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Feasibility Report

Lighthouse Point Road and 3rd Street Reconstruction

City of Two Harbors

BMI Project No. 0U1.132372.000
January 2026

Submitted by:
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Certification

Feasibility Report

For

Lighthouse Point Road and 3rd Street Reconstruction

City of Two Harbors
Two Harbors, Minnesota
BMI Project No. 0U1.132372.000

January 26, 2026

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

By: _____

Andrew J. Brotzler, P.E.
License No. 40413

Date: January 26, 2026

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I. INTRODUCTION

The Two Harbors City Council adopted Resolution 10-358-24 on October 28, 2024, which ordered the preparation of a Feasibility Report for the Lighthouse Point Road. This report will examine the complete reconstruction of the roadway and utilities within the project area. The following streets are proposed for improvement:

- 3rd Street from 1st Avenue to South Avenue
- Lighthouse Point Road from South Avenue to Agate Bay Public Water Access

See Figure 1 in Appendix A for the proposed project location map.

The City of Two Harbor's 2025-2029 Capital Improvement Plan (CIP) identifies funding for this project for the year 2026. Completion of this report is necessary to prepare for the improvements and for the utilization of special assessments as a portion of the project funding package. This report also reviews the existing conditions in the project area and discusses, in detail, the proposed improvements. The proposed improvements will consist of:

- Replacement of sanitary sewer and water system.
- Storm sewer and associated drainage improvements within the public right-of-way.
- Street reconstruction to city and MnDOT State Aid standards.
- Replacement of sidewalks and construction of new bituminous trail and pedestrian ramps.

The report also provides preliminary cost estimates for the proposed improvements with funding for the project coming from a combination of funding sources including:

- State Park Road Account (SPRA) grant
- Local Road Improvement Program (LRIP) grant
- Special assessments
- City Utility Funds

An open house for the property owners within the proposed project area was held on January 20, 2026, prior to this report being finalized. This open house provided property owners an opportunity to provide their feedback on the proposed improvements. Information was provided via a mailing to all adjacent property owners.

If the city decides to proceed with the proposed street reconstruction improvements described in this report, construction will begin in 2026.

II. EXISTING CONDITIONS

A. Streets

Lighthouse Point Road and 3rd Street are local roads within the City of Two Harbors' transportation network. It is important to note that Lighthouse Point Road provides the only access to the Minnesota Department of Natural Resources Agate Bay Public Water Access and the Two Harbors Lighthouse. The road serves urban residential properties up to South Avenue and then is an access road for the wastewater treatment plant and access to the Agate Bay Public Waters access and lighthouse. There are no pedestrian transportation facilities (sidewalks, trails, etc.) in the Lighthouse Point Road portion of the project.

Based on conversations with city public works staff, the project streets were originally constructed many decades ago and have received routine maintenance throughout the years. The road is in generally poor condition, with potholes, some alligator cracking, and longitudinal cracking.

A city-wide pavement condition rating was completed in 2021. Table 1 below shows the approximate existing street widths from face of curb to face of curb, approximate right-of-way widths, and the existing pavement conditions.

Table 1 – Existing Streets

Street Name	Street Width	ROW Width	Street Rating
3rd Street (1st Avenue to South Avenue)	24'	66'	3 – Poor
Lighthouse Point Road	22-24'	66'	3 – Poor

The City of Two Harbors utilizes a 0–10 pavement rating scale to document the condition of roadway surfaces and to support long-term capital planning. This rating system is based on visual observations of surface distress, ride quality, and overall structural performance. Each roadway segment is assigned a numerical score from 1 (Failed) to 10 (Excellent), allowing for consistent comparison of pavement conditions across the network.

The average condition of the street pavements in the project area is 3 with the majority of the pavements needing immediate replacement.

Soil borings and a geotechnical evaluation were completed in the project area by Braun Intertec and the report is included in Appendix D. The report indicates an existing bituminous pavement thickness ranging from 2 to 4-inches with an aggregate base thickness ranging from 2 to 4-inches; boring location ST-6 revealed 5-inches of existing concrete pavement beneath 2-inches of existing bituminous pavement. Existing subgrade soils found beneath the aggregate base are predominantly clayey sandy soils. Several borings also encountered auger refusal at relatively shallow depths, indicating the presence of significant rock or very dense material across portions of the project area. These conditions suggest that excavation for utilities or full-depth reconstruction may require additional effort due to the prevalence of shallow rock.

B. Sanitary Sewer

Sanitary sewer extends along the entire project length and was installed around 1957. The main is a 24-inch concrete gravity pipe located near the roadway centerline beneath the bituminous pavement, running north–south on 3rd Street from 1st Avenue to South Avenue, then continuing down Lighthouse Point Road to the wastewater treatment plant. Additionally, a 30-inch concrete discharge line runs from the southwest corner of the plant

across Lighthouse Point Road to Agate Bay. Three manholes exist at 3rd Street/1st Avenue, 3rd Street/South Avenue, and the treatment plant; all were inspected and found to be in poor condition. There is one service that exists at the south end of the project extents. This service currently serves the Lighthouse Bed and Breakfast and is fed by gravity to the Lift Station just south of the wastewater treatment facility. There are no other sanitary sewer services that exist within the project limit. Residential and commercial connections occur on adjacent avenues beyond the project boundaries.

C. Watermain

Watermain extends through multiple areas of the project limits. It crosses east–west at 3rd Street and 1st Avenue and again at South Avenue. At the alley south of South Avenue, it crosses Lighthouse Point Road and tees south along its east side. Further south, the main splits: one branch exits the project limits to serve the wastewater treatment plant, while the other continues along the west side of Lighthouse Point Road, terminating just south of the plant after supplying a fire hydrant and the Lighthouse Bed and Breakfast. Installed around 1957, the system consists of 4-inch, 8-inch, and 12-inch ductile iron pipes; their condition is unknown. Only two active water services exist within the project limits—¾-inch lines serving the wastewater treatment plant and the Lighthouse Bed and Breakfast. Fire hydrants are located on the east side of 3rd Street at the northeast corners of 1st Avenue and South Avenue, and one more on the east side of Lighthouse Point Road just south of the plant.

D. Storm Sewer

Storm sewer flows north to south along the east side of 3rd Street and Lighthouse Point Road until it reaches the wastewater treatment plant. The storm sewer south of the wastewater treatment plant flows north to south along the center of Lighthouse Point Road and discharges in a ditch west of Lighthouse Point Road across from the wastewater treatment plant south property line. In addition to this system, there is an existing ditch on the west side of Lighthouse Point Road extending from the gravel access road to the newly constructed stormwater outlet associated with the Agate Bay Stormwater Project, providing additional surface conveyance toward the outlet.

At the intersection of 3rd St and 1st Ave the are 2 catch basins and 1 manhole in the NW quadrant, 2 catch basins and 1 manhole in the NE quadrant, and 1 catch basin and 1 manhole in the SE quadrant.

At the intersection of 3rd St and South Ave there is one catch basin at each of the northwest, northeast, and southwest quadrants of the intersection.

At the intersection of 3rd St and the alley south of South Avenue there is a storm manhole.

E. Street Lighting

There is one streetlight at 3rd Street and 1st Avenue in the northwest corner of the intersection and one streetlight at 3rd Street and South Ave in the northeast corner of the intersection. Both of these lights have underground power.

F. Other Utilities

1. Gas

Buried gas main crosses 3rd Street east–west at the alley south of 1st Avenue. Another gas main crosses 3rd Street at the southern quadrant of the South Avenue intersection, then tees south along the east side of Lighthouse Point Road, continuing until it dead ends near the fire hydrant just south of the wastewater treatment plant.

There are two gas services located within the project limits. Both are located on the east side of Lighthouse Point Road; one feeds the wastewater treatment plant and the other feeds the Lighthouse Bed and Breakfast.

The understanding of this Report is that the gas mains and gas service are constructed of Polyethylene material. The city does not anticipate replacing the gas main in conjunction with this project.

2. Electric

An overhead electric line runs north–south along the west side of 3rd Street from 1st Avenue to South Avenue, then crosses to the southeast corner near the alley south of South Avenue. From there, it continues south along the east side of Lighthouse Point Road until exiting the project limits near the access road for the Lighthouse Bed and Breakfast. A second overhead line runs east–west along the alley south of 1st Avenue, then turns south on the east side of 3rd Street, crossing South Avenue and terminating at the same southeast corner pole, which connects both overhead lines. An underground electric line begins at the southwest corner of the alley south of South Avenue and 3rd Street, runs south along the west side of Lighthouse Point Road, crosses the access road to Waterfront Drive, and reaches a three-phase pedestal. It then crosses Lighthouse Point Road to another pedestal and transformer on the east side, where it splits east and south before exiting near the Wastewater Treatment Plant and the Lighthouse Bed and Breakfast.

3. Fiber

Buried fiber line is located on the west side of Lighthouse Point Road. The fiber line begins at the same pole and runs in the orientation as the underground electric line. The buried fiber line crosses Lighthouse Point Road just north of where the underground electric crosses and ends at the nearest pole south of the wastewater treatment plant on the east side of Lighthouse Point Road.

G. Trees/Landscaping

There are existing cedar trees at 302 South Avenue that straddles the existing right-of-way and will likely be impacted by construction of the proposed bituminous trail. However, the rest of the project contains minimal trees and properties with landscaping, fencing, and other features that are within the public right of way. It is recommended that the City work with the property owners at these locations to address these items if this project proceeds.

III. PROPOSED IMPROVEMENTS

A. Streets

Based on the roadway pavement age, surface deterioration, street rating, existing pavement section, and review of the geotechnical exploration, complete reconstruction is proposed for the project. The streets are proposed to be reconstructed to current city standards including B624 concrete curb and gutter throughout the entire improvement area at a street width of 28-feet face-to-face. All driveways will be replaced with a concrete apron between the back of curb and the concrete sidewalk. Driveways will be replaced from the concrete sidewalk to the city right-of-way with materials matching the existing driveways.

The proposed street section will be built to a 9-ton design load standard in accordance with MnDOT State Aid Standards. Based on geotechnical engineering recommendations the proposed road section will include:

4" Bituminous Pavement
8" Aggregate Base (reclaimed existing pavement and gravel)
12" Select Granular Borrow

Based on the geotechnical report, a geotextile fabric layer is recommended beneath the select granular borrow section, spanning the full width and length of the proposed roadway. This layer will act as a separation barrier between the subgrade and granular borrow, preventing contamination and preserving the integrity of the pavement structure. Additionally, it will improve drainage by allowing water to pass through while retaining fine soils, reducing the risk of frost heave and subgrade instability. Incorporating geotextile fabric enhances long-term performance and extends the service life of the reconstructed roadway.

Subsurface drain tile is recommended for each block. Subsurface drain tile is proposed to run along each side of the street from 1st Avenue to the end of Lighthouse Point Road as shown in the typical section in Appendix A. The drain tile would connect to the proposed storm sewer system.

The 5-foot-wide sidewalk will be replaced on the east side of 3rd St from the NE quadrant of 1st Ave to the southeast quadrant of South Avenue.

A 10-foot-wide paved trail is proposed to be installed on the west side of 3rd St from the southwest quadrant of 1st Ave and extend the MnDNR Agate Bay Public Waters Access. The paved trail is proposed in accordance with the city's 2018 Trails Plan, enhancing pedestrian access to the waterfront area.

Based on geotechnical engineering recommendations the proposed trail section will include:

3" Bituminous Pavement
6" Aggregate Base (reclaimed existing pavement and gravel)

B. Sanitary Sewer

Based on the existing 24-inch sanitary sewer main age and material type, the proposed improvement would be to remove and replace the sanitary sewer.

A cost comparison was done to compare the cost of CIPP Lining versus removing and replacing the existing sanitary sewer main. Based on that evaluation, full replacement was determined to be more cost effective.

The proposed construction of the sanitary sewer main would start at the sanitary manhole in the center of the 1st Avenue and 3rd Street intersection and would replace the existing 24-inch concrete sanitary sewer pipe to the manhole in the center of Lighthouse Point Road that discharges into the wastewater treatment plant.

Additionally, the scope of this project includes extending sanitary sewer utilities for future development to the property owned by Acre Development LLC. A newly constructed 8-inch sanitary sewer main will be extended to the access road adjacent to the property.

The 30-inch sanitary sewer discharge line from the wastewater treatment plant will remain existing with no improvements or modifications proposed as part of this project.

Temporary interruptions will be necessary during the sanitary sewer improvements. It will be necessary to establish temporary bypass of segments of the sanitary sewer main during construction of the new sewer improvements. The furnishing, installation, and maintenance of any temporary bypass equipment would be included in the project as the responsibility of the contractor, under review and approval by the city.

C. Watermain

Based on the existing watermain pipe age and size, the proposed improvement for the watermain is full replacement with new 8-inch and 12-inch diameter PVC and ductile pipe. All hydrants, valves, and fittings will also be replaced.

The 4-inch watermain at 1st Avenue will be replaced with 8-inch diameter ductile pipe where it crosses the project. Two services are proposed to be replaced within the project limits. New 1-inch water service lines will be installed from the newly installed main and reconnected to existing service lines at the right-of-way.

The 12-inch watermains at the alley south of South Avenue and at the intersection of Lighthouse Point Road and South Ave will be replaced where they cross the project. The 12-inch watermain crossing at South Ave will be replaced with 8” PVC pipe. The 12-inch watermain crossing the alley of South Ave will be replaced with 12-inch ductile pipe. Two services are anticipated to be replaced within the project limits for South Ave.

The 8-inch watermain along Lighthouse Road will be replaced in its entirety. New 8-inch PVC or HDPE pipe is proposed for replacement. Similar to the sanitary sewer main, watermain will be extended to the access road adjacent to the Acre Development LLC property for future extension and development of this property.

D. Storm Sewer

Based on the existing storm sewer age, size, and performance, the proposed improvement for the storm sewer system is full replacement with new RCP. Pipe extensions and additional storm structures will be installed with a new layout to address existing drainage concerns and meet drainage requirements. The proposed storm sewer layout will be analyzed for hydraulic performance during final design to determine final pipe sizing and catch basin locations. Additionally, stormwater quality improvements will be analyzed during final design to help remove sediments and pollutant loads to the downstream system.

E. Stormwater Management

The existing stormwater collection and runoff routing systems are amongst the most lacking street elements in the project area. With the recommended installation of concrete curb and gutter, it will facilitate a significant improvement to the storm sewer system as roadway drain elements are most effectively implemented in concrete curb and gutter. No significant changes are recommended to be made to the overall drainage patterns, but storm sewer

extensions, replacements, and intake structure improvements, are proposed to further utilize the advantages of the new curb and gutter.

The project is anticipated to have more than 1 acre of disturbance impacts. Therefore, a Minnesota Pollution Control Agency (MPCA) Construction Stormwater Permit is anticipated to be required for this project.

F. Street Lighting

Existing streetlights at 3rd Street and 1st Avenue, and 3rd Street and South Avenue are proposed to be replaced as part of the project. Street lighting is not currently planned along Lighthouse Point Road and the paved trail.

G. Other Utilities

1. Gas

The gas system is owned, operated, and maintained by the City of Two Harbors. No modifications to the gas system are proposed to be included in the project.

Existing gas mains are present at various locations as discussed in Section II – Existing Conditions.

The contractor for the proposed improvements would be required to expose gas mains and services in advance of construction, so their exact location and depths could be documented. This work will be coordinated with the city.

Excavation near gas mains and services will need to be done with proper caution and appropriate coordination with the city. It may be necessary to modify the depth or width of the excavation in certain locations to reduce or avoid impacts with the gas utility.

2. Electric

The electric system is owned, operated, and maintained by the City of Two Harbors Electric Department.

The proposed relocation of two existing utility poles along the west side of 3rd Street have been reviewed and coordinated with city staff.

3. Fiber

No modifications to the Fiber would be included in the contract let for the proposed improvements.

IV. STAKEHOLDER COORDINATION

A. Private Utilities

Private Utility coordination is considerably less for this project than for those that are in more urbanized areas with significant underground utility work. A Gopher State One Call process was completed to request private utility information for inclusion on preliminary figures and to help understand if there are anticipated conflicts. An early review of the facilities shows communications lines that generally should not interfere with the street reconstruction project. More outreach and coordination with these private utility owners will be completed as the project develops.

B. City Utilities

City Utility coordination will be required for this project. Utilizing the Two Harbors GIS information overhead power and buried gas were identified but should not interfere with the street reconstruction project. More outreach and coordination with city staff will be completed as the project develops.

C. Public Involvement

A project open house was held on Tuesday, January 20, 2026, for property owners along the proposed project area. Comments and concerns received from property owners will be evaluated and incorporated into the final design as feasible. It is anticipated that during construction, project updates will be shared and provided through the city's social media channels.

V. RIGHT-OF-WAY AND EASEMENTS

Generally, the entire roadway system is encompassed within 66-feet of right-of-way. The proposed 10-foot trail alignment along Lighthouse Point Road does transition beyond the existing right-of-way along MnDNR property. The proposed impacts on the MnDNR property associated with the road and trail construction have been reviewed with representatives of the MnDNR. As this property is in the process of being conveyed to the city, appropriate agreements are anticipated to be executed by and between the MnDNR and the city for the interim to accommodate the proposed construction in 2026.

VI. ESTIMATED COSTS

Detailed estimates of probable construction costs have been prepared for the improvements described in this Report and are included in Appendix B. All costs are based on anticipated unit prices for the 2026 construction season. All estimated costs also include a 10% contingency and a cost for engineering consulting fees. Table 2 summarizes the estimated project costs for the recommended proposed project improvements.

Table 2 – Estimated Project Costs

Proposed Improvements	Total Estimated Cost	Grant Eligible – LRIP & SPRA	Non-Eligible - City of Two Harbors
Street Improvements	$1,376,678	$1,376,678	-
Drainage Improvements	$825,125	$825,125	-
Water Improvements	$820,231	-	$820,231
Sanitary Sewer Improvements	$1,881,177	-	$1,881,177
Total Project Cost	**$4,903,213**	**$2,201,804**	**$2,701,408**

VII. ASSESSMENTS AND FUNDING

A preliminary assessment roll was compiled for all adjacent benefitting properties per the City's Assessment Policy for Public and Development-Initiated Improvements. As all of the parcels adjacent to the proposed improvements are corner lots, the proposed assessment for the side-lot of the parcel is calculated at 15% of the estimated street cost. Storm sewer costs are proposed to be fully funded by the city through grant and city funds.

Based upon the assumptions described above, the estimated street construction project cost of $1,077,498.13, and the total project front footage of 2,888 feet, a per front foot assessment rate of $55.96 per foot has been calculated. A detailed preliminary assessment roll and map is included in Appendix C.

The proposed project assessments and funding summary are based on preliminary estimated project costs for the recommended improvements. These costs may be revised at the time of the final assessment hearing depending on final design of the project, potential property acquisition, soil conditions, bids received, and actual work performed. The assessments are proposed to be assessed over a 15-year period.

VIII. PROJECT SCHEDULE

The proposed project schedule is shown below:

Feasibility Report

*Contract Authorization**	*October 28, 2024*
Neighborhood Meeting	*January 20, 2026*
*Accept Feasibility Report & Call for Public Improvement Hearing**	*January 26, 2026*
*Public Improvement Hearing & Order Improvements**	*February 23, 2026*
*Approve Plans/Specifications & Authorize Bidding**	*February 23, 2026*
Bid Opening	*Week of March 30, 2026*
*Accept Bids & Award Contract**	*April 13, 2026*
Construction	*May – October 2026*
Assessment Hearing	*Fall of 2026*

* City Council Meeting

IX. CONCLUSION

This report has been prepared to investigate the potential for completing street reconstruction of 3rd Street and Lighthouse Point Road. This report identified the recommended infrastructure improvements including the addition of new concrete curb and gutter throughout the project, provided recommended improvement estimated costs, and identified applicable funding needs and sources to finance the improvements.

From an engineering standpoint, this project, as proposed, is feasible, cost effective, and necessary.

Appendix A: Figures

Lighthouse Point Road

Two Harbors, Minnesota

Project Location

January 2026

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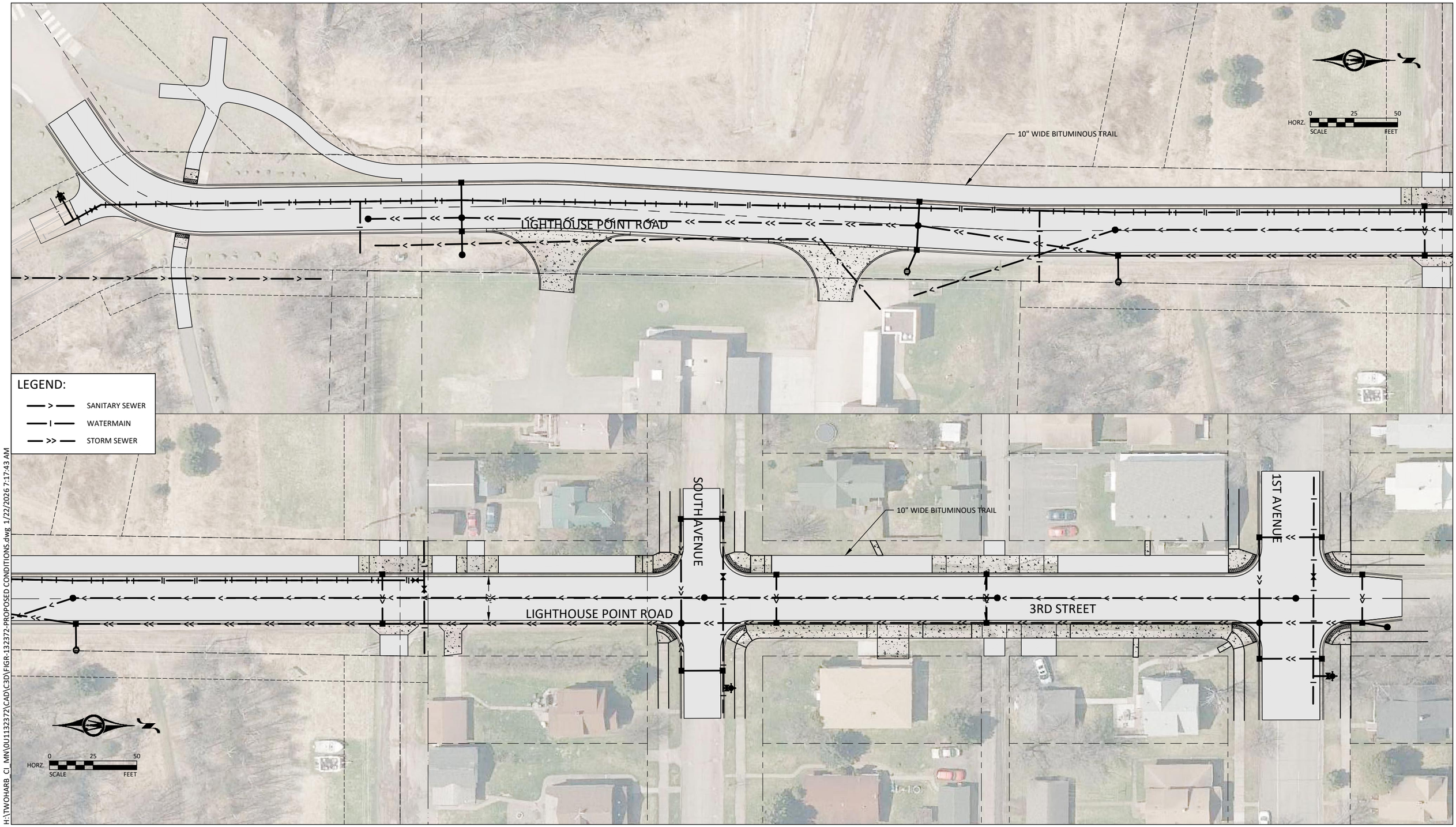
Map Document: \\arcserver1\GIS\TWOHARB_CI_MN\0U1132372\ESRI\Pro\Funding_App.aprx | Project Location | Username: aaronpa | Date Saved: 10/26/2023 1:33 PM



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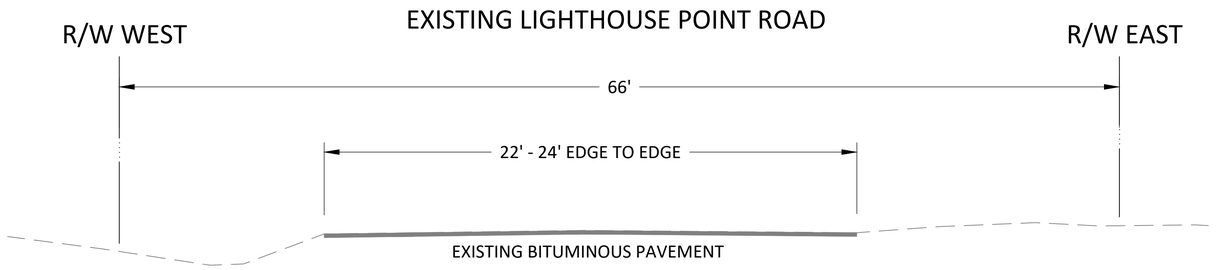
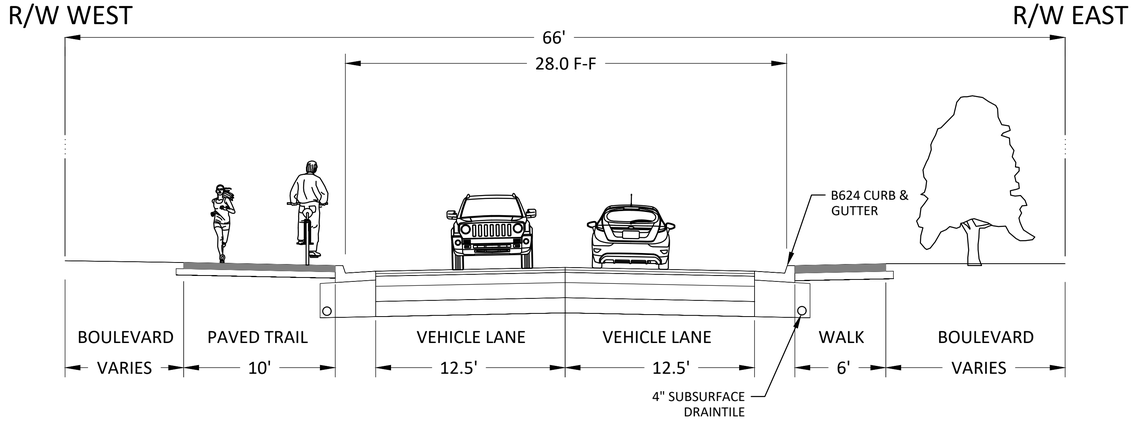


PROPOSED TYPICAL SECTION - LIGHTHOUSE POINT ROAD
AGATE BAY BEACH TO 1ST AVENUE



Appendix B: Preliminary Cost Estimates

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ENGINEER'S PRELIMINARY COST ESTIMATE

Lighthouse Point Road Reconstruction

City of Two Harbors

BMI Project No.: 0U1.132372

CITY OF TWO HARBORS

Prepared: 1/21/26

Item No.	Item	Estimated Quantity	Unit	Unit Price	Amount	Grant Eligible				Non-Eligible							
						LRIP Eligible		SPRA Eligible		Water		Sewer		Storm		Street	
						Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
1	MOBILIZATION	1	LS	$233,290.00	$233,290.00	0.3	$69,987.00	0.3	$69,987.00	0.2	$46,658.00	0.2	$46,658.00				
2	REMOVE BITUMINOUS PAVEMENT	3200	SY	$7.00	$22,400.00	1600	$11,200.00	1600	$11,200.00								
3	REMOVE PAVEMENT	1300	SY	$15.00	$19,500.00	650	$9,750.00	650	$9,750.00								
4	REMOVE BITUMINOUS DRIVEWAY PAVEMENT	140	SY	$13.00	$1,820.00	70	$910.00	70	$910.00								
5	SAWING BITUMINOUS PAVEMENT	212	LF	$3.00	$636.00	106	$318.00	106	$318.00								
6	REMOVE CONCRETE DRIVEWAY PAVEMENT	150	SY	$15.00	$2,250.00	75	$1,125.00	75	$1,125.00								
7	REMOVE CONCRETE SIDEWALK	575	SY	$12.00	$6,900.00	288	$3,450.00	288	$3,450.00								
8	REMOVE CONCRETE CURB & GUTTER	1050	LF	$10.00	$10,500.00	525	$5,250.00	525	$5,250.00								
9	REMOVE WATERMAIN PIPE	1100	LF	$12.00	$13,200.00					1100	$13,200.00						
10	REMOVE SEWER PIPE (STORM)	1252	LF	$20.00	$25,040.00	626	$12,520.00	626	$12,520.00								
11	REMOVE STORM STRUCTURE	20	EA	$500.00	$10,000.00	10	$5,000.00	10	$5,000.00								
12	SALVAGE HYDRANT	3	EA	$600.00	$1,800.00					3	$1,800.00						
13	REMOVE MANHOLE (SANITARY)	3	EA	$2,000.00	$6,000.00					3	$6,000.00						
14	REMOVE SANITARY SEWER PIPE	1000	LF	$30.00	$30,000.00							1000	$30,000.00				
15	REMOVE LIFT STATION	1	LS	$40,000.00	$40,000.00							1	$40,000.00				
16	COMMON EXCAVATION	4600	CY	$27.00	$124,200.00	400	$10,800.00	4200	$113,400.00								
17	ROCK EXCAVATION	3230	CY	$275.00	$888,250.00	2100	$577,500.00			565	$155,375.00	565	$155,375.00				
18	GEOTEXTILE FABRIC TYPE 7	4500	SY	$5.00	$22,500.00	2250	$11,250.00	2250	$11,250.00								
19	SELECT GRANULAR EMBANKMENT (CV)	1500	CY	$40.00	$60,000.00	750	$30,000.00	750	$30,000.00								
20	AGGREGATE BASE (CV) CLASS 5	1750	CY	$50.00	$87,500.00	875	$43,750.00	875	$43,750.00								
21	TYPE SP 12.5 NON WEARING COURSE MIX (3,C)	460	TON	$120.00	$55,200.00			460	$55,200.00								
22	TYPE SP 9.5 WEARING COURSE MIX (2,B)	740	TON	$120.00	$88,800.00	740	$88,800.00										
23	BITUMINOUS MATERIAL FOR TACK COAT	190	GAL	$3.50	$665.00			190	$665.00								
24	CONCRETE CURB AND GUTTER DESIGN B618	2860	LF	$35.00	$100,100.00	1430	$50,050.00	1430	$50,050.00								
25	6" CONCRETE WALK	2824	SF	$16.00	$45,184.00			2824	$45,184.00								
26	7" CONCRETE DRIVEWAY PAVEMENT	150	SY	$103.00	$15,450.00			150	$15,450.00								
27	CONCRETE COLLAR (MANHOLE)	3	EA	$1,560.00	$4,680.00			3	$4,680.00								
28	CONCRETE COLLAR (VALVE)	9	EA	$1,200.00	$10,800.00			9	$10,800.00								
29	6' DIA SANITARY SEWER MANHOLE	32	LF	$1,800.00	$57,600.00							32	$57,600.00				
30	CONNECT TO EXISTING SANITARY SEWER	9	EA	$2,500.00	$22,500.00							9	$22,500.00				
31	30" RCP SANITARY SEWER PIPE	20	LF	$3,900.00	$78,000.00							20	$78,000.00				
32	24" PVC SANITARY SEWER PIPE	700	LF	$145.00	$101,500.00							700	$101,500.00				
33	18" RCP SANITARY SEWER PIPE	40	LF	$120.00	$4,800.00							40	$4,800.00				
34	12" PVC SANITARY SEWER PIPE	30	LF	$115.00	$3,450.00							30	$3,450.00				
35	8" PVC SANITARY SEWER PIPE	10	LF	$90.00	$900.00							10	$900.00				
36	IMPROVED PIPE FOUNDATION	250	LF	$10.00	$2,500.00							250	$2,500.00				
37	30" CIPP LINING	700	LF	$325.00	$227,500.00							700	$227,500.00				
38	24" CIPP LINING	120	LF	$265.00	$31,800.00							120	$31,800.00				
39	CLEAN AND TELEVISE SANITARY SEWER	1850	LF	$2.00	$3,700.00							1850	$3,700.00				
40	SANITARY SEWER BYPASS PUMPING	1	LS	$265,000.00	$265,000.00							1	$265,000.00				
41	CONNECT TO EXISTING WATER MAIN	6	EA	$2,275.00	$13,650.00					6	$13,650.00						
42	6" PVC WATERMAIN	60	LF	$62.00	$3,720.00					60	$3,720.00						
43	8" PVC WATERMAIN	820	LF	$70.00	$57,400.00					820	$57,400.00						
44	12" PVC WATERMAIN	220	LF	$125.00	$27,500.00					220	$27,500.00						
45	HYDRANT	3	EA	$9,000.00	$27,000.00					3	$27,000.00						
46	DUCTILE IRON FITTINGS	2500	LB	$12.00	$30,000.00					2500	$30,000.00						
47	6" GATE VALVE	3	EA	$2,750.00	$8,250.00					3	$8,250.00						
48	8" GATE VALVE	9	EA	$5,000.00	$45,000.00					9	$45,000.00						
49	1" CURB STOP & BOX	4	EA	$743.00	$2,972.00					4	$2,972.00						
50	1" CORPORATION STOP	4	EA	$815.00	$3,260.00					4	$3,260.00						
51	2" CORPORATION STOP	1	EA	$1,250.00	$1,250.00					1	$1,250.00						
52	CONNECT TO EXISTING WATER SERVICE	5	EA	$815.00	$4,075.00					5	$4,075.00						
53	1" TYPE K COPPER PIPE	200	LF	$38.00	$7,600.00					200	$7,600.00						

BOLTON & MENK
Real People. Real Solutions.

