Minneapolis
City of Lakes

Community Planning and Economic Development
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AVAILABILITY OF THE ENVIRONMENTAL ASSESSMENT WORKSHEET FOR
Hiawatha Maintenance Facility Expansion

This EAW studies the proposed Hiawatha Maintenance Facility Expansion located at 1911 East 26th Street, 1860 East 28th Street and 2717 Longfellow Avenue in Minneapolis. The Minneapolis Public Works Department is proposing to expand their Hiawatha Maintenance Facility, located at 1911 East 26th Street, into the property immediately to the south. This will involve the relocation and consolidation of water distribution maintenance office, shop, yard and vehicle/equipment storage functions, and sewer and stormwater office staff from elsewhere, requiring the demolition of the former Roof Depot warehouse building, and construction of approximately 328,000 square feet of new buildings, and parking (surface and structured) for an additional 360 City and personal vehicles.

Copies of the EAW will be available for review at the downtown Minneapolis Central Library located at 300 Nicollet Mall. Notice will be published in the *EQB Monitor* on Tuesday, February 9, 2021. Public comments on the EAW must be made within the 30-day comment period, which ends at 4:00 p.m. on Monday, March 11, 2021. It is anticipated that the BIHZ Committee at its regular meeting on Tuesday, March 30, 2021, or at a subsequent meeting, will receive a report and recommendation from City staff and consider the adequacy of this EAW and the need for an Environmental Impact Statement for this proposal. The City Council will act on the recommendation of this Committee at its regular meeting on Friday, April 16, 2021, or at a subsequent meeting.

This EAW and supporting information will also be available for review on the City of Minneapolis web site: http://www2.minneapolismn.gov/cped/planning/cped_eaw. Copies of this EAW can also be provided to individuals by email. For further information or to submit comments on the EAW, contact Hilary Dvorak, Principal City Planner, at 612.673.2639 or via email hilary.dvorak@minneapolismn.gov.

July 2013 version

ENVIRONMENTAL ASSESSMENT WORKSHEET

This Environmental Assessment Worksheet (EAW) form and EAW Guidelines are available at the Environmental Quality Board's website at:
http://www.eqb.state.mn.us/EnvRevGuidanceDocuments.htm. The EAW form provides information about a project that may have the potential for significant environmental effects. The EAW Guidelines provide additional detail and resources for completing the EAW form.
Cumulative potential effects can either be addressed under each applicable EAW Item or can be addressed collectively under EAW Item 19.
Note to reviewers: Comments must be submitted to the RGU during the 30-day comment period following notice of the EAW in the *EQB Monitor*. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation and the need for an EIS.

1. **Project title: City of Minneapolis – Hiawatha Maintenance Facility Expansion**

2. **Proposer:**
Contact person: Bob Friddle
Title: Director, Facilities Design and Construction
Address: 350 South 5th Street, Rm 223
City, State, ZIP: Minneapolis, MN 55415
Phone: (612) 607-2207
Fax: NA
Email: Bob.Friddle@minneapolismn.gov

3. **RGU**
Contact person: Hilary Dvorak
Title: Principal City Planner
Address: 505 4th Avenue South, Rm 320
City, State, ZIP: Minneapolis, MN 55415
Phone: (612) 273-2639
Fax: (612) 673-2526
Email: Hilary.Dvorak@minneapolismn.gov

4. **Reason for EAW Preparation:** (check one)

Required:	Discretionary:
☐ EIS Scoping	☐ Citizen petition
☐ Mandatory EAW	☐ RGU discretion
	X Proposer initiated

If EAW or EIS is mandatory give EQB rule category subpart number(s) and name(s):

5. **Project Location:**
County: Hennepin
City/Township: Minneapolis
PLS Location (¼, ¼, Section, Township, Range): NW 1/4, T29N; R24W, Section 36
Watershed (81 major watershed scale): 6
GPS Coordinates: 44.571799; 93.143972
Tax Parcel Number: PID 3602924320001 (Current Maintenance Facility Property)
PID 3602924320003 (Roof Depot Property)
PID 3602924320075 (2717 Longfellow Avenue)

At a minimum attach each of the following to the EAW:

- County map showing the general location of the project;
- U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopy acceptable); and
- Site plans showing all significant project and natural features. Pre-construction site plan and post-construction site plan.

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6. Project Description:

a. Provide the brief project summary to be published in the *EQB Monitor*, (approximately 50 words).

The Minneapolis Public Works Department is proposing to expand their Hiawatha Maintenance Facility, located at 1911 East 26th Street, into the property immediately to the south. This will involve the relocation and consolidation of water distribution maintenance office, shop, yard and vehicle/equipment storage functions, and sewer and stormwater office staff from elsewhere, requiring the demolition of the former Roof Depot warehouse building, and construction of approximately 328,000 square feet of *new* buildings, and parking (surface and structured) for an *additional* 360 City and personal vehicles.

b. Give a complete description of the proposed project and related new construction, including infrastructure needs. If the project is an expansion include a description of the existing facility. Emphasize: 1) construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes, 2) modifications to existing equipment or industrial processes, 3) significant demolition, removal or remodeling of existing structures, and 4) timing and duration of construction activities.

The City of Minneapolis Public Works Department (the City) Hiawatha Maintenance Facility (HMF) is located at 1911 East 26th Street. The City is proposing to expand the HMF to the south onto the property formerly occupied by a roofing materials supply company (former Roof Depot). Refer to **Figure 1** illustrating the location of the Site and proposed expansion area. For purposes of this document, the current facility and proposed expansion area will be referred to as "the Site." **Figure 2** illustrates the current Site layout.

As part of on-going efforts to increase the efficiency of facility operations and provide value for residents and customers, as well as improve working conditions for employees, over the years the City has been upgrading facilities and consolidating operations of maintenance facilities located throughout the City. As part of these efforts, the City has recognized the need for expansion of the HMF facility. This expansion will involve the following:

- Physical expansion of the facility onto the 7+ acre Roof Depot property (1860 East 28th Street and 2717 Longfellow Avenue) immediately south of the current facility;
- Environmental abatement and demolition of the 201,000 square foot former Roof Depot warehouse building
- Site environmental cleanup and stormwater management.
- Relocation and consolidation of the Water Distribution Maintenance functions (offices, shops, equipment, yard and vehicle storage) from the Fridley Water Works and East Side Water Yard;
- Relocation of surface water and storm sewer staff from the City of Lakes Building in downtown Minneapolis; and
- Relocation of sanitary sewer staff, equipment and vehicles from the South Transfer Station.

Major improvements that will take place as part of this expansion include the addition of new office space in the northeast portion of the Site, expansion of the existing maintenance facility, construction of a parking ramp in the north eastern portion of the Site, new stores warehouse in the western portion of the Site along Longfellow Avenue, relocation of the fuel island and underground

petroleum storage tank system, new office area and shop in the southeast portion of the Site, construction of additional storage space for vehicles in the central portion of the Site, construction of a training center and relocation of the cure in place pipe (CIPP) operations. In addition, open retention ponds and below ground treatment systems are planned for the management of storm water prior to discharge to the City storm sewer system. Additional excavation activities will include the removal, relocation of existing and installation of new utilities.

The number of employees based on site (most of whom work in the field all day) is currently 300, that number will increase to 440. Refer to the Response to Question 18, Transportation, below for additional details regarding parking.

Refer to **Figure 3** illustrating the layout including improvements to existing site features and new features in the expansion area.

The Site has a history of industrial activities. Therefore, environmental contamination will likely be encountered during the completion of site improvements. Renovation and demolition activities will likely require the management of asbestos and other hazardous materials and dust prior to conducting renovation and demolition activities. Details of known contamination and plans to manage contaminated materials and dust during construction are discussed in the response to Question 12 in this EAW.

Site improvements have the potential to generate additional noise and potentially generate some dust during construction activities. Some additional traffic will also be generated due to the consolidation of City services to the project location. Refer to the responses to Questions 16, 17 and 18 in this EAW for further explanation of the increase in traffic levels and associated vehicle noise, vehicle emissions and dust control and how they will be addressed during and after development.

Improvements to stormwater management have been incorporated into site plans including the construction of aboveground stormwater detention ponds, underground stormwater treatment facilities and landscaped water features. Refer to the response to Question 11 for a detailed discussion of planned stormwater management associated with the site improvements.

The proposed buildout of the southern portion of the Site are anticipated to open in 2022. Full construction, including the northern portion of the Site is scheduled for completion in 2024. Full occupancy of the Site, including full growth in the number of employees at the Site, is anticipated in 2025.

c. Project magnitude:

Total Project Acreage	16.8 Acres
Linear project length	0 feet
Number and type of residential units	0
Commercial building area (in square feet)	0
Industrial building area (in square feet)	265,271 sf
Institutional building area (in square feet)	0

Other uses – specify (in square feet)	Hard Surface: Parking/Circulation/Yard Space – 367,665 sf Green Space: Landscaping and Storm Water Ponds – 95,974 sf
Structure height(s)	Buildings range from 18 – 55 feet;

d. Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.

The City Public Works Department operates facilities in neighborhoods throughout the City in an effort to provide efficient services to residents. Some of these public works facilities are aging and need to be replaced and/or upgraded in order to provide the necessary level of service. As aged buildings are being taken off-line, the City has been consolidating services into key locations to improve the efficiency of services it provides, provide high value to residents and customers, and improve working conditions for employees.

The proposed project will involve the relocation and consolidation of the Water Distribution Maintenance functions from the East Side Wateryard. Additional surface water and sewer staff will be relocated to the Site from existing downtown office space. Wateryard functions are a key element to the distribution of approximately 55 million gallons of safe drinking water per day to City residents as well as seven wholesale customers located outside the City's boundary. Locating the water functions adjacent/integrated with streets and sewer functions offers the City and the surrounding neighborhoods numerous opportunities including the following:

- Improving the City's responsiveness and delivery of essential services – sharing of resources and a central location, resulting in lower operating costs and faster response times.
- Ability to share repair facilities, materials, stores, equipment, conference rooms, break areas, and lockers/showers.
- Job creation for the neighborhoods – Over 470 jobs will be located on this Site, many of them green jobs related to the distribution of clean drinking water, and preserving the quality of our rivers, lakes and streams.
- Integrate green site development and construction practices and serve as a catalyst for Green development – solar energy, storm water treatment and retention, a LEED certified building, and a green community buffer are all part of the design.
- Integrate with the neighborhood – the community has been asked to help design the buffer so that it can best integrate with surroundings.
- Mitigate and manage the effects of site development in a responsible manner – the Public Works department is and will continue to be a responsive neighbor in the community.
- Locate a recruitment and training center on-site to expand job opportunities and address an unprecedented number of impending retirements in the City workforce.

City staff from Finance and Property Services (FPS), Public Works, Neighborhood Community Relations (NCR) and Community Planning and Economic Development (CPED) have met with members of the community under several different formats to discuss and present ideas for the expansion. It is understood that, although much progress has been made, community members remain concerned with some aspects of the expansion, namely additional traffic, added pollution from demolition and vehicle operations.

In an effort to continue to engage the community and address their concerns, the City has elected to perform environmental review by preparing a discretionary Environmental Assessment Worksheet (EAW) under Minnesota Rules Chapter 4410.

e. Are future stages of this development including development on any other property planned or likely to happen? ☐ Yes X No

If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

f. Is this project a subsequent stage of an earlier project? X Yes No
If yes, briefly describe the past development, timeline and any past environmental review.

Construction took place at the Site in 2008 and involved demolition of an existing asphalt plant and a number of small old buildings, renovation of and addition to the office building with locker rooms, and addition of new vehicle and equipment maintenance bays, a fuel station and a snow salt/sand/brine storage area. The project was certified LEED Platinum and included a geothermal well field. In 2018 a small asphalt tank was installed at the Site. However, none of these previous construction activities were completed with the curent expansion in mind and the improvements to the Site in 2008 did not require environmental review.

7. **Cover types:** Estimate the acreage of the site with each of the following cover types before and after development:

	Before	**After**		**Before**	**After**
Wetlands	0	0	Lawn/landscaping	2.0	1.6
Deep water/streams	0	0	Impervious surface	14.8	14.5
Wooded/forest	0	0	Stormwater Pond	0	0.7
Brush/Grassland	0	0	Other (describe)		
Cropland	0	0			
			TOTAL	**16.8**	**16.8**

8. **Permits and approvals required:** List all known local, state and federal permits, approvals, certifications and financial assistance for the project. Include modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure. *All of these final decisions are prohibited until all appropriate environmental review has been completed. See Minnesota Rules, Chapter 4410.3100.*

Unit of Government	Type of Application	Status
Federal		
U.S. Environmental Protection Agency	Spill Prevention, Control, and Countermeasure (SPCC) Plan	To be completed
State		
MPCA	Aboveground Storage Tank Registration and Notifications	Active, to be updated
	Underground Storage Tank Registration and Notifications	Active, to be updated
	NPDES/SDS Construction Stormwater Permit	To be applied for
	Sanitary Sewer Extension Permit	To be applied for, if needed
	Response Action Plan Approval	To be applied for, required
County		
	Hazardous Waste Generator License	Active
Regional		
Metropolitan Council	Sanitary Sewer Extension Permit	To be applied for, if needed
Mississippi River Water Management Organization	Stormwater Management Plan Approval	To be applied for, if needed
Local		
City of Minneapolis	Building Permits	To be applied for
	Demolition Permit	Active, to be updated
	Erosion and Sedimentation Control Plan	To be applied for
	Approval and Grading Permit	To be applied for
	Stormwater Management Plan Approval	To be applied for, if needed
	Temporary Water Discharge	To be applied for, if needed
	Lane Obstruction Permit	To be applied for, if needed
	After Hours Work Permit	To be applied for, if needed
	Encroachment Permit	To be applied for, if needed
	Utility Repair Permit	To be applied for, if needed
	Sidewalk Construction Permit	To be applied for, if needed
	Testing and Inspection Permit	To be applied for, if needed
	EIS Decision In process	To be applied for, if needed
	Zoning and Subdivision Approvals	To be applied for, required
	Travel Demand Management Plan	Required; see response to Question 19 below.

Unit of Government	Type of Application	Status
	Water Discharge from Dewatering or Stormwater Ponds	To be applied for, if needed
	Temporary On-Site Storage of Impacted Soil Approval	To be applied for, if needed
	Underground/Aboveground Storage Tank Removal and Installation Permits	To be applied for
City of Minneapolis Fire Department (Fire Inspections Services)	Underground/Aboveground Storage Tank Removal and Installation Permits	To be applied for

Cumulative potential effects may be considered and addressed in response to individual EAW Item Nos. 9-18, or the RGU can address all cumulative potential effects in response to EAW Item No. 19. If addressing cumulative effect under individual items, make sure to include information requested in EAW Item No. 19

9. Land use:

a. Describe:

i. Existing land use of the site as well as areas adjacent to and near the site, including parks, trails, prime or unique farmlands.

The Site is presently subdivided into two separate land use areas: the existing HMF on the north 9.10-acre parcel and the Roof Depot warehouse on the south 7.7-acre parcel. The Site is bordered as follows:

- North – 26th Street E. with single-family homes and open land beyond;
- East – Midtown Greenway bicycle pathway along a former railroad grade with the multi-lane Hiawatha Avenue and a multi-tenant medical office building beyond;
- South – 28th Street E. with a foundry and then the Greenway and a cemetery beyond;
- West – Longfellow Avenue, 27th Street E. and an alley with single-family homes beyond.

Refer to **Figure 4** illustrating the current land use at the site and surrounding areas.

ii. Plans. Describe planned land use as identified in comprehensive plan (if available) and any other applicable plan for land use, water, or resources management by a local, regional, state, or federal agency.

The Minneapolis 2040 (Comprehensive Plan) Future Land Use Map depicts the Site serving a Production Mixed Use purpose. The Comprehensive Plan describes Production Mixed Use as follows:

Land use designation that allows both production and non-production uses, recognizing that while many buildings in these areas are no longer viable for modern production industries, they are increasingly occupied by a wide variety of uses that contribute to the

economic health and diversity of the city. Residential uses are allowed as part of mixed-use buildings that provide production space and must incorporate mitigation strategies to address potential conflicts between existing production uses and new residences. Adaptive re-use of older industrial property is encouraged.

Surrounding land uses are classified as follows:

- North – Urban Neighborhood;
- East – Transportation, and Parks and Open Space;
- South – Production Mixed Use and Public, Office and Institutional; and
- West – Urban Neighborhood.

Refer to **Figure 5** for a copy of the Minneapolis 2040 Future Land Use Map.

The Minneapolis 2040 Built Form Map depicts the Site with a Corridor 6 designation. The Comprehensive Plan describes a Corridor 6 designation as follows:

New and remodeled buildings in the Corridor 6 district should reflect a variety of building types on both moderate and large sized lots. Building heights should be 2 to 6 stories. Building heights should be at least 2 stories in order to best take advantage of the access to transit, jobs, and goods and services provided by the Corridor 6 district. Requests to exceed 6 stories will be evaluated on the basis of whether or not a taller building is a reasonable means for further achieving Comprehensive Plan goals.

Surrounding built form districts are classified as follows:

- North – Interior 3, applied adjacent to select corridors and near METRO stations, serving as a transition to lower density residential areas;
- East – Parks;
- South – Interior 3 and Transit 10, applied along high frequency transit routes and adjacent to METRO stations, reflecting a variety of building types on both moderate and large sized lots; and
- West – Interior 3.

Refer to **Figure 6** for a copy of the Minneapolis 2040 Built Form Map.

iii. Zoning, including special districts or overlays such as shoreland, floodplain, wild and scenic rivers, critical area, agricultural preserves, etc.

The Minneapolis CPED Zoning Map currently designates most of the Site as an I2 Medium Industrial District. The parcel west of the existing Roof Depot building (i.e., the drive area) is designated as an I1 Light Industrial District. I1 and I2 districts are defined by the City as follows:

The I1 Light Industrial District is established to provide clean, attractive locations for low impact and technology-based light industrial uses, research and development, and similar

uses which produce little or no noise, odor, vibration, glare or other objectionable influences, and have little or no adverse effect on surrounding properties.

The I2 Medium Industrial District is established to provide locations for medium industrial uses and other specific uses which have the potential to produce greater amounts of noise, odor, vibration, glare or other objectionable influences than uses allowed in the I1 District and which may have an adverse effect on surrounding properties.

Surrounding zoning designations are as follows:

- North – R2B Multiple-Family Residential;
- East – R1A Multiple Family Residential and undesignated transportation corridor;
- South – I2 Medium Industrial District, with a Pedestrian Oriented Overlay District beyond; and
- West – R2B Multiple-Family Residential.

Refer to **Figure 7** for a copy of the Minneapolis CPED Zoning Map for the area.

A review of various State online resources for indications of other special districts or overlays yielded the following findings:

- According to the Minnesota Department of Natural Resources (DNR) Watershed Health Assessment Framework, the Site is located in the Mississippi Headwaters Basin – Twin Cities Watershed.
- The Mississippi National River and Recreation Area protected corridor is located approximately one mile east of the Site. Additionally, several city parks are located between approximately one-quarter to one-half mile from the Site.
- The DNR Regionally Significant Terrestrial and Wetland Ecological Areas (RSEA) map does not show RSEAs in the Site vicinity.
- The DNR Minnesota Biological Survey indicates the Site vicinity has a Below Biodiversity Significance ranking because it lacks occurrences of rare species and natural features.
- The National Wetlands Inventory/Protected Waters and Wetlands list maintained by the DNR shows no protected waters or wetlands in the Site vicinity.
- The Minnesota Pollution Control Agency (MPCA) Impaired Waters Viewer (IWAV) shows an unnamed stream paralleling Hiawatha Avenue east of the site.

Refer to **Attachment A** for copies of information gathered during this search of on-line sources.

b. Discuss the project's compatibility with nearby land uses, zoning, and plans listed in Item 9a above, concentrating on implications for environmental effects.

The project involves demolition of the existing Roof Depot warehouse and expansion of the existing HMF with a larger footprint and extending southward onto the Roof property. The resulting development will be a mix of office, shop, indoor storage, yard storage, surface parking and interior traffic flow. The proposed stormwater management design will capture surface runoff from the Site and infiltrate it on-site or pre-treat it prior to entering the City storm sewer system.

This project is consistent with nearby land uses, zoning and plans listed in Item 9a above. Essentially, an existing medium industrial use will remain at the Site, along with upgraded modern design features which will discourage negative environmental effects to the Site and surrounding area.

c. Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in Item 9b above.

Based on the above responses to 9.a and 9.b, there does not appear to be any incompatibility between this project and the nearby land uses required by Minneapolis 2040, the Minneapolis Built Form Guidance or the City Zoning requirements. Although expanding the facility, operations will continue to include only those that are envisioned in the planning documents discussed above.

10. Geology, soils and topography/land forms:

a. Geology - Describe the geology underlying the project area and identify and map any susceptible geologic features such as sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions. Discuss any limitations of these features for the project and any effects the project could have on these features. Identify any project designs or mitigation measures to address effects to geologic features.

According to the Geologic Atlas of Hennepin County, Minnesota (Minnesota Geological Survey [MGS] Atlas No. C-45, 2018), the Site is underlain by approximately 26 to 75 feet of terrace sand and gravel deposited in late-glacial times by meltwater associated with the Glacial River Warren (now the Mississippi River gorge). The fine- to coarse-grained sand and gravel is understood to coarsen with depth and contains scattered organic materials.

Also associated with late-glacial flood events, a buried bedrock valley (an ancient gorge filled with sediment) runs north of the Site trending westward. The uppermost bedrock beneath the Site is mapped as Platteville Formation, a 25- to 30-foot thick fossiliferous limestone with significant fracturing, bedding plane dissolution and voids. Because the Site is near the lip of the buried valley, the bedrock surface slopes northward beneath the Site and may cut into the deeper St. Peter Formation, a 110- to 140-foot thick quartzose sandstone with minimal structure and matrix cement.

Due to its friable nature, the St. Peter Formation was historically mined for industrial uses and to create underground storage or utility tunnels. It may also be washed out in places, resulting in caverns and sinks. However, the overlying Platteville Formation serves as an erosion-resistant ledgerock, which reduces karst formation and provides bridging to prevent surface collapse.

These geologic features are not anticipated to pose any significant limitations for the project, and the project is not anticipated to have any marked effects on these features.

b. Soils and topography - Describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability or other soils limitations, such as steep slopes, highly permeable soils. Provide estimated volume and acreage of soil excavation and/or grading.

Discuss impacts from project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after project construction to address soil limitations including stabilization, soil corrections or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed in response to Item 11.b.ii.

The topographic 7.5-minute quadrangle map (United States Geological Survey [USGS], 2019) shows the Site elevation to be approximately 840-850 feet above mean sea level (amsl). A topographical survey has been generated for existing Site condition for use in final design. Refer to **Figure 8** (north portion of Site) and **Figure 9** (south portion of Site) illustrating existing topography for the Site. The Site and surrounding area are relatively level and flat, although the Greenway and Hiawatha Avenue features to the northeast have been constructed at higher elevations. Most of the Site is covered with impervious materials including buildings and pavements.

The NRCS online soil survey database for Hennepin County indicates the primary soil underlying the southeast two-thirds of the Site is unit U4A, Urban land-Udipsamments (cut and fill land) complex, 0 to 2 percent slopes, a variable sandy material that is somewhat excessively drained. Approximately the north half of the existing HMF property and the area west of the Roof Depot building consists of D64B, Urban land-Hubbard complex, Mississippi River Valley, 0 to 8 percent slopes, a sandy alluvium or loamy alluvium over sandy outwash that is very transmissive and excessively drained.

The lengthy developed history of the Twin Cities urban core has resulted in substantial cutting, filling and grading. As a result, the natural alluvial soils in the area may be overlain in places by substantial thicknesses of either reworked or imported fill, either in a controlled or uncontrolled fashion.

Further information regarding soils on the Roof Depot portion of the Site is described in the DRAFT Interim Response Action Plan (Draft IRAP) prepared for the City by Braun Intertec, dated June 12, 2020. According to the Draft IRAP, previous investigations at the Roof Depot property identified 2 to 13 feet of fill (except for one location where fill extends to a 28-foot depth) consisting mainly of silty sand with gravel or poorly graded sand with silt. A copy of the June 12, 2020 IRAP is included in **Attachment B**.

Various investigation soil borings at the Roof Depot property encountered debris including concrete, slate, metal, brick, ash, slag, clinkers, coal, porcelain and glass debris. Asbestos was encountered at one sample location. Contaminated soils identified at the Site prior to construction activities, as well as those encountered during construction that were not previously identified, will be required to be managed in accordance with a Response Action Plan/Construction Contingency Plan prepared by the City and submitted for review and approved to the Minnesota Pollution Control Agency (MPCA) prior to beginning construction. Refer to the response to Question 12 below.

Depending on the foundation designs selected for future structures, soil correction may be necessary during construction to attain geotechnical specifications, especially where unsuitable, uncontrolled or potentially contaminated fill soils are present. In addition, if contamination in soils are identified that exceed MPCA action levels for the intended use of the Site, they may be

required to be removed from the Site and disposed of off-site at an approved disposal facility. Some excavated materials may prove suitable for reuse to backfill the partial sub-basement area beneath the existing Roof Depot building, but it is anticipated that most excavated soils will require off-site disposal as regulated fill. A geotechnical exploration, and possibly additional environmental investigation, and review is required to better estimate required correction depths and excavation volumes for specific aspects of the planned development.

NOTE: For silica sand projects, the EAW must include a hydrogeologic investigation assessing the potential groundwater and surface water effects and geologic conditions that could create an increased risk of potentially significant effects on groundwater and surface water. Descriptions of water resources and potential effects from the project in EAW Item 11 must be consistent with the geology, soils and topography/landforms and potential effects described in EAW Item 10.

11. Water resources:

a. Describe surface water and groundwater features on or near the site in a.i. and a.ii. below.

i. Surface water - lakes, streams, wetlands, intermittent channels, and county/judicial ditches. Include any special designations such as public waters, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include water quality impairments or special designations listed on the current MPCA 303d Impaired Waters List that are within 1 mile of the project. Include DNR Public Waters Inventory number(s), if any.

There are no surface water features at the Site. There are no MPCA 303d Impaired Waters List waters located within 1 mile of the project. The MPCA IWAV online map application shows an unnamed stream (AUID No. 07010206-999) paralleling Hiawatha Avenue east of the Site. The IWAV depicts the stream running near the west edge of the street. The stream has designated use Class 2Bg for general cool and warm water aquatic life and habitat, and Class 3C for limited resource value waters.

ii.Groundwater – aquifers, springs, seeps. Include: 1) depth to groundwater; 2) if project is within a MDH wellhead protection area; 3) identification of any onsite and/or nearby wells, including unique numbers and well logs if available. If there are no wells known on site or nearby, explain the methodology used to determine this.

Where saturated, the surficial sand and gravel may present shallow unconfined aquifers of limited extent within the upper 26 to 75 feet of the subsurface. While the uppermost bedrock units (Platteville Formation limestone and St. Peter Formation sandstone) are typically transmissive for groundwater flow, the effective permeability tends to be heterogeneous, resulting in perched pockets and seeps of groundwater along exposed faces rather than continuous aquifers of appreciable yield. As a result, most historical water wells in the Twin Cities region were drilled into the deeper Prairie du Chien-Jordan aquifer which exhibits a more stable potentiometric surface (i.e., saturated water level).

The project is not within a MDH wellhead protection area. A review of the MDH Minnesota Well Index did not identify drinking water or production wells at the Site or adjoining properties. Shallow monitoring wells have been present at the Site and adjoining land in the past but have been abandoned. The nearest mapped production well is MDH Unique No. 201086 located approximately 1,000 feet east of the Site. The well log identifies Platteville

Formation limestone at 56 feet depth and St. Peter Formation sandstone at 84 feet depth. The well log indicates the 700-foot industrial well is open within multiple deeper aquifers beginning with the Prairie du Chien Formation at 250 feet depth. Similar bedrock depths and aquifer characteristics would be anticipated at the Site.

According to the Geologic Atlas of Hennepin County, Minnesota (MGS Atlas No. C-04, 1989), the surficial water table near the Site is interpolated to be at about 805 feet amsl (45 feet below grade). The IRAP for the Roof Depot portion of the Site reports that soil borings encountered groundwater at 25 to 32 feet deep. A copy of the June 12, 2020 IRAP is included in **Attachment B**.

The potentiometric surface within the Prairie du Chien-Jordan aquifer is interpolated to be at about 760 feet amsl (90 feet below grade). Both the surficial and bedrock hydrogeologic maps indicate regional groundwater flow gradients are eastward towards the Mississippi River approximately one mile from the Site. However, localized subsurface conditions can affect groundwater flow, particularly in shallow perched groundwater zones. Groundwater investigations at the former CMC Heartland property east of the Site have identified local groundwater flow gradients towards the southwest instead.

b. Describe effects from project activities on water resources and measures to minimize or mitigate the effects in Item b.i. through Item b.iv. below.

i. Wastewater - For each of the following, describe the sources, quantities and composition of all sanitary, municipal/domestic and industrial wastewater produced or treated at the site.

1) If the wastewater discharge is to a publicly owned treatment facility, identify any pretreatment measures and the ability of the facility to handle the added water and waste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.

Based on a review of historic usage reports for both the HMF and former Roof Depot building, the existing Site generates approximately 2 gallons per minute of domestic and industrial wastewater. Wastewater from the facility is currently discharged to the Metropolitan Disposal System (MDS). Domestic wastewater sources consist of sinks, toilets and floor drains internal to the office space in Building A. Industrial wastewater is generated from floor drains/trenches located in the vehicle maintenance bays on the south end of Building A.

Domestic wastewater is discharged from Building A via service lines connected to the 96-inch tunnel located in East 26th Street. Prior to discharge to the MDS, Minnesota Plumbing Code requires that wastewater from the vehicle maintenance bays be routed through oil/water separators in order to keep discharges of petroleum products (i.e. oil, fuel, etc.) from entering the MDS. The City of Minneapolis Property Services staff complete annual inspections and cleanout of the oil/water separators owned by the City. Some facilities require more frequent inspections and maintenance depending on the extent of their use in the winter months.

The proposed expansion will include additional wastewater generated through the operations of proposed Buildings D, E, F and H in addition to the expansion of Building A. Overall, it is anticipated that the expansion will generate a maximum of 65 gallons per minute of domestic

wastewater and a maximum of 70 gallons per minute of industrial wastewater. This increase in wastewater volume from the site is not anticipated to have a significant effect on the quantity of wastewater discharged to the MDS. Final design of the facility will include refining the total wastewater discharge volumes and approval for acceptance by the City and the Metropolitan Council.

At this time, it is anticipated that an additional oil/water separator will be required for the additional vehicle maintenance bays in Building A. It is also anticipated that, due to vehicle storage activities in Building D, an oil/water separator will be necessary for this building as well. Wastewater generated in Buildings E, F and H will only be generating domestic wastewater. Wastewater from the northern portion of the Site will continue to discharge to the 96-inch tunnel located within East 26th Street, including the addition to Building A. Wastewater from Buildings E, H and F will discharge to the sanitary sewer main located in Longfellow Avenue. Although a specific location has not yet been determined, wastewater generated within Buildings B and D will ultimately discharge to a sanitary sewer mainline within one of the surrounding streets. Based on the anticipated fixture count for the new buildings, it is anticipated that approximately 65 maximum gallons per minute of domestic wastewater and 70 maximum gallons per minute of industrial wastewater will be generated in addition to the wastewater currently being generated at the Site. The City does not anticipate any additional capacity or pre-treatment facilities will be necessary for the MDS to accommodate these additional volumes.

The design of the final wastewater management system will be in accordance with Minnesota Plumbing Code requirements. The final wastewater system design plans will be developed and approved prior to beginning construction of the expansion. These final design plans will be required to go through Plan Review by the City of Minneapolis prior to final approval. The Plan Review will involve the City working with the Metropolitan Council when identifying changes in volume so that SAC and WAC charges can be determined.

Refer to **Figure 10** and **Figure 11** illustrating preliminary utility plans for both the northern and southern portions of the proposed expansion.

2) If the wastewater discharge is to a subsurface sewage treatment systems (SSTS), describe the system used, the design flow, and suitability of site conditions for such a system.

No wastewater discharge to subsurface sewage treatment system is planned for this project.

3) If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigate impacts. Discuss any effects to surface or groundwater from wastewater discharges.

Wastewater from the Site will not be discharged directly to a surface water. The City of Minneapolis is one of 66 communities in the Twin Cities Metropolitan area whose wastewater is treated by the Metro Treatment Plant, located in St. Paul along the Mississippi River. As mentioned above, wastewater from the Site will be discharged to the MDS which routes wastewater to the Metro Treatment Plant. Upon final treatment, wastewater from the Metro Treatment Plant is discharged to the Mississippi under a permit approved by the Minnesota Pollution Control Agency.

ii. Stormwater - Describe the quantity and quality of stormwater runoff at the site prior to and post construction. Include the routes and receiving water bodies for runoff from the site (major downstream water bodies as well as the immediate receiving waters). Discuss any environmental effects from stormwater discharges. Describe stormwater pollution prevention plans including temporary and permanent runoff controls and potential BMP site locations to manage or treat stormwater runoff. Identify specific erosion control, sedimentation control or stabilization measures to address soil limitations during and after project construction.

The Site currently has a total impervious area of approximately 14.8 acres. After the Site is redeveloped, the total impervious area will be approximately 14.5 acres. Currently, the stormwater management system on the north half of the Site consists of overland flow to low areas where it is collected in catch basins and routed through the City's storm sewer system. Peripheral areas of the Site drain overland to off-site catch basins and/or drainage ditches. The south portion of the Site does not have stormwater management infrastructure. Stormwater currently flows overland via sheet flow into off-site catch basins and/or drainage ditches.

The Site discharges to storm sewer in three locations: 1) an overflow into East 26th Street, 2) an overflow into the Minnesota Department of Transportation Hiawatha storm sewer, and 3) connection to the storm sewer in 28th Street. All three outlets ultimately flow into the Mississippi River. The Site is close to being within a mile of the river to the northeast. The river is listed as impaired for construction related activities in this area.

The preliminary design of the currently proposed stormwater management system was completed in accordance with current City of Minneapolis stormwater management standards. In addition, the system is also being designed to meet Leadership in Energy and Environmental Design criteria developed by the United States Green Building Council in an effort to obtain LEED V3.0 stormwater credits, which includes infiltrating stormwater on the north portion of the Site. The system will meet 70-80% Total Suspended Solids (TSS) removal depending on the new City of Minneapolis design criteria. Per LEED requirements, the capacity of the system will be able to infiltrate a 1.4-inch rain event. Overall, the system is being designed for a 100-year storm event using the Atlas 14 data provided by the National Oceanic and Atmospheric Association (NOAA).

With efforts being made to obtain LEED V3 design criteria, the City is hoping to secure funding from the Mississippi Watershed Management Organization (MWMO) that go above and beyond current regulatory standards.

The proposed system on the north portion of the Site will be an infiltration system such that captured stormwater will not leave the Site but infiltrate into the groundwater below. The stormwater collected from the north portion of the Site will be directed to an infiltration basin located beneath the proposed parking ramp. Infiltration of stormwater will need to be evaluated as part of environmental investigation and response action planning (see Response to Question 12 below). Depending on the extent of groundwater contamination beneath the north half of the Site, alternative stormwater management techniques may have to be employed.

The system on the south side of the Site will allow for stormwater collected to pass through a pre-treatment filtration system prior to its discharge into the City of Minneapolis stormwater system.

This is due to the presence of the edge of a groundwater contamination plume existing near the south side of the Site (Refer to the response to Question 12 offering more details on this plume). Stormwater collected from the south portion of the Site will be directed to designed underground retention systems that will slow the water flow down prior to it being directed to filter cartridge vaults for treatment. Treated stormwater from the south portion of the Site will be discharged to the City's stormwater management system.

Therefore, the redevelopment of the Site will involve significant upgrades to the current stormwater management system. This system will significantly increase the quality of the water leaving the Site and eventually discharging to the Mississippi River. Refer to **Figure 10** through **Figure 12** consisting of Preliminary Utility Plans for the north and south portions of the Site and for preliminary stormwater management system details.

Greater than 1-acre of the Site will be disturbed during construction. Therefore, in accordance with Minnesota Rules Chapter 7090, the City is required to obtain coverage under the Minnesota Pollution Control Agency's General Construction Stormwater Permit (MNR100001) dated August 1, 2018. This permit requires construction projects to prepare and implement a Stormwater Pollution Prevention Plan throughout the project. The main elements of the SWPPP include the following:

- A description of construction activities and the potential for sediment and other pollutants to be discharged from the site;
- Maps showing locations of surface waters (lakes, streams, rivers, wetlands, sedimentation basins) within one mile of the site;
- Identification of whether the identified surface waters have work in waters restrictions during fish spawning periods and whether or not they are designated special waters and/or impaired;
- Specific pollution mitigation procedures identified as part of environmental review;
- Training for individuals charged with the implementation of the SWPPP;
- A site map illustrating existing grades, drainage patterns and pollutant generating activities;
- Estimated quantities and proposed locations of all erosion prevention and sediment control best management practices to be implemented during construction;
- Stormwater design specifications and design calculations for stormwater management systems, including the number of acres of existing and new impervious surfaces;
- The following factors must be accounted for in the design of the best management practices to be implemented at the site:
    - The amount, frequency, intensity and duration of rainfall events;
    - Stormwater runoff and run-on and expected flow from impervious areas;
    - Slope lengths and steepness, the site location and drainage features;
    - Flow rate and volume of channelized flow; and
    - Soil types.
- Timing of the installation of all temporary and permanent erosion and sediment control best management practices;
- Description of methods to be used for dewatering and basin drainage;
- Plans identifying areas not to be disturbed (buffer zones), phasing of construction so as to minimize disturbed areas, and minimize compaction of areas receiving topsoil;

- Methods used to achieve final stabilization;
- Documentation of best management practice modifications when it is determined that they are not performing (SWPPP Amendments);
- A description of pollutant prevention measures for storage, handling and disposal of hazardous materials, solid wastes, concrete and equipment wash water, portable toilets, construction products and materials;
- Plans for proper use of sediment treatment materials (polymers, flocculants, etc.);
- A description of inspection and maintenance activities; and
- Procedures for terminating the permit.

It is also common to include potential wind erosion and methods utilized to prevent dust and soil particles from becoming airborne during construction.

iii. Water appropriation - Describe if the project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use and purpose of the water use and if a DNR water appropriation permit is required. Describe any well abandonment. If connecting to an existing municipal water supply, identify the wells to be used as a water source and any effects on, or required expansion of, municipal water infrastructure. Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation.

Pumping of groundwater is not planned during construction operations. Construction is not anticipated to require groundwater dewatering for depression of the water table. However, it may be necessary to dewater low areas of the Site where stormwater has accumulated after rain events in order to accommodate the progress of construction. It is anticipated that discharge water from temporary dewatering of low areas would be accomplished with a portable, gas powered dewatering pump and discharged on site. Should off-site discharge be necessary, it will be conducted under the requirements of the Minnesota Pollution Control Agency Construction Stormwater General Permit. Pumping during these temporary dewatering events during construction is not anticipated to exceed more than 10,000 gallons per day or 1,000,000 gallons per year, which would require a Department of Natural Resources Water Appropriations Permit.

If stormwater accumulates in areas of contaminated soils/materials and is determined to be contaminated due to contact with these contaminated soils/materials, temporary dewatering activities will require pretreatment prior to discharge under an MPCA NPDES direct discharge permit if discharge is to surface waters. If discharge is directly to the sanitary sewer system, it will be conducted under a Metropolitan Council Environmental Services Special Discharge Permit. As above, pumping during these temporary dewatering events during construction is not anticipated to exceed more than 10,000 gallons per day or 1,000,000 gallons per year, which would require a Department of Natural Resources Water Appropriations Permit.

The City's water system supplies water for domestic, vehicle maintenance and fire suppression use at the current Site. In addition, water use at the Site includes the use of approximately 100,000 gallons per year to test water meters. However, this water is supplied via a tank and recycled. The City water system also supplies water for domestic and fire suppression use at the former Roof Depot site.

The City water supply system to the Site currently consists of a 12-inch water main running east/west along 26th Street that turns and runs south along Longfellow Avenue and connects into another 12-inch mainline running east/west along 28th Street. An 8-inch line runs north/south through the approximate center of the northern portion of the overall site and stubs out at the approximate center of the proposed overall site. The 12-inch water main within 26th Street currently serves the existing office (Building A) and will also have a direct connection to the office expansion to the east, supplying both domestic water and fire suppression water needs. The 8-inch water line running north/south supplies the necessary fire suppression water throughout the northern portion of the Site. The 12-inch main running along 28th Street supplies both domestic and fire suppression water to the southern portion of the overall site.

The above described system will supply the necessary domestic, vehicle maintenance and fire suppression water for the proposed overall site at the required pressures and will not require additional water supply sources. Therefore, no additional water appropriations are necessary for the proposed overall site. Refer to **Figure 10** and **Figure11** presenting Preliminary Site Utility Plans for the north and south portions of the site.

iv. Surface Waters

a) Wetlands - Describe any anticipated physical effects or alterations to wetland features such as draining, filling, permanent inundation, dredging and vegetative removal. Discuss direct and indirect environmental effects from physical modification of wetlands, including the anticipated effects that any proposed wetland alterations may have to the host watershed. Identify measures to avoid (e.g., available alternatives that were considered), minimize, or mitigate environmental effects to wetlands. Discuss whether any required compensatory wetland mitigation for unavoidable wetland impacts will occur in the same minor or major watershed and identify those probable locations.

As stated in responses to Questions 9.a.iii and 11.a.i, a review of the NWI list maintained by the Minnesota Department of Natural Resources, identified no wetlands on or adjacent to the Site. Adherence with the Minnesota Pollution Control Agency Construction Stormwater NPDES General Permit and post construction stormwater management features incorporated into the design of the expansion provide for the required treatment of stormwater leaving the Site. Therefore, construction and operations of Hiawatha Maintenance Facility Expansion is not anticipated to impact wetlands downstream of the Site.

b) Other surface waters- Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicial ditches) such as draining, filling, permanent inundation, dredging, diking, stream diversion, impoundment, aquatic plant removal and riparian alteration. Discuss direct and indirect environmental effects from physical modification of water features. Identify measures to avoid, minimize, or mitigate environmental effects to surface water features, including in-water Best Management Practices that are proposed to avoid or minimize turbidity/sedimentation while physically altering the water features. Discuss how the project will change the number or type of watercraft on any water body, including current and projected watercraft usage.

The proposed expansion of the Hiawatha Maintenance Facility will not require physical alterations to any on-site or off-site surface water features.

12. Contamination/Hazardous Materials/Wastes:

a. Pre-project site conditions - Describe existing contamination or potential environmental hazards on or in close proximity to the project site such as soil or ground water contamination, abandoned dumps, closed landfills, existing or abandoned storage tanks, and hazardous liquid or gas pipelines. Discuss any potential environmental effects from pre-project site conditions that would be caused or exacerbated by project construction and operation. Identify measures to avoid, minimize or mitigate adverse effects from existing contamination or potential environmental hazards. Include development of a Contingency Plan or Response Action Plan.

Soils, Groundwater and Soil Vapors

There is existing contamination beneath and near the project site, including soil and groundwater contamination, and existing or abandoned storage tanks. There are no reported dumps, closed landfills, and hazardous liquid or gas pipelines. The draft IRAP and additional Response Action Plan (RAP) and Construction Contingency Plan (CCP) documents will need to be developed for MPCA approval to avoid, minimize or mitigate adverse effects from existing contamination or potential environmental hazards.

HMF (north half of the Site):

There has not been a comprehensive environmental assessment of the existing HMF property on the north half of the Site. Three closed MPCA petroleum leak files address known historical releases and two MPCA registrations document historical storage tanks at the HMF property:

- Leak File No. LS0003790 (closed 1998) is related to a 10,000-gallon gasoline underground storage tank (UST) east of the Minneapolis Public Works Equipment Service Garage which failed a tightness test in 1990. The MPCA closed the leak file in 1996 based on repairs and tank system monitoring data. The file was reopened after the tank removal in 1997. An 8,000-gallon diesel UST was removed at the same time but was not identified as a likely release source. During the tank removal, the highest organic vapor concentration by photoionization detector (PID) screening was 186 parts-per-million (ppm). Excavation bottom samples exhibited minor concentrations of diesel range organics (DRO), up to 26 milligrams-per-kilogram (mg/kg or ppm) but no volatile organic compounds (VOCs). Soil impacts were not detected in follow-up soil borings through the former tank basins.
- Leak File No. LS0013972 (closed 2002) is related to 5 cubic yards of petroleum-contaminated soil found while digging a footing at the Minneapolis Asphalt Plant in 2002. During the excavation, the highest organic vapor concentration by PID was 19 ppm. A soil sample exhibited a minor concentration of DRO (20 ppm). The release report indicates the MPCA suggested reusing the soil as backfill. The MPCA project manager concluded in a file note of January 11, 2002: "Most likely an historical release which should have been called into the Spills unit. The Site probably has been subject to periodic spills in the past – Search of Spills data base #52318 where buried barrels were reported may be indicative of past but not current disposal methods. Close site."
- Leak File No. LS0017358 (closed 2009) is related to storage tanks and dispensers removed east of the Fleet Services building in 2008, including a 15,000-gallon gasoline UST and a 15,000-gallon diesel UST. During the tank removal, the highest organic vapor concentration by PID was 137 ppm. Excavation bottom samples exhibited minor

concentrations of DRO (up to 18.9 mg/kg) and VOCs (toluene at 0.057 mg/kg). Soil impacts were not detected in follow-up soil borings through the former tank basins. DRO was present in a groundwater sample collected from the boring through the diesel UST basin at 750 micrograms-per-liter ("ug/L," which is equivalent to parts-per-billion). The MPCA hydrogeologist concluded in a file note of September 15, 2009: "Contamination at this site appears to be very minor…. The Site does not pose a risk to receptors; I recommend closure of the file."

- Tank File No. TS0001571 – In total, 14 USTs have been registered at the HMF address 1911 E. 26th Street, including:
    - One active 15,000-gallon diesel UST installed in 2010;
    - One active 15,000-gallon gasoline UST installed in 2010;
    - One active 10,000-gallon E-85 UST installed in 2010;
    - One 8,000-gallon diesel UST installed in 1970 and removed in 1997;
    - One 10,000-gallon alcohol blend UST installed in 1970 and removed in 1997;
    - One 3,000-gallon used or waste oil UST installed in 1970 and since removed;
    - One 560-gallon used or waste oil UST installed in 1970 and since removed;
    - One 560-gallon "petroleum other" UST installed in 1970 and since removed;
    - Two 560-gallon motor oil USTs installed in 1970 and since removed;
    - One 560-gallon transmission fluid UST installed in 1970 and since removed;
    - One 1,000-gallon used or waste oil UT installed in 1996 and since removed;
    - One 15,000-gallon diesel UST installed in 1997 and removed in 2008; and
    - One 15,000-gallon gasoline UST installed in 1997 and removed in 2008.
- Tank File No. TS0055096 – In total, 17 aboveground storage tanks (ASTs) have been registered at the HMF (Minneapolis Asphalt Plant) address 1925 E. 26th Street, including:
    - One active 12,000-gallon fuel oil #1 AST installed in 1995;
    - Three active 25,000-gallon asphalt and asphaltic blends ASTs installed in 1995;
    - One 65,900-gallon asphaltic blends AST installed in 1940 and since removed;
    - One 56,500-gallon asphaltic blends AST installed in 1940 and since removed;
    - One 27,500-gallon asphaltic blends AST installed in 1955 and since removed;
    - One 21,500-gallon asphaltic blends AST installed in 1955 and since removed;
    - Two 15,000-gallon fuel oil #1 ASTs installed in 1955 and since removed;
    - Two 24,000-gallon fuel oil #1 ASTs installed in 1955 and since removed;
    - One 70,000-gallon "other" AST installed in 1985 and since removed; and
    - Four 24,113-gallon fuel oil #1 ASTs installed in 1980 and since removed.

The long-term presence of numerous petroleum storage tanks and the closed leak files indicate the potential for residual petroleum impacts to soil, groundwater and/or soil vapor media beneath the HMF portion of the Site. The data available suggests the contamination from the known releases was limited to soils in the vicinity of the UST area directly east of the current HMF office/maintenance facility building with minor migration via groundwater or soil vapor pathways, and the degree of impacts would be expected to have decreased over time. The potential for releases from past storage tanks and historical operations at the asphalt plant location remains a potential for additional contamination at the Site. Refer to **Figure 13** illustrating former locations of the above leak sites and storage tank locations.

<u>Roof Depot (south half of the Site):</u>

Past environmental site assessments (ESAs) have identified and defined contamination at the Roof Depot property on the south half of the Site, which will require proper management during the redevelopment.

A 2015 Phase I ESA (Braun Intertec Project No. B15-00394) found historical uses included housing, coal storage, warehousing, machining and other commercial purposes. The recognized environmental conditions (RECs) can be summarized briefly as follows:

- The potential for buried materials from demolished houses and past coal storage to include demolition debris, urban fill with coal, ash or clinkers, and other wastes;
- The potential to encounter contamination related to historical machining and auto repair activities near the southwest corner of the site;
- A known groundwater contamination plume extending beneath the site from the east-adjoining property formerly occupied by CMC Heartland, where historical activities included a railroad yard, lumber storage, woodworking, machining, agricultural chemical manufacturing and two bulk petroleum storage facilities; and
- A historical REC ("HREC") related to the 1999 burial and 2000 removal of pails of roofing glues, resins, adhesives and other hazardous wastes in an abandoned sub-grade loading dock. The cleanup was managed through the MPCA's delegated Resource Conservation and Recovery Act (RCRA) program. Following the removal of the waste materials and soil borings showing minor residual petroleum concentrations of toluene (0.099 to 4.9 mg/kg), the MPCA issued a closure letter indicating no further action was necessary.

Additional environmental considerations were described in the 2015 Phase I ESA, including:

- MPCA Tank File No. TS0055634 – Two active 10,600-gallon fuel oil #1 ASTs are present in the building basement, installed in 1947 for heating purposes.
- MPCA Spill File No. – A 2000 accident caused a vehicle tank to release 20 gallons of diesel fuel, which was contained and disposed. The MPCA then closed the Spill file.
- A 560-gallon gasoline UST was reportedly present from 1951 through 1975. A 1998 Phase II ESA did not detect petroleum contamination in the former UST location.
- Materials known to have been warehoused at the property include herbicides, insecticides, resins, tires, degreasing agents, fertilizers, isopropyl alcohol, asphalt adhesives and other combustibles.
- An inactive water tower above the building roof was formerly used to fill boilers, reportedly relying on the municipal water supply rather than wells.
- Adjoining facilities with regulatory listings include HMF, Minneapolis Fire Department, Midtown Greenway, HCCRA ROW, Bituminous Roadways, Smith Foundry, Jadco Supply, Hiawatha Business Center, CMC Heartland Lite Yard Site and South Minneapolis Residential Soil Contamination. Some of these commercial-industrial activities are known to have resulted in subsurface contamination, and the potential exists for other unidentified releases at these neighboring properties.

Subsequent Phase II ESA and Investigation activities by Braun Intertec in 2015 through 2016 and 2020 were conducted under oversight of the MPCA Voluntary Investigation and Cleanup (VIC) Program (File No. VP34190). The key findings can be summarized briefly as follows:

- Fill soil extended typically to depths of 2 to 13 feet bgs, except in one 28-foot deep pocket near the southeast corner of the Site. Concrete, slate, metal, brick, coal, clinkers,

ash, slag, porcelain and glass debris were noted in the fill at some locations, particularly along the west property edge where residences were demolished in the past. Asbestos was present at one location near the southwest corner of the Site.

- Soil samples contained petroleum impacts by DRO (11.2 to 212 mg/kg). Two samples contained gasoline range organics (GRO) up to 14.9 mg/kg. The MPCA threshold for reuse as unregulated fill soil is 100 mg/kg, which was exceeded at four sample locations beneath the west part of the Site. Petroleum at one location beneath the northeast quadrant of the Roof Depot building.
- Measured VOC concentrations in soil were below MPCA Soil Reference Values (SRVs) for residential or industrial land uses. Benzene was present at two locations above the MPCA Soil Leaching Value (SLV) for potential leaching to groundwater. The affected locations are currently beneath the building.
- Measured concentrations of polynuclear aromatic hydrocarbons (PAHs) in soil were below the MPCA SRVs, except for the benzo(a)pyrene (BaP) equivalents on the west part of the Site, with one location above the SRV for industrial use and three locations above the SLV for industrial use. The affected locations are currently covered with surface paving.
- Arsenic was detected in soil at elevated concentrations beneath the east half of the Roof Depot property and scattered locations farther west. The results were above the SRV for industrial use near the northeast building corner. All arsenic results below 5 feet bgs were below SLVs and SRVs, indicating that leaching and vertical migration has not been significant.
- Groundwater samples did not contain DRO or VOCs, except for trichloroethene (TCE) detected at a concentration of 1.0 ug/L in one sample. This detection of TCE is below the MDH Health Risk Limit (HRL) in drinking water but is above the current HRL of 0.4 ug/L.
- The metals arsenic and antimony were detected in groundwater samples from the south part of the Site at concentrations above the USEPA Maximum Contaminant Levels (MCLs) for drinking water.
- Various VOCs were detected in soil vapor samples, but not at concentrations above the current MPCA soil vapor action levels (33-times Intrusion Screening Values (ISVs). The lone exception is a concentration of tetrachloroethene (PCE) near the northeast corner of the Roof Depot portion of the Site.

The MPCA VIC Program issued a No Association Determination (NAD) letter to the City in 2016 for the Roof Depot portion of the Site. This NAD letter indicates the identified release consisting of PAHs and arsenic in soil; TCE, arsenic and antimony in groundwater; and PCE and 111-trichloroethane in soil vapor. The letter summarizes that fill soil extends up to 6 feet in depth along the west site boundary, with "concrete, slate, metal, brick, ash, slag, porcelain and glass debris indicating that buried debris exists in the area of former residential dwellings that once occupied the western side of the site."

The Investigations indicated the presence of elevated concentrations of DRO/GRO and benzene in soils at select locations above the MPCA criteria for management as unregulated fill soil in accordance with MPCA Guidance Document c-rem1-01 (2012).

Refer to **Figure 14** illustrating the approximate areas of identified contamination on the Roof Depot portion of the Site.

CMC Heartland (east of the Site):
The former CMC Heartland Lite Yard property (CMC Site), east of the Site beyond the Midtown Greenway, is a former industrial property. Historic contamination identified at the CMC Site has resulted in it being listed on the National Priorities List ("Superfund"). The CMC Site does have the potential for some of the environmental impacts to affect the Site. Subsequent names for the property are Hiawatha Business Center or 2800 Hiawatha, LLC. Hundreds of documents apply to the investigation and cleanup of the CMC Site. The following regulatory listings reviewed for this EAW summarize the known conditions at the CMC Site:

- The MDA and MPCA issued a *Commissioners' Joint Certificate of Completion of Response Actions* on August 25, 2011, for voluntary investigation and cleanup activities. Past uses included a railroad yard, lumber storage yard, woodworking and machine shop operations, agricultural chemical manufacturing for 30 years, and two bulk petroleum storage facilities.

  The identified release included agricultural chemicals (arsenic and lead from arsenic-based pesticides) to soil and groundwater and other hazardous substances (lead, mercury and PAHs) to soils. The redeveloper was issued No Association Determinations for these releases from MDA and MPCA in 2005 after the responsible parties performed MDA cleanup actions including removal of metals-impacted soil within 4 feet below the finished development grades to MPCA approved site cleanup standards. These cleanup standards were MPCA Industrial SRVs for arsenic and the MPCA SLVs for lead.

  A hot spot area was also excavated to water table depth at 26 feet bgs to minimize long-term impacts to groundwater quality. A large portion of the excavated soil required treatment before off-site disposal due to hazardous waste levels of arsenic and/or lead.

  During the redevelopment in 2005-2006, additional soils were excavated to remove petroleum contamination below the south part of the existing building footprint, the stormwater pond and utility corridors. The MDA issued a No Further Action letter in 2010.

  Arsenic-contaminated soil remained at depths below 4 feet bgs, which is managed by an Environmental Covenant and Easement recorded in 2008. An MDH Special Well Construction Area established in 2005 controls groundwater development in the affected areas to the southwest, downgradient from the Site. Based on long-term monitoring, a 600- to 800-foot-wide plume of dissolved arsenic contamination in groundwater extended approximately 1,500 feet southwest from the CMC Site at depths of 35 to 55 feet bgs.

