 - 140		%Rec	1	9/29/2023 7:49:00 PM
Sample Moisture (Percent Moisture)				Batch ID: R86856		Analyst: MP
Percent Moisture	24.2	0.100		wt%	1	10/2/2023 8:41:07 AM

Analytical Report

Work Order: **2309498**
Date Reported: **10/12/2023**

CLIENT: Pace Analytical Minnesota
Project: P66 Oily Water Sewer

Lab ID: 2309498-004 **Collection Date:** 9/20/2023 2:40:00 PM
Client Sample ID: **B-4-23, 9ft** **Matrix:** Soil

Analyses	Result	MDL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 41591		Analyst: AP
Aliphatic Hydrocarbon (C8-C10)	ND	10.7		mg/Kg-dry	1	10/11/2023 12:08:10 PM
Aliphatic Hydrocarbon (C10-C12)	ND	4.88		mg/Kg-dry	1	10/11/2023 12:08:10 PM
Aliphatic Hydrocarbon (C12-C16)	ND	2.08		mg/Kg-dry	1	10/11/2023 12:08:10 PM
Aliphatic Hydrocarbon (C16-C21)	ND	4.15		mg/Kg-dry	1	10/11/2023 12:08:10 PM
Aliphatic Hydrocarbon (C21-C34)	8.09	6.67	J	mg/Kg-dry	1	10/11/2023 12:08:10 PM
Aromatic Hydrocarbon (C8-C10)	ND	7.40		mg/Kg-dry	1	10/11/2023 4:29:40 PM
Aromatic Hydrocarbon (C10-C12)	ND	3.46		mg/Kg-dry	1	10/11/2023 4:29:40 PM
Aromatic Hydrocarbon (C12-C16)	ND	2.38		mg/Kg-dry	1	10/11/2023 4:29:40 PM
Aromatic Hydrocarbon (C16-C21)	7.87	5.51	J	mg/Kg-dry	1	10/11/2023 4:29:40 PM
Aromatic Hydrocarbon (C21-C34)	9.68	8.14	J	mg/Kg-dry	1	10/11/2023 4:29:40 PM
Surr: 1-Chlorooctadecane	57.2	50 - 150		%Rec	1	10/11/2023 12:08:10 PM
Surr: o-Terphenyl	67.5	50 - 150		%Rec	1	10/11/2023 4:29:40 PM
Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 41637		Analyst: MS
Aliphatic Hydrocarbon (C5-C6)	0.574	0.316	J	mg/Kg-dry	1	9/29/2023 8:25:00 PM
Aliphatic Hydrocarbon (C6-C8)	ND	0.516		mg/Kg-dry	1	9/29/2023 8:25:00 PM
Aliphatic Hydrocarbon (C8-C10)	ND	1.38		mg/Kg-dry	1	9/29/2023 8:25:00 PM
Aliphatic Hydrocarbon (C10-C12)	ND	0.364		mg/Kg-dry	1	9/29/2023 8:25:00 PM
Aromatic Hydrocarbon (C8-C10)	0.591	0.211	J	mg/Kg-dry	1	9/29/2023 8:25:00 PM
Aromatic Hydrocarbon (C10-C12)	ND	0.414		mg/Kg-dry	1	9/29/2023 8:25:00 PM
Aromatic Hydrocarbon (C12-C13)	ND	0.688		mg/Kg-dry	1	9/29/2023 8:25:00 PM
Surr: 2,5-dibromotoluene	94.3	60 - 140		%Rec	1	9/29/2023 8:25:00 PM
Sample Moisture (Percent Moisture)				Batch ID: R86856		Analyst: MP
Percent Moisture	16.8	0.100		wt%	1	10/2/2023 8:41:07 AM

Analytical Report

Work Order: **2309498**
Date Reported: **10/12/2023**

CLIENT: Pace Analytical Minnesota
Project: P66 Oily Water Sewer

Lab ID: 2309498-005 **Collection Date:** 9/21/2023 9:00:00 AM
Client Sample ID: **B-5-23, 8.5ft** **Matrix:** Soil

Analyses	Result	MDL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 41591		Analyst: AP
Aliphatic Hydrocarbon (C8-C10)	ND	11.1		mg/Kg-dry	1	10/11/2023 12:29:53 PM
Aliphatic Hydrocarbon (C10-C12)	ND	5.04		mg/Kg-dry	1	10/11/2023 12:29:53 PM
Aliphatic Hydrocarbon (C12-C16)	14.8	2.15		mg/Kg-dry	1	10/11/2023 12:29:53 PM
Aliphatic Hydrocarbon (C16-C21)	11.6	4.29		mg/Kg-dry	1	10/11/2023 12:29:53 PM
Aliphatic Hydrocarbon (C21-C34)	ND	6.90		mg/Kg-dry	1	10/11/2023 12:29:53 PM
Aromatic Hydrocarbon (C8-C10)	ND	7.65		mg/Kg-dry	1	10/11/2023 4:51:17 PM
Aromatic Hydrocarbon (C10-C12)	ND	3.58		mg/Kg-dry	1	10/11/2023 4:51:17 PM
Aromatic Hydrocarbon (C12-C16)	8.03	2.47	J	mg/Kg-dry	1	10/11/2023 4:51:17 PM
Aromatic Hydrocarbon (C16-C21)	19.0	5.69		mg/Kg-dry	1	10/11/2023 4:51:17 PM
Aromatic Hydrocarbon (C21-C34)	9.45	8.41	J	mg/Kg-dry	1	10/11/2023 4:51:17 PM
Surr: 1-Chlorooctadecane	55.5	50 - 150		%Rec	1	10/11/2023 12:29:53 PM
Surr: o-Terphenyl	75.0	50 - 150		%Rec	1	10/11/2023 4:51:17 PM
Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 41637		Analyst: MS
Aliphatic Hydrocarbon (C5-C6)	0.461	0.318	J	mg/Kg-dry	1	9/29/2023 10:49:00 PM
Aliphatic Hydrocarbon (C6-C8)	4.47	0.519		mg/Kg-dry	1	9/29/2023 10:49:00 PM
Aliphatic Hydrocarbon (C8-C10)	22.0	1.39	Q	mg/Kg-dry	1	9/29/2023 10:49:00 PM
Aliphatic Hydrocarbon (C10-C12)	14.3	0.367		mg/Kg-dry	1	9/29/2023 10:49:00 PM
Aromatic Hydrocarbon (C8-C10)	18.8	0.213		mg/Kg-dry	1	9/29/2023 10:49:00 PM
Aromatic Hydrocarbon (C10-C12)	11.3	0.417		mg/Kg-dry	1	9/29/2023 10:49:00 PM
Aromatic Hydrocarbon (C12-C13)	11.9	0.693		mg/Kg-dry	1	9/29/2023 10:49:00 PM
Surr: 2,5-dibromotoluene	95.0	60 - 140		%Rec	1	9/29/2023 10:49:00 PM

NOTES:
Q - Associated calibration verification is above acceptance criteria (127%, nominal 80-120). Result may be high-biased.

Sample Moisture (Percent Moisture)				Batch ID: R86856		Analyst: MP
Percent Moisture	20.5	0.100		wt%	1	10/2/2023 8:41:07 AM

Analytical Report

Work Order: **2309498**
Date Reported: **10/12/2023**

CLIENT: Pace Analytical Minnesota
Project: P66 Oily Water Sewer

Lab ID: 2309498-006 **Collection Date:** 9/21/2023 10:30:00 AM
Client Sample ID: **B-6-23, 4.5ft** **Matrix:** Soil

Analyses	Result	MDL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 41591		Analyst: AP
Aliphatic Hydrocarbon (C8-C10)	ND	11.3		mg/Kg-dry	1	10/11/2023 12:51:37 PM
Aliphatic Hydrocarbon (C10-C12)	ND	5.12		mg/Kg-dry	1	10/11/2023 12:51:37 PM
Aliphatic Hydrocarbon (C12-C16)	10.8	2.18	J	mg/Kg-dry	1	10/11/2023 12:51:37 PM
Aliphatic Hydrocarbon (C16-C21)	23.6	4.36		mg/Kg-dry	1	10/11/2023 12:51:37 PM
Aliphatic Hydrocarbon (C21-C34)	7.87	7.00	J	mg/Kg-dry	1	10/11/2023 12:51:37 PM
Aromatic Hydrocarbon (C8-C10)	ND	7.77		mg/Kg-dry	1	10/11/2023 5:13:01 PM
Aromatic Hydrocarbon (C10-C12)	ND	3.64		mg/Kg-dry	1	10/11/2023 5:13:01 PM
Aromatic Hydrocarbon (C12-C16)	2.83	2.50	J	mg/Kg-dry	1	10/11/2023 5:13:01 PM
Aromatic Hydrocarbon (C16-C21)	ND	5.78		mg/Kg-dry	1	10/11/2023 5:13:01 PM
Aromatic Hydrocarbon (C21-C34)	10.1	8.55	J	mg/Kg-dry	1	10/11/2023 5:13:01 PM
Surr: 1-Chlorooctadecane	63.0	50 - 150		%Rec	1	10/11/2023 12:51:37 PM
Surr: o-Terphenyl	60.7	50 - 150		%Rec	1	10/11/2023 5:13:01 PM
Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 41637		Analyst: MS
Aliphatic Hydrocarbon (C5-C6)	0.605	0.327	J	mg/Kg-dry	1	9/29/2023 9:01:00 PM
Aliphatic Hydrocarbon (C6-C8)	ND	0.534		mg/Kg-dry	1	9/29/2023 9:01:00 PM
Aliphatic Hydrocarbon (C8-C10)	ND	1.43		mg/Kg-dry	1	9/29/2023 9:01:00 PM
Aliphatic Hydrocarbon (C10-C12)	ND	0.377		mg/Kg-dry	1	9/29/2023 9:01:00 PM
Aromatic Hydrocarbon (C8-C10)	0.471	0.219	J	mg/Kg-dry	1	9/29/2023 9:01:00 PM
Aromatic Hydrocarbon (C10-C12)	ND	0.429		mg/Kg-dry	1	9/29/2023 9:01:00 PM
Aromatic Hydrocarbon (C12-C13)	ND	0.713		mg/Kg-dry	1	9/29/2023 9:01:00 PM
Surr: 2,5-dibromotoluene	87.1	60 - 140		%Rec	1	9/29/2023 9:01:00 PM
Sample Moisture (Percent Moisture)				Batch ID: R86856		Analyst: MP
Percent Moisture	15.6	0.100		wt%	1	10/2/2023 8:41:07 AM

Analytical Report

Work Order: **2309498**
Date Reported: **10/12/2023**

CLIENT: Pace Analytical Minnesota
Project: P66 Oily Water Sewer

Lab ID: 2309498-007 **Collection Date:** 9/21/2023 11:30:00 AM
Client Sample ID: **B-7-23, 4ft** **Matrix:** Soil

Analyses	Result	MDL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 41591		Analyst: AP
Aliphatic Hydrocarbon (C8-C10)	ND	11.7		mg/Kg-dry	1	10/11/2023 1:13:29 PM
Aliphatic Hydrocarbon (C10-C12)	ND	5.34		mg/Kg-dry	1	10/11/2023 1:13:29 PM
Aliphatic Hydrocarbon (C12-C16)	ND	2.27		mg/Kg-dry	1	10/11/2023 1:13:29 PM
Aliphatic Hydrocarbon (C16-C21)	ND	4.54		mg/Kg-dry	1	10/11/2023 1:13:29 PM
Aliphatic Hydrocarbon (C21-C34)	ND	7.30		mg/Kg-dry	1	10/11/2023 1:13:29 PM
Aromatic Hydrocarbon (C8-C10)	ND	8.10		mg/Kg-dry	1	10/11/2023 5:34:56 PM
Aromatic Hydrocarbon (C10-C12)	ND	3.79		mg/Kg-dry	1	10/11/2023 5:34:56 PM
Aromatic Hydrocarbon (C12-C16)	ND	2.61		mg/Kg-dry	1	10/11/2023 5:34:56 PM
Aromatic Hydrocarbon (C16-C21)	8.23	6.03	J	mg/Kg-dry	1	10/11/2023 5:34:56 PM
Aromatic Hydrocarbon (C21-C34)	9.68	8.91	J	mg/Kg-dry	1	10/11/2023 5:34:56 PM
Surr: 1-Chlorooctadecane	62.2	50 - 150		%Rec	1	10/11/2023 1:13:29 PM
Surr: o-Terphenyl	78.3	50 - 150		%Rec	1	10/11/2023 5:34:56 PM
Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 41637		Analyst: MS
Aliphatic Hydrocarbon (C5-C6)	0.764	0.325	J	mg/Kg-dry	1	9/29/2023 9:37:00 PM
Aliphatic Hydrocarbon (C6-C8)	ND	0.531		mg/Kg-dry	1	9/29/2023 9:37:00 PM
Aliphatic Hydrocarbon (C8-C10)	ND	1.42		mg/Kg-dry	1	9/29/2023 9:37:00 PM
Aliphatic Hydrocarbon (C10-C12)	ND	0.375		mg/Kg-dry	1	9/29/2023 9:37:00 PM
Aromatic Hydrocarbon (C8-C10)	0.881	0.217	J	mg/Kg-dry	1	9/29/2023 9:37:00 PM
Aromatic Hydrocarbon (C10-C12)	ND	0.426		mg/Kg-dry	1	9/29/2023 9:37:00 PM
Aromatic Hydrocarbon (C12-C13)	ND	0.708		mg/Kg-dry	1	9/29/2023 9:37:00 PM
Surr: 2,5-dibromotoluene	94.0	60 - 140		%Rec	1	9/29/2023 9:37:00 PM
Sample Moisture (Percent Moisture)				Batch ID: R86856		Analyst: MP
Percent Moisture	18.7	0.100		wt%	1	10/2/2023 8:41:07 AM

Work Order: 2309498
CLIENT: Pace Analytical Minnesota
Project: P66 Oily Water Sewer

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **MB-41591**	SampType: **MBLK**	Units: **mg/Kg**	Prep Date: **9/26/2023**	RunNo: **86798**
Client ID: **MBLKS**	Batch ID: **41591**		Analysis Date: **9/27/2023**	SeqNo: **1811220**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C8-C10)	ND	20.0									
Aliphatic Hydrocarbon (C10-C12)	ND	10.0									
Aliphatic Hydrocarbon (C12-C16)	ND	10.0									
Aliphatic Hydrocarbon (C16-C21)	ND	10.0									
Aliphatic Hydrocarbon (C21-C34)	9.80	10.0									J
Surr: 1-Chlorooctadecane	79.0		100.0		79.0	50	150				

Sample ID: **LCS-41591**	SampType: **LCS**	Units: **mg/Kg**	Prep Date: **9/26/2023**	RunNo: **86798**
Client ID: **LCSS**	Batch ID: **41591**		Analysis Date: **9/27/2023**	SeqNo: **1811221**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C8-C10)	79.9	20.0	250.0	0	31.9	15.9	130				
Aliphatic Hydrocarbon (C10-C12)	65.4	10.0	125.0	0	52.3	30.4	115				
Aliphatic Hydrocarbon (C12-C16)	80.8	10.0	125.0	0	64.7	39.8	130				
Aliphatic Hydrocarbon (C16-C21)	88.8	10.0	125.0	0	71.0	50.3	123				
Aliphatic Hydrocarbon (C21-C34)	102	10.0	125.0	0	81.2	36.6	144				
Surr: 1-Chlorooctadecane	82.0		100.0		82.0	50	150				

Sample ID: **MB-41591**	SampType: **MBLK**	Units: **mg/Kg**	Prep Date: **9/26/2023**	RunNo: **86798**
Client ID: **MBLKS**	Batch ID: **41591**		Analysis Date: **9/27/2023**	SeqNo: **1811233**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C8-C10)	ND	20.0									
Aromatic Hydrocarbon (C10-C12)	ND	10.0									
Aromatic Hydrocarbon (C12-C16)	ND	10.0									
Aromatic Hydrocarbon (C16-C21)	ND	10.0									
Aromatic Hydrocarbon (C21-C34)	9.46	10.0									J
Surr: o-Terphenyl	85.9		100.0		85.9	50	150				

Work Order: 2309498
CLIENT: Pace Analytical Minnesota
Project: P66 Oily Water Sewer

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **LCS-41591**	SampType: **LCS**	Units: **mg/Kg**	Prep Date: **9/26/2023**	RunNo: **86798**
Client ID: **LCSS**	Batch ID: **41591**		Analysis Date: **9/27/2023**	SeqNo: **1811234**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C8-C10)	104	20.0	250.0	0	41.6	18.6	130				
Aromatic Hydrocarbon (C10-C12)	75.4	10.0	125.0	0	60.4	42.7	105				
Aromatic Hydrocarbon (C12-C16)	86.7	10.0	125.0	0	69.3	43.6	124				
Aromatic Hydrocarbon (C16-C21)	92.8	10.0	125.0	0	74.3	49.5	124				
Aromatic Hydrocarbon (C21-C34)	99.6	10.0	125.0	0	79.7	54.8	124				
Surr: o-Terphenyl	73.9		100.0		73.9	50	150				

Sample ID: **2309321-001AMS**	SampType: **MS**	Units: **mg/Kg-dry**	Prep Date: **9/26/2023**	RunNo: **86798**
Client ID: **BATCH**	Batch ID: **41591**		Analysis Date: **10/4/2023**	SeqNo: **1815264**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C8-C10)	81.7	23.6	295.4	0	27.6	6.01	130				
Aliphatic Hydrocarbon (C10-C12)	65.6	11.8	147.7	0	44.4	11.6	127				
Aliphatic Hydrocarbon (C12-C16)	78.8	11.8	147.7	0	53.4	24.7	129				
Aliphatic Hydrocarbon (C16-C21)	80.6	11.8	147.7	0	54.5	25.5	132				
Aliphatic Hydrocarbon (C21-C34)	93.8	11.8	147.7	10.26	56.5	21.4	138				
Surr: 1-Chlorooctadecane	73.2		118.1		62.0	50	150				

Sample ID: **2309321-001AMSD**	SampType: **MSD**	Units: **mg/Kg-dry**	Prep Date: **9/26/2023**	RunNo: **86798**
Client ID: **BATCH**	Batch ID: **41591**		Analysis Date: **10/4/2023**	SeqNo: **1815265**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C8-C10)	93.2	23.7	295.7	0	31.5	6.01	130	81.66	13.2	30	
Aliphatic Hydrocarbon (C10-C12)	72.2	11.8	147.8	0	48.8	11.6	127	65.62	9.53	30	
Aliphatic Hydrocarbon (C12-C16)	88.1	11.8	147.8	0	59.6	24.7	129	78.82	11.1	30	
Aliphatic Hydrocarbon (C16-C21)	98.3	11.8	147.8	0	66.5	25.5	132	80.55	19.8	30	
Aliphatic Hydrocarbon (C21-C34)	111	11.8	147.8	10.26	68.1	21.4	138	93.76	16.8	30	
Surr: 1-Chlorooctadecane	93.2		118.3		78.8	50	150		0		

Work Order: 2309498
CLIENT: Pace Analytical Minnesota
Project: P66 Oily Water Sewer

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **2309321-001AMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **9/26/2023** RunNo: **86798**
Client ID: **BATCH** Batch ID: **41591** Analysis Date: **10/4/2023** SeqNo: **1815271**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C8-C10)	119	23.6	295.4	0	40.3	12.6	130				
Aromatic Hydrocarbon (C10-C12)	90.7	11.8	147.7	0	61.4	26.3	130				
Aromatic Hydrocarbon (C12-C16)	104	11.8	147.7	0	70.7	23.3	139				
Aromatic Hydrocarbon (C16-C21)	120	11.8	147.7	0	81.1	32.2	131				
Aromatic Hydrocarbon (C21-C34)	97.9	11.8	147.7	0	66.3	35.8	139				
Surr: o-Terphenyl	91.3		118.1		77.3	50	150				

Sample ID: **2309321-001AMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **9/26/2023** RunNo: **86798**
Client ID: **BATCH** Batch ID: **41591** Analysis Date: **10/4/2023** SeqNo: **1815272**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C8-C10)	112	23.7	295.7	0	38.0	12.6	130	119.0	5.72	30	
Aromatic Hydrocarbon (C10-C12)	96.1	11.8	147.8	0	65.0	26.3	130	90.69	5.79	30	
Aromatic Hydrocarbon (C12-C16)	107	11.8	147.8	0	72.6	23.3	139	104.4	2.73	30	
Aromatic Hydrocarbon (C16-C21)	118	11.8	147.8	0	79.8	32.2	131	119.7	1.53	30	
Aromatic Hydrocarbon (C21-C34)	100	11.8	147.8	0	68.0	35.8	139	97.90	2.58	30	
Surr: o-Terphenyl	97.9		118.3		82.8	50	150		0		

Work Order: 2309498
CLIENT: Pace Analytical Minnesota
Project: P66 Oily Water Sewer

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID: **LCS-41637**	SampType: **LCS**	Units: **mg/Kg**	Prep Date: **9/29/2023**	RunNo: **87099**
Client ID: **LCSS**	Batch ID: **41637**		Analysis Date: **9/29/2023**	SeqNo: **1818144**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	20.7	2.50	20.00	0	103	70	130				
Aliphatic Hydrocarbon (C6-C8)	11.8	2.50	10.00	0	118	70	130				
Aliphatic Hydrocarbon (C8-C10)	12.7	2.50	10.00	0	127	70	130				
Aliphatic Hydrocarbon (C10-C12)	11.6	2.50	10.00	0	116	70	130				
Aromatic Hydrocarbon (C8-C10)	51.0	2.50	50.00	0	102	70	130				
Aromatic Hydrocarbon (C10-C12)	11.2	2.50	10.00	0	112	70	130				
Aromatic Hydrocarbon (C12-C13)	9.80	2.50	10.00	0	98.0	70	130				
Surr: 2,5-dibromotoluene	2.64		2.500		105	60	140				

Sample ID: **MB-41637**	SampType: **MBLK**	Units: **mg/Kg**	Prep Date: **9/29/2023**	RunNo: **87099**
Client ID: **MBLKS**	Batch ID: **41637**		Analysis Date: **9/29/2023**	SeqNo: **1818131**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	0.392	2.50		0	0						J
Aliphatic Hydrocarbon (C6-C8)	0.805	2.50		0	0						J
Aliphatic Hydrocarbon (C8-C10)	ND	2.50		0	0						
Aliphatic Hydrocarbon (C10-C12)	ND	2.50		0	0						
Aromatic Hydrocarbon (C8-C10)	1.13	2.50		0	0						J
Aromatic Hydrocarbon (C10-C12)	ND	2.50		0	0						
Aromatic Hydrocarbon (C12-C13)	ND	2.50		0	0						
Surr: 2,5-dibromotoluene	2.22		2.500		89.0	60	140				

Sample ID: **2309498-002BDUP**	SampType: **DUP**	Units: **mg/Kg-dry**	Prep Date: **9/29/2023**	RunNo: **87099**
Client ID: **B-2-23, 7ft**	Batch ID: **41637**		Analysis Date: **9/29/2023**	SeqNo: **1818134**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	1.00	2.41		0	0			1.479	38.5	25	J
Aliphatic Hydrocarbon (C6-C8)	1.99	2.41		0	0			2.645	28.2	25	J
Aliphatic Hydrocarbon (C8-C10)	ND	2.41		0	0			0	0	25	
Aliphatic Hydrocarbon (C10-C12)	1.90	2.41		0	0			1.480	25.0	25	J
Aromatic Hydrocarbon (C8-C10)	2.36	2.41		0	0			2.002	16.3	25	J

Work Order: 2309498
CLIENT: Pace Analytical Minnesota
Project: P66 Oily Water Sewer

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID: **2309498-002BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **9/29/2023** RunNo: **87099**
Client ID: **B-2-23, 7ft** Batch ID: **41637** Analysis Date: **9/29/2023** SeqNo: **1818134**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	2.12	2.41		0	0			1.873	12.5	25	J
Aromatic Hydrocarbon (C12-C13)	2.16	2.41		0	0			1.926	11.6	25	J
Surr: 2,5-dibromotoluene	2.18		2.411		90.4	60	140		0	0	

Sample ID: **2309498-004BMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **9/29/2023** RunNo: **87099**
Client ID: **B-4-23, 9ft** Batch ID: **41637** Analysis Date: **9/30/2023** SeqNo: **1818142**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	18.3	2.40	19.17	0.5743	92.5	70	130				
Aliphatic Hydrocarbon (C6-C8)	11.2	2.40	9.587	0	117	70	130				
Aliphatic Hydrocarbon (C8-C10)	10.7	2.40	9.587	0	112	70	130				
Aliphatic Hydrocarbon (C10-C12)	12.5	2.40	9.587	0	131	70	130				S
Aromatic Hydrocarbon (C8-C10)	51.9	2.40	47.93	0.5909	107	70	130				
Aromatic Hydrocarbon (C10-C12)	10.7	2.40	9.587	0	112	70	130				
Aromatic Hydrocarbon (C12-C13)	8.97	2.40	9.587	0	93.6	70	130				
Surr: 2,5-dibromotoluene	2.41		2.397		101	60	140				

NOTES:
S - Outlying spike recoveries were associated with this sample.

Sample Log-In Check List

Client Name:	PACEMI	Work Order Number:	2309498
Logged by:	Morgan Wilson	Date Received:	9/28/2023 11:15:00 AM

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	Client		

Log In

3.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☑	No ☐	Not Present ☐
4.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5.	Were all items received at a temperature of >2°C to 6°C *	Yes ☑	No ☐	NA ☐
6.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
7.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8.	Are samples properly preserved?	Yes ☑	No ☐	
9.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
10.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
11.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
12.	Does paperwork match bottle labels?	Yes ☑	No ☐	
13.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14.	Is it clear what analyses were requested?	Yes ☑	No ☐	
15.	Were all hold times (except field parameters, pH e.g.) able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☑

Person Notified:		Date:	
By Whom:		Via:	☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:			
Client Instructions:			

17. Additional remarks:

Item Information

Item #	Temp °C
Sample	3.9

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Chain of Custody

PASI Minnesota Laboratory

2309498 Pace

Workorder: 10669887 **Workorder Name:** P66 Oily Water Sewer **Results Requested By:** 10/12/2023

Report / Invoice To	Subcontract To
Jennifer Gross Pace Analytical Minnesota 1700 Elm Street Minneapolis, MN 55414 Phone (612)607-1700 Email: jennifer.gross@pacelabs.com	Fremont Analytical 3600 Fremont Avenue N. Seattle, WA 98103 206-352-3790 P.O. 10669887JMG

State of Sample Origin: WA

Item	Sample ID	Collect Date/Time	Lab ID	Matrix	Preserved Containers: VG9M	Preserved Containers: Unpreserved					Requested Analysis: NW-VPH (SUB: Fremont)	Requested Analysis: NW-EPH (SUB: Fremont)	Requested Analysis: Dry Weight										LAB USE ONLY
1	B-1-23, 7.5ft	9/21/2023 13:30	10669887001	Solid	2	1					X	X	X										
2	B-2-23, 7ft	9/20/2023 12:25	10669887002	Solid	2	1					X	X	X										
3	B-3-23, 7ft	9/21/2023 14:00	10669887003	Solid	2	1					X	X	X										
4	B-4-23, 9ft	9/20/2023 14:40	10669887004	Solid	2	1					X	X	X										
5	B-5-23, 8.5ft	9/21/2023 09:00	10669887005	Solid	2	1					X	X	X										
6	B-6-23, 4.5ft	9/21/2023 10:30	10669887006	Solid	2	1					X	X	X										
7	B-7-23, 4ft	9/21/2023 11:30	10669887007	Solid	2	1					X	X	X										

Transfers	Released By	Date/Time	Received By	Date/Time
1	Brian Green / PACE	9/27/23 11:55	[signature]	9/28/23 1115
2				
3				

Comments

WA EIM EDD required

NW-VPH: Aliphatic EC 5-6, Aliphatic EC>6-8, Aliphatic EC>8-10, Aliphatic EC>10-12, Aromatic EC>8-10, Aromatic EC>10-12, Aromatic EC>12-13

Cooler Temperature on Receipt ____ °C | **Custody Seal** Y or N | **Received on Ice** Y or N | **Samples Intact** Y or N

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

December 19, 2023

Joe Sumera
Phillips 66
3901 Unick Road
Ferndale, WA 98248

RE: Project: P66 Oily Water Sewer
Pace Project No.: 10676662

Dear Joe Sumera:

Enclosed are the analytical results for sample(s) received by the laboratory on November 17, 2023. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

Some analyses were subcontracted outside of the Pace Network. The test report from the external subcontractor is attached to this report in its entirety.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace National - Mt. Juliet
- Pace Analytical Services - Minneapolis

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jenni Gross

Jennifer Gross
jennifer.gross@pacelabs.com
(612)607-1700
Project Manager

Enclosures

cc: Megan Everson, Whatcom Environmental Services
Eric Libolt, Whatcom Environmental Services

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

Pace Analytical Services, LLC - Minneapolis MN
1700 Elm Street SE, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alabama Certification #: 40770
Alaska Contaminated Sites Certification #: 17-009
Alaska DW Certification #: MN00064
Arizona Certification #: AZ0014
Arkansas DW Certification #: MN00064
Arkansas WW Certification #: 88-0680
California Certification #: 2929
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8 Tribal Water Systems+Wyoming DW Certification #: via MN 027-053-137
Florida Certification #: E87605
Georgia Certification #: 959
GMP+ Certification #: GMP050884
Hawaii Certification #: MN00064
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification #: C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky DW Certification #: 90062
Kentucky WW Certification #: 90062
Louisiana DEQ Certification #: AI-03086
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064
Maryland Certification #: 322
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137
Minnesota Dept of Ag Approval: via MN 027-053-137
Minnesota Petrofund Registration #: 1240
Mississippi Certification #: MN00064
Missouri Certification #: 10100
Montana Certification #: CERT0092
Nebraska Certification #: NE-OS-18-06
Nevada Certification #: MN00064
New Hampshire Certification #: 2081
New Jersey Certification #: MN002
New York Certification #: 11647
North Carolina DW Certification #: 27700
North Carolina WW Certification #: 530
North Dakota Certification (A2LA) #: R-036
North Dakota Certification (MN) #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification (1700) #: CL101
Oklahoma Certification #: 9507
Oregon Primary Certification #: MN300001
Oregon Secondary Certification #: MN200001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification #: MN00064
South Carolina Certification #:74003001
Tennessee Certification #: TN02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Vermont Certification #: VT-027053137
Virginia Certification #: 460163
Washington Certification #: C486
West Virginia DEP Certification #: 382
West Virginia DW Certification #: 9952 C
Wisconsin Certification #: 999407970
Wyoming UST Certification #: via A2LA 2926.01
USDA Permit #: P330-19-00208

Pace Analytical Services National
12065 Lebanon Road, Mt. Juliet, TN 37122
Alabama Certification #: 40660
Alaska Certification 17-026
Arizona Certification #: AZ0612
Arkansas Certification #: 88-0469
California Certification #: 2932
Canada Certification #: 1461.01
Colorado Certification #: TN00003
Connecticut Certification #: PH-0197
DOD Certification: #1461.01
EPA# TN00003
Florida Certification #: E87487
Georgia DW Certification #: 923
Georgia Certification: NELAP
Idaho Certification #: TN00003
Illinois Certification #: 200008
Indiana Certification #: C-TN-01
Iowa Certification #: 364
Kansas Certification #: E-10277
Kentucky UST Certification #: 16
Kentucky Certification #: 90010
Louisiana Certification #: AI30792
Louisiana DW Certification #: LA180010
Maine Certification #: TN0002
Maryland Certification #: 324
Massachusetts Certification #: M-TN003
Michigan Certification #: 9958
Minnesota Certification #: 047-999-395
Mississippi Certification #: TN00003
Missouri Certification #: 340
Montana Certification #: CERT0086
Nebraska Certification #: NE-OS-15-05
Nevada Certification #: TN-03-2002-34
New Hampshire Certification #: 2975

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

Pace Analytical Services National

New Jersey Certification #: TN002
New Mexico DW Certification
New York Certification #: 11742
North Carolina Aquatic Toxicity Certification #: 41
North Carolina Drinking Water Certification #: 21704
North Carolina Environmental Certificate #: 375
North Dakota Certification #: R-140
Ohio VAP Certification #: CL0069
Oklahoma Certification #: 9915
Oregon Certification #: TN200002
Pennsylvania Certification #: 68-02979
Rhode Island Certification #: LAO00356
South Carolina Certification #: 84004
South Dakota Certification
Tennessee DW/Chem/Micro Certification #: 2006
Texas Certification #: T 104704245-17-14
Texas Mold Certification #: LAB0152
USDA Soil Permit #: P330-15-00234
Utah Certification #: TN00003
Vermont Dept. of Health: ID# VT-2006
Virginia Certification #: VT2006
Virginia Certification #: 460132
Washington Certification #: C847
West Virginia Certification #: 233
Wisconsin Certification #: 998093910
Wyoming UST Certification #: via A2LA 2926.01
A2LA-ISO 17025 Certification #: 1461.01
A2LA-ISO 17025 Certification #: 1461.02
AIHA-LAP/LLC EMLAP Certification #:100789

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10676662001	**B-8-23, 5.5ft**	Solid	11/16/23 09:30	11/17/23 08:50
10676662002	**B-9-23, 5ft**	Solid	11/16/23 10:45	11/17/23 08:50
10676662003	**Trip Blank**	Solid	11/16/23 00:00	11/17/23 08:50

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

SAMPLE ANALYTE COUNT

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10676662001	**B-8-23, 5.5ft**	EPA 6010D	SMB	7	PASI-M
		EPA 6020B	NN2	6	PASI-M
		EPA 7470A	LMW	1	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270E by SIM	JLR	21	PASI-M
		EPA 8260D	JAH	71	PAN
		EPA 8260D	PAB	14	PASI-M
		SM 2540G	CMK	1	PAN
		EPA 7196A	TQP	1	PAN
		Trivalent Chromium Calculation	KEO	1	PASI-M
10676662002	**B-9-23, 5ft**	EPA 6010D	SMB	7	PASI-M
		EPA 6020B	NN2	6	PASI-M
		EPA 7470A	LMW	1	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270E by SIM	JLR	21	PASI-M
		EPA 8260D	DWR	71	PAN
		EPA 8260D	PAB	14	PASI-M
		SM 2540G	CMK	1	PAN
		EPA 7196A	TQP	1	PAN
		Trivalent Chromium Calculation	KEO	1	PASI-M
10676662003	**Trip Blank**	EPA 8260D	DWR	71	PAN

PAN = Pace National - Mt. Juliet
PASI-M = Pace Analytical Services - Minneapolis

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

Sample: B-8-23, 5.5ft **Lab ID: 10676662001** Collected: 11/16/23 09:30 Received: 11/17/23 08:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP, TCLP MICRO	Analytical Method: EPA 6010D Preparation Method: EPA 3015A Leachate Method/Date: EPA 1311; 11/29/23 14:13 Pace Analytical Services - Minneapolis							
Arsenic	ND	mg/L	0.20	1	11/30/23 11:06	11/30/23 15:34	7440-38-2	
Barium	**0.28**	mg/L	0.10	1	11/30/23 11:06	11/30/23 15:34	7440-39-3	
Cadmium	ND	mg/L	0.030	1	11/30/23 11:06	11/30/23 15:34	7440-43-9	
Chromium	ND	mg/L	0.10	1	11/30/23 11:06	11/30/23 15:34	7440-47-3	
Lead	ND	mg/L	0.10	1	11/30/23 11:06	11/30/23 15:34	7439-92-1	
Selenium	ND	mg/L	0.20	1	11/30/23 11:06	11/30/23 15:34	7782-49-2	
Silver	ND	mg/L	0.10	1	11/30/23 11:06	11/30/23 15:34	7440-22-4	
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**3.7**	mg/kg	0.58	1	11/28/23 09:29	11/30/23 12:32	7440-38-2	
Cadmium	ND	mg/kg	0.093	1	11/28/23 09:29	11/30/23 12:32	7440-43-9	
Chromium	**22.1**	mg/kg	2.3	1	11/28/23 09:29	11/30/23 12:32	7440-47-3	
Lead	**2.4**	mg/kg	0.58	1	11/28/23 09:29	11/30/23 12:32	7439-92-1	
Nickel	**25.4**	mg/kg	0.58	1	11/28/23 09:29	11/30/23 12:32	7440-02-0	
Zinc	**38.8**	mg/kg	5.8	1	11/28/23 09:29	11/30/23 12:32	7440-66-6	
7470A Mercury, TCLP	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Leachate Method/Date: EPA 1311; 11/29/23 14:13 Pace Analytical Services - Minneapolis							
Mercury	ND	mg/L	0.00060	1	11/30/23 11:01	12/01/23 10:53	7439-97-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis							
Mercury	ND	mg/kg	0.023	1	11/28/23 10:10	12/06/23 12:42	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**21.0**	%	0.10	1		12/11/23 10:28		N2
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3546 Pace Analytical Services - Minneapolis							
1-Methylnaphthalene	**1040**	ug/kg	12.5	1	11/22/23 22:26	12/06/23 04:28	90-12-0	
2-Methylnaphthalene	**1160**	ug/kg	12.5	1	11/22/23 22:26	12/06/23 04:28	91-57-6	
Acenaphthene	**161**	ug/kg	12.5	1	11/22/23 22:26	12/06/23 04:28	83-32-9	
Acenaphthylene	ND	ug/kg	12.5	1	11/22/23 22:26	12/06/23 04:28	208-96-8	
Anthracene	ND	ug/kg	12.5	1	11/22/23 22:26	12/06/23 04:28	120-12-7	
Benzo(a)anthracene	**23.4**	ug/kg	12.5	1	11/22/23 22:26	12/06/23 04:28	56-55-3	
Benzo(a)pyrene	ND	ug/kg	12.5	1	11/22/23 22:26	12/06/23 04:28	50-32-8	
Benzo(b)fluoranthene	ND	ug/kg	12.5	1	11/22/23 22:26	12/06/23 04:28	205-99-2	
Benzo(g,h,i)perylene	ND	ug/kg	12.5	1	11/22/23 22:26	12/06/23 04:28	191-24-2	
Benzo(k)fluoranthene	ND	ug/kg	12.5	1	11/22/23 22:26	12/06/23 04:28	207-08-9	
Chrysene	**14.4**	ug/kg	12.5	1	11/22/23 22:26	12/06/23 04:28	218-01-9	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

Sample: B-8-23, 5.5ft **Lab ID: 10676662001** Collected: 11/16/23 09:30 Received: 11/17/23 08:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3546 Pace Analytical Services - Minneapolis							
Dibenz(a,h)anthracene	ND	ug/kg	12.5	1	11/22/23 22:26	12/06/23 04:28	53-70-3	
Dibenzofuran	**92.6**	ug/kg	12.5	1	11/22/23 22:26	12/06/23 04:28	132-64-9	L2
Fluoranthene	ND	ug/kg	12.5	1	11/22/23 22:26	12/06/23 04:28	206-44-0	
Fluorene	**262**	ug/kg	12.5	1	11/22/23 22:26	12/06/23 04:28	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	ug/kg	12.5	1	11/22/23 22:26	12/06/23 04:28	193-39-5	
Naphthalene	**106**	ug/kg	12.5	1	11/22/23 22:26	12/06/23 04:28	91-20-3	
Phenanthrene	ND	ug/kg	12.5	1	11/22/23 22:26	12/06/23 04:28	85-01-8	
Pyrene	**163**	ug/kg	12.5	1	11/22/23 22:26	12/06/23 04:28	129-00-0	
Surrogates								
2-Fluorobiphenyl (S)	88	%.	54-125	1	11/22/23 22:26	12/06/23 04:28	321-60-8	
p-Terphenyl-d14 (S)	80	%.	60-125	1	11/22/23 22:26	12/06/23 04:28	1718-51-0	
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
Acetone	ND	mg/kg	2.51	40	12/09/23 16:21	12/09/23 16:21	67-64-1	H3
Allyl chloride	ND	mg/kg	0.251	40	12/09/23 16:21	12/09/23 16:21	107-05-1	H3
Benzene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	71-43-2	H3
Bromobenzene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	108-86-1	H3
Bromochloromethane	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	74-97-5	H3
Bromodichloromethane	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	75-27-4	H3
Bromoform	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	75-25-2	H3
Bromomethane	ND	mg/kg	0.251	40	12/09/23 16:21	12/09/23 16:21	74-83-9	H3
n-Butylbenzene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	104-51-8	H3
sec-Butylbenzene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	135-98-8	H3
tert-Butylbenzene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	98-06-6	H3
Carbon tetrachloride	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	56-23-5	H3
Chlorobenzene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	108-90-7	H3
Dibromochloromethane	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	124-48-1	H3
Chloroethane	ND	mg/kg	0.251	40	12/09/23 16:21	12/09/23 16:21	75-00-3	H3
Chloroform	ND	mg/kg	0.251	40	12/09/23 16:21	12/09/23 16:21	67-66-3	H3
Chloromethane	ND	mg/kg	0.125	40	12/09/23 16:21	12/09/23 16:21	74-87-3	H3
2-Chlorotoluene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	95-49-8	H3
4-Chlorotoluene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	106-43-4	H3
1,2-Dibromoethane (EDB)	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	106-93-4	H3
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.251	40	12/09/23 16:21	12/09/23 16:21	96-12-8	H3
Dibromomethane	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	74-95-3	H3
1,2-Dichlorobenzene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	95-50-1	H3
1,3-Dichlorobenzene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	541-73-1	H3
1,4-Dichlorobenzene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	106-46-7	H3
Dichlorodifluoromethane	ND	mg/kg	0.251	40	12/09/23 16:21	12/09/23 16:21	75-71-8	H3
Dichlorofluoromethane	ND	mg/kg	0.251	40	12/09/23 16:21	12/09/23 16:21	75-43-4	H3
1,1-Dichloroethane	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	75-34-3	H3
1,2-Dichloroethane	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	107-06-2	H3
1,1-Dichloroethene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	75-35-4	H3
cis-1,2-Dichloroethene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	156-59-2	H3

