



Purchasing Division
Finance Department
Room 120
411 West First Street
Duluth, Minnesota 55802

218-730-5340
purchasing@duluthmn.gov

Addendum 2
Solicitation 24-AA14
Development Partner for Solar Photovoltaics and Storage

This addendum serves to notify all bidders of the following changes to the solicitation documents:

- A. The following questions asked are answered in *italics*.

Please send or provide a link for all RFP documents. *The RFP documents and Addenda can be found on the City's website at <https://duluthmn.gov/purchasing/bids-request-for-proposals/>.*

1. Please confirm who will be the offtake and buy the power. *We Anticipate Minnesota Power being the main purchaser of the generated power. Each proposed project may have different purchasers of the offtake power though as many different forms of contracts will be accepted to fit the project (i.e. community solar, PPA, build-transfer, etc.). Minnesota Power will retain any Renewable Energy Credits (RECs) that these project(s) may receive.*
2. Will land be provided? Or do we have to have land control? *Land will not be owned by any selected entity from the RFP process. The land is owned by one of the entities (City of Duluth, DEDA, or ISD709) and will be made available for the selected respondent. The contract terms for construction on that land will be negotiated after the selection of the proposal(s) in February.*
3. Will the ultimate winner of this RFP be required to be a qualified Solar developer capable of building such a project, or will other RFP specific companies be considered as well? *We anticipate the selected entity or entities to be able to design, develop, construct, and maintain the project or portfolio. Whether all of this is done in-house or subcontracted out will be the responsibility of the selected entity.*
4. Is there a cost to lease/use the land that will be provided? *The cost or land use agreement will be decided upon contract negotiation with the selected proposal(s). Partners are open to different forms of land lease or power purchasing contracts and will make efforts to ensure financial feasibility for all parties involved.*
5. Are there specific criteria or preferences for how solar-plus-storage configurations should be prioritized compared to solar-only installations on the identified properties? *While there is no storage requirement, it will be up to each proposal as to whether to include storage or not. It is anticipated that Minnesota Power will add additional points*

to an RFP that includes storage as an option on any project or proposal. Because of this, we prefer a solar-plus-storage configuration but do not have any criteria to include it and will not give preference to a proposal if it has storage.

6. Could we propose additional sites and solar capacity if we were to propose other suitable sites? *No, the sites offered in the RFP were vetted and selected during a planning process over the past year and we are not accepting proposals on any other sites.*
7. Will storage be a priority at each site? *See Question 5.*
8. Is there a place we can see MPCA evidence of any contamination on-site? *Information on past MPCA action for these sites and the neighborhood around each site can be found online at <https://www.pca.state.mn.us/about-mPCA/whats-in-my-neighborhood>.*
9. What is the slope of the LPMS site? *The average slope of the site is ~13.5%. Certain areas may be flatter or steeper than others as the site is not uniform, but the site starts at an elevation of 824 ft above sea level and runs down to 742 ft above sea level over an approximate 590 foot length.*
10. Easement setbacks for all transmission lines and roads? *There are no roads or trails running through the sites and will not require any setbacks. From existing roads, potential solar development needs to follow the underlying zoning district's setbacks. More information can be found here: <https://duluthmn.gov/planning-development/land-use-zoning-and-applications/zoning-regulations/>. If any variances need to be made, the city will work with the developer to bring them before the Planning Commission. If any parking areas or access paths are created, they need to be marked "access path" on the site plans so as not to require any setbacks. There are no setback requirements from the transmission line easements.*
11. Would the vents need to stay in place on Duluth dump? *Yes, any vent or structure put in place by the MPCA currently or during site adjustment in the coming year(s) will need to remain in place and cannot be adjusted. Additionally, any solar array constructed on this site must use a ballasted, or similar system, that does not disrupt any part of the cap.*
12. If any trees need to be cleared, are there any specific trees on any site that cannot be cut down? *Tree replacement requirements will apply to all sites and removal standards and thresholds can be found here: <https://duluthmn.gov/media/sknpktng/50-25-landscaping-and-tree-preservation.pdf>. Since most of the sites are already cleared, a full tree survey can be forgone if it is easily determined that there will not be any impacts. A full tree survey has been recommended for Site #3 by the City of Duluth Planning and Development Department. Any project needs to have a vegetative maintenance plan that includes any street frontage or vegetative buffer if required by the UDC, but there is some flexibility. For Site #3, an underlying pollinator habitat or similar is recommended.*
13. When was the dirt placed on the DEDA site? *The final 12,500 cubic yards of the agreed upon amount of 57,000 cubic yards of the fill was placed on site in September of 2024. The stockpiled soil is covered by not less than 4 inches of clay and 4 inches of topsoil. This*

soil is in addition to the soil placed there as a cap in 2013 (see Question 19). For detailed as-built designs see Appendix A.

14. Is there any geotechnical data available for the sites? *See Questions 17, 20, 23, & 27*
15. Where is the transmission for each site? *The exact place of interconnect is currently unknown for each site. The City will work with the selected project or portfolio to submit a pre-applicant review for each site before submitting to the Minnesota Power RFP in 2025.*
16. Where is the access for each site? *Access for each site is located at the following:*
 - Site #1 – Nick Glumac Dr. on the East side of the property*
 - Site #2 – Partners would work with the railroad company to provide access via the railway access road along the southern side of the property. Barring being able to work with the railroad access, we would look to pursue an agreement with Northwoods Academy that abuts the West side of the property.*
 - Site #3 – Partners would work to secure access along the utility easement that runs through the NW corner of the property via an agreement with Minnesota Power.*
 - Site #4 – Direct access off Rice Lake Rd. along the SW side of the property*
17. Is there any ALTA Survey or Parcel Mapping available for Site #1? *See “Outlot A” in Appendix B*
18. Has a Phase I Environmental Site Assessment (ESA) been conducted on this parcel, and if so, are there any Recognized Environmental Conditions (RECs)? *Yes, Phase I & II studies were completed on the site around 2013. After cleanup of identified RECs throughout the Atlas Cement property, the MPCA issued a No Further Action Determination letter to DEDA. See Appendix C.*
19. We were told the Minnesota Pollution Control Agency (MPCA) cleared these caps. Can that be confirmed? Approximately how far down are these concrete caps, and approximately how many are there? Is there a map/diagram showing the location of these sealed concrete caps? *The area on Outlot A that was used as a soil management area consisted of a minimum of an approximate 2.5-foot-thick clay liner topped with 4 feet of topsoil. For more information refer to the fifth paragraph in the No Further Action Determination letter in Appendix C.*
20. Is there any ALTA Survey or Parcel Mapping available for Site #2? *There is no survey available but public parcel information is available on the St. Louis County website <https://gis.stlouiscountymn.gov/landexplorer/>.*
21. Has a Phase I Environmental Site Assessment (ESA) been conducted on this parcel, and if so, are there any Recognized Environmental Conditions (RECs)? *See the 2021 Final Assessment Report provided by the MPCA in Appendix D*
22. Given the elevation, would be access to the site for construction and maintenance purposes. How would the site be accessed? *See Questions 16*
23. Is there any ALTA Survey or Parcel Mapping available for Site #3? *There is no survey available but public parcel information is available on the St. Louis County website <https://gis.stlouiscountymn.gov/landexplorer/>.*

24. Has a Phase I Environmental Site Assessment (ESA) been conducted on this parcel, and if so, are there any Recognized Environmental Conditions (RECs)? *No Phase I has been completed*
25. Are there any three-phase distribution maps available for this area? *See Question 15*
26. We did not visit this site during the tour. The main question for this site pertained to access. How does the City of Duluth access this parcel? *See Question 16*
27. Is there any ALTA Survey or Parcel Mapping available for Site #4? *There is no survey available but public parcel information is available on the St. Louis County website <https://gis.stlouiscountymn.gov/landexplorer/>.*
28. Has a Phase I Environmental Site Assessment (ESA) been conducted on this parcel, and if so, are there any Recognized Environmental Conditions (RECs)? *There is no record of a Phase I study in our archives. However, the city has been working closely with the MPCA who has been responsible for any remediation and/or capping of the refuse in the past. We know this is a former dump site that will be re-capped or remediated in the coming years.*
29. Are there any three-phase distribution maps available for this area? *See Question 15*
30. This former dumpsite will be re-capped in 2025 by the Minnesota Pollution Control Agency (MPCA). How long does that process take? *The MPCA is currently in the process of evaluating the site for possible remediation activity. The approximate yearlong evaluation and assessment process will proceed in 2025 with plans to implement a re-cap or remediation plan in 2026 and 2027. The site should be available for solar implementation in 2028 or 2029, meeting our goal of having all awarded sites online by 2030.*
31. Can you clarify the 10 MW requirement? *Minnesota Power has set a maximum of 10 MW ac per project or portfolio. An entity will be able to submit more than one project or portfolio to the Minnesota Power RFP process in 2025 but each stand-alone project or portfolio cannot exceed the 10 MW ac limit.*
32. Is there a specific load on site? If yes, can you share load details? *There are no loads on any of the four sites that have been outlined in the RFP.*
33. Is the 10 MW requirement driven by space and/or interconnect capacity requirement? *The 10 MW capacity limit was set by Minnesota Power and will be a requirement of their RFP Process and selection criteria in 2025.*
34. Typically, BESS for standard solar + storage sites are 2 or 4 hours; is there a guideline for BESS sizing. *There are no guidelines for BESS at the moment. There may be when the Minnesota Power RFP is released in 2025 but that is unknown. Currently, it is up to each individual entity whether they want to include storage in their proposal, and if so, whether it is 2 or 4 hours.*
35. Is there a preference for AC or DC coupled system? Will both options be considered? *Alternating Current (AC) is currently the preference. Once the RFP is released by Minnesota Power in 2025 we anticipate more guidance on this.*

36. Is there a preference for PPA vs owned route? *No, all contract options can and will be considered. We are looking for a partner who can help provide insight into the best financial and contract structures for each project.*
37. Is there a max/min offtake rate for the power price set with the City of Duluth? *There is no maximum or minimum offtake rate set. We anticipate Minnesota Power will be buying the offtake power from these projects and any contract or rate will need to be negotiated with them or any other purchaser.*
38. How long is the term of the PPA? *There is no determined term on any contract or Power Purchase Agreement and will depend on each individual project and contract structure.*
39. Does the City have their own internal or preferred contractor (Electrical, General, Civil) and engineering firm. *No, we are relying on the selected proposal to be able to design, develop, construct, and maintain the project or portfolio. Whether all of this is done in-house or subcontracted out will be the responsibility of the selected entity.*
40. Are all sites confirmed, 480V 3 phase? *This information is not yet available. See Question 15*
41. Can the city confirm landfill gas composition (methane, biogas, etc.)? *See Table 15 of Appendix D for landfill gas composition for 2011 through 2021.*
42. For PV stabilization or firming, will the City of Duluth/ Minnesota Power manage operations from the Minnesota Power Regional Service Center? *We anticipate that Minnesota Power would handle any grid firming that needs to occur if there is BESS. This will be confirmed during the pre-applicant review with Minnesota Power before their RFP process.*
- B. The Site Walk Sign-in sheet is attached.

Please acknowledge receipt of this Addendum by including a copy of it with your proposal. The pages included will not count toward any page limitation, if any, identified in the RFP.

Posted: **December 20, 2024**

Attachments:

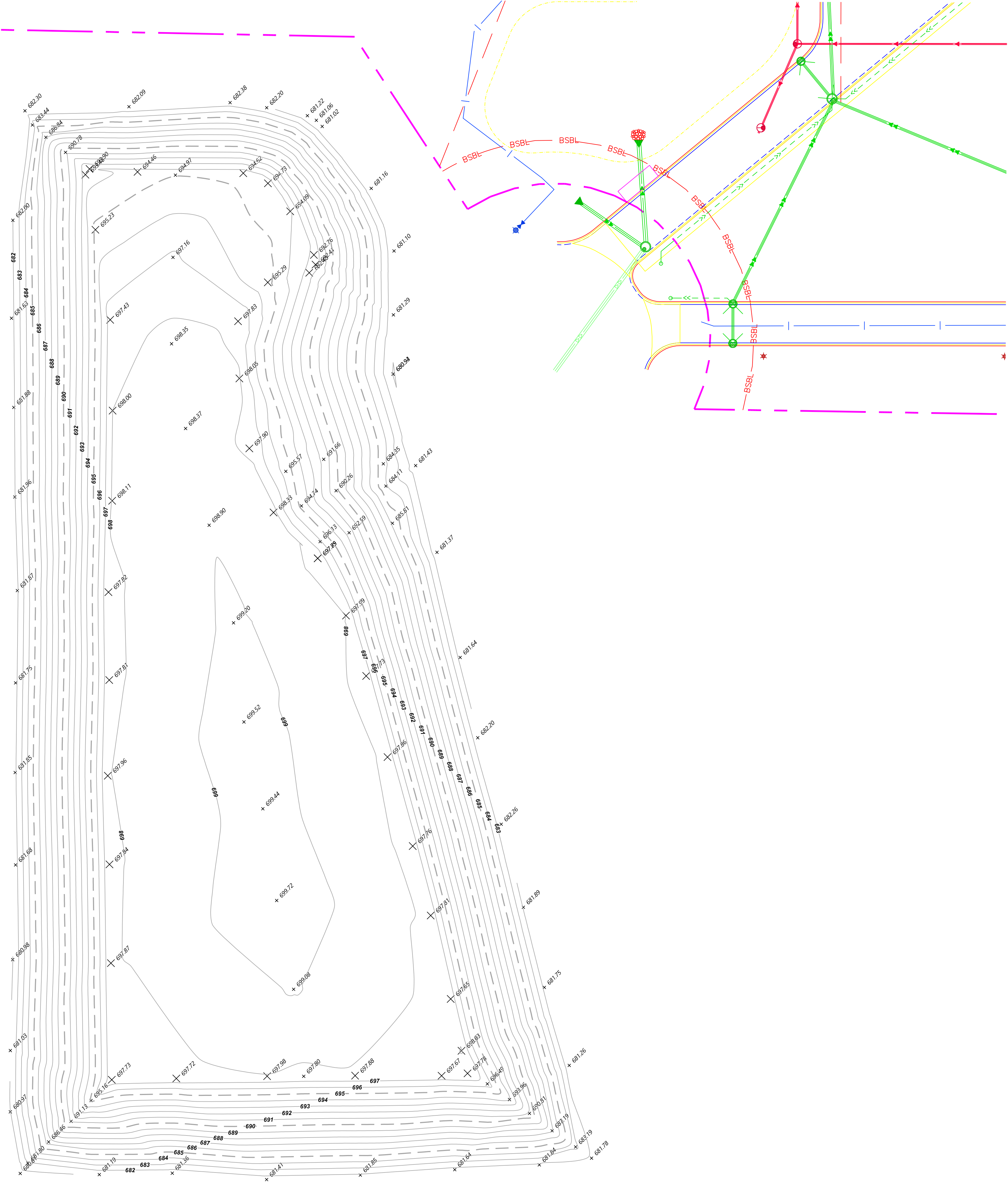
Appendix A

Appendix B

Appendix C

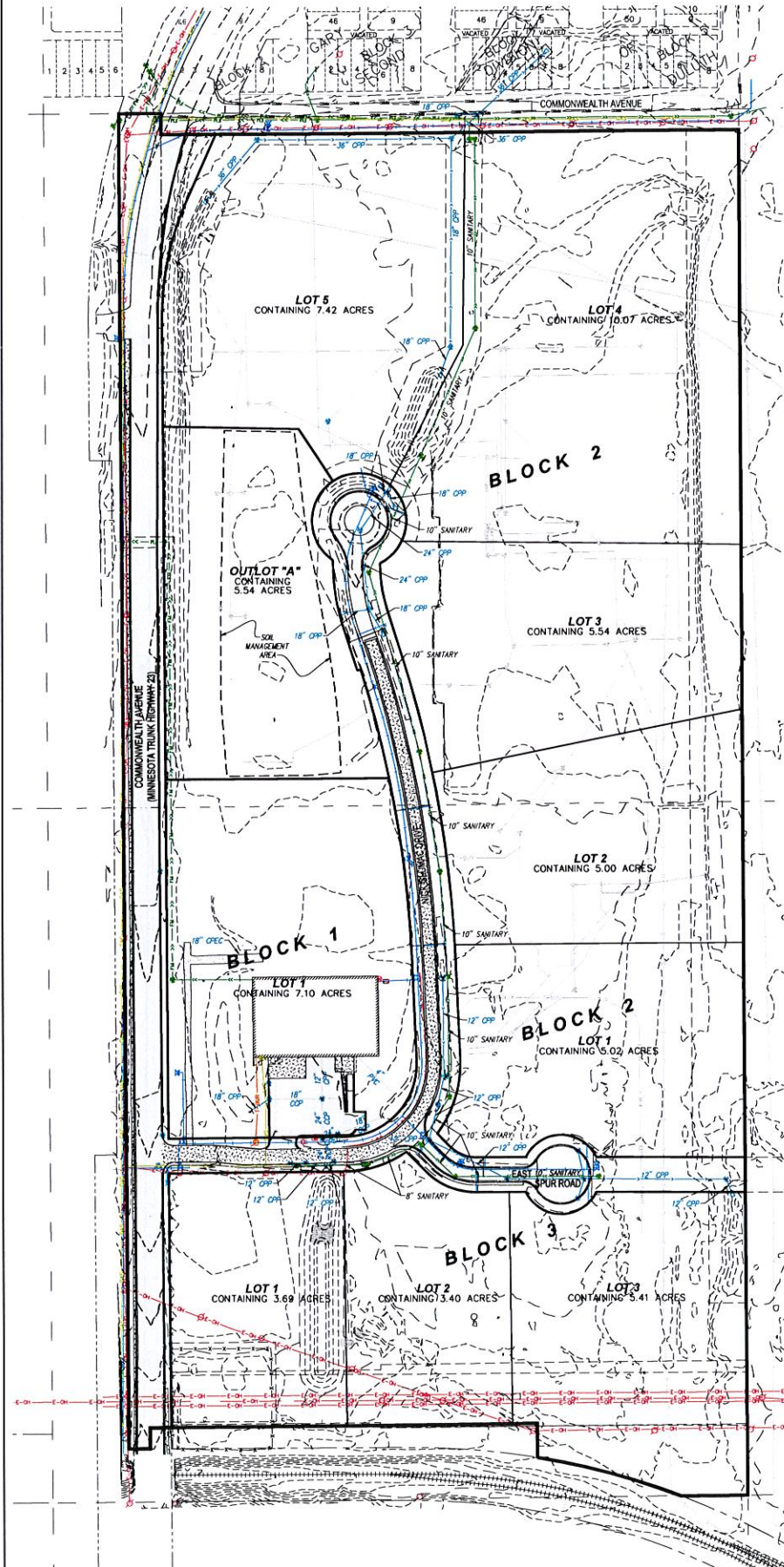
Appendix D

Site Walk Sign-in Sheet



ATLAS INDUSTRIAL PARK

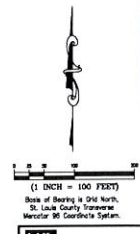
part of the SE 1/4
Section 34, T49N, R15W of the 4th P.M.
St. Louis County, Minnesota



LEGEND

- = BOUNDARY LINE, THIS PLAT
- = PROPOSED BLOCK LINE
- = PROPOSED LOT LINE
- = BUILDING
- = CONCRETE SURFACE
- = BITUMINOUS SURFACE
- = GRAVEL SURFACE
- = CURB & GUTTER
- = ROADWAY RIGHT-OF-WAY LINE
- = SECTION LINE
- = QUARTER SECTION LINE
- = SIXTEENTH SECTION LINE
- = UNDERGROUND WATER LINE
- = UNDERGROUND TELEPHONE LINE
- = UNDERGROUND GAS LINE
- = UNDERGROUND ELECTRIC LINE
- = OVERHEAD ELECTRIC LINE
- = SANITARY SEWER LINE
- = SANITARY SEWER FORCE MAIN
- = STORM SEWER PIPE
- = UNDERGROUND COMMUNICATION LINE
- = RAILROAD TRACKS
- = 10' CONTOUR INTERVAL
- = 2' CONTOUR INTERVAL
- = SANITARY SEWER LIFT STATION
- = SANITARY SEWER MANHOLE
- = CATCH BASIN
- = STORM MANHOLE
- = WATER MANHOLE
- = HAND HOLE
- = WATER VALVE
- = HYDRANT
- = TELEPHONE PEDISTAL
- = LIGHT POLE
- = GAS METER
- = ELECTRIC HAND HOLE
- = ELECTRIC METER/PANEL
- = POWER POLE
- = APRON END

- SURVEYORS' NOTES**
- CITY OF DULUTH LEAD DATA INCORPORATED INTO THIS SURVEY WAS FLOWN BY MOORE, INC. OCT 29-NOV 8, 2012 AND PROCESSED TO MEET VERTICAL ACCURACY STANDARDS FOR 2 FOOT CONTOURS, PORTIONS OF ACTUAL GROUND SURVEY BASED ON 2012 THRU 2015 SITE MODIFICATIONS.
 - HORIZONTAL DATUM = ST LOUIS COUNTY TRANSVERSE MERCATOR 1996 (SCTM_96)
 - VERTICAL DATUM = NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88)
 - BENCHMARK 1 (BM 1) = TOP OF ALUMINUM ALLOY FLANGE-ENCASED ROD STAMPED "BERNE 2009", THE MARK IS IN GARY NEW DULUTH, 0.25 MILE NORTH ALONG TRUNK HIGHWAY 23 FROM JUNCTION OF TRUNK HIGHWAY 23 AND COUNTY ROAD 3 WEST AT TRUNK HIGHWAY 23 MILEPOST 340.30, 58.2 FEET NORTH OF NOX CLINAC DRIVE, 48.7 FEET EAST OF NORTHBOND TRUNK HIGHWAY 23, 23 + 694.53 FEET.
 - UTILITIES SHOWN IN GRAY WITHIN THIS PRELIMINARY PLAT ARE KNOWN TO HAVE HISTORICAL DOCUMENTS AND PRESUMED TO BE ABANDONED.
 - ZONING CLASSIFICATION = I-C
 MINIMUM LOT AREA: ZERO SQUARE FEET
 MINIMUM LOT FRONTAGE: ZERO FEET
 MINIMUM DEPTH OF FRONT YARD: 25 FEET
 MINIMUM WIDTH OF SIDE YARD: ZERO FEET
 MINIMUM DEPTH OF REAR YARD (R.Y.): ZERO FEET
 MAXIMUM HEIGHT OF STRUCTURE: 60 FEET
 - BASES OF BEARING IS GRID NORTH, ST. LOUIS COUNTY TRANSVERSE MERCATOR 96 COORDINATE SYSTEM.





Minnesota Pollution Control Agency

520 Lafayette Road North | St. Paul, Minnesota 55155-4194 | 651-296-6300

800-657-3864 | 651-282-5332 TTY | www.pca.state.mn.us | Equal Opportunity Employer

July 3, 2014

Ms. Heidi Timm-Bijold
Duluth Economic Development Authority
411 West First Street, 402 City Hall
Duluth, MN 55802

RE: Atlas Cement Plant #5 – Soil Management Area, 2404 Commonwealth Avenue, Duluth
MPCA Project Number VP3004
PINs 010-2746-01260 and 010-2746-01310
No Further Action Determination

Dear Ms. Timm-Bijold:

The Minnesota Pollution Control Agency (MPCA) staff in the Voluntary Investigation and Cleanup (VIC) Program has been requested to provide a No Further Action Determination for releases identified at the Atlas Cement #5 Site – Soil Management Area, located at the address referenced above (the Site).

The MPCA staff has reviewed the information submitted for the Site. The Site is an approximately 2.58-acre Soil Management Area on the west side of the larger 63-acre land parcel that was formerly occupied by the Universal Atlas Cement (UAC) plant. The UAC plant was a facility dedicated to the manufacture of Portland cement and related products. UAC, a subsidiary of U.S. Steel Corporation, operated from 1915 to 1975, with numerous industrial buildings serviced by a multi-track railway yard. By 1979, the majority of the UAC buildings were demolished and the train tracks were removed, however several of the former structure's foundations and floors remain on-site. In 2004, the former UAC plant site was purchased by Duluth Economic and Development Authority and in 2008 an 11-acre parcel on the southwestern corner of the former plant site was remediated and re-developed with a new industrial warehouse/manufacturing building owned by IKONICS, Inc.

Soil and groundwater investigations have been ongoing at the Site and vicinity since 1991 with the most recent Site investigations being conducted in 2013. Fill soil up to 20 feet thick was found to overlie native silty clay. The fill was characterized as containing gravel, sand, cinders, slag, coal, cement and crushed limestone mixed to varying degrees with soil. Soil contamination was defined by analytical concentrations above Tier II Industrial Soil Reference Values (SRVs), and occurred within the fill soil as discrete "hot spots" of limited aerial extent. Elevated concentrations of polynuclear aromatic hydrocarbons (PAHs) and Resource Conservation and Recovery Act (RCRA) metals were historically found in Atlas Cement #5 Site soils. As with the previous investigations on the IKONICS property, elevated lead concentrations may be present throughout the Site and elevated arsenic concentrations are expected to be present beneath the former rail lines. In addition to the aforementioned contaminants, certain areas of soil were historically found to have alkaline pH values, from 8.5 to in excess of 12.5. This alkaline material was presumably a waste product generated by the Portland cement manufacturing process and Site reclamation activities conducted by U.S. Steel Corporation following plant closure in 1979 resulted in some mixing of surface soils across the Site.

The surficial groundwater table ranges in depth from one to five feet below ground surface and has been shown to have pH values ranging from 6.76 to 12.86. Groundwater samples were also collected, filtered, and analyzed for metals, and concentrations of metals did not exceed drinking water standards established by the U.S. Environmental Protection Agency (EPA) or Minnesota Department of Health (MDH), and as such, the Voluntary Response Action Plan (VRAP) and VRAP Addendums did not propose any corrective action for groundwater.

July 3, 2014

For the purpose of this determination, the identified release at the Site is defined as the PAHs, lead, and arsenic in the soil and the high pH readings in the soil and groundwater associated with concrete production by-products (Identified Release).

Soil mixed with debris and soil contaminated with arsenic, lead, and PAHs was excavated from the Site vicinity. Soil with concentrations of arsenic, lead, and/or PAHs greater than the Tier II Industrial SRV excavated in August 2012 was placed in the Soil Management Area located north of the IKONICS, Inc. parcel, as depicted on the Site Map in Attachment B. Soil with concentrations of arsenic, lead, and/or PAHs greater than the Tier II Industrial SRV excavated in August 2013 was disposed of at a permitted landfill. The Soil Management Area was designed with a profile consisting of a clay liner approximately one-foot thick, followed by soil contaminated with arsenic, lead, PAHs, and/or elevated pH levels, followed by another clay liner approximately 20-inches thick, and then capped with four-feet of topsoil and grass. The area around the Soil Management Area was graded to encourage runoff into the local stormwater ditch. The risk to human health and the environment has been managed through the implementation of these environmental response actions.

Based on a review of the information provided to the MPCA, the MPCA staff will not request any further investigation or remediation of the Identified Release at the Site. Furthermore, the MPCA is issuing a determination to take no action under Minn. Stat. §§ 115B.01-115B.18, with respect to the Identified Release. Specifically, the MPCA staff will not refer the Identified Release to the U.S. Environmental Protection Agency for inclusion on the Comprehensive Environmental Response, Compensation and Liability Information System list, to the State Site Assessment staff for preparation of a Hazard Ranking System score, or to the MPCA Commissioner for the placement of the Site on the Permanent List of Priorities.

An *Affidavit Concerning Real Property Contaminated with Hazardous Substances* was executed on April 24, 2014 and recorded with St. Louis County on May 13, 2014 as Document Number 944198.0. The affidavit includes information on the materials in the Soil Management Area. The Duluth Economic and Development Authority intends to retain ownership of the Soil Management Area and other infrastructure areas of the larger Atlas Cement Plant site.

Please be advised that the determination made in this letter is subject to the disclaimers found in Attachment A. If you have any questions about the contents of this letter, please contact Shanna Schmitt, Hydrogeologist, at 651-757-2697 or shanna.schmitt@state.mn.us.

Sincerely,



Gary L. Krueger
Supervisor
Site Remediation and Redevelopment Section
Remediation Division

GLK/SS:ls

Attachments

cc: Sheryl Filby Williams, Barr Engineering Company

ATTACHMENT A
DISCLAIMERS
ATLAS CEMENT #5 SITE – SOIL MANAGEMENT AREA
MPCA PROJECT NUMBER VP3004

1. Reservation of Authorities

The MPCA Commissioner reserves the authority to take any appropriate actions with respect to any release, threatened release, or other conditions at the Site. The MPCA Commissioner also reserves the authority to take such actions if the voluntary party does not proceed in the manner described in this letter or if actions taken or omitted by the voluntary party with respect to the Site contribute to any release or threatened release, or create an imminent and substantial danger to public health and welfare.

2. No MPCA Assumption of Liability

The MPCA, its Commissioner and staff do not assume any liability for any release, threatened release or other conditions at the Site or for any actions taken or omitted by the voluntary party with regard to the release, threatened release, or other conditions at the Site, whether the actions taken or omitted are in accordance with this letter or otherwise.

3. Letter Based on Current Information

All statements, conclusions and representations in this letter are based upon information known to the MPCA Commissioner and staff at the time this letter was issued. The MPCA Commissioner and staff reserve the authority to modify or rescind any such statement, conclusion or representation and to take any appropriate action under his authority if the MPCA Commissioner or staff acquires information after issuance of this letter that provides a basis for such modification or action.

4. Disclaimer Regarding Use or Development of the Property

The MPCA, its Commissioner and staff do not warrant that the Site is suitable or appropriate for any particular use.

5. Disclaimer Regarding Investigative or Response Action at the Property

Nothing in this letter is intended to authorize any response action under Minn. Stat. § 115B.17, subd. 12.

ATTACHMENT B
SITE MAP
ATLAS CEMENT #5 SITE – SOIL MANAGEMENT AREA
MPCA PROJECT NUMBER VP3004

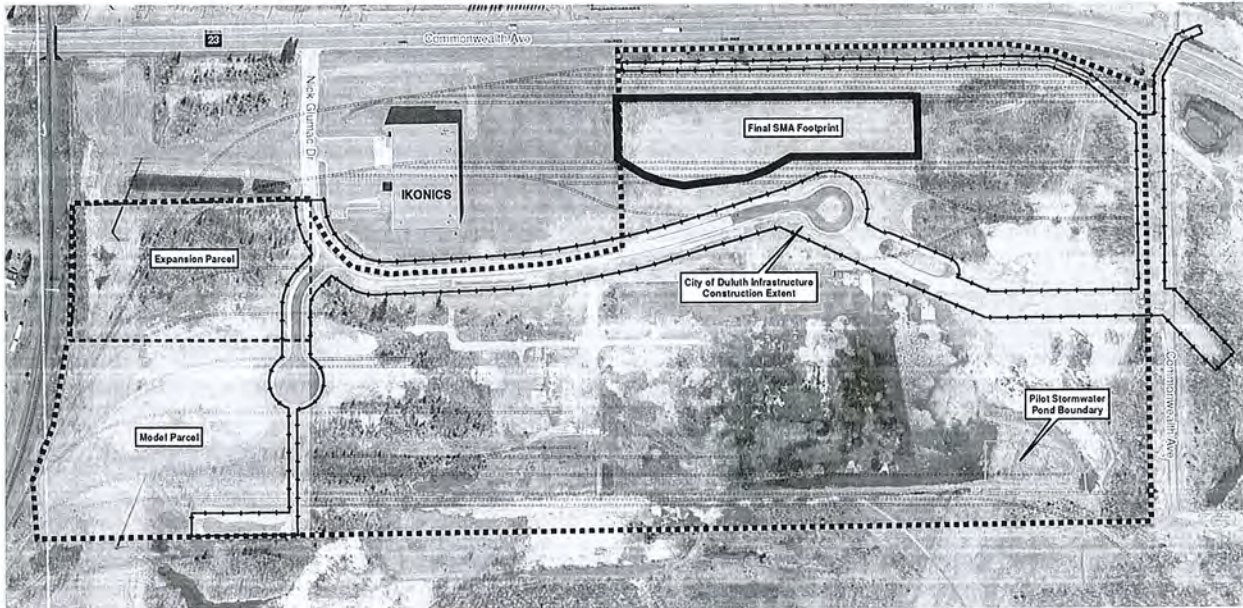


Figure adapted from the "2013 Supplemental Response Action Implementation Technical Memorandum," dated December 31, 2013 by Barr Engineering Company



AECOM
230 West Superior Street
Suite 400
Duluth, MN 55802

June 30, 2021

Ms. Jennifer Jevnisek
Project Manager
Site Remediation/Redevelopment Section
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155

**Subject: FY21 Site Assessment Report
Duluth Dump #1 Groundwater Monitoring
Duluth, Minnesota
MPCA Work Order: 3000027201
AECOM Project # 60645588**

Dear Ms. Jevnisek,

The purpose of this letter is to document the additional site assessment activities completed by AECOM Technical Services, Inc. (AECOM) for the Minnesota Pollution Control Agency (MPCA) during MPCA Fiscal Year 2021 (FY21) at the Duluth Dump #1 (Site) in Duluth, Minnesota. The site area is situated on 3 (three) parcels of land totaling approximately 24 acres (currently owned by the City of Duluth and formerly owned by the Lepak family), and partially encompasses a wetland area with the headwaters of the East Branch of the Chester Creek. A Site Location map is attached as **Figure 1** and a Site Layout Map is attached as **Figure 2**. This letter report describes the assessment methods and results of the landfill gas monitoring and residential well sampling completed in FY21.

Previous Work & Timeline

The Site operated from approximately 1954 to 1959, accepting mixed municipal solid waste (MSW), which may have filled in portions of the wetland area associated with Chester Creek. Unsanctioned dumping of wastes may have continued after this time. Official dump closure was in 1962. Groundwater contamination was initially identified based on analytical results from monitoring wells installed on the Site in 1984. The Site was placed on the Minnesota Permanent List of Priorities (PLP) in 1987. Demolition waste may have been disposed of in the northwestern portion of the Site until at least 1988. The responsible party was determined to be the City of Duluth as the operator of the Site. A Request for Response Action (RFRA) was issued by the MPCA to the City of Duluth on August 23, 1988 (MPCA 1988).

A leak associated with a former gasoline underground storage tank (UST) on the southwest portion of the Site was identified June 1, 1989. The leak was associated with former operations by the Lepak family and was assigned Leak #5052 by the Minnesota Pollution Control Agency (MPCA). Monitoring wells associated with the leak were installed in 1994 and groundwater contamination was identified. The UST was removed and disposed offsite. Leak #5052 was closed by the MPCA on May 2, 2005 with residual soil and groundwater contamination remaining on the Site.

A Remedial Investigation for the Site was completed in 1995 and a follow-up remedial design was prepared in 1997 for the City of Duluth and approved by the MPCA with minor modifications. Remedial Phase I activities (consolidation, soil cover, gas vents) were completed by the City of Duluth from 1999 to 2002. Generally, under this scope of work, waste along the east side of the dump was consolidated into the existing dump. Waste materials were excavated from the East Branch of Chester Creek and their associated wetlands.

Phase II remediation activities were completed in 2006 by the City of Duluth. The fill materials on the southeast portion of the dump and under the power line were excavated and consolidated to the western portion of the existing dump. In addition, the Lepak residential buildings (with the exception of the barn located on the southwest corner of the Site) were razed and incorporated into the western side of the dump as well. The remaining barn located on the southwest portion of the Site is currently utilized by City of Duluth for storage. The removal of the barn on the site property is the responsibility of the City of Duluth. The demolished barn is anticipated to be incorporated into Duluth Dump #1. The former Lepak residential well (MDH Unique 0000114877) is listed as active on the Minnesota Department of Health (MDH) County Well Index (CWI) database.

The planned Phase III of remediation includes the consolidation of the remaining waste located on the western and northwestern portions of the Site. This plan also includes removing waste, especially waste below the water table, to a location away from the wetland of Chester Creek on the southwest side of the dump. The planned Phase III remediation has not been completed at this time, and Levine & Sons property and wastes are not included in this plan.

AECOM Scope of Work & Objectives

AECOM's scope of work for the additional site assessment activities in FY21 included the following items:

1. Two rounds of soil vapor measurements for methane, carbon monoxide, and oxygen using a GEM-2000 landfill gas meter at up to 13 vapor monitoring locations along the western and southern property boundaries and at the 8 landfill gas vents installed through the existing consolidated dump materials;
2. One round of groundwater sampling for 1,4-dioxane by EPA 8270SIM and Per- and Polyfluoroalkyl Substances (PFAS) analysis at 5 residential wells as requested by the MPCA.

Field & Laboratory Methods

Landfill Gas Field Sampling Methods

A Landtec Gem-2000 Plus landfill gas meter was used to measure methane (CH₄), oxygen, and carbon monoxide (CO) at the eight (8) landfill passive gas vents and the twelve (12) vapor monitoring points in November 2020 and April 2021. The eight landfill passive gas vents are installed through the existing consolidated dump materials. The landfill gas meter was calibrated according to manufacturer's specifications prior to use.

Landfill passive gas vent locations are displayed in **Figure 3**.

Residential Well and Groundwater Monitoring Field Methods

Groundwater elevation data was collected from each monitoring well located on Site with a water level meter in November 2020 to construct updated groundwater flow maps. The static water level was measured to the nearest 0.01 foot. The list of monitoring wells is below.

Deep Wells	Shallow Wells
1. MW00-1D	1. MW-1
2. MW00-3D	2. MW00-3S
3. MW00-4D	3. MW00-4S
4. MW08-8D	4. MW92-1
	5. MW07-7S
	6. MW10-09
	7. MW10-10

Monitoring well construction information is included in **Table 1**. Monitoring well locations are displayed in **Figure 3**.

AECOM sampled residential well RW-1, RW-2, RW-3, RW-15, and RW-17 on November 18th, 2020. A multi-parameter meter was utilized to obtain field measurements of groundwater chemistry parameters including pH, temperature, dissolved oxygen (DO), oxidation reduction potential (ORP), and specific conductivity. Samples were taken from the point in the waterline closest to the well prior to possible water treatment. If present, aerators, filters and other devices were removed from the tap prior to sampling. When possible, samples were taken before the water entered the pressure tank. If this wasn't possible, the water was purged long enough to empty the pressure tank and the pipes prior to sampling. Other pertinent details regarding the samples or sampling procedure were noted on the Sampling Information Forms.

Samples were collected directly into laboratory supplied containers immediately after well purging by PFAS certified and trained samplers. 1,4-Dioxane samples were submitted to Pace Analytical in Minneapolis, Minnesota to be analyzed by EPA 8270D by SIM. Per- and Polyfluoroalkyl Substances (PFAS) samples were submitted to the Minnesota Department of Health Public Health (MDH) to be analyzed by MDH Method 555. The specific list of PFAS compounds is below.

CAS#	PFAS Compound
108427-53-8	Perfluorohexane sulfonate
307-24-4	Perfluorohexanoic acid
375-22-4	Perfluorobutanoic acid
45298-90-6	Perfluorooctane sulfonate
2706-90-3	Perfluoropentanoic acid
335-67-1	Perfluorooctanoic acid
45187-15-3	Perfluorobutane sulfonate

Residential well information is included in **Table 12**. Residential well locations are displayed in **Figure 2**.

Assessment Results & Conclusions

Landfill Gas Field Sampling Results

Eight passive methane vents are located within the consolidated waste area. All vents detected methane gases in November 2020 with the highest concentration detected at Vent 6 (69.4%). All vents, except for Vent 5, detected methane gases in April 2021 with the highest concentration detected at Vent 2 (30.7%). These results are expected as all vent locations are directly over consolidated waste.

13 vapor monitoring points (VMPs) are located along the western and southern property boundaries. VMP-3 and VMP-6 detected methane gases in November 2020 with concentrations of 4.0% and 9.7% respectively. None of the VMPs detected methane in April 2021.

Landfill gas monitoring results are summarized in **Table 15** and **Table 16** and are displayed in **Figure 6**. Landfill gas testing forms are included in **Attachment 2**.

Residential Well and Groundwater Monitoring Field Results

A northwestern groundwater flow direction was observed at shallow water table levels (**Figure 4**) and deep aquifer levels (**Figure 5**) and remains consistent to results from previous monitoring periods. Groundwater elevation data is included in **Table 2**.

The samples collected from the residential wells in the surrounding area were analyzed for 1,4-Dioxane and Per- and Polyfluoroalkyl Substance (PFAS) analysis. PFAS compounds were detected in one (1) of

the five (5) residential well samples collected; however, the detected compound was flagged as “J” value indicating that the analyte was present between the method detection limit and reporting limit and should be considered an estimated value. Perfluorobutanoic acid (PFBA) was detected at RW-15 at a concentration of 0.005 J ug/L. 1,4-Dioxane was detected above the laboratory reporting limits in RW-1 (0.36 ug/L), RW-3 (0.43 ug/L), and RW-17 (0.54 ug/L, 0.57 ug/L). Concentrations did not exceed the MDH health risk limit (HRL) of 1.0 ug/L.

Residential monitoring results are summarized in **Table 13** and laboratory analytical reports are included in **Attachment 2**.

Conclusion

AECOM appreciates the opportunity to assist the Minnesota Pollution Control Agency with this project. Should you have questions or need additional assistance related to this project, please contact us at your convenience.

Sincerely,

Chbe Luli





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Project Geologist
Chloe.Malin@aecom.com

Ethan Harvey
Project Manager
Ethan.Harvey@aecom.com

Enclosures:

Figures:

- Figure 1 – Site Location Map
- Figure 2 – Area Map
- Figure 3 – Site Layout Map
- Figure 4 – Water Table Flow Map
- Figure 5 – Aquifer Flow Map
- Figure 6 – Landfill and Soil Gas Sampling Results

Tables:

- Table 1 – Well Construction Information
- Table 2 – Groundwater Elevation Data
- Table 12 – Residential Well Information
- Table 13 – Residential Well Analytical Data
- Table 15 – Landfill Gas Monitoring Results
- Table 16 – Landfill Soil Gas Probes

Attachments:

- Attachment 1 – Residential Well Laboratory Analytical Reports
- Attachment 2 – Field Forms

AECOM Path: C:\Users\pearson3\Desktop\GIS\MXD\Dump\GIS\MXD\Figure 1 - Site Location.mxd Revised: 3/4/2019 By JP

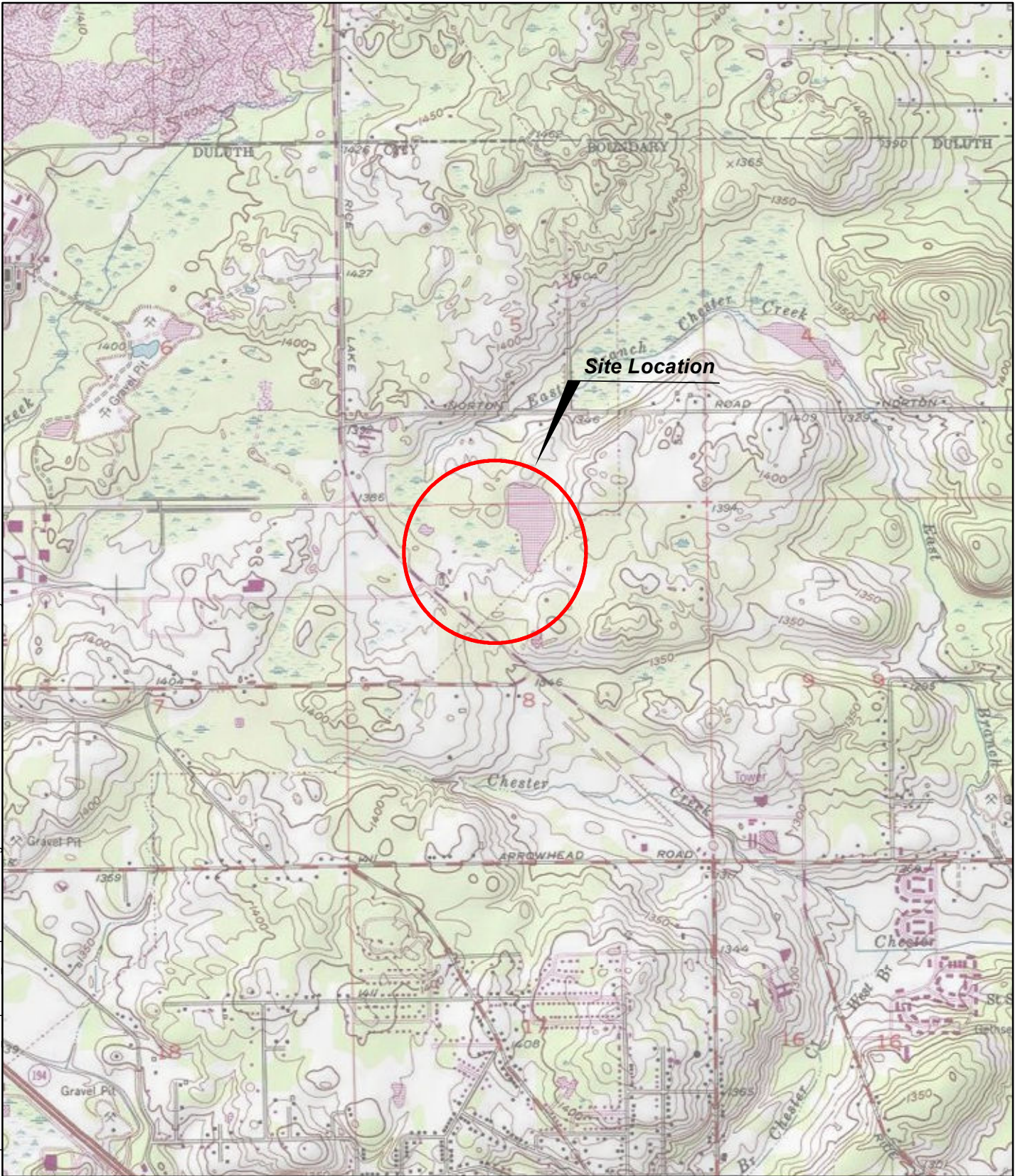
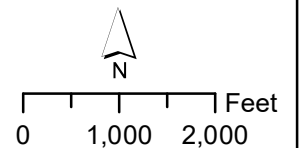


Figure 1 - Site Location Map
Duluth Dump #1
Duluth, Minnesota
Project No.: 60611861 Date: 6/18/2020

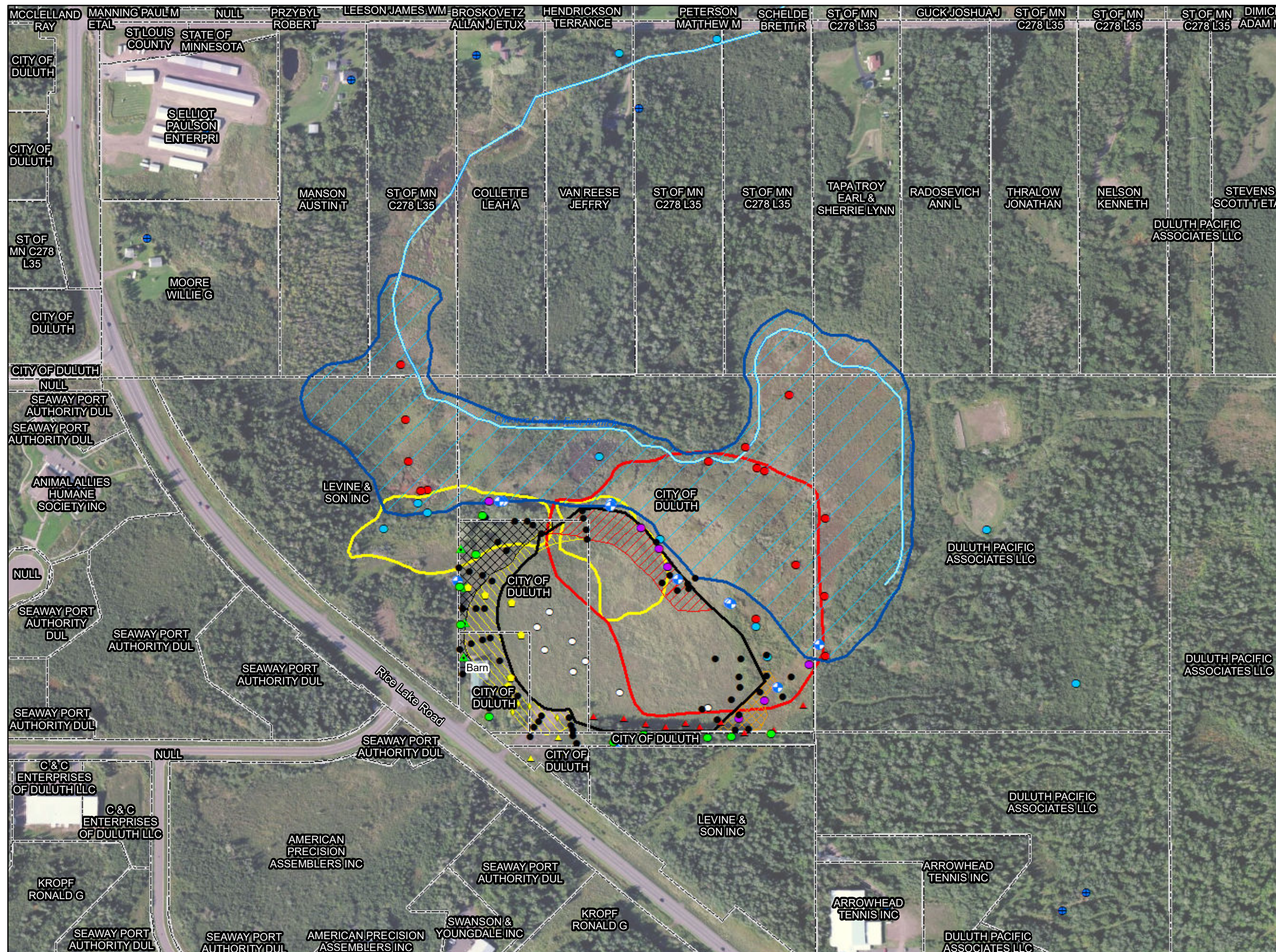
Service Layer Credits: Copyright:© 2013 National Geographic Society, i-cubed



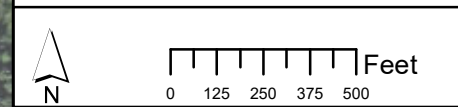
AECOM

**Figure 2 –Area Map
Duluth Dump #1
Duluth, MN**

Project No: 60611861



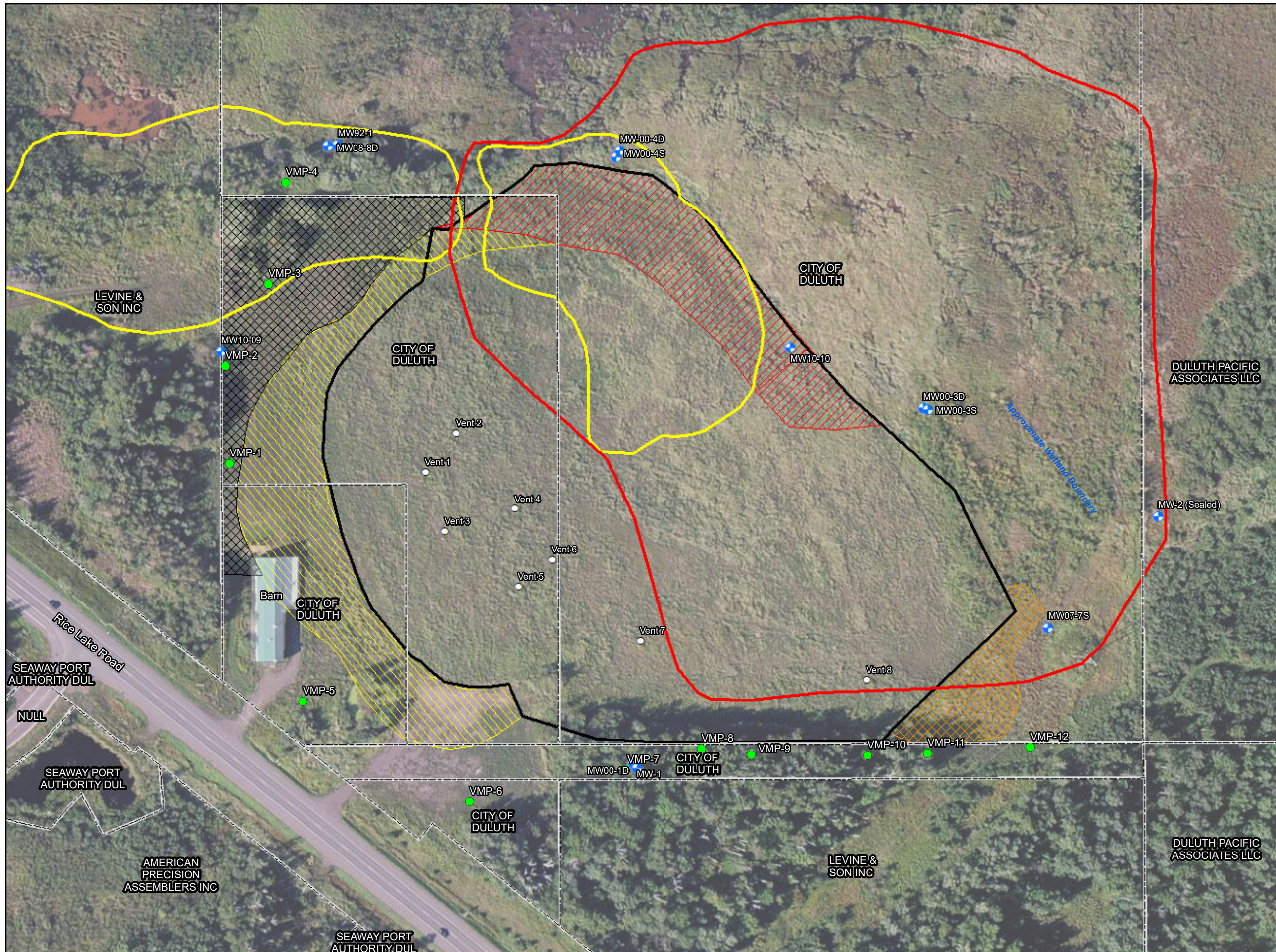
- Vapor Monitoring Point
- Test Pit Location
- ▲ Demolition Waste Location (1990)
- ◆ Household Waste Location (1990)
- ◇ Masonite and Trees Location (1990)
- ▲ Vapor Probe
- ▲ Soil Vapor Monitoring Points Location
- Surface Sediment Sample Location
- Seep Samples
- Surface Water Sample Location
- Gas Vent and Monitoring Location
- ⊕ Residential Wells
- ⊕ Monitoring Well
- Barn
- Chester Creek, East Branch
- Wetland
- St. Louis County Parcel Boundary
- Historic Extent of Waste (RREM, 1989)**
- Demolition Waste
- Estimated Dump Fill Limits
- RAAP Phase III (WCEC, 2006)**
- Phase II Cap Limits
- Waste Delineation Investigation (AECOM)**
- Consolidated Mix Household Waste and Fill
- Unconsolidated Demolition Waste
- Unconsolidated Household Waste
- Unconsolidated Mix Household Waste and Fill



Surface water Samples, Wetland delineation, Residential Wells, Monitoring Wells, and Vents georeferenced from WCEC Environmental document (2009)
 Contours from MNTopo
 Parcels from St. Louis County Service Layer Credits:
 Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
 Revised: 6/18/2020 By JP

**Figure 3 – Site Layout
Duluth Dump #1
Duluth, MN**

Project No: 60611861



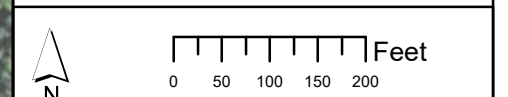
Legend

- Vapor_monitoring_points_2019
- Gas Vent and Monitoring Location
- ⊕ Monitoring Well
- Barn
- St. Louis County Parcel Boundary
- Demolition Waste
- Estimated Dump Fill Limits
- Phase II Cap Limits

Waste Delineation Investigation (AECOM)

Comment

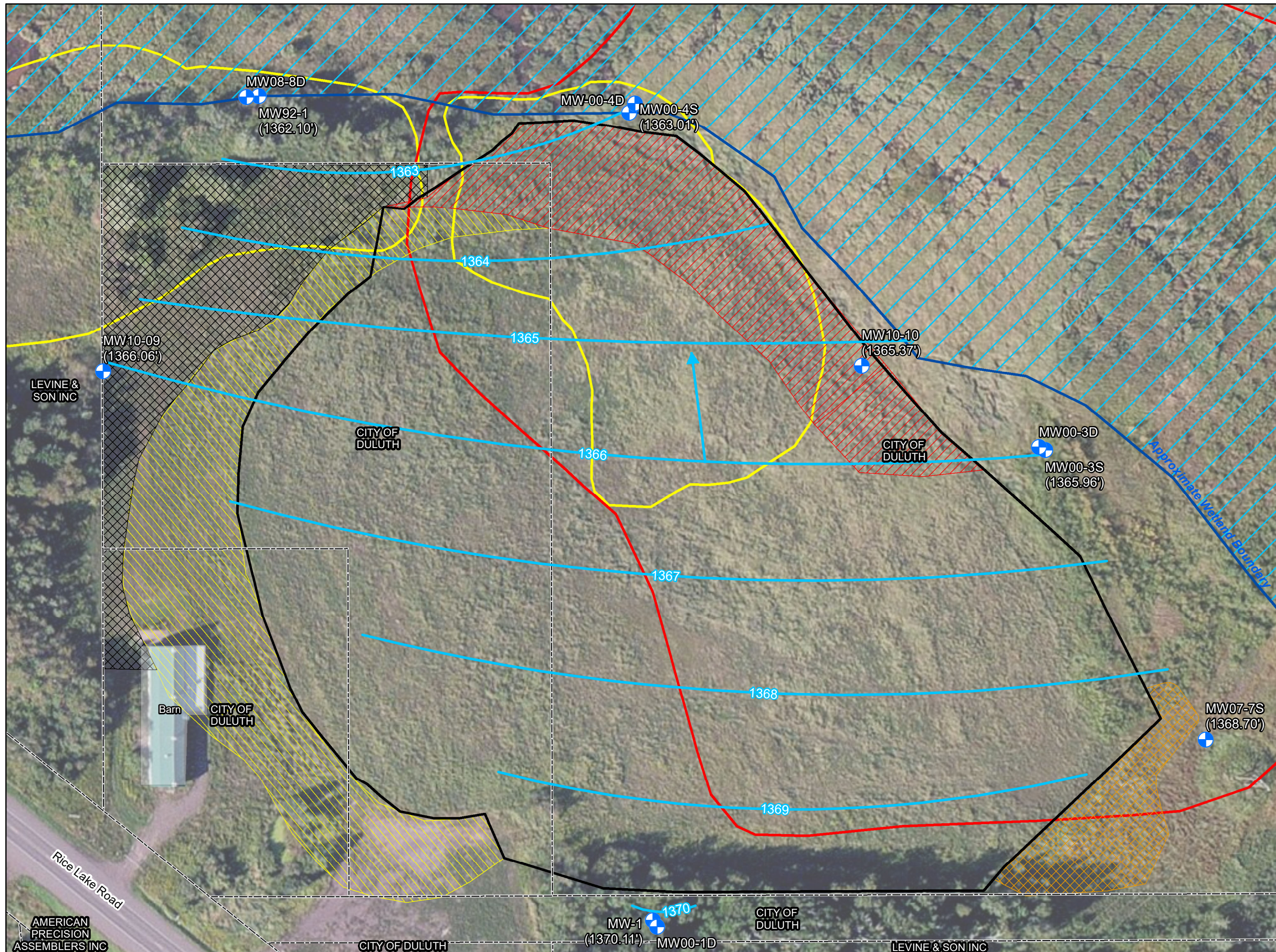
- Consolidated Mix Household Waste and Fill
- Unconsolidated Demolition Waste
- Unconsolidated Household Waste
- Unconsolidated Mix Household Waste and Fill