- Leak File No. LS0001583 (closed 1997) is related to a gasoline and fuel oil release attributed to the Chicago-Milwaukee Corp./Rollins Oil Co. The release was discovered in 1989 and the file was closed in 1997 after investigation, monitoring and remediation by pump-and-treat. Groundwater contamination remained at closure. The file was reopened in 2017 to complete a vapor reassessment. If necessary, the investigation and mitigation of soil vapors will be completed.

- Leak File No. LS0009035 (closed 1996) is related to a gasoline and diesel release on "Vacant Property" previously operated by CMC Heartland. The release was discovered in 1995 and the file was closed in 1996 after site assessment. Groundwater contamination remained at closure. The file was reopened in 2005 in conjunction with voluntary response actions through the MPCA Petroleum Brownfield Program (described above). The file was reopened in 2017 to complete a vapor reassessment. If necessary, the investigation and mitigation of soil vapors will be completed.

- The CMC Site is identified as the source for the 1,480-acre South Minneapolis Residential Soil Contamination Superfund site due to airborne dispersal of arsenic-based pesticides during historic manufacturing operations. High levels of arsenic were found in soil and groundwater during the 1994 Hiawatha Avenue rebuild and traced by the state to CMC Heartland. The arsenic dispersal area was added to the NPL by the EPA in 2007. The cleanup consisted of removing over 50,000 tons of contaminated soil from affected residential properties from 2004 through 2011. The EPA completed partial removal from the NPL listing in 2019 after the implemented remedy effectively cleaned up unsafe levels of arsenic in surface soils at more than 600 properties. The HMF project site is located within the affected area.

Refer to **Figure 12** and **Figure 13** illustrating the location of the CMC Site relative to the Site.

Mitigation Measures

Environmental investigation and cleanup activities have historically taken place at the Site dur to the presence of leaking tanks, spills and debris laden soils. As part of Site redevelopment, areas of contaminated soil, groundwater and/ vapors will need to be defined and, if identified at concentration above the applicable MPCA cleanup standards, managed under an MPCA approved Response Action Plan/Construction Contingency Plan (RAP/CCP). This RAP/CCP will lay out procedures to manage contamination during and after construction such that work is completed in a manner that is protective of human health and the environment. If necessary, the RAP/CCP will provide on-going engineering and administrative controls to minimize risks during and after construction. An IRAP has been drafted for MPCA and Minnesota Department of Agriculture (MDA) approval prior to the demolition and preliminary site preparation work. Temporary workplace conditions will be controlled through application of OSHA-compliant health and safety planning.

Asbestos and Hazardous Materials

HMF (north half of the Site):

The current office building was inspected for asbestos and hazardous materials prior to its renovation in 2008. Prior to renovation, the building was mitigated of asbestos and hazardous materials.

In addition, a recent asbestos and hazardous materials survey was completed on the central stores building located along Longfellow. If and when any of the remaining current buildings/structures are scheduled to be impacted as part of any renovation/demolition, whether it be as part of the expansion or some other renovation/demolition, these buildings/structures will undergo an asbestos and regulated waste inspection and subsequent abatement and removal following

applicable federal, state and local regulations. The abatement, removal and subsequent renovation/demolition techniques will include dust control measures, in the form of containments, wetting or other applicable methods, to eliminate and/or minimize dust migration offsite.

Roof Depot (south half of the Site)
The south portion of the Site consists of the one-story Roof Depot building with a basement and boiler room. The building is approximately 201,000 square feet and was constructed in 1947. In 2015, Braun Intertec Corporation conducted an asbestos and regulated waste inspection of the Roof Depot building and prepared a report titled Hazardous Building Materials Inspection Report dated April 7, 2015. This report identified numerous asbestos containing building materials (ACBM), some assumed ACBM, numerous paints/coatings that contain lead, and numerous regulated waste materials as defined by the Minnesota Pollution Control Agency (MPCA) in their Pre-Renovation/Demolition Environmental Checklist. The report can be found in **Attachment C**.

From March 13, 2020 through May 15, 2020, VCI Environmental, Inc., a Minnesota Department of Health (MDH) certified asbestos abatement company (AC167), conducted hazardous materials and asbestos abatement of the known ACBMs at the site following all applicable federal and state hazardous materials and asbestos abatement regulations, which included proper dust control measures in the form of wet methods and negative pressure containments. Abatement oversight and air monitoring was provided by Braun Intertec. All air monitoring results were found to be less than 0.01 fibers per cubic centimeter (f/cc), which is the MDH clean indoor air standard. Daily abatement activity logs, asbestos air sample results and asbestos notifications and permits for the abatement can be found in **Attachment C**.

As outlined in the IRAP prior to final demolition of the building, the previously assumed ACBMs will be sampled and tested to determine asbestos content. If asbestos is identified, an MDH certified asbestos abatement company will be contracted to properly remove the ACBMs, utilizing proper dust control measures such as wet methods and negative pressure containments. In addition, the regulated waste materials will be salvaged, reused, recycled or properly disposed of following MPCA requirements. When the asbestos and regulated waste materials have been properly removed, the building will be demolished, using dust control methods such as wetting. The demolition debris will be recycled or disposed of at a construction and demolition (C&D) landfill. If any of the materials are painted/coated with paint containing 1.0 milligrams per square centimeter (mg/cm^2) or greater of lead it cannot be recycled but must be disposed of at a C&D landfill.

It should be noted that an empty unground storage tank (UST) currently exists under the floor slab. This UST formerly contained diesel fuel. This UST will be removed at the time the building is demolished. Removal will be conducted in accordance with MPCA Petroleum Remediation Program Guidance Document "Excavation of Petroleum-Contaminated Soil and Tank Removal Sampling" (c-prp0-01).

b. Project related generation/storage of solid wastes - Describe solid wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from solid waste handling, storage and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of solid waste including source reduction and recycling.

During the construction activities associated with the expansion there will be solid waste generated and stored at the Site. In general, waste materials generated during construction activities will be stored in roll-off containers on-site prior to disposal. These solid wastes will consist of construction debris/waste, which will be minimized by recycling and reusing products as much as possible. Materials that cannot be recycled and/or reused, will be properly disposed of at an off-site approved disposal facility.

Once the expansion is complete and the Site is operational, the facility will continue to generate typical solid wastes (domestic and commercial) that will be disposed of utilizing the standard City provided waste disposal services

Both construction and operational solid waste disposal will contribute to landfill disposal; however, recycling and reusing products will continue to be a focus for the City of Minneapolis.

c. Project related use/storage of hazardous materials - Describe chemicals/hazardous materials used/stored during construction and/or operation of the project including method of storage. Indicate the number, location and size of any above or below ground tanks to store petroleum or other materials. Discuss potential environmental effects from accidental spill or release of hazardous materials. Identify measures to avoid, minimize or mitigate adverse effects from the use/storage of chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.

Hazardous materials used by the City maintenance crews and stored at the facility include the following:

- Motor oil;
- Transmission fluid;
- Lead acid batteries;
- Individual propane tanks
- Liquid asphalt; and
- Cure in Place Process (CIPP) materials.

Motor oil and transmission fluid are stored within the indoors vehicle maintenance areas in containers consisting of 250-gallon totes or smaller. Unless currently in use they are temporarily stored on shelving in the maintenance bays. When in use, on the floor of the maintenance bays, 250-gallon totes are placed in secondary containment pallets.

New lead acid batteries are used to operate maintenance vehicles. New batteries are stored on shelving, out of the way of vehicle patterns on pallets.

The City also stores and utilizes individual propane tanks for operations of forklifts at the Site. If not being utilized, these propane tanks are stored within locked cages in accordance with the requirements of the Minnesota State Fire Code. In addition, propane is used in heaters during the winter season to keep the ground thawed at off-Site excavation locations, when necessary.

A 7,500-gallon above ground storage tank (AST) containing liquid asphalt is currently located to the southeast of the existing maintenance building. The AST is positioned within a secondary

containment enclosure. The asphalt is used for small paving maintenance projects throughout the city. The storage tank is equipped with an electric heater that maintains the temperature of the asphalt at 350 degrees Fahrenheit at all times to maintain the asphalt in a flowable state. When exposed to cooler temperatures, the liquid asphalt quickly solidifies and is unlikely to travel beyond the immediate area if spilled.

When used for small paving repair projects, the asphalt it is pumped from the tank into portable tanks for transport to the location(s) within the City in need of repairs. During the transfer of asphalt to a truck from the AST, an operator is present at all times to monitor filling operations and control spills. The AST itself is filled from a tanker truck. Again, an operator is present at all times to monitor filling operations and control spills if they occur.

CIPP materials are currently stored in one of the service bays in the maintenance building. Equipment consisting of mixers is used to create a lining out of resins that is used to repair aged sewer pipes around the City. Upon application, the lining cures into a hard surface thus increasing the life of the sewer pipe. CIPP operations typically only occur during the months of April through August when repairs of sewer pipe are taking place across the City. The City estimates that approximately 200 drums of resin are utilized each year, although only 60-65 drums of resin are stored on site at any one time.

The project includes a separate building specifically for storing CIPP equipment and resins and conducting the mixing process. Separation of this process and associated materials from other operations allows for a more efficient process.

The Site currently contains a fuel island with three (3) underground storage tanks (USTs) and associated pumps for use in fueling City operated vehicles. The underground storage tanks consist of one, 15,000-gallon gasoline UST, one 15,000-gallon diesel UST, and one, 10,000-gallon gasoline UST. These tanks were installed in 2009 in accordance with Minnesota Rules Chapter 7150.

The project involves removal of the existing fuel island, tanks and associated appurtenances and relocation onto the southern expansion area. Removal of the existing tanks will be conducted in accordance with MPCA Guidance Document “Excavation of Petroleum Contaminated Soil and Tank Removal Sampling” (c-prp3-01). In addition, proper tank removal notifications and change in status forms will be filed with the MPCA.

The new underground storage tank system will be located in the central area of the southern portion of the Site. The system will consist of the same number and size of tanks and associated pumping. This new system will be installed in accordance with Minnesota Rules Chapter 7150. All proper tank installation notifications and registration documents will be filed with the MPCA prior to and after installation, as necessary.

Per U.S. Environmental Protection Agency Title 40, Code of Federal Regulations, Chapter 112, (40CFR112) facilities with an aggregate above ground oil storage of 1,320 gallons or underground oil storage of 40,000 gallons, and there is a reasonable expectation of an oil discharge into or upon navigable waters of the US or adjoining shorelines, are required to prepare a Spill Control and Countermeasure (SPCC) Plan. The purpose of an SPCC Plan is to help facilities prevent a discharge of oil into navigable waters or adjoining shorelines. The site is

currently operating under an SPCC Plan prepared in accordance with the requirements of 40CFR112. This plan will need to be modified, as necessary, to accommodate the new facility operations.

Some universal wastes will likely be generated during construction and operation of the facility and will be managed and disposed of appropriately utilizing City recycling services and/or a universal waste disposal contractor, such as Safety-Kleen.

d. Project related generation/storage of hazardous wastes - Describe hazardous wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from hazardous waste handling, storage, and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of hazardous waste including source reduction and recycling.

The current facility maintains a Hazardous Waste Generator's license through Hennepin County. The EPA Hazardous Waste Number associated with this license is MND982632333. The facility's license covers it as a Very Small Quantity Generator (VSQG) because the facility generates 100 kilograms or less of hazardous waste, or 1 gram or less of acutely hazardous waste, per month. The facility generates wastes defined as special wastes under Minnesota Hazardous Waste Rules.

Hazardous wastes generated at the Site are identified by the MPCA as acetone/styrene-soaked liners (F003), brake cleaner (D001), carburetor cleaner (D001) and PW solvent – Petroleum Naptha (D001). Past annual reporting has indicated that approximately 10 gallons of acetone/styrene-soaked liners, 10 pounds of brake cleaner, 10 pounds of carburetor cleaner and 105 gallons of PW Solvent-Petroleum Naptha are generated in a given year. This equates to approximately 44 pounds of hazardous waste per month. The soaked liners are recycled, the brake cleaner and carburetor cleaner are burned for fuel and the PW solvent – Petroleum Naptha is recycled.

Special wastes are also generated at the Site and include fluorescent light bulbs/ballasts, used oil, used anti-freeze, used oil filters, used lead acid batteries and used sorbents and rags. The facility has contracted with the following waste management companies to manage its special wastes:

- Fluorescent bulbs/ballasts – Green Light Recycling
- Used oil, used anti-freeze and used oil filters – Loes Oil
- Used lead acid batteries – Factory Motor Parts
- Used sorbent pads and rags – CRI Recycling

The above referenced wastes will continue to be generated at the newly expanded facility. The City is required to update its hazardous waste license on an annual basis with Hennepin County. Hennepin County will continue to perform inspections of the facility as long as the hazardous waste license is required.

The City will continue to explore opportunities to utilize alternative fuels for use in its City vehicles. Use of alternative fuel vehicles (i.e. electric) would reduce the use of some of the materials that generate the special waste streams.

13. Fish, wildlife, plant communities, and sensitive ecological resources (rare features):

a. Describe fish and wildlife resources as well as habitats and vegetation on or in near the site.

The Site is located in an urban neighborhood just west of Hiawatha Avenue. Surrounding properties consist of a mixture of industrial, commercial and residential properties. The Site itself does not contain a significant amount of vegetation or habitat for threatened or endangered species. No wetlands currently exist on or nearby the Site. An intermittent stream/drainage ditch is located east of the Site along the bike trail.

b. Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota County Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA-____) and/or correspondence number (ERDB 20210127) from which the data were obtained and attach the Natural Heritage letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.

On August 5, 2020, the City submitted a data request to the Department of Natural Resources Natural Heritage Information System (NHIS). The request included the information necessary for the DNR to determine the potential affects the proposed project might have on known occurrences of state-listed threatened or endangered species.

The DNR responded in a letter dated December 15, 2020. In its response, the DNR stated that they did not believe the proposed project will negatively affect known state-listed threatened or endangered species.

Refer to **Attachment D** for copies of the City's August 5, 2020 request and the DNR's December 15, 2020 response.

c. Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project. Include a discussion on introduction and spread of invasive species from the project construction and operation. Separately discuss effects to known threatened and endangered species.

NA

d. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to fish, wildlife, plant communities, and sensitive ecological resources.

NA

14. Historic properties:

Describe any historic structures, archeological sites, and/or traditional cultural properties on or in close proximity to the site. Include: 1) historic designations, 2) known artifact areas, and 3) architectural features. Attach letter received from the State Historic Preservation Office (SHPO). Discuss any anticipated effects to historic properties during project construction and operation. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties.

On August 18, 2020, AET, on behalf of the City, prepared and submitted a data request for the Site from the State Historic Preservation Office (SHPO). A response was received from SHPO in a letter dated September 21, 2020. Refer to Attachment E for copies of the data request packet and SHPO response letter.

Based on its review of the information received in the data request packet, SHPO determined that the potential for the project to impact intact archaeological resources is low. Therefore, an archaeological survey is not required by SHPO.

SHPO did identify two historic properties located within the vicinity of the proposed project that are listed in the National Register of Historic Places (NRHP). These sites include the Minneapolis Pioneers and Soldiers Memorial Cemetery and the Chicago, Milwaukee & St. Paul Grade Separation (Midtown Greenway). The Minneapolis Pioneers and Soldiers Memorial Cemetery is also a locally designated historic landmark. The Minneapolis Pioneers and Soldiers Cemetery is located approximately 0.5 miles directly south of the Site and the Midtown Greenway passes along the eastern and southern portions of the Site.

The Southside Destructor site has been determined to be eligible for listing in the NRHP. This site is located 0.5 to 1 mile southwest of the Site.

Both the Roof Depot (former Sears & Roebucks Machine Warehouse) and the current Hiawatha Maintenance Facility were identified in the SHPO response as being identified during previous survey efforts. However, neither of these facilities have been formally evaluated to determine their eligibility for listing in the NRHP.

Refer to **Attachment E** for copies of August 18, 2020 data request from the City and SHPO's September 21, 2020 response letter.

Further investigation into the Roof Depot and Hiawatha Maintenance Facility historic status indicated the following:

- Roof Depot Building – The City commissioned Preservation Design Works, LLC (PDW) to perform an assessment of the building addressed as 1860 East 28th Street to determine if the building represented work of a master architect or builder per Section 599.210 in the Minneapolis Code of Ordinances (Minneapolis City Code). In its assessment PDW concluded that the building did not "exemplify the work" of a master architect or builder. In addition, in December 2019, the City's Department of Finance and Property Services requested that the City's Department of Community Planning and Economic Development (CPED) perform an historic review on the building. After its review, CPED determined that the "property does not appear to meet local designation criteria listed in Section 599.210 of the Minneapolis City Code and has been determined to not be a historic resource."
- Hiawatha Maintenance Facility – In December 2019, the City's Department of Finance and Property Services requested that the City's Department of Community Planning and Economic Development (CPED) perform an historic review on a building located at 1901 East 26th Street. Although the parcel address is 1901 East 26th Street, the building that was specifically identified for historic review was the Water Works Warehouse addressed as 1858 East 27th Street. After its review, CPED determined that the "property does not appear to

meet local designation criteria listed in Section 599.210 of the Minneapolis City Code and has been determined to not be a historic resource."

Refer to **Attachment E** for copies of the PDW and CPED historic review documents.

15. Visual:

Describe any scenic views or vistas on or near the project site. Describe any project related visual effects such as vapor plumes or glare from intense lights. Discuss the potential visual effects from the project. Identify any measures to avoid, minimize, or mitigate visual effects.

Construction activities to be conducted at the Site will include demolition and excavation activities that will utilize large construction equipment. Construction activities can create dust and potential erosion and sediment issues. Dust suppression and erosion and sediment control procedures will be administered through the required Minnesota Pollution Control Agency Construction Stormwater NPDES permit for the Site. In addition, City of Minneapolis requirements for dust suppression and erosion and sediment control will be adhered to throughout construction. Refer to responses to Questions 8 (required permits) and 11.b.ii (Stormwater) for more detailed information on the requirements of the Minnesota Pollution Control Agency's General Construction Stormwater NPDES Permit.

Nighttime construction is not anticipated for this project. Therefore, no additional lighting will be implemented during construction activities. The Site will be secured at all times with an 8-foot chain link fence to ensure public safety and will be kept in a neat and orderly manner throughout construction.

The area immediately surrounding the Site does not include any scenic views or vistas by strict definition. There are no lakes, rivers, bluffs, virgin timber tracts, prairie remnants, geological features, waterfalls, specimen trees or plots of wildflowers in the immediate vicinity of the site. However, there are notable landmarks in the vicinity of the Site that add attractive visual elements to the area. Most notably, the pedestrian suspension bridge located to the southeast of the Site.

The final design will take into consideration the neighborhood's request to be able to view specific landmarks (i.e. the suspension bridge). In addition, the new design will incorporate substantially more green space than exists on the current Site and designers are being particularly careful with what residents see within the Site as they approach from the pedestrian bridge or surrounding neighborhood.

Overall Schematic Design

The overall schematic design presents the proposed building/structure layout, greenspace and site entry points relative to the surrounding neighborhood with illustrated views from the northwest, northeast, southwest and southeast. The existing wall along the western boundary of the Site will be maintained to limit views and noise along the existing bike/walkway associated with daily activities at the Site. Refer to **Attachment F** containing current schematic drawings (June 12, 2020) illustrating the proposed Site layout.

Photographic elevation renderings illustrating views of each building from different directions offer insight into what neighbors, employees and others passing by the Site will see from both inside and outside the Site. These include views from each direction outside of the Site along 26th Street, Longfellow Avenue, 28th Street and from the pedestrian bridge as you approach the Site. These views illustrate relative building heights, proposed siding/facades, window arrangements, landscaping and

pedestrian walkways. Refer to **Attachment F** containing current photographic renderings of elevations (June 12, 2020) illustrating future construction.

Preliminary Landscape Plans

As stated previously, the new design will incorporate significantly more greenspace and landscaping surrounding the Site border and within the Site boundaries. An employee patio will be constructed between the existing office space (Building A) and the expanded office space to the east. This employee patio will include a water feature that will also act as a stormwater basin. Trees, shrubs and other plantings and landscape features (i.e. walking paths and landscape boulders) will be incorporated into this area along with an outdoor picnic/gathering area.

The southwest portion of the Site will feature amenities for community use. A community garden and playground area will be incorporated along the southwest border of the Site along Longfellow Avenue, south of 27th Street. The community garden could include raised garden beds, rain barrels to capture and store reusable rainwater, a storage shed and garden fencing. The playground will include natural play structures (i.e. fabricated from logs), wood fiber play surfaces and a picnic area. Final design of the community garden and playground area is subject to community review and input.

A community plaza/art area will be featured at the corner of Longfellow Avenue and 28th Street. This plaza will include raised planters, bike racks, bistro tables and chairs at the employee entrance and seatwall benches. A landscaped, stormwater retention feature will be placed between the community playground and the plaza along Longfellow Avenue. Refer to **Attachment F** for plan sheets illustrating planned landscaping for the project.

Bike Lane Study

The City is considering constructing a bike trail along the south side of proposed Buildings G and H along 28th Street. This bike trail would connect with the existing trail along the eastern portion of the Site and will also connect with the one-way bike lane along the southern side of 28th Avenue.

Refer to **Attachment F** for drawings illustrating potential bike lane alternatives under consideration.

The Site will continue to operate 24 hours per day, five days per week. During weekends, only security lighting will be left on.

16. Air:

a. Stationary source emissions - Describe the type, sources, quantities and compositions of any emissions from stationary sources such as boilers or exhaust stacks. Include any hazardous air pollutants, criteria pollutants, and any greenhouse gases. Discuss effects to air quality including any sensitive receptors, human health or applicable regulatory criteria. Include a discussion of any methods used assess the project's effect on air quality and the results of that assessment. Identify pollution control equipment and other measures that will be taken to avoid, minimize, or mitigate adverse effects from stationary source emissions.

   The City commissioned an Air Permit Assessment in 2020. The results of the Air Permit Assessment are summarized in a document entitled "Hiawatha Maintenance Facility and expansion, prepared by American Engineering Testing, Inc. for the City of Minneapolis, dated September 23, 2020." The following is a summary discussion of an Air Permit Assessment performed for the Site in the summer of 2020. The Air Permit Assessment was performed to

evaluate the current HMF facility permit requirements and additional requirements, if necessary, for the overall expansion project.

The main operations at the existing facility consist of vehicle and equipment maintenance, bulk material storage, a central storage building, a fuel island for vehicles, and office space. The facility generates air emissions from its operations. Emissions are emitted into the atmosphere from natural gas boilers, natural gas process heaters, bulk material handling, an asphalt binder tank, fuel tank vents, and one sand blasting operation. The existing facility emits the following stationary source emissions into the atmosphere: PM, PM_{10}, $PM_{2.5}$, SO_2, NO_x, VOC, CO, CO_2e, and Hazardous Air Pollutants (HAPs). However, the current facility does not require a state or federal air permit as the potential emission are below the state and federal air permit thresholds.

The proposed expansion of the facility operations will increase the air emissions. The new operations that will increase air emissions include the Water Distribution Maintenance functions from the Fridley Water Works and relocation of the East Site Water Yard. The proposed emission source additions from the Fridley Water Works and East Side Water Yard will include a natural gas boiler, additional fuel tank venting, and a small indoor abrasive blasting operation. The addition will generate additional air emissions and add to the facility's PM, PM_{10}, $PM_{2.5}$, SO_2, NO_x, VOC, CO, CO_2e, and HAP total emissions.

The existing emission sources at the facility and the proposed addition's emission sources are not subject to any National Emission Standards for Hazardous Air Pollutants (NESHAPs) or New Source Performance Standards (NSPS) regulations that will require an air permit.

A summary of the existing facility and the proposed facility additions Potential to Emit (PTE) is shown in Table 1 below:

Table 1 Unlimited HMF Potential to Emit (TPY)

Pollutant	Existing Facility	Proposed Facility Additions	Existing Facility + Facility Proposed Additions Total Emissions
Particulate Matter (PM)	1.36	0.09	**1.45**
Particulate Matter Less than 10 Microns (PM_{10})	0.83	0.09	**0.92**
Particulate Matter Less than 2.5 Microns ($PM_{2.5}$)	0.45	0.08	**0.54**
Nitrogen Oxides (NO_x)	5.11	1.07	**6.19**
Volatile Organic Compounds (VOC)	1.40	0.31	**1.71**
Carbon Monoxide (CO)	4.77	0.90	**5.24**
Sulfur Dioxide (SO_2)	0.03	0.01	**0.04**
Greenhouse Gases (Expressed as CO_2e)	6,142	1290	**7,432**
Single Hazardous Air Pollutant (HAP)[1]	0.20	N/A	**0.20**
Total HAP	0.78	0.12	**0.90**

(1) Single largest HAP is Styrene

An air permit assessment was conducted for both the existing facility and the proposed additions to the HMF. The assessment calculated potential emissions from the stationary sources based on 8,760 hours of operation per year and the maximum throughput. The assessment confirmed the existing facility and the proposed additions do not require an air permit. The complete air assessment study is included in **Attachment G**.

A summary of PTE at the existing facility is shown below in Table 2:

Table 2 HMF Existing Unlimited Potential to Emit (TPY)

Emission Unit	PM	PM_{10}	$PM_{2.5}$	SO2	NOx	VOC	CO	CO_2e	Max Single HAP	Total HAP
Main Building Boilers	0.261	0.261	0.261	0.021	3.435	0.189	2.886	4,127		0.39
Main Building Process Heaters	0.039	0.039	0.039	0.003	0.515	0.028	0.433	619		0.06
Bulk Material Handling	0.905	0.428	0.065							
Cure in Place Process (CIPP)						0.577				0.20
Central Stores Boiler	0.082	0.082	0.082	0.006	1.082	0.060	0.909	1,300		0.12
Central Stores Hot Water Heater	0.005	0.005	0.005	0.0004	0.067	0.004	0.056	80		0.01
Brine Tank Heater	0.001	0.001	0.001	0.0001	0.013	0.001	0.011	15		0.001
Sand Blasting	0.055	0.013	0.001							
PG 64-22 Tank Loadout						0.078	0.025			0.001
PG 64-22 Tank Storage/Filling	0.010					0.010	0.022			0.003
PG 64-22 Tank Venting						0.003				
Fuel Island						0.450				
Total Facility Emissions	**1.36**	**0.83**	**0.45**	**0.03**	**5.11**	**1.40**	**4.34**	**6,142**	**0.2**	**0.78**

A summary of the PTE from the proposed additions to the HMF is shown below in Table 3:

Table 3 HMF Proposed Additions Unlimited Potential to Emit (TPY)

Emission Unit	PM	PM_{10}	$PM_{2.5}$	SO2	NOx	VOC	CO	CO_2e	Max Single HAP	Total HAP
Main Building Boiler	0.082	0.082	0.082	0.006	1.074	0.059	0.902	1,290	0.033	0.12
Fuel Island						0.252				
Abrasive Blasting	0.008	0.008								
Total Emissions	**0.09**	**0.09**	**0.082**	**0.006**	**1.074**	**0.31**	**0.902**	**1,290**	**0.033**	**0.12**

The City has submitted the Air Permit Assessment to the Minnesota Pollution Control Agency (MPCA) for its review. Part of the purpose of the preparation of the Air Permit Assessment is to illustrate that existing and future emissions anticipated at the Site are at a level that should not require a cumulative levels and effects (CLE) study, required under the Clark-Berglund legislation. The MPCA is in the process of reviewing and confirming questions it has regarding the information included in the Air Permit Assessment. The City will continue to provide information to the MPCA in an effort to confirm the conclusions in the Air Permit Assessment. Confirmation from the MPCA after its review is necessary for final confirmation.

A full copy of the Air Permit Assessment is contained in **Attachment G**.

b. Vehicle emissions - Describe the effect of the project's traffic generation on air emissions. Discuss the project's vehicle-related emissions effect on air quality. Identify measures (e.g. traffic operational improvements, diesel idling minimization plan) that will be taken to minimize or mitigate vehicle-related emissions.

Vehicle related air emissions include carbon monoxide, carbon dioxide, hydrocarbons, NOx, particulate matter and air toxics. The main source of mobile source air emissions for the project include employee automobiles and City maintenance vehicles.

Currently, the effects of increased traffic on existing mobile source air emissions are evaluated based on either a qualitative or quantitative approach. For larger projects that significantly increase traffic volume in the vicinity of the project, a quantitative approach is required using MPCA approved models. For projects with relatively small increases in traffic generation, a qualitative approach is typically implemented.

Vehicle related air emissions are produced mostly when vehicles are in an idling condition (i.e. stopped at intersections). Therefore, models used to predict the levels of emissions from vehicle traffic in urban areas typically focus on traffic levels at major intersections. These analyses are referred to as "hot spot" analyses. The MPCA's hot spot screening requirements identify intersections where traffic volumes are at or above a level of 82,300 vehicles per day before modeling is required. Otherwise, a detailed qualitative analysis is required. The highest traffic levels in the vicinity of the Site occur along Hiawatha Avenue (Highway 55) that runs in a north/south direction along the eastern border of the project Site. Review of the Minnesota Department of Transportation (MnDOT) GIS mapping application, average annual daily traffic (AADT) on Hiawatha Avenue is 32,000 vehicles per day. Therefore, given the MPCA screening criteria, a qualitative analysis of mobile source air emissions is appropriate.

As part of the assessment of overall project impacts, the City commissioned the preparation of a Travel Demand Management Plan (TDMP). Based on the TDMP, approximately 200 additional vehicles will drive to and from the Site during AM peak hours and 18 additional vehicles will drive to and from the Site during PM peak hours on a daily basis. Considering that current traffic levels along Hiawatha Avenue of 32,000 average annual vehicle trips per day, the increase in traffic from the project represents less than a 1% increase to the overall traffic in the area. Based on current, and projected traffic levels along Hiawatha Avenue, the increase in traffic levels generated by the project are considered minimal and will not significantly affect mobile source air emissions at the Site.

As part of normal operations at the current HMF, diesel-powered City vehicles are fitted with state-of-the-art air emissions filters. In addition, diesel exhaust fluids are captured during fueling operations at the fueling station.

In an effort to control vehicle emissions within the confines of the project boundary, the City has developed a diesel idle minimization plan encouraging the following:

- diesel-powered equipment is properly maintained and shut off when not in use;
- prohibit engine tampering to increase horsepower; and
- use newer model year equipment and vehicles, where practical.

Better fuel efficiency, improvements in vehicle technology, and strict regulation dramatically decrease the total vehicle related air emissions, even with increased vehicle activities. Vehicle related air emissions will continue to decrease into the future as a result of the United States Environmental Protection Agency's (USEPA) national control programs that are projected to reduce annual emissions by over 90 percent from 2010 to 2050 (Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents, FHWA, October 12, 2016). Local project conditions may differ from these national projections in terms of fleet mix and turnover, vehicle miles traveled (VMT) growth rates, and local control measures. However, the EPA-projected reductions are so significant that emissions in the study area are likely to be lower in the future as well.

c. Dust and odors - Describe sources, characteristics, duration, quantities, and intensity of dust and odors generated during project construction and operation. (Fugitive dust may be discussed under item 16a). Discuss the effect of dust and odors in the vicinity of the project including nearby sensitive receptors and quality of life. Identify measures that will be taken to minimize or mitigate the effects of dust and odors.

The project will generate temporary fugitive dust emissions during construction. These emissions will be controlled by watering, sprinkling, or calcium chloride application, as appropriate and in adherence with the City ordinances and NPDES Construction Stormwater permit. Dust emissions are not anticipated to be significant during operations as all ground surfaces will be bituminous or vegetated.

The construction of the project is not anticipated to generate objectionable odors. Odors are generated from the asphalt binder tank and CIPP operations, but they are not expected to be significant. Both the asphalt binder tank and CIPP operations will be located in the eastern portion of the Site as far away from residential neighborhoods as possible. Dust and odors generated by the project are not anticipated to have a significant impact on human health, quality of life, or the environment.

17. Noise

Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation. Discuss the effect of noise in the vicinity of the project including 1) existing noise levels/sources in the area, 2) nearby sensitive receptors, 3) conformance to state noise standards, and 4) quality of life. Identify measures that will be taken to minimize or mitigate the effects of noise.

The project Site is located in an urban area of Minneapolis surrounded by city, highway, and county roads. Of these roads, Hiawatha Avenue (Highway 55) which borders the Site to the east, contributes the greatest amount of existing noise from motorized vehicles (cars, small trucks, mid-size trucks and large trucks) in the project area.

The project Site borders residential noise receptors to the west and north. There are many residences within a half mile of the Project.

Based on the City commissioned TDMP, approximately 200 additional vehicles will drive to and from the Site during AM peak hours and 18 additional vehicles will drive to and from the Site

during PM peak hours on a daily basis. Considering that current traffic levels along Hiawatha Avenue of 32,000 average annual vehicle trips per day, the increase in traffic from the project represents less than a 1% increase to the overall traffic in the area. This projected increase in traffic from the project is not anticipated to significantly effect current and future noise levels currently generated by motorized vehicles in the area of the project.

The Minneapolis Code of Ordinances regulates both the hours of operation for construction equipment and allowable noise levels. Construction of the project will follow the requirements identified in Minneapolis Code of Ordinance, Chapter 59.30, which states "operation of construction equipment without a permit is allowed only on Monday through Friday from 7:00 a.m. to 6:00 p.m., not including federal holidays." A permit will be obtained from the City if work outside these hours is deemed necessary.

The Minneapolis Code of Ordinances and the MPCA regulate noise associated with building and facility operation. The current operations at the HMF are in compliance with City and State noise ordinances. The proposed expansion of the facility is not expected to significantly increase the operational noise levels and the facility will comply with City and State noise requirements.

18. Transportation

a. Describe traffic-related aspects of project construction and operation. Include: 1) existing and proposed additional parking spaces, 2) estimated total average daily traffic generated, 3) estimated maximum peak hour traffic generated and time of occurrence, 4) indicate source of trip generation rates used in the estimates, and 5) availability of transit and/or other alternative transportation modes.

Construction Traffic

Additional traffic will be generated during construction activities. Additional traffic will include trucks delivering construction materials, trucks importing and exporting soils and waste materials, mobilization and demobilization of construction equipment, and construction worker vehicles. Parking and operations of these vehicles will be provided on Site during construction. Occasionally, during loading and unloading operations, construction related vehicles may be staged in areas near the perimeter of the Site. However, construction entrances and exits will be located as far away from residential areas as possible. See responses to Questions 16 and 17 for a discussion of dust, odor and noise management during construction activities.

Project Traffic

The City's Comprehensive Plan has set forth policies for transportation within the City. The City requires that a Travel Demand Management Plan (TDMP) be prepared for proposed projects involving non-residential development, additions over 100,000 square feet or more of gross floor area, or any development or redevelopment projects deemed to have a potential for substantial traffic impact. Therefore, the City commissioned Kimley-Horn to prepare a TDMP for this project.

The TDMP details the proposed project including the Site's design, location, and proposed amenities that will foster reduction in single occupancy vehicle (SOVs) trips, reduced demand for work trips, plus the increased use of alternate transportation modes by employees and visitors. It also discusses the anticipated traffic and parking changes and any potential impacts of these changes. Finally, the TDMP outlines specific strategies that the City will implement to minimize the development's impact on the surrounding neighborhoods.

The existing HMF has 350 outdoor surface parking spaces. This includes outdoor spaces that serve city fleet vehicle and employee parking spaces. An additional 8 spaces is allotted for visitor parking.

The proposed facility will provide for 888 total parking and equipment storage spaces. This proposed facility includes 353 for city fleet vehicles, 146 for city fleet equipment storage, 315 for employee parking, 9 spaces for visitor parking and 65 spaces for the training center. These 888 spaces are allocated as follows: 65 fleet vehicles parked indoors, 422 outdoor parking ramp spaces, and 401 outdoor surface parking spaces.

The AADT for the proposed facility upon obtaining full occupancy is 1,800 vehicle trips per day including City fleet vehicles (674), heavy fleet vehicles (202) and employee vehicles (924). Peak daily trips occur right before 7:30 a.m. and right after 3:00 p.m. The peak daily a.m. trips for the existing facility is 165 total trips and the peak p.m. trips is 50 total trips. For the proposed project, peak daily vehicle trips increase to 365 total trips in the a.m. and 68 total trips in the p.m.

Refer to **Attachment H** for a complete copy of the TDMP for this project.

b. Discuss the effect on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system. *If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW.* Use the format and procedures described in the Minnesota Department of Transportation's Access Management Manual, Chapter 5 *(available at: http://www.dot.state.mn.us/accessmanagement/resources.html)* or a similar local guidance,

As part of the TDMP, several intersections in the immediate vicinity of the project were analyzed to determine the effects the project would have on current intersection capacities. Intersection capacities were studied at the following intersections:

- East 26th Street and Cedar Avenue;
- East 26th Street and Longfellow Avenue;
- East 26th Street and site access;
- East 26th Street and Hiawatha Avenue;
- East 27th Street and Longfellow Avenue;
- East 28th Street and Cedar Avenue;
- East 28th Street and Longfellow Avenue; and
- East 28th Street and Hiawatha Avenue.

Intersection capacities were evaluated for the existing site conditions, a No Build Scenario (2025) and a Build Scenario (2025). Results of the intersection capacity analysis indicated the following:

- Levels of Service (LOS) at each intersection remained unchanged for AM peak operations between the existing conditions and No Build Scenarios, with the exception of the East 28th Street and Hiawatha Avenue intersection where the LOS dropped from C to D.
- LOS at each intersection remained unchanged for PM peak operations between the existing conditions and No Build Scenarios, with the exception of the intersections of East 28th Street

and Longfellow Avenue (dropped from LOS A to B) and East 28th Street and Hiawatha Avenue intersection where the LOS dropped from E to F.

- LOS at each intersection remained unchanged for AM peak operations between the existing conditions and Build Scenarios.
- LOS at each intersection remained unchanged for the PM peak operations between the existing conditions and the Build Scenarios with the exception of intersections of East 26th Street and Longfellow Avenue where LOS increased from B to A and East 28th Street and Hiawatha Avenue where LOS improved from E to D.
- LOS at each intersection remained unchanged for the AM peak operations between the No Build and Build scenarios with the exception of East 28th Street and Hiawatha Avenue where the LOS improved from D to C.
- LOS at each intersection remained unchanged for the PM peak operations between the No Build and Build scenarios with the exception of the intersections of East 28th Street and Longfellow where the LOS increased from B to A and East 28th Street and Hiawatha Avenue where the LOS improved from F to D.

The TDMP concluded that the delay and LOS at the study intersections are not significantly impacted by the project. Current projects, along with a proposed list of short-term and long-term projects have also been identified in the TDMP that could further improve streets around the project Site. The City intends to pursue these ideas and engage the neighborhood regarding these proposed short and long-term improvements. The City goal is to make improvements to the Site and the surrounding streets to improve the accessibility, safety and options for all transportation users.

The TDMP presents specific travel demand management strategies to be implement by the City for the project. A list of general, pedestrian, bicyclist, transit, parking, fleet and employee vehicle traffic, and adjacent street improvements strategies is presented in Section 7.0 of the TDMP. Implementation of these strategies into the proposed project will allow the City to achieve its goals of enhancing the local transportation system by lowering peak hour demand, reducing single occupant vehicles (SOVs), and helping to achieve improved conditions for the most vulnerable users of the transportation system.

Refer to **Attachment H** for a complete copy of the TDMP for this project.

c. Identify measures that will be taken to minimize or mitigate project related transportation effects.

A condition of the City Council's approval of the Site expansion plan was that the City complete an analysis of improvements to 26th and 28th Streets to improve multimodal mobility and community safety. In response to this condition set by the City Council, the City Public Works Department examined the following streets between Cedar Avenue and Hiawatha Avenue.

- Cedar Avenue between East 26th and East 28th Streets;
- Longfellow Avenue between East 26th and East 28th Streets;
- East 27th Street between Cedar Avenue to the Site; and
- Alleys in the area.

City Public Works staff, along with assistance from Kimley-Horn, developed a list of improvements over the short term (over the next five years), long term, and those that are not recommended at this time. A summary of the proposed short-term actions is provided below:

1. East 28th Street & 20th/21st Avenue - Evaluate raised crossing for the bike trail;
2. East 28th Street & Midtown Greenway Crossing – Support Hennepin County project while evaluating other options and safety improvements;
3. East 26th and 28th Streets – Four to three lane conversion;
4. Longfellow Avenue & East 26th and 28th Street Intersections – Mark crosswalks;
5. Longfellow Avenue – Consider future traffic calming after other key short-term actions;
6. Longfellow Avenue & East 27th Street – Consider future traffic calming after other key short-term actions;
7. Alleys/East 27th Street – Retain 27th Street Campus access for emergency purposes only. Prohibit any regular use to/from the Campus for any users; and
8. Cedar Avenue – Leverage the Hennepin County temporary project to improve long-term safety for all users.

This list of improvements is considered by the City to be "good neighbor" actions that meet the direction of the City Council. However, they are not transportation mitigation strategies required as part of the typical TDMP development process. The City Public Works Department continues to evaluate how best to include several of these ideas in coordination with the expansion project, the existing and future Public Works Capital Improvement Program, and/or with other partners and funding resources. These good neighbor actions are proposed to be accomplished over the next 1 to 5 years.

Refer to Appendix C and Table 4-1 in the TDMP contained in **Attachment H** for a detailed discussion of these actions.

19. Cumulative potential effects: (Preparers can leave this item blank if cumulative potential effects are addressed under the applicable EAW Items)

a. Describe the geographic scales and timeframes of the project related environmental effects that could combine with other environmental effects resulting in cumulative potential effects.

Construction activities associated with this project are anticipated to begin in 2021 and last through 2024. These construction activities will be conducted in accordance with state and local environmental protection procedures. Once operational, the facility will operate under all required environmental permitting required by local and state laws. Therefore, by addressing the environmental effects during the construction and operations of this facility, significant cumulative effects are not anticipated.

b. Describe any reasonably foreseeable future projects (for which a basis of expectation has been laid) that may interact with environmental effects of the proposed project within the geographic scales and timeframes identified above.

No other projects that may contribute to cumulative environmental effects of this project are currently planned within the immediate vicinity of the Site. As mentioned in the response to Question 18 "Traffic," short and long-term street improvement projects planned for the project area could improve streets, along with associated traffic and environmental effects from traffic, around the project Site. No other projects

in the immediate vicinity of the Site are planned within the reasonably foreseeable future that may interact with the environmental effects of this project.

c. Discuss the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to these cumulative effects.

No cumulative potential environmental effects are anticipated for this project.

20. Other potential environmental effects: If the project may cause any additional environmental effects not addressed by items 1 to 19, describe the effects here, discuss the how the environment will be affected, and identify measures that will be taken to minimize and mitigate these effects.

There have been no other potential environmental effects identified for this project that have not been discussed in the responses to the above questions of this EAW.

RGU CERTIFICATION. *(The Environmental Quality Board will only accept **SIGNED** Environmental Assessment Worksheets for public notice in the EQB Monitor.)*

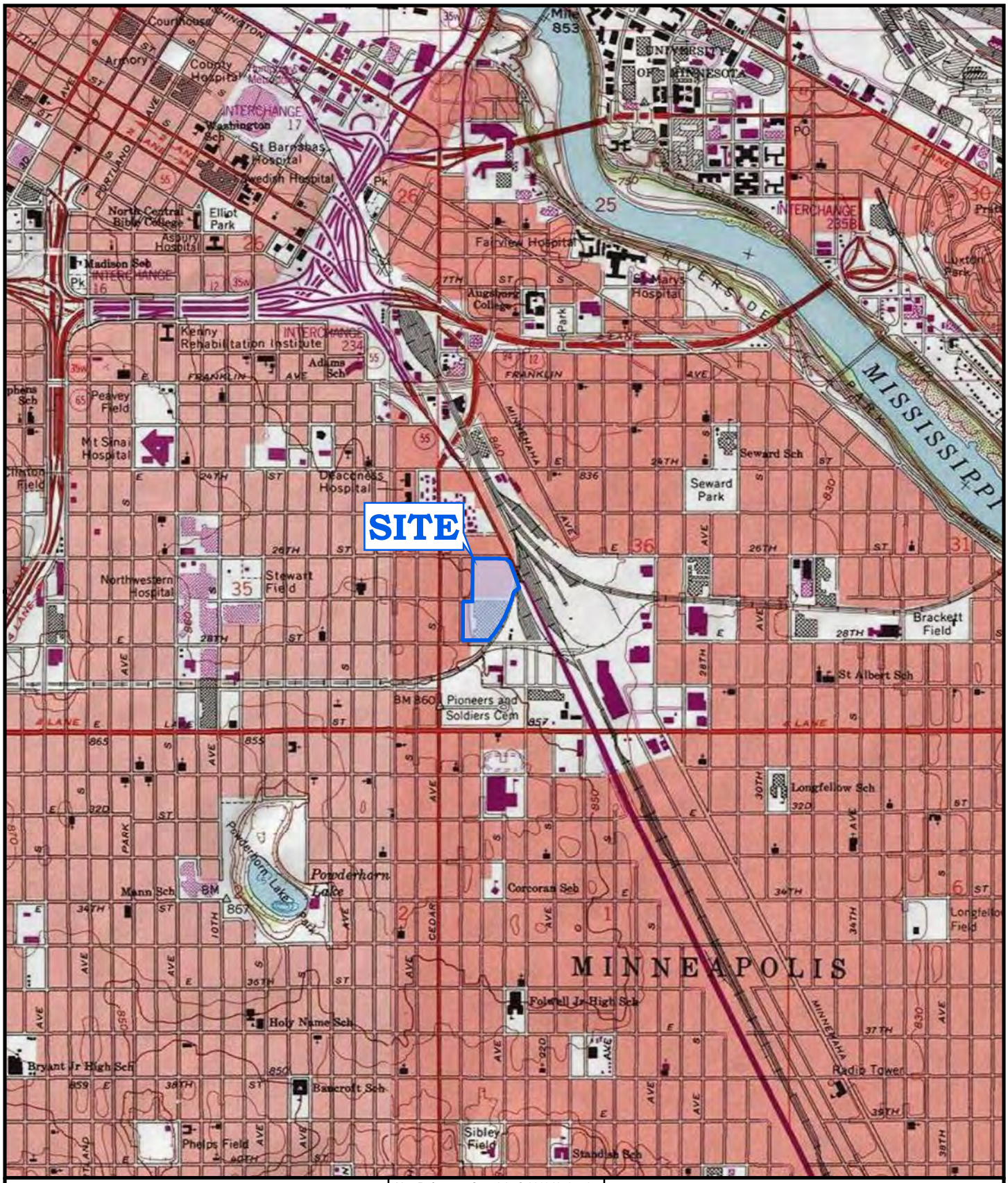
I hereby certify that:

- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9c and 60, respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

Signature Hilary Dvorak Date January 28, 2021

Title Principal City Planner

Figures



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Map Reference: Copyright:© 2013 National Geographic Society, i-cubed
USGS 7.5" Quadrangles, Minneapolis South and St. Paul West, Minnesota

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Feet

Figure 1
Site Location Map

Environmental Assessment Worksheet

Hiawatha Maintenance Facility Expansion
Minneapolis, Minnesota

Date: 09/02/2020 AET Project No. 03-21225

File: HMF_F1-SLM.mxd PO 17938-1148

AMERICAN ENGINEERING TESTING, INC.

Map Reference:
Hennepin County Orthophotos 2018

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Feet

Figure 2
Site Layout Map

Environmental Assessment Worksheet

Hiawatha Maintenance Facility Expansion
Minneapolis, Minnesota

Date: 09/02/2020 AET Project No. 03-21225

File: HMF_F2-SITE.mxd PO 17938-1148

Legend

- (A) Existing Office + Addition
- (B) Parking Ramp
- (C) Storage Building (Existing)
- (D) Vehicle Storage Building
- (E) Central Stores
- (F) Water Department
- (H) Training Center

AMERICAN ENGINEERING TESTING, INC.

Map Reference:
RSP Architects (June 12, 2020)

NOT TO SCALE

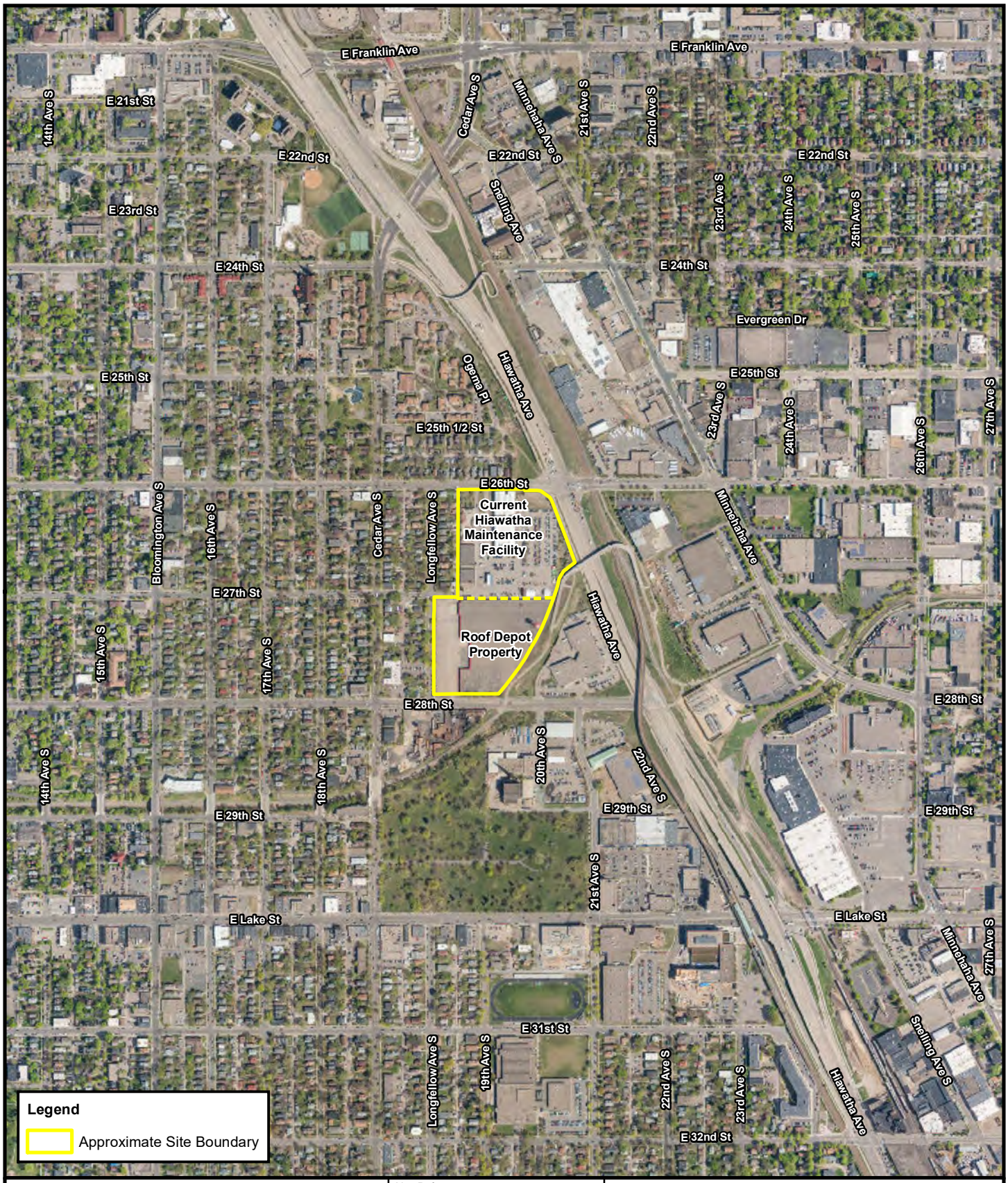
Figure 3
Proposed Site Schematic

Environmental Assessment Worksheet

Hiawatha Maintenance Facility Expansion
Minneapolis, Minnesota

Date: 9/22/2020 AET Project No. 03-21225

File: HMF_F3_Schematic.dwg PO 17938-1148



AMERICAN ENGINEERING TESTING, INC.

Map Reference:
Hennepin County Orthophotos 2018

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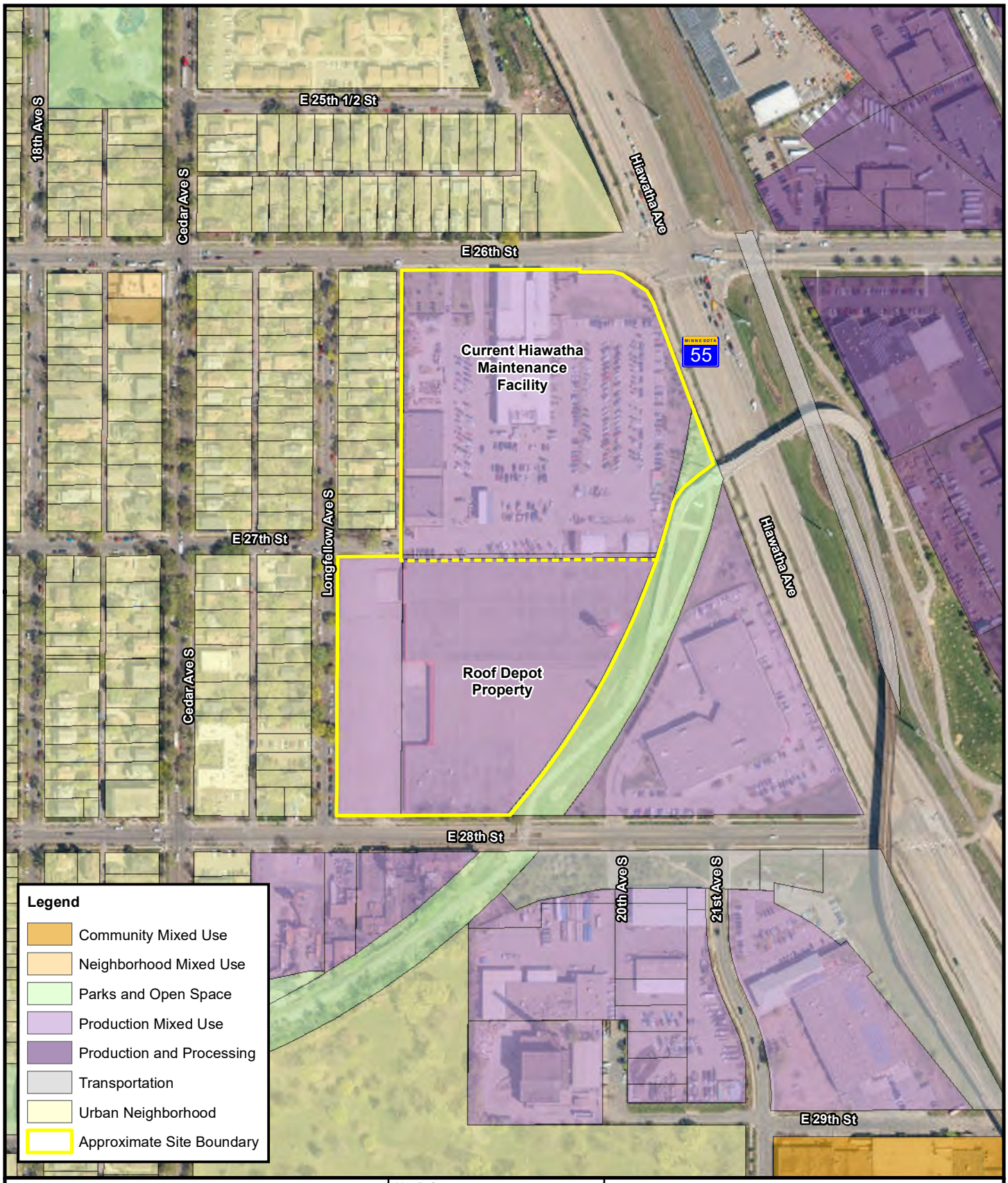
Figure 4
Land Use Map

Environmental Assessment Worksheet

Hiawatha Maintenance Facility Expansion
Minneapolis, Minnesota

Date: 10/08/2020 AET Project No. 03-21225

File: HMF_EAW_F4-LandUse.mxd PO 17938-1148



AMERICAN ENGINEERING TESTING, INC.