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

Sample: B-8-23, 5.5ft **Lab ID: 10676662001** Collected: 11/16/23 09:30 Received: 11/17/23 08:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
trans-1,2-Dichloroethene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	156-60-5	H3
1,2-Dichloropropane	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	78-87-5	H3
1,3-Dichloropropane	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	142-28-9	H3
2,2-Dichloropropane	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	594-20-7	H3
1,1-Dichloropropene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	563-58-6	H3
cis-1,3-Dichloropropene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	10061-01-5	H3
trans-1,3-Dichloropropene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	10061-02-6	H3
Ethylbenzene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	100-41-4	H3
Diethyl ether (Ethyl ether)	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	60-29-7	H3
Hexachloro-1,3-butadiene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	87-68-3	H3
n-Hexane	ND	mg/kg	0.501	40	12/09/23 16:21	12/09/23 16:21	110-54-3	H3
Isopropylbenzene (Cumene)	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	98-82-8	H3
p-Isopropyltoluene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	99-87-6	H3
2-Butanone (MEK)	ND	mg/kg	0.501	40	12/09/23 16:21	12/09/23 16:21	78-93-3	H3
Methylene Chloride	ND	mg/kg	0.251	40	12/09/23 16:21	12/09/23 16:21	75-09-2	H3
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.501	40	12/09/23 16:21	12/09/23 16:21	108-10-1	H3
Methyl-tert-butyl ether	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	1634-04-4	H3
Naphthalene	ND	mg/kg	0.251	40	12/09/23 16:21	12/09/23 16:21	91-20-3	H3
n-Propylbenzene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	103-65-1	H3
Styrene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	100-42-5	H3
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	630-20-6	H3
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	79-34-5	H3
Tetrachloroethene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	127-18-4	H3
Tetrahydrofuran	ND	mg/kg	0.251	40	12/09/23 16:21	12/09/23 16:21	109-99-9	H3
Toluene	ND	mg/kg	0.251	40	12/09/23 16:21	12/09/23 16:21	108-88-3	H3
1,2,3-Trichlorobenzene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	87-61-6	H3
1,2,4-Trichlorobenzene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	120-82-1	H3
1,2,4-Trimethylbenzene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	95-63-6	H3
1,3,5-Trimethylbenzene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	108-67-8	H3
1,1,1-Trichloroethane	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	71-55-6	H3
1,1,2-Trichloroethane	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	79-00-5	H3
Trichloroethene	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	79-01-6	H3
Trichlorofluoromethane	ND	mg/kg	0.251	40	12/09/23 16:21	12/09/23 16:21	75-69-4	H3
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	76-13-1	H3
1,2,3-Trichloropropane	ND	mg/kg	0.125	40	12/09/23 16:21	12/09/23 16:21	96-18-4	H3
Vinyl chloride	ND	mg/kg	0.0501	40	12/09/23 16:21	12/09/23 16:21	75-01-4	H3
Xylene (Total)	ND	mg/kg	0.150	40	12/09/23 16:21	12/09/23 16:21	1330-20-7	H3
Surrogates								
1,2-Dichloroethane-d4 (S)	119	%	70.0-130	40	12/09/23 16:21	12/09/23 16:21	17060-07-0	
Toluene-d8 (S)	123	%	75.0-131	40	12/09/23 16:21	12/09/23 16:21	2037-26-5	
4-Bromofluorobenzene (S)	107	%	67.0-138	40	12/09/23 16:21	12/09/23 16:21	460-00-4	
8260D MSV TCLP	Analytical Method: EPA 8260D Leachate Method/Date: EPA 1311; 11/26/23 16:26 Pace Analytical Services - Minneapolis							
Benzene	ND	ug/L	25.0	1		11/29/23 19:48	71-43-2	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

Sample: B-8-23, 5.5ft **Lab ID: 10676662001** Collected: 11/16/23 09:30 Received: 11/17/23 08:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260D MSV TCLP	Analytical Method: EPA 8260D Leachate Method/Date: EPA 1311; 11/26/23 16:26 Pace Analytical Services - Minneapolis							
2-Butanone (MEK)	ND	ug/L	250	1		11/29/23 19:48	78-93-3	
Carbon tetrachloride	ND	ug/L	25.0	1		11/29/23 19:48	56-23-5	
Chlorobenzene	ND	ug/L	25.0	1		11/29/23 19:48	108-90-7	
Chloroform	ND	ug/L	25.0	1		11/29/23 19:48	67-66-3	
1,4-Dichlorobenzene	ND	ug/L	25.0	1		11/29/23 19:48	106-46-7	
1,2-Dichloroethane	ND	ug/L	25.0	1		11/29/23 19:48	107-06-2	
1,1-Dichloroethene	ND	ug/L	25.0	1		11/29/23 19:48	75-35-4	
Tetrachloroethene	ND	ug/L	25.0	1		11/29/23 19:48	127-18-4	
Trichloroethene	ND	ug/L	25.0	1		11/29/23 19:48	79-01-6	
Vinyl chloride	ND	ug/L	25.0	1		11/29/23 19:48	75-01-4	
Surrogates								
1,2-Dichlorobenzene-d4 (S)	100	%.	75-125	1		11/29/23 19:48	2199-69-1	
4-Bromofluorobenzene (S)	100	%.	75-125	1		11/29/23 19:48	460-00-4	
Toluene-d8 (S)	101	%.	75-125	1		11/29/23 19:48	2037-26-5	
Total Solids 2540 G-2011	Analytical Method: SM 2540G Preparation Method: SM 2540 G Pace National - Mt. Juliet							
Total Solids	**86.5**	%		1	11/30/23 10:00	11/30/23 10:23		
Wet Chemistry 3060A/7196A	Analytical Method: EPA 7196A Preparation Method: 3060A Pace National - Mt. Juliet							
Chromium, Hexavalent	ND	mg/kg	2.31	1	11/29/23 16:00	12/01/23 00:05		
Trivalent Chromium Calculation	Analytical Method: Trivalent Chromium Calculation Pace Analytical Services - Minneapolis							
Chromium, Trivalent	**22.1**	mg/kg	1.0	1		12/18/23 10:05		

Sample: B-9-23, 5ft **Lab ID: 10676662002** Collected: 11/16/23 10:45 Received: 11/17/23 08:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP, TCLP MICRO	Analytical Method: EPA 6010D Preparation Method: EPA 3015A Leachate Method/Date: EPA 1311; 11/29/23 14:13 Pace Analytical Services - Minneapolis							
Arsenic	ND	mg/L	0.20	1	11/30/23 11:06	11/30/23 15:36	7440-38-2	
Barium	**0.28**	mg/L	0.10	1	11/30/23 11:06	11/30/23 15:36	7440-39-3	
Cadmium	ND	mg/L	0.030	1	11/30/23 11:06	11/30/23 15:36	7440-43-9	
Chromium	ND	mg/L	0.10	1	11/30/23 11:06	11/30/23 15:36	7440-47-3	
Lead	ND	mg/L	0.10	1	11/30/23 11:06	11/30/23 15:36	7439-92-1	
Selenium	ND	mg/L	0.20	1	11/30/23 11:06	11/30/23 15:36	7782-49-2	
Silver	ND	mg/L	0.10	1	11/30/23 11:06	11/30/23 15:36	7440-22-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

Sample: B-9-23, 5ft **Lab ID: 10676662002** Collected: 11/16/23 10:45 Received: 11/17/23 08:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS	Analytical Method: EPA 6020B Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.3**	mg/kg	0.62	1	11/28/23 09:29	11/30/23 12:36	7440-38-2	
Cadmium	ND	mg/kg	0.10	1	11/28/23 09:29	11/30/23 12:36	7440-43-9	
Chromium	**20.0**	mg/kg	2.5	1	11/28/23 09:29	11/30/23 12:36	7440-47-3	
Lead	**2.3**	mg/kg	0.62	1	11/28/23 09:29	11/30/23 12:36	7439-92-1	
Nickel	**22.1**	mg/kg	0.62	1	11/28/23 09:29	11/30/23 12:36	7440-02-0	
Zinc	**32.9**	mg/kg	6.2	1	11/28/23 09:29	11/30/23 12:36	7440-66-6	
7470A Mercury, TCLP	Analytical Method: EPA 7470A Preparation Method: EPA 7470A Leachate Method/Date: EPA 1311; 11/29/23 14:13 Pace Analytical Services - Minneapolis							
Mercury	ND	mg/L	0.00060	1	11/30/23 11:01	12/01/23 10:54	7439-97-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis							
Mercury	ND	mg/kg	0.025	1	11/28/23 10:10	12/06/23 12:47	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**21.8**	%	0.10	1		12/11/23 10:28		N2
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3546 Pace Analytical Services - Minneapolis							
1-Methylnaphthalene	ND	ug/kg	63.0	5	11/22/23 22:26	12/06/23 07:20	90-12-0	
2-Methylnaphthalene	ND	ug/kg	63.0	5	11/22/23 22:26	12/06/23 07:20	91-57-6	
Acenaphthene	ND	ug/kg	63.0	5	11/22/23 22:26	12/06/23 07:20	83-32-9	
Acenaphthylene	**129**	ug/kg	63.0	5	11/22/23 22:26	12/06/23 07:20	208-96-8	
Anthracene	**277**	ug/kg	63.0	5	11/22/23 22:26	12/06/23 07:20	120-12-7	
Benzo(a)anthracene	**133**	ug/kg	63.0	5	11/22/23 22:26	12/06/23 07:20	56-55-3	
Benzo(a)pyrene	**133**	ug/kg	63.0	5	11/22/23 22:26	12/06/23 07:20	50-32-8	
Benzo(b)fluoranthene	**198**	ug/kg	63.0	5	11/22/23 22:26	12/06/23 07:20	205-99-2	
Benzo(g,h,i)perylene	**221**	ug/kg	63.0	5	11/22/23 22:26	12/06/23 07:20	191-24-2	
Benzo(k)fluoranthene	**67.4**	ug/kg	63.0	5	11/22/23 22:26	12/06/23 07:20	207-08-9	
Chrysene	**242**	ug/kg	63.0	5	11/22/23 22:26	12/06/23 07:20	218-01-9	
Dibenz(a,h)anthracene	ND	ug/kg	63.0	5	11/22/23 22:26	12/06/23 07:20	53-70-3	
Dibenzofuran	ND	ug/kg	63.0	5	11/22/23 22:26	12/06/23 07:20	132-64-9	L2
Fluoranthene	**247**	ug/kg	63.0	5	11/22/23 22:26	12/06/23 07:20	206-44-0	
Fluorene	**103**	ug/kg	63.0	5	11/22/23 22:26	12/06/23 07:20	86-73-7	
Indeno(1,2,3-cd)pyrene	**100**	ug/kg	63.0	5	11/22/23 22:26	12/06/23 07:20	193-39-5	
Naphthalene	ND	ug/kg	63.0	5	11/22/23 22:26	12/06/23 07:20	91-20-3	
Phenanthrene	ND	ug/kg	63.0	5	11/22/23 22:26	12/06/23 07:20	85-01-8	
Pyrene	**315**	ug/kg	63.0	5	11/22/23 22:26	12/06/23 07:20	129-00-0	
Surrogates								
2-Fluorobiphenyl (S)	76	%.	54-125	5	11/22/23 22:26	12/06/23 07:20	321-60-8	ED
p-Terphenyl-d14 (S)	68	%.	60-125	5	11/22/23 22:26	12/06/23 07:20	1718-51-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

Sample: B-9-23, 5ft **Lab ID: 10676662002** Collected: 11/16/23 10:45 Received: 11/17/23 08:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
Acetone	ND	mg/kg	14.0	200	11/30/23 16:03	11/30/23 16:03	67-64-1	L0
Allyl chloride	ND	mg/kg	1.40	200	11/30/23 16:03	11/30/23 16:03	107-05-1	
Benzene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	71-43-2	
Bromobenzene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	108-86-1	
Bromochloromethane	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	74-97-5	
Bromodichloromethane	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	75-27-4	
Bromoform	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	75-25-2	
Bromomethane	ND	mg/kg	1.40	200	11/30/23 16:03	11/30/23 16:03	74-83-9	
n-Butylbenzene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	104-51-8	
sec-Butylbenzene	**0.305**	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	56-23-5	
Chlorobenzene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	108-90-7	
Dibromochloromethane	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	124-48-1	
Chloroethane	ND	mg/kg	1.40	200	11/30/23 16:03	11/30/23 16:03	75-00-3	
Chloroform	ND	mg/kg	1.40	200	11/30/23 16:03	11/30/23 16:03	67-66-3	
Chloromethane	ND	mg/kg	0.702	200	11/30/23 16:03	11/30/23 16:03	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	106-43-4	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	106-93-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	1.40	200	11/30/23 16:03	11/30/23 16:03	96-12-8	
Dibromomethane	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	1.40	200	11/30/23 16:03	11/30/23 16:03	75-71-8	
Dichlorofluoromethane	ND	mg/kg	1.40	200	11/30/23 16:03	11/30/23 16:03	75-43-4	
1,1-Dichloroethane	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	156-60-5	
1,2-Dichloropropane	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	10061-01-5	
trans-1,3-Dichloropropene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	10061-02-6	
Ethylbenzene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	100-41-4	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	60-29-7	
Hexachloro-1,3-butadiene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	87-68-3	
n-Hexane	ND	mg/kg	2.81	200	11/30/23 16:03	11/30/23 16:03	110-54-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	99-87-6	
2-Butanone (MEK)	ND	mg/kg	2.81	200	11/30/23 16:03	11/30/23 16:03	78-93-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

Sample: B-9-23, 5ft **Lab ID: 10676662002** Collected: 11/16/23 10:45 Received: 11/17/23 08:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
Methylene Chloride	ND	mg/kg	1.40	200	11/30/23 16:03	11/30/23 16:03	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	2.81	200	11/30/23 16:03	11/30/23 16:03	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	1634-04-4	
Naphthalene	ND	mg/kg	1.40	200	11/30/23 16:03	11/30/23 16:03	91-20-3	
n-Propylbenzene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	103-65-1	
Styrene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	79-34-5	L0
Tetrachloroethene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	127-18-4	
Tetrahydrofuran	ND	mg/kg	1.40	200	11/30/23 16:03	11/30/23 16:03	109-99-9	
Toluene	ND	mg/kg	1.40	200	11/30/23 16:03	11/30/23 16:03	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	120-82-1	
1,2,4-Trimethylbenzene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	108-67-8	
1,1,1-Trichloroethane	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	79-00-5	
Trichloroethene	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	79-01-6	
Trichlorofluoromethane	ND	mg/kg	1.40	200	11/30/23 16:03	11/30/23 16:03	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	76-13-1	
1,2,3-Trichloropropane	ND	mg/kg	0.702	200	11/30/23 16:03	11/30/23 16:03	96-18-4	
Vinyl chloride	ND	mg/kg	0.281	200	11/30/23 16:03	11/30/23 16:03	75-01-4	
Xylene (Total)	ND	mg/kg	0.843	200	11/30/23 16:03	11/30/23 16:03	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	108	%	70.0-130	200	11/30/23 16:03	11/30/23 16:03	17060-07-0	
Toluene-d8 (S)	112	%	75.0-131	200	11/30/23 16:03	11/30/23 16:03	2037-26-5	
4-Bromofluorobenzene (S)	106	%	67.0-138	200	11/30/23 16:03	11/30/23 16:03	460-00-4	
8260D MSV TCLP	Analytical Method: EPA 8260D Leachate Method/Date: EPA 1311; 11/26/23 16:26 Pace Analytical Services - Minneapolis							
Benzene	ND	ug/L	25.0	1		11/29/23 15:43	71-43-2	
2-Butanone (MEK)	ND	ug/L	250	1		11/29/23 15:43	78-93-3	
Carbon tetrachloride	ND	ug/L	25.0	1		11/29/23 15:43	56-23-5	
Chlorobenzene	ND	ug/L	25.0	1		11/29/23 15:43	108-90-7	
Chloroform	ND	ug/L	25.0	1		11/29/23 15:43	67-66-3	
1,4-Dichlorobenzene	ND	ug/L	25.0	1		11/29/23 15:43	106-46-7	
1,2-Dichloroethane	ND	ug/L	25.0	1		11/29/23 15:43	107-06-2	
1,1-Dichloroethene	ND	ug/L	25.0	1		11/29/23 15:43	75-35-4	
Tetrachloroethene	ND	ug/L	25.0	1		11/29/23 15:43	127-18-4	
Trichloroethene	ND	ug/L	25.0	1		11/29/23 15:43	79-01-6	
Vinyl chloride	ND	ug/L	25.0	1		11/29/23 15:43	75-01-4	
Surrogates								
1,2-Dichlorobenzene-d4 (S)	101	%.	75-125	1		11/29/23 15:43	2199-69-1	
4-Bromofluorobenzene (S)	102	%.	75-125	1		11/29/23 15:43	460-00-4	
Toluene-d8 (S)	100	%.	75-125	1		11/29/23 15:43	2037-26-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

Sample: B-9-23, 5ft **Lab ID: 10676662002** Collected: 11/16/23 10:45 Received: 11/17/23 08:50 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Total Solids 2540 G-2011	Analytical Method: SM 2540G Preparation Method: SM 2540 G Pace National - Mt. Juliet							
Total Solids	**85.7**	%		1	11/30/23 10:00	11/30/23 10:23		
Wet Chemistry 3060A/7196A	Analytical Method: EPA 7196A Preparation Method: 3060A Pace National - Mt. Juliet							
Chromium, Hexavalent	ND	mg/kg	2.33	1	11/29/23 16:00	12/01/23 00:05		
Trivalent Chromium Calculation	Analytical Method: Trivalent Chromium Calculation Pace Analytical Services - Minneapolis							
Chromium, Trivalent	**20.0**	mg/kg	1.0	1		12/18/23 10:05		

Sample: Trip Blank **Lab ID: 10676662003** Collected: 11/16/23 00:00 Received: 11/17/23 08:50 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
Acetone	ND	mg/kg	1.25	25	11/30/23 14:56	11/30/23 14:56	67-64-1	L0
Allyl chloride	ND	mg/kg	0.125	25	11/30/23 14:56	11/30/23 14:56	107-05-1	
Benzene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	71-43-2	
Bromobenzene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	108-86-1	
Bromochloromethane	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	74-97-5	
Bromodichloromethane	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	75-27-4	
Bromoform	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	75-25-2	
Bromomethane	ND	mg/kg	0.125	25	11/30/23 14:56	11/30/23 14:56	74-83-9	
n-Butylbenzene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	56-23-5	
Chlorobenzene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	108-90-7	
Dibromochloromethane	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	124-48-1	
Chloroethane	ND	mg/kg	0.125	25	11/30/23 14:56	11/30/23 14:56	75-00-3	
Chloroform	ND	mg/kg	0.125	25	11/30/23 14:56	11/30/23 14:56	67-66-3	
Chloromethane	ND	mg/kg	0.0625	25	11/30/23 14:56	11/30/23 14:56	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	106-43-4	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	106-93-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.125	25	11/30/23 14:56	11/30/23 14:56	96-12-8	
Dibromomethane	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.125	25	11/30/23 14:56	11/30/23 14:56	75-71-8	
Dichlorofluoromethane	ND	mg/kg	0.125	25	11/30/23 14:56	11/30/23 14:56	75-43-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

Sample: Trip Blank **Lab ID: 10676662003** Collected: 11/16/23 00:00 Received: 11/17/23 08:50 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
VOA (GC/MS) 8260D	Analytical Method: EPA 8260D Preparation Method: 5035A Pace National - Mt. Juliet							
1,1-Dichloroethane	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	156-60-5	
1,2-Dichloropropane	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	10061-01-5	
trans-1,3-Dichloropropene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	10061-02-6	
Ethylbenzene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	100-41-4	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	60-29-7	
Hexachloro-1,3-butadiene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	87-68-3	
n-Hexane	ND	mg/kg	0.250	25	11/30/23 14:56	11/30/23 14:56	110-54-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	99-87-6	
2-Butanone (MEK)	ND	mg/kg	0.250	25	11/30/23 14:56	11/30/23 14:56	78-93-3	
Methylene Chloride	ND	mg/kg	0.125	25	11/30/23 14:56	11/30/23 14:56	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.250	25	11/30/23 14:56	11/30/23 14:56	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	1634-04-4	
Naphthalene	ND	mg/kg	0.125	25	11/30/23 14:56	11/30/23 14:56	91-20-3	
n-Propylbenzene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	103-65-1	
Styrene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	79-34-5	L0
Tetrachloroethene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	127-18-4	
Tetrahydrofuran	ND	mg/kg	0.125	25	11/30/23 14:56	11/30/23 14:56	109-99-9	
Toluene	ND	mg/kg	0.125	25	11/30/23 14:56	11/30/23 14:56	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	120-82-1	
1,2,4-Trimethylbenzene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	108-67-8	
1,1,1-Trichloroethane	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	79-00-5	
Trichloroethene	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.125	25	11/30/23 14:56	11/30/23 14:56	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	76-13-1	
1,2,3-Trichloropropane	ND	mg/kg	0.0625	25	11/30/23 14:56	11/30/23 14:56	96-18-4	
Vinyl chloride	ND	mg/kg	0.0250	25	11/30/23 14:56	11/30/23 14:56	75-01-4	
Xylene (Total)	ND	mg/kg	0.0750	25	11/30/23 14:56	11/30/23 14:56	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	102	%	70.0-130	25	11/30/23 14:56	11/30/23 14:56	17060-07-0	
Toluene-d8 (S)	110	%	75.0-131	25	11/30/23 14:56	11/30/23 14:56	2037-26-5	
4-Bromofluorobenzene (S)	103	%	67.0-138	25	11/30/23 14:56	11/30/23 14:56	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

QC Batch: 920932
QC Batch Method: EPA 7470A
Analysis Method: EPA 7470A
Analysis Description: 7470A Mercury TCLP
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10676662001, 10676662002

METHOD BLANK: 4840439 Matrix: Water
Associated Lab Samples: 10676662001, 10676662002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00060	12/01/23 10:18	

METHOD BLANK: 4840223 Matrix: Water
Associated Lab Samples: 10676662001, 10676662002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/L	ND	0.00060	12/01/23 10:56	

LABORATORY CONTROL SAMPLE: 4840440

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/L	0.015	0.014	94	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4840441 4840442

Parameter	Units	10676317001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/L	ND	0.015	0.015	0.016	0.016	105	105	80-120	0	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

QC Batch: 920113
QC Batch Method: EPA 7471B
Analysis Method: EPA 7471B
Analysis Description: 7471B Mercury Solids
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10676662001, 10676662002

METHOD BLANK: 4837492 Matrix: Solid
Associated Lab Samples: 10676662001, 10676662002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/kg	ND	0.017	12/06/23 12:39	

LABORATORY CONTROL SAMPLE: 4837493

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	0.47	0.48	103	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4837494 4837495

Parameter	Units	10676662001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/kg	ND	0.57	0.57	0.60	0.58	100	99	80-120	3	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

QC Batch: 920935
QC Batch Method: EPA 3015A
Analysis Method: EPA 6010D
Analysis Description: 6010D MET ICP, TCLP MICRO
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10676662001, 10676662002

METHOD BLANK: 4840448 Matrix: Water
Associated Lab Samples: 10676662001, 10676662002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/L	ND	0.20	11/30/23 14:56	
Barium	mg/L	ND	0.10	11/30/23 14:56	
Cadmium	mg/L	ND	0.030	11/30/23 14:56	
Chromium	mg/L	ND	0.10	11/30/23 14:56	
Lead	mg/L	ND	0.10	11/30/23 14:56	
Selenium	mg/L	ND	0.20	11/30/23 14:56	
Silver	mg/L	ND	0.10	11/30/23 14:56	

LABORATORY CONTROL SAMPLE: 4840449

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/L	5	4.8	96	80-120	
Barium	mg/L	5	4.8	96	80-120	
Cadmium	mg/L	5	5.0	101	80-120	
Chromium	mg/L	5	4.8	95	80-120	
Lead	mg/L	5	4.9	98	80-120	
Selenium	mg/L	5	5.1	101	80-120	
Silver	mg/L	2.5	2.4	94	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4840450 4840451

Parameter	Units	10676317001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/L	ND	5	5	4.9	4.8	97	97	75-125	1	20	
Barium	mg/L	0.37	5	5	5.2	5.2	97	96	75-125	1	20	
Cadmium	mg/L	ND	5	5	5.1	5.1	102	101	75-125	1	20	
Chromium	mg/L	ND	5	5	4.8	4.8	97	96	75-125	0	20	
Lead	mg/L	ND	5	5	5.0	5.0	99	99	75-125	0	20	
Selenium	mg/L	ND	5	5	5.1	5.1	102	102	75-125	0	20	
Silver	mg/L	ND	2.5	2.5	2.4	2.4	96	95	75-125	1	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

QC Batch: 920106
QC Batch Method: EPA 3050B
Analysis Method: EPA 6020B
Analysis Description: 6020B Solids UPD5
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10676662001, 10676662002

METHOD BLANK: 4837463 Matrix: Solid
Associated Lab Samples: 10676662001, 10676662002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/kg	ND	0.49	11/30/23 11:49	
Cadmium	mg/kg	ND	0.079	11/30/23 11:49	
Chromium	mg/kg	ND	2.0	11/30/23 11:49	
Lead	mg/kg	ND	0.49	11/30/23 11:49	
Nickel	mg/kg	ND	0.49	11/30/23 11:49	
Zinc	mg/kg	ND	4.9	11/30/23 11:49	

LABORATORY CONTROL SAMPLE: 4837464

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	48.3	50.8	105	80-120	
Cadmium	mg/kg	48.3	52.5	109	80-120	
Chromium	mg/kg	48.3	55.3	114	80-120	
Lead	mg/kg	48.3	52.0	108	80-120	
Nickel	mg/kg	48.3	54.8	113	80-120	
Zinc	mg/kg	48.3	52.5	109	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4837465 4837466

Parameter	Units	10676676006 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	0.95	52.6	52.9	51.8	52.4	97	97	75-125	1	20	
Cadmium	mg/kg	0.051J	52.6	52.9	55.1	56.0	105	106	75-125	2	20	
Chromium	mg/kg	15.8	52.6	52.9	71.9	76.9	107	116	75-125	7	20	
Lead	mg/kg	1.7	52.6	52.9	54.2	54.6	100	100	75-125	1	20	
Nickel	mg/kg	29.8	52.6	52.9	91.9	111	118	154	75-125	19	20	M1
Zinc	mg/kg	24.3	52.6	52.9	79.3	83.1	105	111	75-125	5	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

QC Batch: 922652
QC Batch Method: ASTM D2974
Analysis Method: ASTM D2974
Analysis Description: Dry Weight / %M by ASTM D2974
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10676662001, 10676662002

SAMPLE DUPLICATE: 4848424

Parameter	Units	10678115002 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	18.0	17.7	2	30	N2

SAMPLE DUPLICATE: 4848429

Parameter	Units	10677860001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	43.7	45.6	4	30	N2

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

QC Batch: 2180344
QC Batch Method: 5035A
Analysis Method: EPA 8260D
Analysis Description: VOA (GC/MS) 8260D
Laboratory: Pace National - Mt. Juliet
Associated Lab Samples: 10676662002, 10676662003

METHOD BLANK: R4007083-3 Matrix: Solid
Associated Lab Samples: 10676662002, 10676662003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Acetone	mg/kg	ND	1.25	11/30/23 10:56	
Allyl chloride	mg/kg	ND	0.125	11/30/23 10:56	
Benzene	mg/kg	ND	0.0250	11/30/23 10:56	
Bromobenzene	mg/kg	ND	0.0250	11/30/23 10:56	
Bromochloromethane	mg/kg	ND	0.0250	11/30/23 10:56	
Bromodichloromethane	mg/kg	ND	0.0250	11/30/23 10:56	
Bromoform	mg/kg	ND	0.0250	11/30/23 10:56	
Bromomethane	mg/kg	ND	0.125	11/30/23 10:56	
n-Butylbenzene	mg/kg	ND	0.0250	11/30/23 10:56	
sec-Butylbenzene	mg/kg	ND	0.0250	11/30/23 10:56	
tert-Butylbenzene	mg/kg	ND	0.0250	11/30/23 10:56	
Carbon tetrachloride	mg/kg	ND	0.0250	11/30/23 10:56	
Chlorobenzene	mg/kg	ND	0.0250	11/30/23 10:56	
Dibromochloromethane	mg/kg	ND	0.0250	11/30/23 10:56	
Chloroethane	mg/kg	ND	0.125	11/30/23 10:56	
Chloroform	mg/kg	ND	0.125	11/30/23 10:56	
Chloromethane	mg/kg	ND	0.0625	11/30/23 10:56	
2-Chlorotoluene	mg/kg	ND	0.0250	11/30/23 10:56	
4-Chlorotoluene	mg/kg	ND	0.0250	11/30/23 10:56	
1,2-Dibromoethane (EDB)	mg/kg	ND	0.0250	11/30/23 10:56	
1,2-Dibromo-3-chloropropane	mg/kg	ND	0.125	11/30/23 10:56	
Dibromomethane	mg/kg	ND	0.0250	11/30/23 10:56	
1,2-Dichlorobenzene	mg/kg	ND	0.0250	11/30/23 10:56	
1,3-Dichlorobenzene	mg/kg	ND	0.0250	11/30/23 10:56	
1,4-Dichlorobenzene	mg/kg	ND	0.0250	11/30/23 10:56	
Dichlorodifluoromethane	mg/kg	ND	0.125	11/30/23 10:56	
Dichlorofluoromethane	mg/kg	ND	0.125	11/30/23 10:56	
1,1-Dichloroethane	mg/kg	ND	0.0250	11/30/23 10:56	
1,2-Dichloroethane	mg/kg	ND	0.0250	11/30/23 10:56	
1,1-Dichloroethene	mg/kg	ND	0.0250	11/30/23 10:56	
cis-1,2-Dichloroethene	mg/kg	ND	0.0250	11/30/23 10:56	
trans-1,2-Dichloroethene	mg/kg	ND	0.0250	11/30/23 10:56	
1,2-Dichloropropane	mg/kg	ND	0.0250	11/30/23 10:56	
1,3-Dichloropropane	mg/kg	ND	0.0250	11/30/23 10:56	
2,2-Dichloropropane	mg/kg	ND	0.0250	11/30/23 10:56	
1,1-Dichloropropene	mg/kg	ND	0.0250	11/30/23 10:56	
cis-1,3-Dichloropropene	mg/kg	ND	0.0250	11/30/23 10:56	
trans-1,3-Dichloropropene	mg/kg	ND	0.0250	11/30/23 10:56	
Ethylbenzene	mg/kg	ND	0.0250	11/30/23 10:56	
Diethyl ether (Ethyl ether)	mg/kg	ND	0.0250	11/30/23 10:56	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

METHOD BLANK: R4007083-3 Matrix: Solid
Associated Lab Samples: 10676662002, 10676662003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Hexachloro-1,3-butadiene	mg/kg	ND	0.0250	11/30/23 10:56	
n-Hexane	mg/kg	ND	0.250	11/30/23 10:56	
Isopropylbenzene (Cumene)	mg/kg	ND	0.0250	11/30/23 10:56	
p-Isopropyltoluene	mg/kg	ND	0.0250	11/30/23 10:56	
2-Butanone (MEK)	mg/kg	ND	0.250	11/30/23 10:56	
Methylene Chloride	mg/kg	ND	0.125	11/30/23 10:56	
4-Methyl-2-pentanone (MIBK)	mg/kg	ND	0.250	11/30/23 10:56	
Methyl-tert-butyl ether	mg/kg	ND	0.0250	11/30/23 10:56	
Naphthalene	mg/kg	ND	0.125	11/30/23 10:56	
n-Propylbenzene	mg/kg	ND	0.0250	11/30/23 10:56	
Styrene	mg/kg	ND	0.0250	11/30/23 10:56	
1,1,1,2-Tetrachloroethane	mg/kg	ND	0.0250	11/30/23 10:56	
1,1,2,2-Tetrachloroethane	mg/kg	ND	0.0250	11/30/23 10:56	
Tetrachloroethene	mg/kg	ND	0.0250	11/30/23 10:56	
Tetrahydrofuran	mg/kg	ND	0.125	11/30/23 10:56	
Toluene	mg/kg	ND	0.125	11/30/23 10:56	
1,2,3-Trichlorobenzene	mg/kg	ND	0.0250	11/30/23 10:56	
1,2,4-Trichlorobenzene	mg/kg	ND	0.0250	11/30/23 10:56	
1,2,4-Trimethylbenzene	mg/kg	ND	0.0250	11/30/23 10:56	
1,3,5-Trimethylbenzene	mg/kg	ND	0.0250	11/30/23 10:56	
1,1,1-Trichloroethane	mg/kg	ND	0.0250	11/30/23 10:56	
1,1,2-Trichloroethane	mg/kg	ND	0.0250	11/30/23 10:56	
Trichloroethene	mg/kg	ND	0.0250	11/30/23 10:56	
Trichlorofluoromethane	mg/kg	ND	0.125	11/30/23 10:56	
1,1,2-Trichlorotrifluoroethane	mg/kg	ND	0.0250	11/30/23 10:56	
1,2,3-Trichloropropane	mg/kg	ND	0.0625	11/30/23 10:56	
Vinyl chloride	mg/kg	ND	0.0250	11/30/23 10:56	
Xylene (Total)	mg/kg	ND	0.0750	11/30/23 10:56	
1,2-Dichloroethane-d4 (S)	%	129	70.0-130	11/30/23 10:56	
Toluene-d8 (S)	%	109	75.0-131	11/30/23 10:56	
4-Bromofluorobenzene (S)	%	90.8	67.0-138	11/30/23 10:56	

LABORATORY CONTROL SAMPLE: R4007083-1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Acetone	mg/kg	0.125	0.215	172	10.0-160	L0
Allyl chloride	mg/kg	0.125	0.137	110	68.0-135	
Benzene	mg/kg	0.0250	0.0266	106	70.0-123	
Bromobenzene	mg/kg	0.0250	0.0260	104	73.0-121	
Bromochloromethane	mg/kg	0.0250	0.0272	109	77.0-128	
Bromodichloromethane	mg/kg	0.0250	0.0251	100	73.0-121	
Bromoform	mg/kg	0.0250	0.0283	113	64.0-132	
Bromomethane	mg/kg	0.0250	0.0237	94.8	56.0-147	
n-Butylbenzene	mg/kg	0.0250	0.0293	117	68.0-135	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

LABORATORY CONTROL SAMPLE: R4007083-1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
sec-Butylbenzene	mg/kg	0.0250	0.0293	117	74.0-130	
tert-Butylbenzene	mg/kg	0.0250	0.0269	108	75.0-127	
Carbon tetrachloride	mg/kg	0.0250	0.0249	99.6	66.0-128	
Chlorobenzene	mg/kg	0.0250	0.0283	113	76.0-128	
Dibromochloromethane	mg/kg	0.0250	0.0259	104	74.0-127	
Chloroethane	mg/kg	0.0250	0.0259	104	61.0-134	
Chloroform	mg/kg	0.0250	0.0267	107	72.0-123	
Chloromethane	mg/kg	0.0250	0.0316	126	51.0-138	
2-Chlorotoluene	mg/kg	0.0250	0.0262	105	75.0-124	
4-Chlorotoluene	mg/kg	0.0250	0.0257	103	75.0-124	
1,2-Dibromoethane (EDB)	mg/kg	0.0250	0.0267	107	74.0-128	
1,2-Dibromo-3-chloropropane	mg/kg	0.0250	0.0294	118	59.0-130	
Dibromomethane	mg/kg	0.0250	0.0267	107	75.0-122	
1,2-Dichlorobenzene	mg/kg	0.0250	0.0266	106	76.0-124	
1,3-Dichlorobenzene	mg/kg	0.0250	0.0276	110	76.0-125	
1,4-Dichlorobenzene	mg/kg	0.0250	0.0264	106	77.0-121	
Dichlorodifluoromethane	mg/kg	0.0250	0.0239	95.6	43.0-156	
Dichlorofluoromethane	mg/kg	0.0250	0.0289	116	65.0-137	
1,1-Dichloroethane	mg/kg	0.0250	0.0262	105	70.0-127	
1,2-Dichloroethane	mg/kg	0.0250	0.0261	104	65.0-131	
1,1-Dichloroethene	mg/kg	0.0250	0.0259	104	65.0-131	
cis-1,2-Dichloroethene	mg/kg	0.0250	0.0259	104	73.0-125	
trans-1,2-Dichloroethene	mg/kg	0.0250	0.0248	99.2	71.0-125	
1,2-Dichloropropane	mg/kg	0.0250	0.0274	110	74.0-125	
1,3-Dichloropropane	mg/kg	0.0250	0.0274	110	80.0-125	
2,2-Dichloropropane	mg/kg	0.0250	0.0257	103	59.0-135	
1,1-Dichloropropene	mg/kg	0.0250	0.0263	105	73.0-125	
cis-1,3-Dichloropropene	mg/kg	0.0250	0.0255	102	76.0-127	
trans-1,3-Dichloropropene	mg/kg	0.0250	0.0257	103	73.0-127	
Ethylbenzene	mg/kg	0.0250	0.0278	111	74.0-126	
Diethyl ether (Ethyl ether)	mg/kg	0.0250	0.0250	100	64.0-137	
Hexachloro-1,3-butadiene	mg/kg	0.0250	0.0270	108	57.0-150	
n-Hexane	mg/kg	0.0250	0.0254	102	55.0-137	
Isopropylbenzene (Cumene)	mg/kg	0.0250	0.0280	112	72.0-127	
p-Isopropyltoluene	mg/kg	0.0250	0.0295	118	72.0-133	
2-Butanone (MEK)	mg/kg	0.125	0.194	155	30.0-160	
Methylene Chloride	mg/kg	0.0250	0.0254	102	68.0-123	
4-Methyl-2-pentanone (MIBK)	mg/kg	0.125	0.160	128	56.0-143	
Methyl-tert-butyl ether	mg/kg	0.0250	0.0268	107	66.0-132	
Naphthalene	mg/kg	0.0250	0.0306	122	59.0-130	
n-Propylbenzene	mg/kg	0.0250	0.0271	108	74.0-126	
Styrene	mg/kg	0.0250	0.0288	115	72.0-127	
1,1,1,2-Tetrachloroethane	mg/kg	0.0250	0.0262	105	74.0-129	
1,1,2,2-Tetrachloroethane	mg/kg	0.0250	0.0336	134	68.0-128	L0
Tetrachloroethene	mg/kg	0.0250	0.0276	110	70.0-136	
Tetrahydrofuran	mg/kg	0.0250	0.0308	123	37.0-146	
Toluene	mg/kg	0.0250	0.0259	104	75.0-121	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

LABORATORY CONTROL SAMPLE: R4007083-1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,3-Trichlorobenzene	mg/kg	0.0250	0.0283	113	59.0-139	
1,2,4-Trichlorobenzene	mg/kg	0.0250	0.0274	110	62.0-137	
1,2,4-Trimethylbenzene	mg/kg	0.0250	0.0263	105	70.0-126	
1,3,5-Trimethylbenzene	mg/kg	0.0250	0.0271	108	73.0-127	
1,1,1-Trichloroethane	mg/kg	0.0250	0.0267	107	69.0-126	
1,1,2-Trichloroethane	mg/kg	0.0250	0.0271	108	78.0-123	
Trichloroethene	mg/kg	0.0250	0.0252	101	76.0-126	
Trichlorofluoromethane	mg/kg	0.0250	0.0292	117	61.0-142	
1,1,2-Trichlorotrifluoroethane	mg/kg	0.0250	0.0266	106	61.0-139	
1,2,3-Trichloropropane	mg/kg	0.0250	0.0285	114	67.0-129	
Vinyl chloride	mg/kg	0.0250	0.0293	117	63.0-134	
Xylene (Total)	mg/kg	0.0750	0.0813	108	72.0-127	
1,2-Dichloroethane-d4 (S)	%			111	70.0-130	
Toluene-d8 (S)	%			114	75.0-131	
4-Bromofluorobenzene (S)	%			97.3	67.0-138	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

QC Batch: 2186141
QC Batch Method: 5035A
Analysis Method: EPA 8260D
Analysis Description: VOA (GC/MS) 8260D
Laboratory: Pace National - Mt. Juliet

Associated Lab Samples: 10676662001

METHOD BLANK: R4010343-4 Matrix: Solid
Associated Lab Samples: 10676662001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Acetone	mg/kg	ND	1.25	12/09/23 13:13	
Allyl chloride	mg/kg	ND	0.125	12/09/23 13:13	
Benzene	mg/kg	ND	0.0250	12/09/23 13:13	
Bromobenzene	mg/kg	ND	0.0250	12/09/23 13:13	
Bromochloromethane	mg/kg	ND	0.0250	12/09/23 13:13	
Bromodichloromethane	mg/kg	ND	0.0250	12/09/23 13:13	
Bromoform	mg/kg	ND	0.0250	12/09/23 13:13	
Bromomethane	mg/kg	ND	0.125	12/09/23 13:13	
n-Butylbenzene	mg/kg	ND	0.0250	12/09/23 13:13	
sec-Butylbenzene	mg/kg	ND	0.0250	12/09/23 13:13	
tert-Butylbenzene	mg/kg	ND	0.0250	12/09/23 13:13	
Carbon tetrachloride	mg/kg	ND	0.0250	12/09/23 13:13	
Chlorobenzene	mg/kg	ND	0.0250	12/09/23 13:13	
Dibromochloromethane	mg/kg	ND	0.0250	12/09/23 13:13	
Chloroethane	mg/kg	ND	0.125	12/09/23 13:13	
Chloroform	mg/kg	ND	0.125	12/09/23 13:13	
Chloromethane	mg/kg	ND	0.0625	12/09/23 13:13	
2-Chlorotoluene	mg/kg	ND	0.0250	12/09/23 13:13	
4-Chlorotoluene	mg/kg	ND	0.0250	12/09/23 13:13	
1,2-Dibromoethane (EDB)	mg/kg	ND	0.0250	12/09/23 13:13	
1,2-Dibromo-3-chloropropane	mg/kg	ND	0.125	12/09/23 13:13	
Dibromomethane	mg/kg	ND	0.0250	12/09/23 13:13	
1,2-Dichlorobenzene	mg/kg	ND	0.0250	12/09/23 13:13	
1,3-Dichlorobenzene	mg/kg	ND	0.0250	12/09/23 13:13	
1,4-Dichlorobenzene	mg/kg	ND	0.0250	12/09/23 13:13	
Dichlorodifluoromethane	mg/kg	ND	0.125	12/09/23 13:13	
Dichlorofluoromethane	mg/kg	ND	0.125	12/09/23 13:13	
1,1-Dichloroethane	mg/kg	ND	0.0250	12/09/23 13:13	
1,2-Dichloroethane	mg/kg	ND	0.0250	12/09/23 13:13	
1,1-Dichloroethene	mg/kg	ND	0.0250	12/09/23 13:13	
cis-1,2-Dichloroethene	mg/kg	ND	0.0250	12/09/23 13:13	
trans-1,2-Dichloroethene	mg/kg	ND	0.0250	12/09/23 13:13	
1,2-Dichloropropane	mg/kg	ND	0.0250	12/09/23 13:13	
1,3-Dichloropropane	mg/kg	ND	0.0250	12/09/23 13:13	
2,2-Dichloropropane	mg/kg	ND	0.0250	12/09/23 13:13	
1,1-Dichloropropene	mg/kg	ND	0.0250	12/09/23 13:13	
cis-1,3-Dichloropropene	mg/kg	ND	0.0250	12/09/23 13:13	
trans-1,3-Dichloropropene	mg/kg	ND	0.0250	12/09/23 13:13	
Ethylbenzene	mg/kg	ND	0.0250	12/09/23 13:13	
Diethyl ether (Ethyl ether)	mg/kg	ND	0.0250	12/09/23 13:13	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