ENGINEER'S PRELIMINARY COST ESTIMATE

Lighthouse Point Road Reconstruction

City of Two Harbors

BMI Project No.: 0U1.132372

CITY OF TWO HARBORS

Prepared: 1/21/26

Item No.	Item	Estimated Quantity	Unit	Unit Price	Amount	Grant Eligible				Non-Eligible							
						LRIP Eligible		SPRA Eligible		Water		Sewer		Storm		Street	
						Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
54	2" TYPE K COPPER PIPE	25	LF	$88.00	$2,200.00					25	$2,200.00						
55	4" PERFORATED PVC EDGE DRAIN	2860	LF	$30.00	$85,800.00	1430	$42,900.00	1430	$42,900.00								
56	15" RC PIPE SEWER DES 3006 CL V	132	LF	$98.00	$12,936.00	52	$5,096.00	80	$7,840.00								
57	24" RC PIPE SEWER DES 3006 CL III	502	LF	$120.00	$60,240.00	502	$60,240.00										
58	36" RC PIPE SEWER DES 3006 CL III	607	LF	$195.00	$118,365.00			607	$118,365.00								
59	CONSTRUCT DRAINAGE STRUCTURE DESIGN 48-4020	55.0	LF	$690.00	$37,950.00	27.5	$18,975.00	27.5	$18,975.00								
60	CONSTRUCT DRAINAGE STRUCTURE DESIGN 60-4020	9.1	LF	$922.00	$8,390.20			9.1	$8,390.20								
61	CONSTRUCT DRAINAGE STRUCTURE SPECIAL 1	20.0	LF	$500.00	$10,000.00	10.0	$5,000.00	10.0	$5,000.00								
62	CASTING ASSEMBLY	28	EA	$1,200.00	$33,600.00	14	$16,800.00	14	$16,800.00								
63	CONNECT TO EXISTING STORM SEWER	3	EA	$1,600.00	$4,800.00			3	$4,800.00								
64	TRAFFIC CONTROL	1	LS	$65,350.00	$65,350.00	0.3	$19,605.00	0.3	$19,605.00	0.2	$13,070.00	0.2	$13,070.00				
65	EROSION CONTROL	1	LS	$25,000.00	$25,000.00	0.3	$7,500.00	0.3	$7,500.00	0.2	$5,000.00	0.2	$5,000.00				
66	TURF ESTABLISHMENT	3750	SY	$5.00	$18,750.00	3750	$18,750.00										
67	LIGHTING SYSTEM	1	LS	$125,000.00	$125,000.00	1	$125,000.00										
				Subtotal	**$3,565,973.20**		**$1,251,526.00**		**$750,114.20**		**$474,980.00**		**$1,089,353.00**		**$0.00**		**$0.00**
				10% Contingency	**$356,597.32**		**$125,152.60**		**$75,011.42**		**$47,498.00**		**$108,935.30**		**$0.00**		**$0.00**
		Total Estimated Construction Cost			**$3,922,570.52**		**$1,376,678.60**		**$825,125.62**		**$522,478.00**		**$1,198,288.30**		**$0.00**		**$0.00**
		Design, Administration, and Construction Engineering			**$980,642.63**		**$0.00**		**$0.00**		**$297,753.51**		**$682,889.12**		**$0.00**		**$0.00**
		Total Estimated Project Cost			**$4,903,213.15**		**$1,376,678.60**		**$825,125.62**		**$820,231.51**		**$1,881,177.42**		**$0.00**		**$0.00**

Appendix C: Preliminary Assessment Roll

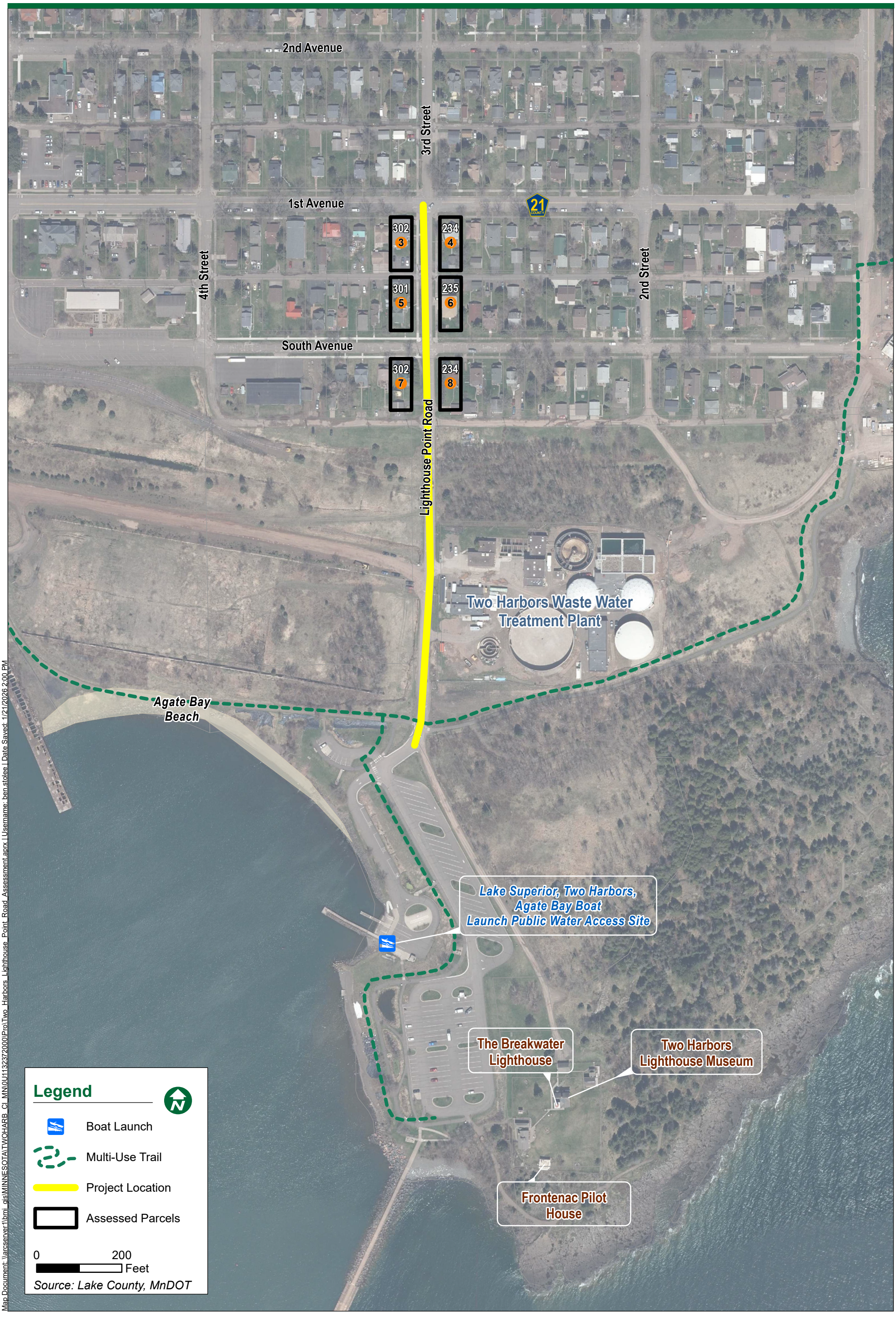
Lighthouse Point Road

City of Two Harbors, MN

Parcel Assessment

January 2026

BOLTON & MENK



Map Document: \\arcserver1\bmi_gis\MINNESOTA\TWOHARB_CI_MN\0U1132372000\Pro\Two_Harbors_Lighthouse_Point_Road_Assessment.aprx | Username: ben.stolee | Date Saved: 1/21/2026 2:00 PM

PRELIMINARY ASSESSMENT ROLL

Lighthouse Point Road Reconstruction

City of Two Harbors

BMI Project No.: 0U1.132372

Prepared: 1/21/26

Parcel Number	Parcel Identification Number	Property Address	Owner	Assessable Footage	Preliminary Assessment Costs	Sidewalk Assessment	Total
3	23-7640-29090	302 1st Avenue	Nordean Properties LP	125	$6,995	$1,250	$8,245
4	23-7640-28010	234 1st Avenue	Hurd, Jolene S	125	$6,995	$1,250	$8,245
5	23-7640-30090	301 South Avenue	Roach, Louise F	125	$6,995	$1,250	$8,245
6	23-7640-31010	235 South Avenue	Rabold, William M & Ruth A	125	$6,995	$1,250	$8,245
7	23-7640-33090	302 South Avenue	Dunn, Susan Lydia	125	$6,995	$1,250	$8,245
8	23-7640-33120	234 South Avenue	Carlson, Corey	125	$6,995	$1,250	$8,245
	23-7600-06612		Acre Development LLC	Utility Extension Cost	$74,152		$74,152
						TOTAL:	**$123,622.38**

Appendix D: Geotechnical Evaluation

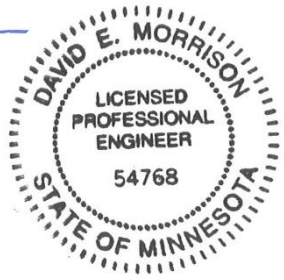
Geotechnical Evaluation Report and Environmental Screening Results

Geotechnical Evaluation and Environmental Screening Results
Lighthouse Point Road Reconstruction
First Avenue to Boat Landing
Two Harbors, Minnesota

Prepared for

City of Two Harbors

Professional Certification:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Minnesota.



David E. Morrison, PE
Project Engineer
License Number: 54768
October 3, 2024

Project B2406524

Braun Intertec Corporation

BRAUN INTERTEC
The Science You Build On.

BRAUN INTERTEC
The Science You Build On.

Braun Intertec Corporation
4511 West First Street, Suite 4
Duluth, MN 55807

Phone: 218.624.4967
Fax: 218.624.0196
Web: braunintertec.com

October 3, 2024 Project B2406524

City of Two Harbors
c/o Joshua Stier, PE
Bolton and Menk
522 First Avenue
Two Harbors, MN 55616

Re: Geotechnical Evaluation and Environmental Screening Results
Lighthouse Point Road Reconstruction
First Avenue to Boat Landing
Two Harbors, Minnesota

Dear Mr. Stier:

We are pleased to present this Geotechnical Evaluation and Environmental Screening Results Report for the Lighthouse Point Road Reconstruction Project.

Thank you for making Braun Intertec your geotechnical consultant for this project. If you have questions about this report, or if there are other services that we can provide in support of our work to date, please contact Jesse Hill-Male at 763.248.0148 (jhill-male@braunintertec.com) or David Morrison at 218.624.4967 (dmorrison@braunintertec.com).

Sincerely,

BRAUN INTERTEC CORPORATION

Jesse O. Hill-Male, EIT
Staff Engineer

Joseph C. Butler, PE
Associate Director, Senior Engineer

David E. Morrison, PE
Project Engineer

Mary Canino, PG, CHMM
Principal Scientist

Table of Contents

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Description **Page**

Appendix

A. Introduction

A.1. Project Description

This Geotechnical Evaluation and Environmental Screening Report addresses the proposed design and construction of Lighthouse Point Road, located in Two Harbors, Minnesota. The project includes the reconstruction and widening of Lighthouse Point Road and the construction of a new trail on the west side of the roadway from near Agate Bay Beach to 1st Avenue. The reconstruction of Lighthouse Point Road includes widening the roadway about 2 to 3 feet on both the east and west sides and construction of new curb and gutter as well as general site improvements. Table 1 below shows the project details.

Table 1. Site Aspects and Grading Description

Aspect	Description	Source
Roadway Pavement type	Bituminous	Current Pavements
Trail Pavement type	Bituminous	Provided
Lighthouse Point Road Pavement loads	150,000 ESALs*	Assumed
Roadway Construction Grade changes	Less than 1 feet	Assumed based on proposed work
Trail Construction Grade changes	Less than 5 feet	Assumed based on proposed work and existing site conditions

*Equivalent 18,000-lb single axle loads based on 20-year design.

The figure below shows an illustration of the proposed site layout.

Figure 1. Site Layout

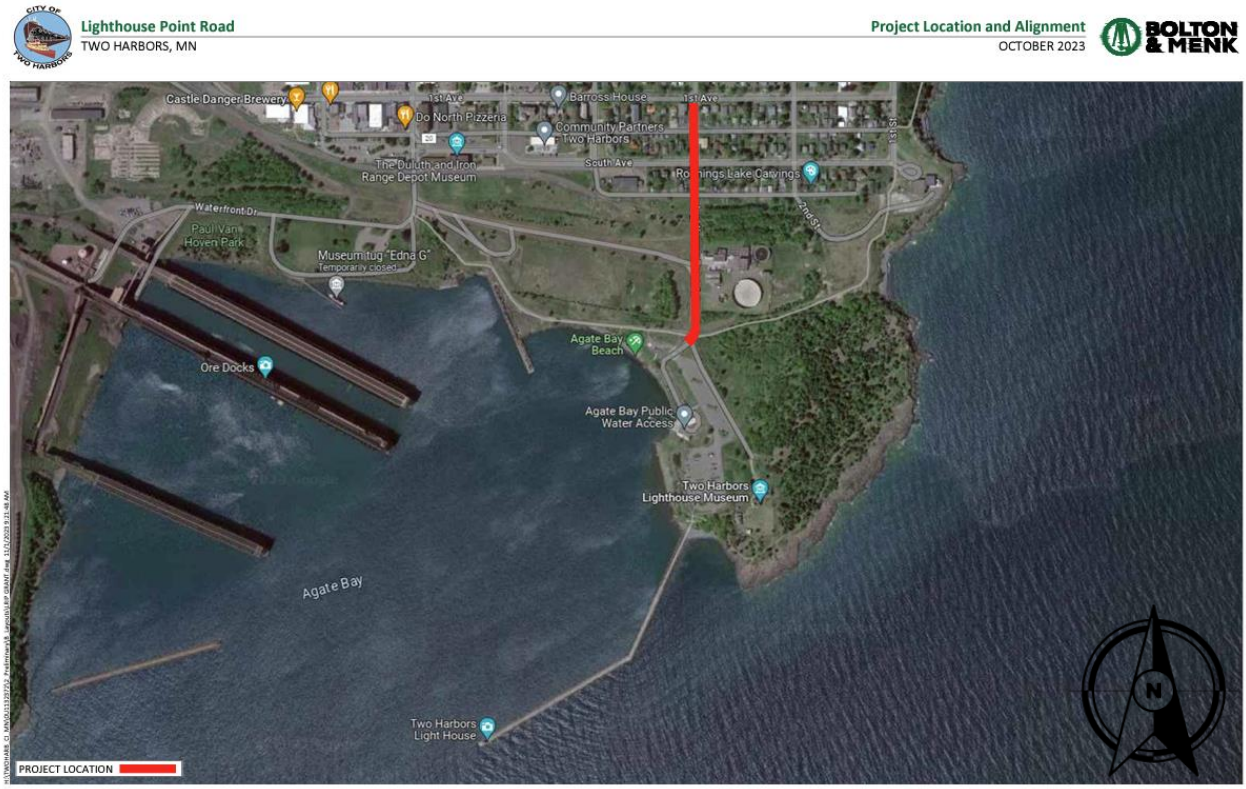

Figure prepared by Bolton & Menk, Inc. dated October 2023.

A.2. Site Conditions and History

Currently, the site exists as a bituminous-surfaced city street with concrete curb and gutter serving residential and commercial properties access to Agate Bay Beach. Lighthouse Point Road also serves access to a nearby wastewater treatment plant. Current grades range from approximately 619 1/2 feet at boring location ST-2 to 643 1/2 feet at boring location ST-6. Generally, the site is sloping downward from north to south and from east to west.

A.3. Purpose – Geotechnical Evaluation

The purpose of our geotechnical evaluation will be to characterize subsurface geologic conditions at selected exploration locations, evaluate their impact on the project, and provide geotechnical recommendations for the design and construction of the roadway.

A.4. Background Information and Reference Documents

We reviewed the following information:

- Plate 3, Surficial Geology, from the Lake County Geologic Atlas prepared by the Minnesota Geological Survey, dated 2022.
- Plate 6, Bedrock Topography, from the Lake County Geologic Atlas prepared by the Minnesota Geological Survey, dated 2022.
- Project limits and preliminary layout of the proposed project prepared by Bolton & Menk, Inc., and dated October 2023.
- Typical road cross section of Lighthouse Point Road from Agate Bay Beach to 1st Avenue prepared by Bolton & Menk, Inc., and dated October 2023.
- Communications with City of Two Harbors regarding the proposed project.

In addition to the provided sources, we have used several publicly available sources of information.

We have described our understanding of the proposed construction and site to the extent others reported it to us. Depending on the extent of available information, we may have made assumptions based on our experience with similar projects. If we have not correctly recorded or interpreted the project details, the project team should notify us. New or changed information could require additional evaluation, analyses and/or recommendations.

A.5. Scope of Services

We performed our scope of services for the project in accordance with our Proposal QTB197877 to City of Two Harbors, dated June 12, 2024, and authorized on July 12, 2024. The following list describes the geotechnical tasks completed in accordance with our authorized scope of services.

- Reviewing the background information and reference documents previously cited.
- Staking and clearing the exploration location of underground utilities. We selected and staked the new exploration locations. We acquired the surface elevations and locations with

GPS technology. The Soil Boring Location Sketch included in the Appendix shows the approximate locations of the borings.

- Performing six (6) standard penetration test (SPT) borings, denoted as ST-1 to ST-6, to a nominal depth of 15 feet below the existing grade or until refusal, whichever is shallower.

- Performing laboratory testing on select samples to aid in soil classification and engineering analysis.

- Monitoring subsurface material encountered at the borings by an environmental field scientist for indications of contamination including staining, odors, and the presence of organic vapors when screened with a photoionization detector (PID) using the headspace method of analysis recommended by the Minnesota Pollution Control Agency (MPCA).

- Collecting selected soil samples for environmental laboratory analysis including one or more of the following: volatile organic compounds (VOCs), gasoline range organics (GRO), diesel range organics (DRO), polycyclic aromatic hydrocarbons (PAHs), and the eight Resource Conservation and Recovery Act (RCRA) metals.

- Preparing this report containing a boring location sketch, logs of soil borings, a summary of the soils encountered, results of laboratory tests, and recommendations for pavement subgrade preparation and the design of pavements.

We performed this geotechnical evaluation concurrently with environmental screening and sampling which is included in Section D of this report. The project team should review Section D to understand both the geotechnical and environmental aspects of the site and how they may impact one another.

B. Results

B.1. Geologic Overview

Based on review of Plate 3, Surficial Geology from the Lake County Geologic Atlas, the project area is generally underlain by clay and silt with seams of fine-grained sand. The Glacial Lacustrine sediment deposits are generally reddish-brown to brown where oxidized and dark reddish-gray to dark gray where

unoxidized. Materials commonly are calcareous and in many places are present as a thin drape over subjacent deposits or bedrock. Furthermore, and based on review of Plate 6, Bedrock Topography from the Lake County Geologic Atlas, the project area generally has the top of bedrock at elevations between 551 and 650 feet.

We based the geologic origins used in this report on the soil types, and in-situ testing, and available common knowledge of the geological history of the site. Because of the complex depositional history, geologic origins can be difficult to ascertain. We did not perform a detailed investigation of the geologic history for the site.

B.2. Boring Results

The table below summarizes the pavement material thicknesses encountered in each of the borings. The aggregate base thicknesses should be considered approximate as the transitions between the aggregate base and underlying subgrade were sometimes difficult to discern. We did not perform gradation analysis on the apparent aggregate base material encountered as part of the pavement section, in accordance with our scope of work. Therefore, we cannot conclusively determine if the encountered material satisfies a particular specification. Note that boring ST-6 encountered 2 inches of bituminous overlaying 5 inches of concrete. Apparent aggregate base was not encountered in boring ST-6 as noted in Table 2 below.

Table 2. Pavement Section Summary

Roadway	Location	Bituminous Thickness (inches)	Apparent Aggregate Base Thickness (inches)
Lighthouse Point Road	ST-4	4	2
	ST-5	2	4
	ST-6	2	Apparent Aggregate Base: 0 Concrete: 5
	Average[1]	**2 3/4**	**3**

[1]Average thicknesses have been rounded up to the nearest quarter-inch.

The table below provides a summary of the soil boring results from our investigation, in the general order we encountered the strata. Please refer to the Log of Boring sheets in the Appendix for additional details.

The Descriptive Terminology sheet in the Appendix includes definitions of abbreviations used in the table below.

For simplicity, we define fill to mean existing, uncontrolled or undocumented fill.

Table 3. Subsurface Profile Summary

Strata	Soil Type - ASTM Classification	Range of Penetration Resistances	Commentary and Details
Pavement section	---	---	▪ Overall thickness ranges from 5 to 7 inches. ▪ Boring ST-6 encountered 5 inches of concrete underlying 2 inches of bituminous at the surface. ▪ Bituminous thickness 2 to 4 inches. ▪ Apparent aggregate base is 2 to 4 inches, when encountered.
Topsoil fill	SM	---	▪ Only encountered at boring location ST-3. ▪ Fine to medium-grained organic SM encountered. ▪ Black in color. ▪ Thickness of 2 feet. ▪ Moisture condition generally moist.
Fill	SM, CL	4 to 12 BPF	▪ Not encountered at boring locations ST-5 or ST-6. ▪ Encountered fine- to medium-grained SM fill at the surface of boring locations ST-1 and ST-2. ▪ Moisture condition generally moist. ▪ When encountered, thicknesses at boring locations varied from 4 to 8 1/2 feet below the existing surface. ▪ Boring locations ST-1, ST-2, and ST-3 all had fill depths of 4 feet below the existing surface while boring location ST-4 encountered 8 1/2 feet of fill below the existing surface. ▪ Black SM encountered from 1/2 foot to 2 feet below the existing surface. ▪ Existing fill contained variable amounts of gravel. ▪ Organic CL encountered at boring locations ST-1 and ST-2 from 1 1/2 to 4 feet and from 2 to 4 feet below the existing surface, respectively.

Strata	Soil Type - ASTM Classification	Range of Penetration Resistances	Commentary and Details
Lacustrine Deposits	CL	6 BPF to 50 blows for 4 inches of penetration	▪ General penetration resistance of 6 to 12 BPF. ▪ Moisture condition generally moist. ▪ Lenses to layers of sand were encountered within the CL at boring locations ST-1, ST-3, and ST-5. ▪ Generally brown in color. ▪ Encountered directly below the pavement section at boring location ST-5. ▪ Not encountered at boring locations ST-ST-4 and ST-6.
Weathered Bedrock	SM, GP	50 blows for 4 inches of penetration to 50 blows for 5 inches of penetration	▪ Top of weathered bedrock varied approximately from elevation 615 feet (ST-4) to 643 feet (ST-6). ▪ Classified the weathered bedrock as SM at boring location ST-4 and as GP at boring location ST-6. ▪ Brown in color at boring location ST-4 and gray in color at boring location ST- 6. ▪ Rock coring is needed to confirm the presence of bedrock as the borings could have potentially met refusal on boulders or limestone floats near the bedrock surface.

B.3. Groundwater

Table 4 summarizes the depths where we observed groundwater; the attached Log of Boring sheets in the Appendix also include this information and additional details.

Table 4. Groundwater Summary

Location	Ground Surface Elevation (feet)	Estimated Depth to Groundwater (ft)	Corresponding Groundwater Elevation (ft)
ST-4	623 1/2	8	615 1/2

At the time of our observation, the groundwater surface elevation appeared to be about elevation 615 1/2 feet. The soil borings indicate a layered soil profile that is conducive for encountering perched water conditions. Project planning should expect groundwater will fluctuate in relation to Lake Superior.

C. Geotechnical Recommendations

C.1. Design and Construction Discussion

At the time of this report, the recommendations provided herein are based on the plans and information provided to us. As the project progresses into final design, elements of the project may be adjusted and as such, our recommendations should be revisited and may require revision. Additional geotechnical investigation and analyses will be required as part of final design.

C.1.a. Reuse of Pavement Materials

From a geotechnical standpoint, milling or reclamation of the bituminous pavement material for reuse as recycled aggregate base or as a component to the new pavement is acceptable, assuming the products meet the applicable project specifications, and these practices are acceptable to the project team.

Prior to reuse, the project should implement thorough quality control practices, including frequent sieve analyses, asphalt contents and other tests, to achieve desirable characteristics for any reclaimed material processed on site.

C.1.b. Reuse of On-Site Soils

The existing non-organic, debris free soils encountered in our borings are suitable for reuse as engineered fill below the proposed pavement and exterior slab sections. In areas where non-organic silty sand fill materials are encountered, these materials could potentially be reused within the roadway pavement section as long as the material conforms to MnDOT Specification 3149.2.B. We do not anticipate the poorly graded gravel or lean clay to conform to MnDOT Specification 3149.2.B. Due to this we do not recommend re-using these materials within the pavement section, but they can be reused within the pavement or exterior slab subgrade fill as long as they conform to MnDOT Specification 2106.1.B.

Soils with organic contents of greater than 5 percent by weight should not be reused as pavement or exterior slab subgrade fill anywhere on the project. Organic soils can be stockpiled for use as a

component in topsoil dressing, side slopes or in other areas where loads are not supported. Any materials reused as engineered fill should be tested and approved by the engineer prior to reuse.

C.1.c. Traffic Loads

Current Annual Average Daily Traffic (AADT) for sections of Lighthouse Point Road are not available. Lighthouse Point Road ends at Agate Bay Public Water Access to the south and traffic generally travels to Lighthouse Point Road from the north, on 1st Avenue. The AADT for 1st Avenue was obtained from the MnDOT traffic Data Website and is 1250 in 2022. For the purpose of our traffic data calculations, we have assumed a "CSAH or Urban County Road" traffic distribution and 2 percent growth traffic. Based on these values, we have used a design traffic loading of 150,000 Equivalent 18-kip Single Axle Loads (ESALs) over the 20 year pavement design life for our pavement design recommendations.

C.1.d. Groundwater Control

We observed limited groundwater in the borings. Where we observed groundwater, it was below the anticipated excavation depths for construction. Some of the soils, such as silty sands and clay, will collect water from precipitation or if water drains to the site. We recommend the contractor remove any water that collects in work areas before performing further work.

Excavations for this project may encounter occasional zones of groundwater. We recommend project planning anticipate temporary excavation dewatering during construction. Based upon the boring observations, we anticipate sump pumps would be suitable for temporary dewatering.

C.1.e. Construction Disturbance

The contractor should note the on-site, silty and clayey soils are highly susceptible to disturbance, due to repeated construction traffic. Disturbance of these soils may cause areas that were previously prepared, or that were suitable for pavement or structure support, to become unstable and require moisture conditioning and compaction. Subcutting and replacing the disturbed material with crushed, coarse gravel, free of fines is also an alternative. The contractor should use means and methods to limit disturbance of the soils.

C.1.f. Disturbance of Existing Utility Lines

The project team should be aware of existing utilities such as phone, cable, fiber, electrical, and gas within the roadway area. Care should be used to avoid disturbance of the soils supporting these existing utilities or impacting the utilities themselves during pavement removals, reconstruction, excavation, and new utility installation.

C.1.g. Shallow Bedrock

Based on the proposed construction, we anticipate excavations will encounter bedrock. At the boring locations, we were able to penetrate the bedrock approximately 5 inches to 2 1/2 feet below the bedrock surface with our hollow stem auger, during drilling operations. This penetration typically indicates the upper 5 inches to 2 1/2 feet of the bedrock is relatively highly weathered. An excavator can sometimes remove weathered bedrock. However, the contractor will likely need blasting below these depths. Line drilling is an option to control the extents of vertical cuts in the bedrock, which can limit the amount of bedrock removal.

During removal, the bedrock will frequently break off at natural seams, fractures or bedding planes. As such, actual bedrock removal quantities can exceed the quantities established by the plans.

C.2. Site Grading and Subgrade Preparation

C.2.a. Removals

We recommend removing unsuitable soils consisting of topsoil, vegetation, existing structures, pavements, and aggregate base from the pavement and exterior slab construction areas and their associated oversize areas. Borings ST-1, ST-2, and ST-3 all encountered silty sand with organics or lean clay with organics within or near the proposed pavement section. Borings ST-1 and ST-2 encountered lean clay with organics from 2 to 4 feet below the existing surface, while boring ST-3 encountered silty sand with organics at the surface to a depth of 2 feet below the existing surface. While we recommend removing the silty sand with organics encountered in boring ST-3, the lean clay with organics has the potential to be buried deep enough in the ground that it will not be encountered when constructing the roadway and exterior slab. If the material is encountered within the pavement or exterior slab sections, we recommend removing the lean clay with organics from within the pavement or exterior slab section and then place a geotextile fabric on top of any organic materials prior to backfilling, to separate the engineered fill from the organic materials. The geotextile fabric will minimize any potential contamination of the sand subbase or subgrade fill. Borings ST-5 and ST-6 encountered lean clay and poorly graded gravel directly underlying the in-place pavement section.

After subcutting the in-place soils and prior to backfilling the pavement or exterior slab subgrade, we recommend having a geotechnical engineer or a technician working under the direction of a geotechnical engineer (geotechnical representative) inspect the in-place soils, to determine if they are suitable for construction. Further subcuts may be necessary depending on subgrade conditions.

C.2.b. Excavation Oversizing

When removing unsuitable materials below structures or pavements, we recommend the excavation extend outward and downward at a slope of 1H:1V (horizontal:vertical) or flatter.

C.2.c. Excavated Slopes

Based on the borings, we anticipate on-site soils in excavations will consist of native lean clay, native poorly graded gravel, lean clay fill, and silty sand fill. The native lean clay soils are typically considered Type B Soil under OSHA (Occupational Safety and Health Administration) guidelines, while the poorly graded gravel, lean clay fill, and silty sand fill are Type C Soils under OSHA guidelines. OSHA guidelines indicate unsupported excavations in Type A soils should have a gradient no steeper than 1H:1V, while OSHA guidelines indicated unsupported excavations in Type C soils should have a gradient no steeper than 1 1/2H:1V. Slopes constructed in this manner may still exhibit surface sloughing. OSHA requires an engineer to evaluate slopes or excavations over 20 feet in depth.

An OSHA-approved qualified person should review the soil classification in the field. Excavations must comply with the requirements of OSHA 29 CFR, Part 1926, Subpart P, “Excavations and Trenches.” This document states excavation safety is the responsibility of the contractor. The project specifications should reference these OSHA requirements.

C.2.d. Excavation Dewatering

We recommend removing groundwater from the excavations. Project planning should include temporary sumps and pumps for excavations in low-permeability soils, such as clays.