Map Reference:
Hennepin County Orthophotos 2018;
City of Minneapolis

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Feet

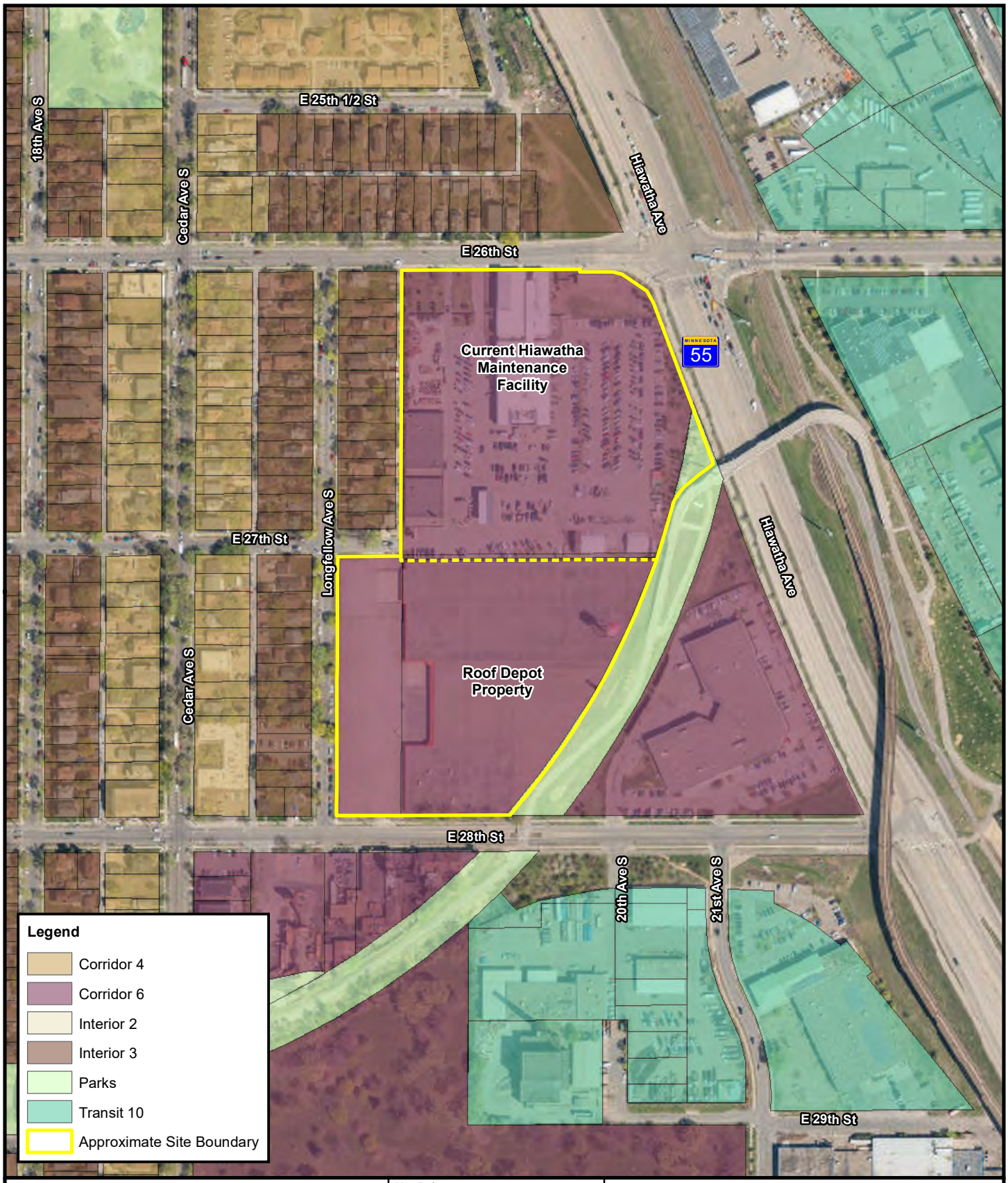
Figure 5
Minneapolis 2040 Land Use Map

Environmental Assessment Worksheet

Hiawatha Maintenance Facility Expansion
Minneapolis, Minnesota

Date: 10/08/2020 AET Project No. 03-21225

File: HMF_EAW_F5-Mpls2040LandUse.mxd PO 17938-1148



AMERICAN ENGINEERING TESTING, INC.

Map Reference:
Hennepin County Orthophotos 2018;
City of Minneapolis

N

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Feet

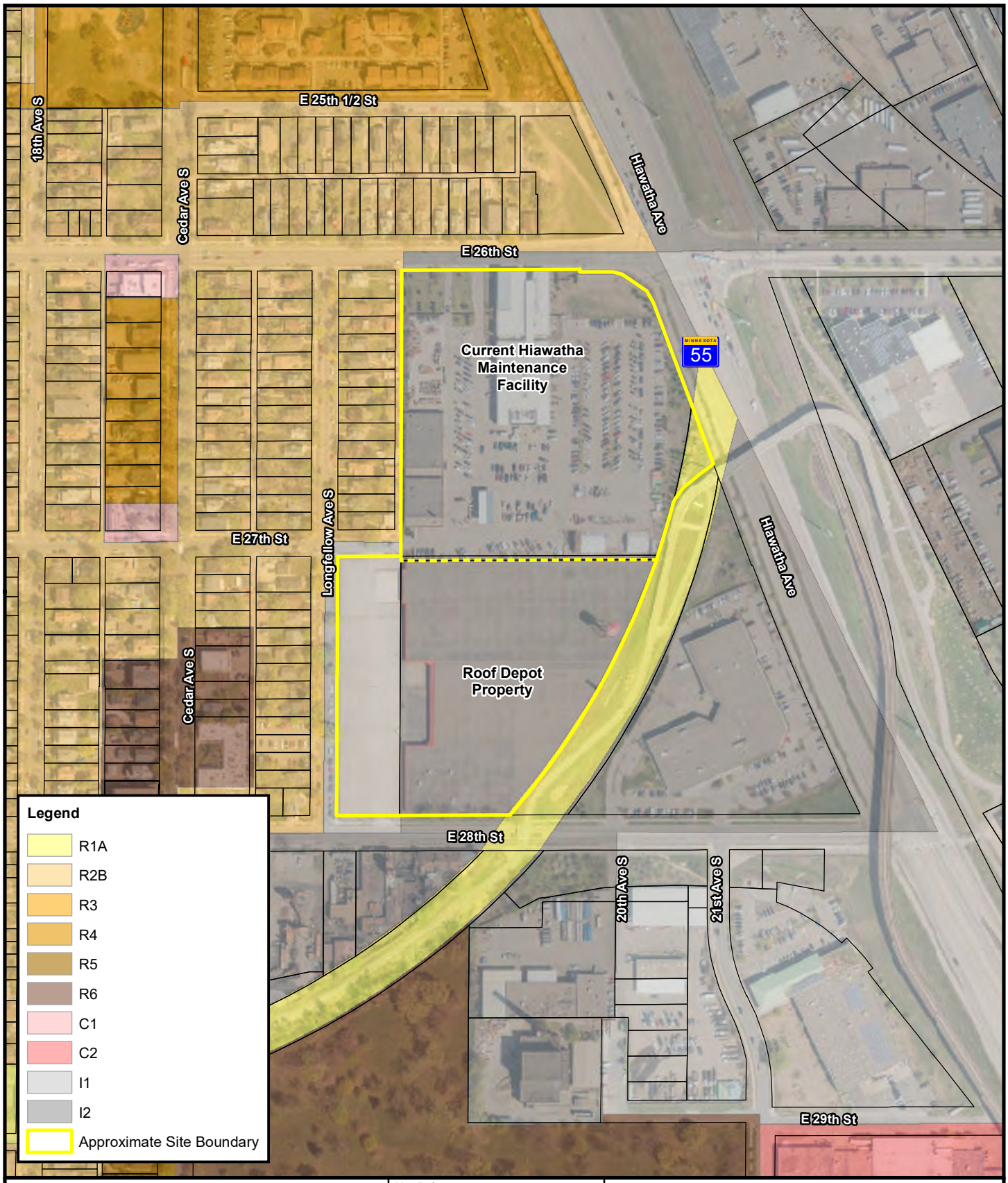
Figure 6
Minneapolis 2040 Built Form Map

Environmental Assessment Worksheet

Hiawatha Maintenance Facility Expansion
Minneapolis, Minnesota

Date: 10/08/2020 AET Project No. 03-21225

File: HMF_EAW_F6-Mpls2040BuiltForm.mxd PO 17938-1148



AMERICAN ENGINEERING TESTING, INC.

Map Reference:
Hennepin County Orthophotos 2018;
City of Minneapolis

N

0 150 300

Feet

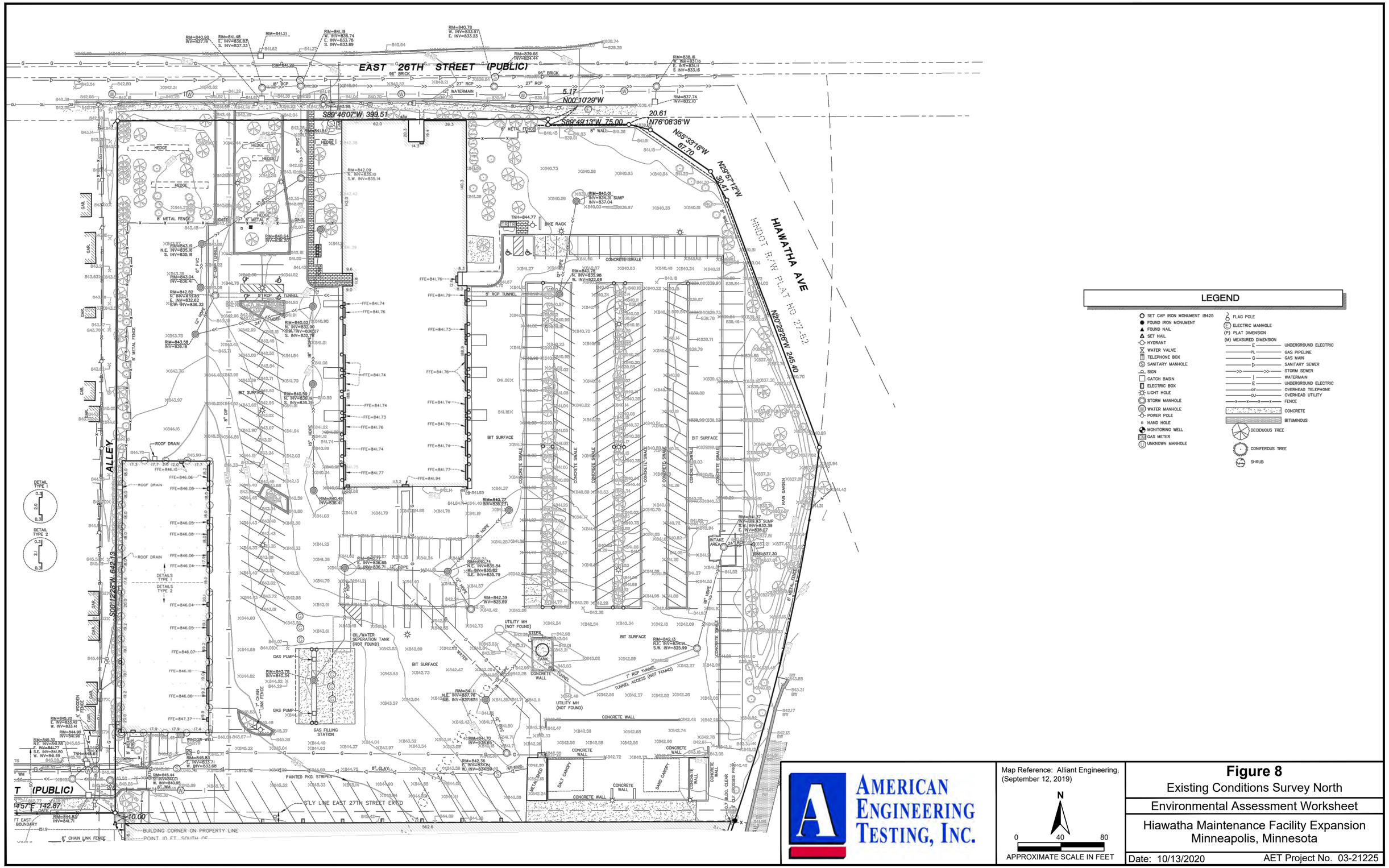
Figure 7
Minneapolis CPED Zoning Map

Environmental Assessment Worksheet

Hiawatha Maintenance Facility Expansion
Minneapolis, Minnesota

Date: 10/08/2020 AET Project No. 03-21225

File: HMF_EAW_F7-MplsCPEDZoning.mxd PO 17938-1148



LEGEND

- SET CAP IRON MONUMENT 18425
- FOUND IRON MONUMENT
- FOUND NAIL
- SET NAIL
- HYDRANT
- WATER VALVE
- TELEPHONE BOX
- SANITARY MANHOLE
- SIGN
- CATCH BASIN
- ELECTRIC BOX
- LIGHT HOLE
- STORM MANHOLE
- WATER MANHOLE
- POWER POLE
- HAND HOLE
- MONITORING WELL
- GAS METER
- UNKNOWN MANHOLE
- FLAG POLE
- ELECTRIC MANHOLE
- (P) PLAT DIMENSION
- (M) MEASURED DIMENSION
- E — UNDERGROUND ELECTRIC
- PL — GAS PIPELINE
- G — GAS MAIN
- S — SANITARY SEWER
- >> — >> — STORM SEWER
- W — WATERMAIN
- E — UNDERGROUND ELECTRIC
- OT — OVERHEAD TELEPHONE
- OU — OVERHEAD UTILITY
- x — x — x — x — FENCE
- CONCRETE
- BITUMINOUS
- DECIDUOUS TREE
- CONIFEROUS TREE
- SHRUB

AMERICAN ENGINEERING TESTING, INC.

Map Reference: Alliant Engineering, (September 12, 2019)

N

0 40 80

APPROXIMATE SCALE IN FEET

Figure 8

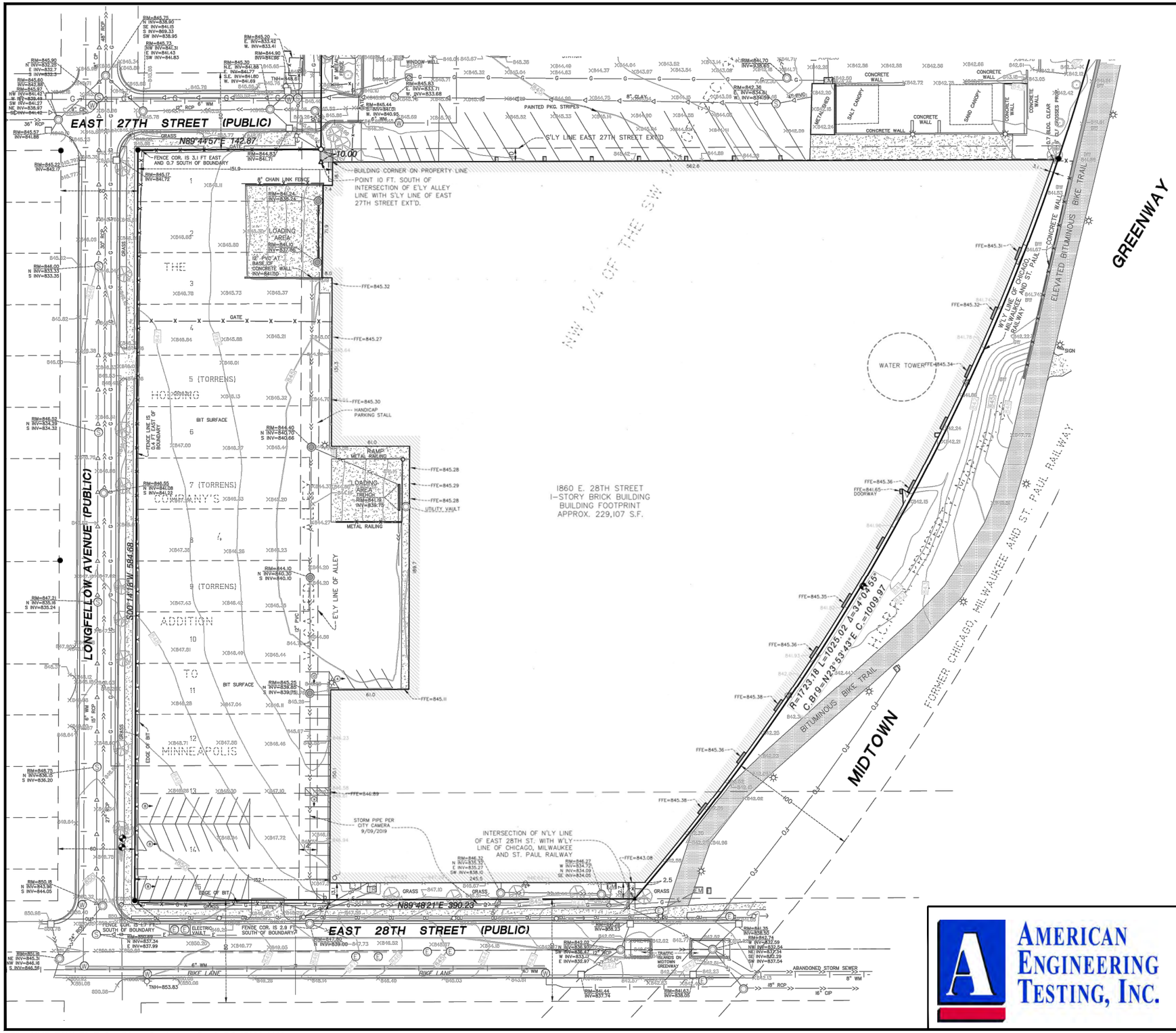
Existing Conditions Survey North

Environmental Assessment Worksheet

Hiawatha Maintenance Facility Expansion
Minneapolis, Minnesota

Date: 10/13/2020 AET Project No. 03-21225

File: HMF_EAW_F8_ExConditions_North.dwg North PO 17938-1148



PROPERTY DESCRIPTION

Roof Depot Property:

Parcel 1:
Lots 1, 2, 3, 4, 6, 8, 10, 11, 12, 13, 14 and 15, Block 4, The Holding Company's Addition to Minneapolis, together with that part of the NW 1/4 of the SW 1/4 of Section 36, Township 29, Range 24, described as follows: Commencing at the intersection of the Northerly line of East 28th Street with the Westerly line of Chicago, Milwaukee and St. Paul Railway Company's right of way; thence Westerly along said northerly line of East 28th Street to its intersection with the Easterly line of an alley in Block 4, of the Holding Company's Addition to Minneapolis; thence North along said Easterly alley line to a point 10 feet South of the intersection of said Easterly alley line with the Southerly line of East 27th Street, if extended; thence Easterly along a line 10 feet South of the Southerly line of East 27th Street extended to the Westerly line of the right of way line of the Chicago, Milwaukee and St. Paul Railway; thence in a Southwesterly direction along said Westerly line of said right of way to the place of beginning according to the United States Government survey thereof, and situate in Hennepin County Minnesota, together with the vacated alley adjoining the Easterly line of Block 4, Holding Company's Addition. (Abstract Property)

Parcel 2:
Lots 5, 7 and 9, The Holding Company's Addition to Minneapolis, according to the plat thereof on file or of record in the office of the Register of Deeds in and for Hennepin County, together with those portions of vacated alley dedicated to the public in Block 4, The Holding Company's Addition to Minneapolis which lie between the Easterly extensions of the North and South lines of said Lot 5; and the North and South lines of said Lot 7 and the North and South lines of said Lot 9.
Being Registered land as is evidenced by Certificate of Title No. 1002641.

Hiawatha Maintenance Facility Property:

That part of the Northwest Quarter of the Southwest Quarter of Section 36, Township 29, Range 24, Hennepin County, Minnesota, lying southerly of the south line of East 26th Street, northerly of the south line of East 27th Street extended easterly of the east line of THE HOLDING COMPANY'S ADDITION TO MINNEAPOLIS, and westerly of the west line of Hiawatha Avenue and the Soo Line Railroad (formerly Chicago, Milwaukee & St. Paul Railway).

and

The north 10.00 feet of that part of the Northwest Quarter of the Southwest Quarter of Section 36, Township 29, Range 24, Hennepin County, Minnesota, lying southerly of the south line of East 27th Street extended easterly, easterly of the east line of THE HOLDING COMPANY'S ADDITION TO MINNEAPOLIS, and westerly of the west line of Soo Line Railroad (formally Chicago, Milwaukee & St. Paul Railway).

NOTES

1. The property description for Roof Depot Property shown here on is based upon information found in the commitment for title insurance prepared by Old Republic National Title Insurance Company, file no. 60604, Supplemental No. 1, dated January 26, 2016. The property description for Hiawatha Maintenance Facility is base on information provided and our in house files.
2. The locations of underground utilities are depicted based on Gopher State One Call, available city maps, records and field locations and may not be exact. Verify critical utilities prior to construction or design.
3. The basis of bearings is assumed.
4. All distances are in feet.
5. The area of the above described property is 728,902 square feet or 16.733 acres.
6. Benchmark: MPLS MON 409 MNDOT survey monument disk located in the intersection of East 26th Street and Cedar Avenue South has an elevation of 846.00 feet (NGVD 29).

   Local Benchmark #1: TNH on the Southeast corner of the intersection of East 28th Street and Longfellow Avenue and has an elevation of 853.83 feet (NGVD29).

   Local Benchmark #2: TNH on the Northwest corner of the intersection of East 27th Street and an alley running parallel and East of Longfellow Avenue and has an elevation of 848.61 feet (NGVD29).

   Local Benchmark #3: TNH on the South side of East 26th Street and 333.65 feet East of the East Right-of-Way line of Longfellow Ave and has an elevation of 843.98 feet (NGVD29).
7. Curb along streets is B6 18 and curb within the parking lot is B6 12.

LEGEND

- SET CAP IRON MONUMENT I8425
- FOUND IRON MONUMENT
- FOUND NAIL
- SET NAIL
- HYDRANT
- WATER VALVE
- TELEPHONE BOX
- SANITARY MANHOLE
- SIGN
- CATCH BASIN
- ELECTRIC BOX
- LIGHT HOLE
- STORM MANHOLE
- WATER MANHOLE
- POWER POLE
- HAND HOLE
- MONITORING WELL
- GAS METER
- UNKNOWN MANHOLE
- FLAG POLE
- ELECTRIC MANHOLE
- (P) PLAT DIMENSION
- (M) MEASURED DIMENSION
- E — UNDERGROUND ELECTRIC
- PL — GAS PIPELINE
- G — GAS MAIN
- SANITARY SEWER
- STORM SEWER
- WATERMAIN
- E — UNDERGROUND ELECTRIC
- OT — OVERHEAD TELEPHONE
- OU — OVERHEAD UTILITY
- x—x—x—x— FENCE
- CONCRETE
- BITUMINOUS

AMERICAN ENGINEERING TESTING, INC.

Map Reference: Alliant Engineering, (September 12, 2019)

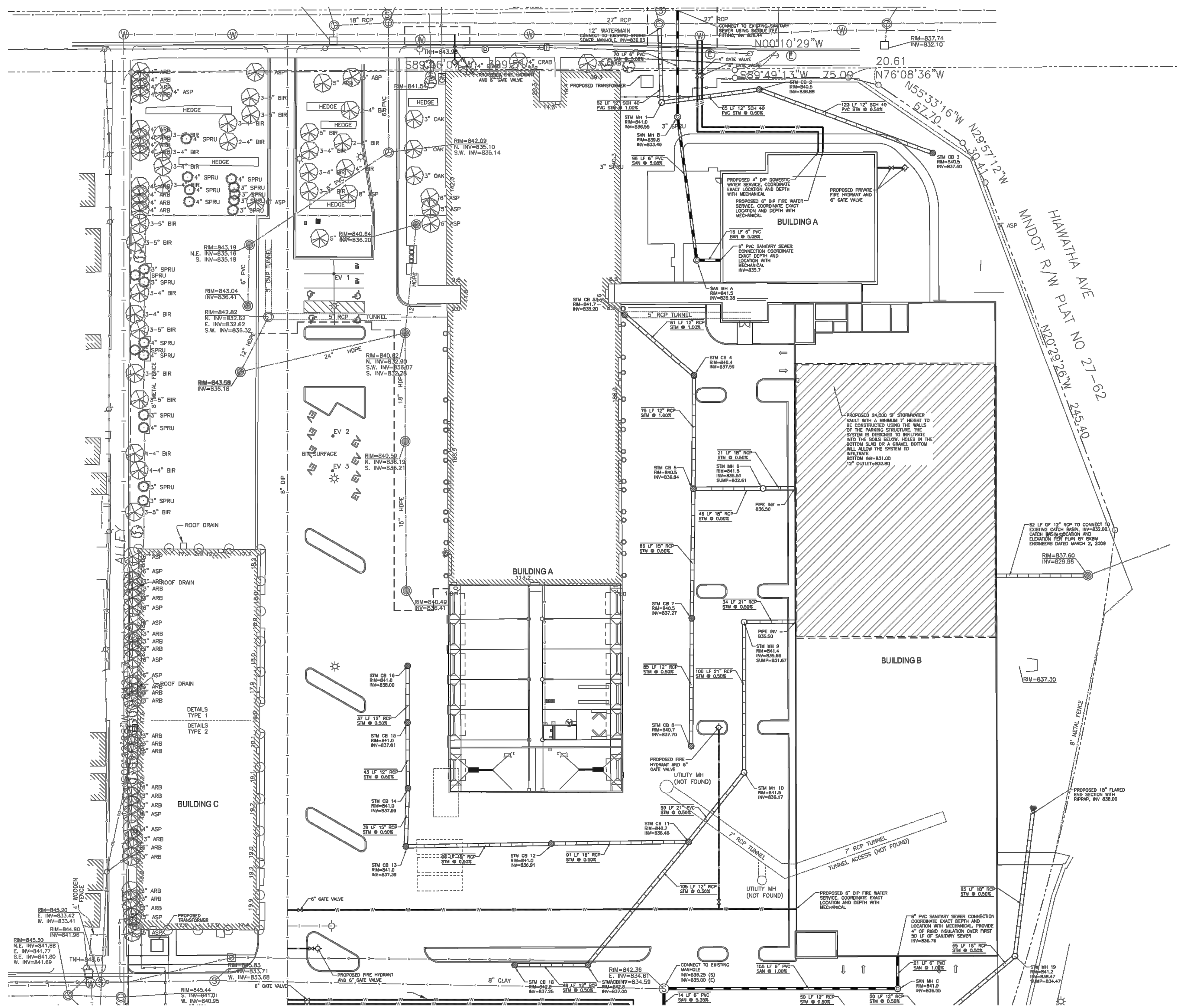
N

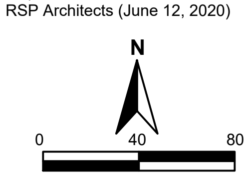
0 40 80

APPROXIMATE SCALE IN FEET

Figure 9
Existing Conditions Survey South
Environmental Assessment Worksheet
Hiawatha Maintenance Facility Expansion
Minneapolis, Minnesota
Date: 10/13/2020 AET Project No. 03-21225

File: HMF_EAW_F9_ExConditions_South.dwg South PO 17938-1148





AMERICAN ENGINEERING TESTING, INC.

Map Reference:
RSP Architects (June 12, 2020)

N

0 40 80

APPROXIMATE SCALE IN FEET

Figure 10

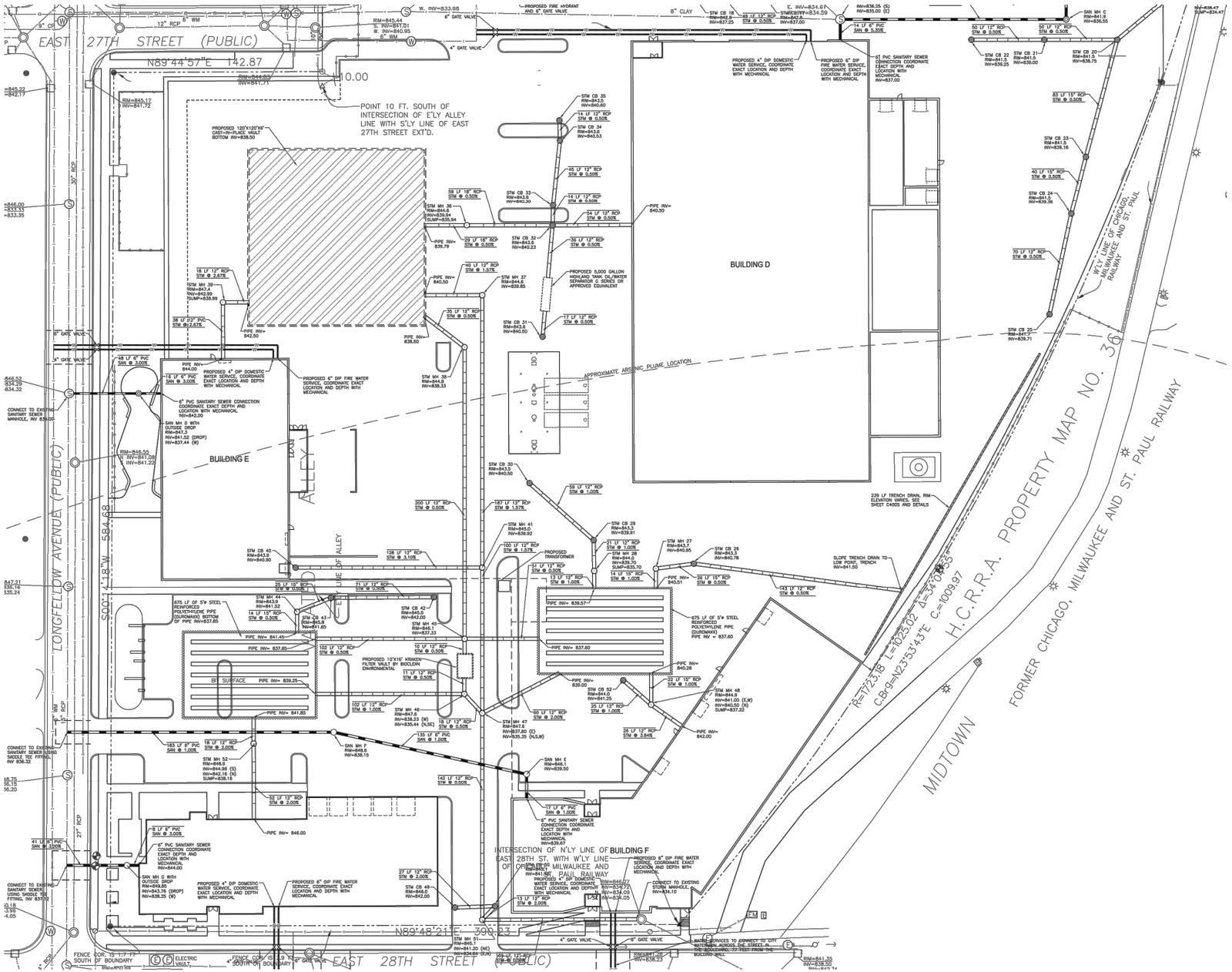
Preliminary Site Utility Plan (North)

Environmental Assessment Worksheet

Hiawatha Maintenance Facility Expansion
Minneapolis, Minnesota

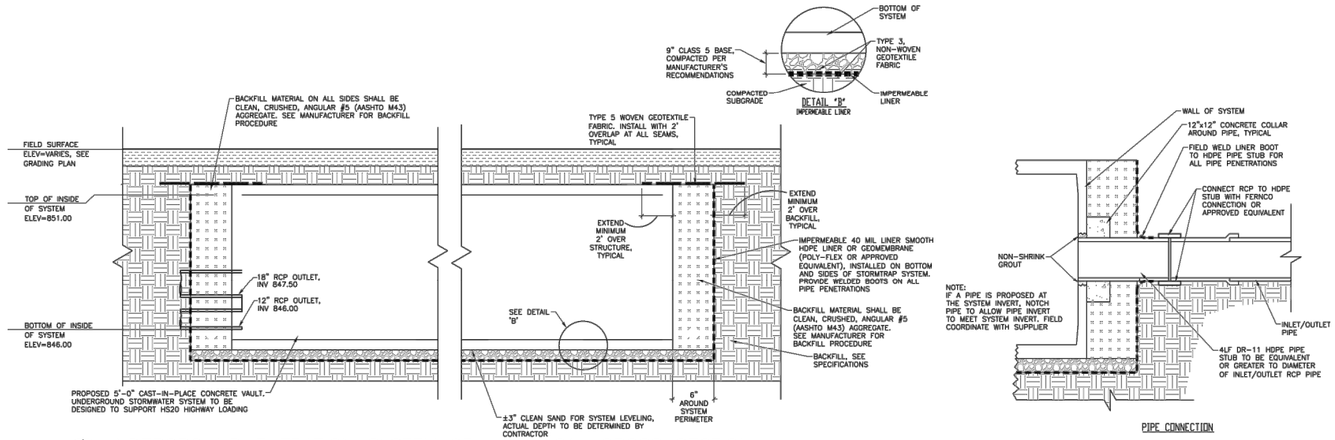
Date: 10/13/2020 AET Project No. 03-21225

File: HMF_EAW_F10_PrelimUtility_North.dwg North-Utility PO 17938-1148



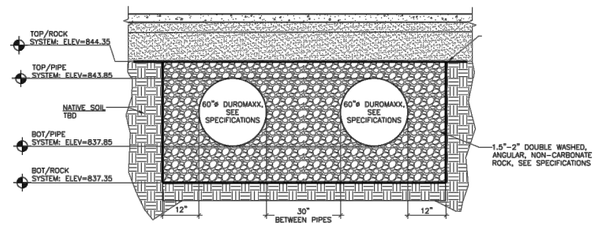
AMERICAN ENGINEERING TESTING, INC.	Map Reference: RSP Architects (June 12, 2020) N 0 40 80 APPROXIMATE SCALE IN FEET	**Figure 11** Preliminary Site Utiltity (South)
		Environmental Assessment Worksheet
		Hiawatha Maintenance Facility Expansion Minneapolis, Minnesota
		Date: 10/13/2020 AET Project No. 03-21225

File: HMF_EAW_F11_PrelimUtility_South.dwg South-Utility PO 17938-1148



1 C550 UNDERGROUND FILTRATION SYSTEM 9P – TYPICAL CROSS SECTION

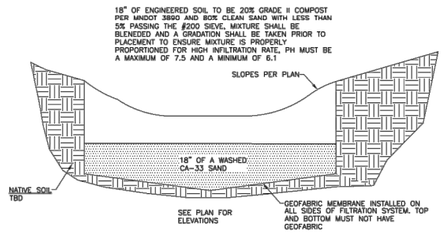
NO SCALE



2 C550 UNDERGROUND STORMWATER SYSTEM 6P – CROSS SECTION

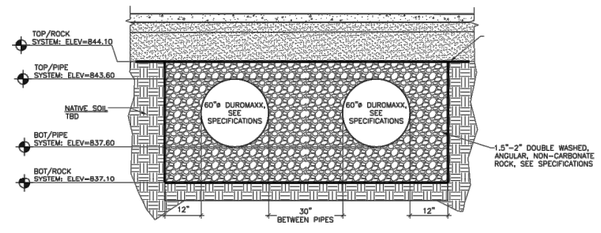
NOTE: FOR EXISTING SOIL INFORMATION, REFER TO SUBSURFACE GEOTECHNICAL INVESTIGATION

NO SCALE



3 C550 INFILTRATION BASIN DETAIL

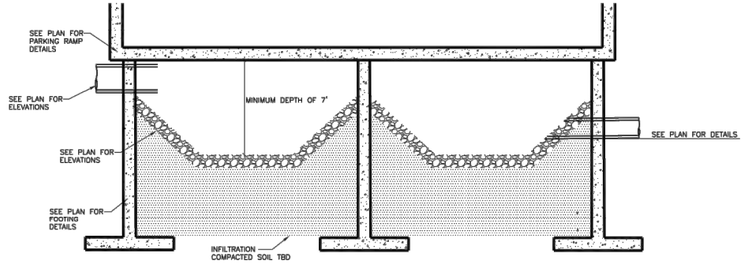
NO SCALE



4 C550 UNDERGROUND STORMWATER SYSTEM 8P– CROSS SECTION

NOTE: FOR EXISTING SOIL INFORMATION, REFER TO SUBSURFACE GEOTECHNICAL INVESTIGATION

NO SCALE



6 C550 UNDERGROUND INFILTRATION SYSTEM – PARKING RAMP 5P

NO SCALE

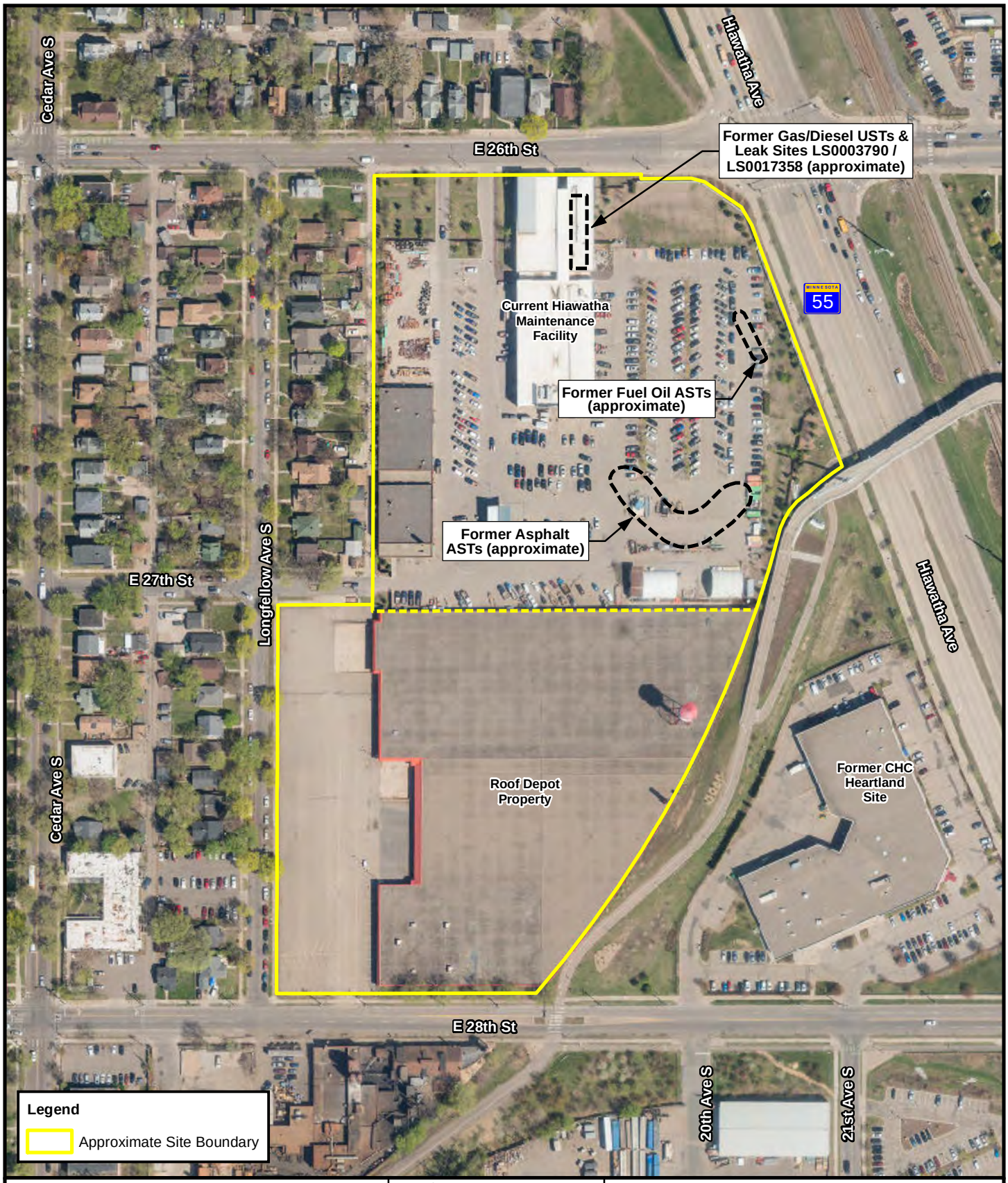
AMERICAN ENGINEERING TESTING, INC.

Map Reference:
RSP Architects (June 12, 2020)

NOT TO SCALE

Figure 12
Preliminary Stormwater Management Details
Environmental Assessment Worksheet
Hiawatha Maintenance Facility Expansion
Minneapolis, Minnesota
Date: 10/13/2020 AET Project No. 03-21225

File: HMF_EAW_F12_Details.dwg Details PO 17938-1148



AMERICAN ENGINEERING TESTING, INC.

Map Reference:
Hennepin County Orthophotos 2018

N

0 100 200

Feet

Figure 13

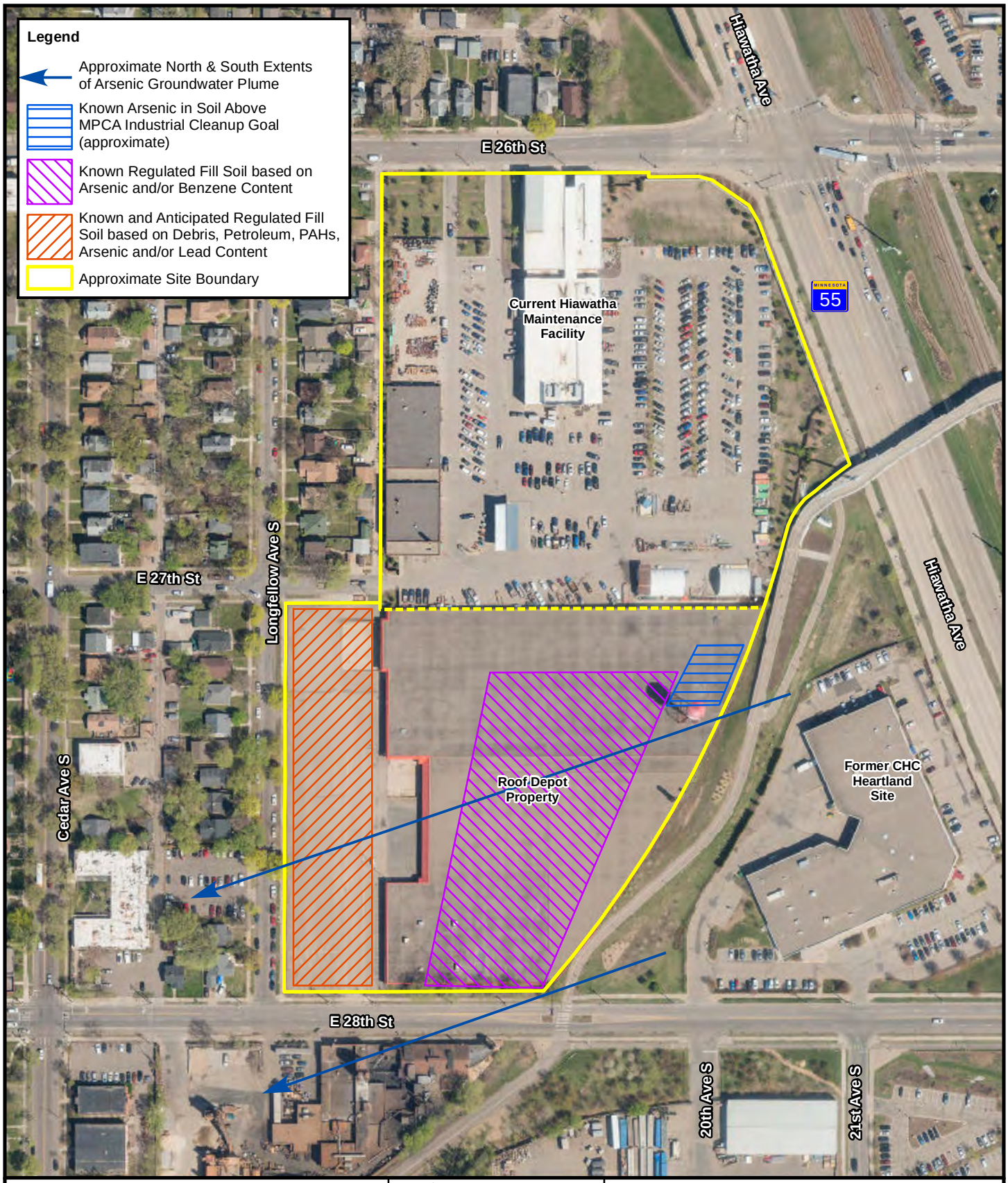
Former UST/AST and Leak Site Locations

Environmental Assessment Worksheet

Hiawatha Maintenance Facility Expansion
Minneapolis, Minnesota

Date: 10/23/2020 AET Project No. 03-21225

File: HMF_EAW_F13-FormerUST_AST.mxd PO 17938-1148



AMERICAN ENGINEERING TESTING, INC.

Map Reference:
Hennepin County Orthophotos 2018

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Feet

Figure 14
Areas of Investigation
and Identified Contamination

Environmental Assessment Worksheet

Hiawatha Maintenance Facility Expansion
Minneapolis, Minnesota

Date: 10/23/2020 AET Project No. 03-21225

File: HMF_EAW_F14-InvAreas.mxd PO 17938-1148

Attachment A

Miscellaneous Land Use Information

AET Project No. 03-21225

DEPARTMENT OF NATURAL RESOURCES

DNR RESPONSE TO COVID-19: For details on adjustments to DNR services, visit this webpage (https://www.dnr.state.mn.us/covid-19.html). For information on the state's response, visit the Department of Health website (https://www.health.state.mn.us/diseases/coronavirus/index.html) .

Regionally significant ecological areas (RSEA)

Communities recognize the importance of natural areas to quality of life and that escalating development pressures threaten remaining natural lands and water bodies. Communities thus need tools to help them identify natural areas for conservation and protection.

Metro area assessment

In 2003 the DNR Central Region conducted a landscape-scale assessment of the seven-county metro area to identify ecologically significant terrestrial and wetland areas. This assessment was based on LandSat data and aerial photo interpretation of grassland. In 2008 the DNR updated the assessment using MLCCS (/mlccs/index.html) data. Products available from this:

- Assessment results (/rsea/metro_assessment.html)
- Map: areas of ecological significance (/rsea/map.html).

Other regional assessments

The DNR has also completed 2 statewide ecological assessments using the National Land Cover Dataset from 2001 and 2006. Those GIS products are available in ArcMap via Quick Layers in the Environmental Quality folder. Contact Bart Richardson for more information - bart.richardson@state.mn.us

Contact

For questions, contact Bart Richardson (651-259-5796, bart.richardson@state.mn.us) or Sharon Pfeifer (651-259-5723)

This effort was supported, in part, by the Metropolitan Council, which provided satellite land cover data used to develop a hybrid land cover map as well as funding for GIS support staff. Staff of DNR Ecological Resources assisted with model development and provided peer review during model development.

Questions?

Call 651-296-6157 or 888-MINNDNR (646-6367)

Email us: info.dnr@state.mn.us

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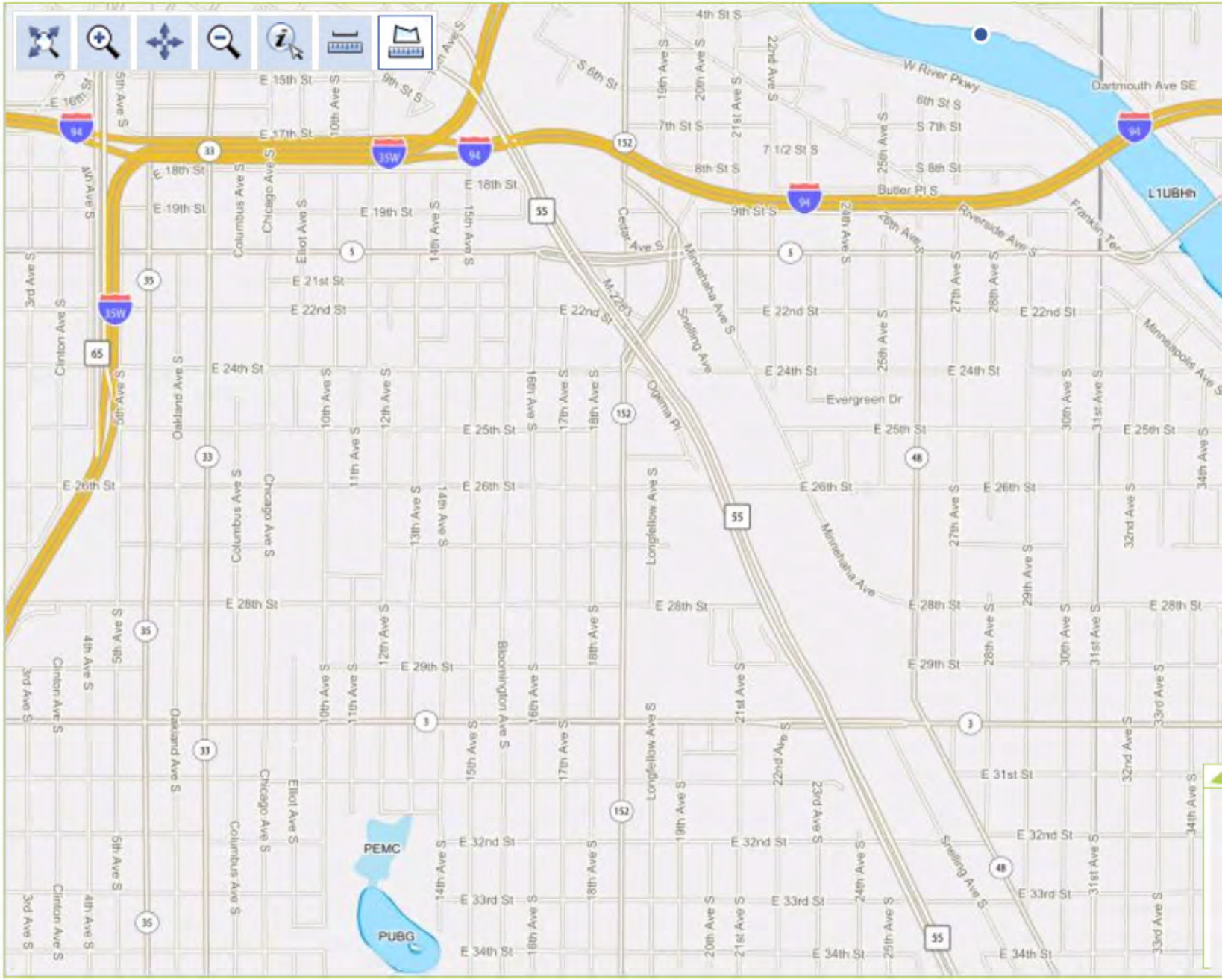
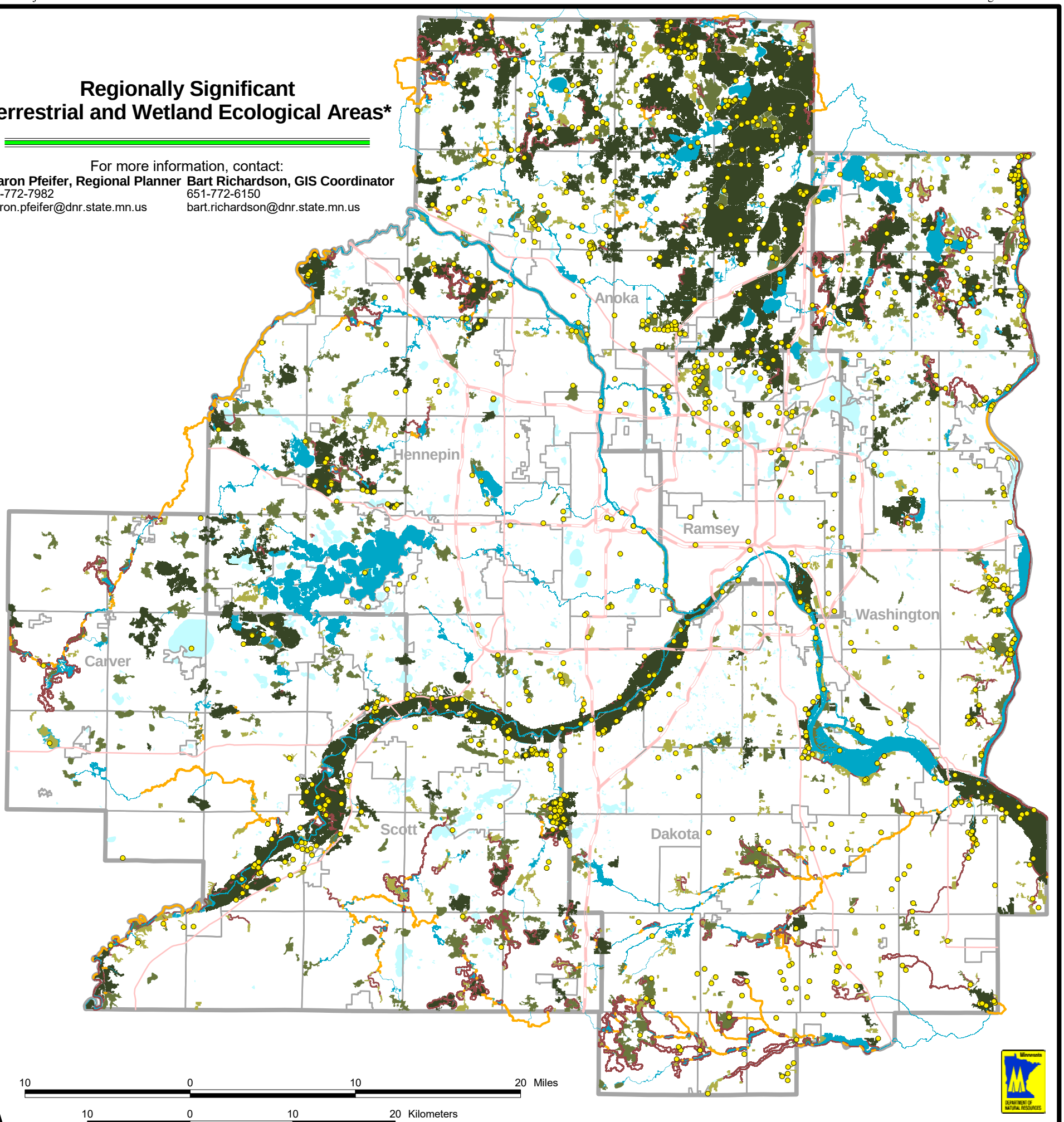


Regionally Significant Terrestrial and Wetland Ecological Areas*

For more information, contact:

Sharon Pfeifer, Regional Planner
651-772-7982
sharon.pfeifer@dnr.state.mn.us

Bart Richardson, GIS Coordinator
651-772-6150
bart.richardson@dnr.state.mn.us



MN DNR, January 31, 2003
/heron05/eco_patch/ecopatch_maps.apr

Ecological Score*+

Regionally Significant Ecological Areas were given a score of 1, 2, or 3 (3 being the highest possible score) based on how well continuous natural areas met standards for size, shape, connectivity, adjacent land use, and species diversity.

3 - *These areas tend to be larger in size, and/or with few adjacent land cover types or land uses that could adversely affect the area; may have greater diversity of vegetation cover types; or it may be an isolated native plant community mapped and given a score of outstanding biodiversity significance by the Minnesota County Biological Survey.*

2 - *These areas tend to be moderate in size and/or with more adjacent land cover types or land uses that could adversely affect the area; may have less diversity of vegetation cover types; or it may be an isolated native plant community mapped and given a score of high biodiversity significance by the Minnesota County Biological Survey.*

1 - *These areas tend to be smaller in size while still meeting the minimum size requirements for regional significance (minimum size is variable based on cover type); may have less diversity of vegetation cover types; may have more adjacent cover types or land uses that could adversely affect the area; or it may be an isolated native plant community mapped and given a score of moderate biodiversity significance by the Minnesota County Biological Survey.*

River and Stream Corridors* +

Shortest-distance paths in and along rivers, streams, lakes, and wetlands that connect at least two RSEAs.

Terrestrial Species Routes
link upland derived RSEAs using natural/ semi-natural vegetation cover along the banks of open water.

Aquatic Species Routes
link wetland derived RSEAs using any open water (streams, rivers, or lakes).

Sections where Routes Coincide

Rare Species and Animal Aggregations** +

Mapped by the Minnesota County Biological Survey

Animals and plants, federally- or state-listed, found after 1970, excluding aquatic species.

Open Water
Interstate Highway
Federal Trunk Highway
Municipal Boundary
County Boundary

The Regionally Significant Terrestrial and Wetland Ecological Areas (RSEA) are derived from a modeling process that predicts the likelihood that regionally significant natural resources exist in a contiguous area. These areas must meet specific criteria that were established to qualify an area as regionally significant (size, shape, connectivity, adjacent land use, and species diversity). The River and Stream Corridors show connections via rivers, streams, lakes, and wetlands for the RSEAs. The data for the modeling process was compiled from several different sources and its completeness or total accuracy cannot be guaranteed. The data and products have not been ground truthed. NOTE: The Terrestrial and Wetland Ecological Assessment does not model for aquatic species, although some aquatic features appear in the results. The Metropolitan Council, in association with DNR staff is undertaking a separate Aquatic Ecological Assessment.