METHOD BLANK: R4010343-4 Matrix: Solid
Associated Lab Samples: 10676662001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Hexachloro-1,3-butadiene	mg/kg	ND	0.0250	12/09/23 13:13	
n-Hexane	mg/kg	ND	0.250	12/09/23 13:13	
Isopropylbenzene (Cumene)	mg/kg	ND	0.0250	12/09/23 13:13	
p-Isopropyltoluene	mg/kg	ND	0.0250	12/09/23 13:13	
2-Butanone (MEK)	mg/kg	ND	0.250	12/09/23 13:13	
Methylene Chloride	mg/kg	ND	0.125	12/09/23 13:13	
4-Methyl-2-pentanone (MIBK)	mg/kg	ND	0.250	12/09/23 13:13	
Methyl-tert-butyl ether	mg/kg	ND	0.0250	12/09/23 13:13	
Naphthalene	mg/kg	ND	0.125	12/09/23 13:13	
n-Propylbenzene	mg/kg	ND	0.0250	12/09/23 13:13	
Styrene	mg/kg	ND	0.0250	12/09/23 13:13	
1,1,1,2-Tetrachloroethane	mg/kg	ND	0.0250	12/09/23 13:13	
1,1,2,2-Tetrachloroethane	mg/kg	ND	0.0250	12/09/23 13:13	
Tetrachloroethene	mg/kg	ND	0.0250	12/09/23 13:13	
Tetrahydrofuran	mg/kg	ND	0.125	12/09/23 13:13	
Toluene	mg/kg	ND	0.125	12/09/23 13:13	
1,2,3-Trichlorobenzene	mg/kg	ND	0.0250	12/09/23 13:13	
1,2,4-Trichlorobenzene	mg/kg	ND	0.0250	12/09/23 13:13	
1,2,4-Trimethylbenzene	mg/kg	ND	0.0250	12/09/23 13:13	
1,3,5-Trimethylbenzene	mg/kg	ND	0.0250	12/09/23 13:13	
1,1,1-Trichloroethane	mg/kg	ND	0.0250	12/09/23 13:13	
1,1,2-Trichloroethane	mg/kg	ND	0.0250	12/09/23 13:13	
Trichloroethene	mg/kg	ND	0.0250	12/09/23 13:13	
Trichlorofluoromethane	mg/kg	ND	0.125	12/09/23 13:13	
1,1,2-Trichlorotrifluoroethane	mg/kg	ND	0.0250	12/09/23 13:13	
1,2,3-Trichloropropane	mg/kg	ND	0.0625	12/09/23 13:13	
Vinyl chloride	mg/kg	ND	0.0250	12/09/23 13:13	
Xylene (Total)	mg/kg	ND	0.0750	12/09/23 13:13	
1,2-Dichloroethane-d4 (S)	%	116	70.0-130	12/09/23 13:13	
Toluene-d8 (S)	%	119	75.0-131	12/09/23 13:13	
4-Bromofluorobenzene (S)	%	107	67.0-138	12/09/23 13:13	

LABORATORY CONTROL SAMPLE: R4010343-1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Acetone	mg/kg	0.125	0.118	94.4	10.0-160	
Allyl chloride	mg/kg	0.125	0.126	101	68.0-135	
Benzene	mg/kg	0.0250	0.0241	96.4	70.0-123	
Bromobenzene	mg/kg	0.0250	0.0248	99.2	73.0-121	
Bromochloromethane	mg/kg	0.0250	0.0246	98.4	77.0-128	
Bromodichloromethane	mg/kg	0.0250	0.0253	101	73.0-121	
Bromoform	mg/kg	0.0250	0.0255	102	64.0-132	
Bromomethane	mg/kg	0.0250	0.0221	88.4	56.0-147	
n-Butylbenzene	mg/kg	0.0250	0.0280	112	68.0-135	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

LABORATORY CONTROL SAMPLE: R4010343-1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
sec-Butylbenzene	mg/kg	0.0250	0.0272	109	74.0-130	
tert-Butylbenzene	mg/kg	0.0250	0.0270	108	75.0-127	
Carbon tetrachloride	mg/kg	0.0250	0.0250	100	66.0-128	
Chlorobenzene	mg/kg	0.0250	0.0249	99.6	76.0-128	
Dibromochloromethane	mg/kg	0.0250	0.0256	102	74.0-127	
Chloroethane	mg/kg	0.0250	0.0243	97.2	61.0-134	
Chloroform	mg/kg	0.0250	0.0243	97.2	72.0-123	
Chloromethane	mg/kg	0.0250	0.0220	88.0	51.0-138	
2-Chlorotoluene	mg/kg	0.0250	0.0260	104	75.0-124	
4-Chlorotoluene	mg/kg	0.0250	0.0265	106	75.0-124	
1,2-Dibromoethane (EDB)	mg/kg	0.0250	0.0257	103	74.0-128	
1,2-Dibromo-3-chloropropane	mg/kg	0.0250	0.0240	96.0	59.0-130	
Dibromomethane	mg/kg	0.0250	0.0252	101	75.0-122	
1,2-Dichlorobenzene	mg/kg	0.0250	0.0246	98.4	76.0-124	
1,3-Dichlorobenzene	mg/kg	0.0250	0.0238	95.2	76.0-125	
1,4-Dichlorobenzene	mg/kg	0.0250	0.0239	95.6	77.0-121	
Dichlorodifluoromethane	mg/kg	0.0250	0.0220	88.0	43.0-156	
Dichlorofluoromethane	mg/kg	0.0250	0.0246	98.4	65.0-137	
1,1-Dichloroethane	mg/kg	0.0250	0.0247	98.8	70.0-127	
1,2-Dichloroethane	mg/kg	0.0250	0.0245	98.0	65.0-131	
1,1-Dichloroethene	mg/kg	0.0250	0.0247	98.8	65.0-131	
cis-1,2-Dichloroethene	mg/kg	0.0250	0.0243	97.2	73.0-125	
trans-1,2-Dichloroethene	mg/kg	0.0250	0.0242	96.8	71.0-125	
1,2-Dichloropropane	mg/kg	0.0250	0.0239	95.6	74.0-125	
1,3-Dichloropropane	mg/kg	0.0250	0.0257	103	80.0-125	
2,2-Dichloropropane	mg/kg	0.0250	0.0250	100	59.0-135	
1,1-Dichloropropene	mg/kg	0.0250	0.0252	101	73.0-125	
cis-1,3-Dichloropropene	mg/kg	0.0250	0.0260	104	76.0-127	
trans-1,3-Dichloropropene	mg/kg	0.0250	0.0268	107	73.0-127	
Ethylbenzene	mg/kg	0.0250	0.0251	100	74.0-126	
Diethyl ether (Ethyl ether)	mg/kg	0.0250	0.0262	105	64.0-137	
Hexachloro-1,3-butadiene	mg/kg	0.0250	0.0237	94.8	57.0-150	
n-Hexane	mg/kg	0.0250	0.0234	93.6	55.0-137	
Isopropylbenzene (Cumene)	mg/kg	0.0250	0.0282	113	72.0-127	
p-Isopropyltoluene	mg/kg	0.0250	0.0276	110	72.0-133	
2-Butanone (MEK)	mg/kg	0.125	0.135	108	30.0-160	
Methylene Chloride	mg/kg	0.0250	0.0241	96.4	68.0-123	
4-Methyl-2-pentanone (MIBK)	mg/kg	0.125	0.143	114	56.0-143	
Methyl-tert-butyl ether	mg/kg	0.0250	0.0278	111	66.0-132	
Naphthalene	mg/kg	0.0250	0.0292	117	59.0-130	
n-Propylbenzene	mg/kg	0.0250	0.0266	106	74.0-126	
Styrene	mg/kg	0.0250	0.0272	109	72.0-127	
1,1,1,2-Tetrachloroethane	mg/kg	0.0250	0.0242	96.8	74.0-129	
1,1,2,2-Tetrachloroethane	mg/kg	0.0250	0.0257	103	68.0-128	
Tetrachloroethene	mg/kg	0.0250	0.0245	98.0	70.0-136	
Tetrahydrofuran	mg/kg	0.0250	0.0258	103	37.0-146	
Toluene	mg/kg	0.0250	0.0242	96.8	75.0-121	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

LABORATORY CONTROL SAMPLE: R4010343-1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,3-Trichlorobenzene	mg/kg	0.0250	0.0263	105	59.0-139	
1,2,4-Trichlorobenzene	mg/kg	0.0250	0.0266	106	62.0-137	
1,2,4-Trimethylbenzene	mg/kg	0.0250	0.0260	104	70.0-126	
1,3,5-Trimethylbenzene	mg/kg	0.0250	0.0267	107	73.0-127	
1,1,1-Trichloroethane	mg/kg	0.0250	0.0244	97.6	69.0-126	
1,1,2-Trichloroethane	mg/kg	0.0250	0.0256	102	78.0-123	
Trichloroethene	mg/kg	0.0250	0.0243	97.2	76.0-126	
Trichlorofluoromethane	mg/kg	0.0250	0.0248	99.2	61.0-142	
1,1,2-Trichlorotrifluoroethane	mg/kg	0.0250	0.0246	98.4	61.0-139	
1,2,3-Trichloropropane	mg/kg	0.0250	0.0252	101	67.0-129	
Vinyl chloride	mg/kg	0.0250	0.0248	99.2	63.0-134	
Xylene (Total)	mg/kg	0.0750	0.0781	104	72.0-127	
1,2-Dichloroethane-d4 (S)	%			121	70.0-130	
Toluene-d8 (S)	%			120	75.0-131	
4-Bromofluorobenzene (S)	%			112	67.0-138	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

QC Batch: 920731
QC Batch Method: EPA 8260D
Analysis Method: EPA 8260D
Analysis Description: 8260D MSV TCLP
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10676662001, 10676662002

METHOD BLANK: 4839573 Matrix: Water
Associated Lab Samples: 10676662001, 10676662002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1-Dichloroethene	ug/L	ND	25.0	11/29/23 15:11	
1,2-Dichloroethane	ug/L	ND	25.0	11/29/23 15:11	
1,4-Dichlorobenzene	ug/L	ND	25.0	11/29/23 15:11	
2-Butanone (MEK)	ug/L	ND	250	11/29/23 15:11	
Benzene	ug/L	ND	25.0	11/29/23 15:11	
Carbon tetrachloride	ug/L	ND	25.0	11/29/23 15:11	
Chlorobenzene	ug/L	ND	25.0	11/29/23 15:11	
Chloroform	ug/L	ND	25.0	11/29/23 15:11	
Tetrachloroethene	ug/L	ND	25.0	11/29/23 15:11	
Trichloroethene	ug/L	ND	25.0	11/29/23 15:11	
Vinyl chloride	ug/L	ND	25.0	11/29/23 15:11	
1,2-Dichlorobenzene-d4 (S)	%.	100	75-125	11/29/23 15:11	
4-Bromofluorobenzene (S)	%.	101	75-125	11/29/23 15:11	
Toluene-d8 (S)	%.	100	75-125	11/29/23 15:11	

METHOD BLANK: 4837394 Matrix: Solid
Associated Lab Samples: 10676662001, 10676662002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1-Dichloroethene	ug/L	ND	25.0	11/29/23 15:11	
1,2-Dichloroethane	ug/L	ND	25.0	11/29/23 15:11	
1,4-Dichlorobenzene	ug/L	ND	25.0	11/29/23 15:11	
2-Butanone (MEK)	ug/L	ND	250	11/29/23 15:11	
Benzene	ug/L	ND	25.0	11/29/23 15:11	
Carbon tetrachloride	ug/L	ND	25.0	11/29/23 15:11	
Chlorobenzene	ug/L	ND	25.0	11/29/23 15:11	
Chloroform	ug/L	ND	25.0	11/29/23 15:11	
Tetrachloroethene	ug/L	ND	25.0	11/29/23 15:11	
Trichloroethene	ug/L	ND	25.0	11/29/23 15:11	
Vinyl chloride	ug/L	ND	25.0	11/29/23 15:11	
1,2-Dichlorobenzene-d4 (S)	%.	100	75-125	11/29/23 15:11	
4-Bromofluorobenzene (S)	%.	101	75-125	11/29/23 15:11	
Toluene-d8 (S)	%.	100	75-125	11/29/23 15:11	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

LABORATORY CONTROL SAMPLE: 4839574

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1-Dichloroethene	ug/L	500	507	101	69-125	
1,2-Dichloroethane	ug/L	500	532	106	75-125	
1,4-Dichlorobenzene	ug/L	500	485	97	75-125	
2-Butanone (MEK)	ug/L	2500	2780	111	61-131	
Benzene	ug/L	500	506	101	75-125	
Carbon tetrachloride	ug/L	500	499	100	73-126	
Chlorobenzene	ug/L	500	495	99	75-125	
Chloroform	ug/L	500	515	103	75-125	
Tetrachloroethene	ug/L	500	510	102	70-125	
Trichloroethene	ug/L	500	493	99	74-125	
Vinyl chloride	ug/L	500	525	105	66-125	
1,2-Dichlorobenzene-d4 (S)	%.			99	75-125	
4-Bromofluorobenzene (S)	%.			102	75-125	
Toluene-d8 (S)	%.			100	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4839575 4839576

Parameter	Units	10676662002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1-Dichloroethene	ug/L	ND	500	500	467	480	93	96	60-136	3	30	
1,2-Dichloroethane	ug/L	ND	500	500	520	522	104	104	71-133	0	30	
1,4-Dichlorobenzene	ug/L	ND	500	500	450	454	90	91	75-125	1	30	
2-Butanone (MEK)	ug/L	ND	2500	2500	3140	3120	126	125	57-142	1	30	
Benzene	ug/L	ND	500	500	475	486	95	97	66-127	2	30	
Carbon tetrachloride	ug/L	ND	500	500	461	484	92	97	73-135	5	30	
Chlorobenzene	ug/L	ND	500	500	471	478	94	95	75-125	1	30	
Chloroform	ug/L	ND	500	500	491	502	96	98	75-125	2	30	
Tetrachloroethene	ug/L	ND	500	500	459	466	92	93	69-129	2	30	
Trichloroethene	ug/L	ND	500	500	457	479	91	96	69-127	5	30	
Vinyl chloride	ug/L	ND	500	500	511	515	102	103	54-146	1	30	
1,2-Dichlorobenzene-d4 (S)	%.						100	99	75-125			
4-Bromofluorobenzene (S)	%.						102	100	75-125			
Toluene-d8 (S)	%.						101	99	75-125			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

QC Batch: 919990
QC Batch Method: EPA 3546
Analysis Method: EPA 8270E by SIM
Analysis Description: 8270E Solid PAH by SIM MSSV
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10676662001, 10676662002

METHOD BLANK: 4836857 Matrix: Solid
Associated Lab Samples: 10676662001, 10676662002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1-Methylnaphthalene	ug/kg	ND	10.0	12/05/23 20:14	
2-Methylnaphthalene	ug/kg	ND	10.0	12/05/23 20:14	
Acenaphthene	ug/kg	ND	10.0	12/05/23 20:14	
Acenaphthylene	ug/kg	ND	10.0	12/05/23 20:14	
Anthracene	ug/kg	ND	10.0	12/05/23 20:14	
Benzo(a)anthracene	ug/kg	ND	10.0	12/05/23 20:14	
Benzo(a)pyrene	ug/kg	ND	10.0	12/05/23 20:14	
Benzo(b)fluoranthene	ug/kg	ND	10.0	12/05/23 20:14	
Benzo(g,h,i)perylene	ug/kg	ND	10.0	12/05/23 20:14	
Benzo(k)fluoranthene	ug/kg	ND	10.0	12/05/23 20:14	
Chrysene	ug/kg	ND	10.0	12/05/23 20:14	
Dibenz(a,h)anthracene	ug/kg	ND	10.0	12/05/23 20:14	
Dibenzofuran	ug/kg	ND	10.0	12/05/23 20:14	
Fluoranthene	ug/kg	ND	10.0	12/05/23 20:14	
Fluorene	ug/kg	ND	10.0	12/05/23 20:14	
Indeno(1,2,3-cd)pyrene	ug/kg	ND	10.0	12/05/23 20:14	
Naphthalene	ug/kg	ND	10.0	12/05/23 20:14	
Phenanthrene	ug/kg	ND	10.0	12/05/23 20:14	
Pyrene	ug/kg	ND	10.0	12/05/23 20:14	
2-Fluorobiphenyl (S)	%.	83	54-125	12/05/23 20:14	
p-Terphenyl-d14 (S)	%.	86	60-125	12/05/23 20:14	

LABORATORY CONTROL SAMPLE: 4836858

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1-Methylnaphthalene	ug/kg	100	59.4	59	41-125	
2-Methylnaphthalene	ug/kg	100	60.2	60	45-125	
Acenaphthene	ug/kg	100	63.4	63	56-125	
Acenaphthylene	ug/kg	100	62.3	62	54-125	
Anthracene	ug/kg	100	83.5	84	59-125	
Benzo(a)anthracene	ug/kg	100	88.7	89	55-125	
Benzo(a)pyrene	ug/kg	100	86.8	87	69-125	
Benzo(b)fluoranthene	ug/kg	100	88.3	88	54-125	
Benzo(g,h,i)perylene	ug/kg	100	70.3	70	63-125	
Benzo(k)fluoranthene	ug/kg	100	91.7	92	65-125	
Chrysene	ug/kg	100	88.5	89	62-125	
Dibenz(a,h)anthracene	ug/kg	100	76.4	76	64-125	
Dibenzofuran	ug/kg	100	66.4	66	70-130	L2
Fluoranthene	ug/kg	100	88.8	89	69-125	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

LABORATORY CONTROL SAMPLE: 4836858

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluorene	ug/kg	100	72.4	72	61-125	
Indeno(1,2,3-cd)pyrene	ug/kg	100	73.4	73	54-125	
Naphthalene	ug/kg	100	61.4	61	49-125	
Phenanthrene	ug/kg	100	80.5	81	60-125	
Pyrene	ug/kg	100	84.1	84	69-125	
2-Fluorobiphenyl (S)	%.			60	54-125	
p-Terphenyl-d14 (S)	%.			87	60-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 4836859 4836860

Parameter	Units	10676697012 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1-Methylnaphthalene	ug/kg	ND	110	106	28.9	83.1	26	79	30-125	97	30	M1,R1
2-Methylnaphthalene	ug/kg	ND	110	106	29.1	91.2	27	86	30-150	103	30	M1,R1
Acenaphthene	ug/kg	ND	110	106	38.3	81.9	35	78	51-125	72	30	M1,R1
Acenaphthylene	ug/kg	ND	110	106	62.6	85.0	57	81	50-125	30	30	
Anthracene	ug/kg	ND	110	106	84.0	95.6	77	91	39-136	13	30	
Benzo(a)anthracene	ug/kg	18.3	110	106	118	94.8	91	72	30-131	22	30	
Benzo(a)pyrene	ug/kg	22.0	110	106	142	94.8	109	69	30-150	40	30	R1
Benzo(b)fluoranthene	ug/kg	33.7	110	106	174	102	128	64	30-150	53	30	R1
Benzo(g,h,i)perylene	ug/kg	12.8	110	106	95.0	78.0	75	62	30-146	20	30	
Benzo(k)fluoranthene	ug/kg	13.2	110	106	113	96.1	91	79	41-130	16	30	
Chrysene	ug/kg	23.4	110	106	139	95.8	106	69	30-135	37	30	R1
Dibenz(a,h)anthracene	ug/kg	ND	110	106	69.8	80.5	60	73	50-129	14	30	
Dibenzofuran	ug/kg	ND	110	106	41.2	80.1	38	76	30-150	64	30	R1
Fluoranthene	ug/kg	18.0	110	106	146	100	117	78	30-150	37	30	R1
Fluorene	ug/kg	ND	110	106	53.8	80.9	49	77	56-125	40	30	M1,R1
Indeno(1,2,3-cd)pyrene	ug/kg	13.7	110	106	101	81.2	80	64	30-148	22	30	
Naphthalene	ug/kg	ND	110	106	32.4	84.7	30	80	30-125	89	30	R1
Phenanthrene	ug/kg	ND	110	106	69.2	84.2	63	80	30-143	20	30	
Pyrene	ug/kg	28.2	110	106	164	94.8	124	63	30-150	54	30	R1
2-Fluorobiphenyl (S)	%.						28	79	54-125			S0
p-Terphenyl-d14 (S)	%.						55	79	60-125			S0

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

QC Batch: 2179335
QC Batch Method: SM 2540 G
Analysis Method: SM 2540G
Analysis Description: Total Solids 2540 G-2011
Laboratory: Pace National - Mt. Juliet
Associated Lab Samples: 10676662001, 10676662002

METHOD BLANK: R4006809-1 Matrix: Solid
Associated Lab Samples: 10676662001, 10676662002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Total Solids	%	0.00100		11/30/23 10:23	

LABORATORY CONTROL SAMPLE: R4006809-2

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Total Solids	%	50.0	50.0	100	90.0-110	

SAMPLE DUPLICATE: R4006809-3

Parameter	Units	10676662001 Result	Dup Result	RPD	Max RPD	Qualifiers
Total Solids	%	86.5	86.8	0.293	10	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

QC Batch: 2179177
QC Batch Method: 3060A
Analysis Method: EPA 7196A
Analysis Description: Wet Chemistry 3060A/7196A
Laboratory: Pace National - Mt. Juliet
Associated Lab Samples: 10676662001, 10676662002

METHOD BLANK: R4006745-1 Matrix: Solid
Associated Lab Samples: 10676662001, 10676662002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Chromium, Hexavalent	mg/kg	ND	2.00	11/30/23 23:53	

LABORATORY CONTROL SAMPLE: R4006745-2

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	mg/kg	24.0	26.4	110	80.0-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: R4006745-4 R4006745-5

Parameter	Units	L1679422-06 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Chromium, Hexavalent	mg/kg	ND	25.4	25.4	14.6	15.3	57.3	60.3	75.0-125	5.05	20	ML

MATRIX SPIKE SAMPLE: R4006745-6

Parameter	Units	L1679422-06 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Chromium, Hexavalent	mg/kg	ND	828	458	55.3	75.0-125	ML

SAMPLE DUPLICATE: R4006745-3

Parameter	Units	L1679415-06 Result	Dup Result	RPD	Max RPD	Qualifiers
Chromium, Hexavalent	mg/kg	ND	ND	0.00	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit - The lowest concentration value that meets project requirements for quantitative data with known precision and bias for a specific analyte in a specific matrix.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Reported results are not rounded until the final step prior to reporting. Therefore, calculated parameters that are typically reported as "Total" may vary slightly from the sum of the reported component parameters.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

SAMPLE QUALIFIERS

Sample: 10676662001

[1] Volatile Organic Compounds (GC/MS) by Method 8260D - Surrogate fails at a lower dilution.

Sample: 10676662002

[1] Volatile Organic Compounds (GC/MS) by Method 8260D - Non-target compounds too high to run at a lower dilution.

Sample: R4006745-4

[1] Wet Chemistry by Method 3060A/7196A - Spike failure due to matrix interference

Sample: R4006745-5

[1] Wet Chemistry by Method 3060A/7196A - Spike failure due to matrix interference

Sample: R4006745-6

[1] Wet Chemistry by Method 3060A/7196A - Spike failure due to matrix interference

ANALYTE QUALIFIERS

ED	Due to the extract's physical characteristics, the analysis was performed at dilution.
H3	Sample was received or analysis requested beyond the recognized method holding time.
L0	Analyte recovery in the laboratory control sample (LCS) was outside QC limits.
L2	Analyte recovery in the laboratory control sample (LCS) was below QC limits. Results for this analyte in associated samples may be biased low.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

ANALYTE QUALIFIERS

ML	Matrix spike recovery and/or matrix spike duplicate recovery was below laboratory control limits. Result may be biased low.
N2	The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request.
R1	RPD value was outside control limits.
S0	Surrogate recovery outside laboratory control limits.

Pace Analytical Services, LLC
1700 Elm Street
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: P66 Oily Water Sewer
Pace Project No.: 10676662

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10676662001	**B-8-23, 5.5ft**	EPA 3015A	920935	EPA 6010D	921034
10676662002	**B-9-23, 5ft**	EPA 3015A	920935	EPA 6010D	921034
10676662001	**B-8-23, 5.5ft**	EPA 3050B	920106	EPA 6020B	920659
10676662002	**B-9-23, 5ft**	EPA 3050B	920106	EPA 6020B	920659
10676662001	**B-8-23, 5.5ft**	EPA 7470A	920932	EPA 7470A	921018
10676662002	**B-9-23, 5ft**	EPA 7470A	920932	EPA 7470A	921018
10676662001	**B-8-23, 5.5ft**	EPA 7471B	920113	EPA 7471B	920638
10676662002	**B-9-23, 5ft**	EPA 7471B	920113	EPA 7471B	920638
10676662001	**B-8-23, 5.5ft**	ASTM D2974	922652		
10676662002	**B-9-23, 5ft**	ASTM D2974	922652		
10676662001	**B-8-23, 5.5ft**	EPA 3546	919990	EPA 8270E by SIM	921796
10676662002	**B-9-23, 5ft**	EPA 3546	919990	EPA 8270E by SIM	921796
10676662001	**B-8-23, 5.5ft**	5035A	2186141	EPA 8260D	2186141
10676662002	**B-9-23, 5ft**	5035A	2180344	EPA 8260D	2180344
10676662003	**Trip Blank**	5035A	2180344	EPA 8260D	2180344
10676662001	**B-8-23, 5.5ft**	EPA 8260D	920731		
10676662002	**B-9-23, 5ft**	EPA 8260D	920731		
10676662001	**B-8-23, 5.5ft**	SM 2540 G	2179335	SM 2540G	2179335
10676662002	**B-9-23, 5ft**	SM 2540 G	2179335	SM 2540G	2179335
10676662001	**B-8-23, 5.5ft**	3060A	2179177	EPA 7196A	2179177
10676662002	**B-9-23, 5ft**	3060A	2179177	EPA 7196A	2179177
10676662001	**B-8-23, 5.5ft**	Trivalent Chromium Calculation	923862		
10676662002	**B-9-23, 5ft**	Trivalent Chromium Calculation	923862		

Pace® Location Requested (City/State):
Pace Analytical Minnesota
1700 Elm Street, Suite 200
Minneapolis, MN 55414

CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

LAB USE ONLY- Affix Workorder/Login Label Here

WO# : 10676662

10676662

Company Name:	Phillips66_Whatcom Environmental	Contact/Report To:	Joe Sumera
Street Address:	3901 Unick Road, Ferndale, WA 98248	Phone #:	(360)384-7870
		E-Mail:	joe.e.sumera@p66.com
		Cc E-Mail:	
Customer Project #:		Invoice To:	Joe Sumera
Project Name:	P66 Oily Water Sewer	Invoice E-Mail:	joe.e.sumera@p66.com
Site Collection Info/Facility ID (as applicable):		Purchase Order # (if applicable):	
		Quote #:	
Time Zone Collected: [ ] AK [ ] PT [ ] MT [ ] CT [ ] ET		County / State origin of sample(s):	Washington

Data Deliverables:
[ ] Level II [ ] Level III [ ] Level IV
[ ] EQUIS
[ ] Other_____

Regulatory Program (DW, RCRA, etc.) as applicable:

Rush (Pre-approval required):
[ ] 2 Day [ ] 3 day [ ] 5 day [ ] Other_____

Date Results Requested:

DW PWSID # or WW Permit # as applicable:

Field Filtered (if applicable): [ ] Yes [ ] No

Analysis:

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Waste Water (WW), Product (P), Soil/Solid (SS), Oil (OL), Wipe (WP), Tissue (TS), Bioassay (B), Vapor (V), Other (OT), Surface Water (SW),Sediment (SED), Sludge (SL), Caulk

Specify Container Size **

Identify Container Preservative Type***

Analysis Requested

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res. Cl2	Number & Type of Containers Plastic	Number & Type of Containers Glass	6010D/7470A RCRA8, TCLP	6020B/7471B Total As,Cd,Cr,Pb,Ni,Zn,Hg; CrIII & VI	8260D BTEXs and HVOCs	8260D VOCs, TCLP	8270E SIM Naphthalenes and PAHs	Dry Weight / %M by ASTM D2974	NWTPH-EPH	NWTPH-VPH	TCLP Benzene	Sample Comment
B-8-23, 5.5ft	SS	G	11/16/23	0930				1	13	X	X	X	X	X	X	X	X	X	001
B-9-23, 5ft	SS	G	11/16/23	1045				1	13	X	X	X	X	X	X	X	X	X	Please send 002
Trip Blank	SL											X							results to elibsit@whatcom-es.com meverson@whatcom-es.com

**Container Size: (1) 1L, (2) 500mL, (3) 250mL, (4) 125mL, (5) 100mL, (6) 40mL vial, (7) EnCore, (8) TerraCore, (9) Other

*** Preservative Types: (1) None, (2) HNO3, (3) H2SO4, (4) HCl, (5) NaOH, (6) Zn Acetate, (7) NaHSO4, (8) Sod. Thiosulfate, (9) Ascorbic Acid, (10) MeOH, (11) Other

Lab Use Only
Proj. Mgr: Jennifer Gross
AcctNum / Client ID:
Table #:
Profile / Template: 33194
Prelog / Bottle Ord. ID: EZ 3016262

Preservation non-conformance identified for sample.

Customer Remarks / Special Conditions / Possible Hazards:
Standard TA

Collected By:
Printed Name: Megan Everson
Signature:

Additional Instructions from Pace®:

# Coolers:	Thermometer ID:	Correction Factor (°C):	Obs. Temp. (°C)	Corrected Temp. (°C)

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
			11/17/23 850
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company. (Signature)	Date/Time:

Tracking Number:

Delivered by: [ ] In- Person [ ] Courier
[ ] FedEX [ ] UPS [ ] Other

Page: 1 of 1

Page 3 of 3

12 FY

Sample Condition Upon Receipt

Client Name: Phillips Lee Whatcom Environmental

Project #:

WO#: 10676662

PM: JMG **Due Date: 12/05/23**

CLIENT: COP

Courier: ☑ FedEx ☐ UPS ☐ USPS ☐ Client ☐ Pace ☐ SpeeDee ☐ Commercial

Tracking Number: 6042 7240 4900 ☐ See Exceptions ENV-FRM-MIN4-0142

Custody Seal on Cooler/Box Present? ☑ Yes ☐ No **Seals Intact?** ☑ Yes ☐ No **Biological Tissue Frozen?** ☐ Yes ☐ No ☑ N/A

Packing Material: ☑ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other **Temp Blank?** ☑ Yes ☐ No

Thermometer: ☐ T1 (0461) ☐ T2 (0436) ☐ T3 (0459) ☑ T4 (0402) ☐ T5 (0178) ☐ T6 (0235) ☐ T7 (0042) ☐ T8 (0775) ☐ T9(0727) ☐ 01339252/1710

Type of Ice: ☑ Wet ☐ Blue ☐ Dry ☐ None ☐ Melted

Did Samples Originate in West Virginia? ☐ Yes ☑ No **Were All Container Temps Taken?** ☐ Yes ☐ No ☑ N/A

Temp should be above freezing to 6 °C **Cooler temp Read w/Temp Blank:** 1.2 °C

Correction Factor: True **Cooler Temp Corrected w/temp blank:** 1.2 °C

Average Corrected Temp (no temp blank only): ____ °C ☐ See Exceptions ENV-FRM-MIN4-0142 ☐ 1 Container

USDA Regulated Soil: (☐ N/A, water sample/other: _____) **Date/Initials of Person Examining Contents:** JW 11/21/23

Did samples originate in a quarantine zone within the United States: AL, AR, AZ CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX, or VA (check maps)? ☐ Yes ☑ No

Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? ☐ Yes ☑ No

If Yes to either question, fill out a Regulated Soil Checklist (ENV-FRM-MIN4-0154) and include with SCUR/COC paperwork.

Location (Check one): ☐ Duluth ☑ Minneapolis ☐ Virginia

				COMMENTS
Chain of Custody Present and Filled Out?	☑ Yes	☐ No		1.
Chain of Custody Relinquished?	☑ Yes	☐ No		2.
Sampler Name and/or Signature on COC?	☑ Yes	☐ No	☐ N/A	3.
Samples Arrived within Hold Time?	☑ Yes	☐ No		4. If fecal: ☐ <8 hrs ☐ >8 hr, <24 ☐ No
Short Hold Time Analysis (<72 hr)?	☐ Yes	☑ No		5. ☐ Fecal Coliform ☐ HPC ☐ Total Coliform/E.coli ☐ BOD/cBOD ☐ Hex Chrom ☐ Turbidity ☐ Nitrate ☐ Nitrite ☐ Orthophos ☐ Other
Rush Turn Around Time Requested?	☐ Yes	☑ No		6.
Sufficient Sample Volume?	☑ Yes	☐ No		7.
Correct Containers Used?	☑ Yes	☐ No	☐ N/A	8.
-Pace Containers Used?	☑ Yes	☐ No		
Containers Intact?	☑ Yes	☐ No		9.
Field Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☑ N/A	10. Is sediment visible in the dissolved container? ☐ Yes ☐ No
Is sufficient information available to reconcile the samples to the COC?	☑ Yes	☐ No		11. **If no, write ID/Date/Time of container below:** ☐ See Exceptions ENV-FRM-MIN4-0142
Matrix: ☐ Water ☑ Soil ☐ Oil ☐ Other				
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☑ N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO3, H2SO4, <2pH, NaOH >9 Sulfide, NaOH>10 Cyanide)	☐ Yes	☐ No	☑ N/A	☐ NaOH ☐ HNO3 ☐ H2SO4 ☐ Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxins/PFAS (*If adding preservative to a container, it must be added to associated field and equipment blanks--verify with PM first.)	☑ Yes	☐ No	☐ N/A	Positive for Residual Chlorine? ☐ Yes ☐ No ☐ See Exceptions ENV-FRM-MIN4-0142
				pH Paper Lot #
				Residual Chlorine | 0-6 Roll | 0-6 Strip | 0-14 Strip
Headspace in Methyl Mercury Container? JMG 11/21/23	~~☑ Yes~~	☐ No	☒ N/A	13.
Extra labels present on soil VOA or WIDRO containers?	☐ Yes	☑ No	☐ N/A	14. ☐ See Exceptions ENV-FRM-MIN4-0142
Headspace in VOA Vials (greater than 6mm)?	☐ Yes	☐ No	☑ N/A	
3 Trip Blanks Present?	☐ Yes	☑ No	☐ N/A	15. Two trip Blank
Trip Blank Custody Seals Present?	☑ Yes	☐ No	☐ N/A	Pace Trip Blank Lot # (if purchased): 0724233

CLIENT NOTIFICATION/RESOLUTION **Field Data Required?** ☐ Yes ☐ No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: Jenni Gross **Date:** 11/21/23

NOTE: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e., out of hold, incorrect preservative, out of temp, incorrect containers).

Labeled By: JW **Line:** 4

Internal Transfer Chain of Custody

Pace

☐ Rush Multiplier____X
☐ Samples Pre-Logged into eCOC

State Of Origin: WA
Cert. Needed: ☒ Yes ☐ No

Workorder: 10676662 **Workorder Name:** P66 Oily Water Sewer

Owner Received Date: 11/17/2023 **Results Requested By:** 12/5/2023

Report To	Subcontract To
Jennifer Gross Pace Analytical Minnesota 1700 Elm Street Minneapolis, MN 55414 Phone (612)607-1700	Pace National 12065 Lebanon Rd Mt. Juliet, TN 37122 Phone (615) 758-5858

L1681750

Item	Sample ID	Sample Type	Collect Date/Time	Lab ID	Matrix	Preserved Containers JGCU	VG9B	VG9M				7196A Cr VI (PACE-TN)	8260D Low Level VOCs (PACE-TN)	Total Solids (PACE-TN)	Use bisulfate vials first									LAB USE ONLY
1	B-8-23, 5.5ft	PS	11/16/2023 09:30	10676662001	Solid	1	2	2				X	X	X	X									-01
2	B-9-23, 5ft	PS	11/16/2023 10:45	10676662002	Solid	1	2	2				X	X	X	X									-02
3	Trip Blank	PS	11/16/2023 00:00	10676662003	Solid			2					X											-03
4																								
5																								

Transfers	Released By	Date/Time	Received By	Date/Time
1	Brian Coen/PACE	11/27/23 1600	Eric Dawson JJ	11-28-23/900
2				
3				

Comments

8260 AP9, use bisulfate vials first

OK

Cooler Temperature on Receipt ____ °C	Custody Seal (Y) or N	Received on Ice (Y) or N	Samples Intact (Y) or N

****In order to maintain client confidentiality, location/name of the sampling site, sampler's name and signature may not be provided on this COC document. This chain of custody is considered complete as is since this information is available in the owner laboratory.*

Sample Receipt Checklist

COC Seal Present/Intact:	✓Y__N	If Applicable	
COC Signed/Accurate:	✓Y__N	VOA Zero Headspace:	__Y__N
Bottles arrive intact:	✓Y__N	Pres. Correct/Check:	__Y__N
Correct bottles used:	✓Y__N	DPA8 2.1 +0 = 2.1	
Sufficient volume sent:	✓Y__N		
RA Screen <0.5 mR/hr:	✓Y__N	6076 5640 9686	

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Pace Analytical Minnesota
Jenni Gross
1700 Elm Street, Ste. 200
Minneapolis, MN 55414

RE: P66 Oily Water Sewer
Work Order Number: 2311489

December 15, 2023

Attention Jenni Gross:

Fremont Analytical, Inc. received 2 sample(s) on 11/29/2023 for the analyses presented in the following report.

Extractable Petroleum Hydrocarbons by NWEPH
Sample Moisture (Percent Moisture)
Volatile Petroleum Hydrocarbons by NWVPH

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

Date: *12/15/2023*

CLIENT: Pace Analytical Minnesota
Project: P66 Oily Water Sewer
Work Order: 2311489

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2311489-001	B-8-23, 5.5ft	11/16/2023 9:30 AM	11/29/2023 10:20 AM
2311489-002	B-9-23, 5ft	11/16/2023 10:45 AM	11/29/2023 10:20 AM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Original

Case Narrative

WO#: **2311489**

Date: **12/15/2023**

CLIENT: Pace Analytical Minnesota
Project: P66 Oily Water Sewer

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
DUP - Sample Duplicate
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MCL - Maximum Contaminant Level
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
REP - Sample Replicate
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **2311489**

Date Reported: **12/15/2023**

Client: Pace Analytical Minnesota

Collection Date: 11/16/2023 9:30:00 AM

Project: P66 Oily Water Sewer

Lab ID: 2311489-001

Matrix: Solid

Client Sample ID: **B-8-23, 5.5ft**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 42172		Analyst: AP
Aliphatic Hydrocarbon (C8-C10)	ND	21.6		mg/Kg-dry	1	12/7/2023 4:03:43 PM
Aliphatic Hydrocarbon (C10-C12)	50.8	10.8		mg/Kg-dry	1	12/7/2023 4:03:43 PM
Aliphatic Hydrocarbon (C12-C16)	210	10.8		mg/Kg-dry	1	12/7/2023 4:03:43 PM
Aliphatic Hydrocarbon (C16-C21)	190	10.8		mg/Kg-dry	1	12/7/2023 4:03:43 PM
Aliphatic Hydrocarbon (C21-C34)	58.0	10.8		mg/Kg-dry	1	12/7/2023 4:03:43 PM
Aromatic Hydrocarbon (C8-C10)	ND	21.6		mg/Kg-dry	1	12/7/2023 8:02:32 PM
Aromatic Hydrocarbon (C10-C12)	ND	10.8	*	mg/Kg-dry	1	12/7/2023 8:02:32 PM
Aromatic Hydrocarbon (C10-C12)	ND	10.7	H	mg/Kg-dry	1	12/15/2023 12:12:56 AM
Aromatic Hydrocarbon (C12-C16)	83.5	10.8		mg/Kg-dry	1	12/7/2023 8:02:32 PM
Aromatic Hydrocarbon (C16-C21)	184	10.8		mg/Kg-dry	1	12/7/2023 8:02:32 PM
Aromatic Hydrocarbon (C21-C34)	44.3	10.7	H	mg/Kg-dry	1	12/15/2023 12:12:56 AM
Aromatic Hydrocarbon (C21-C34)	35.9	10.8	*	mg/Kg-dry	1	12/7/2023 8:02:32 PM
Surr: 1-Chlorooctadecane	61.7	50 - 150		%Rec	1	12/7/2023 4:03:43 PM
Surr: o-Terphenyl	99.6	50 - 150	H	%Rec	1	12/15/2023 12:12:56 AM
Surr: o-Terphenyl	72.3	50 - 150		%Rec	1	12/7/2023 8:02:32 PM

NOTES:

* - Associated LCS is below acceptance criteria. Result may be low-biased.

Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 42189		Analyst: MS
Aliphatic Hydrocarbon (C5-C6)	ND	1.07	H	mg/Kg-dry	1	12/1/2023 7:27:00 PM
Aliphatic Hydrocarbon (C6-C8)	ND	1.07	H	mg/Kg-dry	1	12/1/2023 7:27:00 PM
Aliphatic Hydrocarbon (C8-C10)	4.87	1.07	H	mg/Kg-dry	1	12/1/2023 7:27:00 PM
Aliphatic Hydrocarbon (C10-C12)	13.2	1.07	H	mg/Kg-dry	1	12/1/2023 7:27:00 PM
Aromatic Hydrocarbon (C8-C10)	5.68	1.07	H	mg/Kg-dry	1	12/1/2023 7:27:00 PM
Aromatic Hydrocarbon (C10-C12)	11.9	1.07	H	mg/Kg-dry	1	12/1/2023 7:27:00 PM
Aromatic Hydrocarbon (C12-C13)	13.4	1.07	H	mg/Kg-dry	1	12/1/2023 7:27:00 PM
Surr: 2,5-dibromotoluene	155	60 - 140	SH	%Rec	1	12/1/2023 7:27:00 PM

NOTES:

S - Outlying surrogate recovery(ies) observed. A duplicate analysis was performed with similar results indicating a possible matrix effect.