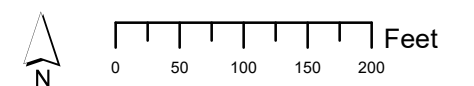
Surface water Samples, Wetland delineation, Residential Wells, Monitoring Wells, and Vents georeferenced from WCEC Environmental document (2009)
Contours from MNTopo
Parcels from St. Louis CountyService Layer Credits:
Source: Esri, DigitalGlobe, GeoEye, Earthstar

Figure 4 - Water Table Flow Map Duluth Dump #1 Duluth, MN

Project No: 60645588



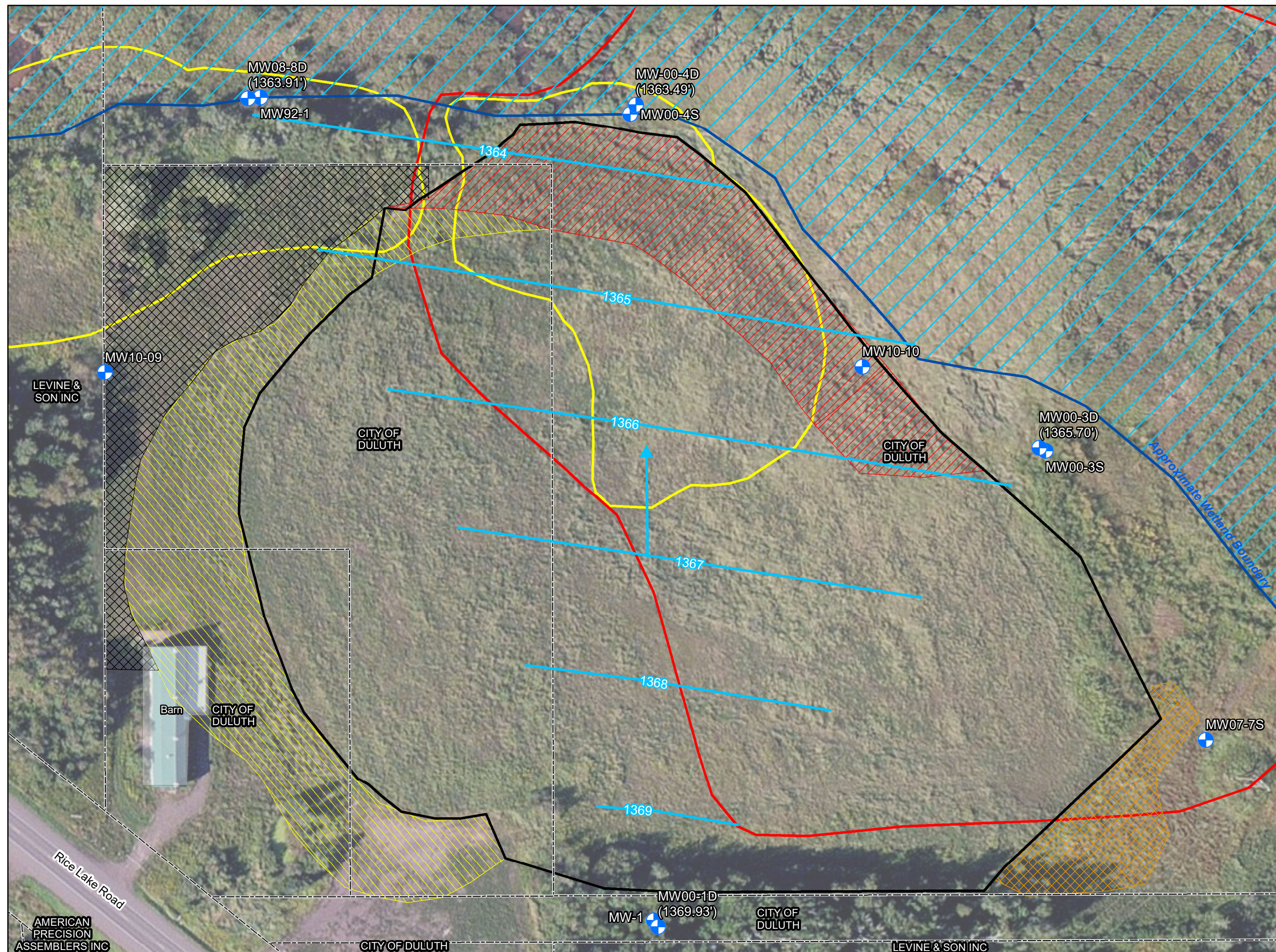
- Monitoring Well Location
- Groundwater Contour (ft. above MSL)
- Contour (ft above MSL)
- Barn
- Wetland
- St. Louis County Parcel Boundary
- Historic Extent of Waste (RREM, 1989)**
 - Demolition Waste
 - Estimated Dump Fill Limit
- RAAP Phase III (WCEC, 2006)**
 - Phase II Cap Limit
- Waste Delineation Investigation (AECOM)**
 - Consolidated Mix Household Waste and Fill
 - Unconsolidated Demolition Waste
 - Unconsolidated Household Waste
 - Unconsolidated Mix Household Waste and Fill
- Groundwater Flow Direction



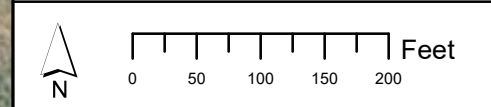
Surface water Samples, Wetland delineation, Residential Wells, Monitoring Wells, and Vents georeferenced from WCEC Environmental document (2009)
Contours from MNTopo
Parcels from St. Louis CountyService Layer Credits:
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,

**Figure 5 – Aquifer Flow Map
Duluth Dump #1
Duluth, MN**

Project No: 60645588



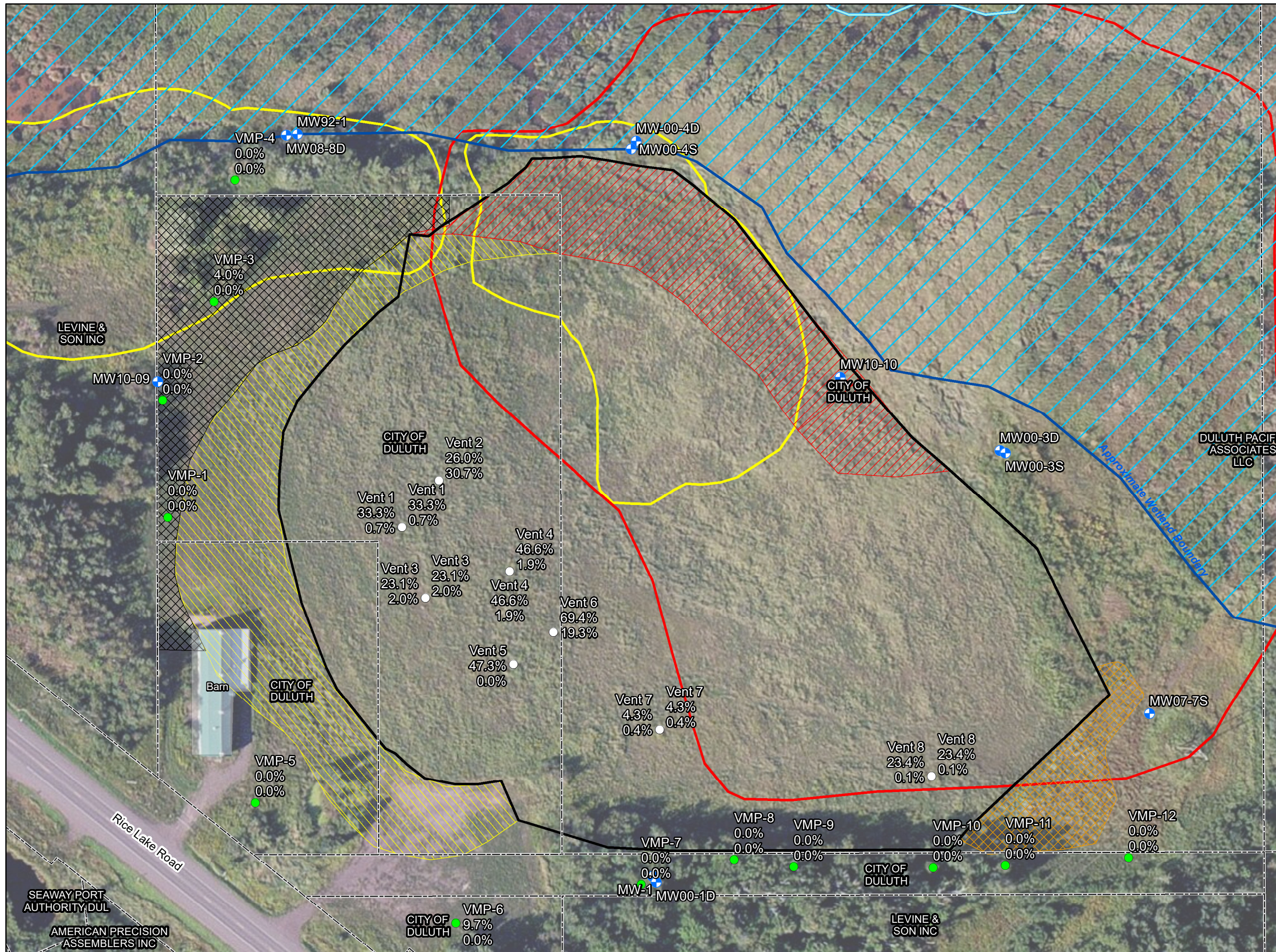
- Monitoring Well Location
- Groundwater Contour (ft. above MSL)
- Contour (ft above MSL)
- Barn
- Wetland
- St. Louis County Parcel Boundary
- Historic Extent of Waste (RREM, 1989)**
 - Demolition Waste
 - Estimated Dump Fill Limit
- RAAP Phase III (WCEC, 2006)**
 - Phase II Cap Limit
- Waste Delineation Investigation (AECOM)**
 - Consolidated Mix Household Waste and Fill
 - Unconsolidated Demolition Waste
 - Unconsolidated Household Waste
 - Unconsolidated Mix Household Waste and Fill
- Groundwater Flow Direction



Surface water Samples, Wetland delineation, Residential Wells, Monitoring Wells, and Vents georeferenced from WCEC Environmental document (2009)
Contours from MNTopo
Parcels from St. Louis CountyService Layer Credits:
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,

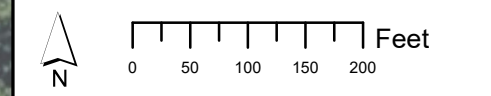
Figure 6 – Landfill and Soil Gas Sampling Results Duluth Dump #1 Duluth, MN

Project No: 60645588



- Vapor Monitoring Point
- Gas Vent and Monitoring Point
- ⊕ Monitoring Well
- ▭ Barn
- ▭ St. Louis County Parcel Boundary
- ▭ Wetland
- ▭ Demolition Waste
- ▭ Estimated Dump Fill Limit
- ▭ Phase II Cap Limit
- Waste Delineation Investigation (AECOM)**
- ▭ Consolidated Mix Household Waste and Fill
- ▭ Unconsolidated Demolition Waste
- ▭ Unconsolidated Household Waste
- ▭ Unconsolidated Mix Household Waste and Fill

Methane Results (%)
11/18/2020
04/27/2021



Surface water Samples, Wetland delineation, Residential Wells, Monitoring Wells, and Vents georeferenced from WCEC Environmental document (2009)
Contours from MNTopo
Parcels from St. Louis CountyService Layer Credits:
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS,

Table 1
Well Construction Information

Well Number	MDH Unique Well Number	UTM Coordinates (Zone 15)	Diameter (inches)	Top of Riser Elevation (feet)	Ground Elevation (feet)	Depth (ft bgs)	Bottom of Well Elevation (Feet)	Screen Interval (Elev. - Elev.)	Well Stickup (feet)	Total Well Depth from Surface (feet)
MW1	NA	N5186969 E565287	2	1383.65	1380.65	15	1365.65	10-15	3	18
				1383.95	1380.75		1380.75		3.2	3.2
MW00-1D	643954	N5186967 E565288	2	1382.86	1380.76	38	1342.76	28-38	2.1	40.1
				1382.86	1380.74		1380.74		2.12	2.12
MW2*	NA	N5187076 E565510	2	1370.59	1368.62	8	1360.62	3-8	1.97	9.97
MW89-6	NA	N5187012 E56137	2	1379.84	1377.97	12	1365.97	7-12	1.87	13.87
MW92-1	NA	N5187235 E565149	2	1367.21	1364.24	15	1349.24	5-15	2.97	17.97
				1368.58	1364.27		1364.27		4.31	4.31
MW94-1	555058	N5209768 E1022178	2	1381.98	NA	13	1368.98	3-13	NA	13
MW94-2	555059	N5209768 E1022178	2	1381.74	NA	13	1368.74	3-13	NA	13
MW94-3	555060	N5209768 E1022178	2	NA	NA	13	NA	3-13	NA	13
MW00-3S	643956	N5187122 E565408	2	1369.08	1364.14	9	1355.14	4-9	4.94	13.94
				1370.46	1367.37		1367.37		3.09	3.09
MW00-3D	643955	N5187122 E565407	2	1368.87	1366.86	26	1340.86	16-26	2.01	28.01
				1370.41	1367.17		1367.17		3.24	3.24
MW00-4S	643957	N5187230 E565270	2	1367.62	1365.34	14	1351.34	4-14	2.28	16.28
				1368.58	1365.35		1365.35		3.23	3.23
MW00-4D	643958	N5187233 E565271	2	1367.17	1365.01	38	1327.01	28-38	2.16	40.16
				1368.08	1364.94		1364.94		3.14	3.14
MW00-5	643959	N5187165 E565344	2	1367.67	1365.16	14.5	1350.66	4.5-14.5	2.51	17.01
				1368.22	1366.38		1366.38		1.84	1.84
MW00-6	643960	N5187140 E565091	2	1377.3	1375.09	14.5	1360.59	4.5-14.5	2.21	16.71
				1377.63	1375.18		1375.18		2.45	2.45
MW07-7S	750505	N5186975 E565295	2	1372.92	1369.6	15	1354.6	5-15	3.32	18.32
MW08-8D	760914	N5187211 E565005	2	1366.32	1363.01	35	1328.01	25-35	3.31	38.31
MW10-09	771703	N5187114 E564977	2	1376.24	1374.82	14.5	1360.32	4.5-14.5	1.42	15.92
MW10-10	771704	N5187122 E565216	2	1370.15	1368.49	14.5	1353.99	4.5-14.5	1.66	16.16

Notes:

* indicates well is damaged

Table 2
Groundwater Elevation Data

Well Number (Unique Number)	Date	Top of Casing Elevation	Product Thickness	Depth to Water from Top of Riser	Relative Groundwater Elevation	Water Level Above Screen (Y/N)
MW1	8/2/2000	1383.65	NA	9.81	1373.84	Y
	11/7/2000	1383.65	NA	9.92	1373.73	Y
	11/13/2002	1383.65	NA	9.42	1374.23	Y
	5/6/2003	1383.65	NA	10.49	1373.16	Y
	11/18/2003	1383.65	NA	11.93	1371.72	Y
	6/1/2004	1383.65	NA	6.59	1377.06	Y
	11/18/2004	1383.65	NA	9.13	1374.52	Y
	6/2/2005	1383.65	NA	6.66	1376.99	Y
	10/23/2007	1383.65	NA	7.52	1376.13	Y
	10/28/2008	1383.95	NA	10.27	1373.68	Y
	5/11/2009	1383.95	NA	7.77	1376.18	Y
	10/20/2009	1383.95	NA	12.90	1371.05	Y
	5/12/2010	1383.95	NA	8.61	1375.34	Y
	10/27/2010	1383.95	NA	10.31	1373.64	Y
	10/25/2011	1383.95	NA	13.98	1369.97	N
	10/11/2012	1383.95	NA	15.60	1368.35	N
6/1/2016	1383.95	NA	7.42	1376.53	N	
10/31/2019	1383.95	NA	7.48	1376.47	Y	
11/19/2020	1383.95	NA	13.84	1370.11	N	
MW00-1D	8/2/2000	1382.86	NA	10.47	1372.39	Y
	11/7/2000	1382.86	NA	10.62	1372.24	Y
	11/13/2002	1382.86	NA	10.02	1372.84	Y
	5/6/2003	1382.86	NA	11.45	1371.41	Y
	11/18/2003	1382.86	NA	11.94	1370.92	Y
	6/1/2004	1382.86	NA	9.01	1373.85	Y
	11/18/2004	1382.86	NA	10.59	1372.27	Y
	6/2/2005	1382.86	NA	9.10	1373.76	Y
	10/23/2007	1382.86	NA	11.51	1371.35	Y
	10/28/2008	1382.86	NA	10.52	1372.34	Y
	5/11/2009	1382.86	NA	10.41	1372.45	Y
	10/20/2009	1382.86	NA	15.95	1366.91	Y
	5/12/2010	1382.86	NA	11.00	1371.86	Y
	10/27/2010	1382.86	NA	13.61	1369.25	Y
	10/25/2011	1382.86	NA	13.79	1369.07	Y
	10/11/2012	1382.86	NA	15.02	1367.84	Y
6/2/2016	1382.86	NA	9.57	1373.29	Y	
10/31/2019	1382.86	NA	9.42	1373.44	Y	
11/18/2020	1382.86	NA	12.93	1369.93	Y	
MW2*						
MW89-6	11/14/2002	1379.84	NA	6.49	1373.35	Y
	5/6/2003	1379.84	NA	6.64	1373.2	Y
	11/18/2003	1379.84	NA	5.26	1374.58	Y
	6/1/2004	1379.84	NA	3.46	1376.38	Y
	11/18/2004	1379.84	NA	5.88	1373.96	Y
6/2/2005	1379.84	NA	4.36	1375.48	Y	

Table 2
Groundwater Elevation Data

Well Number (Unique Number)	Date	Top of Casing Elevation	Product Thickness	Depth to Water from Top of Riser	Relative Groundwater Elevation	Water Level Above Screen (Y/N)
MW92-1	8/2/2000	1367.21	NA	4.62	1362.59	Y
	11/7/2000	1367.21	NA	4.02	1363.19	Y
	11/14/2002	1367.21	NA	4.62	1362.59	Y
	5/6/2003	1367.21	NA	4.83	1362.38	Y
	11/19/2003	1367.21	NA	4.80	1362.41	Y
	6/1/2004	1367.21	NA	4.59	1362.62	Y
	11/18/2004	1367.21	NA	4.92	1362.29	Y
	6/2/2005	1367.21	NA	4.89	1362.32	Y
	10/24/2007	1367.21	NA	5.40	1361.81	Y
	10/28/2008	1368.58	NA	5.55	1363.03	Y
	5/11/2009	1368.58	NA	6.52	1362.06	Y
	10/20/2009	1368.58	NA	6.62	1361.96	Y
	5/12/2010	1368.58	NA	6.56	1362.02	Y
	10/27/2010	1368.58	NA	6.19	1362.39	Y
	10/26/2011	1368.58	NA	6.64	1361.94	Y
	10/11/2012	1368.58	NA	7.03	1361.55	Y
6/1/2016	1368.58	NA	6.36	1362.22	Y	
11/18/2020	1368.58	NA	6.48	1362.1	Y	
MW94-1	11/14/2002	1381.98	NA	8.69	1373.29	N
	5/6/2003	1381.98	NA	9.27	1372.71	N
	11/18/2003	1381.98	NA	7.82	1374.16	N
	6/1/2004	1381.98	NA	not measured	NA	NA
	11/18/2004	1381.98	NA	7.90	1374.08	N
MW94-2	6/2/2005	NA	NA	6.36	NA	N
	11/14/2002	NA	NA	8.29	NA	N
	6/2/2005	NA	NA	6.57	NA	N
MW94-3						
MW00-3S	8/2/2000	1369.08	NA	4.18	1364.9	Y
	11/7/2000	1369.08	NA	7.44	1361.64	Y
	11/13/2002	1369.08	NA	3.27	1365.81	Y
	5/6/2003	1369.08	NA	2.92	1366.16	Y
	11/19/2003	1369.08	NA	3.00	1366.08	Y
	6/1/2004	1369.08	NA	3.00	1366.08	Y
	11/18/2004	1369.08	NA	3.25	1365.83	Y
	6/2/2005	1369.08	NA	3.71	1365.37	Y
	10/24/2007	1369.08	NA	3.41	1365.67	Y
	10/28/2008	1370.46	NA	4.55	1365.91	Y
	5/11/2009	1370.46	NA	4.55	1365.91	Y
	10/20/2009	1370.46	NA	3.47	1366.99	Y
	5/12/2010	1370.46	NA	4.57	1365.89	Y
	10/27/2010	1370.46	NA	4.45	1366.01	Y
	10/25/2011	1370.46	NA	4.92	1365.54	Y
	10/11/2012	1370.46	NA	6.44	1364.02	Y
	6/1/2016	1370.46	NA	4.12	1366.34	Y
10/31/2019	1370.46	NA	4.23	1366.23	Y	
11/18/2020	1370.46	NA	4.50	1365.96	Y	

Table 2
Groundwater Elevation Data

Well Number (Unique Number)	Date	Top of Casing Elevation	Product Thickness	Depth to Water from Top of Riser	Relative Groundwater Elevation	Water Level Above Screen (Y/N)
MW00-3D	8/2/2000	1368.87	NA	5.11	1363.76	Y
	11/7/2000	1368.87	NA	3.46	1365.41	Y
	11/13/2002	1368.87	NA	2.96	1365.91	Y
	5/6/2003	1368.87	NA	3.82	1365.05	Y
	11/19/2003	1368.87	NA	3.42	1365.45	Y
	6/1/2004	1368.87	NA	2.96	1365.91	Y
	11/18/2004	1368.87	NA	3.28	1365.59	Y
	6/2/2005	1368.87	NA	3.18	1365.69	Y
	10/24/2007	1368.87	NA	6.95	1361.92	Y
	10/28/2008	1370.41	NA	3.83	1366.58	Y
	5/11/2009	1370.41	NA	3.85	1366.56	Y
	10/20/2009	1370.41	NA	4.13	1366.28	Y
	5/12/2010	1370.41	NA	4.71	1365.7	Y
	10/27/2010	1370.41	NA	4.99	1365.42	Y
	10/25/2011	1370.41	NA	4.99	1365.42	Y
	6/2/2016	1370.41	NA	3.88	1366.53	Y
10/31/2019	1370.41	NA	4.10	1366.31	Y	
11/18/2020	1370.41	NA	4.71	1365.7	Y	
MW00-4S	8/2/2000	1367.62	NA	4.98	1362.64	Y
	11/7/2000	1367.62	NA	3.28	1364.34	Y
	11/14/2002	1367.62	NA	3.85	1363.77	Y
	5/6/2003	1367.62	NA	4.25	1363.37	Y
	11/19/2003	1367.62	NA	4.05	1363.57	Y
	6/1/2004	1367.62	NA	3.85	1363.77	Y
	11/18/2004	1367.62	NA	4.07	1363.55	Y
	6/2/2005	1367.62	NA	4.00	1363.62	Y
	10/24/2007	1368.58	NA	4.59	1363.99	Y
	10/28/2008	1368.58	NA	4.15	1364.43	Y
	5/11/2009	1368.58	NA	5.27	1363.31	Y
	10/20/2009	1368.58	NA	5.86	1362.72	Y
	5/12/2010	1368.58	NA	4.71	1363.87	Y
	10/27/2010	1368.58	NA	4.61	1363.97	Y
	10/26/2011	1368.58	NA	4.89	1363.69	Y
	10/11/2012	1368.58	NA	5.91	1362.67	Y
6/1/2016	1368.58	NA	4.92	1363.66	Y	
11/1/2019	1368.58	NA	4.45	1364.13	Y	
11/18/2020	1368.58	NA	5.57	1363.01	Y	

Table 2
Groundwater Elevation Data

Well Number (Unique Number)	Date	Top of Casing Elevation	Product Thickness	Depth to Water from Top of Riser	Relative Groundwater Elevation	Water Level Above Screen (Y/N)
MW00-4D	8/2/2000	1367.17	NA	5.11	1362.06	Y
	11/7/2000	1367.17	NA	2.78	1364.39	Y
	11/13/2002	1367.17	NA	3.17	1364	Y
	5/6/2003	1367.17	NA	3.79	1363.38	Y
	11/19/2003	1367.17	NA	3.78	1363.39	Y
	6/1/2004	1367.17	NA	3.26	1363.91	Y
	11/18/2004	1367.17	NA	3.56	1363.61	Y
	6/2/2005	1367.17	NA	3.40	1363.77	Y
	10/24/2007	1368.08	NA	4.71	1363.37	Y
	10/28/2008	1368.08	NA	3.41	1364.67	Y
	5/11/2009	1368.08	NA	4.81	1363.27	Y
	10/20/2009	1368.08	NA	4.27	1363.81	Y
	5/12/2010	1368.08	NA	4.45	1363.63	Y
	10/27/2010	1368.08	NA	4.32	1363.76	Y
	10/26/2011	1368.08	NA	4.75	1363.33	Y
	10/11/2012	1368.08	NA	5.78	1362.3	Y
	6/2/2016	1368.08	NA	3.95	1364.13	Y
11/1/2019	1368.08	NA	3.90	1364.18	Y	
11/18/2020	1368.08	NA	4.59	1363.49	Y	
MW00-5	8/2/2000	1367.67	NA	3.67	1364	Y
	11/7/2000	1367.67	NA	3.14	1364.53	Y
	11/13/2002	1367.67	NA	2.90	1364.77	Y
	5/6/2003	1367.67	NA	3.50	1364.17	Y
	11/19/2003	1367.67	NA	3.43	1364.24	Y
	6/1/2004	1367.67	NA	3.10	1364.57	Y
	11/18/2004	1367.67	NA	3.42	1364.25	Y
	6/2/2005	1367.67	NA	3.26	1364.41	Y
	10/24/2007	1367.67	NA	4.96	1362.71	Y
	10/28/2008	1368.22	NA	3.71	1364.51	Y
	5/11/2009	1368.22	NA	2.97	1365.25	Y
	10/20/2009	1368.22	NA	3.35	1364.87	Y
5/12/2010	1368.22	NA	3.00	1365.22	Y	
Sealed	10/20/2010	NA	NA	NA	NA	NA
MW00-6	8/2/2000	1377.3	NA	9.58	1367.72	N
	11/7/2000	1377.3	NA	9.14	1368.16	N
	11/13/2002	1377.3	NA	9.38	1367.92	N
	5/6/2003	1377.3	NA	9.15	1368.15	N
	11/18/2003	1377.3	NA	10.33	1366.97	N
	6/1/2004	1377.3	NA	6.86	1370.44	N
	11/18/2004	1377.3	NA	8.93	1368.37	N
	6/2/2005	1377.3	NA	7.29	1370.01	N
	10/24/2007	1377.3	NA	7.03	1370.27	N
	10/28/2008	1377.63	NA	9.64	1367.99	N
	5/11/2009	1377.63	NA	8.54	1369.09	N
10/20/2009	1377.63	NA	10.90	1366.73	N	
5/12/2010	1377.63	NA	8.93	1368.7	N	

Table 2
Groundwater Elevation Data

Well Number (Unique Number)	Date	Top of Casing Elevation	Product Thickness	Depth to Water from Top of Riser	Relative Groundwater Elevation	Water Level Above Screen (Y/N)
Sealed	10/20/2010	NA	NA	NA	NA	NA
MW07-7S	10/28/2008	1372.92	NA	2.78	1370.14	Y
	5/11/2009	1372.92	NA	3.40	1369.52	Y
	10/20/2009	1372.92	NA	4.35	1368.57	Y
	5/12/2010	1372.92	NA	3.76	1369.16	Y
	10/27/2010	1372.92	NA	3.62	1369.3	Y
	10/25/2011	1372.92	NA	4.44	1368.48	Y
	10/11/2012	1372.92	NA	6.76	1366.16	Y
	6/1/2016	1372.92	NA	2.57	1370.35	Y
	10/31/2019	1372.92	NA	2.78	1370.14	Y
	11/18/2020	1372.92	NA	4.22	1368.7	Y
MW08-8D	10/28/2008	1366.32	NA	2.20	1364.12	Y
	5/11/2009	1366.32	NA	4.88	1361.44	Y
	10/20/2009	1366.32	NA	3.37	1362.95	Y
	5/12/2010	1366.32	NA	3.10	1363.22	Y
	10/28/2010	1366.32	NA	2.51	1363.81	Y
	10/26/2011	1366.32	NA	3.08	1363.24	Y
	10/11/2012	1366.32	NA	3.54	1362.78	Y
	6/2/2016	1366.32	NA	2.24	1364.08	Y
	10/30/2019	1366.32	NA	1.99	1364.33	Y
	11/18/2020	1366.32	NA	2.41	1363.91	Y
MW10-09	10/27/2010	1376.24	NA	7.78	1368.46	N
	10/25/2011	1376.24	NA	10.95	1365.29	N
	10/11/2012	1376.24	NA	11.51	1364.73	N
	6/1/2016	1376.24	NA	9.59	1366.65	N
	10/30/2019	1376.24	NA	8.39	1367.85	Y
	11/18/2020	1376.24	NA	10.18	1366.06	N
MW10-10	10/27/2010	1370.15	NA	3.97	1366.18	Y
	10/26/2011	1370.15	NA	5.12	1365.03	Y
	10/10/2012	1370.15	NA	4.90	1365.25	Y
	6/2/2016	1370.15	NA	3.82	1366.33	Y
	10/31/2019	1370.15	NA	4.13	1366.02	Y
	11/18/2020	1370.15	NA	4.78	1365.37	Y

Notes:

* indicates well is damaged

All information provided by Delta Environmental Consultants, Inc. in the 2000 Annual Groundwater Monitoring Report dated June 27, 2001 with the exception of MW94- 1 through MW94-3. Information pertaining to these wells Wells professionally surveyed by STS June 12, 2008.

Table 3
Vertical Gradient Calculations

	MW1	MW1D	MW3S	MW3D	MW4S	MW4D	MW92-1	MW8D
Ground Elevation (ft)	1380.75	1380.74	1367.37	1367.17	1365.35	1364.94	1364.27	1363.01
Top of Riser Elevation (ft)	1383.95	1382.86	1370.46	1370.41	1368.58	1368.08	1368.58	1366.32
Depth to Well Screen (ft)	10	28	4	16	4	28	5	25
Screen Length (ft)	5	10	5	10	10	10	10	10
Screen Elevation (H)	1370.75	1352.74	1363.37	1351.17	1361.35	1336.94	1359.27	1338.01
Screen Elevation (M)	1368.25	1347.74	1360.87	1346.17	1356.35	1331.94	1354.27	1333.01

Note: Screen elevations are calculated based on the ground elevation from Table 1. "H" refers to the screen elevation for the top of the screen and "M" refers to the screen elevation for the middle of the screen.

Column A refers to the depth (ft) of water from top of riser (Table 2)

Column B refers to the relative groundwater elevation from Table 2 Column C is the change in head (dh) between the two nested wells

Column C is the change in head (dh) between the two nested wells

Column D is the change in well depth (dl) between the two nested wells using the elevation at the middle of the screen

Column E equals the vertical gradient (dh/dl) between the two nested wells (column C/column D)

Date	Well Nest	Depth to Water	Relative	dh=	dl=	Vertical Gradient
		Column A	Column B	Column C	Column D	Column E
6/1/2004	MW1	6.59	1377.06	3.21	20.39	0.1574301
	MW1D	9.01	1373.85			
11/18/2004	MW1	9.13	1374.52	2.25	20.39	0.1103482
	MW1D	10.59	1372.27			
6/2/2005	MW1	6.66	1376.99	3.23	20.39	0.158411
	MW1D	9.1	1373.76			
10/23/2007	MW1	7.52	1376.13	4.78	20.39	0.2344286
	MW1D	11.51	1371.35			
10/28/2008	MW1	10.27	1373.68	1.34	20.51	0.065334
	MW1D	10.52	1372.34			
5/11/2009	MW1	7.77	1376.18	3.73	20.51	0.1818625
	MW1D	10.41	1372.45			
10/20/2009	MW1	12.9	1371.05	4.14	20.51	0.2018528
	MW1D	15.95	1366.91			
5/12/2010	MW1	8.61	1375.34	1.7	20.51	0.0828864
	MW1D	10.31	1373.64			
10/27/2010	MW1	11	1371.86	2.61	20.51	0.127255
	MW1D	13.61	1369.25			
10/25/2011	MW1	13.98	1369.97	0.9	21.37*	0.042115115
	MW1D	13.79	1369.07			
10/11/2012	MW1	15.6	1368.35	0.51	20.56*	0.024805447
	MW1D	15.02	1367.84			
6/2/2016	MW1	7.42	1376.53	3.24	20.51	0.157971721
	MW1D	9.57	1373.29			
10/31/2019	MW1	7.48	1376.47	3.03	20.51	0.147732813
	MW1D	9.42	1373.44			
11/18/2020	MW1	13.84	1370.11	0.18	20.51	0.008776207
	MW1D	12.93	1369.93			
6/1/2004	MW3S	3	1366.08	0.17	11.78	0.0144312
	MW3D	2.96	1365.91			
11/18/2004	MW3S	3.25	1365.83	0.24	11.78	0.0203735
	MW3D	3.28	1365.59			
6/2/2005	MW3S	3.71	1365.37	-0.32	11.78	-0.0271647
	MW3D	3.18	1365.69			
10/24/2007	MW3S	3.41	1365.67	3.75	11.78	0.3183362
	MW3D	6.95	1361.92			
10/28/2008	MW3S	4.55	1365.91	-0.67	14.7	-0.0455782
	MW3D	3.83	1366.58			
5/11/2009	MW3S	4.55	1365.91	-0.65	14.7	-0.0442177
	MW3D	3.85	1366.56			
10/20/2009	MW3S	3.47	1366.99	0.71	14.7	0.0482993
	MW3D	4.13	1366.28			
5/12/2010	MW3S	4.57	1365.89	0.19	14.7	0.0129252
	MW3D	4.71	1365.7			
10/27/2010	MW3S	4.45	1366.01	0.59	14.7	0.0401361
	MW3D	4.99	1365.42			
10/25/2011	MW3S	4.92	1365.54	0.12	14.7	0.0081633
	MW3D	4.99	1365.42			

Table 3
Vertical Gradient Calculations

Date	Well Nest	Depth to Water (from TOR)	Relative Groundwater Elevation	dh=	dl=	Vertical Gradient
		Column A	Column B	Column C	Column D	Column E
10/11/2012	MW3S	6.44	1364.02	-0.33	14.7	-0.022449
	MW3D	6.06	1364.35			
6/2/2016	MW3S	4.12	10.47	-2.46	14.7	-0.167347
	MW3D	3.88	12.93			
10/31/19	MW3S	4.23	1366.23	0.13	14.7	0.008844
	MW3D	4.10	1366.31			
18/11/2020	MW3S	4.50	1365.96	-0.21	14.7	-0.014286
	MW3D	4.71	1365.70			
6/1/2004	MW4S	3.85	1363.77	-0.14	24.33	-0.0057542
	MW4D	3.26	1363.91			
11/18/2004	MW4S	4.07	1363.55	-0.06	24.33	-0.0024661
	MW4D	3.56	1363.61			
6/2/2005	MW4S	4	1363.62	-0.15	24.33	-0.0061652
	MW4D	3.4	1363.77			
10/24/2007	MW4S	4.59	1363.99	0.62	24.33	0.0234279
	MW4D	4.71	1363.37			
10/28/2008	MW4S	4.15	1364.43	1.97	24.41	0.0807046
	MW4D	4.71	1362.46			
5/11/2009	MW4S	5.27	1363.31	0.04	24.41	0.0016387
	MW4D	4.81	1363.27			
10/20/2009	MW4S	5.86	1362.72	-1.09	24.41	-0.0446538
	MW4D	4.27	1363.81			
5/12/2010	MW4S	4.71	1363.87	0.24	24.41	0.009832
	MW4D	4.45	1363.63			
10/27/2010	MW4S	4.61	1363.97	0.21	24.41	0.008603
	MW4D	4.32	1363.76			
10/26/2011	MW4S	4.89	1363.69	0.36	24.41	0.0147481
	MW4D	4.75	1363.33			
10/11/2012	MW4S	4.92	1364.66	2.36	24.41	0.0151577
	MW4D	5.78	1362.3			
6/2/2016	MW4S	4.92	6.62	3.70	24.41	-0.019254
	MW4D	3.95	2.92			
11/1/2019	MW4S	5.11	1362.06	1.21	24.41	0.049570
	MW4D	3.90	1364.18			
18/11/2020	MW4S	5.57	1363.01	0.98	24.41	0.040147
	MW4D	4.59	1363.49			
10/28/2008	MW92-1	5.55	1363.03	-1.09	21.26	-0.05127
	MW8D	2.20	1364.12			
5/11/2009	MW92-1	6.52	1362.06	0.62	21.26	0.0291627
	MW8D	4.88	1361.44			
10/20/2009	MW92-1	6.62	1361.96	-0.99	21.26	-0.0465663
	MW8D	3.37	1362.95			

Table 3
Vertical Gradient Calculations

Date	Well Nest	Depth to Water (from TOR)	Relative Groundwater Elevation	dh=	dl=	Vertical Gradient
		Column A	Column B	Column C	Column D	Column E
5/12/2010	MW92-1	6.56	1362.02	-1.20	21.26	-0.056444
	MW8D	3.10	1363.22			
10/27/2010	MW92-1	6.19	1362.39	-1.42	21.26	-0.0667921
	MW8D	2.51	1363.81			
10/26/2011	MW92-1	6.64	1361.94	-1.30	21.26	-0.0611477
	MW8D	3.08	1363.24			
10/11/2012	MW92-1	7.03	1361.55	-1.23	21.26	-0.0578551
	MW8D	3.54	1362.78			
6/2/2016	MW92-1	6.36	1363.22	-5.24	21.3	-0.246472
	MW8D	2.24	1368.46			
18/11/2020	MW92-1	6.48	1362.10	4.07	21.3	0.191080
	MW8D	2.41	1363.91			

* Corrected for water table intercepting screen interval in shallow well.

Table 4
Monitoring Well Stabilization Data

Unique Well Number	Date	pH	Specific Conductance (ms/cm)	Temperature (°C)	Dissolved Oxygen (ppm)	ORP (mV)	Volume Removed (gal)	Appearance	
MW1	5/12/2010	6.81	0.218	5.12	6.15	130.0	4.2	clear	
	10/27/2010		0.296	9.02	3.94	-295.5	2.5	slightly turbid	
	10/25/2011	No Data Collected							well dry after first 1/2 gallon
	10/11/2012	No Data Collected							well dry after purge 1 pint; let recharge for one hour - still no water
	6/1/2016	6.98	0.203	6.98		101.4	5.5	clear	
10/31/2019	6.66	0.237	6.26	4.97	-70.1	5.5	clear		
MW00-1D	5/12/2010	8.25	0.272	6.56	0.27	-188.6	15	gray turbid first gallon, sample clear	
	10/27/2010		0.238	6.31	0.42	-345.9	13	gray turbid	
	10/25/2011		0.258	4.8	0.36	-246.0	6	dark gray turbid well volume, sample clear	
	10/11/2012	8.44	0.295	6.8	0.16	-27.1	12	dark gray turbid first gallon, then sample clear	
	6/2/2016	8.34	0.2516	6.9	NA	-149.3	15	clear	
	10/31/2019	8.17	0.278	4.24	0.30	-117.6	16	clear	
MW00-3S	5/14/2010	6.97	1.012	6.2	2.93	4.3	1.5	clear	
	10/27/2010		1.301	9.03	0.33	-361.5	2	clear	
	10/25/2011		1.417	7.44	0.63	-201.4	2	slight brown turbid first 1/2 gallon, sample clear	
	10/11/2012	6.99	1.39	10	0.16	-30.5	1.5	well went dry after 2 well volumes purged, sample clear	
	6/1/2016	6.89	1.165	7.5	NA	-42.7	3.5		
10/31/2019	6.81	1.152	4.89	0.76	-22.0	7	clear		
MW00-3D	5/14/2010	6.72	0.936	5.52	1.25	-108.3	12	brown turbid first gallon, sample clear	
	10/28/2010		0.994	7.78	0.15	-355.6	12.5	slightly turbid	
	10/25/2011		1.036	5.81	0.17	-243.8	11.4	brown turbid first 3 gallons, sample clear	
	10/11/2012	6.83	1.04	7.8	3.39	-69.5	10.8	brown turbid first 1/2 gallon	
	6/1/2016	6.79	1.008	6.3	NA	-94.9	5.24	clear	
	10/31/2019	6.47	1.037	4.79	0.41	-56.4	12	clear	
MW00-4S	5/12/2010	6.74	1.412	4.74	1.75	-107.2	6	brown turbid first gallon, sample clear	
	10/28/2010		1.724	7.81	0.25	-364.8	6	brown turbid first gallon, sample clear	
	10/26/2011		1.852	6.36	0.33	-216.0	6	clear, sand	
	10/12/2012	6.76	2.14	8.5	0.22	-68.8	5.1	swampy odor, brown/gray turbid 1/2 gallon, then clear	
	6/1/2016	6.74	1.534	6	NA	-102	6	clear	
	11/1/2019	6.58	1.137	4.82	1.02	-1.6	7	clear	
MW00-4D	5/14/2010	7.09	0.999	6.38	0.98	-129.0	18	brown turbid first gallon, sample clear	
	10/28/2010		1.213	6.07	0.10	-348.9	18	clear	
	10/26/2011		1.208	4.31	0.25	-217.9	18	clear	
	10/12/2012	7.44	1.16	6.7	0.14	-52.8	18	swampy odor, brown/gray turbid first gallon, then clear	
	6/2/2016	7.42	0.742	7.6	NA	87.1	25	clear	
	11/1/2019	7.19	1.15	3.9	0.61	4.3	19	clear	
MW00-5	5/14/2010	6.48	1.744	4.58	2.68	-23.0	3	brown turbid	
MW00-6	5/12/2010	6.50	0.394	4.74	1.44	193.7	3.25	light brown turbid	
MW-92-1	5/12/2010	7.42	1.133	5.82	2.30	-151.8	6.5	gray turbid first 3 gallons, sample slightly turbid	
	10/28/2010		1.338	6.65	2.19	-330.4	5	gray turbid first gallon, sample slightly turbid	
	10/26/2011		1.324	4.77	2.89	-214.5	5.25	light brown turbid	
	10/12/2012	7.29	1.49	6.7	2.04	-97.5	5.1	brown turbid first gallon, then clear	
	6/1/2016	7.32	1.49	6	NA	-109.1	7	grey, mildly turbid	
MW-07-7S	5/12/2010	6.76	0.356	5.65	0.79	-105.4	6.4	brown turbid first gallon, sample clear	
	10/27/2010		0.339	9.29	0.18	-342.3	5	brown turbid first 2.5 gallons, sample clear	
	10/25/2011		0.348	7.55	0.50	-229.0	6	light brown turbid first 3 gallons, sample clear	
	10/11/2012	6.71	0.554	10.2	0.57	-57.7	4.5	brown turbid first well volume	
	10/31/2019	6.49	0.476	6.49	0.95	-37.2	7	clear	
MW08-8D	5/12/2010	7.26	0.996	6.22	1.53	-112.3	8	brown turbid first gallon, slightly turbid sample, sheen	
	10/28/2010		1.15	6.48	1.61	-346.6	4	brown turbid first gallon, slightly turbid sample, sheen	
	10/26/2011		0.992	4.51	3.07	-224.7	6	petro smell, oily residue on sample tubing	
	10/12/2012	7.24	1.11	6.8	2.44	-107.1	6	swampy odor / brown turbid first 1/2 gallon, then clear	
	6/2/2016	7.19	1.22	6.7	NA	-90.2	16	clear	
	10/30/2019	6.96	1.358	3.4	0.48	44.3	18	clear	
MW10-09	10/27/2010		0.299	8.26	2.37	-308.0	5.2	brown turbid first gallon, sample very slightly turbid	
	10/25/2011		1.217	8.78	0.32	-218.0	3	brown turbid, high sand and sediment	
	10/11/2012	6.50	1.18	11.7	1.11	-12.5	2.4	slight turbidity, sand in tubing	
	6/1/2016	6.46	0.719	6.7	NA	36.1	4	clear	
	10/30/2019	6.48	0.613	7.1	0.86	69.6	5	clear	
MW10-10	10/28/2010		1.677	8.11	0.25	-349.3	6	turbid brown, oily sheen, petro odor	
	10/26/2011		1.933	6.24	0.29	-224.5	6.7	dark brown turbid, oily sheen	
	10/12/2012	6.38	1.97	8.60	0.69	-47.6	4.8	oily, petro odor / brown turbid first 1/2 gallon, then slightly turbid	
	6/1/2016	6.39	1.8	7.10	NA	17.4	12	clear	
	10/31/2019	6.04	1.97	5.40	1.40	-4.2	6	clear	
Surface Water: Seep Locations									
Seep 1	6/3/2016	6.92	0.75	13.4	0.32	28			
Seep 2	6/3/2016	7.84	0.274	11	6.2	113.5			
Seep 3	6/3/2016	7.08	0.321	12.7	3.01	101.2			
Seep 4	5/19/2011							Iron staining and some slime, minimal sediment, sufficient water volume to collect sample	
	5/16/2012							No iron staining or slime, low water level, general appearance improved from previous year	
	6/6/2016	6.87	1.25	13.7	1.2	157.2			
Seep 5	5/19/2011							Heavy iron staining, minimal sediment, water lowing out from demolition pile, sufficient water volume to collect sample	
	5/16/2012							Heavy iron staining and slime, sediment, water level low and stagnant	
	6/6/2016	7.58	0.84	6.9	4.97	256.2			
Seep 6	5/19/2011							Iron staining, low volume for water sample, sediment in sample jars	
	5/16/2012							Iron staining and light slime, sediment in jars, low water level and water slightly yellow color	
	6/6/2016	6.83	1.33	12.6	0.85	154.7			
Seep 7	5/19/2011							Heavy iron staining, low volume for water sample, sediment in sample jars, oily and swampy odor and sheen (possible organic sheen)	
	5/16/2012							Iron staining and slime, sediment in jars, low water level, iron staining on surface of vegetation	
	6/6/2016	7.08	1.02	12.7	0.82	80.9			
SW-2	5/19/2011							Iron slime and algae mats on surface water, heavy sediment in sample jars	
	5/16/2012							Iron staining and slime, no sediment in jars, water lower than previous year, water clear	

Table 4
Monitoring Well Stabilization Data

Unique Well Number	Date	pH	Specific Conductance (ms/cm)	Temperature (°C)	Dissolved Oxygen (ppm)	ORP (mV)	Volume Removed (gal)	Appearance
Surface Water Sampling Locations								
SW-2	5/13/2010	3.80	341	5.5	10.59	178.0		slight yellow, clear
	10/25/2010		442	9.78	15.01	-274.8		green algea mats, slime
	10/24/2011	8.97	0.882	4.35	2.19	-197		green algea mats, slime
	10/10/2012	7.05	0.7	6.6	1.60	306.3		yellow, low water, algea, sediment
SW-3	6/3/2016	6.7	0.732	7.6	0.35	214.4		clear
	5/13/2010	7.46	102	6.68	16.96	182.9		slightly yellow, clear
	10/25/2010		104	7.05	5.75	-299.6		gold color, clear
	10/24/2011	8.73	0.131	4.89	9.51	-188.0		slight yellow, clear
SW-4	10/10/2012	7.41	0.183	6.5	9.23	303.4		slight yellow, some sediment
	6/3/2016	7.73	0.156	13.9	0.163	188		clear
	5/13/2010	7.36	188	5.83	12.24	233.0		slight yellow, clear, little debris
	10/25/2010		191	7.17	2.30	-303.1		slight yellow, clear
SW-5	10/24/2011	8.67	0.379	3.77	4.61	-187.0		slight yellow, clear
	10/10/2012			No Data Collected				DRY
	6/2/2016	6.97	0.233	18.9	4.06	122.1		clear
	5/13/2010	7.45	171	7.02	10.38	-35.2		clear, little debris
SW-6	10/24/2011	9.04	0.521	3.38	11.05	-199.0		iron slime/staining
	10/10/2012			No Data Collected				DRY
	6/3/2016	7.15	0.632	11.7	3.01	76.1		clear
	5/13/2010	7.60	204	8.77	9.24	103.4		clear
SW-6a	10/25/2010		244	8.04	12.10	-313.9		very slight yellow, clear
	10/24/2011	8.93	0.365	2.35	13.98	-190.0		very slight yellow, clear
	10/10/2012	7.26	0.522	6.00	7.60	191.1		clear, some sediment
	6/3/2016	7.17	0.439	12.90	4.43	108.7		clear
SW-7	5/13/2010	8.56	188	6.24	32.85	47.9		clear
	10/25/2010		391	8.23	5.54	-259.4		slight yellow, debris
SW-9	10/10/2012			No Data Collected				DRY
	6/3/2016	6.95	0.82	11.2	1.04	-42.4		clear
	5/13/2010	7.14	139	6.71	20.88	247.9		clear
	10/25/2010		54	7.24	7.43	-222.6		very slight yellow, little debris
SW-10	10/24/2011	8.95	0.141	3.31	72.92	-206.0		iron staining and very little water
	10/10/2012			No Data Collected				DRY
	6/3/2016	7.32	0.101	11.1	2.34	61.9		clear
	10/25/2010		186	7.12	7.79	-313.9		very slight yellow
SW-11	10/24/2011	8.95	0.3	1.67	2.19	-197.0		very slight yellow
	10/10/2012	7.13	0.382	3.70	7.20	150.2		clear some sediment
	6/2/2016	7.06	0.303	14.20	14.20	156		clear
	10/24/2011	8.53	0.97	4.40	2.59	-184.0		very slight yellow
SW-12	10/10/2012	7.12	0.669	6.00	0.83	204.1		yellow brown turbid
	6/3/2016	7.05	0.634	11.30	0.8	209.8		clear
	10/24/2011			No Data Collected				very slight yellow
	10/10/2012	7.19	0.69	6.70	0.83	125.7		yellow brown turbid
SW-13	6/3/2016	6.9	0.76	10.70	0.53	147.2		clear
Residential Wells								
RW-1	10/25/2010		0.193	9.66	3.95	-286.0		clear
	10/24/2011	7.82	0.184	7.78	7.10	-159.8	30	clear
	10/10/2012	7.30	0.197	9.80	5.52	240.4	30	clear
RW-2	5/16/2012			No Data Collected				clear
	10/10/2012	6.77	0.475	11.70	6.37	221.6	45	slight brown cloudy
	6/6/2016	7.43	0.358	8.50	9.71	288.9		
RW-3	10/25/2010		0.289	9.54	0.14	-346.4		clear
	10/24/2011	9.16	0.25	7.17	4.77	-200.7	30	clear
	10/10/2012	8.42	0.288	9.60	0.17	148.0	40	clear
RW-15	10/25/2010		1.442	13.09	4.84	-303.8		clear
	10/24/2011	8.18	1.312	11.91	4.51	-175.8	30	clear with sand
	10/10/2012	6.76	1.81	14.10	1.79	125.8	20	clear with sand, well went dry, high sediment in sample
RW-17	6/6/2016	6.93	1.94	10.00	4.89	313.8		
	10/25/2010		0.902	11.60	1.53	-335.8		sulfur odor and black sediment
	10/24/2011	8.34	0.724	9.42	2.09	-178.9	30	sulfur odor and black sediment
RW-17	10/10/2012	6.62	0.78	12.00	1.47	-3.6	30	sulfur odor, black sediment, slight turbid brown

Table 5
General Parameters and Metals
Groundwater Monitoring Wells (Groundwater Pathway)

Parameter	Units	Drinking Water Standards		Surface Water Standards		MW92-1					MW-1					MW00-1D				
		Lowest Applicable Drinking Water Standard	Standard Source	Lowest Applicable Surface Water Standard	Standard Source	5/12/2010	10/28/2010	10/26/2011	10/12/2012	6/2/2016	5/12/2010	10/27/2010	10/25/2011	10/11/2012	6/2/2016	5/12/2010	10/27/2010	10/25/2011	10/11/2012	6/2/2016
Unfiltered:																				
Hardness	mg/L	NS	NS	50	Class 3A, 3C/3B, 3C	725	700	688	715	748	110	154	145	-	99.5	130	133	79.6	180	119
Nitrogen, Ammonia	mg/L	30	LHA	0.016	Class 2A	2.11	-	-	-	-	<0.05	-	-	-	<0.05	-	-	-	-	-
Nitrogen, Nitrate+Nitrite	mg/L	10, 1	HRL, MCL	NS	NS	<0.1	-	-	-	-	<0.1	-	-	-	<0.1	-	-	-	-	-
Solids, Total Dissolved	mg/L	500	SDWR	NS	NS	713	-	-	-	-	150	-	-	-	161	-	-	-	-	-
Solids, Total Suspended	mg/L	NS	NS	10***	Class 2A	500	-	-	-	-	14.8	-	-	-	26.4	-	-	-	-	-
Sulfate	mg/L	NS	NS	10*	Class 4A	1.91	-	-	-	-	9.6	-	-	-	11.8	-	-	-	-	-
Total Metals (5 micron filter):																				
Aluminum	µg/L	50-200	SDWR	87	Class 2A	109	-	-	-	31	65.7	-	-	-	17.9	-	-	-	-	4.3 J
Antimony	µg/L	6	HRL	5.5	Class 2A	<0.5	-	-	-	0.061 J	<0.5	-	-	-	0.090 J	-	-	-	-	<0.032
Arsenic	µg/L	10	MCL	2	Class 2A	1.83	2.66	2.61	-	1.6	<1	<1	138	-	0.31 J	-	-	-	-	1.6
Barium	µg/L	2000	HRL	4	EPA Tier II	199	202	223	-	241	14.5	24.2	35.7	-	12.4	-	-	-	-	30.2
Beryllium	µg/L	0.08	HRL	0.66	EPA Tier II	<0.2	-	-	-	<0.030	<0.2	-	-	-	<0.030	-	-	-	-	<0.030
Cadmium	µg/L	0.5	HRL	0.66	Class 2A	<0.2	-	-	-	<0.080 UB	<0.2	-	-	-	<0.013	-	-	-	-	<0.013
Calcium	mg/L	NS	NS	NS	NS	182	174	169	-	183	33.1	44.7	40.9	-	29.3	-	-	-	-	32.3
Chromium**	µg/L	100	MCL	11	Class 2A	<2	-	-	-	<0.50 UB	<2	-	-	-	0.66 B	-	-	-	-	0.47 J
Cobalt	µg/L	NS	NS	2.8	Class 2A	<2	-	-	-	0.72	<2	-	-	-	0.045 J	-	-	-	-	0.030 J
Copper	µg/L	1300	TT	6.4	Class 2A	<2	<5	<5	-	1.8 J	<2	<5	11.9	-	1.8 J	-	-	-	-	<0.89
Iron	µg/L	300	SDWR	221	MN Site Specific	6180	6740	6500	-	7440	67.7	88.9	1860	-	24.3 J	-	-	-	-	41.2 J
Lead	µg/L	15	TT	1.3	Class 2A	<1	<0.5	1.04	-	0.16 B	<1	<0.5	2.14	-	<0.10 UB	-	-	-	-	<0.10 UB
Magnesium	mg/L	NS	NS	NS	NS	65.8	64.6	64.5	-	71	6.74	10.2	10.4	-	6.4	-	-	-	-	9.27
Manganese	µg/L	50	SDWR	NS	NS	392	431	405	-	457	<10	<10	40.4	-	0.38 J	-	-	-	-	51.3
Zinc	µg/L	2000	HRL	59	Class 2A	<25	<25	<25	-	1.6 J	<25	<25	<25	-	5.1 J	-	-	-	-	<1.4
Dissolved Metals (0.45 micron filter):																				
Aluminum, Dissolved	µg/L	50-200	SDWR	87	Class 2A	35.2	-	-	-	-	79.7	-	-	-	28	-	-	-	-	-
Antimony, Dissolved	µg/L	6	HRL	5.5	Class 2A	<0.5	-	-	-	-	<0.5	-	-	-	<0.5	-	-	-	-	-
Arsenic, Dissolved	µg/L	10	MCL	2	Class 2A	3.05	2.98	3.4	1.9	-	<1	<1	0.93	-	2.06	1.68	<0.5	1.5	-	
Barium, Dissolved	µg/L	2000	HRL	4	EPA Tier II	192	200	220	224	-	14.6	23	30.4	-	28.2	28.8	37.8	44.9	-	
Beryllium, Dissolved	µg/L	0.08	HRL	0.66	EPA Tier II	<0.2	-	-	-	-	<0.2	-	-	-	<0.2	-	-	-	-	
Cadmium, Dissolved	µg/L	0.5	HRL	0.66	Class 2A	<0.2	-	-	-	-	<0.2	-	-	-	<0.2	-	-	-	-	
Calcium, Dissolved	µg/L	NS	NS	NS	NS	174	-	-	175	-	32.1	-	-	-	35.1	35.6	19.9	46.6	-	
Chromium, Dissolved	µg/L	100	MCL	11	Class 2A	<2	-	-	-	-	<2	-	-	-	<2	-	-	-	-	
Cobalt, Dissolved	µg/L	NS	NS	2.8	Class 2A	<2	-	-	-	-	<2	-	-	-	<2	-	-	-	-	
Copper, Dissolved	µg/L	1300	TT	6.4	Class 2A	<2	<2	<5	<5.0	-	<2	2.26	9.91	-	<2	<2	<5	<5	-	
Iron, Dissolved	µg/L	300	SDWR	221	MN Site Specific	6150	5960	6630	7720	-	90.5	94.4	798	-	86.8	124	873	76.4	-	
Lead, Dissolved	µg/L	15	TT	1.3	Class 2A	<1	<0.5	1.57	<0.5	-	<1	<0.5	2.51	-	<1	<0.5	<0.5	<0.5	-	
Magnesium, Dissolved	µg/L	NS	NS	NS	NS	62.8	-	-	67.4	-	6.64	-	-	-	10.3	10.7	7.26	15.4	-	
Manganese, Dissolved	µg/L	50	SDWR	NS	NS	412	400	414	472	-	<10	<10	48.6	-	44.2	43.7	29.4	65.3	-	
Mercury, low level	ng/L	2000	MCL	1.3	GLI	14.8	18.7	34.2	115	<0.50 UB	9.4	10.3	194	-	1.9	0.7	0.6	13.2	2.4	<0.50 UB
Zinc, Dissolved	µg/L	2000	HRL	59	Class 2A	<25	<25	<25	<10	-	<25	<25	<25	-	<25	<25	<25	<10	-	

Notes:
Bold - indicates concentration above laboratory method detection limit
 Indicates exceedance of Lowest Applicable Drinking Water Standard
Italics - indicates concentration exceeds Lowest Applicable Surface Water Standard/Criteria
 - = not analyzed
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 * - Standard under review
 ** - 2A Aquatic Life and Recreation exceedance value based on Chromium (6+)
 *** - Standard applies between April through September

Acronyms
 HRL = Health Risk Limit
 LHA = Lifetime Health Advisory
 MCL = Maximum Contaminant Level
 NS = No Standard
 RAA = Risk Assessment Advice
 SDWR = Secondary Drinking Water Regulation
 TT = Treatment Technique (at the tap)
 GLI = Great Lakes Initiative Criteria

Flags:
 B - Potential high bias due to associated blank contamination
 J - Estimated concentration
 UB - Not detected at the laboratory practical quantitation limit. Associated with blank contamination at a similar concentration.