Rare features data included here were provided by the Natural Heritage and Nongame Research Program of the Division of Ecological Services, Minnesota Department of Natural Resources (DNR), and were current as of January 31, 2003. These data are not based on an exhaustive inventory of the state. Permission to use these data does not imply endorsement or approval by the DNR of any interpretations or products derived from the data.

+There may be inaccuracies in the data or which the DNR is not aware and for which the DNR will not be held responsible.
The lack of data for any geographic area shall not be construed to mean that no significant features are present.

DEPARTMENT OF NATURAL RESOURCES

DNR RESPONSE TO COVID-19: For details on adjustments to DNR services, visit this webpage (https://www.dnr.state.mn.us/covid-19.html). For information on the state's response, visit the Department of Health website (https://www.health.state.mn.us/diseases/coronavirus/index.html) .

Metro area assessment results

In 2003 DNR Central Region conducted a landscape scale assessment of the seven-county metropolitan area to identify terrestrial and wetland areas of ecological significance. Areas include places where intact native plant communities and/or native animal habitat are still found in the region and continue to provide important ecological functions such as:

- Habitat for game and non-game, including threatened, endangered, and special concern animals.
- Biological diversity.
- Connectivity in the landscape.
- Groundwater recharge and improved water quality.
- High to outstanding examples of native plant and/or animal Communities or animal aggregations (as mapped by the Minnesota County Biological Survey (/eco/mcbs/index.html)).

Assessment results

DNR Central Region identified regionally significant natural resource areas using habitat models. (See the entire assessment methods (/rsea/metro_methods.html).) Based on this coarse filter assessment, it is estimated that approximately 280,000 acres of regionally significant habitat remain, which is 15% of the total land area in the seven-county metropolitan region.

- Download the GIS geodatabase results of the Regional Significant Ecological Assessment RSEA_GIS_data.zip (ftp://ftp.dnr.state.mn.us/pub/gisftp/barichar/RSEA/) (3.5MB)

Wetlands

Wetlands identified and ranked by this assessment: isolated wetlands larger than 25 acres; wetland complexes larger than 148 acres with specific buffer requirements; wetlands over 20 acres in size associated with dry, tall grass; wetland forest complexes, comprised of wetlands between 1 and 10 acres in size adjacent to forested areas; and wildlife lakes at least 50 acres in size, identified by the DNR?s shallow lakes program.

About 52% of the 280,000 acres of regionally significant habitat, or 130,000 acres, included regionally significant wetlands and open water. Of this, 50,000 wetland acres fall outside protected park status. This suggests that 18% of regionally significant wetland areas require protection if they are to retain their high ecological significance.

Forests

Regionally significant forested areas comprise 33% of the total remaining natural land cover in the seven-county metropolitan region.

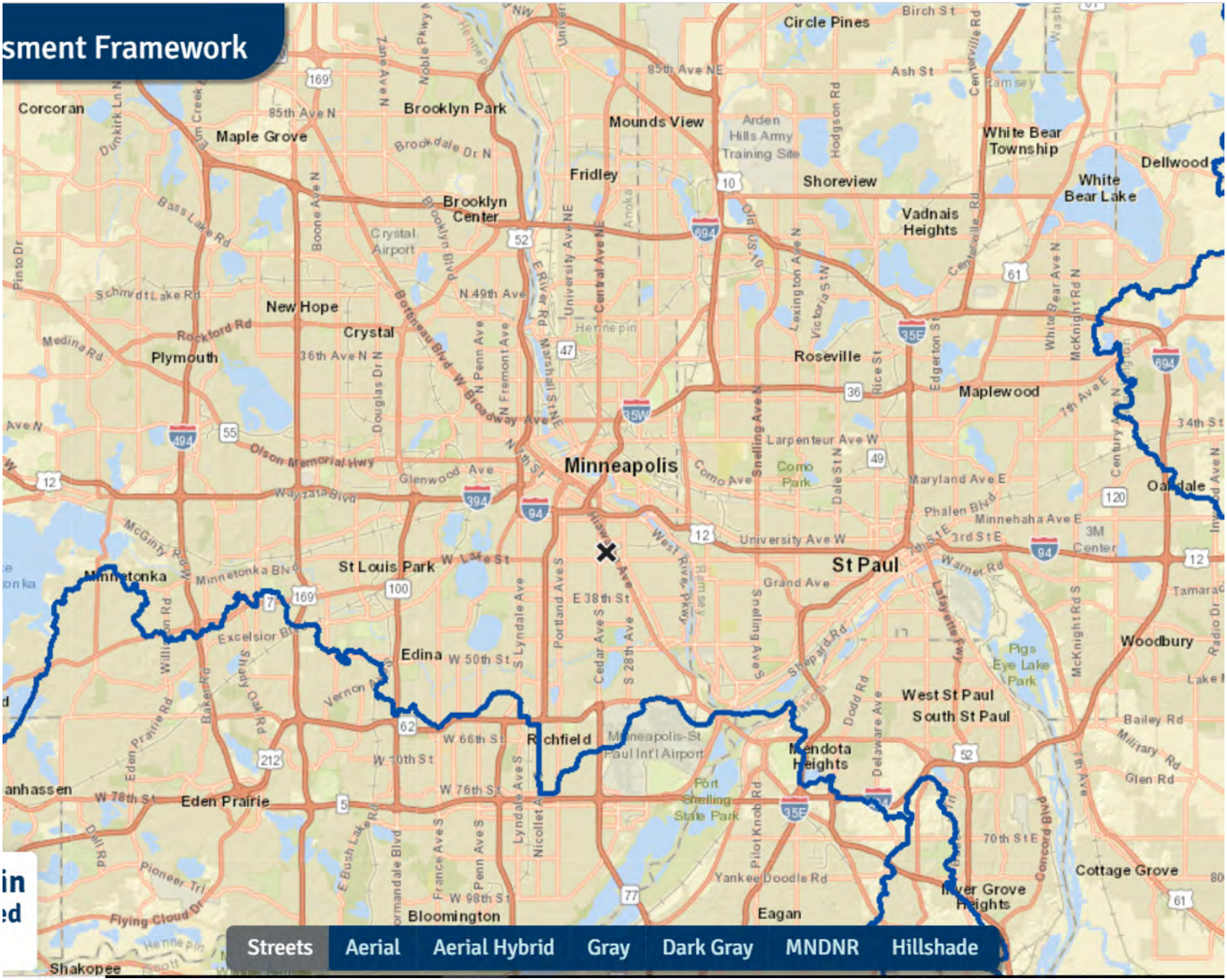
Grasslands

Grasslands (included maintained grasses) constitute 15% of the 280,000 acres of remaining natural land cover.

Questions?

Call 651-296-6157 or 888-MINNDNR (646-6367)

Email us: info.dnr@state.mn.us


sment Framework
Minneapolis
St Paul
Bloomington
Eden Prairie
Edina
St Louis Park
Richfield
Brooklyn Park
Brooklyn Center
Maple Grove
Plymouth
New Hope
Crystal
Roseville
Maplewood
Mounds View
Shoreview
Fridley
Arden Hills Army Training Site
White Bear Township
White Bear Lake
Vadnais Heights
Circle Pines
Dellwood
Oakdale
Woodbury
Cottage Grove
Inver Grove Heights
Eagan
West St Paul
South St Paul
Mendota Heights
Minnetonka
Corcoran
Shakopee
Streets
Aerial
Aerial Hybrid
Gray
Dark Gray
MNDNR
Hillshade

MINNESOTA POLLUTION CONTROL AGENCY

Impaired waters viewer (IWAV)

The interactive IWAV map displays impaired waters around Minnesota in the **draft 2020 Impaired Waters List**.

Glossary of abbreviations used in the map

Glossary

Impaired waters: Waters failing to meet one or more **water quality standards**.

Delisted waters: These are previously listed waters now determined to meet water quality standards based on new and reliable data. Delistings may occur as a result of watershed actions or other factors. Shown are all delistings since 2002.

Corrective actions: Y = Delisting was a result of actions in the watershed that resulted in improved water quality. N = Delisting was not a result of corrective actions.

List corrections: Corrections are determinations that a water is not impaired but which are not considered delistings. Corrections can occur when new water quality standards are adopted and the original listing data now show support, the original assessment methodology was not appropriate, or the original listing data were found to be invalid and current data indicate support. Shown are all corrections to the 2020 Impaired Waters List.

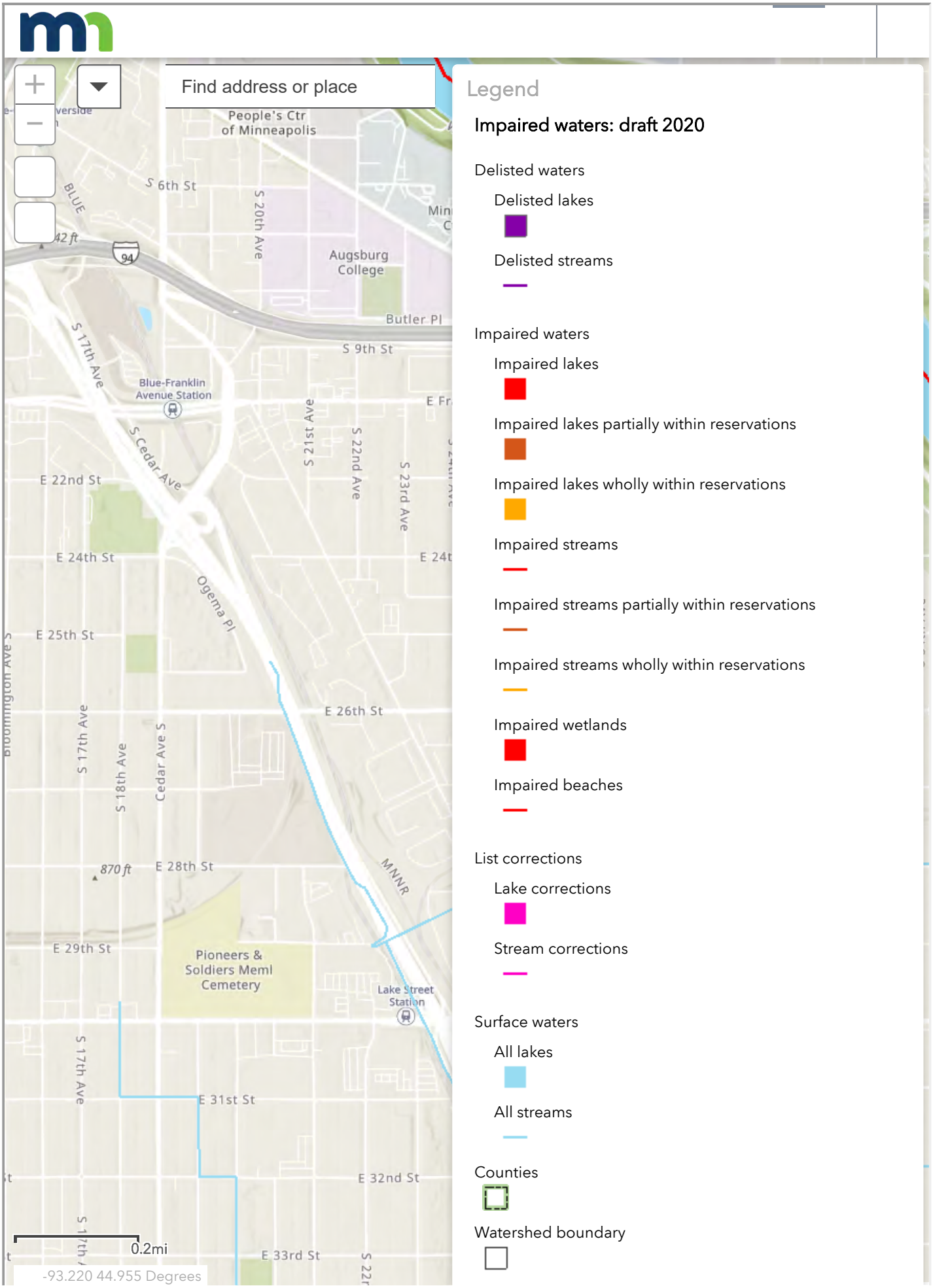
AUID: Assessment unit identifier

Reservation: Defined by the **U.S. Census Bureau's** 2019 spatial data on tribal lands except with respect to the Mille Lacs where the state disagrees with the tribe and the federal government on the boundaries of the reservation. See the tribal designation section: **Draft 2020 Impaired Waters List (wq-iw1-65)**

- InvertBio: Benthic macroinvertebrate bioassessments
- Nitrate
- Nutrients
- PCB-F: Polychlorinated biphenyls (PCBs) in fish tissue
- PCB-W: Polychlorinated biphenyls (PCBs)
- PFOS-F: Perfluorooctane Sulfonate (PFOS) in fish tissue
- PFOS-W: Perfluorooctane Sulfonate (PFOS)
- pH
- PlantBio: Aquatic plant bioassessments
- T: Turbidity
- Temp: Temperature
- Toxaphene
- TSS: Total suspended solids

TALU: Tiered aquatic life use

- E - Exceptional: High quality waters with fish and invertebrate communities at or near undisturbed conditions
- G - General: Waters with good fish and invertebrate communities that meet or should meet minimum goals
- M - Modified: Waters with legally altered habitat that prevents fish and invertebrate communities from meeting minimum goals.


Find address or place
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Legend
Impaired waters: draft 2020
Delisted waters
Delisted lakes
Delisted streams
Impaired waters
Impaired lakes
Impaired lakes partially within reservations
Impaired lakes wholly within reservations
Impaired streams
Impaired streams partially within reservations
Impaired streams wholly within reservations
Impaired wetlands
Impaired beaches
List corrections
Lake corrections
Stream corrections
Surface waters
All lakes
All streams
Counties
Watershed boundary

Use class: See **Minn. Rule 7050.0220** for definitions

Impaired uses:

- AQC: Aquatic consumption, see **Minnesota Dept. of Health** for more information
- AQL: Aquatic life
- AQR: Aquatic recreation
- DW: Drinking water
- LRV: Limited resource value

TMDL: **Total maximum daily load**. The maximum amount of a pollutant that a waterbody can receive and still meet water quality standards. TMDL also refers to the process of allocating pollutant loadings among point and nonpoint sources.

- TMDL approved: Impairments for which a TMDL plan has been developed and **approved** by the U.S. EPA.
- TMDL not required: Impairments for which a TMDL is not appropriate; the impairments are cause for non-pollutants and reflect natural background conditions.
- Additional impairments: Impairments for which a TMDL is underway or not yet developed.

Impairments:

- Ace: Acetochlor
- Al: Aluminum
- Amm-U: Ammonia, unionized
- As: Arsenic
- Cl-: Chloride
- Clpyr: Chlorpyrifos
- Cu: Copper
- Coldwater: Lack of cold water assemblage
- DDT (Dichlorodiphenyltrichloroethane)
- Dieldrin
- Dioxin (including 2,3,7,8-TCDD)
- DO: Dissolved oxygen
- E. coli: Escherichia coli (E. coli)
- FC: Fecal coliform
- FishesBio: Fish bioassessments
- Hg-F: Mercury in fish tissue
- Hg-W: Mercury in water column

Attachment B

June 12, 2020 IRAP

AET Project No. 03-21225

Interim Response Action Plan

Roof Depot Site
1860 28th Street & 2717 Longfellow Avenue
Minneapolis, Minnesota
MPCA Project NO. VP34190
MDA Project No. PTH101093455

Prepared for

City of Minneapolis

June 12, 2020

Project B1500394.03
Braun Intertec Corporation

Table of Contents

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Description **Page**

Attachments

Figures

Appendices

A. Introduction

The City of Minneapolis (the City) is in the process of planning future redevelopment of the property, located at 1860 28th Street & 2717 Longfellow Avenue in Minneapolis, Minnesota (the Site), for a municipal public works storage, administration and training facility. A figure depicting the Site Location is included as Figure 1, and Figure 2 depicts the existing Site conditions in relation to previously completed environmental investigation locations.

As part of the planning and Site preparation process, the City is preparing to demolish the existing warehouse building in 2020 in advance of new construction, which is anticipated to begin in 2021. The proposed redevelopment will include new vehicle maintenance facilities, public works equipment and material storage buildings, new office and training buildings, storm water control improvements, an open air parking ramp, and paved driveways and parking.

As part of due diligence activities, the City enrolled in the Minnesota Pollution Control Agency Voluntary Investigation and Cleanup (VIC) Program on April 6, 2016 to obtain a No Association Determination (NAD) for residual non-petroleum related contamination at the Site. The MPCA VIC Site ID number is: VP0034190. The MPCA VIC Program issued a NAD dated May 27, 2016 (2016 NAD) to the City.

Similarly, the City enrolled in the Minnesota Department of Agriculture (MDA) VIC (AgVIC) Program on December 6, 2019 to facilitate redevelopment of the Site for future City of Minneapolis Public Works Facility use and to obtain a Retroactive No Association Determination (RNAD) for arsenic concentrations in soil and groundwater associated with historical off-Site pesticide manufacturing. The MDA issued a RNAD dated February 3, 2020 to the City.

This Interim Response Action Plan (IRAP) has been developed to summarize existing Site conditions, describe methods and procedures for response actions that will be undertaken to facilitate demolition of the existing warehouse building, and provide controls to protect public health until future redevelopment is completed. The soil at the Site is impacted by polycyclic aromatic hydrocarbons (PAHs), petroleum-related volatile organic compounds (VOCs), Resource Conservation and Recovery Act (RCRA) metal arsenic, gasoline range organics (GRO), and diesel range organics (DRO).

This IRAP generally follows MPCA Guidance Document c-rem4-43 *Brownfield Program Response Action Plans (October 2018)* and MDA Guidance Document 10 *Agricultural Chemical Incident Remedial Investigation Report and Corrective Action Plan*, including the inclusion of a Construction Contingency Plan (CCP) for responding to unexpected environmental conditions on the Site.

The City is requesting approval of this IRAP from the MPCA and MDA VIC Programs prior to completion of the demolition. A subsequent development specific RAP will be prepared and submitted for MPCA and MDA approval prior to redevelopment related activities.

B. Background

B.1. Site Location and Description

The Site is located within the S ½ of the NW ¼ of the SW ¼ of Section 36, Township 29 North, Range 24 West, in an area historically developed for industrial use south of downtown Minneapolis, Hennepin County, Minnesota. The Site consists of two parcels, Parcel IDs 36.029.24.32.0003 and 36.029.24.32.0075, totaling approximately 7.63 acres and is developed with a vacant, approximately 228,000-square-foot, warehouse building constructed in 1947. The building is primarily slab-on-grade, with the exception of a partial basement below the east-central part of the building that extends approximately 25 feet below the ground level floor (see Figure 2). Access to the Site is provided by a driveway located on the south side of the Site from East 28th Street. The building is located on the eastern portion of the Site and paved parking is located on the western portion of the Site.

The properties adjoining the Site to the west and northwest, beyond Longfellow Avenue, are developed for residential use, while the property to the north is occupied by a City Public Works office and storage yard facility. The properties east of the Site were formerly known as the CMC Heartland Lite Yard site (MDA Case File No. RWA253085) and are currently developed with a public bike path and office building. East 28th Street borders the Site along the southern property boundary, while the Smith Foundry is located beyond East 28th Street.

B.2. Site History

According to a Phase I Environmental Site Assessment (ESA) completed in 2015, the eastern portion of the Site was used as a coal storage yard from 1912 through 1944, while the western portion of the Site was primarily developed for residential use until it was converted for paved surface parking lot use. In addition, the northeast corner of the Site was formerly used for machining and auto repair.

The 2015 Phase I ESA indicated that the CMC Heartland site had over 100 years of industrial use, and formerly supported a railroad yard, a lumber storage yard with woodworking and machine shop operations, an agricultural chemical manufacturing business, and two bulk petroleum storage facilities.

Based on information obtained from previous environmental investigations discussed in Section B.3, a plume of groundwater contamination extends from the CMC Heartland site to the west-southwest beneath the Site. The groundwater contamination is believed to be related to the historical agricultural chemical production at the CMC Heartland site, specifically arsenic-based pesticide manufacturing.

B.3. Previous Environmental Investigations

Braun Intertec reviewed and or prepared the following documents in association with the Site, all of which have been provided to the MPCA and MDA under separate cover:

- *Groundwater Monitoring Report, Hiawatha Business Center, 2020 East 28th Street, Minneapolis, Minnesota,* prepared by Peer Engineering, Inc., MDA Case File No. 95-0100B, dated October 2007 to February 2014 (Hiawatha Groundwater Monitoring Reports).
- *Phase I Environmental Site Assessment, Roof Depot, 1860 East 28th Street & 2717 Longfellow Avenue, Minneapolis, Minnesota*, prepared by Braun Intertec, Project Number B1500394, dated April 6, 2015 (2015 Phase I ESA).
- *Phase II Environmental Site Assessment, Roof Depot, 1860 East 28th Street & 2717 Longfellow Avenue, Minneapolis, Minnesota*, prepared by Braun Intertec, Project Number B1500394, dated April 21, 2015 (2015 Phase II ESA).
- *Test Pit Investigation Report, Roof Depot, 1860 East 28th Street & 2717 Longfellow Avenue, Minneapolis, Minnesota*, prepared by Braun Intertec, Project Number B1500394.00, dated January 5, 2016 (2016 Test Pit Investigation Report).
- *Additional Investigation Report, Roof Depot Site, 1860 28th Street & 2717 Longfellow Avenue, Minneapolis, Minnesota*, prepared by Braun Intertec, Project Number B1500394.03, dated May 20, 2020 (2020 Additional Investigation).

The Hiawatha Groundwater Monitoring Reports were prepared as part of corrective action related to the CMC Heartland groundwater plume and under the oversight of the MDA. The reports document groundwater monitoring results from 1997 through 2014. Three of the wells utilized during the period of monitoring were located on adjoining properties, along Site boundaries, and were designated as MW-17, MW-17A and MW-29. Groundwater levels in these wells ranged between 813 and 818 above mean sea level (AMSL) and indicated groundwater flow directions generally southwest to west-southwest. Dissolved arsenic concentrations during the December 2013 sample event (last event covered by the referenced reports) ranged between 700 micrograms per liter (µg/L) near the southwest Site corner and 1,600 µg/L along the east Site boundary.

Based on the findings of the 2015 Phase I ESA, a Phase II ESA was completed at the Site to evaluate the nature, magnitude, and extent of potential contamination associated with the recognized environmental conditions identified (i.e. on-Site machining, auto repair, and coal storage and off-Site source related agricultural chemical impacts). The Phase II ESA scope of work included the advancement of ten soil borings and two soil vapor probes in the paved parking lot and six hand auger borings and three sub-slab soil vapor sampling points below the existing building. The Phase II ESA report concluded the following:

- Fill soil consisting of silty sand is present to depths of up to 6 feet below ground surface (bgs) at the Site. Trace amounts of concrete, coal, and clinker were observed at four locations along the eastern boundary of the Site. Elevated concentrations of DRO were detected at various locations within the fill soil, benzene was detected at one location and the benzo(a)pyrene (BaP) equivalent exceeded regulatory criteria at two locations. Elevated concentrations of arsenic and antimony were detected above regulatory criteria in the groundwater. Soil vapor concentrations were not detected above regulatory criteria.

The 2016 Test Pit Investigation included the excavation of four test pits on the western side of the Site. Results from the test pit investigation concluded the following:

- Fill soil was identified at depths ranging from 0.5 feet to 6 feet bgs along the western boundary of the Site. The fill soil contained variable amounts of concrete, slate, metal, brick, ash, slag, porcelain and glass debris indicating that buried debris exists in the area of the former residential dwellings that once occupied the western side of the Site along Longfellow Avenue under the surface parking lot. In addition, a concrete slab was noted in test pit TP-3. Ash and slag were observed within the debris as well as asbestos at one location (i.e. TP-1), and based on the laboratory analytical results, elevated concentrations of arsenic, PAHs and GRO are associated with the debris.

The 2020 Additional Investigation included the advancement of 22 soil borings (PP-15 through PP-36), installation of 3 temporary groundwater monitoring wells in boring PP-18, PP-20, and PP-28, and completion of 17 soil vapor probes. The 2020 Additional Investigation provided the following conclusions:

- The soil borings completed during the 2020 Additional Investigation encountered between 2 to 13 feet of fill consisting of silty sand with gravel and poorly graded sand with silt, except for a 28-foot deep pocket of fill at soil boring location PP-18. The fill, on average, extended to greater depths below the southeast and northwest portions of the building. Fill soil below

the parking lot and driveways on the western portion of the Site consisted of silty sand with trace gravel and poorly graded sand with silt. Fill depth below the western portion of the Site ranged between 2 to at least 10 feet bgs, the terminal depth of the borings.

- Field monitoring of soil from the 2020 Additional Investigation borings did not identify elevated photoionization detector (PID) readings or olfactory evidence of contamination; however, petroleum-related VOCs were detected at boring location PP-24. No other contaminants were detected above regulatory criteria at the PP-24 location.

- Laboratory analysis identified elevated concentrations of arsenic in shallow fill soil at several locations on the eastern half of the Site, while the only concentrations to exceed the Industrial Soil Reference Value (SRV) were located below the northeast corner of the building. Arsenic concentrations in fill or native soil at depths equal to or greater than 5 feet were below the established Screening Soil Leaching Value (SLV) and SRVs. At the time of the 2020 Additional Investigation, each area with elevated arsenic concentrations were covered by either concrete or pavement, with the exception of the detected arsenic concentration at PP-20. The arsenic concentrations within the 0 to 2-foot interval at PP-20 exceeded its SLV. Based on the arsenic concentrations in the deeper samples (e.g. 2' to 4', 5' to 5.5', etc.) at location PP-20, significant leaching does not appear to be causing arsenic impacts to migrate vertically downward in the vicinity of PP-20.

- Although dissolved arsenic concentrations were detected at levels above Minnesota Department of Health (MDH) drinking water criteria, the concentrations reported during the 2020 Additional Investigation indicate a decline in dissolved arsenic concentrations when compared to prior investigation data. The water table aquifer is impacted with concentrations of benzene which exceed the MDH drinking water criteria.

- Laboratory analysis detected various petroleum and non-petroleum related VOCs in subsurface soil vapors at the Site. All soil vapor concentrations were below 33X the Industrial ISVs, except in one sample, designated as SV-13, located in the northeast corner of the Site. Only one compound concentration, tetrachloroethene (perchloroethylene, PCE), was detected in sample SV-13 that exceeded 33X its Industrial ISV. The 2020 Additional Investigation indicates that a soil vapor intrusion area of concern is present below the northeast part of the Site; however, the Site is currently vacant with no receptors currently present at the Site. Therefore, future buildings planned in the vicinity of SV-13 may require vapor mitigation controls to be incorporated into their design. A second round of soil vapor investigation may be required to define the extent of the soil vapor intrusion area of concern at the Site.

Previous environmental investigation figures, analytical summary tables, boring logs, and test pit logs are included in Appendix A.

C. Site Conceptual Model

The background information summarized in Section B above were used to prepare a site conceptual model for the Site and incorporates the current, former, and planned Site use and conditions, the physical setting, the extent of contaminants of concern (COCs), and a discussion of potential receptors and exposure pathways.

C.1. Physical Setting

The Site is currently vacant and covered by hardscapes (e.g. pavement, concrete, and/or building improvements), with the exception of an approximate 3,500-square-foot area along the southern Site boundary, south of the building. Access to the Site is secured by a locked, 8-foot high, chain link fence.

The Site topography is graded primarily such that water drains to the east and northeast. In general, the Site is relatively flat. Based on Global Positioning System (GPS) data collected during previous investigations, exterior grade elevations range between 843 and 850 feet AMSL. Available Site building information indicates that the top of the ground level floor elevation is approximately 845 feet AMSL, which would place bottom of footings for the boiler room basement area at elevations approximately 815 feet AMSL. Inside the building, the floor slab ranged from 7 inches to 8 inches thick.

An approximate 700-foot section of Hennepin County's Midtown Greenway pedestrian and cyclist path is present along the eastern Site boundary, which includes green spaces. Approximately 50 feet west of the Site, across Longfellow Avenue, single-family residential properties are present, which includes approximately 75 dwellings within 500 feet of the Site. Residential properties are primarily single-family homesteads with a mix of 2-unit, 3-unit, and more than 4-unit buildings.

C.2. Geologic and Hydrogeologic Conditions

The Site stratigraphy consists of surficial variable fill soil underlain by native alluvium and terrace deposits.

C.2.a. Fill Soil

Fill soil is present throughout the Site and consists primarily of light brown to black silty sand with gravel and light brown to dark brown poorly graded sand with silt. The fill depth ranges between 2 to 13 feet bgs, except for a pocket of fill 28 feet in depth identified on the southeast part of the Site (i.e. at soil boring location PP-18). The fill, on average, extended to greater depths below the southeast and northwest portions of the existing building, while fill below the parking lot and driveways extended to depths ranging between 2 to 10 feet bgs. These fill soil vary in particle size from fine to coarse sand and in places contain trace to some gravel.

The fill soil below the warehouse building appeared to be primarily reworked glacial alluvium, with the exception of a 2-foot layer of cinders and coal fragments observed at previous boring location PP-16. Similarly, trace amounts of coal fragments were observed at nearly all depths in the fill below the eastern portion of the warehouse building (e.g. PP-15 through PP-18, PP-24, PP-27, and PP-28). No debris inclusions were observed below the western portion of the warehouse. Contaminant concentrations in the fill soil below the existing building exceeded Industrial SRVs and/or SLVs in the following areas:

- Detected arsenic concentrations in samples PP-16 (2-4') and PP-36 (2-4') exceeded the Industrial SRV, which are located on the northeast corner of the Site. Detected arsenic concentrations exceeded the SLV in samples PP-20 (0-2'), PP-24 (2-4'), PP-26 (0-2'), PP-27 (0-2'), PP-29 (0-2'), and PP-35 (0-2'). The average total arsenic concentration for the soil samples collected during the 2020 Additional Investigation was 4.5 mg/kg.

- Benzene was detected in samples PP-11 (1-2') and PP-24 (2-4') at concentrations greater than its SLV.

Variable amounts of glass, concrete, metal, brick, ash, porcelain, slag, and asbestos-containing debris were observed in the fill at previous investigation locations TP-1 through TP-4, PP-29 and PP-32. No debris or other inclusions were observed in the remainder of the soil samples retrieved from the western part of the Site. Contaminant concentrations in the fill soil below the parking lot and driveways exceeded Industrial SRVs and/or SLVs in the following areas:

- Detected arsenic concentrations exceeded the SLV in samples TP-3 (5'), PP-29 (0-2'), and PP-35 (0-2').

- Detected BaP equivalent PAH concentrations exceeded the Industrial SRV in sample TP-2 (1'), while reported BaP equivalent concentrations in samples TP-4 (1.5'), PP-2 (2-4'), and PP-6 (3-5'), exceeded the SLV.

- Detected DRO concentrations in samples PP-3 (1-2'), PP-6 (3-5'), PP-7 (3-5'), and TP-2 (1') exceeded the MPCA unregulated fill guidance criteria[1].

No other contaminants were detected in the fill at concentrations at or above regulatory criteria.

C.2.b. Native Soil

The fill soil was underlain by native glacial alluvium and outwash consisting of light brown to dark brown poorly graded sand with gravel, poorly graded sand with silt, and silty sand with gravel. No contaminant concentrations were detected at or above regulatory criteria in the native soil.

C.2.c. Groundwater Conditions

Groundwater was encountered at the Site at depths ranging from 25 to 32 feet bgs, corresponding to approximate elevations ranging between 813 and 820 feet AMSL. According to published geologic information, the regional groundwater flow direction within the unconsolidated deposits in the vicinity of the Site is generally to the southwest (Hiawatha Groundwater Monitoring Reports). The groundwater beneath the southern half of the Site is impacted with dissolved arsenic and antimony concentrations above the Environmental Protection Agency (EPA) Maximum Contaminant Levels (MCLs).

C.2.d. Subsurface Soil Vapor Conditions

The proposed interim use of the Site does not include any buildings or other Site occupants that would pose the potential for soil vapor intrusion risk. However, PCE concentrations were detected in soil vapor below the northeast corner of the Site that exceeded 33X Industrial ISVs, which would indicate the potential for vapor intrusion risk for future buildings that may be constructed in this area of the Site.

C.3. Characteristics of COC Impacts

The results of the previous environmental investigations have identified areas of arsenic, PAH, and petroleum impacted fill soil, and arsenic impacted groundwater at the Site. The detected soil impacts were identified at various soil sample locations across the Site at depths 5 feet bgs or less and appeared to be laterally discontinuous. Groundwater impacts exceeding the MCL were limited to the southern half of the Site.

[1]MPCA Guidance Document c-rem1-01 *Best Management Practices for the Off-Site Reuse of Unregulated Fill,* dated February 2012.

C.5. Potential Receptors and Exposure Pathways

There is the potential for human health impacts from exposure to COC-impacted soil, groundwater, and soil vapor; such exposure may be via ingestion, inhalation, or dermal contact. Groundwater at the Site is not utilized for drinking water and is generally not accessible to the general public, and detected soil vapor concentrations are below standards used for short-term exposure risk evaluation. No new buildings or Site occupants are proposed as a result of implementation of this IRAP, and soil vapor intrusion risk to future buildings will be mitigated as part of the proposed public works facility development RAP to be prepared at a later date. Therefore, based on Site characterization data, direct exposure to soil impacted by COCs is the predominant exposure pathway at the Site.

Contaminated groundwater management may be required to implement this IRAP during deep foundation removal, and potential direct contact with contaminated groundwater by construction and utility workers (short term exposure) will be mitigated through the use of appropriate PPE and implementation of Site-specific Health and Safety Plans (HASPs).

D. Cleanup Standards and Definitions

Between demolition of the existing warehouse building and commencement of the proposed public works facility redevelopment, the Site will be used for paved parking lot purposes. This use dictates the cleanup scenario and the cleanup standards used, as well as how they are applied.

The cleanup standards that are applied in creation of this RAP address the potential exposure pathway of direct human exposure to impacted soil during implementation of this IRAP and prior to future redevelopment.

The direct exposure pathway is addressed by the MPCA's Industrial SRV. Because the Site will be covered by an impermeable paved surface as part of this IRAP, which will be in place until implementation of the development RAP associated with the public works facility redevelopment, the Short-term Worker SRV will be used to guide response actions at the Site. Construction workers' exposure to soil will be managed with the implementation of a Site-specific HASP.

Based on the identified COCs, the detected concentrations of COCs in Site soil, the previously established criteria for particulate monitoring on the east adjoining CMC Heartland site, we propose a Site-specific airborne particulate standard of 1.6 milligrams per cubic meter (mg/m^3) for dust that will be utilized to provide protection for human health during the course of IRAP implementation.

E. Proposed Response Actions

Based on the previous investigation data and the proposed interim use of the Site until redevelopment, the proposed response actions for soil are as follows:

1. Demolition of the existing warehouse building and associated foundations, taking care to utilize wet demolition methods in areas where soil contaminant concentrations exceed the Industrial SRVs. Note that portions of the easternmost wall and footings for the existing building will remain in place to retain soil from the existing greenway.

2. Import of clean backfill to balance Site in the vicinity of the existing boiler room basement.

3. Preparation of subgrade prior to placement of engineering controls – new asphalt/pavement section across the entire Site.

4. Short Term/Temporary engineering controls during demolition and construction of new pavement (dust control, storm water control, site access)

These actions are described in more detail in the following sections.

E.1. Project Management Organization

E.1.a. Site Owner

Name:	City of Minneapolis
Address:	350 S. Fifth Street, Room 223
	Minneapolis, MN 55415
Phone No.:	612.673.3387
Contact:	Mr. Bob Friddle

E.1.b. Environmental Project Manager

Name:	Braun Intertec Corporation
Address:	11001 Hampshire Avenue South
	Minneapolis, MN 55438
Phone No.:	952.995.2617
Contact:	Justin P. Michael, PG
Field Representative:	TBD

E.1.c. Analytical Laboratory

Name:	Pace Analytical Services
Address:	1700 Elm Street, Suite 200
	Minneapolis, MN 55414
Phone No.:	612.709.5046
Contact:	Mr. Bob Michaels

E.2. Soil Response Actions

The soil response actions will be directed, monitored and documented by Braun Intertec engineers and scientists with experience with Brownfield redevelopment projects. The work will be defined through engineered plans and specifications and contracting for the work with an earthwork contractor familiar, experienced and qualified for the work.

A general discussion of the contaminated soil response actions is presented below.

E.2.a. Demolition of the Warehouse Building and Associated Improvements.

The warehouse building and its utilities will be demolished in preparation for the construction of new asphalt/pavement section. During demolition and removal observations and field screening of soil encountered will be observed.

Any demolition debris or other miscellaneous debris that can be segregated from the surficial fill soil will be containerized and disposed of off-Site in accordance with local, state and federal requirements. The existing buried utilities at the Site will be disconnected and removed in the immediate vicinity of building penetrations.

E.2.b. PAH/Arsenic Impacted Fill Soil Management

Fill soil encountered during demolition will be segregated from building components to the extent possible and left in place, while subgrade concrete footings and utilities will be segregated from the soil prior to off-site recycling. The excavation contractor will use wet methods to mitigate dust generation during subgrade activities, and due to the elevated PAH and arsenic concentrations in soil, the workers involved in demolition and grading activities will follow the Site-specific HASP.

E.2.c. Soil Import for Backfill of Boiler Room Basement

Imported fill meeting the requirements of MPCA Guidance Document *Best Management Practices for the Off-Site Reuse of Unregulated Fill*, c-rem1-01, dated February 2012 will be used to backfill the former boiler room basement excavation to subgrade. Fill sources will be considered on a case-by-case basis and

evaluated for the potential presence of contaminants in the material. If the fill source is from a site with no environmental concerns, such as native pit run material or from a residential development with no underground storage tanks (USTs) or other environmental concerns, no analytical testing of the material will be conducted. Acceptance of fill from other sources with potential environmental concerns will be made on a case-by-case basis.

As part of the decision making process, the land-use history of the source facility will be evaluated, existing environmental reports will be reviewed, the geotechnical suitability of the material will be assessed, and existing analytical data will be reviewed. If additional analytical testing of the material is deemed warranted, samples will be collected at a frequency of at least one sample per 1,000 cubic yards of material. Analytical parameters will be determined based on historic use of the source facility and the Site contaminants of concern. Analytical results will be compared to the Residential SRVs and SLVs. Environmental monitoring of soil as they are loaded into trucks from the source facilities will be conducted on a case-by-case basis.

E.3. Engineering Controls

After preparation of subgrade, the new asphalt/pavement section will be constructed. Based on the existing soil analytical data, no additional sampling and analysis of on-Site soil is planned as part this IRAP.

E.4. Air Monitoring Program

Air monitoring will be implemented during all sub-grade removals associated with demolition and Site restoration in a manner consistent with methods and procedures used during environmental response actions completed at the east adjoining property, the former CMC Heartland site.

E.4.a. Dust Control and Air Monitoring

Perimeter air monitoring will be performed during subgrade activities to document that the dust control measures are successful at keeping dust associated with potentially impacted soil to levels below the site-specific dust standard. Dust monitoring will be accomplished with fixed dust sampling locations and/or hand-held dust monitoring meters. The dust monitoring will require sampling and reporting on a daily basis while sub-grade removals and restoration work is being performed.

E.4.a.1. Perimeter Monitoring

Six real-time particulate air monitors will be installed at locations along the perimeter of the Site. The monitoring locations will be spaced to provide reasonable coverage of potential predominant wind directions. Wind direction will be documented by environmental field personnel on a daily basis.

Each monitor will be capable of monitoring and recording the average, Short Term Exposure Limit (STEL) and maximum particulate concentration over the entire day. The monitor will be able to measure particulate concentrations in range from 0.001 to 500 mg/m^3. The monitors will be checked 3 times each day at staggered intervals by the environmental field personnel to ensure the 1.6 mg/m^3 standard has not been exceeded over any 8-hour period. No particulate samples are proposed for laboratory analysis. However, the perimeter monitor locations will be ready and capable of collecting airborne particulate filter samples for laboratory analysis if the site-specific standard is exceeded over any 8-hour period.

E.4.a.2. Exposure Standards

Based on the proposed 1.6 mg/m^3 airborne particulate standard, the estimated worst-case time-weighted-average (TWA) exposure over an 8-hour period is calculated below using the worst-case on-Site concentrations for arsenic in soil samples, 174 mg/kg.

Converting this concentration to unitless scaling factors yield, 1.74*10^{-4} for arsenic.

Arsenic: (1.6 mg/m^3)*(1.74*10^{-4}) = 2.78*10^{-4} mg/m^3; and

Each of these estimates are lower than their respective permissible exposure limits (PELs) established by The Occupational Safety and Health Administration (OSHA) (i.e. less than 0.01 mg/m^3 for arsenic) and the site-specific standard for arsenic concentrations in airborne particulate at the former CMC Heartland site. Based on these estimates, dust control at or lower than the proposed 1.6 mg/m^3 standard is protective of public health.

E.4.a.3. Air Monitoring Action Criteria

If the airborne contaminant concentrations at the perimeter of the Site exceed the exposure standards (e.g. PELs or STELs), one or more of the following actions shall be taken:

- Apply water to all accessible drive areas with a water truck.
- Spray water on exposed stockpiles or excavations.
- Cover exposed stockpiles or excavations with plastic or foam.
- Stop work.

E.4.b. Site Access

Site security will include implementing measures to prevent unauthorized access during the work and in non-working hours.

E.5. Excavation Monitoring and Sampling

The purpose of this section is to provide procedures for documenting sampling locations, analytes, and procedures for sampling and analysis of fill material to be imported to the Site, or if unexpected contamination is encountered that requires implementation of the CCP (see Section J).

E.5.a. Soil Screening

A Braun Intertec environmental technician with asbestos inspector credentials will be present during excavation and soil import activities. Soil will be observed for the presence of visual and olfactory indications of contamination. Direct olfactory evaluation of contaminated soil is not recommended for safety reasons, but incidental observations will be noted and acted on. The technician will follow MPCA-approved headspace methodology using a PID equipped with a 10.6-electron-volt lamp to monitor soil for the presence of organic vapors. Screening results will be documented.

The headspace procedure is used to field-screen organic vapor levels in soil. The procedure consists of half-filling a new quart-sized sealable bag with a soil sample. The bag is quickly closed and headspace development is allowed to proceed for at least 10 minutes. The bag is shaken vigorously for 15 seconds, both at the beginning and the end of headspace development. After headspace development, the PID probe is inserted into the bag to one-half the headspace depth. The highest reading observed on the PID is then recorded.

E.5.b. Documentation Sampling

Although not anticipated, if additional soil samples are collected during implementation of this IRAP, they will be collected from the base or sidewall of the excavation using clean, glass, stainless steel, Teflon, or other inert hand tools. Re-usable sample equipment will be decontaminated prior to first use and between sample collection. Decontamination procedures will include a vigorous wash in an Alconox solution, followed by a potable water rinse, followed by an acetone rinse or wipe, followed by a triple rinse with deionized water.

E.5.c. Sample Labeling and Handling

Sample bottle labels appropriate for the size and type of containers will be provided by the MDH certified laboratory analyzing the samples. All sample containers will be labeled prior to being filled. Each label will indicate at a minimum:

- Unique sample identification
- Date/time of sample collection
- Sampler's initials
- Required analyses
- Type of preservative

All labels will be completed in waterproof ink.

The field sampler will be responsible for the care and custody of the samples until they are transferred or properly dispatched to the laboratory. The samples will be shipped via courier or hand delivered to the laboratory. During transfer of custody, a properly completed chain-of-custody form will accompany samples.

E.6. Site Controls

The following controls will be necessary during IRAP activities to ensure the work is conducted in a manner that is protective to the health and safety of onsite workers and the general public. A HASP detailing personal health and safety measures will be provided to the MPCA and MDA prior to Site work. The earthwork contractor will also prepare a HASP that will address environmental concern, as well as those concerns normally associated with demolition, excavation and compaction.

Engineering controls will be implemented during the response actions to protect human health and the environment including Site-wide dust control, storm water control and Site access. These controls will be designed, planned and documented throughout the IRAP implementation to ensure thoroughness and as a technique to manage the construction.

E.6.a. Fugitive Dust

The primary COC exposure route of concern at the Site is inhalation of fugitive dust with elevated arsenic concentrations. Currently, the Site is covered with pavement or a building, which generally prevents the generation of arsenic-containing dust. When earthwork occurs, controls must be in place to minimize the generation of dust during work and non-work hours.

The contractor will provide the defined and specified practices to control fugitive dust generation during IRAP activities. The purpose is to reduce the risk of exposure to airborne materials that may contain elevated concentrations of the COCs and silica to workers and to the general public adjacent to the Site. These practices will be implemented when impacted soil are exposed at or below the ground surface. Records will be kept of the date, time, location and method of dust suppression.

Dust from demolition of below grade footings, grading, and soil consolidation actions will be controlled by applying water to the building materials or soil being worked. Visibly dry areas will be watered as they are observed. The amount of impacted soil that is exposed at the end of each work shift will be minimized, and those areas left exposed will be sprayed down prior to the end of each work shift. The amount of water used for dust suppression will be carefully controlled so that runoff does not occur. Records will be kept of the date, time, location and method of dust suppression.

E.6.b. Erosion Control

The Contractor will be responsible for implementing appropriate erosion controls in accordance with general permit requirements for storm water control at construction sites. This typically includes installation of silt fences at the project boundaries and limits of excavations to control erosion during work on-site. In addition, the Contractor will be responsible for providing rock construction entrances or performing street sweeping to prevent muddy or dusty conditions on city streets.

E.7. Site Access

Site security will include implementing measures to prevent unauthorized access during the work and in non-working hours.

E.8. Stockpile Management

During the course of the remedial excavation, stockpiles will be created for concrete, imported fill, pavement, and other demolition debris. The stockpiles will be maintained until the stockpiled material is transported off-Site or reused on Site. Such stockpiles, if chemically impacted, will be covered when not being added to or subtracted from.

Soil stockpiles will be located throughout the Site in areas adjacent to active work areas. Stockpiles will be inspected daily to ensure cover materials are sufficient and material is not being lost to erosion/runoff.

E.9. Contaminated Groundwater Management

Groundwater removed during excavation and/or foundation removals will be managed in accordance with City of Minneapolis and Metropolitan Council of Environmental Services (MCES) regulations. Monitoring, testing, and reporting will be required by MCES. Based on contaminant levels observed, pre-discharge treatments are not anticipated to be required.

F. Demolition Schedule

Current project schedule proposes to begin demolition in Winter 2020.

G. Construction Observation and Documentation Plan

The following sections describe the types of observations that will be made and the types of documentation that will be prepared during implementation of the response action elements.

G.1. Field Reports

The Environmental Project Manager shall complete and submit a progress summary report of construction activities upon request. If requested, the report shall include the following information:

- Contractor's activities including type and volumes of material excavated and/or replaced (as necessary).
- Weather conditions at the Site, including any precipitation and wind conditions.
- Contractor's efforts in reducing dusty conditions or activities to eliminate site runoff during wet conditions.
- Any unforeseen Site conditions encountered during the Work.
- Contractor's equipment that is on-site and being used.
- Health and safety status and issues.

G.2. Forms

The following forms that will be used to document construction activities.

- Daily Field Report
- Project Health and Safety Field Meeting Form
- Incident Report Form
- Air Monitoring Log

The Environmental Field Representative shall submit copies of the forms, records and logs to the Environmental Project Manager at the end of each week.

G.3. Plan Modification

Any proposed modifications to the IRAP will be communicated to the MPCA and MDA in a timely manner. The IRAP shall be modified only with written approval of the MPCA, MDA, Owner, and the Environmental Project Manager. The Environmental Project Manager shall promptly complete a document describing the plan modification whenever the MPCA, MDA, Environmental Project Manager, and Owner approve any changes made in the field that deviate from the IRAP. Copies of the modifications will be distributed to all project parties.

G.4. Scope Change

The Field Representative is required to inform the Environmental Project Manager, in a timely manner, of any possible changes in Scope. The Environmental Project Manager shall complete a request to perform additional engineering services when requested by the MPCA or Owner. The Contractor shall also be notified of any changes in Scope.

G.5. Photographs

The Field Representative will take photographs to document observations, problems, and/or deficiencies, or Work in progress. The photographs will be filed in a permanent protective file by the Field Representative.

The photographs for this project should include, at a minimum, the following:

- Pre-construction conditions.
- Excavation of soil.
- Stockpiling of soil.
- Any unforeseen site conditions encountered during construction.
- Any compaction and backfilling taking place in excavated areas.
- Grading operations.
- Dust and water control operations.
- Air monitoring.
- Temporary closure activities.

H. Documentation

The results of the work performed will be included in an IRAP Implementation Report (Report) that will be prepared upon completion of the project for submittal to the MPCA and MDA VIC programs' staff. The Report will include documentation from field and laboratory work, photographs, and will include scaled Site drawings illustrating the locations of sampling, excavations, soil removal, and placement of cover.

The Report will discuss the results of field activities in sufficient detail to document the work and demonstrate compliance with this IRAP.

I. Construction Contingency Plan

It is possible that unanticipated conditions may be encountered during the proposed work at the Site. Unanticipated conditions include, but are not limited to, USTs, wells, buried debris, buried asbestos-containing material, buried drums or other containers, and buried foundations from historical structures. In the event that unanticipated conditions are encountered, the MPCA and MDA will be notified and a course of action will be discussed with MPCA and MDA staff. If unanticipated USTs are encountered, an attempt will be made to identify the contents of the UST prior to making arrangements for UST removal as described above. If buried debris or building materials are encountered, these will be managed in accordance with procedures for disposal of demolition debris or solid waste. Buried drums, leaking containers, piping, sumps and impacted soil as a result of chemical releases will be reported to the MPCA and MDA and a contingency plan will be developed and implemented. The contingency plan will include the following elements: First Response, Communications, and Isolation.

Specifically, based upon the Site history and the conditions observe during the remedial investigations, Braun Intertec assumes that the following unanticipated conditions may be encountered during the proposed work at the site:

- Unknown buried utility lines
- Unknown wells
- Unidentified soil impacts

I.2. First Response

First Response includes assessing the situation and obtaining air monitoring data with a photoionization detector, oxygen detector, or combustible gas indicator in accordance with procedures in the Site-specific HASP. If conditions are safe, samples will be collected for field screening by visual observation and for jar headspace screening with a PID. This field screening data will be used to assess the hazard and develop a plan for response.

I.3. Communications

Communications include notifying the Braun Intertec Project Manager, who will notify the MPCA and MDA project managers of the unanticipated condition, the preliminary assessment of the hazard, and the expected response. The response may include collecting samples of wastes, soil, or water for chemical analysis or performing containerization or isolation activities prior to arranging for disposal.

I.4. Isolation

Isolation includes placing small containers or small quantities of soil into 55-gallon drums for containment, or backfilling the excavation if larger containers or large quantities of impacted materials are present. The anticipated response for large quantities of hazardous materials is the notification of an emergency response contractor to develop a plan to isolate and contain the hazardous materials until treatment or disposal options can be determined. At least five new 55-gallon drums will be available on Site to containerize hazardous materials if necessary. If buried debris such as concrete or wood is encountered; the material will be excavated and stockpiled. It is anticipated that buried debris can be disposed of in a landfill for demolition debris or municipal solid waste.

I.5. Emergency Response Contractors

The Contractor and/or excavation subcontractor will most likely perform excavation and trucking of materials on Site or off Site.

However, the following contractors may be utilized for response to emergencies or other situations at the Site:

Name of Contractor	**Type of Service**
Stevens Drilling and Environmental 6240 Highway 12 West Maple Plain, MN 55359 763.479.1797	Emergency Response Vacuum Truck Containerization of Liquid or Oily Wastes
Minnesota Petroleum 682 39th Ave NE Columbia Heights, MN 55421 763-780-5191	Vacuum Truck Containerization of Liquid or Oily Wastes
Pace Analytical Services 1700 Elm Street, Suite 200 Minneapolis, MN 55414 612.709.5046 Bob Michels	Analytical Services
Thein Well Service 11355 Highway 71 Northeast Spicer, MN 56288 320.847.3207	Well Abandonment and Replacement

The Field Representative will perform field sampling and air monitoring. Field equipment to be kept available on short notice will include a PID or equivalent, a portable dust meter, and containers and equipment for various air, water, and soil sampling which may be required. In addition, equipment and supplies as required for implementing the site-specific HASP will be available for use as needed.

J. Health and Safety Plan

The Field Representative is the Site safety officer and has a primary responsibility for ensuring Site safety and adherence to the Site HASP, which is available under separate cover. The HASP addresses, but is not limited to, the level/type of personal protective equipment (PPE) required during the phases of response action activities, procedures for and frequency of personal airborne dust monitoring. Both the HASP and contractors' HASPs will be available on Site at all times. All visitors to the Site must familiarize themselves with these HASPs and sign in and out when entering or leaving the Site.

In general, access to the fenced work areas will be limited to construction workers and project staff. The Field Representative, as site safety officer, will allow no entry to the work areas at the Site without their permission. The Field Representative will be responsible for maintaining the Daily Sign In/Out Log that will be kept in the Site field trailer. All visitors to the site must sign in and out. Access to construction areas will be limited to personnel following required health and safety protocols during periods of excavation, backfill, and compaction when exposures to potentially impacted soil could occur. The Field Representative shall enter no excavation that is greater than 3 feet in depth.

Construction workers who may be exposed to potentially impacted soil will be required to use protective equipment to include, but not be limited to the following:

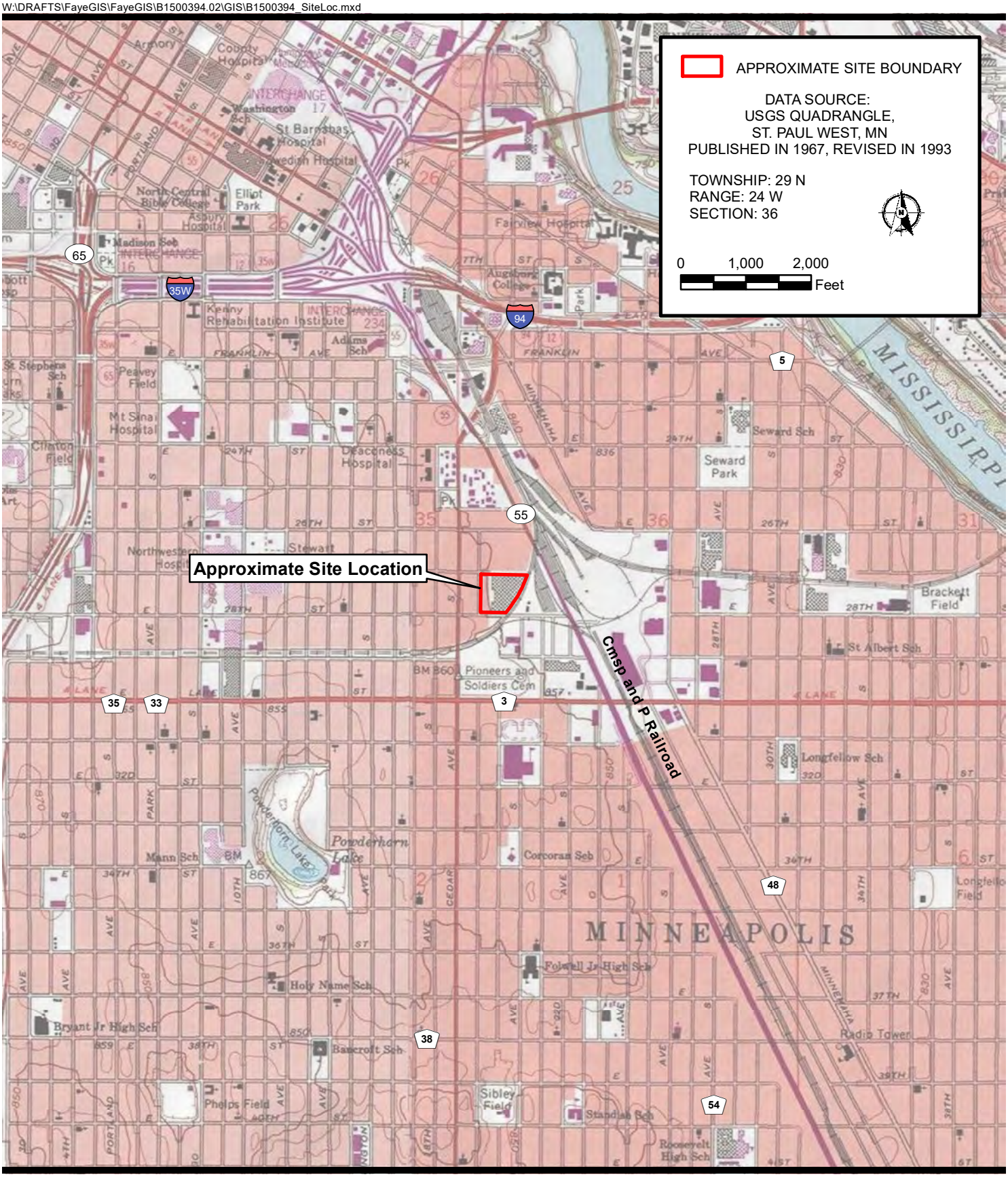
- Hard hat.
- Steel-toed boots.
- Orange vest when working around heavy equipment.
- Safety glasses.
- Long-sleeved clothing.
- Disposable gloves, boot covers, or coveralls may be used if circumstances dictate (i.e. rainy and muddy weather).