Sample Moisture (Percent Moisture)				Batch ID: R88065		Analyst: MP
Percent Moisture	12.5	0.500		wt%	1	12/1/2023 8:30:57 AM

Analytical Report

Work Order: **2311489**

Date Reported: **12/15/2023**

Client: Pace Analytical Minnesota

Collection Date: 11/16/2023 10:45:00 AM

Project: P66 Oily Water Sewer

Lab ID: 2311489-002

Matrix: Solid

Client Sample ID: **B-9-23, 5ft**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Extractable Petroleum Hydrocarbons by NWEPH				Batch ID: 42172		Analyst: AP
Aliphatic Hydrocarbon (C8-C10)	ND	23.6		mg/Kg-dry	1	12/11/2023 2:27:04 PM
Aliphatic Hydrocarbon (C10-C12)	ND	11.8		mg/Kg-dry	1	12/11/2023 2:27:04 PM
Aliphatic Hydrocarbon (C12-C16)	ND	11.8		mg/Kg-dry	1	12/11/2023 2:27:04 PM
Aliphatic Hydrocarbon (C16-C21)	28.4	11.8		mg/Kg-dry	1	12/11/2023 2:27:04 PM
Aliphatic Hydrocarbon (C21-C34)	42.5	11.8		mg/Kg-dry	1	12/11/2023 2:27:04 PM
Aromatic Hydrocarbon (C8-C10)	ND	23.6		mg/Kg-dry	1	12/11/2023 5:43:14 PM
Aromatic Hydrocarbon (C10-C12)	ND	11.8	*	mg/Kg-dry	1	12/11/2023 5:43:14 PM
Aromatic Hydrocarbon (C10-C12)	ND	11.5	H	mg/Kg-dry	1	12/15/2023 12:34:24 AM
Aromatic Hydrocarbon (C12-C16)	ND	11.8		mg/Kg-dry	1	12/11/2023 5:43:14 PM
Aromatic Hydrocarbon (C16-C21)	20.9	11.8		mg/Kg-dry	1	12/11/2023 5:43:14 PM
Aromatic Hydrocarbon (C21-C34)	26.2	11.5	H	mg/Kg-dry	1	12/15/2023 12:34:24 AM
Aromatic Hydrocarbon (C21-C34)	21.6	11.8	*	mg/Kg-dry	1	12/11/2023 5:43:14 PM
Surr: 1-Chlorooctadecane	57.7	50 - 150		%Rec	1	12/11/2023 2:27:04 PM
Surr: o-Terphenyl	65.2	50 - 150		%Rec	1	12/11/2023 5:43:14 PM
Surr: o-Terphenyl	95.7	50 - 150	H	%Rec	1	12/15/2023 12:34:24 AM

NOTES:

* - Associated LCS is below acceptance criteria. Result may be low-biased.

Volatile Petroleum Hydrocarbons by NWVPH				Batch ID: 42189		Analyst: MS
Aliphatic Hydrocarbon (C5-C6)	ND	2.44	H	mg/Kg-dry	1	12/1/2023 6:15:28 PM
Aliphatic Hydrocarbon (C6-C8)	ND	2.44	H	mg/Kg-dry	1	12/1/2023 6:15:28 PM
Aliphatic Hydrocarbon (C8-C10)	ND	2.44	H	mg/Kg-dry	1	12/1/2023 6:15:28 PM
Aliphatic Hydrocarbon (C10-C12)	ND	2.44	H	mg/Kg-dry	1	12/1/2023 6:15:28 PM
Aromatic Hydrocarbon (C8-C10)	ND	2.44	H	mg/Kg-dry	1	12/1/2023 6:15:28 PM
Aromatic Hydrocarbon (C10-C12)	ND	2.44	H	mg/Kg-dry	1	12/1/2023 6:15:28 PM
Aromatic Hydrocarbon (C12-C13)	ND	2.44	H	mg/Kg-dry	1	12/1/2023 6:15:28 PM
Surr: 2,5-dibromotoluene	104	60 - 140	H	%Rec	1	12/1/2023 6:15:28 PM
Sample Moisture (Percent Moisture)				Batch ID: R88065		Analyst: MP
Percent Moisture	16.8	0.500		wt%	1	12/1/2023 8:30:57 AM

Work Order: 2311489
CLIENT: Pace Analytical Minnesota
Project: P66 Oily Water Sewer

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **MB-42172**	SampType: **MBLK**	Units: **mg/Kg**	Prep Date: **11/29/2023**	RunNo: **88267**
Client ID: **MBLKS**	Batch ID: **42172**		Analysis Date: **12/7/2023**	SeqNo: **1842458**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C8-C10)	ND	20.0									
Aliphatic Hydrocarbon (C10-C12)	ND	10.0									
Aliphatic Hydrocarbon (C12-C16)	ND	10.0									
Aliphatic Hydrocarbon (C16-C21)	ND	10.0									
Aliphatic Hydrocarbon (C21-C34)	ND	10.0									
Surr: 1-Chlorooctadecane	68.8		100.0		68.8	50	150				

Sample ID: **2311489-001AMS**	SampType: **MS**	Units: **mg/Kg-dry**	Prep Date: **11/29/2023**	RunNo: **88267**
Client ID: **B-8-23, 5.5ft**	Batch ID: **42172**		Analysis Date: **12/7/2023**	SeqNo: **1842462**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C8-C10)	80.3	21.6	269.4	0	29.8	6.01	130				
Aliphatic Hydrocarbon (C10-C12)	114	10.8	134.7	50.80	46.6	11.6	127				
Aliphatic Hydrocarbon (C12-C16)	278	10.8	134.7	209.6	50.7	24.7	129				
Aliphatic Hydrocarbon (C16-C21)	242	10.8	134.7	189.7	38.9	25.5	132				
Aliphatic Hydrocarbon (C21-C34)	120	10.8	134.7	57.97	45.7	21.4	138				
Surr: 1-Chlorooctadecane	57.4		107.8		53.3	50	150				

Sample ID: **2311489-001AMSD**	SampType: **MSD**	Units: **mg/Kg-dry**	Prep Date: **11/29/2023**	RunNo: **88267**
Client ID: **B-8-23, 5.5ft**	Batch ID: **42172**		Analysis Date: **12/7/2023**	SeqNo: **1842463**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C8-C10)	96.1	21.7	271.7	0	35.4	6.01	130	80.29	17.9	30	
Aliphatic Hydrocarbon (C10-C12)	127	10.9	135.9	50.80	56.1	11.6	127	113.6	11.1	30	
Aliphatic Hydrocarbon (C12-C16)	287	10.9	135.9	209.6	57.2	24.7	129	278.0	3.31	30	
Aliphatic Hydrocarbon (C16-C21)	245	10.9	135.9	189.7	41.0	25.5	132	242.1	1.33	30	
Aliphatic Hydrocarbon (C21-C34)	130	10.9	135.9	57.97	52.8	21.4	138	119.6	8.15	30	
Surr: 1-Chlorooctadecane	72.5		108.7		66.7	50	150		0		

Work Order: 2311489
CLIENT: Pace Analytical Minnesota
Project: P66 Oily Water Sewer

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **LCS-42172**	SampType: **LCS**			Units: **mg/Kg**		Prep Date: **11/29/2023**		RunNo: **88267**		
Client ID: **LCSS**	Batch ID: **42172**					Analysis Date: **12/7/2023**		SeqNo: **1842465**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C8-C10)	59.0	20.0	250.0	0	23.6	15.9	130				
Aliphatic Hydrocarbon (C10-C12)	47.3	10.0	125.0	0	37.8	30.4	115				
Aliphatic Hydrocarbon (C12-C16)	57.1	10.0	125.0	0	45.7	39.8	130				
Aliphatic Hydrocarbon (C16-C21)	63.9	10.0	125.0	0	51.1	50.3	123				
Aliphatic Hydrocarbon (C21-C34)	80.6	10.0	125.0	0	64.5	36.6	144				
Surr: 1-Chlorooctadecane	50.1		100.0		50.1	50	150				

Sample ID: **MB-42172**	SampType: **MBLK**			Units: **mg/Kg**		Prep Date: **11/29/2023**		RunNo: **88267**		
Client ID: **MBLKS**	Batch ID: **42172**					Analysis Date: **12/7/2023**		SeqNo: **1842468**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C8-C10)	ND	20.0									
Aromatic Hydrocarbon (C10-C12)	ND	10.0									*
Aromatic Hydrocarbon (C12-C16)	ND	10.0									
Aromatic Hydrocarbon (C16-C21)	ND	10.0									
Aromatic Hydrocarbon (C21-C34)	ND	10.0									*
Surr: o-Terphenyl	79.0		100.0		79.0	50	150				

NOTES:
* - Associated LCS is below acceptance criteria. Result may be low-biased.

Sample ID: **LCS-42172**	SampType: **LCS**			Units: **mg/Kg**		Prep Date: **11/29/2023**		RunNo: **88267**		
Client ID: **LCSS**	Batch ID: **42172**					Analysis Date: **12/7/2023**		SeqNo: **1842469**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C8-C10)	62.7	20.0	250.0	0	25.1	18.6	130				
Aromatic Hydrocarbon (C10-C12)	48.6	10.0	125.0	0	38.8	42.7	105				S
Aromatic Hydrocarbon (C12-C16)	55.1	10.0	125.0	0	44.1	43.6	124				
Aromatic Hydrocarbon (C16-C21)	62.2	10.0	125.0	0	49.8	49.5	124				
Aromatic Hydrocarbon (C21-C34)	59.0	10.0	125.0	0	47.2	54.8	124				S
Surr: o-Terphenyl	42.5		100.0		42.5	50	150				S

Work Order: 2311489
CLIENT: Pace Analytical Minnesota
Project: P66 Oily Water Sewer

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **LCS-42172** SampType: **LCS** Units: **mg/Kg** Prep Date: **11/29/2023** RunNo: **88267**
Client ID: **LCSS** Batch ID: **42172** Analysis Date: **12/7/2023** SeqNo: **1842469**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

NOTES:
S - Outlying spike recovery observed (low bias). Samples will be qualified with a *.
S - Outlying surrogate recovery(ies) observed.

Sample ID: **2311489-001AMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **11/29/2023** RunNo: **88267**
Client ID: **B-8-23, 5.5ft** Batch ID: **42172** Analysis Date: **12/7/2023** SeqNo: **1842472**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C8-C10)	95.8	21.6	269.4	0	35.6	12.6	130				
Aromatic Hydrocarbon (C10-C12)	77.3	10.8	134.7	6.729	52.4	26.3	130				
Aromatic Hydrocarbon (C12-C16)	164	10.8	134.7	83.46	59.4	23.3	139				
Aromatic Hydrocarbon (C16-C21)	257	10.8	134.7	183.8	54.2	32.2	131				
Aromatic Hydrocarbon (C21-C34)	110	10.8	134.7	35.85	54.7	35.8	139				
Surr: o-Terphenyl	67.3		107.8		62.4	50	150				

Sample ID: **2311489-001AMSD** SampType: **MSD** Units: **mg/Kg-dry** Prep Date: **11/29/2023** RunNo: **88267**
Client ID: **B-8-23, 5.5ft** Batch ID: **42172** Analysis Date: **12/7/2023** SeqNo: **1842473**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C8-C10)	89.4	21.7	271.7	0	32.9	12.6	130	95.79	6.87	30	
Aromatic Hydrocarbon (C10-C12)	72.9	10.9	135.9	6.729	48.7	26.3	130	77.26	5.85	30	
Aromatic Hydrocarbon (C12-C16)	129	10.9	135.9	83.46	33.3	23.3	139	163.5	23.9	30	
Aromatic Hydrocarbon (C16-C21)	188	10.9	135.9	183.8	2.85	32.2	131	256.8	31.1	30	S
Aromatic Hydrocarbon (C21-C34)	94.3	10.9	135.9	35.85	43.0	35.8	139	109.5	15.0	30	
Surr: o-Terphenyl	58.9		108.7		54.2	50	150		0		

NOTES:
S - Outlying spike recovery(ies) observed. A duplicate analysis was performed and recovered within range.

Work Order: 2311489
CLIENT: Pace Analytical Minnesota
Project: P66 Oily Water Sewer

QC SUMMARY REPORT

Extractable Petroleum Hydrocarbons by NWEPH

Sample ID: **MB-42293**	SampType: **MBLK**	Units: **%Rec**	Prep Date: **12/11/2023**	RunNo: **88372**
Client ID: **MBLKS**	Batch ID: **42293**		Analysis Date: **12/14/2023**	SeqNo: **1845146**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1-Chlorooctadecane	75.4		100.0		75.4	50	150				

Sample ID: **LCS-42293**	SampType: **LCS**	Units: **%Rec**	Prep Date: **12/11/2023**	RunNo: **88372**
Client ID: **LCSS**	Batch ID: **42293**		Analysis Date: **12/14/2023**	SeqNo: **1845147**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1-Chlorooctadecane	80.4		100.0		80.4	50	150				

Sample ID: **MB-42293**	SampType: **MBLK**	Units: **mg/Kg**	Prep Date: **12/11/2023**	RunNo: **88372**
Client ID: **MBLKS**	Batch ID: **42293**		Analysis Date: **12/14/2023**	SeqNo: **1845157**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	ND	10.0									
Aromatic Hydrocarbon (C21-C34)	ND	10.0									
Surr: o-Terphenyl	125		100.0		125	50	150				

Sample ID: **LCS-42293**	SampType: **LCS**	Units: **mg/Kg**	Prep Date: **12/11/2023**	RunNo: **88372**
Client ID: **LCSS**	Batch ID: **42293**		Analysis Date: **12/14/2023**	SeqNo: **1845158**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	98.9	10.0	125.0	0	79.1	42.7	105				
Aromatic Hydrocarbon (C21-C34)	118	10.0	125.0	0	94.3	54.8	124				
Surr: o-Terphenyl	97.3		100.0		97.3	50	150				

Work Order: 2311489
CLIENT: Pace Analytical Minnesota
Project: P66 Oily Water Sewer

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID: **LCS-42189**	SampType: **LCS**	Units: **mg/Kg**	Prep Date: **11/30/2023**	RunNo: **88183**
Client ID: **LCSS**	Batch ID: **42189**		Analysis Date: **12/1/2023**	SeqNo: **1840775**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	20.2	2.50	20.00	0	101	70	130				
Aliphatic Hydrocarbon (C6-C8)	10.7	2.50	10.00	0	107	70	130				
Aliphatic Hydrocarbon (C8-C10)	11.4	2.50	10.00	0	114	70	130				
Aliphatic Hydrocarbon (C10-C12)	11.4	2.50	10.00	0	114	70	130				
Aromatic Hydrocarbon (C8-C10)	48.9	2.50	50.00	0	97.8	70	130				
Aromatic Hydrocarbon (C10-C12)	9.61	2.50	10.00	0	96.1	70	130				
Aromatic Hydrocarbon (C12-C13)	9.13	2.50	10.00	0	91.3	70	130				
Surr: 2,5-dibromotoluene	2.80		2.500		112	60	140				

Sample ID: **MB-42189**	SampType: **MBLK**	Units: **mg/Kg**	Prep Date: **11/30/2023**	RunNo: **88183**
Client ID: **MBLKS**	Batch ID: **42189**		Analysis Date: **12/1/2023**	SeqNo: **1840766**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	ND	2.50		0	0						
Aliphatic Hydrocarbon (C6-C8)	ND	2.50		0	0						
Aliphatic Hydrocarbon (C8-C10)	ND	2.50		0	0						
Aliphatic Hydrocarbon (C10-C12)	ND	2.50		0	0						
Aromatic Hydrocarbon (C8-C10)	ND	2.50		0	0						
Aromatic Hydrocarbon (C10-C12)	ND	2.50		0	0						
Aromatic Hydrocarbon (C12-C13)	ND	2.50		0	0						
Surr: 2,5-dibromotoluene	2.45		2.500		98.0	60	140				

Sample ID: **2311489-002BDUP**	SampType: **DUP**	Units: **mg/Kg-dry**	Prep Date: **11/30/2023**	RunNo: **88183**
Client ID: **B-9-23, 5ft**	Batch ID: **42189**		Analysis Date: **12/1/2023**	SeqNo: **1840768**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	ND	2.44		0	0			0		25	H
Aliphatic Hydrocarbon (C6-C8)	ND	2.44		0	0			0		25	H
Aliphatic Hydrocarbon (C8-C10)	ND	2.44		0	0			0		25	H
Aliphatic Hydrocarbon (C10-C12)	ND	2.44		0	0			0		25	H
Aromatic Hydrocarbon (C8-C10)	ND	2.44		0	0			0		25	H

Work Order: 2311489
CLIENT: Pace Analytical Minnesota
Project: P66 Oily Water Sewer

QC SUMMARY REPORT

Volatile Petroleum Hydrocarbons by NWVPH

Sample ID: **2311489-002BDUP** SampType: **DUP** Units: **mg/Kg-dry** Prep Date: **11/30/2023** RunNo: **88183**
Client ID: **B-9-23, 5ft** Batch ID: **42189** Analysis Date: **12/1/2023** SeqNo: **1840768**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aromatic Hydrocarbon (C10-C12)	ND	2.44		0	0			0		25	H
Aromatic Hydrocarbon (C12-C13)	ND	2.44		0	0			0		25	H
Surr: 2,5-dibromotoluene	2.59		2.438		106	60	140		0	0	H

Sample ID: **2311489-001BMS** SampType: **MS** Units: **mg/Kg-dry** Prep Date: **11/30/2023** RunNo: **88183**
Client ID: **B-8-23, 5.5ft** Batch ID: **42189** Analysis Date: **12/1/2023** SeqNo: **1840773**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (C5-C6)	8.27	1.07	8.552	0	96.8	70	130				H
Aliphatic Hydrocarbon (C6-C8)	5.70	1.07	4.276	0.7150	117	70	130				H
Aliphatic Hydrocarbon (C8-C10)	8.90	1.07	4.276	4.868	94.3	70	130				H
Aliphatic Hydrocarbon (C10-C12)	15.5	1.07	4.276	13.22	53.3	70	130				SH
Aromatic Hydrocarbon (C8-C10)	23.5	1.07	21.38	5.679	83.3	70	130				H
Aromatic Hydrocarbon (C10-C12)	14.0	1.07	4.276	11.91	50.0	70	130				SH
Aromatic Hydrocarbon (C12-C13)	16.7	1.07	4.276	13.39	76.6	70	130				H
Surr: 2,5-dibromotoluene	1.83		1.069		171	60	140				SH

NOTES:
S - Spiked amount was low relative to sample concentration. Outlying spike recoveries may be expected.
S - Outlying surrogate recovery(ies) observed. A duplicate analysis was performed with similar results indicating a possible matrix effect.

Sample Log-In Check List

Client Name:	PACEMI	Work Order Number:	2311489
Logged by:	Morgan Wilson	Date Received:	11/29/2023 10:20:00 AM

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	FedEx		

Log In

3.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☑	No ☐	Not Present ☐
4.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
5.	Were all items received at a temperature of >2°C to 6°C *	Yes ☑	No ☐	NA ☐
6.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
7.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
8.	Are samples properly preserved?	Yes ☑	No ☐	
9.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
10.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
11.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
12.	Does paperwork match bottle labels?	Yes ☑	No ☐	
13.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
14.	Is it clear what analyses were requested?	Yes ☑	No ☐	
15.	Were all hold times (except field parameters, pH e.g.) able to be met?	Yes ☐	No ☑	

Special Handling (if applicable)

16. Was client notified of all discrepancies with this order? Yes ☑ No ☐ NA ☐

Person Notified:	Jenni Gross	Date:	11/29/2023
By Whom:	Morgan W/Brianna B	Via:	☑ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:	Confirm TAT. Report by 12/5; See additional remarks		
Client Instructions:	Std TAT		

17. Additional remarks:

Hold time was unable to be met for VPH due to instrument malfunction.

Item Information

Item #	Temp ºC
Sample	0.6

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

2311489

Chain of Custody

PASI Minnesota Laboratory

Pace

Workorder: 10676662 **Workorder Name:** P66 Oily Water Sewer **Results Requested By:** 12/5/2023

Report / Invoice To	Subcontract To
Jennifer Gross Pace Analytical Minnesota 1700 Elm Street Minneapolis, MN 55414 Phone (612)607-1700 Email: jennifer.gross@pacelabs.com	Fremont Analytical 3600 Fremont Avenue N. Seattle, WA 98103 206-352-3790 P.O. 10676662 JMG

Send Invoice To: invoices@pacelabs.coupahost.com
State of Sample Origin: WA

Item	Sample ID	Collect Date/Time	Lab ID	Matrix	Preserved Containers: VG9M	Preserved Containers: JGCU	Preserved Containers				Requested Analysis: NW-VPH (SUB: Fremont)	Requested Analysis: NW-EPH (SUB: Fremont)	Requested Analysis: Dry Weight										LAB USE ONLY
1	B-8-23, 5.5ft	11/16/2023 09:30	10676662001	Solid	2	1					X	X	X										
2	B-9-23, 5ft	11/16/2023 10:45	10676662002	Solid	2	1					X	X	X										
3																							
4																							
5																							

Transfers	Released By	Date/Time	Received By	Date/Time
1	Bri Cook IPAE	11/28/23 10:35		11/29/23 10:20
2				
3				

Comments

WA EIM EDD required

NW-VPH: Aliphatic EC 5-6, Aliphatic EC>6-8, Aliphatic EC>8-10, Aliphatic EC>10-12, Aromatic EC>8-10, Aromatic EC>10-12, Aromatic EC>12-13

Cooler Temperature on Receipt ____ °C | **Custody Seal** Y or N | **Received on Ice** Y or N | **Samples Intact** Y or N

APPENDIX F -
OMEGA LINER SPECIFICATIONS

Omega-Liner™ Product Information

2021

Omega-Liner™ Product Information 2021

Table of Contents

Omega-Liner Technical Data Summary

Omega-Liner™ Technical Data

Company Information

Certification Owner	Omega UV Liner Company
Location	Canton, South Dakota

Product Information

Product name	Omega Liner
Use of the product since	2017
Inflate procedure	Compressed air
Curing method	UV or LED Light
Installation technique	Pull-in Place
Impregnation Location	At manufacturers site
North American Product Classification System Code (NAPCS)	464
MSDS Sheet	Available
WRC Classification	PT/299/0610-AS
Resin System(s)	Unsaturated Polyester Vinyl Ester
Dimension range	6” (150mm) to 63” (1575mm)
Wall thickness in cured condition	3.6 mm – 15.4 mm, in 1.2 mm increments
Number of layers	Varies according to thickness, 3-13
Longitudinal seam	Yes

Liner Physical Properties

Chemical resistance		According to ASTM D 543
Barcol hardness according to ASTM 2583		≥ 40
Recovery period		Up to 100 years
Maximum residual styrene content after curing		≤ 3 %
Square weight per mm wall thickness		28.01 oz/yd^2 + 4.42oz/yd^2 / - 2.94oz/yd^2
Short-term Flexural Modulus	Sanitary	1,600,000 psi
In accordance with ASTM D 790	Surface	2,200,000 psi
Long-term Flexural Modulus	Sanitary	50y = 1,088,000psi / 70y = 1,051,200psi / 100y = 1,040,000psi
In accordance with ASTM D 790	Surface	50y = 1,460,800psi / 70y = 1,445,400psi / 100y = 1,430,000psi
Short-term flexural strength in relation to ASTM D 790		30,000 psi
Poisson´s ratio according ASTM E132		Axial = 0.279 Radial = 0.171
Reduction factor after 10.000 h Per ASTM D2990 and DIN EN 761		50y = 66.4% / 70y = 65.7% / 100y = 65.0%
Creep behavior after 24 h according per ASTM D2990		< 10 %

Material Information

Inner Foil

Material	PE / PA
Thickness of foil	Up to 0.20 mm

Outer Fleece

Material	PP / PP
Thickness of foil	Up to .22 mm

Outer Protective Foils

Material	PE / PA / PE
Thickness of foil	Up to 0.35 mm

Reinforcement

Reinforcement material	Glass fiber stitch bonded fabric, non-woven
Textile glass type	West Dominant ECR Glass which is permanently resistant to chemical agents or corrosion
Specific density	2.62 g/cm^3
Allowed stretching in radial direction	4.6 %
Stretching in axial direction	0 %
Maximum Pull-In Force (<24"/>24")	20,000lb/50,000lb

Gliding Foil

Material	HDPE
Thickness of foil	Up to 2.0 mm

Resin System Data

UP resin group according to DIN 18820-1	3
UP resin type according to DIN 16946-2	1140
VE resin type according to DIN 16946-2	1310
UP resin based on	Isophthalic acid / Neopentyl glycol
Curing agents	UV-curing: UV-initiators
Reaction shrinkage of the pure resin	8 %
Content of styrene before curing	Approx. 39-42 %
Barcol Hardness in accordance with ASTM D2583	48
Tensile Elongation in accordance with ASTM D 638	3.1%

Resin Physical Data

Viscosity @ 77°F/25°C, RVF Brookfield Spindle #2 @20rpm	800 cps
Peak Exotherm	180 – 215 °F
Flash Point	84 °F

Omega-Liner Material Technical Data

SAFETY DATA SHEET

Date of issue: *03/20/2019*
Date of previous issue: *02/08/2019*

Section 1. Identification

Product name Omega Liner, UP

Product type Composite Pipe Repair Liner Impregnated With UP Resin

Chemical family Aromatic

SDS No. OLC001 (Version: 1.0)

Relevant identified uses of the substance or mixture and uses advised against

Identified uses Used in the Remediation of Pipes

Uses advised against No additional information.

Supplier's details

Omega Liner Company
515 Noid Road
Canton, SD 57013
Website: www.omegauvpipe.com
Phone Number: +1 (605) 558-1020
Hours: 8AM-4pm (Central Time) Monday-Friday

Emergency telephone number (with hours of operation)

CHEMTREC (US): 24 hours/7 days (800) 424-9300
CANUTEC (Canada): 24 hours/7 days (613) 996-6666

Section 2. Hazards identification

OSHA/HCS status

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture

FLAMMABLE LIQUIDS – Category 3 – H226
ACUTE TOXICITY (INHALATION) – Category 4 – H332
SKIN CORROSION/IRRITATION – Category 2 – H315
SERIOUS EYE DAMAGE/ EYE IRRITATION – Category 2 – H319
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) – Category 3 – H335
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) – Category 1 – H372

GHS label elements

Hazard pictograms

Signal word

Danger

Hazard statements

H226: Flammable Solid and vapor.
H332: Harmful if inhaled.
H319: Causes serious eye irritation.
H315: Causes skin irritation.
H335: May cause respiratory irritation.
H372: Causes damage to organs through prolonged or repeated exposure if inhaled.

Precautionary statements

General

P101: If medical advice is needed, have product container or label at hand.
P102: Keep out of reach of children.

Section 2. Hazards identification

Prevention

P210: Keep away from heat, sparks, open flames and hot surfaces. - No smoking.
P233: Keep container tightly closed.
P240: Ground/bond container and receiving equipment.
P241: Use explosion-proof electrical/ventilating/lighting/material-handling equipment.
P242: Use only non-sparking tools.
P243: Take precautionary measures against static discharge.
P264: Wash hands thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P271: Use only outdoors or in a well-ventilated area.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P260: Do not breathe vapor or mist.

Response

P370+P378: In case of fire: Use dry chemical, CO_2, water spray (fog) or foam.
P309+P311: IF exposed or if you feel unwell: Call a POISON CENTER or doctor/physician if exposed or you feel unwell.
P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P312: Call a POISON CENTER or physician if you feel unwell.
P303+P361+P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
P332+P313: If skin irritation occurs, get medical advice/attention.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313: If eye irritation persists, get medical advice/attention.
P391: Collect spillage.

Storage

P403 + P235: Store in a well-ventilated place. Keep cool.
P233: Keep container tightly closed.
P405: Store locked up.

Disposal

P501: Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazards not otherwise classified

Exothermic curing reaction upon exposure of internal materials to UV light(IE Sunlight)

Section 3. Composition/information on ingredients

Substance/mixture : Resin, Initiator Mixture

Ingredient name	CAS number	%
Styrene	100-42-5	25

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact

Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Use of buffered baby shampoo will aid in removal. If irritation persists, get medical attention.

Inhalation

Move the victim to a safe area as soon as possible. Allow the victim to rest in a well-ventilated area. If breathing is difficult, give oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Skin contact

In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. If irritation persists, seek medical attention. Wash contaminated clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion

Section 4. First aid measures

Wash out mouth with water. Remove dentures if any. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Seek immediate medical attention.

Most important symptoms/effects, acute and delayed

Eye contact

Causes serious eye irritation.

Inhalation

Harmful if inhaled. May cause respiratory irritation.

Skin contact

Causes skin irritation.

Ingestion

Irritating to mouth, throat and stomach.

Over-exposure signs/symptoms

Eye contact

Adverse symptoms may include the following: pain or irritation, watering, redness.

Inhalation

Adverse symptoms may include the following: respiratory tract irritation, coughing.

Skin contact

Adverse symptoms may include the following: irritation, redness.

Ingestion

Adverse symptoms may include the following: Irritating to mouth, throat and stomach..

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician

Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media

Use dry chemical, CO_2, water spray (fog) or foam.

Unsuitable extinguishing media

Do not use water jet.

Specific hazards arising from the chemical

Flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard. This material is harmful to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous thermal decomposition products

Decomposition products may include the following materials: carbon dioxide, carbon monoxide, sulfur oxides halogenated compounds, metal oxide/oxides

Special protective actions for fire-fighters

Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Special protective equipment for fire-fighters

Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. **Cures on exposure to Sunlight. Exothermic Curing Reaction**

For emergency responders

If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment. See also the information in "For non-emergency personnel".

Environmental precautions

Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.

Methods and materials for containment and cleaning up

Small spill

Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.

Large spill

Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures

Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Do not breathe vapor or mist. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene

Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities

Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Eliminate all ignition sources. Segregate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. Refer to the product label and/or technical data sheet for further information.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Section 8. Exposure controls/personal protection

Ingredient name	Exposure limits
Styrene	**ACGIH TLV (United States, 3/2015). Absorbed through skin.** TWA: 20 ppm 8 hours. TWA: 85 mg/m³ 8 hours. STEL: 40 ppm 15 minutes. STEL: 170 mg/m³ 15 minutes. **OSHA PEL Z2 (United States, 2/2013).** TWA: 100 ppm 8 hours. AMP: 600 ppm 5 minutes. CEIL: 200 ppm **NIOSH REL (United States, 10/2013).** TWA: 50 ppm 10 hours. Form: TWA: 215 mg/m³ 10 hours. STEL: 100 ppm 15 minutes. STEL: 425 mg/m³ 15 minutes.

Appropriate engineering controls

Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Individual protection measures

Hygiene measures

Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection

Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Hand protection

Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Body protection

Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection

Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection

Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state	Gelled Liquid, inside Protective material
Color	Clear, Green Tinted
Odor	Aromatic.
Odor threshold	0.01 - 0.1 ppm (*Styrene*)
pH	*Not applicable.*
Melting point	-23.8°F / -30.6°C (*Styrene*)
Boiling point	293°F / 145°C (*Styrene*)
Flash point	88°F / 31°C (*Styrene*)
Evaporation rate	< 1 (Butyl acetate = 1)
Flammability (solid, gas)	*Not applicable.*
Lower and upper explosive (flammable) limits	**Lower:** 1.1% **Upper:** 6.1% (*Styrene*)
Vapor pressure	5.0 mm Hg@ 68°F / 20°C (*Styrene*) 3.6
Vapor density	(Air = 1) (*Styrene*)
Relative density	1.1 (Water = 1)
Solubility	Slight.

Section 9. Physical and chemical properties

Partition coefficient: n-octanol/water	Not available.
Auto-ignition temperature	914°F / 490°C (*Styrene*)
Decomposition temperature	Not available.
Viscosity	5000 Cp Min
Molecular weight	1,000 to 15,000

Section 10. Stability and reactivity

Reactivity

No specific test data related to reactivity available for this product or its ingredients.

Chemical stability

The product is stable. Stable under recommended storage and handling conditions (see Section 7).

Possibility of hazardous reactions

Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid

Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

Incompatible materials

Reactive or incompatible with the following materials: oxidizing materials

Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Styrene	LC50 Inhalation Gas. LC50 Inhalation Vapor LD50 Oral	Rat Rat Rat	2770 ppm 11800 mg/m³ 2650 mg/kg	4 hours 4 hours -

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Styrene	Eyes - Mild irritant	Human	-	50 parts per million	-
	Eyes - Moderate irritant	Rabbit	-	24 hours 100 milligrams	-
	Eyes - Severe irritant	Rabbit	-	100 milligrams	-
	Skin - Mild irritant	Rabbit	-	500 milligrams	-
	Skin - Moderate irritant	Rabbit	-	100 Percent	-

Sensitization

May cause sensitization by skin contact.

Carcinogenicity

Classification

Product/ingredient name	ACGIH	IARC	NTP
Styrene	-	2B	Reasonably anticipated to be a human carcinogen.

1) Negative Study A published study concluded that the mechanism for producing cancer in mice exposed to styrene is not applicable in human metabolism. (June 2013 Pharmacology & Toxicology 66 (2013))
2) Negative Study A recent update to an extensive study of reinforced plastic workers from 1948-1977 concluded that there was no coherent evidence that styrene exposure increased risk of cancer (March 2013 Epidemiology Vol. 24 Issue 2)
3) Positive Study Styrene induced pulmonary toxicity and carcinogenicity in mice was shown to be caused by a metabolite of styrene, probably styrene oxide. (Dec.2001 Toxicology Vol.169 Issue 2)

Mutagenicity

No mutagenic effect.

Reproductive toxicity

Section 11. Toxicological information

Not considered to be toxic to the reproductive system.

Teratogenicity

No known effect according to our database..

Specific target organ toxicity (single exposure)

No known effect according to our database.

Specific target organ toxicity (repeated exposure)

A study of long term effects of workers exposed to styrene levels in the range of 25-35 ppm, 8 hour TWA, indicated a possible mild hearing loss.

Aspiration hazard

No known effect according to our database.

Potential acute health effects

Eye contact

Causes serious eye irritation.

Inhalation

Harmful if inhaled. May cause respiratory irritation.

Skin contact

Causes skin irritation.

Ingestion

Irritating to mouth, throat and stomach.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact

Adverse symptoms may include the following: pain or irritation, watering, redness.

Inhalation

Adverse symptoms may include the following: respiratory tract irritation, coughing.

Skin contact

Adverse symptoms may include the following: irritation, redness.

Ingestion

Adverse symptoms may include the following: Irritating to mouth, throat and stomach..

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
Styrene	Acute EC50 4.7 mg/l Fresh water Acute LC50 4.02 mg/l Fresh water	Daphnia - Daphnia magna Fish - Pimephales promelas	48 hours 96 hours

Persistence and degradability

Product/ingredient name	Test	Result	Dose	Inoculum
Styrene	EU	100 % - Readily - 1 days	-	-

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
Styrene	-	-	Readily

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Styrene	2.95	13.49	low

Mobility in soil

Soil/water partition coefficient (K_{OC})

Not available.

Other adverse effects

No known effect according to our database.

Section 13. Disposal considerations

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

Disposal methods

The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid disposal. Attempt to use product completely in accordance with intended use. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

Special precautions

This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

DOT / TDG/ IMDG/IMO / ICAO/IATA and National regulations.

US DOT: UN3077, Environmentally Hazardous Substance, solid, n.o.s.("Styrene"), 9, III

Additional information RQ = 5825lb Omega Liner = 1000lb Styrene

IMO/IMDG: UN3077, Environmentally Hazardous Substance, solid, n.o.s. (29 degrees centigrade), 9, III

IATA: UN3077, Environmentally Hazardous Substance, solid, n.o.s., 9, III

ADR: UN3077, Environmentally Hazardous Substance, solid, n.o.s., 9, III (D/E)

RID: UN3077, Environmentally Hazardous Substance, solid, n.o.s., 9, III

ADN: UN3077, Environmentally Hazardous Substance, solid, n.o.s., 9, III

Environmental hazards Marine pollutant: No, composite/mixture, product does not meet standard

Section 15. Regulatory information

Inventories (National and International)

United States inventory (TSCA 8b) : All components are listed or exempted.

Australia (AICS) : All components are listed or exempted.

Canada (DSL) : All components are listed or exempted.

China (IECSC) : All components are listed or exempted.

Europe (EINECS) : All components are listed or exempted.

New Zealand (NZIoC) : All components are listed or exempted.

Philippines (PICCS) : All components are listed or exempted.

Japan (ENCS) : All components are listed or exempted.

Malaysia (EHS Register) : Not determined

Republic of Korea (KECI) : All components are listed or exempted.

Taiwan (CSNN) : Not determined.

SARA 311/312

Composition/information on ingredients

Section 15. Regulatory information

Name	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Styrene	Yes.	No.	No.	No.	Yes.

SARA 313

	Product name	CAS number
Form R - Reporting requirements	Styrene	100-42-5

CERCLA RQ - Styrene - 1000 lbs. (453.6 kg)

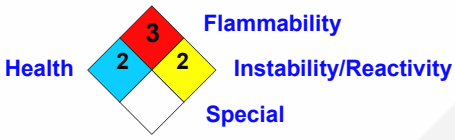
State regulations

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

Section 16. Other information

National Fire Protection Association (U.S.A.)



History

Date of issue : 03/20/2019

Date of previous issue : 02/07/2019

Version : 2.0

Key to abbreviations :
ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

Indicates information that has changed from previously issued version.

Notice to reader

The information contained in this data sheet is furnished in good faith and without warranty, representation, or inducement or license of any kind, except that it is accurate to the best of Omega Liner Companies knowledge, or was obtained from sources believed by Omega Liner Company to be reliable. The accuracy, adequacy or completeness of health and safety precautions set forth herein cannot be guaranteed, and the buyer is solely responsible for ensuring that the product is used, handled, stored, and disposed of safely and in compliance with applicable federal, state or provincial, and local laws. Omega Liner Company disclaims liability for any loss, damage or personal injury that arises from, or is in any way related to, use of the information contained in this data sheet.

Omega-Liner Material Test Results

HTS Pipe Consultants, Inc.
420 Pickering Street, Houston, TX 77091
www.htspipeconsultants.com

Phone 713-692-8373
Fax 713-692-8502
Toll Free 1-800-692-TEST

February 4, 2019

Omega Liner Company, Inc.
515 Noid Road
Canton, SD 57013

Attn: Mr. Ken Moulds

Re: **Chemical Corrosion Testing**

Dear Mr. Moulds,

One (1) sample of cured-in-place liner was delivered to HTS' laboratory for testing. The test requirements and test identification are as follows:

ASTM F1216 – 30 Day Chemical Resistance

HTS Report No. OLF818.002Y

Chemical resistance testing was performed in accordance with ASTM D543-06, Evaluating the Resistance of Plastics to Chemical Reagents, using the guidelines set by ASTM F1216-09, Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube, Appendix X2. Nine sets of five (5) test specimens were conditioned in accordance with Procedure A of ASTM D618-13 and then eight sets were exposed to the prescribed reagents for 30 days at 23±2°C following the Practice A – Immersion test of ASTM D543-06. One set was held as a control set and immersed in water prior to initiating the test. Following the chemical exposure, the specimens were weighed, measured and then tested in accordance with ASTM D790-10, Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials, Test Method 1 - Procedure A. The results of the flexural properties testing were then compared to those of the additional control set of five (5) specimens.

The complete results are reported in enclosed tables. Flexural property test results include tangent flexural modulus of elasticity and flexural strength at maximum load.

We very much appreciate the opportunity to work with you and Omega Liner Company.

Sincerely,
HTS Pipe Consultants

Rick Eastwood
Vice-President – Business Development

SUMMARY OF TEST DATA
RESISTANCE OF CIPP TO CHEMICAL REAGENTS

SAMPLE ID: **Duration:** 1 Year **Date Tested:** 1/31/2019

Chemical Reagent (Concentration)	Mechanical Property	Test Method ASTM D	Unit	Control Sample	1 Year	
					Value	% Change
Vegetable Oil (100%)	Observation	543		N/A	No Change	
	Weight	543	g	282.24	282.91	0.24
	Thickness	2122	in.	0.179	0.179	0.00
			mm.	4.5	4.5	0.00
	Max. Flexural	790	psi	81129	78330	-3.45
	Modulus	790	psi	2472138	2257321	-8.69
Detergent (0.1%)	Observation	543		N/A	No Change	
	Weight	543	g	282.02	282.56	0.19
	Thickness	2122	in.	0.178	0.178	0.00
			mm.	4.5	4.5	0.00
	Max. Flexural	790	psi	81129	73867	-8.95
	Modulus	790	psi	2472138	2356190	-4.69
Soap (0.1%)	Observation	543		N/A	No Change	
	Weight	543	g	278.19	278.85	0.24
	Thickness	2122	in.	0.175	0.175	0.00
			mm.	4.4	4.4	0.00
	Max. Flexural	790	psi	81129	77206	-4.84
	Modulus	790	psi	2472138	2457931	-0.57
Nitric Acid (1.0%)	Observation	543		N/A	No Change	
	Weight	543	g	275.7	276.30	0.22
	Thickness	2122	in.	0.173	0.173	0.00
			mm.	4.4	4.4	0.00
	Max. Flexural	790	psi	81129	74668	-7.96
	Modulus	790	psi	2472138	2302743	-6.85

SUMMARY OF TEST DATA
RESISTANCE OF CIPP TO CHEMICAL REAGENTS

SAMPLE ID: **Duration:** 1 Year **Date Tested:** 1/31/2019

Chemical Reagent (Concentration)	Mechanical Property	Test Method ASTM D	Unit	Control Sample	1 Year	
					Value	% Change
Sulfuric Acid (5.0%)	Observation	543		N/A	No Change	
	Weight	543	g	281.12	281.54	0.15
	Thickness	2122	in.	0.176	0.176	0.00
			mm.	4.5	4.5	0.00
	Max. Flexural	790	psi	81129	74569	-8.09
	Modulus	790	psi	2472138	2256549	-8.72
Ethanol Free Gasoline (100%)	Observation	543		N/A	No Change	
	Weight	543	g	285.59	286.09	0.18
	Thickness	2122	in.	0.176	0.176	0.00
			mm.	4.5	4.5	0.00
	Max. Flexural	790	psi	81129	36847	-54.58
	Modulus	790	psi	2472138	1643143	-33.53
Sodium Hydroxide (0.5%)	Observation	543		N/A	No Change	
	Weight	543	g	273.35	273.91	0.20
	Thickness	2122	in.	0.170	0.170	0.00
			mm.	4.3	4.3	0.00
	Max. Flexural	790	psi	81129	74135	-8.62
	Modulus	790	psi	2472138	2278550	-7.83

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Toll Free 1-800-692-TEST

Friday, March 02, 2018

FLEXURAL PROPERTIES OF PLASTICS
ASTM D790
3 POINT BEND

INSTRON CORPORATION
BLUEHILL V. 2.26.