C.2.e. Engineered Fill Materials and Compaction

Table 5 below contains our recommendations for engineered fill materials and compaction specifications. Note that similar materials compared to existing should be used to the degree possible; importing different soils for backfill may create lenses that could trap water and result in differential frost heave and other performance issues. If longitudinal transitions in soil type are required, we recommend tapering them at a rate of 1:20 V:H or flatter. Transitions in the transverse direction, such as at intersections, should be at least 1:4 V:H.

Table 5. Engineered Fill Materials

Locations To Be Used	Engineered Fill Classification	Possible Soil Type Descriptions
Sand Subbase	Select Granular Material MnDOT Table 3149.2-1	MnDOT 2106.3.G.1
Pavement and Exterior Slab Subgrade Fill	Select Grading Material MnDOT 2106.1.B.1	
Below landscaped surfaces, where subsidence is not a concern	Non-Structural Grading Material MnDOT 2106.1.B.8	MnDOT 2106.3.G.2

We recommend placing engineered fill in accordance with MnDOT Specification 2106. We recommend compacting engineered fill in accordance with the MnDOT specifications listed in Table 5 above. The project documents should specify relative compaction of engineered fill, based on the structure located above the engineered fill, and vertical proximity to that structure.

The project documents should not allow the contractor to use frozen material as engineered fill or to place engineered fill on frozen material. Frost should not penetrate under foundations during construction.

We recommend performing density tests in engineered fill to evaluate if the contractors are effectively compacting the soil and meeting project requirements.

C.2.f. Pavement and Exterior Slab Subgrade Preparation

We recommend the following steps for pavement and exterior slab subgrade preparation, understanding minimal grade changes will occur.

1. Once removals are performed as recommended in Section C.2.a, have a geotechnical representative observe the excavated subgrade to evaluate if additional subgrade improvements are necessary.

2. Scarify, moisture condition, and surface compact the exposed subgrade.

3. Correct any areas that yield or rut in excess of project requirements.

4. In accordance with Section C.2.e, place compacted fill to the bottom of the pavement or exterior slab section.

C.2.g. Pavement Subgrade Test Roll

After preparing the subgrade as described above and prior to the placement of the aggregate base, we recommend test rolling the subgrade soils with a fully loaded tandem-axle truck. We also recommend having a geotechnical representative observe the test roll. Areas that fail the test roll likely indicate soft or weak areas that will require additional soil correction work to support pavements.

The contractor should correct areas that display excessive yielding or rutting during the test roll, as determined by the geotechnical representative. Possible options for subgrade correction include moisture conditioning and recompaction, subcutting and replacement with soil or crushed aggregate, chemical stabilization and/or geotextiles. We recommend performing a second test roll after the aggregate base material is in place, and prior to placing bituminous pavement.

We recommend performing test rolls in accordance with MnDOT Specification 2111.

C.3. Frost Protection

We consider the on-site silty and clay materials to be highly frost susceptible. Unfavorable amounts of heaving could occur if these soils become saturated and freeze. Grading to direct surface drainage away from pavements helps limit the potential for saturation and subsequent heaving to occur. Still, even limited amounts of movement can create tripping hazards.

One method to help limit the potential for heaving to occur is to remove frost-susceptible soils present below the overlying slab or pavement area and replace the excavated material with non-frost-susceptible, engineered fill. We recommend providing drainage at the base of the subcut, as well as gradual transitions from this subcut (3H:1V or flatter gradient).

Over the life of the pavement or slab, cracks may develop and joints may open up, which will expose the subgrade and allow water to enter the subgrade. This water entering the subgrade increases the likelihood of heave. It will be critical that the owner develop a detailed maintenance program to repair any cracks and joints that may develop during the useful life of the various surface features. The maintenance program should pay special attention to areas where dissimilar materials abut one another, where construction joints occur and where shrinkage cracks develop.

C.4. Pavements

C.4.a. Design Sections

Our scope of services for this project did not include laboratory tests on subgrade soils to determine an R-value for pavement design. Based on our experience with similar clayey soils anticipated at the pavement subgrade elevation, we recommend pavement design assume an R-value of 10. Note the contractor may need to perform limited removal of unsuitable or less suitable soils to achieve this value.

Based upon the assumed traffic loads and subgrade types, we recommend the new pavement section to include the following materials and thicknesses listed in Tables 6 and 7 below.

Table 6. Lighthouse Point Road Recommended Bituminous Pavement Section Thickness Design

Layer	Thickness (inches)	Material Specification
Bituminous	4	MnDOT 2360
Aggregate Base	8	Class 5 (MnDOT 3138)
Sand Subbase	12	Select Granular (MnDOT 3149.2.B)
Approved Subgrade	---	---

Table 7. Trail Recommended Bituminous Pavement Section Thickness Design

Layer	Thickness (inches)	Material Specification
Bituminous wear course	3	MnDOT 2360
Aggregate Base	6	Class 5 (MnDOT 3138)
Approved Subgrade	---	---

C.4.b. Bituminous Pavement Materials

We recommend that the bituminous wear and non-wear courses meet the requirements of specifications 2360. We recommend compacting the aggregate base to meet the requirements of MnDOT Specification 2211.3.D.2.c (Penetration Index Method for the dynamic cone penetrometer [DCP]). We recommend compacting the bituminous pavements to at least 92 percent of their maximum theoretical (Rice) density.

C.4.c. Subgrade Drainage

We recommend installing perforated drainpipes throughout pavement areas at low points, around catch basins, and behind curb in landscaped areas. We also recommend installing drainpipes along pavement and exterior slab edges where exterior grades promote drainage toward those edge areas. The contractor should place drainpipes in small trenches, extended at least 8 inches below the granular subbase layer, or below the aggregate base material where no subbase is present.

C.4.d. Performance and Maintenance

We based the above pavement and exterior slab designs on a 20-year performance life for bituminous. This is the amount of time before we anticipate the pavement will require reconstruction. This performance life assumes routine maintenance, such as seal coating and crack sealing. The actual pavement life will vary depending on variations in weather, traffic conditions and maintenance.

It is common to place the non-wear course of bituminous and then delay placement of wear course. For this situation, we recommend evaluating if the reduced pavement section will have sufficient structure to support construction traffic.

Many conditions affect the overall performance of the exterior slabs and pavements. Some of these conditions include the environment, loading conditions and the level of ongoing maintenance. With regard to bituminous pavements in particular, it is common to have thermal cracking develop within the first few years of placement and continue throughout the life of the pavement. We recommend developing a regular maintenance plan for filling cracks in exterior slabs and pavements to lessen the potential impacts for cold weather distress due to frost heave or warm weather distress due to wetting and softening of the subgrade.

C.5. Equipment Support

The recommendations included in the report may not be applicable to equipment used for the construction and maintenance of this project. We recommend evaluating subgrade conditions in areas of shoring, scaffolding, cranes, pumps, lifts and other construction equipment prior to mobilization to determine if the exposed materials are suitable for equipment support, or require some form of subgrade improvement. We also recommend project planning consider the effect that loads applied by such equipment may have on structures they bear on or surcharge – including pavements, buried utilities, below-grade walls, etc. We can assist you in this evaluation.

D. Purpose - Environmental Screening and Sampling

The purpose of the environmental screening was to obtain environmental data for the in-place subgrade and determine management alternatives for the soil, if excavated, or otherwise disturbed by construction.

During the geotechnical soil boring activities, subsurface materials encountered were monitored by an environmental field scientist. Soils encountered in the borings were observed in the field and indications of contamination including staining and odors were documented, if detected. In addition, soil samples were screened for the presence of organic vapors with a 10.6 electron volt (eV) PID using the headspace method of analysis recommended by the MPCA.

D.1. Field Screening Results

The results of the environmental screening indicated that PID readings in the borings ranged from 0.2 to 35.9 parts per million (ppm). PID readings in ST-1 through ST-4 ranged from 0.2 to 2.7 ppm except for a PID reading of 7.6 ppm in the 0 to 2-foot depth interval, which consisted of fill material underlying bituminous pavement. PID readings in boring ST-5 ranged from 4.3 to 9.8 ppm, and all encountered material consisted of red native lean clay. PID readings in boring ST-6 were 2.9 ppm from the upper interval (0.4 to 2 feet) and 35.9 ppm from the underlying interval where the auger met refusal at 2.9 feet due to bedrock.

No unusual odors, staining, or debris were observed in any of the other soil samples collected during the drilling activities. PID readings, as well as other observations made during the boring activities, are included on the Log of Boring sheets located in the Appendix.

D.2. Analytical Results

A total of six (6) soil samples were collected for laboratory analysis for a combination of VOCs, GRO, DRO, PAHs, and the eight RCRA metals from the 6 geotechnical borings at various depths across the Project (ranging from 0 to 2 feet bgs to 2.5 to 4 feet bgs).

The soil analytical results are summarized in Soil Analytical Results, Table A, included in the Appendix. Laboratory analytical results of soil samples collected during the Phase II were compared to MPCA regulatory criteria including unregulated fill criteria, Soil Reference Values (SRVs), and screening Soil

Leaching Values (SLVs), which are also listed on Table A. The laboratory analytical report is also attached. The analytical results indicated the following:

- Five VOCs were detected in 3 of the 6 soil samples analyzed at concentrations greater than or equal to laboratory reporting limits.
  - Benzene was detected in sample ST-4 (0-2) at a concentration of 0.151 mg/kg, which exceeded the SLV of 0.017 mg/kg and did not exceed the Residential/Recreational SRV of 9.5 mg/kg or the Commercial/Industrial SRV of 42 mg/kg.
  - Ethylbenzene, toluene, 1,2,4-trimethylbenzene, and total xylenes were detected in one or more soil samples [ST-2 (1-4), ST-3 (1-4), and/or ST-4 (0-2)] at concentrations below respective SLVs and SRVs.
- Various PAHs were detected in all 6 soil samples analyzed at concentrations greater than or equal to laboratory reporting limits.
  - Benzo(a)pyrene (BaP) was detected in sample ST-1 (2.5-4) at a concentration of 2.11 mg/kg, which exceeded the SLV of 1.4 mg/kg and the Residential/Recreational SRV of 2 mg/kg. The detected concentration did not exceed the Commercial/Industrial SRV of 23 mg/kg. Additionally, the calculated BaP Equivalent Concentration in sample ST-1 (2.5-4) was 2.99 mg/kg, which exceeded the SLV of 1.4 mg/kg and the Residential/Recreational SRV of 2 mg/kg. The calculated BaP Equivalent Concentration did not exceed the Commercial/Industrial SRV of 23 mg/kg.
  - The remaining PAH concentrations did not exceed respective SLVs or SRVs and include the following detections in one or more soil samples: acenaphthene, acenaphthylene, anthracene, benz(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methyl naphthalene, phenanthrene, and pyrene.
- Various RCRA metals were detected in all 6 soil samples analyzed at concentrations greater than or equal to laboratory reporting limits.
  - Arsenic was detected in samples ST-1 (2.5-4) and ST-4 (0-2) at concentrations of 7.09 mg/kg and 6.19 mg/kg, respectively, which exceeded the SLV of 5.8 mg/kg and did not

exceed the Residential/Recreational or Commercial/Industrial SRVs of 9 mg/kg. The arsenic concentrations detected in these soil samples are within the naturally occurring background range for arsenic in soil.

- Barium, chromium, lead, and mercury were detected in soil samples at concentrations below respective SLVs and SRVs.

- DRO was detected in all 6 soil samples analyzed at concentrations ranging from 8.85 mg/kg in sample ST-5 (2.5-4) to 534 mg/kg in sample ST-6 (0-2). There are no established MPCA SRVs or SLVs for DRO, however, the MPCA considers excavated soil with DRO concentrations greater than 100 mg/kg to be "regulated fill." DRO was detected at concentrations exceeding 100 mg/kg in the following samples:

  - ST-1 (2.5-4) at 117 mg/kg
  - ST-2 (1-4) at 158 mg/kg
  - ST-3 (1-4) at 144 mg/kg
  - ST-4 (0-2) at 205 mg/kg
  - ST-6 (0-2) at 534 mg/kg

- GRO was detected in 1 of the 6 soil samples analyzed at concentrations greater than or equal to laboratory reporting limits. There are no established MPCA SRVs or SLV for GRO; however, the MPCA considers excavated soil with GRO concentrations greater than 100 m/kg to be "regulated fill." GRO was detected in sample ST-4 (0-2) at a concentration of 12.0 mg/kg, which did not exceed the MPCA Unregulated Fill Criterion of 100 mg/kg.

D.3. Environmental Recommendations

The analyses and provided recommendations are based on our field observations and the results of laboratory chemical analyses of samples collected for this project. It is important to note that our investigation is limited to the diameter of the investigation locations at pre-determined locations and cannot be assumed to be completely representative of the soil (or groundwater) conditions throughout the project.

D.3.a. Unregulated Fill

Soil to be encountered during construction appears to meet MPCA criteria for unrestricted reuse as unregulated fill in the vicinity of boring ST-5. Excess soil generated at this location appears acceptable for onsite or offsite reuse as fill or aggregate.

D.3.b. Regulated Fill Acceptable for Project Reuse

Due to analytical results exceeding corresponding regulatory criteria and a PID reading exceeding 10 ppm, shallow fill material at soil borings ST-1, ST-2, ST-3, and ST-4 is considered Regulated Fill. Construction specifications should include the management and proper handling of soil excavated from these areas for either:

- Reuse on the project under pavement, or
- Disposal at a permitted landfill.

A summary of Regulated Fill by area is provided below:

- DRO and PAH impacts from 2.5 to 4 feet bgs were identified in boring ST-1. This material is acceptable for reuse on the project under an impermeable surface. If the material cannot be reused on the project, the material should be disposed of offsite at an MPCA permitted landfill.

- DRO impacts from 1 to 4 feet bgs were identified in borings ST-2 and ST-3. This material is acceptable for reuse on the project under an impermeable surface. If the material cannot be reused on the project, the material should be disposed of offsite at an MPCA permitted landfill.

- DRO and VOC impacts from 0 to 2 feet bgs were identified in boring ST-4. This material is acceptable for reuse on the project under an impermeable surface. If the material cannot be reused on the project, the material should be disposed of offsite at an MPCA permitted landfill.

D.3.c. Regulated Fill Exceeding Reuse Criteria

If encountered during construction, material excavated below pavement in the vicinity of boring ST-6 to approximately 3 feet bgs should be segregated for off-site disposal at an MPCA permitted landfill due to elevated DRO (534 mg/kg). This material is not acceptable for offsite reuse due to elevated DRO and a PID reading in excess of 10 ppm (i.e., 35.9 ppm).

During earthwork in the vicinity of ST-6, environmental screening with a PID may be beneficial for delineation of impacts and onsite material management decisions in accordance with MPCA unregulated fill criteria.

It is recommended that the City of Two Harbors, their environmental consultant, or their contractor complete a waste profile to obtain landfill approval for waste acceptance in advance of construction. Analytical obtained as part of this evaluation may be acceptable for landfill characterization.

D.3.d. Construction Contingencies

The analyses and conclusions submitted in this report are based on field observations by Braun Intertec and the results of laboratory chemical analyses of samples collected for this project. It is important to note that the Braun Intertec investigation is limited to the diameter of the investigation locations and cannot be assumed to be completely representative of the soil and groundwater conditions throughout the entire Corridor.

Construction contingencies for the management of previously unknown contamination are recommended in the event contamination is discovered during construction (e.g., MnDOT Specification 1717).

E. Procedures

E.1. Penetration Test Borings

We drilled the penetration test borings with an all-terrain vehicle core and auger drill equipped with hollow-stem auger. We performed the borings in general accordance with ASTM D6151 taking penetration test samples at 2 1/2-foot intervals. The boring logs show the actual sample intervals and corresponding depths.

E.2. Exploration Logs

E.2.a. Log of Boring Sheets

The Appendix includes Log of Boring sheets for our penetration test borings. The logs identify and describe the penetrated geologic materials, and present the results of penetration resistance and other in-situ tests performed. The logs also present the results of organic vapor screening performed on penetration test samples, and groundwater measurements.

We inferred strata boundaries from changes in the penetration test samples and the auger cuttings. Because we did not perform continuous sampling, the strata boundary depths are only approximate. The

boundary depths likely vary away from the boring locations, and the boundaries themselves may occur as gradual rather than abrupt transitions.

E.2.b. Organic Vapor Measurements

At predetermined locations, we screened the material samples retrieved during drilling for the presence of organic vapors with a PID using both: (1) direct readings from each sample, and (2) the headspace method of analysis recommended in "Soil Sample Collection and Analysis Procedures," MPCA Petroleum Remediation Guidance Document 4-04 (September 2008). The PID is equipped with a 10.6 eV lamp and calibrated to an isobutylene standard, prior to the start of fieldwork. The results of the readings and sample locations are depicted on Figure 2 and identified on the soil boring logs in the Appendix.

E.2.c. Geologic Origins

We assigned geologic origins to the materials shown on the logs and referenced within this report, based on: (1) a review of the background information and reference documents cited above, (2) visual classification of the various geologic material samples retrieved during the course of our subsurface exploration, (3) penetration resistance and other testing performed for the project, (4) laboratory test results, and (5) available common knowledge of the geologic processes and environments that have impacted the site and surrounding area in the past.

E.3. Material Classification and Testing

E.3.a. Visual and Manual Classification

We visually and manually classified the geologic materials encountered based on ASTM D2488. When we performed laboratory classification tests, we used the results to classify the geologic materials in accordance with ASTM D2487. The Appendix includes a chart explaining the classification system we used.

E.3.b. Soil Sampling

Soil samples collected from the soil borings for laboratory analyses were obtained from the depth interval exhibiting indications of contamination, including intervals where elevated PID readings or intervals with debris were observed. If no indications of contamination were encountered, soil samples were collected from the depth most likely to be excavated based on available construction plans. The soil samples were analyzed by Eurofins Environment Testing (Eurofins) of Cedar Falls, Iowa for a combination of the following analytical parameters:

- Volatile organic compounds (VOCs) using United States Environmental Protection Agency (EPA) Method 8260B
- Polycyclic aromatic hydrocarbons (PAHs) using EPA Method 8270C
- Diesel-range organics (DRO) using the Wisconsin Department of Natural Resources (WDNR) modified Method WI DRO
- Gasoline-range organics (GRO) using the WDNR modified Method WI GRO
- Eight Resource Conservation and Recovery Act (RCRA) total metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) using EPA Method 6010C and Method 7471B

Analytical parameters for soil samples collected from each soil boring are summarized on boring logs and Table A, included as appendices.

E.4. Groundwater Measurements

The drillers checked for groundwater while advancing the penetration test borings, and again after auger withdrawal. We then filled the boreholes or allowed them to remain open for an extended period of observation, as noted on the boring logs.

F. Qualifications

F.1. Variations in Subsurface Conditions

F.1.a. Material Strata

We developed our evaluation, analyses and recommendations from a limited amount of site and subsurface information. It is not standard engineering practice to retrieve material samples from exploration locations continuously with depth. Therefore, we must infer strata boundaries and thicknesses to some extent. Strata boundaries may also be gradual transitions, and project planning should expect the strata to vary in depth, elevation and thickness, away from the exploration locations.

Variations in subsurface conditions present between exploration locations may not be revealed until performing additional exploration work, or starting construction. If future activity for this project reveals any such variations, you should notify us so that we may reevaluate our recommendations. Such variations could increase construction costs, and we recommend including a contingency to accommodate them.

F.1.b. Groundwater Levels

We made groundwater measurements under the conditions reported herein and shown on the exploration logs, and interpreted in the text of this report. Note that the observation periods were relatively short, and project planning can expect groundwater levels to fluctuate in response to rainfall, flooding, irrigation, seasonal freezing and thawing, surface drainage modifications and other seasonal and annual factors.

F.2. Continuity of Professional Responsibility

F.2.a. Plan Review

We based this report on a limited amount of information, and we made a number of assumptions to help us develop our recommendations. We should be retained to review the geotechnical aspects of the designs and specifications. This review will allow us to evaluate whether we anticipated the design correctly, if any design changes affect the validity of our recommendations, and if the design and specifications correctly interpret and implement our recommendations.

F.2.b. Construction Observations and Testing

We recommend retaining us to perform the required observations and testing during construction as part of the ongoing geotechnical evaluation. This will allow us to correlate the subsurface conditions exposed during construction with those encountered by the borings and provide professional continuity from the design phase to the construction phase. If we do not perform observations and testing during construction, it becomes the responsibility of others to validate the assumption made during the preparation of this report and to accept the construction-related geotechnical engineer-of-record responsibilities.

F.3. Use of Report

This report is for the exclusive use of the addressed parties. Without written approval, we assume no responsibility to other parties regarding this report. Our evaluation, analyses and recommendations may not be appropriate for other parties or projects.

F.4. Standard of Care

In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality. No warranty, express or implied, is made.

Appendix

Standard Penetration Test Boring

N

0 75 150 Feet

1" = 150 Feet

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Drawing Information

Project No: B2406524

Drawing No: F1_BoringLocations

Drawn By:	ZS
Date Drawn:	9/23/2024
Checked By:	MJL
Last Modified:	8/20/2024

Project Information

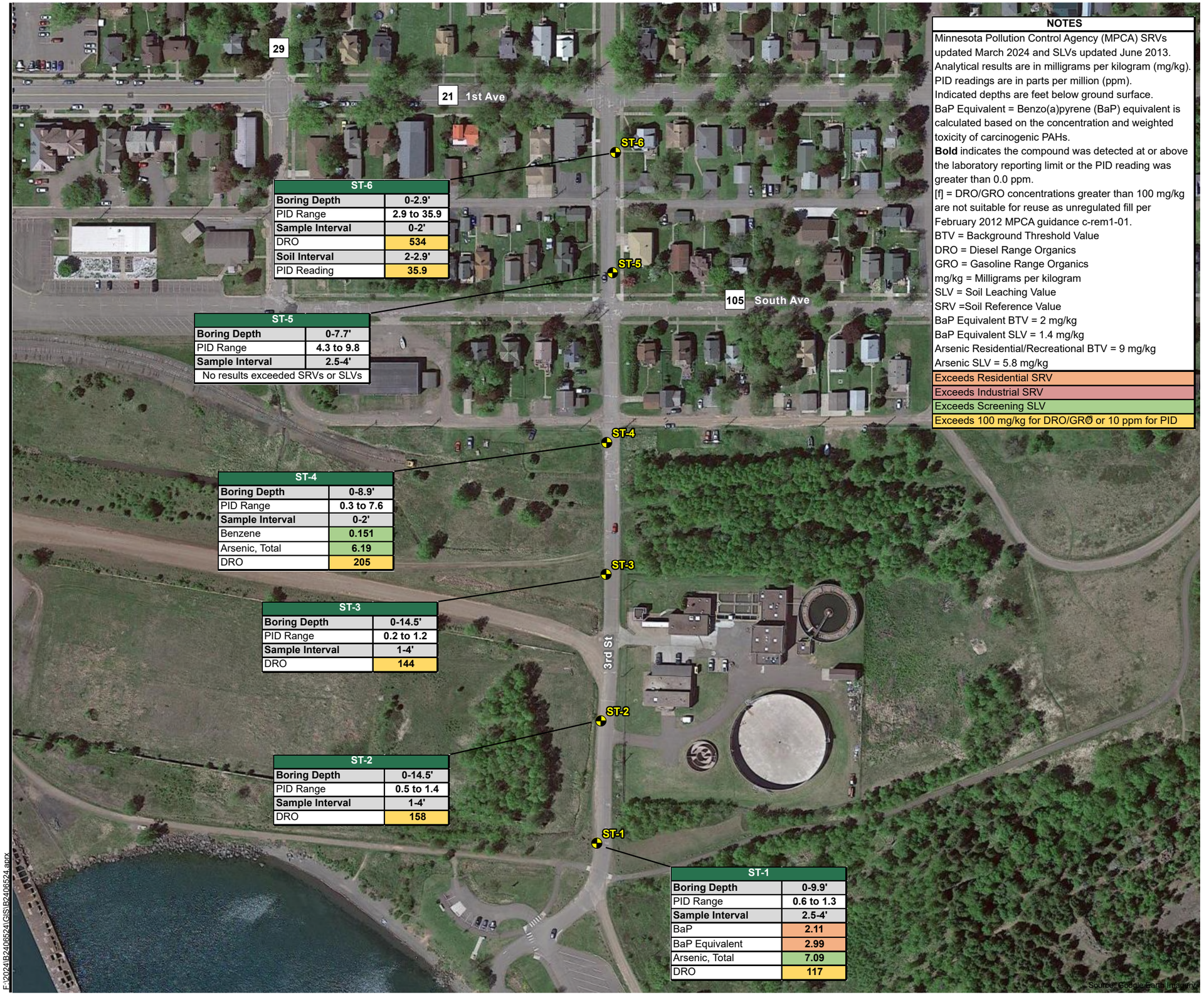
Geotechnical Evaluation and Environmental Screening Results

Lighthouse Point Road Reconstruction

Two Harbors, Minnesota

Boring Location Sketch

Figure 1



ST-6	
Boring Depth	**0-2.9'**
PID Range	**2.9 to 35.9**
Sample Interval	**0-2'**
DRO	**534**
Soil Interval	**2-2.9'**
PID Reading	**35.9**

ST-5	
Boring Depth	**0-7.7'**
PID Range	**4.3 to 9.8**
Sample Interval	**2.5-4'**
No results exceeded SRVs or SLVs	

ST-4	
Boring Depth	**0-8.9'**
PID Range	**0.3 to 7.6**
Sample Interval	**0-2'**
Benzene	**0.151**
Arsenic, Total	**6.19**
DRO	**205**

ST-3	
Boring Depth	**0-14.5'**
PID Range	**0.2 to 1.2**
Sample Interval	**1-4'**
DRO	**144**

ST-2	
Boring Depth	**0-14.5'**
PID Range	**0.5 to 1.4**
Sample Interval	**1-4'**
DRO	**158**

ST-1	
Boring Depth	**0-9.9'**
PID Range	**0.6 to 1.3**
Sample Interval	**2.5-4'**
BaP	**2.11**
BaP Equivalent	**2.99**
Arsenic, Total	**7.09**
DRO	**117**

NOTES

Minnesota Pollution Control Agency (MPCA) SRVs updated March 2024 and SLVs updated June 2013.
Analytical results are in milligrams per kilogram (mg/kg).
PID readings are in parts per million (ppm).
Indicated depths are feet below ground surface.
BaP Equivalent = Benzo(a)pyrene (BaP) equivalent is calculated based on the concentration and weighted toxicity of carcinogenic PAHs.
Bold indicates the compound was detected at or above the laboratory reporting limit or the PID reading was greater than 0.0 ppm.
[f] = DRO/GRO concentrations greater than 100 mg/kg are not suitable for reuse as unregulated fill per February 2012 MPCA guidance c-rem1-01.
BTV = Background Threshold Value
DRO = Diesel Range Organics
GRO = Gasoline Range Organics
mg/kg = Milligrams per kilogram
SLV = Soil Leaching Value
SRV =Soil Reference Value
BaP Equivalent BTV = 2 mg/kg
BaP Equivalent SLV = 1.4 mg/kg
Arsenic Residential/Recreational BTV = 9 mg/kg
Arsenic SLV = 5.8 mg/kg

Exceeds Residential SRV
Exceeds Industrial SRV
Exceeds Screening SLV
Exceeds 100 mg/kg for DRO/GRO[f] or 10 ppm for PID

Standard Penetration Test Boring

N

0 75 150 Feet

1" = 150 Feet

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Drawing Information

Project No: B2406524

Drawing No: F2_SoilAnalytical

Drawn By:	ZS
Date Drawn:	9/23/2024
Checked By:	MJL
Last Modified:	9/23/2024

Project Information

Geotechnical Evaluation and Environmental Screening Results

Lighthouse Point Road Reconstruction

Two Harbors, Minnesota

Soil Analytical Exceedances

Figure 2

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2406524
Geotechnical Evaluation
Lighthouse Point Road Reconstruction
Lighthouse Point Road
Two Harbors, Minnesota

BORING: **ST-1**
LOCATION:
DATUM: NAD 1983 HARN Adj MN Lake (US Feet)
NORTHING: 81820 EASTING: 436165
DRILLER: M. Heinzen LOGGED BY: D. Morrison START DATE: 08/30/24 END DATE: 08/30/24
SURFACE ELEVATION: 625.0 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Soil WEATHER: Sunny

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	PID ppm	MC %	Tests or Remarks
623.5		FILL: SILTY SAND (SM), fine to medium-grained, trace Gravel, brown, moist			1.3		
1.5		FILL: LEAN CLAY (CL), with Sand, organic, brown, moist		3-2-5 (7) 12"	0.8		Sample ST-1 (2.5-4) collected at 14:55 for VOCs, GRO, DRO, PAHs, and RCRA metals
621.0							
4.0		LEAN CLAY (CL), with Sand, brown, moist, medium to stiff (LACUSTRINE)		3-2-4 (6) 12"	1.1		
			5				
				4-6-6 (12) 16"	1.3		
615.1							
9.9		END OF BORING	10	50/5" (REF) 6"	0.6		Auger met refusal at 9.9 feet
		Boring then backfilled with auger cuttings					Water not observed while drilling.
			15				

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2406524
Geotechnical Evaluation
Lighthouse Point Road Reconstruction
Lighthouse Point Road
Two Harbors, Minnesota

BORING: **ST-2**
LOCATION:
DATUM: NAD 1983 HARN Adj MN Lake (US Feet)
NORTHING: 82014 EASTING: 436171
DRILLER: M. Heinzen LOGGED BY: D. Morrison START DATE: 08/30/24 END DATE: 08/30/24
SURFACE ELEVATION: 619.4 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Sunny

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	PID ppm	MC %	Tests or Remarks
617.4		FILL: SILTY SAND (SM), fine to medium-grained, trace Gravel, brown, moist			1.4		Sample ST-2 (1-4) collected at 14:40 for VOCs, GRO, DRO, PAHs, and RCRA metals
2.0 615.4		FILL: LEAN CLAY (CL), with Sand, organic, brown, moist		2-3-5 (8) 8"	0.5		
4.0		LEAN CLAY (CL), brown, moist, medium (LACUSTRINE)	5	2-3-3 (6) 8"	1.3		
				2-3-4 (7) 10"	1.1		
			10	3-3-4 (7) 18"	0.9		
604.9				3-3-5 (8) 18"	0.5		
14.5		END OF BORING Boring then backfilled with auger cuttings	15				Water not observed while drilling.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2406524
Geotechnical Evaluation
Lighthouse Point Road Reconstruction
Lighthouse Point Road
Two Harbors, Minnesota

BORING: **ST-3**
LOCATION:
DATUM: NAD 1983 HARN Adj MN Lake (US Feet)
NORTHING: 82244 EASTING: 436180
DRILLER: M. Heinzen LOGGED BY: D. Morrison START DATE: 08/30/24 END DATE: 08/30/24
SURFACE ELEVATION: 623.1 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Grass WEATHER: Sunny

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	PID ppm	MC %	Tests or Remarks
621.1		SILTY SAND (SM), fine to medium-grained, with organic, black, moist (TOPSOIL FILL)			1.2		Sample ST-3 (1-4) collected at 13:45 for VOCs, GRO, DRO, PAHs, and RCRA metals
2.0		FILL: LEAN CLAY (CL), with Sand, Gravel, brown, moist		4-4-8 (12) 5"	0.2		
619.1							
4.0		LEAN CLAY (CL), trace Sand, brown, moist, medium to stiff (LACUSTRINE)		3-3-6 (9) 6"	0.9		
			5				
				3-4-5 (9) 14"	0.6		
			10	3-4-4 (8) 16"	0.3		
				3-3-4 (7) 18"	0.4		
608.6							
14.5		END OF BORING	15				Water not observed while drilling.
		Boring then backfilled with auger cuttings					

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2406524
Geotechnical Evaluation
Lighthouse Point Road Reconstruction
Lighthouse Point Road
Two Harbors, Minnesota

BORING: **ST-4**
LOCATION:
DATUM: NAD 1983 HARN Adj MN Lake (US Feet)
NORTHING: 82453 EASTING: 436181
START DATE: 08/30/24 END DATE: 08/30/24
DRILLER: M. Heinzen LOGGED BY: D. Morrison
SURFACE ELEVATION: 623.3 ft RIG: 75012 METHOD: 3 1/4" HSA
SURFACING: Asphalt WEATHER: Sunny

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	PID ppm	MC %	Tests or Remarks
622.9		BITUMINOUS, 4 inches					
0.3		APPARENT AGGREGATE BASE, 2 inches			7.6		Sample ST-4 (0-2) collected at 11:55 for VOCs, GRO, DRO, PAHs, and RCRA metals
622.8		FILL: SILTY SAND (SM), fine to medium-grained, with Gravel, with Clay, black, moist					
0.5							
621.3							
2.0		FILL: LEAN CLAY (CL), trace Gravel, Sand, brown, moist		4-3-4 (7) 8"	3.3		
				3-3-3 (6) 4"	2.7		
616.8							
6.5		FILL: SILTY SAND (SM), fine to medium-grained, with Gravel, brown, moist		3-3-1 (4) 3"	0.3		
614.8	▽						
8.5		SILTY SAND (SM), fine to medium-grained, with Gravel, brown, moist, very dense, (WEATHERED BEDROCK)		50/5" (REF) 5"	0.5		Sewer utility
614.4							Auger met refusal at 8.9 feet
8.9		END OF BORING					
		Boring then backfilled with auger cuttings					Water observed at 8.2 feet with 8.4 feet of tooling in the ground while drilling.