The following work practices will be implemented by workers when they may be exposed to potentially impacted soil:

- No eating, drinking, or smoking in or downwind of work areas.
- Wash hands prior to eating, drinking or smoking in designated areas outside the work zone.
- Decontaminate personnel (boot wash, hand wash) and equipment (pressure wash or steam clean) if exposed to impacted soil.

Figures

W:\DRAFTS\FayeGIS\FayeGIS\B1500394.02\GIS\B1500394_SiteLoc.mxd



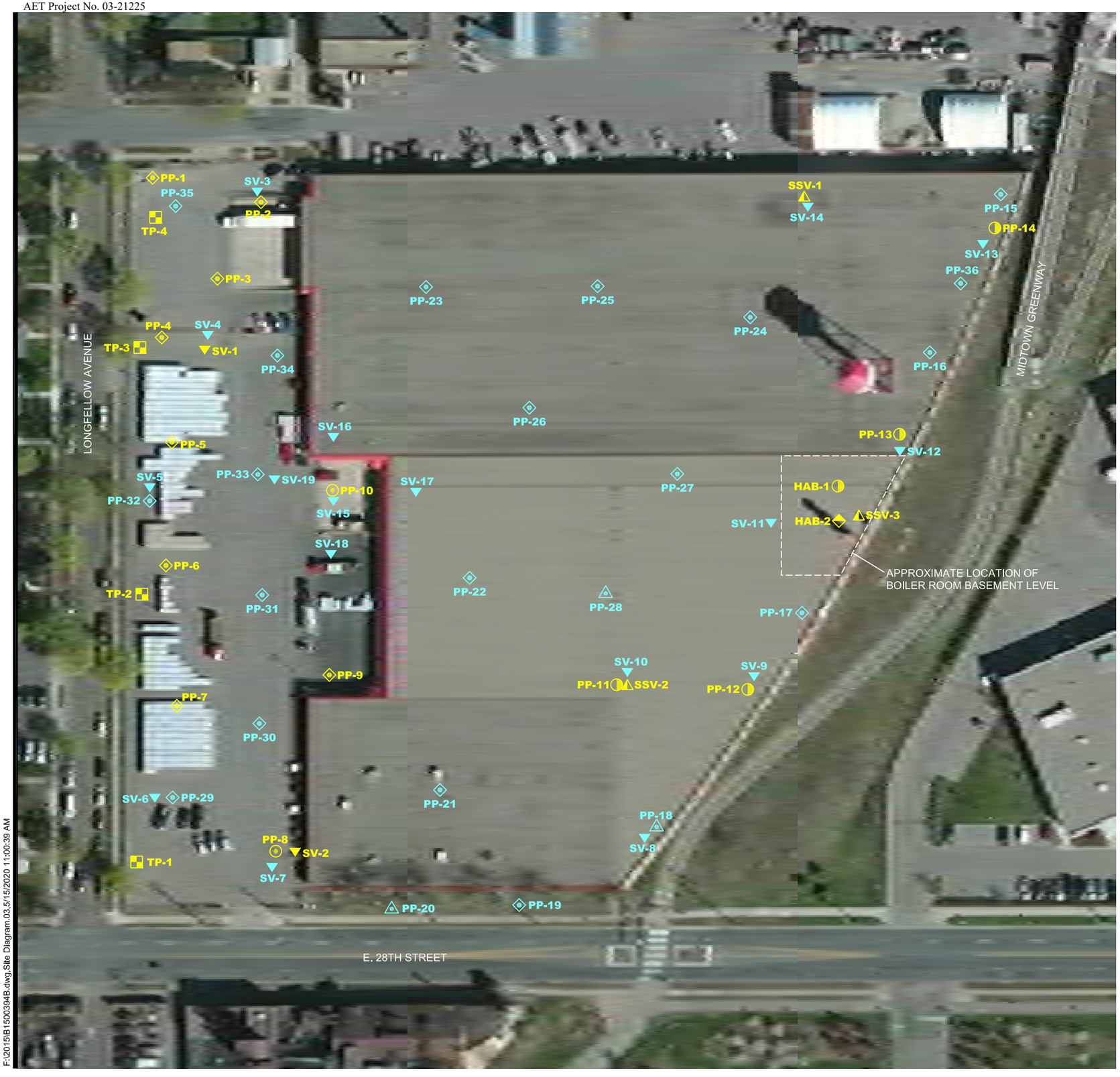
Sheet: 1 of 1

Fig. 1

Project No:	B1500394.02
Drawing No.	B1500394_SiteLoc
Scale:	1 in = 2,000 ft
Drawn By:	FER
Date Drawn:	1/16/15
Checked By:	JPM
Last Modified:	1/30/20

SITE LOCATION MAP
ROOF DEPOT SITE
1860 28TH STREET
2717 LONGFELLOW AVENUE
MINNEAPOLIS, MINNESOTA

BRAUN INTERTEC
11001 Hampshire Avenue So.
Minneapolis, MN 55438
PH. (952) 995-2000
FAX (952) 995-2020



▽ **SOIL VAPOR PROBE LOCATION (2020 ADDITIONAL INVESTIGATION)**

◬ **PUSH PROBE SOIL BORING LOCATION WITH TEMPORARY GROUNDWATER MONITORING WELL (2020 ADDITIONAL INVESTIGATION)**

◈ **PUSH PROBE SOIL BORING LOCATION (2020 ADDITIONAL INVESTIGATION)**

■ **TEST PIT LOCATION (APPROX. 5' x 10')**

◈ **PUSH PROBE SOIL BORING (2015 PHASE II ESA)**

◉ **PUSH PROBE SOIL BORING WITH GROUNDWATER SAMPLE (2015 PHASE II ESA)**

◑ **HAND AUGER SOIL BORING (2015 PHASE II ESA)**

◆ **HAND AUGER SOIL BORING WITH GROUNDWATER SAMPLE (2015 PHASE II ESA)**

▽ **SOIL VAPOR PROBE (2015 PHASE II ESA)**

◬ **SUB-SLAB SOIL VAPOR SAMPLE (2015 PHASE II ESA)**

N

40' 0 80'

SCALE: 1" = 80'

BRAUN INTERTEC
The Science You Build On.
11001 Hampshire Avenue S
Minneapolis, MN 55438
PH. (952) 995-2000
FAX (952) 995-2020

SITE DIAGRAM
ROOF DEPOT SITE
1860 28TH STREET AND 2717 LONGFELLOW AVENUE
MINNEAPOLIS, MINNESOTA

Project No:	B1500394.03
Drawing No:	B1500394B
Scale:	1" = 80'
Drawn By:	BJB
Date Drawn:	1/23/20
Checked By:	JPM
Last Modified:	5/15/20
Sheet: of	Fig: 2

F:\2015\B1500394B.dwg,Site Diagram,03,5/15/2020 11:00:39 AM

Appendix A

Previous Investigation Data – Soil Boring Logs & Analytical Laboratory Reports

Table 1
Summary of Soil Analytical Results
Roof Depot
Minneapolis, Minnesota
Project B1500394

Compound/Parameter	CAS No.	Sample Identifier												Residential Soil Reference Value (mg/kg)	Industrial Soil Reference Value (mg/kg)	Tier 1 Soil Leaching Value (mg/kg)
		PP-2 (2-4)	PP-3 (1-2)	PP-5 (2-4)	PP-6 (3-5)	PP-7 (3-5)	PP-8 (2)	PP-10 (2)	PP-11 (1-2)	PP-12 (1-2)	PP-13 (2-4)	PP-14 (2-3)	HA-2 (1-3)			
		3/25/15	3/25/15	3/26/15	3/26/15	3/26/15	3/25/15	3/25/15	3/26/15	3/26/15	3/26/15	3/26/15	3/25/15			
		10300830002	10300830003	10300830005	10300830006	10300830007	10300830008	10300830010	10300830011	10300830012	10300830013	10300830014	10300830016			
Volatile Organic Compounds (mg/kg)																
Benzene	71-43-2	<0.026	<0.022	<0.023	<0.024	<0.021	<0.024	<0.026	0.032	<0.021	<0.021	<0.023	<0.025	6	10	0.017
Ethylbenzene	100-41-4	<0.066	<0.054	<0.058	<0.059	<0.052	<0.059	<0.066	**0.062**	<0.053	<0.052	<0.058	<0.062	200	200	1
Naphthalene	91-20-3	<0.26	<0.22	<0.23	**0.40**	<0.21	<0.24	<0.26	**0.40**	**0.28**	<0.21	**0.26**	<0.25	10	28	4.5
Toluene	108-88-3	<0.066	<0.054	**0.069**	**0.069**	<0.052	<0.059	<0.066	**0.27**	**0.17**	**0.079**	**0.21**	<0.062	107	305	2.5
1,2,4-Trimethylbenzene	95-63-6	<0.066	<0.054	<0.058	<0.059	<0.052	<0.059	<0.066	**0.17**	**0.094**	<0.052	**0.10**	<0.062	8	25	2.7
1,3,5-Trimethylbenzene	108-67-8	<0.066	<0.054	<0.058	<0.059	<0.052	<0.059	<0.066	**0.066**	<0.053	<0.052	<0.058	<0.062	3	10	2.7
Xylene (Total)	1330-20-7	<0.20	<0.16	<0.17	<0.18	<0.16	<0.18	<0.20	**0.64**	**0.39**	**0.18**	**0.38**	<0.19	45	130	5.4
All other reported VOCs	NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NE	NE	NE
Semivolatile Organic Compounds (mg/kg)																
Acenaphthene	83-32-9	**0.86**	**0.19**	<0.011	**0.58**	**0.082**	<0.012	<0.012	<0.011	<0.010	<0.010	<0.010	<0.011	1,200	5,260	81
Acenaphthylene	208-96-8	**0.36**	**0.15**	**0.020**	**0.25**	**0.074**	<0.012	**0.029**	<0.011	<0.010	<0.010	<0.010	<0.011	NE	NE	NE
Anthracene	120-12-7	**3.3**	**0.53**	**0.019**	**1.6**	**0.22**	<0.012	**0.028**	**0.034**	**0.014**	**0.017**	**0.024**	<0.011	7,880	45,400	1,300
Benzo(a)anthracene	56-55-3	**8.3**	**0.47**	**0.046**	**1.8**	**0.62**	<0.012	**0.045**	**0.20**	**0.057**	**0.082**	**0.085**	<0.011	cPAH	cPAH	cPAH
Benzo(a)pyrene	50-32-8	**8.1**	**0.52**	**0.063**	**1.6**	**0.94**	<0.012	**0.076**	**0.90**	**0.12**	**0.12**	**0.13**	<0.011	cPAH	cPAH	1.4
Benzo(b)fluoranthene	205-99-2	**9.2**	**0.69**	**0.078**	**1.8**	**1.0**	<0.012	**0.11**	**0.94**	**0.14**	**0.17**	**0.13**	<0.011	cPAH	cPAH	cPAH
Benzo(g,h,i)perylene	191-24-2	**4.4**	**0.24**	**0.052**	**0.72**	**0.59**	<0.012	**0.096**	**1.7**	**0.28**	**0.16**	**0.14**	<0.011	NE	NE	NE
Benzo(k)fluoranthene	207-08-9	**3.6**	**0.27**	**0.027**	**0.76**	**0.43**	<0.012	**0.039**	**0.32**	**0.048**	**0.049**	**0.044**	<0.011	cPAH	cPAH	cPAH
Chrysene	218-01-9	**8.4**	**0.59**	**0.057**	**1.8**	**0.71**	<0.012	**0.064**	**0.43**	**0.090**	**0.11**	**0.15**	<0.011	cPAH	cPAH	cPAH
Fluoranthene	206-44-0	**16.2**	**1.2**	**0.062**	**3.7**	**0.94**	<0.012	**0.070**	**0.16**	**0.080**	**0.13**	**0.084**	<0.011	1,080	6,800	670
Fluorene	86-73-7	**0.81**	**0.35**	<0.011	**1.1**	**0.062**	<0.012	<0.012	**0.011**	<0.010	<0.010	<0.010	<0.011	850	4,120	110
Indeno(1,2,3-cd)pyrene	193-39-5	**3.8**	**0.20**	**0.041**	**0.72**	**0.51**	<0.012	**0.065**	**1.1**	**0.16**	**0.11**	**0.064**	<0.011	cPAH	cPAH	cPAH
Naphthalene	91-20-3	**0.10**	**0.056**	<0.011	**0.44**	<0.054	<0.012	<0.012	**0.084**	**0.024**	**0.020**	**0.031**	<0.011	10	28	4.5
Phenanthrene	85-01-8	**11.5**	**1.7**	**0.035**	**4.2**	**0.71**	<0.012	**0.048**	**0.34**	**0.090**	**0.079**	**0.16**	<0.011	NE	NE	NE
Pyrene	129-00-0	**21.4**	**1.3**	**0.082**	**4.2**	**1.2**	<0.012	**0.085**	**0.26**	**0.11**	**0.15**	**0.15**	<0.011	890	5,800	440
BaP Equivalent**	NA	**10.7**	**0.69**	**0.083**	**2.1**	**1.2**	<0.012	**0.10**	**1.2**	**0.16**	**0.17**	**0.16**	<0.011	2	3	NE
Total Petroleum Hydrocarbons (mg/kg)																
Gasoline Range Organics	NA	**14.9**	<11.1	<11.4	<11.2	<11.0	<11.5	<11.3	**14.4**	<12.0	<11.6	<10.7	<12.1	NE	NE	NE
WDRO C10-C28	NA	**68.5** [4]	**212** [4]	<8.6	**169** [4]	**112** [4]	<9.5	**46.1** [4]	**64.0** [4]	**19.2** [4]	**11.2** [4]	**39.1** [4]	<9.0	NE	NE	NE
Metals (mg/kg)																
Antimony	7440-36-0	<0.52 [2]	<0.45	<0.45	<0.44	**0.53**	<0.49	<0.55	<0.49	<0.47	<0.48	<0.47	<0.45	12	100	5.4
Arsenic	7440-38-2	**3.0**	**1.6**	**3.1**	**1.1**	**2.6**	**2.2**	**2.4**	**2.8**	**1.5**	**1.6**	**1.9**	**3.3**	9	20	5.8
Barium	7440-39-3	**65.4** [1]	**26.4**	**25.3**	**31.2**	**58.2**	**94.6**	**43.5**	**25.5**	**18.9**	**26.3**	**23.3**	**7.6**	1,100	18,000	1,700
Beryllium	7440-41-7	**0.36** [3]	<0.18	<0.18	<0.18	<0.20	**0.30**	<0.22	<0.20	<0.19	<0.19	<0.19	<0.18	55	230	2.7
Cadmium	7440-43-9	**0.17**	**0.085**	**0.15**	<0.071	**0.72**	<0.079	**1.3**	**0.096**	<0.076	**0.078**	<0.075	<0.071	25	200	8.8
Chromium	7440-47-3	**8.4** [1]	**4.4**	**4.1**	**3.8**	**7.5**	**7.9**	**12.7**	**4.0**	**2.4**	**3.4**	**4.0**	**1.9**	87 [c]	650 [c]	36 [c]
Copper	7440-50-8	**7.0**	**4.8**	**3.2**	**1.8**	**14.6**	**4.7**	**18.6**	**7.5**	**3.5**	**4.0**	**4.5**	**2.0**	100	9,000	700
Lead	7439-92-1	**16.2** [1]	**11.0**	**16.2**	**2.5**	**99.4**	**5.0**	**24.4**	**8.7**	**3.2**	**3.4**	**3.8**	**0.66**	300	700	2,700
Mercury	7439-97-6	**0.022**	**0.024**	**0.030**	<0.020	**0.069**	<0.023	**0.025**	**0.022**	<0.020	<0.021	<0.021	<0.019	0.5	1.5	3.3
Nickel	7440-02-0	**9.6** [1]	**5.3**	**3.9**	**3.6**	**9.9**	**8.3**	**10.3**	**5.5**	**3.3**	**6.4**	**5.4**	**3.0**	560	2,500	180
Selenium	7782-49-2	<0.52 [3]	<0.45	<0.45	<0.44	<0.51	<0.49	<0.55	<0.49	<0.47	<0.48	<0.47	<0.45	160	1,300	2.6
Silver	7440-22-4	<0.52	<0.45	<0.45	<0.44	<0.51	<0.49	<0.55	<0.49	<0.47	<0.48	<0.47	<0.45	160	1,300	7.9
Thallium	7440-28-0	**0.11**	<0.090	<0.091	<0.088	<0.10	<0.099	<0.11	<0.099	<0.095	<0.096	<0.093	<0.089	3	21	0.89
Zinc	7440-66-6	**60.6** [1]	**27.2**	**40.7**	**13.7**	**90.6**	**27.1**	**84.6**	**21.2**	**9.6**	**12.8**	**14.7**	<4.5	8,700	75,000	3,000
Other Parameters																
Percent Moisture (%)	NA	**13.1**	**5.0**	**10.2**	**12.2**	**7.2**	**14.8**	**13.9**	**5.1**	**4.8**	**4.5**	**4.4**	**9.6**	NE	NE	NE

Notes:

[1] [M6] Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.

[2] [M6] Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution. - [R1] RPD value was outside control limits.

[3] [R1] RPD value was outside control limits.

[4] [T6] High boiling point hydrocarbons are present in the sample.

mg/kg = Milligrams per kilogram.

< = Less than the reporting limit

---- = Not analyzed or calculated for this parameter

NE = Not Established

ND = Not detected above reporting limit

SRV - Soil Reference Value Established by the Minnesota Pollution Control Agency; 1999, revised 2009

SLV - Soil Leaching Value Established by the Minnesota Pollution Control Agency; 1999, revised 2005

cPAH = Individual criteria not established. Included in BaP equivalent calculation.

** = Benzo(a)pyrene (BaP) equivalent is calculated based on the concentration and weighted toxicity of carcinogenic PAHs (cPAH); Minnesota Pollution

[c] = Criteria for hexavalent chromium.

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Table 2
Summary of Groundwater Analytical Results
Roof Depot
Minneapolis, Minnesota
Project B1500394

Compound/Parameter	CAS No.	Sample Identifier			Drinking Water Criteria (ug/L)
		PP-8W	PP-10W	HA-W	
		3/25/15 10:20	3/25/15 12:30	3/26/15 11:00	
		10300830018	10300830019	10300830020	
Volatile Organic Compounds (ug/L)					
Trichloroethene	79-01-6	<0.40	**1.0**	<0.40	5
All other reported VOCs	NE	ND	ND	ND	NE
Total Petroleum Hydrocarbons (ug/L)					
WDRO C10-C28	NA	<116	<110	<116	NE
Metals (ug/L)					
Antimony, Dissolved	7440-36-0	**13.7**	<0.50	**6.9**	6
Arsenic, Dissolved	7440-38-2	**348**	**10.8**	**737**	10
Barium, Dissolved	7440-39-3	**66.5**	**74.6**	**39.9**	2,000
Beryllium, Dissolved	7440-41-7	<0.20	<0.20	<0.20	0.08
Cadmium, Dissolved	7440-43-9	<0.080	<0.080	<0.080	4
Chromium, Dissolved	7440-47-3	<0.50	<0.50	**0.90**	100 [c]
Copper, Dissolved	7440-50-8	<1.0	<1.0	<1.0	1,000
Lead, Dissolved	7439-92-1	<0.10	<0.10	<0.10	NE
Mercury, Dissolved	7439-97-6	<0.20	<0.20	<0.20	2
Nickel, Dissolved	7440-02-0	**10.8**	**11.0**	**0.50**	NE
Selenium, Dissolved	7782-49-2	**2.5**	**0.62**	**2.7**	30
Silver, Dissolved	7440-22-4	<0.50	<0.50	<0.50	30
Thallium, Dissolved	7440-28-0	<0.10	<0.10	<0.10	0.6
Zinc, Dissolved	7440-66-6	<5.0	<5.0	<5.0	2,000

Notes:

ug/L = Micrograms per liter.

<RL = Less than the reporting limit

---- = Not analyzed or calculated for this parameter

NE = Not Established

ND = Not detected above reporting limit

Drinking Water Criteria from Minnesota Pollution Control Agency Risk Based Site Evaluation Process Groundwater Guidance Document, Revised 08/2010.

Minnesota Drinking Water Criteria based on following hierarchy of MDH recommended values: Health Risk Levels, Health Based Values, Risk Assessment Advise, Maximum Contaminant Level and Unit Risk Level or Lifetime Health Advisory Level.

[c] = Criteria for hexavalent chromium.

BRAUN INTERTEC

Table 3
Soil Analytical Results
Roof Depot Site
Minneapolis, Minnesota
Project B1500394.00

Compound/Parameter	CAS No.	Sample Identifier and Date Collected					Industrial Soil Reference Value (SRV) (mg/kg)	Screening Soil Leaching Value (SLV) (mg/kg)
		TP-1 (2')	TP-2 (1')	TP-4 (1.5')	TP-3 (5')	Trip (MeOH)		
		12/8/2015	12/8/2015	12/8/2015	12/8/2015	12/8/2015		
		10332647001	10332647002	10332647003	10332647004	10332647005		
Volatile Organic Compounds (VOCs) (mg/kg)								
Naphthalene	91-20-3	<0.55	**1.1**	<0.54	<0.60	<0.50	28	4.5
Toluene	108-88-3	<0.055	**0.072**	**0.065**	<0.060	<0.050	305	2.5
1,2,4-Trimethylbenzene	95-63-6	<0.055	**0.12**	**0.095**	<0.060	**0.087**	25	2.7
All other reported VOCs	---	<RL	<RL	<RL	<RL	<RL	---	---
Polycyclic-Aromatic Hydrocarbons (PAHs) (mg/kg)								
Acenaphthene	83-32-9	<0.011 [4]	**10.8**	**1**	<0.012	---	5,260	81
Acenaphthylene	208-96-8	**0.021**	**17.4**	**0.34**	**0.17**	---	NE	NE
Anthracene	120-12-7	**0.046** [3]	**70**	**5.4**	**0.098**	---	45,400	1,300
Benzo(a)anthracene	56-55-3	**0.19** [3]	**159**	**10.3**	**0.59**	---	cPAH	cPAH
Benzo(b)fluoranthene	205-99-2	**0.22** [3]	**148**	**10.2**	**0.71**	---	cPAH	cPAH
Benzo(k)fluoranthene	207-08-9	**0.29** [2]	**185**	**12.2**	**0.91**	---	cPAH	cPAH
Benzo(a)pyrene	50-32-8	**0.16** [2]	**78.9**	**7**	**0.51**	---	cPAH	cPAH
Benzo(g,h,i)perylene	191-24-2	**0.12** [3]	**73.3**	**5.6**	**0.37**	---	NE	NE
Chrysene	218-01-9	**0.22** [3]	**149**	**10.6**	**0.51**	---	cPAH	cPAH
Dibenz(a,h)anthracene	53-70-3	**0.051** [2]	**32.3**	**1.9**	**0.13**	---	cPAH	cPAH
Fluoranthene	206-44-0	**0.36** [3]	**358**	**29.5**	**1.1**	---	6,800	670
Fluorene	86-73-7	<0.011	**19.2**	**1.8**	<0.012	---	4,120	110
Indeno(1,2,3-cd)pyrene	193-39-5	**0.13** [2]	**80.1**	**6.3**	**0.46**	---	cPAH	cPAH
Naphthalene	91-20-3	<0.011	**2.2**	**0.22**	<0.012	---	28	4.5
Phenanthrene	85-01-8	**0.13** [3]	**157**	**18.9**	**0.13**	---	NE	NE
Pyrene	129-00-0	**0.29** [3]	**263**	**22**	**0.93**	---	5,800	440
All other reported PAHs	---	<RL	<RL	<RL	<RL	<RL	---	---
BaP Equivalent[c]	None	**0.3**	**155.7**	**12.1**	**0.9**	**0.0**	3	1.4
Metals (mg/kg)								
Arsenic, Total	7440-38-2	**1.3**	<7.2 [1]	**4.8**	**10.4**	---	20	5.8
Barium, Total	7440-39-3	**36.6**	**32.8**	**77.2**	**250**	---	18,000	1,700
Cadmium, Total	7440-43-9	<0.13	**0.72**	**0.30**	**1.3**	---	200	8.8
Chromium, Total[d]	7440-47-3	**4.9**	**9.9**	**7.7**	**13.7**	---	100,000/650[d]	1,000,000,000/36[d]
Lead, Total	7439-92-1	**8.0**	**19.9**	**44.5**	**641**	---	700	2,700
Mercury, Total	7439-97-6	<0.021	**0.076**	**0.068**	**0.21**	---	1.5	3.3
Selenium, Total	7782-49-2	<0.89	<7.2 [1]	<0.83	<0.91	---	1,300	2.6
Silver, Total	7440-22-4	<0.44	<0.36	<0.42	<0.45	---	1,300	7.9
Other Parameters (mg/kg)								
Diesel Range Organics (DRO)	None	<11.5	<10.5	<11.5	<12.0	---	NE	NE
Gasoline Range Organics (GRO)	None	<9.3	**2940** [5]	**81.6** [5]	**20.2** [5]	---	NE	NE

Notes

[1] [D3] Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

[2] [M1] Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

[3] [M1] Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery. - [R1] RPD value was outside control limits.

[4] [R1] RPD value was outside control limits.

[5] [T6] High boiling point hydrocarbons are present in the sample.

SRVs and SLVs updated 12/19/14.

mg/kg = Milligrams per kilogram.

< = Not detected at or above the laboratory reporting limit indicated.

---- = Not analyzed or calculated for this parameter.

RL = Reporting limits for other parameters that are not listed individually in this table because their concentrations were below reporting limits provided in the laboratory report.

NE = Regulatory limit not established for this parameter.

cPAH = Individual regulatory limit not established for this carcinogenic PAH; included in BaP equivalent calculation.

[a] = Regulatory limit for combination of cis- and trans-1,3-Dichloropropene.

[b] = Regulatory limit for combination of m, p, and o-xylenes.

[c] = Benzo(a)pyrene (BaP) equivalent is calculated based on the concentration and weighted toxicity of cPAHs; Minnesota Pollution Control Agency; 2009. If no cPAHs were detected above reasonable laboratory reporting limits the BaP equivalent is reported as 0 mg/kg per MPCA Remediation Division Policy; June 2011.

[d] = Reported result is total chromium, regulatory limit for chromium III and chromium VI are provided.

Exceeds Industrial SRV
Exceeds Screening SLV

BRAUN INTERTEC

Table 2
Soil Analytical Results - Total Arsenic Only
Roof Depot
Minneapolis, Minnesota
Project B1500394.03

Compound/Parameter	CAS No.	Industrial Soil Reference Value (SRV) (mg/kg)	Screening Soil Leaching Value (SLV) (mg/kg)	Sample Identifier and Date Collected								
				PP-15 (0-2)	PP-15 (5-5.5)	PP-15 (7.5-8)	PP-15 (9.5-10)	PP-16 (0-2)	PP-16 (2-4)	PP-16 (5-5.5)	PP-16 (7.5-8)	PP-16 (9.5-10)
				04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020
Metals (mg/kg)												
Arsenic, Total	7440-38-2	20	5.8	**1.6**	**2.2**	**2.3**	**1.6**	**3.3**	**174**	**2.4**	**3.6**	**1.9**
Toxicity Characteristic Leaching Procedure (TCLP) - Metals (mg		**Regulatory Level**										
Arsenic	7440-38-2	5.0		---	---	---	---	---	*Pending*	---	---	---

Notes

Minnesota Pollution Control Agency (MPCA) SRVs updated June 2009 and SLVs updated June 2013.

mg/kg = Milligrams per kilogram.

< = Not detected at or above the laboratory reporting limit indicated.

--- = Not analyzed or calculated for this parameter or not applicable.

RL = Reporting limits for other parameters that are not listed individually in this table because their concentrations were below reporting limits provided in the laboratory report.

NE = Regulatory limit not established for this parameter.

Regulatory Level = Maximum Concentration of Contaminants for the Toxicity Characteristic from 40 CFR 261.24.

mg/L = Milligrams per liter.

Exceeds Industrial SRV
Exceeds Screening SLV

BRAUN INTERTEC

Table 2
Soil Analytical Results - Total Arsenic Only
Roof Depot
Minneapolis, Minnesota
Project B1500394.03

Compound/Parameter	CAS No.	Industrial Soil Reference Value (SRV) (mg/kg)	Screening Soil Leaching Value (SLV) (mg/kg)	Sample Identifier and Date Collected									
				PP-17 (0-2)	PP-17 (2-4)	PP-17 (5-5.5)	PP-17 (7.5-8)	PP-17 (9.5-10)	PP-18 (0-2)	PP-18 (2-4)	PP-18 (5-5.5)	PP-18 (7.5-8)	PP-18 (9.5-10)
				04/20/2020	04/20/2020	04/20/2020	04/20/2020	04/20/2020	04/20/2020	04/20/2020	04/20/2020	04/20/2020	04/20/2020
Metals (mg/kg)													
Arsenic, Total	7440-38-2	20	5.8	**5.0**	**3.8**	**2.7**	**1.4**	**1.4**	**2.8**	**2.2**	**1.3**	**1.5**	**1.6**
Toxicity Characteristic Leaching Procedure (TCLP) - Metals (mg		**Regulatory Level**											
Arsenic	7440-38-2	5.0		---	---	---	---	---	---	---	---	---	---

Notes

Minnesota Pollution Control Agency (MPCA) SRVs updated June 2009 and SLVs updated June 2013.

mg/kg = Milligrams per kilogram.

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RL = Reporting limits for other parameters that are not listed individually in this table because their concentrations

NE = Regulatory limit not established for this parameter.

Regulatory Level = Maximum Concentration of Contaminants for the Toxicity Characteristic from 40 CFR 261.24.

mg/L = Milligrams per liter.

Exceeds Industrial SRV
Exceeds Screening SLV

BRAUN INTERTEC

Table 2
Soil Analytical Results - Total Arsenic Only
Roof Depot
Minneapolis, Minnesota
Project B1500394.03

Compound/Parameter	CAS No.	Industrial Soil Reference Value (SRV) (mg/kg)	Screening Soil Leaching Value (SLV) (mg/kg)	Sample Identifier and Date Collected									
				PP-19 (0-2)	PP-19 (2-4)	PP-19 (5-5.5)	PP-19 (7.5-8)	PP-19 (9.5-10)	PP-20 (0-2)	PP-20 (2-4)	PP-20 (5-5.5)	PP-20 (7.5-8)	PP-20 (9.5-10)
				04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020
Metals (mg/kg)													
Arsenic, Total	7440-38-2	20	5.8	**4.1**	**2.7**	**2.3**	**1.5**	**1.8**	**15.5**	**2.4**	**3.1**	**1.7**	**1.2**
Toxicity Characteristic Leaching Procedure (TCLP) - Metals (mg		**Regulatory Level**											
Arsenic	7440-38-2	5.0		---	---	---	---	---	---	---	---	---	---

Notes

Minnesota Pollution Control Agency (MPCA) SRVs updated June 2009 and SLVs updated June 2013.

mg/kg = Milligrams per kilogram.

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Regulatory Level = Maximum Concentration of Contaminants for the Toxicity Characteristic from 40 CFR 261.24.

mg/L = Milligrams per liter.

Exceeds Industrial SRV
Exceeds Screening SLV

BRAUN INTERTEC

Table 2
Soil Analytical Results - Total Arsenic Only
Roof Depot
Minneapolis, Minnesota
Project B1500394.03

Compound/Parameter	CAS No.	Industrial Soil Reference Value (SRV) (mg/kg)	Screening Soil Leaching Value (SLV) (mg/kg)	Sample Identifier and Date Collected									
				PP-21 (0-2)	PP-21 (2-4)	PP-21 (5-5.5)	PP-21 (7.5-8)	PP-21 (9.5-10)	PP-22 (0-2)	PP-22 (2-4)	PP-22 (5-5.5)	PP-22 (7.5-8)	PP-22 (9.5-10)
				04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020
Metals (mg/kg)													
Arsenic, Total	7440-38-2	20	5.8	**2.6**	**2.0**	**1.9**	**1.4**	<0.96	**2.9**	**1.9**	**1.4**	**1.5**	**1.5**
Toxicity Characteristic Leaching Procedure (TCLP) - Metals (mg		**Regulatory Level**											
Arsenic	7440-38-2	5.0		---	---	---	---	---	---	---	---	---	---

Notes

Minnesota Pollution Control Agency (MPCA) SRVs updated June 2009 and SLVs updated June 2013.

mg/kg = Milligrams per kilogram.

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RL = Reporting limits for other parameters that are not listed individually in this table because their concentrations

NE = Regulatory limit not established for this parameter.

Regulatory Level = Maximum Concentration of Contaminants for the Toxicity Characteristic from 40 CFR 261.24.

mg/L = Milligrams per liter.

Exceeds Industrial SRV
Exceeds Screening SLV

BRAUN INTERTEC

Table 2
Soil Analytical Results - Total Arsenic Only
Roof Depot
Minneapolis, Minnesota
Project B1500394.03

Compound/Parameter	CAS No.	Industrial Soil Reference Value (SRV) (mg/kg)	Screening Soil Leaching Value (SLV) (mg/kg)	Sample Identifier and Date Collected									
				PP-23 (0-2)	PP-23 (2-4)	PP-23 (5-5.5)	PP-23 (7.5-8)	PP-23 (9.5-10)	PP-24 (0-2)	PP-24 (2-4)	PP-24 (5-5.5)	PP-24 (7.5-8)	PP-24 (9.5-10)
				04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020
Metals (mg/kg)													
Arsenic, Total	7440-38-2	20	5.8	**3.0**	**1.6**	**3.0**	**1.5**	**1.2**	**3.2**	**12.1**	**1.6**	**2.4**	**1.5**
Toxicity Characteristic Leaching Procedure (TCLP) - Metals (mg		**Regulatory Level**											
Arsenic	7440-38-2	5.0		---	---	---	---	---	---	---	---	---	---

Notes

Minnesota Pollution Control Agency (MPCA) SRVs updated June 2009 and SLVs updated June 2013.

mg/kg = Milligrams per kilogram.

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Regulatory Level = Maximum Concentration of Contaminants for the Toxicity Characteristic from 40 CFR 261.24.

mg/L = Milligrams per liter.

Exceeds Industrial SRV
Exceeds Screening SLV

BRAUN INTERTEC

Table 2
Soil Analytical Results - Total Arsenic Only
Roof Depot
Minneapolis, Minnesota
Project B1500394.03

Compound/Parameter	CAS No.	Industrial Soil Reference Value (SRV) (mg/kg)	Screening Soil Leaching Value (SLV) (mg/kg)	Sample Identifier and Date Collected									
				PP-25 (0-2)	PP-25 (2-4)	PP-25 (5-5.5)	PP-25 (7.5-8)	PP-25 (9.5-10)	PP-26 (0-2)	PP-26 (2-4)	PP-26 (5-5.5)	PP-26 (7.5-8)	PP-26 (9.5-10)
				04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020
Metals (mg/kg)													
Arsenic, Total	7440-38-2	20	5.8	**2.1**	**1.5**	**1.8**	**1.4**	**1.3**	**17.4**	**1.8**	**4.7**	**2.6**	**1.4**
Toxicity Characteristic Leaching Procedure (TCLP) - Metals (mg		**Regulatory Level**											
Arsenic	7440-38-2	5.0		---	---	---	---	---	---	---	---	---	---

Notes

Minnesota Pollution Control Agency (MPCA) SRVs updated June 2009 and SLVs updated June 2013.

mg/kg = Milligrams per kilogram.

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Regulatory Level = Maximum Concentration of Contaminants for the Toxicity Characteristic from 40 CFR 261.24.

mg/L = Milligrams per liter.

Exceeds Industrial SRV
Exceeds Screening SLV

BRAUN INTERTEC

Table 2
Soil Analytical Results - Total Arsenic Only
Roof Depot
Minneapolis, Minnesota
Project B1500394.03

Compound/Parameter	CAS No.	Industrial Soil Reference Value (SRV) (mg/kg)	Screening Soil Leaching Value (SLV) (mg/kg)	Sample Identifier and Date Collected									
				PP-27 (0-2)	PP-27 (2-4)	PP-27 (5-5.5)	PP-27 (7.5-8)	PP-27 (9.5-10)	PP-28 (0-2)	PP-28 (2-4)	PP-28 (5-5.5)	PP-28 (7.5-8)	PP-28 (9.5-10)
				04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/21/2020	04/20/2020	04/20/2020	04/20/2020	04/20/2020	04/20/2020
Metals (mg/kg)													
Arsenic, Total	7440-38-2	20	5.8	**8.1**	**2.5**	**1.6**	**1.4**	**1.3**	**5.3**	**3.7**	**1.4**	**1.5**	**1.3**
Toxicity Characteristic Leaching Procedure (TCLP) - Metals (mg		**Regulatory Level**											
Arsenic	7440-38-2	5.0		---	---	---	---	---	---	---	---	---	---

Notes

Minnesota Pollution Control Agency (MPCA) SRVs updated June 2009 and SLVs updated June 2013.

mg/kg = Milligrams per kilogram.

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mg/L = Milligrams per liter.

Exceeds Industrial SRV
Exceeds Screening SLV

BRAUN INTERTEC

Table 2
Soil Analytical Results - Total Arsenic Only
Roof Depot
Minneapolis, Minnesota
Project B1500394.03

Compound/Parameter	CAS No.	Industrial Soil Reference Value (SRV) (mg/kg)	Screening Soil Leaching Value (SLV) (mg/kg)	Sample Identifier and Date Collected									
				PP-29 (0-2)	PP-29 (2-4)	PP-29 (5-5.5)	PP-29 (7.5-8)	PP-29 (9.5-10)	PP-30 (0-2)	PP-30 (2-4)	PP-30 (5-5.5)	PP-30 (7.5-8)	PP-30 (9.5-10)
				04/22/2020	04/22/2020	04/22/2020	04/22/2020	04/22/2020	04/22/2020	04/22/2020	04/22/2020	04/22/2020	04/22/2020
Metals (mg/kg)													
Arsenic, Total	7440-38-2	20	5.8	**14.1**	**1.8**	**3.9**	**1.7**	**1.4**	**3.4**	**1.6**	**2.0**	**1.1**	**2.1**
Toxicity Characteristic Leaching Procedure (TCLP) - Metals (mg		**Regulatory Level**											
Arsenic	7440-38-2	5.0		---	---	---	---	---	---	---	---	---	---

Notes

Minnesota Pollution Control Agency (MPCA) SRVs updated June 2009 and SLVs updated June 2013.

mg/kg = Milligrams per kilogram.

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RL = Reporting limits for other parameters that are not listed individually in this table because their concentrations

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Regulatory Level = Maximum Concentration of Contaminants for the Toxicity Characteristic from 40 CFR 261.24.

mg/L = Milligrams per liter.

Exceeds Industrial SRV
Exceeds Screening SLV

BRAUN INTERTEC

Table 2
Soil Analytical Results - Total Arsenic Only
Roof Depot
Minneapolis, Minnesota
Project B1500394.03

Compound/Parameter	CAS No.	Industrial Soil Reference Value (SRV) (mg/kg)	Screening Soil Leaching Value (SLV) (mg/kg)	Sample Identifier and Date Collected									
				PP-31 (0-2)	PP-31 (2-4)	PP-31 (5-5.5)	PP-31 (7.5-8)	PP-31 (9.5-10)	PP-32 (0-2)	PP-32 (2-4)	PP-32 (5-5.5)	PP-32 (7.5-8)	PP-32 (9.5-10)
				04/22/2020	04/22/2020	04/22/2020	04/22/2020	04/22/2020	04/22/2020	04/22/2020	04/22/2020	04/22/2020	04/22/2020
Metals (mg/kg)													
Arsenic, Total	7440-38-2	20	5.8	**2.3**	**1.6**	**1.4**	**1.8**	**1.2**	**6.9**	**2.1**	**1.5**	**1.9**	**1.4**
Toxicity Characteristic Leaching Procedure (TCLP) - Metals (mg		**Regulatory Level**											
Arsenic	7440-38-2	5.0		---	---	---	---	---	---	---	---	---	---

Notes

Minnesota Pollution Control Agency (MPCA) SRVs updated June 2009 and SLVs updated June 2013.

mg/kg = Milligrams per kilogram.

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Regulatory Level = Maximum Concentration of Contaminants for the Toxicity Characteristic from 40 CFR 261.24.

mg/L = Milligrams per liter.

Exceeds Industrial SRV
Exceeds Screening SLV

BRAUN INTERTEC

Table 2
Soil Analytical Results - Total Arsenic Only
Roof Depot
Minneapolis, Minnesota
Project B1500394.03

Compound/Parameter	CAS No.	Industrial Soil Reference Value (SRV) (mg/kg)	Screening Soil Leaching Value (SLV) (mg/kg)	Sample Identifier and Date Collected									
				PP-33 (0-2)	PP-33 (2-4)	PP-33 (5-5.5)	PP-33 (7.5-8)	PP-33 (9.5-10)	PP-34 (0-2)	PP-34 (2-4)	PP-34 (5-5.5)	PP-34 (7.5-8)	PP-34 (9.5-10)
				04/22/2020	04/22/2020	04/22/2020	04/22/2020	04/22/2020	04/22/2020	04/22/2020	04/22/2020	04/22/2020	04/22/2020
Metals (mg/kg)													
Arsenic, Total	7440-38-2	20	5.8	**3.3**	**1.9**	**2.1**	**1.3**	**1.8**	**2.5**	**1.2**	**2.8**	**1.2**	**1.5**
Toxicity Characteristic Leaching Procedure (TCLP) - Metals (mg		**Regulatory Level**											
Arsenic	7440-38-2	5.0		---	---	---	---	---	---	---	---	---	---

Notes

Minnesota Pollution Control Agency (MPCA) SRVs updated June 2009 and SLVs updated June 2013.

mg/kg = Milligrams per kilogram.

< = Not detected at or above the laboratory reporting limit indicated.

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RL = Reporting limits for other parameters that are not listed individually in this table because their concentrations

NE = Regulatory limit not established for this parameter.

Regulatory Level = Maximum Concentration of Contaminants for the Toxicity Characteristic from 40 CFR 261.24.

mg/L = Milligrams per liter.

Exceeds Industrial SRV
Exceeds Screening SLV

BRAUN INTERTEC

Table 2
Soil Analytical Results - Total Arsenic Only
Roof Depot
Minneapolis, Minnesota
Project B1500394.03

Compound/Parameter	CAS No.	Industrial Soil Reference Value (SRV) (mg/kg)	Screening Soil Leaching Value (SLV) (mg/kg)	Sample Identifier and Date Collected									
				PP-35 (0-2)	PP-35 (2-4)	PP-35 (5-5.5)	PP-35 (7.5-8)	PP-35 (9.5-10)	PP-36 (0-2)	PP-36 (2-4)	PP-36 (5-5.5)	PP-36 (7.5-8)	PP-36 (9.5-10)
				04/22/2020	04/22/2020	04/22/2020	04/22/2020	04/22/2020	04/22/2020	04/22/2020	04/22/2020	04/22/2020	04/22/2020
Metals (mg/kg)													
Arsenic, Total	7440-38-2	20	5.8	**3.5**	**6.0**	**1.5**	**1.3**	**2.3**	**3.5**	**24.2**	**1.6**	**2.7**	**3.4**
Toxicity Characteristic Leaching Procedure (TCLP) - Metals (mg		**Regulatory Level**											
Arsenic	7440-38-2	5.0		---	---	---	---	---	---	---	---	---	---

Notes

Minnesota Pollution Control Agency (MPCA) SRVs updated June 2009 and SLVs updated June 2013.

mg/kg = Milligrams per kilogram.

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NE = Regulatory limit not established for this parameter.

Regulatory Level = Maximum Concentration of Contaminants for the Toxicity Characteristic from 40 CFR 261.24.

mg/L = Milligrams per liter.

Exceeds Industrial SRV
Exceeds Screening SLV

BRAUN INTERTEC

Table 2
Soil Analytical Results - Total Arsenic Only
Roof Depot
Minneapolis, Minnesota
Project B1500394.03

Compound/Parameter	CAS No.	Industrial Soil Reference Value (SRV) (mg/kg)	Screening Soil Leaching Value (SLV) (mg/kg)	Sample Identifier and Date Collected				
				Dup-1	Dup-2	Dup-3	Dup-4	Dup-5
				04/20/2020	04/21/2020	04/21/2020	04/21/2020	04/22/2020
Metals (mg/kg)								
Arsenic, Total	7440-38-2	20	5.8	**2.5**	**2.6**	**3.5**	**2.4**	**3.8**
Toxicity Characteristic Leaching Procedure (TCLP) - Metals (mg		**Regulatory Level**						
Arsenic	7440-38-2	5.0		---	---	---	---	---

Notes

Minnesota Pollution Control Agency (MPCA) SRVs updated June 2009 and SLVs updated June 2013.

mg/kg = Milligrams per kilogram.

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NE = Regulatory limit not established for this parameter.

Regulatory Level = Maximum Concentration of Contaminants for the Toxicity Characteristic from 40 CFR 261.24.

mg/L = Milligrams per liter.

Exceeds Industrial SRV
Exceeds Screening SLV

BRAUN INTERTEC

Table 3
Soil Analytical Results - Additional Parameters
Roof Depot
Minneapolis, Minnesota
Project B1500394.03

Compound/Parameter	CAS No.	Industrial Soil Reference Value (SRV) (mg/kg)	Screening Soil Leaching Value (SLV) (mg/kg)	Sample Identifier and Date Collected
				PP-24 (2-4)
				04/21/2020
Volatile Organic Compounds (VOCs) (mg/kg)				
Benzene	71-43-2	10	0.017	**0.309**
n-Butylbenzene	104-51-8	92	NE	**0.0608**
Ethylbenzene	100-41-4	200	1.0	**0.179**
Naphthalene	91-20-3	28	4.5	**1.38** [3]
n-Propylbenzene	103-65-1	93	NE	**0.0702**
Toluene	108-88-3	305	2.5	**2.01**
1,2,4-Trimethylbenzene	95-63-6	25	2.7	**0.613**
1,3,5-Trimethylbenzene	108-67-8	10	2.7	**0.176**
Xylenes, total	1330-20-7	130[b]	5.4[b]	**2.92**
All other reported VOCs	---	---	---	<RL
Polycyclic Aromatic Hydrocarbons (PAHs) (mg/kg)				
Benz(a)anthracene	56-55-3	cPAH	cPAH	**0.0365**
Benzo(b)fluoranthene	205-99-2	cPAH	cPAH	**0.058**
Benzo(k)fluoranthene	207-08-9	cPAH	cPAH	**0.0171**
Benzo(a)pyrene	50-32-8	cPAH	cPAH	**0.0328**
Benzo(g,h,i)perylene	191-24-2	NE	NE	**0.0417**
Chrysene	218-01-9	cPAH	cPAH	**0.0692**
Fluoranthene	206-44-0	6,800	670	**0.0649**
Indeno(1,2,3-cd)pyrene	193-39-5	cPAH	cPAH	**0.0263**
Naphthalene	91-20-3	28	4.5	**0.0757**
Phenanthrene	85-01-8	NE	NE	**0.121**
Pyrene	129-00-0	5,800	440	**0.0597**
All other reported PAHs	---	---	---	<RL
BaP Equivalent[c]	---	23	1.4	**0.047**
Metals (mg/kg)				
Barium, Total	7440-39-3	18,000	1,700	**300**
Cadmium, Total	7440-43-9	200	8.8	**0.15**
Chromium, Total[e]	7440-47-3	100,000/650[e]	1,000,000,000/36[e]	**5.9**
Lead, Total	7439-92-1	700	2,700	**11.0**
Mercury, Total	7439-97-6	1.5	3.3	<0.020
Selenium, Total	7782-49-2	1,300	2.6	<0.96
Silver, Total	7440-22-4	1,300	7.9	<0.48
Other Parameters (mg/kg)				
Diesel Range Organics (DRO)	---	NE[f]	NE[f]	**23.3** [4]
Gasoline Range Organics (GRO)	---	NE[f]	NE[f]	**15.2** [1]
Toxicity Characteristic Leaching Procedure (TCLP) - Metals (mg		**Regulatory Level**		
Arsenic	7440-38-2	5.0		

Notes

Minnesota Pollution Control Agency (MPCA) SRVs updated June 2009 and SLVs updated June 2013.

mg/kg = Milligrams per kilogram.

< = Not detected at or above the laboratory reporting limit indicated.

--- = Not analyzed or calculated for this parameter or not applicable.

RL = Reporting limits for other parameters that are not listed individually in this table because their concentrations were below reporting limits provided in the laboratory report.

NE = Regulatory limit not established for this parameter.

cPAH = Individual regulatory limit not established for this carcinogenic PAH; included in BaP equivalent calculation.

[b] = Regulatory limit for combination of m-, p-, and o-xylenes.

[c] = Benzo(a)pyrene (BaP) equivalent is calculated based on the concentration and weighted toxicity of cPAHs; MPCA; 2009. If no cPAHs were detected above reasonable laboratory reporting limits the BaP equivalent is reported as 0 mg/kg per MPCA Remediation Division Policy; June 2011.

[e] = Reported result is total chromium, regulatory limit for chromium III and chromium VI are provided.

[f] = DRO/GRO concentrations greater than 100 mg/kg are not suitable for reuse as unregulated fill per MPCA Guidance Document c-rem1-01 "Best Management Practices for the Off-Site Reuse of Unregulated Fill" (February 2012).

Regulatory Level = Maximum Concentration of Contaminants for the Toxicity Characteristic from 40 CFR 261.24.

mg/L = Milligrams per liter.

[1] [G+] Late peaks present outside the GRO window.

[2] [L1] Analyte recovery in the laboratory control sample (LCS) was above QC limits. Results for this analyte in associated samples may be biased high.

[3] [M1] Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

[4] [T6] High boiling point hydrocarbons are present in the sample. - [T7] Low boiling point hydrocarbons are present in the sample.

Exceeds Industrial SRV
Exceeds Screening SLV
Exceeds 100 mg/kg for DRO/GRO

BRAUN INTERTEC

Table 4
Groundwater Analytical Results
Roof Depot
Minneapolis, Minnesota
Project B1500394.03

Compound/Parameter	CAS No.	Sample Identifier, Depth to Groundwater, and Date Collected			Drinking Water Criteria (µg/L)	Source-Date
		PP-18	PP-20	PP-28		
		29.8'	27.8'	32.9'		
		04/20/2020	04/21/2020	04/20/2020		
Volatile Organic Compounds (VOCs) (µg/L)						
All reported VOCs	---	<RL	<RL	<RL	---	---
Metals (µg/L)						
Arsenic, Dissolved	7440-38-2	**805**	**97.8**	**29.0**	10	MCL

Notes

Drinking Water Criteria = The most conservative value for chronic or cancer exposures provided from the following sources including the Minnesota Department of Health (MDH) Health Risk Limit (HRL), MDH Health Based Value (HBV), MDH Risk Assessment Advice (RAA) or Maximum Contaminant Level (MCL). The date of promulgation is provided, if available. Values updated April 2019.

µg/L = Micrograms per liter.

< = Not detected at or above the laboratory reporting limit indicated.

--- = Not analyzed or calculated for this parameter or not applicable.

RL = Reporting limits for other parameters that are not listed individually in this table because their concentrations were below reporting limits provided in the laboratory report.

NE = Regulatory limit not established for this parameter.

Exceeds Drinking Water Criteria

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LOG OF BORING

Braun Project B1500394
LIMITED SITE INVESTIGATION
Roof Depot Site
1860 28th Street
Minneapolis, Minnesota

BORING: **HAB-1**

LOCATION: See attached sketch.

DRILLER: J. Friederichs | METHOD: Hand Auger | DATE: **3/25/15** | SCALE: **1" = 4'**

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	pid ppm	Tests or Notes
0.0						
0.7	PAV	About 7 inches of concrete.				
	FILL	FILL: Silty Sand, with a little Gravel, dark brown, moist.			0.4	
2.0						
	SP	POORLY GRADED SAND, fine- to medium-grained, with a little Gravel, brown, moist to wet.			0.3	
4.0						
		END OF HAND AUGER BORING @ 4 FEET.			0.1	
		Water not observed in hand auger boring.				
		Borehole filled with soil cuttings.				
		Soil sample collected from 1 to 3 feet for analytical testing.				

(See Descriptive Terminology sheet for explanation of abbreviations)

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LOG OF BORING

Braun Project B1500394
LIMITED SITE INVESTIGATION
Roof Depot Site
1860 28th Street
Minneapolis, Minnesota

BORING: **HAB-2**

LOCATION: See attached sketch.

DRILLER: J. Friederichs | METHOD: Hand Auger | DATE: **3/25/15** | SCALE: **1" = 4'**

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	pid ppm	Tests or Notes
0.0						
0.7	CONC	8 inches of concrete.				
	FILL	FILL: Silty Sand, fine- to medium-grained, trace Gravel, dark brown, moist.			0.1	
					0.2	
3.0						
	SP	POORLY GRADED SAND, fine- to medium-grained, with a little Gravel, brown, wet to waterbearing.		▼	0.0	
4.0		(Glacial Outwash)			0.4	
		END OF HAND AUGER @ 4 FEET.				
		Water observed at 4 feet while drilling.				
		Boring then backfilled with soil cuttings.				
		Soil sample collected from 1 to 3 feet for analytical testing.				

(See Descriptive Terminology sheet for explanation of abbreviations)

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BRAUN INTERTEC

LOG OF BORING

Braun Project B1500394
LIMITED SITE INVESTIGATION
Roof Depot Site
1860 28th Street
Minneapolis, Minnesota

BORING: **PP-1**

LOCATION: See attached sketch.

DRILLER: SDE | METHOD: Push Probe | DATE: **3/25/15** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	Tests or Notes
0.0					
0.8	PAV	2 inches of bituminous over about 8 inches of aggregate base.			
	FILL	FILL: Silty Sand, with a little Gravel, trace of clinker, dark brown, wet.	0.2		
			0.3		
4.0					
	CL	SANDY LEAN CLAY, dark brown, wet.	0.4		
6.0					
	SM	SILTY SAND, fine-grained, dark brown, moist. (Alluvium)	0.2		
8.0					
	SP	POORLY GRADED SAND, fine- to medium-grained, with a little Gravel, brown, moist. (Glacial Outwash)	0.1		
			0.1		
15.0					
		END OF PUSH PROBE @ 15 FEET.			
		Water not observed while probing.			
		Boring then grouted.			
		Sample soil collected from 2 to 4 feet for analytical testing.			

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BRAUN INTERTEC

LOG OF BORING

Braun Project B1500394
LIMITED SITE INVESTIGATION
Roof Depot Site
1860 28th Street
Minneapolis, Minnesota

BORING: **PP-2**

LOCATION: See attached sketch.

DRILLER: SDE | METHOD: Push Probe | DATE: **3/25/15** | SCALE: **1" = 4'**

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	pid ppm	Tests or Notes
0.0	PAV	2 inches of bituminous over 6 inches of concrete over 3 inches of aggregate base.				
0.9	FILL	FILL: Silty Sand, fine- to medium-grained, trace Gravel, dark brown, moist.			0.4	
4.0	SP	POORLY GRADED SAND, fine- to medium-grained, with a little Gravel, brown, moist. (Glacial Outwash)			0.3 0.2 0.3 0.3	
15.0		END OF PUSH PROBE @ 15 FEET. Water not observed while probing. Boring then grouted. Soil sample collected from 2 to 4 feet.			0.2	

(See Descriptive Terminology sheet for explanation of abbreviations)

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BRAUN INTERTEC

LOG OF BORING

Braun Project B1500394
LIMITED SITE INVESTIGATION
Roof Depot Site
1860 28th Street
Minneapolis, Minnesota

BORING: **PP-3**

LOCATION: See attached sketch.