OPERATOR NAME:
E. CARRILLO

TEMPERATURE (F) / HUMIDITY (%)
71 / 50

RATE (in/min)
.067

SAMPLE ID:

CONTROL SAMPLE

	WIDTH (in)	THICKNESS (in)	SUPPORT SPAN (in)
1	2.065	0.170	2.5
2	2.063	0.172	2.5
3	2.064	0.173	2.5
4	2.058	0.174	2.5
5	2.065	0.174	2.5

	STRAIN @ MAX (in/in)	MAXIMUM LOAD (lbf)	FLEXURAL STRENGTH (psi)	FLEXURAL MODULUS (psi)
1	0.0418	1359.7	85438	2589751
2	0.0375	1210.9	74400	2352291
3	0.0406	1343.4	81552	2436485
4	0.0404	1343.4	80852	2454366
5	0.0398	1390.5	83401	2527797
Mean	0.0400	1329.6	81129	2472138
Standard Deviation	0.0016	69.1	4162	90666
Minimum	0.0375	1210.9	74400	2352291
Maximum	0.0418	1390.5	85438	2589751

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Thursday, January 31, 2019

FLEXURAL PROPERTIES OF PLASTICS
ASTM D790
3 POINT BEND

INSTRON CORPORATION
BLUEHILL V. 2.26.

OPERATOR NAME:
E. CARRILLO

TEMPERATURE (F) / HUMIDITY (%)
71 / 50

RATE (in/min)
.067

SAMPLE ID:

SAMPLE SOAKED IN VEGETABLE OIL (100%) FOR 1 YEAR

	WIDTH (in)	THICKNESS (in)	SUPPORT SPAN (in)
1	2.087	0.176	2.5
2	2.086	0.178	2.5
3	2.089	0.178	2.5
4	2.009	0.180	2.5
5	2.093	0.180	2.5

	STRAIN @ MAX (in/in)	MAXIMUM LOAD (lbf)	FLEXURAL STRENGTH (psi)	FLEXURAL MODULUS (psi)
1	0.0417	1327.2	76986	2219301
2	0.0382	1308.5	74244	2175580
3	0.0420	1400.0	79318	2292019
4	0.0427	1431.0	82456	2332574
5	0.0389	1422.2	78644	2267129
Mean	0.0407	1377.8	78330	2257321
Standard Deviation	0.0020	56.2	3025	61421
Minimum	0.0382	1308.5	74244	2175580
Maximum	0.0427	1431.0	82456	2332574

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Thursday, January 31, 2019

FLEXURAL PROPERTIES OF PLASTICS
ASTM D790
3 POINT BEND

INSTRON CORPORATION
BLUEHILL V. 2.26.

OPERATOR NAME:
E. CARRILLO

TEMPERATURE (F) / HUMIDITY (%)
71 / 50

RATE (in/min)
.067

SAMPLE ID:

SAMPLE SOAKED IN DETERGENT (.1%) FOR 1 YEAR

	WIDTH (in)	THICKNESS (in)	SUPPORT SPAN (in)
1	2.080	0.170	2.5
2	2.088	0.171	2.5
3	2.088	0.173	2.5
4	2.098	0.173	2.5
5	2.099	0.175	2.5

	STRAIN @ MAX (in/in)	MAXIMUM LOAD (lbf)	FLEXURAL STRENGTH (psi)	FLEXURAL MODULUS (psi)
1	0.0370	1186.7	74033	2382974
2	0.0379	1197.7	73565	2296735
3	0.0371	1191.7	71512	2302430
4	0.0348	1242.5	74203	2437461
5	0.0365	1303.2	76025	2361348
Mean	0.0367	1224.4	73867	2356190
Standard Deviation	0.0011	49.3	1615	58681
Minimum	0.0348	1186.7	71512	2296735
Maximum	0.0379	1303.2	76025	2437461

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Thursday, January 31, 2019

FLEXURAL PROPERTIES OF PLASTICS
ASTM D790
3 POINT BEND

INSTRON CORPORATION
BLUEHILL V. 2.26.

OPERATOR NAME:
E. CARRILLO

TEMPERATURE (F) / HUMIDITY (%)
71 / 50

RATE (in/min)
.067

SAMPLE ID:

SAMPLE SOAKED IN SOAP (.1%) FOR 1 YEAR

	WIDTH (in)	THICKNESS (in)	SUPPORT SPAN (in)
1	2.092	0.170	2.5
2	2.077	0.172	2.5
3	2.095	0.172	2.5
4	2.091	0.178	2.5
5	2.091	0.178	2.5

	STRAIN @ MAX (in/in)	MAXIMUM LOAD (lbf)	FLEXURAL STRENGTH (psi)	FLEXURAL MODULUS (psi)
1	0.0354	1253.5	77749	2527162
2	0.0370	1279.2	78071	2470586
3	0.0367	1233.6	74639	2411142
4	0.0394	1360.9	77031	2397797
5	0.0371	1387.5	78538	2482966
Mean	0.0371	1303.0	77206	2457931
Standard Deviation	0.0014	67.7	1536	53351
Minimum	0.0354	1233.6	74639	2397797
Maximum	0.0394	1387.5	78538	2527162

F818-2-8Y.is_flex

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Thursday, January 31, 2019

FLEXURAL PROPERTIES OF PLASTICS
ASTM D790
3 POINT BEND

INSTRON CORPORATION
BLUEHILL V. 2.26.

OPERATOR NAME:
E. CARRILLO

TEMPERATURE (F) / HUMIDITY (%)
71 / 50

RATE (in/min)
.067

SAMPLE ID:

SAMPLE SOAKED IN NITRIC ACID (1.%) FOR 1 YEAR

	WIDTH (in)	THICKNESS (in)	SUPPORT SPAN (in)
1	2.084	0.167	2.5
2	2.094	0.172	2.5
3	2.088	0.173	2.5
4	2.090	0.175	2.5
5	2.089	0.177	2.5

	STRAIN @ MAX (in/in)	MAXIMUM LOAD (lbf)	FLEXURAL STRENGTH (psi)	FLEXURAL MODULUS (psi)
1	0.0369	1157.3	74667	2293784
2	0.0358	1197.7	72504	2307743
3	0.0376	1267.7	76072	2335219
4	0.0382	1294.3	75832	2350842
5	0.0387	1296.1	74265	2226127
Mean	0.0374	1242.6	74668	2302743
Standard Deviation	0.0011	62.2	1429	48331
Minimum	0.0358	1157.3	72504	2226127
Maximum	0.0387	1296.1	76072	2350842

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Thursday, January 31, 2019

FLEXURAL PROPERTIES OF PLASTICS
ASTM D790
3 POINT BEND

INSTRON CORPORATION
BLUEHILL V. 2.26.

OPERATOR NAME:
E. CARRILLO

TEMPERATURE (F) / HUMIDITY (%)
71 / 50

RATE (in/min)
.067

SAMPLE ID:

SAMPLE SOAKED IN SULFURIC ACID (5.0%) FOR 1 YEAR

	WIDTH (in)	THICKNESS (in)	SUPPORT SPAN (in)
1	2.091	0.172	2.5
2	2.078	0.174	2.5
3	2.080	0.175	2.5
4	2.085	0.176	2.5
5	2.089	0.178	2.5

	STRAIN @ MAX (in/in)	MAXIMUM LOAD (lbf)	FLEXURAL STRENGTH (psi)	FLEXURAL MODULUS (psi)
1	0.0352	1155.5	70046	2331248
2	0.0371	1242.1	74038	2244193
3	0.0383	1331.6	78392	2272167
4	0.0374	1274.8	74019	2273726
5	0.0395	1347.6	76350	2161413
Mean	0.0375	1270.3	74569	2256549
Standard Deviation	0.0016	77.0	3116	61892
Minimum	0.0352	1155.5	70046	2161413
Maximum	0.0395	1347.6	78392	2331248

F818-2-10Y.is_flex

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Thursday, January 31, 2019

FLEXURAL PROPERTIES OF PLASTICS
ASTM D790
3 POINT BEND

INSTRON CORPORATION
BLUEHILL V. 2.26.

OPERATOR NAME:
E. CARRILLO

TEMPERATURE (F) / HUMIDITY (%)
71 / 50

RATE (in/min)
.067

SAMPLE ID:

SAMPLE SOAKED IN ETHANOL FREE GASOLINE (100%) FOR 1 YEAR

	WIDTH (in)	THICKNESS (in)	SUPPORT SPAN (in)
1	2.091	0.177	2.5
2	2.078	0.178	2.5
3	2.087	0.178	2.5
4	2.090	0.178	2.5
5	2.093	0.179	2.5

	STRAIN @ MAX (in/in)	MAXIMUM LOAD (lbf)	FLEXURAL STRENGTH (psi)	FLEXURAL MODULUS (psi)
1	0.0395	680.7	38967	1676980
2	0.0345	602.4	34312	1555903
3	0.0371	631.7	35825	1689472
4	0.0387	662.3	37503	1631192
5	0.0388	672.9	37628	1662167
Mean	0.0377	650.0	36847	1643143
Standard Deviation	0.0020	32.5	1803	53402
Minimum	0.0345	602.4	34312	1555903
Maximum	0.0395	680.7	38967	1689472

F818-2-11Y.is_flex

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Thursday, January 31, 2019

FLEXURAL PROPERTIES OF PLASTICS
ASTM D790
3 POINT BEND

INSTRON CORPORATION
BLUEHILL V. 2.26.

OPERATOR NAME:
E. CARRILLO

TEMPERATURE (F) / HUMIDITY (%)
71 / 50

RATE (in/min)
.067

SAMPLE ID:

SAMPLE SOAKED IN SODIUM HYDROXIDE (0.5%) FOR 1 YEAR

	WIDTH (in)	THICKNESS (in)	SUPPORT SPAN (in)
1	2.078	0.165	2.5
2	2.086	0.168	2.5
3	2.090	0.169	2.5
4	2.082	0.170	2.5
5	2.087	0.170	2.5

	STRAIN @ MAX (in/in)	MAXIMUM LOAD (lbf)	FLEXURAL STRENGTH (psi)	FLEXURAL MODULUS (psi)
1	0.0382	1167.9	77415	2393456
2	0.0376	1173.9	74773	2220240
3	0.0366	1176.8	73928	2360889
4	0.0367	1141.6	71151	2188277
5	0.0376	1180.7	73409	2229887
Mean	0.0373	1168.2	74135	2278550
Standard Deviation	0.0007	15.6	2272	92060
Minimum	0.0366	1141.6	71151	2188277
Maximum	0.0382	1180.7	77415	2393456

F818-2-12Y.is_flex

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April 15, 2019

Omega Liner Company, Inc.
515 Noid Road
Canton, SD 57013

Attn: Grant Marquardt

One (1) sample of UV-cured fiberglass pipe liner was delivered to HTS' laboratory for testing. The client identified the sample and test requirements as follows:

10,000 Hour Test Report
ASTM D2990 Flexural Creep Test
50-Year Linear Extrapolation
HTS Report No. OLF818.004

Flexural Creep testing was performed in accordance with **ASTM D2990-09 Section 6.3, Standard Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics**, using the guidelines set by **ASTM F2019-11, Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Pulled in Place Installation of Glass Reinforced Plastic (GRP) Cured-in-Place thermosetting Resin Pipe (CIPP), ASTM D3567 Standard Practice for Determining Dimensions of "Fiberglass" (Glass-Fiber-Reinforced Thermosetting Resin) Pipe and Fittings and ASTM D790 Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents**.

One (1) set of five (5) test specimens were conditioned in accordance with Procedure A of ASTM D618-13, prepared in accordance with ASTM D790, and placed on the test rack with the calculated amount of force applied. One set was held as a control set. The results of the specimen's flexural properties testing were then compared to those of the additional control set of five (5) specimens.

The results are reported in enclosed tables. The 50 year modulus was determined by extrapolating the data set using linear trend line analysis contained within commercially available software (Microsoft Excel). Using this linear trend line analysis extrapolation of the data set, the 50 year (438,000 hour) modulus was calculated to be 1,078,161 psi (66.46% retention).

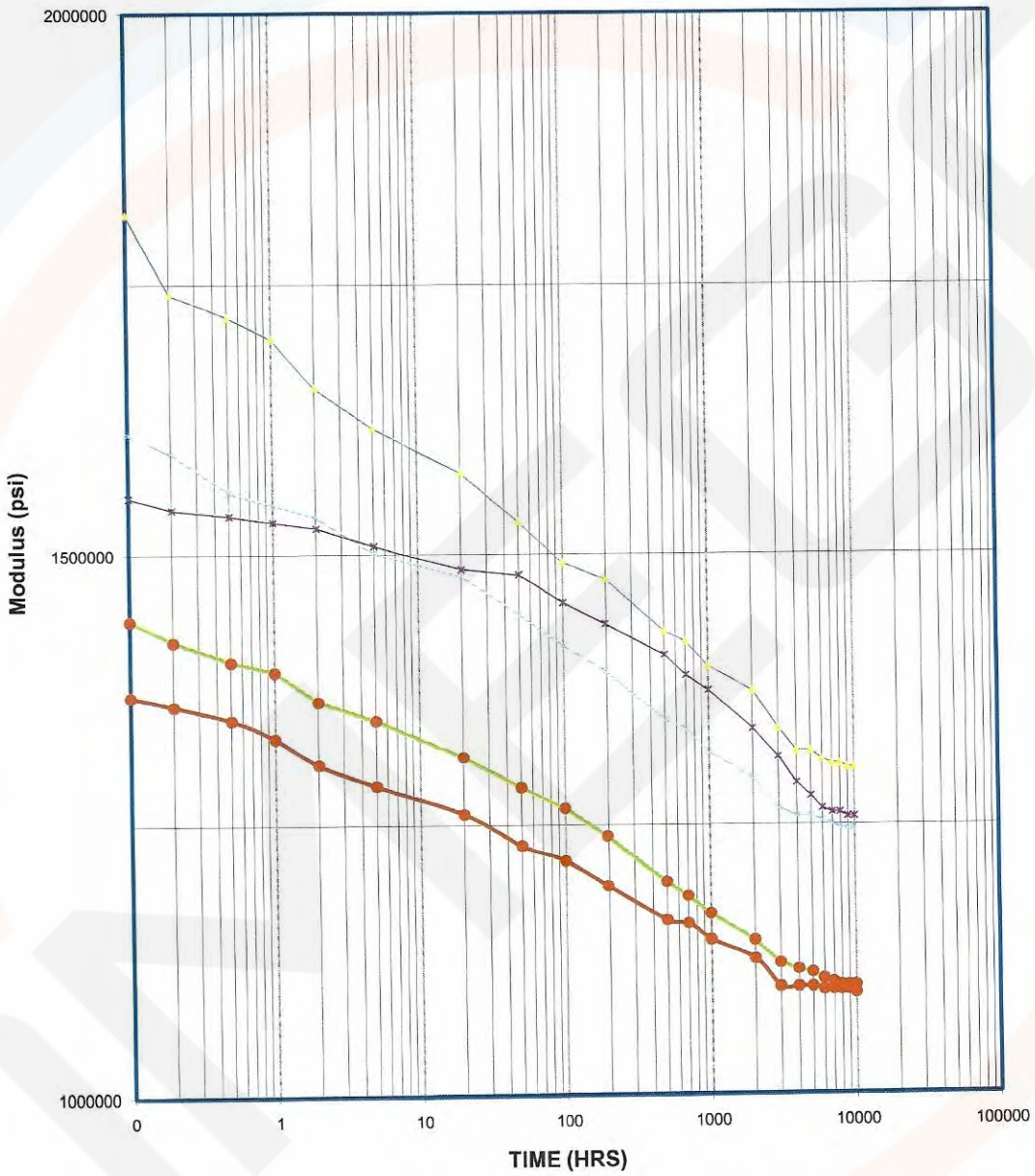
We very much appreciate the opportunity to work with you and Omega Lining Company. Please let me know if you have any questions or comments.

Sincerely,
HTS Pipe Consultants

Rick Eastwood
Vice President

HTS Pipe Consultants, Inc.
420 Pickering, Houston, Texas 77091
Tel: (713) 692-8373 Fax: (713) 692-8502

FLEXURAL CREEP
ASTM D2990



Project Name:

Project No.:

Sample ID No.:

Tested Temperature: 71°F

Lab Humidity: 50%

Specimen Gage Length: 2.5"

Stress: 6250 PSI

HTS Report#: **OLF818.004**

Sample ID:

Spec# 1	Stress: 6250 psi
Thickness: 0.155"	Width: 2.055"

TIME (HRS)	Modulus (psi)
0.02	1621725
0.10	1438448
0.20	1419010
0.50	1400090
1	1390817
2	1363724
5	1346240
20	1312584
50	1284486
100	1265141
196	1239017
500	1196658
700	1183174
1004	1166741
2012	1141377
3000	1120072
4004	1114130
5013	1111182
6000	1105334
7004	1102433
7996	1099547
9000	1099547
10005	1099547

Spec# 2	Stress: 6250 psi
Thickness: 0.152"	Width: 2.045"

TIME (HRS)	Modulus (psi)
0.02	1381667
0.10	1368425
0.20	1359736
0.50	1346908
1	1330177
2	1305844
5	1286237
20	1259756
50	1230796
100	1216809
196	1193083
500	1160750
700	1157613
1004	1142178
2012	1124191
3000	1098248
4004	1098248
5013	1098248
6000	1095448
7004	1095440
7996	1095440
9000	1095440
10005	1092645

Spec# 3	Stress: 6250 psi
Thickness: 0.152"	Width: 2.043"

TIME (HRS)	Modulus (psi)
0.02	1895207
0.10	1814902
0.20	1741126
0.50	1720148
1	1699670
2	1653733
5	1616290
20	1574694
50	1529703
100	1492393
196	1476955
500	1427723
700	1418268
1004	1395169
2012	1372811
3000	1338490
4004	1317898
5013	1317898
6000	1309838
7004	1305844
7996	1305844
9000	1301875
10005	1301875

Sample ID:

Spec# 4	Stress: 6250 psi	Spec# 5	Stress: 6250 psi
Thickness: 0.156"	Width: 2.047"	Thickness: 0.157"	Width: 2.045"

TIME (HRS)	Modulus (psi)	TIME (HRS)	Modulus (psi)
0.02	1630213	0.02	1588798
0.10	1611330	0.10	1553094
0.20	1592879	0.20	1541547
0.50	1557218	0.50	1535838
1	1545683	1	1530171
2	1534318	2	1524545
5	1501203	5	1507914
20	1479909	20	1486295
50	1444064	50	1480987
100	1414693	100	1455004
196	1391115	196	1434866
500	1346240	500	1405682
700	1337610	700	1386877
1004	1316512	1004	1373100
2012	1292057	2012	1337665
3000	1264650	3000	1312267
4004	1257031	4004	1287814
5013	1257031	5013	1275927
6000	1253256	6000	1264257
7004	1249504	7004	1260414
7996	1245774	7996	1260414
9000	1245774	9000	1256595
10005	1245774	10005	1256595

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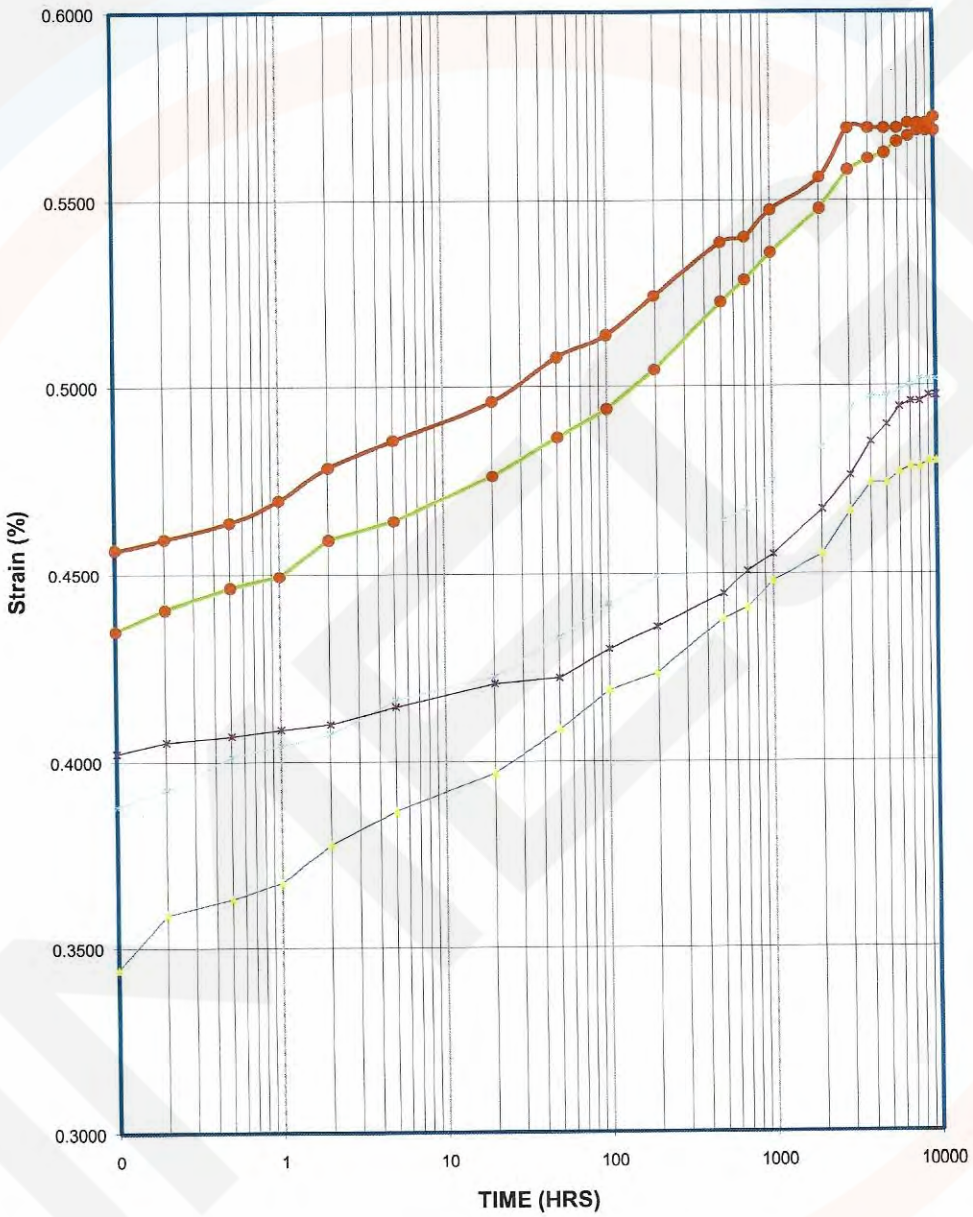
FLEXURAL CREEP
ASTM D2990



Project Name:
Project No.:
Sample ID No.:

Tested Temperature: 71°F
Lab Humidity: 50%
Specimen Gage Length: 2.5"
Stress: 6250 PSI

HTS Report#: **OLF818.004**

Sample ID:

Spec# 1	Stress: 6250 psi	Spec# 2	Stress: 6250 psi	Spec# 3	Stress: 6250 psi
Thickness: 0.155"	Width: 2.055"	Thickness: 0.152"	Width: 2.045"	Thickness: 0.152"	Width: 2.043"

TIME (HRS)	Strain (%)	TIME (HRS)	Strain (%)	TIME (HRS)	Strain (%)
0.02	0.3854	0.02	0.4524	0.02	0.3298
0.10	0.4345	0.10	0.4567	0.10	0.3444
0.20	0.4404	0.20	0.4596	0.20	0.3590
0.50	0.4464	0.50	0.4640	0.50	0.3633
1	0.4494	1	0.4699	1	0.3677
2	0.4593	2	0.4786	2	0.3779
5	0.4643	5	0.4859	5	0.3867
20	0.4762	20	0.4961	20	0.3969
50	0.4866	50	0.5078	50	0.4086
100	0.4940	100	0.5136	100	0.4188
196	0.5044	196	0.5239	196	0.4232
500	0.5223	500	0.5384	500	0.4378
700	0.5282	700	0.5399	700	0.4407
1004	0.5357	1004	0.5472	1004	0.4480
2012	0.5476	2012	0.5560	2012	0.4553
3000	0.5580	3000	0.5691	3000	0.4669
4004	0.5610	4004	0.5691	4004	0.4742
5013	0.5625	5013	0.5691	5013	0.4742
6000	0.5654	6000	0.5691	6000	0.4772
7004	0.5669	7004	0.5705	7004	0.4786
7996	0.5684	7996	0.5705	7996	0.4786
9000	0.5684	9000	0.5705	9000	0.4801
10005	0.5684	10005	0.5720	10005	0.4801

Sample ID:

Spec# 4 Stress: 6250 psi

Thickness: 0.156" Width: 2.047"

TIME (HRS)	Strain (%)
0.02	0.3834
0.10	0.3879
0.20	0.3924
0.50	0.4014
1	0.4044
2	0.4073
5	0.4163
20	0.4223
50	0.4328
100	0.4418
196	0.4493
500	0.4643
700	0.4673
1004	0.4747
2012	0.4837
3000	0.4942
4004	0.4972
5013	0.4972
6000	0.4987
7004	0.5002
7996	0.5017
9000	0.5017
10005	0.5017

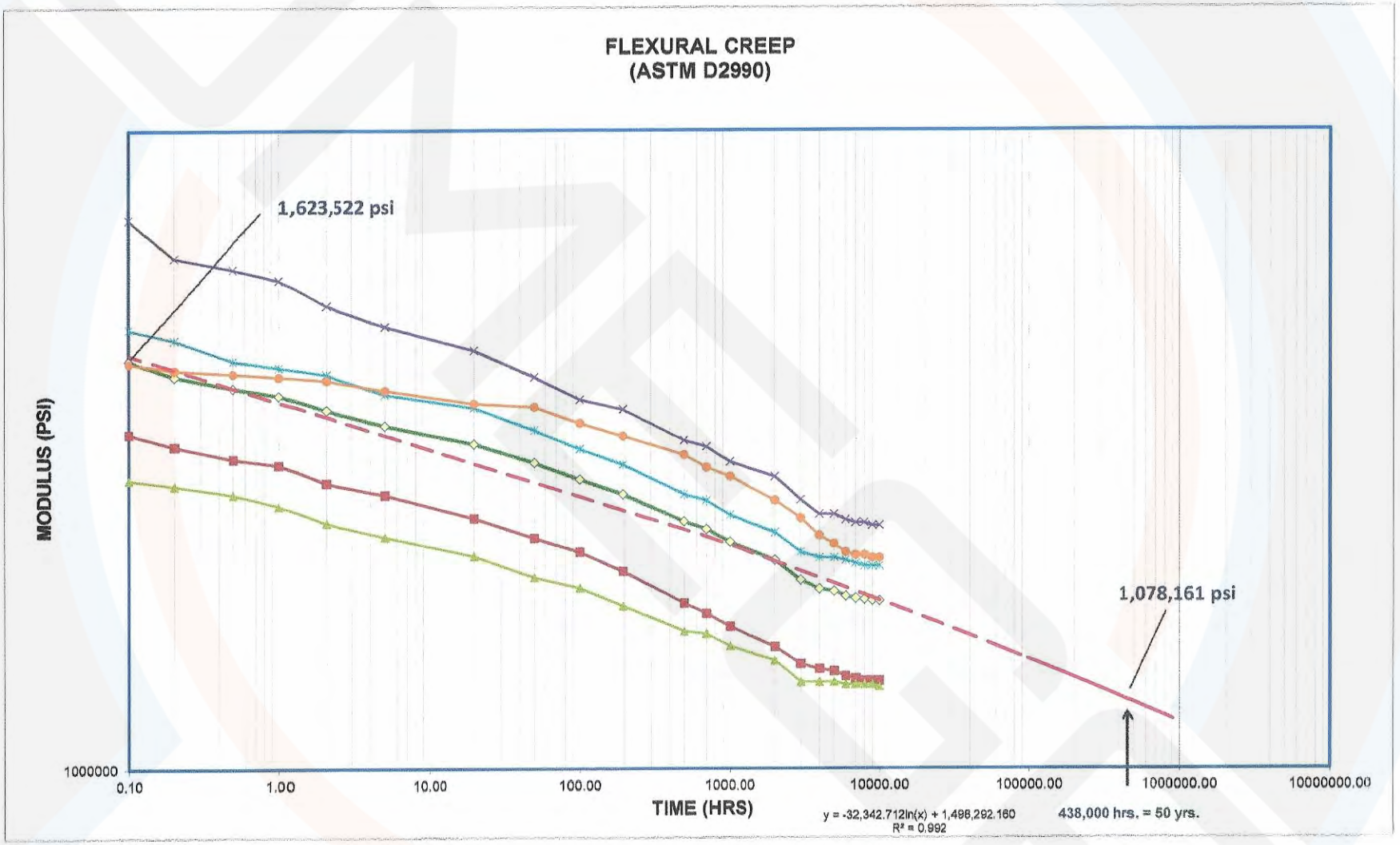
Spec# 5 Stress: 6250 psi

Thickness: 0.157" Width: 2.045"

TIME (HRS)	Strain (%)
0.02	0.3934
0.10	0.4024
0.20	0.4054
0.50	0.4069
1	0.4085
2	0.4100
5	0.4145
20	0.4205
50	0.4220
100	0.4296
196	0.4356
500	0.4446
700	0.4507
1004	0.4552
2012	0.4672
3000	0.4763
4004	0.4853
5013	0.4898
6000	0.4944
7004	0.4959
7996	0.4959
9000	0.4974
10005	0.4974

HTS Pipe Consultants, Inc.
420 Pickering, Houston, Texas 77091
Tel: (713) 692-8373 Fax: (713) 692-8502

FLEXURAL CREEP
(ASTM D2990)



Project Name:	Omega Lininga	Modulus = 1,078,161 psi (extrapolated to 50 years)	Test Temperature : 71° F
Report Date :	April 15, 2019	% Retained = 66.4	Laboratory Humidity : 50%
Sample ID No.:		Line from Lab test data	Specimen Gage Length : 2.5"
HTS Report#:	OLF818.004	Line from linear extrapolation	Stress : 6,250 psi

Omega-Liner
Licensed Engineer Certification Example

TRENCHLESS DESIGN
ENGINEERING

TRENCHLESS DESIGN ENGINEERING LTD.
12 - 111 Fourth Ave., B-345
St. Catharines, Ontario, Canada L2S 3P5
Tel 905-468-8129 Fax 905-468-9462
www.trenchlessdesign.com

April 11, 2018

[redacted]

Dear Mr. [redacted]

RE: Proposed UVC CIPP Liner (Omega) for City of [redacted] Installation

I understand that Aquaflow Technologies has proposed to install an Ultra Violet Light Cured CIPP (Cured-in-Place Pipe) liner in the City of [redacted] The proposed liner is the Omega Liner Company UV Cure Liner. Further it is understood that in connection with the proposed installation the City (through its engineer, GHD) requires:

1. A letter confirming that the Proposed liner (Omega UV Cure Liner) complies with [redacted] Standard Specification [redacted], Specification for the Cured-in-Place Pipe Lining of Sewers.

2. A design for the liner, certified by an Ontario P.Eng, that complies with the design requirements within [redacted] and for an installation invert depth of 5.2 m.

1. Omega UVC Liner Compliance with TS 4.10

I have reviewed the City of [redacted] Specification for the Cured-in-Place Lining of Sewers. Section [redacted] (Scope) requires Cured-in-Place Pipe (CIPP) lining. Omega is a CIPP liner. Section [redacted] (Materials and Standards) allows for 3 types of liners, which are:

Inverted CIPP Liners in accordance with ASTM F1216-09
Pulled in place liners in accordance with ASTM F1743-8
Reinforced pulled in place liners in accordance with ASTM F2019-03(2009)

Further, ASTM D5813-04(2008) is applicable to all 3 types of liners.

I have reviewed the information you provided to me on the Omega liner. I confirm that the Omega liner meets with the requirements of ASTM F2019-03(2009) subject to comments on ASTM D5813 in next paragraph.

In regard to ASTM D5813, the Omega UV Liner Technical Date lists chemical resistance testing in accordance with the required ASTM D543 however I have not identified reference to testing in accordance with ASTM D3681 (applies to chemical resistance for glass fiber reinforced CIPP in deflected condition) as specified in F2019. This requirement may not be relevant to circular liner installations that are considered to fail by buckling and not by deflection. However, it is possible that the City may require evidence of D3681 testing as a condition of acceptance.

In regard to the [redacted] requirement for all liner materials requiring a *"…history of successful use as CIPP liner materials in….Ontario.",* acceptance based on this criterion will be dependent on the City's findings and decision. How substantial this history of use needs to be (to satisfy the City) may depend on the total length of lining for this particular installation in comparison to the length of CIPP lining in typical

City o[redacted]contracts where [redacted] is specified. These contracts normally involve very large amounts of lining.

2. CIPP Liner Design (Omega Liner) In Compliance with TS 4.10

Regarding [redacted] Design Requirements for CIPP Liner I have prepared a stamped design in accordance with the requirements. This design differs from the Mar 7, 2018 design by [redacted] in several parameters including:

Design Method Version is F1216-07a as per [redacted] requirement.
Water Table is 2.0 m down from ground surface as per [redacted] requirement.
Ovality is 3% as per [redacted] requirement.

Further I have chosen to make changes to the CIPP liner properties for design based on my experience with the design of all types of CIPP including UVC CIPP. The stamped design was sent separate to this letter.

Should you have any questions or there is any clarification needed, please contact me at 905-468-8129.

Yours truly,

TRENCHLESS DESIGN ENGINEERING LTD.

Ian J. Doherty, P.Eng.

REGISTERED PROFESSIONAL ENGINEER
11042018
I. J. DOHERTY
PROVINCE OF ONTARIO

Omega-Liner Installation Manual

Liner Installation Manual

Rev. 1.4

October 2020

Table of Contents

Company Details

History

The Omega Liner Company was founded in 2016. The owners have a long history in contracting and in CIPP rehabilitation. They recognized an opportunity to offer a new kind of product that was tailored to the needs of installation contractors. They assembled a team of highly experienced and dedicated men and women to make this a reality. Today Omega Liner products are widely acclaimed for their ease of handling, speed of delivery and outstanding support. As with any CIPP product the manufacturer is only as good as the men and women installing the product. We welcome you to the team!

Facilities

Omega Liner Company produces liner in our 60,000 square foot facility in Canton, South Dakota.

Key Contacts

We have a highly experienced team of people solely focused on making your installation a success. We are here for you.

Technical Support

Jason Homrighaus, Technical Director
518-332-7210
jason@omegauvpipe.com

Product Support

David McConnell, Plant Manager
605-777-9372
david@omegauvpipe.com

Shipping and Logistics

Jason Ulrickson, Shipping Manager
605-777-9374
julrikson@OmegaUVpipe.com

Business Support

Grant Marquardt, General Manager
605-777-3955
gmarquardt@OmegaUVpipe.com

Liner Information

Construction

The Omega Liner is a fiberglass reinforced, cured in place pipe. It consists of an inner foil material, multiple layers of fiberglass reinforcement, a fleece barrier layer and a UV protective outer foil. The reinforcement layers are vacuum impregnated with the UV activated resin material.

All Omega products are constructed under controlled conditions in our ISO certified factory. Each liner is inspected prior to packaging to ensure proper wet-out and preparation.

Specifications

Omega UV liners meet the following minimum specifications

Dimension range	6" (150mm) to 63" (1575mm)
Wall thickness in cured condition	3.6 mm – 15.4 mm, in 1.2 mm increments
Number of layers	Varies according to thickness, 3-13
Longitudinal seam	Yes
Chemical resistance	According to ASTM D 543
Barcol hardness according to ASTM 2583	≥ 40
Recovery period	50 years
Maximum residual styrene content after curing	≤ 3 %
Square weight per mm wall thickness	28.01 oz/yd^2 + 4.42oz/yd^2 / - 2.94oz/yd^2
Short-term Flexural Modulus in accordance with ASTM D 790	2,200,000 psi
Long-term Flexural Modulus in accordance with ASTM D 790	1,700,000 psi
Short-term flexural strength in relation to ASTM D 790	30,000 psi
Poisson´s ratio according ASTM E132	Axial= 0.279 Radial = 0.171
Reduction factor after 10.000 h Per ASTM D2990 and DIN EN 761	68.1% Extrapolated at 2,000
Creep behavior after 24 h according per ASTM D2990	< 10 %

Equipment

Tools

The following end kit tools are recommended for proper installation of Omega liners. Two kits should be available for efficient installation.

3-Pound Sledge with Fiberglass Handle & No-Slip Cushion Grip	1
19mm Long Pattern Combination Wrench	1
13mm Long Pattern Combination Wrench	1
3/8-Inch Drive by 19mm 6 Point Socket	1
13mm Socket 3/8" Drive, Shallow	1
Flex Ratchet 3/8-Inch	1
Stanley Utility Knife, model 99E	4
Utility Knife Replacement Blades	100
20" Tire Iron Spoon Lever	2
#2 Phillips Screwdriver, 1 1/2-Inch	1
IRWIN VISE-GRIP Original Locking Welding Clamp, 9"	4
Metabo WE15-150 Quick 13.5 Amp 9,600 rpm Angle Grinder with Electronics and Lock-On Sliding Switch, 6"	1
4-1/2-Inch Dry Cutting Continuous Rim Diamond Saw Blade with 7/8-Inch Arbor for Masonry 3 Each	3
Adjustable Wrench, 8-Inch	1
All Purpose Work Bucket	1
Extension Cord, 20'	2
Heavy Straps, 2" Ratchet	4
Heavy Straps, 1" Ratchet	4
Light Straps, 1" Ratchet	2
Rope, 3/8", 20'	1
Bag or Case for hand tools	2
Nitrile Gloves (Hardy (Harbor Freight) 7 Mil Nitrile Powder-Free Gloves 50 Pc X-Large	4

Liner Installation Support Tools

Impact Drill, Cordless, (M18 FUEL Brushless Cordless 1 in. SDS-Plus Rotary Hammer Model# 2712-20)	1
1.25" SDS Bit, 6” length	2
3/8" SDS Bit, 6” Length	2
Impact Driver, (M18 FUEL SURGE 18-Volt Lithium-Ion Brushless Cordless 1/4 in. Hex Impact Driver Model # 2760-20)	2
3/8” drive Socket Adapter	2
½” drive Socket Adapter	2
#2 Phillips Bit	4
Flashlight (M18 18-Volt Lithium-Ion Cordless 1250-Lumen Search Light Model # 2354-20)	1
Rechargeable Batteries (M18 18-Volt Lithium-Ion High Output Battery Pack 6.0Ah Model # 48-11-1862)	4
Cordless Sawzall (M18 FUEL 18-Volt Lithium-Ion Brushless Cordless SUPER SAWZALL Orbital Reciprocating Saw Model # 2722-20)	2
Sawzall Spare Blades, 12-inch, Metal Cutting	12
Sawzall Spare Blades, 12-inch, Demolition(wood) Cutting	12
Portable Generator (Honda, 2,200-Watt Super Quiet Gasoline Powered Portable Companion Inverter Generator with Eco-Throttle and 30 Amp Outlet Model # EU2200ITA1 Companion)	2
Portable 2" Pump (Wacker, 2/3 HP 2 in. Electric Submersible Utility Pump , Model # 0620412)	2

Liner Installation Equipment

Cable winch of appropriate length and capacity for install location	
Method to position liner, crane, forklift, skid steer, telehandler, payloader etc.	
Roll Support Fixture (A frame or similar)	
Tools for opening crate	
Lifting slings, various lengths and capacities	
Cable Swivel Joint of appropriate size and capacity (Light Duty, Greenlee 39106 Cable Pull Swivel, 3-1/2-Inch, Heavy Duty, Greenlee 39107 Cable Pull Swivels, 4-1/8-Inch)	1
Shackles of appropriate size and capacity	4
Duct Tape	4
2” heavy ratchet straps (locking with long handles, 5000lb DOT type)	10
Anchor Bolts	
D-Ring Anchors	
Heavy Roller Bars, Various lengths	
Snatch Blocks, 20000lb	
Heavy Screw Jacks, Various sizes	
Bar Rollers	
Manhole Rollers	
Portable Capstan Winch (Portable Winch Co, Model# PCW5000)	1
High strength rope, ¼”- 3/8”(HTP Static Line 7/16”, 600’ Kernmantle) or (	
CSE Equipment	2
Pipe Plugs of appropriate size	
Glide Foil appropriate to the size pipe	

Curing Equipment

UV Curing system with adjustable positioning or alternate wheel sets	1
Cable Roller system to protect UV cable	1
Appropriately sized cans for liner and UV system	1
2” Heavy Duty Ratchet Straps	6
Sluice Foil material for light train installation	1

Finishing Equipment

Tools for grouting end of pipe	1
CCTV camera system for post inspection	1
Robotic Cutter system for Lateral reinstatement	1
Carbide Cutting heads for Cutter	1

Training and Certification

General Requirements

Training

Omega liners are a specialty product that is intended to be installed by trained and knowledgeable personnel, who are experienced in the installation and curing of UV Cured lining materials.

Certified Installers

Omega Liner Company offers installation training and/or certification as appropriate for installation companies at a corporate and individual employee level. Please contact Omega for more information if Certification is required for your contract.

LA County California Certification

LA County has established specific certification requirements for contractors above and beyond the normal Omega training. To receive Omega Certification, installation contractors must submit one of the following;

1) Proof of prior certification within LA County

2) Provide documentation of the following items

    a) Documentation showing installer has two (2) years of recent active continuous experience installing a City of LA approved CIPP product or equivalent liner product.
    b) Documentation showing certified installer has placed a minimum of 25,000 lineal feet of a City of LA approved product or equal liner product.
    c) Documentation by way of description, or presentation summary/outline, etc, of what is covered as part of the training given by the certification program. As a minimum, ensure the program addresses the following:

In addition to providing proof of experience above, installers supervisory team must also attend an Omega Liner provided training class at least once every 3 years that will cover the following topics;

1) Proper installation of the product including any safeguards to consider, or unique product specific aspects to be aware of.
2) Common installation challenges encountered and how to properly address them, or case studies presented, etc.
3) Proper restrained sampling procedure and sampling methodology
4) Industry guidelines and regulations

After completion of the above requirements course attendees will receive an Omega Liner LA county installation certification that shall be effective for 3 years from date of course completion.

Pre-Order Procedures

Overview

When preparing for your liner order, there are many things that need to be considered related to both the liner you are ordering and the installation process itself. Attention to obtaining the proper information in order to ensure a proper liner fit is crucial to the success of your installation.

Host Pipe Material Considerations

It is important to identify the construction material of the host pipe. Different materials result in differences in the dimensions of the pipe which can affect the fit of the liner. Our liners are normally constructed undersize by about 7-10%. It is not sufficient to simply utilize plan specifications to determine material. Many pipes have been repaired in their lifetime and routinely different materials are used in the repairs. An example of this is the common use of PVC pipe as a patching material. PVC pipe runs smaller than other non-metallic pipes and it is not unusual to see a different diameter used than the host pipe.