Table 5
General Parameters and Metals
Groundwater Monitoring Wells (Groundwater Pathway)

Parameter	Units	Drinking Water Standards		Surface Water Standard	MW00-3D					MW00-3S					MW00-4D					FD MW00-4D
		Lowest Applicable Drinking Water Standard	Standard Source		5/14/2010	10/28/2010	10/25/2011	10/11/2012	6/2/2016	5/14/2010	10/27/2010	10/25/2011	10/11/2012	6/1/2016	5/14/2010	10/28/2010	10/26/2011	10/26/2011	10/12/2012	
Unfiltered:																				
Hardness	mg/L	NS	NS	50	494	481	432	471	462	474	606	677	662	527	583	584	561	592	496	502
Nitrogen, Ammonia	mg/L	30	LHA	0.016	1.69	-	-	-	-	0.09	-	-	-	-	0.21	-	-	-	-	-
Nitrogen, Nitrate+Nitrite	mg/L	10, 1	HRL, MCL	NS	<0.1	-	-	-	-	<0.1	-	-	-	-	<0.1	-	-	-	-	-
Solids, Total Dissolved	mg/L	500	SDWR	NS	568	-	-	-	-	741	-	-	-	-	729	-	-	-	-	-
Solids, Total Suspended	mg/L	NS	NS	10***	83	-	-	-	-	50.8	-	-	-	-	15.5	-	-	-	-	-
Sulfate	mg/L	NS	NS	10*	<1	-	-	-	-	150	-	-	-	-	1.23	-	-	-	-	-
Total Metals (5 micron filter):																				
Aluminum	µg/L	50-200	SDWR	87	-	-	-	-	2.8 J	<25	-	-	-	<10.0 UB	-	-	-	-	-	-
Antimony	µg/L	6	HRL	5.5	-	-	-	-	0.073 J	<0.5	-	-	-	<0.032	-	-	-	-	-	-
Arsenic	µg/L	10	MCL	2	-	-	-	-	7.8	<1	2.56	2.67	-	2.4	-	-	-	-	-	-
Barium	µg/L	2000	HRL	4	-	-	-	-	243	119	210	225	-	180	-	-	-	-	-	-
Beryllium	µg/L	0.08	HRL	0.66	-	-	-	-	<0.030	<0.2	-	-	-	<0.030	-	-	-	-	-	-
Cadmium	µg/L	0.5	HRL	0.66	-	-	-	-	<0.013	<0.2	-	-	-	<0.013	-	-	-	-	-	-
Calcium	mg/L	NS	NS	NS	-	-	-	-	103	116	136	160	-	118	-	-	-	-	-	-
Chromium**	µg/L	100	MCL	11	-	-	-	-	1.3	<2	-	-	-	0.52 B	-	-	-	-	-	-
Cobalt	µg/L	NS	NS	2.8	-	-	-	-	10.4	<2	-	-	-	2.9	-	-	-	-	-	-
Copper	µg/L	1300	TT	6.4	-	-	-	-	1.2 J	2.66	<5	47.6	-	<0.89	-	-	-	-	-	-
Iron	µg/L	300	SDWR	221	-	-	-	-	31200	364	4680	5380	-	8850	-	-	-	-	-	-
Lead	µg/L	15	TT	1.3	-	-	-	-	<0.10 UB	<1	<0.5	<0.5	-	<0.012	-	-	-	-	-	-
Magnesium	mg/L	NS	NS	NS	-	-	-	-	49.7	44.8	64.8	67.4	-	56.3	-	-	-	-	-	-
Manganese	µg/L	50	SDWR	NS	-	-	-	-	2410	2040	1030	987	-	1060	-	-	-	-	-	-
Zinc	µg/L	2000	HRL	59	-	-	-	-	<1.4	<25	<25	<25	-	<1.4	-	-	-	-	-	-
Dissolved Metals (0.45 micron filter):																				
Aluminum, Dissolved	µg/L	50-200	SDWR	87	<25	-	-	-	-	<25	-	-	-	-	<25	-	-	-	-	-
Antimony, Dissolved	µg/L	6	HRL	5.5	<0.5	-	-	-	-	<0.5	-	-	-	<0.5	-	-	-	-	-	-
Arsenic, Dissolved	µg/L	10	MCL	2	8.11	9.21	9.21	7.3	-	<1	2.44	3.85	3	-	2.99	2.84	3.51	2.9	2.6	2.7
Barium, Dissolved	µg/L	2000	HRL	4	216	212	212	230	-	119	203	225	228	-	206	198	212	217	193	197
Beryllium, Dissolved	µg/L	0.08	HRL	0.66	<0.2	-	-	-	-	<0.2	-	-	-	-	<0.2	-	-	-	-	-
Cadmium, Dissolved	µg/L	0.5	HRL	0.66	<0.2	-	-	-	-	<0.2	-	-	-	-	<0.2	-	-	-	-	-
Calcium, Dissolved	µg/L	NS	NS	NS	112	112	97.7	105	-	114	-	-	147	-	134	130	115	121	98.1	98.4
Chromium, Dissolved	µg/L	100	MCL	11	<2	-	-	-	-	<2	-	-	-	-	<2	-	-	-	-	-
Cobalt, Dissolved	µg/L	NS	NS	2.8	10.1	-	-	-	-	2.21	-	-	-	-	2.71	-	-	-	-	-
Copper, Dissolved	µg/L	1300	TT	6.4	<2	3.41	<2	<10	-	<2	<2	18.6	<5.0	-	<2	<2	<5	<0.7	<5	<5.0
Iron, Dissolved	µg/L	300	SDWR	221	31600	29000	29700	30700	-	403	2730	6350	8980	-	4530	3320	2310	2330	1770	1800
Lead, Dissolved	µg/L	15	TT	1.3	<2	<0.5	<0.5	<0.5	-	<2	<0.5	<0.5	<0.5	-	<2	<0.5	<0.5	<0.5	<0.5	<0.5
Magnesium, Dissolved	µg/L	NS	NS	NS	52.1	49	45.8	50.4	-	44.2	-	-	71.4	-	60.3	63	66.5	70.3	61	62.2
Manganese, Dissolved	µg/L	50	SDWR	NS	2530	2410	2180	2360	-	2030	1030	1080	886	-	1500	1040	656	665	459	466
Mercury, low level	ng/L	2000	MCL	1.3	2.7	1.2	2	2.1	<0.50 UB	5.7	6.4	7.9	7.4	<0.50 UB	0.7	0.8	0.6	0.7	0.72	<0.5
Zinc, Dissolved	µg/L	2000	HRL	59	<25	<25	<25	<10	-	<25	<25	<25	<10	-	<25	<25	<25	<25	<10	<10

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Acronyms
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Table 5
General Parameters and Metals
Groundwater Monitoring Wells (Groundwater Pathway)

Parameter	Units	Drinking Water Standards		Surface V	MW00-4D	MW00-4S					MW10-10		FD	MW10-10	FD	MW10-10	FD	MW10-10	MW10-09			
		Lowest Applicable Drinking Water Standard	Standard Source	Lowest Applicable Surface Water Standard		MW00-4D	MW00-4S	MW00-4S	MW00-4S	MW00-4S	MW00-4S	MW10-10	MW10-10	MW10-10	MW10-10	MW10-10	MW10-10	MW10-10	MW10-10	MW10-10	MW10-10	MW10-10
Unfiltered:																						
Hardness	mg/L	NS	NS	50	327	881	977	872	846	684	550	451	434	398	402	400	400	123	706	633	413	
Nitrogen, Ammonia	mg/L	30	LHA	0.016	-	2.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nitrogen, Nitrate+Nitrite	mg/L	10, 1	HRL, MCL	NS	-	<0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Solids, Total Dissolved	mg/L	500	SDWR	NS	-	983	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Solids, Total Suspended	mg/L	NS	NS	10***	-	89	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sulfate	mg/L	NS	NS	10*	-	<1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Total Metals (5 micron filter):																						
Aluminum	µg/L	50-200	SDWR	87	2.3 J	30.4	-	-	-	11.2	-	-	-	-	-	331	384	-	-	-	25.3	
Antimony	µg/L	6	HRL	5.5	<0.032	<0.5	-	-	-	0.090 J	-	-	-	-	-	0.20 J	0.20 J	-	-	-	0.10 J	
Arsenic	µg/L	10	MCL	2	2.7	2.4	3.74	2.67	-	3.6	5.03	6.66	5.9	-	-	2.5	2.4	<1	2.97	-	0.50 J	
Barium	µg/L	2000	HRL	4	145	230	239	301	-	317	408	367	367	-	-	453	456	66.8	160	-	111	
Beryllium	µg/L	0.08	HRL	0.66	<0.030	<0.2	-	-	-	<0.030	-	-	-	-	-	<0.030	0.038 J	-	-	-	<0.030	
Cadmium	µg/L	0.5	HRL	0.66	<0.013	<0.2	-	-	-	<0.013	-	-	-	-	-	0.031 J	0.044 J	-	-	-	<0.080 UB	
Calcium	mg/L	NS	NS	NS	63.4	244	281	242	-	191	134	114	111	-	-	102	102	36.8	177	-	124	
Chromium**	µg/L	100	MCL	11	0.47 J	<2	-	-	-	1.5 B	-	-	-	-	-	4.1	4.5	-	-	-	0.58 B	
Cobalt	µg/L	NS	NS	2.8	0.89	5.16	-	-	-	7.0	-	-	-	-	-	11.5	12.2	-	-	-	1.2	
Copper	µg/L	1300	TT	6.4	<0.89	<2	<2	2.6	-	<0.89	56	16.6	15.3	-	-	3.9 J	3.1 J	134	36.6	-	1.7 J	
Iron	µg/L	300	SDWR	221	1240	32400	35300	27400	-	50400	21200	80700	79200	-	-	63400	62300	701	10800	-	1300	
Lead	µg/L	15	TT	1.3	<0.012	<1	<0.5	<0.5	-	0.044 J	5.07	2.21	2.12	-	-	4.6 J	3.5 J	17.9	18.5	-	0.35 B	
Magnesium	mg/L	NS	NS	NS	41	66	66.8	65.1	-	50.1	52.2	404	38.2	-	-	35.2	35.2	748	64.2	-	25	
Manganese	µg/L	50	SDWR	NS	278	8660	8200	6210	-	4190	8290	3640	3290	-	-	619	613	543	9390	-	1630	
Zinc	µg/L	2000	HRL	59	<1.4	<25	<25	<25	-	<1.4	38.3	<25	<25	-	-	<20.0 UB	<20.0 UB	116	36.8	-	40.6	
Dissolved Metals (0.45 micron filter):																						
Aluminum, Dissolved	µg/L	50-200	SDWR	87	-	<25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Antimony, Dissolved	µg/L	6	HRL	5.5	-	<0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Arsenic, Dissolved	µg/L	10	MCL	2	-	3.27	5.55	4.21	3.1	-	4.19	8	7.15	5	5.2	-	-	<1	1.94	1.3	-	
Barium, Dissolved	µg/L	2000	HRL	4	-	228	229	293	347	-	442	383	356	427	434	-	-	67.2	140	140	-	
Beryllium, Dissolved	µg/L	0.08	HRL	0.66	-	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cadmium, Dissolved	µg/L	0.5	HRL	0.66	-	<0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Calcium, Dissolved	µg/L	NS	NS	NS	-	262	-	-	230	-	-	-	-	102	102	-	-	-	-	-	170	
Chromium, Dissolved	µg/L	100	MCL	11	-	<2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cobalt, Dissolved	µg/L	NS	NS	2.8	-	5.84	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Copper, Dissolved	µg/L	1300	TT	6.4	-	<2	<2	<5	<10.0	-	37	14.2	647	<25	<25	-	-	14.3	38.5	<5	-	
Iron, Dissolved	µg/L	300	SDWR	221	-	31700	36400	28300	34000	-	15300	89100	70300	68700	69100	-	-	537	4280	7470	-	
Lead, Dissolved	µg/L	15	TT	1.3	-	<1	<0.5	0.84	<0.5	-	4.24	2.36	0.76	<0.5	<0.50	-	-	16.9	13.7	<0.5	-	
Magnesium, Dissolved	µg/L	NS	NS	NS	-	65.4	-	-	65.7	-	-	-	-	34.7	35.5	-	-	-	-	-	504	
Manganese, Dissolved	µg/L	50	SDWR	NS	-	8690	8280	6100	6020	-	7640	2600	3410	613	615	-	-	583	9260	7510	-	
Mercury, low level	ng/L	2000	MCL	1.3	<0.50 UB	3	1.2	3.1	0.74	<0.50 UB	99.6	854	77.9	17.5	30.7	2.2	2.2	18.8	1000	16.7	1.5	
Zinc, Dissolved	µg/L	2000	HRL	59	-	<25	<25	<25	<10	-	<25	<25	-	<10	11.8	-	-	116	<25	<10	-	

Notes:
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 Indicates exceedance of Lowest Applicable Drinking Water Standard
Italics - indicates concentration exceeds Lowest Applicable Surface Water Standard/Criteria
 - = not analyzed
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 ** - 2A Aquatic Life and Recreation exceedance value based on Chromium (6+)
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 HRL = Health Risk Limit
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Table 5
General Parameters and Metals
Groundwater Monitoring Wells (Groundwater Pathway)

Parameter	Units	Drinking Water Standards		Surface V	MW00-5	MW00-6	MW07-7S					MW08-8D				
		Lowest Applicable Drinking Water Standard	Standard Source	Lowest Applicable Surface Water Standard			5/14/2010	5/12/2013	5/12/2010	10/27/2010	10/25/2011	10/11/2012	6/1/2016	5/12/2010	10/28/2010	10/26/2011
Unfiltered:																
Hardness	mg/L	NS	NS	50	447	244	164	126	129	203	157	9	649	489	598	615
Nitrogen, Ammonia	mg/L	30	LHA	0.016	75.5	0.13	3.35	-	-	-	-	0.14	-	-	-	-
Nitrogen, Nitrate+Nitrite	mg/L	10, 1	HRL, MCL	NS	<0.1	<0.1	<0.1	-	-	-	-	<0.1	-	-	-	-
Solids, Total Dissolved	mg/L	500	SDWR	NS	1120	233	205	-	-	-	-	684	-	-	-	-
Solids, Total Suspended	mg/L	NS	NS	10***	736	342	77	-	-	-	-	8650	-	-	-	-
Sulfate	mg/L	NS	NS	10*	1.29	14.9	6.98	-	-	-	-	12.8	-	-	-	-
Total Metals (5 micron filter):																
Aluminum	µg/L	50-200	SDWR	87	211	17100	6220	-	-	-	<10.0 UB	-	-	-	-	3.5 J
Antimony	µg/L	6	HRL	5.5	<0.5	<0.5	<0.5	-	-	-	<0.032	-	-	-	-	0.052 J
Arsenic	µg/L	10	MCL	2	1.93	2.2	3.38	347	4.18	-	3.7	-	-	-	-	3.3
Barium	µg/L	2000	HRL	4	208	109	104	60.6	79.2	-	72.9	-	-	-	-	306
Beryllium	µg/L	0.08	HRL	0.66	<0.2	0.44	<0.2	-	-	-	<0.030	-	-	-	-	<0.030
Cadmium	µg/L	0.5	HRL	0.66	<0.2	<0.2	<0.2	-	-	-	<0.013	-	-	-	-	<0.013
Calcium	mg/L	NS	NS	NS	121	62.6	39.1	324	31.3	-	37.8	-	-	-	-	130
Chromium**	µg/L	100	MCL	11	<2	49.1	8.65	-	-	-	0.72 B	-	-	-	-	<0.50 UB
Cobalt	µg/L	NS	NS	2.8	8.76	9.14	5.21	-	-	-	1.2	-	-	-	-	1.1
Copper	µg/L	1300	TT	6.4	<2	63.6	34.6	<5	12.8	-	<0.89	-	-	-	-	<0.89
Iron	µg/L	300	SDWR	221	11600	17700	27600	15600	18000	-	17400	-	-	-	-	2040
Lead	µg/L	15	TT	1.3	<11	6.89	3.21	<0.5	1.84	-	0.023 J	-	-	-	-	<0.012
Magnesium	mg/L	NS	NS	NS	35.2	214	16.1	11	12.3	-	15.2	-	-	-	-	70.8
Manganese	µg/L	50	SDWR	NS	660	178	2300	1960	1810	-	1940	-	-	-	-	537
Zinc	µg/L	2000	HRL	59	<25	43.6	<25	<25	<25	-	<1.4	-	-	-	-	<1.4
Dissolved Metals (0.45 micron filter):																
Aluminum, Dissolved	µg/L	50-200	SDWR	87	167	-	549	-	-	-	-	601	-	-	-	-
Antimony, Dissolved	µg/L	6	HRL	5.5	<0.5	-	<0.5	-	-	-	-	<0.5	-	-	-	-
Arsenic, Dissolved	µg/L	10	MCL	2	2.84	-	3.01	3.83	4.48	3.7	-	4.31	3.72	2.75	1.8	-
Barium, Dissolved	µg/L	2000	HRL	4	200	-	62.7	61.7	84.9	99.5	-	256	267	215	258	-
Beryllium, Dissolved	µg/L	0.08	HRL	0.66	<0.2	-	<0.2	-	-	-	-	<0.2	-	-	-	-
Cadmium, Dissolved	µg/L	0.5	HRL	0.66	<0.2	-	<0.2	-	-	-	-	<0.2	-	-	-	-
Calcium, Dissolved	µg/L	NS	NS	NS	120	-	34.9	-	-	514	-	139	141	104	126	-
Chromium, Dissolved	µg/L	100	MCL	11	<2	-	<2	-	-	-	-	<2	-	-	-	-
Cobalt, Dissolved	µg/L	NS	NS	2.8	9.3	-	<2	-	-	-	-	<2	-	-	-	-
Copper, Dissolved	µg/L	1300	TT	6.4	<2	-	6.61	2.63	31.3	<5	-	5.82	23	<5	<5	-
Iron, Dissolved	µg/L	300	SDWR	221	11400	-	17900	16200	17800	25400	-	2540	3760	1240	641	-
Lead, Dissolved	µg/L	15	TT	1.3	<2	-	<1	<0.5	3.22	<0.5	-	1.22	2.66	1.55	<0.5	-
Magnesium, Dissolved	µg/L	NS	NS	NS	34.9	-	12.3	-	-	18.2	-	69.8	72.2	55.6	68.8	-
Manganese, Dissolved	µg/L	50	SDWR	NS	678	-	2110	2010	1750	2660	-	531	609	379	569	-
Mercury, low level	ng/L	2000	MCL	1.3	19.8	13.1	3.1	3.5	8.1	3.3	<0.50 UB	10.9	18.1	6.2	13.4	<0.50 UB
Zinc, Dissolved	µg/L	2000	HRL	59	<25	-	<25	<25	<25	<10	-	<25	<25	<25	<10	-

Notes:

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Table 6
Monitoring Well Analytical Data Organic Parameters (Groundwater Pathway)

Parameter	Units	Drinking Water Standards		Surface Water Standards		MW92-1					MW-1					MW00-1D				
		Lowest Applicable Drinking Water	Standard Source	Lowest Applicable Surface Water Standard/Criteria	Standard Source	5/12/2010	10/28/2010	10/26/2011	10/12/2012	6/1/2016	5/12/2010	10/27/2010	10/25/2011	10/11/2012	6/1/2016	5/12/2010	10/27/2010	10/25/2011	10/11/2012	6/2/2016
Petroleum:																				
DRO	mg/L	NS	NS	NS	NS	<0.08	-	-	-	0.16	<0.08	-	-	-	<0.032	<0.08	-	0.24	-	<0.035
GRO	mg/L	NS	NS	NS	NS	<0.04	-	-	-	-	<0.04	-	-	-	-	<0.04	-	-	-	-
1,4-Dioxane:																				
1,4-Dioxane	µg/L	1	HRL	NS	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1.0
Volatile Organic Compounds:																				
1,1,2,2-Tetrachloroethane	µg/L	2	HRL	1.1	Class 2A	-	-	-	-	<0.055	-	-	-	-	<0.055	-	-	-	-	<0.055
1,1-Dichloroethane	µg/L	80	RAA	NS	NS	-	-	-	-	<0.055	-	-	-	-	<0.055	-	-	-	-	<0.055
1,2,4-Trimethylbenzene	µg/L	100	RAA	NS	NS	<1	<1	<1.0	<1	<0.068	<1	<1	<1.0	-	<0.068	<1	<1	<1.0	<1	0.10 J
1,2-Dichlorobenzene	µg/L	600	HRL	NS	NS	-	-	<1.0	<1	<0.078	-	-	<1.0	-	<0.078	-	-	<1.0	<1	<0.078
1,2-Dichloroethane	µg/L	1	HRL	3.5	Class 2A	-	-	<1.0	<1	<1.0 UB	-	-	<1.0	-	<1.0 UB	-	-	<1.0	<1	<1.0 UB
1,3,5-Trimethylbenzene	µg/L	100	HRL	NS	NS	<1	<1	<1.0	<1	<0.042	<1	<1	<1.0	-	<0.042	<1	<1	<1.0	<1	<0.042
1,4-Dichlorobenzene	µg/L	10	HRL	NS	NS	<0.5	<0.5	<1.0	<1	<1.0 UB	<0.5	<0.5	<1.0	-	<0.081	<0.5	<0.5	<1.0	<1	<0.081
Benzene	µg/L	2	HRL	9.7	Class 2A	<0.5	<0.5	<1.0	<1	<1.0 UB	<0.5	<0.5	<1.0	-	<1.0 UB	<0.5	<0.5	<1.0	<1	<1.0 UB
Bromodichloromethane	µg/L	6	HRL	NS	NS	<0.5	<0.5	<1.0	<1	<0.068	<0.5	<0.5	<1.0	-	<0.068	<0.5	<0.5	<1.0	<1	<0.068
Chlorobenzene	µg/L	100	HRL	20	Class 2A	<1	<1	<1.0	<1	<0.066	<1	<1	<1.0	-	<0.066	<1	<1	<1.0	<1	<0.066
Chloroform	µg/L	30	HRL	53	Class 2A	-	-	<1.0	<1	<0.21	-	-	<1.0	-	<0.21	-	-	<1.0	<1	<0.21
Chloromethane	µg/L	NS	NS	NS	NS	-	-	1.0 J	<4	<0.080	-	-	0.81 J	-	<0.080	-	-	<4.0	<4	<0.080
cis-1,2-Dichloroethylene	µg/L	6	HBV	NS	NS	<0.5	<0.5	<1.0	<1	<0.12	<0.5	<0.5	<1.0	-	<0.12	0.70	0.70	0.51 J	<1	0.24 J
Dibromochloromethane	µg/L	10	HRL	NS	NS	<1	<1	<1.0	<1	<0.048	<1	<1	<1.0	-	<0.048	<1	<1	<1.0	<1	<0.048
Dichlorodifluoromethane	µg/L	700	HRL	NS	NS	-	-	-	-	<0.075	-	-	-	-	<0.075	-	-	-	-	0.86 J
Dichlorofluoromethane	µg/L	30	RAA	NS	NS	<0.5	<0.5	<1.0	<1	0.18 J	<0.5	<0.5	<1.0	-	<0.054	<0.5	<0.5	<1.0	<1	0.34 J
Ethyl Ether	µg/L	200	RAA	NS	NS	<2	<2	<4.0	<4	0.22 J	<2	<2	<4.0	-	<0.090	<2	<2	<4.0	<4	<0.090
Isopropylbenzene	µg/L	300	HRL	NS	NS	<1	<1	<1.0	<1	<0.064	<1	<1	<1.0	-	<0.064	<1	<1	<1.0	<1	<0.064
Methylene Chloride	µg/L	5	HRL	45	Class 2A	<1	<1	<10.0	<4	<4.0 UB	<1	<1	<10.0	-	<0.097	2.2	2.0	<10	<4	<4.0 UB
Naphthalene	µg/L	70	HRL	81	Class 2A	<1	<1	<4.0	<4	<4.0 UB	<1	<1	<4.0	-	<0.064	<1	<1	<4.0	<4	<0.064
n-Butylbenzene	µg/L	NS	NS	NS	NS	-	-	<1.0	<1	<0.16	-	-	<1.0	-	<0.16	-	-	<1.0	<1	<0.16
n-Propylbenzene	µg/L	NS	NS	NS	NS	<1	<1	<1.0	<1	<0.049	<1	<1	<1.0	-	<0.049	<1	<1	<1.0	<1	<0.049
p-Isopropyltoluene	µg/L	NS	NS	NS	NS	-	-	<1.0	<1	<0.064	-	-	<1.0	-	<0.064	-	-	<1.0	<1	<0.064
sec-Butylbenzene	µg/L	NS	NS	NS	NS	-	-	<1.0	<1	<0.094	-	-	<1.0	-	<0.094	-	-	<1.0	<1	<0.094
tert-Butylbenzene	µg/L	NS	NS	NS	NS	-	-	-	-	<0.051	-	-	-	-	<0.051	-	-	-	-	<0.051
Toluene	µg/L	200	HRL	253	Class 2A	<1	<1	<1.0	<1	<1.0 UB	<1	<1	<4.0 UB	-	<0.059	<1	<1	<1.0	<1	<0.059
Vinyl Chloride	µg/L	0.2	HRL	0.17	Class 2A	<0.5	<0.5	<0.40	<0.4	<0.084	<0.5	<0.5	<0.40	-	<0.084	0.90	0.90	0.72	<0.4	<0.084
Xylene (Total)	µg/L	300	HRL	166	Class 2A	<1	<1	<2.0	<2	<0.15	<1	<1	<2.0	-	<0.15	<1	<1	<2.0	<2	<0.15

Notes:

Bold - indicates concentration above laboratory method detection limit

Indicates exceedance of Lowest Applicable Drinking Water Standard

Italics - indicates concentration exceeds 2A Aquatic Life and Recreation exceedance value; not applicable to deep wells.

- = not analyzed

<XX - Less than the laboratory method detection limit for the 2016 data set

Blank = historical data. Either not detected or not analyzed.

Acronyms:

GRO = Gasoline Range Organics

DRO = Diesel Range Organics

HRL = Health Risk Limit

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RAA = Risk Assessment Advice

Flags:

B - Potential high bias due to associated blank contamination

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**Table 6
Monitoring Well Analytical Data Organic Parameters (Groundwater Pathway)**

Parameter	Units	Drinking Water Standards		Surface Water S	MW00-3D					MW00-3S					MW00-4D	FD MW00-4D	MW00-4D	FD MW00-4D	MW00-4D	FD MW00-4D	MW00-4D
		Lowest Applicable Drinking Water	Standard Source	Lowest Applicable Surface Water Standard/Criteria	5/14/2010	10/28/2010	10/25/2011	10/11/2012	6/2/2016	5/14/2010	10/27/2010	10/25/2011	10/11/2012	6/2/2016	5/14/2010	5/14/2010	10/28/2010	10/28/2010	10/26/2011	10/26/2011	10/12/2012
Petroleum:																					
DRO	mg/L	NS	NS	NS	0.20	0.30	-	0.54	0.74	<0.08	-	-	-	0.28	<0.08	0.09	-	-	-	-	
GRO	mg/L	NS	NS	NS	0.04	-	-	-	-	<0.04	-	-	-	-	<0.04	<0.04	-	-	-	-	
1,4-Dioxane:																					
1,4-Dioxane	µg/L	1	HRL	NS	-	-	-	-	<1.0	-	-	-	-	<1.0	-	-	-	-	-	-	
Volatile Organic Compounds:																					
1,1,2,2-Tetrachloroethane	µg/L	2	HRL	1.1					0.21 J					<0.055							
1,1-Dichloroethane	µg/L	80	RAA	NS					<0.055					<0.055							
1,2,4-Trimethylbenzene	µg/L	100	RAA	NS	<1	<1	0.41	<1	0.53 J	<1	<1	<1.0	<1	0.21 J	<1	<1	<1	<1	<1.0	<1.0	
1,2-Dichlorobenzene	µg/L	600	HRL	NS	-	-	0.33 J	<1	0.35 J	-	-	<1.0	<1	<0.078	-	-	-	-	<1.0	<1.0	
1,2-Dichloroethane	µg/L	1	HRL	3.5	-	-	<1.0	<1	<1.0 UB	-	-	<1.0	<1	<1.0 UB	-	-	-	-	<1.0	<1.0	
1,3,5-Trimethylbenzene	µg/L	100	HRL	NS	<1	<1	<1.0	<1	0.096 J	<1	<1	<1.0	<1	<0.042	<1	<1	<1	<1	<1.0	<1.0	
1,4-Dichlorobenzene	µg/L	10	HRL	NS	1.4	1.6	<1.3 UB	1.30	1.7	<0.5	<0.5	<1.0	<1	<0.081	<0.5	<0.5	<0.5	<0.5	<1.0	<1.0	
Benzene	µg/L	2	HRL	9.7	2.1	<0.510	2.1	2.1	2.5	0.50	<0.51	0.7 J	<1	0.77 B	0.60	0.60	<0.5	<0.5	<1.0	<1.0	
Bromodichloromethane	µg/L	6	HRL	NS	<0.5	<0.5	<1.0	<1	<0.068	<0.5	<0.5	<1.0	<1	<0.068	<0.5	<0.5	<0.5	<0.5	<1.0	<1.0	
Chlorobenzene	µg/L	100	HRL	20	5.1	5.8	6.2	6.0	8.2	<1	<1	<1.0	<1	<0.066	<1	<1	<1	<1	<1.0	<1.0	
Chloroform	µg/L	30	HRL	53	-	-	<1.0	<1	<0.21	-	-	<1.0	<1	<0.21	-	-	-	-	<1.0	<1.0	
Chloromethane	µg/L	NS	NS	NS	-	-	0.42 J	<4	<0.080	-	-	<4.0	<4	<0.080	-	-	-	-	<4.0	<4.0	
cis-1,2-Dichloroethylene	µg/L	6	HBV	NS	<0.5	<0.5	<1.0	<1	<0.12	<0.5	<0.5	<1.0	<1	0.19 J	<0.5	<0.5	<0.5	<0.5	<1.0	<1.0	
Dibromochloromethane	µg/L	10	HRL	NS	<1	<1	<1.0	<1	<0.048	<1	<1	<1.0	<1	<0.048	<1	<1	<1	<1	<1.0	<1.0	
Dichlorodifluoromethane	µg/L	700	HRL	NS					<0.075					<0.075							
Dichlorofluoromethane	µg/L	30	RAA	NS	<0.5	<0.5	0.27 J	<1	0.36 J	<0.5	<0.5	0.33 J	<1	0.34 J	<0.5	<0.5	<0.5	<0.5	<1.0	<1.0	
Ethyl Ether	µg/L	200	RAA	NS	<2	<2	<4.0	<4	<0.090	<2	<2	<1.0	<4	0.59 J	<2	<2	<2	<2	0.58 J	0.57 J	
Isopropylbenzene	µg/L	300	HRL	NS	<1	<1	0.61 J	<1	0.60 J	<1	<1	0.33 J	<1	<0.064	<1	<1	<1	<1	<1.0	<1.0	
Methylene Chloride	µg/L	5	HRL	45	<1	<1	<10	<4	<0.097	<1	<1	<10	<4	<4.0 UB	<1	<1	<1	<1	<10	<10	
Naphthalene	µg/L	70	HRL	81	<1	<1	<4.0	<4	<4.0 UB	<1	<1	<4.0	<4	<4.0 UB	<1	<1	<1	<1	<4.0	<4.0	
n-Butylbenzene	µg/L	NS	NS	NS	-	-	<1.0	<1	<0.16	-	-	<1.0	<1	<0.16	-	-	-	-	<1.0	<1.0	
n-Propylbenzene	µg/L	NS	NS	NS	<1	<1	<1.0	<1	0.13 J	<1	<1	<1.0	<1	<0.049	<1	<1	<1	<1	<1.0	<1.0	
p-Isopropyltoluene	µg/L	NS	NS	NS	-	-	<1.0	<1	<0.064	-	-	<1.0	<1	<0.064	-	-	-	-	<1.0	<1.0	
sec-Butylbenzene	µg/L	NS	NS	NS	-	-	0.66 J	<1	0.78 J	-	-	<1.0	<1	<0.094	-	-	-	-	<1.0	<1.0	
tert-Butylbenzene	µg/L	NS	NS	NS					0.20 J					<0.051							
Toluene	µg/L	200	HRL	253	<1	<1	<0.73 UBJ	<1	<4.0 UB	<1	<1	<0.53 UBJ	<1	<0.059	<1	<1	<1	<1	<1.0	<1.0	
Vinyl Chloride	µg/L	0.2	HRL	0.17	<0.5	<0.5	<0.40	<0.4	<0.084	<0.5	<0.5	<0.40	<0.4	<0.084	1.1	0.9	1.0	0.90	0.75	0.70	
Xylene (Total)	µg/L	300	HRL	166	<1	<1	<2.0	<2	<0.15	<1	<1	<2.0	<2	<0.15	<1	<1	<1	<1	<2.0	<2.0	

Notes:
Bold - indicates concentration above laboratory method detection limit
Indicates exceedance of Lowest Applicable Drinking Water Standard
Italics - indicates concentration exceeds 2A Aquatic Life and Recreation exceedance value; not applicable
- = not analyzed
<XX - Less than the laboratory method detection limit for the 2016 data set
Blank = historical data. Either not detected or not analyzed.

Acronyms:
GRO = Gasoline Range Organics
DRO = Diesel Range Organics
HRL = Health Risk Limit
NS = No Standard
RAA = Risk Assessment Advice

Flags:
B - Potential high bias due to associated blank contamination
J - Estimated concentration
UB - Not detected at the laboratory practical quantitation limit. Associated with blank contamination at

Table 6
Monitoring Well Analytical Data Organic Parameters (Groundwater Pathway)

Parameter	Units	Drinking Water Standards		Surface Water S	FD	MW00-4D	MW00-4S					MW00-5	MW Dup B	MW10-10	FD	MW10-10	FD	MW10-10	FD	MW10-10	FD	MW10-10	
		Lowest Applicable Drinking Water	Standard Source	Lowest Applicable Surface Water Standard/Criteria	MW00-4D	MW00-4D	10/12/2012	6/2/2016	5/12/2010	10/28/2010	10/26/2011	10/12/2012	6/1/2016	5/14/2010	5/14/2010	10/28/2010	10/28/2010	10/26/2011	10/26/2011	10/12/2012	10/12/2012	6/2/2016	6/2/2016
Petroleum:																							
DRO	mg/L	NS	NS	NS	-	0.17	0.12	-	-	-	-	0.43	0.13	0.12	0.89 J	0.78	0.50	0.49	1.51	1.41	2.2	2.2	
GRO	mg/L	NS	NS	NS	-	-	<0.04	-	-	-	-	<0.04	<0.04	-	-	-	-	-	-	-	-	-	
1,4-Dioxane:																							
1,4-Dioxane	µg/L	1	HRL	NS	-	5.0	-	-	-	-	-	<1.0	-	-	-	-	-	-	-	-	<1.0	<1.0	
Volatile Organic Compounds:																							
1,1,2,2-Tetrachloroethane	µg/L	2	HRL	1.1		<0.055						<0.055									<0.055	<0.055	
1,1-Dichloroethane	µg/L	80	RAA	NS		<0.055						<0.055									<0.055	<0.055	
1,2,4-Trimethylbenzene	µg/L	100	RAA	NS	<1	0.11 J	<1	<1	<1.0	<1		0.58 J	<1	<1	17.0	20.0	8.4	8.8	25.5	25.4	42.4	45.2	
1,2-Dichlorobenzene	µg/L	600	HRL	NS	<1	<0.078	-	-	<1.0	<1		<0.078	-	-	-	-	<1.0	<1.0	<1	<1	0.34 J	<0.078	
1,2-Dichloroethane	µg/L	1	HRL	3.5	<1	<1.0 UB	-	-	<1.0	<1		<1.0 UB	-	-	-	-	<1.0	<1.0	<1	<1	<1.0 UB	<1.0 UB	
1,3,5-Trimethylbenzene	µg/L	100	HRL	NS	<1	<0.042	<1	<1	<1.0	<1		<0.042	<1	<1	5.2	6.1	3.9	4.1	9.7	10.0	14.3	15.2	
1,4-Dichlorobenzene	µg/L	10	HRL	NS	<1	<0.081	<0.5	<0.5	<1.0	<1		<0.081	<0.5	<0.5	1.0	0.80	1.2	1.2	1.6	1.7	2.0	2.0	
Benzene	µg/L	2	HRL	9.7	<1	0.36 B	<0.5	<0.5	0.45	<1		0.75 B	7.6	8.8	13.0	14.0	16.8	14.9	18.5	18.4	16.7	17.2	
Bromodichloromethane	µg/L	6	HRL	NS	<1	<0.068	<0.5	<0.5	<1.0	<1		<0.068	<0.5	<0.5	<0.5	<0.5	<1.0	<1.0	<1	<1	<0.068	<0.068	
Chlorobenzene	µg/L	100	HRL	20	<1	0.36 J	<1	<1	<1.0	<1		0.83 J	<1	<1	6.5	6.5	8.5	8.5	12.6	12.9	13.1	13.4	
Chloroform	µg/L	30	HRL	53	<1	<0.21	-	-	<1.0	<1		<0.21	-	-	-	-	<1.0	<1.0	<1	<1	<0.21	<0.21	
Chloromethane	µg/L	NS	NS	NS	<4	<0.080	-	-	<4.0	<4		<0.080	-	-	-	-	<4.0	0.60 J	<4	<4	<0.080	<0.080	
cis-1,2-Dichloroethylene	µg/L	6	HBV	NS	<1	<0.12	<0.5	<0.5	<1.0	<1		<0.12	<0.5	0.60	<0.5	<0.5	<1.0	<1.0	<1	<1	<0.12	<0.12	
Dibromochloromethane	µg/L	10	HRL	NS	<1	<0.048	<1	<1	<1.0	<1		<0.048	<1	<1	<1	<1	<1.0	<1.0	<1	<1	<0.048	<0.048	
Dichlorodifluoromethane	µg/L	700	HRL	NS		<0.075						<0.075									<0.075	<0.075	
Dichlorofluoromethane	µg/L	30	RAA	NS	<1	0.33 J	<0.5	<0.5	<1.0	<1		<0.054	<0.5	<0.5	<0.5	<0.5	<1.0	<1.0	<1	<1	<0.054	<0.054	
Ethyl Ether	µg/L	200	RAA	NS	<4	0.55 J	<2	<2	1.5 J	<4		0.96 J	2.3	2.1	<2	<2	1.2	1.1	<4	<4	1.3 J	1.6 J	
Isopropylbenzene	µg/L	300	HRL	NS	<1	<0.064	<1	<1	<1.0	<1		<0.064	<1	<1	1.2	1.4	1.5	1.5	2.0	2.0	2.8	3.1	
Methylene Chloride	µg/L	5	HRL	45	<4	<0.097	<1	<1	<10	<4		<0.097	<1	<1	<1	<1	<10	<10	<4	<4	<0.097	<0.097	
Naphthalene	µg/L	70	HRL	81	<4	<0.064	<1	<1	<4.0	<4		<4.0 UB	<1	<1	5.0	5.7	4.7	4.7	14.2	14.1	14.4	16.3	
n-Butylbenzene	µg/L	NS	NS	NS	<1	<0.16	-	-	<1.0	<1		<0.16	-	-	-	-	<1.0	0.40 J	<1	<1	1.0	1.1	
n-Propylbenzene	µg/L	NS	NS	NS	<1	<0.049	<1	<1	<1.0	<1		<0.049	<1	<1	1.0	1.1	1.2	1.2	2.0	2.1	2.9	3.1	
p-Isopropyltoluene	µg/L	NS	NS	NS	<1	<0.064	-	-	<1.0	<1		<0.064	-	-	-	-	1.1	<1.0	<1	<1	0.84 J	0.69 J	
sec-Butylbenzene	µg/L	NS	NS	NS	<1	<0.094	-	-	<1.0	<1		<0.094	-	-	-	-	0.77 J	0.79 J	<1	<1	1.5	1.6	
tert-Butylbenzene	µg/L	NS	NS	NS		<0.051						<0.051									0.34 J	<0.051	
Toluene	µg/L	200	HRL	253	<1	<0.059	<1	<1	<1.0	<1		<4.0 UB	<1	<1	<1	<1	<1.0	<1.0	<1	<1	0.18 J	0.17 J	
Vinyl Chloride	µg/L	0.2	HRL	0.17	0.68	<0.084	<0.5	<0.5	<0.40	<0.4		<0.084	<0.5	<0.5	<0.5	<0.5	<0.40	<0.40	<0.4	<0.4	<0.084	<0.084	
Xylene (Total)	µg/L	300	HRL	166	<2	<0.15	<1	<1	<2.0	<2		<0.15	<1	<1	15.0	16	2.2 J	2.3 J	10.3	10.3	15.1	15.6	

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**Table 6
Monitoring Well Analytical Data Organic Parameters (Groundwater Pathway)**

Parameter	Units	Drinking Water Standards		Surface Water S	MW10-09				MW00-6	MW07-7S				MW08-8D					
		Lowest Applicable Drinking Water	Standard Source	Lowest Applicable Surface Water Standard/Criteria	10/27/2010	10/25/2011	10/11/2012	6/1/2016	5/12/2013	5/12/2010	10/27/2010	10/25/2011	10/11/2012	6/1/2016	5/12/2010	10/28/2010	10/26/2011	10/12/2012	6/2/2016
Petroleum:																			
DRO	mg/L	NS	NS	NS	-	-	-	0.10 J	<0.08	<0.08	-	-	-	0.076 J	0.20	0.28	-	0.33	0.36
GRO	mg/L	NS	NS	NS	-	-	-	-	<0.04	<0.04	-	-	-	-	<0.04	-	-	-	-
1,4-Dioxane:																			
1,4-Dioxane	µg/L	1	HRL	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1.0
Volatile Organic Compounds:																			
1,1,2,2-Tetrachloroethane	µg/L	2	HRL	1.1				<0.055						<0.055					<0.055
1,1-Dichloroethane	µg/L	80	RAA	NS				<0.055						<0.055					0.29 J
1,2,4-Trimethylbenzene	µg/L	100	RAA	NS	<1	<1	<1	<0.068	<1	<1	<1	<1.0	<1	0.59 J	<1	<1	<1.0	<1	<0.068
1,2-Dichlorobenzene	µg/L	600	HRL	NS	-	<1.0	<1	<0.078	-	-	-	<1.0	<1	<0.078	-	-	<1.0	<1	<0.078
1,2-Dichloroethane	µg/L	1	HRL	3.5	-	<1.0	<1	<1.0 UB	-	-	-	<1.0	<1	<1.0 UB	-	-	0.34 J	<1	<1.0 UB
1,3,5-Trimethylbenzene	µg/L	100	HRL	NS	<1	<1	<1	<0.042	<1	<1	<1	<1.0	<1	<0.042	<1	<1	<1.0	<1	<0.042
1,4-Dichlorobenzene	µg/L	10	HRL	NS	<0.5	<2.0	<1	<1.0 UB	<0.5	0.60	0.60	<0.59 UBJ	<1	<1.0 UB	<0.5	<0.5	<1.0	<1	<0.081
Benzene	µg/L	2	HRL	9.7	<0.5	<2.0	<1	<1.0 UB	<0.5	0.60	<0.5 UB	0.54	<1	<1.0 UB	<0.5	<0.5 UB	<1.0	<1	<1.0 UB
Bromodichloromethane	µg/L	6	HRL	NS	<0.5	<2.0	<1	<0.068	<0.5	<0.5	<0.5	<1.0	<1	<0.068	<0.5	<0.5	<1.0	<1	<0.068
Chlorobenzene	µg/L	100	HRL	20	<1	<2.0	<1	<0.066	<1	<1	<1	0.76	1.0	0.43 J	<1	<1	<1.0	<1	<0.066
Chloroform	µg/L	30	HRL	53	-	<1.0	<1	<0.21	-	-	-	<1.0	<1	<0.21	-	-	<1.0	<1	<0.21
Chloromethane	µg/L	NS	NS	NS	-	<4.0	<4	<0.080	-	-	-	<4.0	<4	<0.080	-	-	<4.0	<4	<0.080
cis-1,2-Dichloroethylene	µg/L	6	HBV	NS	<0.5	<2.0	<1	<0.12	<0.5	<0.5	<0.5	<1.0	<1	<0.12	0.70	0.80	0.47 J	<1	0.55 J
Dibromochloromethane	µg/L	10	HRL	NS	<1	<2.0	<1	<0.048	<1	<1	<1	<1.0	<1	<0.048	<1	<1	<1.0	<1	<0.048
Dichlorodifluoromethane	µg/L	700	HRL	NS				<0.075						<0.075					<0.075
Dichlorofluoromethane	µg/L	30	RAA	NS	<0.5	<2.0	<1	<0.054	<0.5	0.50	<0.5	0.52	<1	0.36 J	<0.5	<0.5	<1.0	<1	0.32 J
Ethyl Ether	µg/L	200	RAA	NS	<2	<8.0	<4	<0.090	<2	<2	<2	<4.0	<4	<0.090	2.7	2.6	2.2	<4	2.9 J
Isopropylbenzene	µg/L	300	HRL	NS	<1	<2.0	<1	<0.064	<1	<1	<1	<1.0	<1	<0.064	<1	<1	<1.0	<1	<0.064
Methylene Chloride	µg/L	5	HRL	45	<1	<2.0	<4	<0.097	<1	<1	<1	<1.0	<4	<0.097	<1	<1	<1.0	<4	<4.0 UB
Naphthalene	µg/L	70	HRL	81	<1	<8.0	<4	<4.0 UB	<1	<1	<1	<4.0	<4	<4.0 UB	<1	<1	<4.0	<4	<0.064
n-Butylbenzene	µg/L	NS	NS	NS	-	<1.0	<1	<0.16	-	-	-	<1.0	<1	<0.16	-	-	<1.0	<1	<0.16
n-Propylbenzene	µg/L	NS	NS	NS	<1	<2.0	<1	<0.049	<1	<1	<1	<1.0	<1	<0.049	<1	<1	<1.0	<1	<0.049
p-Isopropyltoluene	µg/L	NS	NS	NS	-	<1.0	<1	<0.064	-	-	-	<1.0	<1	<0.064	-	-	<1.0	<1	<0.064
sec-Butylbenzene	µg/L	NS	NS	NS	-	<1.0	<1	<0.094	-	-	-	<1.0	<1	<0.094	-	-	<1.0	<1	<0.094
tert-Butylbenzene	µg/L	NS	NS	NS				<0.051						0.069 J					<0.051
Toluene	µg/L	200	HRL	253	<1	<2.0	<1	<0.059	<1	<1	<1	<1.0 UB	<1	<0.059	<1	<1	<1.0	<1	<0.059
Vinyl Chloride	µg/L	0.2	HRL	0.17	<0.5	<0.80	<0.4	<0.084	<0.5	<0.5	<0.5	<0.40	<0.4	<0.084	5.6	5.9	4.4	4.7	6.1
Xylene (Total)	µg/L	300	HRL	166	<1	<2.0	<2	<0.15	<1	<1	<1	<2.0	<2	<0.15	<1	<1	<2.0	<2	<0.15

Notes:

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Acronyms:

GRO = Gasoline Range Organics

DRO = Diesel Range Organics

HRL = Health Risk Limit

NS = No Standard

RAA = Risk Assessment Advice

Flags:

B - Potential high bias due to associated blank contamination

J - Estimated concentration

UB - Not detected at the laboratory practical quantitation limit. Associated with blank contamination at

Table 7
Monitoring Well Analytical Data Perfluorinated Compounds (Groundwater Pathway)

Parameter	Units	Drinking Water Standards		MW92-1	MW-1	MW00-1D	MW00-3S	MW00-3D	MW00-4S	MW00-4D	MW10-09	MW10-09 (DUP)	MW10-10	MW07-7S	MW08-8D	Field Blank	
		Lowest Applicable Drinking Water Standard	Standard Source														
		10/30/2019	10/31/2020														10/31/2020
PFC:																	
Perfluorobutanesulfonate (PFBS)	ug/L	2	HBV	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Perfluorobutanoic acid (PFBA)	ug/L	7	HRL	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.005J	<0.050	<0.050	<0.050	<0.050
Perfluorohexanesulfonate (PFHxS)	ug/L	0.047	HBV	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.005J	<0.025	0.005J	<0.025	<0.025	<0.025
Perfluorohexanoic acid (PFHxA)	ug/L	NS	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.004J	<0.050	<0.050	<0.050	<0.050
Perfluorooctanesulfonate (PFOS)	ug/L	0.015	HBV	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.009J	0.009J	<0.015	<0.015	<0.015	<0.015	<0.015
Perfluorooctanoic acid (PFOA)	ug/L	0.035	HRL	0.005J	<0.035	<0.035	0.011J	0.017J	<0.035	0.015J	<0.035	<0.035	0.028J	<0.035	0.016J	<0.035	<0.035
Perfluoropentanoic acid (PFPeA)	ug/L	NS	--	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Dioxane:																	
1,4-Dioxane	µg/L	1	HRL	7.6	<0.28	<0.29	0.92	<0.28	6.3	<0.25	<0.25	<0.28	1.1	<0.28	0.79	<0.31	<0.31

Notes: **Bold** - indicates concentration above laboratory method detection limit
 Indicates exceedance of Lowest Applicable Drinking Water Standard
 - = not analyzed
 <XX - Less than the laboratory method detection limit
 Blank = historical data. Either not detected or not analyzed.