DRILLER: SDE | METHOD: Push Probe | DATE: **3/25/15** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	pid ppm	Tests or Notes
0.0						
0.7	PAV	3 inches of bituminous over 4 inches of aggregate base.				
	FILL	FILL: Silty Sand, fine- to medium-grained, trace Gravel, dark brown, moist.			0.5	
2.5	SP	POORLY GRADED SAND, fine- to medium-grained, trace Gravel, moist.			0.4	
					0.3	
					0.4	
					0.2	
					0.1	
					0.1	
15.0					0.1	
		END OF PUSH PROBE @ 15 FEET.				
		Water not observed while probing.				
		Boring then grouted.				
		Soil sample collected from 1 to 2 feet for analytical testing.				

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LOG OF BORING

Braun Project B1500394
LIMITED SITE INVESTIGATION
Roof Depot Site
1860 28th Street
Minneapolis, Minnesota

BORING: **PP-4**

LOCATION: See attached sketch.

DRILLER: SDE | METHOD: Push Probe | DATE: **3/25/15** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	pid ppm	Tests or Notes
0.0						
0.7	PAV	3 inches of bituminous over 4 inches of aggregate base.				
	FILL	FILL: Poorly Graded Sand with Silt, fine- to medium-grained, trace Gravel, dark brown, moist.			0.6	
					0.3	
					0.1	
6.0						
	SP	POORLY GRADED SAND, fine- to medium-grained, trace Gravel, brown, moist. (Glacial Outwash)			0.2	
					0.1	
					0.1	
					0.1	
15.0					0.2	
		END OF PUSH PROBE @ 15 FEET.				
		Water not observed while probing.				
		Boring then grouted.				
		Soil sample collected from 2 to 4 feet for analytical testing.				

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BRAUN INTERTEC

LOG OF BORING

Braun Project B1500394
LIMITED SITE INVESTIGATION
Roof Depot Site
1860 28th Street
Minneapolis, Minnesota

BORING: **PP-5**

LOCATION: See attached sketch.

DRILLER: SDE | METHOD: Push Probe | DATE: **3/26/15** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	pid ppm	Tests or Notes
0.0						
0.7	PAV	3 inches of bituminous over 4 inches of Class 5.				
	FILL	FILL: Silty Sand, fine- to medium-grained, trace Gravel, black, moist.			0.3	
4.0					0.5	
	SP	POORLY GRADED SAND, fine- to medium-grained, trace Gravel, brown, moist. (Glacial Outwash)			0.3	
					0.1	
					0.2	
					0.2	
					0.1	
15.0					0.1	
		END OF PUSH PROBE @ 15 FEET.				
		Water not observed while probing.				
		Boring then grouted.				
		Soil sample collected from 2 to 4 feet for analytical testing.				

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LOG OF BORING

Braun Project B1500394
LIMITED SITE INVESTIGATION
Roof Depot Site
1860 28th Street
Minneapolis, Minnesota

BORING: **PP-6**

LOCATION: See attached sketch.

DRILLER: SDE | METHOD: Push Probe | DATE: **3/26/15** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	Tests or Notes
0.0					
0.5	PAV	3 inches of bituminous over 3 inches of aggregate base.			
	FILL	FILL: Silty sand, fine- to medium-grained, trace Gravel, dark brown, moist.	0.7		
			0.4		
5.5			0.4		
	SP-SM	POORLY GRADED SAND with SILT, fine-grained, dark brown, moist. (Alluvium)	0.2		
8.0					
	SP	POORLY GRADED SAND, fine- to medium-grained, trace Gravel, brown, moist. (Glacial Outwash)	0.2		
			0.2		
			0.1		
15.0			0.1		
		END OF PUSH PROBE @ 15 FEET.			
		Water not observed while drilling.			
		Boring then grouted.			
		Soil sample collected from 3 to 5 feet for analytical testing.			

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LOG OF BORING

Braun Project B1500394
LIMITED SITE INVESTIGATION
Roof Depot Site
1860 28th Street
Minneapolis, Minnesota

BORING: **PP-7**

LOCATION: See attached sketch.

DRILLER: SDE | METHOD: Push Probe | DATE: **3/26/15** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	pid ppm	Tests or Notes
0.0						
0.3	PAV	3 inches of bituminous.				
	FILL	FILL: Silty Sand, fine- to medium-grained, with some Gravel, trace of concrete, black, moist.			0.3	
					0.2	
6.0					0.1	
	SP-SM	POORLY GRADED SAND with SILT, trace Gravel, brown, moist. (Glacial Outwash)			0.1	
					0.1	
					0.2	
					0.1	
15.0					0.1	
		END OF PUSH PROBE @ 15 FEET.				
		Water not observed while probing.				
		Boring then grouted.				
		Soil sample collected from 3 to 5 feet for analytical testing.				

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BRAUN INTERTEC

LOG OF BORING

Braun Project B1500394
LIMITED SITE INVESTIGATION
Roof Depot Site
1860 28th Street
Minneapolis, Minnesota

BORING: **PP-8**

LOCATION: See attached sketch.

DRILLER: SDE | METHOD: Push Probe | DATE: **3/25/15** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	pid ppm	Tests or Notes
0.0						
0.5	PAV	3 inches of bituminous over 3 inches of aggregate base.				
	FILL	FILL: Silty Sand, fine- to medium-grained, with a little Gravel, dark brown, moist.			0.4	
3.0					0.2	
3.5	SC	CLAYEY SAND, trace Gravel, brown, wet. (Alluvium)				
	SP	POORLY GRADED SAND, fine-grained, trace Gravel, dark brown, moist. (Alluvium)			0.1	
8.0					0.2	
	SP	POORLY GRADED SAND, fine- to medium-grained, with a little Gravel, brown, moist to 31 feet then waterbearing. (Glacial Outwash)			0.1	
					0.2	
					0.2	
					0.1	
					0.1	
					0.2	
					0.2	
					0.1	

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LOG OF BORING

Braun Project B1500394
LIMITED SITE INVESTIGATION
Roof Depot Site
1860 28th Street
Minneapolis, Minnesota

BORING: **PP-8 (cont.)**
LOCATION: See attached sketch.

DRILLER: SDE | METHOD: Push Probe | DATE: **3/25/15** | SCALE: **1" = 4'**

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	pid ppm	Tests or Notes
32.0		POORLY GRADED SAND, fine- to medium-grained, with a little Gravel, brown, moist to 31 feet then waterbearing. (Glacial Outwash) *(continued)*				
34.0		END OF PUSH PROBE @ 34 FEET.				
		Temporary well set in probehole.				
		Water initially at 32 feet but rose to 31 feet in temporary well.				
		Water sample collected and temporary well removed.				
		Boring then grouted.				
		Soil sample collected at 2 feet for analytical testing.				

(See Descriptive Terminology sheet for explanation of abbreviations)

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BRAUN INTERTEC

LOG OF BORING

Braun Project B1500394
LIMITED SITE INVESTIGATION
Roof Depot Site
1860 28th Street
Minneapolis, Minnesota

BORING: **PP-9**

LOCATION: See attached sketch.

DRILLER: SDE | METHOD: Push Probe | DATE: **3/26/15** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	pid ppm	Tests or Notes
0.0	PAV	3 inches of bituminous over 6 inches of concrete.				
0.8	FILL	FILL: Silty Sand, trace Gravel, dark brown, moist.			0.3	
3.0	SP	POORLY GRADED SAND, fine- to medium-grained, trace Gravel, brown, moist.			0.2	
					0.1	
					0.1	
					0.1	
		A layer of coarse Sand was encountered at 13 feet.			0.2	
15.0		END OF PUSH PROBE @ 15 FEET.			0.2	
		Water not observed while probing.				
		Boring then grouted.				

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BRAUN INTERTEC

LOG OF BORING

Braun Project B1500394
LIMITED SITE INVESTIGATION
Roof Depot Site
1860 28th Street
Minneapolis, Minnesota

BORING: **PP-10**

LOCATION: See attached sketch.

DRILLER: SDE | METHOD: Push Probe | DATE: **3/25/15** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	pid ppm	Tests or Notes
0.0	FILL	FILL: Silty Sand, fine- to coarse-grained, with some Gravel, dark brown, moist.			0.5	
2.0	SP-SM	POORLY GRADED SAND with SILT, fine- to medium-grained, trace Gravel, brown, moist. (Alluvium)			0.2	
5.0	SP	POORLY GRADED SAND, fine- to medium-grained, trace Gravel, brown, moist to 26 1/2 feet then waterbearing. (Glacial Outwash)			0.1	
					0.1	
					0.1	
					0.1	
					0.2	
					0.2	
					0.0	
32.0					0.0	

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BRAUN INTERTEC

LOG OF BORING

Braun Project B1500394
LIMITED SITE INVESTIGATION
Roof Depot Site
1860 28th Street
Minneapolis, Minnesota

BORING: **PP-10 (cont.)**
LOCATION: See attached sketch.

DRILLER: SDE | METHOD: Push Probe | DATE: **3/25/15** | SCALE: **1" = 4'**

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	pid ppm	Tests or Notes
32.0		PUSH PROBE OBSTRUCTED @ 32 FEET, POSSIBLY IN GRAVEL.				
		Temporary well installed in probehole.				
		Water initially at 27 feet but rose to 26 1/2 feet.				
		Water sample collected and temporary well removed.				
		Boring then grouted.				
		Soil sample collected at 2 feet for analytical testing.				

(See Descriptive Terminology sheet for explanation of abbreviations)

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BRAUN INTERTEC

LOG OF BORING

Braun Project B1500394
LIMITED SITE INVESTIGATION
Roof Depot Site
1860 28th Street
Minneapolis, Minnesota

BORING: **PP-11**

LOCATION: See attached sketch.

DRILLER: SDE | METHOD: Hand Auger | DATE: **3/26/15** | SCALE: **1" = 4'**

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	pid ppm	Tests or Notes
0.0						
0.7	CONC	7 inches of concrete.				
2.0	FILL	FILL: Silty Sand with Silt, trace Gravel, coal and clinker, black, moist.			0.2	
		HAND AUGER BORING OBSTRUCTED @ 2 FEET.				
		Water not observed while drilling.				
		Boring then backfilled with soil cuttings.				
		Soil sample collected from 1 to 2 feet for analytical testing.				

(See Descriptive Terminology sheet for explanation of abbreviations)

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BRAUN INTERTEC

LOG OF BORING

Braun Project B1500394
LIMITED SITE INVESTIGATION
Roof Depot Site
1860 28th Street
Minneapolis, Minnesota

BORING: **PP-12**

LOCATION: See attached sketch.

DRILLER: SDE | METHOD: Hand Auger | DATE: **3/26/15** | SCALE: **1" = 4'**

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	pid ppm	Tests or Notes
0.0						
0.7	CONC	7 inches of concrete.				
2.0	FILL	FILL: Poorly Graded Sand with Silt, with some Gravel, dark brown, moist.			0.3	
		HAND AUGER BORING OBSTRUCTED @ 2 FEET.				
		Water not observed while drilling.				
		Soil sample collected from 1 to 2 feet for analytical testing.				

(See Descriptive Terminology sheet for explanation of abbreviations)

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BRAUN INTERTEC

LOG OF BORING

Braun Project B1500394
LIMITED SITE INVESTIGATION
Roof Depot Site
1860 28th Street
Minneapolis, Minnesota

BORING: **PP-13**

LOCATION: See attached sketch.

DRILLER: SDE | METHOD: Hand Auger | DATE: **3/26/15** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	pid ppm	Tests or Notes
0.0						
0.7	CONC	8 inches of concrete.				
	FILL	FILL: Poorly Graded Sand with Silt, fine- to medium-grained, trace Gravel, dark brown, moist.			0.2	
		with some coal fragments at 2 1/2 to 3 feet,			0.1	
4.0		END OF HAND AUGER @ 4 FEET.				
		Water not observed while drilling.				
		Soil sample collected from 2 to 4 feet for analytical testing.				

LOG OF BORING N:\GINT\PROJECTS\AX PROJECTS\2015\00394.GPJ BRAUN_V8_CURRENT.GDT 4/3/15 16:42

BRAUN INTERTEC

LOG OF BORING

Braun Project B1500394
LIMITED SITE INVESTIGATION
Roof Depot Site
1860 28th Street
Minneapolis, Minnesota

BORING: **PP-14**

LOCATION: See attached sketch.

DRILLER: SDE | METHOD: Hand Auger | DATE: **3/26/15** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	pid ppm	Tests or Notes
0.0						
0.7	CONC	8 inches of concrete.				
	FILL	FILL: Poorly Graded Sand with Silt, fine- to medium-grained, trace Gravel, trace clinker, moist.			0.2	
3.0					0.3	
		END OF HAND AUGER BORING @ 3 FEET. Soil sample collected from 2 to 3 feet for analytical testing.				

LOG OF BORING N:\GINT\PROJECTS\AX PROJECTS\2015\00394.GPJ BRAUN_V8_CURRENT.GDT 4/3/15 16:42

BRAUN INTERTEC

LOG OF TEST PIT

Braun Project B1500394.00
TEST PIT INVESTIGATION
1860 25th Street & 2717 Longfellow Avenue
Minneapolis, Minnesota

TEST PIT: **TP-1**

LOCATION: See attached sketch.

DRILLER: Rachel Contracting | METHOD: Backhoe | DATE: **12/8/15** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	PID PPM	Tests or Notes
0.0						
0.5	PAV	4 inches of bituminous over 2 inches of aggregate base.				
	FILL	FILL: Silty Sand, fine-grained, trace Gravel, concrete, slate, and metal, black, moist.			0.0	Note: Soil sample collected at 2 feet for analytical testing.
4.0	SM	SILTY SAND, fine-grained, dark brown to brown, moist. (Alluvium)			0.0	
					0.0	
8.0					0.0	
	SP-SM	POORLY GRADED SAND with SILT, fine- to medium-grained, little Gravel, brown, moist. (Glacial Outwash)				
10.0					0.0	
		BOTTOM OF TEST PIT.				
		Water not observed in test pit.				
		Test pit backfilled with excavated soil.				

LOG OF TEST PIT N:\GINT\PROJECTS\AX PROJECTS\2015\00394.00.GPJ BRAUN_V8_CURRENT.GDT 12/29/15 10:56

BRAUN INTERTEC

LOG OF TEST PIT

Braun Project B1500394.00
TEST PIT INVESTIGATION
1860 25th Street & 2717 Longfellow Avenue
Minneapolis, Minnesota

TEST PIT: **TP-2**

LOCATION: See attached sketch.

DRILLER: Rachel | METHOD: Backhoe | DATE: **12/8/15** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	PID PPM	Tests or Notes
0.0						
0.5	PAV	4 inches of bituminous over 2 inches of aggregate base.				Note: Soil sample collected at 1 foot for analytical testing.
	FILL	FILL: Silty Sand, fine-grained, with concrete, brick, ash, slag, porcelain and metal, black, moist.			0.0	
4.0						
	SM	SILTY SAND, fine-grained, dark brown to brown, moist to wet. (Alluvium)			0.0	
					0.0	
8.0						
	SP	POORLY GRADED SAND, fine- to medium-grained, little Gravel, brown, moist. (Glacial Outwash)			0.0	
10.0					0.0	
		BOTTOM OF TEST PIT.				
		Water not observed in test pit.				
		Test pit backfilled with excavated soil.				

LOG OF TEST PIT N:\GINT\PROJECTS\AX PROJECTS\2015\00394.00.GPJ BRAUN_V8_CURRENT.GDT 12/29/15 10:56

BRAUN INTERTEC

LOG OF TEST PIT

Braun Project B1500394.00
TEST PIT INVESTIGATION
1860 25th Street & 2717 Longfellow Avenue
Minneapolis, Minnesota

TEST PIT: **TP-3**

LOCATION: See attached sketch.

DRILLER: Rachel | METHOD: Backhoe | DATE: **12/8/15** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	PID PPM	Tests or Notes
0.0						
	PAV	9 inches of bituminous over 6 inches of aggregate base.				
1.3						
	FILL	FILL: Silty Sand, fine-grained, with Gravel, concrete, glass and metal, black, moist.			0.0	
		*Concrete, glass, porcelain, glass, metal and ceramics encountered from 4 to 5 feet.			0.0	*Concrete slab noted at 4 to 5 feet on east side of trench.
6.0						
	SP	POORLY GRADED SAND, fine- to medium-grained, little Gravel, brown, moist. (Glacial Outwash)			0.0	Note: Soil sample collected at 5 feet for analytical testing.
					0.0	
10.0						
		BOTTOM OF TEST PIT.				
		Water not observed in test pit.				
		Test pit backfilled with excavated soil.				

LOG OF TEST PIT N:\GINT\PROJECTS\AX PROJECTS\2015\00394.00.GPJ BRAUN_V8_CURRENT.GDT 12/29/15 10:56

BRAUN INTERTEC

LOG OF TEST PIT

Braun Project B1500394.00
TEST PIT INVESTIGATION
1860 25th Street & 2717 Longfellow Avenue
Minneapolis, Minnesota

TEST PIT: **TP-4**

LOCATION: See attached sketch.

DRILLER: Rachel | METHOD: Backhoe | DATE: **12/8/15** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	PID PPM	Tests or Notes
0.0						
1.0	PAV	6 inches of bituminous over 6 inches of aggregate base.				
	FILL	FILL: Silty Sand, fine-grained, with brick, glass and ash, black, moist.			0.0	Note: Soil sample collected at 1 1/2 feet for analytical testing.
4.0	SM	SILTY SAND, fine-grained, dark brown to brown, moist. (Alluvium)			0.0	
6.0	SP	POORLY GRADED SAND, fine- to medium-grained, trace Gravel, brown, moist. (Glacial Outwash)			0.0	
					0.0	
10.0					0.0	
		BOTTOM OF TEST PIT.				
		Water not observed in test pit.				
		Test pit backfilled with excavated soil.				

BRAUN INTERTEC
The Science You Build On

LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-15**
LOCATION: See attached sketch
NORTHING: 159283 EASTING: 536246
START DATE: 04/21/20 END DATE: 04/21/20
SURFACE ELEVATION:
RIG: Subcontractor METHOD: Direct Push
SURFACING: Concrete WEATHER:
DRILLER: Range Environmental LOGGED BY: J. Carlson

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
0.5		CONCRETE, 6 inches					
		FILL: POORLY GRADED SAND with SILT (SP-SM), fine to coarse-grained, trace Gravel, brown, dry		10	0.8		Soil sample PP-15 (0-2') @ 12:38 collected for Total Arsenic Soil sample PP-15 (2-4') @ 12:35 collected for Total Arsenic
5							Soil sample PP-15 (5-5.5') @ 12:40 collected for Total Arsenic
7.0					0.9		
		FILL: POORLY GRADED SAND with SILT (SP-SM), fine-grained, with Gravel, with concrete, with Sandy Lean Clay, brown, dry		60			Soil sample PP-15 (7.5-8') @ 12:42 collected for Total Arsenic
9.0					0.8		
10.0		SILTY SAND (SM), fine-grained, light brown, moist					
10		END OF BORING			0.8		Soil sample PP-15 (9.5-10") @ 12:44 collected for Total Arsenic
15							
20							
25							
30							

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-16**
LOCATION: See attached sketch
NORTHING: 159158 EASTING: 536190
DRILLER: Range Environmental LOGGED BY: J. Carlson START DATE: 04/21/20 END DATE: 04/21/20
SURFACE ELEVATION: RIG: Subcontractor METHOD: Direct Push SURFACING: Concrete WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
0.5		CONCRETE, 6 inches					
		FILL: SILTY SAND (SM), fine-grained, with Gravel, trace cinders, brown, dry			1.1		Soil sample PP-16 (0-2') @ 12:02 collected for Total Arsenic
3.0				40			
		FILL: Cinders, trace coal fragments, black			1.0		Soil sample PP-16 (2-4') @ 12:04 collected for Total Arsenic
5.0							
		FILL: SILTY SAND (SM), fine-grained, with Gravel, brown, dry	5		1.1		Soil sample PP-16 (5-5.5') @ 12:06 collected for Total Arsenic
8.0				100			
9.0		SILTY SAND (SM), fine-grained, trace Gravel, dark brown, moist			1.2		Soil sample PP-16 (7.5-8') @ 12:08 collected for Total Arsenic
10.0		SILTY SAND (SM), fine-grained, with Silt seams, trace Gravel, brown, moist	10		1.2		Soil sample PP-16 (9.5-10') @ 12:10 collected for Total Arsenic
		END OF BORING					
			15				
			20				
			25				
			30				

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-17**
LOCATION: See attached sketch
NORTHING: 158953 EASTING: 536089
DRILLER: Range Environmental LOGGED BY: J. Carlson START DATE: 04/20/20 END DATE: 04/20/20
SURFACE ELEVATION: RIG: Subcontractor METHOD: Direct Push SURFACING: Concrete WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
0.5		CONCRETE, 6 inches					Soil sample PP-17 (0-2') @ 12:47 collected for Total Arsenic
		FILL: SILTY SAND (SM), fine to medium-grained, trace Gravel, trace coal fragments, dark brown, moist		50	1.0		Soil sample PP-17 (2-4') @ 12:48 collected for Total Arsenic
5.0		FILL: POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, trace Gravel, with Silt clumps, brown, moist	5		1.1		Soil sample PP-17 (5-5.5') @ 12:50 collected for Total Arsenic
7.0		FILL: POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, light brown, moist		80	1.1		Soil sample PP-17 (7.5-8') @ 12:52 collected for Total Arsenic
			10		1.2		Soil sample PP-17 (9.5-10') @ 12:54 collected for Total Arsenic
13.0		*Trace black Organic Clay at 12 feet*		70	1.3		
15.0		POORLY GRADED SAND (SP), fine-grained, trace Gravel, light brown, moist	15		1.1		
		POORLY GRADED SAND (SP), fine to medium-grained, with to trace Gravel, light brown, moist		90	1.1		
20.0		POORLY GRADED SAND with SILT (SP-SM), fine-grained, with Gravel, brown, moist	20		1.1		
22.0		POORLY GRADED SAND (SP), fine to coarse-grained, with Gravel, brown, moist		100			
23.0		END OF BORING			1.1		
			25				
			30				

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-18**
LOCATION: See attached sketch
NORTHING: 158785 EASTING: 535975
DRILLER: Range Environmental LOGGED BY: J. Carlson START DATE: 04/20/20 END DATE: 04/20/20
SURFACE ELEVATION: RIG: Subcontractor METHOD: Direct Push SURFACING: Concrete WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
0.5		CONCRETE, 6 inches					
		FILL: SILTY SAND (SM), fine-grained, brown and dark brown, moist		80	0.0		Soil sample PP-18 (0-2') @ 10:23 collected for Total Arsenic
2.0		FILL: POORLY GRADED SAND with SILT (SP-SM), fine-grained, trace Gravel, trace cinders, brown, moist		80	0.0		Soil sample PP-18 (2-4') @ 10:25 collected for Total Arsenic
			5		0.3		Soil sample PP-18 (5-5.5') @ 10:27 collected for Total Arsenic
7.0		FILL: POORLY GRADED SAND (SP), fine-grained, with Gravel, light brown, dry to moist		80	0.3		Soil sample PP-18 (7.5-8') @ 10:30 collected for Total Arsenic
10.0			10		0.3		Soil sample PP-18 (9.5-10') @ 10:32 collected for Total Arsenic
11.0		FILL: POORLY GRADED SAND with SILT (SP-SM), fine-grained, with Gravel, brown, moist					
11.5		FILL: SILTY SAND (SM), fine-grained, trace Gravel, trace concrete, dark brown, moist		100	1.0		
		FILL: POORLY GRADED SAND (SP), fine to coarse-grained, trace Gravel, brown, moist			0.8		
15.0			15				
16.0		FILL: POORLY GRADED SAND with SILT (SP-SM), fine-grained, with Gravel, trace coal fragments, dark brown, moist			1.2		
17.0		FILL: SILTY SAND (SM), fine-grained, dark brown to black, moist		80			
		FILL: POORLY GRADED SAND (SP), fine-grained, trace Gravel, light brown, moist			1.6		
20.0			20				
		FILL: SILTY SAND (SM), fine to medium-grained, with Gravel, light brown, moist			0.8		
23.0				100			
		FILL: POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, light brown, moist			0.4		
25.0			25				
		FILL: POORLY GRADED SAND with SILT (SP-SM), fine-grained, with Gravel, trace coal fragments, brown, moist			1.3		
28.0				90			
		POORLY GRADED SAND (SP), fine to coarse-grained, with Gravel, brown, wet			1.2		
30.0	▼		30				
		SILTY SAND (SM), fine-grained, with Gravel, brown, moist			1.1		Temporary well installed with screen set from 31 to 34 feet
32.0							

Continued on next page

BRAUN INTERTEC
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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-18**
LOCATION: See attached sketch
NORTHING: 158785 EASTING: 535975
DRILLER: Range Environmental LOGGED BY: J. Carlson START DATE: 04/20/20 END DATE: 04/20/20
SURFACE ELEVATION: RIG: Subcontractor METHOD: Direct Push SURFACING: Concrete WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
		POORLY GRADED SAND (SP), fine to coarse-grained, with Gravel, brown, wet		80	1.2		
34.0							
35.0		SILTY SAND (SM), fine to medium-grained, reddish brown, wet			1.0		Water measured at a depth of 29.80 feet in temporary well. Water sample PP-18W @ 12:10 collected for VOCs and Dissolved Arsenic
		END OF BORING					

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-19**
LOCATION: See attached sketch
NORTHING: 158723 EASTING: 535866
DRILLER: Range Environmental LOGGED BY: J. Carlson START DATE: 04/21/20 END DATE: 04/21/20
SURFACE ELEVATION: 846.7 ft RIG: Subcontractor METHOD: Direct Push SURFACING: Grass WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
846.0		SILTY SAND (SM), fine-grained, trace roots, dark brown, moist (TOPSOIL)					Soil sample PP-19 (0-2') @ 9:51 collected for Total Arsenic
0.7		FILL: POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, trace coal fragments, brown, moist		40	0.8		Soil sample PP-19 (2-4') @ 9:52 collected for Total Arsenic
842.7					1.1		
4.0		SILTY SAND (SM), fine to medium-grained, trace Gravel, trace roots, brown, moist	5				Soil sample PP-19 (5-5.5') @ 9:54 collected for Total Arsenic
840.7					1.0		
6.0		POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, trace Gravel, trace roots, brown, moist		100			Soil sample PP-19 (7.5-8') @ 9:55 collected for Total Arsenic
837.7					0.8		
9.0		POORLY GRADED SAND (SP), fine to medium-grained, with Gravel, brown, moist	10		1.2		Soil sample PP-19 (9.5-10') @ 09:56 collected for Total Arsenic
836.7							
10.0		END OF BORING					
			15				
			20				
			25				
			30				

BRAUN INTERTEC
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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-20**
LOCATION: See attached sketch
NORTHING: 158720 EASTING: 535766
DRILLER: Range Environmental LOGGED BY: J. Carlson START DATE: 04/21/20 END DATE: 04/21/20
SURFACE ELEVATION: 847.8 ft RIG: Subcontractor METHOD: Direct Push SURFACING: Grass WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
847.0		SILTY SAND (SM), fine-grained, trace roots, dark brown, moist (TOPSOIL)					Soil sample PP-20 (0-2') @ 07:46 collected for Total Arsenic
0.8		SILTY SAND (SM), fine-grained, dark brown to brown, moist		50	0.5		Soil sample PP-20 (2-4') @ 07:48 collected for Total Arsenic
					0.5		
		Trace roots at 5 feet	5				Soil sample PP-20 (5-5.5') @ 07:55 collected for Total Arsenic
841.8					0.5		
6.0		POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, trace Gravel, brown, moist		50			Soil sample PP-20 (7.5-8') @ 07:58 collected for Total Arsenic
					0.5		
837.8							
10.0		POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, light brown, moist	10		0.6		Soil sample PP-20 (9.5-10') @ 08:00 collected for Total Arsenic
				100	0.5		
					0.5		
			15				
					0.8		
829.8				100			
18.0		POORLY GRADED SAND (SP), fine-grained, trace Gravel, light brown, moist			0.9		
			20				
826.8							
21.0		POORLY GRADED SAND (SP), fine to coarse-grained, with Gravel, brown, moist		90	1.0		
					0.9		
822.8							
25.0		POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, brown, moist to wet	25		0.8		
	▼			80			
					1.0		
			30				Temporary well installed with screen set from 31 to 34 feet

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-20**
LOCATION: See attached sketch
NORTHING: 158720 EASTING: 535766
DRILLER: Range Environmental LOGGED BY: J. Carlson START DATE: 04/21/20 END DATE: 04/21/20
SURFACE ELEVATION: 847.8 ft RIG: Subcontractor METHOD: Direct Push SURFACING: Grass WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
		POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, brown, moist to wet		20			
812.8 / 35.0		END OF BORING					Water measured at a depth of 27.76 feet in temporary well. Water sample PP-20W @ 09:00 collected for VOCs and Dissolved Arsenic

BRAUN INTERTEC
The Science You Build On

LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-21**
LOCATION: See attached sketch
NORTHING: 158814 EASTING: 535804
DRILLER: Range Environmental LOGGED BY: J. Carlson START DATE: 04/21/20 END DATE: 04/21/20
SURFACE ELEVATION: RIG: Subcontractor METHOD: Direct Push SURFACING: Concrete WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
0.5		CONCRETE, 6 inches					
		FILL: SILTY SAND (SM), fine-grained, brown, dry to moist			1.3		Soil sample PP-21 (0-2') @ 10:25 collected for Total Arsenic
				40			
					1.2		Soil sample PP-21 (2-4') @ 10:27 collected for Total Arsenic
			5				Soil sample PP-21 (5-5.5') @ 10:30 collected for Total Arsenic
					1.6		
7.0		POORLY GRADED SAND with SILT (SP-SM), fine-grained, with Gravel, light brown, dry		100			
					1.4		Soil sample PP-21 (7.5-8') @ 10:31 collected for Total Arsenic
9.0							
10.0		POORLY GRADED SAND (SP), fine-grained, light brown, dry	10		1.6		Soil sample PP-21 (9.5-10') @ 10:32 collected for Total Arsenic
		END OF BORING					
			15				
			20				
			25				
			30				

BRAUN INTERTEC
The Science You Build On

LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-22**
LOCATION: See attached sketch
NORTHING: 158981 EASTING: 535827
DRILLER: Range Environmental LOGGED BY: J. Carlson START DATE: 04/21/20 END DATE: 04/21/20
SURFACE ELEVATION: RIG: Subcontractor METHOD: Direct Push SURFACING: Concrete WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
0.5		CONCRETE, 6 inches					
		FILL: SILTY SAND (SM), fine to medium-grained, dark brown to black, moist			2.4		Soil sample PP-22 (0-2') @ 10:46 collected for Total Arsenic
2.0		SILTY SAND (SM), fine to medium-grained, brown, moist		80			
					2.4		Soil sample PP-22 (2-4') @ 10:48 collected for Total Arsenic
5.0		POORLY GRADED SAND with SILT (SP-SM), fine-grained, trace Gravel, brown to light brown, moist			1.6		Soil sample PP-22 (5-5.5') @ 10:56 collected for Total Arsenic
				60			
					1.3		Soil sample PP-22 (7.5-8') @ 10:52 collected for Total Arsenic
10.0		END OF BORING			1.5		Soil sample PP-22 (9.5-10') @ 10:54 collected for Total Arsenic

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-23**
LOCATION: See attached sketch
NORTHING: 159210 EASTING: 535793
DRILLER: Range Environmental LOGGED BY: J. Carlson START DATE: 04/21/20 END DATE: 04/21/20
SURFACE ELEVATION: RIG: Subcontractor METHOD: Direct Push SURFACING: WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
0.5		CONCRETE, 6 inches					Soil sample PP-23 (0-2') @ 13:48 collected for Total Arsenic
		FILL: SILTY SAND (SM), fine to medium-grained, trace Gravel, with clumps of Silt, brown and dark brown, moist			0.8		
2.0		FILL: POORLY GRADED SAND with SILT (SP-SM), fine-grained, trace Gravel, with clumps of dark brown Silty Sand, trace black Silt, light brown, moist		60	0.8		Soil sample PP-23 (2-4') @ 13:50 collected for Total Arsenic
							Soil sample PP-23 (5-5.5') @ 13:53 collected for Total Arsenic
6.0		POORLY GRADED SAND (SP), fine-grained, with Gravel, light brown, dry to moist			0.9		
				80	0.8		Soil sample PP-23 (7.5-8') @ 13:55 collected for Total Arsenic
10.0		END OF BORING			0.8		Soil sample PP-23 (9.5-10') @ 13:57 collected for Total Arsenic

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-24**
LOCATION: See attached sketch
NORTHING: 159186 EASTING: 536048
DRILLER: Range Environmental LOGGED BY: J. Carlson START DATE: 04/22/20 END DATE: 04/22/20
SURFACE ELEVATION: RIG: Subcontractor METHOD: Direct Push SURFACING: WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
0.5		CONCRETE, 6 inches					Soil sample PP-24 (0-2') @ 11:35 collected for Total Arsenic
		FILL: SILTY SAND (SM), fine-grained, with to trace Gravel, trace coal fragments, dark brown, moist		60	1.2		
					1.0		Soil sample PP-24 (2-4') @ 11:38 collected for VOCs, DRO, GRO, PAHs, and 8 RCRA metals
5.0		FILL: POORLY GRADED SAND (SP), fine-grained, trace Gravel, light brown, dry	5		1.4		Soil sample PP-24 (5-5.5') @ 11:42 collected for Total Arsenic
7.0		FILL: SILTY SAND (SM), fine-grained, with Gravel, brown, moist		80			
9.0					1.1		Soil sample PP-24 (7.5-8') @ 11:44 collected for Total Arsenic
10.0		POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, brown, moist	10		1.4		Soil sample PP-24 (9.5-10') @ 11:46 collected for Total Arsenic
		END OF BORING					
			15				
			20				
			25				
			30				

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-25**
LOCATION: See attached sketch
NORTHING: 159210 EASTING: 535928
DRILLER: Range Environmental LOGGED BY: J. Carlson START DATE: 04/21/20 END DATE: 04/21/20
SURFACE ELEVATION: RIG: Subcontractor METHOD: Direct Push SURFACING: Concrete WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
0.5		CONCRETE, 6 inches					Soil sample PP-25 (0-2') @ 13:35 collected for Total Arsenic
		FILL: SILTY SAND (SM), fine-grained, with clumps of Silt, brown and dark brown, moist			0.5		
2.0		POORLY GRADED SAND with SILT (SP-SM), fine-grained, light brown, moist		60			Soil sample PP-25 (2-4') @ 13:37 collected for Total Arsenic
					0.5		
5							Soil sample PP-25 (5-5.5') @ 13:38 collected for Total Arsenic
					0.7		
7.0		POORLY GRADED SAND (SP), fine to medium-grained, with Gravel, light brown, moist		60			Soil sample PP-25 (7.5-8') @ 13:39 collected for Total Arsenic
9.0					0.7		
10.0		POORLY GRADED SAND (SP), fine-grained, light brown, moist			0.7		Soil sample PP-25 (9.5-10') @ 13:40 collected for Total Arsenic
10		END OF BORING					
15							
20							
25							
30							

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-26**
LOCATION: See attached sketch
NORTHING: 159115 EASTING: 535874
DRILLER: Range Environmental LOGGED BY: J. Carlson START DATE: 04/21/20 END DATE: 04/21/20
SURFACE ELEVATION: RIG: Subcontractor METHOD: Direct Push SURFACING: WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
0.5		CONCRETE, 6 inches					
		FILL: SILTY SAND (SM), fine-grained, trace Gravel, dark brown to black, moist			0.9		Soil sample PP-26 (0-2') @ 14:12 collected for Total Arsenic
2.0		POORLY GRADED SAND with SILT (SP-SM), fine-grained, trace to with Gravel, light brown, dry to moist		100	0.9		Soil sample PP-26 (2-4') @ 14:14 collected for Total Arsenic
5					1.4		Soil sample PP-26 (5-5.5') @ 14:16 collected for Total Arsenic
				100	1.0		Soil sample PP-26 (7.5-8') @ 14:18 collected for Total Arsenic
10.0		END OF BORING			0.9		Soil sample PP-26 (9.5-10') @ 14:20 collected for Total Arsenic
10							
15							
20							
25							
30							

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-27**
LOCATION: See attached sketch
NORTHING: 159063 EASTING: 535991
DRILLER: Range Environmental LOGGED BY: J. Carlson START DATE: 04/21/20 END DATE: 04/21/20
SURFACE ELEVATION: RIG: Subcontractor METHOD: Direct Push SURFACING: WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
0.5		CONCRETE, 6 inches					
		FILL: SILTY SAND (SM), fine-grained, trace Gravel, trace coal fragments, black, moist			1.1		Soil sample PP-27 (0-2') @ 11:08 collected for Total Arsenic
2.0		FILL: SILTY SAND (SM), fine-grained, trace coal fragments, brown and dark brown		40	1.2		Soil sample PP-27 (2-4') @ 11:10 collected for Total Arsenic
5.0		FILL: POORLY GRADED SAND with SILT (SP-SM), fine-grained, trace Gravel, brown, dry			1.2		Soil sample PP-27 (5-5.5') @ 11:13 collected for Total Arsenic
7.0		POORLY GRADED SAND (SP), fine to medium-grained, with Gravel, brown, dry		100	1.3		Soil sample PP-27 (7.5-8') @ 11:15 collected for Total Arsenic
10.0		END OF BORING			1.6		Soil sample PP-27 (9.5-10') @ 11:17 collected for Total Arsenic

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-28**
LOCATION: See attached sketch
NORTHING: 158968 EASTING: 535934
DRILLER: Range Environmental LOGGED BY: J. Carlson START DATE: 04/20/20 END DATE: 04/20/20
SURFACE ELEVATION: RIG: Subcontractor METHOD: Direct Push SURFACING: WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
0.5		CONCRETE, 6 inches					
2.0		FILL: SILTY SAND (SM), fine-grained, trace Gravel, trace coal fragments, black, moist			0.7		Soil sample PP-28 (0-2') @ 13:40 collected for Total Arsenic
4.0		FILL: SILTY SAND (SM), fine-grained, trace coal fragments, brown and dark brown, moist		80	0.8		Soil sample PP-28 (2-4') @ 13:45 collected for Total Arsenic
7.0		FILL: POORLY GRADED SAND with SILT (SP-SM), fine-grained, trace Gravel, brown, dry	5		0.9		Soil sample PP-28 (5-5.5') @ 13:47 collected for Total Arsenic
9.0		FILL: POORLY GRADED SAND (SP), fine to medium-grained, with Gravel, trace coal fragments, brown, moist		50	0.9		Soil sample PP-28 (7.5-8') @ 13:50 collected for Total Arsenic
13.0		POORLY GRADED SAND with SILT (SP-SM), fine-grained, trace Gravel, light brown, dry	10	100	1.0 0.8		Soil sample PP-28 (9.5-10') @ 13:52 collected for Total Arsenic
14.0		POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, light brown, moist			1.0		
18.0		POORLY GRADED SAND with SILT (SP-SM), fine-grained, trace Gravel, light brown, moist	15	90	1.0		
24.0		POORLY GRADED SAND (SP), fine to medium-grained, with Gravel, with fine grained layers, light brown, moist	20	100	1.1 1.2		
25.0		SILTY, CLAYEY SAND (SC-SM), trace Gravel, grayish brown, moist	25		1.2		
28.0		SILTY SAND (SM), fine-grained, trace Gravel, brown, moist		90	1.3		
		POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, brown, wet	30		1.1		
					1.2		Temporary well installed with screen set from 31 to 35 feet

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-28**
LOCATION: See attached sketch
NORTHING: 158968 EASTING: 535934
DRILLER: Range Environmental LOGGED BY: J. Carlson START DATE: 04/20/20 END DATE: 04/20/20
SURFACE ELEVATION: RIG: Subcontractor METHOD: Direct Push SURFACING: WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
33.0	▽	POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, brown, wet		100			
		SANDY SILT (ML), brown, wet			1.3		
35.0		END OF BORING					Water measured at a depth of 32.85 feet in temporary well. Water sample PP-28W @ 15:15 collected for VOCs and Dissolved Arsenic

35
40
45
50
55
60

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-29**
LOCATION: See attached sketch
NORTHING: 158808 EASTING: 535593
DRILLER: Range Environmental LOGGED BY: J. Carlson START DATE: 04/22/20 END DATE: 04/22/20
SURFACE ELEVATION: 849.2 ft RIG: Subcontractor METHOD: Direct Push SURFACING: Asphalt WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
848.2		PAVEMENT, 4 inches of bituminous over 8 inches of apparent aggregate base					
1.0		FILL: SILTY SAND (SM), fine to medium-grained, trace Gravel, trace glass, dark brown, moist			0.1		Soil sample PP-29 (0-2') @ 09:43 collected for Total Arsenic
847.2							
2.0		FILL: SILTY SAND (SM), fine-grained, trace Gravel, dark brown and brown, moist		50	0.1		Soil sample PP-29 (2-4') @ 09:46 collected for Total Arsenic
			5		0.3		Soil sample PP-29 (5-5.5') @ 09:47 collected for Total Arsenic
842.2							
7.0		FILL: SILTY SAND (SM), fine-grained, brown, moist		100	0.2		Soil sample PP-29 (7.5-8') @ 09:48 collected for Total Arsenic
840.2							
9.0		FILL: POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, trace Gravel, with clumps of Silt, brown and light brown, moist	10		0.4		Soil sample PP-29 (9.5-10') @ 09:49 collected for Total Arsenic
839.2							
10.0		END OF BORING					
			15				
			20				
			25				
			30				

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-30**
LOCATION: See attached sketch
NORTHING: 158866 EASTING: 535662
DRILLER: Range Environmental LOGGED BY: J. Carlson START DATE: 04/22/20 END DATE: 04/22/20
SURFACE ELEVATION: 846.3 ft RIG: Subcontractor METHOD: Direct Push SURFACING: Asphalt WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
845.3		PAVEMENT, 4 inches of bituminous over 8 inches of apparent aggregate base					Soil sample PP-30 (0-2') @ 10:05 collected for Total Arsenic
1.0		FILL: SILTY SAND (SM), fine-grained, dark brown, moist			0.1		
844.3				80			Soil sample PP-30 (2-4') @ 10:08 collected for Total Arsenic
2.0		SILTY SAND (SM), fine-grained, brown, moist			0.3		
842.3							
4.0		POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, brown to light brown, moist					Soil sample PP-30 (5-5.5') @ 10:10 collected for Total Arsenic
			5		0.3		
				90			Soil sample PP-30 (7.5-8') @ 10:11 collected for Total Arsenic
					0.4		
836.3							
10.0		END OF BORING	10		0.4		Soil sample PP-30 (9.5-10') @ 10:12 collected for Total Arsenic
			15				
			20				
			25				
			30				

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-31**
LOCATION: See attached sketch
NORTHING: 158967 EASTING: 535664
DRILLER: Range Environmental LOGGED BY: J. Carlson START DATE: 04/22/20 END DATE: 04/22/20
SURFACE ELEVATION: 845.5 ft RIG: Subcontractor METHOD: Direct Push SURFACING: Asphalt WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
844.5		PAVEMENT, 4 inches of bituminous over 8 inches of apparent aggregate base					
1.0		FILL: SILTY SAND (SM), fine to medium-grained, trace Gravel, with clumps of Silt, dark brown to black, moist			0.4		Soil sample PP-31 (0-2') @ 10:27 collected for Total Arsenic
843.5				90			
2.0							Soil sample PP-31 (2-4') @ 10:28 collected for Total Arsenic
842.0		SILTY SAND (SM), fine-grained, brown, moist			0.3		
3.5		POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, brown, moist					
			5				Soil sample PP-31 (5-5.5') @ 10:30 collected for Total Arsenic
					0.3		
				100			Soil sample PP-31 (7.5-8') @ 10:32 collected for Total Arsenic
836.5					0.4		
9.0		POORLY GRADED SAND with SILT (SP-SM), fine-grained, light brown, moist					
835.5			10		0.6		Soil sample PP-31 (9.5-10') @ 10:34 collected for Total Arsenic
10.0		END OF BORING					
			15				
			20				
			25				
			30				

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-32**
LOCATION: See attached sketch
NORTHING: 159041 EASTING: 535575
DRILLER: Range Environmental LOGGED BY: J. Carlson START DATE: 04/22/20 END DATE: 04/22/20
SURFACE ELEVATION: 847.7 ft RIG: Subcontractor METHOD: Direct Push SURFACING: Asphalt WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
846.7		PAVEMENT, 4 inches of bituminous over 8 inches of apparent aggregate base					
1.0		FILL: SILTY SAND (SM), fine to medium-grained, with slag, trace Gravel, dark brown, moist			0.4		Soil sample PP-32 (0-2') @ 10:42 collected for Total Arsenic
845.7				80			
2.0		FILL: SILTY SAND (SM), fine-grained, brown and dark brown, moist			0.4		Soil sample PP-32 (2-4') @ 10:44 collected for Total Arsenic
842.7							
5.0		SILTY SAND (SM), fine-grained, trace Gravel, brown, moist	5		0.6		Soil sample PP-32 (5-5.5') @ 10:46 collected for Total Arsenic
				80			
838.7					0.6		Soil sample PP-32 (7.5-8') @ 10:48 collected for Total Arsenic
9.0		POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, trace Gravel, with clumps of Silty Sand, brown, moist	10		0.6		Soil sample PP-32 (9.5-10') @ 10:50 collected for Total Arsenic
837.7							
10.0		END OF BORING					
			15				
			20				
			25				
			30				

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-33**
LOCATION: See attached sketch
NORTHING: 159062 EASTING: 535660
DRILLER: Range Environmental LOGGED BY: J. Carlson START DATE: 04/23/20 END DATE: 04/23/20
SURFACE ELEVATION: 845.7 ft RIG: Subcontractor METHOD: Direct Push SURFACING: Asphalt WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
844.7		PAVEMENT, 4 inches of bituminous over 8 inches of apparent aggregate base					
1.0		FILL: SANDY SILT (ML), trace Gravel, black, moist			0.7		Soil sample PP-33 (0-2') @ 11:03 collected for Total Arsenic
843.7		FILL: SILTY SAND (SM), fine-grained, with clumps of Silt, brown, moist		80			
2.0					0.7		Soil sample PP-33 (2-4') @ 11:05 collected for Total Arsenic
			5				Soil sample PP-33 (5-5.5') @ 11:06 collected for Total Arsenic
838.7					0.6		
7.0		FILL: POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, trace Gravel, brown intermixed with dark brown, moist		80			Soil sample PP-33 (7.5-8') @ 11:07 collected for Total Arsenic
835.7					0.5		
10.0		END OF BORING	10		0.4		Soil sample PP-33 (9.5-10') @ 11:08 collected for Total Arsenic
			15				
			20				
			25				
			30				

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-34**
LOCATION: See attached sketch
NORTHING: 159156 EASTING: 535676
DRILLER: Range Environmental LOGGED BY: J. Carlson START DATE: 04/22/20 END DATE: 04/22/20
SURFACE ELEVATION: 845.4 ft RIG: Subcontractor METHOD: Direct Push SURFACING: Asphalt WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
844.4		PAVEMENT, 4 inches of bituminous over 8 inches of apparent aggregate base					
1.0		FILL: SILTY SAND (SM), fine-grained, brown and dark brown, moist			0.8		Soil sample PP-34 (0-2') @ 11:17 collected for Total Arsenic
843.4				100			
2.0		POORLY GRADED SAND with SILT (SP-SM), fine-grained, trace Gravel, brown, moist			0.6		Soil sample PP-34 (2-4') @ 11:18 collected for Total Arsenic
840.4							
5.0		POORLY GRADED SAND (SP), fine to medium-grained, trace Gravel, brown, moist			0.6		Soil sample PP-34 (5-5.5') @ 11:20 collected for Total Arsenic
				90			
836.4					0.7		Soil sample PP-34 (7.5-8') @ 11:21 collected for Total Arsenic
9.0		POORLY GRADED SAND (SP), fine-grained, light brown, moist					
835.4					0.6		Soil sample PP-34 (9.5-10') @ 11:22 collected for Total Arsenic
10.0		END OF BORING					

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See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-35**
LOCATION: See attached sketch
NORTHING: 159274 EASTING: 535596
DRILLER: Range Environmental LOGGED BY: J. Carlson START DATE: 04/22/20 END DATE: 04/22/20
SURFACE ELEVATION: 846.6 ft RIG: Subcontractor METHOD: Direct Push SURFACING: Asphalt WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
845.6		PAVEMENT, 4 inches of bituminous over 8 inches of apparent aggregate base			0.2		Soil sample PP-35 (0-2') @ 13:32 collected for Total Arsenic
1.0		FILL: SILTY SAND (SM), fine-grained, trace Gravel, dark brown to black, moist		80	0.4		Soil sample PP-35 (2-4') @ 13:34 collected for Total Arsenic
841.6			5				
5.0		FILL: POORLY GRADED SAND with SILT (SP-SM), fine-grained, with Gravel, with clumps of Silt, brown, moist			0.5		Soil sample PP-35 (5-5.5') @ 13:36 collected for Total Arsenic
				50			Soil sample PP-35 (7.5-8') @ 13:38 collected for Total Arsenic
837.6							
9.0		POORLY GRADED SAND (SP), fine to coarse-grained, trace Gravel, brown, moist			0.8		
836.6			10				Soil sample PP-35 (9.5-10') @ 13:40 collected for Total Arsenic
10.0		END OF BORING					
			15				
			20				
			25				
			30				

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LOG OF BORING

See Descriptive Terminology sheet for explanation of abbreviations

Project Number B1500394.03
Environmental Investigation
Roof Depot
1860 28th St.
Minneapolis , Minnesota

BORING: **PP-36**
LOCATION: See attached sketch
NORTHING: 159213 EASTING: 536214
DRILLER: Range Environmental LOGGED BY: J. Carlson START DATE: 04/21/20 END DATE: 04/21/20
SURFACE ELEVATION: RIG: Subcontractor METHOD: Direct Push SURFACING: Concrete WEATHER:

Elev./ Depth ft	Water Level	Description of Materials (Soil-ASTM D2488 or 2487; Rock-USACE EM 1110-1-2908)	Sample	Recovery %	PID ppm	Temp. Well	Tests or Remarks
0.5		CONCRETE, 6 inches					
		FILL: POORLY GRADED SAND with SILT (SP-SM), fine to medium-grained, trace to with Gravel, trace coal fragments, trace cinders, dark brown to brown, dry			1.0		Soil sample PP-36 (0-2') @ 12:16 collected for Total Arsenic
				20			
					0.8		Soil sample PP-36 (2-4') @ 12:18 collected for Total Arsenic
			5				
					0.9		Soil sample PP-36 (5-5.5') @ 12:20 collected for Total Arsenic
				50			
		Trace coal fragments at 8 feet					Soil sample PP-36 (7.5-8') @ 12:21 collected for Total Arsenic
9.0					0.7		
10.0		SILTY SAND (SM), fine to medium-grained, trace Gravel, brown, moist	10		1.0		Soil sample PP-36 (9.5-10') @ 12:22 collected for Total Arsenic
		END OF BORING					
			15				
			20				
			25				
			30				

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

April 10, 2015

Jeremy Hansen
Braun Intertec Corp.
11001 Hampshire Ave S
Minneapolis, MN 55438

RE: Project: B1500394 Roof Depot
Pace Project No.: 10300830

Dear Jeremy Hansen:
Enclosed are the analytical results for sample(s) received by the laboratory on March 27, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,

Steve Albrecht
steve.albrecht@pacelabs.com
Project Manager

Enclosures

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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CERTIFICATIONS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10300830001	**PP-1 (2-4)**	Solid	03/25/15 15:45	03/27/15 08:20
10300830002	**PP-2 (2-4)**	Solid	03/25/15 16:30	03/27/15 08:20
10300830003	**PP-3 (1-2)**	Solid	03/25/15 17:00	03/27/15 08:20
10300830004	**PP-4 (2-4)**	Solid	03/25/15 15:00	03/27/15 08:20
10300830005	**PP-5 (2-4)**	Solid	03/26/15 08:40	03/27/15 08:20
10300830006	**PP-6 (3-5)**	Solid	03/26/15 09:15	03/27/15 08:20
10300830007	**PP-7 (3-5)**	Solid	03/26/15 09:50	03/27/15 08:20
10300830008	**PP-8 (2)**	Solid	03/25/15 09:45	03/27/15 08:20
10300830009	**PP-9 (1-3)**	Solid	03/26/15 10:30	03/27/15 08:20
10300830010	**PP-10 (2)**	Solid	03/25/15 12:00	03/27/15 08:20
10300830011	**PP-11 (1-2)**	Solid	03/26/15 12:30	03/27/15 08:20
10300830012	**PP-12 (1-2)**	Solid	03/26/15 12:00	03/27/15 08:20
10300830013	**PP-13 (2-4)**	Solid	03/26/15 13:00	03/27/15 08:20
10300830014	**PP-14 (2-3)**	Solid	03/26/15 13:30	03/27/15 08:20
10300830015	**HA-1 (1-3)**	Solid	03/25/15 11:30	03/27/15 08:20
10300830016	**HA-2 (1-3)**	Solid	03/25/15 10:30	03/27/15 08:20
10300830017	**Trip Blank - SL**	Solid	03/25/15 00:00	03/27/15 08:20
10300830018	**PP-8W**	Water	03/25/15 10:20	03/27/15 08:20
10300830019	**PP-10W**	Water	03/25/15 12:30	03/27/15 08:20
10300830020	**HA-W**	Water	03/26/15 11:00	03/27/15 08:20

REPORT OF LABORATORY ANALYSIS

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SAMPLE ANALYTE COUNT

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10300830002	**PP-2 (2-4)**	WI MOD DRO	MT	2	PASI-M
		WI MOD GRO	BMM	2	PASI-M
		EPA 6020A	TT3	13	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	LT	19	PASI-M
		EPA 8260	SH2	70	PASI-M
10300830003	**PP-3 (1-2)**	WI MOD DRO	MT	2	PASI-M
		WI MOD GRO	BMM	2	PASI-M
		EPA 6020A	TT3	13	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	LT	19	PASI-M
		EPA 8260	SH2	70	PASI-M
10300830005	**PP-5 (2-4)**	WI MOD DRO	MT	2	PASI-M
		WI MOD GRO	BMM	2	PASI-M
		EPA 6020A	TT3	13	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	LT	19	PASI-M
		EPA 8260	SH2	70	PASI-M
10300830006	**PP-6 (3-5)**	WI MOD DRO	MT	2	PASI-M
		WI MOD GRO	BMM	2	PASI-M
		EPA 6020A	TT3	13	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	LT	19	PASI-M
		EPA 8260	SH2	70	PASI-M
10300830007	**PP-7 (3-5)**	WI MOD DRO	MT	2	PASI-M
		WI MOD GRO	BMM	2	PASI-M
		EPA 6020A	TT3	13	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	LT	19	PASI-M
		EPA 8260	AMT	70	PASI-M
10300830008	**PP-8 (2)**	WI MOD DRO	MT	2	PASI-M
		WI MOD GRO	BMM	2	PASI-M

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SAMPLE ANALYTE COUNT

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		EPA 6020A	TT3	13	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	LT	19	PASI-M
		EPA 8260	AMT	70	PASI-M
10300830010	**PP-10 (2)**	WI MOD DRO	MT	2	PASI-M
		WI MOD GRO	BMM	2	PASI-M
		EPA 6020A	TT3	13	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	LT	19	PASI-M
		EPA 8260	AMT	70	PASI-M
10300830011	**PP-11 (1-2)**	WI MOD DRO	MT	2	PASI-M
		WI MOD GRO	BMM	2	PASI-M
		EPA 6020A	TT3	13	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	LT	19	PASI-M
		EPA 8260	AMT	70	PASI-M
10300830012	**PP-12 (1-2)**	WI MOD DRO	MT	2	PASI-M
		WI MOD GRO	BMM	2	PASI-M
		EPA 6020A	TT3	13	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	LT	19	PASI-M
		EPA 8260	AMT	70	PASI-M
10300830013	**PP-13 (2-4)**	WI MOD DRO	MT	2	PASI-M
		WI MOD GRO	BMM	2	PASI-M
		EPA 6020A	TT3	13	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	LT	19	PASI-M
		EPA 8260	AMT	70	PASI-M
10300830014	**PP-14 (2-3)**	WI MOD DRO	MT	2	PASI-M
		WI MOD GRO	BMM	2	PASI-M
		EPA 6020A	TT3	13	PASI-M
		EPA 7471B	LMW	1	PASI-M

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SAMPLE ANALYTE COUNT

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	LT	19	PASI-M
		EPA 8260	AMT	70	PASI-M
10300830016	**HA-2 (1-3)**	WI MOD DRO	MT	2	PASI-M
		WI MOD GRO	BMM	2	PASI-M
		EPA 6020A	TT3	13	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	LT	19	PASI-M
		EPA 8260	AMT	70	PASI-M
10300830017	**Trip Blank - SL**	EPA 8260	AMT	70	PASI-M
10300830018	**PP-8W**	WI MOD DRO	MT	2	PASI-M
		EPA 6020A	RJS	13	PASI-M
		EPA 7470	LMW	1	PASI-M
		EPA 8260	AJC	70	PASI-M
10300830019	**PP-10W**	WI MOD DRO	MT	2	PASI-M
		EPA 6020A	RJS	13	PASI-M
		EPA 7470	LMW	1	PASI-M
		EPA 8260	AJC	70	PASI-M
10300830020	**HA-W**	WI MOD DRO	MT	2	PASI-M
		EPA 6020A	RJS	13	PASI-M
		EPA 7470	LMW	1	PASI-M
		EPA 8260	AJC	70	PASI-M

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PROJECT NARRATIVE

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Method: **WI MOD DRO**
Description: WIDRO GCS
Client: Braun-BLM
Date: April 10, 2015

General Information:
12 samples were analyzed for WI MOD DRO. All samples were received in acceptable condition with any exceptions noted below.