Liner Storage

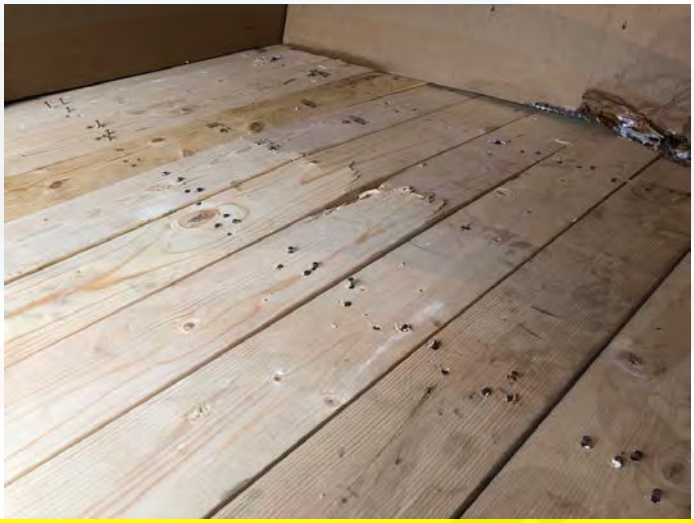
Liners must be stored so that they will not freeze, and they must be protected from water. Liners may be stored outside or on trailers if they are tarped and protected from the weather. Our shipping crates are not waterproof and are constructed with a basin in the lower section of the crate. This basin can and will fill with water if left out in the rain. *Water infiltration due to improper storage will void the Omega Liner Warranty.*

Liner Handling

Liner handling and access is one of the most challenging components on many CIPP installations. Some large or thick liners can exceed 30,000 lb. Therefore, it is important, prior to ordering, that methods and equipment for positioning and pulling in the liner are established. Under some circumstances, pipes may need to be lined in segments, or access roads or other structures installed to facilitate access.

Forklifts and loader forks must be long enough to reach across the entire crate, typically this would require an 8’ fork. *Lifting heavy crates with short forks WILL result in liner damage and void the warranty.*

Where a crane is used to lift a liner, spreader bars or other means of preventing the crate from being crushed should be employed.



Damage during installation and handling is not covered by our warranty and is the single most common cause of failed or defective installation.

Manhole Inspection

Manholes must be evaluated to determine if the liner can be inserted safely and that there is sufficient room to install the required cans and rollers. Liners beyond the smallest sizes, are essentially impossible to remove without damage, once installed in the line. Additionally, liner protective foils and covers are designed to protect the liner during transportation and installation, they are not designed for, nor suitable for protection in an actively flowing pipe. Liners left in the pipe, without bypass, uncured, are not covered under warranty.

Pipe Inspection

Pipes must be inspected prior to liner installation. It is highly recommended that if no pre survey video is available, that the pipe be surveyed before ordering liners. It is not at all uncommon for there to be offsets, deviations, material or size changes that can heavily impact your installations or cause liner defects on installation.

Length

Pipe lengths must be verified in the field. Bid lists, drawings and third-party inspection documents can have significant differences from the actual length of the pipe. Additionally, consideration must be given to the size and configuration of manholes to ensure sufficient additional material. *Omega does not guarantee a specific overage of liner*, only that it will be at least as long as the ordered liner.

Diameter

Pipe diameter measurements should be collected manually. Pipe measurements taken from installation plans are notoriously inaccurate and could lead to ill-fitting liner.

Circumference Measurement

When dealing with ovalized pipe, box culverts, egg shapes, ovals, arch tops or any Hand laid pipe, it is extremely important to understand that these pipes do not always have standard measurements, as each manufacturer used slightly different forms and layouts. In these instances, the proper method of measuring the pipe, is to obtain a circumference measurement directly from the pipes surface using a steel band or equivalent.

Other Considerations

Care should be taken in any pipe inspection to note any defects in the pipe. Additionally, attention should be paid to consistency of diameter and material changes and these should be documented so that the proper liner can be constructed. If there is any doubt about the situation, please contact us to discuss.

Material Changes

As previously noted, material changes are often associated with ID changes so identifying these materials will ensure a proper liner sizing.

Damaged Pipes

Any internal pipe damage should be evaluated to determine any potential for damage to the liner. Additional protection options may be available depending on the situation. In some cases, the wisest course, is a replacement of the damaged section prior to lining.

Erosion

Erosion can occur in any situation where infiltration is observed and is almost guaranteed if the operator is able to see external soil or bedding material. In these situations, care should be taken to note the location of such issues and an appropriate grouting or backfill should be considered after lining.

Ovality

Ovality can have a great impact on the ability of a liner to support structural loads. As such any observed ovality should be noted and, if possible, quantified so that it can be used as a part of structural calculations for the installation. Additionally, ovality can affect the passage of curing equipment through the liner, so care is advised when ovality is observed to avoid surprises.

Offsets

Offset joints may or may not present an issue to your lining project. Offsets less than 10%, are generally not an issue, and may result in some cosmetic wrinkling, deeper offsets can present some more serious concerns for damaging the liner during pull-in and while curing.

Manholes

Diameter, depth, layout, location and access to manholes must be evaluated and considered before any project. It is important to ensure you can get the needed cans into the manhole and that there is room to install the cans etc. Access for liner handling is also critical to a successful installation.

Terrain

The terrain of the installation is very important to determine the amount of liner and the tools and methods that may be required to ensure safe and effective installation.

Other Installation Materials

Safety Caps

Safety Caps are required during installation of all Omega liner products. *Failure to utilize caps will void any warranty claim on the liner and could lead to dangerous situations.* Safety caps are available in 2 different materials, canvas for normal standouts and heavy vinyl for longer freestanding sections. Caps can also be prepared with zippers if required. Canvas Safety caps should be inverted prior to installation to help support the seam.

Sluice Foil

A sluice foil is used to allow for safe installation of the UV light cores and trains by allowing for liner inflation with the cans open. Sluice foils are available for all liner sizes and can be ordered piece wise or as bulk rolls. If care is taken during installation a foil can be used for more than one installation. Generally, the sluice foil size should be the same as the liner size.

Glide Foil

*Glide foil is **required** for installation of Omega Liners.* This highly durable and smooth material reduces friction between the liner and the pipe surface while also protecting the liner from abrasion and cutting damage during the Pull-in phase of the installation. It is available in sizes to cover all liner diameters. Generally, an appropriately sized Glide foil should cover at least 1/3 to 1/2 of the pipe diameter and should be wider if turns are present. *Failure to use glide foil during installation may void Omega's Liner warranty.*

End Seals

End Seals are commonly specified in areas with high levels of ground water infiltration. They are also commonly specified in some cities and states. Omega Liners are able to be installed with any normal hydrophilic seals, gasket seals or grouting/parging methods. Careful selection of seal dimensions and configuration should be used to minimize cross sectional impact on the liner and to prevent wrinkling. Omega recommends the use of Hydrophilic seals as they present a small impact on cross section while forming a tight seal, they are also quite easy to install.

Preparation

Worksite

It is of great importance to properly and safely setup your worksite. You must ensure equipment can be properly positioned and that you have any required vehicular access etc. Where possible liners should be positioned to pull down the grade of the pipe. UV systems should be setup at the downstream end of the pipe to ensure any water accumulation does not prevent access to the light trains.

Proper traffic control and barricades should be placed to prevent access to the installation area, as manholes must remain open throughout the installation process. All vehicles should be equipped with appropriate safety lighting and personnel wearing the correct PPE for the location.

Attention to bypass routing should be given to ensure vehicles and equipment are free to move as needed about the worksite.

Water Infiltration and Management

Having a dry clean pipe is vital to the success and quality of any liner installation. While Omega liners are protected from exposure to water and moisture, they are not waterproof and are not designed to be submerged or exposed to water for long periods of time.

Under no circumstances should a liner be pulled into a pipe unless it will be cured or unless the line is dry and remains under bypass until cured. Liners loaded, but not cured, may void the warranty or result in poor liner appearance or structure.

Water entry into the liner or between the foils may void the Liner Warranty and may result in a liner that no longer meets the structural requirements for the installation. The installer is responsible for ensuring that water is properly controlled prior to and at all times during installation and curing of the liner.

Bypass Pumping

Bypass pumping or storage is an important aspect of ensuring this dry environment. Any good bypass design will allow for unfettered access by personnel to the liner and surrounding work area. Hoses should be kept clear of vehicle lanes and be properly secured. Where possible intake and discharge locations should be positioned away from the working manholes/access points.

Plugs

Pipe plugs should be used to prevent the passage of water into the working pipe. Bypass should be established before final cleaning and inspection of the pipe to eliminate the potential for debris entering the pipe. Omega liner outer foils systems are designed for light and physical protection. They are not considered to be a water-tight encapsulation system. Liners should not be pulled through standing water or left in a flowing pipe. Outer covering is sufficient to protect the liner from incidental moisture such as light infiltration or lateral discharges; however, effort should be taken to minimize the duration of such exposure.

Where possible plugs should be positioned in the downstream side of the next upstream manhole for safety reasons. If such placement is not feasible then plugs should be positioned some distance upstream of the working manhole, to allow safe access by installation crew and room for light train positioning if required.

Pumps

Due to the length of time required to complete a liner installation, appropriate pumping systems must be available to protect the ends of the liner from excessive amounts of water. In many cases a small transfer or sump pump should be used within catch basins or manholes to prevent water buildup.

Infiltration

Infiltration can present some challenges to liner installation. If infiltration is relatively minor no additional action is required. High pressure, or high-volume infiltration should be controlled through the use of grouting or point repairs prior to proceeding with liner installation.

Pipes

Cleaning and Inspection

Pipes must be cleaned and inspected immediately prior to liner installation to ensure there is no debris or pipe defect that could damage the liner during installation. Installation into debris laden pipes can result in poor liner fit and potential liner failure. *Such defects or damage are not covered by our warranty.*

Grade

Grade must be considered when setting up the site. For proper operation in steep grades the light train should either be restrained from runaway or pulled up the grade. Correct pull speed must be maintained at all times.

Laterals

Due to the construction of Omega liners, they may not form dimples as some other types of liners do. It is important then to ensure accurate measurement and marking of lateral locations prior to liner installation.

UV System

Train Preparation

UV light trains should be inspected upon arrival at the jobsite before the liner is installed. Bulbs should be checked for damage, connectors should be clean and dry, no exposed wiring or loose bolts. Any required adjustment should be made for leg positioners. Wheel sets appropriate to the pipe being lined should be installed. Wheels should be checked to ensure they are free from scratches, cuts or resin that could create a sharp edge that might damage the inner foil surface.

Fuel

Ensure that the generator has sufficient fuel for the expected lining time. (Don't laugh it happens a lot more than you think)

Startup and Testing

UV system should be brought fully online and the trains installed on the cable. Check that all IR sensors are functioning. Omega requires that, at a minimum, the front and rear IR sensors must be operational during the cure. Verify that Cameras and LEDs are working properly. Finally, the train should be fired up to full power and allowed to run for 30 sec before shutting back down to cool.

These checks should be performed before the liner is pulled into the pipe to ensure the liner can be cured upon installation. Leaving liner in the pipe for an extended period could impact the liner and void the warranty.

In the event of equipment malfunction or improper IR operation, you must contact Omega for guidance before proceeding to ensure you do not violate the warranty terms and conditions.

Liner

Inspection on Opening

Liner crate should also be visually inspected to ensure it is free from defect or damage during transportation. There should be no evidence of leakage from the crate body. Care should be taken when removing the steel strapping that is used to hold the crate together during transport as it can be under considerable tension.

Verification of Specification

Upon opening the liner crate there will be a Liner Information Sheet on top of the liner. It is important to review the information on the sheet to ensure that the liner is correct for the installation.

This Way Up

Omega Liner has a seam in the outer foil that should be positioned in the Up position for maximum protection from moisture infiltration into the liner. The liner is positioned within the crate such that the Tail of the liner will be in the up position when the liner is removed through the door side of the crate. For situations where a liner must be loaded underneath the crate, it is possible to request that the liner be reverse stacked.

Folding and Strapping of Liner

Installer must ensure the liner is properly attached to the pulling rope or cable. Improper strapping of the liner may lead to the liner slipping from the straps or flipping/twisting of the liner.

1. Determine the amount of liner that needs to be folded back to ensure sufficient length is available in the receiving manhole.

2. Pull out 2x the amount of liner determined in step one and stretch flat on a level surface. Ensure that the liner is positioned so that the top of the liner, as it lays in the pipe, is in the up position

3. Fold liner into 3rds for at least 1.5x the distance from step one

4. Place Pulling sling across the liner at the distance determined from step one, sling should be as close to 2x the width of the folded liner as possible to minimize length of pulling string.

5. Fold liner back over the sling, so that sling is at the center of the fold.

6. Place 1st strap 6-10 inches behind the sling, and snug up so that the buckle is positioned at the center top of the fold. Use straps with handles appropriate to the pipe size, so that the handles do not protrude excessively past the liner edges

7. Place second strap, 6 to 10 inches behind the first, this second strap should be positioned so that it wraps around the liner in the opposite direction. Snug strap up.

8. Loosen the forward strap and remove any slack, then tighten strap fully by hand

9. Loose the rear strap and remove any slack, then tighten the strap fully by hand

10. Repeat step 8 and 9, 2 additional times. By the third time, there should be little slack on the release and the liner should bulge from in between the two straps. For larger liners thumping on the straps with a fist or rubber mallet can help to set the liner under the straps. Proceed to 11 if straps are tight

11. Loosen each strap to remove any play, snug up by hand, then using a pry bar, tire iron or strap handle at least 16" long, proceed to tighten down the strap until it cannot be easily clicked any further. For larger liners, let liner rest for 10 min, then check if any additional tightening can be done. When ready, straps should feel rock hard and it should be impossible to get a finger beneath them.

12. Ensure handles are locked down and that they are centered over the bundled liner. Duct tape may be used to wrap the straps and buckles for protection, however, if properly tightened, straps will not contact the pipe.

13. Strap tails can be coiled and taped to handles or may be tucked into the back edge to the fold. Ensure they are secure and will not come loose during handling.

14. Insert Clevis into the ends of the pulling sling on the nose of the liner.

15. Liner is now ready for installation

Winch, Block and Tackle, and Manhole Rigging

Pull in forces, for long or large diameter liners, can exceed 15000lbs of line pull. Rigging of rollers, bars, blocks, sheaves, anchors and braces, need to be carefully considered to ensure safe and smooth pull in of the liner. All clips, clevis's, slings, straps, ropes and cables must be of sufficient capacity and be in good condition.

At no time during pull in operations should personnel be between the liner and the pulling winch. No personnel should be in any manhole with loaded rigging. Only heavy-duty bars and braces that are properly drilled into the manhole structure should be used.

All pulling with twisted rope or cable must be done with a swivel device between the liner and the rope/cable. Failure to use a swivel can result in twisting of the liner in the pipe, particularly in smaller diameter liners.

For large diameter installations, consultation with a rigger or structural engineer should be considered, if no one has sufficient experience to ensure safe rigging.

Can Preparation

Cans should be inspected prior to use. Inspect all hardware for tightness. All seals should be checked and intact. Ensure that grommets are in good condition and not excessively worn. Check for excess resin on the can body, as well as any scuffs or damage to can ribs, to prevent any potential damage to the inner foil during installation. Check that signal line fittings are properly fitted, tight, and free from debris. Test fittings to ensure proper attachment of signal line. If desired wrap the can body with plastic or tape, such that the cover is not too thick as to prevent proper engagement of the liner with the ribs. Excess resin should be ground, chipped, or dissolved off the can as needed.

Liner Installation

Worksite

Liner Positioning

Liner crate should be positioned so that it is in line with the pipe's axis. Whenever possible, the crate should be positioned opposite the direction of pull during the installation. Note that if you will be pulling back under the box, that the liner fold must be done so that the strap handles will be in the up position once the liner is positioned in the pipe.

If using a feeding device, Conveyor or other aid, place crate sufficiently far back from the manhole/pipe to allow room for loading, handling and preparing the liner. Sufficient distance to allow proper folding should be provided.

Notes on Pulling and Feeding

Liners should never be pulled by the pulling winch into the manhole unless fully guided by appropriate rollers and guides. This WILL result in liner damage and will void the warranty. Generally, the liner should be pulled from the box and fed into the pipe so that there is slack to be taken up by the pulling winch. Liner should never be pulled over a hard edge under tension. To reduce potential for damage, liner should be allowed to drop from several feet down into the manhole. Manhole edges and steps should be covered or removed to allow for smooth passage of the liner.

For some situations it can be helpful to have a person in the manhole to help guide and position the liner into the pipe. It is important to maintain clear communication in these instances. Whenever possible, a person should be designated to be the leader for the pull, they should be in direct communication with the winch operator and should be exclusively focused on directing this operation at all times. This should be the single point of direction for the pulling operation. This person should be positioned directly at the manhole.

Communications

Jobsite communication is vital to completing a safe and efficient Liner installation. Every effort should be made to ensure effective communication is available, if communication is not possible then lining should not continue until such time as communications can be established.

At a minimum, radio communication must be available from one end of the liner to the other at all times during installation and curing. Radios of sufficient power and range for the worksite conditions should be available with sufficient battery or backup to ensure uninterrupted contact.

Verbal communication between manhole occupants and surface crew must be ensured. Equipment may need to be relocated to ensure effective communication. For situations involving deep or loud manholes consider the use of hand signals or closed-circuit intercom type communications equipment.

Underground Pipes

Underground pipes require the use of confined space entry equipment at all times. Care should be taken to ensure that no protrusions or other obstacles within the manholes exist which could snag the liner or workers during installation. For particularly large liners, it may be necessary to remove the top of the manhole to accommodate installation of the liner.

For medium to large liners, it is necessary to have some sort of handling equipment onsite to aid in installation and removal of the liner tail during installation. *Pulling liner tails with trucks, etc. out of manholes will damage the pulled section and void the warranty if later installed.* At a minimum, the liner should be lifted with slings to allow for removal and restacking into the crate.

Culverts

Culverts present a number of distinct considerations and risks during installation. As part of storm water systems, culverts may be subject to extreme variations in flow. Careful attention should be paid to weather conditions to avoid unexpected flooding of the culvert. Culverts are much more likely to be constructed of metal, or concrete materials that may have separated, rusted, or have otherwise been damaged, may present additional potential for damage to the liner during installation and curing.

Careful attention is to be paid to removing any sharp edges, protruding edges or points when dealing with rotted metal pipe. Use of additional glide foil, sleds or caps may be required to ensure liner does not become trapped or snagged on rough edges.

Large voids should be filled or bridged if possible, prior to pulling in the liner. Use of safety caps should be considered for long areas, with large voids, to avoid over expansion of the liner during installation.

Curing

Liner Preparation

The pulling sling and straps should be removed, and the liner flattened back out and smoothed. It is generally easier to slip on the safety cap while the liner is still folded. Fold open the sides for about 3 feet from the end, to facilitate installation of the can. Any excess material should be cut away cleanly, and the exposed end should be protected from moisture and light.

Strap Considerations

The use of high quality and high strength straps is extremely important for proper curing of the liner.

The normal recommendation for straps would be 5000lb ratchet straps as typically used by trucks for tiedown of cargo. The hooks should be removed, and the long section of the strap should be attached to the handle. Smaller ratchet straps should only be used for the attachment of sluice foils.

All straps used to cinch the liner, or for installing cans, should be tightened using a bar or extended handle to ensure they are sufficiently tight. It is also good practice to allow the tightened straps to rest for 10-15 min and then retighten them.

Liner Support

It is important to properly support the liner where it passes out of the pipe. Liner should not be allowed to hang into a drop or catch basin as this can lead to shearing damage or inner foil damage during light train installation. Use stone, sandbags, wood, metal or other means to ensure a smooth transition from the pipe.

Can Installation

Installation of cans is one of the most critical points in the installation of any liner. The can selected, should be as large as possible, without creating difficulty during installation of the can. Typically, a can that is approximately 15-20% smaller than the liner diameter should be selected. This will ensure a loose enough fit for ease of installation without excessive wrinkling or bunching of the liner. Cans should be well maintained with intact seals.

Can Install Procedure

1. Support bottom of liner to ensure no water can enter the liner while installing the can.

2. Using ropes or additional persons, open the liner to expose the inner surface of the inner foil.

3. Attach an extension line to the tagline inside the liner. Ensure that this extension is secure and tied off at all times, to prevent the loss of the tagline. Additionally, ensure that the Tag line does not become trapped between the can and the liner while strapping.

4. Place the can into the liner so that it is centered at the lowest point in the liner. Can should be positioned deep enough so that the liner edge is roughly even with, or slightly beyond, the flange of the can.

5. Place a 1st strap nearer to the Flange face of the can to hold the liner in position.

6. Orient the 2nd strap the reverse of the 1st strap. (i.e. ratchet tightens in opposite direction) Position the second strap between the rear most pair of rings on the can and ensure that it is even around the can. Any excess liner should be evenly distributed about the can in 2-4 flat and even folds. Tighten this strap to hand tight.

7. Loosen and remove slack in the first strap, position between the flange and the second ring, and ensure it is evenly positioned. Tighten this strap hand tight.

8. Repeat the loosen and slack removal for both straps.

9. Tighten both straps, using an extension handle, bar or tire iron, to obtain extra leverage until no further tightening can be achieved.

10. Wait 10-15 min and then repeat step nine.

Relief Cut

After the can is installed, a small relief cut should be made into the outer foil and fleece of the liner at the top and outer end of the flat area of the inflated liner. The cut should be 1" long and care should be taken to not damage the fiberglass underneath.

Liner Retraction

If during pull, in the head of the liner slowly retracts back into the pipe, there is tension in the outer foil that is pulling it back. To eliminate this retraction and reduce the potential for the formation of pressure ridges, the outer foil should be trimmed free all the way around the liner. This will allow the fiberglass to un-bunch and ensure a smooth installation.

End Seal Installation

End seals should now be positioned in the pipe. Ensure that the seal is even, and that it will stretch into position, upon inflation. Its position should be further verified during inflation. Additional care should be taken to ensure the end seal is able to properly contact the liner and the pipe. Safety cap material should not be positioned between the liner and the seal.

Safety Cap Positioning

The safety cap can be positioned over the exposed portion of the liner, before or after can installation. The edge of the cap should be just inside the pipe face and it should extend to the back edge of the first strap. It should be turned inside out so that the folded portion is on the inside. Ensure that the cap is smooth, and not bunched up, or tilted.

Restrained Sample Curing and Collection

In addition to the normal handling of the liner, if Samples are required to be collected, then they shall be properly restrained during inflation and curing.

As a general rule, a properly sized safety cap (same diameter as the Host pipe) shall be sufficient to provide the needed sample. In some cases, with thicker liners, some additional length of liner shall be left outside the pipe to provide sufficient sample length.

Alternatively, a section of liner from within the pipe may be removed for the same purpose.

Samples must be flat in the axial direction throughout their length to provide for proper testing.

Use of cut pipe sections may be possible when there is sufficient clearance to accommodate the pipe in line with the host pipe.

Samples taken from areas that have not been properly restrained are not representative of the installed liner.

Liner Inflation

There are a variety of methods and techniques for inflating liners. Some are better suited to certain situations than others. There are two main goals for initial liner inflation.

The first is to allow for a pulling line to be drawn into the liner using the tag line

The second is to facilitate the installation of the UV light train into the Liner without damaging the inner foil.

Pulling the Tag Line

The tag line is not of sufficient strength to allow for the pulling of a light train through the liner. At no time should the tagline be pulled when the liner is not inflated. This can result in cutting the inner foil, which will void the warranty and may result in liner failure.

Airing Up

When airing up the liner, it is necessary to seal the end of the liner to trap air inside the liner to allow it to inflate, and facilitate pulling of the line, or installation of the train. There are 5 main methods of achieving this;

1. Hose in liner -- For small diameter pipes it is quite easy to simply place the hose into the end of the liner and bunch the liner around the hose using your hands. These small liners generally open quickly, and tend to hold themselves open, therefore, constant air feed may not be needed to pull the rope or install the train.

2. Install the Lid – For pulling the rope in, a simple and easy technique, is to install the can lid after routing the tag line through the grommet opening. Placing a hand over the grommet opening will speed the process of inflation. Once the rope has been pulled through, the liner is deflated and the lid is removed, to prepare for installation of the light train

3. Long Sluice Foil – The use of a long sluice foil is generally the most reliable way to install a light train into the liner. The sluice foil should be about 3 feet longer than the light train. Duct tape should be used to prepare a location for a port at the upper side of the sluice, but the opening should not be cut until it is time to actually insert the light train into the liner. This ensures minimal leakage, until inflation is achieved. The sluice is then strapped to the can behind the flange ring. The air hose should be connected to the can port, a purpose-built sluice port or into the sluice itself, or at the tail of the sluice and secured, to eliminate the chance for blowout.

4. Short Sluice Foil – A more advanced method of train installation is through use of a short sluice foil. A short sluice is a short piece of sluice material that is sufficiently long to be brought together and sealed at the center. A small strap, or piece of rope, can be used to cinch the material while inflating. Attachment of air lines is similar to a long sluice however, though possible, this technique does not work as well when sticking the hose into the sluice directly.

5. Air Lock Sluices – For extremely large liners the use of a purpose-built air lock sluice should be considered. Made from durable fabric these sluices have been designed to allow for the installers, the train and the lid to be placed inside while inflating the liner. Once the liner has inflated, the installers can then place the light trains into the liner and ensure they are properly setup, they can then install the cable and can lid without deflating the liner. This technique can radically shorten the time spent inflating and deflating these very large liners.

Train Setup

The light train should be setup to allow the largest set of wheels that will still allow the train to pass through the can. For very small liners, the cans will be too small to allow the train to pass into the can, and these should be installed without the can in place.

The train should be fully setup and tested prior to installation into the liner. A proper attachment cable or pulling ring should be affixed to the train to allow attachment of the pulling rope. All IR Sensors should be clean and operational. The train wheels should be free of nicks and debris that might abrade or cut the inner foil surface.

Train legs should all be the same length to ensure that the train will not flip and drag on the floor of the liner.

Knots and Clips

When attaching the light train to the pulling rope it is vital to ensure that a secure and strong connection is made. Separation of the pull rope from the train can lead to huge difficulties during installation. Metal clips should be securely attached to the rope using appropriate knots or splices.

If the rope is to be tied to the train it is again vital to ensure that the knot is secure to eliminate the potential for it to come undone. Two knots of particular value in this scenario are the Bowline and the Figure 8 Follow-through. Instructions on how to tie these knots can be found in the attachments.

Pulling in the train

Once the train is in position to be pulled into the pipe and the pulling rope has been pulled through and attached to the train, the inflation process should be resumed (or in the case of sluice foils this can be done as a combine process). When the liner has puffed fully open the train can be pulled/fed into the liner. It is vital that clear communication is maintained at all times to prevent damage to the light train or the liner.

When using a long sluice, the access hole should be cut, and the installer can reach in and guide the light train into the can while it is pulled in from the far end. This should be done by hand, and communication is important so that both ends can work together in the event of a snag or other difficulty in positioning the train. With a long sluice as much time and care can be taken as needed to get the train in the pipe. However, this technique can be challenging when the train cannot be laid out smoothly in front of the can such as in catch basins and non-through flow manholes.

When using a short sluice, a bit more experience and coordination is required to ensure a smooth insertion, as the liner will be faster to collapse once the process begins. The advantage of this technique, is that it is much faster and much easier to manage in tight or rough terrain.

Once the train has been pulled in and the tail of the train is sufficiently deep into the can to allow the cable to be connected, and the lid to be installed, the liner should be allowed to deflate, and the can prepared for calibration.

If airlock sluices are utilized, the train is positioned by hand and attached to the pull rope. At that point, the can is sealed, and the line is ready for calibration.

Calibration

All Omega liners are constructed slightly undersized for the pipe they are designed to line. This built in under sizing is used to ensure a tight fit even when there are small variations in the pipes' internal diameter. The liners are constructed so they can expand until they are fitted up to the pipe. This expansion is not a stretching action, but rather a sliding movement, that once achieved will remain in place. The downside of this design is that if the pressure is too high or the liner is not properly restrained, it could open too far and potentially compromise the strength of the liner.

Inflation Pressure Selection

The minimum inflation pressure is found on the Curing Tables and varies by the diameter of the liner. Most liners will calibrate below this pressure but to ensure good compression and tight fit up to the host pipe, the liner should be brought to this pressure at some point during the calibration process.

Inflation Pressure Adjustments

Hydrostatic pressure should be considered, to ensure that sufficient pressure is present within the liner to offset the hydrostatic pressure.

Under cold conditions, or while working with small diameter liners, it may be necessary to increase the pressure to achieve the desired fit up to the host pipe.

Inflation Procedure

Inflation of the liner is performed in stages to allow for the liner to properly fit and calibrate to the host pipe.

1. The liner should be brought to 50mb(0.73psi), and held there, while the straps are checked for tightness and for any leaks etc. **During this time installers may safely work around the can with minimal risk of injury.**

2. Once the liner has been checked and deemed ready for calibration, the pressure can be increased to 100mb(1.4psi), at a rate of 50mb per minute. The liner should be held at 100mb for approximately 1 min. **From this point forward, no personnel should be working in front of the can, due to risk of injury in the event of a blowout.**

3. Proceed to increase the pressure at a rate of 50mb per minute until the minimum calibration pressure is achieved. Pressure should be held at this point for at least 5 min to ensure that the liner is stable, and the cans are secure.

4. If additional pressure is required to offset hydrostatic pressure, or to achieve a tighter fit, the pressure can be increased at 50mb per minute until the desired pressure is achieved. Final pressure should be held for 5 min prior to continuing. Care should be taken to observe the status of the cans to ensure they do not move or blow out if higher than normal pressures are observed.

Pulling in the light train

Once the proper calibration pressure has been achieved, the light train can be pulled through the liner. Use of a capstan winch is recommended as the weight of the train and cable can be quite large, especially with longer runs. Additionally, the steady, even rate of pull results in less stress on the entire system. Slack should be fed out as the train is pulled, to reduce the forces experienced by the light train.

Inspection

While the train is being pulled into the liner, the UV operator should observe and inspect the liner for any visible defects, or anomalies, so that they might be documented and, if needed, addressed prior to curing the liner.

Identifying Defects

Defects that occur in the liner should be noted by the operator. Some defects are normal and occur due to normal conditions within the pipe such as bunching at corners, striations in long curves and various lumps and pits in the floor. White staining, air pockets, abraded or damaged foil/fiberglass twists and lifted floor all represent potential issues that may need to be addressed or evaluated prior to proceeding with the installation.

Calibration Confirmation

The operator should observe and determine that calibration has occurred. This is done by looking at the surface finish of the liner, and observing the presence of seams, bumps or other pipe surface being transmitted through the liner. Ribs from corrugations are also a strong indicator of proper calibration. The presence of longitudinal wrinkles, or blades, may indicate an uncalibrated liner or an improperly sized liner.

Bell Appearance

The end bells should be observed, to ensure that they are even and smooth, and that the can is sitting in line with the pipe. Any twisting, bunching, or wadding, should be addressed before curing the liner.

Inner Foil Condition

The inner foil should be free from abrasions, cuts, marks, or bubbles. If these are observed, care should be taken to identify their origin before proceeding, as this sort of defects could result in liner failure.

Curing the Liner

Using the Curing Table

The Omega Liner Curing Tables are provided in both Metric and SAE Units. To use the table, locate the diameter of the liner you are curing along the left side, then identify the light train that you are using along the top. The point where these two intersect is the pulling speed that is recommended for that particular liner and train combination. Additionally, by moving left from the diameter, you will find the operating pressure for that size liner. There are a number of other comments and notes to help determine the proper information when there is not an exact fit to the data in the table.

Ignition Sequence

The ignition sequence is important for the proper curing of the far end of the liner. There are two main considerations that need to be considered for a proper ignition sequence. The first of these, is the time required for HID arch inside the bulbs to come to full temperature. As the gas inside the bulbs heats, the gas is ionized and, as a result the electrical arc within the bulb, will be able to be maintained with less amperage. At the same time, as the temperature is increasing, the energy level of the gas results in a higher energy spectrum of radiation to be produced. During this period, (about 30 sec) the color of the bulbs will shift from a white/yellow color, to a blue, and finally, an intense violet/purple color and the UV output is peaked. This results in a longer time needed to cure the exposed liner at the start of the cure.

To calculate the Ignition sequence time the following formula is used (also found on the curing table).

(Length of Train/Pull Speed)/Number of Bulbs *1.5 = Startup Delay

"Length of Train" = Distance from first bulb center to last bulb center
"Pull Speed" = Lowest number of range from Curing Table
"Start-up Delay" = time in seconds between each bulb ignition and shutdown

Once all bulbs are lit, wait an additional delay period then proceed at ½ the pull speed for 3 feet or 1 meter, then ramp up to full speed over the next 30 seconds.

For large single cores, or double cores etc., use center of bulb group to center of bulb group for length and number of cores for bulb count.

IR Sensor Interpretation

Review the Information on Radiation and IR sensors in the **Principles of UV Curing** in the **Reference** section to help understand the principles of Radiational curing and IR sensor function/purpose.

Proper use of IR sensor reading is vital to the high quality of UV installations. Sensors should be kept clean, and free of any build up, before every run. Additionally, the sensors should be checked for proper operation prior to each installation. UV sensors are notorious for being problematic.

As a general rule, an operator can expect to see a 100 to 150 degrees F (70-80 Degrees C) change in temperature increase during the course of a cure. The ambient temperature of the liner, PRIOR to the start of the cure, as shown on the IR sensors, (not the Ambient Temperature sensor) should act as the benchmark from which to evaluate the exothermic temperature rise of the liner due to curing. The temperature will rise steadily, as the liner cures, at which point a peak will be achieved.

The goal is to position this peak before or at the last sensor on the train. This generally means that the second and third temperatures should be similar, or with the rearmost sensor slightly higher.

The forward sensor should be considerably lower than the other two if the speed is correct.

Examples can be found in The **Reference** section information.

Optimizing Pulling Speed

Once baseline curing speed has been established for at least one train length, it is possible to optimize the pulling speed based on the data from the IR sensors. Adjustments should not be made beyond the range shown on the table. If this range still produces too slow a curing speed, then contact Omega for additional guidance.

Shutdown Sequence

The Shutdown sequence is essentially the same as the Start-up sequence from before, except that the bulbs are shut off. At 3 feet or 1 meter, the speed should be ramped to ½ speed then stopped just short of the can. Some prefer to pull in the last 6 inches by hand. The additional delay period should be observed after stopping but before shutting off the first bulb.

Response to Anomalies

In the event of an issue during the cure, the operator may need to make adjustments to the pulling speed of the train. If bulbs are lost, then the speed should be reduced a similar percentage of the bulbs that are lost. Depending on the bulbs that are lost, secondary curing may be required if the loss resulted in a shadowed area, or a first or last bulb failing, resulting in an incompletely cured liner at the end.

If all of the train bulbs shut down during the cure, then the operator should stop in position until the bulbs can be reignited. They should resume curing, once all the bulbs have been fired for 30 seconds.

In the event of a loss of pressure, or a rise in the floor, the bulbs should be shut off until the issue is corrected, then the Cure should be resumed per above.

If water is observed inside the liner, curing should be continued to completion, then the water should be removed and the floor recured.

Finishing

Can Removal

Removal of cans is fairly self-explanatory. Cans can sometimes become trapped if the curing extends over the edge of the can, in such cases care should be taken to trim away the hardened liner from the can. Whenever possible, straps should not be cut, as this is wasteful and unnecessary. A pry tool can be used to release straps, even if the handle is trapped from opening. Pry bars can also be used to help lever the can out of the liner.

Many installers prefer to remove the can prior to removal of the light train.

Light Train Removal

The light train should be removed with care. The metal surfaces of the train can be hot enough to cause 3rd degree burns to unprotected skin. Gloves should be worn at all times while handling a hot train. The train should be removed, before any cutting is performed, to help reduce the chance of dust covering the train.

If it is not possible to remove trains before cutting, then the inner foil should be pulled down and tied shut prior to cutting the end of the liner.

Care should also be taken to protect the train from uncured resin during the removal. Trains can be disconnected, as needed, to facilitate removal.

End Cutting

Cutting the end of a liner is a mixture of skill and art. Most people develop their own technique and sequence of operations as they gain experience. There are a number of key concerns to be evaluated and addressed in any cutting operation

Cutting Blades

Best results are obtained with diamond cutting tools, as a great deal of heat, abrasion, and pressure, are generated during the cutting of fiberglass liners. Standard grit, or fiber cutting wheels, do not hold up well and have a strong tendency to shatter. Diamond blades have a thinner profile compared to fiber blades.

Grinder Setup and Safety

Due to the working conditions and the nature of UV liners, cutting of liners presents a number of risks that should be addressed related to use of grinders. First, grinder selection should be carefully considered. Though cheap, and readily available, common 7-9amp grinders from building supply outlets are not well suited to liner cutting. Many of these grinders have poorly designed ventilation systems that are highly prone to ingesting dust and moisture during the cutting process. They may also have open brushes, which are rapidly fouled, or damaged, during normal operations.

More appropriate 12-14 amp grinders are available. In particular, Metabo grinders are particularly well suited as they have largely sealed electrical components, have a dust reduction design, are easily serviced, and have built in safety features to protect from overheating. Additionally, these grinders have sufficient power for the heavy extended cutting that is involved.

In the photo, a modified guard is shown to help facilitate cutting of liners. Key features to note are the narrowed profile of the guard to match the profile of the grinder body. This ensures hand protection, while also allowing for the various positions in which the grinder may need to be used.

The second feature, is that the lip on the bottom of the guard has been trimmed back to create a straight profile. This modification allows dust and water to be thrown out sideways, rather than flung from the tip of the blade. This results in a much-reduced volume of dust and water in line with the blade, resulting in better visibility for the operator.

An additional consideration on grinder use is to properly position the grinder in relation to blade rotation. The grinder should always be plunged into the liner so the edge of the blade, nearest to the direction of travel, is rotating in such a way as to pull the grinder inwards towards the liner. The grinder body should always be inclined in the direction of travel, and should not be held perpendicular to the liner, as this could result in a kickback. Whenever possible, the grinder should be pulled through the material rather than pushed.

Paddle switch grinders or non-latching switch grinders, are difficult to use, and may in fact be more dangerous to use than latching switch grinders. The manipulation and various cutting angles, as well as the frequent need to cut with one hand, can make proper handling of a paddle style grinder very difficult.

Bone Saws

For conditions where dust generation or safety is a concern, it is possible to utilize Oscillating tools or Bone saws as an alternative to grinders. These tools are MUCH slower cutting than grinders on all but the thinnest, and smallest liners, but they radically reduce the amount of flying dust and water that is generated. They are also significantly safer to operate under many conditions. In manholes where large diameter pipes are being removed, grinders should still be considered to aid in the breakdown of large bells.

Electrical Concerns

Most battery powered tools do not have sufficient capacity to handle cutting out on anything but the smallest/thinnest liners. In most cases, a corded tool will be required to maximize efficiency. Care should be taken to ensure that electrical cords are properly secured, out of the way of the cutting area, and the connections are secured with tape or other mechanical means(tied), so that they do not separate. Also ensure the cord ends are kept clear of any standing water.

Respiratory Concerns

Breathing of fiberglass dust is very hazardous, and respiratory protection should be used at all times. For outdoor cutting of small liners it may be sufficient to use disposable dust masks. For work in manholes, or for heavy cutting, half face respirators with P100 cartridges should be considered the minimum with full face, P100 respirators being preferred.

PPE

Safety glasses or goggles should be worn at all times while cutting. Leather or abrasion resistant fabric gloves are the best choice for hand protection from splinters, heat and flying debris. White Tyvek bunny suits are the preferred coverage for work clothes. Though suits with legs removed are also sufficient.

General Cutting Safety

A few additional items of note should be observed during cutting operations.

When cutting on twisted or torqued liners, care should be taken to cut small reliefs as needed to relieve tension and otherwise help prevent pinching or movement of the liner as it is cut.

It is strongly advised to use a knife to cut away any tough outer foil or safety sleeve material from the outer surface of the liner before cutting. These fabrics can become caught in the grinder blade and cause a loss of control of the grinder.

Moisture control is important while cutting ends, as any standing water can be flung up and onto the operator and the electrical cords.

Also, it is highly advised that, the downstream end is allowed to be cut before any water is released from the upstream side.

Cutting Procedure(general/recommended)

The following is a general guide for cutting of a small to medium size liner from the outside of the liner.

1) Remove any external fabric from the liner.

2) Tie off the pull rope to a secure point, or to the inner foil, to ensure the line does not get lost or cut.

3) Pull inner foil free from bell of pipe and push forward beyond the area to be cut.

4) Starting close to the pipe interface, make a parallel cut to the interface over the top area of the liner that is accessible. Make two perpendicular cuts along the left and right sides, out to the point where the liner is no longer cured.

5) Pull back the cut section away from the pipe, opening it like a lid, to access the inside of the liner.

6) Continue the parallel cut on the inside of the liner down to the center of the pipe. Do not cut too deeply into the host pipe during these cuts. Look for telltale signs of dust coloration to limit cutting of the pipe.

7) Reposition and repeat on the opposite side of the liner to meet the other cut at the center.

8) Remove Liner end bell and trim any remaining fabric or foil from the lower portion of the cut.

9) If removed bell is too large to remove from manhole, cut the remaining liner into petals, repeating the perpendicular cutting every 12-18 inches around the perimeter of the bell. This will create a string of petals that are attached by their points, now they can be easily pulled through the manhole in one piece.

Inner Foil Removal

Attachment to Tagline

To attach the tagline to the inner foil the following procedure results in a solid connection.

1) Twist inner foil with the tagline at the center to form a twist about 1-1.5 feet long

2) Using the tagline, tie a two-half hitch knot around the twisted liner

3) Fold the twisted section back over the knotted rope

4) Tie again with two half hitches

5) Wrap duct tape around the twisted and tied end to secure it in a folded position

Pulling Methods

When pulling the tag line, a roller should be mounted in the manhole. Use of a wide and deep roller is recommended, to reduce the stress on the inner foil as it is pulled. The rope should not be pulled over the edge of the liner as damage to the rope or liner may result.

Pulling with a portable capstan winch is strongly recommended, as pulling of foil requires a surprising amount of force, for all but the shortest liner. It is also possible to pull by hand, but this should be done while pulling straight out the end of the pipe over a roller.

Pulling with vehicles is not recommended, as there is an increased risk of tearing the foil if it snags

Handling/Disposal

The most direct method of handling inner foil after removal is to roll it up into loose rolls and then tape to facilitate handling. *The foil must be saved any time there is a question about the cure or if any kind of warranty claim may be sought.*

Reuse Considerations

Inner foil can be used for sluice foils if it is not damaged during removal. It is a good practice to save pieces of Inner foil and store them with the curing equipment in case there are problems during an installation, or Sluice foil is not available.