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2406524
Geotechnical Evaluation
Lighthouse Point Road Reconstruction
Lighthouse Point Road
Two Harbors, Minnesota

BORING: **ST-5**
LOCATION:
DATUM: NAD 1983 HARN Adj MN Lake (US Feet)
NORTHING: 82720 EASTING: 436190
DRILLER: M. Heinzen LOGGED BY: D. Morrison START DATE: 08/30/24 END DATE: 08/30/24
SURFACE ELEVATION: 631.8 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Asphalt WEATHER: Sunny

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	PID ppm	MC %	Tests or Remarks
~~631.6~~		BITUMINOUS, 2 inches			4.3		
0.2		APPARENT AGGREGATE BASE, 4 inches					
631.3		LEAN CLAY (CL), trace Sand, trace Gravel,					
0.5		brown, moist, medium to stiff (LACUSTRINE)					
				3-3-3 (6) 10"			Sample ST-5 (2.5-4) collected at 10:55 for VOCs, GRO, DRO, PAHs, and RCRA metals
5				4-4-6 (10) 15"			
624.1				50/4" (REF) 3"			
7.7		END OF BORING					Auger met refusal at 7.7 feet
		Boring then backfilled with auger cuttings					Water not observed while drilling.
10							
15							

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B2406524
Geotechnical Evaluation
Lighthouse Point Road Reconstruction
Lighthouse Point Road
Two Harbors, Minnesota

BORING: **ST-6**
LOCATION:
DATUM: NAD 1983 HARN Adj MN Lake (US Feet)
NORTHING: 82911 EASTING: 436195
DRILLER: M. Heinzen LOGGED BY: D. Morrison START DATE: 08/30/24 END DATE: 08/30/24
SURFACE ELEVATION: 643.3 ft RIG: 75012 METHOD: 3 1/4" HSA SURFACING: Concrete WEATHER: Sunny

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Blows (N-Value) Recovery	PID ppm	MC %	Tests or Remarks
642.7		PAVEMENT, 5 inches, 2 inches of bituminous over 5 inches of concrete			2.9		
0.6		POORLY GRADED GRAVEL (GP), gray, moist, very dense, (WEATHERED BEDROCK)		40-50/4" (REF) 6"	35.9		Sample ST-6 (1-2) collected at 10:11 for VOCs, GRO, DRO, PAHs, and RCRA metals
640.4							Auger met refusal at 2.9 feet
2.9		END OF BORING					
		Boring then backfilled with auger cuttings					Water not observed while drilling.
		5					
		10					
		15					

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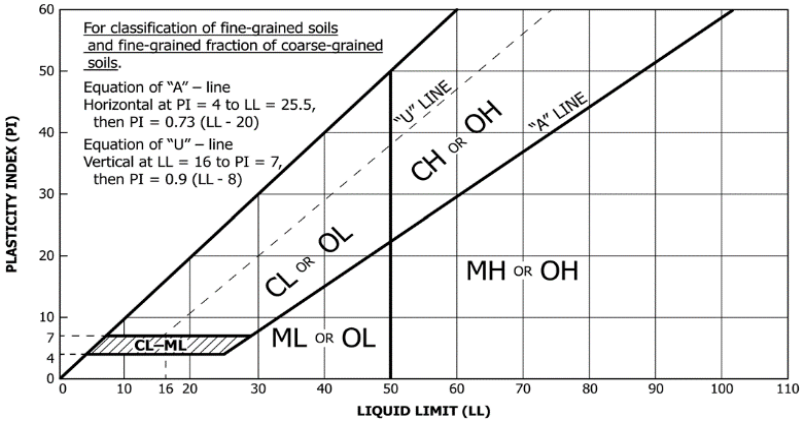
Descriptive Terminology of Soil

Based on Standards ASTM D2487/2488
(Unified Soil Classification System)

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]				Soil Classification	
				Group Symbol	Group Name[B]
Coarse-grained Soils (more than 50% retained on No. 200 sieve)	Gravels (More than 50% of coarse fraction retained on No. 4 sieve)	Clean Gravels (Less than 5% fines[C])	$C_u \geq 4$ and $1 \leq C_c \leq 3$[D]	GW	Well-graded gravel[E]
			$C_u < 4$ and/or ($C_c < 1$ or $C_c > 3$)[D]	GP	Poorly graded gravel[E]
		Gravels with Fines (More than 12% fines[C])	Fines classify as ML or MH	GM	Silty gravel[E F G]
			Fines Classify as CL or CH	GC	Clayey gravel[E F G]
	Sands (50% or more coarse fraction passes No. 4 sieve)	Clean Sands (Less than 5% fines[H])	$C_u \geq 6$ and $1 \leq C_c \leq 3$[D]	SW	Well-graded sand[I]
			$C_u < 6$ and/or ($C_c < 1$ or $C_c > 3$)[D]	SP	Poorly graded sand[I]
		Sands with Fines (More than 12% fines[H])	Fines classify as ML or MH	SM	Silty sand[F G I]
			Fines classify as CL or CH	SC	Clayey sand[F G I]
Fine-grained Soils (50% or more passes the No. 200 sieve)	Silts and Clays (Liquid limit less than 50)	Inorganic	PI > 7 and plots on or above "A" line[J]	CL	Lean clay[K L M]
			PI < 4 or plots below "A" line[J]	ML	Silt[K L M]
		Organic	Liquid Limit – oven dried / Liquid Limit – not dried <0.75	OL	Organic clay[K L M N] / Organic silt[K L M O]
	Silts and Clays (Liquid limit 50 or more)	Inorganic	PI plots on or above "A" line	CH	Fat clay[K L M]
			PI plots below "A" line	MH	Elastic silt[K L M]
		Organic	Liquid Limit – oven dried / Liquid Limit – not dried <0.75	OH	Organic clay[K L M P] / Organic silt[K L M Q]
Highly Organic Soils		Primarily organic matter, dark in color, and organic odor		PT	Peat

A. Based on the material passing the 3-inch (75-mm) sieve.
B. If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
C. Gravels with 5 to 12% fines require dual symbols:
   GW-GM well-graded gravel with silt
   GW-GC well-graded gravel with clay
   GP-GM poorly graded gravel with silt
   GP-GC poorly graded gravel with clay
D. $C_u = D_{60} / D_{10}$ $C_c = (D_{30})^2 / (D_{10} \times D_{60})$
E. If soil contains ≥ 15% sand, add "with sand" to group name.
F. If fines classify as CL-ML, use dual symbol GC-GM or SC-SM.
G. If fines are organic, add "with organic fines" to group name.
H. Sands with 5 to 12% fines require dual symbols:
   SW-SM well-graded sand with silt
   SW-SC well-graded sand with clay
   SP-SM poorly graded sand with silt
   SP-SC poorly graded sand with clay
I. If soil contains ≥ 15% gravel, add "with gravel" to group name.
J. If Atterberg limits plot in hatched area, soil is CL-ML, silty clay.
K. If soil contains 15 to < 30% plus No. 200, add "with sand" or "with gravel", whichever is predominant.
L. If soil contains ≥ 30% plus No. 200, predominantly sand, add "sandy" to group name.
M. If soil contains ≥ 30% plus No. 200 predominantly gravel, add "gravelly" to group name.
N. PI ≥ 4 and plots on or above "A" line.
O. PI < 4 or plots below "A" line.
P. PI plots on or above "A" line.
Q. PI plots below "A" line.



Laboratory Tests

DD	Dry density, pcf	**q_p**	Pocket penetrometer strength, tsf
WD	Wet density, pcf	**q_U**	Unconfined compression test, tsf
P200	% Passing #200 sieve	**LL**	Liquid limit
MC	Moisture content, %	**PL**	Plastic limit
OC	Organic content, %	**PI**	Plasticity index

Particle Size Identification

Boulders..... over 12"
Cobbles..... 3" to 12"
Gravel
  Coarse..... 3/4" to 3" (19.00 mm to 75.00 mm)
  Fine..... No. 4 to 3/4" (4.75 mm to 19.00 mm)
Sand
  Coarse..... No. 10 to No. 4 (2.00 mm to 4.75 mm)
  Medium..... No. 40 to No. 10 (0.425 mm to 2.00 mm)
  Fine..... No. 200 to No. 40 (0.075 mm to 0.425 mm)
Silt..... No. 200 (0.075 mm) to .005 mm
Clay..... < .005 mm

Relative Proportions[L, M]

trace..... 0 to 5%
little..... 6 to 14%
with..... ≥ 15%

Inclusion Thicknesses

lens..... 0 to 1/8"
seam..... 1/8" to 1"
layer..... over 1"

Apparent Relative Density of Cohesionless Soils

Very loose ..... 0 to 4 BPF
Loose ..... 5 to 10 BPF
Medium dense..... 11 to 30 BPF
Dense..... 31 to 50 BPF
Very dense..... over 50 BPF

Consistency of Cohesive Soils	Blows Per Foot	Approximate Unconfined Compressive Strength
Very soft	0 to 1 BPF	< 0.25 tsf
Soft	2 to 4 BPF	0.25 to 0.5 tsf
Medium	5 to 8 BPF	0.5 to 1 tsf
Stiff	9 to 15 BPF	1 to 2 tsf
Very Stiff	16 to 30 BPF	2 to 4 tsf
Hard	over 30 BPF	> 4 tsf

Moisture Content:

Dry: Absence of moisture, dusty, dry to the touch.
Moist: Damp but no visible water.
Wet: Visible free water, usually soil is below water table.

Drilling Notes:

Blows/N-value: Blows indicate the driving resistance recorded for each 6-inch interval. The reported N-value is the blows per foot recorded by summing the second and third interval in accordance with the Standard Penetration Test, ASTM D1586.

Partial Penetration: If the sampler could not be driven through a full 6-inch interval, the number of blows for that partial penetration is shown as #/x" (i.e. 50/2"). The N-value is reported as "REF" indicating refusal.

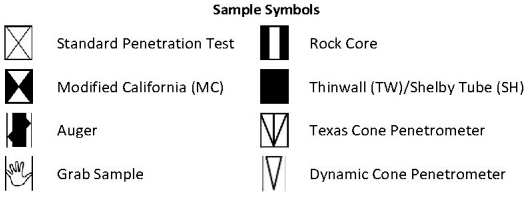
Recovery: Indicates the inches of sample recovered from the sampled interval. For a standard penetration test, full recovery is 18", and is 24" for a thinwall/shelby tube sample.

WOH: Indicates the sampler penetrated soil under weight of hammer and rods alone; driving not required.

WOR: Indicates the sampler penetrated soil under weight of rods alone; hammer weight and driving not required.

Water Level: Indicates the water level measured by the drillers either while drilling (▽), at the end of drilling (▼), or at some time after drilling (▼).

Sample Symbols



5/2021

Table A
Soil Analytical Results
Lighthouse Point Road Reconstruction
Two Harbors, Minnesota
Project B2406524

Compound/Parameter	CAS No.	Sample Location, Sample Identifier, and Date Collected							Residential/ Recreational SRV (mg/kg)	Commercial/ Industrial SRV (mg/kg)	SLV (mg/kg)
		ST-1 (2.5-4)	ST-2 (1-4)	ST-3 (1-4)	ST-4 (0-2)	ST-5 (2.5-4)	ST-6 (0-2)	TB			
		310-289515-1	310-289515-2	310-289515-3	310-289515-4	310-289515-5	310-289515-6	310-289515-7			
		08/30/24	08/30/24	08/30/24	08/30/24	08/30/24	08/30/24	08/30/24			
Volatile Organic Compounds (VOCs) (mg/kg)											
Benzene	71-43-2	<0.165	<0.0936	<0.121	**0.151**	<0.130	<0.0957	<0.100	9.5	42	0.017
Ethylbenzene	100-41-4	<0.165	<0.0936	<0.121	**0.135**	<0.130	<0.0957	<0.100	190	480	1.0
Toluene	108-88-3	<0.165	**0.102**	**0.144**	**0.715**	<0.130	<0.0957	<0.100	820	820	2.5
1,2,4-Trimethylbenzene	95-63-6	<0.165	**0.112**	**0.146**	**0.496**	<0.130	<0.0957	<0.100	140	220	2.7
Xylenes, total	1330-20-7	<0.247	**0.311**	**0.326**	**1.27**	<0.196	<0.144	<0.150	260[b]	260[b]	5.4 [b]
All other reported VOCs	---	<RL	<RL	<RL	<RL	<RL	<RL	<RL	---	---	---
Polycyclic Aromatic Hydrocarbons (PAHs) (mg/kg)											
Acenaphthene	83-32-9	**0.0177**	**0.0307**	**0.0235**	**0.119**	**0.0144**	<0.0201	---	460	6,800	81
Acenaphthylene	208-96-8	**0.263**	**0.0305**	**0.0409**	**0.197**	**0.00815**	<0.0201	---	NE	NE	NE
Anthracene	120-12-7	**0.307**	**0.0222**	**0.0748 [F2],[I],[F1]**	**0.172**	**0.0110**	<0.0201	---	2,800	42,000	1,300
Benz(a)anthracene	56-55-3	**2.15**	**0.0968**	**0.203 [F2],[F1]**	**0.659**	**0.0168**	**0.0340**	---	cPAH	cPAH	cPAH
Benzo(b)fluoranthene	205-99-2	**3.26**	**0.0974**	**0.321 [F2],[F1]**	**0.653**	**0.00828**	**0.0473**	---	cPAH	cPAH	cPAH
Benzo(k)fluoranthene	207-08-9	**0.848**	**0.0301**	**0.126 [F2],[F1]**	**0.183**	**0.00491**	<0.0201	---	cPAH	cPAH	cPAH
Benzo(a)pyrene (BaP)	50-32-8	**2.11**	**0.0845**	**0.197 [F2],[F1]**	**0.385**	**0.0113 [I]**	**0.0341**	---	2[BTV]; cPAH	23; cPAH	1.4; cPAH
Benzo(g,h,i)perylene	191-24-2	**1.19**	**0.0639**	**0.186**	**0.252**	**0.00464**	**0.189**	---	NE	NE	NE
Chrysene	218-01-9	**1.86**	**0.103**	**0.263 [F2],[F1]**	**0.628**	**0.0136**	**0.121**	---	cPAH	cPAH	cPAH
Dibenz(a,h)anthracene	53-70-3	**0.272 [I]**	**0.0307**	**0.0618 [I]**	**0.0829**	<0.00241	**0.0333 [I]**	---	cPAH	cPAH	cPAH
Fluoranthene	206-44-0	**4.81**	**0.128 [I]**	**0.381 [F2],[F1]**	**1.01**	**0.0234**	<0.0201	---	210	2,700	670
Fluorene	86-73-7	**0.0621**	**0.0722**	**0.0575**	**0.251**	**0.0185**	<0.0201	---	390	5,800	110
Indeno(1,2,3-cd)pyrene	193-39-5	**0.863**	**0.0402**	**0.114**	**0.154**	**0.00358**	**0.0442**	---	cPAH	cPAH	cPAH
2-Methyl naphthalene	91-57-6	**0.421**	**1.23**	**1.01**	**5.62**	**0.0132**	<0.0201	---	39	580	NE
Naphthalene	91-20-3	**0.550**	**0.831**	**0.624**	**3.97**	**0.00629**	<0.0201	---	81	280	4.5
Phenanthrene	85-01-8	**0.712**	**0.429**	**0.530 [F1]**	**1.75**	**0.0491**	**0.0468**	---	NE	NE	NE
Pyrene	129-00-0	**4.94**	**0.118**	**0.294 [F2],[F1]**	**0.981**	**0.0320**	**0.0928**	---	220	3,200	440
BaP Equivalent Concentration [c]	---	**2.99**	**0.129**	**0.311**	**0.603**	**0.0148**	**0.0665**	---	2[BTV]	23	1.4
Metals (mg/kg)											
Arsenic, Total	7440-38-2	**7.09**	**2.06**	**3.60**	**6.19**	**4.14**	**1.89**	---	9[BTV]	9[BTV]	5.8
Barium, Total	7440-39-3	**46.0**	**32.0**	**33.4**	**80.0**	**171**	**62.5**	---	3,100	41,000	1,700
Cadmium, Total	7440-43-9	<0.534	<0.394	<0.427	<0.503	<0.483	<0.447	---	1.6	23	8.8
Chromium, Total [e]	7440-47-3	**19.6**	**17.6**	**15.7**	**14.6**	**45.8**	**22.4**	---	23,000/2.3[e]	100,000/62[e]	1,000,000,000/36[e]
Lead, Total	7439-92-1	**199**	**7.50**	**15.6**	**67.6**	**9.74**	**3.90**	---	200	460	2,700
Mercury, Total	7439-97-6	**0.186**	<0.0157	**0.0267**	**0.0557**	**0.0268**	<0.0178	---	2.7	3.1	3.3
Selenium, Total	7782-49-2	<1.60	<1.18	<1.28	<1.51	<1.45	<1.34	---	78	1,200	2.6
Silver, Total	7440-22-4	<0.534	<0.394	<0.427	<0.503	<0.483	<0.447	---	78	1,200	7.9

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Table A
Soil Analytical Results
Lighthouse Point Road Reconstruction
Two Harbors, Minnesota
Project B2406524

Compound/Parameter	CAS No.	Sample Location, Sample Identifier, and Date Collected							Residential/ Recreational SRV (mg/kg)	Commercial/ Industrial SRV (mg/kg)	SLV (mg/kg)
		ST-1 (2.5-4)	ST-2 (1-4)	ST-3 (1-4)	ST-4 (0-2)	ST-5 (2.5-4)	ST-6 (0-2)	TB			
		310-289515-1	310-289515-2	310-289515-3	310-289515-4	310-289515-5	310-289515-6	310-289515-7			
		08/30/24	08/30/24	08/30/24	08/30/24	08/30/24	08/30/24	08/30/24			
Petroleum Parameters (mg/kg)									**MPCA Unreg. Fill Criterion**		
Diesel Range Organics (DRO)	---	**117**	**158**	**144**	**205**	**8.85**	**534**	---	100[f]		
Gasoline Range Organics (GRO)	---	<13.3	<10.0	<10.9	**12.0**	<12.3	<9.40	<10.0	100[f]		

Notes
Minnesota Pollution Control Agency (MPCA) Soil Reference Values (SRVs) updated in March 2024 and Soil Leaching Values (SLVs) updated in June 2013.
mg/kg = Milligrams per kilogram.
< = Not detected at or above the laboratory reporting limit indicated.
--- = Not analyzed or calculated for this parameter or not applicable.
Bold indicates the compound was detected at or above the laboratory reporting limit.
BTV = Background Threshold Value. BTVs are not calculated health based SRVs. The MPCA calculated SRVs were determined to be below background values (MPCA guidance document c-r1-05, April 2021).
cPAH = Included in the calculation for the BaP equivalent concentration.
NE = Regulatory limit not established for this parameter.
RL = Reporting limits for other parameters that are not listed individually in this table because their concentrations were below reporting limits provided in the laboratory report.
[a] = Regulatory limit for combination of cis- and trans-1,3-Dichloropropene.
[b] = Regulatory limit for combination of m-, p-, and o-Xylenes.
[c] = Benzo(a)pyrene (BaP) equivalent concentration is calculated based on the concentration and weighted toxicity of cPAHs (MPCA, 2009). If no cPAHs were detected above reasonable laboratory reporting limits the BaP equivalent concentration is reported as 0 mg/kg per MPCA Remediation Division Policy (June 2011).
[d] = Regulatory limit for 4-Methylphenol only.
[e] = Reported result is total chromium, regulatory limit for chromium III and chromium VI are provided.
[f] = DRO/GRO concentrations greater than 100 mg/kg are not suitable for reuse as unregulated fill per MPCA Guidance Document c-rem1-01 "Best Management Practices for the Off-Site Reuse of Unregulated Fill".
[*+]: LCS and/or LCSD is outside acceptance limits, high biased.
[I]: Value is EMPC (estimated maximum possible concentration).
[F1]: MS and/or MSD recovery exceeds control limits.
[F2]: MS/MSD RPD exceeds control limits

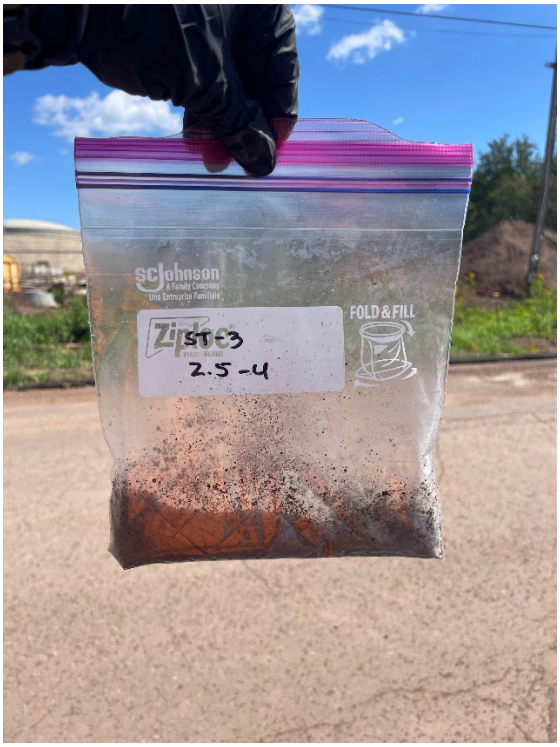
Exceeds Residential/Recreational SRV
Exceeds Commercial/Industrial SRV
Exceeds SLV
Exceeds 100 mg/kg for DRO/GRO

Photograph #1	Lighthouse Point Road Reconstruction – Environmental Screening	B2406524
Date:	8/30/2024	BRAUN INTERTEC
Direction:	Facing east	
Subject:	Boring ST-6 was advanced north of South Avenue on the east side of the roadway.	

Photograph #2	Lighthouse Point Road Reconstruction – Environmental Screening	B2406524
Date:	8/30/2024	BRAUN INTERTEC
Direction:	Facing southwest	
Subject:	Boring ST-5 was advanced south of South Avenue on the east side of the roadway.	

Photograph #3	Lighthouse Point Road Reconstruction – Environmental Screening	B2406524
Date:	8/30/2024	BRAUN INTERTEC
Direction:	Facing south	
Subject:	Boring ST-4 was advanced in the southern portion of the Corridor on the west side of the roadway.	

Photograph #4	Lighthouse Point Road Reconstruction – Environmental Screening	B2406524
Date:	8/30/2024	BRAUN INTERTEC
Direction:	Facing west	
Subject:	Boring ST-3 was advanced northwest of the Wastewater Treatment Facility on the west side of the roadway.	



Photograph #5	Lighthouse Point Road Reconstruction – Environmental Screening	B2406524
Date:	8/30/2024	BRAUN INTERTEC
Direction:	Facing east	
Subject:	Silty sand fill material encountered from boring ST-3.	

Photograph #6	Lighthouse Point Road Reconstruction – Environmental Screening	B2406524
Date:	8/30/2024	BRAUN INTERTEC
Direction:	Facing southwest	
Subject:	Boring ST-1 was advanced at the southern extent of the Corridor on the western side of the roadway.	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Melissa Gross
Braun Intertec Corporation
4511 West First Street
Suite 4
Duluth, Minnesota 55807

Generated 9/16/2024 11:04:15 AM

JOB DESCRIPTION

Two Harbor Lighthouse
B2406524

JOB NUMBER

310-289515-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

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Authorization

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9/16/2024 11:04:15 AM

Authorized for release by
Zach Bindert, Senior Project Manager
Zach.Bindert@et.eurofinsus.com
(319)595-2016

Table of Contents

Job Narrative
310-289515-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers and/or narrative comments are included to explain any exceptions, if applicable.

- Matrix QC may not be reported if insufficient sample is provided or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The samples were received on 8/31/2024 10:00 AM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 1.9°C.

GC/MS VOA
Method 8260D: Surrogate recovery was outside acceptance limits for the following matrix spike/matrix spike duplicate (MS/MSD) sample: (310-289355-C-2-B MS). The parent sample's surrogate recovery was within limits. The MS/MSD sample has been qualified and reported.

Method 8260D: The laboratory control sample (LCS) and / or laboratory control sample duplicate (LCSD) for preparation batch 310-432142 and analytical batch 310-432144 recovered outside control limits for the following analytes: 1,1-Dichloroethane. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

GC/MS Semi VOA
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Gasoline Range Organics
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Diesel Range Organics
Method WI_DRO: Significant peaks, readily distinguished from background, were detected in the following samples within five minutes after the end of the analytical window defined by the last component eluting in the Diesel Range Organics (DRO) mix (i.e., n-Octacosane): ST-1 (2.5-4) (310-289515-1), ST-2 (1-4) (310-289515-2), ST-3 (1-4) (310-289515-3) and ST-6 (0-2) (310-289515-6).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Metals
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

General Chemistry
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Sample Summary

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-289515-1	ST-1 (2.5-4)	Solid	08/30/24 14:55	08/31/24 10:00
310-289515-2	ST-2 (1-4)	Solid	08/30/24 14:40	08/31/24 10:00
310-289515-3	ST-3 (1-4)	Solid	08/30/24 13:45	08/31/24 10:00
310-289515-4	ST-4 (0-2)	Solid	08/30/24 11:55	08/31/24 10:00
310-289515-5	ST-5 (2.5-4)	Solid	08/30/24 10:55	08/31/24 10:00
310-289515-6	ST-6 (0-2)	Solid	08/30/24 10:11	08/31/24 10:00
310-289515-7	TB	Solid	08/30/24 12:00	08/31/24 10:00

Detection Summary

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Client Sample ID: ST-1 (2.5-4) — Lab Sample ID: 310-289515-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acenaphthene	0.0177		0.0130		mg/Kg	5	☼	8270E	Total/NA
Acenaphthylene	0.263		0.0130		mg/Kg	5	☼	8270E	Total/NA
Anthracene	0.307		0.0130		mg/Kg	5	☼	8270E	Total/NA
Benzo[a]anthracene	2.15		0.0130		mg/Kg	5	☼	8270E	Total/NA
Benzo[a]pyrene	2.11		0.0130		mg/Kg	5	☼	8270E	Total/NA
Benzo[b]fluoranthene	3.26		0.130		mg/Kg	50	☼	8270E	Total/NA
Benzo[g,h,i]perylene	1.19		0.0130		mg/Kg	5	☼	8270E	Total/NA
Benzo[k]fluoranthene	0.848		0.0130		mg/Kg	5	☼	8270E	Total/NA
Chrysene	1.86		0.0130		mg/Kg	5	☼	8270E	Total/NA
Dibenz(a,h)anthracene	0.272	I	0.0130		mg/Kg	5	☼	8270E	Total/NA
Fluoranthene	4.81		0.130		mg/Kg	50	☼	8270E	Total/NA
Fluorene	0.0621		0.0130		mg/Kg	5	☼	8270E	Total/NA
Indeno[1,2,3-cd]pyrene	0.863		0.0130		mg/Kg	5	☼	8270E	Total/NA
2-Methylnaphthalene	0.421		0.0130		mg/Kg	5	☼	8270E	Total/NA
Naphthalene	0.550		0.0130		mg/Kg	5	☼	8270E	Total/NA
Phenanthrene	0.712		0.0130		mg/Kg	5	☼	8270E	Total/NA
Pyrene	4.94		0.130		mg/Kg	50	☼	8270E	Total/NA
Diesel Range Organics [C10-C28]	117		61.0		mg/Kg	5	☼	WI-DRO	Total/NA
Arsenic	7.09		1.07		mg/Kg	5	☼	6020B	Total/NA
Barium	46.0		1.07		mg/Kg	5	☼	6020B	Total/NA
Chromium	19.6		1.60		mg/Kg	5	☼	6020B	Total/NA
Lead	199		2.67		mg/Kg	5	☼	6020B	Total/NA
Mercury	0.186		0.0209		mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: ST-2 (1-4) — Lab Sample ID: 310-289515-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toluene	0.102		0.0936		mg/Kg	1	☼	8260D	Total/NA
1,2,4-Trimethylbenzene	0.112		0.0936		mg/Kg	1	☼	8260D	Total/NA
Xylenes, Total	0.311		0.140		mg/Kg	1	☼	8260D	Total/NA
Acenaphthene	0.0307		0.0200		mg/Kg	10	☼	8270E	Total/NA
Acenaphthylene	0.0305		0.0200		mg/Kg	10	☼	8270E	Total/NA
Anthracene	0.0222		0.0200		mg/Kg	10	☼	8270E	Total/NA
Benzo[a]anthracene	0.0968		0.0200		mg/Kg	10	☼	8270E	Total/NA
Benzo[a]pyrene	0.0845		0.0200		mg/Kg	10	☼	8270E	Total/NA
Benzo[b]fluoranthene	0.0974		0.0200		mg/Kg	10	☼	8270E	Total/NA
Benzo[g,h,i]perylene	0.0639		0.0200		mg/Kg	10	☼	8270E	Total/NA
Benzo[k]fluoranthene	0.0301		0.0200		mg/Kg	10	☼	8270E	Total/NA
Chrysene	0.103		0.0200		mg/Kg	10	☼	8270E	Total/NA
Dibenz(a,h)anthracene	0.0307		0.0200		mg/Kg	10	☼	8270E	Total/NA
Fluoranthene	0.128	I	0.0200		mg/Kg	10	☼	8270E	Total/NA
Fluorene	0.0722		0.0200		mg/Kg	10	☼	8270E	Total/NA
Indeno[1,2,3-cd]pyrene	0.0402		0.0200		mg/Kg	10	☼	8270E	Total/NA
2-Methylnaphthalene	1.23		0.0200		mg/Kg	10	☼	8270E	Total/NA
Naphthalene	0.831		0.0200		mg/Kg	10	☼	8270E	Total/NA
Phenanthrene	0.429		0.0200		mg/Kg	10	☼	8270E	Total/NA
Pyrene	0.118		0.0200		mg/Kg	10	☼	8270E	Total/NA
Diesel Range Organics [C10-C28]	158		90.0		mg/Kg	5	☼	WI-DRO	Total/NA
Arsenic	2.06		0.789		mg/Kg	5	☼	6020B	Total/NA
Barium	32.0		0.789		mg/Kg	5	☼	6020B	Total/NA
Chromium	17.6		1.18		mg/Kg	5	☼	6020B	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: ST-2 (1-4) (Continued) — Lab Sample ID: 310-289515-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Lead	7.50		1.97		mg/Kg	5	☼	6020B	Total/NA