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

Sample Preparation:
The samples were prepared in accordance with WI MOD DRO 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.

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

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:

Analyte Comments:

QC Batch: OEXT/28694

T6: High boiling point hydrocarbons are present in the sample.

- PP-10 (2) (Lab ID: 10300830010)
  - WDRO C10-C28
- PP-11 (1-2) (Lab ID: 10300830011)
  - WDRO C10-C28
- PP-12 (1-2) (Lab ID: 10300830012)
  - WDRO C10-C28
- PP-13 (2-4) (Lab ID: 10300830013)
  - WDRO C10-C28
- PP-14 (2-3) (Lab ID: 10300830014)
  - WDRO C10-C28

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PROJECT NARRATIVE

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Method: **WI MOD DRO**
Description: WIDRO GCS
Client: Braun-BLM
Date: April 10, 2015

Analyte Comments:

QC Batch: OEXT/28694

T6: High boiling point hydrocarbons are present in the sample.

- PP-2 (2-4) (Lab ID: 10300830002)
  - WDRO C10-C28
- PP-3 (1-2) (Lab ID: 10300830003)
  - WDRO C10-C28
- PP-6 (3-5) (Lab ID: 10300830006)
  - WDRO C10-C28
- PP-7 (3-5) (Lab ID: 10300830007)
  - WDRO C10-C28

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PROJECT NARRATIVE

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Method: **WI MOD DRO**
Description: WIDRO GCS
Client: Braun-BLM
Date: April 10, 2015

General Information:
3 samples were analyzed for WI MOD DRO. All samples were received in acceptable condition with any exceptions noted below.

P4: Sample field preservation does not meet EPA or method recommendations for this analysis.
- HA-W (Lab ID: 10300830020)
- PP-8W (Lab ID: 10300830018)

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

Sample Preparation:
The samples were prepared in accordance with WI MOD DRO 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.

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

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:

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PROJECT NARRATIVE

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Method: **WI MOD GRO**
Description: WIGRO GCV
Client: Braun-BLM
Date: April 10, 2015

General Information:
12 samples were analyzed for WI MOD GRO. All samples were received in acceptable condition with any exceptions noted below.

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

Sample Preparation:
The samples were prepared in accordance with EPA 5030 Medium Soil 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.

QC Batch: GCV/13574

CH: The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high.

- MS (Lab ID: 1932401)
  - Gasoline Range Organics

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.

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.

QC Batch: GCV/13574

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10300504004

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1932401)
  - Gasoline Range Organics

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Method: **WI MOD GRO**
Description: WIGRO GCV
Client: Braun-BLM
Date: April 10, 2015

Additional Comments:

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PROJECT NARRATIVE

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Method: **EPA 6020A**
Description: 6020A MET ICPMS
Client: Braun-BLM
Date: April 10, 2015

General Information:
12 samples were analyzed for EPA 6020A. All samples were received in acceptable condition with any exceptions noted below.

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

Sample Preparation:
The samples were prepared in accordance with EPA 3050 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.

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.

QC Batch: MPRP/53233

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10300830002

M6: Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.

- MS (Lab ID: 1927021)
  - Chromium
  - Lead
  - Zinc
- MSD (Lab ID: 1927022)
  - Antimony
  - Barium
  - Chromium
  - Nickel
  - Zinc

R1: RPD value was outside control limits.

- MSD (Lab ID: 1927022)
  - Antimony
  - Beryllium

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PROJECT NARRATIVE

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Method: **EPA 6020A**
Description: 6020A MET ICPMS
Client: Braun-BLM
Date: April 10, 2015

QC Batch: MPRP/53233

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10300830002

R1: RPD value was outside control limits.

- Selenium

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Method: **EPA 6020A**
Description: 6020A MET ICPMS, Dissolved
Client: Braun-BLM
Date: April 10, 2015

General Information:
3 samples were analyzed for EPA 6020A. All samples were received in acceptable condition with any exceptions noted below.

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

Sample Preparation:
The samples were prepared in accordance with EPA 3020 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.

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:

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PROJECT NARRATIVE

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Method: **EPA 7470**
Description: 7470 Mercury, Dissolved
Client: Braun-BLM
Date: April 10, 2015

General Information:
3 samples were analyzed for EPA 7470. All samples were received in acceptable condition with any exceptions noted below.

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

Sample Preparation:
The samples were prepared in accordance with EPA 7470A 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.

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:

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PROJECT NARRATIVE

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Method: **EPA 7471B**
Description: 7471B Mercury
Client: Braun-BLM
Date: April 10, 2015

General Information:
12 samples were analyzed for EPA 7471B. All samples were received in acceptable condition with any exceptions noted below.

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

Sample Preparation:
The samples were prepared in accordance with EPA 7471B 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.

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:

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PROJECT NARRATIVE

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Method: **EPA 8270D by SIM**
Description: 8270D MSSV PAH by SIM
Client: Braun-BLM
Date: April 10, 2015

General Information:
12 samples were analyzed for EPA 8270D by SIM. All samples were received in acceptable condition with any exceptions noted below.

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

Sample Preparation:
The samples were prepared in accordance with EPA 3550 with any exceptions noted below.

QC Batch: OEXT/28695

P3: Sample extract could not be concentrated to the routine final volume, resulting in elevated reporting limits.
- PP-3 (1-2) (Lab ID: 10300830003)

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.

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:

Analyte Comments:

QC Batch: OEXT/28695

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
- PP-2 (2-4) (Lab ID: 10300830002)
  - 2-Fluorobiphenyl (S)
- PP-6 (3-5) (Lab ID: 10300830006)
  - 2-Fluorobiphenyl (S)

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PROJECT NARRATIVE

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Method: **EPA 8270D by SIM**
Description: 8270D MSSV PAH by SIM
Client: Braun-BLM
Date: April 10, 2015

Analyte Comments:

QC Batch: OEXT/28695

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- PP-7 (3-5) (Lab ID: 10300830007)
  - 2-Fluorobiphenyl (S)

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PROJECT NARRATIVE

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Method: **EPA 8260**
Description: 8260 MSV 5030 Med Level
Client: Braun-BLM
Date: April 10, 2015

General Information:
13 samples were analyzed for EPA 8260. All samples were received in acceptable condition with any exceptions noted below.

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

Sample Preparation:
The samples were prepared in accordance with EPA 5035/5030B with any exceptions noted below.

Initial Calibrations (including MS Tune as applicable):
All criteria were within method requirements with any exceptions noted below.

QC Batch: MSV/30929

SS: This analyte did not meet the secondary source verification criteria for the initial calibration. The reported result should be considered an estimated value.

- LCS (Lab ID: 1928307)
  - 1,1,2,2-Tetrachloroethane
- MS (Lab ID: 1928308)
  - 1,1,2,2-Tetrachloroethane

QC Batch: MSV/30935

SS: This analyte did not meet the secondary source verification criteria for the initial calibration. The reported result should be considered an estimated value.

- LCS (Lab ID: 1928536)
  - 1,1,2,2-Tetrachloroethane
- MS (Lab ID: 1928537)
  - 1,1,2,2-Tetrachloroethane

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

QC Batch: MSV/30929

CH: The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high.

- LCS (Lab ID: 1928307)
  - 1,1,2,2-Tetrachloroethane

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.

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

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PROJECT NARRATIVE

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Method: **EPA 8260**
Description: 8260 MSV 5030 Med Level
Client: Braun-BLM
Date: April 10, 2015

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.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: MSV/30929

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

- LCS (Lab ID: 1928307)
  - 1,1,2,2-Tetrachloroethane
- MS (Lab ID: 1928308)
  - 1,1,2,2-Tetrachloroethane

QC Batch: MSV/30935

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

- LCS (Lab ID: 1928536)
  - 1,1,2,2-Tetrachloroethane
- MS (Lab ID: 1928537)
  - 1,1,2,2-Tetrachloroethane

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PROJECT NARRATIVE

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Method: **EPA 8260**
Description: 8260 VOC
Client: Braun-BLM
Date: April 10, 2015

General Information:
3 samples were analyzed for EPA 8260. All samples were received in acceptable condition with any exceptions noted below.

Hold Time:
The samples were analyzed within the method required hold times 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.

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.

QC Batch: MSV/30955

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10300823003

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 1930696)
  - 1,2,4-Trichlorobenzene
  - 1,2-Dibromoethane (EDB)
  - 1,2-Dichlorobenzene
  - 1,3-Dichlorobenzene
  - 1,4-Dichlorobenzene
  - Hexachloro-1,3-butadiene
  - sec-Butylbenzene

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Method: **EPA 8260**
Description: 8260 VOC
Client: Braun-BLM
Date: April 10, 2015

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

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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-2 (2-4) **Lab ID: 10300830002** Collected: 03/25/15 16:30 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO GCS	Analytical Method: WI MOD DRO Preparation Method: WI MOD DRO							
WDRO C10-C28	**68.5**	mg/kg	19.6	2	03/30/15 10:25	04/01/15 10:11		T6
Surrogates								
n-Triacontane (S)	101	%.	50-150	2	03/30/15 10:25	04/01/15 10:11	638-68-6	
WIGRO GCV	Analytical Method: WI MOD GRO Preparation Method: EPA 5030 Medium Soil							
Gasoline Range Organics	**14.9**	mg/kg	12.0	1	04/06/15 09:34	04/08/15 12:48		
Surrogates								
a,a,a-Trifluorotoluene (S)	92	%.	80-150	1	04/06/15 09:34	04/08/15 12:48	98-08-8	
6020A MET ICPMS	Analytical Method: EPA 6020A Preparation Method: EPA 3050							
Antimony	ND	mg/kg	0.52	20	03/31/15 13:57	04/01/15 09:04	7440-36-0	M6,R1
Arsenic	**3.0**	mg/kg	0.52	20	03/31/15 13:57	04/01/15 09:04	7440-38-2	
Barium	**65.4**	mg/kg	0.31	20	03/31/15 13:57	04/01/15 09:04	7440-39-3	M6
Beryllium	**0.36**	mg/kg	0.21	20	03/31/15 13:57	04/01/15 09:04	7440-41-7	R1
Cadmium	**0.17**	mg/kg	0.083	20	03/31/15 13:57	04/01/15 09:04	7440-43-9	
Chromium	**8.4**	mg/kg	0.52	20	03/31/15 13:57	04/01/15 09:04	7440-47-3	M6
Copper	**7.0**	mg/kg	1.0	20	03/31/15 13:57	04/01/15 09:04	7440-50-8	
Lead	**16.2**	mg/kg	0.10	20	03/31/15 13:57	04/01/15 09:04	7439-92-1	M6
Nickel	**9.6**	mg/kg	0.52	20	03/31/15 13:57	04/01/15 09:04	7440-02-0	M6
Selenium	ND	mg/kg	0.52	20	03/31/15 13:57	04/01/15 09:04	7782-49-2	R1
Silver	ND	mg/kg	0.52	20	03/31/15 13:57	04/01/15 09:04	7440-22-4	
Thallium	**0.11**	mg/kg	0.10	20	03/31/15 13:57	04/01/15 09:04	7440-28-0	
Zinc	**60.6**	mg/kg	5.2	20	03/31/15 13:57	04/01/15 09:04	7440-66-6	M6
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	**0.022**	mg/kg	0.020	1	03/31/15 15:33	04/01/15 11:17	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**13.1**	%	0.10	1		03/30/15 11:43		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Acenaphthene	**0.86**	mg/kg	0.057	5	03/30/15 10:46	04/01/15 16:12	83-32-9	
Acenaphthylene	**0.36**	mg/kg	0.057	5	03/30/15 10:46	04/01/15 16:12	208-96-8	
Anthracene	**3.3**	mg/kg	0.23	20	03/30/15 10:46	04/01/15 16:34	120-12-7	
Benzo(a)anthracene	**8.3**	mg/kg	2.3	200	03/30/15 10:46	04/01/15 16:56	56-55-3	
Benzo(a)pyrene	**8.1**	mg/kg	2.3	200	03/30/15 10:46	04/01/15 16:56	50-32-8	
Benzo(b)fluoranthene	**9.2**	mg/kg	2.3	200	03/30/15 10:46	04/01/15 16:56	205-99-2	
Benzo(g,h,i)perylene	**4.4**	mg/kg	0.23	20	03/30/15 10:46	04/01/15 16:34	191-24-2	
Benzo(k)fluoranthene	**3.6**	mg/kg	0.23	20	03/30/15 10:46	04/01/15 16:34	207-08-9	
Chrysene	**8.4**	mg/kg	2.3	200	03/30/15 10:46	04/01/15 16:56	218-01-9	
Dibenz(a,h)anthracene	ND	mg/kg	0.057	5	03/30/15 10:46	04/01/15 16:12	53-70-3	
Fluoranthene	**16.2**	mg/kg	2.3	200	03/30/15 10:46	04/01/15 16:56	206-44-0	
Fluorene	**0.81**	mg/kg	0.057	5	03/30/15 10:46	04/01/15 16:12	86-73-7	
Indeno(1,2,3-cd)pyrene	**3.8**	mg/kg	0.23	20	03/30/15 10:46	04/01/15 16:34	193-39-5	
Naphthalene	**0.10**	mg/kg	0.057	5	03/30/15 10:46	04/01/15 16:12	91-20-3	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-2 (2-4) **Lab ID: 10300830002** Collected: 03/25/15 16:30 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Phenanthrene	**11.5**	mg/kg	2.3	200	03/30/15 10:46	04/01/15 16:56	85-01-8	
Pyrene	**21.4**	mg/kg	2.3	200	03/30/15 10:46	04/01/15 16:56	129-00-0	
Total BaP Eq. MN 2006sh. ND=0	**10.7**	mg/kg	2.3	200	03/30/15 10:46	04/01/15 16:56		
Surrogates								
2-Fluorobiphenyl (S)	89	%.	55-125	5	03/30/15 10:46	04/01/15 16:12	321-60-8	D3
p-Terphenyl-d14 (S)	56	%.	30-150	5	03/30/15 10:46	04/01/15 16:12	1718-51-0	
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Acetone	ND	mg/kg	1.3	1	03/31/15 11:46	04/01/15 18:57	67-64-1	
Allyl chloride	ND	mg/kg	0.26	1	03/31/15 11:46	04/01/15 18:57	107-05-1	
Benzene	ND	mg/kg	0.026	1	03/31/15 11:46	04/01/15 18:57	71-43-2	
Bromobenzene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	108-86-1	
Bromochloromethane	ND	mg/kg	0.26	1	03/31/15 11:46	04/01/15 18:57	74-97-5	
Bromodichloromethane	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	75-27-4	
Bromoform	ND	mg/kg	0.26	1	03/31/15 11:46	04/01/15 18:57	75-25-2	
Bromomethane	ND	mg/kg	0.66	1	03/31/15 11:46	04/01/15 18:57	74-83-9	
2-Butanone (MEK)	ND	mg/kg	0.33	1	03/31/15 11:46	04/01/15 18:57	78-93-3	
n-Butylbenzene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.26	1	03/31/15 11:46	04/01/15 18:57	56-23-5	
Chlorobenzene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	108-90-7	
Chloroethane	ND	mg/kg	0.66	1	03/31/15 11:46	04/01/15 18:57	75-00-3	
Chloroform	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	67-66-3	
Chloromethane	ND	mg/kg	0.26	1	03/31/15 11:46	04/01/15 18:57	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	106-43-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.66	1	03/31/15 11:46	04/01/15 18:57	96-12-8	
Dibromochloromethane	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	124-48-1	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	106-93-4	
Dibromomethane	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.26	1	03/31/15 11:46	04/01/15 18:57	75-71-8	
1,1-Dichloroethane	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.26	1	03/31/15 11:46	04/01/15 18:57	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.26	1	03/31/15 11:46	04/01/15 18:57	156-60-5	
Dichlorofluoromethane	ND	mg/kg	0.66	1	03/31/15 11:46	04/01/15 18:57	75-43-4	
1,2-Dichloropropane	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.26	1	03/31/15 11:46	04/01/15 18:57	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	10061-01-5	

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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-2 (2-4) **Lab ID: 10300830002** Collected: 03/25/15 16:30 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
trans-1,3-Dichloropropene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	10061-02-6	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.26	1	03/31/15 11:46	04/01/15 18:57	60-29-7	
Ethylbenzene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	100-41-4	
Hexachloro-1,3-butadiene	ND	mg/kg	0.33	1	03/31/15 11:46	04/01/15 18:57	87-68-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	99-87-6	
Methylene Chloride	ND	mg/kg	0.26	1	03/31/15 11:46	04/01/15 18:57	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.33	1	03/31/15 11:46	04/01/15 18:57	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	1634-04-4	
Naphthalene	ND	mg/kg	0.26	1	03/31/15 11:46	04/01/15 18:57	91-20-3	
n-Propylbenzene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	103-65-1	
Styrene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	79-34-5	
Tetrachloroethene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	127-18-4	
Tetrahydrofuran	ND	mg/kg	2.6	1	03/31/15 11:46	04/01/15 18:57	109-99-9	
Toluene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	120-82-1	
1,1,1-Trichloroethane	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	79-00-5	
Trichloroethene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.26	1	03/31/15 11:46	04/01/15 18:57	75-69-4	
1,2,3-Trichloropropane	ND	mg/kg	0.26	1	03/31/15 11:46	04/01/15 18:57	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.26	1	03/31/15 11:46	04/01/15 18:57	76-13-1	
1,2,4-Trimethylbenzene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.066	1	03/31/15 11:46	04/01/15 18:57	108-67-8	
Vinyl chloride	ND	mg/kg	0.026	1	03/31/15 11:46	04/01/15 18:57	75-01-4	
Xylene (Total)	ND	mg/kg	0.20	1	03/31/15 11:46	04/01/15 18:57	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	88	%.	55-150	1	03/31/15 11:46	04/01/15 18:57	17060-07-0	
Toluene-d8 (S)	101	%.	61-125	1	03/31/15 11:46	04/01/15 18:57	2037-26-5	
4-Bromofluorobenzene (S)	98	%.	54-131	1	03/31/15 11:46	04/01/15 18:57	460-00-4	

REPORT OF LABORATORY ANALYSIS

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Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-3 (1-2) **Lab ID: 10300830003** Collected: 03/25/15 17:00 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO GCS	Analytical Method: WI MOD DRO Preparation Method: WI MOD DRO							
WDRO C10-C28	**212**	mg/kg	85.7	10	03/30/15 10:25	04/01/15 10:18		T6
Surrogates								
n-Triacontane (S)	79	%.	50-150	10	03/30/15 10:25	04/01/15 10:18	638-68-6	
WIGRO GCV	Analytical Method: WI MOD GRO Preparation Method: EPA 5030 Medium Soil							
Gasoline Range Organics	ND	mg/kg	11.1	1	04/06/15 09:34	04/08/15 13:11		
Surrogates								
a,a,a-Trifluorotoluene (S)	92	%.	80-150	1	04/06/15 09:34	04/08/15 13:11	98-08-8	
6020A MET ICPMS	Analytical Method: EPA 6020A Preparation Method: EPA 3050							
Antimony	ND	mg/kg	0.45	20	03/31/15 13:57	04/01/15 08:56	7440-36-0	
Arsenic	**1.6**	mg/kg	0.45	20	03/31/15 13:57	04/01/15 08:56	7440-38-2	
Barium	**26.4**	mg/kg	0.27	20	03/31/15 13:57	04/01/15 08:56	7440-39-3	
Beryllium	ND	mg/kg	0.18	20	03/31/15 13:57	04/01/15 08:56	7440-41-7	
Cadmium	**0.085**	mg/kg	0.072	20	03/31/15 13:57	04/01/15 08:56	7440-43-9	
Chromium	**4.4**	mg/kg	0.45	20	03/31/15 13:57	04/01/15 08:56	7440-47-3	
Copper	**4.8**	mg/kg	0.90	20	03/31/15 13:57	04/01/15 08:56	7440-50-8	
Lead	**11.0**	mg/kg	0.090	20	03/31/15 13:57	04/01/15 08:56	7439-92-1	
Nickel	**5.3**	mg/kg	0.45	20	03/31/15 13:57	04/01/15 08:56	7440-02-0	
Selenium	ND	mg/kg	0.45	20	03/31/15 13:57	04/01/15 08:56	7782-49-2	
Silver	ND	mg/kg	0.45	20	03/31/15 13:57	04/01/15 08:56	7440-22-4	
Thallium	ND	mg/kg	0.090	20	03/31/15 13:57	04/01/15 08:56	7440-28-0	
Zinc	**27.2**	mg/kg	4.5	20	03/31/15 13:57	04/01/15 08:56	7440-66-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	**0.024**	mg/kg	0.019	1	03/31/15 15:33	04/01/15 11:23	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**5.0**	%	0.10	1		03/30/15 11:43		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Acenaphthene	**0.19**	mg/kg	0.052	1	03/30/15 10:46	04/01/15 19:28	83-32-9	
Acenaphthylene	**0.15**	mg/kg	0.052	1	03/30/15 10:46	04/01/15 19:28	208-96-8	
Anthracene	**0.53**	mg/kg	0.052	1	03/30/15 10:46	04/01/15 19:28	120-12-7	
Benzo(a)anthracene	**0.47**	mg/kg	0.052	1	03/30/15 10:46	04/01/15 19:28	56-55-3	
Benzo(a)pyrene	**0.52**	mg/kg	0.052	1	03/30/15 10:46	04/01/15 19:28	50-32-8	
Benzo(b)fluoranthene	**0.69**	mg/kg	0.052	1	03/30/15 10:46	04/01/15 19:28	205-99-2	
Benzo(g,h,i)perylene	**0.24**	mg/kg	0.052	1	03/30/15 10:46	04/01/15 19:28	191-24-2	
Benzo(k)fluoranthene	**0.27**	mg/kg	0.052	1	03/30/15 10:46	04/01/15 19:28	207-08-9	
Chrysene	**0.59**	mg/kg	0.052	1	03/30/15 10:46	04/01/15 19:28	218-01-9	
Dibenz(a,h)anthracene	ND	mg/kg	0.052	1	03/30/15 10:46	04/01/15 19:28	53-70-3	
Fluoranthene	**1.2**	mg/kg	0.052	1	03/30/15 10:46	04/01/15 19:28	206-44-0	
Fluorene	**0.35**	mg/kg	0.052	1	03/30/15 10:46	04/01/15 19:28	86-73-7	
Indeno(1,2,3-cd)pyrene	**0.20**	mg/kg	0.052	1	03/30/15 10:46	04/01/15 19:28	193-39-5	
Naphthalene	**0.056**	mg/kg	0.052	1	03/30/15 10:46	04/01/15 19:28	91-20-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-3 (1-2) **Lab ID: 10300830003** Collected: 03/25/15 17:00 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Phenanthrene	**1.7**	mg/kg	0.052	1	03/30/15 10:46	04/01/15 19:28	85-01-8	
Pyrene	**1.3**	mg/kg	0.052	1	03/30/15 10:46	04/01/15 19:28	129-00-0	
Total BaP Eq. MN 2006sh. ND=0	**0.69**	mg/kg	0.052	1	03/30/15 10:46	04/01/15 19:28		
Surrogates								
2-Fluorobiphenyl (S)	75	%.	55-125	1	03/30/15 10:46	04/01/15 19:28	321-60-8	P3
p-Terphenyl-d14 (S)	63	%.	30-150	1	03/30/15 10:46	04/01/15 19:28	1718-51-0	
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Acetone	ND	mg/kg	1.1	1	03/31/15 11:46	04/01/15 17:54	67-64-1	
Allyl chloride	ND	mg/kg	0.22	1	03/31/15 11:46	04/01/15 17:54	107-05-1	
Benzene	ND	mg/kg	0.022	1	03/31/15 11:46	04/01/15 17:54	71-43-2	
Bromobenzene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	108-86-1	
Bromochloromethane	ND	mg/kg	0.22	1	03/31/15 11:46	04/01/15 17:54	74-97-5	
Bromodichloromethane	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	75-27-4	
Bromoform	ND	mg/kg	0.22	1	03/31/15 11:46	04/01/15 17:54	75-25-2	
Bromomethane	ND	mg/kg	0.54	1	03/31/15 11:46	04/01/15 17:54	74-83-9	
2-Butanone (MEK)	ND	mg/kg	0.27	1	03/31/15 11:46	04/01/15 17:54	78-93-3	
n-Butylbenzene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.22	1	03/31/15 11:46	04/01/15 17:54	56-23-5	
Chlorobenzene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	108-90-7	
Chloroethane	ND	mg/kg	0.54	1	03/31/15 11:46	04/01/15 17:54	75-00-3	
Chloroform	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	67-66-3	
Chloromethane	ND	mg/kg	0.22	1	03/31/15 11:46	04/01/15 17:54	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	106-43-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.54	1	03/31/15 11:46	04/01/15 17:54	96-12-8	
Dibromochloromethane	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	124-48-1	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	106-93-4	
Dibromomethane	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.22	1	03/31/15 11:46	04/01/15 17:54	75-71-8	
1,1-Dichloroethane	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.22	1	03/31/15 11:46	04/01/15 17:54	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.22	1	03/31/15 11:46	04/01/15 17:54	156-60-5	
Dichlorofluoromethane	ND	mg/kg	0.54	1	03/31/15 11:46	04/01/15 17:54	75-43-4	
1,2-Dichloropropane	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.22	1	03/31/15 11:46	04/01/15 17:54	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	10061-01-5	

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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-3 (1-2) **Lab ID: 10300830003** Collected: 03/25/15 17:00 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
trans-1,3-Dichloropropene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	10061-02-6	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.22	1	03/31/15 11:46	04/01/15 17:54	60-29-7	
Ethylbenzene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	100-41-4	
Hexachloro-1,3-butadiene	ND	mg/kg	0.27	1	03/31/15 11:46	04/01/15 17:54	87-68-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	99-87-6	
Methylene Chloride	ND	mg/kg	0.22	1	03/31/15 11:46	04/01/15 17:54	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.27	1	03/31/15 11:46	04/01/15 17:54	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	1634-04-4	
Naphthalene	ND	mg/kg	0.22	1	03/31/15 11:46	04/01/15 17:54	91-20-3	
n-Propylbenzene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	103-65-1	
Styrene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	79-34-5	
Tetrachloroethene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	127-18-4	
Tetrahydrofuran	ND	mg/kg	2.2	1	03/31/15 11:46	04/01/15 17:54	109-99-9	
Toluene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	120-82-1	
1,1,1-Trichloroethane	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	79-00-5	
Trichloroethene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.22	1	03/31/15 11:46	04/01/15 17:54	75-69-4	
1,2,3-Trichloropropane	ND	mg/kg	0.22	1	03/31/15 11:46	04/01/15 17:54	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.22	1	03/31/15 11:46	04/01/15 17:54	76-13-1	
1,2,4-Trimethylbenzene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.054	1	03/31/15 11:46	04/01/15 17:54	108-67-8	
Vinyl chloride	ND	mg/kg	0.022	1	03/31/15 11:46	04/01/15 17:54	75-01-4	
Xylene (Total)	ND	mg/kg	0.16	1	03/31/15 11:46	04/01/15 17:54	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	87	%.	55-150	1	03/31/15 11:46	04/01/15 17:54	17060-07-0	
Toluene-d8 (S)	98	%.	61-125	1	03/31/15 11:46	04/01/15 17:54	2037-26-5	
4-Bromofluorobenzene (S)	99	%.	54-131	1	03/31/15 11:46	04/01/15 17:54	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-5 (2-4) **Lab ID: 10300830005** Collected: 03/26/15 08:40 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO GCS	Analytical Method: WI MOD DRO Preparation Method: WI MOD DRO							
WDRO C10-C28	ND	mg/kg	8.6	1	03/30/15 10:25	03/31/15 15:05		
Surrogates								
n-Triacontane (S)	70	%.	50-150	1	03/30/15 10:25	03/31/15 15:05	638-68-6	
WIGRO GCV	Analytical Method: WI MOD GRO Preparation Method: EPA 5030 Medium Soil							
Gasoline Range Organics	ND	mg/kg	11.4	1	04/06/15 09:34	04/06/15 22:34		
Surrogates								
a,a,a-Trifluorotoluene (S)	94	%.	80-150	1	04/06/15 09:34	04/06/15 22:34	98-08-8	
6020A MET ICPMS	Analytical Method: EPA 6020A Preparation Method: EPA 3050							
Antimony	ND	mg/kg	0.45	20	03/31/15 13:57	04/01/15 08:58	7440-36-0	
Arsenic	**3.1**	mg/kg	0.45	20	03/31/15 13:57	04/01/15 08:58	7440-38-2	
Barium	**25.3**	mg/kg	0.27	20	03/31/15 13:57	04/01/15 08:58	7440-39-3	
Beryllium	ND	mg/kg	0.18	20	03/31/15 13:57	04/01/15 08:58	7440-41-7	
Cadmium	**0.15**	mg/kg	0.072	20	03/31/15 13:57	04/01/15 08:58	7440-43-9	
Chromium	**4.1**	mg/kg	0.45	20	03/31/15 13:57	04/01/15 08:58	7440-47-3	
Copper	**3.2**	mg/kg	0.91	20	03/31/15 13:57	04/01/15 08:58	7440-50-8	
Lead	**16.2**	mg/kg	0.091	20	03/31/15 13:57	04/01/15 08:58	7439-92-1	
Nickel	**3.9**	mg/kg	0.45	20	03/31/15 13:57	04/01/15 08:58	7440-02-0	
Selenium	ND	mg/kg	0.45	20	03/31/15 13:57	04/01/15 08:58	7782-49-2	
Silver	ND	mg/kg	0.45	20	03/31/15 13:57	04/01/15 08:58	7440-22-4	
Thallium	ND	mg/kg	0.091	20	03/31/15 13:57	04/01/15 08:58	7440-28-0	
Zinc	**40.7**	mg/kg	4.5	20	03/31/15 13:57	04/01/15 08:58	7440-66-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	**0.030**	mg/kg	0.020	1	03/31/15 15:33	04/01/15 11:25	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**10.2**	%	0.10	1		03/30/15 11:43		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Acenaphthene	ND	mg/kg	0.011	1	03/30/15 10:46	04/01/15 13:41	83-32-9	
Acenaphthylene	**0.020**	mg/kg	0.011	1	03/30/15 10:46	04/01/15 13:41	208-96-8	
Anthracene	**0.019**	mg/kg	0.011	1	03/30/15 10:46	04/01/15 13:41	120-12-7	
Benzo(a)anthracene	**0.046**	mg/kg	0.011	1	03/30/15 10:46	04/01/15 13:41	56-55-3	
Benzo(a)pyrene	**0.063**	mg/kg	0.011	1	03/30/15 10:46	04/01/15 13:41	50-32-8	
Benzo(b)fluoranthene	**0.078**	mg/kg	0.011	1	03/30/15 10:46	04/01/15 13:41	205-99-2	
Benzo(g,h,i)perylene	**0.052**	mg/kg	0.011	1	03/30/15 10:46	04/01/15 13:41	191-24-2	
Benzo(k)fluoranthene	**0.027**	mg/kg	0.011	1	03/30/15 10:46	04/01/15 13:41	207-08-9	
Chrysene	**0.057**	mg/kg	0.011	1	03/30/15 10:46	04/01/15 13:41	218-01-9	
Dibenz(a,h)anthracene	ND	mg/kg	0.011	1	03/30/15 10:46	04/01/15 13:41	53-70-3	
Fluoranthene	**0.062**	mg/kg	0.011	1	03/30/15 10:46	04/01/15 13:41	206-44-0	
Fluorene	ND	mg/kg	0.011	1	03/30/15 10:46	04/01/15 13:41	86-73-7	
Indeno(1,2,3-cd)pyrene	**0.041**	mg/kg	0.011	1	03/30/15 10:46	04/01/15 13:41	193-39-5	
Naphthalene	ND	mg/kg	0.011	1	03/30/15 10:46	04/01/15 13:41	91-20-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-5 (2-4) **Lab ID: 10300830005** Collected: 03/26/15 08:40 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Phenanthrene	**0.035**	mg/kg	0.011	1	03/30/15 10:46	04/01/15 13:41	85-01-8	
Pyrene	**0.082**	mg/kg	0.011	1	03/30/15 10:46	04/01/15 13:41	129-00-0	
Total BaP Eq. MN 2006sh. ND=0	**0.083**	mg/kg	0.011	1	03/30/15 10:46	04/01/15 13:41		
Surrogates								
2-Fluorobiphenyl (S)	76	%.	55-125	1	03/30/15 10:46	04/01/15 13:41	321-60-8	
p-Terphenyl-d14 (S)	69	%.	30-150	1	03/30/15 10:46	04/01/15 13:41	1718-51-0	
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Acetone	ND	mg/kg	1.2	1	03/31/15 11:46	04/01/15 18:15	67-64-1	
Allyl chloride	ND	mg/kg	0.23	1	03/31/15 11:46	04/01/15 18:15	107-05-1	
Benzene	ND	mg/kg	0.023	1	03/31/15 11:46	04/01/15 18:15	71-43-2	
Bromobenzene	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	108-86-1	
Bromochloromethane	ND	mg/kg	0.23	1	03/31/15 11:46	04/01/15 18:15	74-97-5	
Bromodichloromethane	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	75-27-4	
Bromoform	ND	mg/kg	0.23	1	03/31/15 11:46	04/01/15 18:15	75-25-2	
Bromomethane	ND	mg/kg	0.58	1	03/31/15 11:46	04/01/15 18:15	74-83-9	
2-Butanone (MEK)	ND	mg/kg	0.29	1	03/31/15 11:46	04/01/15 18:15	78-93-3	
n-Butylbenzene	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.23	1	03/31/15 11:46	04/01/15 18:15	56-23-5	
Chlorobenzene	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	108-90-7	
Chloroethane	ND	mg/kg	0.58	1	03/31/15 11:46	04/01/15 18:15	75-00-3	
Chloroform	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	67-66-3	
Chloromethane	ND	mg/kg	0.23	1	03/31/15 11:46	04/01/15 18:15	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	106-43-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.58	1	03/31/15 11:46	04/01/15 18:15	96-12-8	
Dibromochloromethane	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	124-48-1	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	106-93-4	
Dibromomethane	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.23	1	03/31/15 11:46	04/01/15 18:15	75-71-8	
1,1-Dichloroethane	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.23	1	03/31/15 11:46	04/01/15 18:15	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.23	1	03/31/15 11:46	04/01/15 18:15	156-60-5	
Dichlorofluoromethane	ND	mg/kg	0.58	1	03/31/15 11:46	04/01/15 18:15	75-43-4	
1,2-Dichloropropane	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.23	1	03/31/15 11:46	04/01/15 18:15	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	10061-01-5	

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-5 (2-4) **Lab ID: 10300830005** Collected: 03/26/15 08:40 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
trans-1,3-Dichloropropene	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	10061-02-6	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.23	1	03/31/15 11:46	04/01/15 18:15	60-29-7	
Ethylbenzene	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	100-41-4	
Hexachloro-1,3-butadiene	ND	mg/kg	0.29	1	03/31/15 11:46	04/01/15 18:15	87-68-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	99-87-6	
Methylene Chloride	ND	mg/kg	0.23	1	03/31/15 11:46	04/01/15 18:15	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.29	1	03/31/15 11:46	04/01/15 18:15	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	1634-04-4	
Naphthalene	ND	mg/kg	0.23	1	03/31/15 11:46	04/01/15 18:15	91-20-3	
n-Propylbenzene	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	103-65-1	
Styrene	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	79-34-5	
Tetrachloroethene	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	127-18-4	
Tetrahydrofuran	ND	mg/kg	2.3	1	03/31/15 11:46	04/01/15 18:15	109-99-9	
Toluene	**0.069**	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	120-82-1	
1,1,1-Trichloroethane	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	79-00-5	
Trichloroethene	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.23	1	03/31/15 11:46	04/01/15 18:15	75-69-4	
1,2,3-Trichloropropane	ND	mg/kg	0.23	1	03/31/15 11:46	04/01/15 18:15	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.23	1	03/31/15 11:46	04/01/15 18:15	76-13-1	
1,2,4-Trimethylbenzene	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.058	1	03/31/15 11:46	04/01/15 18:15	108-67-8	
Vinyl chloride	ND	mg/kg	0.023	1	03/31/15 11:46	04/01/15 18:15	75-01-4	
Xylene (Total)	ND	mg/kg	0.17	1	03/31/15 11:46	04/01/15 18:15	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	87	%.	55-150	1	03/31/15 11:46	04/01/15 18:15	17060-07-0	
Toluene-d8 (S)	98	%.	61-125	1	03/31/15 11:46	04/01/15 18:15	2037-26-5	
4-Bromofluorobenzene (S)	102	%.	54-131	1	03/31/15 11:46	04/01/15 18:15	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-6 (3-5) **Lab ID: 10300830006** Collected: 03/26/15 09:15 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO GCS	Analytical Method: WI MOD DRO Preparation Method: WI MOD DRO							
WDRO C10-C28	**169**	mg/kg	46.8	5	03/30/15 10:25	04/01/15 10:32		T6
Surrogates								
n-Triacontane (S)	94	%.	50-150	5	03/30/15 10:25	04/01/15 10:32	638-68-6	
WIGRO GCV	Analytical Method: WI MOD GRO Preparation Method: EPA 5030 Medium Soil							
Gasoline Range Organics	ND	mg/kg	11.2	1	04/06/15 09:34	04/06/15 22:56		
Surrogates								
a,a,a-Trifluorotoluene (S)	98	%.	80-150	1	04/06/15 09:34	04/06/15 22:56	98-08-8	
6020A MET ICPMS	Analytical Method: EPA 6020A Preparation Method: EPA 3050							
Antimony	ND	mg/kg	0.44	20	03/31/15 13:57	04/01/15 09:01	7440-36-0	
Arsenic	**1.1**	mg/kg	0.44	20	03/31/15 13:57	04/01/15 09:01	7440-38-2	
Barium	**31.2**	mg/kg	0.26	20	03/31/15 13:57	04/01/15 09:01	7440-39-3	
Beryllium	ND	mg/kg	0.18	20	03/31/15 13:57	04/01/15 09:01	7440-41-7	
Cadmium	ND	mg/kg	0.071	20	03/31/15 13:57	04/01/15 09:01	7440-43-9	
Chromium	**3.8**	mg/kg	0.44	20	03/31/15 13:57	04/01/15 09:01	7440-47-3	
Copper	**1.8**	mg/kg	0.88	20	03/31/15 13:57	04/01/15 09:01	7440-50-8	
Lead	**2.5**	mg/kg	0.088	20	03/31/15 13:57	04/01/15 09:01	7439-92-1	
Nickel	**3.6**	mg/kg	0.44	20	03/31/15 13:57	04/01/15 09:01	7440-02-0	
Selenium	ND	mg/kg	0.44	20	03/31/15 13:57	04/01/15 09:01	7782-49-2	
Silver	ND	mg/kg	0.44	20	03/31/15 13:57	04/01/15 09:01	7440-22-4	
Thallium	ND	mg/kg	0.088	20	03/31/15 13:57	04/01/15 09:01	7440-28-0	
Zinc	**13.7**	mg/kg	4.4	20	03/31/15 13:57	04/01/15 09:01	7440-66-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	ND	mg/kg	0.020	1	03/31/15 15:33	04/01/15 11:27	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**12.2**	%	0.10	1		03/30/15 11:43		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Acenaphthene	**0.58**	mg/kg	0.057	5	03/30/15 10:46	04/01/15 17:39	83-32-9	
Acenaphthylene	**0.25**	mg/kg	0.057	5	03/30/15 10:46	04/01/15 17:39	208-96-8	
Anthracene	**1.6**	mg/kg	0.057	5	03/30/15 10:46	04/01/15 17:39	120-12-7	
Benzo(a)anthracene	**1.8**	mg/kg	0.057	5	03/30/15 10:46	04/01/15 17:39	56-55-3	
Benzo(a)pyrene	**1.6**	mg/kg	0.057	5	03/30/15 10:46	04/01/15 17:39	50-32-8	
Benzo(b)fluoranthene	**1.8**	mg/kg	0.23	20	03/30/15 10:46	04/01/15 18:01	205-99-2	
Benzo(g,h,i)perylene	**0.72**	mg/kg	0.057	5	03/30/15 10:46	04/01/15 17:39	191-24-2	
Benzo(k)fluoranthene	**0.76**	mg/kg	0.057	5	03/30/15 10:46	04/01/15 17:39	207-08-9	
Chrysene	**1.8**	mg/kg	0.057	5	03/30/15 10:46	04/01/15 17:39	218-01-9	
Dibenz(a,h)anthracene	ND	mg/kg	0.057	5	03/30/15 10:46	04/01/15 17:39	53-70-3	
Fluoranthene	**3.7**	mg/kg	0.23	20	03/30/15 10:46	04/01/15 18:01	206-44-0	
Fluorene	**1.1**	mg/kg	0.057	5	03/30/15 10:46	04/01/15 17:39	86-73-7	
Indeno(1,2,3-cd)pyrene	**0.72**	mg/kg	0.057	5	03/30/15 10:46	04/01/15 17:39	193-39-5	
Naphthalene	**0.44**	mg/kg	0.057	5	03/30/15 10:46	04/01/15 17:39	91-20-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-6 (3-5) **Lab ID: 10300830006** Collected: 03/26/15 09:15 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Phenanthrene	**4.2**	mg/kg	0.23	20	03/30/15 10:46	04/01/15 18:01	85-01-8	
Pyrene	**4.2**	mg/kg	0.23	20	03/30/15 10:46	04/01/15 18:01	129-00-0	
Total BaP Eq. MN 2006sh. ND=0	**2.1**	mg/kg	0.23	20	03/30/15 10:46	04/01/15 18:01		
Surrogates								
2-Fluorobiphenyl (S)	87	%.	55-125	5	03/30/15 10:46	04/01/15 17:39	321-60-8	D3
p-Terphenyl-d14 (S)	81	%.	30-150	5	03/30/15 10:46	04/01/15 17:39	1718-51-0	
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Acetone	ND	mg/kg	1.2	1	03/31/15 11:46	04/01/15 18:36	67-64-1	
Allyl chloride	ND	mg/kg	0.24	1	03/31/15 11:46	04/01/15 18:36	107-05-1	
Benzene	ND	mg/kg	0.024	1	03/31/15 11:46	04/01/15 18:36	71-43-2	
Bromobenzene	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	108-86-1	
Bromochloromethane	ND	mg/kg	0.24	1	03/31/15 11:46	04/01/15 18:36	74-97-5	
Bromodichloromethane	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	75-27-4	
Bromoform	ND	mg/kg	0.24	1	03/31/15 11:46	04/01/15 18:36	75-25-2	
Bromomethane	ND	mg/kg	0.59	1	03/31/15 11:46	04/01/15 18:36	74-83-9	
2-Butanone (MEK)	ND	mg/kg	0.29	1	03/31/15 11:46	04/01/15 18:36	78-93-3	
n-Butylbenzene	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.24	1	03/31/15 11:46	04/01/15 18:36	56-23-5	
Chlorobenzene	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	108-90-7	
Chloroethane	ND	mg/kg	0.59	1	03/31/15 11:46	04/01/15 18:36	75-00-3	
Chloroform	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	67-66-3	
Chloromethane	ND	mg/kg	0.24	1	03/31/15 11:46	04/01/15 18:36	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	106-43-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.59	1	03/31/15 11:46	04/01/15 18:36	96-12-8	
Dibromochloromethane	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	124-48-1	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	106-93-4	
Dibromomethane	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.24	1	03/31/15 11:46	04/01/15 18:36	75-71-8	
1,1-Dichloroethane	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.24	1	03/31/15 11:46	04/01/15 18:36	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.24	1	03/31/15 11:46	04/01/15 18:36	156-60-5	
Dichlorofluoromethane	ND	mg/kg	0.59	1	03/31/15 11:46	04/01/15 18:36	75-43-4	
1,2-Dichloropropane	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.24	1	03/31/15 11:46	04/01/15 18:36	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	10061-01-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-6 (3-5) **Lab ID: 10300830006** Collected: 03/26/15 09:15 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
trans-1,3-Dichloropropene	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	10061-02-6	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.24	1	03/31/15 11:46	04/01/15 18:36	60-29-7	
Ethylbenzene	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	100-41-4	
Hexachloro-1,3-butadiene	ND	mg/kg	0.29	1	03/31/15 11:46	04/01/15 18:36	87-68-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	99-87-6	
Methylene Chloride	ND	mg/kg	0.24	1	03/31/15 11:46	04/01/15 18:36	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.29	1	03/31/15 11:46	04/01/15 18:36	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	1634-04-4	
Naphthalene	**0.40**	mg/kg	0.24	1	03/31/15 11:46	04/01/15 18:36	91-20-3	
n-Propylbenzene	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	103-65-1	
Styrene	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	79-34-5	
Tetrachloroethene	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	127-18-4	
Tetrahydrofuran	ND	mg/kg	2.4	1	03/31/15 11:46	04/01/15 18:36	109-99-9	
Toluene	**0.069**	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	120-82-1	
1,1,1-Trichloroethane	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	79-00-5	
Trichloroethene	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.24	1	03/31/15 11:46	04/01/15 18:36	75-69-4	
1,2,3-Trichloropropane	ND	mg/kg	0.24	1	03/31/15 11:46	04/01/15 18:36	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.24	1	03/31/15 11:46	04/01/15 18:36	76-13-1	
1,2,4-Trimethylbenzene	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.059	1	03/31/15 11:46	04/01/15 18:36	108-67-8	
Vinyl chloride	ND	mg/kg	0.024	1	03/31/15 11:46	04/01/15 18:36	75-01-4	
Xylene (Total)	ND	mg/kg	0.18	1	03/31/15 11:46	04/01/15 18:36	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	88	%.	55-150	1	03/31/15 11:46	04/01/15 18:36	17060-07-0	
Toluene-d8 (S)	99	%.	61-125	1	03/31/15 11:46	04/01/15 18:36	2037-26-5	
4-Bromofluorobenzene (S)	97	%.	54-131	1	03/31/15 11:46	04/01/15 18:36	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-7 (3-5) **Lab ID: 10300830007** Collected: 03/26/15 09:50 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO GCS	Analytical Method: WI MOD DRO Preparation Method: WI MOD DRO							
WDRO C10-C28	**112**	mg/kg	42.2	5	03/30/15 10:25	04/01/15 10:25		T6
Surrogates								
n-Triacontane (S)	84	%.	50-150	5	03/30/15 10:25	04/01/15 10:25	638-68-6	
WIGRO GCV	Analytical Method: WI MOD GRO Preparation Method: EPA 5030 Medium Soil							
Gasoline Range Organics	ND	mg/kg	11.0	1	04/06/15 09:34	04/06/15 23:18		
Surrogates								
a,a,a-Trifluorotoluene (S)	98	%.	80-150	1	04/06/15 09:34	04/06/15 23:18	98-08-8	
6020A MET ICPMS	Analytical Method: EPA 6020A Preparation Method: EPA 3050							
Antimony	**0.53**	mg/kg	0.51	20	03/31/15 13:57	04/01/15 09:24	7440-36-0	
Arsenic	**2.6**	mg/kg	0.51	20	03/31/15 13:57	04/01/15 09:24	7440-38-2	
Barium	**58.2**	mg/kg	0.31	20	03/31/15 13:57	04/01/15 09:24	7440-39-3	
Beryllium	ND	mg/kg	0.20	20	03/31/15 13:57	04/01/15 09:24	7440-41-7	
Cadmium	**0.72**	mg/kg	0.081	20	03/31/15 13:57	04/01/15 09:24	7440-43-9	
Chromium	**7.5**	mg/kg	0.51	20	03/31/15 13:57	04/01/15 09:24	7440-47-3	
Copper	**14.6**	mg/kg	1.0	20	03/31/15 13:57	04/01/15 09:24	7440-50-8	
Lead	**99.4**	mg/kg	0.10	20	03/31/15 13:57	04/01/15 09:24	7439-92-1	
Nickel	**9.9**	mg/kg	0.51	20	03/31/15 13:57	04/01/15 09:24	7440-02-0	
Selenium	ND	mg/kg	0.51	20	03/31/15 13:57	04/01/15 09:24	7782-49-2	
Silver	ND	mg/kg	0.51	20	03/31/15 13:57	04/01/15 09:24	7440-22-4	
Thallium	ND	mg/kg	0.10	20	03/31/15 13:57	04/01/15 09:24	7440-28-0	
Zinc	**90.6**	mg/kg	5.1	20	03/31/15 13:57	04/01/15 09:24	7440-66-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	**0.069**	mg/kg	0.021	1	03/31/15 15:33	04/01/15 11:33	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**7.2**	%	0.10	1		03/30/15 11:43		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Acenaphthene	**0.082**	mg/kg	0.054	5	03/30/15 10:46	04/01/15 18:23	83-32-9	
Acenaphthylene	**0.074**	mg/kg	0.054	5	03/30/15 10:46	04/01/15 18:23	208-96-8	
Anthracene	**0.22**	mg/kg	0.054	5	03/30/15 10:46	04/01/15 18:23	120-12-7	
Benzo(a)anthracene	**0.62**	mg/kg	0.054	5	03/30/15 10:46	04/01/15 18:23	56-55-3	
Benzo(a)pyrene	**0.94**	mg/kg	0.054	5	03/30/15 10:46	04/01/15 18:23	50-32-8	
Benzo(b)fluoranthene	**1.0**	mg/kg	0.054	5	03/30/15 10:46	04/01/15 18:23	205-99-2	
Benzo(g,h,i)perylene	**0.59**	mg/kg	0.054	5	03/30/15 10:46	04/01/15 18:23	191-24-2	
Benzo(k)fluoranthene	**0.43**	mg/kg	0.054	5	03/30/15 10:46	04/01/15 18:23	207-08-9	
Chrysene	**0.71**	mg/kg	0.054	5	03/30/15 10:46	04/01/15 18:23	218-01-9	
Dibenz(a,h)anthracene	ND	mg/kg	0.054	5	03/30/15 10:46	04/01/15 18:23	53-70-3	
Fluoranthene	**0.94**	mg/kg	0.054	5	03/30/15 10:46	04/01/15 18:23	206-44-0	
Fluorene	**0.062**	mg/kg	0.054	5	03/30/15 10:46	04/01/15 18:23	86-73-7	
Indeno(1,2,3-cd)pyrene	**0.51**	mg/kg	0.054	5	03/30/15 10:46	04/01/15 18:23	193-39-5	
Naphthalene	ND	mg/kg	0.054	5	03/30/15 10:46	04/01/15 18:23	91-20-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-7 (3-5) **Lab ID: 10300830007** Collected: 03/26/15 09:50 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Phenanthrene	**0.71**	mg/kg	0.054	5	03/30/15 10:46	04/01/15 18:23	85-01-8	
Pyrene	**1.2**	mg/kg	0.054	5	03/30/15 10:46	04/01/15 18:23	129-00-0	
Total BaP Eq. MN 2006sh. ND=0	**1.2**	mg/kg	0.054	5	03/30/15 10:46	04/01/15 18:23		
Surrogates								
2-Fluorobiphenyl (S)	84	%.	55-125	5	03/30/15 10:46	04/01/15 18:23	321-60-8	D3
p-Terphenyl-d14 (S)	87	%.	30-150	5	03/30/15 10:46	04/01/15 18:23	1718-51-0	
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Acetone	ND	mg/kg	1.0	1	04/01/15 09:05	04/01/15 19:59	67-64-1	
Allyl chloride	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 19:59	107-05-1	
Benzene	ND	mg/kg	0.021	1	04/01/15 09:05	04/01/15 19:59	71-43-2	
Bromobenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	108-86-1	
Bromochloromethane	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 19:59	74-97-5	
Bromodichloromethane	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	75-27-4	
Bromoform	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 19:59	75-25-2	
Bromomethane	ND	mg/kg	0.52	1	04/01/15 09:05	04/01/15 19:59	74-83-9	
2-Butanone (MEK)	ND	mg/kg	0.26	1	04/01/15 09:05	04/01/15 19:59	78-93-3	
n-Butylbenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 19:59	56-23-5	
Chlorobenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	108-90-7	
Chloroethane	ND	mg/kg	0.52	1	04/01/15 09:05	04/01/15 19:59	75-00-3	
Chloroform	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	67-66-3	
Chloromethane	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 19:59	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	106-43-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.52	1	04/01/15 09:05	04/01/15 19:59	96-12-8	
Dibromochloromethane	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	124-48-1	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	106-93-4	
Dibromomethane	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 19:59	75-71-8	
1,1-Dichloroethane	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 19:59	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 19:59	156-60-5	
Dichlorofluoromethane	ND	mg/kg	0.52	1	04/01/15 09:05	04/01/15 19:59	75-43-4	
1,2-Dichloropropane	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 19:59	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	10061-01-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-7 (3-5) **Lab ID: 10300830007** Collected: 03/26/15 09:50 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
trans-1,3-Dichloropropene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	10061-02-6	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 19:59	60-29-7	
Ethylbenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	100-41-4	
Hexachloro-1,3-butadiene	ND	mg/kg	0.26	1	04/01/15 09:05	04/01/15 19:59	87-68-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	99-87-6	
Methylene Chloride	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 19:59	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.26	1	04/01/15 09:05	04/01/15 19:59	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	1634-04-4	
Naphthalene	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 19:59	91-20-3	
n-Propylbenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	103-65-1	
Styrene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	79-34-5	
Tetrachloroethene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	127-18-4	
Tetrahydrofuran	ND	mg/kg	2.1	1	04/01/15 09:05	04/01/15 19:59	109-99-9	
Toluene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	120-82-1	
1,1,1-Trichloroethane	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	79-00-5	
Trichloroethene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 19:59	75-69-4	
1,2,3-Trichloropropane	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 19:59	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 19:59	76-13-1	
1,2,4-Trimethylbenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 19:59	108-67-8	
Vinyl chloride	ND	mg/kg	0.021	1	04/01/15 09:05	04/01/15 19:59	75-01-4	
Xylene (Total)	ND	mg/kg	0.16	1	04/01/15 09:05	04/01/15 19:59	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	87	%.	55-150	1	04/01/15 09:05	04/01/15 19:59	17060-07-0	
Toluene-d8 (S)	100	%.	61-125	1	04/01/15 09:05	04/01/15 19:59	2037-26-5	
4-Bromofluorobenzene (S)	98	%.	54-131	1	04/01/15 09:05	04/01/15 19:59	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-8 (2) **Lab ID: 10300830008** Collected: 03/25/15 09:45 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO GCS	Analytical Method: WI MOD DRO Preparation Method: WI MOD DRO							
WDRO C10-C28	ND	mg/kg	9.5	1	03/30/15 10:25	03/31/15 15:54		
Surrogates								
n-Triacontane (S)	72	%.	50-150	1	03/30/15 10:25	03/31/15 15:54	638-68-6	
WIGRO GCV	Analytical Method: WI MOD GRO Preparation Method: EPA 5030 Medium Soil							
Gasoline Range Organics	ND	mg/kg	11.5	1	04/08/15 13:24	04/08/15 15:49		
Surrogates								
a,a,a-Trifluorotoluene (S)	91	%.	80-150	1	04/08/15 13:24	04/08/15 15:49	98-08-8	
6020A MET ICPMS	Analytical Method: EPA 6020A Preparation Method: EPA 3050							
Antimony	ND	mg/kg	0.49	20	03/31/15 13:57	04/01/15 09:27	7440-36-0	
Arsenic	**2.2**	mg/kg	0.49	20	03/31/15 13:57	04/01/15 09:27	7440-38-2	
Barium	**94.6**	mg/kg	0.30	20	03/31/15 13:57	04/01/15 09:27	7440-39-3	
Beryllium	**0.30**	mg/kg	0.20	20	03/31/15 13:57	04/01/15 09:27	7440-41-7	
Cadmium	ND	mg/kg	0.079	20	03/31/15 13:57	04/01/15 09:27	7440-43-9	
Chromium	**7.9**	mg/kg	0.49	20	03/31/15 13:57	04/01/15 09:27	7440-47-3	
Copper	**4.7**	mg/kg	0.99	20	03/31/15 13:57	04/01/15 09:27	7440-50-8	
Lead	**5.0**	mg/kg	0.099	20	03/31/15 13:57	04/01/15 09:27	7439-92-1	
Nickel	**8.3**	mg/kg	0.49	20	03/31/15 13:57	04/01/15 09:27	7440-02-0	
Selenium	ND	mg/kg	0.49	20	03/31/15 13:57	04/01/15 09:27	7782-49-2	
Silver	ND	mg/kg	0.49	20	03/31/15 13:57	04/01/15 09:27	7440-22-4	
Thallium	ND	mg/kg	0.099	20	03/31/15 13:57	04/01/15 09:27	7440-28-0	
Zinc	**27.1**	mg/kg	4.9	20	03/31/15 13:57	04/01/15 09:27	7440-66-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	ND	mg/kg	0.023	1	03/31/15 15:33	04/01/15 11:35	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**14.8**	%	0.10	1		03/30/15 11:44		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Acenaphthene	ND	mg/kg	0.012	1	03/30/15 10:46	03/31/15 15:28	83-32-9	
Acenaphthylene	ND	mg/kg	0.012	1	03/30/15 10:46	03/31/15 15:28	208-96-8	
Anthracene	ND	mg/kg	0.012	1	03/30/15 10:46	03/31/15 15:28	120-12-7	
Benzo(a)anthracene	ND	mg/kg	0.012	1	03/30/15 10:46	03/31/15 15:28	56-55-3	
Benzo(a)pyrene	ND	mg/kg	0.012	1	03/30/15 10:46	03/31/15 15:28	50-32-8	
Benzo(b)fluoranthene	ND	mg/kg	0.012	1	03/30/15 10:46	03/31/15 15:28	205-99-2	
Benzo(g,h,i)perylene	ND	mg/kg	0.012	1	03/30/15 10:46	03/31/15 15:28	191-24-2	
Benzo(k)fluoranthene	ND	mg/kg	0.012	1	03/30/15 10:46	03/31/15 15:28	207-08-9	
Chrysene	ND	mg/kg	0.012	1	03/30/15 10:46	03/31/15 15:28	218-01-9	
Dibenz(a,h)anthracene	ND	mg/kg	0.012	1	03/30/15 10:46	03/31/15 15:28	53-70-3	
Fluoranthene	ND	mg/kg	0.012	1	03/30/15 10:46	03/31/15 15:28	206-44-0	
Fluorene	ND	mg/kg	0.012	1	03/30/15 10:46	03/31/15 15:28	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	mg/kg	0.012	1	03/30/15 10:46	03/31/15 15:28	193-39-5	
Naphthalene	ND	mg/kg	0.012	1	03/30/15 10:46	03/31/15 15:28	91-20-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-8 (2) **Lab ID: 10300830008** Collected: 03/25/15 09:45 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Phenanthrene	ND	mg/kg	0.012	1	03/30/15 10:46	03/31/15 15:28	85-01-8	
Pyrene	ND	mg/kg	0.012	1	03/30/15 10:46	03/31/15 15:28	129-00-0	
Total BaP Eq. MN 2006sh. ND=0	ND	mg/kg	0.012	1	03/30/15 10:46	03/31/15 15:28		
Surrogates								
2-Fluorobiphenyl (S)	56	%.	55-125	1	03/30/15 10:46	03/31/15 15:28	321-60-8	
p-Terphenyl-d14 (S)	60	%.	30-150	1	03/30/15 10:46	03/31/15 15:28	1718-51-0	
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Acetone	ND	mg/kg	1.2	1	04/01/15 09:05	04/01/15 20:19	67-64-1	
Allyl chloride	ND	mg/kg	0.24	1	04/01/15 09:05	04/01/15 20:19	107-05-1	
Benzene	ND	mg/kg	0.024	1	04/01/15 09:05	04/01/15 20:19	71-43-2	
Bromobenzene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	108-86-1	
Bromochloromethane	ND	mg/kg	0.24	1	04/01/15 09:05	04/01/15 20:19	74-97-5	
Bromodichloromethane	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	75-27-4	
Bromoform	ND	mg/kg	0.24	1	04/01/15 09:05	04/01/15 20:19	75-25-2	
Bromomethane	ND	mg/kg	0.59	1	04/01/15 09:05	04/01/15 20:19	74-83-9	
2-Butanone (MEK)	ND	mg/kg	0.30	1	04/01/15 09:05	04/01/15 20:19	78-93-3	
n-Butylbenzene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.24	1	04/01/15 09:05	04/01/15 20:19	56-23-5	
Chlorobenzene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	108-90-7	
Chloroethane	ND	mg/kg	0.59	1	04/01/15 09:05	04/01/15 20:19	75-00-3	
Chloroform	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	67-66-3	
Chloromethane	ND	mg/kg	0.24	1	04/01/15 09:05	04/01/15 20:19	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	106-43-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.59	1	04/01/15 09:05	04/01/15 20:19	96-12-8	
Dibromochloromethane	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	124-48-1	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	106-93-4	
Dibromomethane	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.24	1	04/01/15 09:05	04/01/15 20:19	75-71-8	
1,1-Dichloroethane	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.24	1	04/01/15 09:05	04/01/15 20:19	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.24	1	04/01/15 09:05	04/01/15 20:19	156-60-5	
Dichlorofluoromethane	ND	mg/kg	0.59	1	04/01/15 09:05	04/01/15 20:19	75-43-4	
1,2-Dichloropropane	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.24	1	04/01/15 09:05	04/01/15 20:19	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	10061-01-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-8 (2) **Lab ID: 10300830008** Collected: 03/25/15 09:45 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
trans-1,3-Dichloropropene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	10061-02-6	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.24	1	04/01/15 09:05	04/01/15 20:19	60-29-7	
Ethylbenzene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	100-41-4	
Hexachloro-1,3-butadiene	ND	mg/kg	0.30	1	04/01/15 09:05	04/01/15 20:19	87-68-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	99-87-6	
Methylene Chloride	ND	mg/kg	0.24	1	04/01/15 09:05	04/01/15 20:19	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.30	1	04/01/15 09:05	04/01/15 20:19	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	1634-04-4	
Naphthalene	ND	mg/kg	0.24	1	04/01/15 09:05	04/01/15 20:19	91-20-3	
n-Propylbenzene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	103-65-1	
Styrene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	79-34-5	
Tetrachloroethene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	127-18-4	
Tetrahydrofuran	ND	mg/kg	2.4	1	04/01/15 09:05	04/01/15 20:19	109-99-9	
Toluene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	120-82-1	
1,1,1-Trichloroethane	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	79-00-5	
Trichloroethene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.24	1	04/01/15 09:05	04/01/15 20:19	75-69-4	
1,2,3-Trichloropropane	ND	mg/kg	0.24	1	04/01/15 09:05	04/01/15 20:19	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.24	1	04/01/15 09:05	04/01/15 20:19	76-13-1	
1,2,4-Trimethylbenzene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.059	1	04/01/15 09:05	04/01/15 20:19	108-67-8	
Vinyl chloride	ND	mg/kg	0.024	1	04/01/15 09:05	04/01/15 20:19	75-01-4	
Xylene (Total)	ND	mg/kg	0.18	1	04/01/15 09:05	04/01/15 20:19	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	90	%.	55-150	1	04/01/15 09:05	04/01/15 20:19	17060-07-0	
Toluene-d8 (S)	102	%.	61-125	1	04/01/15 09:05	04/01/15 20:19	2037-26-5	
4-Bromofluorobenzene (S)	98	%.	54-131	1	04/01/15 09:05	04/01/15 20:19	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-10 (2) **Lab ID: 10300830010** Collected: 03/25/15 12:00 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO GCS	Analytical Method: WI MOD DRO Preparation Method: WI MOD DRO							
WDRO C10-C28	**46.1**	mg/kg	9.4	1	03/30/15 10:25	03/31/15 14:58		T6
Surrogates								
n-Triacontane (S)	71	%.	50-150	1	03/30/15 10:25	03/31/15 14:58	638-68-6	
WIGRO GCV	Analytical Method: WI MOD GRO Preparation Method: EPA 5030 Medium Soil							
Gasoline Range Organics	ND	mg/kg	11.3	1	04/08/15 13:24	04/08/15 16:11		
Surrogates								
a,a,a-Trifluorotoluene (S)	92	%.	80-150	1	04/08/15 13:24	04/08/15 16:11	98-08-8	
6020A MET ICPMS	Analytical Method: EPA 6020A Preparation Method: EPA 3050							
Antimony	ND	mg/kg	0.55	20	03/31/15 13:57	04/01/15 09:30	7440-36-0	
Arsenic	**2.4**	mg/kg	0.55	20	03/31/15 13:57	04/01/15 09:30	7440-38-2	
Barium	**43.5**	mg/kg	0.33	20	03/31/15 13:57	04/01/15 09:30	7440-39-3	
Beryllium	ND	mg/kg	0.22	20	03/31/15 13:57	04/01/15 09:30	7440-41-7	
Cadmium	**1.3**	mg/kg	0.088	20	03/31/15 13:57	04/01/15 09:30	7440-43-9	
Chromium	**12.7**	mg/kg	0.55	20	03/31/15 13:57	04/01/15 09:30	7440-47-3	
Copper	**18.6**	mg/kg	1.1	20	03/31/15 13:57	04/01/15 09:30	7440-50-8	
Lead	**24.4**	mg/kg	0.11	20	03/31/15 13:57	04/01/15 09:30	7439-92-1	
Nickel	**10.3**	mg/kg	0.55	20	03/31/15 13:57	04/01/15 09:30	7440-02-0	
Selenium	ND	mg/kg	0.55	20	03/31/15 13:57	04/01/15 09:30	7782-49-2	
Silver	ND	mg/kg	0.55	20	03/31/15 13:57	04/01/15 09:30	7440-22-4	
Thallium	ND	mg/kg	0.11	20	03/31/15 13:57	04/01/15 09:30	7440-28-0	
Zinc	**84.6**	mg/kg	5.5	20	03/31/15 13:57	04/01/15 09:30	7440-66-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	**0.025**	mg/kg	0.021	1	03/31/15 15:33	04/01/15 11:37	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**13.9**	%	0.10	1		03/30/15 11:44		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Acenaphthene	ND	mg/kg	0.012	1	03/30/15 10:46	04/01/15 15:51	83-32-9	
Acenaphthylene	**0.029**	mg/kg	0.012	1	03/30/15 10:46	04/01/15 15:51	208-96-8	
Anthracene	**0.028**	mg/kg	0.012	1	03/30/15 10:46	04/01/15 15:51	120-12-7	
Benzo(a)anthracene	**0.045**	mg/kg	0.012	1	03/30/15 10:46	04/01/15 15:51	56-55-3	
Benzo(a)pyrene	**0.076**	mg/kg	0.012	1	03/30/15 10:46	04/01/15 15:51	50-32-8	
Benzo(b)fluoranthene	**0.11**	mg/kg	0.012	1	03/30/15 10:46	04/01/15 15:51	205-99-2	
Benzo(g,h,i)perylene	**0.096**	mg/kg	0.012	1	03/30/15 10:46	04/01/15 15:51	191-24-2	
Benzo(k)fluoranthene	**0.039**	mg/kg	0.012	1	03/30/15 10:46	04/01/15 15:51	207-08-9	
Chrysene	**0.064**	mg/kg	0.012	1	03/30/15 10:46	04/01/15 15:51	218-01-9	
Dibenz(a,h)anthracene	ND	mg/kg	0.012	1	03/30/15 10:46	04/01/15 15:51	53-70-3	
Fluoranthene	**0.070**	mg/kg	0.012	1	03/30/15 10:46	04/01/15 15:51	206-44-0	
Fluorene	ND	mg/kg	0.012	1	03/30/15 10:46	04/01/15 15:51	86-73-7	
Indeno(1,2,3-cd)pyrene	**0.065**	mg/kg	0.012	1	03/30/15 10:46	04/01/15 15:51	193-39-5	
Naphthalene	ND	mg/kg	0.012	1	03/30/15 10:46	04/01/15 15:51	91-20-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-10 (2) **Lab ID: 10300830010** Collected: 03/25/15 12:00 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Phenanthrene	**0.048**	mg/kg	0.012	1	03/30/15 10:46	04/01/15 15:51	85-01-8	
Pyrene	**0.085**	mg/kg	0.012	1	03/30/15 10:46	04/01/15 15:51	129-00-0	
Total BaP Eq. MN 2006sh. ND=0	**0.10**	mg/kg	0.012	1	03/30/15 10:46	04/01/15 15:51		
Surrogates								
2-Fluorobiphenyl (S)	74	%.	55-125	1	03/30/15 10:46	04/01/15 15:51	321-60-8	
p-Terphenyl-d14 (S)	70	%.	30-150	1	03/30/15 10:46	04/01/15 15:51	1718-51-0	
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Acetone	ND	mg/kg	1.3	1	04/01/15 09:05	04/01/15 20:39	67-64-1	
Allyl chloride	ND	mg/kg	0.26	1	04/01/15 09:05	04/01/15 20:39	107-05-1	
Benzene	ND	mg/kg	0.026	1	04/01/15 09:05	04/01/15 20:39	71-43-2	
Bromobenzene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	108-86-1	
Bromochloromethane	ND	mg/kg	0.26	1	04/01/15 09:05	04/01/15 20:39	74-97-5	
Bromodichloromethane	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	75-27-4	
Bromoform	ND	mg/kg	0.26	1	04/01/15 09:05	04/01/15 20:39	75-25-2	
Bromomethane	ND	mg/kg	0.66	1	04/01/15 09:05	04/01/15 20:39	74-83-9	
2-Butanone (MEK)	ND	mg/kg	0.33	1	04/01/15 09:05	04/01/15 20:39	78-93-3	
n-Butylbenzene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.26	1	04/01/15 09:05	04/01/15 20:39	56-23-5	
Chlorobenzene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	108-90-7	
Chloroethane	ND	mg/kg	0.66	1	04/01/15 09:05	04/01/15 20:39	75-00-3	
Chloroform	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	67-66-3	
Chloromethane	ND	mg/kg	0.26	1	04/01/15 09:05	04/01/15 20:39	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	106-43-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.66	1	04/01/15 09:05	04/01/15 20:39	96-12-8	
Dibromochloromethane	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	124-48-1	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	106-93-4	
Dibromomethane	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.26	1	04/01/15 09:05	04/01/15 20:39	75-71-8	
1,1-Dichloroethane	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.26	1	04/01/15 09:05	04/01/15 20:39	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.26	1	04/01/15 09:05	04/01/15 20:39	156-60-5	
Dichlorofluoromethane	ND	mg/kg	0.66	1	04/01/15 09:05	04/01/15 20:39	75-43-4	
1,2-Dichloropropane	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.26	1	04/01/15 09:05	04/01/15 20:39	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	10061-01-5	