Lateral Reinstatement

Differences from Felt

There are a several notable considerations for those not familiar with cutting laterals in UV liners.

1) UV liners are much harder than Felt liners and require non-metallic cutting edges (Diamond, carbide etc.). High speed steel bits are not recommended as their life is greatly reduced.

2) In general, UV liners do not dimple to the same degree as Felt liners. Extreme attention to detail regarding lateral locations should be observed.

3) Care should be taken to ensure that outer foil is completely cut away from the opening to prevent potential blockages

Manual Reinstatement

For liners above 36 inches, manual reinstatement is the most common method. While grinders are good for this task, many have good success using hole saws as well.

The use of glowsticks, positioned inside the laterals, can aid in locating and cutting the laterals when utilizing Omega Liners with the normal outer foil. However, detailed notes should still be collected in the event that the stick falls out or is occluded by material within the lateral.

Electrical Concerns

Any high voltage tools used for lateral reinstatement must be connected to a GFCI circuit protection device and should be covered, or otherwise protected from moisture, as it is quite common for laterals to have filled with water or debris during the curing process

PPE

Particular attention should be paid to PPE selection for manual reinstatement. Respiratory protection is a must due to the confined quarters as well as hearing protection. Tyvek should be worn to protect from disease causing organisms and fiberglass dust.

End Finishing

Liner ends can be treated using all conventional sealing or grouting techniques.

Intermediates

Intermediate manholes can be lined through; however, a safety cap or caps must be installed for any area not contained within the pipe. Fabric should be cut away before using a grinder. In general, the top section of the liner is removed down the edge of the bench rather than cutting out the entire section between the interfaces

Reference Information

Principles of UV Curing

This section is intended to help explain the general principles of how UV curing works and how that impacts the installation and curing process.

Curing of UV Activated Resin

Polyester and Vinyl ester resins work by forming long polymer chains that interlock and form a rigid plastic material. When combined with a glass fiber reinforcement material, the composite becomes very strong and resilient and is able to bear great loads.

Additionally, the glass fiber reinforcement serves a secondary purpose in this application. The glass fibers serve as a conduit for the UV radiation, allowing it to penetrate deep into the composite structure.

The resins used for UV curing are the same as those used for steam and hot water curing, however the method of activation is distinctly different. In a thermal Resin, the presence of heat causes the Peroxides in the resin to initiate the polymerization reaction. Once the reaction has commenced, the heat generated from the exothermic reaction penetrates further into the resin and continues the reaction in a cascade until all the resin has cured.

In practical terms, this means a thermally cured liner is an all or nothing operation. Once the reaction begins, the entire liner will cure out unless somehow cooled sufficiently to keep the reaction from occurring.

The fact that the reaction can be slowed, or stopped due to cooling, has a secondary effect impacting the strength of heat cured liners. This is due to the fact that at the interface with the pipe or with surrounding ground water (in particular flowing water) the resin can be impeded from curing. This can reduce the effective thickness of the liner, reducing its overall strength. Additionally, over time the resin can be washed from the liner in those areas.

In a UV initiated system, The UV initiators degrade in the presence of UV radiation and so come in contact with the polymers and begin the reaction. The key difference is that the initiation reaction that occurs is not affected by heat. This allows you to effectively stop the cascade reaction by starving it of the required activation components. The reaction is not noticeably affected by the temperature of the materials, so cold temperatures or flowing water, do not impact the ability to completely cure the liner.

Also important in the design, is the construction of the liners with regard to foil encapsulation. Most mainline UV liners are constructed with outer protective fleeces and foils that reduce contact with water to aid in reduction of washout and other moisture effects.

Moisture Effects

Beyond the issue of resin washout, is the impact of water on the Resin/initiator mixture itself. IN the presence of small amounts of moisture, the resin becomes discolored and forms a milky emulsion with the water. In small amounts this generally has no significant impact on the liner as it is primarily a surface boundary layer effect (i.e. the outmost surface). When the amount of moisture is significant, or extended contact time occurs, the area of impact grows larger and deeper into the uncured resin material. When such areas become significantly larger in size, they have the potential to impact the ultimate strength of the liner.

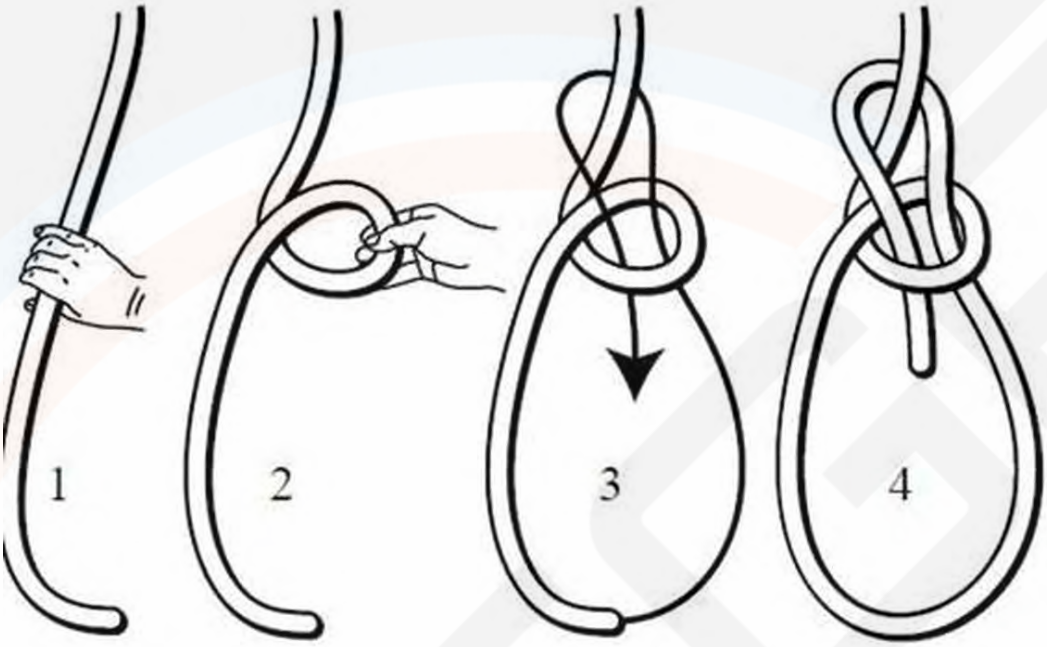
Moisture between the inner foil and the resin are a somewhat more concerning problem as the water and also the emulsion, have the ability to absorb or reflect the UV radiation. This leads to a shadowing effect which, if large enough in area, could impact the curing of the resin deeper in the liner. It should be noted however, that the ability of the UV radiation to penetrate and travel along the fibers means that the radiation can cure behind thin or spotty emulsions or pockets of water by ¼ to ½ inch in some cases.

The last area of impact of water, is the presence of water on the floor of the liner inside the inner foil. When water is allowed to enter the inside of the foil, in all but ideal conditions, it will cause the formation of puddles or long bands of standing water. At depths of $1/16^{th}$ to $1/8^{th}$ of an inch, UV radiation is greatly impeded in its ability to penetrate through the water. Such scenarios are of particular concern as they can lead to long sections of liner that have a strip of material that is not properly cured. This can allow for compression of the uncured area and can cause the liner to buckle at the weakened area of the liner.

In such scenarios, the water must be removed, and the unexposed area cured, via an additional pass through the liner with the UV curing equipment.

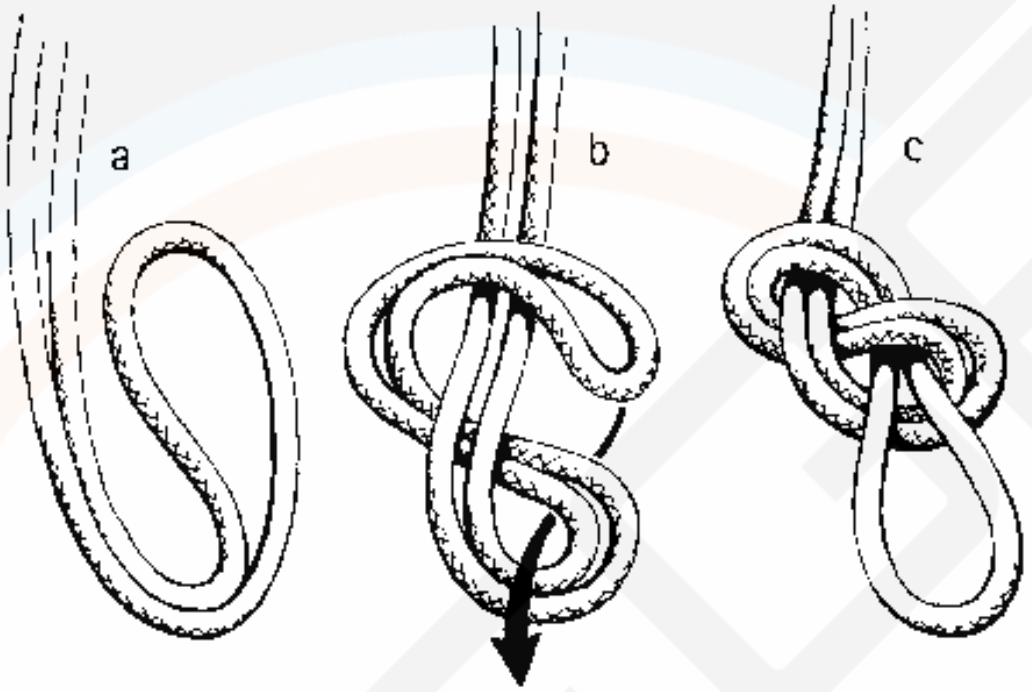
Knots

Bowline Knot – This knot is very valuable because it minimizes stress on the rope, it is easy to untie even if tight, and it will not cinch down on itself.

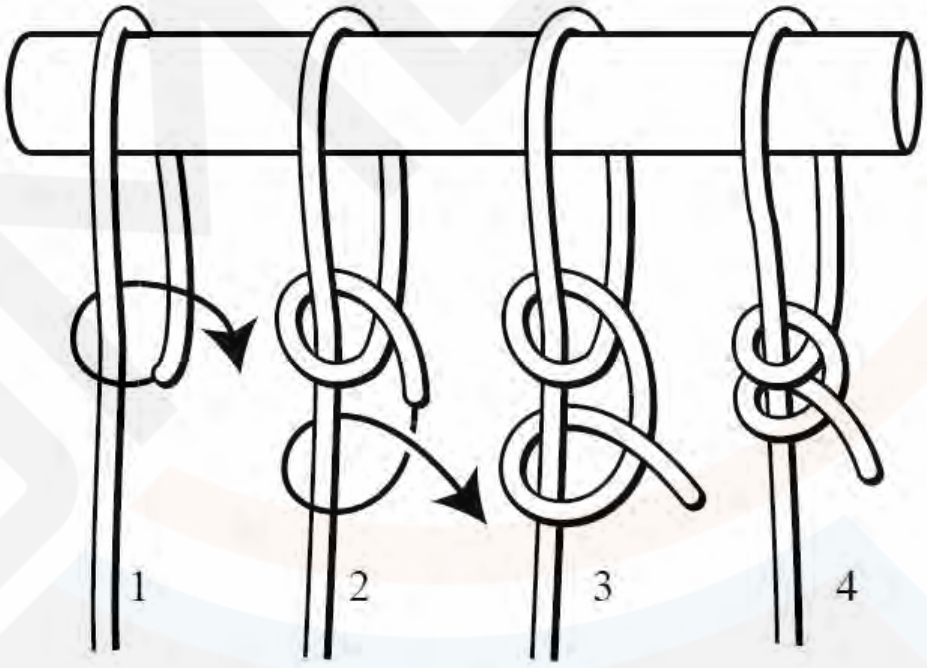


Sheet Bend – This knot is very useful for attaching a smaller rope to a bigger rope. This is frequently the case when preparing to pull a tag line through the liner.

Figure 8 Follow Through – The figure 8 knot is ideal for creating a strong loop at the end of a pulling rope. It is the strongest knot you can use that has the lowest impact on the strength of the rope. Like the Bowline, it is easy to untie even when very tight.



Half Hitch – The half hitch is another very useful knot particularly when securing a rope to inner foil. It can also be used when pulling in liner especially in tight manholes where it is hard to get the liner pulled in far enough. It is very easy to tie and will become tighter under load.



Omega-Liner Curing Tables

Omega Liner Curing Guidelines

Diameter (in)	Diameter (mm)	Thickness (mm)	Operating pressure at least mbar (psi)	Chain 8 x 400	Chain 8 x 600 8 x 650	LS Chain 10 x 650	Chain 12 x 400	Chain 6 x 1000	Chain 9 x 1000	LS Core Chain 5 x 2000	Double Core 2 x 4000	Double Core 3 x 4000	Prokassro Super Core 2 x 6000	IBG Super Core 1 x 12000	IST Super Core 3 x 6000
				Curing Speed Range Meters / Minute											
6	152	2.4	550 (8.0)	1.4 - 1.6	1.8 -2.1	1.8 -2.1	1.8 -2.1								
		3.6		1.3 - 1.5	1.6 - 1.8	1.6 - 1.8	1.6 - 1.8								
		4.8		1.2 - 1.4	1.4 - 1.6	1.4 - 1.6	1.4 - 1.6								
8	203	2.4	550 (8.0)	1.3 - 1.5	1.8 - 2.0	1.8 - 2.0	1.8 - 2.0								
		3.6		1.2 - 1.4	1.5 - 1.7	1.5 - 1.7	1.5 - 1.7								
		4.8		1.0 - 1.2	1.3 - 1.5	1.3 - 1.5	1.3 - 1.5								
		6.0		0.9 - 1.1	1.1 - 1.3	1.1 - 1.3	1.1 - 1.3								
10	254	2.4	500 (7.25)	1.2 - 1.4	1.7 - 1.9	1.7 - 1.9	1.7 - 1.9								
		3.6		1.0 - 1.2	1.5 - 1.7	1.5 - 1.7	1.5 - 1.7								
		4.8		.9 - 1.1	1.3 - 1.5	1.3 - 1.5	1.3 - 1.5								
		6.0		.8 - 1.0	1.1 - 1.3	1.1 -1.3	1.1 -1.3								
12	305	3.6	500 (7.25)	1.0 - 1.2	1.1 - 1.3	1.1 - 1.3	1.1 - 1.3								
		4.8		.8 - 1.0	.9 - 1.1	.9 - 1.1	.9 - 1.1								
		6.0		.7 - .9	.8 - 1.0	.8 - 1.0	.8 - 1.0								
15	381	3.6	500 (7.25)	0.8 - 1.0	.9 - 1.1	0.9 - 1.1	0.9 - 1.1								
		4.8		.7 - .9	.8 - 1.0	.8 - 1.0	.8 - 1.0								
		6.0		.5 - .7	.6 - .8	.6 - .8	.6 - .8								
16	406	4.8	500 (7.25)	.7 - .9	.8 - 1.0	.8 - 1.0	.8 - 1.0								
		6.0		.5 - .7	.6 - .8	.6 - .8	.6 - .8								
18	457	4.8	450 (6.5)	.6 - .75	.7 - .85	.7 - .85	.7 - .85								
		6.0		.5 - .65	.6 - .75	.6 - .75	.6 - .75								
20	508	4.8	400 (5.8)	.5 - .65	.6 - .75	.6 - .75	.6 - .75								
		6.0		.4 - .55	.5 - .65	.5 - .65	.5 - .65								
		7.2		.3 - .45	.4 - .55	.4 - .55	.4 - .55								
21	533	4.8	400 (5.8)	.5 - .65	.6 - .75	.6 - .75	.6 - .75								
		6.0		.4 - .55	.5 - .65	.5 - .65	.5 - .65								
		7.2		.3 - .45	.4 - .55	.4 - .55	.4 - .55								
24	610	4.8	350 (5.0)	.7 - .9	.8 - 1.0	.8 - 1.0	.8 - 1.0	.8 - 1.0	1.1 - 1.3	1.1 - 1.3	1.1 - 1.3				
		6.0		.65 - .85	.75 - .95	.75 - .95	.75 - .95	.75 - .95	1.0 - 1.2	1.0 - 1.2	1.0 - 1.2				
		7.2		.6 - .8	.7 - .9	.7 - .9	.7 - .9	.7 - .9	.9 - 1.1	.9 - 1.1	.9 - 1.1				
		8.4		.55 - .75	.65 - .85	.65 - .85	.65 - .85	.65 - .85	.8 - 1.0	.8 - 1.0	.8 - 1.0				
		9.6		.45 - .65	.55 - .75	.55 - .75	.55 - .75	.55 - .75	.7 - .9	.7 - .9	.7 - .9				
		10.8		.35 - .55	.45 - .65	.45 - .65	.45 - .65	.45 - .65	.6 - .8	.6 - .8	.6 - .8				
27	686	6.0	350 (5.0)	.4 - .6	.5 - .8	.5 - .8	.5 - .8	.5 - .7	.75 - .95	.7 - .9	.75 - .95				
		7.2		.3 - .5	.4 - .6	.4 - .6	.4 - .6	.4 - .6	.7 - .9	.6 - .8	.7 - .9				
		8.4		.2 - .4	.3 - .5	.3 - .5	.3 - .5	.3 - .5	.65 .85	.5 - .7	.65 .85				
30	762	6.0	300 (4.4)	.4 - .6	.5 - .7	.5 - .7	.5 - .7	.5 - .7	.7 - .9	.7 - .9	.7 - .9				
		7.2		.3 - .5	.4 - .6	.4 - .6	.4 - .6	.4 - .6	.65 - .85	.6 - .8	.65 - .85				
		8.4		.2 - .4	.3 - .5	.3 - .5	.3 - .5	.3 - .5	.6 - .8	.5 - .7	.6 - .8				
		9.6		.1 - .3	.2 - .3	.2 - .3	.2 - .3	.2 - .3	.55 - .75	.4 - .6	.55 - .75				
36	914	6.0	300 (4.4)	.3 - .5	.4 - .5	.4 - .5	.4 - .5	.4 - .5	.6 - .8	.55 - .65	.6 - .8				
		7.2		.2 - .4	.25 - .35	.25 - .35	.25 - .35	.25 - .35	.55 - .75	.45 - .65	.55 - .75				
		8.4		.1 - .3	.15 - .25	.15 - .25	.15 - .25	.15 - .25	.5 - .7	.4 - .6	.5 - .7				
		9.6		.05 - .1	.05 - .1	.05 - .1	.05 - .1	.05 - .1	.3 - .5	.35 - .55	.3 - .5				
42	1067	7.2	250 (3.7)	.2 - .4	.3 - .4	.3 - .4	.3 - .4	.4 - .6	.45 - .65	.45 - .65	.45 - .65	.8 - 1.0	.8 - 1.0	.8 - 1.0	
		8.4		.1 - .3	.15 - .35	.15 - .35	.15 - .35	.35 - .55	.4 - .6	.4 - .6	.4 - .6	.7 - .9	.7 - .9	.7 - .9	
		9.6		.05 - .2	.05 - .3	.05 - .3	.05 - .3	.3 - .5	.35 - .55	.35 - .55	.35 - .55	.6 - .8	.6 - .8	.6 - .8	
		10.8		.05 - .1	.05 - .2	.05 - .2	.05 - .2	.25 - .5	.3 - .5	.3 - .5	.3 - .5	.5 - .7	.5 - .7	.5 - .7	
48	1219	8.4	250 (3.7)	.1 - .3	.15 - .35	.15 - .35	.15 - .35	.2 - .4	.25 - .45	.25 - .45	.25 - .45	.7 - .9	.7 - .9	.7 - .9	
		9.6		.05 - .1	.05 - .2	.05 - .2	.05 - .2	.15 - .35	.2 - .4	.2 - .4	.2 - .4	.6 - .8	.6 - .8	.6 - .8	.65 - .85
		10.8		.03 - .1	.03 - .1	.03 - .1	.03 - .1	.1 - .3	.15 - .35	.15 - .35	.15 - .35	.5 - .7	.5 - .7	.5 - .7	.55 - .75
		12		.01 - .05	.01 - .05	.01 - .5	.01 - .5	.08 - .25	.1 - .3	.1 - .3	.1 - .3	.4 - .6	.4 - .6	.4 - .6	.45 - .65
52	1321	10.8	250 (3.7)							.025 - .1	.025 - .1	.65 - .85	.65 - .85	.65 - .85	.7 - .9
		12								.02 - .07	.02 - .07	.55 - .75	.55 - .75	.55 - .75	.6 - .8
		13.2								.01 - .05	.01 - .05	.45 - .65	.45 - .65	.45 - .65	.5 - .7
54	1372	10.8	250 (3.7)							.02 - .1	.025 - .1	.45 - .65	.45 - .65	.45 - .65	.55 - .75
		12								.02 - .07	.02 - .07	.35 - .55	.35 - .55	.35 - .55	.4 - .6
		13.2								.01 - .05	.01 - .05	.25 - .45	.25 - .45	.25 - .45	.3 - .5
		14.4								.01 - .04	.01 - .04	.2 - .4	.2 - .4	.2 - .4	.25 - .45
60	1524	10.8	250 (3.7)									.45 - .65	.45 - .65	.45 - .65	.5 - .7
		12										.35 - .55	.35 - .55	.35 - .55	.4 - .6
		13.2										.25 - .45	.25 - .45	.25 - .45	.3 - .5
		14.4										.15 - .35	.15 - .35	.15 - .35	.2 - .4
63	1600	10.8	250 (3.7)									.4 - .6	.4 - .6	.4 - .6	.45 - .65
		12										.3 - .5	.3 - .5	.3 - .5	.35 - .55
		13.2										.2 - .4	.2 - .4	.2 - .4	.25 - .45
		14.4										.1 - .3	.1 - .3	.1 - .3	.15 - .35

Note: For Small Diameters and Cold temperatures additional pressure may be needed to fully calibrate the Liner. Liner must have full safety caps and be monitored at all times if exceeding the operating pressure. Pressure should be increased at 50mb increments with 3-5min delay at each step until calibration is achieved. Pressure should then be reduced incrementally to the specified operating pressure.

To determine Bulb Start-up/Shutdown spacing use the following calculation;

(Length of Train/Pull Speed)/Number of Bulbs = Startup Delay

"Length of Train" = distance from 1st Bulb Center to Last Bulb Center
"Pull Speed" = lowest number in range from Table
"Start-up Delay" = time in seconds between each bulb ignition and shutdown

Once all bulbs are lit wait one additional delay period then proceed at .5 meters/minute for .5 meters

For Spacing on large cores use center of bulb group for length and the number of cores for Bulb Count in the Start-up/Shutdown Calculation

Refer to Omega Installation Manual on proper use of this table. This table represents estimated curing speeds, However IR sensor readings must be used to monitor curing and speeds adjusted accordingly. This table is inteded for use with Omega Liner Company Products and may not be applicable to other vendors products.

Recommended for this size | Not ideal for this size, consider a larger train | This application may cause excessive heating of inner foil consider a lower wattage

For large diameters over 52" particular care should be taken to ensure IR sensors face towards the pipe surface furthest from the bulbs if not running centered in pipe. This will ensure the most accurate feedback of state of liner cure.

For unusual shapes such as eggs, Ovals or archs, use largest dimension of pipe to select curing speed. For oversizes in large elipses and Arches, use closest listed size and use 60- 80% of indicated speed as a guideline. Additionally perform a thump test on starting bell to verify intended pulling speeds.

Whenever curing pipes that fall outside of the settings in this table please contact omega for guidance on recommended settings.

Omega Liner Curing Guidelines

Diameter (in)	Diameter (mm)	Thickness (mm)	Operating pressure at least mbar (psi)	Chain 8 x 400	Chain 8 x 600 8 x 650	LS Chain 10 x 650	Chain 12 x 400	Chain 6 x 1000	Chain 9 x 1000	LS Core Chain 5 x 2000	Double Core 2 x 4000	Double Core 3 x 4000	Prokassro Super Core 2 x 6000	IBG Super Core 1 x 12000	IST Super Core 3 x 6000
				Curing Speed Range Feet / Minute											
6	152	2.4	550 (8.0)	4.7 - 5.3	6 - 7	6 - 7	6 - 7								
		3.6		4.3 - 5	5.3 - 6	5.3 - 6	5.3 - 6								
		4.8		4 - 1.4	4.7 - 5.3	4.7 - 5.3	4.7 - 5.3								
8	203	2.4	550 (8.0)	4.3 - 5	6 - 6.6	6 - 6.6	6 - 6.6								
		3.6		4 - 4.7	5 - 5.7	5 - 5.7	5 - 5.7								
		4.8		3.3 - 4	4.3 - 5	4.3 - 5	4.3 - 5								
		6.0		3 - 3.7	3.7 - 4.3	3.7 - 4.3	3.7 - 4.3								
10	254	2.4	500 (7.25)	4 - 4.7	5.7 - 6.3	5.7 - 6.3	5.7 - 6.3								
		3.6		3.3 - 4	5 - 5.7	5 - 5.7	5 - 5.7								
		4.8		3 - 3.7	4.3 - 5	4.3 - 5	4.3 - 5								
		6.0		2.7 - 3.3	3.7 - 4.3	3.7 - 4.3	3.7 - 4.3								
12	305	3.6	500 (7.25)	3.3 - 4	3.7 - 4.3	3.7 - 4.3	3.7 - 4.3								
		4.8		2.7 - 3.3	3 - 3.7	3 - 3.7	3 - 3.7								
		6.0		2.4 - 3	2.7 - 3.3	2.7 - 3.3	2.7 - 3.3								
15	381	3.6	500 (7.25)	2.7 - 3.3	3 - 3.7	3 - 3.7	3 - 3.7								
		4.8		2.4 - 3	2.7 - 3.3	2.7 - 3.3	2.7 - 3.3								
		6.0		1.7 - 2.4	2 - 2.7	2 - 2.7	2 - 2.7								
16	406	4.8	500 (7.25)	2.4 - 3	2.7 - 3.3	2.7 - 3.3	2.7 - 3.3								
		6.0		1.7 - 2.4	2 - 2.7	2 - 2.7	2 - 2.7								
18	457	4.8	450 (6.5)	2 - 2.5	2.4 - 2.9	2.4 - 2.9	2.4 - 2.9								
		6.0		1.7 - 214.5	2 - 2.5	2 - 2.5	2 - 2.5								
20	508	4.8	400 (5.8)	1.7 - 2.2	2 - 2.5	2 - 2.5	2 - 2.5								
		6.0		1.4 - 1.9	1.7 - 2.2	1.7 - 2.2	1.7 - 2.2								
		7.2		1 - 1.5	1.4 - 1.9	1.4 - 1.9	1.4 - 1.9								
21	533	4.8	400 (5.8)	1.7 - 2.2	2 - 2.5	2 - 2.5	2 - 2.5								
		6.0		1.4 - 1.9	1.7 - 2.2	1.7 - 2.2	1.7 - 2.2								
		7.2		1 - 1.5	1.4 - 1.9	1.4 - 1.9	1.4 - 1.9								
24	610	4.8	350 (5.0)	2.4 - 3	2.7 - 3.3	2.7 - 3.3	2.7 - 3.3	2.7 - 3.3	3.7 - 4.3	3.7 - 4.3	3.7 - 4.3				
		6.0		2.2 - 2.9	2.5 - 3.2	2.5 - 3.2	2.5 - 3.2	2.5 - 3.2	3.3 - 4	3.3 - 4	3.3 - 4				
		7.2		2 - 2.7	2.4 - 3	2.4 - 3	2.4 - 3	2.4 - 3	3 - 3.7	3 - 3.7	3 - 3.7				
		8.4		1.9 - 2.5	2.2 - 2.9	2.2 - 2.9	2.2 - 2.9	2.2 - 2.9	2.7 - 3.3	2.7 - 3.3	2.7 - 3.3				
		9.6		1.5 - 2.2	1.9 - 2.5	1.9 - 2.5	1.9 - 2.5	1.9 - 2.5	2.4 - 3	2.4 - 3	2.4 - 3				
		10.8		1.2 - 1.9	1.5 - 2.2	1.5 - 2.2	1.5 - 2.2	1.5 - 2.2	2 - 2.7	2 - 2.7	2 - 2.7				
27	686	6.0	350 (5.0)	1.4 - 2	1.7 - 2.7	1.7 - 2.7	1.7 - 2.7	1.7 - 2.4	2.5 - 3.2	2.4 - 3	2.5 - 3.2				
		7.2		1 - 1.7	1.4 - 2	1.4 - 2	1.4 - 2	1.4 - 2	2.4 - 3	2 - 2.7	2.4 - 3				
		8.4		0.7 - 1.4	1 - 1.7	1 - 1.7	1 - 1.7	1 - 1.7	2.2 - 2.9	1.7 - 2.4	2.2 - 2.9				
30	762	6.0	300 (4.4)	1.4 - 2	1.7 - 2.4	1.7 - 2.4	1.7 - 2.4	1.7 - 2.4	2.4 - 3	2.4 - 3	2.4 - 3				
		7.2		1 - 1.7	1.4 - 2	1.4 - 2	1.4 - 2	1.4 - 2	2.2 - 2.9	2 - 2.7	2.2 - 2.9				
		8.4		0.7 - 1.4	1 - 1.7	1 - 1.7	1 - 1.7	1 - 1.7	2 - 2.7	1.7 - 2.4	2 - 2.7				
		9.6		0.4 - 1	0.7 - 1	0.7 - 1	0.7 - 1	0.7 - 1	1.9 - 2.5	1.4 - 2	1.9 - 2.5				
36	914	6.0	300 (4.4)	1 - 1.7	1.4 - 1.7	1.4 - 1.7	1.4 - 1.7	1.4 - 1.7	2 - 2.7	1.9 - 2.2	2 - 2.7				
		7.2		0.7 - 1.4	0.9 - 1.2	0.9 - 1.2	0.9 - 1.2	0.9 - 1.2	1.9 - 2.5	1.5 - 2.2	1.9 - 2.5				
		8.4		0.4 - 1	0.5 - 0.9	0.5 - 0.9	0.5 - 0.9	0.5 - 0.9	1.7 - 2.4	1.4 - 2	1.7 - 2.4				
		9.6		0.2 - 0.4	0.2 - 0.4	0.2 - 0.4	0.2 - 0.4	0.2 - 0.4	1 - 1.7	1.2 - 1.9	1 - 1.7				
42	1067	7.2	250 (3.7)	0.7 - 1.4	1 - 1.4	1 - 1.4	1 - 1.4	1.4 - 2	1.5 - 2.2	1.5 - 2.2	1.5 - 2.2	2.7 - 3.3	2.7 - 3.3	2.7 - 3.3	
		8.4		0.4 - 1	0.5 - 1.2	0.5 - 1.2	0.5 - 1.2	1.2 - 1.9	1.4 - 2	1.4 - 2	1.4 - 2	2.4 - 3	2.4 - 3	2.4 - 3	
		9.6		0.2 - 0.7	0.2 - 1	0.2 - 1	0.2 - 1	1 - 1.7	1.2 - 1.9	1.2 - 1.9	1.2 - 1.9	2 - 2.7	2 - 2.7	2 - 2.7	
		10.8		0.2 - 0.4	0.2 - 0.7	0.2 - 0.7	0.2 - 0.7	0.9 - 1.7	1 - 1.7	1 - 1.7	1 - 1.7	1.7 - 2.4	1.7 - 2.4	1.7 - 2.4	
48	1219	8.4	250 (3.7)	0.4 - 1	0.5 - 1.2	0.5 - 1.2	0.5 - 1.2	0.7 - 1.4	0.9 - 1.5	0.9 - 1.5	0.9 - 1.5	2.4 - 3	2.4 - 3	2.4 - 3	
		9.6		0.2 - 0.4	0.2 - 0.7	0.2 - 0.7	0.2 - 0.7	0.5 - 1.2	0.7 - 1.4	0.7 - 1.4	0.7 - 1.4	2 - 2.7	2 - 2.7	2 - 2.7	2.2 - 2.9
		10.8		0.1 - 0.4	0.1 - 0.4	0.1 - 0.4	0.1 - 0.4	0.4 - 1	0.5 - 1.2	0.5 - 1.2	0.5 - 1.2	1.7 - 2.4	1.7 - 2.4	1.7 - 2.4	1.9 - 2.5
		12		0.1 - 0.2	0.1 - 0.2	0.1 - 1.7	0.1 - 1.7	0.3 - 0.9	0.4 - 1	0.4 - 1	0.4 - 1	1.4 - 2	1.4 - 2	1.4 - 2	1.5 - 2.2
52	1321	10.8	250 (3.7)							0.1 - 0.4	0.1 - 0.4	2.2 - 2.9	2.2 - 2.9	2.2 - 2.9	2.4 - 3
		12								0.1 - 0.3	0.1 - 0.3	1.9 - 2.5	1.9 - 2.5	1.9 - 2.5	2 - 2.7
		13.2								0.1 - 0.2	0.1 - 0.2	1.5 - 2.2	1.5 - 2.2	1.5 - 2.2	1.7 - 2.4
54	1372	10.8	250 (3.7)							0.1 - 0.4	0.1 - 0.4	1.5 - 2.2	1.5 - 2.2	1.5 - 2.2	1.9 - 2.5
		12								0.1 - 0.3	0.1 - 0.3	1.2 - 1.9	1.2 - 1.9	1.2 - 1.9	1.4 - 2
		13.2								0.1 - 0.2	0.1 - 0.2	0.9 - 1.5	0.9 - 1.5	0.9 - 1.5	1 - 1.7
		14.4								0.1 - 0.2	0.1 - 0.2	0.7 - 1.4	0.7 - 1.4	0.7 - 1.4	0.9 - 1.5
60	1524	10.8	250 (3.7)									1.5 - 2.2	1.5 - 2.2	1.5 - 2.2	1.7 - 2.4
		12										1.2 - 1.9	1.2 - 1.9	1.2 - 1.9	1.4 - 2
		13.2										0.9 - 1.5	0.9 - 1.5	0.9 - 1.5	1 - 1.7
		14.4										0.5 - 1.2	0.5 - 1.2	0.5 - 1.2	0.7 - 1.4
63	1600	10.8	250 (3.7)									1.4 - 2	1.4 - 2	1.4 - 2	1.5 - 2.2
		12										1 - 1.7	1 - 1.7	1 - 1.7	1.2 - 1.9
		13.2										0.7 - 1.4	0.7 - 1.4	0.7 - 1.4	0.9 - 1.5
		14.4										0.4 - 1	0.4 - 1	0.4 - 1	0.5 - 1.2

Note: For Small Diameters and Cold temperatures additional pressure may be needed to fully calibrate the Liner. Liner must have full safety caps and be monitored at all times if exceeding the operating pressure. Pressure should be increased at 50mb increments with 3-5min delay at each step until calibration is achieved. Pressure should then be reduced incrementally to the specified operating pressure.

To determine Bulb Start-up/Shutdown spacing use the following calculation;

(Length of Train/Pull Speed)/Number of Bulbs = Startup Delay

"Length of Train" = distance from 1st Bulb Center to Last Bulb Center
"Pull Speed" = lowest number in range from Table
"Start-up Delay" = time in seconds between each bulb ignition and shutdown

Once all bulbs are lit wait one additional delay period then proceed at 1.5 feet/minute for 1.5 feet

For Spacing on large cores use center of bulb group for length and the number of cores for Bulb Count in the Start-up/Shutdown Calculation

Refer to Omega Installation Manual on proper use of this table. This table represents estimated curing speeds, However IR sensor readings must be used to monitor curing and speeds adjusted accordingly. This table is inteded for use with Omega Liner Company Products and may not be applicable to other vendors products.

Recommended for this size | Not ideal for this size, consider a larger train | This application may cause excessive heating of inner foil consider a lower wattage

For large diameters over 52" particular care should be taken to ensure IR sensors face towards the pipe surface furthest from the bulbs if not running centered in pipe. This will ensure the most accurate feedback of state of liner cure.

For unusual shapes such as eggs, Ovals or archs, use largest dimension of pipe to select curing speed. For oversizes in large elipses and Arches, use closest listed size and use 60- 80% of indicated speed as a guideline. Additionally perform a thump test on starting bell to verify intended pulling speeds.

Whenever curing pipes that fall outside of the settings in this table please contact omega for guidance on recommended settings.

Omega Liner Company
Quality System Overview

QUALITY SYSTEMS REGISTRARS, INC.

CERTIFICATE OF REGISTRATION

This is to certify that the management system of:

Omega Liner Company

Client Number: 2019-038
515 Noid Road
Canton, SD 57013

Has been assessed and certified as meeting the requirements of:

ISO 9001:2015

This certificate of registration remains valid subject to satisfactory surveillance audits for the following activities:

Sales and customer service, purchasing, receiving, manufacturing, warehousing and distribution of underground liners.

Standard	***Certificate Number***	***Certified Since***
ISO 9001:2015	QSR-1135	8/23/2019

Date Issued	***Certification Date***	***Valid Until***
7/7/2020	8/23/2019	8/22/2022

CAROL L. TILLMAN
VICE PRESIDENT

ANAB ACCREDITED ISO/IEC 17021 MANAGEMENT SYSTEMS CERTIFICATION BODY

INTERNATIONAL ACCREDITATION FORUM IAF

5045 HIGHWAY 162, HOLLYWOOD, SOUTH CAROLINA 29449 | (703) 478-0241 | QSR.COM

APPENDIX G -
MCTATPH DATA WORKSHEETS

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 09/21/23
Site Name: P66 Oily Water Sewer
Sample Name: B-1-23 7.5ft

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6	0.641	2.03%
AL_EC >6-8	0.274	0.87%
AL_EC >8-10	0.73	2.31%
AL_EC >10-12	2.34	7.42%
AL_EC >12-16	1	3.17%
AL_EC >16-21	1.99	6.31%
AL_EC >21-34	7.47	23.69%
AR_EC >8-10	0.382	1.21%
AR_EC >10-12	0.22	0.70%
AR_EC >12-16	1.15	3.65%
AR_EC >16-21	5.29	16.77%
AR_EC >21-34	9.99	31.68%
Benzene	0.00054	0.00%
Toluene	0.00267	0.01%
Ethylbenzene	0.00054	0.00%
Total Xylenes	0.0016	0.01%
Naphthalene	0.0053	0.02%
1-Methyl Naphthalene	0.0053	0.02%
2-Methyl Naphthalene	0.0053	0.02%
n-Hexane		0.00%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene	0.0053	0.02%
Benzo(b)fluoranthene	0.0053	0.02%
Benzo(k)fluoranthene	0.0053	0.02%
Benzo(a)pyrene	0.0053	0.02%
Chrysene	0.0053	0.02%
Dibenz(a,h)anthracene	0.0053	0.02%
Indeno(1,2,3-cd)pyrene	0.0053	0.02%
Sum	31.53535	100.00%

Notes for Data Entry | Set Default Hydrogeology

Clear All Soil Concentration Data Entry Cells

Restore All Soil Concentration Data cleared previously

REMARK:
Enter site-specific information here……..

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.43	Unitless
Volumetric water content:	0.3	Unitless
Volumetric air content:	0.13	Unitless
Soil bulk density measured:	1.5	kg/L
Fraction Organic Carbon:	0.002	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here: 500 ug/L

A2 Soil Cleanup Levels: Calculation and Summary of Results. Refer to WAC 173-340-720, 740, 745, 747, 750

Site Information

Date: 9/21/2023
Site Name: P66 Oily Water Sewer
Sample Name: B-1-23 7.5ft
Measured Soil TPH Concentration, mg/kg: **31.535**

1. Summary of Calculation Results

Exposure Pathway	Method/Goal	Protective Soil TPH Conc, mg/kg	With Measured Soil Conc		Does Measured Soil Conc Pass or Fail?
			RISK @	HI @	
Protection of Soil Direct Contact: Human Health	Method B	2,288	1.08E-08	1.38E-02	Pass
	Method C	32,896	2.68E-09	9.59E-04	Pass
Protection of Method B Ground Water Quality (Leaching)	Potable GW: Human Health Protection	100% NAPL	1.31E-07	4.86E-02	Pass
	Target TPH GW Conc. @ 500 ug/L	100% NAPL	NA	NA	Pass

2. Results for Protection of Soil Direct Contact Pathway: Human Health

	Method B: Unrestricted Land Use	Method C: Industrial Land Use
Protective Soil Concentration, TPH mg/kg	**2,288.00**	**32,896.34**
Most Stringent Criterion	**HI =1**	**HI =1**

Soil Criteria	Protective Soil Concentration @Method B				Protective Soil Concentration @Method C			
	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @
HI =1	YES	2.29E+03	7.84E-07	1.00E+00	YES	3.29E+04	2.80E-06	1.00E+00
Total Risk=1E-5	*NO*	2.92E+04	1.00E-05	1.28E+01	*NO*	1.18E+05	1.00E-05	3.58E+00
Risk of Benzene= 1E-6	*NO*	1.06E+06	3.63E-04	4.64E+02	NA			
Risk of cPAHs mixture= 1E-6	*NO*	2.98E+03	1.02E-06	1.30E+00				
EDB	NA	NA	NA	NA				
EDC	NA	NA	NA	NA				

3. Results for Protection of Ground Water Quality (Leaching Pathway)

3.1. Protection of Potable Ground Water Quality (Method B): Human Health Protection

Most Stringent Criterion	**NA**
Protective Ground Water Concentration, ug/L	**NA**
Protective Soil Concentration, mg/kg	**Soil-to-Ground Water is not a critical pathway!**

Ground Water Criteria	Protective Potable Ground Water Concentration @Method B				Protective Soil Conc, mg/kg
	Most Stringent?	TPH Conc, ug/L	RISK @	HI @	
HI=1	YES	2.23E+02	5.40E-06	3.69E-01	100% NAPL
Total Risk = 1E-5	YES	2.23E+02	5.40E-06	3.69E-01	100% NAPL
Total Risk = 1E-6	YES	1.11E+02	1.00E-06	1.69E-01	3.13E+02
Risk of cPAHs mixture= 1E-5	YES	2.23E+02	5.40E-06	3.69E-01	100% NAPL
Benzene MCL = 5 ug/L	YES	2.23E+02	5.40E-06	3.69E-01	100% NAPL
MTBE = 20 ug/L	NA	NA	NA	NA	NA

Note: 100% NAPL is 83000 mg/kg TPH.