Client Sample ID: ST-3 (1-4) — Lab Sample ID: 310-289515-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Toluene	0.144		0.121		mg/Kg	1	☼	8260D	Total/NA
1,2,4-Trimethylbenzene	0.146		0.121		mg/Kg	1	☼	8260D	Total/NA
Xylenes, Total	0.326		0.181		mg/Kg	1	☼	8260D	Total/NA
Acenaphthene	0.0235		0.0209		mg/Kg	10	☼	8270E	Total/NA
Acenaphthylene	0.0409		0.0209		mg/Kg	10	☼	8270E	Total/NA
Anthracene	0.0748	F2 I F1	0.0209		mg/Kg	10	☼	8270E	Total/NA
Benzo[a]anthracene	0.203	F2 F1	0.0209		mg/Kg	10	☼	8270E	Total/NA
Benzo[a]pyrene	0.197	F2 F1	0.0209		mg/Kg	10	☼	8270E	Total/NA
Benzo[b]fluoranthene	0.321	F2 F1	0.0209		mg/Kg	10	☼	8270E	Total/NA
Benzo[g,h,i]perylene	0.186		0.0209		mg/Kg	10	☼	8270E	Total/NA
Benzo[k]fluoranthene	0.126	F2 F1	0.0209		mg/Kg	10	☼	8270E	Total/NA
Chrysene	0.263	F2 F1	0.0209		mg/Kg	10	☼	8270E	Total/NA
Dibenz(a,h)anthracene	0.0618	I	0.0209		mg/Kg	10	☼	8270E	Total/NA
Fluoranthene	0.381	F2 F1	0.0209		mg/Kg	10	☼	8270E	Total/NA
Fluorene	0.0575		0.0209		mg/Kg	10	☼	8270E	Total/NA
Indeno[1,2,3-cd]pyrene	0.114		0.0209		mg/Kg	10	☼	8270E	Total/NA
2-Methylnaphthalene	1.01		0.0209		mg/Kg	10	☼	8270E	Total/NA
Naphthalene	0.624		0.0209		mg/Kg	10	☼	8270E	Total/NA
Phenanthrene	0.530	F1	0.0209		mg/Kg	10	☼	8270E	Total/NA
Pyrene	0.294	F2 F1	0.0209		mg/Kg	10	☼	8270E	Total/NA
Diesel Range Organics [C10-C28]	144		127		mg/Kg	5	☼	WI-DRO	Total/NA
Arsenic	3.60		0.854		mg/Kg	5	☼	6020B	Total/NA
Barium	33.4		0.854		mg/Kg	5	☼	6020B	Total/NA
Chromium	15.7		1.28		mg/Kg	5	☼	6020B	Total/NA
Lead	15.6		2.14		mg/Kg	5	☼	6020B	Total/NA
Mercury	0.0267		0.0173		mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: ST-4 (0-2) — Lab Sample ID: 310-289515-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	0.151		0.127		mg/Kg	1	☼	8260D	Total/NA
Ethylbenzene	0.135		0.127		mg/Kg	1	☼	8260D	Total/NA
Naphthalene	0.488		0.317		mg/Kg	1	☼	8260D	Total/NA
Toluene	0.715		0.127		mg/Kg	1	☼	8260D	Total/NA
1,2,4-Trimethylbenzene	0.496		0.127		mg/Kg	1	☼	8260D	Total/NA
Xylenes, Total	1.27		0.190		mg/Kg	1	☼	8260D	Total/NA
Acenaphthene	0.119		0.0109		mg/Kg	5	☼	8270E	Total/NA
Acenaphthylene	0.197		0.0109		mg/Kg	5	☼	8270E	Total/NA
Anthracene	0.172		0.0109		mg/Kg	5	☼	8270E	Total/NA
Benzo[a]anthracene	0.659		0.0109		mg/Kg	5	☼	8270E	Total/NA
Benzo[a]pyrene	0.385		0.0109		mg/Kg	5	☼	8270E	Total/NA
Benzo[b]fluoranthene	0.653		0.0109		mg/Kg	5	☼	8270E	Total/NA
Benzo[g,h,i]perylene	0.252		0.0109		mg/Kg	5	☼	8270E	Total/NA
Benzo[k]fluoranthene	0.183		0.0109		mg/Kg	5	☼	8270E	Total/NA
Chrysene	0.628		0.0109		mg/Kg	5	☼	8270E	Total/NA
Dibenz(a,h)anthracene	0.0829		0.0109		mg/Kg	5	☼	8270E	Total/NA
Fluoranthene	1.01		0.0109		mg/Kg	5	☼	8270E	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: ST-4 (0-2) (Continued) — Lab Sample ID: 310-289515-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Fluorene	0.251		0.0109		mg/Kg	5	☼	8270E	Total/NA
Indeno[1,2,3-cd]pyrene	0.154		0.0109		mg/Kg	5	☼	8270E	Total/NA
2-Methylnaphthalene	5.62		0.109		mg/Kg	50	☼	8270E	Total/NA
Naphthalene	3.97		0.109		mg/Kg	50	☼	8270E	Total/NA
Phenanthrene	1.75		0.0109		mg/Kg	5	☼	8270E	Total/NA
Pyrene	0.981		0.0109		mg/Kg	5	☼	8270E	Total/NA
Wisconsin GRO	12.0		11.2		mg/Kg	1	☼	WI-GRO	Total/NA
Diesel Range Organics [C10-C28]	205		28.7		mg/Kg	5	☼	WI-DRO	Total/NA
Arsenic	6.19		1.01		mg/Kg	5	☼	6020B	Total/NA
Barium	80.0		1.01		mg/Kg	5	☼	6020B	Total/NA
Chromium	14.6		1.51		mg/Kg	5	☼	6020B	Total/NA
Lead	67.6		2.52		mg/Kg	5	☼	6020B	Total/NA
Mercury	0.0557		0.0192		mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: ST-5 (2.5-4) — Lab Sample ID: 310-289515-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acenaphthene	0.0144		0.00241		mg/Kg	1	☼	8270E	Total/NA
Acenaphthylene	0.00815		0.00241		mg/Kg	1	☼	8270E	Total/NA
Anthracene	0.0110		0.00241		mg/Kg	1	☼	8270E	Total/NA
Benzo[a]anthracene	0.0168		0.00241		mg/Kg	1	☼	8270E	Total/NA
Benzo[a]pyrene	0.0113	I	0.00241		mg/Kg	1	☼	8270E	Total/NA
Benzo[b]fluoranthene	0.00828		0.00241		mg/Kg	1	☼	8270E	Total/NA
Benzo[g,h,i]perylene	0.00464		0.00241		mg/Kg	1	☼	8270E	Total/NA
Benzo[k]fluoranthene	0.00491		0.00241		mg/Kg	1	☼	8270E	Total/NA
Chrysene	0.0136		0.00241		mg/Kg	1	☼	8270E	Total/NA
Fluoranthene	0.0234		0.00241		mg/Kg	1	☼	8270E	Total/NA
Fluorene	0.0185		0.00241		mg/Kg	1	☼	8270E	Total/NA
Indeno[1,2,3-cd]pyrene	0.00358		0.00241		mg/Kg	1	☼	8270E	Total/NA
2-Methylnaphthalene	0.0132		0.00241		mg/Kg	1	☼	8270E	Total/NA
Naphthalene	0.00629		0.00241		mg/Kg	1	☼	8270E	Total/NA
Phenanthrene	0.0491		0.00241		mg/Kg	1	☼	8270E	Total/NA
Pyrene	0.0320		0.00241		mg/Kg	1	☼	8270E	Total/NA
Diesel Range Organics [C10-C28]	8.85		6.80		mg/Kg	1	☼	WI-DRO	Total/NA
Arsenic	4.14		0.966		mg/Kg	5	☼	6020B	Total/NA
Barium	171		0.966		mg/Kg	5	☼	6020B	Total/NA
Chromium	45.8		1.45		mg/Kg	5	☼	6020B	Total/NA
Lead	9.74		2.41		mg/Kg	5	☼	6020B	Total/NA
Mercury	0.0268		0.0208		mg/Kg	1	☼	7471B	Total/NA

Client Sample ID: ST-6 (0-2) — Lab Sample ID: 310-289515-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzo[a]anthracene	0.0340		0.0201		mg/Kg	10	☼	8270E	Total/NA
Benzo[a]pyrene	0.0341		0.0201		mg/Kg	10	☼	8270E	Total/NA
Benzo[b]fluoranthene	0.0473		0.0201		mg/Kg	10	☼	8270E	Total/NA
Benzo[g,h,i]perylene	0.189		0.0201		mg/Kg	10	☼	8270E	Total/NA
Chrysene	0.121		0.0201		mg/Kg	10	☼	8270E	Total/NA
Dibenz(a,h)anthracene	0.0333	I	0.0201		mg/Kg	10	☼	8270E	Total/NA
Indeno[1,2,3-cd]pyrene	0.0442		0.0201		mg/Kg	10	☼	8270E	Total/NA
Phenanthrene	0.0468		0.0201		mg/Kg	10	☼	8270E	Total/NA
Pyrene	0.0928		0.0201		mg/Kg	10	☼	8270E	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Client Sample ID: ST-6 (0-2) (Continued) — Lab Sample ID: 310-289515-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Diesel Range Organics [C10-C28]	534		155		mg/Kg	5	☼	WI-DRO	Total/NA
Arsenic	1.89		0.894		mg/Kg	5	☼	6020B	Total/NA
Barium	62.5		0.894		mg/Kg	5	☼	6020B	Total/NA
Chromium	22.4		1.34		mg/Kg	5	☼	6020B	Total/NA
Lead	3.90		2.23		mg/Kg	5	☼	6020B	Total/NA

Client Sample ID: TB — Lab Sample ID: 310-289515-7

No Detections.

This Detection Summary does not include radiochemical test results.

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Client Sample ID: ST-1 (2.5-4)
Date Collected: 08/30/24 14:55
Date Received: 08/31/24 10:00

Lab Sample ID: 310-289515-1
Matrix: Solid
Percent Solids: 76.9

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<0.823		0.823		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Allyl chloride	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Benzene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Bromobenzene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Bromochloromethane	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Bromodichloromethane	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Bromoform	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Bromomethane	<0.823		0.823		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
2-Butanone (MEK)	<1.23		1.23		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Carbon tetrachloride	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Chlorobenzene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Chlorodibromomethane	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Chloroethane	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Chloroform	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Chloromethane	<0.411		0.411		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
2-Chlorotoluene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
4-Chlorotoluene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
cis-1,2-Dichloroethene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
cis-1,3-Dichloropropene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
1,2-Dibromo-3-Chloropropane	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
1,2-Dibromoethane (EDB)	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Dibromomethane	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
1,2-Dichlorobenzene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
1,3-Dichlorobenzene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
1,4-Dichlorobenzene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Dichlorodifluoromethane	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
1,1-Dichloroethane	<0.165	*+	0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
1,2-Dichloroethane	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
1,1-Dichloroethene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Dichlorofluoromethane	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
1,2-Dichloropropane	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
1,3-Dichloropropane	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
2,2-Dichloropropane	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
1,1-Dichloropropene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Ethyl ether	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Ethylbenzene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Hexachlorobutadiene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Isopropylbenzene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Methylene Chloride	<0.411		0.411		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
4-Methyl-2-pentanone (MIBK)	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Methyl tert-butyl ether	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Naphthalene	<0.411		0.411		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
n-Butylbenzene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
N-Propylbenzene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
4-Isopropyltoluene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
sec-Butylbenzene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Styrene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
tert-Butylbenzene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
1,1,1,2-Tetrachloroethane	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Client Sample ID: ST-1 (2.5-4)
Date Collected: 08/30/24 14:55
Date Received: 08/31/24 10:00

Lab Sample ID: 310-289515-1
Matrix: Solid
Percent Solids: 76.9

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Tetrachloroethene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Tetrahydrofuran	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Toluene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
trans-1,2-Dichloroethene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
trans-1,3-Dichloropropene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
1,2,3-Trichlorobenzene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
1,2,4-Trichlorobenzene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
1,1,1-Trichloroethane	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
1,1,2-Trichloroethane	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Trichloroethene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Trichlorofluoromethane	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
1,2,3-Trichloropropane	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
1,1,2-Trichloro-1,2,2-trifluoroethane	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
1,2,4-Trimethylbenzene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
1,3,5-Trimethylbenzene	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Vinyl chloride	<0.165		0.165		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1
Xylenes, Total	<0.247		0.247		mg/Kg	☼	09/04/24 08:04	09/05/24 11:12	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*	*09/04/24 08:04*	*09/05/24 11:12*	*1*
Dibromofluoromethane (Surr)	*97*		*80 - 120*	*09/04/24 08:04*	*09/05/24 11:12*	*1*
Toluene-d8 (Surr)	*97*		*80 - 120*	*09/04/24 08:04*	*09/05/24 11:12*	*1*

Method: SW846 8270E - Semivolatile Organic Compounds (GC-MS/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**0.0177**		0.0130		mg/Kg	☼	09/09/24 13:20	09/11/24 17:24	5
Acenaphthylene	**0.263**		0.0130		mg/Kg	☼	09/09/24 13:20	09/11/24 17:24	5
Anthracene	**0.307**		0.0130		mg/Kg	☼	09/09/24 13:20	09/11/24 17:24	5
Benzo[a]anthracene	**2.15**		0.0130		mg/Kg	☼	09/09/24 13:20	09/11/24 17:24	5
Benzo[a]pyrene	**2.11**		0.0130		mg/Kg	☼	09/09/24 13:20	09/11/24 17:24	5
Benzo[b]fluoranthene	**3.26**		0.130		mg/Kg	☼	09/09/24 13:20	09/12/24 15:40	50
Benzo[g,h,i]perylene	**1.19**		0.0130		mg/Kg	☼	09/09/24 13:20	09/11/24 17:24	5
Benzo[k]fluoranthene	**0.848**		0.0130		mg/Kg	☼	09/09/24 13:20	09/11/24 17:24	5
Chrysene	**1.86**		0.0130		mg/Kg	☼	09/09/24 13:20	09/11/24 17:24	5
Dibenz(a,h)anthracene	**0.272**	I	0.0130		mg/Kg	☼	09/09/24 13:20	09/11/24 17:24	5
Fluoranthene	**4.81**		0.130		mg/Kg	☼	09/09/24 13:20	09/12/24 15:40	50
Fluorene	**0.0621**		0.0130		mg/Kg	☼	09/09/24 13:20	09/11/24 17:24	5
Indeno[1,2,3-cd]pyrene	**0.863**		0.0130		mg/Kg	☼	09/09/24 13:20	09/11/24 17:24	5
2-Methylnaphthalene	**0.421**		0.0130		mg/Kg	☼	09/09/24 13:20	09/11/24 17:24	5
Naphthalene	**0.550**		0.0130		mg/Kg	☼	09/09/24 13:20	09/11/24 17:24	5
Phenanthrene	**0.712**		0.0130		mg/Kg	☼	09/09/24 13:20	09/11/24 17:24	5
Pyrene	**4.94**		0.130		mg/Kg	☼	09/09/24 13:20	09/12/24 15:40	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*70*		*28 - 116*	*09/09/24 13:20*	*09/11/24 17:24*	*5*
Nitrobenzene-d5 (Surr)	*26*		*15 - 131*	*09/09/24 13:20*	*09/11/24 17:24*	*5*
Terphenyl-d14 (Surr)	*66*		*24 - 132*	*09/09/24 13:20*	*09/11/24 17:24*	*5*

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Client Sample ID: ST-1 (2.5-4)

Date Collected: 08/30/24 14:55
Date Received: 08/31/24 10:00

Lab Sample ID: 310-289515-1

Matrix: Solid
Percent Solids: 76.9

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<13.3		13.3		mg/Kg	☼	09/04/24 15:06	09/05/24 22:17	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*92*		*80 - 120*	*09/04/24 15:06*	*09/05/24 22:17*	*1*

Method: WI-DRO - Wisconsin - Diesel Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics [C10-C28]	**117**		61.0		mg/Kg	☼	09/06/24 08:21	09/11/24 16:57	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**7.09**		1.07		mg/Kg	☼	09/06/24 09:30	09/06/24 20:44	5
Barium	**46.0**		1.07		mg/Kg	☼	09/06/24 09:30	09/06/24 20:44	5
Cadmium	<0.534		0.534		mg/Kg	☼	09/06/24 09:30	09/06/24 20:44	5
Chromium	**19.6**		1.60		mg/Kg	☼	09/06/24 09:30	09/06/24 20:44	5
Lead	**199**		2.67		mg/Kg	☼	09/06/24 09:30	09/06/24 20:44	5
Selenium	<1.60		1.60		mg/Kg	☼	09/06/24 09:30	09/06/24 20:44	5
Silver	<0.534		0.534		mg/Kg	☼	09/06/24 09:30	09/06/24 20:44	5

Method: SW846 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.186**		0.0209		mg/Kg	☼	09/09/24 16:25	09/11/24 15:08	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	**23.1**		0.1		%			09/03/24 09:04	1
Percent Solids (EPA Moisture)	**76.9**		0.1		%			09/03/24 09:04	1

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Client Sample ID: ST-2 (1-4)
Date Collected: 08/30/24 14:40
Date Received: 08/31/24 10:00

Lab Sample ID: 310-289515-2
Matrix: Solid
Percent Solids: 96.8

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<0.468		0.468		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Allyl chloride	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Benzene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Bromobenzene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Bromochloromethane	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Bromodichloromethane	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Bromoform	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Bromomethane	<0.468		0.468		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
2-Butanone (MEK)	<0.702		0.702		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Carbon tetrachloride	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Chlorobenzene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Chlorodibromomethane	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Chloroethane	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Chloroform	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Chloromethane	<0.234		0.234		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
2-Chlorotoluene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
4-Chlorotoluene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
cis-1,2-Dichloroethene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
cis-1,3-Dichloropropene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
1,2-Dibromo-3-Chloropropane	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
1,2-Dibromoethane (EDB)	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Dibromomethane	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
1,2-Dichlorobenzene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
1,3-Dichlorobenzene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
1,4-Dichlorobenzene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Dichlorodifluoromethane	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
1,1-Dichloroethane	<0.0936	*+	0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
1,2-Dichloroethane	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
1,1-Dichloroethene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Dichlorofluoromethane	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
1,2-Dichloropropane	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
1,3-Dichloropropane	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
2,2-Dichloropropane	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
1,1-Dichloropropene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Ethyl ether	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Ethylbenzene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Hexachlorobutadiene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Isopropylbenzene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Methylene Chloride	<0.234		0.234		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
4-Methyl-2-pentanone (MIBK)	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Methyl tert-butyl ether	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Naphthalene	<0.234		0.234		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
n-Butylbenzene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
N-Propylbenzene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
4-Isopropyltoluene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
sec-Butylbenzene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Styrene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
tert-Butylbenzene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
1,1,1,2-Tetrachloroethane	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Client Sample ID: ST-2 (1-4)
Date Collected: 08/30/24 14:40
Date Received: 08/31/24 10:00

Lab Sample ID: 310-289515-2
Matrix: Solid
Percent Solids: 96.8

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Tetrachloroethene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Tetrahydrofuran	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Toluene	**0.102**		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
trans-1,2-Dichloroethene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
trans-1,3-Dichloropropene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
1,2,3-Trichlorobenzene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
1,2,4-Trichlorobenzene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
1,1,1-Trichloroethane	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
1,1,2-Trichloroethane	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Trichloroethene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Trichlorofluoromethane	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
1,2,3-Trichloropropane	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
1,1,2-Trichloro-1,2,2-trifluoroethane	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
1,2,4-Trimethylbenzene	**0.112**		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
1,3,5-Trimethylbenzene	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Vinyl chloride	<0.0936		0.0936		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1
Xylenes, Total	**0.311**		0.140		mg/Kg	☼	09/04/24 08:04	09/05/24 11:35	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*104*		*80 - 120*	*09/04/24 08:04*	*09/05/24 11:35*	*1*
Dibromofluoromethane (Surr)	*98*		*80 - 120*	*09/04/24 08:04*	*09/05/24 11:35*	*1*
Toluene-d8 (Surr)	*95*		*80 - 120*	*09/04/24 08:04*	*09/05/24 11:35*	*1*

Method: SW846 8270E - Semivolatile Organic Compounds (GC-MS/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**0.0307**		0.0200		mg/Kg	☼	09/09/24 13:20	09/11/24 17:57	10
Acenaphthylene	**0.0305**		0.0200		mg/Kg	☼	09/09/24 13:20	09/11/24 17:57	10
Anthracene	**0.0222**		0.0200		mg/Kg	☼	09/09/24 13:20	09/11/24 17:57	10
Benzo[a]anthracene	**0.0968**		0.0200		mg/Kg	☼	09/09/24 13:20	09/11/24 17:57	10
Benzo[a]pyrene	**0.0845**		0.0200		mg/Kg	☼	09/09/24 13:20	09/11/24 17:57	10
Benzo[b]fluoranthene	**0.0974**		0.0200		mg/Kg	☼	09/09/24 13:20	09/11/24 17:57	10
Benzo[g,h,i]perylene	**0.0639**		0.0200		mg/Kg	☼	09/09/24 13:20	09/11/24 17:57	10
Benzo[k]fluoranthene	**0.0301**		0.0200		mg/Kg	☼	09/09/24 13:20	09/11/24 17:57	10
Chrysene	**0.103**		0.0200		mg/Kg	☼	09/09/24 13:20	09/11/24 17:57	10
Dibenz(a,h)anthracene	**0.0307**		0.0200		mg/Kg	☼	09/09/24 13:20	09/11/24 17:57	10
Fluoranthene	**0.128**	I	0.0200		mg/Kg	☼	09/09/24 13:20	09/11/24 17:57	10
Fluorene	**0.0722**		0.0200		mg/Kg	☼	09/09/24 13:20	09/11/24 17:57	10
Indeno[1,2,3-cd]pyrene	**0.0402**		0.0200		mg/Kg	☼	09/09/24 13:20	09/11/24 17:57	10
2-Methylnaphthalene	**1.23**		0.0200		mg/Kg	☼	09/09/24 13:20	09/11/24 17:57	10
Naphthalene	**0.831**		0.0200		mg/Kg	☼	09/09/24 13:20	09/11/24 17:57	10
Phenanthrene	**0.429**		0.0200		mg/Kg	☼	09/09/24 13:20	09/11/24 17:57	10
Pyrene	**0.118**		0.0200		mg/Kg	☼	09/09/24 13:20	09/11/24 17:57	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*54*		*28 - 116*	*09/09/24 13:20*	*09/11/24 17:57*	*10*
Nitrobenzene-d5 (Surr)	*30*		*15 - 131*	*09/09/24 13:20*	*09/11/24 17:57*	*10*
Terphenyl-d14 (Surr)	*50*		*24 - 132*	*09/09/24 13:20*	*09/11/24 17:57*	*10*

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Client Sample ID: ST-2 (1-4)

Date Collected: 08/30/24 14:40
Date Received: 08/31/24 10:00

Lab Sample ID: 310-289515-2

Matrix: Solid
Percent Solids: 96.8

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<10.0		10.0		mg/Kg	☼	09/04/24 15:06	09/05/24 22:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*	*09/04/24 15:06*	*09/05/24 22:43*	*1*

Method: WI-DRO - Wisconsin - Diesel Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics [C10-C28]	**158**		90.0		mg/Kg	☼	09/06/24 08:21	09/11/24 17:08	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**2.06**		0.789		mg/Kg	☼	09/06/24 09:30	09/06/24 20:48	5
Barium	**32.0**		0.789		mg/Kg	☼	09/06/24 09:30	09/06/24 20:48	5
Cadmium	<0.394		0.394		mg/Kg	☼	09/06/24 09:30	09/06/24 20:48	5
Chromium	**17.6**		1.18		mg/Kg	☼	09/06/24 09:30	09/06/24 20:48	5
Lead	**7.50**		1.97		mg/Kg	☼	09/06/24 09:30	09/06/24 20:48	5
Selenium	<1.18		1.18		mg/Kg	☼	09/06/24 09:30	09/06/24 20:48	5
Silver	<0.394		0.394		mg/Kg	☼	09/06/24 09:30	09/06/24 20:48	5

Method: SW846 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.0157		0.0157		mg/Kg	☼	09/09/24 16:25	09/11/24 15:10	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	**3.2**		0.1		%			09/03/24 09:04	1
Percent Solids (EPA Moisture)	**96.8**		0.1		%			09/03/24 09:04	1

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Client Sample ID: ST-3 (1-4)
Date Collected: 08/30/24 13:45
Date Received: 08/31/24 10:00

Lab Sample ID: 310-289515-3
Matrix: Solid
Percent Solids: 93.0

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<0.603		0.603		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Allyl chloride	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Benzene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Bromobenzene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Bromochloromethane	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Bromodichloromethane	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Bromoform	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Bromomethane	<0.603		0.603		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
2-Butanone (MEK)	<0.905		0.905		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Carbon tetrachloride	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Chlorobenzene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Chlorodibromomethane	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Chloroethane	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Chloroform	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Chloromethane	<0.302		0.302		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
2-Chlorotoluene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
4-Chlorotoluene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
cis-1,2-Dichloroethene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
cis-1,3-Dichloropropene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
1,2-Dibromo-3-Chloropropane	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
1,2-Dibromoethane (EDB)	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Dibromomethane	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
1,2-Dichlorobenzene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
1,3-Dichlorobenzene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
1,4-Dichlorobenzene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Dichlorodifluoromethane	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
1,1-Dichloroethane	<0.121	*+	0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
1,2-Dichloroethane	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
1,1-Dichloroethene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Dichlorofluoromethane	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
1,2-Dichloropropane	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
1,3-Dichloropropane	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
2,2-Dichloropropane	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
1,1-Dichloropropene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Ethyl ether	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Ethylbenzene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Hexachlorobutadiene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Isopropylbenzene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Methylene Chloride	<0.302		0.302		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
4-Methyl-2-pentanone (MIBK)	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Methyl tert-butyl ether	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Naphthalene	<0.302		0.302		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
n-Butylbenzene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
N-Propylbenzene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
4-Isopropyltoluene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
sec-Butylbenzene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Styrene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
tert-Butylbenzene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
1,1,1,2-Tetrachloroethane	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1

Client Sample ID: ST-3 (1-4)
Date Collected: 08/30/24 13:45
Date Received: 08/31/24 10:00

Lab Sample ID: 310-289515-3
Matrix: Solid
Percent Solids: 93.0

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Tetrachloroethene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Tetrahydrofuran	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Toluene	**0.144**		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
trans-1,2-Dichloroethene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
trans-1,3-Dichloropropene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
1,2,3-Trichlorobenzene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
1,2,4-Trichlorobenzene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
1,1,1-Trichloroethane	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
1,1,2-Trichloroethane	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Trichloroethene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Trichlorofluoromethane	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
1,2,3-Trichloropropane	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
1,1,2-Trichloro-1,2,2-trifluoroethane	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
1,2,4-Trimethylbenzene	**0.146**		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
1,3,5-Trimethylbenzene	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Vinyl chloride	<0.121		0.121		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1
Xylenes, Total	**0.326**		0.181		mg/Kg	☼	09/04/24 08:04	09/05/24 11:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*106*		*80 - 120*	*09/04/24 08:04*	*09/05/24 11:58*	*1*
Dibromofluoromethane (Surr)	*95*		*80 - 120*	*09/04/24 08:04*	*09/05/24 11:58*	*1*
Toluene-d8 (Surr)	*93*		*80 - 120*	*09/04/24 08:04*	*09/05/24 11:58*	*1*

Method: SW846 8270E - Semivolatile Organic Compounds (GC-MS/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**0.0235**		0.0209		mg/Kg	☼	09/11/24 13:18	09/13/24 06:09	10
Acenaphthylene	**0.0409**		0.0209		mg/Kg	☼	09/11/24 13:18	09/13/24 06:09	10
Anthracene	**0.0748**	**F2 I F1**	0.0209		mg/Kg	☼	09/11/24 13:18	09/13/24 06:09	10
Benzo[a]anthracene	**0.203**	**F2 F1**	0.0209		mg/Kg	☼	09/11/24 13:18	09/13/24 06:09	10
Benzo[a]pyrene	**0.197**	**F2 F1**	0.0209		mg/Kg	☼	09/11/24 13:18	09/13/24 06:09	10
Benzo[b]fluoranthene	**0.321**	**F2 F1**	0.0209		mg/Kg	☼	09/11/24 13:18	09/13/24 06:09	10
Benzo[g,h,i]perylene	**0.186**		0.0209		mg/Kg	☼	09/11/24 13:18	09/13/24 06:09	10
Benzo[k]fluoranthene	**0.126**	**F2 F1**	0.0209		mg/Kg	☼	09/11/24 13:18	09/13/24 06:09	10
Chrysene	**0.263**	**F2 F1**	0.0209		mg/Kg	☼	09/11/24 13:18	09/13/24 06:09	10
Dibenz(a,h)anthracene	**0.0618**	**I**	0.0209		mg/Kg	☼	09/11/24 13:18	09/13/24 06:09	10
Fluoranthene	**0.381**	**F2 F1**	0.0209		mg/Kg	☼	09/11/24 13:18	09/13/24 06:09	10
Fluorene	**0.0575**		0.0209		mg/Kg	☼	09/11/24 13:18	09/13/24 06:09	10
Indeno[1,2,3-cd]pyrene	**0.114**		0.0209		mg/Kg	☼	09/11/24 13:18	09/13/24 06:09	10
2-Methylnaphthalene	**1.01**		0.0209		mg/Kg	☼	09/11/24 13:18	09/13/24 06:09	10
Naphthalene	**0.624**		0.0209		mg/Kg	☼	09/11/24 13:18	09/13/24 06:09	10
Phenanthrene	**0.530**	**F1**	0.0209		mg/Kg	☼	09/11/24 13:18	09/13/24 06:09	10
Pyrene	**0.294**	**F2 F1**	0.0209		mg/Kg	☼	09/11/24 13:18	09/13/24 06:09	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*61*		*28 - 116*	*09/11/24 13:18*	*09/13/24 06:09*	*10*
Nitrobenzene-d5 (Surr)	*60*		*15 - 131*	*09/11/24 13:18*	*09/13/24 06:09*	*10*
Terphenyl-d14 (Surr)	*55*		*24 - 132*	*09/11/24 13:18*	*09/13/24 06:09*	*10*

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Client Sample ID: ST-3 (1-4)

Date Collected: 08/30/24 13:45
Date Received: 08/31/24 10:00

Lab Sample ID: 310-289515-3

Matrix: Solid
Percent Solids: 93.0

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<10.9		10.9		mg/Kg	☼	09/04/24 15:06	09/05/24 23:09	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*	*09/04/24 15:06*	*09/05/24 23:09*	*1*

Method: WI-DRO - Wisconsin - Diesel Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics [C10-C28]	**144**		127		mg/Kg	☼	09/06/24 08:21	09/11/24 17:20	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**3.60**		0.854		mg/Kg	☼	09/06/24 09:30	09/06/24 20:51	5
Barium	**33.4**		0.854		mg/Kg	☼	09/06/24 09:30	09/06/24 20:51	5
Cadmium	<0.427		0.427		mg/Kg	☼	09/06/24 09:30	09/06/24 20:51	5
Chromium	**15.7**		1.28		mg/Kg	☼	09/06/24 09:30	09/06/24 20:51	5
Lead	**15.6**		2.14		mg/Kg	☼	09/06/24 09:30	09/06/24 20:51	5
Selenium	<1.28		1.28		mg/Kg	☼	09/06/24 09:30	09/06/24 20:51	5
Silver	<0.427		0.427		mg/Kg	☼	09/06/24 09:30	09/06/24 20:51	5

Method: SW846 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.0267**		0.0173		mg/Kg	☼	09/09/24 16:25	09/11/24 15:12	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	**7.0**		0.1		%			09/03/24 09:04	1
Percent Solids (EPA Moisture)	**93.0**		0.1		%			09/03/24 09:04	1

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Client Sample ID: ST-4 (0-2)
Date Collected: 08/30/24 11:55
Date Received: 08/31/24 10:00