Acronyms:
 PFC = Perfluorinated Compound
 HBV = Health Based Values
 HRL = Health Risk Limit
 NS = No Standard

Flags:
 J - Estimated concentration

Table 8
Surface Water Analytical Data General Parameters and Metals

Parameter	Units	Class 1B Drinking Water (b)	Class 2A Aquatic Life and Recreation	Class 3A, 3C/ 3B, 3C Industrial Consumption	MN Site Specific/GLI Criteria (e)	SW-2					SW-3					SW-4						
						10/25/2010	5/19/2011	10/24/2011	10/10/2012	6/3/2016	5/13/2010	5/13/2010	10/25/2010	10/24/2011	10/10/2012	6/3/2016	5/13/2010	10/25/2010	10/25/2010	10/24/2011	10/24/2011	6/2/2016
Unfiltered																						
Alkalinity	mg/L	NS	NS	NS	NS	-	-	-	-	197	-	-	-	-	-	86.3	-	-	-	-	99.7	
Hardness	mg/L	NS	NS	50	NS	266	211	222	301	218	68	70	75	74	97	82.1	124	94	99	159	156	108
Nitrogen, Ammonia	mg/L	NS	16	NS	NS	-	-	-	-	0.16 J	<0.05	0.13	-	-	-	0.062 J	<0.05	-	-	-	-	<0.053
Nitrogen, Nitrate+Nitrite	mg/L	1	NS	NS	NS	-	-	-	-	<0.019 UJ	<0.1	<0.1	-	-	-	<0.019 UJ	<0.1	-	-	-	-	<0.019
Solids, Total Dissolved	mg/L	500 (s)	NS	NS	NS	-	-	-	-	363	126	133	-	-	-	137	218	-	-	-	-	136
Solids, Total Suspended	mg/L	NS	NS	NS	NS	-	-	-	-	8.0 J	<1	<1	-	-	-	9.0 J	<1	-	-	-	-	5.0 J
Sulfate	mg/L	250 (s)	10*	NS	250	-	-	-	-	<1.0 UJ	138	135	-	-	-	<1.0 UJ	1.98	-	-	-	-	<1.0
Total Metals (5 micron filter)																						
Aluminum	µg/L	50-200 (s)	87	NS	NS	-	-	-	-	8.2 J	32.8	36.2	-	-	-	28.7	<25	-	-	-	-	25.2
Antimony	µg/L	6	5.5	NS	NS	-	-	-	-	0.060 J	<0.5	<0.5	-	-	-	0.070 J	<0.5	-	-	-	-	0.071 J
Arsenic	µg/L	10	2	NS	NS	<1	0.56	<0.5	1.1	0.29 J	<1	<1	<1	<0.5	0.68	0.7	<1	<1	<1	0.64	0.63	0.45 J
Barium	µg/L	2000	NS	NS	683	247	177	125	197	114	10.2	10.6	24	22.1	28.8	25	20.4	15.4	19.6	25	26.8	15.2
Beryllium	µg/L	4	NS	NS	NS	-	-	-	-	<0.030	<0.2	<0.2	-	-	-	<0.030	<0.2	-	-	-	-	<0.030
Cadmium	µg/L	5	0.66	NS	NS	-	-	-	-	<0.013	<0.2	<0.2	-	-	-	0.018 J	<0.2	-	-	-	-	<0.013
Calcium	mg/L	NS	NS	NS	NS	74	60	59.6	79.8	61.4	18.0	18.6	20	19.5	25.2	21.5	32.4	25	26.5	44.4	43.9	27.1
Chromium**	µg/L	100	11	NS	NS	-	-	-	-	0.48 J	<2	<2	-	-	-	0.54	<2	-	-	-	-	0.59
Cobalt	µg/L	NS	2.8	NS	NS	-	-	-	-	0.54	<2	<2	-	-	-	0.92	<2	-	-	-	-	0.74
Copper	µg/L	1000 (s)	6.4	NS	NS	2.07	13.9	<2	9.2	<0.89	<2	<2	2	<2	<5	1.0 J	<2	2.06	2.37	<2	<2	1.1 J
Iron	µg/L	300 (s)	NS	NS	221	23500	17100	4780	15700	1290	417	423	6300	3360	3430	4150	723	675	960	495	579	1850
Lead	µg/L	NS	1.3	NS	NS	7.84	118	5.17	98.3	0.84	<1	<1	1	<0.5	0.7	0.28	<1	<0.5	<0.5	<0.5	102	0.097 J
Magnesium	mg/L	NS	NS	NS	NS	19.7	14.7	17.7	24.70	15.8	5.6	5.8	6.08	6.14	8.2	6.91	10.4	7.68	8.05	11.6	11.4	9.66
Manganese	µg/L	50 (s)	NS	NS	NS	1180	454	824	675	941	35	35.8	129	182	77.8	382	319	39.4	86.5	184	226	197
Mercury	ng/L	2000	6.9	NS	1.3	3	-	10	12.5	-	4	4.5	2	0.9	0.71	-	3.4	5.9	3.7	1.1	0.9	-
Zinc	µg/L	5000 (s)	59	NS	NS	<25	<25	<25	76.5	1.4 J	<25	<25	<25	<25	<10	1.7 J	<25	<25	<25	<25	<25	1.9 J
Dissolved Metals (0.45 micron filter):																						
Mercury	ng/L	2000	6.9	NS	1.3	-	-	-	-	0.64 B	-	-	-	-	-	0.82 B	-	-	-	-	-	0.97

Notes:
Bold - indicates value above laboratory method detection limit
 Indicates value above lowest applicable standard
 Italics - value exceeds 2A Aquatic Life and Recreation exceedance value
 - - indicates not analyzed
 <XX - Less than the laboratory method detection limit for the
 * - Standard applied when wild rice is present
 ** - 2A Aquatic Life and Recreation exceedance value based on Chromium (6+)

Acronyms:
 NS = No Standard

Standards:
 Surface Water Classification for the Chester Creek East Branch: 1B, 2A, 3B, 3C, 4A, 4B, 5, 6 per Minnesota Rule
 Surface Water Criteria accessed at: <https://www.pca.state.mn.us/sites/default/files/c-s4-01c.xls>

- (a) - based on a hardness of 180 mg/L as used in the 2012 Annual Monitoring Report. Average hardness for 2016
- (b) For chemicals or pollutants in the Class 1B (Drinking Water) column that do not have standards or criteria listed in this table, use the Maximum Contaminant Level, Health Risk Limit, or Health-Based Value in the most current version of the Summary of Drinking Water "Criteria" Table
- (e) Great Lakes Initiative (GLI) criteria for the protection of wildlife from bioaccumulative chemicals (EPA 1995). Adapted in Minn. Rules Ch. 7052. Use meant for Lake Superior watershed. Consult MPCA Environmental Assessment and Outcomes staff prior to use.
- (g) Criteria values developed by Suter and Tsao (1996) using Tier II method described in EPA's Water Quality Guidance for the Great Lakes System. Used as an ecological screening number.
- (s) Secondary Standard - Safe Drinking Water Regulations

Flags:
 B - Potential high bias due to associated blank contamination
 J - Estimated concentration
 UB - Not detected at the laboratory practical quantitation limit. Associated with blank contamination.
 UJ - Estimated reporting limit

Table 8
Surface Water Analytical Data General Parameters and Metals

Parameter	Units	Class 1B Drinking Water (b)	Class 2A Aquatic Life and Recreation	Class 3A, 3C/ 3B, 3C Industrial Consumption	MN Site Specific/GLI Criteria (e)	SW-5		SW-5 FD	SW-6	SW-6a			SW-7	SW-9		SW-10				SW-11				
						5/13/2010	10/24/2011	6/3/2016	6/3/2016	5/13/2010	10/25/2010	10/10/2012	6/3/2016	5/13/2010	10/25/2010	6/3/2016	5/13/2010	10/25/2010	10/24/2011	6/3/2016	10/25/2010	10/24/2011	10/10/2012	6/2/2016
Unfiltered																								
Alkalinity	mg/L	NS	NS	NS	NS	-	-	347	327	-	-	-	105	-	-	273	-	-	-	41.6	-	-	-	92.4
Hardness	mg/L	NS	NS	50	NS	126	269	300	296	108	144	224	131	90	271	214	31	49	93	43.5	107	126	136	110
Nitrogen, Ammonia	mg/L	NS	16	NS	NS	<0.05	-	<0.053	<0.053	<0.05	-	-	<0.053	<0.05	-	<0.053	<0.05	-	-	<0.053	-	-	-	<0.053
Nitrogen, Nitrate+Nitrite	mg/L	1	NS	NS	NS	<0.1	-	<0.019	<0.019	<0.1	-	-	0.053 J	<0.1	-	<0.019 UJ	<0.1	-	-	0.019 J	-	-	-	0.026 J
Solids, Total Dissolved	mg/L	500 (s)	NS	NS	NS	166	-	407	390	192	-	-	235	203	-	308	73	-	-	77	-	-	-	200
Solids, Total Suspended	mg/L	NS	NS	NS	NS	6.5	-	129 J	44 J	4.8	-	-	<5.0	<1	-	12	<1	-	-	<5.0	-	-	-	<5.0
Sulfate	mg/L	250 (s)	10*	NS	250	2.29	-	<1.0 UJ	<2.5 UJ	2.43	-	-	<1.0 UJ	4.00	-	<1.0 UJ	1.3	-	-	<1.0 UJ	-	-	-	<1.0
Total Metals (5 micron filter)																								
Aluminum	µg/L	50-200 (s)	87	NS	NS	352	-	4.5 J	6.2 J	<25	-	-	6.1 J	151	-	3.0 J	93.7	-	-	45.3	-	-	-	12.9
Antimony	µg/L	6	5.5	NS	NS	<0.5	-	0.094 J	0.090 J	<0.5	-	-	0.035 J	0.069 J	<0.5	-	0.063 J	-	-	0.063 J	-	-	-	0.052 J
Arsenic	µg/L	10	2	NS	NS	<1	2.36	0.37 J	0.5	<1	<1	1.3	0.24 J	<1	1.18	0.28 J	<1	<1	3.51	0.30 J	<1	<0.5	<0.5	0.23 J
Barium	µg/L	2000	NS	NS	683	19	173	27.3	27	23	39	214	28.5	12	55.2	22.2	<10	<10	239	6.4 J	21.8	26.4	64.9	21.9
Beryllium	µg/L	4	NS	NS	NS	<0.2	-	<0.030	<0.030	<0.2	-	-	<0.030	<0.2	-	<0.030	<0.2	-	-	<0.030	-	-	-	<0.030
Cadmium	µg/L	5	0.66	NS	NS	<0.2	-	<0.013	<0.013	<0.2	-	-	<0.013	<0.2	-	<0.013	<0.2	-	-	0.027 J	-	-	-	<0.013
Calcium	mg/L	NS	NS	NS	NS	29.9	66	70.8	69.6	29	38	58.1	34.7	23.2	67.2	54.9	7.66	12.2	23.1	10.6	28.6	33.1	35.7	29
Chromium**	µg/L	100	11	NS	NS	<2	-	0.43 J	0.53	<2	-	-	0.53	<2	-	0.35 J	<2	-	-	0.77	-	-	-	0.46 J
Cobalt	µg/L	NS	2.8	NS	NS	<2	-	0.63	0.64	<2	-	-	0.19 J	<2	-	1.6	<2	-	-	0.18 J	-	-	-	0.16 J
Copper	µg/L	1000 (s)	6.4	NS	NS	5.72	14.7	2.0 J	1.5 J	<2	<2	<10	<0.89	<2	4.43	0.89 J	<2	<2	17.1	1.2 J	<2	<2	<5	<0.89
Iron	µg/L	300 (s)	NS	NS	221	375	46600	141	148	429	4980	30100	627	254	13100	1300	193	334	16000	104	1940	1740	6270	243
Lead	µg/L	NS	1.3	NS	NS	<11	6.59	<0.012	0.041 J	<1	0.59	1.4	<0.012	<1	1.35	<0.012	<1	<0.5	12.9	0.037 J	<0.5	<0.5	<0.5	<0.012
Magnesium	mg/L	NS	NS	NS	NS	12.6	25.1	30	29.7	8.9	117.0	19.1	10.9	7.69	25.1	18.8	2.91	4.53	8.52	4.16	8.73	10.6	11.4	9.14
Manganese	µg/L	50 (s)	NS	NS	NS	29.3	3640	124	121	52	611	6950	160	30.6	2580	996	41	127	756	25.8	154	265	1120	57.6
Mercury	ng/L	2000	6.9	NS	1.3	3.5	213	-	-	1	1	2.4	-	2.7	8	-	3.3	2.5	88.1	-	6.5	1.3	0.6	-
Zinc	µg/L	5000 (s)	59	NS	NS	<25	41.1	1.7 J	1.5 J	<25	<25	<20	<1.4	<25	<25	<1.4	<25	<25	83.9	3.6 J	<25	<25	<10	1.4 J
Dissolved Metals (0.45 micron filter):																								
Mercury	ng/L	2000	6.9	NS	1.3	-	-	0.61 B	<0.50 UB	-	-	-	0.6 B	-	-	<0.50 UB	-	-	-	2.2	-	-	-	0.83 B

Notes:
Bold - indicates value above laboratory method detection limit
Acronyms:
Indicates value above lowest applicable standard
NS = No Standard
Italics - value exceeds 2A Aquatic Life and Recreation exceedance value
-- indicates not analyzed
<XX - Less than the laboratory method detection limit for the
* - Standard applied when wild rice is present
** - 2A Aquatic Life and Recreation exceedance value based on Chromium (6+)

Standards:
Surface Water Classification for the Chester Creek East Branch: 1B, 2A, 3B, 3C, 4A, 4B, 5, 6 per Minnesota Rule
Surface Water Criteria accessed at: <https://www.pca.state.mn.us/sites/default/files/c-s4-01c.xls>

(a) - based on a hardness of 180 mg/L as used in the 2012 Annual Monitoring Report. Average hardness for 2016

(b) For chemicals or pollutants in the Class 1B (Drinking Water) column that do not have standards or criteria listed in this table, use the Maximum Contaminant Level, Health Risk Limit, or Health-Based Value in the most current version of the Summary of Drinking Water "Criteria" Table

(c) Great Lakes Initiative (GLI) criteria for the protection of wildlife from bioaccumulative chemicals (EPA 1995). Adapted in Minn. Rules Ch. 7052. Use meant for Lake Superior watershed. Consult MPCA Environmental Assessment and Outcomes staff prior to use.

(g) Criteria values developed by Suter and Tsao (1996) using Tier II method described in EPA's Water Quality Guidance for the Great Lakes System. Used as an ecological screening number.

(s) Secondary Standard - Safe Drinking Water Regulations

Flags:
B - Potential high bias due to associated blank contamination
J - Estimated concentration
UB - Not detected at the laboratory practical quantitation limit. Associated with blank contaminator
UJ - Estimated reporting limit

Table 8
Surface Water Analytical Data General Parameters and Metals

Parameter	Units	Class 1B Drinking Water (b)	Class 2A Aquatic Life and Recreation	Class 3A, 3C/ 3B, 3C Industrial Consumption	MN Site Specific/GLI Criteria (e)	SW-12			SW-13			
						10/24/2011	10/10/2012	6/3/2016	11/14/2011	10/10/2012	10/10/2012	6/3/2016
<i>Unfiltered</i>												
Alkalinity	mg/L	NS	NS	NS	NS			193				194
Hardness	mg/L	NS	NS	50	NS	265	274	211	209	280	277	212
Nitrogen, Ammonia	mg/L	NS	16	NS	NS	-	-	0.24	-	-	-	0.24
Nitrogen, Nitrate+Nitrite	mg/L	1	NS	NS	NS	-	-	<0.019 UJ	-	-	-	<0.019 UJ
Solids, Total Dissolved	mg/L	500 (s)	NS	NS	NS	-	-	348	-	-	-	353
Solids, Total Suspended	mg/L	NS	NS	NS	NS	-	-	19	-	-	-	12
Sulfate	mg/L	250 (s)	10*	NS	250	-	-	<1.0 UJ	-	-	-	<1.0 UJ
<i>Total Metals (5 micron filter)</i>												
Aluminum	µg/L	50-200 (s)	87	NS	NS	-	-	10.7	-	-	-	9.3 J
Antimony	µg/L	6	5.5	NS	NS	-	-	0.068 J	-	-	-	0.066 J
Arsenic	µg/L	10	2	NS	NS	<0.5	0.78	0.30 J	<0.5	0.68	<0.5	0.29 J
Barium	µg/L	2000	NS	NS	683	89	180	109	82	148	147	114
Beryllium	µg/L	4	NS	NS	NS	-	-	<0.030	-	-	-	<0.030
Cadmium	µg/L	5	0.66	NS	NS	-	-	<0.013	-	-	-	<0.013
Calcium	mg/L	NS	NS	NS	NS	70	72	58.8	56	74.2	73	59.4
Chromium**	µg/L	100	11	NS	NS	-	-	0.50 J	-	-	-	0.62
Cobalt	µg/L	NS	2.8	NS	NS	-	-	0.64	-	-	-	0.66
Copper	µg/L	1000 (s)	6.4	NS	NS	<2	<5	0.99 J	<5	<5	<5	<0.89
Iron	µg/L	300 (s)	NS	NS	221	1820	2150	2150	4960	14500	14300	1980
Lead	µg/L	NS	1.3	NS	NS	1.44	17.9	1.1	10.9	8.4	8.2	1.2
Magnesium	mg/L	NS	NS	NS	NS	20	22.8	15.5	16.8	23	22.7	15.5
Manganese	µg/L	50 (s)	NS	NS	NS	165	608	910	522	617	609	1090
Mercury	ng/L	2000	6.9	NS	1.3	0.7	7.2	-	3.5	5.3	3.9	-
Zinc	µg/L	5000 (s)	59	NS	NS	<25	26.5	2.2 J	<25	13.4	11.4	2.6 J
<i>Dissolved Metals (0.45 micron filter):</i>												
Mercury	ng/L	2000	6.9	NS	1.3	-	-	0.57 B	-	-	-	0.64 B

Notes:

- Bold** - indicates value above laboratory method detection limit
 Indicates value above lowest applicable standard
 Italics - value exceeds 2A Aquatic Life and Recreation exceedance value
 - - indicates not analyzed
 <XX - Less than the laboratory method detection limit for the
 * - Standard applied when wild rice is present
 ** - 2A Aquatic Life and Recreation exceedance value based on Chromium (6+)
- Acronyms:**
 NS = No Standard

Standards:

Surface Water Classification for the Chester Creek East Branch: 1B, 2A, 3B, 3C, 4A, 4B, 5, 6 per Minnesota Rule
 Surface Water Criteria accessed at: <https://www.pca.state.mn.us/sites/default/files/c-s4-01c.xls>

(a) - based on a hardness of 180 mg/L as used in the 2012 Annual Monitoring Report. Average hardness for 2016

(b) For chemicals or pollutants in the Class 1B (Drinking Water) column that do not have standards or criteria listed in this table, use the Maximum Contaminant Level, Health Risk Limit, or Health-Based Value in the most current version of the Summary of Drinking Water "Criteria" Table

(e) Great Lakes Initiative (GLI) criteria for the protection of wildlife from bioaccumulative chemicals (EPA 1995). Adapted in Minn. Rules Ch. 7052. Use meant for Lake Superior watershed. Consult MPCA Environmental Assessment and Outcomes staff prior to use.

(g) Criteria values developed by Suter and Tsao (1996) using Tier II method described in EPA's Water Quality Guidance for the Great Lakes System. Used as an ecological screening number.

(s) Secondary Standard - Safe Drinking Water Regulations

Flags:

- B - Potential high bias due to associated blank contamination
 J - Estimated concentration
 UB - Not detected at the laboratory practical quantitation limit. Associated with blank contaminator
 UJ - Estimated reporting limit

Table 9
Surface Water Analytical Data Organic Parameters

Parameter	Units	Class 1B Drinking Water (b)	Class 2A Aquatic Life and Recreation	Class 3A, 3C/ 3B, 3C Industrial Consumption	MN Site Specific/GLI Criteria (e)	SW-2						SW-3					
						5/13/2010	10/25/2010	5/19/2011	10/24/2011	10/10/2012	6/3/2016	5/13/2010	5/13/2010	10/25/2010	10/24/2011	10/10/2012	6/3/2016
Fuels:																	
DRO	mg/L	NS	NS	NS	NS	<0.08	-	<0.09	-	-	0.13	<0.08	-	<0.09	-	-	0.10 J
GRO	mg/L	NS	NS	NS	NS	<0.04	-	-	-	-	-	<0.04	-	<0.04	-	-	-
Volatile Organic Compounds:																	
1,2,4-Trimethylbenzene	µg/L	NS	NS	NS	NS	<1	<1	<1	ND	<1	<0.068	<1	<1	<1	ND	<1	<0.068
1,3,5-Trimethylbenzene	µg/L	100	NS	NS	NS	<1	<1	<1	ND	<1	<0.042	<1	<1	<1	ND	<1	<0.042
1,3-Dichlorobenzene	µg/L	NS	NS	NS	NS						<0.085						0.10 J
1,4-Dichlorobenzene	µg/L	10	NS	NS	NS	<0.5	<0.5	<0.5	ND	<1	<1.0 UJ	<0.5	<0.5	<0.5	ND	<1	<1.0 UB
Benzene	µg/L	2	5.1	NS	NS	<0.5	<0.5	<0.5	ND	<1	<0.042	<0.5	<0.5	<0.5	ND	<1	<1.0 UB
Bromodichloromethane	µg/L	6	NS	NS	NS	<0.5	<0.5	<0.5	ND	<1	<0.068	<0.5	<0.5	<0.5	ND	<1	<0.068
Chlorobenzene	µg/L	100	20	NS	NS	<1	<1	<1	ND	<1	<0.066	<1	<1	<1	ND	<1	<0.066
Chloromethane	µg/L	NS	NS	NS	NS	ND	ND	<1	1.1 J	<4.0	<0.080	ND	ND	ND	ND	<4.0	<0.080
Dibromochloromethane	µg/L	10	NS	NS	NS	<1	<1	<1	ND	<1	<4.0 UJ	<1	<1	<1	ND	<1	<0.048
Dichlorofluoromethane	µg/L	NS	NS	NS	NS	<0.5	<0.5	<0.5	ND	<1	<1.0 UJ	<0.5	<0.5	<0.5	ND	<1	<0.054
Ethyl Ether	µg/L	NS	NS	NS	NS	<2	<2	<2	ND	<4	<0.090	<2	<2	<2	ND	<4	<0.090
Isopropylbenzene	µg/L	300	NS	NS	NS	<1	<1	<1	ND	<1	<0.064	<1	<1	<1	ND	<1	<0.064
Naphthalene	µg/L	70	81	NS	NS	<1	<1	<1	ND	<4	<0.064	<1	<1	<1	ND	<4	<4.0 UB
n-Propylbenzene	µg/L	NS	NS	NS	NS	<1	<1	<1	ND	<1	<0.049	<1	<1	<1	ND	<1	<0.049
Toluene	µg/L	1000	253	NS	NS	<1	<1	<1	0.46 J	<1	0.17 J	<1	<1	<1	ND	<1	0.25 J
Xylene, Total	µg/L	10000	166	NS	NS	<1	<1	<1	ND	<2	<0.15	<1	<1	<1	ND	<2	<0.15

Notes:

Bold - indicates concentration above laboratory method detection limit
 Indicates exceedance of Lowest Applicable Drinking Water Standard
Italics - indicates concentration exceeds 2A Aquatic Life and Recreation exceedance value
 - = not analyzed
 <XX - Less than the laboratory method detection limit for the 2016 data set
 Blank = historical data. Either not detected or not analyzed.

Acronyms:

ND: Non-Detect
 NS = No Standard

Flags:

J - Estimated concentration
 UB - Not detected at the laboratory practical quantitation limit. Associated with blank contamination at a similar concentration.

Standards:

Surface Water Classification for the Chester Creek East Branch: 1B, 2A, 3B, 3C, 4A, 4B, 5, 6 per Minnesota Rule chapter 7050.0470
 Surface Water Criteria accessed at: <https://www.pca.state.mn.us/sites/default/files/c-s4-01c.xls>

(b) For chemicals or pollutants in the Class 1B (Drinking Water) column that do not have standards or criteria listed in this table, use the Maximum Contaminant Level, Health Risk Limit, or Health-Based Value in the most current version of the Summary of Drinking Water "Criteria" Table
 (c) Great Lakes Initiative (GLI) criteria for the protection of wildlife from bioaccumulative chemicals (EPA 1995). Adapted in Minn. Rules Ch. 7052. Use meant for Lake Superior watershed. Consult MPCA

Table 9
Surface Water Analytical Data Organic Parameters

Parameter	Units	Class 1B Drinking Water (b)	Class 2A Aquatic Life and Recreation	Class 3A, 3C/ 3B, 3C Industrial Consumption	MN Site Specific/GLI Criteria (e)	SW-4						SW-5			SW-6	SW-6a				SW-7	SW-9		
						5/13/2010	10/25/2010	10/25/2010	10/24/2011	10/24/2011	6/1/2016	5/13/2010	10/24/2011	6/3/2016	5/13/2010	10/25/2010	10/24/2011	10/10/2012	6/3/2016	5/13/2010	10/25/2010	6/3/2016	5/13/2010
Fuels:																							
DRO	mg/L	NS	NS	NS	NS	<0.08	-	-	-	-	0.062 J	<0.08	-	0.15	<0.08	-	-	-	0.056 J	<0.08	-	0.12	<0.08
GRO	mg/L	NS	NS	NS	NS	<0.04	-	-	-	-	-	<0.04	-	-	<0.04	-	-	-	-	<0.04	-	-	<0.04
Volatile Organic Compounds:																							
1,2,4-Trimethylbenzene	µg/L	NS	NS	NS	NS	<1	<1	<1	<0.068	ND	0.24 J	<1	ND	<0.068	<1	<1	ND	<1	<0.068	<1	<1	<0.068	<1
1,3,5-Trimethylbenzene	µg/L	100	NS	NS	NS	<1	<1	<1	ND	ND	0.087 J	<1	ND	<0.042	<1	<1	ND	<1	<0.042	<1	<1	<0.042	<1
1,3-Dichlorobenzene	µg/L	NS	NS	NS	NS						<0.085			<0.085					<0.085			<0.085	
1,4-Dichlorobenzene	µg/L	10	NS	NS	NS	<0.5	<0.5	<0.5	ND	ND	<0.081	<0.5	ND	<0.081	<0.5	<0.5	ND	<1	<0.081	<0.5	<0.5	<0.081	<0.5
Benzene	µg/L	2	5.1	NS	NS	<0.5	<0.5	<0.5	ND	ND	<1.0 UB	<0.5	ND	<1.0 UB	<0.5	<0.5	ND	<1	<1.0 UB	<0.5	<0.5	<1.0 UB	<0.5
Bromodichloromethane	µg/L	6	NS	NS	NS	<0.5	<0.5	<0.5	ND	ND	<0.068	<0.5	ND	<0.068	<0.5	<0.5	ND	<1	<0.068	<0.5	<0.5	<0.068	<0.5
Chlorobenzene	µg/L	100	20	NS	NS	<1	<1	<1	ND	ND	<0.066	<1	ND	<0.066	<1	<1	ND	<1	<0.066	<1	<1	<0.066	<1
Chloromethane	µg/L	NS	NS	NS	NS	ND	ND	ND	16 J	0.99 J	<0.080	ND	ND	<0.080	ND	ND	1.7 J	<4.0	<0.080	ND	ND	<0.080	ND
Dibromochloromethane	µg/L	10	NS	NS	NS	<1	<1	<1	<0.048	ND	<0.048	<1	ND	<0.048	<1	<1	ND	<1	<0.048	<1	<1	<0.048	<1
Dichlorofluoromethane	µg/L	NS	NS	NS	NS	<0.5	<0.5	<0.5	ND	ND	<0.054	<0.5	ND	<0.054	<0.5	<0.5	ND	<1	<0.054	<0.5	<0.5	<0.054	<0.5
Ethyl Ether	µg/L	NS	NS	NS	NS	<2	<2	<2	ND	ND	<0.090	<2	ND	<0.090	<2	<2	ND	<4	<0.090	<2	<2	<0.090	<2
Isopropylbenzene	µg/L	300	NS	NS	NS	<1	<1	<1	ND	ND	<0.064	<1	ND	<0.064	<1	<1	ND	<1	<0.064	<1	<1	<0.064	<1
Naphthalene	µg/L	70	81	NS	NS	<1	<1	<1	ND	ND	<4.0 UB	<1	ND	<0.064	<1	<1	ND	<4	<4.0 UB	<1	<1	<0.064	<1
n-Propylbenzene	µg/L	NS	NS	NS	NS	<1	<1	<1	ND	ND	<0.049	<1	ND	<0.049	<1	<1	ND	<1	<0.049	<1	<1	<0.049	<1
Toluene	µg/L	1000	253	NS	NS	<1	<1	<1	ND	ND	0.20 J	<1	0.4611	0.060 J	<1	<1	ND	<1	<0.059	<1	<1	0.16 J	<1
Xylene, Total	µg/L	10000	166	NS	NS	<1	<1	<1	ND	ND	<0.15	<1	ND	<0.15	<1	<1	ND	<2	<0.15	<1	<1	<0.15	<1

Notes:
Bold - indicates concentration above laboratory method detection limit
 Indicates exceedance of Lowest Applicable Drinking Water Standard
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Standards:
 Surface Water Classification for the Chester Creek East Branch: 1B, 2A, 3B, 3C, 4A, 4B, 5, 6 per Minnesota Rule chapter 7050.0470
 Surface Water Criteria accessed at: <https://www.pca.state.mn.us/sites/default/files/c-s4-01c.xls>

(b) For chemicals or pollutants in the Class 1B (Drinking Water) column that do not have standards or criteria listed in this table, use the Maximum Contaminant Level, Health Risk Limit, or Health-Based Value in the most current version of the Summary of Drinking Water "Criteria" Table
 (e) Great Lakes Initiative (GLI) criteria for the protection of wildlife from bioaccumulative chemicals (EPA 1995). Adapted in Minn. Rules Ch. 7052. Use meant for Lake Superior watershed. Consult MPCA

Table 9
Surface Water Analytical Data Organic Parameters

Parameter	Units	Class 1B Drinking Water (b)	Class 2A Aquatic Life and Recreation	Class 3A, 3C/ 3B, 3C Industrial Consumption	MN Site Specific/GLI Criteria (e)	SW-10			SW-11				SW-12			SW-13			
						10/25/2010	10/24/2011	6/3/2016	10/25/2010	10/24/2011	10/10/2012	6/2/2016	10/24/2011	10/10/2012	6/3/2016	11/12/2011	10/10/2012	10/10/2012	6/3/2016
Fuels:																			
DRO	mg/L	NS	NS	NS	NS	-	-	<0.034	-	-	-	0.065 J	-	-	0.14	-	-	-	0.13
GRO	mg/L	NS	NS	NS	NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds:																			
1,2,4-Trimethylbenzene	µg/L	NS	NS	NS	NS	<1	ND	<0.068	<1	<1	<1	1.2	ND	<1	<0.068	ND	<1	<1	<0.068
1,3,5-Trimethylbenzene	µg/L	100	NS	NS	NS	<1	ND	<0.042	<1	<1	<1	0.42 J	ND	<1	<0.042	ND	<1	<1	<0.042
1,3-Dichlorobenzene	µg/L	NS	NS	NS	NS	<1	ND	<0.085	<1	<1	<1	<0.085	ND	<1	<0.085	ND	<1	<1	<0.085
1,4-Dichlorobenzene	µg/L	10	NS	NS	NS	<0.5	ND	<0.081	<0.5	<0.5	<1	<0.081	ND	<1	<0.081	ND	<1	<1	<0.081
Benzene	µg/L	2	5.1	NS	NS	<0.5	ND	<1.0 UB	<0.5	<0.5	<1	<1.0 UB	ND	<1	<1.0 UB	ND	<1	<1	<1.0 UB
Bromodichloromethane	µg/L	6	NS	NS	NS	<0.5	ND	<0.068	<0.5	<0.5	<1	<0.068	ND	<1	<0.068	ND	<1	<1	<0.068
Chlorobenzene	µg/L	100	20	NS	NS	<1	ND	<0.066	<1	<1	<1	0.23 J	ND	<1	<0.066	ND	<1	<1	<0.066
Chloromethane	µg/L	NS	NS	NS	NS	ND	ND	<0.080	ND	ND	<4.0	<0.080	1.411	<4.0	<0.080	ND	<4.0	<4.0	<0.080
Dibromochloromethane	µg/L	10	NS	NS	NS	<1	ND	<0.048	<1	<1	<1	<0.048	ND	<1	<0.048	ND	<1	<1	<0.048
Dichlorofluoromethane	µg/L	NS	NS	NS	NS	<0.5	ND	<0.054	<0.5	<0.5	<1	<0.054	ND	<1	<0.054	ND	<1	<1	<0.054
Ethyl Ether	µg/L	NS	NS	NS	NS	<2	ND	<0.090	<2	<2	<4	<0.090	ND	<4	<0.090	ND	<4	<4	<0.090
Isopropylbenzene	µg/L	300	NS	NS	NS	<1	ND	<0.064	<1	<1	<1	<0.064	ND	<1	<0.064	ND	<1	<1	<0.064
Naphthalene	µg/L	70	81	NS	NS	<1	ND	<0.064	<1	<1	<4	1.4 J	ND	<4	<0.064	ND	<4	<4	<4.0 UB
n-Propylbenzene	µg/L	NS	NS	NS	NS	<1	ND	<0.049	<1	<1	<1	0.077 J	ND	<1	<0.049	ND	<1	<1	<0.049
Toluene	µg/L	1000	253	NS	NS	<1	ND	<0.059	<1	<1	<1	<0.059	ND	<1	<0.059	ND	<1	<1	0.12 J
Xylene, Total	µg/L	10000	166	NS	NS	<1	ND	<0.15	<1	<1	<2	<0.15	ND	<2	<0.15	ND	<2	<2	<0.15

Notes:

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Standards:

Surface Water Classification for the Chester Creek East Branch: 1B, 2A, 3B, 3C, 4A, 4B, 5, 6 per Minnesota Rule chapter 7050.0470
 Surface Water Criteria accessed at: <https://www.pca.state.mn.us/sites/default/files/c-s4-01c.xls>

(b) For chemicals or pollutants in the Class 1B (Drinking Water) column that do not have standards or criteria listed in this table, use the Maximum Contaminant Level, Health Risk Limit, or Health-Based Value in the most current version of the Summary of Drinking Water "Criteria" Table
 (e) Great Lakes Initiative (GLI) criteria for the protection of wildlife from bioaccumulative chemicals (EPA 1995). Adapted in Minn. Rules Ch. 7052. Use meant for Lake Superior watershed. Consult MPCA

Table 10
Seep Analytical Data
General Parameters and Metals

Parameter	Units	Class 1B Drinking Water (b)	Class 2A Aquatic Life and Recreation	Class 3A, 3C/ 3B, 3C Industrial Consumption	MN Site Specific/GLI Criteria (e)	Seep 1		Seep 2		Seep 3		Seep 4				Seep 4 FD
						5/21/2008	6/3/2016	5/21/2008	6/3/2016	5/21/2008	6/3/2016	5/21/2008	5/19/2011	5/16/2012	6/6/2016	6/6/2016
General Chemistry:																
Alkalinity, Total	mg/L	NS	NS	NS	NS	249	-	123	-	113	-	566	287	138	-	-
Chloride	mg/L	250 (s)	230	50	NS	3.3	-	2.1	-	2.1	-	17.3	-	-	-	-
Hardness	mg/L	NS	NS	50	NS	502	429	113	139	129	164	623	225	132	463	471
Phosphorus	mg/L	NS	NS	NS	NS	1.61	-	<0.1	-	<0.1	-	0.8	-	-	-	-
Solids, Total Dissolved	mg/L	500 (s)	NS	NS	NS	272	-	165	-	173	-	556	-	-	-	-
Solids, Total Suspended	mg/L	NS	NS	NS	NS	24900	-	20.4	-	8.4	-	846	-	-	-	-
Sulfate	mg/L	250 (s)	10*	NS	250 / -	64	-	22.7	-	29.8	-	15.8	-	-	-	-
Total Metals (5 micron filter)																
Aluminum	µg/L	50-200 (s)	87	NS	NS	20300	2140	345	29.2	196	6.5 J	795	-	-	15.6	25.8 J
Antimony	µg/L	6	5.5	NS	NS	<200	0.15 J	<10	<0.032	<10	<0.032	<20	-	-	0.12J	0.094 J
Arsenic	µg/L	10	2	NS	NS	<2	2	<2	0.25 J	<2	0.34 J	<2	<0.5	<.5	6	6.7
Barium	µg/L	2000	NS	NS	683	2240	72.1	39	10.7	38	20	1790	244	74	364	378
Beryllium	µg/L	4	NS	NS	NS	1.53	0.18 J	<0.2	<0.030	<0.2	0.038 J	<0.2	-	-	<0.030	<0.030
Cadmium, GF	µg/L	5.00	0.66	NS	NS	3.67	0.17	<0.2	0.024 J	<0.2	0.035 J	0.53	-	-	0.023J	0.015 J
Calcium	mg/L	NS	NS	NS	NS	171.0	115.0	30.5	36.6	34.9	45.8	178.0	60.5	34.4	11.1	113.0
Chromium, GF**	µg/L	100	11	NS	NS	<10	2.9	<2	0.48 J	<2	0.52	<4	-	-	1.9	2
Cobalt	µg/L	NS	2.8	NS	NS	35	4.6	5.47	0.62	8.47	1.3	7.97	-	-	28.5	28.9
Copper	µg/L	1000 (s)	6.4	NS	NS	359	20.7	15.6	4.2 J	18.9	3.2 J	23.6	<2	<5	1.2J	1.8 J
Iron	mg/L	0.3	NS	NS	0.221	1380	6.37	1.56	0.14	0.97	1.35	296	6.23	0.91	85	89
Lead, GF	µg/L	NS	1.3	NS	NS	261	5.8	<1	0.056 J	<1	0.039 J	9.6	<0.5	<0.5	0.076J	0.11
Magnesium	mg/L	NS	NS	NS	NS	18.5	34.6	8.9	11.6	10.2	12.2	43.7	17.5	11.2	45.5	46.0
Manganese	mg/L	0.050 (S)	NS	NS	NS	3.38	3.95	0.687	0.233	0.664	0.667	1.54	0.573	0.0272	2.24	2.28
Mercury, Low Level	µg/L	2	0.0069	NS	0.0013	0.65	-	<0.2	-	<0.2	-	<0.2	-	-	-	-
Zinc	µg/L	5000 (s)	59	NS	NS	640	38.8	<25	6.1 J	27.2	2.3 J	99.3	<25	11.5	5.0J	6.8 J

Notes:

Bold - indicates value above laboratory method detection limit

Indicates value above lowest applicable standard

Italics - value exceeds 2A Aquatic Life and Recreation exceedance value

-- indicates not analyzed

<XX - Less than the laboratory method detection limit for the 2016

* - Standard currently under revision

** - 2A Aquatic Life and Recreation exceedance value based on Chromium (6+)

Acronyms:

NS = No Standard

Standards:

Surface Water Classification for the Chester Creek East Branch: 1B, 2A, 3B, 3C, 4A, 4B, 5, 6 per Minnesota Rule chapter

Surface Water Criteria accessed at: <https://www.pca.state.mn.us/sites/default/files/c-s4-01c.xls>

(a) - based on a hardness of 180 mg/L as used in the 2012 Annual Monitoring Report.

(b) For chemicals or pollutants in the Class 1B (Drinking Water) column that do not have standards or criteria listed in this table, use the Maximum Contaminant Level, Health Risk Limit, or Health-Based Value in the most current version of the Summary of Drinking Water "Criteria" Table

(e) Great Lakes Initiative (GLI) criteria for the protection of wildlife from bioaccumulative chemicals (EPA 1995).

Adapted in Minn. Rules Ch. 7052. Use meant for Lake Superior watershed. Consult MPCA Environmental Assessment and Outcomes staff prior to use.

(g) Criteria values developed by Suter and Tsao (1996) using Tier II method described in EPA's Water Quality Guidance for the Great Lakes System. Used as an ecological screening number.

Table 10
Seep Analytical Data
General Parameters and Metals

Parameter	Units	Class 1B Drinking Water (b)	Class 2A Aquatic Life and Recreatio	Class 3A, 3C/ 3B, 3C Industrial Consumption	MN Site Specific/GLI Criteria (e)	Seep 5				Seep 6			Seep 7		
						5/21/2008	5/19/2011	5/16/2012	6/6/2016	5/19/2011	5/16/2012	6/6/2016	5/19/2011	5/16/2012	6/6/2016
<i>General Chemistry:</i>															
Alkalinity, Total	mg/L	NS	NS	NS	NS	151	177	129	-	520	682	-	632	493	-
Chloride	mg/L	250 (s)	230	50	NS	66.1	-	-	-	-	-	-	-	-	-
Hardness	mg/L	NS	NS	50	NS	175	238	322	269	427	637	458	440	401	415
Phosphorus	mg/L	NS	NS	NS	NS	0.31	-	-	-	-	-	-	-	-	-
Solids, Total Dissolved	mg/L	500 (s)	NS	NS	NS	304	-	-	-	-	-	-	-	-	-
Solids, Total Suspended	mg/L	NS	NS	NS	NS	114	-	-	-	-	-	-	-	-	-
Sulfate	mg/L	250 (s)	10*	NS	250 / -	18.7	-	-	-	-	-	-	-	-	-
<i>Total Metals (5 micron filter)</i>															
Aluminum	µg/L	50-200 (s)	87	NS	NS	88.4	-	-	30.2	-	-	133	-	-	17.9
Antimony	µg/L	6	5.5	NS	NS	<10	-	-	0.077 J	-	-	0.11 J	-	-	0.11 J
Arsenic	µg/L	10	2	NS	NS	3.3	<0.5	13.1	0.33 J	36.8	11.2	4.00	9.85	15.9	1.9
Barium	µg/L	2000	NS	NS	683	112	184	957	254	1010	612	275	5670	1080	236
Beryllium	µg/L	4	NS	NS	NS	<0.2	-	-	<0.030	-	-	0.083 J	-	-	0.033 J
Cadmium, GF	µg/L	5.00	0.66	NS	NS	0.41	-	-	0.045 J	-	-	0.099	-	-	0.040 J
Calcium	mg/L	NS	NS	NS	NS	51.7	68.6	98.9	76.0	122.0	155.0	128.0	118.0	92.3	121
Chromium, GF**	µg/L	100	11	NS	NS	<2	-	-	0.91	-	-	1.8	-	-	1.4
Cobalt	µg/L	NS	2.8	NS	NS	<2	-	-	0.52	-	-	20.5	-	-	14.6
Copper	µg/L	1000 (s)	6.4	NS	NS	8.76	6.09	25	4.3 J	47.6	<20	2.4 J	21.1	28.1	1.4 J
Iron	mg/L	0.3	NS	NS	0.221	7.65	16.1	345	12.4	234	940	56.6	302	840	31.5
Lead, GF	µg/L	NS	1.3	NS	NS	50.4	80.9	1110	35.9	10.5	10.9	0.27	9.19	25.4	0.10
Magnesium	mg/L	NS	NS	NS	NS	11.2	16.1	18.3	19.2	29.8	60.4	33.5	35.4	41.3	27.7
Manganese	mg/L	0.050 (S)	NS	NS	NS	0.402	0.512	0.725	0.678	5.3	2.6	5.35	0.543	0.336	5.88
Mercurcy, Low Level	µg/L	2	0.0069	NS	0.0013	<0.2	-	-	-	-	-	-	-	-	-
Zinc	µg/L	5000 (s)	59	NS	NS	<25	32.6	300	7.9 J	11.5	63.9	7.4 J	131	103	3.3 J

Notes:

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Italics - value exceeds 2A Aquatic Life and Recreation exceedance value

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** - 2A Aquatic Life and Recreation exceedance value based on Chromium (6+)

Acronyms:

NS = No Standard

Standards:

Surface Water Classification for the Chester Creek East Branch: 1B, 2A, 3B, 3C, 4A, 4B, 5, 6 per Minnesota Rule chapter

Surface Water Criteria accessed at: <https://www.pca.state.mn.us/sites/default/files/c-s4-01c.xls>

(a) - based on a hardness of 180 mg/L as used in the 2012 Annual Monitoring Report.

(b) For chemicals or pollutants in the Class 1B (Drinking Water) column that do not have standards or criteria listed in this table, use the Maximum Contaminant Level, Health Risk Limit, or Health-Based Value in the most current version of the Summary of Drinking Water "Criteria" Table

(e) Great Lakes Initiative (GLI) criteria for the protection of wildlife from bioaccumulative chemicals (EPA 1995).

Adapted in Minn. Rules Ch. 7052. Use meant for Lake Superior watershed. Consult MPCA Environmental Assessment and Outcomes staff prior to use.

(g) Criteria values developed by Suter and Tsao (1996) using Tier II method described in EPA's Water Quality Guidance for the Great Lakes System. Used as an ecological screening number.

Table 11
Organic Compounds Detected in Seep Samples

Parameter	Units	Class 1B Drinking Water (b)	Class 2A Chronic (CS)	Class 3A, 3C/ 3B, 3C Industrial Consumption	MN Site Specific/GL I Criteria (e)	EPA Tier II Secondary (g)	Seep 1		Seep 2		Seep 3		Seep 4				Seep 4 FD	Seep 5				Seep 6			Seep 7				
							5/21/2008	6/3/2016	5/21/2008	6/3/2016	5/21/2008	6/3/2016	5/21/2008	5/19/2011	5/16/2012	6/6/2016		6/6/2016	5/21/2008	5/19/2011	5/16/2012	6/6/2016	5/19/2011	5/16/2012	6/6/2016	5/19/2011	5/16/2012	5/6/2016	
Fuels:																													
Diesel Range Organics (DRO)	mg/L	NS	NS	NS	NS	NS	0.2	0.22 B	<0.1	0.13 B	<0.1	0.17 B	0.2	0.14	0.14	1.0 J	1.4 J	<0.1	<0.09	0.23	0.14 B	0.3778	0.34	0.73	0.7378	NA	0.65		
Gasoline Range Organics (GRO)	mg/L	NS	NS	NS	NS	NS	<0.1	-	<0.1	-	<0.1	-	0.1	NA	NA	-	-	<0.1	NA	NA	-	NA	NA	-	NA	NA	-		
Volatile Organic Compounds:																													
1,2,4-Trimethylbenzene	µg/L	100	NS	NS	NS	NS	1.7	<0.068	ND	<0.068	ND	<0.068	3	<1	ND	20.5	19.9	ND	<1	ND	0.17 J	19	8.4	1.1	30	12	1.0		
1,2-Dichlorobenzene	µg/L	600	NS	NS	NS	NS	14	<0.078	ND	<0.078	ND	<0.078	0.26 J	0.23 J							<0.078			<0.078			<0.078		
1,3,5-Trimethylbenzene	µg/L	100	NS	NS	NS	NS	NS	ND	<0.042	ND	<0.042	ND	<0.042	ND	<1	ND	3.6	3.7	ND	<1	ND	<0.042	3	1.5	0.27 J	6.5	2.4	0.28 J	
1,4-Dichlorobenzene	µg/L	75	NS	NS	NS	NS	15	71	1.5	<0.081	ND	<0.081	ND	<0.081	2.6	<0.1	ND	1.6	1.6	ND	<0.1	ND	0.10 J	<0.1	ND	0.10 J	4	2.5	<0.081
2-Butanone (MEK)	µg/L	NS	NS	NS	NS	NS	14000		3.2 J		<1.1		<1.1				2.1 J	1.9 J							2.1 J		1.3 J		
Acetone	µg/L	NS	NS	NS	NS	NS	1500		14.9 J		<20.0 UB		<20.0 UB				<20.0 UB	<20.0 UB				<20.0 UB			<20.0 UB		<20.0 UB		
Benzene	µg/L	2	9.7	NS	NS	NS	NS	ND	<0.042	ND	<0.042	ND	<0.042	1.5	<0.5	ND	5.8	5.8	ND	<0.5	ND	0.28 J	2.3	2.6	2.6	8	6.3	0.53 J	
Chlorobenzene	µg/L	100	20	NS	NS	NS	NS	ND	<0.066	ND	<0.066	ND	<0.066	4.4	<1	ND	3.4	3.5	ND	<1	ND	0.27 J	<1	ND	0.83 J	15	11.3	0.15 J	
Chloromethane	µg/L	NS	NS	NS	NS	NS	NS	1.7	<0.080	ND	<0.080	ND	<0.080	ND	<1	ND	<0.080	<0.080	ND	<1	ND	<0.080	<1	ND	<0.080	<1	ND	<0.080	
cis-1,2-Dichloroethylene	µg/L	70	NS	NS	NS	NS	NS	590	ND	<0.12	ND	<0.12	ND	<0.5	ND	<0.12	<0.12	ND	<0.5	ND	<0.12	<0.5	ND	<0.12	<0.5	ND	<0.12		
Ethyl Ether	µg/L	200	NS	NS	NS	NS	NS	ND	<0.090	ND	<0.090	ND	<0.090	ND	<2	ND	0.69 J	0.56 J	ND	<2	ND	<0.090	<2	ND	0.53 J	<2	ND	0.18 J	
Isopropylbenzene	µg/L	300	NS	NS	NS	NS	NS	1	<0.064	ND	<0.064	ND	<0.064	1.1	<1	ND	1.4	1.4	ND	<1	ND	<0.064	<1	ND	0.30 J	2.6	1.5	0.23 J	
Methyl Isobutyl Ketone	µg/L	300	NS	NS	NS	NS	NS	ND	<0.80	ND	<0.80	ND	<0.80	ND	<5	ND	<0.80	<0.80	ND	<5	ND	<0.80	<5	ND	<0.80	<5	ND	<0.80	
Methylene Chloride	µg/L	5	45	NS	NS	NS	NS	ND	<0.097	ND	<0.097	ND	<0.097	ND	<1	ND	<0.097	<0.097	ND	<1	ND	<0.097	<1	ND	<0.097	<1	ND	<0.097	
Naphthalene	µg/L	70	81	NS	NS	NS	NS	3.6	0.082 J	ND	<0.064	ND	<0.064	ND	<1	ND	<4.0 UB	<4.0 UB	ND	<1	ND	<4.0 UB	1.3	ND	<4.0 UB	7.5	ND	<4.0 UB	
n-Propylbenzene	µg/L	NS	NS	NS	NS	NS	NS	ND	<0.049	ND	<0.049	ND	<0.049	ND	<1	ND	0.89 J	0.93 J	ND	<1	ND	<0.049	<1	ND	0.11 J	2.1	1	<0.049	
p-Isopropyltoluene	µg/L	NS	NS	NS	NS	NS	NS		0.41 J		<0.064		<0.064				0.064	0.064				<0.064			<0.064		<0.064		
sec-Butylbenzene	µg/L	NS	NS	NS	NS	NS	NS	ND	<0.094	ND	<0.094	ND	<0.094	ND	<1	ND	0.18 J	<0.094	ND	<1	ND	<0.094	<1	ND	<0.094	<1	ND	<0.094	
tert-Butylbenzene	µg/L	NS	NS	NS	NS	NS	NS		<0.051		<0.051		<0.051				0.066 J	<0.051				<0.051			<0.051		<0.051		
Toluene	µg/L	1000	253	NS	NS	NS	NS	ND	0.067 J	ND	<0.059	ND	0.58 J	ND	<1	ND	1.2	1.3	ND	<1	ND	0.067 J	1.3	6.4	1.3	<1	ND	1.6	
Trichloroethene	µg/L	0.4	25	NS	NS	NS	NS		<0.051		<0.051		<0.051				<0.051	<0.051				<0.051			<0.051		<0.051		
Vinyl Chloride	µg/L	2	0.17	NS	NS	NS	NS	ND	<0.084	ND	<0.084	ND	<0.084	ND	<0.5	ND	<0.084	<0.084	ND	<0.5	ND	<0.084	<0.5	ND	<0.084	<0.5	ND	<0.084	
Xylene (Total)	µg/L	10000	166	NS	NS	NS	NS	ND	<0.15	ND	<0.15	ND	<0.15	ND	<1	ND	<0.15	<0.15	ND	<1	ND	<0.15	<1	ND	<0.15	5.4	3	<0.15	

Notes:

Bold = detected value
Bold and Shaded = values above lowest applicable standard
 - = not analyzed
 Blank = historical data. Either not detected or not analyzed.
 <XX - Less than the laboratory method detection limit for the 2016 data set

Acronyms:

ND: Non-Detect
 NS = No Standard

Flags:

B - Potential high bias due to associated blank contamination
 J - Estimated concentration
 UB - Not detected at the laboratory practical quantitation limit. Associated with blank

Standards:

Surface Water Classification for the Chester Creek East Branch: 1B, 2A, 3B, 3C, 4A, 4B, 5, 6 per Minnesota Rule chapter 7050.0470
 Surface Water Criteria accessed at: <https://www.pca.state.mn.us/sites/default/files/c-s4-01c.xls>

(b) For chemicals or pollutants in the Class 1B (Drinking Water) column that do not have standards or criteria listed in this table, use the Maximum Contaminant Level, Health Risk Limit, or Health-Based Value in the most current version of the Summary of Drinking Water "Criteria" Table.
 (e) Great Lakes Initiative (GLI) criteria for the protection of wildlife from bioaccumulative chemicals (EPA 1995). Adapted from Minn. Rules Ch. 7052. Use meant for Lake Superior
 (g) Criteria values developed by Suter and Tsao (1996) using Tier II method described in EPA's Water Quality Guidance for the Great Lakes System. Used as an ecological screening

Table 12
Residential Well Information

Well	Unique Number	Address	Distance (ft) / Direction	Casing Diameter (ft)	Screen Depth (ft)	Well Depth (ft)	Depth to Water (ft)
RW-1	1E+09	3844 Norton Rd	1500 N	4	No information	No information	No information
RW-2	1E+09	3902 Norton Rd	1600 N	5	No information	18	No information
RW-3	1E+09	3946 Norton Rd	1700 NW	Unknown	No information	55	10 ft
RW-10	NA	4402 Rice Lake Rd	750 SE	.5 (both wells)	No information	two 400-foot wells tapped together	No information
RW-11 (North Well)	NA	Rice Lake Rd	1500 SE		open hole 60-65 ft	No information	40
RW-12 (South Well)	NA	Rice Lake Rd	1500 SE	0.5	open hole to 311 ft	No information	30
RW-15	1E+09	4510 Rice Lake Rd	1500 NW	No information	10-30	No information	No information
RW-17	1E+09	4514 Rice Lake Rd	2000 NNW	0.5	50	50	No information

Table 13
Residential Well Analytical Data
General Parameters and Metals

Parameter	Units	Lowest Applicable Drinking Water Standard	Standard Source	RW-1					RW-2					RW-3					
				10/25/2010	10/24/2011	10/10/2012	10/29/2019	11/18/2020	5/16/2012	10/10/2012	6/6/2016	10/29/2019	11/18/2020	10/25/2010	10/24/2011	10/10/2012	6/6/2016	10/29/2020	11/18/2020
General Chemistry:																			
Alkalinity, Total	mg/L	NS	--	86.5	95.2	80.3	-	-	76.5	91.6	92	-	-	139	137	144	146	-	-
Chloride	mg/l	250	SDWR	0.72	0.65	0.68	-	-	165	83.4	47.7	-	-	2.25	2.6	2.5	4	-	-
Hardness	mg/L	NS	--	-	-	-	-	-	-	-	110	-	-	-	-	-	137	-	-
Nitrogen, Ammonia	mg/L	30	LHA	<0.05	<0.1	<0.10	-	-	<0.1	0.11	-	-	-	<0.05	<0.1	0.14	-	-	-
Nitrogen, Nitrate+Nitrite	mg/L	10, 1	HRL, MCL	0.88	0.6	0.46	-	-	1.1	0.51	0.73	-	-	<0.1	<0.1	<0.10	<0.019	-	-
Phosphorus, Total	mg/L	NS	--	<0.1	<0.1	<0.1	-	-	<0.1	<0.10	-	-	-	<0.1	<0.1	<0.10	-	-	-
Metals:																			
Aluminum	ug/L	50-200	SDWR	-	-	-	-	-	-	-	4.7 J	-	-	-	-	-	7.8 J	-	-
Antimony	ug/L	6	HRL	-	-	-	-	-	-	-	<0.032	-	-	-	-	-	<0.032	-	-
Arsenic	ug/L	10	MCL	<1	1.41	<0.5	-	-	<0.5	0.52	0.44 J	-	-	2.12	2	1.9	2.2	-	-
Barium	ug/L	2000	HRL	<10	<10	<10	-	-	29.6	21.8	18.1	-	-	23	22.2	22.8	25.4	-	-
Beryllium	ug/L	0.08	HRL	-	-	-	-	-	-	-	<0.030	-	-	-	-	-	<0.030	-	-
Cadmium	ug/L	0.5	HRL	-	-	-	-	-	-	-	0.025 J	-	-	-	-	-	<0.013	-	-
Calcium	mg/L	NS	NS	-	-	-	-	-	-	-	27.8	-	-	-	-	-	32	-	-
Chromium	ug/L	100	MCL	-	-	1.5	-	-	-	-	1.5	-	-	-	-	-	0.35 J	-	-
Cobalt	ug/L	NS	--	-	-	-	-	-	-	-	0.053 J	-	-	-	-	-	0.033 J	-	-
Copper	ug/L	1300	TT	7.51	4.89	6.8	-	-	45.2	131	253	-	-	12.8	<2	11.9	4.3 J	-	-
Iron	ug/L	300	SDWR	<50	<50	<50	-	-	69.3	248	<18.0	-	-	90.2	60.3	63.2	69.3	-	-
Lead	ug/L	15	TT	<0.5	<0.5	<0.50	-	-	0.91	0.96	0.59	-	-	1.22	<0.5	0.64	0.33	-	-
Magnesium	mg/L	NS	--	-	-	-	-	-	-	-	9.9	-	-	-	-	-	13.7	-	-
Manganese	ug/L	50	SDWR	<10	<10	<10	-	-	<10.0	12.5	0.69 J	-	-	48.2	47	49	49.8	-	-
Zinc	ug/L	2000	HRL	<25	<25	<10	-	-	10.4	18.3	13.8 J	-	-	<25	<25	<10	1.9 J	-	-
PFC:																			
Perfluorobutanesulfonate (PFBS)	ug/L	2	HBV	-	-	-	<0.050	<0.015	-	-	-	<0.050	<0.015	-	-	-	-	<0.050	<0.015
Perfluorobutanoic acid (PFBA)	ug/L	7	HRL	-	-	-	<0.050	<0.015	-	-	-	<0.050	<0.015	-	-	-	-	<0.050	<0.015
Perfluorohexanesulfonate (PFHxS)	ug/L	0.047	HBV	-	-	-	<0.025	<0.015	-	-	-	<0.025	<0.015	-	-	-	-	<0.025	<0.015
Perfluorohexanoic acid (PFHxA)	ug/L	NS	--	-	-	-	<0.050	<0.015	-	-	-	<0.050	<0.015	-	-	-	-	<0.050	<0.015
Perfluorooctanesulfonate (PFOS)	ug/L	0.015	HBV	-	-	-	<0.015	<0.015	-	-	-	<0.015	<0.015	-	-	-	-	<0.015	<0.015
Perfluorooctanoic acid (PFOA)	ug/L	0.035	HRL	-	-	-	<0.035	<0.015	-	-	-	<0.035	<0.015	-	-	-	-	<0.035	<0.015
Perfluoropentanoic acid (PFPeA)	ug/L	NS	--	-	-	-	<0.050	<0.015	-	-	-	<0.050	<0.015	-	-	-	-	<0.050	<0.015
Dioxane:																			
1, 4-Dioxane	ug/L	1	HRL	-	-	-	<0.28	0.36	-	-	-	<0.25	<0.24	-	-	-	-	<0.26	0.43

Table 13
Residential Well Analytical Data
General Parameters and Metals

Parameter	Units	Lowest Applicable Drinking Water Standard	Standard Source	RW-15							RW-17					
				10/25/2010	10/25/2010	10/24/2011	10/24/2011	10/10/2012	6/6/2016	10/29/2020	11/18/2020	10/25/2010	10/24/2011	10/10/2012	11/4/2020	11/18/2020
General Chemistry:																
Alkalinity, Total	mg/L	NS	--	109	124	126	125	215	253	-	-	312	302	288	-	-
Chloride	mg/l	250	SDWR	302	339	377	377	522	466	-	-	67.4	56.3	54.4	-	-
Hardness	mg/L	NS	--	-	-	-	-	-	629	-	-	-	-	-	-	-
Nitrogen, Ammonia	mg/L	30	LHA	<0.05	<0.05	<0.1	<0.1	0.1	-	-	-	1.62	1.63	2.0	-	-
Nitrogen, Nitrate+Nitrite	mg/L	10, 1	HRL, MCL	0.62	0.67	0.87	0.89	0.75	0.44	-	-	0.14	0.15	<0.10	-	-
Phosphorus, Total	mg/L	NS	--	<0.1	<0.1	<0.1	<0.1	<0.10	-	-	-	0.14	0.13	0.14	-	-
Metals:																
Aluminum	ug/L	50-200	SDWR	-	-	-	-	-	2.2 J	-	-	-	-	-	-	-
Antimony	ug/L	6	HRL	-	-	-	-	-	<0.032	-	-	-	-	-	-	-
Arsenic	ug/L	10	MCL	<1	<1	<0.5	<0.5	<0.50	0.19 J	-	-	3.66	2.15	1.9	-	-
Barium	ug/L	2000	HRL	61.8	75.2	76.2	76.6	121	124	-	-	81.3	74.9	71.8	-	-
Beryllium	ug/L	0.08	HRL	-	-	-	-	-	<0.030	-	-	-	-	-	-	-
Cadmium	ug/L	0.5	HRL	-	-	-	-	-	0.1	-	-	-	-	-	-	-
Calcium	mg/L	NS	NS	-	-	-	-	-	171	-	-	-	-	-	-	-
Chromium	ug/L	100	MCL	-	-	-	-	-	0.61	-	-	-	-	-	-	-
Cobalt	ug/L	NS	--	-	-	-	-	-	0.064 J	-	-	-	-	-	-	-
Copper	ug/L	1300	TT	115	7.65	13.4	17.2	23.1	5.2 J	-	-	61.9	31	20.9	-	-
Iron	ug/L	300	SDWR	345	312	186	232	1490	38.1 J	-	-	25600	22300	20400	-	-
Lead	ug/L	15	TT	0.74	<0.5	0.99	1.48	1.0	0.094 J	-	-	7.59	5.41	4.3	-	-
Magnesium	mg/L	NS	--	-	-	-	-	-	49.2	-	-	-	-	-	-	-
Manganese	ug/L	50	SDWR	<10	<10	<10	<10	32.7	64.8	-	-	8400	7800	7610	-	-
Zinc	ug/L	2000	HRL	<25	<25	<25	<25	30.1	18.4 J	-	-	54.5	26.6	23.3	-	-
PFC:																
Perfluorobutanesulfonate (PFBS)	ug/L	2	HBV	-	-	-	-	-	-	<0.050	<0.015	-	-	-	<0.050	<0.015
Perfluorobutanoic acid (PFBA)	ug/L	7	HRL	-	-	-	-	-	-	<0.050	0.005	-	-	-	<0.050	<0.015
Perfluorohexanesulfonate (PFHxS)	ug/L	0.047	HBV	-	-	-	-	-	-	<0.025	<0.015	-	-	-	<0.025	<0.015
Perfluorohexanoic acid (PFHxA)	ug/L	NS	--	-	-	-	-	-	-	<0.050	<0.015	-	-	-	<0.050	<0.015
Perfluorooctanesulfonate (PFOS)	ug/L	0.015	HBV	-	-	-	-	-	-	<0.015	<0.015	-	-	-	<0.015	<0.015
Perfluorooctanoic acid (PFOA)	ug/L	0.035	HRL	-	-	-	-	-	-	<0.035	<0.015	-	-	-	<0.035	<0.015
Perfluoropentanoic acid (PFPeA)	ug/L	NS	--	-	-	-	-	-	-	<0.050	<0.015	-	-	-	<0.050	<0.015
Dioxane:																
1, 4-Dioxane	ug/L	1	HRL	-	-	-	-	-	-	<0.25	<0.25	-	-	-	0.44	0.54/0.57

Table 14
Residential Well Analytical Data Organic Parameters

Parameter	Units	Lowest Applicable Drinking Water Standard	Standard Source	RW-1				RW-2			RW-3				RW-15						RW-17			
				10/25/2010	10/24/2011	5/16/2012	10/10/2012	5/16/2012	10/10/2012	6/6/2016	10/25/2010	10/24/2011	10/10/2012	6/6/2016	10/25/2010	10/25/2010	10/24/2011	10/24/2011	10/10/2012	6/6/2016	10/25/2010	10/24/2011	10/10/2012	
Fuels:																								
Diesel Range Organics (DRO)	mg/L	NS	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Gasoline Range Organics (GRO)	mg/L	NS	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Volatile Organic Compounds:																								
1,2,4-Trimethylbenzene	µg/L	100	RAA	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<0.068	<1	<1.0	<1.0	<0.068	<1	<1	<1.0	<1.0	<1.0	0.18 J	<1	<1.0	<1.0	
1,3,5-Trimethylbenzene	µg/L	100	HRL	<1	<1.0	<1	<1.0	<1.0	<1.0	<0.042	<1	<1.0	<1.0	<0.042	<1	<1	<1.0	<1.0	<1.0	<1.0	<0.042	<1	<1.0	<1.0
1,4-Dichlorobenzene	µg/L	10	HRL	<0.5	<1.0	<1	<1.0	<1.0	<1.0	<0.081	<0.5	<1.0	<1.0	<0.081	<0.5	<0.5	<1.0	<1.0	<1.0	<1.0	<0.081	<0.5	<1.0	<1.0
Benzene	µg/L	2	HRL	<0.5	<1.0	<1	<1.0	<1.0	<1.0	<0.042	<0.5	<1.0	<1.0	<0.042	<0.5	<0.5	<1.0	<1.0	<1.0	<1.0	<0.042	<0.5	<1.0	<1.0
Bromodichloromethane	µg/L	6	HRL	<0.5	<1.0	<1	<1.0	<1.0	<1.0	<0.068	<0.5	<1.0	<1.0	<0.068	<0.5	<0.5	<1.0	<1.0	<1.0	<1.0	<0.068	<0.5	<1.0	<1.0
Chlorobenzene	µg/L	100	HRL	<1	<1.0	<1	<1.0	<1.0	<1.0	<0.066	<1	<1.0	<1.0	<0.066	<1	<1	<1.0	<1.0	<1.0	<1.0	<0.066	<1	<1.0	<1.0
Chloroform	µg/L	30	HRL	<1	<1.0	<1	<1.0	<1.0	<1.0	<0.21	<1	<1.0	<1.0	<0.21	<1	<1	<1.0	<1.0	<1.0	<1.0	<0.21	8.1	<1.0	<1.0
Chloromethane	µg/L	NS	--	<1	<4.0	<4.0	<4.0	<4.0	<4.0	<0.080	<1	<4.0	<4.0	<0.080	<1	<1	<4.0	0.90 J	<4.0	<0.080	<4.0	0.95 J	<4.0	<4.0
cis-1,2-Dichloroethylene	µg/L	6	HBV	<0.5	<1.0	<1	<1.0	<1.0	<1.0	<0.12	<0.5	<1.0	<1.0	<0.12	<0.5	<0.5	<1.0	<1.0	<1.0	<1.0	<0.12	<0.5	<1.0	<1.0
Dibromochloromethane	µg/L	10	HRL	<1	<4.0	<1	<1.0	<1.0	<1.0	<0.048	<1	<4.0	<1.0	<0.048	<1	<1	<4.0	<4.0	<1.0	<1.0	<0.048	<1	<4.0	<1.0
Dichlorofluoromethane	µg/L	30	RAA	<0.5	<1.0	<1	<1.0	<1.0	<1.0	<0.054	<0.5	<1.0	<1.0	<0.054	<0.5	<0.5	<1.0	<1.0	<1.0	<1.0	<0.054	<0.5	<1.0	<1.0
Ethyl Ether	µg/L	200	RAA	<2	<4.0	<4	<4.0	<4.0	<4.0	<0.090	<2	<4.0	<4.0	<0.090	<2	<2	<4.0	<4.0	<4.0	<4.0	<0.090	<2	<4.0	<4.0
Isopropylbenzene	µg/L	300	HRL	<1	<1.0	<1	<1.0	<1.0	<1.0	<0.064	<1	<1.0	<1.0	<0.064	<1	<1	<1.0	<1.0	<1.0	<1.0	<0.064	<1	<1.0	<1.0
Methylene Chloride	µg/L	5	HRL	<1	<10.0	<4	<4.0	<4.0	<4.0	<0.097	<1	<10.0	<4.0	<0.097	<1	<1	<10.0	<10.0	<4.0	<4.0	<0.097	<1	<10.0	<4.0
m-phthalene	µg/L	70	HRL	<1	<4.0	<4	<4.0	<4.0	<4.0	<0.064	<1	<4.0	<4.0	<0.064	<1	<1	<4.0	<4.0	<4.0	<4.0	<0.064	<1	<4.0	<4.0
n-Propylbenzene	µg/L	NS	--	<1	<1.0	<1	<1.0	<1.0	<1.0	<0.049	<1	<1.0	<1.0	<0.049	<1	<1	<1.0	<1.0	<1.0	<1.0	<0.049	<1	<1.0	<1.0
Toluene	µg/L	200	HRL	<1	<1.0	<1	<1.0	<1.0	<1.0	<0.059	<1	<1.0	<1.0	<0.059	<1	<1	<1.0	<1.0	<1.0	<1.0	<0.059	<1	<1.0	<1.0
Vinyl Chloride	µg/L	0.2	HRL	<0.5	<0.40	<0.4	<0.4	<0.4	<0.4	<0.084	<0.5	<0.40	<0.4	<0.084	<0.5	<0.5	<0.40	<0.40	<0.4	<0.4	<0.084	<0.5	<0.40	<0.4
Xylene, M&P	µg/L	300	HRL	<1	<2.0	<2.0	<2.0	<2.0	<2.0	<0.15	<1	<2.0	<2.0	<0.15	<1	<1	<2.0	<2.0	<2.0	<2.0	<0.15	<1	<2.0	<2.0

Notes:
Bold = detected value
 - = not analyzed
 <XX - Less than the laboratory method detection limit for the 2016 data

Acronyms:
 HBV = Health Based Value
 HRL = Health Risk Limit
 NS = No Standard
 RAA = Risk Assessment Advice

Flags:
 J - Estimated concentration
 UB - Not detected at the laboratory practical quantitation limit.
 Associated with blank contamination at a similar concentration.