3.2 Protection of Ground Water Quality for TPH Ground Water Concentration previously adjusted and entered

Ground Water Criteria	Protective Ground Water Concentration			Protective Soil Conc, mg/kg
	TPH Conc, ug/L	Risk @	HI @	
Target TPH GW Conc = 500 ug/L	2.23E+02	5.40E-06	3.69E-01	**100% NAPL**

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 09/20/23
Site Name: P66 Oily Water Sewer
Sample Name: B-2-23 7.0ft

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6	1.48	3.04%
AL_EC >6-8	2.65	5.45%
AL_EC >8-10	0.7	1.44%
AL_EC >10-12	1.48	3.04%
AL_EC >12-16	2.24	4.61%
AL_EC >16-21	2.22	4.57%
AL_EC >21-34	7.69	15.82%
AR_EC >8-10	2	4.11%
AR_EC >10-12	1.87	3.85%
AR_EC >12-16	4.09	8.41%
AR_EC >16-21	10.2	20.98%
AR_EC >21-34	10.8	22.22%
Benzene	0.0858	0.18%
Toluene	0.345	0.71%
Ethylbenzene	0.121	0.25%
Total Xylenes	0.527	1.08%
Naphthalene	0.0125	0.03%
1-Methyl Naphthalene	0.016	0.03%
2-Methyl Naphthalene	0.0425	0.09%
n-Hexane		0.00%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene	0.00595	0.01%
Benzo(b)fluoranthene	0.00595	0.01%
Benzo(k)fluoranthene	0.00595	0.01%
Benzo(a)pyrene	0.00595	0.01%
Chrysene	0.00595	0.01%
Dibenz(a,h)anthracene	0.00595	0.01%
Indeno(1,2,3-cd)pyrene	0.00595	0.01%
Sum	48.61145	100.00%

Notes for Data Entry | Set Default Hydrogeology

Clear All Soil Concentration Data Entry Cells

Restore All Soil Concentration Data cleared previously

REMARK:
Enter site-specific information here……..

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.43	Unitless
Volumetric water content:	0.3	Unitless
Volumetric air content:	0.13	Unitless
Soil bulk density measured:	1.5	kg/L
Fraction Organic Carbon:	0.002	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here:	500	ug/L

A2 Soil Cleanup Levels: Calculation and Summary of Results. Refer to WAC 173-340-720, 740, 745, 747, 750

Site Information

Date: 9/20/2023
Site Name: P66 Oily Water Sewer
Sample Name: B-2-23 7.0ft
Measured Soil TPH Concentration, mg/kg: **48.611**

1. Summary of Calculation Results

Exposure Pathway	Method/Goal	Protective Soil TPH Conc, mg/kg	With Measured Soil Conc		Does Measured Soil Conc Pass or Fail?
			RISK @	HI @	
Protection of Soil Direct Contact: Human Health	Method B	2,482	1.72E-08	1.96E-02	Pass
	Method C	35,584	3.73E-09	1.37E-03	Pass
Protection of Method B Ground Water Quality (Leaching)	Potable GW: Human Health Protection	19	1.59E-05	6.58E-01	Fail
	Target TPH GW Conc. @ 500 ug/L	199	NA	NA	Pass

2. Results for Protection of Soil Direct Contact Pathway: Human Health

	Method B: Unrestricted Land Use	Method C: Industrial Land Use
Protective Soil Concentration, TPH mg/kg	**2,482.31**	**35,584.00**
Most Stringent Criterion	**HI =1**	**HI =1**

Soil Criteria	Protective Soil Concentration @Method B				Protective Soil Concentration @Method C			
	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @
HI =1	YES	2.48E+03	8.79E-07	1.00E+00	YES	3.56E+04	2.73E-06	1.00E+00
Total Risk=1E-5	*NO*	2.82E+04	1.00E-05	1.14E+01	*NO*	1.30E+05	1.00E-05	3.66E+00
Risk of Benzene= 1E-6	*NO*	1.03E+04	3.64E-06	4.15E+00	NA			
Risk of cPAHs mixture= 1E-6	*NO*	4.09E+03	1.45E-06	1.65E+00				
EDB	NA	NA	NA	NA				
EDC	NA	NA	NA	NA				

3. Results for Protection of Ground Water Quality (Leaching Pathway)

3.1. Protection of Potable Ground Water Quality (Method B): Human Health Protection

Most Stringent Criterion	**Benzene MCL = 5 ug/L**
Protective Ground Water Concentration, ug/L	**77.82**
Protective Soil Concentration, mg/kg	**19.10**

Ground Water Criteria	Protective Potable Ground Water Concentration @Method B				Protective Soil Conc, mg/kg
	Most Stringent?	TPH Conc, ug/L	RISK @	HI @	
HI=1	*NO*	2.63E+02	2.51E-05	1.00E+00	7.79E+01
Total Risk = 1E-5	*NO*	1.19E+02	1.00E-05	4.28E-01	3.03E+01
Total Risk = 1E-6	YES	1.28E+01	1.00E-06	4.50E-02	3.01E+00
Risk of cPAHs mixture= 1E-5	*NO*	1.38E+03	4.47E-04	1.26E+01	100% NAPL
Benzene MCL = 5 ug/L	YES	7.78E+01	6.32E-06	2.77E-01	1.91E+01
MTBE = 20 ug/L	NA	NA	NA	NA	NA

Note: 100% NAPL is 82000 mg/kg TPH.

3.2 Protection of Ground Water Quality for TPH Ground Water Concentration previously adjusted and entered

Ground Water Criteria	Protective Ground Water Concentration			Protective Soil Conc, mg/kg
	TPH Conc, ug/L	Risk @	HI @	
Target TPH GW Conc = 500 ug/L	5.00E+02	5.98E-05	2.17E+00	**1.99E+02**

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 09/21/23
Site Name: P66 Oily Water Sewer
Sample Name: B-3-23 7.0ft

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6	1.14	0.95%
AL_EC >6-8	0.3	0.25%
AL_EC >8-10	0.422	0.35%
AL_EC >10-12	26.8	22.38%
AL_EC >12-16	26.8	22.38%
AL_EC >16-21	35.6	29.73%
AL_EC >21-34	9.22	7.70%
AR_EC >8-10	0.845	0.71%
AR_EC >10-12	0.482	0.40%
AR_EC >12-16	3.57	2.98%
AR_EC >16-21	3.37	2.81%
AR_EC >21-34	11.1	9.27%
Benzene	0.000615	0.00%
Toluene	0.00307	0.00%
Ethylbenzene	0.000615	0.00%
Total Xylenes	0.00184	0.00%
Naphthalene	0.00625	0.01%
1-Methyl Naphthalene	0.00625	0.01%
2-Methyl Naphthalene	0.00625	0.01%
n-Hexane	0.0152	0.01%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene	0.00625	0.01%
Benzo(b)fluoranthene	0.00625	0.01%
Benzo(k)fluoranthene	0.00625	0.01%
Benzo(a)pyrene	0.00625	0.01%
Chrysene	0.00625	0.01%
Dibenz(a,h)anthracene	0.00625	0.01%
Indeno(1,2,3-cd)pyrene	0.00625	0.01%
Sum	119.73284	100.00%

Notes for Data Entry | Set Default Hydrogeology

Clear All Soil Concentration Data Entry Cells

Restore All Soil Concentration Data cleared previously

REMARK:
Enter site-specific information here……..

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.43	Unitless
Volumetric water content:	0.3	Unitless
Volumetric air content:	0.13	Unitless
Soil bulk density measured:	1.5	kg/L
Fraction Organic Carbon:	0.002	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here:	500	ug/L

A2 Soil Cleanup Levels: Calculation and Summary of Results. Refer to WAC 173-340-720, 740, 745, 747, 750

Site Information

Date: 9/21/2023
Site Name: P66 Oily Water Sewer
Sample Name: B-3-23 7.0ft
Measured Soil TPH Concentration, mg/kg: **119.733**

1. Summary of Calculation Results

Exposure Pathway	Method/Goal	Protective Soil TPH Conc, mg/kg	With Measured Soil Conc		Does Measured Soil Conc Pass or Fail?
			RISK @	HI @	
Protection of Soil Direct Contact: Human Health	Method B	1,473	1.27E-08	8.13E-02	Pass
	Method C	27,396	3.16E-09	4.37E-03	Pass
Protection of Method B Ground Water Quality (Leaching)	Potable GW: Human Health Protection	100% NAPL	1.35E-07	4.98E-02	Pass
	Target TPH GW Conc. @ 500 ug/L	100% NAPL	NA	NA	Pass

2. Results for Protection of Soil Direct Contact Pathway: Human Health

	Method B: Unrestricted Land Use	Method C: Industrial Land Use
Protective Soil Concentration, TPH mg/kg	**1,473.29**	**27,396.25**
Most Stringent Criterion	**HI =1**	**HI =1**

Soil Criteria	Protective Soil Concentration @Method B				Protective Soil Concentration @Method C			
	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @
HI =1	YES	1.47E+03	1.57E-07	1.00E+00	YES	2.74E+04	7.23E-07	1.00E+00
Total Risk=1E-5	*NO*	9.40E+04	1.00E-05	6.38E+01	*NO*	3.79E+05	1.00E-05	1.38E+01
Risk of Benzene= 1E-6	*NO*	3.54E+06	3.76E-04	2.40E+03	NA			
Risk of cPAHs mixture= 1E-6	*NO*	9.60E+03	1.02E-06	6.52E+00				
EDB	NA	NA	NA	NA				
EDC	NA	NA	NA	NA				

3. Results for Protection of Ground Water Quality (Leaching Pathway)

3.1. Protection of Potable Ground Water Quality (Method B): Human Health Protection

Most Stringent Criterion	**NA**
Protective Ground Water Concentration, ug/L	**NA**
Protective Soil Concentration, mg/kg	**Soil-to-Ground Water is not a critical pathway!**

Ground Water Criteria	Protective Potable Ground Water Concentration @Method B				Protective Soil Conc, mg/kg
	Most Stringent?	TPH Conc, ug/L	RISK @	HI @	
HI=1	YES	1.10E+02	1.54E-06	1.57E-01	100% NAPL
Total Risk = 1E-5	YES	1.10E+02	1.54E-06	1.57E-01	100% NAPL
Total Risk = 1E-6	YES	9.79E+01	1.00E-06	1.34E-01	2.53E+03
Risk of cPAHs mixture= 1E-5	YES	1.10E+02	1.54E-06	1.57E-01	100% NAPL
Benzene MCL = 5 ug/L	YES	1.10E+02	1.54E-06	1.57E-01	100% NAPL
MTBE = 20 ug/L	NA	NA	NA	NA	NA

Note: 100% NAPL is 70000 mg/kg TPH.

3.2 Protection of Ground Water Quality for TPH Ground Water Concentration previously adjusted and entered

Ground Water Criteria	Protective Ground Water Concentration			Protective Soil Conc, mg/kg
	TPH Conc, ug/L	Risk @	HI @	
Target TPH GW Conc = 500 ug/L	1.10E+02	1.54E-06	1.57E-01	**100% NAPL**

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 09/20/23
Site Name: P66 Oily Water Sewer
Sample Name: B-4-23 9.0ft

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6	0.574	1.77%
AL_EC >6-8	0.258	0.79%
AL_EC >8-10	0.69	2.12%
AL_EC >10-12	0.182	0.56%
AL_EC >12-16	1.04	3.20%
AL_EC >16-21	2.08	6.40%
AL_EC >21-34	8.09	24.88%
AR_EC >8-10	0.591	1.82%
AR_EC >10-12	0.207	0.64%
AR_EC >12-16	1.19	3.66%
AR_EC >16-21	7.87	24.20%
AR_EC >21-34	9.68	29.77%
Benzene	0.00159	0.00%
Toluene	0.00303	0.01%
Ethylbenzene	0.000605	0.00%
Total Xylenes	0.00182	0.01%
Naphthalene	0.00605	0.02%
1-Methyl Naphthalene	0.00605	0.02%
2-Methyl Naphthalene	0.00605	0.02%
n-Hexane	0.000605	0.00%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene	0.00605	0.02%
Benzo(b)fluoranthene	0.00605	0.02%
Benzo(k)fluoranthene	0.00605	0.02%
Benzo(a)pyrene	0.00605	0.02%
Chrysene	0.00605	0.02%
Dibenz(a,h)anthracene	0.00605	0.02%
Indeno(1,2,3-cd)pyrene	0.00605	0.02%
Sum	32.52015	100.00%

Notes for Data Entry | Set Default Hydrogeology
Clear All Soil Concentration Data Entry Cells
Restore All Soil Concentration Data cleared previously

REMARK:
Enter site-specific information here……..

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.43	Unitless
Volumetric water content:	0.3	Unitless
Volumetric air content:	0.13	Unitless
Soil bulk density measured:	1.5	kg/L
Fraction Organic Carbon:	0.002	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here:	500	ug/L

A2 Soil Cleanup Levels: Calculation and Summary of Results. Refer to WAC 173-340-720, 740, 745, 747, 750

Site Information

Date: 9/20/2023
Site Name: P66 Oily Water Sewer
Sample Name: B-4-23 9.0ft
Measured Soil TPH Concentration, mg/kg: **32.520**

1. Summary of Calculation Results

Exposure Pathway	Method/Goal	Protective Soil TPH Conc, mg/kg	With Measured Soil Conc		Does Measured Soil Conc Pass or Fail?
			RISK @	HI @	
Protection of Soil Direct Contact: Human Health	Method B	2,634	1.24E-08	1.23E-02	Pass
	Method C	34,877	3.07E-09	9.32E-04	Pass
Protection of Method B Ground Water Quality (Leaching)	Potable GW: Human Health Protection	1,129	3.29E-07	6.30E-02	Pass
	Target TPH GW Conc. @ 500 ug/L	100% NAPL	NA	NA	Pass

2. Results for Protection of Soil Direct Contact Pathway: Human Health

	Method B: Unrestricted Land Use	Method C: Industrial Land Use
Protective Soil Concentration, TPH mg/kg	**2,634.45**	**34,877.14**
Most Stringent Criterion	**HI =1**	**HI =1**

Soil Criteria	Protective Soil Concentration @Method B				Protective Soil Concentration @Method C			
	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @
HI =1	YES	2.63E+03	1.00E-06	1.00E+00	YES	3.49E+04	3.29E-06	1.00E+00
Total Risk=1E-5	*NO*	2.62E+04	1.00E-05	9.96E+00	*NO*	1.06E+05	1.00E-05	3.04E+00
Risk of Benzene= 1E-6	*NO*	3.71E+05	1.42E-04	1.41E+02	NA			
Risk of cPAHs mixture= 1E-6	*NO*	2.69E+03	1.03E-06	1.02E+00				
EDB	NA	NA	NA	NA				
EDC	NA	NA	NA	NA				

3. Results for Protection of Ground Water Quality (Leaching Pathway)

3.1. Protection of Potable Ground Water Quality (Method B): Human Health Protection

Most Stringent Criterion	**Benzene MCL = 5 ug/L**
Protective Ground Water Concentration, ug/L	**197.88**
Protective Soil Concentration, mg/kg	**1128.86**

Ground Water Criteria	Protective Potable Ground Water Concentration @Method B				Protective Soil Conc, mg/kg
	Most Stringent?	TPH Conc, ug/L	RISK @	HI @	
HI=1	*NO*	2.59E+02	1.53E-05	6.67E-01	100% NAPL
Total Risk = 1E-5	*NO*	2.30E+02	1.00E-05	5.12E-01	2.83E+03
Total Risk = 1E-6	YES	6.71E+01	1.00E-06	1.30E-01	1.04E+02
Risk of cPAHs mixture= 1E-5	*NO*	2.59E+02	1.53E-05	6.67E-01	100% NAPL
Benzene MCL = 5 ug/L	YES	1.98E+02	6.50E-06	3.99E-01	1.13E+03
MTBE = 20 ug/L	NA	NA	NA	NA	NA

Note: 100% NAPL is 85000 mg/kg TPH.

3.2 Protection of Ground Water Quality for TPH Ground Water Concentration previously adjusted and entered

Ground Water Criteria	Protective Ground Water Concentration			Protective Soil Conc, mg/kg
	TPH Conc, ug/L	Risk @	HI @	
Target TPH GW Conc = 500 ug/L	2.59E+02	1.53E-05	6.67E-01	**100% NAPL**

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 09/21/23
Site Name: P66 Oily Water Sewer
Sample Name: B-5-23 8.5ft

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6	0.461	0.33%
AL_EC >6-8	4.47	3.24%
AL_EC >8-10	22	15.97%
AL_EC >10-12	14.3	10.38%
AL_EC >12-16	14.8	10.74%
AL_EC >16-21	11.6	8.42%
AL_EC >21-34	3.45	2.50%
AR_EC >8-10	18.8	13.65%
AR_EC >10-12	11.3	8.20%
AR_EC >12-16	8.03	5.83%
AR_EC >16-21	19	13.79%
AR_EC >21-34	9.45	6.86%
Benzene	0.000595	0.00%
Toluene	0.00299	0.00%
Ethylbenzene	0.000595	0.00%
Total Xylenes	0.00179	0.00%
Naphthalene	0.0214	0.02%
1-Methyl Naphthalene	0.00605	0.00%
2-Methyl Naphthalene	0.0125	0.01%
n-Hexane	0.00595	0.00%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene	0.00605	0.00%
Benzo(b)fluoranthene	0.00605	0.00%
Benzo(k)fluoranthene	0.00605	0.00%
Benzo(a)pyrene	0.00605	0.00%
Chrysene	0.00605	0.00%
Dibenz(a,h)anthracene	0.00605	0.00%
Indeno(1,2,3-cd)pyrene	0.00605	0.00%
Sum	137.75522	100.00%

Notes for Data Entry | Set Default Hydrogeology
Clear All Soil Concentration Data Entry Cells
Restore All Soil Concentration Data cleared previously

REMARK:
Enter site-specific information here……..

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.43	Unitless
Volumetric water content:	0.3	Unitless
Volumetric air content:	0.13	Unitless
Soil bulk density measured:	1.5	kg/L
Fraction Organic Carbon:	0.002	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here:	500	ug/L

A2 Soil Cleanup Levels: Calculation and Summary of Results. Refer to WAC 173-340-720, 740, 745, 747, 750

Site Information

Date: 9/21/2023
Site Name: P66 Oily Water Sewer
Sample Name: B-5-23 8.5ft
Measured Soil TPH Concentration, mg/kg: **137.755**

1. Summary of Calculation Results

Exposure Pathway	Method/Goal	Protective Soil TPH Conc, mg/kg	With Measured Soil Conc		Does Measured Soil Conc Pass or Fail?
			RISK @	HI @	
Protection of Soil Direct Contact: Human Health	Method B	1,439	1.23E-08	9.58E-02	Pass
	Method C	25,544	3.06E-09	5.39E-03	Pass
Protection of Method B Ground Water Quality (Leaching)	Potable GW: Human Health Protection	231	1.28E-07	7.88E-01	Pass
	Target TPH GW Conc. @ 500 ug/L	346	NA	NA	Pass

2. Results for Protection of Soil Direct Contact Pathway: Human Health

	Method B: Unrestricted Land Use	Method C: Industrial Land Use
Protective Soil Concentration, TPH mg/kg	**1,438.68**	**25,543.50**
Most Stringent Criterion	**HI =1**	**HI =1**

Soil Criteria	Protective Soil Concentration @Method B				Protective Soil Concentration @Method C			
	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @
HI =1	YES	1.44E+03	1.29E-07	1.00E+00	YES	2.55E+04	5.67E-07	1.00E+00
Total Risk=1E-5	*NO*	1.12E+05	1.00E-05	7.76E+01	*NO*	4.50E+05	1.00E-05	1.76E+01
Risk of Benzene= 1E-6	*NO*	4.20E+06	3.77E-04	2.92E+03	NA			
Risk of cPAHs mixture= 1E-6	*NO*	1.14E+04	1.02E-06	7.93E+00				
EDB	NA	NA	NA	NA				
EDC	NA	NA	NA	NA				

3. Results for Protection of Ground Water Quality (Leaching Pathway)

3.1. Protection of Potable Ground Water Quality (Method B): Human Health Protection

Most Stringent Criterion	**HI=1**
Protective Ground Water Concentration, ug/L	**423.32**
Protective Soil Concentration, mg/kg	**230.68**

Ground Water Criteria	Protective Potable Ground Water Concentration @Method B				Protective Soil Conc, mg/kg
	Most Stringent?	TPH Conc, ug/L	RISK @	HI @	
HI=1	YES	4.23E+02	1.93E-07	1.00E+00	2.31E+02
Total Risk = 1E-5	*NO*	7.60E+02	9.90E-07	1.61E+00	100% NAPL
Total Risk = 1E-6	*NO*	7.60E+02	9.90E-07	1.61E+00	100% NAPL
Risk of cPAHs mixture= 1E-5	*NO*	7.60E+02	9.90E-07	1.61E+00	100% NAPL
Benzene MCL = 5 ug/L	*NO*	7.60E+02	9.90E-07	1.61E+00	100% NAPL
MTBE = 20 ug/L	NA	NA	NA	NA	NA

Note: 100% NAPL is 74000 mg/kg TPH.

3.2 Protection of Ground Water Quality for TPH Ground Water Concentration previously adjusted and entered

Ground Water Criteria	Protective Ground Water Concentration			Protective Soil Conc, mg/kg
	TPH Conc, ug/L	Risk @	HI @	
Target TPH GW Conc = 500 ug/L	5.00E+02	2.61E-07	1.15E+00	**3.46E+02**

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 09/21/23
Site Name: P66 Oily Water Sewer
Sample Name: B-6-23 4.5ft

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6	0.605	1.00%
AL_EC >6-8	0.267	0.44%
AL_EC >8-10	0.715	1.18%
AL_EC >10-12	0.189	0.31%
AL_EC >12-16	10.8	17.81%
AL_EC >16-21	23.6	38.92%
AL_EC >21-34	7.87	12.98%
AR_EC >8-10	0.471	0.78%
AR_EC >10-12	0.215	0.35%
AR_EC >12-16	2.83	4.67%
AR_EC >16-21	2.89	4.77%
AR_EC >21-34	10.1	16.66%
Benzene	0.00061	0.00%
Toluene	0.00304	0.01%
Ethylbenzene	0.00061	0.00%
Total Xylenes	0.00183	0.00%
Naphthalene	0.00575	0.01%
1-Methyl Naphthalene	0.00575	0.01%
2-Methyl Naphthalene	0.00575	0.01%
n-Hexane	0.0061	0.01%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene	0.00575	0.01%
Benzo(b)fluoranthene	0.00575	0.01%
Benzo(k)fluoranthene	0.00575	0.01%
Benzo(a)pyrene	0.00575	0.01%
Chrysene	0.0249	0.04%
Dibenz(a,h)anthracene	0.00575	0.01%
Indeno(1,2,3-cd)pyrene	0.00575	0.01%
Sum	60.64084	100.00%

Notes for Data Entry | Set Default Hydrogeology
Clear All Soil Concentration Data Entry Cells
Restore All Soil Concentration Data cleared previously

REMARK:
Enter site-specific information here……..

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.43	Unitless
Volumetric water content:	0.3	Unitless
Volumetric air content:	0.13	Unitless
Soil bulk density measured:	1.5	kg/L
Fraction Organic Carbon:	0.002	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here:	500	ug/L

A2 Soil Cleanup Levels: Calculation and Summary of Results. Refer to WAC 173-340-720, 740, 745, 747, 750

Site Information

Date: 9/21/2023
Site Name: P66 Oily Water Sewer
Sample Name: B-6-23 4.5ft
Measured Soil TPH Concentration, mg/kg: **60.641**

1. Summary of Calculation Results

Exposure Pathway	Method/Goal	Protective Soil TPH Conc, mg/kg	With Measured Soil Conc		Does Measured Soil Conc Pass or Fail?
			RISK @	HI @	
Protection of Soil Direct Contact: Human Health	Method B	2,646	1.20E-08	2.29E-02	Pass
	Method C	43,936	2.97E-09	1.38E-03	Pass
Protection of Method B Ground Water Quality (Leaching)	Potable GW: Human Health Protection	100% NAPL	1.42E-07	3.65E-02	Pass
	Target TPH GW Conc. @ 500 ug/L	100% NAPL	NA	NA	Pass

2. Results for Protection of Soil Direct Contact Pathway: Human Health

	Method B: Unrestricted Land Use	Method C: Industrial Land Use
Protective Soil Concentration, TPH mg/kg	**2,645.84**	**43,936.33**
Most Stringent Criterion	**HI =1**	**HI =1**

Soil Criteria	Protective Soil Concentration @Method B				Protective Soil Concentration @Method C			
	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @
HI =1	YES	2.65E+03	5.23E-07	1.00E+00	YES	4.39E+04	2.15E-06	1.00E+00
Total Risk=1E-5	*NO*	5.06E+04	1.00E-05	1.91E+01	*NO*	2.04E+05	1.00E-05	4.65E+00
Risk of Benzene= 1E-6	*NO*	1.81E+06	3.57E-04	6.82E+02	NA			
Risk of cPAHs mixture= 1E-6	*NO*	5.17E+03	1.02E-06	1.95E+00				
EDB	NA	NA	NA	NA				
EDC	NA	NA	NA	NA				

3. Results for Protection of Ground Water Quality (Leaching Pathway)

3.1. Protection of Potable Ground Water Quality (Method B): Human Health Protection

Most Stringent Criterion	**NA**
Protective Ground Water Concentration, ug/L	**NA**
Protective Soil Concentration, mg/kg	**Soil-to-Ground Water is not a critical pathway!**

Ground Water Criteria	Protective Potable Ground Water Concentration @Method B				Protective Soil Conc, mg/kg
	Most Stringent?	TPH Conc, ug/L	RISK @	HI @	
HI=1	YES	1.41E+02	3.37E-06	2.22E-01	100% NAPL
Total Risk = 1E-5	YES	1.41E+02	3.37E-06	2.22E-01	100% NAPL
Total Risk = 1E-6	YES	9.40E+01	1.00E-06	1.25E-01	6.41E+02
Risk of cPAHs mixture= 1E-5	YES	1.41E+02	3.37E-06	2.22E-01	100% NAPL
Benzene MCL = 5 ug/L	YES	1.41E+02	3.37E-06	2.22E-01	100% NAPL
MTBE = 20 ug/L	NA	NA	NA	NA	NA

Note: 100% NAPL is 74000 mg/kg TPH.

3.2 Protection of Ground Water Quality for TPH Ground Water Concentration previously adjusted and entered

Ground Water Criteria	Protective Ground Water Concentration			Protective Soil Conc, mg/kg
	TPH Conc, ug/L	Risk @	HI @	
Target TPH GW Conc = 500 ug/L	1.41E+02	3.37E-06	2.22E-01	**100% NAPL**

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry: Refer to WAC 173-340-720, 740,745, 747, 750

1. Enter Site Information

Date: 09/21/23
Site Name: P66 Oily Water Sewer
Sample Name: B-7-23 4.0ft

2. Enter Soil Concentration Measured

Chemical of Concern or Equivalent Carbon Group	Measured Soil Conc dry basis mg/kg	Composition Ratio %
Petroleum EC Fraction		
AL_EC >5-6	0.764	2.60%
AL_EC >6-8	0.266	0.91%
AL_EC >8-10	0.71	2.42%
AL_EC >10-12	0.188	0.64%
AL_EC >12-16	1.14	3.88%
AL_EC >16-21	2.27	7.73%
AL_EC >21-34	3.65	12.43%
AR_EC >8-10	0.881	3.00%
AR_EC >10-12	0.213	0.73%
AR_EC >12-16	1.31	4.46%
AR_EC >16-21	8.23	28.02%
AR_EC >21-34	9.68	32.95%
Benzene	0.000595	0.00%
Toluene	0.00298	0.01%
Ethylbenzene	0.000595	0.00%
Total Xylenes	0.00179	0.01%
Naphthalene	0.00615	0.02%
1-Methyl Naphthalene	0.00615	0.02%
2-Methyl Naphthalene	0.00615	0.02%
n-Hexane	0.00595	0.02%
MTBE		0.00%
Ethylene Dibromide (EDB)		0.00%
1,2 Dichloroethane (EDC)		0.00%
Benzo(a)anthracene	0.00615	0.02%
Benzo(b)fluoranthene	0.00615	0.02%
Benzo(k)fluoranthene	0.00615	0.02%
Benzo(a)pyrene	0.00615	0.02%
Chrysene	0.00615	0.02%
Dibenz(a,h)anthracene	0.00615	0.02%
Indeno(1,2,3-cd)pyrene	0.00615	0.02%
Sum	29.37541	100.00%

Notes for Data Entry | Set Default Hydrogeology

Clear All Soil Concentration Data Entry Cells

Restore All Soil Concentration Data cleared previously

REMARK:
Enter site-specific information here……..

3. Enter Site-Specific Hydrogeological Data

Total soil porosity:	0.43	Unitless
Volumetric water content:	0.3	Unitless
Volumetric air content:	0.13	Unitless
Soil bulk density measured:	1.5	kg/L
Fraction Organic Carbon:	0.002	Unitless
Dilution Factor:	20	Unitless

4. Target TPH Ground Water Concentation (if adjusted)

If you adjusted the target TPH ground water concentration, enter adjusted value here:	500	ug/L

A2 Soil Cleanup Levels: Calculation and Summary of Results. Refer to WAC 173-340-720, 740, 745, 747, 750

Site Information

Date: 9/21/2023
Site Name: P66 Oily Water Sewer
Sample Name: B-7-23 4.0ft
Measured Soil TPH Concentration, mg/kg: **29.375**

1. Summary of Calculation Results

Exposure Pathway	Method/Goal	Protective Soil TPH Conc, mg/kg	With Measured Soil Conc		Does Measured Soil Conc Pass or Fail?
			RISK @	HI @	
Protection of Soil Direct Contact: Human Health	Method B	2,302	1.25E-08	1.28E-02	Pass
	Method C	30,566	3.11E-09	9.61E-04	Pass
Protection of Method B Ground Water Quality (Leaching)	Potable GW: Human Health Protection	100% NAPL	1.47E-07	6.77E-02	Pass
	Target TPH GW Conc. @ 500 ug/L	100% NAPL	NA	NA	Pass

2. Results for Protection of Soil Direct Contact Pathway: Human Health

	Method B: Unrestricted Land Use	Method C: Industrial Land Use
Protective Soil Concentration, TPH mg/kg	**2,301.58**	**30,566.38**
Most Stringent Criterion	**HI =1**	**HI =1**

Soil Criteria	Protective Soil Concentration @Method B				Protective Soil Concentration @Method C			
	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @	Most Stringent?	TPH Conc, mg/kg	RISK @	HI @
HI =1	YES	2.30E+03	9.82E-07	1.00E+00	YES	3.06E+04	3.24E-06	1.00E+00
Total Risk=1E-5	*NO*	2.34E+04	1.00E-05	1.02E+01	*NO*	9.45E+04	1.00E-05	3.09E+00
Risk of Benzene= 1E-6	*NO*	8.97E+05	3.83E-04	3.90E+02	NA			
Risk of cPAHs mixture= 1E-6	*NO*	2.39E+03	1.02E-06	1.04E+00				
EDB	NA	NA	NA	NA				
EDC	NA	NA	NA	NA				

3. Results for Protection of Ground Water Quality (Leaching Pathway)

3.1. Protection of Potable Ground Water Quality (Method B): Human Health Protection

Most Stringent Criterion	**NA**
Protective Ground Water Concentration, ug/L	**NA**
Protective Soil Concentration, mg/kg	**Soil-to-Ground Water is not a critical pathway!**

Ground Water Criteria	Protective Potable Ground Water Concentration @Method B				Protective Soil Conc, mg/kg
	Most Stringent?	TPH Conc, ug/L	RISK @	HI @	
HI=1	YES	3.42E+02	6.00E-06	5.12E-01	100% NAPL
Total Risk = 1E-5	YES	3.42E+02	6.00E-06	5.12E-01	100% NAPL
Total Risk = 1E-6	YES	1.58E+02	1.00E-06	2.25E-01	2.53E+02
Risk of cPAHs mixture= 1E-5	YES	3.42E+02	6.00E-06	5.12E-01	100% NAPL
Benzene MCL = 5 ug/L	YES	3.42E+02	6.00E-06	5.12E-01	100% NAPL
MTBE = 20 ug/L	NA	NA	NA	NA	NA

Note: 100% NAPL is 88000 mg/kg TPH.

3.2 Protection of Ground Water Quality for TPH Ground Water Concentration previously adjusted and entered

Ground Water Criteria	Protective Ground Water Concentration			Protective Soil Conc, mg/kg
	TPH Conc, ug/L	Risk @	HI @	
Target TPH GW Conc = 500 ug/L	3.42E+02	6.00E-06	5.12E-01	**100% NAPL**

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry

1. Enter Site Information

Date: 11/16/23
Site Name: P66 Oily Water Sewer
Sample Name: B-8-23 5.5 ft

Enter Site Data in Non-shaded (white) Cells

2. Enter Soil Concentration Measured

Clear Soil Data

Chemical or Petroleum Fraction	Measured Soil Conc mg/kg	Composition Ratio %
AL_EC >5-6	0.2845	0.0%
AL_EC >6-8	0.535	0.1%
AL_EC >8-10	4.87	0.6%
AL_EC >10-12	50.8	6.0%
AL_EC >12-16	210	24.9%
AL_EC >16-21	190	22.5%
AL_EC >21-34	58	6.9%
AR_EC >8-10	5.57995	0.7%
AR_EC >10-12	11.794	1.4%
AR_EC >12-16	81.3	9.6%
AR_EC >16-21	184	21.8%
AR_EC >21-34	44.288	5.2%
Benzene	0.02505	0.0%
Toluene	0.1255	0.0%
Ethylbenzene	0.02505	0.0%
Total Xylenes	0.075	0.0%
Naphthalene	0.106	0.0%
1-Methyl Naphthalene	1.04	0.1%
2-Methyl Naphthalene	1.16	0.1%
n-Hexane	0.2505	0.0%
MTBE	0.02505	0.0%
Ethylene Dibromide (EDB)	0.02505	0.0%
1,2 Dichloroethane (EDC)	0.0125	0.0%
Benzo(a)anthracene	0.0234	0.0%
Benzo(b)fluoranthene	0.00625	0.0%
Benzo(k)fluoranthene	0.00625	0.0%
Benzo(a)pyrene	0.00625	0.0%
Chrysene	0.0144	0.0%
Dibenz(a,h)anthracene	0.00625	0.0%
Indeno(1,2,3-cd)pyrene	0.00625	0.0%
	844.3902	**100%**

REMARK:
Enter site specific information here.....

3. Enter Site-Specific Hydrogeological Data (MTCA defaults are provided for unsaturated soil)

Reset Hydro Defaults

Total soil porosity (n):	0.43	Unitless
Volumetric water content (θ_w):	0.3	Unitless
Volumetric air content (θ_a):	0.13	Unitless (calculated) $\longrightarrow \theta_a = n - \theta_w$
Soil bulk density (ρ_b):	1.5	kg/L
Fraction Organic Carbon (f_{oc}):	0.001	Unitless
Dilution Factor (DF):	20	Unitless

4. Enter Target TPH Groundwater Concentation (µg/L)

Enter value here: 500 µg/L (*see worksheet B2_Groundwater Meth B*)

Reset Target TPH GW Conc Information

Basis: Method A Potable Groundwater

Remark: Petroleum fractionated data (EPH/VPH) and individual compounds tested in groundwater generated a Method B potable drinking water cleanup level of 340 µg/L (see Worksheet B2.1A). This level is below the most restrictive default Method A value of 500 µg/L. As a result, the Method A default potable groundwater cleanup level of 500 µg/L is selected as the target groundwater concentration to develop a TPH concentration in soil that is protective of potable groundwater.

A4 Soil Cleanup Levels: Summary of Results. Refer to WAC 173-340-720, 740, 745, 747

Date: 11/16/23
Site Name: P66 Oily Water Sewer
Sample Name: B-8-23 5.5 ft
Measured Soil TPH Concentration, mg/kg: 844.39

Summary of Calculation Results

Exposure Pathway	Method/Goal	Protective TPH Conc (mg/kg)	With Measured Soil Conc	
			HI or Risk	Pass or Fail
Soil Direct Contact Protection of Soil Incidental Ingestion and Dermal Contact: Human Health	**Method B: Unrestricted Land Use**			
	TPH Soil Cleanup Level (@ HI =1)	1,700	5.1E-01	Pass
	Cancer Risk (1)		1.8E-07	Pass
	Method C: Industrial Land Use			
	TPH Soil Cleanup Level (@ HI = 1)	28,000	3.0E-02	Pass
	Cancer Risk (1)		2.3E-08	Pass
Soil Leaching Protection of Groundwater Quality	**Soil Concentration Protective of Target TPH Groundwater Concentration**			
	Protective TPH Soil Concentration, mg/kg =	*Use Residual Saturation Conc*	---	Pass
			Soil Leaching is not a critical pathway.	
	100% NAPL TPH concentration (mg/kg) is:	76,000.0		
	Target TPH Groundwater Concentration (µg/L)			
	500 Method A Potable Groundwater			
Remark:	*Petroleum fractionated data (EPH/VPH) and individual compounds tested in groundwater generated a Method B potable drinking water cleanup level of 340 µg/L (see Worksheet B2.1A). This level is below the most restrictive default Method A value of 500 µg/L. As a result, the Method A default potable groundwater cleanup level of 500 µg/L is selected as the target groundwater concentration to develop a TPH concentration in soil that is protective of potable groundwater.*			

Notes:

(1) Known or suspected carcinogenic chemicals that contribute to unacceptable cancer risk within the petroleum mixture are evaluated separately and must meet compliance with soil cleanup standards both on an individual basis and and when accounting for cumulative risk from multiple chemicals and pathways at the site. *See Worksheets: A2.1B and A3.1B (Soil Direct Contact); B2.1B (Potable Water Ingestion).*

Terrestrial Ecological Pathway: Check to determine if a simplified or site-specific Terrestrial Ecological Evaluation may be required (*see* WAC 173-340-7490 through ~7494).

A1 Soil Cleanup Levels: Worksheet for Soil Data Entry

1. Enter Site Information

Date: 11/16/23
Site Name: P66 Oily Water Sewer
Sample Name: B-9-23 5ft

Enter Site Data in Non-shaded (white) Cells

2. Enter Soil Concentration Measured

Clear Soil Data

Chemical or Petroleum Fraction	Measured Soil Conc mg/kg	Composition Ratio %
AL_EC >5-6	-0.185	-0.1%
AL_EC >6-8	1.22	0.9%
AL_EC >8-10	1.22	0.9%
AL_EC >10-12	1.22	0.9%
AL_EC >12-16	5.9	4.2%
AL_EC >16-21	28.4	20.4%
AL_EC >21-34	42.5	30.6%
AR_EC >8-10	0.658	0.5%
AR_EC >10-12	1.1885	0.9%
AR_EC >12-16	5.837	4.2%
AR_EC >16-21	20.9	15.0%
AR_EC >21-34	26.014	18.7%
Benzene	0.1405	0.1%
Toluene	0.7	0.5%
Ethylbenzene	0.1405	0.1%
Total Xylenes	0.4215	0.3%
Naphthalene	0.0315	0.0%
1-Methyl Naphthalene	0.0315	0.0%
2-Methyl Naphthalene	0.0315	0.0%
n-Hexane	1.405	1.0%
MTBE	0.1405	0.1%
Ethylene Dibromide (EDB)	0.1405	0.1%
1,2 Dichloroethane (EDC)	0.0125	0.0%
Benzo(a)anthracene	0.133	0.1%
Benzo(b)fluoranthene	0.198	0.1%
Benzo(k)fluoranthene	0.0674	0.0%
Benzo(a)pyrene	0.133	0.1%
Chrysene	0.242	0.2%
Dibenz(a,h)anthracene	0.0315	0.0%
Indeno(1,2,3-cd)pyrene	0.1	0.1%
	138.9729	**100%**

REMARK:
Enter site specific information here.....

3. Enter Site-Specific Hydrogeological Data (MTCA defaults are provided for unsaturated soil)

Reset Hydro Defaults

Total soil porosity (n):	0.43	Unitless
Volumetric water content (θ_w):	0.3	Unitless
Volumetric air content (θ_a):	0.13	Unitless (calculated) $\longrightarrow \theta_a = n - \theta_w$
Soil bulk density (ρ_b):	1.5	kg/L
Fraction Organic Carbon (f_{oc}):	0.001	Unitless
Dilution Factor (DF):	20	Unitless

4. Enter Target TPH Groundwater Concentation (µg/L)

Enter value here: 500 µg/L (*see worksheet B2_Groundwater Meth B*)

Reset Target TPH GW Conc Information

Basis: Method A Potable Groundwater

Remark: Petroleum fractionated data (EPH/VPH) and individual compounds tested in groundwater generated a Method B potable drinking water cleanup level of 340 µg/L (see Worksheet B2.1A). This level is below the most restrictive default Method A value of 500 µg/L. As a result, the Method A default potable groundwater cleanup level of 500 µg/L is selected as the target groundwater concentration to develop a TPH concentration in soil that is protective of potable groundwater.

A4 Soil Cleanup Levels: Summary of Results. Refer to WAC 173-340-720, 740, 745, 747

Date: 11/16/23
Site Name: P66 Oily Water Sewer
Sample Name: B-9-23 5ft
Measured Soil TPH Concentration, mg/kg: 138.97

Summary of Calculation Results

Exposure Pathway	Method/Goal	Protective TPH Conc (mg/kg)	With Measured Soil Conc	
			HI or Risk	Pass or Fail
Soil Direct Contact Protection of Soil Incidental Ingestion and Dermal Contact: Human Health	**Method B: Unrestricted Land Use**			
	TPH Soil Cleanup Level (@ HI =1)	3,400	4.1E-02	Pass
	Cancer Risk (1)		1.6E-06	**Fail**
	Method C: Industrial Land Use			
	TPH Soil Cleanup Level (@ HI = 1)	48,000	2.9E-03	Pass
	Cancer Risk (1)		1.1E-07	Pass
Soil Leaching Protection of Groundwater Quality	**Soil Concentration Protective of Target TPH Groundwater Concentration**			
	Protective TPH Soil Concentration, mg/kg =	380	---	Pass
	Target TPH Groundwater Concentration (µg/L)			
	500 Method A Potable Groundwater			
Remark:	*Petroleum fractionated data (EPH/VPH) and individual compounds tested in groundwater generated a Method B potable drinking water cleanup level of 340 µg/L (see Worksheet B2.1A). This level is below the most restrictive default Method A value of 500 µg/L. As a result, the Method A default potable groundwater cleanup level of 500 µg/L is selected as the target groundwater concentration to develop a TPH concentration in soil that is protective of potable groundwater.*			

Notes:

(1) Known or suspected carcinogenic chemicals that contribute to unacceptable cancer risk within the petroleum mixture are evaluated separately and must meet compliance with soil cleanup standards both on an individual basis and and when accounting for cumulative risk from multiple chemicals and pathways at the site. *See Worksheets: A2.1B and A3.1B (Soil Direct Contact); B2.1B (Potable Water Ingestion).*

Terrestrial Ecological Pathway: Check to determine if a simplified or site-specific Terrestrial Ecological Evaluation may be required (*see* WAC 173-340-7490 through ~7494).