Lab Sample ID: 310-289515-4
Matrix: Solid
Percent Solids: 88.1

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<0.635		0.635		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Allyl chloride	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Benzene	**0.151**		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Bromobenzene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Bromochloromethane	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Bromodichloromethane	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Bromoform	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Bromomethane	<0.635		0.635		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
2-Butanone (MEK)	<0.952		0.952		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Carbon tetrachloride	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Chlorobenzene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Chlorodibromomethane	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Chloroethane	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Chloroform	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Chloromethane	<0.317		0.317		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
2-Chlorotoluene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
4-Chlorotoluene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
cis-1,2-Dichloroethene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
cis-1,3-Dichloropropene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
1,2-Dibromo-3-Chloropropane	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
1,2-Dibromoethane (EDB)	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Dibromomethane	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
1,2-Dichlorobenzene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
1,3-Dichlorobenzene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
1,4-Dichlorobenzene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Dichlorodifluoromethane	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
1,1-Dichloroethane	<0.127	*+	0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
1,2-Dichloroethane	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
1,1-Dichloroethene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Dichlorofluoromethane	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
1,2-Dichloropropane	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
1,3-Dichloropropane	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
2,2-Dichloropropane	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
1,1-Dichloropropene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Ethyl ether	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Ethylbenzene	**0.135**		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Hexachlorobutadiene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Isopropylbenzene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Methylene Chloride	<0.317		0.317		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
4-Methyl-2-pentanone (MIBK)	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Methyl tert-butyl ether	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Naphthalene	**0.488**		0.317		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
n-Butylbenzene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
N-Propylbenzene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
4-Isopropyltoluene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
sec-Butylbenzene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Styrene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
tert-Butylbenzene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
1,1,1,2-Tetrachloroethane	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Client Sample ID: ST-4 (0-2)
Date Collected: 08/30/24 11:55
Date Received: 08/31/24 10:00

Lab Sample ID: 310-289515-4
Matrix: Solid
Percent Solids: 88.1

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Tetrachloroethene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Tetrahydrofuran	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Toluene	**0.715**		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
trans-1,2-Dichloroethene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
trans-1,3-Dichloropropene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
1,2,3-Trichlorobenzene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
1,2,4-Trichlorobenzene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
1,1,1-Trichloroethane	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
1,1,2-Trichloroethane	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Trichloroethene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Trichlorofluoromethane	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
1,2,3-Trichloropropane	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
1,1,2-Trichloro-1,2,2-trifluoroethane	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
1,2,4-Trimethylbenzene	**0.496**		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
1,3,5-Trimethylbenzene	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Vinyl chloride	<0.127		0.127		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1
Xylenes, Total	**1.27**		0.190		mg/Kg	☼	09/04/24 08:04	09/05/24 12:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*107*		*80 - 120*	*09/04/24 08:04*	*09/05/24 12:20*	*1*
Dibromofluoromethane (Surr)	*92*		*80 - 120*	*09/04/24 08:04*	*09/05/24 12:20*	*1*
Toluene-d8 (Surr)	*97*		*80 - 120*	*09/04/24 08:04*	*09/05/24 12:20*	*1*

Method: SW846 8270E - Semivolatile Organic Compounds (GC-MS/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**0.119**		0.0109		mg/Kg	☼	09/11/24 13:18	09/13/24 06:42	5
Acenaphthylene	**0.197**		0.0109		mg/Kg	☼	09/11/24 13:18	09/13/24 06:42	5
Anthracene	**0.172**		0.0109		mg/Kg	☼	09/11/24 13:18	09/13/24 06:42	5
Benzo[a]anthracene	**0.659**		0.0109		mg/Kg	☼	09/11/24 13:18	09/13/24 06:42	5
Benzo[a]pyrene	**0.385**		0.0109		mg/Kg	☼	09/11/24 13:18	09/13/24 06:42	5
Benzo[b]fluoranthene	**0.653**		0.0109		mg/Kg	☼	09/11/24 13:18	09/13/24 06:42	5
Benzo[g,h,i]perylene	**0.252**		0.0109		mg/Kg	☼	09/11/24 13:18	09/13/24 06:42	5
Benzo[k]fluoranthene	**0.183**		0.0109		mg/Kg	☼	09/11/24 13:18	09/13/24 06:42	5
Chrysene	**0.628**		0.0109		mg/Kg	☼	09/11/24 13:18	09/13/24 06:42	5
Dibenz(a,h)anthracene	**0.0829**		0.0109		mg/Kg	☼	09/11/24 13:18	09/13/24 06:42	5
Fluoranthene	**1.01**		0.0109		mg/Kg	☼	09/11/24 13:18	09/13/24 06:42	5
Fluorene	**0.251**		0.0109		mg/Kg	☼	09/11/24 13:18	09/13/24 06:42	5
Indeno[1,2,3-cd]pyrene	**0.154**		0.0109		mg/Kg	☼	09/11/24 13:18	09/13/24 06:42	5
2-Methylnaphthalene	**5.62**		0.109		mg/Kg	☼	09/11/24 13:18	09/14/24 02:44	50
Naphthalene	**3.97**		0.109		mg/Kg	☼	09/11/24 13:18	09/14/24 02:44	50
Phenanthrene	**1.75**		0.0109		mg/Kg	☼	09/11/24 13:18	09/13/24 06:42	5
Pyrene	**0.981**		0.0109		mg/Kg	☼	09/11/24 13:18	09/13/24 06:42	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*54*		*28 - 116*	*09/11/24 13:18*	*09/13/24 06:42*	*5*
Nitrobenzene-d5 (Surr)	*40*		*15 - 131*	*09/11/24 13:18*	*09/13/24 06:42*	*5*
Terphenyl-d14 (Surr)	*49*		*24 - 132*	*09/11/24 13:18*	*09/13/24 06:42*	*5*

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Client Sample ID: ST-4 (0-2)

Date Collected: 08/30/24 11:55
Date Received: 08/31/24 10:00

Lab Sample ID: 310-289515-4

Matrix: Solid
Percent Solids: 88.1

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	12.0		11.2		mg/Kg	☼	09/04/24 15:06	09/05/24 23:35	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*103*		*80 - 120*	*09/04/24 15:06*	*09/05/24 23:35*	*1*

Method: WI-DRO - Wisconsin - Diesel Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics [C10-C28]	205		28.7		mg/Kg	☼	09/06/24 08:21	09/12/24 12:15	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	6.19		1.01		mg/Kg	☼	09/06/24 09:30	09/06/24 20:55	5
Barium	80.0		1.01		mg/Kg	☼	09/06/24 09:30	09/06/24 20:55	5
Cadmium	<0.503		0.503		mg/Kg	☼	09/06/24 09:30	09/06/24 20:55	5
Chromium	14.6		1.51		mg/Kg	☼	09/06/24 09:30	09/06/24 20:55	5
Lead	67.6		2.52		mg/Kg	☼	09/06/24 09:30	09/06/24 20:55	5
Selenium	<1.51		1.51		mg/Kg	☼	09/06/24 09:30	09/06/24 20:55	5
Silver	<0.503		0.503		mg/Kg	☼	09/06/24 09:30	09/06/24 20:55	5

Method: SW846 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.0557		0.0192		mg/Kg	☼	09/09/24 16:25	09/11/24 15:14	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	11.9		0.1		%			09/03/24 09:04	1
Percent Solids (EPA Moisture)	88.1		0.1		%			09/03/24 09:04	1

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Client Sample ID: ST-5 (2.5-4)
Date Collected: 08/30/24 10:55
Date Received: 08/31/24 10:00

Lab Sample ID: 310-289515-5
Matrix: Solid
Percent Solids: 82.8

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<0.652		0.652		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Allyl chloride	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Benzene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Bromobenzene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Bromochloromethane	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Bromodichloromethane	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Bromoform	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Bromomethane	<0.652		0.652		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
2-Butanone (MEK)	<0.978		0.978		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Carbon tetrachloride	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Chlorobenzene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Chlorodibromomethane	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Chloroethane	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Chloroform	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Chloromethane	<0.326		0.326		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
2-Chlorotoluene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
4-Chlorotoluene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
cis-1,2-Dichloroethene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
cis-1,3-Dichloropropene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
1,2-Dibromo-3-Chloropropane	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
1,2-Dibromoethane (EDB)	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Dibromomethane	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
1,2-Dichlorobenzene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
1,3-Dichlorobenzene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
1,4-Dichlorobenzene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Dichlorodifluoromethane	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
1,1-Dichloroethane	<0.130	*+	0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
1,2-Dichloroethane	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
1,1-Dichloroethene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Dichlorofluoromethane	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
1,2-Dichloropropane	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
1,3-Dichloropropane	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
2,2-Dichloropropane	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
1,1-Dichloropropene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Ethyl ether	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Ethylbenzene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Hexachlorobutadiene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Isopropylbenzene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Methylene Chloride	<0.326		0.326		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
4-Methyl-2-pentanone (MIBK)	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Methyl tert-butyl ether	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Naphthalene	<0.326		0.326		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
n-Butylbenzene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
N-Propylbenzene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
4-Isopropyltoluene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
sec-Butylbenzene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Styrene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
tert-Butylbenzene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
1,1,1,2-Tetrachloroethane	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Client Sample ID: ST-5 (2.5-4)
Date Collected: 08/30/24 10:55
Date Received: 08/31/24 10:00

Lab Sample ID: 310-289515-5
Matrix: Solid
Percent Solids: 82.8

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Tetrachloroethene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Tetrahydrofuran	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Toluene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
trans-1,2-Dichloroethene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
trans-1,3-Dichloropropene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
1,2,3-Trichlorobenzene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
1,2,4-Trichlorobenzene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
1,1,1-Trichloroethane	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
1,1,2-Trichloroethane	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Trichloroethene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Trichlorofluoromethane	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
1,2,3-Trichloropropane	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
1,1,2-Trichloro-1,2,2-trifluoroethane	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
1,2,4-Trimethylbenzene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
1,3,5-Trimethylbenzene	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Vinyl chloride	<0.130		0.130		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1
Xylenes, Total	<0.196		0.196		mg/Kg	☼	09/04/24 08:04	09/05/24 12:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*107*		*80 - 120*	*09/04/24 08:04*	*09/05/24 12:43*	*1*
Dibromofluoromethane (Surr)	*96*		*80 - 120*	*09/04/24 08:04*	*09/05/24 12:43*	*1*
Toluene-d8 (Surr)	*95*		*80 - 120*	*09/04/24 08:04*	*09/05/24 12:43*	*1*

Method: SW846 8270E - Semivolatile Organic Compounds (GC-MS/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**0.0144**		0.00241		mg/Kg	☼	09/11/24 13:18	09/13/24 07:15	1
Acenaphthylene	**0.00815**		0.00241		mg/Kg	☼	09/11/24 13:18	09/13/24 07:15	1
Anthracene	**0.0110**		0.00241		mg/Kg	☼	09/11/24 13:18	09/13/24 07:15	1
Benzo[a]anthracene	**0.0168**		0.00241		mg/Kg	☼	09/11/24 13:18	09/13/24 07:15	1
Benzo[a]pyrene	**0.0113**	I	0.00241		mg/Kg	☼	09/11/24 13:18	09/13/24 07:15	1
Benzo[b]fluoranthene	**0.00828**		0.00241		mg/Kg	☼	09/11/24 13:18	09/13/24 07:15	1
Benzo[g,h,i]perylene	**0.00464**		0.00241		mg/Kg	☼	09/11/24 13:18	09/13/24 07:15	1
Benzo[k]fluoranthene	**0.00491**		0.00241		mg/Kg	☼	09/11/24 13:18	09/13/24 07:15	1
Chrysene	**0.0136**		0.00241		mg/Kg	☼	09/11/24 13:18	09/13/24 07:15	1
Dibenz(a,h)anthracene	<0.00241		0.00241		mg/Kg	☼	09/11/24 13:18	09/13/24 07:15	1
Fluoranthene	**0.0234**		0.00241		mg/Kg	☼	09/11/24 13:18	09/13/24 07:15	1
Fluorene	**0.0185**		0.00241		mg/Kg	☼	09/11/24 13:18	09/13/24 07:15	1
Indeno[1,2,3-cd]pyrene	**0.00358**		0.00241		mg/Kg	☼	09/11/24 13:18	09/13/24 07:15	1
2-Methylnaphthalene	**0.0132**		0.00241		mg/Kg	☼	09/11/24 13:18	09/13/24 07:15	1
Naphthalene	**0.00629**		0.00241		mg/Kg	☼	09/11/24 13:18	09/13/24 07:15	1
Phenanthrene	**0.0491**		0.00241		mg/Kg	☼	09/11/24 13:18	09/13/24 07:15	1
Pyrene	**0.0320**		0.00241		mg/Kg	☼	09/11/24 13:18	09/13/24 07:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*66*		*28 - 116*	*09/11/24 13:18*	*09/13/24 07:15*	*1*
Nitrobenzene-d5 (Surr)	*61*		*15 - 131*	*09/11/24 13:18*	*09/13/24 07:15*	*1*
Terphenyl-d14 (Surr)	*68*		*24 - 132*	*09/11/24 13:18*	*09/13/24 07:15*	*1*

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Client Sample ID: ST-5 (2.5-4)

Date Collected: 08/30/24 10:55
Date Received: 08/31/24 10:00

Lab Sample ID: 310-289515-5

Matrix: Solid
Percent Solids: 82.8

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<12.3		12.3		mg/Kg	☼	09/05/24 14:05	09/06/24 20:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*115*		*80 - 120*	*09/05/24 14:05*	*09/06/24 20:48*	*1*

Method: WI-DRO - Wisconsin - Diesel Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics [C10-C28]	**8.85**		6.80		mg/Kg	☼	09/06/24 08:21	09/11/24 14:04	1

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**4.14**		0.966		mg/Kg	☼	09/06/24 09:30	09/06/24 20:59	5
Barium	**171**		0.966		mg/Kg	☼	09/06/24 09:30	09/06/24 20:59	5
Cadmium	<0.483		0.483		mg/Kg	☼	09/06/24 09:30	09/06/24 20:59	5
Chromium	**45.8**		1.45		mg/Kg	☼	09/06/24 09:30	09/06/24 20:59	5
Lead	**9.74**		2.41		mg/Kg	☼	09/06/24 09:30	09/06/24 20:59	5
Selenium	<1.45		1.45		mg/Kg	☼	09/06/24 09:30	09/06/24 20:59	5
Silver	<0.483		0.483		mg/Kg	☼	09/06/24 09:30	09/06/24 20:59	5

Method: SW846 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.0268**		0.0208		mg/Kg	☼	09/09/24 16:25	09/11/24 15:17	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	**17.2**		0.1		%			09/03/24 09:04	1
Percent Solids (EPA Moisture)	**82.8**		0.1		%			09/03/24 09:04	1

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Client Sample ID: ST-6 (0-2)
Date Collected: 08/30/24 10:11
Date Received: 08/31/24 10:00

Lab Sample ID: 310-289515-6
Matrix: Solid
Percent Solids: 98.3

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<0.478		0.478		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Allyl chloride	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Benzene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Bromobenzene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Bromochloromethane	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Bromodichloromethane	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Bromoform	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Bromomethane	<0.478		0.478		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
2-Butanone (MEK)	<0.718		0.718		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Carbon tetrachloride	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Chlorobenzene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Chlorodibromomethane	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Chloroethane	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Chloroform	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Chloromethane	<0.239		0.239		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
2-Chlorotoluene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
4-Chlorotoluene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
cis-1,2-Dichloroethene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
cis-1,3-Dichloropropene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
1,2-Dibromo-3-Chloropropane	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
1,2-Dibromoethane (EDB)	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Dibromomethane	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
1,2-Dichlorobenzene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
1,3-Dichlorobenzene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
1,4-Dichlorobenzene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Dichlorodifluoromethane	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
1,1-Dichloroethane	<0.0957	*+	0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
1,2-Dichloroethane	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
1,1-Dichloroethene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Dichlorofluoromethane	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
1,2-Dichloropropane	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
1,3-Dichloropropane	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
2,2-Dichloropropane	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
1,1-Dichloropropene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Ethyl ether	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Ethylbenzene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Hexachlorobutadiene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Isopropylbenzene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Methylene Chloride	<0.239		0.239		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
4-Methyl-2-pentanone (MIBK)	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Methyl tert-butyl ether	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Naphthalene	<0.239		0.239		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
n-Butylbenzene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
N-Propylbenzene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
4-Isopropyltoluene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
sec-Butylbenzene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Styrene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
tert-Butylbenzene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
1,1,1,2-Tetrachloroethane	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1

Client Sample ID: ST-6 (0-2)
Date Collected: 08/30/24 10:11
Date Received: 08/31/24 10:00

Lab Sample ID: 310-289515-6
Matrix: Solid
Percent Solids: 98.3

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Tetrachloroethene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Tetrahydrofuran	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Toluene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
trans-1,2-Dichloroethene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
trans-1,3-Dichloropropene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
1,2,3-Trichlorobenzene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
1,2,4-Trichlorobenzene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
1,1,1-Trichloroethane	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
1,1,2-Trichloroethane	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Trichloroethene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Trichlorofluoromethane	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
1,2,3-Trichloropropane	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
1,1,2-Trichloro-1,2,2-trifluoroethane	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
1,2,4-Trimethylbenzene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
1,3,5-Trimethylbenzene	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Vinyl chloride	<0.0957		0.0957		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1
Xylenes, Total	<0.144		0.144		mg/Kg	☼	09/04/24 08:04	09/05/24 13:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*105*		*80 - 120*	*09/04/24 08:04*	*09/05/24 13:06*	*1*
Dibromofluoromethane (Surr)	*99*		*80 - 120*	*09/04/24 08:04*	*09/05/24 13:06*	*1*
Toluene-d8 (Surr)	*99*		*80 - 120*	*09/04/24 08:04*	*09/05/24 13:06*	*1*

Method: SW846 8270E - Semivolatile Organic Compounds (GC-MS/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<0.0201		0.0201		mg/Kg	☼	09/11/24 13:18	09/13/24 07:49	10
Acenaphthylene	<0.0201		0.0201		mg/Kg	☼	09/11/24 13:18	09/13/24 07:49	10
Anthracene	<0.0201		0.0201		mg/Kg	☼	09/11/24 13:18	09/13/24 07:49	10
Benzo[a]anthracene	**0.0340**		0.0201		mg/Kg	☼	09/11/24 13:18	09/13/24 07:49	10
Benzo[a]pyrene	**0.0341**		0.0201		mg/Kg	☼	09/11/24 13:18	09/13/24 07:49	10
Benzo[b]fluoranthene	**0.0473**		0.0201		mg/Kg	☼	09/11/24 13:18	09/13/24 07:49	10
Benzo[g,h,i]perylene	**0.189**		0.0201		mg/Kg	☼	09/11/24 13:18	09/13/24 07:49	10
Benzo[k]fluoranthene	<0.0201		0.0201		mg/Kg	☼	09/11/24 13:18	09/13/24 07:49	10
Chrysene	**0.121**		0.0201		mg/Kg	☼	09/11/24 13:18	09/13/24 07:49	10
Dibenz(a,h)anthracene	**0.0333**	I	0.0201		mg/Kg	☼	09/11/24 13:18	09/13/24 07:49	10
Fluoranthene	<0.0201		0.0201		mg/Kg	☼	09/11/24 13:18	09/13/24 07:49	10
Fluorene	<0.0201		0.0201		mg/Kg	☼	09/11/24 13:18	09/13/24 07:49	10
Indeno[1,2,3-cd]pyrene	**0.0442**		0.0201		mg/Kg	☼	09/11/24 13:18	09/13/24 07:49	10
2-Methylnaphthalene	<0.0201		0.0201		mg/Kg	☼	09/11/24 13:18	09/13/24 07:49	10
Naphthalene	<0.0201		0.0201		mg/Kg	☼	09/11/24 13:18	09/13/24 07:49	10
Phenanthrene	**0.0468**		0.0201		mg/Kg	☼	09/11/24 13:18	09/13/24 07:49	10
Pyrene	**0.0928**		0.0201		mg/Kg	☼	09/11/24 13:18	09/13/24 07:49	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*56*		*28 - 116*	*09/11/24 13:18*	*09/13/24 07:49*	*10*
Nitrobenzene-d5 (Surr)	*56*		*15 - 131*	*09/11/24 13:18*	*09/13/24 07:49*	*10*
Terphenyl-d14 (Surr)	*62*		*24 - 132*	*09/11/24 13:18*	*09/13/24 07:49*	*10*

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Client Sample ID: ST-6 (0-2)

Date Collected: 08/30/24 10:11
Date Received: 08/31/24 10:00

Lab Sample ID: 310-289515-6

Matrix: Solid
Percent Solids: 98.3

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<9.40		9.40		mg/Kg	☼	09/05/24 14:05	09/06/24 21:14	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*112*		*80 - 120*	*09/05/24 14:05*	*09/06/24 21:14*	*1*

Method: WI-DRO - Wisconsin - Diesel Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics [C10-C28]	**534**		155		mg/Kg	☼	09/06/24 08:21	09/11/24 17:31	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**1.89**		0.894		mg/Kg	☼	09/06/24 09:30	09/06/24 21:02	5
Barium	**62.5**		0.894		mg/Kg	☼	09/06/24 09:30	09/06/24 21:02	5
Cadmium	<0.447		0.447		mg/Kg	☼	09/06/24 09:30	09/06/24 21:02	5
Chromium	**22.4**		1.34		mg/Kg	☼	09/06/24 09:30	09/06/24 21:02	5
Lead	**3.90**		2.23		mg/Kg	☼	09/06/24 09:30	09/06/24 21:02	5
Selenium	<1.34		1.34		mg/Kg	☼	09/06/24 09:30	09/06/24 21:02	5
Silver	<0.447		0.447		mg/Kg	☼	09/06/24 09:30	09/06/24 21:02	5

Method: SW846 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.0178		0.0178		mg/Kg	☼	09/09/24 16:25	09/11/24 15:19	1

General Chemistry

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (EPA Moisture)	**1.7**		0.1		%			09/03/24 09:04	1
Percent Solids (EPA Moisture)	**98.3**		0.1		%			09/03/24 09:04	1

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Client Sample ID: TB
Date Collected: 08/30/24 12:00
Date Received: 08/31/24 10:00

Lab Sample ID: 310-289515-7
Matrix: Solid

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<0.500		0.500		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Allyl chloride	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Benzene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Bromobenzene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Bromochloromethane	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Bromodichloromethane	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Bromoform	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Bromomethane	<0.500		0.500		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
2-Butanone (MEK)	<0.750		0.750		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Carbon tetrachloride	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Chlorobenzene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Chlorodibromomethane	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Chloroethane	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Chloroform	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Chloromethane	<0.250		0.250		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
2-Chlorotoluene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
4-Chlorotoluene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
cis-1,2-Dichloroethene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
cis-1,3-Dichloropropene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
1,2-Dibromo-3-Chloropropane	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
1,2-Dibromoethane (EDB)	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Dibromomethane	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
1,2-Dichlorobenzene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
1,3-Dichlorobenzene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
1,4-Dichlorobenzene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Dichlorodifluoromethane	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
1,1-Dichloroethane	<0.100	*+	0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
1,2-Dichloroethane	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
1,1-Dichloroethene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Dichlorofluoromethane	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
1,2-Dichloropropane	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
1,3-Dichloropropane	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
2,2-Dichloropropane	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
1,1-Dichloropropene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Ethyl ether	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Ethylbenzene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Hexachlorobutadiene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Isopropylbenzene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Methylene Chloride	<0.250		0.250		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
4-Methyl-2-pentanone (MIBK)	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Methyl tert-butyl ether	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Naphthalene	<0.250		0.250		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
n-Butylbenzene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
N-Propylbenzene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
4-Isopropyltoluene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
sec-Butylbenzene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Styrene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
tert-Butylbenzene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
1,1,1,2-Tetrachloroethane	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Client Sample ID: TB
Date Collected: 08/30/24 12:00
Date Received: 08/31/24 10:00

Lab Sample ID: 310-289515-7
Matrix: Solid

Method: SW846 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,2,2-Tetrachloroethane	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Tetrachloroethene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Tetrahydrofuran	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Toluene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
trans-1,2-Dichloroethene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
trans-1,3-Dichloropropene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
1,2,3-Trichlorobenzene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
1,2,4-Trichlorobenzene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
1,1,1-Trichloroethane	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
1,1,2-Trichloroethane	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Trichloroethene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Trichlorofluoromethane	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
1,2,3-Trichloropropane	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
1,1,2-Trichloro-1,2,2-trifluoroethane	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
1,2,4-Trimethylbenzene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
1,3,5-Trimethylbenzene	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Vinyl chloride	<0.100		0.100		mg/Kg		09/04/24 08:04	09/05/24 13:28	1
Xylenes, Total	<0.150		0.150		mg/Kg		09/04/24 08:04	09/05/24 13:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*108*		*80 - 120*	*09/04/24 08:04*	*09/05/24 13:28*	*1*
Dibromofluoromethane (Surr)	*101*		*80 - 120*	*09/04/24 08:04*	*09/05/24 13:28*	*1*
Toluene-d8 (Surr)	*96*		*80 - 120*	*09/04/24 08:04*	*09/05/24 13:28*	*1*

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<10.0		10.0		mg/Kg		09/05/24 14:05	09/06/24 21:40	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*108*		*80 - 120*	*09/05/24 14:05*	*09/06/24 21:40*	*1*

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
*+	LCS and/or LCSD is outside acceptance limits, high biased.
S1-	Surrogate recovery exceeds control limits, low biased.

GC/MS Semi VOA

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
F1	MS and/or MSD recovery exceeds control limits.
F2	MS/MSD RPD exceeds control limits
I	Value is EMPC (estimated maximum possible concentration).

Metals

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
F3	Duplicate RPD exceeds the control limit
F5	Duplicate RPD exceeds limit, and one or both sample results are less than 5 times RL, and the absolute difference between results is < the upper reporting limits for both.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Surrogate Summary

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Solid | **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)		
		BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(80-120)	(80-120)	(80-120)
310-289355-C-2-B MS	Matrix Spike	70 S1-	99	100
310-289355-C-2-C MSD	Matrix Spike Duplicate	102	103	98
310-289515-1	ST-1 (2.5-4)	101	97	97
310-289515-2	ST-2 (1-4)	104	98	95
310-289515-3	ST-3 (1-4)	106	95	93
310-289515-4	ST-4 (0-2)	107	92	97
310-289515-5	ST-5 (2.5-4)	107	96	95
310-289515-6	ST-6 (0-2)	105	99	99
310-289515-7	TB	108	101	96
LCS 310-432142/2-A	Lab Control Sample	101	99	96
MB 310-432142/1-A	Method Blank	109	99	98

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8270E - Semivolatile Organic Compounds (GC-MS/MS)

Matrix: Solid | **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)		
		FBP	NBZ	TPHL
Lab Sample ID	Client Sample ID	(28-116)	(15-131)	(24-132)
310-289515-1	ST-1 (2.5-4)	70	26	66
310-289515-2	ST-2 (1-4)	54	30	50
310-289515-3	ST-3 (1-4)	61	60	55
310-289515-3 MS	ST-3 (1-4)	59	47	57
310-289515-3 MSD	ST-3 (1-4)	55	54	53
310-289515-4	ST-4 (0-2)	54	40	49
310-289515-5	ST-5 (2.5-4)	66	61	68
310-289515-6	ST-6 (0-2)	56	56	62
LCS 310-432862/2-A	Lab Control Sample	69	66	78
MB 310-432862/1-A	Method Blank	52	49	68

Surrogate Legend

FBP = 2-Fluorobiphenyl (Surr)
NBZ = Nitrobenzene-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Matrix: Solid | **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		BFB
Lab Sample ID	Client Sample ID	(80-120)
310-289515-1	ST-1 (2.5-4)	92
310-289515-2	ST-2 (1-4)	100
310-289515-3	ST-3 (1-4)	97
310-289515-4	ST-4 (0-2)	103
310-289515-5	ST-5 (2.5-4)	115
310-289515-6	ST-6 (0-2)	112

Surrogate Summary

Client: Braun Intertec Corporation
Job ID: 310-289515-1
Project/Site: Two Harbor Lighthouse
SDG: B2406524

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC) (Continued)

Matrix: Solid
Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)							
		BFB							
Lab Sample ID	Client Sample ID	(80-120)							
310-289515-7	TB	108							
LCS 310-432220/2-A	Lab Control Sample	97							
LCS 310-432351/2-A	Lab Control Sample	115							
LCSD 310-432220/23-A	Lab Control Sample Dup	103							
LCSD 310-432351/23-A	Lab Control Sample Dup	104							
MB 310-432220/1-A	Method Blank	96							
MB 310-432351/1-A	Method Blank	113							

Surrogate Legend

BFB = 4-Bromofluorobenzene (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 310-432142/1-A
Matrix: Solid
Analysis Batch: 432144

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 432142

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	<0.460		0.460		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Allyl chloride	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Benzene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Bromobenzene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Bromochloromethane	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Bromodichloromethane	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Bromoform	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Bromomethane	<0.460		0.460		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
2-Butanone (MEK)	<0.690		0.690		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Carbon tetrachloride	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Chlorobenzene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Chlorodibromomethane	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Chloroethane	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Chloroform	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Chloromethane	<0.230		0.230		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
2-Chlorotoluene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
4-Chlorotoluene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
cis-1,2-Dichloroethene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
cis-1,3-Dichloropropene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
1,2-Dibromo-3-Chloropropane	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
1,2-Dibromoethane (EDB)	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Dibromomethane	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
1,2-Dichlorobenzene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
1,3-Dichlorobenzene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
1,4-Dichlorobenzene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Dichlorodifluoromethane	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
1,1-Dichloroethane	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
1,2-Dichloroethane	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
1,1-Dichloroethene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Dichlorofluoromethane	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
1,2-Dichloropropane	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
1,3-Dichloropropane	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
2,2-Dichloropropane	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
1,1-Dichloropropene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Ethyl ether	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Ethylbenzene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Hexachlorobutadiene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Isopropylbenzene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Methylene Chloride	<0.230		0.230		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
4-Methyl-2-pentanone (MIBK)	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Methyl tert-butyl ether	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Naphthalene	<0.230		0.230		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
n-Butylbenzene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
N-Propylbenzene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
4-Isopropyltoluene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
sec-Butylbenzene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Styrene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
tert-Butylbenzene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 310-432142/1-A
Matrix: Solid
Analysis Batch: 432144

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 432142

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1,2-Tetrachloroethane	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
1,1,2,2-Tetrachloroethane	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Tetrachloroethene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Tetrahydrofuran	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Toluene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
trans-1,2-Dichloroethene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
trans-1,3-Dichloropropene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
1,2,3-Trichlorobenzene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
1,2,4-Trichlorobenzene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
1,1,1-Trichloroethane	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
1,1,2-Trichloroethane	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Trichloroethene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Trichlorofluoromethane	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
1,2,3-Trichloropropane	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
1,1,2-Trichloro-1,2,2-trifluoroethane	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
1,2,4-Trimethylbenzene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
1,3,5-Trimethylbenzene	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Vinyl chloride	<0.0920		0.0920		mg/Kg		09/04/24 08:04	09/05/24 05:30	1
Xylenes, Total	<0.138		0.138		mg/Kg		09/04/24 08:04	09/05/24 05:30	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*109*		*80 - 120*	*09/04/24 08:04*	*09/05/24 05:30*	*1*
Dibromofluoromethane (Surr)	*99*		*80 - 120*	*09/04/24 08:04*	*09/05/24 05:30*	*1*
Toluene-d8 (Surr)	*98*		*80 - 120*	*09/04/24 08:04*	*09/05/24 05:30*	*1*

Lab Sample ID: LCS 310-432142/2-A
Matrix: Solid
Analysis Batch: 432144

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 432142

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Acetone	1.93	2.034		mg/Kg		105	50 - 150
Allyl chloride	0.965	1.038		mg/Kg		108	50 - 150
Benzene	0.965	0.8101		mg/Kg		84	80 - 127
Bromobenzene	0.965	0.8214		mg/Kg		85	80 - 129
Bromochloromethane	0.965	0.9097		mg/Kg		94	79 - 141
Bromodichloromethane	0.965	0.7900		mg/Kg		82	72 - 126
Bromoform	0.965	0.8805		mg/Kg		91	56 - 140
2-Butanone (MEK)	1.93	1.820		mg/Kg		94	50 - 150
Carbon tetrachloride	0.965	0.8763		mg/Kg		91	74 - 134
Chlorobenzene	0.965	0.8077		mg/Kg		84	80 - 123
Chlorodibromomethane	0.965	0.7883		mg/Kg		82	70 - 127
Chloroform	0.965	0.9187		mg/Kg		95	78 - 128
2-Chlorotoluene	0.965	0.8701		mg/Kg		90	80 - 123
4-Chlorotoluene	0.965	0.8725		mg/Kg		90	79 - 122
cis-1,2-Dichloroethene	0.965	0.8805		mg/Kg		91	80 - 131
cis-1,3-Dichloropropene	0.965	0.7734		mg/Kg		80	77 - 127
1,2-Dibromo-3-Chloropropane	0.965	0.9282		mg/Kg		96	50 - 150
1,2-Dibromoethane (EDB)	0.965	0.8550		mg/Kg		89	80 - 126