Table 15
Landfill Gas Monitoring Results

Location ID	Date	Methane %	Carbon Monoxide ppm	Oxygen %	Balance %	Adj. Gas Temp °F	Adj. Static Pressure Inches H ₂ O	Adj. Diff Press. Inches H ₂ O	Barom. Press. Inches Hg
Vent-1	10/26/2011	55.6	--	--	--	--	--	--	--
	1/15/2012	54.1	--	--	--	--	--	--	--
	4/4/2012	58.7	--	--	--	--	--	--	--
	6/22/2012	60.2	--	--	--	--	--	--	--
	9/5/2012	40.8	--	--	--	--	--	--	--
	12/5/2012	52	--	--	--	--	--	--	--
	6/3/2016	23.1	0.0	9.5	61.1	58	NA	NA	28.48
	9/28/2018	2.1	0.0	20.1	76.1	ND	NA	NA	28.57
	2/1/2019	3.6	0.0	19.6	77.8	ND	NA	NA	30.09
	1/16/2020	0.3	0.6	23.5	75.6	ND	12.69	-8.774	29.1
	6/2/2020	1.8	0.9	18.7	78.7	NA	NA	NA	28.38
	11/18/2020	33.3	7.5	11.0	48.0	NA	-0.0	-0.002	28.30
4/27/2021	0.7	0.4	21.2	77.7	NA	-0.0	0.030	28.40	
Vent-2	10/26/2011	36.3	--	--	--	--	--	--	--
	1/15/2012	22.5	--	--	--	--	--	--	--
	4/4/2012	18.4	--	--	--	--	--	--	--
	6/22/2012	3	--	--	--	--	--	--	--
	9/5/2012	38.7	--	--	--	--	--	--	--
	12/5/2012	26.4	--	--	--	--	--	--	--
	6/3/2016	22.7	0.0	0.8	60.9	56	NA	NA	28.48
	9/28/2018	15.1	0.0	13.8	63.2	ND	NA	NA	28.57
	2/1/2019	10.7	0.0	12.9	60.0	ND	NA	NA	30.09
	1/16/2020	15.0	16.2	3.1	65.7	0	12.68	-8.646	29.1
	6/2/2020	0.0	0.0	20.4	78.7	NA	NA	NA	28.38
	11/18/2020	26.0	21.3	0.0	52.7	NA	-0.0	0.005	28.30
4/27/2021	30.7	17.4	0.5	51.4	NA	-0.0	0.023	28.40	
Vent-3	10/26/2011	29	--	--	--	--	--	--	--
	1/15/2012	23.9	--	--	--	--	--	--	--
	4/4/2012	37.8	--	--	--	--	--	--	--
	6/22/2012	14.9	--	--	--	--	--	--	--
	9/5/2012	27.7	--	--	--	--	--	--	--
	12/5/2012	23.7	--	--	--	--	--	--	--
	6/3/2016	15.3	0.0	8.0	69.5	57	NA	NA	28.47
	9/28/2018	1.9	0.0	20.5	76.1	ND	NA	NA	28.57
	2/1/2019	2.4	0.0	19.4	74.6	ND	NA	NA	30.09
	1/16/2020	0.7	0.8	25.0	73.5	0	12.05	-8.822	29.12
	6/2/2020	6.9	1.1	18.0	74.8	NA	NA	NA	28.38
	11/18/2020	23.1	6.8	12.2	57.9	NA	-0.1	0.224	28.30
4/27/2021	2.0	0.8	21.0	76.2	NA	-0.0	-0.006	28.40	

Table 15
Landfill Gas Monitoring Results

Location ID	Date	Methane %	Carbon Monoxide ppm	Oxygen %	Balance %	Adj. Gas Temp °F	Adj. Static Pressure Inches H ₂ O	Adj. Diff Press. Inches H ₂ O	Barom. Press. Inches Hg
Vent-4	10/26/2011	66.8	--	--	--	--	--	--	--
	1/15/2012	28.6	--	--	--	--	--	--	--
	4/4/2012	48.2	--	--	--	--	--	--	--
	6/22/2012	46.9	--	--	--	--	--	--	--
	9/5/2012	2.5	--	--	--	--	--	--	--
	12/5/2012	2.1	--	--	--	--	--	--	--
	6/3/2016	17.4	0.0	11.0	63.6	57	NA	NA	28.47
	9/28/2018	5.1	0.0	18.3	72.3	ND	NA	NA	28.57
	2/1/2019	6.2	0.0	17.8	72.1	ND	NA	NA	30.09
	1/16/2020	0.2	0.9	24.2	74.7	0	12.01	-8.822	29.12
	6/2/2020	12.7	5.5	13.1	67.9	NA	NA	NA	28.38
	11/18/2020	46.6	14.7	4.0	34.7	NA	-0.0	0.020	28.30
4/27/2021	1.9	2.3	19.0	76.8	NM	-0.0	0.007	28.40	

Table 15
Landfill Gas Monitoring Results

Location ID	Date	Methane %	Carbon Monoxide ppm	Oxygen %	Balance %	Adj. Gas Temp °F	Adj. Static Pressure Inches H ₂ O	Adj. Diff Press. Inches H ₂ O	Barom. Press. Inches Hg
Vent-5	10/26/2011	55	--	--	--	--	--	--	--
	1/15/2012	30.3	--	--	--	--	--	--	--
	4/4/2012	26.2	--	--	--	--	--	--	--
	6/22/2012	15.8	--	--	--	--	--	--	--
	9/5/2012	42.6	--	--	--	--	--	--	--
	12/5/2012	40.1	--	--	--	--	--	--	--
	6/3/2016	24.1	0.0	3.2	61.7	56	NA	NA	28.47
	9/28/2018	0.0	0.0	22.0	78.0	ND	NA	NA	28.57
	2/1/2019	0.3	0.0	21.2	75.5	ND	NA	NA	30.09
	1/16/2020	0.2	0.5	24.2	75.2	0	12.12	-8.812	29.12
	6/2/2020	19.1	4.0	13.3	64.5	NA	NA	NA	28.38
	11/18/2020	47.3	16.0	6.1	40.6	NA	-0.0	0.018	28.30
4/27/2021	0.0	0.1	22.2	77.7	NA	-0.0	0.013	28.40	
Vent-6	10/26/2011	39.1	--	--	--	--	--	--	--
	1/15/2012	26	--	--	--	--	--	--	--
	4/4/2012	51.9	--	--	--	--	--	--	--
	6/22/2012	29.8	--	--	--	--	--	--	--
	9/5/2012	39.7	--	--	--	--	--	--	--
	12/5/2012	16.4	--	--	--	--	--	--	--
	6/3/2016	30.3	0.0	5.1	52.8	55	NA	NA	28.47
	9/28/2018	1.8	0.0	21.2	76.6	ND	NA	NA	28.57
	2/1/2019	2.1	0.0	11.7	77.4	ND	NA	NA	30.09
	1/16/2020	0.2	0.3	24.5	75	0	11.98	-8.82	29.12
	6/2/2020	5.0	2.1	16.4	76.4	NA	NA	NA	28.38
	11/18/2020	69.4	15.9	0.0	14.7	NA	-0.0	0.010	28.30
4/27/2021	19.3	4.7	14.5	61.5	NA	0.0	0.031	28.40	
Vent-7	10/26/2011	2.8	--	--	--	--	--	--	--
	1/15/2012	10.3	--	--	--	--	--	--	--
	4/4/2012	2.8	--	--	--	--	--	--	--
	6/22/2012	9.9	--	--	--	--	--	--	--
	9/5/2012	2.7	--	--	--	--	--	--	--
	12/5/2012	18.9	--	--	--	--	--	--	--
	6/3/2016	0.1	0.0	17.1	80.6	56	NA	NA	28.53
	9/28/2018	0.0	0.0	12.4	81.4	ND	NA	NA	28.57
	2/1/2019	0.3	0.0	19.1	81.2	ND	NA	NA	30.09
	1/16/2020	0.2	1.2	23.9	74.4	0	11.97	-3.815	29.12
	6/2/2020	0.0	3.6	13.1	83.5	NA	NA	NA	28.38
	11/18/2020	4.3	4.3	11.1	80.3	NA	-0.0	-0.006	28.30
4/27/2021	0.4	0.5	21.0	78.1	NA	-0.0	0.009	28.40	

Table 15
Landfill Gas Monitoring Results

Location ID	Date	Methane %	Carbon Monoxide ppm	Oxygen %	Balance %	Adj. Gas Temp °F	Adj. Static Pressure Inches H ₂ O	Adj. Diff Press. Inches H ₂ O	Barom. Press. Inches Hg
Vent-8	10/26/2011	6.9	--	--	--	--	--	--	--
	1/15/2012	5.9	--	--	--	--	--	--	--
	4/4/2012	13.1	--	--	--	--	--	--	--
	6/22/2012	2.4	--	--	--	--	--	--	--
	9/5/2012	4.7	--	--	--	--	--	--	--
	12/5/2012	2.3	--	--	--	--	--	--	--
	6/3/2016	0.0	0.0	18.5	80.4	56	NA	NA	28.53
	9/28/2018	0.4	0.0	19.9	78.1	ND	NA	NA	28.57
	2/1/2019	0.9	0.0	10.9	79.6	ND	NA	NA	30.09
	1/16/2020	0.2	0.3	24.6	74.9	0	11.91	-8.834	29.12
	6/2/2020	0.0	0.4	19.4	80.1	NA	NA	NA	5
	11/18/2020	23.4	10.9	4.6	61.1	NA	-0.0	-0.005	28.30
4/27/2021	0.1	0.3	22.2	77.4	NA	-0.0	0.024	28.40	
Note: System is not under pressure (i.e., it is not mechanically ventilated)									

Table 16
Landfill Soil Gas Probes

Location ID	Date	Time	Methane %	Methane LEL	Carbon Monoxide %	Oxygen %	Balance %	Baro. Press. Inches Hg
VP-1	5/3/2017	945	4.1	86	0.0	0.7	90.1	28.51
VP-2	5/3/2017	1050	1.2	21	0.0	15.4	82.7	28.51
VP-3	5/3/2017	1145	3.9	78	0.0	18.4	76.5	28.5
VP-4	5/3/2017	1235	0.1	3	0.0	8.9	81.7	28.46
The above four points were set as temporary points and abandoned after use the same day								
VMP-1	9/28/2018		0.0	ND	0.0	12.5	82.8	28.66
	2/1/2019		4.3	82	0.0	1.0	89.9	30.09
	1/16/2020	1245	0.0	ND	4.9	8.8	86.3	29.12
	11/18/2020	0815	0.0	ND	4.3	1.8	93.9	28.24
VMP-2	4/27/2021		0.0	ND	1.5	14.5	84	28.4
	9/28/2018		0.8	ND	2.6	5.0	80.6	28.68
	2/1/2019		1.4	74	0.0	16.2	81.6	30.09
	1/16/2020	1285	0.1	ND	7.0	4.6	88.3	29.12
VMP-3	11/18/2020	1257	0.0	ND	13.1	4.7	82.1	28.38
	4/27/2021		0.0	ND	2.0	20.4	77.6	28.40
	9/28/2018		0.0	ND	2.0	13.2	82.1	28.69
	2/1/2019		3.7	76	0.0	17.9	76.7	30.09
VMP-4	1/16/2020	1311	0.1	ND	0.2	23.2	76.5	29.12
	11/18/2020	1248	4.0	ND	13.5	4.4	78.1	28.38
	4/27/2021		0.0	ND	11.5	3.1	85.4	28.40
	9/28/2018		0.1	ND	4.0	6.5	84.2	28.71
VMP-5	2/1/2019		0.0	2	0.0	9.4	81.3	30.09
	1/16/2020	1321	0.1	ND	0.2	23.6	76.1	29.12
	11/18/2020	1235	0.0	ND	10.4	8.8	80.8	28.39
	4/27/2021		0.0	ND	2.7	18.2	79.1	28.40
VMP-6	1/16/2020	1205	0.1	ND	0.7	20.1	79.0	29.12
	11/19/2020	0825	0.0	ND	0.1	22.1	77.8	28.24
	4/27/2021		0.0	ND	0.0	22.0	78.0	28.40
VMP-7	1/16/2020		No data - City of Duluth plowed snow over VMP					
	11/19/2020	0837	9.7	ND	7.4	13.0	69.9	28.24
	4/27/2021		0.0	ND	0.1	21.5	78.4	28.40
VMP-8	1/16/2020	1556	0.1	ND	0.1	22.9	76.9	29.12
	11/19/2020	0846	0.0	ND	0.8	21.7	77.5	28.24
	4/27/2021		0.0	ND	0.2	22.0	77.8	28.40
VMP-9	1/16/2020	1545	0.1	ND	0.3	23.6	76	29.15
	11/19/2020	0851	0.0	ND	1.1	21.3	77.6	28.24
	4/27/2021		0.0	ND	1.1	21.2	77.7	28.40
VMP-10	1/16/2020	1529	0.1	ND	0.2	24.2	75.5	29.15
	11/19/2020	0856	0.0	ND	1.1	21.3	77.6	28.24
	4/27/2021		0.0	ND	0.1	22.1	77.8	28.40
VMP-11	1/16/2020	1317	0.0	ND	0.2	23.9	75.6	29.15
	11/19/2020	0900	0.0	ND	0.6	21.7	77.7	28.24
	4/27/2021		0.0	ND	0.1	22.1	77.8	28.4
VMP-12	1/16/2020	1506	0.1	ND	0.2	23.8	76	29.15
	11/19/2020	0906	0.0	ND	1.2	20.7	78.1	28.24
	4/27/2021		0.0	ND	0.1	22.4	77.5	28.40
VMP-12	1/16/2020	1459	0.1	ND	0.1	22.9	76.9	29.15
	11/19/2020	0911	0.0	ND	4.1	16.5	79.4	28.24
	4/27/2021		0.0	ND	0.1	22.3	77.6	28.40

Table 16
Landfill Soil Gas Probes

Location ID	Date	Time	Methane %	Methane LEL	Carbon Monoxide %	Oxygen %	Balance %	Baro. Press. Inches Hg
VP-1	9/28/2018		2.3	ND	0.0	1.4	83.1	28.62
VP-2	9/28/2018		0.0	ND	0.0	21.3	78.7	28.62
VP-3	9/28/2018		2.0	ND	0.0	4.7	86.4	28.62
VP-4	9/28/2018		11.1	ND	0.0	9.4	73.3	28.62
VP-5	9/28/2018		13.5	ND	0.0	14.5	68.1	28.62
VP-6	9/28/2018		5.1	ND	0.0	0.1	82.7	28.63
VP-7	9/28/2018		0.3	ND	0.0		78.7	28.63
VP-8	9/28/2018		0.0	ND	0.0	17.1	79	28.63
VP-9	9/28/2018		0.0	ND	0.0	18	81.3	28.63
VP-10	9/28/2018	No data - water pulled into sampling hoses						

Sample ID	2019 Residential	2019 Residential	VMP-1		VMP-2	
			Date	Intrusion Screening	33X ISV	1/16/2020
PID (ppm)			0.1	0.0	0.1	0.0
Compounds			Result	Result	Result	Result
1,1,1-Trichloroethane	5,200	170,000	<1.6	<1.7	<1.5	<1.7
1,1,2,2-Tetrachloroethane	NA	NA	<1.0	<1.0	<0.94	<1.0
1,1,2-Trichloroethane	0.21	7.0	<0.80	<0.83	<0.74	<0.83
1,1,2-Trichlorotrifluoroethane	5,200	170,000	<2.2	<2.3	<2.1	<2.3
1,1-Dichloroethane	NA	NA	<1.2	<1.2	<1.1	<1.2
1,1-Dichloroethene	210	7,000	<1.2	<1.2	<1.1	<1.2
1,2,4-Trichlorobenzene	2.1	70	<10.9	<11.2	<10.1	<11.2
1,2,4-Trimethylbenzene	63	2,100	<1.4	<1.5	<1.3	<1.5
1,2-Dibromoethane (EDB)	0.017	0.6	<1.1	<1.2	<1.0	<1.2
1,2-Dichlorobenzene	NA	NA	<1.8	<1.8	<1.6	<1.8
1,2-Dichloroethane	0.39	13	<0.59	<0.61	<0.55	<0.61
1,2-Dichloropropane	2.7	90	<1.4	<1.4	<1.3	<1.4
1,3,5-Trimethylbenzene	63	2,100	<1.4	<1.5	<1.3	<1.5
1,3-Butadiene	0	9	<0.65	<0.67	<0.60	<0.67
1,3-Dichlorobenzene	NA	NA	<1.8	<1.8	<1.6	<1.8
1,4-Dichlorobenzene	63	2,100	<4.4	<4.6	<4.1	<4.6
2-Butanone (MEK)	5,200	170,000	<4.3	<4.5	<4.0	<4.5
2-Hexanone	31	1,000	<6.0	<6.2	<5.6	<6.2
2-Propanol	210	7,000	<3.6	<3.7	<3.4	<3.7
4-Ethyltoluene	NA	NA	<3.6	<3.7	<3.4	<3.7
4-Methyl-2-pentanone (MIBK)	3,100	100,000	<6.0	<6.2	<5.6	<6.2
Acetone	32,000	1,100,000	7.1	21.8	<3.2	22.2
Benzene	4.6	150	<0.47	<0.48	<0.44	<0.48
Benzyl chloride	0.2	7	<3.8	<3.9	<3.5	<3.9
Bromodichloromethane	21	700	<2.0	<2.0	<1.8	<2.0
Bromoform	NA	NA	<7.6	<7.8	<7.0	<7.8
Bromomethane	5.2	170	<1.1	<1.2	<1.1	<1.2
Carbon disulfide	830	28,000	<0.91	1.1	<0.85	1.2
Carbon tetrachloride	1.7	57	<1.8	<1.9	<1.7	<1.9
Chlorobenzene	52	1,700	<1.3	<1.4	<1.3	<1.4
Chloroethane	4,200	140,000	<0.77	<0.80	<0.72	<0.80
Chloroform	100	3,300	<0.71	<0.74	<0.66	<0.74
Chloromethane	94	3,100	<0.60	0.75	<0.56	<0.63
Cyclohexane	6,300	210,000	<2.5	<2.6	<2.3	<2.6
Dibromochloromethane	NA	NA	<6.2	<2.6	<5.8	<2.6
Dichlorodifluoromethane	NA	NA	5.2	2.4	4.8	2.3
Dichlorotetrafluoroethane	NA	NA	2.5	<2.1	<1.9	<2.1
Ethanol	NA	NA	8.4	16.6	3.5	13.9
Ethyl acetate	73	2,400	<1.1	<1.1	<0.98	<1.1
Ethylbenzene	4.1	140	<1.3	<1.3	<1.2	<1.3
Hexachloro-1,3-butadiene	NA	NA	<7.8	<8.1	<7.3	<8.1
Methyl-tert-butyl ether	39	1,300	<5.3	<5.5	<4.9	<5.5
Methylene Chloride	NA	NA	<5.1	<5.3	<4.7	<5.3
Naphthalene	9.4	310	<3.8	<4.0	<3.6	<4.0
Propylene	3,100	100,000	<0.50	<0.52	0.53	3
Styrene	940	31,000	<1.2	<1.3	<1.2	<1.3
Tetrachloroethene	3.4	110	<0.99	<1.0	<0.92	<1.0
Tetrahydrofuran	2,100	70,000	<0.86	<0.89	<0.80	<0.89
Toluene	4,200	140,000	1.3	<1.1	1.2	1.7
Trichloroethene	2.1	70	<0.79	<0.81	<0.73	<0.81
Trichlorofluoromethane	1,000	33,000	<1.6	<1.7	<1.5	<1.7
Vinyl acetate	210	7,000	<1.0	<1.1	<0.96	<1.1
Vinyl chloride	1.7	57	<0.37	<0.39	<0.35	<0.39
cis-1,2-Dichloroethene	0.017	1	<1.2	<1.2	<1.1	<1.2
cis-1,3-Dichloropropene	2.5	83	<1.3	<1.4	<1.2	<1.4
m&p-Xylene	100	3,300	<2.5	<2.6	<2.4	<2.6
n-Heptane	420	14,000	<1.2	<1.2	<1.1	<1.2
n-Hexane	730	24,000	<1.0	<1.1	<0.96	<1.1
o-Xylene	100	3,300	<1.3	<1.3	<1.2	<1.3
trans-1,2-Dichloroethene	NA	NA	<1.2	<1.2	<1.1	<1.2
trans-1,3-Dichloropropene	NA	NA	<1.4	<1.4	<1.2	<1.5

Concentrations in ug/m3

Method 3C Fixed gases in %

BOLD type indicates lab detections

BOLD and gray highlighted cells indicate compounds detected above 2019 Residential ISVs but below the 2019 33X Residential ISVs

Result exceeds 2019 - 33x Residential ISV

NA = Not Applicable

DL= Detection Limit

Sample ID Date PID (ppm) Compounds	2019 Residential Intrusion Screening	2019 Residential 33X ISV	VMP-3		VMP-4	
			1/16/2020	5/8/2020	1/16/2020	5/8/2020
			0.1	0.0	0.1	0.0
			Result	Result	Result	Result
1,1,1-Trichloroethane	5,200	170,000	<1.5	<1.8	<1.5	<1.7
1,1,2,2-Tetrachloroethane	NA	NA	<0.94	<1.1	<0.94	<1.0
1,1,2-Trichloroethane	0.21	7.0	<0.74	<0.89	<0.74	<0.83
1,1,2-Trichlorotrifluoroethane	5,200	170,000	<2.1	<2.5	<2.1	<2.3
1,1-Dichloroethane	NA	NA	<1.1	<1.3	<1.1	<1.2
1,1-Dichloroethene	210	7,000	<1.1	<1.3	<1.1	<1.2
1,2,4-Trichlorobenzene	2.1	70	<10.1	<12.1	<10.1	<11.2
1,2,4-Trimethylbenzene	63	2,100	<1.3	<1.6	<1.3	<1.5
1,2-Dibromoethane (EDB)	0.017	0.6	<1.0	<1.3	<1.0	<1.2
1,2-Dichlorobenzene	NA	NA	<1.6	<2.0	<1.6	<1.8
1,2-Dichloroethane	0.39	13	<0.55	<0.66	<0.55	<0.61
1,2-Dichloropropane	2.7	90	<1.3	<1.5	<1.3	<1.4
1,3,5-Trimethylbenzene	63	2,100	<1.3	<1.6	<1.3	<1.5
1,3-Butadiene	0	9	<0.60	<0.72	<0.60	<0.67
1,3-Dichlorobenzene	NA	NA	<1.6	<2.0	<1.6	<1.8
1,4-Dichlorobenzene	63	2,100	<4.1	<4.9	<4.1	<4.6
2-Butanone (MEK)	5,200	170,000	<4.0	<4.8	<4.0	<4.5
2-Hexanone	31	1,000	<5.6	<6.7	<5.6	<6.2
2-Propanol	210	7,000	<3.4	<4.0	<3.4	<3.7
4-Ethyltoluene	NA	NA	<3.4	<4.0	<3.4	<3.7
4-Methyl-2-pentanone (MIBK)	3,100	100,000	<5.6	<6.7	<5.6	<6.2
Acetone	32,000	1,100,000	9.0	24.3	8.8	81.1
Benzene	4.6	150	<0.44	<0.52	<0.44	<0.48
Benzyl chloride	0.2	7	<3.5	<4.2	<3.5	<3.9
Bromodichloromethane	21	700	<1.8	<2.2	<1.8	<2.0
Bromoform	NA	NA	<7.0	<8.5	<7.0	<7.8
Bromomethane	5.2	170	<1.1	<1.3	<1.1	<1.2
Carbon disulfide	830	28,000	1.1	1.3	5.8	3.1
Carbon tetrachloride	1.7	57	<1.7	<2.1	<1.7	<1.9
Chlorobenzene	52	1,700	<1.3	<1.5	<1.3	<1.4
Chloroethane	4,200	140,000	<0.72	<0.86	<0.72	<0.80
Chloroform	100	3,300	<0.66	<0.80	<0.66	<0.74
Chloromethane	94	3,100	0.64	0.86	0.81	0.87
Cyclohexane	6,300	210,000	<2.3	<2.8	<2.3	<2.6
Dibromochloromethane	NA	NA	<5.8	<2.8	<5.8	<2.6
Dichlorodifluoromethane	NA	NA	<1.4	3.1	1120	1420
Dichlorotetrafluoroethane	NA	NA	<1.9	<2.3	<1.9	<2.1
Ethanol	NA	NA	10.5	16.2	7.8	30.8
Ethyl acetate	73	2,400	<0.98	1.3	<0.98	<1.1
Ethylbenzene	4.1	140	<1.2	<1.4	<1.2	<1.3
Hexachloro-1,3-butadiene	NA	NA	<7.3	<8.7	<7.3	<8.1
Methyl-tert-butyl ether	39	1,300	<4.9	<5.9	<4.9	<5.5
Methylene Chloride	NA	NA	<4.7	<5.7	<4.7	<5.3
Naphthalene	9.4	310	<3.6	<4.3	<3.6	<4.0
Propylene	3,100	100,000	<0.47	<0.56	<0.47	2.6
Styrene	940	31,000	<1.2	<1.4	<1.2	<1.3
Tetrachloroethene	3.4	110	<0.92	<1.1	<0.92	<1.0
Tetrahydrofuran	2,100	70,000	<0.80	<0.97	<0.80	<0.89
Toluene	4,200	140,000	1.4	<1.2	1.1	1.2
Trichloroethene	2.1	70	<0.73	<0.88	<0.73	<0.81
Trichlorofluoromethane	1,000	33,000	<1.5	<1.8	<1.5	<1.7
Vinyl acetate	210	7,000	<0.96	<1.2	<0.96	<1.1
Vinyl chloride	1.7	57	<0.35	<0.42	<0.35	<0.39
cis-1,2-Dichloroethene	0.017	1	<1.1	<1.3	<1.1	<1.2
cis-1,3-Dichloropropene	2.5	83	<1.2	<1.5	<1.2	<1.4
m&p-Xylene	100	3,300	<2.4	<2.8	<2.4	<2.6
n-Heptane	420	14,000	<1.1	<1.3	<1.1	<1.2
n-Hexane	730	24,000	<0.96	<1.2	<0.96	<1.1
o-Xylene	100	3,300	<1.2	<1.4	<1.2	<1.3
trans-1,2-Dichloroethene	NA	NA	<1.1	<1.3	<1.1	<1.2
trans-1,3-Dichloropropene	NA	NA	<1.2	<1.4	<1.2	<1.4

Concentrations in ug/m3

Method 3C Fixed gases in %

BOLD type indicates lab detections

BOLD and gray highlighted cells indicate compounds detected above 2019 Residential IS

Result exceeds 2019 - 33x Residential ISV

NA = Not Applicable

DL= Detection Limit

Sample ID Date	2019 Residential Intrusion Screening	2019 Residential 33X ISV	VMP-5		VMP-6
			1/16/2020 0.1	5/8/2020 0.0	5/8/2020 0.0
PID (ppm) Compounds			Result	Result	Result
1,1,1-Trichloroethane	5,200	170,000	<1.5	<1.7	<3.0
1,1,2,2-Tetrachloroethane	NA	NA	<0.94	<1.1	<1.9
1,1,2-Trichloroethane	0.21	7.0	<0.74	<0.86	<1.5
1,1,2-Trichlorotrifluoroethane	5,200	170,000	<2.1	<2.4	<4.2
1,1-Dichloroethane	NA	NA	<1.1	<1.3	<2.2
1,1-Dichloroethene	210	7,000	<1.1	<1.2	<2.2
1,2,4-Trichlorobenzene	2.1	70	<10.1	<11.7	<20.3
1,2,4-Trimethylbenzene	63	2,100	<1.3	<1.5	<2.7
1,2-Dibromoethane (EDB)	0.017	0.6	<1.0	<1.2	<2.1
1,2-Dichlorobenzene	NA	NA	<1.6	<1.9	<3.3
1,2-Dichloroethane	0.39	13	<0.55	<0.64	<1.1
1,2-Dichloropropane	2.7	90	<1.3	<1.5	<2.5
1,3,5-Trimethylbenzene	63	2,100	<1.3	<1.5	<2.7
1,3-Butadiene	0	9	<0.60	<0.70	<1.2
1,3-Dichlorobenzene	NA	NA	<1.6	<1.9	<3.3
1,4-Dichlorobenzene	63	2,100	<4.1	<4.7	<8.2
2-Butanone (MEK)	5,200	170,000	<4.0	<4.6	<8.1
2-Hexanone	31	1,000	<5.6	<6.4	<11.2
2-Propanol	210	7,000	<3.4	<3.9	<6.7
4-Ethyltoluene	NA	NA	<3.4	<3.9	<6.7
4-Methyl-2-pentanone (MIBK)	3,100	100,000	<5.6	<6.4	<11.2
Acetone	32,000	1,100,000	<3.2	34.1	<16.2
Benzene	4.6	150	<0.44	0.64	<0.87
Benzyl chloride	0.2	7	<3.5	<4.1	<7.1
Bromodichloromethane	21	700	<1.8	<2.1	<3.7
Bromoform	NA	NA	<7.0	<8.1	<14.1
Bromomethane	5.2	170	<1.1	<1.2	<2.1
Carbon disulfide	830	28,000	<0.85	2.2	<1.7
Carbon tetrachloride	1.7	57	<1.7	<2.0	<3.4
Chlorobenzene	52	1,700	<1.3	<1.5	<2.5
Chloroethane	4,200	140,000	<0.72	<0.83	<1.4
Chloroform	100	3,300	<0.66	<0.77	<1.3
Chloromethane	94	3,100	1.1	1.6	1.8
Cyclohexane	6,300	210,000	<2.3	<2.7	<4.7
Dibromochloromethane	NA	NA	<5.8	<2.7	<4.7
Dichlorodifluoromethane	NA	NA	2.2	2.4	<2.7
Dichlorotetrafluoroethane	NA	NA	<1.9	<2.2	<3.8
Ethanol	NA	NA	<2.6	26.3	15.1
Ethyl acetate	73	2,400	<0.98	<1.1	<2.0
Ethylbenzene	4.1	140	<1.2	<1.4	<2.4
Hexachloro-1,3-butadiene	NA	NA	<7.3	<8.4	<14.6
Methyl-tert-butyl ether	39	1,300	<4.9	<5.7	<9.8
Methylene Chloride	NA	NA	<4.7	<5.5	<9.5
Naphthalene	9.4	310	<3.6	<4.1	<7.2
Propylene	3,100	100,000	<0.47	159	<0.94
Styrene	940	31,000	<1.2	<1.3	<2.3
Tetrachloroethene	3.4	110	<0.92	<1.1	<1.9
Tetrahydrofuran	2,100	70,000	<0.80	<0.93	<1.6
Toluene	4,200	140,000	<1.0	<1.2	<2.1
Trichloroethene	2.1	70	<0.73	<0.85	<1.5
Trichlorofluoromethane	1,000	33,000	<1.5	<1.8	<3.1
Vinyl acetate	210	7,000	<0.96	<1.1	<1.9
Vinyl chloride	1.7	57	<0.35	<0.40	<0.70
cis-1,2-Dichloroethene	0.017	1	<1.1	<1.2	<2.2
cis-1,3-Dichloropropene	2.5	83	<1.2	<1.4	<2.5
m&p-Xylene	100	3,300	<2.4	<2.7	<4.8
n-Heptane	420	14,000	<1.1	<1.3	<2.2
n-Hexane	730	24,000	<0.96	4.3	<1.9
o-Xylene	100	3,300	<1.2	<1.4	<2.4
trans-1,2-Dichloroethene	NA	NA	<1.1	<1.2	<2.2
trans-1,3-Dichloropropene	NA	NA	<1.2	<2.5	<2.7

Concentrations in ug/m3

Method 3C Fixed gases in %

BOLD type indicates lab detections

BOLD and gray highlighted cells indicate compounds detected above 2019 Residential IS

Result exceeds 2019 - 33x Residential ISV

NA = Not Applicable

DL= Detection Limit

Sample ID	2019 Residential Intrusion Screening	2019 Residential 33X ISV	VMP-7		VMP-8	
			1/16/2020	5/8/2020	1/16/2020	5/8/2020
Date			0.0	0.0	0.0	0.0
PID (ppm)			Result	Result	Result	Result
Compounds						
1,1,1-Trichloroethane	5,200	170,000	<1.5	<3.2	<1.6	<1.5
1,1,2,2-Tetrachloroethane	NA	NA	<0.97	<2.0	<1.0	<0.94
1,1,2-Trichloroethane	0.21	7.0	<0.77	<1.6	<0.80	<0.74
1,1,2-Trichlorotrifluoroethane	5,200	170,000	<2.2	<4.5	<2.2	<2.1
1,1-Dichloroethane	NA	NA	<1.1	<2.4	<1.2	<1.1
1,1-Dichloroethene	210	7,000	<1.1	<2.3	<1.2	<1.1
1,2,4-Trichlorobenzene	2.1	70	<10.5	<21.7	<10.9	<10.1
1,2,4-Trimethylbenzene	63	2,100	<1.4	<2.9	<1.4	<1.3
1,2-Dibromoethane (EDB)	0.017	0.6	<1.1	<2.2	<1.1	<1.0
1,2-Dichlorobenzene	NA	NA	<1.7	<3.5	<1.8	<1.6
1,2-Dichloroethane	0.39	13	<0.57	<1.2	<0.59	<0.55
1,2-Dichloropropane	2.7	90	<1.3	<2.7	<1.4	<1.3
1,3,5-Trimethylbenzene	63	2,100	<1.4	<2.9	<1.4	<1.3
1,3-Butadiene	0	9	<0.63	<1.3	<0.65	<0.60
1,3-Dichlorobenzene	NA	NA	<1.7	<3.5	<1.8	<1.6
1,4-Dichlorobenzene	63	2,100	<4.3	<8.8	<4.4	<4.1
2-Butanone (MEK)	5,200	170,000	<4.2	<8.6	<4.3	<4.0
2-Hexanone	31	1,000	<5.8	<12.0	<6.0	<5.6
2-Propanol	210	7,000	<3.5	<7.2	<3.6	<3.4
4-Ethyltoluene	NA	NA	<3.5	<7.2	<3.6	<3.4
4-Methyl-2-pentanone (MIBK)	3,100	100,000	<5.8	<12.0	<6.0	<5.6
Acetone	32,000	1,100,000	9.5	<17.4	8.6	23.9
Benzene	4.6	150	4.3	<0.94	0.47	<0.44
Benzyl chloride	0.2	7	<3.7	<7.6	<3.8	<3.5
Bromodichloromethane	21	700	<1.9	<3.9	<2.0	<1.8
Bromoform	NA	NA	<7.3	<15.1	<7.6	<7.0
Bromomethane	5.2	170	<1.1	<2.3	<1.1	<1.1
Carbon disulfide	830	28,000	2.1	<1.8	1.2	<0.85
Carbon tetrachloride	1.7	57	<1.8	<3.7	<1.8	<1.7
Chlorobenzene	52	1,700	<1.3	<2.7	<1.3	<1.3
Chloroethane	4,200	140,000	<0.75	<1.5	<0.77	<0.72
Chloroform	100	3,300	<0.69	<1.4	<0.71	<0.66
Chloromethane	94	3,100	<0.58	1.2	1.3	0.82
Cyclohexane	6,300	210,000	<2.4	<5.0	<2.5	<2.3
Dibromochloromethane	NA	NA	<6.0	<5.0	<6.2	<2.3
Dichlorodifluoromethane	NA	NA	2.1	<2.9	2.8	2.4
Dichlorotetrafluoroethane	NA	NA	<2.0	<4.1	<2.0	<1.9
Ethanol	NA	NA	5.8	12.8	8.0	18
Ethyl acetate	73	2,400	<1.0	<2.1	<1.1	1
Ethylbenzene	4.1	140	<1.2	<2.5	<1.3	<1.2
Hexachloro-1,3-butadiene	NA	NA	<7.5	<15.6	<7.8	<7.3
Methyl-tert-butyl ether	39	1,300	<5.1	<10.5	<5.3	<4.9
Methylene Chloride	NA	NA	<4.9	29	<5.1	<4.7
Naphthalene	9.4	310	<3.7	<7.7	<3.8	<3.6
Propylene	3,100	100,000	<0.49	<1.0	2.6	3.9
Styrene	940	31,000	<1.2	<2.5	<1.2	<1.2
Tetrachloroethene	3.4	110	<0.96	<2.0	<0.99	<0.92
Tetrahydrofuran	2,100	70,000	<0.83	<1.7	<0.86	<0.80
Toluene	4,200	140,000	<1.1	4	<1.1	<1.0
Trichloroethene	2.1	70	<0.76	<1.6	<0.79	<0.73
Trichlorofluoromethane	1,000	33,000	<1.6	<3.3	<1.6	<1.5
Vinyl acetate	210	7,000	<1.0	<2.1	<1.0	<0.96
Vinyl chloride	1.7	57	<0.36	<0.75	<0.37	<0.35
cis-1,2-Dichloroethene	0.017	1	<1.1	<2.3	<1.2	<1.1
cis-1,3-Dichloropropene	2.5	83	<1.3	<2.7	<1.3	<1.2
m&p-Xylene	100	3,300	<2.5	<5.1	<2.5	<2.4
n-Heptane	420	14,000	<1.2	<2.4	<1.2	<1.1
n-Hexane	730	24,000	<1.0	14.7	<1.0	<0.96
o-Xylene	100	3,300	<1.2	<2.5	<1.3	<1.2
trans-1,2-Dichloroethene	NA	NA	<1.1	<2.3	<1.2	<1.1
trans-1,3-Dichloropropene	NA	NA	<1.3	<1.2	<1.3	<1.4

Concentrations in ug/m3

Method 3C Fixed gases in %

BOLD type indicates lab detections

BOLD and gray highlighted cells indicate compounds detected above 2019 Residential IS

Result exceeds 2019 - 33x Residential ISV

NA = Not Applicable

DL= Detection Limit

Sample ID	2019 Residential	2019 Residential	VMP-9		VMP-10	
			Date	Intrusion Screening	33X ISV	1/16/2020
PID (ppm)	5,200	170,000	0.0	0.0	0.0	0.0
Compounds	Result	Result	Result	Result	Result	Result
1,1,1-Trichloroethane	5,200	170,000	<1.7	<1.7	<1.6	<2.2
1,1,2,2-Tetrachloroethane	NA	NA	<1.0	<1.0	<1.0	<1.4
1,1,2-Trichloroethane	0.21	7.0	<0.83	<0.83	<0.80	<1.1
1,1,2-Trichlorotrifluoroethane	5,200	170,000	<2.3	<2.3	<2.2	<3.1
1,1-Dichloroethane	NA	NA	<1.2	<1.2	<1.2	<1.7
1,1-Dichloroethene	210	7,000	<1.2	<1.2	<1.2	<1.6
1,2,4-Trichlorobenzene	2.1	70	<11.2	<11.2	<10.9	<15.2
1,2,4-Trimethylbenzene	63	2,100	<1.5	<1.5	<1.4	3
1,2-Dibromoethane (EDB)	0.017	0.6	<1.2	<1.2	<1.1	<1.6
1,2-Dichlorobenzene	NA	NA	<1.8	<1.8	<1.8	<2.5
1,2-Dichloroethane	0.39	13	<0.61	<0.61	<0.59	<0.83
1,2-Dichloropropane	2.7	90	<1.4	<1.4	<1.4	<1.9
1,3,5-Trimethylbenzene	63	2,100	<1.5	<1.5	<1.4	<2.0
1,3-Butadiene	0	9	<0.67	<0.67	<0.65	<0.90
1,3-Dichlorobenzene	NA	NA	<1.8	<1.8	<1.8	<2.5
1,4-Dichlorobenzene	63	2,100	<4.6	<4.6	<4.4	<6.2
2-Butanone (MEK)	5,200	170,000	<4.5	<4.5	<4.3	<6.0
2-Hexanone	31	1,000	<6.2	<6.2	<6.0	<8.4
2-Propanol	210	7,000	<3.7	<3.7	<3.6	<5.0
4-Ethyltoluene	NA	NA	<3.7	<3.7	<3.6	<5.0
4-Methyl-2-pentanone (MIBK)	3,100	100,000	<6.2	<6.2	<6.0	<8.4
Acetone	32,000	1,100,000	6.2	13.4	8.7	20.8
Benzene	4.6	150	<0.48	<0.48	1.5	0.86
Benzyl chloride	0.2	7	<3.9	<3.9	<3.8	<5.3
Bromodichloromethane	21	700	<2.0	<2.0	<2.0	<2.7
Bromoform	NA	NA	<7.8	<7.8	<7.6	<10.6
Bromomethane	5.2	170	<1.2	<1.2	<1.1	<1.6
Carbon disulfide	830	28,000	<0.94	<0.94	<0.91	<1.3
Carbon tetrachloride	1.7	57	<1.9	<1.9	<1.8	<2.6
Chlorobenzene	52	1,700	<1.4	<1.4	<1.3	<1.9
Chloroethane	4,200	140,000	<0.80	<0.80	<0.77	<1.1
Chloroform	100	3,300	<0.74	<0.74	<0.71	<1.0
Chloromethane	94	3,100	<0.63	1.1	1.7	1.4
Cyclohexane	6,300	210,000	<2.6	<2.6	<2.5	<3.5
Dibromochloromethane	NA	NA	<6.5	<2.6	<2.5	<3.5
Dichlorodifluoromethane	NA	NA	2.4	2.4	2.7	2.6
Dichlorotetrafluoroethane	NA	NA	<2.1	<2.1	<2.0	<2.9
Ethanol	NA	NA	6.9	12.5	9.6	17.1
Ethyl acetate	73	2,400	<1.1	<1.1	<1.1	<1.5
Ethylbenzene	4.1	140	<1.3	<1.3	<1.3	<1.8
Hexachloro-1,3-butadiene	NA	NA	<8.1	<8.1	<7.8	<10.9
Methyl-tert-butyl ether	39	1,300	<5.5	<5.5	<5.3	<7.4
Methylene Chloride	NA	NA	<5.3	<5.3	<5.1	<7.1
Naphthalene	9.4	310	<4.0	<4.0	<3.8	<5.3
Propylene	3,100	100,000	<0.52	2.7	<0.50	4.9
Styrene	940	31,000	<1.3	<1.3	<1.2	<1.7
Tetrachloroethene	3.4	110	<1.0	<1.0	<0.99	<1.4
Tetrahydrofuran	2,100	70,000	<0.89	<0.89	<0.86	<1.2
Toluene	4,200	140,000	<1.1	<1.1	<1.1	<1.5
Trichloroethene	2.1	70	<0.81	<0.81	<0.79	<1.1
Trichlorofluoromethane	1,000	33,000	<1.7	<1.7	<1.6	<2.3
Vinyl acetate	210	7,000	<1.1	<1.1	<1.0	<1.4
Vinyl chloride	1.7	57	<0.39	<0.39	<0.37	<0.52
cis-1,2-Dichloroethene	0.017	1	<1.2	<1.2	<1.2	<1.6
cis-1,3-Dichloropropene	2.5	83	<1.4	<1.4	<1.3	<1.9
m&p-Xylene	100	3,300	<2.6	<2.6	<2.5	<3.6
n-Heptane	420	14,000	<1.2	<1.2	<1.2	<1.7
n-Hexane	730	24,000	<1.1	<1.1	<1.0	<1.4
o-Xylene	100	3,300	<1.3	<1.3	<1.3	<1.8
trans-1,2-Dichloroethene	NA	NA	<1.2	<1.2	<1.2	<1.6
trans-1,3-Dichloropropene	NA	NA	<1.4	<1.9	<1.3	<3.8

Concentrations in ug/m3

Method 3C Fixed gases in %

BOLD type indicates lab detections

BOLD and gray highlighted cells indicate compounds detected above 2019 Residential IS

Result exceeds 2019 - 33x Residential ISV

NA = Not Applicable

DL= Detection Limit

Sample ID Date PID (ppm) Compounds	2019 Residential Intrusion Screening	2019 Residential 33X ISV	VMP-11		VMP-12	
			1/16/2020	5/8/2020	1/16/2020	5/8/2020
			0.0	0.0	0.0	0.0
			Result	Result	Result	Result
1,1,1-Trichloroethane	5,200	170,000	<1.6	<4.5	<4.5	<4.5
1,1,2,2-Tetrachloroethane	NA	NA	<1.0	<2.8	<2.8	<2.8
1,1,2-Trichloroethane	0.21	7.0	<0.80	<2.3	<2.2	<2.3
1,1,2-Trichlorotrifluoroethane	5,200	170,000	<2.2	<6.3	<6.3	<6.3
1,1-Dichloroethane	NA	NA	<1.2	<3.3	<3.3	<3.3
1,1-Dichloroethene	210	7,000	<1.2	<3.3	<3.3	<3.3
1,2,4-Trichlorobenzene	2.1	70	<10.9	<30.7	<30.5	<30.7
1,2,4-Trimethylbenzene	63	2,100	<1.4	<4.1	<4.0	5.6
1,2-Dibromoethane (EDB)	0.017	0.6	<1.1	<3.2	<3.2	<3.2
1,2-Dichlorobenzene	NA	NA	<1.8	<5.0	<4.9	<5.0
1,2-Dichloroethane	0.39	13	<0.59	<1.7	<1.7	<1.7
1,2-Dichloropropane	2.7	90	<1.4	<3.8	<3.8	<3.8
1,3,5-Trimethylbenzene	63	2,100	<1.4	<4.1	<4.0	<4.1
1,3-Butadiene	0	9	<0.65	<1.8	<1.8	<1.8
1,3-Dichlorobenzene	NA	NA	<1.8	<5.0	<4.9	<5.0
1,4-Dichlorobenzene	63	2,100	<4.4	<12.5	<12.4	<12.5
2-Butanone (MEK)	5,200	170,000	<4.3	<12.2	<12.1	<12.2
2-Hexanone	31	1,000	<6.0	<16.9	<16.8	<16.9
2-Propanol	210	7,000	<3.6	<10.2	<10.1	<10.2
4-Ethyltoluene	NA	NA	<3.6	<10.2	<10.1	<10.2
4-Methyl-2-pentanone (MIBK)	3,100	100,000	<6.0	<16.9	<16.8	<16.9
Acetone	32,000	1,100,000	5.8	<24.6	13.4	195
Benzene	4.6	150	0.88	<1.3	<1.3	<1.3
Benzyl chloride	0.2	7	<3.8	<10.7	<10.6	<10.7
Bromodichloromethane	21	700	<2.0	<5.5	<5.5	<5.5
Bromoform	NA	NA	<7.6	<21.4	<21.2	<21.4
Bromomethane	5.2	170	<1.1	<3.2	<3.2	<3.2
Carbon disulfide	830	28,000	<0.91	<2.6	3.8	<2.6
Carbon tetrachloride	1.7	57	<1.8	<5.2	<5.2	<5.2
Chlorobenzene	52	1,700	<1.3	<3.8	<3.8	<3.8
Chloroethane	4,200	140,000	<0.77	<2.2	<2.2	<2.2
Chloroform	100	3,300	<0.71	<2.0	<2.0	<2.0
Chloromethane	94	3,100	<0.60	2.8	<1.7	<1.7
Cyclohexane	6,300	210,000	<2.5	<7.1	<7.1	<7.1
Dibromochloromethane	NA	NA	<2.5	<7.0	<7.0	<7.0
Dichlorodifluoromethane	NA	NA	2.1	<4.1	<4.1	<4.1
Dichlorotetrafluoroethane	NA	NA	<2.0	<5.8	<5.7	<5.8
Ethanol	NA	NA	5.2	17.9	16.1	64.7
Ethyl acetate	73	2,400	<1.1	<3.0	<3.0	4
Ethylbenzene	4.1	140	<1.3	<3.6	<3.6	<3.6
Hexachloro-1,3-butadiene	NA	NA	<7.8	<22.1	<21.9	<22.1
Methyl-tert-butyl ether	39	1,300	<5.3	<14.9	<14.8	<14.9
Methylene Chloride	NA	NA	<5.1	<14.4	29.6	<14.4
Naphthalene	9.4	310	<3.8	<10.8	<10.7	<10.8
Propylene	3,100	100,000	<0.50	3.9	<1.4	15
Styrene	940	31,000	<1.2	<3.5	<3.5	<3.5
Tetrachloroethene	3.4	110	<0.99	<2.8	<2.8	<2.8
Tetrahydrofuran	2,100	70,000	<0.86	<2.4	<2.4	<2.4
Toluene	4,200	140,000	<1.1	<3.1	<3.1	16.7
Trichloroethene	2.1	70	<0.79	<2.2	<2.2	<2.2
Trichlorofluoromethane	1,000	33,000	<1.6	<4.6	<4.6	<4.6
Vinyl acetate	210	7,000	<1.0	<2.9	<2.9	<2.9
Vinyl chloride	1.7	57	<0.37	<1.1	<1.1	<1.1
cis-1,2-Dichloroethene	0.017	1	<1.2	<3.3	<3.3	<3.3
cis-1,3-Dichloropropene	2.5	83	<1.3	<3.8	<3.7	<3.8
m&p-Xylene	100	3,300	<2.5	<7.2	<7.2	<7.2
n-Heptane	420	14,000	<1.2	<3.4	<3.4	<3.4
n-Hexane	730	24,000	<1.0	<2.9	<2.9	<2.9
o-Xylene	100	3,300	<1.3	<3.6	<3.6	<3.6
trans-1,2-Dichloroethene	NA	NA	<1.2	<3.3	<3.3	<3.3
trans-1,3-Dichloropropene	NA	NA	<1.3	<3.8	<3.7	2.5

Concentrations in ug/m3

Method 3C Fixed gases in %

BOLD type indicates lab detections

BOLD and gray highlighted cells indicate compounds detected above 2019 Residential IS

Result exceeds 2019 - 33x Residential ISV

NA = Not Applicable

DL= Detection Limit

Table 18
Sediment Metals

						Monitoring Point:										
						SED-1	SED-2	SED-3	SS-1	SS-2	P-1	P-2	P-3	P-4	P-5	
						Date:	8/8/1989	8/8/1989	8/8/1989	1992	1992	1994	1994	1994	1994	1994
Parameter	Units	SQT Level 1	SQT Level 2	Residential SRV	Industrial SRV											
Metals																
Arsenic	mg/kg	9.8	33	9	20	2.0	1.2	1.5	< 20	< 20	< 5	< 5	< 5	< 5	< 5	< 5
Barium	mg/kg	--	--	1100	18000	NA	NA	NA	NA	NA	180	110	93	150	83	
Cadmium	mg/kg	0.99	5	25	200	1.7	< 0.17	0.19	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	mg/kg	43	110	87 / 44000	650 / 100000	31	45	44	20	20	42	22	14	26	< 0.5	
Copper	mg/kg	32	150	100	9000	86	119	57	37	51	NA	NA	NA	NA	NA	NA
Iron	mg/kg	--	--	9000	75000	NA	NA	NA	15,000	16,000	20,000	16,000	39,000	16,000	8,800	
Lead	mg/kg	36	130	300	700	103	25	18	< 5	6	11	9.7	28	11	< 2.5	
Manganese	mg/kg	--	--	3600	8100	246	422	378	340	280	390	150	570	160	170	
Mercury	mg/kg	0.18	1.1	0.5	1.5	0.5	< 0.07	< 0.07	< 0.02	< 0.02	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Selenium	mg/kg	--	--	160.0	1300	NA	NA	NA	NA	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Silver	mg/kg	--	--	160	1300	NA	NA	NA	NA	NA	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	mg/kg	120	460	8700	75000	472	91	61	45	48	NA	NA	NA	NA	NA	NA

Notes:

a - Standard provided for hexavalent chromium / chromium III

BOLD - Exceeds SQT Level 1

BOLD = Exceeds SQT Level 1 and 2 or Residential SRV

BOLD = Exceeds Industrial SRV

SQT - Sediment Quality Target

SRV -Soil Reference Value

NA - Not Analyzed

-- Not Established

Table 18
Sediment Metals

						Monitoring Point: Date:									
						P-5D	P-6	P-7	P-8	C-1	S-1	S-2	SED-10	SED-11	SED-12
						1994	1994	1994	1994	1994	1994	1994	1995	1995	1995
Parameter	Units	SQT Level 1	SQT Level 2	Residential SRV	Industrial SRV										
Metals															
Arsenic	mg/kg	9.8	33	9	20	< 5	NA	NA	NA	< 5	< 5	< 5	< 2	3	< 2
Barium	mg/kg	--	--	1100	18000	80	NA	NA	NA	41	53	140	58	33	52
Cadmium	mg/kg	0.99	5	25	200	< 0.5	NA	NA	NA	< 0.5	< 0.5	< 0.5	< 0.6	0.68	0.63
Chromium	mg/kg	43	110	87 / 44000	650 / 100000	< 0.5	NA	NA	NA	15	14	22	16	2.8	17
Copper	mg/kg	32	150	100	9000	NA	NA	NA	NA	NA	NA	NA	17	12	13
Iron	mg/kg	--	--	9000	75000	9,100	NA	NA	NA	16,000	13,000	15,000	14,000	3,400	9,200
Lead	mg/kg	36	130	300	700	NA	NA	NA	NA	12	19	68	5.8	6.2	4.4
Manganese	mg/kg	--	--	3600	8100	180	NA	NA	NA	260	130	200	160	42	320
Mercury	mg/kg	0.18	1.1	0.5	1.5	< 0.2	NA	NA	NA	< 0.2	< 0.2	< 0.2	0.01	0.05	0.02
Selenium	mg/kg	--	--	160.0	1300	< 0.5	NA	NA	NA	< 0.5	< 0.5	< 0.5	NA	NA	NA
Silver	mg/kg	--	--	160	1300	< 0.5	NA	NA	NA	< 0.5	< 0.5	< 0.5	NA	NA	NA
Zinc	mg/kg	120	460	8700	75000	NA	NA	NA	NA	NA	NA	NA	34	38	43

Notes:

a - Standard provided for hexavalent chromium / chromium III

BOLD - Exceeds SQT Level 1

BOLD = Exceeds SQT Level 1 and 2 or Residential SRV

BOLD = Exceeds Industrial SRV

SQT - Sediment Quality Target

SRV -Soil Reference Value

NA - Not Analyzed

-- Not Established

Table 20
Soil Metals and Organic Parameters

Monitoring Point:						Soil 1	Soil 2	Soil 3	Soil 4	Soil 5	Soil 6	89-1	89-2	89-3	89-4	89-6	89-6	SS-1	SS-2
Depth (feet bgs):												6-7.5	8-9.5	11-12.5	8-9.5	0-2	6-5.8		
Date:						1987	1987	1987	1987	1987	1987	7/24/1989	7/24/1989	7/26/1989	7/24/1989	7/26/1989	7/26/1989	1992	1992
Parameter	Units	SLV	Residential SRV	Industrial SRV	Eco-SSL														
VOC																			
Acetone	mg/kg	8.4	340	1000	--	NA	NA	NA	NA	NA	NA	NA	<5	<5	<5	<5	<5	NA	NA
Allyl chloride	mg/kg	0.15	--	--	--	NA	NA	NA	NA	NA	NA	NA	<0.5	<0.5	<0.5	<0.5	<0.5	NA	NA
Benzene	mg/kg	0.017	6	10	--	NA	NA	NA	NA	NA	NA	NA	<0.12	<0.12	<0.12	<0.12	<0.12	NA	NA
Bromodichloromethane	mg/kg	0.021	10	17	--	NA	NA	NA	NA	NA	NA	NA	<0.025	<0.025	<0.025	<0.025	<0.025	NA	NA
Bromoforn	mg/kg	0.13	--	--	--	NA	NA	NA	NA	NA	NA	NA	<0.12	<0.12	<0.12	<0.12	<0.12	NA	NA
Bromomethane	mg/kg	0.036	0.7	2	--	NA	NA	NA	NA	NA	NA	NA	<0.19	<0.19	<0.19	<0.19	<0.19	NA	NA
Carbon tetrachloride	mg/kg	0.0077	0.3	0.9	--	NA	NA	NA	NA	NA	NA	NA	<0.038	<0.038	<0.038	<0.038	<0.038	NA	NA
Chlorobenzene	mg/kg	1.2	11	32	--	NA	NA	NA	NA	NA	NA	NA	<0.12	<0.12	<0.12	<0.12	<0.12	NA	NA
Chloroethane	mg/kg	--	1000	3000	--	NA	NA	NA	NA	NA	NA	NA	<0.12	<0.12	<0.12	<0.12	<0.12	NA	NA
2-Chloroethylvinyl ether	mg/kg	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	<0.62	<0.62	<0.62	<0.62	<0.62	NA	NA
Chloroform	mg/kg	0.11	2.5	4	--	NA	NA	NA	NA	NA	NA	NA	<0.062	<0.062	<0.062	<0.062	<0.062	NA	NA
Chloromethane	mg/kg	0.11	8	23	--	NA	NA	NA	NA	NA	NA	NA	<0.12	<0.12	<0.12	<0.12	<0.12	NA	NA
Cumene	mg/kg	--	30	87	--	NA	NA	NA	NA	NA	NA	NA	<0.12	<0.12	0.8	<0.12	<0.12	NA	NA
1,2-Dibromoethane	mg/kg	0.000015	0.3	0.5	--	NA	NA	NA	NA	NA	NA	NA	<0.5	<0.5	<0.5	<0.5	<0.5	NA	NA
Dibromochloromethane	mg/kg	0.034	--	--	--	NA	NA	NA	NA	NA	NA	NA	<0.12	<0.12	<0.12	<0.12	<0.12	NA	NA
Dibromomethane	mg/kg	--	260	1860	--	NA	NA	NA	NA	NA	NA	NA	<0.18	<0.18	<0.18	<0.18	<0.18	NA	NA
Dichloroacetonitrile	mg/kg	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	<10	<10	<10	<10	<10	NA	NA
1,2-Dichlorobenzene	mg/kg	11	26	75	--	NA	NA	NA	NA	NA	NA	NA	<0.5	<0.5	<0.5	<0.5	<0.5	NA	NA
1,3-Dichlorobenzene	mg/kg	10	26	200	--	NA	NA	NA	NA	NA	NA	NA	<0.5	<0.5	<0.5	<0.5	<0.5	NA	NA
1,4-Dichlorobenzene	mg/kg	0.17	30	50	--	NA	NA	NA	NA	NA	NA	NA	<0.5	<0.5	<0.5	<0.5	<0.5	NA	NA
1,1-Dichloroethane	mg/kg	0.41	34	55	--	NA	NA	NA	NA	NA	NA	NA	<0.025	0.07	<0.025	<0.025	<0.025	NA	NA
1,2-Dichloroethane	mg/kg	0.0038	4	6	--	NA	NA	NA	NA	NA	NA	NA	<0.025	<0.025	<0.025	<0.025	<0.025	NA	NA
1,1-Dichloroethylene	mg/kg	1.40	20	60	--	NA	NA	NA	NA	NA	NA	NA	<0.038	<0.038	<0.038	<0.038	<0.038	NA	NA
cis-1,2-Dichloroethylene	mg/kg	--	8	22	--	NA	NA	NA	NA	NA	NA	NA	<0.062	<0.062	<0.062	<0.062	<0.062	NA	NA
trans-1,2-Dichloroethylene	mg/kg	0.42	11	33	--	NA	NA	NA	NA	NA	NA	NA	<0.038	<0.038	<0.038	<0.038	<0.038	NA	NA
Dichlorodifluoromethane	mg/kg	37	16	50	--	NA	NA	NA	NA	NA	NA	NA	<0.19	<0.19	<0.19	<0.19	<0.19	NA	NA
Dichlorofluoromethane	mg/kg	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	<0.12	<0.12	<0.12	<0.12	<0.12	NA	NA
1,2-Dichloropropane	mg/kg	0.024	4	6	--	NA	NA	NA	NA	NA	NA	NA	<0.025	<0.025	<0.025	<0.025	<0.025	NA	NA
1,3-Dichloropropane	mg/kg	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	<0.075	<0.075	<0.075	<0.075	<0.075	NA	NA
1,1-Dichloro-1-propene	mg/kg	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	<0.12	<0.12	<0.12	<0.12	<0.12	NA	NA
cis-1,3-Dichloro-1-propene	mg/kg	0.011	--	--	--	NA	NA	NA	NA	NA	NA	NA	<0.062	<0.062	<0.062	<0.062	<0.062	NA	NA
trans-1,3-Dichloro-1-propene	mg/kg	0.011	--	--	--	NA	NA	NA	NA	NA	NA	NA	<0.038	<0.038	<0.038	<0.038	<0.038	NA	NA
2,3-Dichloro-1-propene	mg/kg	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	<0.062	<0.062	<0.062	<0.062	<0.062	NA	NA
Ethyl ether	mg/kg	0.51	--	--	--	NA	NA	NA	NA	NA	NA	NA	<0.038	<0.038	<0.038	<0.038	<0.038	NA	NA
Ethylbenzene	mg/kg	1.0	200	200	--	NA	NA	NA	NA	NA	NA	NA	<0.12	<0.12	0.5	<0.12	<0.12	NA	NA
Methyl ethyl ketone	mg/kg	0.11	5500	19000	--	NA	NA	NA	NA	NA	NA	NA	<2.5	<2.5	<2.5	<2.5	<2.5	NA	NA
Methyl isobutyl ketone	mg/kg	0.76	1700	9000	--	NA	NA	NA	NA	NA	NA	NA	<0.12	<0.12	<0.12	<0.12	<0.12	NA	NA
Methylene Chloride	mg/kg	0.017	--	--	--	NA	NA	NA	NA	NA	NA	NA	0.24 (I)	0.23 (I)	0.35	0.50 (I)	<0.12	NA	NA
Pentachloroethane	mg/kg	--	--	--	--	NA	NA	NA	NA	NA	NA	NA	<0.25	<0.25	<0.25	<0.25	<0.25	NA	NA
1,1,1,2-Tetrachloroethane	mg/kg	0.41	31	51	--	NA	NA	NA	NA	NA	NA	NA	<0.038	<0.038	<0.038	<0.038	<0.038	NA	NA
1,1,2,2-Tetrachloroethane	mg/kg	0.012	3.5	6.5	--	NA	NA	NA	NA	NA	NA	NA	<0.12	<0.12	<0.12	<0.12	<0.12	NA	NA
Tetrachloroethylene (PCE)	mg/kg	0.042	72	131	--	NA	NA	NA	NA	NA	NA	NA	<0.12	<0.12	<0.12	<0.12	<0.12	NA	NA
Tetrahydrofuran	mg/kg	0.24	--	--	--	NA	NA	NA	NA	NA	NA	NA	<1.8	<1.8	<1.8	<1.8	<1.8	NA	NA
Trichlorofluoromethane	mg/kg	35	67	195	--	NA	NA	NA	NA	NA	NA	NA	<0.05	<0.05	<0.05	<0.05	<0.05	NA	NA
1,1,1-Trichloroethane	mg/kg	56	140	472	--	NA	NA	NA	NA	NA	NA	NA	<0.062	<0.062	<0.062	<0.062	<0.062	NA	NA
1,1,2-Trichloroethane	mg/kg	0.014	9	14	--	NA	NA	NA	NA	NA	NA	NA	<0.12	<0.12	<0.12	<0.12	<0.12	NA	NA
Trichloroethylene (TCE)	mg/kg	0.0023	29	46	--	NA	NA	NA	NA	NA	NA	NA	<0.062	<0.062	<0.062	<0.062	<0.062	NA	NA
1,1,2-Trichlorotrifluoroethane	mg/kg	16884	3745	5430	--	NA	NA	NA	NA	NA	NA	NA	<0.088	<0.088	<0.088	<0.088	<0.088	NA	NA
1,2,3-Trichloropropane	mg/kg	0.27	--	--	--	NA	NA	NA	NA	NA	NA	NA	<0.5	<0.5	<0.5	<0.5	<0.5	NA	NA
Toluene	mg/kg	2.5	107	305	--	NA	NA	NA	NA	NA	NA	NA	<0.12	<0.12	<0.12	<0.12	<0.12	NA	NA
m-Xylene	mg/kg	5.4	--	--	--	NA	NA	NA	NA	NA	NA	NA	<0.12	<0.12	1.6	<0.12	<0.12	NA	NA
o-Xylene	mg/kg	5.4	--	--	--	NA	NA	NA	NA	NA	NA	NA	<0.12	<0.12	<0.12	<0.12	<0.12	NA	NA
p-Xylene	mg/kg	5.4	--	--	--	NA	NA	NA	NA	NA	NA	NA	<0.12	<0.12	<0.12	<0.12	<0.12	NA	NA
Xylene (mixed)	mg/kg	--	45	130	--	NA	NA	NA	NA	NA	NA	NA	<0.36	<0.36	1.6	<0.36	<0.36	NA	NA
Vinyl chloride	mg/kg	0.0014	0.8	2.2	--	NA	NA	NA	NA	NA	NA	NA	<0.19	<0.19	<0.19	<0.19	<0.19	NA	NA

BOLD - Exceeds SLV
BOLD = Exceeds Industrial SRV
Italics = Exceeds Ecological SSL

SLV - Soil Leaching Value
 SRV - Minnesota Department of Health Soil Reference Value
 SSL - US Environmental Protection Agency Ecological Soil Screening Level
 * Denotes value for total low molecular weight PAHs
 ** Denotes value for total high molecular weight PAHs
 *** Aluminum not a COPC for soil pH >5
 **** Iron not a COPC for soil pH 5-8
 VOC - Volatile Organic Compounds
 NA -Not Analyzed
 -- Not Established
 I - Detected in an associated blank



Protecting, maintaining and improving the health of all Minnesotans

Report Date: 12/4/20

Client Name: PL - MPCA - Metro MERLA-SF

Project Code: PL

Project Name: Metro MERLA-SF

Work Order Number: 20K0900

Report To: PL - MPCA - Metro MERLA-SF

Eric Pederson

520 Lafayette Rd.

Saint Paul, MN 55155

The MDH Public Health Laboratory performs chemical, bacteriological and radiological analyses of environmental samples including water, waste water, sediment, air, soil and hazardous material. The laboratory provides testing services in accordance with standard operating procedures referencing approved methodology as defined in Standard Methods for the Examination of Water and Wastewater, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods: EPA SW-846, and 40 Code of Federal Regulation (CFR) parts 136, 141, and 261. In cases where analytes of interest do not have corresponding EPA approved methodology, the MDH Public Health Laboratory uses in-house methods that have undergone rigorous validation and documentation.

The results within this report are in compliance with the terms and conditions stated in the standard operating procedures, reference methodologies, and quality assurance project plan; unless otherwise narrated in the attached report.

Release of the data contained in this report has been authorized by laboratory management and is verified with the following signature affirmation. Thank you for using the MDH Public Health Laboratory.

Sincerely,

A handwritten signature in black ink, appearing to read "Paul Moyer", is written over a light gray rectangular background.

Paul Moyer, Environmental Laboratory Manager
Public Health Laboratory, Minnesota Department of Health

Public Health Laboratory . Environmental Laboratory Section . 601 Robert St. N . PO Box 64899 . St Paul, MN 55164
(651) 201-5300

<http://www.health.mn.us/divs/phl/environmental>

Final Report
 Summary of Samples Received

Program Code: PL	Project ID: PRJ07955
Program Name: Metro MERLA-SF	Facility Name: SR0000093
Collected By: Chloe Malin	City: Duluth Dump #1
Collector ID: None	Generated: 12/04/20 15:35

Work Order Comment: SP-02 field matrix: Wtr-drink, SP-06 collection time is 0910 with parent as SP-03, SP-07 lab/field matrix: DW/Wtr-drink per J. Jevnisek. -CNN 11/20/20

Field ID	MDH Sample Number	Matrix	Date & Time Collected	Date & Time Received	Receipt °C
1000020726	20K0900-01	Wtr-Drink	11/18/20 10:45	11/19/20 10:18	0.6
1000020722	20K0900-02	Wtr-Drink	11/18/20 13:40	11/19/20 10:18	0.6
1000020739	20K0900-03	Wtr-Drink	11/18/20 9:10	11/19/20 10:18	0.6
1000020740	20K0900-04	Wtr-Drink	11/18/20 9:45	11/19/20 10:18	0.6
1000020735	20K0900-05	Wtr-Drink	11/18/20 10:20	11/19/20 10:18	0.6
Field Duplicate	20K0900-06	Wtr-Drink	11/18/20 9:10	11/19/20 10:18	0.6
Trip Blank	20K0900-07	Wtr-Drink	11/18/20 9:10	11/19/20 10:18	0.6

Field ID	MDH Sample Number	Receiving Comments
1000020722	20K0900-02	Illegible field matrix. -CNN
1000020739	20K0900-03	Extra for MS + MSD -CNN
Field Duplicate	20K0900-06	No collection time. -CNN
Trip Blank	20K0900-07	No lab/field matrix. -CNN

Authorized by:

*The results in this report apply only to the samples analyzed.
 This report must not be reproduced, except in full, without the written approval of the laboratory.*



Paul Moyer, Environmental Laboratory Manager
 Public Health Laboratory, Minnesota Department of Health



Minnesota Pollution Control Agency

MPCA Chain-of-Custody Form

revision 2017.0328

* indicates a required field

Work Order Number: 3000024908

COC Type:

Page: 1 of 1

Turnaround Time: Std

COC ID:

FOR LAB USE

PROJECT/CLIENT INFO

LABORATORY

Facility Code:* SR0000093

Program Code (MDH Lab Only): PL

Lab Name: Minnesota Department of Health

Project Name:* Duluth Dump #1

Project Task Code:* PRJ07955

Address: 601 Robert Street

Project Manager: MPCA: Jennifer Jevnisek/ AECOM: Ethan Harvey (218) 205-6657

St. Paul, MN 55155

Potential Hazard?

No

If yes, add information to Sampler Comments field

EPA Lab ID:*



20K0900

SAMPLE DETAILS

ANALYSIS REQUESTED

SAMPLE TYPES		SAMPLING METHODS			LAB MATRICES		FIELD MATRICES		ANALYSIS REQUESTED										
Sample-Routine Sample	G-Grab sample	DW-Drinking Water	BL-Biological Material	Wtr-Ground-Groundwater	FF	PRESERV.													
QC-FB-Field Blank Sample	CT-Composite, time-paced w/AS	NW-Noopotable Water	OT-Other	Wtr-Surf-Surface Water															
QC-FR-Field Replicate Sample	CF-Composite w/AS	SD-Soil/Solid	TS-Tissue	Wtr-Drink-Drinking Water															
QC-TB-Trip Blank Sample	D-T-Discrete,time-paced w/AS	AR-Air		QC-BLANK-Artificial Blank Water															
QC-EB-Equipment Blank	D-F-Discrete,flow-paced w/AS			Leachate-Leachate Sample															
Treated-Mid-Treatment system sample	SW-GAS-Gas Sampling			Air-Indoor-Indoor Air															
Treated-Post-Treatment system sample	Unknown-Unknown			Gas-Soil-Soil Gas															
MN Location Identifier*	Field Name	Sample Type*	Start Date* (mm/dd/yyyy)	Start Time* (hh:mm)	Start	End	Units (m or ft.)	Sampling Method*	End Date (mm/dd/yyyy)	End Time (hh:mm)	Lab Matrix*	Field Matrix*	AIS	Sampler Comments (filter volume, special handling, etc.)	# of Cont	ANALYSIS*	PFAS	Lab Sample No.	#
1000020726	RW-2	Sample	11-18-20	1045				G			DW	Wtr-Drink			1		x		1
																			2
																			3
																			4
																			5
																			6
																			7
																			8
																			9
																			10

Sampler's Name: Chloe Main Phone#: 6083179634 Billing Organization: MPCA Acct#:

Sampler's Signature: Chloe mali Address: (Attention Jennifer Jevnisek jennifer.jevnisek@state.mn.us)

Sampler's Organization: AECOM Courier Name: Tracking#:

Receiving Comments:

Relinquished By/Affiliation	Date/Time	Accepted By/Affiliation	Date/Time
<u>Chloe mali / AECOM</u>	<u>11-18-20/1415</u>	<u>[Signature]</u>	<u>11/19/2020 1015</u>

Page 3 of 24

Data in LAB_MN Format for MPCA submittal



MPCA Chain-of-Custody Form revision 2017.0328
 * indicates a required field

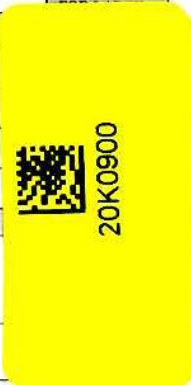
Work Order Number: 3000024908 COC Type: Page: 1 of 1
 Turnaround Time: Std COC ID:

PROJECT/CLIENT INFO

LABORATORY

Facility Code:* SR0000093 Program Code (MDH Lab Only):
 Project Name:* Duluth Dump #1 Project Task Code:* PRJ07955
 Project Manager: MPCA: Jennifer Jevnisek/ AECOM: Ethan Harvey (218)205-6657
 Potential Hazard? No If yes, add information to Sampler Comments field

Lab Name: Minnesota Department of Health
 Address: 601 Robert Street
 St. Paul, MN 55155
 EPA Lab ID:*



SAMPLE DETAILS

ANALYSIS REQUESTED

SAMPLE TYPES
 Sample-Routine Sample
 QC-FB=Field Blank Sample
 QC-FR=Field Replicate Sample
 QC-TB=Trip Blank Sample
 QC-EB=Equipment Blank
 Treated-Mid=Treatment system sample
 Treated-Post=Treatment system sample

SAMPLING METHODS
 G=Grab sample
 CT=Composite, time-paced w/AS
 CF=Composite w/AS
 D-T=Discrete,time-paced w/AS
 D-F=Discrete,flow-paced w/AS
 SW-GAS=Gas Sampling
 Unknown=Unknown

LAB MATRICES
 DW=Drinking Water
 NW=Nonpotable Water
 SD=Soil/Solid
 AR=Air

BL=Biological Material
 OT=Other
 TS=Tissue
 Complete ONLY if Method is CT, CF, D-T, or D-F

FIELD MATRICES
 Wtr-Ground=Groundwater
 Wtr-Surf=Surface Water
 Wtr-Drink=Drinking Water
 QC-BLANK=Artificial Blank Water
 Leachate=Leachate Sample
 Air-Indoor=Indoor Air
 Gas-Soil=Soil Gas

PRESERV.	FF	ANALYSIS*	PFAS																
----------	----	-----------	------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

MN Location Identifier*	Field Name	Sample Type*	Start Date* (mm/dd/yyyy)	Start Time* 24 hr (hh:mm)	Depth			Sampling Method*	End Date (mm/dd/yyyy)	End Time 24 hr (hh:mm)	Lab Matrix*	Field Matrix* AIS	Sampler Comments (filter volume, special handling, etc.)	# of Cont	ANALYSIS*	PFAS	Lab Sample No.	#
					Start	End	Units (m or ft.)											
1000020722	RW-1	Sample	11-18-20	1340				G			DW	Wtr-E		1	x		02-01	1
																	11/20/20	3
																		4
																		5
																		6
																		7
																		8
																		9
																		10

Sampler's Name:* *Chloe Malin* Phone#: *6083178634* Billing Organization: MPCA Acct#: Address: (Attention Jennifer Jevnisek jennifer.jevnisek@state.mn.us) Courier Name: Tracking#: Receiving Comments:

Relinquished By/Affiliation	Date/Time	Accepted By/Affiliation	Date/Time
<i>Chloe Malin / AECOM</i>	<i>11-18-20/1415</i>	<i>[Signature]</i>	<i>11/19/2020 1018</i>

Data in LAB_MN Format for MPCA submittal



MPCA Chain-of-Custody Form revision 2017.0328
 * indicates a required field

Work Order Number: 3000024908 COC Type: Page: 1 of 1
 Turnaround Time: Std COC ID:

PROJECT/CLIENT INFO

LABORATORY

Facility Code:* SR0000093 Program Code (MDH Lab Only): PL
 Project Name:* Duluth Dump #1 Project Task Code:* PRJ07955
 Project Manager: MPCA: Jennifer Jevnisek/ AECOM: Ethan Harvey (218)205-6657
 Potential Hazard? No If yes, add information to Sampler Comments field

Lab Name: Minnesota Department of Health
 Address: 601 Robert Street
 St. Paul, MN 55155
 EPA Lab ID:*



SAMPLE DETAILS

ANALYSIS REQUESTED

SAMPLE TYPES		SAMPLING METHODS			LAB MATRICES				FIELD MATRICES				ANALYSIS*	PFAS	Lab Sample No.	#		
G=Grab sample CT=Composite, time-paced w/AS CF=Composite w/AS D-T=Discrete, time-paced w/AS D-F=Discrete, flow-paced w/AS SW-GAS=Gas Sampling Unknown=Unknown		DW=Drinking Water NW=Nonpotable Water SD=Soil/Solid AR=Air			BI=Biological Material OT=Other TS=Tissue				Wtr-Ground-Groundwater Wtr-Surf-Surface Water Wtr-Drink-Drinking Water QC-BLANK=Artificial Blank Water Leachate=Leachate Sample Air-Indoor-Indoor Air Gas-Soil-Soil Gas									
MN Location Identifier*	Field Name	Sample Type*	Start Date* (mm/dd/yyyy)	Start Time* 24 hr (hh:mm)	Start	End	Units (m or ft.)	Sampling Method*	End Date (mm/dd/yyyy)	End Time 24 hr (hh:mm)	Lab Matrix*	Field Matrix*	AIS	Sampler Comments (filter volume, special handling, etc.)	# of Cont	PFAS	Lab Sample No.	#
1000020739	RW-15	Sample	11-18-20	0910				G			DW	Wtr-Drink		EXTRA FOR MS + MSD	3	x		1
																		3
																		4
																		5
																		6
																		7
																		8
																		9
																		10

-03
 of
 cell 11/20/20

Sampler's Name:* Chloe Malin Phone#: 6023178634 Billing Organization: MPCA Acct#:
 Sampler's Signature:* Chloe Malin Address: (Attention Jennifer Jevnisek jennifer.jevnisek@state.mn.us)
 Sampler's Organization: AECOM Courier Name: Tracking#:

Receiving Comments:

Relinquished By/Affiliation	Date/Time	Accepted By/Affiliation	Date/Time
Chloe Malin / AECOM	11-18-20 / 1415	[Signature]	11/19/20 1014

Data in LAB_MN Format for MPCA submittal



MPCA Chain-of-Custody Form revision 2017.0328
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Work Order Number: 3000024908

COC Type:

Page: 1 of 1

Turnaround Time: Std

COC ID:

PROJECT/CLIENT INFO

LABORATORY

Facility Code:* SR0000093 Program Code (MDH Lab Only): PL
 Project Name:* Duluth Dump #1 Project Task Code:* PRJ07955
 Project Manager: MPCA: Jennifer Jevnisek/ AECOM: Ethan Harvey (218) 205-6657
 Potential Hazard? No If yes, add information to Sampler Comments field

Lab Name: Minnesota Department of Health
 Address: 601 Robert Street
 St. Paul, MN 55155
 EPA Lab ID:*



20K0900

SAMPLE DETAILS

ANALYSIS REQUESTED

SAMPLE TYPES		SAMPLING METHODS		LAB MATRICES		FIELD MATRICES		ANALYSIS REQUESTED										
Sample-Routine Sample	G=Grab sample	DW=Drinking Water	BL=Biological Material	Wtr-Ground=Groundwater	FF	PFAS												
QC-FB=Field Blank Sample	CT=Composite, time-paced w/AS	OT=Other	OT=Other	Wtr-Surf=Surface Water	FF	PFAS												
QC-FR=Field Replicate Sample	CF=Composite w/AS	NW=Nonpotable Water	TS=Tissue	Wtr-Drink=Drinking Water	FF	PFAS												
QC-TB=Trip Blank Sample	D-T=Discrete, time-paced w/AS	SD=Soil/Solid		QC-BLANK=Artificial Blank Water	FF	PFAS												
QC-EB=Equipment Blank	D-F=Discrete, flow-paced w/AS	AR=Air		Leachate=Leachate Sample	FF	PFAS												
Treated-Mid=Treatment system sample	SW-GAS=Gas Sampling			Air-Indoor=Indoor Air	FF	PFAS												
Treated-Post=Treatment system sample	Unknown=Unknown			Gas-Soil=Soil Gas	FF	PFAS												
MN Location Identifier*	Field Name	Sample Type*	Start Date* (mm/dd/yyyy)	Start Time* 24 hr (hh:mm)	Start	End	Units (m or ft.)	Sampling Method*	End Date (mm/dd/yyyy)	End Time 24 hr (hh:mm)	Lab Matrix*	Field Matrix* AIS	Sampler Comments (filter volume, special handling, etc.)	# of Cont	ANALYSIS*	PFAS	Lab Sample No.	#
1000020740	RW-17	Sample	11-18-20	0945				G			DW	Wtr-Drink		1	x		1	1
																	2	2
																	3	3
																	4	4
																	5	5
																	6	6
																	7	7
																	8	8
																	9	9
																	10	10

Sampler's Name: *Chloe Malin* Phone#: *608372634* Billing Organization: MPCA Acct#:
 Sampler's Signature: *Chloe Malin* Address: (Attention Jennifer Jevnisek jennifer.jevnisek@state.mn.us)
 Sampler's Organization: *AECOM* Courier Name: Tracking#:

Receiving Comments:

Relinquished By/Affiliation	Date/Time	Accepted By/Affiliation	Date/Time
<i>Chloe Malin / AECOM</i>	<i>11-18-20 / 1415</i>	<i>Curry By MDH</i>	<i>11/18/20</i>

Page 6 of 24

Data in LAB_MN Format for MPCA submittal



MPCA Chain-of-Custody Form revision 2017.0328
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Work Order Number: 3000024908 COC Type: Page: 1 of 1
 Turnaround Time: Std COC ID:

PROJECT/CLIENT INFO

LABORATORY

Facility Code:* SR0000093 Program Code (MDH Lab Only): PL
 Project Name:* Duluth Dump #1 Project Task Code:* PRJ07955
 Project Manager: MPCA: Jennifer Jevnisek/ AECOM: Ethan Harvey (218) 205 - 6657
 Potential Hazard? No If yes, add information to Sampler Comments field

Lab Name: Minnesota Department of Health
 Address: 601 Robert Street
 St. Paul, MN 55155
 EPA Lab ID:*



SAMPLE DETAILS

ANALYSIS REQUESTED

SAMPLE TYPES		SAMPLING METHODS		LAB MATRICES		FIELD MATRICES		ANALYSIS REQUESTED										
Sample=Routine Sample	G=Grab sample	DW=Drinking Water	BL=Biological Material	Wtr-Ground=Groundwater														
QC-FB=Field Blank Sample	CT=Composite, time-paced w/AS	OT=Other	OT=Other	Wtr-Surf=Surface Water														
QC-FR=Field Replicate Sample	CF=Composite w/AS	NW=Nonpotable Water	TS=Tissue	Wtr-Drink=Drinking Water														
QC-TB=Trip Blank Sample	D-T=Discrete, time-paced w/AS	SD=Soil/Solid		QC-BLANK=Artificial Blank Water														
QC-EB=Equipment Blank	D-F=Discrete, flow-paced w/AS	AR=Air		Leachate=Leachate Sample														
Treated-Mid=Treatment system sample	SW-GAS=Gas Sampling			Air-Indoor=Indoor Air														
Treated-Post=Treatment system sample	Unknown=Unknown			Gas-Soil=Soil Gas														
MN Location Identifier*	Field Name	Sample Type*	Start Date* (mm/dd/yyyy)	Start Time* 24 hr (hh:mm)	Start	End	Units (m or ft.)	Sampling Method*	End Date (mm/dd/yyyy)	End Time 24 hr (hh:mm)	Lab Matrix*	Field Matrix* AIS	Sampler Comments (filter volume, special handling, etc.)	# of Cont	ANALYSIS*	PFAS	Lab Sample No.	#
1000020735	RW-3	Sample	11-18-20	1030				G			DW	Wtr-Drink		1	x		1	1
																	2	2
																	3	3
																	4	4
																	5	5
																	6	6
																	7	7
																	8	8
																	9	9
																	10	10

Sampler's Name:* *Chloe Mallin* Phone#: *6083178634* Billing Organization: MPCA Acct#:
 Sampler's Signature:* *Chloe Mallin* Address: (Attention Jennifer Jevnisek jennifer.jevnisek@state.mn.us)
 Sampler's Organization: *AECOM* Courier Name: Tracking#:

Receiving Comments:

Relinquished By/Affiliation	Date/Time	Accepted By/Affiliation	Date/Time
<i>Chloe Mallin / AECOM</i>	<i>11-18-20 / 1415</i>	<i>Chris By MDH</i>	<i>11/19/2020 / 1015</i>

*Data in LAB_MN Format for MPCA submittal



MPCA Chain-of-Custody Form revision 2017.0328
 * indicates a required field

Work Order Number: 3000024908

COC Type:

Page: 1 of 1

Turnaround Time: Std

COC ID:

PROJECT/CLIENT INFO

LABORATORY

Facility Code:* SR0000093 Program Code (MDH Lab Only): PL
 Project Name:* Duluth Dump #1 Project Task Code:* PRJ07955
 Project Manager: MPCA: Jennifer Jevnisek/ AECOM: Ethan Harvey (218) 205-6657
 Potential Hazard? No If yes, add information to Sampler Comments field

Lab Name: Minnesota Department of Health
 Address: 601 Robert Street
 St. Paul, MN 55155
 EPA Lab ID:*



SAMPLE DETAILS

ANALYSIS REQUESTED

SAMPLE TYPES		SAMPLING METHODS		LAB MATRICES		FIELD MATRICES		ANALYSIS REQUESTED								
Sample=Routine Sample QC-FB=Field Blank Sample QC-FR=Field Replicate Sample QC-TB=Trip Blank Sample QC-EB=Equipment Blank Treated-Mid=Treatment system sample Treated-Post=Treatment system sample		G=Grab sample CT=Composite, time-paced w/AS CF=Composite w/AS D-T=Discrete, time-paced w/AS D-F=Discrete, flow-paced w/AS SW-GAS=Gas Sampling Unknown=Unknown		DW=Drinking Water NW=Nonpotable Water SD=Soil/Solid AR=Air		BI=Biological Material OT=Other TS=Tissue		Wtr-Ground=Groundwater Wtr-Surf=Surface Water Wtr-Drink=Drinking Water QC-BLANK=Artificial Blank Water Leachate=Leachate Sample Air-Indoor=Indoor Air Gas-Soil=Soil Gas		PRESERV. FF ANALYSIS* PFAS						
MN Location Identifier*	Field Name	Sample Type*	Start Date* (mm/dd/yyyy)	Start Time* 24 hr (hh:mm)	Start	End	Units (m or ft.)	Sampling Method*	End Date (mm/dd/yyyy)	End Time 24 hr (hh:mm)	Lab Matrix*	Field Matrix* AIS	Sampler Comments (filter volume, special handling, etc.)	# of Cont	Lab Sample No.	#
1000020739	RW-15	Sample									DW	Wtr-Drink				1
Field Duplicate	Field Duplicate	QC-FR Sample	11-18-20					G			DW	Wtr-Drink		1		2
Trip Blank	Trip Blank	QC-TB	11-18-20	0910										1		3
																4
																5
																6
																7
																8
																9
																10

Sampler's Name:* Chloe Malin Phone#: 608-317-8634 Billing Organization: MPCA Acct#:
 Sampler's Signature:* *Chloe Malin* Address: (Attention Jennifer Jevnisek jennifer.jevnisek@state.mn.us)
 Sampler's Organization: AECOM Courier Name: Tracking#:

Receiving Comments:

Relinquished By/Affiliation	Date/Time	Accepted By/Affiliation	Date/Time
Chloe Malin / AECOM	11-18-20/1415	<i>Christy MDH</i>	11/19/2020 10:18

Page 8 of 24

*W
CU
11/20/20*



MPCA Chain-of-Custody Form revision 2017.0322

* indicates a required field

Work Order Number: 3000024908

COC Type:

Page: 1 of 1

Turnaround Time: Std

COC ID:

PROJECT/CLIENT INFO

LABORATORY

FOR LAB USE ONLY

Lab Work Order Sticker

Facility Code:* SR0000093
 Program Code (MDH Lab Only): PL
 Project Name:* Duluth Dump #1
 Project Task Code:* PRJ07955
 Project Manager: MPCA: Jennifer Jevnisek/ AECOM: Ethan Harvey
 Potential Hazard? No
 If yes, add information to **Sampler Comments** field

Lab Name: Minnesota Department of Health
 Address: 601 Robert Street
 St. Paul, MN 55155
 EPA Lab ID:*

SAMPLE DETAILS

ANALYSIS REQUESTED

SAMPLE TYPES
 Sample=Routine Sample
 QC-FB=Field Blank Sample
 QC-FR=Field Replicate Sample
 QC-TB=Trip Blank Sample
 QC-EB=Equipment Blank
 Treated-Mid=Treatment system sample
 Treated-Post=Treatment system sample

SAMPLING METHODS
 G=Grab sample
 CT=Composite, time-paced w/AS
 CF=Composite w/AS
 D-T=Discrete, time-paced w/AS
 D-F=Discrete, flow-paced w/AS
 SW-GAS=Gas Sampling
 Unknown=Unknown

LAB MATRICES
 DW=Drinking Water
 NW=Nonpotable Water
 SD=Soil/Solid
 AR=Air

BL=Biological Material
 OT=Other
 TS=Tissue

FIELD MATRICES
 Wtr-Ground=Groundwater
 Wtr-Surf=Surface Water
 Wtr-Drink=Drinking Water
 QC-BLANK=Artificial Blank Water
 Leachate=Leachate Sample
 Air-Indoor=Indoor Air
 Gas-Soil=Soil Gas

MN Location Identifier*	Field Name	Sample Type*	Start Date* (mm/dd/yyyy)	Start Time* 24 hr (hh:mm)	Depth			Sampling Method*	Complete ONLY if Method is CT, CF, D-T, or D-F		Lab Matrix*	Field Matrix*	AIS	Sampler Comments (filter volume, special handling, etc.)	# of Cont	ANALYSIS*	PRESERV.	PFAS							Lab Sample No.	#	
					Start	End	Units (m or ft.)		End Date (mm/dd/yyyy)	End Time 24 hr (hh:mm)																	
1000020740	RW-17	Sample									DW	Wtr-Drink					x									1	
																										2	
																											3
																											4
																											5
																											6
																											7
																											8
																											9
																											10

Sampler's Name:* _____ Phone#: _____ Billing Organization: MPCA Acct#: _____
 Sampler's Signature:* _____ Address: (Attention Jennifer Jevnisek jennifer.jevnisek@state.mn.us)
 Sampler's Organization: _____ Courier Name: _____ Tracking#: _____

Receiving Comments:

Relinquished By/Affiliation	Date/Time	Accepted By/Affiliation	Date/Time

Data in LAB_MN Format for MPCA submittal

Sample Condition Upon Receipt
Minnesota Department of Health Public Health Laboratory



Data Entry Worksheet

Parcel Information

Date & time of receipt: NOV 19 '20 10:18

Courier: Walk-in FedEx Spee-Dee UPS USPS Other courier _____

Tracking # 8157 3733 6607

After hours drop-off: Refrigerator (207) (186) () Freezer (185) () Unrefrigerated

Parcel: Plastic cooler Styrofoam/cardboard cooler Cardboard box Envelope Plastic can

None Other _____ Info: _____

Custody seals present: No; Yes, If "Yes" Custody seals intact: Yes; No _____

Custody seal # _____ Evidentiary samples identified: No; Yes

Packaging & Temperature Information

Packing material: Bubble wrap Styrofoam Paper None Other _____

Cooling material: Wet ice (loose) Wet ice pack #(2) Gel pack #(4) Dry ice None

Other _____

Condition of cooling material: Solid Partially frozen Liquid; Liquid temperature: _____ °C N/A

Representative sample temperature: 0.8 °C IR thermometer instrument used: A13

Samples received without evidence of freezing: Yes; No _____

Initials of person receiving parcel: JD

Chain of Custody, Sample Container & Analysis Information

Chain of custody received with sample containers: Yes; No

Chain of custody type: Standard Civil Criminal Priority/Emergency Unknown

All sample containers are unique to a sample point listed on the chain of custody: Yes; No

All sample containers have been collected prior to the expiration date listed on container label:

Yes; No; Unknown _____

All sample containers received intact: Yes; No _____

All sample containers received per COC submission: Yes; No _____

All sample containers are appropriate for requested analysis: Yes; No; Unknown

All analysis have been received within the specified holding time for analysis: Yes; No Unknown

Rad Chem. request received: Yes; No, If "Yes" sample survey results: < 0.5 mrem/hr ≥ 0.5 mrem/hr

Rad Chem. meter calibration date verified: Yes; No

Sample submission details are entered in the Environmental Laboratory LIMS.

Initials of person logging in the work order request into LIMS: B

Final Report
Case Narrative

Program Code: PL	Project ID: PRJ07955
Program Name: Metro MERLA-SF	Facility Name: SR0000093
Collected by: Chloe Malin	City: Duluth Dump #1
Collector ID: None	Generated: 12/04/2020 15:35

Except where noted in this report, no additional comments are needed for this Work Order.

Authorized by:

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Paul Moyer, Environmental Laboratory Manager
Public Health Laboratory, Minnesota Department of Health

Final Report
 Analytical Results

Program Code: PL	Project ID: PRJ07955
Program Name: Metro MERLA-SF	Facility Name/ID: SR0000093
Collected By: Chloe Malin	City: Duluth Dump #1
Collector ID: None	Generated: 12/04/20 15:35

MDH Sample Number: 20K0900-01

Location ID: 1000020726	Collect Date: 11/18/20	Field Residual Chlorine Result: None
Field Name: RW-2	Collect Time: 10:45	Field Fluoride Result: None
Sampling Point: None	Matrix: Wtr-Drink	Field pH Result: None
QA Type: None		Field PO ₄ Result: None

Results were produced by the Minnesota Department of Health, except where noted.

PFC Expanded List

Analyte	Analyte Qualifier(s)	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Perfluorobutanesulfonate (PFBS)		<	0.015	ug/L	1	B0K0848	11/30/20 12:14	11/30/20 12:14	MDH 555
Perfluorobutanoic acid (PFBA)		<	0.015	ug/L	1	B0K0848	11/30/20 12:14	11/30/20 12:14	MDH 555
Perfluorohexanesulfonate (PFHxS)		<	0.015	ug/L	1	B0K0848	11/30/20 12:14	11/30/20 12:14	MDH 555
Perfluorohexanoic acid (PFHxA)		<	0.015	ug/L	1	B0K0848	11/30/20 12:14	11/30/20 12:14	MDH 555
Perfluorooctanesulfonate (PFOS)		<	0.015	ug/L	1	B0K0848	11/30/20 12:14	11/30/20 12:14	MDH 555
Perfluorooctanoic acid (PFOA)		<	0.015	ug/L	1	B0K0848	11/30/20 12:14	11/30/20 12:14	MDH 555
Perfluoropentanoic acid (PFPeA)		<	0.015	ug/L	1	B0K0848	11/30/20 12:14	11/30/20 12:14	MDH 555

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 Public Health Laboratory, Minnesota Department of Health

Final Report
 Analytical Results

Program Code: PL	Project ID: PRJ07955
Program Name: Metro MERLA-SF	Facility Name/ID: SR0000093
Collected By: Chloe Malin	City: Duluth Dump #1
Collector ID: None	Generated: 12/04/20 15:35

MDH Sample Number: 20K0900-02

Location ID: 1000020722	Collect Date: 11/18/20	Field Residual Chlorine Result: None
Field Name: RW-1	Collect Time: 13:40	Field Fluoride Result: None
Sampling Point: None	Matrix: Wtr-Drink	Field pH Result: None
QA Type: None		Field PO ₄ Result: None

Receiving Comments: Illegible field matrix. -CNN

Results were produced by the Minnesota Department of Health, except where noted.

PFC Expanded List

Analyte	Analyte Qualifier(s)	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Perfluorobutanesulfonate (PFBS)		<	0.015	ug/L	1	B0K0848	11/30/20 12:22	11/30/20 12:22	MDH 555
Perfluorobutanoic acid (PFBA)		<	0.015	ug/L	1	B0K0848	11/30/20 12:22	11/30/20 12:22	MDH 555
Perfluorohexanesulfonate (PFHxS)		<	0.015	ug/L	1	B0K0848	11/30/20 12:22	11/30/20 12:22	MDH 555
Perfluorohexanoic acid (PFHxA)		<	0.015	ug/L	1	B0K0848	11/30/20 12:22	11/30/20 12:22	MDH 555
Perfluorooctanesulfonate (PFOS)		<	0.015	ug/L	1	B0K0848	11/30/20 12:22	11/30/20 12:22	MDH 555
Perfluorooctanoic acid (PFOA)		<	0.015	ug/L	1	B0K0848	11/30/20 12:22	11/30/20 12:22	MDH 555
Perfluoropentanoic acid (PFPeA)		<	0.015	ug/L	1	B0K0848	11/30/20 12:22	11/30/20 12:22	MDH 555

FINAL REPORT

Report ID: 12042020153615

Authorized by:

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 Public Health Laboratory, Minnesota Department of Health

Final Report
 Analytical Results

Program Code: PL	Project ID: PRJ07955
Program Name: Metro MERLA-SF	Facility Name/ID: SR0000093
Collected By: Chloe Malin	City: Duluth Dump #1
Collector ID: None	Generated: 12/04/20 15:35

MDH Sample Number: 20K0900-03

Location ID: 1000020739	Collect Date: 11/18/20	Field Residual Chlorine Result: None
Field Name: RW-15	Collect Time: 9:10	Field Fluoride Result: None
Sampling Point: None	Matrix: Wtr-Drink	Field pH Result: None
QA Type: None		Field PO ₄ Result: None

Receiving Comments: Extra for MS + MSD -CNN

Results were produced by the Minnesota Department of Health, except where noted.

PFC Expanded List

Analyte	Analyte Qualifier(s)	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Perfluorobutanesulfonate (PFBS)		<	0.015	ug/L	1	B0K0848	11/30/20 12:31	11/30/20 12:31	MDH 555
Perfluorobutanoic acid (PFBA)	J	0.005	0.015	ug/L	1	B0K0848	11/30/20 12:31	11/30/20 12:31	MDH 555
Perfluorohexanesulfonate (PFHxS)		<	0.015	ug/L	1	B0K0848	11/30/20 12:31	11/30/20 12:31	MDH 555
Perfluorohexanoic acid (PFHxA)		<	0.015	ug/L	1	B0K0848	11/30/20 12:31	11/30/20 12:31	MDH 555
Perfluorooctanesulfonate (PFOS)		<	0.015	ug/L	1	B0K0848	11/30/20 12:31	11/30/20 12:31	MDH 555
Perfluorooctanoic acid (PFOA)		<	0.015	ug/L	1	B0K0848	11/30/20 12:31	11/30/20 12:31	MDH 555
Perfluoropentanoic acid (PFPeA)		<	0.015	ug/L	1	B0K0848	11/30/20 12:31	11/30/20 12:31	MDH 555

FINAL REPORT

Report ID: 12042020153615

Authorized by:

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 Public Health Laboratory, Minnesota Department of Health

Final Report
 Analytical Results

Program Code: PL	Project ID: PRJ07955
Program Name: Metro MERLA-SF	Facility Name/ID: SR0000093
Collected By: Chloe Malin	City: Duluth Dump #1
Collector ID: None	Generated: 12/04/20 15:35

MDH Sample Number: 20K0900-04

Location ID: 1000020740	Collect Date: 11/18/20	Field Residual Chlorine Result: None
Field Name: RW-17	Collect Time: 9:45	Field Fluoride Result: None
Sampling Point: None	Matrix: Wtr-Drink	Field pH Result: None
QA Type: None		Field PO ₄ Result: None

Results were produced by the Minnesota Department of Health, except where noted.

PFC Expanded List

Analyte	Analyte Qualifier(s)	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Perfluorobutanesulfonate (PFBS)		<	0.015	ug/L	1	B0K0848	11/30/20 12:55	11/30/20 12:55	MDH 555
Perfluorobutanoic acid (PFBA)		<	0.015	ug/L	1	B0K0848	11/30/20 12:55	11/30/20 12:55	MDH 555
Perfluorohexanesulfonate (PFHxS)		<	0.015	ug/L	1	B0K0848	11/30/20 12:55	11/30/20 12:55	MDH 555
Perfluorohexanoic acid (PFHxA)		<	0.015	ug/L	1	B0K0848	11/30/20 12:55	11/30/20 12:55	MDH 555
Perfluorooctanesulfonate (PFOS)		<	0.015	ug/L	1	B0K0848	11/30/20 12:55	11/30/20 12:55	MDH 555
Perfluorooctanoic acid (PFOA)		<	0.015	ug/L	1	B0K0848	11/30/20 12:55	11/30/20 12:55	MDH 555
Perfluoropentanoic acid (PFPeA)		<	0.015	ug/L	1	B0K0848	11/30/20 12:55	11/30/20 12:55	MDH 555

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 Public Health Laboratory, Minnesota Department of Health

Final Report
 Analytical Results

Program Code: PL	Project ID: PRJ07955
Program Name: Metro MERLA-SF	Facility Name/ID: SR0000093
Collected By: Chloe Malin	City: Duluth Dump #1
Collector ID: None	Generated: 12/04/20 15:35

MDH Sample Number: 20K0900-05

Location ID: 1000020735	Collect Date: 11/18/20	Field Residual Chlorine Result: None
Field Name: RW-3	Collect Time: 10:20	Field Fluoride Result: None
Sampling Point: None	Matrix: Wtr-Drink	Field pH Result: None
QA Type: None		Field PO ₄ Result: None

Results were produced by the Minnesota Department of Health, except where noted.

PFC Expanded List

Analyte	Analyte Qualifier(s)	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Perfluorobutanesulfonate (PFBS)		<	0.015	ug/L	1	B0K0848	11/30/20 13:03	11/30/20 13:03	MDH 555
Perfluorobutanoic acid (PFBA)		<	0.015	ug/L	1	B0K0848	11/30/20 13:03	11/30/20 13:03	MDH 555
Perfluorohexanesulfonate (PFHxS)		<	0.015	ug/L	1	B0K0848	11/30/20 13:03	11/30/20 13:03	MDH 555
Perfluorohexanoic acid (PFHxA)		<	0.015	ug/L	1	B0K0848	11/30/20 13:03	11/30/20 13:03	MDH 555
Perfluorooctanesulfonate (PFOS)		<	0.015	ug/L	1	B0K0848	11/30/20 13:03	11/30/20 13:03	MDH 555
Perfluorooctanoic acid (PFOA)		<	0.015	ug/L	1	B0K0848	11/30/20 13:03	11/30/20 13:03	MDH 555
Perfluoropentanoic acid (PFPeA)		<	0.015	ug/L	1	B0K0848	11/30/20 13:03	11/30/20 13:03	MDH 555

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Paul Moyer, Environmental Laboratory Manager
 Public Health Laboratory, Minnesota Department of Health

Final Report
 Analytical Results

Program Code: PL	Project ID: PRJ07955
Program Name: Metro MERLA-SF	Facility Name/ID: SR0000093
Collected By: Chloe Malin	City: Duluth Dump #1
Collector ID: None	Generated: 12/04/20 15:35

MDH Sample Number: 20K0900-06

Location ID: Field Duplicate	Collect Date: 11/18/20	Field Residual Chlorine Result: None
Field Name: Field Duplicate	Collect Time: 9:10	Field Fluoride Result: None
Sampling Point: None	Matrix: Wtr-Drink	Field pH Result: None
QA Type: Field Dup/Rep		Field PO ₄ Result: None

Receiving Comments: No collection time. -CNN

Results were produced by the Minnesota Department of Health, except where noted.

PFC Expanded List

Analyte	Analyte Qualifier(s)	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Perfluorobutanesulfonate (PFBS)		<	0.015	ug/L	1	B0K0849	11/30/20 13:35	11/30/20 13:35	MDH 555
Perfluorobutanoic acid (PFBA)		<	0.015	ug/L	1	B0K0849	11/30/20 13:35	11/30/20 13:35	MDH 555
Perfluorohexanesulfonate (PFHxS)		<	0.015	ug/L	1	B0K0849	11/30/20 13:35	11/30/20 13:35	MDH 555
Perfluorohexanoic acid (PFHxA)		<	0.015	ug/L	1	B0K0849	11/30/20 13:35	11/30/20 13:35	MDH 555
Perfluorooctanesulfonate (PFOS)		<	0.015	ug/L	1	B0K0849	11/30/20 13:35	11/30/20 13:35	MDH 555
Perfluorooctanoic acid (PFOA)		<	0.015	ug/L	1	B0K0849	11/30/20 13:35	11/30/20 13:35	MDH 555
Perfluoropentanoic acid (PFPeA)		<	0.015	ug/L	1	B0K0849	11/30/20 13:35	11/30/20 13:35	MDH 555

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 Public Health Laboratory, Minnesota Department of Health

Final Report
 Analytical Results

Program Code: PL	Project ID: PRJ07955
Program Name: Metro MERLA-SF	Facility Name/ID: SR0000093
Collected By: Chloe Malin	City: Duluth Dump #1
Collector ID: None	Generated: 12/04/20 15:35

MDH Sample Number: 20K0900-07

Location ID: Trip Blank	Collect Date: 11/18/20	Field Residual Chlorine Result: None
Field Name: Trip Blank	Collect Time: 9:10	Field Fluoride Result: None
Sampling Point: None	Matrix: Wtr-Drink	Field pH Result: None
QA Type: Trip Blank		Field PO ₄ Result: None

Receiving Comments: No lab/field matrix. -CNN

Results were produced by the Minnesota Department of Health, except where noted.

PFC Expanded List

Analyte	Analyte Qualifier(s)	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method
Perfluorobutanesulfonate (PFBS)		<	0.015	ug/L	1	B0K0849	11/30/20 13:43	11/30/20 13:43	MDH 555
Perfluorobutanoic acid (PFBA)		<	0.015	ug/L	1	B0K0849	11/30/20 13:43	11/30/20 13:43	MDH 555
Perfluorohexanesulfonate (PFHxS)		<	0.015	ug/L	1	B0K0849	11/30/20 13:43	11/30/20 13:43	MDH 555
Perfluorohexanoic acid (PFHxA)		<	0.015	ug/L	1	B0K0849	11/30/20 13:43	11/30/20 13:43	MDH 555
Perfluorooctanesulfonate (PFOS)		<	0.015	ug/L	1	B0K0849	11/30/20 13:43	11/30/20 13:43	MDH 555
Perfluorooctanoic acid (PFOA)		<	0.015	ug/L	1	B0K0849	11/30/20 13:43	11/30/20 13:43	MDH 555
Perfluoropentanoic acid (PFPeA)		<	0.015	ug/L	1	B0K0849	11/30/20 13:43	11/30/20 13:43	MDH 555

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Paul Moyer, Environmental Laboratory Manager
 Public Health Laboratory, Minnesota Department of Health

Final Report
Quality Control

Program Code: PL	Project ID: PRJ07955
Program Name: Metro MERLA-SF	Facility Name/ID: SR0000093
Collected By: Chloe Malin	City: Duluth Dump #1
Collector ID: None	Generated: 12/04/20 15:35

Batch Summary

Samples in Batch: B0K0848 - PFCs Preparation

20K0900-01 20K0900-02 20K0900-03 20K0900-04 20K0900-05

Samples in Batch: B0K0849 - PFCs Preparation

20K0900-06 20K0900-07

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Public Health Laboratory, Minnesota Department of Health

Final Report
 Quality Control

Program Code: PL	Project ID: PRJ07955
Program Name: Metro MERLA-SF	Facility Name/ID: SR0000093
Collected By: Chloe Malin	City: Duluth Dump #1
Collector ID: None	Generated: 12/04/20 15:35

Results were produced by Minnesota Department of Health, except where noted.

Batch B0K0848 - PFCs Preparation

Blank (B0K0848-BLK1)

Prepared: 11/30/20 10:06 Analyzed: 11/30/20 10:06

Analyte	Analyte Qualifier(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Perfluorobutanesulfonate (PFBS)		<	0.015	ug/L						
Perfluorobutanoic acid (PFBA)		<	0.015	ug/L						
Perfluorohexanesulfonate (PFHxS)		<	0.015	ug/L						
Perfluorohexanoic acid (PFHxA)		<	0.015	ug/L						
Perfluorooctanesulfonate (PFOS)		<	0.015	ug/L						
Perfluorooctanoic acid (PFOA)		<	0.015	ug/L						
Perfluoropentanoic acid (PFPeA)		<	0.015	ug/L						

Blank (B0K0848-BLK2)

Prepared: 11/30/20 13:27 Analyzed: 11/30/20 13:27

Analyte	Analyte Qualifier(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Perfluorobutanesulfonate (PFBS)		<	0.015	ug/L						
Perfluorobutanoic acid (PFBA)		<	0.015	ug/L						
Perfluorohexanesulfonate (PFHxS)		<	0.015	ug/L						
Perfluorohexanoic acid (PFHxA)		<	0.015	ug/L						
Perfluorooctanesulfonate (PFOS)		<	0.015	ug/L						
Perfluorooctanoic acid (PFOA)		<	0.015	ug/L						
Perfluoropentanoic acid (PFPeA)		<	0.015	ug/L						

LCS (B0K0848-BS1)

Prepared: 11/30/20 09:57 Analyzed: 11/30/20 09:57

Analyte	Analyte Qualifier(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Perfluorobutanesulfonate (PFBS)		0.51	0.015	ug/L	0.50		101	80-120		
Perfluorobutanoic acid (PFBA)		0.50	0.015	ug/L	0.5		99	80-120		
Perfluorohexanesulfonate (PFHxS)		0.49	0.015	ug/L	0.50		99	80-120		
Perfluorohexanoic acid (PFHxA)		0.49	0.015	ug/L	0.5		97	80-120		
Perfluorooctanesulfonate (PFOS)		0.49	0.015	ug/L	0.49		99	80-120		
Perfluorooctanoic acid (PFOA)		0.47	0.015	ug/L	0.5		94	80-120		
Perfluoropentanoic acid (PFPeA)		0.49	0.015	ug/L	0.5		99	80-120		

LCS Dup (B0K0848-BSD1)

Prepared: 11/30/20 13:19 Analyzed: 11/30/20 13:19

Analyte	Analyte Qualifier(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Perfluorobutanesulfonate (PFBS)		0.47	0.015	ug/L	0.50		94	80-120	7	20
Perfluorobutanoic acid (PFBA)		0.50	0.015	ug/L	0.5		101	80-120	2	20
Perfluorohexanesulfonate (PFHxS)		0.44	0.015	ug/L	0.50		89	80-120	11	20

FINAL REPORT

Report ID: 12042020153615

Authorized by:

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Paul Moyer, Environmental Laboratory Manager
 Public Health Laboratory, Minnesota Department of Health

Final Report
 Quality Control

Program Code: PL	Project ID: PRJ07955
Program Name: Metro MERLA-SF	Facility Name/ID: SR0000093
Collected By: Chloe Malin	City: Duluth Dump #1
Collector ID: None	Generated: 12/04/20 15:35

Results were produced by Minnesota Department of Health, except where noted.