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 310-432142/2-A
Matrix: Solid
Analysis Batch: 432144

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 432142

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Dibromomethane	0.965	0.9010		mg/Kg		93	78 - 133
1,2-Dichlorobenzene	0.965	0.8066		mg/Kg		84	80 - 123
1,3-Dichlorobenzene	0.965	0.8516		mg/Kg		88	80 - 124
1,4-Dichlorobenzene	0.965	0.7648		mg/Kg		79	79 - 122
1,1-Dichloroethane	0.965	1.442	*+	mg/Kg		149	75 - 133
1,2-Dichloroethane	0.965	0.9505		mg/Kg		99	74 - 135
1,1-Dichloroethene	0.965	0.8565		mg/Kg		89	72 - 136
1,2-Dichloropropane	0.965	0.8513		mg/Kg		88	80 - 130
1,3-Dichloropropane	0.965	0.8674		mg/Kg		90	79 - 130
2,2-Dichloropropane	0.965	0.7160		mg/Kg		74	50 - 150
1,1-Dichloropropene	0.965	0.8539		mg/Kg		89	80 - 131
Ethyl ether	0.965	0.8715		mg/Kg		90	71 - 139
Ethylbenzene	0.965	0.8318		mg/Kg		86	80 - 123
Hexachlorobutadiene	0.965	0.8722		mg/Kg		90	50 - 150
Isopropylbenzene	0.965	0.8315		mg/Kg		86	80 - 125
Methylene Chloride	0.965	1.237		mg/Kg		128	50 - 150
4-Methyl-2-pentanone (MIBK)	1.93	1.804		mg/Kg		93	67 - 136
Methyl tert-butyl ether	0.965	1.293		mg/Kg		134	72 - 136
Naphthalene	0.965	0.9168		mg/Kg		95	50 - 150
n-Butylbenzene	0.965	0.8199		mg/Kg		85	71 - 127
N-Propylbenzene	0.965	0.8402		mg/Kg		87	79 - 125
4-Isopropyltoluene	0.965	0.8108		mg/Kg		84	76 - 125
sec-Butylbenzene	0.965	0.8453		mg/Kg		88	76 - 125
Styrene	0.965	0.8282		mg/Kg		86	79 - 124
tert-Butylbenzene	0.965	0.8195		mg/Kg		85	78 - 124
1,1,1,2-Tetrachloroethane	0.965	0.8554		mg/Kg		89	78 - 127
1,1,2,2-Tetrachloroethane	0.965	0.8678		mg/Kg		90	74 - 131
Tetrachloroethene	0.965	0.8328		mg/Kg		86	80 - 134
Tetrahydrofuran	1.93	1.901		mg/Kg		99	65 - 141
Toluene	0.965	0.8014		mg/Kg		83	78 - 126
trans-1,2-Dichloroethene	0.965	1.150		mg/Kg		119	75 - 134
trans-1,3-Dichloropropene	0.965	0.8347		mg/Kg		87	74 - 125
1,2,3-Trichlorobenzene	0.965	0.9025		mg/Kg		94	50 - 150
1,2,4-Trichlorobenzene	0.965	0.8669		mg/Kg		90	74 - 130
1,1,1-Trichloroethane	0.965	0.9444		mg/Kg		98	77 - 134
1,1,2-Trichloroethane	0.965	0.8417		mg/Kg		87	80 - 127
Trichloroethene	0.965	0.8793		mg/Kg		91	80 - 130
1,2,3-Trichloropropane	0.965	0.8725		mg/Kg		90	75 - 134
1,1,2-Trichloro-1,2,2-trifluoroethane	0.965	0.9057		mg/Kg		94	66 - 150
1,2,4-Trimethylbenzene	0.965	0.8147		mg/Kg		84	73 - 130
1,3,5-Trimethylbenzene	0.965	0.8063		mg/Kg		84	76 - 124
Xylenes, Total	1.93	1.583		mg/Kg		82	80 - 125

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*
Dibromofluoromethane (Surr)	*99*		*80 - 120*
Toluene-d8 (Surr)	*96*		*80 - 120*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 310-289355-C-2-B MS
Matrix: Solid
Analysis Batch: 432144

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 432142

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Acetone	<0.485		2.04	1.593		mg/Kg	☼	78	13 - 150
Allyl chloride	<0.0970		1.02	0.7362		mg/Kg	☼	72	19 - 150
Benzene	<0.0970		1.02	0.8342		mg/Kg	☼	82	27 - 150
Bromobenzene	<0.0970		1.02	0.6056		mg/Kg	☼	59	30 - 150
Bromochloromethane	<0.0970		1.02	0.9360		mg/Kg	☼	92	31 - 150
Bromodichloromethane	<0.0970		1.02	0.8467		mg/Kg	☼	83	20 - 150
Bromoform	<0.0970		1.02	0.6633		mg/Kg	☼	65	18 - 150
2-Butanone (MEK)	<0.727		2.04	2.042		mg/Kg	☼	100	23 - 150
Carbon tetrachloride	<0.0970		1.02	0.8649		mg/Kg	☼	85	23 - 150
Chlorobenzene	<0.0970		1.02	0.8197		mg/Kg	☼	80	32 - 150
Chlorodibromomethane	<0.0970		1.02	0.7770		mg/Kg	☼	76	24 - 145
Chloroform	<0.0970		1.02	0.9510		mg/Kg	☼	93	28 - 150
2-Chlorotoluene	<0.0970		1.02	0.6277		mg/Kg	☼	62	22 - 150
4-Chlorotoluene	<0.0970		1.02	0.6295		mg/Kg	☼	62	19 - 150
cis-1,2-Dichloroethene	<0.0970		1.02	0.9415		mg/Kg	☼	92	31 - 150
cis-1,3-Dichloropropene	<0.0970		1.02	0.8210		mg/Kg	☼	81	27 - 146
1,2-Dibromo-3-Chloropropane	<0.0970		1.02	0.8487		mg/Kg	☼	83	16 - 150
1,2-Dibromoethane (EDB)	<0.0970		1.02	0.8977		mg/Kg	☼	88	31 - 150
Dibromomethane	<0.0970		1.02	0.9058		mg/Kg	☼	89	30 - 150
1,2-Dichlorobenzene	<0.0970		1.02	0.8934		mg/Kg	☼	88	28 - 150
1,3-Dichlorobenzene	<0.0970		1.02	0.8659		mg/Kg	☼	85	29 - 150
1,4-Dichlorobenzene	<0.0970		1.02	0.8213		mg/Kg	☼	81	29 - 150
1,1-Dichloroethane	<0.0970	*+	1.02	1.012		mg/Kg	☼	99	27 - 150
1,2-Dichloroethane	<0.0970		1.02	0.9576		mg/Kg	☼	94	27 - 150
1,1-Dichloroethene	<0.0970		1.02	0.6500		mg/Kg	☼	64	20 - 150
1,2-Dichloropropane	<0.0970		1.02	0.9383		mg/Kg	☼	92	32 - 150
1,3-Dichloropropane	<0.0970		1.02	0.8756		mg/Kg	☼	86	31 - 150
2,2-Dichloropropane	<0.0970		1.02	0.7258		mg/Kg	☼	71	10 - 150
1,1-Dichloropropene	<0.0970		1.02	0.8669		mg/Kg	☼	85	31 - 150
Ethyl ether	<0.0970		1.02	0.5959		mg/Kg	☼	58	21 - 150
Ethylbenzene	<0.0970		1.02	0.8932		mg/Kg	☼	88	20 - 150
Hexachlorobutadiene	<0.0970		1.02	0.8956		mg/Kg	☼	84	11 - 150
Isopropylbenzene	<0.0970		1.02	0.6061		mg/Kg	☼	59	25 - 150
Methylene Chloride	<0.242		1.02	0.8071		mg/Kg	☼	79	17 - 150
4-Methyl-2-pentanone (MIBK)	<0.0970		2.04	2.063		mg/Kg	☼	101	21 - 150
Methyl tert-butyl ether	<0.0970		1.02	0.8037		mg/Kg	☼	79	22 - 150
Naphthalene	<0.242		1.02	0.8898		mg/Kg	☼	84	10 - 150
n-Butylbenzene	<0.0970		1.02	0.8598		mg/Kg	☼	82	10 - 150
N-Propylbenzene	<0.0970		1.02	0.6201		mg/Kg	☼	61	16 - 150
4-Isopropyltoluene	<0.0970		1.02	0.8561		mg/Kg	☼	84	19 - 150
sec-Butylbenzene	<0.0970		1.02	0.8696		mg/Kg	☼	85	21 - 150
Styrene	<0.0970		1.02	0.5992		mg/Kg	☼	59	27 - 150
tert-Butylbenzene	<0.0970		1.02	0.8652		mg/Kg	☼	85	28 - 150
1,1,1,2-Tetrachloroethane	<0.0970		1.02	0.8639		mg/Kg	☼	85	28 - 150
1,1,2,2-Tetrachloroethane	<0.0970		1.02	0.6214		mg/Kg	☼	61	19 - 150
Tetrachloroethene	<0.0970		1.02	0.8797		mg/Kg	☼	86	31 - 150
Tetrahydrofuran	<0.0970		2.04	2.187		mg/Kg	☼	107	22 - 150
Toluene	<0.0970		1.02	0.8701		mg/Kg	☼	85	24 - 150

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 310-289355-C-2-B MS
Matrix: Solid
Analysis Batch: 432144

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 432142

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
trans-1,2-Dichloroethene	<0.0970		1.02	0.7801		mg/Kg	☼	77	25 - 150
trans-1,3-Dichloropropene	<0.0970		1.02	0.8760		mg/Kg	☼	86	25 - 145
1,2,3-Trichlorobenzene	<0.0970		1.02	0.8483		mg/Kg	☼	80	19 - 150
1,2,4-Trichlorobenzene	<0.0970		1.02	0.8956		mg/Kg	☼	85	21 - 150
1,1,1-Trichloroethane	<0.0970		1.02	0.9152		mg/Kg	☼	90	29 - 150
1,1,2-Trichloroethane	<0.0970		1.02	0.8545		mg/Kg	☼	84	25 - 150
Trichloroethene	<0.0970		1.02	0.9340		mg/Kg	☼	92	33 - 150
1,2,3-Trichloropropane	<0.0970		1.02	0.6647		mg/Kg	☼	65	24 - 150
1,1,2-Trichloro-1,2,2-trifluoroethane	<0.0970		1.02	0.6783		mg/Kg	☼	67	19 - 150
1,2,4-Trimethylbenzene	<0.0970		1.02	0.8740		mg/Kg	☼	86	10 - 150
1,3,5-Trimethylbenzene	<0.0970		1.02	0.8440		mg/Kg	☼	83	17 - 150
Xylenes, Total	<0.145		2.04	1.433		mg/Kg	☼	70	18 - 150

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*70*	*S1-*	*80 - 120*
Dibromofluoromethane (Surr)	*99*		*80 - 120*
Toluene-d8 (Surr)	*100*		*80 - 120*

Lab Sample ID: 310-289355-C-2-C MSD
Matrix: Solid
Analysis Batch: 432144

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 432142

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Acetone	<0.485		2.03	1.855		mg/Kg	☼	91	13 - 150	15	40
Allyl chloride	<0.0970		1.02	0.8190		mg/Kg	☼	81	19 - 150	11	40
Benzene	<0.0970		1.02	0.8044		mg/Kg	☼	79	27 - 150	4	40
Bromobenzene	<0.0970		1.02	0.8124		mg/Kg	☼	80	30 - 150	29	40
Bromochloromethane	<0.0970		1.02	0.8876		mg/Kg	☼	87	31 - 150	5	40
Bromodichloromethane	<0.0970		1.02	0.7826		mg/Kg	☼	77	20 - 150	8	40
Bromoform	<0.0970		1.02	0.8560		mg/Kg	☼	84	18 - 150	25	40
2-Butanone (MEK)	<0.727		2.03	1.644		mg/Kg	☼	81	23 - 150	22	40
Carbon tetrachloride	<0.0970		1.02	0.8367		mg/Kg	☼	82	23 - 150	3	40
Chlorobenzene	<0.0970		1.02	0.8046		mg/Kg	☼	79	32 - 150	2	40
Chlorodibromomethane	<0.0970		1.02	0.7704		mg/Kg	☼	76	24 - 145	1	40
Chloroform	<0.0970		1.02	0.9162		mg/Kg	☼	90	28 - 150	4	40
2-Chlorotoluene	<0.0970		1.02	0.8584		mg/Kg	☼	85	22 - 150	31	40
4-Chlorotoluene	<0.0970		1.02	0.8645		mg/Kg	☼	85	19 - 150	31	40
cis-1,2-Dichloroethene	<0.0970		1.02	0.9265		mg/Kg	☼	91	31 - 150	2	40
cis-1,3-Dichloropropene	<0.0970		1.02	0.7502		mg/Kg	☼	74	27 - 146	9	40
1,2-Dibromo-3-Chloropropane	<0.0970		1.02	0.8765		mg/Kg	☼	86	16 - 150	3	40
1,2-Dibromoethane (EDB)	<0.0970		1.02	0.8275		mg/Kg	☼	81	31 - 150	8	40
Dibromomethane	<0.0970		1.02	0.8698		mg/Kg	☼	86	30 - 150	4	40
1,2-Dichlorobenzene	<0.0970		1.02	0.7983		mg/Kg	☼	79	28 - 150	11	40
1,3-Dichlorobenzene	<0.0970		1.02	0.8314		mg/Kg	☼	82	29 - 150	4	40
1,4-Dichlorobenzene	<0.0970		1.02	0.7761		mg/Kg	☼	76	29 - 150	6	40
1,1-Dichloroethane	<0.0970	*+	1.02	0.8619		mg/Kg	☼	85	27 - 150	16	40
1,2-Dichloroethane	<0.0970		1.02	0.9196		mg/Kg	☼	91	27 - 150	4	40
1,1-Dichloroethene	<0.0970		1.02	0.8926		mg/Kg	☼	88	20 - 150	31	40

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 310-289355-C-2-C MSD
Matrix: Solid
Analysis Batch: 432144

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 432142

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
1,2-Dichloropropane	<0.0970		1.02	0.8345		mg/Kg	☼	82	32 - 150	12	40
1,3-Dichloropropane	<0.0970		1.02	0.8121		mg/Kg	☼	80	31 - 150	8	40
2,2-Dichloropropane	<0.0970		1.02	0.6654		mg/Kg	☼	66	10 - 150	9	40
1,1-Dichloropropene	<0.0970		1.02	0.8283		mg/Kg	☼	82	31 - 150	5	40
Ethyl ether	<0.0970		1.02	0.8012		mg/Kg	☼	79	21 - 150	29	40
Ethylbenzene	<0.0970		1.02	0.8329		mg/Kg	☼	82	20 - 150	7	40
Hexachlorobutadiene	<0.0970		1.02	0.9024		mg/Kg	☼	85	11 - 150	1	40
Isopropylbenzene	<0.0970		1.02	0.8560		mg/Kg	☼	84	25 - 150	34	40
Methylene Chloride	<0.242		1.02	0.9837		mg/Kg	☼	97	17 - 150	20	40
4-Methyl-2-pentanone (MIBK)	<0.0970		2.03	1.739		mg/Kg	☼	86	21 - 150	17	40
Methyl tert-butyl ether	<0.0970		1.02	0.8507		mg/Kg	☼	84	22 - 150	6	40
Naphthalene	<0.242		1.02	0.8882		mg/Kg	☼	84	10 - 150	0	40
n-Butylbenzene	<0.0970		1.02	0.8195		mg/Kg	☼	78	10 - 150	5	40
N-Propylbenzene	<0.0970		1.02	0.8938		mg/Kg	☼	88	16 - 150	36	40
4-Isopropyltoluene	<0.0970		1.02	0.8296		mg/Kg	☼	82	19 - 150	3	40
sec-Butylbenzene	<0.0970		1.02	0.8233		mg/Kg	☼	81	21 - 150	5	40
Styrene	<0.0970		1.02	0.8186		mg/Kg	☼	81	27 - 150	31	40
tert-Butylbenzene	<0.0970		1.02	0.8116		mg/Kg	☼	80	28 - 150	6	40
1,1,1,2-Tetrachloroethane	<0.0970		1.02	0.7706		mg/Kg	☼	76	28 - 150	11	40
1,1,2,2-Tetrachloroethane	<0.0970		1.02	0.8208		mg/Kg	☼	81	19 - 150	28	40
Tetrachloroethene	<0.0970		1.02	0.8209		mg/Kg	☼	81	31 - 150	7	40
Tetrahydrofuran	<0.0970		2.03	1.704		mg/Kg	☼	84	22 - 150	25	40
Toluene	<0.0970		1.02	0.8124		mg/Kg	☼	80	24 - 150	7	40
trans-1,2-Dichloroethene	<0.0970		1.02	0.8506		mg/Kg	☼	84	25 - 150	9	40
trans-1,3-Dichloropropene	<0.0970		1.02	0.8055		mg/Kg	☼	79	25 - 145	8	40
1,2,3-Trichlorobenzene	<0.0970		1.02	0.8737		mg/Kg	☼	83	19 - 150	3	40
1,2,4-Trichlorobenzene	<0.0970		1.02	0.8271		mg/Kg	☼	79	21 - 150	8	40
1,1,1-Trichloroethane	<0.0970		1.02	0.8665		mg/Kg	☼	85	29 - 150	5	40
1,1,2-Trichloroethane	<0.0970		1.02	0.7898		mg/Kg	☼	78	25 - 150	8	40
Trichloroethene	<0.0970		1.02	0.8884		mg/Kg	☼	87	33 - 150	5	40
1,2,3-Trichloropropane	<0.0970		1.02	0.8784		mg/Kg	☼	86	24 - 150	28	40
1,1,2-Trichloro-1,2,2-trifluoroethane	<0.0970		1.02	0.8960		mg/Kg	☼	88	19 - 150	28	40
1,2,4-Trimethylbenzene	<0.0970		1.02	0.8155		mg/Kg	☼	80	10 - 150	7	40
1,3,5-Trimethylbenzene	<0.0970		1.02	0.7951		mg/Kg	☼	78	17 - 150	6	40
Xylenes, Total	<0.145		2.03	1.622		mg/Kg	☼	80	18 - 150	12	40

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*
Dibromofluoromethane (Surr)	*103*		*80 - 120*
Toluene-d8 (Surr)	*98*		*80 - 120*

Method: 8270E - Semivolatile Organic Compounds (GC-MS/MS)

Lab Sample ID: MB 310-432862/1-A
Matrix: Solid
Analysis Batch: 433017

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 432862

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	<0.00189		0.00189		mg/Kg		09/11/24 13:18	09/13/24 03:56	1
Acenaphthylene	<0.00189		0.00189		mg/Kg		09/11/24 13:18	09/13/24 03:56	1
Anthracene	<0.00189		0.00189		mg/Kg		09/11/24 13:18	09/13/24 03:56	1
Benzo[a]anthracene	<0.00189		0.00189		mg/Kg		09/11/24 13:18	09/13/24 03:56	1
Benzo[a]pyrene	<0.00189		0.00189		mg/Kg		09/11/24 13:18	09/13/24 03:56	1
Benzo[b]fluoranthene	<0.00189		0.00189		mg/Kg		09/11/24 13:18	09/13/24 03:56	1
Benzo[g,h,i]perylene	<0.00189		0.00189		mg/Kg		09/11/24 13:18	09/13/24 03:56	1
Benzo[k]fluoranthene	<0.00189		0.00189		mg/Kg		09/11/24 13:18	09/13/24 03:56	1
Chrysene	<0.00189		0.00189		mg/Kg		09/11/24 13:18	09/13/24 03:56	1
Dibenz(a,h)anthracene	<0.00189		0.00189		mg/Kg		09/11/24 13:18	09/13/24 03:56	1
Fluoranthene	<0.00189		0.00189		mg/Kg		09/11/24 13:18	09/13/24 03:56	1
Fluorene	<0.00189		0.00189		mg/Kg		09/11/24 13:18	09/13/24 03:56	1
Indeno[1,2,3-cd]pyrene	<0.00189		0.00189		mg/Kg		09/11/24 13:18	09/13/24 03:56	1
2-Methylnaphthalene	<0.00189		0.00189		mg/Kg		09/11/24 13:18	09/13/24 03:56	1
Naphthalene	<0.00189		0.00189		mg/Kg		09/11/24 13:18	09/13/24 03:56	1
Phenanthrene	<0.00189		0.00189		mg/Kg		09/11/24 13:18	09/13/24 03:56	1
Pyrene	<0.00189		0.00189		mg/Kg		09/11/24 13:18	09/13/24 03:56	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorobiphenyl (Surr)	*52*		*28 - 116*	*09/11/24 13:18*	*09/13/24 03:56*	*1*
Nitrobenzene-d5 (Surr)	*49*		*15 - 131*	*09/11/24 13:18*	*09/13/24 03:56*	*1*
Terphenyl-d14 (Surr)	*68*		*24 - 132*	*09/11/24 13:18*	*09/13/24 03:56*	*1*

Lab Sample ID: LCS 310-432862/2-A
Matrix: Solid
Analysis Batch: 433017

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 432862

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Acenaphthene	0.125	0.1217		mg/Kg		97	40 - 110
Acenaphthylene	0.125	0.1262		mg/Kg		101	37 - 110
Anthracene	0.125	0.08764		mg/Kg		70	43 - 110
Benzo[a]anthracene	0.125	0.1092		mg/Kg		87	42 - 110
Benzo[a]pyrene	0.125	0.1017		mg/Kg		81	38 - 116
Benzo[b]fluoranthene	0.125	0.1028		mg/Kg		82	42 - 114
Benzo[g,h,i]perylene	0.125	0.1027		mg/Kg		82	34 - 116
Benzo[k]fluoranthene	0.125	0.1000		mg/Kg		80	36 - 118
Chrysene	0.125	0.1010		mg/Kg		81	43 - 110
Dibenz(a,h)anthracene	0.125	0.09101		mg/Kg		73	33 - 121
Fluoranthene	0.125	0.1056		mg/Kg		84	39 - 110
Fluorene	0.125	0.1056		mg/Kg		84	40 - 110
Indeno[1,2,3-cd]pyrene	0.125	0.08470		mg/Kg		68	34 - 120
2-Methylnaphthalene	0.125	0.1032		mg/Kg		82	37 - 110
Naphthalene	0.125	0.09759		mg/Kg		78	33 - 110
Phenanthrene	0.125	0.09940		mg/Kg		79	42 - 110
Pyrene	0.125	0.1008		mg/Kg		80	40 - 113

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*69*		*28 - 116*

Method: 8270E - Semivolatile Organic Compounds (GC-MS/MS) (Continued)

Lab Sample ID: LCS 310-432862/2-A
Matrix: Solid
Analysis Batch: 433017

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 432862

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Nitrobenzene-d5 (Surr)	*66*		*15 - 131*
Terphenyl-d14 (Surr)	*78*		*24 - 132*

Lab Sample ID: 310-289515-3 MS
Matrix: Solid
Analysis Batch: 433017

Client Sample ID: ST-3 (1-4)
Prep Type: Total/NA
Prep Batch: 432862

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Acenaphthene	0.0235		0.141	0.1100		mg/Kg	☼	61	20 - 111
Acenaphthylene	0.0409		0.141	0.1511		mg/Kg	☼	78	23 - 110
Anthracene	0.0748	F2 I F1	0.141	0.2900	F1	mg/Kg	☼	153	22 - 110
Benzo[a]anthracene	0.203	F2 F1	0.141	1.095	F1	mg/Kg	☼	634	16 - 117
Benzo[a]pyrene	0.197	F2 F1	0.141	0.4761	F1	mg/Kg	☼	198	13 - 118
Benzo[b]fluoranthene	0.321	F2 F1	0.141	1.067	F1	mg/Kg	☼	530	13 - 120
Benzo[g,h,i]perylene	0.186		0.141	0.3493		mg/Kg	☼	116	12 - 117
Benzo[k]fluoranthene	0.126	F2 F1	0.141	0.3822	F1	mg/Kg	☼	182	16 - 118
Chrysene	0.263	F2 F1	0.141	1.122	F1	mg/Kg	☼	610	17 - 116
Dibenz(a,h)anthracene	0.0618	I	0.141	0.1514		mg/Kg	☼	64	12 - 122
Fluoranthene	0.381	F2 F1	0.141	2.065	F1	mg/Kg	☼	1197	14 - 118
Fluorene	0.0575		0.141	0.1725		mg/Kg	☼	82	23 - 110
Indeno[1,2,3-cd]pyrene	0.114		0.141	0.2398		mg/Kg	☼	90	10 - 129
2-Methylnaphthalene	1.01		0.141	1.438	4	mg/Kg	☼	307	14 - 112
Naphthalene	0.624		0.141	0.9314	4	mg/Kg	☼	218	20 - 110
Phenanthrene	0.530	F1	0.141	0.9140	F1	mg/Kg	☼	273	17 - 116
Pyrene	0.294	F2 F1	0.141	1.506	F1	mg/Kg	☼	861	11 - 123

Surrogate	MS %Recovery	MS Qualifier	Limits
2-Fluorobiphenyl (Surr)	*59*		*28 - 116*
Nitrobenzene-d5 (Surr)	*47*		*15 - 131*
Terphenyl-d14 (Surr)	*57*		*24 - 132*

Lab Sample ID: 310-289515-3 MSD
Matrix: Solid
Analysis Batch: 433017

Client Sample ID: ST-3 (1-4)
Prep Type: Total/NA
Prep Batch: 432862

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Acenaphthene	0.0235		0.140	0.1057		mg/Kg	☼	59	20 - 111	4	40
Acenaphthylene	0.0409		0.140	0.1252		mg/Kg	☼	60	23 - 110	19	40
Anthracene	0.0748	F2 I F1	0.140	0.1496	F2	mg/Kg	☼	53	22 - 110	64	40
Benzo[a]anthracene	0.203	F2 F1	0.140	0.3237	F2	mg/Kg	☼	86	16 - 117	109	40
Benzo[a]pyrene	0.197	F2 F1	0.140	0.2432	F2	mg/Kg	☼	33	13 - 118	65	40
Benzo[b]fluoranthene	0.321	F2 F1	0.140	0.4535	F2	mg/Kg	☼	95	13 - 120	81	40
Benzo[g,h,i]perylene	0.186		0.140	0.2741		mg/Kg	☼	63	12 - 117	24	40
Benzo[k]fluoranthene	0.126	F2 F1	0.140	0.1719	F2	mg/Kg	☼	33	16 - 118	76	40
Chrysene	0.263	F2 F1	0.140	0.3587	F2	mg/Kg	☼	68	17 - 116	103	40
Dibenz(a,h)anthracene	0.0618	I	0.140	0.1199		mg/Kg	☼	41	12 - 122	23	40
Fluoranthene	0.381	F2 F1	0.140	0.4138	F2	mg/Kg	☼	24	14 - 118	133	40
Fluorene	0.0575		0.140	0.1544		mg/Kg	☼	69	23 - 110	11	40

Method: 8270E - Semivolatile Organic Compounds (GC-MS/MS) (Continued)

Lab Sample ID: 310-289515-3 MSD
Matrix: Solid
Analysis Batch: 433017

Client Sample ID: ST-3 (1-4)
Prep Type: Total/NA
Prep Batch: 432862

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Indeno[1,2,3-cd]pyrene	0.114		0.140	0.1842		mg/Kg	☼	50	10 - 129	26	40
2-Methylnaphthalene	1.01		0.140	1.404	4	mg/Kg	☼	284	14 - 112	2	40
Naphthalene	0.624		0.140	0.9406	4	mg/Kg	☼	226	20 - 110	1	40
Phenanthrene	0.530	F1	0.140	0.7709	F1	mg/Kg	☼	172	17 - 116	17	40
Pyrene	0.294	F2 F1	0.140	0.3499	F2	mg/Kg	☼	40	11 - 123	125	40

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
2-Fluorobiphenyl (Surr)	*55*		*28 - 116*
Nitrobenzene-d5 (Surr)	*54*		*15 - 131*
Terphenyl-d14 (Surr)	*53*		*24 - 132*

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC)

Lab Sample ID: MB 310-432220/1-A
Matrix: Solid
Analysis Batch: 432222

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 432220

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<9.57		9.57		mg/Kg		09/04/24 15:06	09/05/24 14:32	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*	*09/04/24 15:06*	*09/05/24 14:32*	*1*

Lab Sample ID: LCS 310-432220/2-A
Matrix: Solid
Analysis Batch: 432222

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 432220

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Wisconsin GRO			19.0	18.43		mg/Kg		97	80 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*

Lab Sample ID: LCSD 310-432220/23-A
Matrix: Solid
Analysis Batch: 432222

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 432220

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Wisconsin GRO			18.9	16.99		mg/Kg		90	80 - 120	8	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*103*		*80 - 120*

Method: WI-GRO - Wisconsin - Gasoline Range Organics (GC) (Continued)

Lab Sample ID: MB 310-432351/1-A
Matrix: Solid
Analysis Batch: 432354

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 432351

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Wisconsin GRO	<9.33		9.33		mg/Kg		09/05/24 14:05	09/06/24 14:14	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
4-Bromofluorobenzene (Surr)	*113*		*80 - 120*	*09/05/24 14:05*	*09/06/24 14:14*	*1*

Lab Sample ID: LCS 310-432351/2-A
Matrix: Solid
Analysis Batch: 432354

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 432351

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Wisconsin GRO	19.3	21.45		mg/Kg		111	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*115*		*80 - 120*

Lab Sample ID: LCSD 310-432351/23-A
Matrix: Solid
Analysis Batch: 432354

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 432351

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Wisconsin GRO	19.7	20.83		mg/Kg		106	80 - 120	3	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
4-Bromofluorobenzene (Surr)	*104*		*80 - 120*

Method: WI-DRO - Wisconsin - Diesel Range Organics (GC)

Lab Sample ID: MB 310-432423/1-A
Matrix: Solid
Analysis Batch: 432815

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 432423

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Diesel Range Organics [C10-C28]	<6.80		6.80		mg/Kg		09/06/24 08:21	09/11/24 13:30	1

Lab Sample ID: LCS 310-432423/2-A
Matrix: Solid
Analysis Batch: 432815

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 432423

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Diesel Range Organics [C10-C28]	98.0	95.64		mg/Kg		98	70 - 120

Lab Sample ID: LCSD 310-432423/3-A
Matrix: Solid
Analysis Batch: 432815

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 432423

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Diesel Range Organics [C10-C28]	98.1	106.2		mg/Kg		108	70 - 120	10	20

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-432338/1-A ^5
Matrix: Solid
Analysis Batch: 432557

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 432338

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.913		0.913		mg/Kg		09/06/24 09:30	09/06/24 20:05	5
Barium	<0.913		0.913		mg/Kg		09/06/24 09:30	09/06/24 20:05	5
Cadmium	<0.457		0.457		mg/Kg		09/06/24 09:30	09/06/24 20:05	5
Chromium	<1.37		1.37		mg/Kg		09/06/24 09:30	09/06/24 20:05	5
Lead	<2.28		2.28		mg/Kg		09/06/24 09:30	09/06/24 20:05	5
Selenium	<1.37		1.37		mg/Kg		09/06/24 09:30	09/06/24 20:05	5
Silver	<0.457		0.457		mg/Kg		09/06/24 09:30	09/06/24 20:05	5

Lab Sample ID: LCS 310-432338/2-A ^20
Matrix: Solid
Analysis Batch: 432557

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 432338

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	185	207.7		mg/Kg		113	80 - 120
Barium	92.3	103.4		mg/Kg		112	80 - 120
Cadmium	92.3	101.6		mg/Kg		110	80 - 120
Chromium	92.3	105.2		mg/Kg		114	80 - 120
Lead	185	217.5		mg/Kg		118	80 - 120
Selenium	369	403.9		mg/Kg		109	80 - 120

Lab Sample ID: LCS 310-432338/2-A ^20
Matrix: Solid
Analysis Batch: 432751

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 432338

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Silver	92.3	99.10		mg/Kg		107	80 - 120