Batch B0K0848 - PFCs Preparation

LCS Dup (B0K0848-BSD1)

Prepared: 11/30/20 13:19 Analyzed: 11/30/20 13:19

Analyte	Analyte Qualifier(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Perfluorohexanoic acid (PFHxA)		0.49	0.015	ug/L	0.5		97	80-120	0.1	20
Perfluorooctanesulfonate (PFOS)		0.49	0.015	ug/L	0.49		99	80-120	0.008	20
Perfluorooctanoic acid (PFOA)		0.42	0.015	ug/L	0.5		84	80-120	11	20
Perfluoropentanoic acid (PFPeA)		0.49	0.015	ug/L	0.5		98	80-120	0.6	20

Matrix Spike (B0K0848-MS1)

Source: 20K0900-03

Prepared: 11/30/20 12:39 Analyzed: 11/30/20 12:39

Analyte	Analyte Qualifier(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Perfluorobutanesulfonate (PFBS)		0.47	0.015	ug/L	0.50	<	95	70-130		
Perfluorobutanoic acid (PFBA)		0.49	0.015	ug/L	0.5	<	97	70-130		
Perfluorohexanesulfonate (PFHxS)		0.47	0.015	ug/L	0.50	<	94	70-130		
Perfluorohexanoic acid (PFHxA)		0.44	0.015	ug/L	0.5	<	88	70-130		
Perfluorooctanesulfonate (PFOS)		0.49	0.015	ug/L	0.49	<	98	70-130		
Perfluorooctanoic acid (PFOA)		0.43	0.015	ug/L	0.5	<	86	70-130		
Perfluoropentanoic acid (PFPeA)		0.49	0.015	ug/L	0.5	<	99	70-130		

Matrix Spike Dup (B0K0848-MSD1)

Source: 20K0900-03

Prepared: 11/30/20 12:47 Analyzed: 11/30/20 12:47

Analyte	Analyte Qualifier(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Perfluorobutanesulfonate (PFBS)		0.49	0.015	ug/L	0.50	<	97	70-130	3	20
Perfluorobutanoic acid (PFBA)		0.48	0.015	ug/L	0.5	<	96	70-130	2	20
Perfluorohexanesulfonate (PFHxS)		0.47	0.015	ug/L	0.50	<	95	70-130	0.8	20
Perfluorohexanoic acid (PFHxA)		0.48	0.015	ug/L	0.5	<	95	70-130	8	20
Perfluorooctanesulfonate (PFOS)		0.50	0.015	ug/L	0.49	<	100	70-130	3	20
Perfluorooctanoic acid (PFOA)		0.47	0.015	ug/L	0.5	<	93	70-130	8	20
Perfluoropentanoic acid (PFPeA)		0.49	0.015	ug/L	0.5	<	98	70-130	0.8	20

Batch B0K0849 - PFCs Preparation

Blank (B0K0849-BLK1)

Prepared: 11/30/20 13:27 Analyzed: 11/30/20 13:27

Analyte	Analyte Qualifier(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Perfluorobutanesulfonate (PFBS)		<	0.015	ug/L						
Perfluorobutanoic acid (PFBA)		<	0.015	ug/L						
Perfluorohexanesulfonate (PFHxS)		<	0.015	ug/L						
Perfluorohexanoic acid (PFHxA)		<	0.015	ug/L						

FINAL REPORT

Report ID: 12042020153615

Authorized by:

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Paul Moyer, Environmental Laboratory Manager
 Public Health Laboratory, Minnesota Department of Health

Final Report
 Quality Control

Program Code: PL	Project ID: PRJ07955
Program Name: Metro MERLA-SF	Facility Name/ID: SR0000093
Collected By: Chloe Malin	City: Duluth Dump #1
Collector ID: None	Generated: 12/04/20 15:35

Results were produced by Minnesota Department of Health, except where noted.

Batch B0K0849 - PFCs Preparation

Blank (B0K0849-BLK1)

Prepared: 11/30/20 13:27 Analyzed: 11/30/20 13:27

Analyte	Analyte Qualifier(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Perfluorooctanesulfonate (PFOS)		<	0.015	ug/L						
Perfluorooctanoic acid (PFOA)		<	0.015	ug/L						
Perfluoropentanoic acid (PFPeA)		<	0.015	ug/L						

Blank (B0K0849-BLK2)

Prepared: 11/30/20 16:48 Analyzed: 11/30/20 16:48

Analyte	Analyte Qualifier(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Perfluorobutanesulfonate (PFBS)		<	0.015	ug/L						
Perfluorobutanoic acid (PFBA)		<	0.015	ug/L						
Perfluorohexanesulfonate (PFHxS)		<	0.015	ug/L						
Perfluorohexanoic acid (PFHxA)		<	0.015	ug/L						
Perfluorooctanesulfonate (PFOS)		<	0.015	ug/L						
Perfluorooctanoic acid (PFOA)		<	0.015	ug/L						
Perfluoropentanoic acid (PFPeA)		<	0.015	ug/L						

LCS (B0K0849-BS1)

Prepared: 11/30/20 13:19 Analyzed: 11/30/20 13:19

Analyte	Analyte Qualifier(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Perfluorobutanesulfonate (PFBS)		0.47	0.015	ug/L	0.50		94	80-120		
Perfluorobutanoic acid (PFBA)		0.50	0.015	ug/L	0.5		101	80-120		
Perfluorohexanesulfonate (PFHxS)		0.44	0.015	ug/L	0.50		89	80-120		
Perfluorohexanoic acid (PFHxA)		0.49	0.015	ug/L	0.5		97	80-120		
Perfluorooctanesulfonate (PFOS)		0.49	0.015	ug/L	0.49		99	80-120		
Perfluorooctanoic acid (PFOA)		0.42	0.015	ug/L	0.5		84	80-120		
Perfluoropentanoic acid (PFPeA)		0.49	0.015	ug/L	0.5		98	80-120		

LCS Dup (B0K0849-BSD1)

Prepared: 11/30/20 16:40 Analyzed: 11/30/20 16:40

Analyte	Analyte Qualifier(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Perfluorobutanesulfonate (PFBS)		0.47	0.015	ug/L	0.50		95	80-120	0.7	20
Perfluorobutanoic acid (PFBA)		0.48	0.015	ug/L	0.5		97	80-120	4	20
Perfluorohexanesulfonate (PFHxS)		0.47	0.015	ug/L	0.50		94	80-120	6	20
Perfluorohexanoic acid (PFHxA)		0.46	0.015	ug/L	0.5		93	80-120	4	20
Perfluorooctanesulfonate (PFOS)		0.49	0.015	ug/L	0.49		97	80-120	2	20
Perfluorooctanoic acid (PFOA)		0.43	0.015	ug/L	0.5		86	80-120	3	20
Perfluoropentanoic acid (PFPeA)		0.50	0.015	ug/L	0.5		100	80-120	1	20

FINAL REPORT

Report ID: 12042020153615

Authorized by:

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Paul Moyer, Environmental Laboratory Manager
 Public Health Laboratory, Minnesota Department of Health

Final Report
 Quality Control

Program Code: PL	Project ID: PRJ07955
Program Name: Metro MERLA-SF	Facility Name/ID: SR0000093
Collected By: Chloe Malin	City: Duluth Dump #1
Collector ID: None	Generated: 12/04/20 15:35

Results were produced by Minnesota Department of Health, except where noted.

Batch B0K0849 - PFCs Preparation

Matrix Spike (B0K0849-MS1) Source: 20K0997-01 Prepared: 11/30/20 15:04 Analyzed: 11/30/20 15:04

Analyte	Analyte Qualifier(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Perfluorobutanesulfonate (PFBS)		0.50	0.015	ug/L	0.50	<	100	70-130		
Perfluorobutanoic acid (PFBA)		0.78	0.015	ug/L	0.5	0.28	100	70-130		
Perfluorohexanesulfonate (PFHxS)		0.50	0.015	ug/L	0.50	<	98	70-130		
Perfluorohexanoic acid (PFHxA)		0.51	0.015	ug/L	0.5	<	101	70-130		
Perfluorooctanesulfonate (PFOS)		0.48	0.015	ug/L	0.49	<	96	70-130		
Perfluorooctanoic acid (PFOA)	W4	0.53	0.015	ug/L	0.5	<	104	70-130		
Perfluoropentanoic acid (PFPeA)		0.51	0.015	ug/L	0.5	0.016	98	70-130		

Matrix Spike Dup (B0K0849-MSD1) Source: 20K0997-01 Prepared: 11/30/20 15:12 Analyzed: 11/30/20 15:12

Analyte	Analyte Qualifier(s)	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Perfluorobutanesulfonate (PFBS)		0.48	0.015	ug/L	0.50	<	96	70-130	4	20
Perfluorobutanoic acid (PFBA)		0.78	0.015	ug/L	0.5	0.28	100	70-130	0.09	20
Perfluorohexanesulfonate (PFHxS)		0.47	0.015	ug/L	0.50	<	93	70-130	5	20
Perfluorohexanoic acid (PFHxA)		0.44	0.015	ug/L	0.5	<	88	70-130	14	20
Perfluorooctanesulfonate (PFOS)		0.51	0.015	ug/L	0.49	<	102	70-130	7	20
Perfluorooctanoic acid (PFOA)	W4	0.43	0.015	ug/L	0.5	<	84	70-130	20	20
Perfluoropentanoic acid (PFPeA)		0.50	0.015	ug/L	0.5	0.016	97	70-130	1	20

Authorized by:

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Paul Moyer, Environmental Laboratory Manager
 Public Health Laboratory, Minnesota Department of Health

Final Report
Quality Control

Data Qualifiers and Definitions

W4	Matrix spike/matrix spike duplicate relative percent difference exceeded the laboratory acceptance limit. Recovery met acceptance criteria.
J	Analyte was present between the method detection limit and reporting limit and should be considered an estimated value.
Dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
%REC	Percent Recovery

Authorized by:

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Paul Moyer, Environmental Laboratory Manager
Public Health Laboratory, Minnesota Department of Health

December 18, 2020

Ethan Harvey
AECOM
230 W Superior St
Suite 400
Duluth, MN 55802

RE: Project: Duluth Dump #1
Pace Project No.: 10539716

Dear Ethan Harvey:

Enclosed are the analytical results for sample(s) received by the laboratory on November 18, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

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

- Pace Analytical Services - Minneapolis

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

Sincerely,



Tina Soltani
tina.soltani@pacelabs.com
(612) 607-6384
Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: Duluth Dump #1

Pace Project No.: 10539716

Pace Analytical Services - Minneapolis MN

1700 Elm Street SE, Minneapolis, MN 55414

1800 Elm Street SE, Minneapolis, MN 55414--Satellite Air Lab

A2LA Certification #: 2926.01*

Alabama Certification #: 40770

Alaska Contaminated Sites Certification #: 17-009*

Alaska DW Certification #: MN00064

Arizona Certification #: AZ0014*

Arkansas DW Certification #: MN00064

Arkansas WW Certification #: 88-0680

California Certification #: 2929

Colorado Certification #: MN00064

Connecticut Certification #: PH-0256

EPA Region 8+Wyoming DW Certification #: via MN 027-053-137

Florida Certification #: E87605*

Georgia Certification #: 959

Hawaii Certification #: MN00064

Idaho Certification #: MN00064

Illinois Certification #: 200011

Indiana Certification #: C-MN-01

Iowa Certification #: 368

Kansas Certification #: E-10167

Kentucky DW Certification #: 90062

Kentucky WW Certification #: 90062

Louisiana DEQ Certification #: AI-03086*

Louisiana DW Certification #: MN00064

Maine Certification #: MN00064*

Maryland Certification #: 322

Massachusetts DWP Certification #: via MN 027-053-137

Michigan Certification #: 9909

Minnesota Certification #: 027-053-137*

Minnesota Dept of Ag Certification #: via MN 027-053-137

Minnesota Petrofund Certification #: 1240*

Mississippi Certification #: MN00064

Missouri Certification #: 10100

Montana Certification #: CERT0092

Nebraska Certification #: NE-OS-18-06

Nevada Certification #: MN00064

New Hampshire Certification #: 2081*

New Jersey Certification #: MN002

New York Certification #: 11647*

North Carolina DW Certification #: 27700

North Carolina WW Certification #: 530

North Dakota Certification #: R-036

Ohio DW Certification #: 41244

Ohio VAP Certification #: CL101

Oklahoma Certification #: 9507*

Oregon Primary Certification #: MN300001

Oregon Secondary Certification #: MN200001*

Pennsylvania Certification #: 68-00563*

Puerto Rico Certification #: MN00064

South Carolina Certification #: 74003001

Tennessee Certification #: TN02818

Texas Certification #: T104704192*

Utah Certification #: MN00064*

Vermont Certification #: VT-027053137

Virginia Certification #: 460163*

Washington Certification #: C486*

West Virginia DEP Certification #: 382

West Virginia DW Certification #: 9952 C

Wisconsin Certification #: 999407970

Wyoming UST Certification #: via A2LA 2926.01

USDA Permit #: P330-19-00208

Please Note: Applicable air certifications are denoted with an asterisk ().

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: Duluth Dump #1
Pace Project No.: 10539716

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10539716001	RW-1	Water	11/18/20 13:40	11/18/20 18:15

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: Duluth Dump #1

Pace Project No.: 10539716

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10539716001	RW-1	EPA 8270E by SIM	CH3, ZT	2

PASI-M = Pace Analytical Services - Minneapolis

REPORT OF LABORATORY ANALYSIS

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SUMMARY OF DETECTION

Project: Duluth Dump #1

Pace Project No.: 10539716

Lab Sample ID Method	Client Sample ID Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
10539716001	RW-1					
EPA 8270E by SIM	1,4-Dioxane (SIM)	0.36	ug/L	0.24	12/04/20 19:36	B,H2

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Duluth Dump #1

Pace Project No.: 10539716

Method: EPA 8270E by SIM

Description: 8270E MSSV 14 Dioxane By SIM

Client: AECOM MN ND

Date: December 18, 2020

General Information:

1 sample was analyzed for EPA 8270E by SIM by Pace Analytical Services Minneapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

H2: Extraction or preparation was conducted outside of the recognized method holding time.

- RW-1 (Lab ID: 10539716001)

Sample Preparation:

The samples were prepared in accordance with EPA Mod. 3510C with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

QC Batch: 712569

S0: Surrogate recovery outside laboratory control limits.

- BLANK (Lab ID: 3804879)
 - 1,4-Dioxane-d8 (S)
- LCS (Lab ID: 3804880)
 - 1,4-Dioxane-d8 (S)
- MS (Lab ID: 3804881)
 - 1,4-Dioxane-d8 (S)
- MSD (Lab ID: 3804882)
 - 1,4-Dioxane-d8 (S)

QC Batch: 713669

S0: Surrogate recovery outside laboratory control limits.

- BLANK (Lab ID: 3810065)
 - 1,4-Dioxane-d8 (S)
- LCS (Lab ID: 3810066)
 - 1,4-Dioxane-d8 (S)
- RW-1 (Lab ID: 10539716001)
 - 1,4-Dioxane-d8 (S)

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Duluth Dump #1

Pace Project No.: 10539716

Method: EPA 8270E by SIM

Description: 8270E MSSV 14 Dioxane By SIM

Client: AECOM MN ND

Date: December 18, 2020

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: 713669

B: Analyte was detected in the associated method blank.

- BLANK for HBN 713669 [OEXT/573 (Lab ID: 3810065)]
 - 1,4-Dioxane (SIM)

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Duluth Dump #1

Pace Project No.: 10539716

Sample: RW-1		Lab ID: 10539716001		Collected: 11/18/20 13:40		Received: 11/18/20 18:15		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270E MSSV 14 Dioxane By SIM		Analytical Method: EPA 8270E by SIM Preparation Method: EPA Mod. 3510C Pace Analytical Services - Minneapolis							
1,4-Dioxane (SIM)	ND	ug/L	0.24	0.10	1	11/23/20 11:38	11/24/20 22:28	123-91-1	
1,4-Dioxane (SIM)	0.36	ug/L	0.24	0.10	1	12/01/20 18:25	12/04/20 19:36	123-91-1	B,H2
Surrogates									
1,4-Dioxane-d8 (S)	26	%	30-125		1	12/01/20 18:25	12/04/20 19:36		S0
1,4-Dioxane-d8 (S)	30	%	30-125		1	11/23/20 11:38	11/24/20 22:28		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Duluth Dump #1
Pace Project No.: 10539716

QC Batch: 712569	Analysis Method: EPA 8270E by SIM
QC Batch Method: EPA Mod. 3510C	Analysis Description: 8270E Water 14 Dioxane by SIM
	Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10539716001

METHOD BLANK: 3804879 Matrix: Water

Associated Lab Samples: 10539716001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,4-Dioxane (SIM)	ug/L	ND	0.25	0.11	11/30/20 22:07	
1,4-Dioxane-d8 (S)	%.	25	30-125		11/30/20 22:07	S0

LABORATORY CONTROL SAMPLE: 3804880

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,4-Dioxane (SIM)	ug/L	10	10.1	101	32-128	
1,4-Dioxane-d8 (S)	%.			24	30-125	S0

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3804881 3804882

Parameter	Units	10539722001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,4-Dioxane (SIM)	ug/L	ND	10	10	10.7	11.2	107	112	32-130	4	30	
1,4-Dioxane-d8 (S)	%.						28	28	30-125			S0

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Duluth Dump #1
Pace Project No.: 10539716

QC Batch: 713669	Analysis Method: EPA 8270E by SIM
QC Batch Method: EPA Mod. 3510C	Analysis Description: 8270E Water 14 Dioxane by SIM
	Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10539716001

METHOD BLANK: 3810065 Matrix: Water

Associated Lab Samples: 10539716001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,4-Dioxane (SIM)	ug/L	0.40	0.25	0.11	12/04/20 17:10	
1,4-Dioxane-d8 (S)	%.	26	30-125		12/04/20 17:10	S0

LABORATORY CONTROL SAMPLE: 3810066

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,4-Dioxane (SIM)	ug/L	10	9.3	93	32-128	
1,4-Dioxane-d8 (S)	%.			23	30-125	S0

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3825961 3825962

Parameter	Units	10539722001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,4-Dioxane (SIM)	ug/L	ND	10	10	10	10.5	98	103	32-130	5	30	
1,4-Dioxane-d8 (S)	%.						32	35	30-125			

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

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: Duluth Dump #1
Pace Project No.: 10539716

DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

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

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B Analyte was detected in the associated method blank.

H2 Extraction or preparation was conducted outside of the recognized method holding time.

S0 Surrogate recovery outside laboratory control limits.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Duluth Dump #1

Pace Project No.: 10539716

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10539716001	RW-1	EPA Mod. 3510C	712569	EPA 8270E by SIM	712977
10539716001	RW-1	EPA Mod. 3510C	713669	EPA 8270E by SIM	714371

REPORT OF LABORATORY ANALYSIS

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MPCA Chain-of-Custody Form revision 2017.0328
* indicates a required field

Work Order Number: 3000024908 COC Type: Page: 1 of 1

Turnaround Time: Std COC ID:

PROJECT/CLIENT INFO

LABORATORY

FOR LAB USE ONLY

Lab Work Order Sticker

Facility Code:* SR0000093 Program Code (MDH Lab Only):
Project Name:* Duluth Dump #1 Project Task Code:* PRJ07955
Project Manager: MPCA: Jennifer Jevnisek/ AECOM: Ethan Harvey
Potential Hazard? No If yes, add information to Sampler Comments field

Lab Name: Pace Analytical (Tina Soltani)
Address: 1800 Elm Street SE
Minneapolis, MN 55414
EPA Lab ID:*

SAMPLE DETAILS

ANALYSIS REQUESTED

SAMPLE TYPES
Sample=Routine Sample
QC-FB=Field Blank Sample
QC-FR=Field Replicate Sample
QC-TB=Trip Blank Sample
QC-EB=Equipment Blank
Treated-Mid=Treatment system sample
Treated-Post=Treatment system sample

SAMPLING METHODS
G=Grab sample
CT=Composite, time-paced w/AS
CF=Composite w/AS
D-T=Discrete, time-paced w/AS
D-F=Discrete, flow-paced w/AS
SW-GAS=Gas Sampling
Unknown=Unknown

LAB MATRICES
DW=Drinking Water
NW=Nonpotable Water
SD=Soil/Solid
AR=Air

BL=Biological Material
OT=Other
TS=Tissue

FIELD MATRICES
Wtr-Ground=Groundwater
Wtr-Surf=Surface Water
Wtr-Drink=Drinking Water
QC-BLANK=Artificial Blank Water
Leachate=Leachate Sample
Air-Indoor=Indoor Air
Gas-Soil=Soil Gas

MN Location Identifier*	Field Name	Sample Type*	Start Date* (mm/dd/yyyy)	Start Time* 24 hr (hh:mm)	Start	End	Units (m or ft.)	Sampling Method*	Complete ONLY if Method is CT, CF, D-T, or D-F		Lab Matrix*	Field Matrix* AIS	Sampler Comments (filter volume, special handling, etc.)	# of Cont	ANALYSIS*	PRESERV.	Lab Sample No.	#
									End Time 24 hr (hh:mm)									
1000020722	RW-1	Sample	11-18-20					G			DW	Wtr-Drink		2			x	1
																		2
																		3
																		4
																		5
																		6
																		7
																		8
																		9
																		10

WO#: 10539716



Sampler's Name:* *Chloe Malin* Phone#: *608378634*
Sampler's Signature:* *Chloe Malin*
Sampler's Organization: **AECOM**

Billing Organization: AECOM Acct#:
Address: USAPImaging@aecom.com (Ethan Harvey / AECOM Project #60645588)
Courier Name: Tracking#:

Reinquished By/Affiliation	Date/Time	Accepted By/Affiliation	Date/Time
<i>Chloe Malin / AECOM</i>	11-18-20 15:20	<i>John Pace / AECOM</i>	11/18/2020 15:20
<i>John Pace / AECOM</i>	11/18/2020 15:24	<i>John Pace / AECOM</i>	11/18/20 18:15

Process Data in LAB MN Format for MPCA submittal



Document Name:
Sample Condition Upon Receipt (SCUR) - MN

Document Revised: 12Aug2020
Page 1 of 1

Document No.:
ENV-FRM-MIN4-0150 Rev.01

Pace Analytical Services -
Minneapolis

Sample Condition Upon Receipt

Client Name:

Project #:

MPCA

WO# : 10539716

Courier: Fed Ex UPS USPS Client
 Pace SpeedDee Commercial

PM: TS1 Due Date: 12/07/20
CLIENT: AECOM

Tracking Number: _____ See Exceptions
ENV-FRM-MIN4-0142

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

Packing Material: Bubble Wrap Bubble Bags None Other: _____ Temp Blank? Yes No

Thermometer: T1(0461) T2(1336) T3(0459)
 T4(0254) T5(0489) Type of Ice: Wet Blue None Dry Melted

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

Temp should be above freezing to 6°C Cooler Temp Read w/temp blank: 0.3 °C Average Corrected Temp (no temp blank only): _____ °C See Exceptions ENV-FRM-MIN4-0142 1 Container
Correction Factor: true Cooler Temp Corrected w/temp blank: 0.3 °C

USDA Regulated Soil: (N/A, water sample/Other: _____) Date/Initials of Person Examining Contents: M/11.18.20

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? Yes No Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? Yes No

If Yes to either question, fill out a Regulated Soil Checklist (E-MN-Q-338) and include with SCUR/COC paperwork.

		COMMENTS:
Chain of Custody Present and Filled Out?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	1.
Chain of Custody Relinquished?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	2.
Sampler Name and/or Signature on COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	4.
Short Hold Time Analysis (<72 hr)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. <input type="checkbox"/> Fecal Coliform <input type="checkbox"/> HPC <input type="checkbox"/> Total Coliform/E coli <input type="checkbox"/> BOD/cBOD <input type="checkbox"/> Hex Chrome <input type="checkbox"/> Turbidity <input type="checkbox"/> Nitrate <input type="checkbox"/> Nitrite <input type="checkbox"/> Orthophos <input type="checkbox"/> Other
Rush Turn Around Time Requested?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6.
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	7.
Correct Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	8.
-Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Containers Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.
Field Filtered Volume Received for Dissolved Tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	10. Is sediment visible in the dissolved container? <input type="checkbox"/> Yes <input type="checkbox"/> No
Is sufficient information available to reconcile the samples to the COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	11. If no, write ID/ Date/Time on Container Below: <input type="checkbox"/> See Exception ENV-FRM-MIN4-0142
Matrix: <input checked="" type="checkbox"/> Water <input type="checkbox"/> Soil <input type="checkbox"/> Oil <input type="checkbox"/> Other		
All containers needing acid/base preservation have been checked?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO ₃ , H ₂ SO ₄ , <2pH, NaOH >9 Sulfide, NaOH >10 Cyanide)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	<input type="checkbox"/> NaOH <input type="checkbox"/> HNO ₃ <input type="checkbox"/> H ₂ SO ₄ <input type="checkbox"/> Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Positive for Res. Chlorine? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> See Exception ENV-FRM-MIN4-0142
		pH Paper Lot#
		Res. Chlorine 0-6 Roll 0-6 Strip 0-14 Strip
Extra labels present on soil VOA or WIDRO containers?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> See Exception ENV-FRM-MIN4-0140
Headspace in VOA Vials (greater than 6mm)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Trip Blank Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Custody Seals Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Pace Trip Blank Lot # (if purchased): _____

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? Yes No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: Sample logged per time on containers.

Project Manager Review: [Signature]

Date: 11/20/20

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

Labeled by: RNLCB

December 18, 2020

Ethan Harvey
AECOM
230 W Superior St
Suite 400
Duluth, MN 55802

RE: Project: Duluth Dump #1
Pace Project No.: 10539719

Dear Ethan Harvey:

Enclosed are the analytical results for sample(s) received by the laboratory on November 18, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

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

- Pace Analytical Services - Minneapolis

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

Sincerely,



Tina Soltani
tina.soltani@pacelabs.com
(612) 607-6384
Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: Duluth Dump #1

Pace Project No.: 10539719

Pace Analytical Services - Minneapolis MN

1700 Elm Street SE, Minneapolis, MN 55414

1800 Elm Street SE, Minneapolis, MN 55414--Satellite Air Lab

A2LA Certification #: 2926.01*

Alabama Certification #: 40770

Alaska Contaminated Sites Certification #: 17-009*

Alaska DW Certification #: MN00064

Arizona Certification #: AZ0014*

Arkansas DW Certification #: MN00064

Arkansas WW Certification #: 88-0680

California Certification #: 2929

Colorado Certification #: MN00064

Connecticut Certification #: PH-0256

EPA Region 8+Wyoming DW Certification #: via MN 027-053-137

Florida Certification #: E87605*

Georgia Certification #: 959

Hawaii Certification #: MN00064

Idaho Certification #: MN00064

Illinois Certification #: 200011

Indiana Certification #: C-MN-01

Iowa Certification #: 368

Kansas Certification #: E-10167

Kentucky DW Certification #: 90062

Kentucky WW Certification #: 90062

Louisiana DEQ Certification #: AI-03086*

Louisiana DW Certification #: MN00064

Maine Certification #: MN00064*

Maryland Certification #: 322

Massachusetts DWP Certification #: via MN 027-053-137

Michigan Certification #: 9909

Minnesota Certification #: 027-053-137*

Minnesota Dept of Ag Certification #: via MN 027-053-137

Minnesota Petrofund Certification #: 1240*

Mississippi Certification #: MN00064

Missouri Certification #: 10100

Montana Certification #: CERT0092

Nebraska Certification #: NE-OS-18-06

Nevada Certification #: MN00064

New Hampshire Certification #: 2081*

New Jersey Certification #: MN002

New York Certification #: 11647*

North Carolina DW Certification #: 27700

North Carolina WW Certification #: 530

North Dakota Certification #: R-036

Ohio DW Certification #: 41244

Ohio VAP Certification #: CL101

Oklahoma Certification #: 9507*

Oregon Primary Certification #: MN300001

Oregon Secondary Certification #: MN200001*

Pennsylvania Certification #: 68-00563*

Puerto Rico Certification #: MN00064

South Carolina Certification #: 74003001

Tennessee Certification #: TN02818

Texas Certification #: T104704192*

Utah Certification #: MN00064*

Vermont Certification #: VT-027053137

Virginia Certification #: 460163*

Washington Certification #: C486*

West Virginia DEP Certification #: 382

West Virginia DW Certification #: 9952 C

Wisconsin Certification #: 999407970

Wyoming UST Certification #: via A2LA 2926.01

USDA Permit #: P330-19-00208

Please Note: Applicable air certifications are denoted with an asterisk ().

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: Duluth Dump #1

Pace Project No.: 10539719

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10539719001	RW-2	Water	11/18/20 10:45	11/18/20 18:15

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: Duluth Dump #1

Pace Project No.: 10539719

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10539719001	RW-2	EPA 8270E by SIM	CH3, ZT	2

PASI-M = Pace Analytical Services - Minneapolis

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Duluth Dump #1

Pace Project No.: 10539719

Method: EPA 8270E by SIM

Description: 8270E MSSV 14 Dioxane By SIM

Client: AECOM MN ND

Date: December 18, 2020

General Information:

1 sample was analyzed for EPA 8270E by SIM by Pace Analytical Services Minneapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

H2: Extraction or preparation was conducted outside of the recognized method holding time.

- RW-2 (Lab ID: 10539719001)

Sample Preparation:

The samples were prepared in accordance with EPA Mod. 3510C with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

QC Batch: 712569

S0: Surrogate recovery outside laboratory control limits.

- BLANK (Lab ID: 3804879)
 - 1,4-Dioxane-d8 (S)
- LCS (Lab ID: 3804880)
 - 1,4-Dioxane-d8 (S)
- MS (Lab ID: 3804881)
 - 1,4-Dioxane-d8 (S)
- MSD (Lab ID: 3804882)
 - 1,4-Dioxane-d8 (S)

QC Batch: 713669

S0: Surrogate recovery outside laboratory control limits.

- BLANK (Lab ID: 3810065)
 - 1,4-Dioxane-d8 (S)
- LCS (Lab ID: 3810066)
 - 1,4-Dioxane-d8 (S)
- RW-2 (Lab ID: 10539719001)
 - 1,4-Dioxane-d8 (S)

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Duluth Dump #1

Pace Project No.: 10539719

Method: EPA 8270E by SIM

Description: 8270E MSSV 14 Dioxane By SIM

Client: AECOM MN ND

Date: December 18, 2020

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Duluth Dump #1

Pace Project No.: 10539719

Sample: RW-2		Lab ID: 10539719001		Collected: 11/18/20 10:45	Received: 11/18/20 18:15	Matrix: Water			
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270E MSSV 14 Dioxane By SIM		Analytical Method: EPA 8270E by SIM Preparation Method: EPA Mod. 3510C Pace Analytical Services - Minneapolis							
1,4-Dioxane (SIM)	ND	ug/L	0.24	0.10	1	11/23/20 11:38	11/24/20 22:48	123-91-1	
1,4-Dioxane (SIM)	ND	ug/L	0.24	0.10	1	12/01/20 18:25	12/04/20 19:57	123-91-1	H2
Surrogates									
1,4-Dioxane-d8 (S)	30	%	30-125		1	11/23/20 11:38	11/24/20 22:48		
1,4-Dioxane-d8 (S)	28	%	30-125		1	12/01/20 18:25	12/04/20 19:57		S0

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Duluth Dump #1
Pace Project No.: 10539719

QC Batch: 712569 Analysis Method: EPA 8270E by SIM
QC Batch Method: EPA Mod. 3510C Analysis Description: 8270E Water 14 Dioxane by SIM
Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10539719001

METHOD BLANK: 3804879 Matrix: Water

Associated Lab Samples: 10539719001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,4-Dioxane (SIM)	ug/L	ND	0.25	0.11	11/30/20 22:07	
1,4-Dioxane-d8 (S)	%.	25	30-125		11/30/20 22:07	S0

LABORATORY CONTROL SAMPLE: 3804880

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,4-Dioxane (SIM)	ug/L	10	10.1	101	32-128	
1,4-Dioxane-d8 (S)	%.			24	30-125	S0

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3804881 3804882

Parameter	Units	10539722001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,4-Dioxane (SIM)	ug/L	ND	10	10	10.7	11.2	107	112	32-130	4	30	
1,4-Dioxane-d8 (S)	%.						28	28	30-125			S0

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Duluth Dump #1
Pace Project No.: 10539719

QC Batch: 713669	Analysis Method: EPA 8270E by SIM
QC Batch Method: EPA Mod. 3510C	Analysis Description: 8270E Water 14 Dioxane by SIM
	Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10539719001

METHOD BLANK: 3810065 Matrix: Water

Associated Lab Samples: 10539719001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,4-Dioxane (SIM)	ug/L	0.40	0.25	0.11	12/04/20 17:10	
1,4-Dioxane-d8 (S)	%.	26	30-125		12/04/20 17:10	S0

LABORATORY CONTROL SAMPLE: 3810066

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,4-Dioxane (SIM)	ug/L	10	9.3	93	32-128	
1,4-Dioxane-d8 (S)	%.			23	30-125	S0

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3825961 3825962

Parameter	Units	3825961		3825962		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		10539722001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result						
1,4-Dioxane (SIM)	ug/L	ND	10	10	10	10.5	98	103	32-130	5	30
1,4-Dioxane-d8 (S)	%.						32	35	30-125		

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

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: Duluth Dump #1

Pace Project No.: 10539719

DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

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

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

H2 Extraction or preparation was conducted outside of the recognized method holding time.

S0 Surrogate recovery outside laboratory control limits.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Duluth Dump #1

Pace Project No.: 10539719

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10539719001	RW-2	EPA Mod. 3510C	712569	EPA 8270E by SIM	712977
10539719001	RW-2	EPA Mod. 3510C	713669	EPA 8270E by SIM	714371

REPORT OF LABORATORY ANALYSIS

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Minnesota Pollution Control Agency

MPCA Chain-of-Custody Form revision 2017.0328
* indicates a required field

Work Order Number: 3000024908

COC Type:

Page: 1 of 1

Turnaround Time: Std

COC ID:

PROJECT/CLIENT INFO

LABORATORY

FOR LAB USE ONLY

Facility Code:* SR0000093

Program Code PL (MDH Lab Only)

Lab Name: Pace Analytical (Tina Soltani)

Project Name:* Duluth Dump #1

Project Task Code:* PRJ07955

Address: 1800 Elm Street SE

Project Manager: MPCA: Jennifer Jevnisek/ AECOM: Ethan Harvey

Minneapolis, MN 55414

Potential Hazard? No

If yes, add information to Sampler Comments field

EPA Lab ID:*

Lab Work Order Sticker

SAMPLE DETAILS

ANALYSIS REQUESTED

SAMPLE TYPES
Sample=Routine Sample
QC-FB=Field Blank Sample
QC-FR=Field Replicate Sample
QC-TB=Trip Blank Sample
QC-EB=Equipment Blank
Treated-Mid=Treatment system sample
Treated-Post=Treatment system sample

SAMPLING METHODS
G=Grab sample
CT=Composite, time-paced w/AS
CF=Composite w/AS
D-T=Discrete, time-paced w/AS
D-F=Discrete, flow-paced w/AS
SW-GAS=Gas Sampling
Unknown=Unknown

LAB MATRICES
DW=Drinking Water
NW=Nonpotable Water
SD=Soil/Solid
AR=Air

BL=Biological Material
OT=Other
TS=Tissue

FIELD MATRICES
Wtr-Ground=Groundwater
Wtr-Surf=Surface Water
Wtr-Drink=Drinking Water
QC-BLANK=Artificial Blank Water
Leachate=Leachate Sample
Air-Indoor=Indoor Air
Gas-Soil=Soil Gas

Table with columns: MN Location Identifier, Field Name, Sample Type, Start Date, Start Time, Start, End, Units, Sampling Method, End Date, End Time, Lab Matrix, Field Matrix, AIS, Sampler Comments, # of Cont, ANALYSIS*, 1-4 Dioxane, Lab Sample No., #. Includes handwritten data for sample 1000020726.

WO#: 10539719



Sampler's Name: Chae Mali, Phone#: 6083179634, Billing Organization: AECOM, Acct#: USAImaging@aecom.com, Address: USAImaging@aecom.com (Ethan Harvey / AECOM Project #60645588), Courier Name: Tracking#:

Receiving Comments:

Table with columns: Relinquished By/Affiliation, Date/Time, Accepted By/Affiliation, Date/Time. Includes handwritten signatures and dates.



Document Name:
Sample Condition Upon Receipt (SCUR) - MN

Document Revised: 12Aug2020

Page 1 of 1

Document No.:
ENV-FRM-MIN4-0150 Rev.01

Pace Analytical Services -
Minneapolis

Sample Condition Upon Receipt

Client Name:

Project #:

MPCA

WO#: 10539719

Courier:

Fed Ex UPS USPS Client
 Pace Speedee Commercial

PM: TS1

Due Date: 12/07/20

CLIENT: AECOM

See Exceptions
ENV-FRM-MIN4-0142

Tracking Number:

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

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

Thermometer: T1(0461) T2(1336) T3(0459) T4(0254) T5(0489) Type of Ice: Wet Blue None Dry Melted

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

Temp should be above freezing to 6°C Cooler Temp Read w/temp blank: 0.3 °C

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

Correction Factor: true Cooler Temp Corrected w/temp blank: 0.3 °C

USDA Regulated Soil: (N/A, water sample/Other:)

Date/Initials of Person Examining Contents: M 11.18.20

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

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

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

		COMMENTS:
Chain of Custody Present and Filled Out?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	1.
Chain of Custody Relinquished?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	2.
Sampler Name and/or Signature on COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	4.
Short Hold Time Analysis (<72 hr)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. <input type="checkbox"/> Fecal Coliform <input type="checkbox"/> HPC <input type="checkbox"/> Total Coliform/E coli <input type="checkbox"/> BOD/cBOD <input type="checkbox"/> Hex Chrome <input type="checkbox"/> Turbidity <input type="checkbox"/> Nitrate <input type="checkbox"/> Nitrite <input type="checkbox"/> Orthophos <input type="checkbox"/> Other
Rush Turn Around Time Requested?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6.
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	7.
Correct Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	8.
-Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Containers Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.
Field Filtered Volume Received for Dissolved Tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	10. Is sediment visible in the dissolved container? <input type="checkbox"/> Yes <input type="checkbox"/> No
Is sufficient information available to reconcile the samples to the COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	11. If no, write ID/ Date/Time on Container Below: <input type="checkbox"/> See Exception ENV-FRM-MIN4-0142
Matrix: <input checked="" type="checkbox"/> Water <input type="checkbox"/> Soil <input type="checkbox"/> Oil <input type="checkbox"/> Other		
All containers needing acid/base preservation have been checked?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO ₃ , H ₂ SO ₄ , <2pH, NaOH >9 Sulfide, NaOH >10 Cyanide)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	<input type="checkbox"/> NaOH <input type="checkbox"/> HNO ₃ <input type="checkbox"/> H ₂ SO ₄ <input type="checkbox"/> Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Positive for Res. Chlorine? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> pH Paper Lot# <input type="checkbox"/> See Exception ENV-FRM-MIN4-0142
		Res. Chlorine 0-6 Roll 0-6 Strip 0-14 Strip
Extra labels present on soil VOA or WIDRO containers?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> See Exception ENV-FRM-MIN4-0142
Headspace in VOA Vials (greater than 6mm)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Trip Blank Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Custody Seals Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Pace Trip Blank Lot # (if purchased):

CLIENT NOTIFICATION/RESOLUTION

Field Data Required? Yes No

Person Contacted: _____
Comments/Resolution: _____

Date/Time: _____

Project Manager Review: _____

Date: 11/20/20

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

Labeled by: RVC ③

December 18, 2020

Ethan Harvey
AECOM
230 W Superior St
Suite 400
Duluth, MN 55802

RE: Project: Duluth Dump #1
Pace Project No.: 10539720

Dear Ethan Harvey:

Enclosed are the analytical results for sample(s) received by the laboratory on November 18, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

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

- Pace Analytical Services - Minneapolis

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

Sincerely,



Tina Soltani
tina.soltani@pacelabs.com
(612) 607-6384
Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: Duluth Dump #1
Pace Project No.: 10539720

Pace Analytical Services - Minneapolis MN

1700 Elm Street SE, Minneapolis, MN 55414
1800 Elm Street SE, Minneapolis, MN 55414--Satellite Air Lab

A2LA Certification #: 2926.01*
Alabama Certification #: 40770
Alaska Contaminated Sites Certification #: 17-009*
Alaska DW Certification #: MN00064
Arizona Certification #: AZ0014*
Arkansas DW Certification #: MN00064
Arkansas WW Certification #: 88-0680
California Certification #: 2929
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8+Wyoming DW Certification #: via MN 027-053-137
Florida Certification #: E87605*
Georgia Certification #: 959
Hawaii Certification #: MN00064
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification #: C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky DW Certification #: 90062
Kentucky WW Certification #: 90062
Louisiana DEQ Certification #: AI-03086*
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064*
Maryland Certification #: 322
Massachusetts DWP Certification #: via MN 027-053-137
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137*
Minnesota Dept of Ag Certification #: via MN 027-053-137
Minnesota Petrofund Certification #: 1240*

Mississippi Certification #: MN00064
Missouri Certification #: 10100
Montana Certification #: CERT0092
Nebraska Certification #: NE-OS-18-06
Nevada Certification #: MN00064
New Hampshire Certification #: 2081*
New Jersey Certification #: MN002
New York Certification #: 11647*
North Carolina DW Certification #: 27700
North Carolina WW Certification #: 530
North Dakota Certification #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507*
Oregon Primary Certification #: MN300001
Oregon Secondary Certification #: MN200001*
Pennsylvania Certification #: 68-00563*
Puerto Rico Certification #: MN00064
South Carolina Certification #:74003001
Tennessee Certification #: TN02818
Texas Certification #: T104704192*
Utah Certification #: MN00064*
Vermont Certification #: VT-027053137
Virginia Certification #: 460163*
Washington Certification #: C486*
West Virginia DEP Certification #: 382
West Virginia DW Certification #: 9952 C
Wisconsin Certification #: 999407970
Wyoming UST Certification #: via A2LA 2926.01
USDA Permit #: P330-19-00208
Please Note: Applicable air certifications are denoted with an asterisk ().

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: Duluth Dump #1
Pace Project No.: 10539720

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10539720001	RW-3	Water	11/18/20 10:20	11/18/20 18:15

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: Duluth Dump #1

Pace Project No.: 10539720

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10539720001	RW-3	EPA 8270E by SIM	CH3, ZT	2

PASI-M = Pace Analytical Services - Minneapolis

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SUMMARY OF DETECTION

Project: Duluth Dump #1

Pace Project No.: 10539720

Lab Sample ID Method	Client Sample ID Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
10539720001	RW-3					
EPA 8270E by SIM	1,4-Dioxane (SIM)	0.43	ug/L	0.25	12/04/20 20:17	B,H2

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Duluth Dump #1

Pace Project No.: 10539720

Method: EPA 8270E by SIM

Description: 8270E MSSV 14 Dioxane By SIM

Client: AECOM MN ND

Date: December 18, 2020

General Information:

1 sample was analyzed for EPA 8270E by SIM by Pace Analytical Services Minneapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

H2: Extraction or preparation was conducted outside of the recognized method holding time.

- RW-3 (Lab ID: 10539720001)

Sample Preparation:

The samples were prepared in accordance with EPA Mod. 3510C with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

QC Batch: 712569

S0: Surrogate recovery outside laboratory control limits.

- BLANK (Lab ID: 3804879)
 - 1,4-Dioxane-d8 (S)
- LCS (Lab ID: 3804880)
 - 1,4-Dioxane-d8 (S)
- MS (Lab ID: 3804881)
 - 1,4-Dioxane-d8 (S)
- MSD (Lab ID: 3804882)
 - 1,4-Dioxane-d8 (S)

QC Batch: 713669

S0: Surrogate recovery outside laboratory control limits.

- BLANK (Lab ID: 3810065)
 - 1,4-Dioxane-d8 (S)
- LCS (Lab ID: 3810066)
 - 1,4-Dioxane-d8 (S)

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Duluth Dump #1

Pace Project No.: 10539720

Method: EPA 8270E by SIM

Description: 8270E MSSV 14 Dioxane By SIM

Client: AECOM MN ND

Date: December 18, 2020

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: 713669

B: Analyte was detected in the associated method blank.

- BLANK for HBN 713669 [OEXT/573 (Lab ID: 3810065)]
 - 1,4-Dioxane (SIM)

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Duluth Dump #1

Pace Project No.: 10539720

Sample: RW-3		Lab ID: 10539720001		Collected: 11/18/20 10:20	Received: 11/18/20 18:15	Matrix: Water			
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270E MSSV 14 Dioxane By SIM		Analytical Method: EPA 8270E by SIM Preparation Method: EPA Mod. 3510C Pace Analytical Services - Minneapolis							
1,4-Dioxane (SIM)	ND	ug/L	0.25	0.11	1	11/23/20 11:38	11/24/20 23:09	123-91-1	
1,4-Dioxane (SIM)	0.43	ug/L	0.25	0.11	1	12/01/20 18:25	12/04/20 20:17	123-91-1	B,H2
Surrogates									
1,4-Dioxane-d8 (S)	30	%	30-125		1	12/01/20 18:25	12/04/20 20:17		
1,4-Dioxane-d8 (S)	32	%	30-125		1	11/23/20 11:38	11/24/20 23:09		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Duluth Dump #1

Pace Project No.: 10539720

QC Batch: 712569

Analysis Method: EPA 8270E by SIM

QC Batch Method: EPA Mod. 3510C

Analysis Description: 8270E Water 14 Dioxane by SIM

Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10539720001

METHOD BLANK: 3804879

Matrix: Water

Associated Lab Samples: 10539720001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,4-Dioxane (SIM)	ug/L	ND	0.25	0.11	11/30/20 22:07	
1,4-Dioxane-d8 (S)	%.	25	30-125		11/30/20 22:07	S0

LABORATORY CONTROL SAMPLE: 3804880

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,4-Dioxane (SIM)	ug/L	10	10.1	101	32-128	
1,4-Dioxane-d8 (S)	%.			24	30-125	S0

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3804881 3804882

Parameter	Units	10539722001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,4-Dioxane (SIM)	ug/L	ND	10	10	10.7	11.2	107	112	32-130	4	30	
1,4-Dioxane-d8 (S)	%.						28	28	30-125			S0

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Duluth Dump #1

Pace Project No.: 10539720

QC Batch: 713669

Analysis Method: EPA 8270E by SIM

QC Batch Method: EPA Mod. 3510C

Analysis Description: 8270E Water 14 Dioxane by SIM

Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10539720001

METHOD BLANK: 3810065

Matrix: Water

Associated Lab Samples: 10539720001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,4-Dioxane (SIM)	ug/L	0.40	0.25	0.11	12/04/20 17:10	
1,4-Dioxane-d8 (S)	%.	26	30-125		12/04/20 17:10	S0

LABORATORY CONTROL SAMPLE: 3810066

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,4-Dioxane (SIM)	ug/L	10	9.3	93	32-128	
1,4-Dioxane-d8 (S)	%.			23	30-125	S0

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3825961 3825962

Parameter	Units	10539722001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,4-Dioxane (SIM)	ug/L	ND	10	10	10	10.5	98	103	32-130	5	30	
1,4-Dioxane-d8 (S)	%.						32	35	30-125			

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

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: Duluth Dump #1

Pace Project No.: 10539720

DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

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

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B Analyte was detected in the associated method blank.

H2 Extraction or preparation was conducted outside of the recognized method holding time.

S0 Surrogate recovery outside laboratory control limits.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Duluth Dump #1
Pace Project No.: 10539720

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10539720001	RW-3	EPA Mod. 3510C	712569	EPA 8270E by SIM	712977
10539720001	RW-3	EPA Mod. 3510C	713669	EPA 8270E by SIM	714371

REPORT OF LABORATORY ANALYSIS

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MPCA Chain-of-Custody Form

revision 2017.0328

* indicates a required field

Work Order Number: 300024908

COC Type:

Page: 1 of 1

Turnaround Time: Std

COC ID:

PROJECT/CLIENT INFO

LABORATORY

FOR LAB USE ONLY

Facility Code:* SR0000093

Program Code PL
(MDH Lab Only):

Lab Name: Pace Analytical (Tinasoiani)

Project Name:* Duluth Dump #1

Project Task Code:* PRJ07955

Address: 1800 Elm Street SE

Project Manager: MPCA: Jennifer Jevnisek/ AECOM: Ethan Harvey

Minneapolis, MN 55414

Potential Hazard? No

If yes, add information to Sampler Comments field

EPA Lab ID:*

Lab Work Order Sticker

SAMPLE DETAILS

ANALYSIS REQUESTED

SAMPLE TYPES
Sample=Routine Sample
QC-FB=Field Blank Sample
QC-FR=Field Replicate Sample
QC-TB=Trip Blank Sample
QC-EB=Equipment Blank
Treated-Mid=Treatment system sample
Treated-Post=Treatment system sample

SAMPLING METHODS
G=Grab sample
CT=Composite, time-paced w/AS
CF=Composite w/AS
D-T=Discrete, time-paced w/AS
D-F=Discrete, flow-paced w/AS
SW-GAS=Gas Sampling
Unknown=Unknown

LAB MATRICES
DW=Drinking Water
NW=Nonpotable Water
SD=Soil/Solid
AR=Air

BL=Biological Material
OT=Other
TS=Tissue

FIELD MATRICES
Wtr-Ground=Groundwater
Wtr-Surf=Surface Water
Wtr-Drink=Drinking Water
QC-BLANK=Artificial Blank Water
Leachate=Leachate Sample
Air-Indoor=Indoor Air
Gas-Soil=Soil Gas

MN Location Identifier*	Field Name	Sample Type*	Start Date* (mm/dd/yyyy)	Start Time* (24 hr (h:mm))	Depth			Sampling Method*	Complete ONLY if Method is CT, CF, D-T, or D-F		Lab Matrix*	Field Matrix* AIS	Sampler Comments (filter volume, special handling, etc.)	# of Cont	ANALYSIS*	PRESERV.	Lab Sample No.	#
					Start	End	Units (m or ft.)		End Date (mm/dd/yyyy)	End Time (24 hr (h:mm))								
1000020735	RW-3	Sample	11-18-20	1030				G			DW	Wtr-Drink		2				1
																		2
																		3
																		4
																		5
																		6
																		7
																		8
																		9
																		10

WO#: 10539720



10539720

Sampler's Name:* Chloe Main

Phone#: 6083178634

Billing Organization: AECOM

Acct#:

Sampler's Signature:* Chloe Main

Address: USAPImaging@aecom.com (Ethan Harvey / AECOM Project #60645588)

Sampler's Organization: AECOM

Courier Name:

Tracking#:

Receiving Comments:

Relinquished By/Affiliation

Chloe Main / AECOM

Date/Time

11-18-20 / 15:20

Accepted By/Affiliation

JL Pace / AECOM

Date/Time

11/18/20 15:20

Process data in LAB_MN Format for MPCA submittal

JL Pace / AECOM

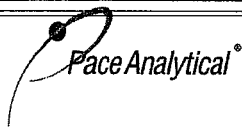
11/18/20 / 15:20

PACE

11/18/20 1815

001

-01



Document Name:
Sample Condition Upon Receipt (SCUR) - MN

Document Revised: 12Aug2020

Page 1 of 1

Document No.:
ENV-FRM-MIN4-0150 Rev.01

Pace Analytical Services -
Minneapolis

Sample Condition
Upon Receipt

Client Name:

Project #:

WO#: 10539720

Courier:

Fed Ex UPS USPS Client
 Pace SpeedDee Commercial

PM: TS1

Due Date: 12/07/20

CLIENT: AECOM

Tracking Number:

See Exceptions
ENV-FRM-MIN4-0142

Custody Seal on Cooler/Box Present?

Yes No

Seals Intact?

Yes No

Biological Tissue Frozen?

Yes No N/A

Packing Material:

Bubble Wrap Bubble Bags None Other: _____

Temp Blank?

Yes No

Thermometer:

T1(0461) T2(1336) T3(0459)
 T4(0254) T5(0489)

Type of Ice:

Wet Blue None Dry Melted

Did Samples Originate in West Virginia? Yes No

Were All Container Temps Taken? Yes No N/A

Temp should be above freezing to 6°C

Cooler Temp Read w/temp blank: _____ °C

Average Corrected

See Exceptions

Temp (no temp blank

ENV-FRM-MIN4-0142

Correction Factor: true

Cooler Temp Corrected w/temp blank: _____ °C

only): _____ °C

1 Container

USDA Regulated Soil: (N/A, water sample/Other: _____)

Date/Initials of Person Examining Contents: M 11-18-20

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

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

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

		COMMENTS:
Chain of Custody Present and Filled Out?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	1.
Chain of Custody Relinquished?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	2.
Sampler Name and/or Signature on COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	4.
Short Hold Time Analysis (<72 hr)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. <input type="checkbox"/> Fecal Coliform <input type="checkbox"/> HPC <input type="checkbox"/> Total Coliform/E coli <input type="checkbox"/> BOD/cBOD <input type="checkbox"/> Hex Chrome <input type="checkbox"/> Turbidity <input type="checkbox"/> Nitrate <input type="checkbox"/> Nitrite <input type="checkbox"/> Orthophos <input type="checkbox"/> Other
Rush Turn Around Time Requested?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6.
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	7.
Correct Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	8.
-Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Containers Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.
Field Filtered Volume Received for Dissolved Tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	10. Is sediment visible in the dissolved container? <input type="checkbox"/> Yes <input type="checkbox"/> No
Is sufficient information available to reconcile the samples to the COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	11. If no, write ID/ Date/Time on Container Below: <input type="checkbox"/> See Exception ENV-FRM-MIN4-0142
Matrix: <input checked="" type="checkbox"/> Water <input type="checkbox"/> Soil <input type="checkbox"/> Oil <input type="checkbox"/> Other _____		
All containers needing acid/base preservation have been checked?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO ₃ , H ₂ SO ₄ , <2pH, NaOH >9 Sulfide, NaOH >10 Cyanide)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	<input type="checkbox"/> NaOH <input type="checkbox"/> HNO ₃ <input type="checkbox"/> H ₂ SO ₄ <input type="checkbox"/> Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Positive for Res. <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> See Exception Chlorine? <input type="checkbox"/> No <input type="checkbox"/> pH Paper Lot# ENV-FRM-MIN4-0142
		Res. Chlorine 0-6 Roll 0-6 Strip 0-14 Strip
Extra labels present on soil VOA or WIDRO containers?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> See Exception ENV-FRM-MIN4-0140
Headspace in VOA Vials (greater than 6mm)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Trip Blank Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Custody Seals Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Pace Trip Blank Lot # (if purchased): _____

CLIENT NOTIFICATION/RESOLUTION

Person Contacted: _____

Date/Time: _____

Field Data Required? Yes No

Comments/Resolution: _____

Project Manager Review: _____

Date: 11/20/20

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

Labeled by: _____

RNC (3)

December 18, 2020

Ethan Harvey
AECOM
230 W Superior St
Suite 400
Duluth, MN 55802

RE: Project: Duluth Dump #1
Pace Project No.: 10539722

Dear Ethan Harvey:

Enclosed are the analytical results for sample(s) received by the laboratory on November 18, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

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

- Pace Analytical Services - Minneapolis

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

Sincerely,



Tina Soltani
tina.soltani@pacelabs.com
(612) 607-6384
Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
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CERTIFICATIONS

Project: Duluth Dump #1

Pace Project No.: 10539722

Pace Analytical Services - Minneapolis MN

1700 Elm Street SE, Minneapolis, MN 55414

1800 Elm Street SE, Minneapolis, MN 55414--Satellite Air Lab

A2LA Certification #: 2926.01*

Alabama Certification #: 40770

Alaska Contaminated Sites Certification #: 17-009*

Alaska DW Certification #: MN00064

Arizona Certification #: AZ0014*

Arkansas DW Certification #: MN00064

Arkansas WW Certification #: 88-0680

California Certification #: 2929

Colorado Certification #: MN00064

Connecticut Certification #: PH-0256

EPA Region 8+Wyoming DW Certification #: via MN 027-053-137

Florida Certification #: E87605*

Georgia Certification #: 959

Hawaii Certification #: MN00064

Idaho Certification #: MN00064

Illinois Certification #: 200011

Indiana Certification #: C-MN-01

Iowa Certification #: 368

Kansas Certification #: E-10167

Kentucky DW Certification #: 90062

Kentucky WW Certification #: 90062

Louisiana DEQ Certification #: AI-03086*

Louisiana DW Certification #: MN00064

Maine Certification #: MN00064*

Maryland Certification #: 322

Massachusetts DWP Certification #: via MN 027-053-137

Michigan Certification #: 9909

Minnesota Certification #: 027-053-137*

Minnesota Dept of Ag Certification #: via MN 027-053-137

Minnesota Petrofund Certification #: 1240*

Mississippi Certification #: MN00064

Missouri Certification #: 10100

Montana Certification #: CERT0092

Nebraska Certification #: NE-OS-18-06

Nevada Certification #: MN00064

New Hampshire Certification #: 2081*

New Jersey Certification #: MN002

New York Certification #: 11647*

North Carolina DW Certification #: 27700

North Carolina WW Certification #: 530

North Dakota Certification #: R-036

Ohio DW Certification #: 41244

Ohio VAP Certification #: CL101

Oklahoma Certification #: 9507*

Oregon Primary Certification #: MN300001

Oregon Secondary Certification #: MN200001*

Pennsylvania Certification #: 68-00563*

Puerto Rico Certification #: MN00064

South Carolina Certification #: 74003001

Tennessee Certification #: TN02818

Texas Certification #: T104704192*

Utah Certification #: MN00064*

Vermont Certification #: VT-027053137

Virginia Certification #: 460163*

Washington Certification #: C486*

West Virginia DEP Certification #: 382

West Virginia DW Certification #: 9952 C

Wisconsin Certification #: 999407970

Wyoming UST Certification #: via A2LA 2926.01

USDA Permit #: P330-19-00208

Please Note: Applicable air certifications are denoted with an asterisk ().