Lab Sample ID: 310-288810-B-1-D MS ^20
Matrix: Solid
Analysis Batch: 432557

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 432338

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	7.14	F1	231	311.8	F1	mg/Kg	☼	132	75 - 125
Barium	95.7	F1	116	363.5	F1	mg/Kg	☼	231	75 - 125
Cadmium	3.05		116	147.8		mg/Kg	☼	125	75 - 125
Chromium	28.3		116	169.6		mg/Kg	☼	122	75 - 125
Lead	90.8	F1	231	461.8	F1	mg/Kg	☼	160	75 - 125
Selenium	<1.73		463	571.9		mg/Kg	☼	123	75 - 125
Silver	0.861	F1	116	166.1	F1	mg/Kg	☼	143	75 - 125

Lab Sample ID: 310-288810-B-1-E MSD ^20
Matrix: Solid
Analysis Batch: 432557

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 432338

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	7.14	F1	231	291.2		mg/Kg	☼	123	75 - 125	7	20
Barium	95.7	F1	115	383.9	F1	mg/Kg	☼	250	75 - 125	5	20
Cadmium	3.05		115	136.5		mg/Kg	☼	116	75 - 125	8	20
Chromium	28.3		115	166.2		mg/Kg	☼	119	75 - 125	2	20

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: 310-288810-B-1-E MSD ^20
Matrix: Solid
Analysis Batch: 432557

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 432338

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Lead	90.8	F1	231	422.8	F1	mg/Kg	☼	144	75 - 125	9	20
Selenium	<1.73		462	549.6		mg/Kg	☼	119	75 - 125	4	20
Silver	0.861	F1	115	158.1	F1	mg/Kg	☼	136	75 - 125	5	20

Lab Sample ID: 310-289577-B-3-B DU ^5
Matrix: Solid
Analysis Batch: 432557

Client Sample ID: Duplicate
Prep Type: Total/NA
Prep Batch: 432338

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Arsenic	6.87		7.365		mg/Kg	☼	7	20
Cadmium	0.711		0.9293	F5	mg/Kg	☼	27	20
Chromium	16.6		20.48	F3	mg/Kg	☼	21	20
Lead	307		287.9		mg/Kg	☼	7	20
Selenium	<1.44		<1.44		mg/Kg	☼	NC	20
Silver	<0.481		<0.479		mg/Kg	☼	NC	20

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 310-432461/1-A
Matrix: Solid
Analysis Batch: 432894

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 432461

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.0185		0.0185		mg/Kg		09/09/24 16:25	09/11/24 14:16	1

Lab Sample ID: LCS 310-432461/2-A
Matrix: Solid
Analysis Batch: 432894

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 432461

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.162	0.1822		mg/Kg		112	80 - 120

Lab Sample ID: 310-289092-B-2-G MS
Matrix: Solid
Analysis Batch: 432894

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 432461

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	1.56	F1	0.860	1.276	F1	mg/Kg	☼	-33	80 - 120

Lab Sample ID: 310-289092-B-2-H MSD
Matrix: Solid
Analysis Batch: 432894

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 432461

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	1.56	F1	0.862	1.308	F1	mg/Kg	☼	-29	80 - 120	3	20

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Method: Moisture - Percent Moisture

Lab Sample ID: 310-289511-B-4 DU
Matrix: Solid
Analysis Batch: 432020

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Percent Moisture	14.6			14.8		%				1	40
Percent Solids	85.4			85.2		%				0.2	16

GC/MS VOA

Prep Batch: 432142

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289515-1	ST-1 (2.5-4)	Total/NA	Solid	5035	
310-289515-2	ST-2 (1-4)	Total/NA	Solid	5035	
310-289515-3	ST-3 (1-4)	Total/NA	Solid	5035	
310-289515-4	ST-4 (0-2)	Total/NA	Solid	5035	
310-289515-5	ST-5 (2.5-4)	Total/NA	Solid	5035	
310-289515-6	ST-6 (0-2)	Total/NA	Solid	5035	
310-289515-7	TB	Total/NA	Solid	5035	
MB 310-432142/1-A	Method Blank	Total/NA	Solid	5035	
LCS 310-432142/2-A	Lab Control Sample	Total/NA	Solid	5035	
310-289355-C-2-B MS	Matrix Spike	Total/NA	Solid	5035	
310-289355-C-2-C MSD	Matrix Spike Duplicate	Total/NA	Solid	5035	

Analysis Batch: 432144

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289515-1	ST-1 (2.5-4)	Total/NA	Solid	8260D	432142
310-289515-2	ST-2 (1-4)	Total/NA	Solid	8260D	432142
310-289515-3	ST-3 (1-4)	Total/NA	Solid	8260D	432142
310-289515-4	ST-4 (0-2)	Total/NA	Solid	8260D	432142
310-289515-5	ST-5 (2.5-4)	Total/NA	Solid	8260D	432142
310-289515-6	ST-6 (0-2)	Total/NA	Solid	8260D	432142
310-289515-7	TB	Total/NA	Solid	8260D	432142
MB 310-432142/1-A	Method Blank	Total/NA	Solid	8260D	432142
LCS 310-432142/2-A	Lab Control Sample	Total/NA	Solid	8260D	432142
310-289355-C-2-B MS	Matrix Spike	Total/NA	Solid	8260D	432142
310-289355-C-2-C MSD	Matrix Spike Duplicate	Total/NA	Solid	8260D	432142

GC/MS Semi VOA

Prep Batch: 432635

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289515-1	ST-1 (2.5-4)	Total/NA	Solid	3546	
310-289515-2	ST-2 (1-4)	Total/NA	Solid	3546	

Analysis Batch: 432762

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289515-1	ST-1 (2.5-4)	Total/NA	Solid	8270E	432635
310-289515-2	ST-2 (1-4)	Total/NA	Solid	8270E	432635

Prep Batch: 432862

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289515-3	ST-3 (1-4)	Total/NA	Solid	3546	
310-289515-4	ST-4 (0-2)	Total/NA	Solid	3546	
310-289515-5	ST-5 (2.5-4)	Total/NA	Solid	3546	
310-289515-6	ST-6 (0-2)	Total/NA	Solid	3546	
MB 310-432862/1-A	Method Blank	Total/NA	Solid	3546	
LCS 310-432862/2-A	Lab Control Sample	Total/NA	Solid	3546	
310-289515-3 MS	ST-3 (1-4)	Total/NA	Solid	3546	
310-289515-3 MSD	ST-3 (1-4)	Total/NA	Solid	3546	

GC/MS Semi VOA

Analysis Batch: 432945

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289515-1	ST-1 (2.5-4)	Total/NA	Solid	8270E	432635

Analysis Batch: 433017

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289515-3	ST-3 (1-4)	Total/NA	Solid	8270E	432862
310-289515-4	ST-4 (0-2)	Total/NA	Solid	8270E	432862
310-289515-5	ST-5 (2.5-4)	Total/NA	Solid	8270E	432862
310-289515-6	ST-6 (0-2)	Total/NA	Solid	8270E	432862
MB 310-432862/1-A	Method Blank	Total/NA	Solid	8270E	432862
LCS 310-432862/2-A	Lab Control Sample	Total/NA	Solid	8270E	432862
310-289515-3 MS	ST-3 (1-4)	Total/NA	Solid	8270E	432862
310-289515-3 MSD	ST-3 (1-4)	Total/NA	Solid	8270E	432862

Analysis Batch: 433183

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289515-4	ST-4 (0-2)	Total/NA	Solid	8270E	432862

GC VOA

Prep Batch: 432220

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289515-1	ST-1 (2.5-4)	Total/NA	Solid	WI GRO	
310-289515-2	ST-2 (1-4)	Total/NA	Solid	WI GRO	
310-289515-3	ST-3 (1-4)	Total/NA	Solid	WI GRO	
310-289515-4	ST-4 (0-2)	Total/NA	Solid	WI GRO	
MB 310-432220/1-A	Method Blank	Total/NA	Solid	5035	
LCS 310-432220/2-A	Lab Control Sample	Total/NA	Solid	5035	
LCSD 310-432220/23-A	Lab Control Sample Dup	Total/NA	Solid	5035	

Analysis Batch: 432222

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289515-1	ST-1 (2.5-4)	Total/NA	Solid	WI-GRO	432220
310-289515-2	ST-2 (1-4)	Total/NA	Solid	WI-GRO	432220
310-289515-3	ST-3 (1-4)	Total/NA	Solid	WI-GRO	432220
310-289515-4	ST-4 (0-2)	Total/NA	Solid	WI-GRO	432220
MB 310-432220/1-A	Method Blank	Total/NA	Solid	WI-GRO	432220
LCS 310-432220/2-A	Lab Control Sample	Total/NA	Solid	WI-GRO	432220
LCSD 310-432220/23-A	Lab Control Sample Dup	Total/NA	Solid	WI-GRO	432220

Prep Batch: 432351

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289515-5	ST-5 (2.5-4)	Total/NA	Solid	WI GRO	
310-289515-6	ST-6 (0-2)	Total/NA	Solid	WI GRO	
310-289515-7	TB	Total/NA	Solid	WI GRO	
MB 310-432351/1-A	Method Blank	Total/NA	Solid	5035	
LCS 310-432351/2-A	Lab Control Sample	Total/NA	Solid	5035	
LCSD 310-432351/23-A	Lab Control Sample Dup	Total/NA	Solid	5035	

Analysis Batch: 432354

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289515-5	ST-5 (2.5-4)	Total/NA	Solid	WI-GRO	432351

GC VOA (Continued)

Analysis Batch: 432354 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289515-6	ST-6 (0-2)	Total/NA	Solid	WI-GRO	432351
310-289515-7	TB	Total/NA	Solid	WI-GRO	432351
MB 310-432351/1-A	Method Blank	Total/NA	Solid	WI-GRO	432351
LCS 310-432351/2-A	Lab Control Sample	Total/NA	Solid	WI-GRO	432351
LCSD 310-432351/23-A	Lab Control Sample Dup	Total/NA	Solid	WI-GRO	432351

GC Semi VOA

Prep Batch: 432423

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289515-1	ST-1 (2.5-4)	Total/NA	Solid	WI DRO PREP	
310-289515-2	ST-2 (1-4)	Total/NA	Solid	WI DRO PREP	
310-289515-3	ST-3 (1-4)	Total/NA	Solid	WI DRO PREP	
310-289515-4	ST-4 (0-2)	Total/NA	Solid	WI DRO PREP	
310-289515-5	ST-5 (2.5-4)	Total/NA	Solid	WI DRO PREP	
310-289515-6	ST-6 (0-2)	Total/NA	Solid	WI DRO PREP	
MB 310-432423/1-A	Method Blank	Total/NA	Solid	WI DRO PREP	
LCS 310-432423/2-A	Lab Control Sample	Total/NA	Solid	WI DRO PREP	
LCSD 310-432423/3-A	Lab Control Sample Dup	Total/NA	Solid	WI DRO PREP	

Analysis Batch: 432815

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289515-1	ST-1 (2.5-4)	Total/NA	Solid	WI-DRO	432423
310-289515-2	ST-2 (1-4)	Total/NA	Solid	WI-DRO	432423
310-289515-3	ST-3 (1-4)	Total/NA	Solid	WI-DRO	432423
310-289515-5	ST-5 (2.5-4)	Total/NA	Solid	WI-DRO	432423
310-289515-6	ST-6 (0-2)	Total/NA	Solid	WI-DRO	432423
MB 310-432423/1-A	Method Blank	Total/NA	Solid	WI-DRO	432423
LCS 310-432423/2-A	Lab Control Sample	Total/NA	Solid	WI-DRO	432423
LCSD 310-432423/3-A	Lab Control Sample Dup	Total/NA	Solid	WI-DRO	432423

Analysis Batch: 432950

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289515-4	ST-4 (0-2)	Total/NA	Solid	WI-DRO	432423

Metals

Prep Batch: 432338

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289515-1	ST-1 (2.5-4)	Total/NA	Solid	3050B	
310-289515-2	ST-2 (1-4)	Total/NA	Solid	3050B	
310-289515-3	ST-3 (1-4)	Total/NA	Solid	3050B	
310-289515-4	ST-4 (0-2)	Total/NA	Solid	3050B	
310-289515-5	ST-5 (2.5-4)	Total/NA	Solid	3050B	
310-289515-6	ST-6 (0-2)	Total/NA	Solid	3050B	
MB 310-432338/1-A ^5	Method Blank	Total/NA	Solid	3050B	
LCS 310-432338/2-A ^20	Lab Control Sample	Total/NA	Solid	3050B	
310-288810-B-1-D MS ^20	Matrix Spike	Total/NA	Solid	3050B	
310-288810-B-1-E MSD ^20	Matrix Spike Duplicate	Total/NA	Solid	3050B	
310-289577-B-3-B DU ^5	Duplicate	Total/NA	Solid	3050B	

Metals

Prep Batch: 432461

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289515-1	ST-1 (2.5-4)	Total/NA	Solid	7471B	
310-289515-2	ST-2 (1-4)	Total/NA	Solid	7471B	
310-289515-3	ST-3 (1-4)	Total/NA	Solid	7471B	
310-289515-4	ST-4 (0-2)	Total/NA	Solid	7471B	
310-289515-5	ST-5 (2.5-4)	Total/NA	Solid	7471B	
310-289515-6	ST-6 (0-2)	Total/NA	Solid	7471B	
MB 310-432461/1-A	Method Blank	Total/NA	Solid	7471B	
LCS 310-432461/2-A	Lab Control Sample	Total/NA	Solid	7471B	
310-289092-B-2-G MS	Matrix Spike	Total/NA	Solid	7471B	
310-289092-B-2-H MSD	Matrix Spike Duplicate	Total/NA	Solid	7471B	

Analysis Batch: 432557

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289515-1	ST-1 (2.5-4)	Total/NA	Solid	6020B	432338
310-289515-2	ST-2 (1-4)	Total/NA	Solid	6020B	432338
310-289515-3	ST-3 (1-4)	Total/NA	Solid	6020B	432338
310-289515-4	ST-4 (0-2)	Total/NA	Solid	6020B	432338
310-289515-5	ST-5 (2.5-4)	Total/NA	Solid	6020B	432338
310-289515-6	ST-6 (0-2)	Total/NA	Solid	6020B	432338
MB 310-432338/1-A ^5	Method Blank	Total/NA	Solid	6020B	432338
LCS 310-432338/2-A ^20	Lab Control Sample	Total/NA	Solid	6020B	432338
310-288810-B-1-D MS ^20	Matrix Spike	Total/NA	Solid	6020B	432338
310-288810-B-1-E MSD ^20	Matrix Spike Duplicate	Total/NA	Solid	6020B	432338
310-289577-B-3-B DU ^5	Duplicate	Total/NA	Solid	6020B	432338

Analysis Batch: 432751

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 310-432338/2-A ^20	Lab Control Sample	Total/NA	Solid	6020B	432338

Analysis Batch: 432894

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289515-1	ST-1 (2.5-4)	Total/NA	Solid	7471B	432461
310-289515-2	ST-2 (1-4)	Total/NA	Solid	7471B	432461
310-289515-3	ST-3 (1-4)	Total/NA	Solid	7471B	432461
310-289515-4	ST-4 (0-2)	Total/NA	Solid	7471B	432461
310-289515-5	ST-5 (2.5-4)	Total/NA	Solid	7471B	432461
310-289515-6	ST-6 (0-2)	Total/NA	Solid	7471B	432461
MB 310-432461/1-A	Method Blank	Total/NA	Solid	7471B	432461
LCS 310-432461/2-A	Lab Control Sample	Total/NA	Solid	7471B	432461
310-289092-B-2-G MS	Matrix Spike	Total/NA	Solid	7471B	432461
310-289092-B-2-H MSD	Matrix Spike Duplicate	Total/NA	Solid	7471B	432461

General Chemistry

Analysis Batch: 432020

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289515-1	ST-1 (2.5-4)	Total/NA	Solid	Moisture	
310-289515-2	ST-2 (1-4)	Total/NA	Solid	Moisture	
310-289515-3	ST-3 (1-4)	Total/NA	Solid	Moisture	
310-289515-4	ST-4 (0-2)	Total/NA	Solid	Moisture	
310-289515-5	ST-5 (2.5-4)	Total/NA	Solid	Moisture	

General Chemistry (Continued)

Analysis Batch: 432020 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289515-6	ST-6 (0-2)	Total/NA	Solid	Moisture	
310-289511-B-4 DU	Duplicate	Total/NA	Solid	Moisture	

Lab Chronicle

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Client Sample ID: ST-1 (2.5-4)

Date Collected: 08/30/24 14:55
Date Received: 08/31/24 10:00

Lab Sample ID: 310-289515-1

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	432020	W9YR	EET CF	09/03/24 09:04

Client Sample ID: ST-1 (2.5-4)

Date Collected: 08/30/24 14:55
Date Received: 08/31/24 10:00

Lab Sample ID: 310-289515-1

Matrix: Solid
Percent Solids: 76.9

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			432142	MZR8	EET CF	09/04/24 08:04
Total/NA	Analysis	8260D		1	432144	MZR8	EET CF	09/05/24 11:12
Total/NA	Prep	3546			432635	D0DG	EET CF	09/09/24 13:20
Total/NA	Analysis	8270E		5	432762	L0FS	EET CF	09/11/24 17:24
Total/NA	Prep	3546			432635	D0DG	EET CF	09/09/24 13:20
Total/NA	Analysis	8270E		50	432945	L0FS	EET CF	09/12/24 15:40
Total/NA	Prep	WI GRO			432220	P5ZC	EET CF	09/04/24 15:06
Total/NA	Analysis	WI-GRO		1	432222	P5ZC	EET CF	09/05/24 22:17
Total/NA	Prep	WI DRO PREP			432423	D0DG	EET CF	09/06/24 08:21
Total/NA	Analysis	WI-DRO		5	432815	C3AA	EET CF	09/11/24 16:57
Total/NA	Prep	3050B			432338	QTZ5	EET CF	09/06/24 09:30
Total/NA	Analysis	6020B		5	432557	NFT2	EET CF	09/06/24 20:44
Total/NA	Prep	7471B			432461	DHM5	EET CF	09/09/24 16:25
Total/NA	Analysis	7471B		1	432894	DHM5	EET CF	09/11/24 15:08

Client Sample ID: ST-2 (1-4)

Date Collected: 08/30/24 14:40
Date Received: 08/31/24 10:00

Lab Sample ID: 310-289515-2

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	432020	W9YR	EET CF	09/03/24 09:04

Client Sample ID: ST-2 (1-4)

Date Collected: 08/30/24 14:40
Date Received: 08/31/24 10:00

Lab Sample ID: 310-289515-2

Matrix: Solid
Percent Solids: 96.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			432142	MZR8	EET CF	09/04/24 08:04
Total/NA	Analysis	8260D		1	432144	MZR8	EET CF	09/05/24 11:35
Total/NA	Prep	3546			432635	D0DG	EET CF	09/09/24 13:20
Total/NA	Analysis	8270E		10	432762	L0FS	EET CF	09/11/24 17:57
Total/NA	Prep	WI GRO			432220	P5ZC	EET CF	09/04/24 15:06
Total/NA	Analysis	WI-GRO		1	432222	P5ZC	EET CF	09/05/24 22:43
Total/NA	Prep	WI DRO PREP			432423	D0DG	EET CF	09/06/24 08:21
Total/NA	Analysis	WI-DRO		5	432815	C3AA	EET CF	09/11/24 17:08
Total/NA	Prep	3050B			432338	QTZ5	EET CF	09/06/24 09:30
Total/NA	Analysis	6020B		5	432557	NFT2	EET CF	09/06/24 20:48

Client Sample ID: ST-2 (1-4)

Lab Sample ID: 310-289515-2

Date Collected: 08/30/24 14:40
Matrix: Solid
Date Received: 08/31/24 10:00
Percent Solids: 96.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	7471B			432461	DHM5	EET CF	09/09/24 16:25
Total/NA	Analysis	7471B		1	432894	DHM5	EET CF	09/11/24 15:10

Client Sample ID: ST-3 (1-4)

Lab Sample ID: 310-289515-3

Date Collected: 08/30/24 13:45
Matrix: Solid
Date Received: 08/31/24 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	432020	W9YR	EET CF	09/03/24 09:04

Client Sample ID: ST-3 (1-4)

Lab Sample ID: 310-289515-3

Date Collected: 08/30/24 13:45
Matrix: Solid
Date Received: 08/31/24 10:00
Percent Solids: 93.0

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			432142	MZR8	EET CF	09/04/24 08:04
Total/NA	Analysis	8260D		1	432144	MZR8	EET CF	09/05/24 11:58
Total/NA	Prep	3546			432862	BDJ4	EET CF	09/11/24 13:18
Total/NA	Analysis	8270E		10	433017	L0FS	EET CF	09/13/24 06:09
Total/NA	Prep	WI GRO			432220	P5ZC	EET CF	09/04/24 15:06
Total/NA	Analysis	WI-GRO		1	432222	P5ZC	EET CF	09/05/24 23:09
Total/NA	Prep	WI DRO PREP			432423	D0DG	EET CF	09/06/24 08:21
Total/NA	Analysis	WI-DRO		5	432815	C3AA	EET CF	09/11/24 17:20
Total/NA	Prep	3050B			432338	QTZ5	EET CF	09/06/24 09:30
Total/NA	Analysis	6020B		5	432557	NFT2	EET CF	09/06/24 20:51
Total/NA	Prep	7471B			432461	DHM5	EET CF	09/09/24 16:25
Total/NA	Analysis	7471B		1	432894	DHM5	EET CF	09/11/24 15:12

Client Sample ID: ST-4 (0-2)

Lab Sample ID: 310-289515-4

Date Collected: 08/30/24 11:55
Matrix: Solid
Date Received: 08/31/24 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	432020	W9YR	EET CF	09/03/24 09:04

Client Sample ID: ST-4 (0-2)

Lab Sample ID: 310-289515-4

Date Collected: 08/30/24 11:55
Matrix: Solid
Date Received: 08/31/24 10:00
Percent Solids: 88.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			432142	MZR8	EET CF	09/04/24 08:04
Total/NA	Analysis	8260D		1	432144	MZR8	EET CF	09/05/24 12:20
Total/NA	Prep	3546			432862	BDJ4	EET CF	09/11/24 13:18
Total/NA	Analysis	8270E		5	433017	L0FS	EET CF	09/13/24 06:42
Total/NA	Prep	3546			432862	BDJ4	EET CF	09/11/24 13:18
Total/NA	Analysis	8270E		50	433183	D2YP	EET CF	09/14/24 02:44

Lab Chronicle

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Client Sample ID: ST-4 (0-2)

Lab Sample ID: 310-289515-4

Date Collected: 08/30/24 11:55
Date Received: 08/31/24 10:00

Matrix: Solid
Percent Solids: 88.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	WI GRO			432220	P5ZC	EET CF	09/04/24 15:06
Total/NA	Analysis	WI-GRO		1	432222	P5ZC	EET CF	09/05/24 23:35
Total/NA	Prep	WI DRO PREP			432423	D0DG	EET CF	09/06/24 08:21
Total/NA	Analysis	WI-DRO		5	432950	V7YZ	EET CF	09/12/24 12:15
Total/NA	Prep	3050B			432338	QTZ5	EET CF	09/06/24 09:30
Total/NA	Analysis	6020B		5	432557	NFT2	EET CF	09/06/24 20:55
Total/NA	Prep	7471B			432461	DHM5	EET CF	09/09/24 16:25
Total/NA	Analysis	7471B		1	432894	DHM5	EET CF	09/11/24 15:14

Client Sample ID: ST-5 (2.5-4)

Lab Sample ID: 310-289515-5

Date Collected: 08/30/24 10:55
Date Received: 08/31/24 10:00

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	432020	W9YR	EET CF	09/03/24 09:04

Client Sample ID: ST-5 (2.5-4)

Lab Sample ID: 310-289515-5

Date Collected: 08/30/24 10:55
Date Received: 08/31/24 10:00

Matrix: Solid
Percent Solids: 82.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			432142	MZR8	EET CF	09/04/24 08:04
Total/NA	Analysis	8260D		1	432144	MZR8	EET CF	09/05/24 12:43
Total/NA	Prep	3546			432862	BDJ4	EET CF	09/11/24 13:18
Total/NA	Analysis	8270E		1	433017	L0FS	EET CF	09/13/24 07:15
Total/NA	Prep	WI GRO			432351	P5ZC	EET CF	09/05/24 14:05
Total/NA	Analysis	WI-GRO		1	432354	P5ZC	EET CF	09/06/24 20:48
Total/NA	Prep	WI DRO PREP			432423	D0DG	EET CF	09/06/24 08:21
Total/NA	Analysis	WI-DRO		1	432815	C3AA	EET CF	09/11/24 14:04
Total/NA	Prep	3050B			432338	QTZ5	EET CF	09/06/24 09:30
Total/NA	Analysis	6020B		5	432557	NFT2	EET CF	09/06/24 20:59
Total/NA	Prep	7471B			432461	DHM5	EET CF	09/09/24 16:25
Total/NA	Analysis	7471B		1	432894	DHM5	EET CF	09/11/24 15:17

Client Sample ID: ST-6 (0-2)

Lab Sample ID: 310-289515-6

Date Collected: 08/30/24 10:11
Date Received: 08/31/24 10:00

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	432020	W9YR	EET CF	09/03/24 09:04

Lab Chronicle

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Client Sample ID: ST-6 (0-2)

Lab Sample ID: 310-289515-6

Date Collected: 08/30/24 10:11
Date Received: 08/31/24 10:00

Matrix: Solid
Percent Solids: 98.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			432142	MZR8	EET CF	09/04/24 08:04
Total/NA	Analysis	8260D		1	432144	MZR8	EET CF	09/05/24 13:06
Total/NA	Prep	3546			432862	BDJ4	EET CF	09/11/24 13:18
Total/NA	Analysis	8270E		10	433017	L0FS	EET CF	09/13/24 07:49
Total/NA	Prep	WI GRO			432351	P5ZC	EET CF	09/05/24 14:05
Total/NA	Analysis	WI-GRO		1	432354	P5ZC	EET CF	09/06/24 21:14
Total/NA	Prep	WI DRO PREP			432423	D0DG	EET CF	09/06/24 08:21
Total/NA	Analysis	WI-DRO		5	432815	C3AA	EET CF	09/11/24 17:31
Total/NA	Prep	3050B			432338	QTZ5	EET CF	09/06/24 09:30
Total/NA	Analysis	6020B		5	432557	NFT2	EET CF	09/06/24 21:02
Total/NA	Prep	7471B			432461	DHM5	EET CF	09/09/24 16:25
Total/NA	Analysis	7471B		1	432894	DHM5	EET CF	09/11/24 15:19

Client Sample ID: TB

Lab Sample ID: 310-289515-7

Date Collected: 08/30/24 12:00
Date Received: 08/31/24 10:00

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	5035			432142	MZR8	EET CF	09/04/24 08:04
Total/NA	Analysis	8260D		1	432144	MZR8	EET CF	09/05/24 13:28
Total/NA	Prep	WI GRO			432351	P5ZC	EET CF	09/05/24 14:05
Total/NA	Analysis	WI-GRO		1	432354	P5ZC	EET CF	09/06/24 21:40

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

Accreditation/Certification Summary

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Laboratory: Eurofins Cedar Falls

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Minnesota	NELAP	019-999-319	12-31-24

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
8260D	5035	Solid	Dichlorofluoromethane
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids

Method Summary

Client: Braun Intertec Corporation
Project/Site: Two Harbor Lighthouse

Job ID: 310-289515-1
SDG: B2406524

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	EET CF
8270E	Semivolatile Organic Compounds (GC-MS/MS)	SW846	EET CF
WI-GRO	Wisconsin - Gasoline Range Organics (GC)	WI-GRO	EET CF
WI-DRO	Wisconsin - Diesel Range Organics (GC)	WI-DRO	EET CF
6020B	Metals (ICP/MS)	SW846	EET CF
7471B	Mercury (CVAA)	SW846	EET CF
Moisture	Percent Moisture	EPA	EET CF
3050B	Preparation, Metals	SW846	EET CF
3546	Microwave Extraction	SW846	EET CF
5035	Closed System Purge and Trap	SW846	EET CF
7471B	Preparation, Mercury	SW846	EET CF
WI DRO PREP	Wisconsin Extraction (Diesel Range Organics)	WI-DRO	EET CF
WI GRO	Closed System Purge and Trap	WI-GRO	EET CF

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

WI-DRO = "Modified DRO: Method For Determining Diesel Range Organics", Wisconsin DNR, Publ-SW-141, September, 1995.

WI-GRO = "Modified GRO: Method For Determining Gasoline Range Organics", Wisconsin DNR, Publ-SW-140, September, 1995.

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

eurofins | Environment Testing America

310-289515 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information				
Client: Bram				
City/State:	CITY Duluth	STATE MN	Project:	
Receipt Information				
Date/Time Received:	DATE 8/31/24	TIME 1000	Received By: PH	

Delivery Type: ☐ UPS ☑ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee ☐ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other:_____

Condition of Cooler/Containers

Sample(s) received in Cooler?	☑ Yes ☐ No	*If yes:* Cooler ID:	
Multiple Coolers?	☐ Yes ☑ No	*If yes:* Cooler # _____ of _____	
Cooler Custody Seals Present? No	☐ Yes ☑ No	*If yes:* Cooler custody seals intact? ☐ Yes ☐ No	
Sample Custody Seals Present? No	☐ Yes ☑ No	*If yes:* Sample custody seals intact? ☐ Yes ☐ No	
Trip Blank Present?	☑ Yes ☐ No	*If yes:* Which VOA samples are in cooler? ↓	

All

Temperature Record

Coolant: ☑ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:_____ ☐ NONE

Thermometer ID: R	Correction Factor (°C): 0

• **Temp Blank Temperature** – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature

Uncorrected Temp (°C): 1.9	Corrected Temp (°C): 1.9

• **Sample Container Temperature**

	CONTAINER 1	CONTAINER 2
Container(s) used:		
Uncorrected Temp (°C):		
Corrected Temp (°C):		

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g , bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE: If yes, contact PM before proceeding If no, proceed with login

Additional Comments

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613
Phone (319) 277-2401 Phone (319) 277-2425

Chain of Custody Record

Duluth Service Center #269

eurofins | Environment Testing America

Client Information	Sampler: Melissa Gross	Lab PM: Zach Binderd	Carrier Tracking No(s):	COC No:
Client Contact: Melissa gross	Phone: 612-716-7161	E-Mail: ZachBinderd@eurofinsus.com MN	State of Origin:	Page: Page 1 of 1
Company: Braun Intertec	PWSID:			Job #:

Address: 4511 West 1st Street	Due Date Requested: STD	Analysis Requested
City: Duluth	TAT Requested (days): STD	
State, Zip: MN 55807	Compliance Project: Δ Yes Δ No	
Phone: 612-716-7161	PO #: BZ406524	
Email: Mgross@braunintertec.com	WO #:	
Project Name: Two Harbor Lighthouse	Project #: BZ406524	
Site: Lighthouse pt Rd	SSOW#:	

Preservation Codes.

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Moisture	VOC	DRO	GRO	Metals	PAH	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	F	N	F	N	N		
ST-1 (2.5-4)	8/30	1455	G	S			X	X	X	X	X	X	4	
ST-2 (1-4)		1440	G	S			X	X	X	X	X	X	4	
ST-3 (1-4)		1345	G	S			X	X	X	X	X	X	4	
ST-4 (0-2)		1155	G	S			X	X	X	X	X	X	4	
ST-5 (2.5-4)		1055	G	S			X	X	X	X	X	X	4	
ST-6 (0-2)		1011	G	S			X	X	X	X	X	X	4	
TB	8/30	1200											2	

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☒ Archive For 1 Months

Deliverable Requested I, II, III, IV, Other (specify)

Special Instructions/QC Requirements

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	8/30 1625		[signature]	8/30/24 1625	Eurofins
2				[signature]	8/31/24 1000	EP
3						

Custody Seals Intact: Δ Yes Δ No | Custody Seal No | Cooler Temperature(s) °C and Other Remarks.

Ver: 01/16/2019

Login Sample Receipt Checklist

Client: Braun Intertec Corporation

Job Number: 310-289515-1
SDG Number: B2406524

Login Number: 289515
List Number: 1
Creator: Homolar, Dana J

List Source: Eurofins Cedar Falls

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	