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: Duluth Dump #1

Pace Project No.: 10539722

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10539722001	RW-15	Water	11/18/20 09:10	11/18/20 18:15

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: Duluth Dump #1

Pace Project No.: 10539722

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10539722001	RW-15	EPA 8270E by SIM	CH3, ZT	2

PASI-M = Pace Analytical Services - Minneapolis

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Duluth Dump #1

Pace Project No.: 10539722

Method: EPA 8270E by SIM

Description: 8270E MSSV 14 Dioxane By SIM

Client: AECOM MN ND

Date: December 18, 2020

General Information:

1 sample was analyzed for EPA 8270E by SIM by Pace Analytical Services Minneapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

H2: Extraction or preparation was conducted outside of the recognized method holding time.

- RW-15 (Lab ID: 10539722001)

Sample Preparation:

The samples were prepared in accordance with EPA Mod. 3510C with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

QC Batch: 712569

S0: Surrogate recovery outside laboratory control limits.

- BLANK (Lab ID: 3804879)
 - 1,4-Dioxane-d8 (S)
- LCS (Lab ID: 3804880)
 - 1,4-Dioxane-d8 (S)
- MS (Lab ID: 3804881)
 - 1,4-Dioxane-d8 (S)
- MSD (Lab ID: 3804882)
 - 1,4-Dioxane-d8 (S)
- RW-15 (Lab ID: 10539722001)
 - 1,4-Dioxane-d8 (S)

QC Batch: 713669

S0: Surrogate recovery outside laboratory control limits.

- BLANK (Lab ID: 3810065)
 - 1,4-Dioxane-d8 (S)
- LCS (Lab ID: 3810066)
 - 1,4-Dioxane-d8 (S)

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Duluth Dump #1

Pace Project No.: 10539722

Method: EPA 8270E by SIM

Description: 8270E MSSV 14 Dioxane By SIM

Client: AECOM MN ND

Date: December 18, 2020

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Duluth Dump #1

Pace Project No.: 10539722

Sample: RW-15		Lab ID: 10539722001		Collected: 11/18/20 09:10		Received: 11/18/20 18:15		Matrix: Water	
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270E MSSV 14 Dioxane By SIM		Analytical Method: EPA 8270E by SIM Preparation Method: EPA Mod. 3510C Pace Analytical Services - Minneapolis							
1,4-Dioxane (SIM)	ND	ug/L	0.25	0.11	1	11/23/20 11:38	12/01/20 00:32	123-91-1	
1,4-Dioxane (SIM)	ND	ug/L	0.25	0.11	1	12/01/20 18:25	12/04/20 20:38	123-91-1	H2
Surrogates									
1,4-Dioxane-d8 (S)	28	%	30-125		1	11/23/20 11:38	12/01/20 00:32		S0
1,4-Dioxane-d8 (S)	31	%	30-125		1	12/01/20 18:25	12/04/20 20:38		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Duluth Dump #1

Pace Project No.: 10539722

QC Batch: 712569

Analysis Method: EPA 8270E by SIM

QC Batch Method: EPA Mod. 3510C

Analysis Description: 8270E Water 14 Dioxane by SIM

Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10539722001

METHOD BLANK: 3804879

Matrix: Water

Associated Lab Samples: 10539722001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,4-Dioxane (SIM)	ug/L	ND	0.25	0.11	11/30/20 22:07	
1,4-Dioxane-d8 (S)	%.	25	30-125		11/30/20 22:07	S0

LABORATORY CONTROL SAMPLE: 3804880

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,4-Dioxane (SIM)	ug/L	10	10.1	101	32-128	
1,4-Dioxane-d8 (S)	%.			24	30-125	S0

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3804881 3804882

Parameter	Units	10539722001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,4-Dioxane (SIM)	ug/L	ND	10	10	10.7	11.2	107	112	32-130	4	30	
1,4-Dioxane-d8 (S)	%.						28	28	30-125			S0

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Duluth Dump #1

Pace Project No.: 10539722

QC Batch: 713669

Analysis Method: EPA 8270E by SIM

QC Batch Method: EPA Mod. 3510C

Analysis Description: 8270E Water 14 Dioxane by SIM

Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10539722001

METHOD BLANK: 3810065

Matrix: Water

Associated Lab Samples: 10539722001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,4-Dioxane (SIM)	ug/L	0.40	0.25	0.11	12/04/20 17:10	
1,4-Dioxane-d8 (S)	%.	26	30-125		12/04/20 17:10	S0

LABORATORY CONTROL SAMPLE: 3810066

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,4-Dioxane (SIM)	ug/L	10	9.3	93	32-128	
1,4-Dioxane-d8 (S)	%.			23	30-125	S0

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3825961 3825962

Parameter	Units	10539722001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,4-Dioxane (SIM)	ug/L	ND	10	10	10	10.5	98	103	32-130	5	30	
1,4-Dioxane-d8 (S)	%.						32	35	30-125			

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

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: Duluth Dump #1

Pace Project No.: 10539722

DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

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

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

H2 Extraction or preparation was conducted outside of the recognized method holding time.

S0 Surrogate recovery outside laboratory control limits.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Duluth Dump #1
Pace Project No.: 10539722

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10539722001	RW-15	EPA Mod. 3510C	712569	EPA 8270E by SIM	712977
10539722001	RW-15	EPA Mod. 3510C	713669	EPA 8270E by SIM	714371

REPORT OF LABORATORY ANALYSIS

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Minnesota Pollution Control Agency

MPCA Chain-of-Custody Form

revision 2017.0328
* indicates a required field

Work Order Number: 300024908

COC Type:

Page: 1 of 1

PROJECT/CLIENT INFO

LABORATORY

FOR LAB USE ONLY

Facility Code:* SR000093

Program Code PL
(MDH Lab Only):

Lab Name: Pace Analytical (Tinasoltani)

Project Name:* Duluth Dump #1

Project Task Code:* PRJ07955

Address: 1800 Elm Street SE

Project Manager: MPCA: Jennifer Jevnisek/ AECOM: Ethan Harvey

Minneapolis, MN 55414

Potential Hazard? No

If yes, add information to Sampler Comments field

EPA Lab ID:*

Lab Work Order Sticker

SAMPLE DETAILS

ANALYSIS REQUESTED

SAMPLE TYPES
Sample=Routine Sample
QC-FB=Field Blank Sample
QC-FR=Field Replicate Sample
QC-TB=Trip Blank Sample
QC-EB=Equipment Blank
Treated-Mid=Treatment system sample
Treated-Post=Treatment system sample

SAMPLING METHODS
G=Grab sample
CT=Composite, time-paced w/AS
CF=Composite w/AS
D-T=Discrete, time-paced w/AS
D-F=Discrete, flow-paced w/AS
SW-GAS=Gas Sampling
Unknown=Unknown

LAB MATRICES
DW=Drinking Water
NW=Nonpotable Water
SD=Soil/Solid
AR=Air

BL=Biological Material
OT=Other
TS=Tissue

FIELD MATRICES
Wtr-Ground=Groundwater
Wtr-Surf=Surface Water
Wtr-Drink=Drinking Water
QC-BLANK=Artificial Blank Water
Leachate=Leachate Sample
Air-Indoor=Indoor Air
Gas-Soil=Soil Gas

MN Location Identifier*	Field Name	Sample Type*	Start Date* (mm/dd/yyyy)	Start Time* 24 hr (hh:mm)	Depth			Sampling Method*	Complete ONLY if Method is CT, CF, D-T, or D-F			Lab Matrix*	Field Matrix* AIS	Sampler Comments (filter volume, special handling, etc.)	# of Cont	ANALYSIS*	PRESERV.	1-4 Dioxane	Lab Sample No.	#
					Start	End	Units (m or ft.)		End Date (mm/dd/yyyy)	End Time 24 hr (hh:mm)	AIS									
1000020739	RW-15	Sample	11-18-20	0910			G				DW	Wtr-Drink	Extra for MS + MSD	6			x		1	
																			2	
																			3	
																			4	
																			5	
																			6	
																			7	
																			8	
																			9	
																			10	

WO#: 10539722



10539722

Sampler's Name:* *Chloe Malin*

Phone#: 608378634

Billing Organization: AECOM

Acct#:

Sampler's Signature:* *Chloe Malin*

Address: USAPImaging@aecom.com (Ethan Harvey / AECOM Project #6064588)

Sampler's Organization: AECOM

Courier Name: Tracking#:

Receiving Comments:

Relinquished By/Affiliation

Chloe Malin / AECOM

Date/Time

11-18-20 15:20

Accepted By/Affiliation

John Pett / PACE

Date/Time

11/18/2020 15:20

Process Data in LAB MN Format for MPCA submittal

John Pett / PACE

11/18/2020 15:20

John Pett / PACE

11/18/2020 16:15

Sample Condition Upon Receipt	Client Name: <u>MPCA</u>	Project #:	WO# : 10539722
Courier:	<input type="checkbox"/> Fed Ex <input type="checkbox"/> UPS <input type="checkbox"/> USPS <input type="checkbox"/> Client <input checked="" type="checkbox"/> Pace <input type="checkbox"/> SpeedDee <input type="checkbox"/> Commercial		PM: TS1 Due Date: 12/07/20 CLIENT: AECOM
Tracking Number:		See Exceptions <input type="checkbox"/>	

Custody Seal on Cooler/Box Present? Yes No Seals Intact? Yes No Biological Tissue Frozen? Yes No N/A
 Packing Material: Bubble Wrap Bubble Bags None Other: _____ Temp Blank? Yes No
 Thermometer: T1(0461) T2(1336) T3(0459) T4(0254) T5(0489) Type of Ice: Wet Blue None Dry Melted

Did Samples Originate in West Virginia? Yes No Were All Container Temps Taken? Yes No N/A
 Temp should be above freezing to 6°C Cooler Temp Read w/temp blank: 0.3 °C Average Corrected Temp (no temp blank only): _____ °C
 Correction Factor: true Cooler Temp Corrected w/temp blank: 0.3 °C See Exceptions ENV-FRM-MIN4-0142 1 Container

USDA Regulated Soil: (N/A, water sample/Other: _____) Date/Initials of Person Examining Contents: M 11-18-20
 Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? Yes No Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? Yes No
If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

	COMMENTS:
Chain of Custody Present and Filled Out? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	1.
Chain of Custody Relinquished? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	2.
Sampler Name and/or Signature on COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Samples Arrived within Hold Time? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	4.
Short Hold Time Analysis (<72 hr)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. <input type="checkbox"/> Fecal Coliform <input type="checkbox"/> HPC <input type="checkbox"/> Total Coliform/E coli <input type="checkbox"/> BOD/cBOD <input type="checkbox"/> Hex Chrome <input type="checkbox"/> Turbidity <input type="checkbox"/> Nitrate <input type="checkbox"/> Nitrite <input type="checkbox"/> Orthophos <input type="checkbox"/> Other
Rush Turn Around Time Requested? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6.
Sufficient Volume? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	7.
Correct Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	8.
-Pace Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Containers Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.
Field Filtered Volume Received for Dissolved Tests? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	10. Is sediment visible in the dissolved container? <input type="checkbox"/> Yes <input type="checkbox"/> No
Is sufficient information available to reconcile the samples to the COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	11. If no, write ID/ Date/Time on Container Below: <input type="checkbox"/> See Exception ENV-FRM-MIN4-0142
Matrix: <input checked="" type="checkbox"/> Water <input type="checkbox"/> Soil <input type="checkbox"/> Oil <input type="checkbox"/> Other	
All containers needing acid/base preservation have been checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	12. Sample # <input type="checkbox"/> NaOH <input type="checkbox"/> HNO ₃ <input type="checkbox"/> H ₂ SO ₄ <input type="checkbox"/> Zinc Acetate
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO ₃ , H ₂ SO ₄ , <2pH, NaOH >9 Sulfide, NaOH >10 Cyanide) <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Positive for Res. <input type="checkbox"/> Yes <input type="checkbox"/> No pH Paper Lot# <input type="checkbox"/> See Exception ENV-FRM-MIN4-0142
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Res. Chlorine 0-6 Roll 0-6 Strip 0-14 Strip
Extra labels present on soil VOA or WIDRO containers? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> See Exception ENV-FRM-MIN4-0140
Headspace in VOA Vials (greater than 6mm)? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Trip Blank Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Custody Seals Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Pace Trip Blank Lot # (if purchased): _____

CLIENT NOTIFICATION/RESOLUTION Field Data Required? Yes No
 Person Contacted: _____ Date/Time: _____
 Comments/Resolution: _____

Project Manager Review: _____ Date: 11/20/20

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

December 18, 2020

Ethan Harvey
AECOM
230 W Superior St
Suite 400
Duluth, MN 55802

RE: Project: Duluth Dump #1
Pace Project No.: 10539723

Dear Ethan Harvey:

Enclosed are the analytical results for sample(s) received by the laboratory on November 18, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

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

- Pace Analytical Services - Minneapolis

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

Sincerely,



Tina Soltani
tina.soltani@pacelabs.com
(612) 607-6384
Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: Duluth Dump #1

Pace Project No.: 10539723

Pace Analytical Services - Minneapolis MN

1700 Elm Street SE, Minneapolis, MN 55414

1800 Elm Street SE, Minneapolis, MN 55414--Satellite Air Lab

A2LA Certification #: 2926.01*

Alabama Certification #: 40770

Alaska Contaminated Sites Certification #: 17-009*

Alaska DW Certification #: MN00064

Arizona Certification #: AZ0014*

Arkansas DW Certification #: MN00064

Arkansas WW Certification #: 88-0680

California Certification #: 2929

Colorado Certification #: MN00064

Connecticut Certification #: PH-0256

EPA Region 8+Wyoming DW Certification #: via MN 027-053-137

Florida Certification #: E87605*

Georgia Certification #: 959

Hawaii Certification #: MN00064

Idaho Certification #: MN00064

Illinois Certification #: 200011

Indiana Certification #: C-MN-01

Iowa Certification #: 368

Kansas Certification #: E-10167

Kentucky DW Certification #: 90062

Kentucky WW Certification #: 90062

Louisiana DEQ Certification #: AI-03086*

Louisiana DW Certification #: MN00064

Maine Certification #: MN00064*

Maryland Certification #: 322

Massachusetts DWP Certification #: via MN 027-053-137

Michigan Certification #: 9909

Minnesota Certification #: 027-053-137*

Minnesota Dept of Ag Certification #: via MN 027-053-137

Minnesota Petrofund Certification #: 1240*

Mississippi Certification #: MN00064

Missouri Certification #: 10100

Montana Certification #: CERT0092

Nebraska Certification #: NE-OS-18-06

Nevada Certification #: MN00064

New Hampshire Certification #: 2081*

New Jersey Certification #: MN002

New York Certification #: 11647*

North Carolina DW Certification #: 27700

North Carolina WW Certification #: 530

North Dakota Certification #: R-036

Ohio DW Certification #: 41244

Ohio VAP Certification #: CL101

Oklahoma Certification #: 9507*

Oregon Primary Certification #: MN300001

Oregon Secondary Certification #: MN200001*

Pennsylvania Certification #: 68-00563*

Puerto Rico Certification #: MN00064

South Carolina Certification #: 74003001

Tennessee Certification #: TN02818

Texas Certification #: T104704192*

Utah Certification #: MN00064*

Vermont Certification #: VT-027053137

Virginia Certification #: 460163*

Washington Certification #: C486*

West Virginia DEP Certification #: 382

West Virginia DW Certification #: 9952 C

Wisconsin Certification #: 999407970

Wyoming UST Certification #: via A2LA 2926.01

USDA Permit #: P330-19-00208

Please Note: Applicable air certifications are denoted with an asterisk ().

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: Duluth Dump #1

Pace Project No.: 10539723

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10539723001	RW-17	Water	11/18/20 09:45	11/18/20 18:15

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: Duluth Dump #1

Pace Project No.: 10539723

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10539723001	RW-17	EPA 8270E by SIM	CH3, ZT	2

PASI-M = Pace Analytical Services - Minneapolis

REPORT OF LABORATORY ANALYSIS

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SUMMARY OF DETECTION

Project: Duluth Dump #1

Pace Project No.: 10539723

Lab Sample ID Method	Client Sample ID Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
10539723001	RW-17					
EPA 8270E by SIM	1,4-Dioxane (SIM)	0.54	ug/L	0.24	12/01/20 01:34	
EPA 8270E by SIM	1,4-Dioxane (SIM)	0.57	ug/L	0.24	12/04/20 21:40	B,H2

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Duluth Dump #1

Pace Project No.: 10539723

Method: EPA 8270E by SIM

Description: 8270E MSSV 14 Dioxane By SIM

Client: AECOM MN ND

Date: December 18, 2020

General Information:

1 sample was analyzed for EPA 8270E by SIM by Pace Analytical Services Minneapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

H2: Extraction or preparation was conducted outside of the recognized method holding time.

- RW-17 (Lab ID: 10539723001)

Sample Preparation:

The samples were prepared in accordance with EPA Mod. 3510C with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

QC Batch: 712569

S0: Surrogate recovery outside laboratory control limits.

- BLANK (Lab ID: 3804879)
 - 1,4-Dioxane-d8 (S)
- LCS (Lab ID: 3804880)
 - 1,4-Dioxane-d8 (S)
- MS (Lab ID: 3804881)
 - 1,4-Dioxane-d8 (S)
- MSD (Lab ID: 3804882)
 - 1,4-Dioxane-d8 (S)
- RW-17 (Lab ID: 10539723001)
 - 1,4-Dioxane-d8 (S)

QC Batch: 713669

S0: Surrogate recovery outside laboratory control limits.

- BLANK (Lab ID: 3810065)
 - 1,4-Dioxane-d8 (S)
- LCS (Lab ID: 3810066)
 - 1,4-Dioxane-d8 (S)

REPORT OF LABORATORY ANALYSIS

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without the written consent of Pace Analytical Services, LLC.

PROJECT NARRATIVE

Project: Duluth Dump #1

Pace Project No.: 10539723

Method: EPA 8270E by SIM

Description: 8270E MSSV 14 Dioxane By SIM

Client: AECOM MN ND

Date: December 18, 2020

QC Batch: 713669

S0: Surrogate recovery outside laboratory control limits.

- RW-17 (Lab ID: 10539723001)
- 1,4-Dioxane-d8 (S)

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

QC Batch: 713669

B: Analyte was detected in the associated method blank.

- BLANK for HBN 713669 [OEXT/573 (Lab ID: 3810065)
- 1,4-Dioxane (SIM)

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

REPORT OF LABORATORY ANALYSIS

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without the written consent of Pace Analytical Services, LLC.

ANALYTICAL RESULTS

Project: Duluth Dump #1

Pace Project No.: 10539723

Sample: RW-17		Lab ID: 10539723001		Collected: 11/18/20 09:45	Received: 11/18/20 18:15	Matrix: Water			
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270E MSSV 14 Dioxane By SIM		Analytical Method: EPA 8270E by SIM Preparation Method: EPA Mod. 3510C Pace Analytical Services - Minneapolis							
1,4-Dioxane (SIM)	0.54	ug/L	0.24	0.10	1	11/23/20 11:38	12/01/20 01:34	123-91-1	
1,4-Dioxane (SIM)	0.57	ug/L	0.24	0.10	1	12/01/20 18:25	12/04/20 21:40	123-91-1	B,H2
Surrogates									
1,4-Dioxane-d8 (S)	28	%	30-125		1	11/23/20 11:38	12/01/20 01:34		S0
1,4-Dioxane-d8 (S)	28	%	30-125		1	12/01/20 18:25	12/04/20 21:40		S0

REPORT OF LABORATORY ANALYSIS

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without the written consent of Pace Analytical Services, LLC.

QUALITY CONTROL DATA

Project: Duluth Dump #1
Pace Project No.: 10539723

QC Batch: 712569 Analysis Method: EPA 8270E by SIM
QC Batch Method: EPA Mod. 3510C Analysis Description: 8270E Water 14 Dioxane by SIM
Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10539723001

METHOD BLANK: 3804879 Matrix: Water

Associated Lab Samples: 10539723001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,4-Dioxane (SIM)	ug/L	ND	0.25	0.11	11/30/20 22:07	
1,4-Dioxane-d8 (S)	%.	25	30-125		11/30/20 22:07	S0

LABORATORY CONTROL SAMPLE: 3804880

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,4-Dioxane (SIM)	ug/L	10	10.1	101	32-128	
1,4-Dioxane-d8 (S)	%.			24	30-125	S0

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3804881 3804882

Parameter	Units	10539722001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,4-Dioxane (SIM)	ug/L	ND	10	10	10.7	11.2	107	112	32-130	4	30	
1,4-Dioxane-d8 (S)	%.						28	28	30-125			S0

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Duluth Dump #1
Pace Project No.: 10539723

QC Batch: 713669	Analysis Method: EPA 8270E by SIM
QC Batch Method: EPA Mod. 3510C	Analysis Description: 8270E Water 14 Dioxane by SIM
	Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10539723001

METHOD BLANK: 3810065 Matrix: Water

Associated Lab Samples: 10539723001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,4-Dioxane (SIM)	ug/L	0.40	0.25	0.11	12/04/20 17:10	
1,4-Dioxane-d8 (S)	%.	26	30-125		12/04/20 17:10	S0

LABORATORY CONTROL SAMPLE: 3810066

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,4-Dioxane (SIM)	ug/L	10	9.3	93	32-128	
1,4-Dioxane-d8 (S)	%.			23	30-125	S0

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3825961 3825962

Parameter	Units	3825961		3825962		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		10539722001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result						
1,4-Dioxane (SIM)	ug/L	ND	10	10	10	10.5	98	103	32-130	5	30
1,4-Dioxane-d8 (S)	%.						32	35	30-125		

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

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: Duluth Dump #1

Pace Project No.: 10539723

DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

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

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

B Analyte was detected in the associated method blank.

H2 Extraction or preparation was conducted outside of the recognized method holding time.

S0 Surrogate recovery outside laboratory control limits.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Duluth Dump #1

Pace Project No.: 10539723

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10539723001	RW-17	EPA Mod. 3510C	712569	EPA 8270E by SIM	712977
10539723001	RW-17	EPA Mod. 3510C	713669	EPA 8270E by SIM	714371

REPORT OF LABORATORY ANALYSIS

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Minnesota Pollution Control Agency

MPCA Chain-of-Custody Form revision 2017.0328

* indicates a required field

Work Order Number: 3000024908

COC Type:

Page: 1 of 1

Turnaround Time: Std

COC ID:

PROJECT/CLIENT INFO

LABORATORY

FOR LAB USE ONLY

Facility Code:* SR0000093

Program Code PL
(MDH Lab Only):

Lab Name: Pace Analytical (Tina Soltani)

Project Name:* Duluth Dump #1

Project Task Code:* PRJ07955

Address: 1800 Elm Street SE

Project Manager: MPCA: Jennifer Jevnisek/ AECOM: Ethan Harvey

Minneapolis, MN 55414

Potential Hazard? No

If yes, add information to Sampler Comments field

EPA Lab ID.*

Lab Work Order Sticker

SAMPLE DETAILS

ANALYSIS REQUESTED

SAMPLE TYPES
Sample=Routine Sample
QC-FB=Field Blank Sample
QC-FR=Field Replicate Sample
QC-TB=Trip Blank Sample
QC-EB=Equipment Blank
Treated-Mid=Treatment system sample
Treated-Post=Treatment system sample

SAMPLING METHODS
G=Grab sample
CT=Composite, time-paced w/AS
CF=Composite w/AS
D-T=Discrete, time-paced w/AS
D-F=Discrete, flow-paced w/AS
SW-GAS=Gas Sampling
Unknown=Unknown

LAB MATRICES
DW=Drinking Water
NW=Nonpotable Water
SD=Soil/Solid
AR=Air

BL=Biological Material
OT=Other
TS=Tissue

FIELD MATRICES
Wtr-Ground=Groundwater
Wtr-Surf=Surface Water
Wtr-Drink=Drinking Water
QC-BLANK=Artificial Blank Water
Leachate=Leachate Sample
Air-Indoor=Indoor Air
Gas-Soil=Soil Gas

MN Location Identifier*	Field Name	Sample Type*	Start Date* (mm/dd/yyyy)	Start Time* 24 hr (hh:mm)	Depth			Sampling Method*	Complete ONLY if Method is CT, CF, D-T, or D-F			Lab Matrix*	Field Matrix* AIS	Sampler Comments (filter volume, special handling, etc.)	# of Cont	ANALYSIS*	PRESERV.	1-4 Dioxane	Lab Sample No.	#
					Start	End	Units (m or ft.)		End Date (mm/dd/yyyy)	End Time 24 hr (hh:mm)	Lab Matrix*									
1000020740	RW-17	Sample	11-18-20	0745				G				DW	Wtr-Drink		2		x		1	
																			2	
																			3	
																			4	
																			5	
																			6	
																			7	
																			8	
																			9	
																			10	

WO#: 10539723

10539723

Sampler's Name: *Chloe Malin* Phone#: *6083178634* Billing Organization: AECOM Acct#: _____

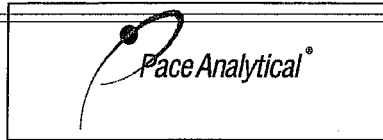
Sampler's Signature: *Chloe Malin* Address: USAPImaging@aecom.com (Ethan Harvey / AECOM Project #60645588)

Sampler's Organization: *AECOM* Courier Name: _____ Tracking#: _____

Receiving Comments:

Relinquished By/Affiliation	Date/Time	Accepted By/Affiliation	Date/Time
<i>Chloe Malin / AECOM</i>	<i>11-18-20 / 15:20</i>	<i>JL Potts / PACE</i>	<i>11/18/20 15:20</i>
<i>JL Potts / PACE</i>	<i>11/18/20 15:30</i>	<i>JL Potts / PACE</i>	<i>11/18/20 1815</i>

0.1
15:20



Document Name:
Sample Condition Upon Receipt (SCUR) - MN
 Document No.:
ENV-FRM-MIN4-0150 Rev.01

Document Revised: **12Aug2020**
Page 1 of 1
 Pace Analytical Services -
Minneapolis

Sample Condition Upon Receipt

Client Name: MPCA Project #: _____

WO# : 10539723
 PM: TS1 Due Date: 12/07/20
 CLIENT: RECOM

Courier: Fed Ex UPS USPS Client
 Pace Speedee Commercial
 Tracking Number: _____ See Exceptions
 ENV-FRM-MIN4-0142

Custody Seal on Cooler/Box Present? Yes No Seals Intact? Yes No Biological Tissue Frozen? Yes No N/A
 Packing Material: Bubble Wrap Bubble Bags None Other: _____ Temp Blank? Yes No
 Thermometer: T1(0461) T2(1336) T3(0459)
 T4(0254) T5(0489) Type of Ice: Wet Blue None Dry Melted

Did Samples Originate in West Virginia? Yes No Were All Container Temps Taken? Yes No N/A
 Temp should be above freezing to 6°C Cooler Temp Read w/temp blank: 0.3 °C Average Corrected Temp (no temp blank only): _____ °C
 Correction Factor: true Cooler Temp Corrected w/temp blank: 0.3 °C

USDA Regulated Soil: N/A, water sample/Other: _____ Date/Initials of Person Examining Contents: M/11-18-20
 Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? Yes No
 Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? Yes No
If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

	COMMENTS:
Chain of Custody Present and Filled Out? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	1.
Chain of Custody Relinquished? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	2.
Sampler Name and/or Signature on COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Samples Arrived within Hold Time? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	4.
Short Hold Time Analysis (<72 hr)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. <input type="checkbox"/> Fecal Coliform <input type="checkbox"/> HPC <input type="checkbox"/> Total Coliform/E coli <input type="checkbox"/> BOD/cBOD <input type="checkbox"/> Hex Chrome <input type="checkbox"/> Turbidity <input type="checkbox"/> Nitrate <input type="checkbox"/> Nitrite <input type="checkbox"/> Orthophos <input type="checkbox"/> Other
Rush Turn Around Time Requested? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6.
Sufficient Volume? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	7.
Correct Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	8.
-Pace Containers Used? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.
Containers Intact? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	10. Is sediment visible in the dissolved container? <input type="checkbox"/> Yes <input type="checkbox"/> No
Field Filtered Volume Received for Dissolved Tests? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11. If no, write ID/ Date/Time on Container Below: <input type="checkbox"/> See Exception ENV-FRM-MIN4-0142
Is sufficient information available to reconcile the samples to the COC? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Matrix: <input checked="" type="checkbox"/> Water <input type="checkbox"/> Soil <input type="checkbox"/> Oil <input type="checkbox"/> Other	
All containers needing acid/base preservation have been checked? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	12. Sample # <input type="checkbox"/> NaOH <input type="checkbox"/> HNO ₃ <input type="checkbox"/> H ₂ SO ₄ <input type="checkbox"/> Zinc Acetate
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO ₃ , H ₂ SO ₄ , <2pH, NaOH >9 Sulfide, NaOH >10 Cyanide) <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Positive for Res. <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> See Exception Chlorine? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> See Exception ENV-FRM-MIN4-0142
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Res. Chlorine 0-6 Roll 0-6 Strip 0-14 Strip
Extra labels present on soil VOA or WIDRO containers? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> See Exception ENV-FRM-MIN4-0140
Headspace in VOA Vials (greater than 6mm)? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Trip Blank Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14. Pace Trip Blank Lot # (if purchased): _____
Trip Blank Custody Seals Present? <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	

CLIENT NOTIFICATION/RESOLUTION Field Data Required? Yes No
 Person Contacted: _____ Date/Time: _____
 Comments/Resolution: _____

Project Manager Review: _____ Date: 11/20/20

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

Labeled by: Rve (1) Page 14 of 14

December 18, 2020

Ethan Harvey
AECOM
230 W Superior St
Suite 400
Duluth, MN 55802

RE: Project: Duluth Dump #1
Pace Project No.: 10539724

Dear Ethan Harvey:

Enclosed are the analytical results for sample(s) received by the laboratory on November 18, 2020. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

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

- Pace Analytical Services - Minneapolis

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

Sincerely,



Tina Soltani
tina.soltani@pacelabs.com
(612) 607-6384
Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

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CERTIFICATIONS

Project: Duluth Dump #1

Pace Project No.: 10539724

Pace Analytical Services - Minneapolis MN

1700 Elm Street SE, Minneapolis, MN 55414

1800 Elm Street SE, Minneapolis, MN 55414--Satellite Air Lab

A2LA Certification #: 2926.01*

Alabama Certification #: 40770

Alaska Contaminated Sites Certification #: 17-009*

Alaska DW Certification #: MN00064

Arizona Certification #: AZ0014*

Arkansas DW Certification #: MN00064

Arkansas WW Certification #: 88-0680

California Certification #: 2929

Colorado Certification #: MN00064

Connecticut Certification #: PH-0256

EPA Region 8+Wyoming DW Certification #: via MN 027-053-137

Florida Certification #: E87605*

Georgia Certification #: 959

Hawaii Certification #: MN00064

Idaho Certification #: MN00064

Illinois Certification #: 200011

Indiana Certification #: C-MN-01

Iowa Certification #: 368

Kansas Certification #: E-10167

Kentucky DW Certification #: 90062

Kentucky WW Certification #: 90062

Louisiana DEQ Certification #: AI-03086*

Louisiana DW Certification #: MN00064

Maine Certification #: MN00064*

Maryland Certification #: 322

Massachusetts DWP Certification #: via MN 027-053-137

Michigan Certification #: 9909

Minnesota Certification #: 027-053-137*

Minnesota Dept of Ag Certification #: via MN 027-053-137

Minnesota Petrofund Certification #: 1240*

Mississippi Certification #: MN00064

Missouri Certification #: 10100

Montana Certification #: CERT0092

Nebraska Certification #: NE-OS-18-06

Nevada Certification #: MN00064

New Hampshire Certification #: 2081*

New Jersey Certification #: MN002

New York Certification #: 11647*

North Carolina DW Certification #: 27700

North Carolina WW Certification #: 530

North Dakota Certification #: R-036

Ohio DW Certification #: 41244

Ohio VAP Certification #: CL101

Oklahoma Certification #: 9507*

Oregon Primary Certification #: MN300001

Oregon Secondary Certification #: MN200001*

Pennsylvania Certification #: 68-00563*

Puerto Rico Certification #: MN00064

South Carolina Certification #: 74003001

Tennessee Certification #: TN02818

Texas Certification #: T104704192*

Utah Certification #: MN00064*

Vermont Certification #: VT-027053137

Virginia Certification #: 460163*

Washington Certification #: C486*

West Virginia DEP Certification #: 382

West Virginia DW Certification #: 9952 C

Wisconsin Certification #: 999407970

Wyoming UST Certification #: via A2LA 2926.01

USDA Permit #: P330-19-00208

Please Note: Applicable air certifications are denoted with an asterisk ().

REPORT OF LABORATORY ANALYSIS

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SAMPLE SUMMARY

Project: Duluth Dump #1

Pace Project No.: 10539724

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10539724001	Field Duplicate	Water	11/18/20 00:00	11/18/20 18:15

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SAMPLE ANALYTE COUNT

Project: Duluth Dump #1

Pace Project No.: 10539724

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10539724001	Field Duplicate	EPA 8270E by SIM	CH3, ZT	2

PASI-M = Pace Analytical Services - Minneapolis

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Duluth Dump #1

Pace Project No.: 10539724

Method: EPA 8270E by SIM

Description: 8270E MSSV 14 Dioxane By SIM

Client: AECOM MN ND

Date: December 18, 2020

General Information:

1 sample was analyzed for EPA 8270E by SIM by Pace Analytical Services Minneapolis. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

H2: Extraction or preparation was conducted outside of the recognized method holding time.

- Field Duplicate (Lab ID: 10539724001)

Sample Preparation:

The samples were prepared in accordance with EPA Mod. 3510C with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):

All criteria were within method requirements with any exceptions noted below.

Continuing Calibration:

All criteria were within method requirements with any exceptions noted below.

Internal Standards:

All internal standards were within QC limits with any exceptions noted below.

Surrogates:

All surrogates were within QC limits with any exceptions noted below.

QC Batch: 712569

S0: Surrogate recovery outside laboratory control limits.

- BLANK (Lab ID: 3804879)
 - 1,4-Dioxane-d8 (S)
- Field Duplicate (Lab ID: 10539724001)
 - 1,4-Dioxane-d8 (S)
- LCS (Lab ID: 3804880)
 - 1,4-Dioxane-d8 (S)
- MS (Lab ID: 3804881)
 - 1,4-Dioxane-d8 (S)
- MSD (Lab ID: 3804882)
 - 1,4-Dioxane-d8 (S)

QC Batch: 713669

S0: Surrogate recovery outside laboratory control limits.

- BLANK (Lab ID: 3810065)
 - 1,4-Dioxane-d8 (S)
- LCS (Lab ID: 3810066)
 - 1,4-Dioxane-d8 (S)

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: Duluth Dump #1

Pace Project No.: 10539724

Method: EPA 8270E by SIM

Description: 8270E MSSV 14 Dioxane By SIM

Client: AECOM MN ND

Date: December 18, 2020

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: Duluth Dump #1

Pace Project No.: 10539724

Sample: Field Duplicate		Lab ID: 10539724001		Collected: 11/18/20 00:00	Received: 11/18/20 18:15	Matrix: Water			
Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8270E MSSV 14 Dioxane By SIM		Analytical Method: EPA 8270E by SIM Preparation Method: EPA Mod. 3510C Pace Analytical Services - Minneapolis							
1,4-Dioxane (SIM)	ND	ug/L	0.24	0.10	1	11/23/20 11:38	12/01/20 01:54	123-91-1	
1,4-Dioxane (SIM)	ND	ug/L	0.24	0.10	1	12/01/20 18:25	12/04/20 22:01	123-91-1	H2
Surrogates									
1,4-Dioxane-d8 (S)	27	%	30-125		1	11/23/20 11:38	12/01/20 01:54		S0
1,4-Dioxane-d8 (S)	30	%	30-125		1	12/01/20 18:25	12/04/20 22:01		

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Duluth Dump #1

Pace Project No.: 10539724

QC Batch: 712569

Analysis Method: EPA 8270E by SIM

QC Batch Method: EPA Mod. 3510C

Analysis Description: 8270E Water 14 Dioxane by SIM

Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10539724001

METHOD BLANK: 3804879

Matrix: Water

Associated Lab Samples: 10539724001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,4-Dioxane (SIM)	ug/L	ND	0.25	0.11	11/30/20 22:07	
1,4-Dioxane-d8 (S)	%.	25	30-125		11/30/20 22:07	S0

LABORATORY CONTROL SAMPLE: 3804880

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,4-Dioxane (SIM)	ug/L	10	10.1	101	32-128	
1,4-Dioxane-d8 (S)	%.			24	30-125	S0

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3804881 3804882

Parameter	Units	10539722001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,4-Dioxane (SIM)	ug/L	ND	10	10	10.7	11.2	107	112	32-130	4	30	
1,4-Dioxane-d8 (S)	%.						28	28	30-125			S0

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

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: Duluth Dump #1

Pace Project No.: 10539724

QC Batch: 713669	Analysis Method: EPA 8270E by SIM
QC Batch Method: EPA Mod. 3510C	Analysis Description: 8270E Water 14 Dioxane by SIM
	Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10539724001

METHOD BLANK: 3810065 Matrix: Water

Associated Lab Samples: 10539724001

Parameter	Units	Blank Result	Reporting Limit	MDL	Analyzed	Qualifiers
1,4-Dioxane (SIM)	ug/L	0.40	0.25	0.11	12/04/20 17:10	
1,4-Dioxane-d8 (S)	%.	26	30-125		12/04/20 17:10	S0

LABORATORY CONTROL SAMPLE: 3810066

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,4-Dioxane (SIM)	ug/L	10	9.3	93	32-128	
1,4-Dioxane-d8 (S)	%.			23	30-125	S0

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3825961 3825962

Parameter	Units	10539722001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,4-Dioxane (SIM)	ug/L	ND	10	10	10	10.5	98	103	32-130	5	30	
1,4-Dioxane-d8 (S)	%.						32	35	30-125			

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

REPORT OF LABORATORY ANALYSIS

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QUALIFIERS

Project: Duluth Dump #1

Pace Project No.: 10539724

DEFINITIONS

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

ND - Not Detected at or above adjusted reporting limit.

TNTC - Too Numerous To Count

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

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

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

S - Surrogate

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

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

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

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

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

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

TNI - The NELAC Institute.

ANALYTE QUALIFIERS

H2 Extraction or preparation was conducted outside of the recognized method holding time.

S0 Surrogate recovery outside laboratory control limits.

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: Duluth Dump #1
Pace Project No.: 10539724

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10539724001	Field Duplicate	EPA Mod. 3510C	712569	EPA 8270E by SIM	712977
10539724001	Field Duplicate	EPA Mod. 3510C	713669	EPA 8270E by SIM	714371

REPORT OF LABORATORY ANALYSIS

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Minnesota Pollution Control Agency

MPCA Chain-of-Custody Form revision 2017.0323

* indicates a required field

Work Order Number: 300024908

COC Type:

Page: 1 of 1

Turnaround Time: Std

COC ID:

PROJECT/CLIENT INFO

LABORATORY

FOR LAB USE ONLY

Facility Code:* SR000093

Program Code (MDH Lab Only):

Lab Name: Pace Analytical (Tina Soltani)

Project Name:* Duluth Dump #1

Project Task Code:* PRJ07955

Address: 1800 Elm Street SE

Project Manager: MPCA: Jennifer Jevnisek/ AECOM: Ethan Harvey

Minneapolis, MN 55414

Potential Hazard? No

If yes, add information to Sampler Comments field

EPA Lab ID:*

Lab Work Order Sticker

SAMPLE DETAILS

ANALYSIS REQUESTED

SAMPLE TYPES		SAMPLING METHODS		LAB MATRICES			Complete ONLY if Method is CT, CF, D-T, or D-F		FIELD MATRICES		ANALYSIS*	PRESERV.	Lab Sample No.	#					
SAMPLE TYPES		SAMPLING METHODS		LAB MATRICES			Complete ONLY if Method is CT, CF, D-T, or D-F		FIELD MATRICES										
Sample=Routine Sample	G=Grab sample	DW=Drinking Water	BL=Biological Material	Wtr-Ground=Groundwater	Wtr-Surf=Surface Water	Wtr-Drink=Drinking Water	QC-BLANK=Artificial Blank Water	Leachate=Leachate Sample	Air-Indoor=Indoor Air	Gas-Soil=Soil Gas									
QC-FB=Field Blank Sample	CT=Composite, time-paced w/AS	NW=Nonpotable Water	OT=Other	Wtr-Surf=Surface Water	Wtr-Drink=Drinking Water	QC-BLANK=Artificial Blank Water	Leachate=Leachate Sample	Air-Indoor=Indoor Air	Gas-Soil=Soil Gas										
QC-FR=Field Replicate Sample	CF=Composite w/AS	SD=Soil/Solid	TS=Tissue	Leachate=Leachate Sample	Air-Indoor=Indoor Air	Gas-Soil=Soil Gas													
QC-TB=Trip Blank Sample	D-T=Discrete, time-paced w/AS	AR=Air																	
QC-EB=Equipment Blank	D-F=Discrete, flow-paced w/AS																		
Treated-Mid=Treatment system sample	SW-GAS=Gas Sampling																		
Treated-Post=Treatment system sample	Unknown=Unknown																		
MN Location Identifier*	Field Name	Sample Type*	Start Date* (mm/dd/yyyy)	Start Time* 24 hr (hh:mm)	Start	End	Units (m or ft.)	Sampling Method*	End Date (mm/dd/yyyy)	End Time 24 hr (hh:mm)	Lab Matrix*	Field Matrix*	AIS	Sampler Comments (filter volume, special handling, etc.)	# of Cont	ANALYSIS*	1-4 Dioxane	Lab Sample No.	#
1000020722	RW-1	Sample									DW	Wtr-Drink					*		1
Field Duplicate	Field Duplicate	QC-FR Sample	11-18-20								DW	Wtr-Drink					X		2
																			3
																			4
																			5
																			6
																			7
																			8
																			9
																			10

WO#: 10539724

10539724

Sampler's Name: *Chloe Main Phone#: 6083178634 Billing Organization: AECOM Acct#:

Sampler's Signature: *Chloe mali Address: USAPImaging@aecom.com (Ethan Harvey / AECOM Project #60645588)

Sampler's Organization: Courier Name: Tracking#:

Receiving Comments:

Relinquished By/Affiliation Date/Time Accepted By/Affiliation Date/Time

Chloe mali/AECOM 11-18-20 15:20 John Patti /PACE 11/18/20 15:20 -0.1

John Patti /PACE 11/18/20 15:20 PACE 11/18/20 18:15

Process Date in LAB_MN Format for MPCA submittal



Document Name:
Sample Condition Upon Receipt (SCUR) - MN

Document No.:
ENV-FRM-MIN4-0150 Rev.01

Document Revised: 12Aug2020
Page 1 of 1

Pace Analytical Services -
Minneapolis

Sample Condition Upon Receipt

Client Name: MPCA

Project #: _____

Courier: Fed Ex UPS USPS Client
 Pace SpeeDee Commercial

Tracking Number: _____

See Exceptions
ENV-FRM-MIN4-0142

WO# : 10539724

PM: TS1 Due Date: 12/07/20
CLIENT: AECOM

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

Packing Material: Bubble Wrap Bubble Bags None Other: _____ Temp Blank? Yes No

Thermometer: T1(0461) T2(1336) T3(0459)
 T4(0254) T5(0489) Type of Ice: Wet Blue None Dry Melted

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

Temp should be above freezing to 6°C Cooler Temp Read w/temp blank: 0.3 °C Average Corrected Temp (no temp blank only): _____ °C See Exceptions ENV-FRM-MIN4-0142 1 Container

Correction Factor: true Cooler Temp Corrected w/temp blank: 0.3 °C

USDA Regulated Soil: (N/A, water sample/Other: _____) Date/Initials of Person Examining Contents: M/1.18.20

Did samples originate in a quarantine zone within the United States: AL, AR, CA, FL, GA, ID, LA, MS, NC, NM, NY, OK, OR, SC, TN, TX or VA (check maps)? Yes No Did samples originate from a foreign source (internationally, including Hawaii and Puerto Rico)? Yes No

If Yes to either question, fill out a Regulated Soil Checklist (F-MN-Q-338) and include with SCUR/COC paperwork.

		COMMENTS:
Chain of Custody Present and Filled Out?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	1.
Chain of Custody Relinquished?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	2.
Sampler Name and/or Signature on COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Samples Arrived within Hold Time?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	4.
Short Hold Time Analysis (<72 hr)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	5. <input type="checkbox"/> Fecal Coliform <input type="checkbox"/> HPC <input type="checkbox"/> Total Coliform/E coli <input type="checkbox"/> BOD/cBOD <input type="checkbox"/> Hex Chrome <input type="checkbox"/> Turbidity <input type="checkbox"/> Nitrate <input type="checkbox"/> Nitrite <input type="checkbox"/> Orthophos <input type="checkbox"/> Other
Rush Turn Around Time Requested?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6.
Sufficient Volume?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	7.
Correct Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	8.
-Pace Containers Used?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Containers Intact?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	9.
Field Filtered Volume Received for Dissolved Tests?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	10. Is sediment visible in the dissolved container? <input type="checkbox"/> Yes <input type="checkbox"/> No
Is sufficient information available to reconcile the samples to the COC?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	11. If no, write ID/ Date/Time on Container Below: <input type="checkbox"/> See Exception ENV-FRM-MIN4-0142
Matrix: <input checked="" type="checkbox"/> Water <input type="checkbox"/> Soil <input type="checkbox"/> Oil <input type="checkbox"/> Other		
All containers needing acid/base preservation have been checked?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO ₃ , H ₂ SO ₄ , <2pH, NaOH >9 Sulfide, NaOH >10 Cyanide)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	<input type="checkbox"/> NaOH <input type="checkbox"/> HNO ₃ <input type="checkbox"/> H ₂ SO ₄ <input type="checkbox"/> Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Positive for Res. Chlorine? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> See Exception ENV-FRM-MIN4-0142
		pH Paper Lot#
		Res. Chlorine 0-6 Roll 0-6 Strip 0-14 Strip
Extra labels present on soil VOA or WIDRO containers?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> See Exception ENV-FRM-MIN4-0140
Headspace in VOA Vials (greater than 6mm)?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Trip Blank Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	14.
Trip Blank Custody Seals Present?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Pace Trip Blank Lot # (if purchased): _____

CLIENT NOTIFICATION/RESOLUTION Field Data Required? Yes No

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: [Signature] Date: 11/20/20

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

SAMPLING INFORMATION FORM

Sampler's Name: Chris Mann / Will Montz Weather: 32° F sunny
 Unusual Conditions None Project _____
 Location Duluth, MN AECOM project number _____
 Sample ID number Rw-1 Date sampled 11-18-20 Time 1340 am _____ pm _____
 Describe sampling point outside spigot
 Unique Well Number 1000020722

WELL INFORMATION: (If Applicable)

Monitoring point elevation = _____ Datum = _____ Water elevation = _____
 Well depth (prior to sampling) _____ feet below monitoring point (mp)
 Depth to water (below mp) = _____ feet Date _____ Time _____ am _____ pm _____
 Well diameter = _____ inches Water level above screen? No Yes _____ feet
 Water column = _____ feet Volume of water in well = _____ gallons

PURGING INFORMATION:

Purging method: Bailer _____ Submersible pump _____ Tap _____ Other _____
 Tubing type: polyethylene _____ Black poly _____ Other _____
 Pump intake or bailer set at _____ feet below monitoring point (mp).
 Discharge rate (if applicable) _____ gpm x 0.1336806 = _____ cfm
 At least _____ well volumes evacuated before sampling, totaling _____ gallons.

SAMPLING INFORMATION

Sampling method: Bailer _____ Tap _____ Other Peristaltic
 Tubing type (if applicable): polyethylene _____ Other _____
 Bailer was: Disposable _____ Laboratory cleaned _____ Field cleaned _____ Other _____
 Sample collected from _____ feet below monitoring point. (mp)
 Sample collection discharge rate (if applicable): = _____ gpm
 Sample appearance clear Odor None

Note any sampling observations if necessary
Field stabilization taken from calibration cup

Chemical Analysis _____

Equipment Calibration _____

FIELD STABILIZATION 1330 - start purge

Purge gallons 111 111 111 111

Military Time	pH	Redox Pot.	Temperature corrected conductance (mS/cm)	Temperature (°C)	DO (mg/L)	Water Level (nearest 0.01 ft)	Cumulative volume of water removed (gal.)	Turbidity (NTU)
1331	6.86	182.7	0.216	12.70	6.80			
1333	6.72	178.1	0.211	9.63	6.27			
1334	6.66	175.0	0.208	9.68	5.67			
1336	6.59	177.6	0.209	9.64	5.18			
1338	6.53	180.4	0.208	9.50	4.67			
1339	6.50	183.5	0.208	9.53	4.83		~20	

SAMPLING INFORMATION FORM

Sampler's Name: Chloe Malin / Will Montz Weather: 34° F mostly sunny
 Unusual Conditions none Project _____
 Location Duluth, MN AECOM project number _____
 Sample ID number RW-2 Date sampled 11-18 Time 10:45 am _____ pm _____
 Describe sampling point Spigot (outside)
 Unique Well Number 1000020726

WELL INFORMATION: (If Applicable)

Monitoring point elevation = _____ Datum = _____ Water elevation = _____
 Well depth (prior to sampling) _____ feet below monitoring point (mp)
 Depth to water (below mp) = _____ feet Date _____ Time _____ am _____ pm _____
 Well diameter = _____ inches Water level above screen? _____ No _____ Yes _____ feet
 Water column = _____ feet Volume of water in well = _____ gallons

PURGING INFORMATION:

Purging method: Bailer _____ Submersible pump _____ Tap _____ Other _____
 Tubing type: polyethylene _____ Black poly _____ Other _____
 Pump intake or bailer set at _____ feet below monitoring point (mp).
 Discharge rate (if applicable) _____ gpm x 0.1336806 = _____ cfm
 At least _____ well volumes evacuated before sampling, totaling _____ gallons.

SAMPLING INFORMATION

Sampling method: Bailer _____ Tap _____ Other Peristaltic
 Tubing type (if applicable): polyethylene _____ Other _____
 Bailer was: Disposable _____ Laboratory cleaned _____ Field cleaned _____ Other _____
 Sample collected from _____ feet below monitoring point. (mp)
 Sample collection discharge rate (if applicable): = _____ gpm
 Sample appearance Clear Odor None
 Note any sampling observations if necessary _____
YSI from calibration cup
 Chemical Analysis _____
 Equipment Calibration _____

FIELD STABILIZATION

Purge gallons: |||||

Military Time	pH	Redox Pot.	Temperature corrected conductance (mS/cm)	Temperature (°C)	DO (mg/L)	Water Level (nearest 0.01 ft)	Cumulative volume of water removed (gal.)	Turbidity (NTU)
1032	6.62	173.3	0.471	9.69	5.91			
1035	6.22	174.9	0.472	9.52	4.91			
1037	6.20	176.6	0.464	9.76	5.40			
1039	6.16	175.6	0.468	9.74	5.12			
1040	6.17	178.5	0.478	9.61	5.57			
1041	6.18	177.8	0.479	9.64	5.49		~32	

SAMPLING INFORMATION FORM

Sampler's Name: Chloe Malin Weather: 32°F, Sunny
 Unusual Conditions None Project _____
 Location Front spigot (outside) AECOM project number _____
 Sample ID number RW-3 Date sampled 11-18-20 Time 1020 am _____ pm _____
 Describe sampling point Front spigot (outside)
 Unique Well Number 1000020735

WELL INFORMATION: (If Applicable)

Monitoring point elevation = _____ Datum = _____ Water elevation = _____
 Well depth (prior to sampling) _____ feet below monitoring point (mp)
 Depth to water (below mp) = _____ feet Date _____ Time _____ am _____ pm _____
 Well diameter = _____ inches Water level above screen? _____ No _____ Yes _____ feet
 Water column = _____ feet Volume of water in well = _____ gallons

PURGING INFORMATION:

Purging method: Bailer _____ Submersible pump _____ Tap _____ Other _____
 Tubing type: polyethylene _____ Black poly _____ Other _____
 Pump intake or bailer set at _____ feet below monitoring point (mp).
 Discharge rate (if applicable) _____ gpm x 0.1336806 = _____ cfm
 At least _____ well volumes evacuated before sampling, totaling _____ gallons.

SAMPLING INFORMATION

Sampling method: Bailer _____ Tap _____ Other Peristaltic
 Tubing type (if applicable): polyethylene _____ Other _____
 Bailer was: Disposable _____ Laboratory cleaned _____ Field cleaned _____ Other _____
 Sample collected from _____ feet below monitoring point. (mp)
 Sample collection discharge rate (if applicable): = _____ gpm
 Sample appearance clear Odor None
 Note any sampling observations if necessary _____
Field stabilization in calibration cup
 Chemical Analysis _____
 Equipment Calibration _____

FIELD STABILIZATION

Purge Gallons: 111 111 111 111 111 1

Military Time	pH	Redox Pot.	Temperature corrected conductance (mS/cm)	Temperature (°C)	DO (mg/L)	Water Level (nearest 0.01 ft)	Cumulative volume of water removed (gal.)	Turbidity (NTU)
1007	7.66	169.8	0.282	9.28	4.52		①	
1008	7.73	161.7	0.281	10.69	3.45			
1011	7.79	152.8	0.282	10.49	3.14			
1013	7.85	149.1	0.282	9.84	2.95			
1015	7.87	148.0	0.283	9.81	2.93		~26	

SAMPLING INFORMATION FORM

Sampler's Name: Chloe Malin/Will Montz Weather: 32°F sunny
 Unusual Conditions none Project FY21 Duluth Dump
 Location Duluth, MN AECOM project number _____
 Sample ID number RW-15/Dup/MS/MSP Date sampled 11-18-20 Time 0910 am _____ pm _____
 Describe sampling point outside spigot
 Unique Well Number 1000020722

WELL INFORMATION: (If Applicable)

Monitoring point elevation = _____ Datum = _____ Water elevation = _____
 Well depth (prior to sampling) _____ feet below monitoring point (mp)
 Depth to water (below mp) = _____ feet Date _____ Time _____ am _____ pm _____
 Well diameter = _____ inches Water level above screen? No Yes _____ feet
 Water column = _____ feet Volume of water in well = _____ gallons

PURGING INFORMATION:

Purging method: Bailer _____ Submersible pump _____ Tap _____ Other _____
 Tubing type: polyethylene _____ Black poly _____ Other _____
 Pump intake or bailer set at _____ feet below monitoring point (mp).
 Discharge rate (if applicable) _____ gpm x 0.1336806 = _____ cfm
 At least _____ well volumes evacuated before sampling, totaling _____ gallons.

SAMPLING INFORMATION

Sampling method: Bailer _____ Tap _____ Other Peristaltic
 Tubing type (if applicable): polyethylene _____ Other _____
 Bailer was: Disposable _____ Laboratory cleaned _____ Field cleaned _____ Other _____
 Sample collected from _____ feet below monitoring point. (mp)
 Sample collection discharge rate (if applicable): = _____ gpm
 Sample appearance clear Odor None
 Note any sampling observations if necessary Spigot outside; calibration cup used for field stabilization
 Chemical Analysis _____
 Equipment Calibration _____

FIELD STABILIZATION

Military Time	pH	Redox Pot.	Temperature corrected conductance (mS/cm)	Temperature (°C)	DO (mg/L)	Water Level (nearest 0.01 ft)	Cumulative volume of water removed (gal.)	Turbidity (NTU)
0857	6.86	100.4	1.996	15.24	3.72			
0859	6.22	131.9	1.858	12.56	2.47			
0901	6.16	144.2	1.923	12.86	2.20			
0903	6.10	150.3	1.840	12.67	2.30			
0905	6.02	154.6	1.795	12.55	2.64			
0907	5.98	156.7	1.791	12.57	2.69		224	

SAMPLING INFORMATION FORM

Sampler's Name: chloe main/ will Montz Weather: 32° F Sunny
 Unusual Conditions None Project Duluth Dump FY21
 Location Duluth, MN AECOM project number _____
 Sample ID number RW-17 Date sampled 11-18-2020 Time 0945 am X pm _____
 Describe sampling point Spigot in shop
 Unique Well Number 1000020740

WELL INFORMATION: (If Applicable)

Monitoring point elevation = _____ Datum = _____ Water elevation = _____
 Well depth (prior to sampling) _____ feet below monitoring point (mp)
 Depth to water (below mp) = _____ feet Date _____ Time _____ am _____ pm _____
 Well diameter = _____ inches Water level above screen? _____ No _____ Yes _____ feet
 Water column = _____ feet Volume of water in well = _____ gallons

PURGING INFORMATION:

Purging method: Bailer _____ Submersible pump _____ Tap _____ Other _____
 Tubing type: polyethylene _____ Black poly _____ Other _____
 Pump intake or bailer set at _____ feet below monitoring point (mp).
 Discharge rate (if applicable) _____ gpm x 0.1336806 = _____ cfm
 At least _____ well volumes evacuated before sampling, totaling _____ gallons.

SAMPLING INFORMATION

Sampling method: Bailer _____ Tap _____ Other Peristaltic
 Tubing type (if applicable): polyethylene _____ Other _____
 Bailer was: Disposable _____ Laboratory cleaned _____ Field cleaned _____ Other _____
 Sample collected from _____ feet below monitoring point. (mp)
 Sample collection discharge rate (if applicable): = _____ gpm
 Sample appearance Clear Odor None
 Note any sampling observations if necessary _____

Chemical Analysis _____
 Equipment Calibration _____

FIELD STABILIZATION

0936: start purging (5gal/min)

Military Time	pH	Redox Pot.	Temperature corrected conductance (mS/cm)	Temperature (°C)	DO (mg/L)	Water Level (nearest 0.01 ft)	Cumulative volume of water removed (gal.)	Turbidity (NTU)
0938	9.02	160.8	0.286	8.01	5.55			
0940	8.85	157.0	0.275	10.01	2.58			
0941	8.82	155.6	0.275	7.99	2.74			
0942	8.77	160.3	0.276	8.06	1.96			
0943	8.74	162.5	0.279	8.23	1.70			
0944	8.69	162.7	0.278	8.20	1.64			

PROJECT: RFP 24-AA14; Development Partner for Solar Photovoltaics and Storage

DATE: December 5, 2024 at 9:00 AM

PRE-PROPOSAL SIGN-IN SHEET

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