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-10 (2) **Lab ID: 10300830010** Collected: 03/25/15 12:00 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
trans-1,3-Dichloropropene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	10061-02-6	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.26	1	04/01/15 09:05	04/01/15 20:39	60-29-7	
Ethylbenzene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	100-41-4	
Hexachloro-1,3-butadiene	ND	mg/kg	0.33	1	04/01/15 09:05	04/01/15 20:39	87-68-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	99-87-6	
Methylene Chloride	ND	mg/kg	0.26	1	04/01/15 09:05	04/01/15 20:39	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.33	1	04/01/15 09:05	04/01/15 20:39	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	1634-04-4	
Naphthalene	ND	mg/kg	0.26	1	04/01/15 09:05	04/01/15 20:39	91-20-3	
n-Propylbenzene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	103-65-1	
Styrene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	79-34-5	
Tetrachloroethene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	127-18-4	
Tetrahydrofuran	ND	mg/kg	2.6	1	04/01/15 09:05	04/01/15 20:39	109-99-9	
Toluene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	120-82-1	
1,1,1-Trichloroethane	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	79-00-5	
Trichloroethene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.26	1	04/01/15 09:05	04/01/15 20:39	75-69-4	
1,2,3-Trichloropropane	ND	mg/kg	0.26	1	04/01/15 09:05	04/01/15 20:39	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.26	1	04/01/15 09:05	04/01/15 20:39	76-13-1	
1,2,4-Trimethylbenzene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.066	1	04/01/15 09:05	04/01/15 20:39	108-67-8	
Vinyl chloride	ND	mg/kg	0.026	1	04/01/15 09:05	04/01/15 20:39	75-01-4	
Xylene (Total)	ND	mg/kg	0.20	1	04/01/15 09:05	04/01/15 20:39	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	90	%.	55-150	1	04/01/15 09:05	04/01/15 20:39	17060-07-0	
Toluene-d8 (S)	101	%.	61-125	1	04/01/15 09:05	04/01/15 20:39	2037-26-5	
4-Bromofluorobenzene (S)	97	%.	54-131	1	04/01/15 09:05	04/01/15 20:39	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-11 (1-2) **Lab ID: 10300830011** Collected: 03/26/15 12:30 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO GCS	Analytical Method: WI MOD DRO Preparation Method: WI MOD DRO							
WDRO C10-C28	**64.0**	mg/kg	40.1	5	03/30/15 10:25	04/01/15 10:39		T6
Surrogates								
n-Triacontane (S)	75	%.	50-150	5	03/30/15 10:25	04/01/15 10:39	638-68-6	
WIGRO GCV	Analytical Method: WI MOD GRO Preparation Method: EPA 5030 Medium Soil							
Gasoline Range Organics	**14.4**	mg/kg	11.0	1	04/08/15 13:24	04/08/15 16:34		
Surrogates								
a,a,a-Trifluorotoluene (S)	91	%.	80-150	1	04/08/15 13:24	04/08/15 16:34	98-08-8	
6020A MET ICPMS	Analytical Method: EPA 6020A Preparation Method: EPA 3050							
Antimony	ND	mg/kg	0.49	20	03/31/15 13:57	04/01/15 09:33	7440-36-0	
Arsenic	**2.8**	mg/kg	0.49	20	03/31/15 13:57	04/01/15 09:33	7440-38-2	
Barium	**25.5**	mg/kg	0.30	20	03/31/15 13:57	04/01/15 09:33	7440-39-3	
Beryllium	ND	mg/kg	0.20	20	03/31/15 13:57	04/01/15 09:33	7440-41-7	
Cadmium	**0.096**	mg/kg	0.079	20	03/31/15 13:57	04/01/15 09:33	7440-43-9	
Chromium	**4.0**	mg/kg	0.49	20	03/31/15 13:57	04/01/15 09:33	7440-47-3	
Copper	**7.5**	mg/kg	0.99	20	03/31/15 13:57	04/01/15 09:33	7440-50-8	
Lead	**8.7**	mg/kg	0.099	20	03/31/15 13:57	04/01/15 09:33	7439-92-1	
Nickel	**5.5**	mg/kg	0.49	20	03/31/15 13:57	04/01/15 09:33	7440-02-0	
Selenium	ND	mg/kg	0.49	20	03/31/15 13:57	04/01/15 09:33	7782-49-2	
Silver	ND	mg/kg	0.49	20	03/31/15 13:57	04/01/15 09:33	7440-22-4	
Thallium	ND	mg/kg	0.099	20	03/31/15 13:57	04/01/15 09:33	7440-28-0	
Zinc	**21.2**	mg/kg	4.9	20	03/31/15 13:57	04/01/15 09:33	7440-66-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	**0.022**	mg/kg	0.021	1	03/31/15 15:33	04/01/15 11:39	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**5.1**	%	0.10	1		03/30/15 11:44		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Acenaphthene	ND	mg/kg	0.011	1	03/30/15 10:46	04/01/15 19:50	83-32-9	
Acenaphthylene	ND	mg/kg	0.011	1	03/30/15 10:46	04/01/15 19:50	208-96-8	
Anthracene	**0.034**	mg/kg	0.011	1	03/30/15 10:46	04/01/15 19:50	120-12-7	
Benzo(a)anthracene	**0.20**	mg/kg	0.011	1	03/30/15 10:46	04/01/15 19:50	56-55-3	
Benzo(a)pyrene	**0.90**	mg/kg	0.053	5	03/30/15 10:46	04/01/15 18:44	50-32-8	
Benzo(b)fluoranthene	**0.94**	mg/kg	0.053	5	03/30/15 10:46	04/01/15 18:44	205-99-2	
Benzo(g,h,i)perylene	**1.7**	mg/kg	0.11	10	03/30/15 10:46	04/01/15 19:06	191-24-2	
Benzo(k)fluoranthene	**0.32**	mg/kg	0.011	1	03/30/15 10:46	04/01/15 19:50	207-08-9	
Chrysene	**0.43**	mg/kg	0.053	5	03/30/15 10:46	04/01/15 18:44	218-01-9	
Dibenz(a,h)anthracene	ND	mg/kg	0.011	1	03/30/15 10:46	04/01/15 19:50	53-70-3	
Fluoranthene	**0.16**	mg/kg	0.011	1	03/30/15 10:46	04/01/15 19:50	206-44-0	
Fluorene	**0.011**	mg/kg	0.011	1	03/30/15 10:46	04/01/15 19:50	86-73-7	
Indeno(1,2,3-cd)pyrene	**1.1**	mg/kg	0.053	5	03/30/15 10:46	04/01/15 18:44	193-39-5	
Naphthalene	**0.084**	mg/kg	0.011	1	03/30/15 10:46	04/01/15 19:50	91-20-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-11 (1-2) **Lab ID: 10300830011** Collected: 03/26/15 12:30 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Phenanthrene	**0.34**	mg/kg	0.011	1	03/30/15 10:46	04/01/15 19:50	85-01-8	
Pyrene	**0.26**	mg/kg	0.011	1	03/30/15 10:46	04/01/15 19:50	129-00-0	
Total BaP Eq. MN 2006sh. ND=0	**1.2**	mg/kg	0.053	5	03/30/15 10:46	04/01/15 18:44		
Surrogates								
2-Fluorobiphenyl (S)	84	%.	55-125	1	03/30/15 10:46	04/01/15 19:50	321-60-8	
p-Terphenyl-d14 (S)	64	%.	30-150	1	03/30/15 10:46	04/01/15 19:50	1718-51-0	
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Acetone	ND	mg/kg	1.1	1	04/01/15 09:05	04/01/15 21:00	67-64-1	
Allyl chloride	ND	mg/kg	0.22	1	04/01/15 09:05	04/01/15 21:00	107-05-1	
Benzene	**0.032**	mg/kg	0.022	1	04/01/15 09:05	04/01/15 21:00	71-43-2	
Bromobenzene	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	108-86-1	
Bromochloromethane	ND	mg/kg	0.22	1	04/01/15 09:05	04/01/15 21:00	74-97-5	
Bromodichloromethane	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	75-27-4	
Bromoform	ND	mg/kg	0.22	1	04/01/15 09:05	04/01/15 21:00	75-25-2	
Bromomethane	ND	mg/kg	0.54	1	04/01/15 09:05	04/01/15 21:00	74-83-9	
2-Butanone (MEK)	ND	mg/kg	0.27	1	04/01/15 09:05	04/01/15 21:00	78-93-3	
n-Butylbenzene	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.22	1	04/01/15 09:05	04/01/15 21:00	56-23-5	
Chlorobenzene	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	108-90-7	
Chloroethane	ND	mg/kg	0.54	1	04/01/15 09:05	04/01/15 21:00	75-00-3	
Chloroform	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	67-66-3	
Chloromethane	ND	mg/kg	0.22	1	04/01/15 09:05	04/01/15 21:00	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	106-43-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.54	1	04/01/15 09:05	04/01/15 21:00	96-12-8	
Dibromochloromethane	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	124-48-1	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	106-93-4	
Dibromomethane	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.22	1	04/01/15 09:05	04/01/15 21:00	75-71-8	
1,1-Dichloroethane	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.22	1	04/01/15 09:05	04/01/15 21:00	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.22	1	04/01/15 09:05	04/01/15 21:00	156-60-5	
Dichlorofluoromethane	ND	mg/kg	0.54	1	04/01/15 09:05	04/01/15 21:00	75-43-4	
1,2-Dichloropropane	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.22	1	04/01/15 09:05	04/01/15 21:00	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	10061-01-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-11 (1-2) **Lab ID: 10300830011** Collected: 03/26/15 12:30 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
trans-1,3-Dichloropropene	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	10061-02-6	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.22	1	04/01/15 09:05	04/01/15 21:00	60-29-7	
Ethylbenzene	**0.062**	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	100-41-4	
Hexachloro-1,3-butadiene	ND	mg/kg	0.27	1	04/01/15 09:05	04/01/15 21:00	87-68-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	99-87-6	
Methylene Chloride	ND	mg/kg	0.22	1	04/01/15 09:05	04/01/15 21:00	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.27	1	04/01/15 09:05	04/01/15 21:00	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	1634-04-4	
Naphthalene	**0.40**	mg/kg	0.22	1	04/01/15 09:05	04/01/15 21:00	91-20-3	
n-Propylbenzene	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	103-65-1	
Styrene	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	79-34-5	
Tetrachloroethene	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	127-18-4	
Tetrahydrofuran	ND	mg/kg	2.2	1	04/01/15 09:05	04/01/15 21:00	109-99-9	
Toluene	**0.27**	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	120-82-1	
1,1,1-Trichloroethane	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	79-00-5	
Trichloroethene	ND	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.22	1	04/01/15 09:05	04/01/15 21:00	75-69-4	
1,2,3-Trichloropropane	ND	mg/kg	0.22	1	04/01/15 09:05	04/01/15 21:00	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.22	1	04/01/15 09:05	04/01/15 21:00	76-13-1	
1,2,4-Trimethylbenzene	**0.17**	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	95-63-6	
1,3,5-Trimethylbenzene	**0.066**	mg/kg	0.054	1	04/01/15 09:05	04/01/15 21:00	108-67-8	
Vinyl chloride	ND	mg/kg	0.022	1	04/01/15 09:05	04/01/15 21:00	75-01-4	
Xylene (Total)	**0.64**	mg/kg	0.16	1	04/01/15 09:05	04/01/15 21:00	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	89	%.	55-150	1	04/01/15 09:05	04/01/15 21:00	17060-07-0	
Toluene-d8 (S)	100	%.	61-125	1	04/01/15 09:05	04/01/15 21:00	2037-26-5	
4-Bromofluorobenzene (S)	100	%.	54-131	1	04/01/15 09:05	04/01/15 21:00	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-12 (1-2) **Lab ID: 10300830012** Collected: 03/26/15 12:00 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO GCS	Analytical Method: WI MOD DRO Preparation Method: WI MOD DRO							
WDRO C10-C28	**19.2**	mg/kg	8.8	1	03/30/15 10:25	03/31/15 14:51		T6
Surrogates								
n-Triacontane (S)	70	%.	50-150	1	03/30/15 10:25	03/31/15 14:51	638-68-6	
WIGRO GCV	Analytical Method: WI MOD GRO Preparation Method: EPA 5030 Medium Soil							
Gasoline Range Organics	ND	mg/kg	12.0	1	04/08/15 13:24	04/08/15 16:57		
Surrogates								
a,a,a-Trifluorotoluene (S)	91	%.	80-150	1	04/08/15 13:24	04/08/15 16:57	98-08-8	
6020A MET ICPMS	Analytical Method: EPA 6020A Preparation Method: EPA 3050							
Antimony	ND	mg/kg	0.47	20	03/31/15 13:57	04/01/15 09:35	7440-36-0	
Arsenic	**1.5**	mg/kg	0.47	20	03/31/15 13:57	04/01/15 09:35	7440-38-2	
Barium	**18.9**	mg/kg	0.28	20	03/31/15 13:57	04/01/15 09:35	7440-39-3	
Beryllium	ND	mg/kg	0.19	20	03/31/15 13:57	04/01/15 09:35	7440-41-7	
Cadmium	ND	mg/kg	0.076	20	03/31/15 13:57	04/01/15 09:35	7440-43-9	
Chromium	**2.4**	mg/kg	0.47	20	03/31/15 13:57	04/01/15 09:35	7440-47-3	
Copper	**3.5**	mg/kg	0.95	20	03/31/15 13:57	04/01/15 09:35	7440-50-8	
Lead	**3.2**	mg/kg	0.095	20	03/31/15 13:57	04/01/15 09:35	7439-92-1	
Nickel	**3.3**	mg/kg	0.47	20	03/31/15 13:57	04/01/15 09:35	7440-02-0	
Selenium	ND	mg/kg	0.47	20	03/31/15 13:57	04/01/15 09:35	7782-49-2	
Silver	ND	mg/kg	0.47	20	03/31/15 13:57	04/01/15 09:35	7440-22-4	
Thallium	ND	mg/kg	0.095	20	03/31/15 13:57	04/01/15 09:35	7440-28-0	
Zinc	**9.6**	mg/kg	4.7	20	03/31/15 13:57	04/01/15 09:35	7440-66-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	ND	mg/kg	0.020	1	03/31/15 15:33	04/01/15 11:41	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**4.8**	%	0.10	1		03/30/15 11:44		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Acenaphthene	ND	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:02	83-32-9	
Acenaphthylene	ND	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:02	208-96-8	
Anthracene	**0.014**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:02	120-12-7	
Benzo(a)anthracene	**0.057**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:02	56-55-3	
Benzo(a)pyrene	**0.12**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:02	50-32-8	
Benzo(b)fluoranthene	**0.14**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:02	205-99-2	
Benzo(g,h,i)perylene	**0.28**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:02	191-24-2	
Benzo(k)fluoranthene	**0.048**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:02	207-08-9	
Chrysene	**0.090**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:02	218-01-9	
Dibenz(a,h)anthracene	ND	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:02	53-70-3	
Fluoranthene	**0.080**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:02	206-44-0	
Fluorene	ND	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:02	86-73-7	
Indeno(1,2,3-cd)pyrene	**0.16**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:02	193-39-5	
Naphthalene	**0.024**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:02	91-20-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-12 (1-2) **Lab ID: 10300830012** Collected: 03/26/15 12:00 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Phenanthrene	**0.090**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:02	85-01-8	
Pyrene	**0.11**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:02	129-00-0	
Total BaP Eq. MN 2006sh. ND=0	**0.16**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:02		
Surrogates								
2-Fluorobiphenyl (S)	76	%.	55-125	1	03/30/15 10:46	04/01/15 14:02	321-60-8	
p-Terphenyl-d14 (S)	84	%.	30-150	1	03/30/15 10:46	04/01/15 14:02	1718-51-0	
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Acetone	ND	mg/kg	1.1	1	04/01/15 09:05	04/01/15 21:20	67-64-1	
Allyl chloride	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:20	107-05-1	
Benzene	ND	mg/kg	0.021	1	04/01/15 09:05	04/01/15 21:20	71-43-2	
Bromobenzene	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	108-86-1	
Bromochloromethane	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:20	74-97-5	
Bromodichloromethane	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	75-27-4	
Bromoform	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:20	75-25-2	
Bromomethane	ND	mg/kg	0.53	1	04/01/15 09:05	04/01/15 21:20	74-83-9	
2-Butanone (MEK)	ND	mg/kg	0.27	1	04/01/15 09:05	04/01/15 21:20	78-93-3	
n-Butylbenzene	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:20	56-23-5	
Chlorobenzene	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	108-90-7	
Chloroethane	ND	mg/kg	0.53	1	04/01/15 09:05	04/01/15 21:20	75-00-3	
Chloroform	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	67-66-3	
Chloromethane	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:20	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	106-43-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.53	1	04/01/15 09:05	04/01/15 21:20	96-12-8	
Dibromochloromethane	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	124-48-1	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	106-93-4	
Dibromomethane	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:20	75-71-8	
1,1-Dichloroethane	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:20	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:20	156-60-5	
Dichlorofluoromethane	ND	mg/kg	0.53	1	04/01/15 09:05	04/01/15 21:20	75-43-4	
1,2-Dichloropropane	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:20	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	10061-01-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-12 (1-2) **Lab ID: 10300830012** Collected: 03/26/15 12:00 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
trans-1,3-Dichloropropene	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	10061-02-6	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:20	60-29-7	
Ethylbenzene	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	100-41-4	
Hexachloro-1,3-butadiene	ND	mg/kg	0.27	1	04/01/15 09:05	04/01/15 21:20	87-68-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	99-87-6	
Methylene Chloride	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:20	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.27	1	04/01/15 09:05	04/01/15 21:20	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	1634-04-4	
Naphthalene	**0.28**	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:20	91-20-3	
n-Propylbenzene	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	103-65-1	
Styrene	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	79-34-5	
Tetrachloroethene	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	127-18-4	
Tetrahydrofuran	ND	mg/kg	2.1	1	04/01/15 09:05	04/01/15 21:20	109-99-9	
Toluene	**0.17**	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	120-82-1	
1,1,1-Trichloroethane	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	79-00-5	
Trichloroethene	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:20	75-69-4	
1,2,3-Trichloropropane	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:20	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:20	76-13-1	
1,2,4-Trimethylbenzene	**0.094**	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.053	1	04/01/15 09:05	04/01/15 21:20	108-67-8	
Vinyl chloride	ND	mg/kg	0.021	1	04/01/15 09:05	04/01/15 21:20	75-01-4	
Xylene (Total)	**0.39**	mg/kg	0.16	1	04/01/15 09:05	04/01/15 21:20	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	88	%.	55-150	1	04/01/15 09:05	04/01/15 21:20	17060-07-0	
Toluene-d8 (S)	99	%.	61-125	1	04/01/15 09:05	04/01/15 21:20	2037-26-5	
4-Bromofluorobenzene (S)	99	%.	54-131	1	04/01/15 09:05	04/01/15 21:20	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-13 (2-4) **Lab ID: 10300830013** Collected: 03/26/15 13:00 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO GCS	Analytical Method: WI MOD DRO Preparation Method: WI MOD DRO							
WDRO C10-C28	**11.2**	mg/kg	8.6	1	03/30/15 10:25	03/31/15 15:12		T6
Surrogates								
n-Triacontane (S)	73	%.	50-150	1	03/30/15 10:25	03/31/15 15:12	638-68-6	
WIGRO GCV	Analytical Method: WI MOD GRO Preparation Method: EPA 5030 Medium Soil							
Gasoline Range Organics	ND	mg/kg	11.6	1	04/08/15 13:24	04/08/15 17:19		
Surrogates								
a,a,a-Trifluorotoluene (S)	92	%.	80-150	1	04/08/15 13:24	04/08/15 17:19	98-08-8	
6020A MET ICPMS	Analytical Method: EPA 6020A Preparation Method: EPA 3050							
Antimony	ND	mg/kg	0.48	20	03/31/15 13:57	04/01/15 09:38	7440-36-0	
Arsenic	**1.6**	mg/kg	0.48	20	03/31/15 13:57	04/01/15 09:38	7440-38-2	
Barium	**26.3**	mg/kg	0.29	20	03/31/15 13:57	04/01/15 09:38	7440-39-3	
Beryllium	ND	mg/kg	0.19	20	03/31/15 13:57	04/01/15 09:38	7440-41-7	
Cadmium	**0.078**	mg/kg	0.077	20	03/31/15 13:57	04/01/15 09:38	7440-43-9	
Chromium	**3.4**	mg/kg	0.48	20	03/31/15 13:57	04/01/15 09:38	7440-47-3	
Copper	**4.0**	mg/kg	0.96	20	03/31/15 13:57	04/01/15 09:38	7440-50-8	
Lead	**3.4**	mg/kg	0.096	20	03/31/15 13:57	04/01/15 09:38	7439-92-1	
Nickel	**6.4**	mg/kg	0.48	20	03/31/15 13:57	04/01/15 09:38	7440-02-0	
Selenium	ND	mg/kg	0.48	20	03/31/15 13:57	04/01/15 09:38	7782-49-2	
Silver	ND	mg/kg	0.48	20	03/31/15 13:57	04/01/15 09:38	7440-22-4	
Thallium	ND	mg/kg	0.096	20	03/31/15 13:57	04/01/15 09:38	7440-28-0	
Zinc	**12.8**	mg/kg	4.8	20	03/31/15 13:57	04/01/15 09:38	7440-66-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	ND	mg/kg	0.021	1	03/31/15 15:33	04/01/15 11:43	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**4.5**	%	0.10	1		03/30/15 11:45		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Acenaphthene	ND	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:24	83-32-9	
Acenaphthylene	ND	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:24	208-96-8	
Anthracene	**0.017**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:24	120-12-7	
Benzo(a)anthracene	**0.082**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:24	56-55-3	
Benzo(a)pyrene	**0.12**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:24	50-32-8	
Benzo(b)fluoranthene	**0.17**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:24	205-99-2	
Benzo(g,h,i)perylene	**0.16**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:24	191-24-2	
Benzo(k)fluoranthene	**0.049**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:24	207-08-9	
Chrysene	**0.11**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:24	218-01-9	
Dibenz(a,h)anthracene	ND	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:24	53-70-3	
Fluoranthene	**0.13**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:24	206-44-0	
Fluorene	ND	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:24	86-73-7	
Indeno(1,2,3-cd)pyrene	**0.11**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:24	193-39-5	
Naphthalene	**0.020**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:24	91-20-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-13 (2-4) **Lab ID: 10300830013** Collected: 03/26/15 13:00 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Phenanthrene	**0.079**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:24	85-01-8	
Pyrene	**0.15**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:24	129-00-0	
Total BaP Eq. MN 2006sh. ND=0	**0.17**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 14:24		
Surrogates								
2-Fluorobiphenyl (S)	80	%.	55-125	1	03/30/15 10:46	04/01/15 14:24	321-60-8	
p-Terphenyl-d14 (S)	92	%.	30-150	1	03/30/15 10:46	04/01/15 14:24	1718-51-0	
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Acetone	ND	mg/kg	1.0	1	04/01/15 09:05	04/01/15 21:40	67-64-1	
Allyl chloride	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:40	107-05-1	
Benzene	ND	mg/kg	0.021	1	04/01/15 09:05	04/01/15 21:40	71-43-2	
Bromobenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	108-86-1	
Bromochloromethane	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:40	74-97-5	
Bromodichloromethane	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	75-27-4	
Bromoform	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:40	75-25-2	
Bromomethane	ND	mg/kg	0.52	1	04/01/15 09:05	04/01/15 21:40	74-83-9	
2-Butanone (MEK)	ND	mg/kg	0.26	1	04/01/15 09:05	04/01/15 21:40	78-93-3	
n-Butylbenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:40	56-23-5	
Chlorobenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	108-90-7	
Chloroethane	ND	mg/kg	0.52	1	04/01/15 09:05	04/01/15 21:40	75-00-3	
Chloroform	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	67-66-3	
Chloromethane	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:40	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	106-43-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.52	1	04/01/15 09:05	04/01/15 21:40	96-12-8	
Dibromochloromethane	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	124-48-1	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	106-93-4	
Dibromomethane	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:40	75-71-8	
1,1-Dichloroethane	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:40	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:40	156-60-5	
Dichlorofluoromethane	ND	mg/kg	0.52	1	04/01/15 09:05	04/01/15 21:40	75-43-4	
1,2-Dichloropropane	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:40	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	10061-01-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-13 (2-4) **Lab ID: 10300830013** Collected: 03/26/15 13:00 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
trans-1,3-Dichloropropene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	10061-02-6	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:40	60-29-7	
Ethylbenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	100-41-4	
Hexachloro-1,3-butadiene	ND	mg/kg	0.26	1	04/01/15 09:05	04/01/15 21:40	87-68-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	99-87-6	
Methylene Chloride	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:40	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.26	1	04/01/15 09:05	04/01/15 21:40	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	1634-04-4	
Naphthalene	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:40	91-20-3	
n-Propylbenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	103-65-1	
Styrene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	79-34-5	
Tetrachloroethene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	127-18-4	
Tetrahydrofuran	ND	mg/kg	2.1	1	04/01/15 09:05	04/01/15 21:40	109-99-9	
Toluene	**0.079**	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	120-82-1	
1,1,1-Trichloroethane	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	79-00-5	
Trichloroethene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:40	75-69-4	
1,2,3-Trichloropropane	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:40	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.21	1	04/01/15 09:05	04/01/15 21:40	76-13-1	
1,2,4-Trimethylbenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.052	1	04/01/15 09:05	04/01/15 21:40	108-67-8	
Vinyl chloride	ND	mg/kg	0.021	1	04/01/15 09:05	04/01/15 21:40	75-01-4	
Xylene (Total)	**0.18**	mg/kg	0.16	1	04/01/15 09:05	04/01/15 21:40	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	89	%.	55-150	1	04/01/15 09:05	04/01/15 21:40	17060-07-0	
Toluene-d8 (S)	99	%.	61-125	1	04/01/15 09:05	04/01/15 21:40	2037-26-5	
4-Bromofluorobenzene (S)	97	%.	54-131	1	04/01/15 09:05	04/01/15 21:40	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-14 (2-3) **Lab ID: 10300830014** Collected: 03/26/15 13:30 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO GCS	Analytical Method: WI MOD DRO Preparation Method: WI MOD DRO							
WDRO C10-C28	**39.1**	mg/kg	16.6	2	03/30/15 10:25	04/01/15 10:04		T6
Surrogates								
n-Triacontane (S)	95	%.	50-150	2	03/30/15 10:25	04/01/15 10:04	638-68-6	
WIGRO GCV	Analytical Method: WI MOD GRO Preparation Method: EPA 5030 Medium Soil							
Gasoline Range Organics	ND	mg/kg	10.7	1	04/08/15 13:24	04/08/15 17:41		
Surrogates								
a,a,a-Trifluorotoluene (S)	92	%.	80-150	1	04/08/15 13:24	04/08/15 17:41	98-08-8	
6020A MET ICPMS	Analytical Method: EPA 6020A Preparation Method: EPA 3050							
Antimony	ND	mg/kg	0.47	20	03/31/15 13:57	04/01/15 09:41	7440-36-0	
Arsenic	**1.9**	mg/kg	0.47	20	03/31/15 13:57	04/01/15 09:41	7440-38-2	
Barium	**23.3**	mg/kg	0.28	20	03/31/15 13:57	04/01/15 09:41	7440-39-3	
Beryllium	ND	mg/kg	0.19	20	03/31/15 13:57	04/01/15 09:41	7440-41-7	
Cadmium	ND	mg/kg	0.075	20	03/31/15 13:57	04/01/15 09:41	7440-43-9	
Chromium	**4.0**	mg/kg	0.47	20	03/31/15 13:57	04/01/15 09:41	7440-47-3	
Copper	**4.5**	mg/kg	0.93	20	03/31/15 13:57	04/01/15 09:41	7440-50-8	
Lead	**3.8**	mg/kg	0.093	20	03/31/15 13:57	04/01/15 09:41	7439-92-1	
Nickel	**5.4**	mg/kg	0.47	20	03/31/15 13:57	04/01/15 09:41	7440-02-0	
Selenium	ND	mg/kg	0.47	20	03/31/15 13:57	04/01/15 09:41	7782-49-2	
Silver	ND	mg/kg	0.47	20	03/31/15 13:57	04/01/15 09:41	7440-22-4	
Thallium	ND	mg/kg	0.093	20	03/31/15 13:57	04/01/15 09:41	7440-28-0	
Zinc	**14.7**	mg/kg	4.7	20	03/31/15 13:57	04/01/15 09:41	7440-66-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	ND	mg/kg	0.021	1	03/31/15 15:33	04/01/15 11:46	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**4.4**	%	0.10	1		03/30/15 11:45		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Acenaphthene	ND	mg/kg	0.010	1	03/30/15 10:46	04/01/15 20:11	83-32-9	
Acenaphthylene	ND	mg/kg	0.010	1	03/30/15 10:46	04/01/15 20:11	208-96-8	
Anthracene	**0.024**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 20:11	120-12-7	
Benzo(a)anthracene	**0.085**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 20:11	56-55-3	
Benzo(a)pyrene	**0.13**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 20:11	50-32-8	
Benzo(b)fluoranthene	**0.13**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 20:11	205-99-2	
Benzo(g,h,i)perylene	**0.14**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 20:11	191-24-2	
Benzo(k)fluoranthene	**0.044**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 20:11	207-08-9	
Chrysene	**0.15**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 20:11	218-01-9	
Dibenz(a,h)anthracene	ND	mg/kg	0.010	1	03/30/15 10:46	04/01/15 20:11	53-70-3	
Fluoranthene	**0.084**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 20:11	206-44-0	
Fluorene	ND	mg/kg	0.010	1	03/30/15 10:46	04/01/15 20:11	86-73-7	
Indeno(1,2,3-cd)pyrene	**0.064**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 20:11	193-39-5	
Naphthalene	**0.031**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 20:11	91-20-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-14 (2-3) **Lab ID: 10300830014** Collected: 03/26/15 13:30 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Phenanthrene	**0.16**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 20:11	85-01-8	
Pyrene	**0.15**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 20:11	129-00-0	
Total BaP Eq. MN 2006sh. ND=0	**0.16**	mg/kg	0.010	1	03/30/15 10:46	04/01/15 20:11		
Surrogates								
2-Fluorobiphenyl (S)	79	%.	55-125	1	03/30/15 10:46	04/01/15 20:11	321-60-8	
p-Terphenyl-d14 (S)	70	%.	30-150	1	03/30/15 10:46	04/01/15 20:11	1718-51-0	
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Acetone	ND	mg/kg	1.2	1	04/01/15 09:05	04/01/15 19:18	67-64-1	
Allyl chloride	ND	mg/kg	0.23	1	04/01/15 09:05	04/01/15 19:18	107-05-1	
Benzene	ND	mg/kg	0.023	1	04/01/15 09:05	04/01/15 19:18	71-43-2	
Bromobenzene	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	108-86-1	
Bromochloromethane	ND	mg/kg	0.23	1	04/01/15 09:05	04/01/15 19:18	74-97-5	
Bromodichloromethane	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	75-27-4	
Bromoform	ND	mg/kg	0.23	1	04/01/15 09:05	04/01/15 19:18	75-25-2	
Bromomethane	ND	mg/kg	0.58	1	04/01/15 09:05	04/01/15 19:18	74-83-9	
2-Butanone (MEK)	ND	mg/kg	0.29	1	04/01/15 09:05	04/01/15 19:18	78-93-3	
n-Butylbenzene	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.23	1	04/01/15 09:05	04/01/15 19:18	56-23-5	
Chlorobenzene	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	108-90-7	
Chloroethane	ND	mg/kg	0.58	1	04/01/15 09:05	04/01/15 19:18	75-00-3	
Chloroform	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	67-66-3	
Chloromethane	ND	mg/kg	0.23	1	04/01/15 09:05	04/01/15 19:18	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	106-43-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.58	1	04/01/15 09:05	04/01/15 19:18	96-12-8	
Dibromochloromethane	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	124-48-1	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	106-93-4	
Dibromomethane	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.23	1	04/01/15 09:05	04/01/15 19:18	75-71-8	
1,1-Dichloroethane	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.23	1	04/01/15 09:05	04/01/15 19:18	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.23	1	04/01/15 09:05	04/01/15 19:18	156-60-5	
Dichlorofluoromethane	ND	mg/kg	0.58	1	04/01/15 09:05	04/01/15 19:18	75-43-4	
1,2-Dichloropropane	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.23	1	04/01/15 09:05	04/01/15 19:18	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	10061-01-5	

Pace Analytical Services, Inc.
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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-14 (2-3) **Lab ID: 10300830014** Collected: 03/26/15 13:30 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
trans-1,3-Dichloropropene	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	10061-02-6	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.23	1	04/01/15 09:05	04/01/15 19:18	60-29-7	
Ethylbenzene	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	100-41-4	
Hexachloro-1,3-butadiene	ND	mg/kg	0.29	1	04/01/15 09:05	04/01/15 19:18	87-68-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	99-87-6	
Methylene Chloride	ND	mg/kg	0.23	1	04/01/15 09:05	04/01/15 19:18	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.29	1	04/01/15 09:05	04/01/15 19:18	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	1634-04-4	
Naphthalene	**0.26**	mg/kg	0.23	1	04/01/15 09:05	04/01/15 19:18	91-20-3	
n-Propylbenzene	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	103-65-1	
Styrene	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	79-34-5	
Tetrachloroethene	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	127-18-4	
Tetrahydrofuran	ND	mg/kg	2.3	1	04/01/15 09:05	04/01/15 19:18	109-99-9	
Toluene	**0.21**	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	120-82-1	
1,1,1-Trichloroethane	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	79-00-5	
Trichloroethene	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.23	1	04/01/15 09:05	04/01/15 19:18	75-69-4	
1,2,3-Trichloropropane	ND	mg/kg	0.23	1	04/01/15 09:05	04/01/15 19:18	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.23	1	04/01/15 09:05	04/01/15 19:18	76-13-1	
1,2,4-Trimethylbenzene	**0.10**	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.058	1	04/01/15 09:05	04/01/15 19:18	108-67-8	
Vinyl chloride	ND	mg/kg	0.023	1	04/01/15 09:05	04/01/15 19:18	75-01-4	
Xylene (Total)	**0.38**	mg/kg	0.17	1	04/01/15 09:05	04/01/15 19:18	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	89	%.	55-150	1	04/01/15 09:05	04/01/15 19:18	17060-07-0	
Toluene-d8 (S)	99	%.	61-125	1	04/01/15 09:05	04/01/15 19:18	2037-26-5	
4-Bromofluorobenzene (S)	99	%.	54-131	1	04/01/15 09:05	04/01/15 19:18	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: HA-2 (1-3) **Lab ID: 10300830016** Collected: 03/25/15 10:30 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO GCS	Analytical Method: WI MOD DRO Preparation Method: WI MOD DRO							
WDRO C10-C28	ND	mg/kg	9.0	1	03/30/15 10:25	03/31/15 15:19		
Surrogates								
n-Triacontane (S)	71	%.	50-150	1	03/30/15 10:25	03/31/15 15:19	638-68-6	
WIGRO GCV	Analytical Method: WI MOD GRO Preparation Method: EPA 5030 Medium Soil							
Gasoline Range Organics	ND	mg/kg	12.1	1	04/08/15 13:24	04/08/15 18:03		
Surrogates								
a,a,a-Trifluorotoluene (S)	93	%.	80-150	1	04/08/15 13:24	04/08/15 18:03	98-08-8	
6020A MET ICPMS	Analytical Method: EPA 6020A Preparation Method: EPA 3050							
Antimony	ND	mg/kg	0.45	20	03/31/15 13:57	04/01/15 09:44	7440-36-0	
Arsenic	**3.3**	mg/kg	0.45	20	03/31/15 13:57	04/01/15 09:44	7440-38-2	
Barium	**7.6**	mg/kg	0.27	20	03/31/15 13:57	04/01/15 09:44	7440-39-3	
Beryllium	ND	mg/kg	0.18	20	03/31/15 13:57	04/01/15 09:44	7440-41-7	
Cadmium	ND	mg/kg	0.071	20	03/31/15 13:57	04/01/15 09:44	7440-43-9	
Chromium	**1.9**	mg/kg	0.45	20	03/31/15 13:57	04/01/15 09:44	7440-47-3	
Copper	**2.0**	mg/kg	0.89	20	03/31/15 13:57	04/01/15 09:44	7440-50-8	
Lead	**0.66**	mg/kg	0.089	20	03/31/15 13:57	04/01/15 09:44	7439-92-1	
Nickel	**3.0**	mg/kg	0.45	20	03/31/15 13:57	04/01/15 09:44	7440-02-0	
Selenium	ND	mg/kg	0.45	20	03/31/15 13:57	04/01/15 09:44	7782-49-2	
Silver	ND	mg/kg	0.45	20	03/31/15 13:57	04/01/15 09:44	7440-22-4	
Thallium	ND	mg/kg	0.089	20	03/31/15 13:57	04/01/15 09:44	7440-28-0	
Zinc	ND	mg/kg	4.5	20	03/31/15 13:57	04/01/15 09:44	7440-66-6	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	ND	mg/kg	0.019	1	03/31/15 15:33	04/01/15 11:48	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**9.6**	%	0.10	1		03/30/15 11:45		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Acenaphthene	ND	mg/kg	0.011	1	03/30/15 10:46	03/31/15 15:50	83-32-9	
Acenaphthylene	ND	mg/kg	0.011	1	03/30/15 10:46	03/31/15 15:50	208-96-8	
Anthracene	ND	mg/kg	0.011	1	03/30/15 10:46	03/31/15 15:50	120-12-7	
Benzo(a)anthracene	ND	mg/kg	0.011	1	03/30/15 10:46	03/31/15 15:50	56-55-3	
Benzo(a)pyrene	ND	mg/kg	0.011	1	03/30/15 10:46	03/31/15 15:50	50-32-8	
Benzo(b)fluoranthene	ND	mg/kg	0.011	1	03/30/15 10:46	03/31/15 15:50	205-99-2	
Benzo(g,h,i)perylene	ND	mg/kg	0.011	1	03/30/15 10:46	03/31/15 15:50	191-24-2	
Benzo(k)fluoranthene	ND	mg/kg	0.011	1	03/30/15 10:46	03/31/15 15:50	207-08-9	
Chrysene	ND	mg/kg	0.011	1	03/30/15 10:46	03/31/15 15:50	218-01-9	
Dibenz(a,h)anthracene	ND	mg/kg	0.011	1	03/30/15 10:46	03/31/15 15:50	53-70-3	
Fluoranthene	ND	mg/kg	0.011	1	03/30/15 10:46	03/31/15 15:50	206-44-0	
Fluorene	ND	mg/kg	0.011	1	03/30/15 10:46	03/31/15 15:50	86-73-7	
Indeno(1,2,3-cd)pyrene	ND	mg/kg	0.011	1	03/30/15 10:46	03/31/15 15:50	193-39-5	
Naphthalene	ND	mg/kg	0.011	1	03/30/15 10:46	03/31/15 15:50	91-20-3	

Pace Analytical Services, Inc.
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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: HA-2 (1-3) **Lab ID: 10300830016** Collected: 03/25/15 10:30 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Phenanthrene	ND	mg/kg	0.011	1	03/30/15 10:46	03/31/15 15:50	85-01-8	
Pyrene	ND	mg/kg	0.011	1	03/30/15 10:46	03/31/15 15:50	129-00-0	
Total BaP Eq. MN 2006sh. ND=0	ND	mg/kg	0.011	1	03/30/15 10:46	03/31/15 15:50		
Surrogates								
2-Fluorobiphenyl (S)	74	%.	55-125	1	03/30/15 10:46	03/31/15 15:50	321-60-8	
p-Terphenyl-d14 (S)	78	%.	30-150	1	03/30/15 10:46	03/31/15 15:50	1718-51-0	
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Acetone	ND	mg/kg	1.2	1	04/01/15 09:05	04/01/15 22:00	67-64-1	
Allyl chloride	ND	mg/kg	0.25	1	04/01/15 09:05	04/01/15 22:00	107-05-1	
Benzene	ND	mg/kg	0.025	1	04/01/15 09:05	04/01/15 22:00	71-43-2	
Bromobenzene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	108-86-1	
Bromochloromethane	ND	mg/kg	0.25	1	04/01/15 09:05	04/01/15 22:00	74-97-5	
Bromodichloromethane	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	75-27-4	
Bromoform	ND	mg/kg	0.25	1	04/01/15 09:05	04/01/15 22:00	75-25-2	
Bromomethane	ND	mg/kg	0.62	1	04/01/15 09:05	04/01/15 22:00	74-83-9	
2-Butanone (MEK)	ND	mg/kg	0.31	1	04/01/15 09:05	04/01/15 22:00	78-93-3	
n-Butylbenzene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.25	1	04/01/15 09:05	04/01/15 22:00	56-23-5	
Chlorobenzene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	108-90-7	
Chloroethane	ND	mg/kg	0.62	1	04/01/15 09:05	04/01/15 22:00	75-00-3	
Chloroform	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	67-66-3	
Chloromethane	ND	mg/kg	0.25	1	04/01/15 09:05	04/01/15 22:00	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	106-43-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.62	1	04/01/15 09:05	04/01/15 22:00	96-12-8	
Dibromochloromethane	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	124-48-1	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	106-93-4	
Dibromomethane	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.25	1	04/01/15 09:05	04/01/15 22:00	75-71-8	
1,1-Dichloroethane	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.25	1	04/01/15 09:05	04/01/15 22:00	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.25	1	04/01/15 09:05	04/01/15 22:00	156-60-5	
Dichlorofluoromethane	ND	mg/kg	0.62	1	04/01/15 09:05	04/01/15 22:00	75-43-4	
1,2-Dichloropropane	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.25	1	04/01/15 09:05	04/01/15 22:00	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	10061-01-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: HA-2 (1-3) **Lab ID: 10300830016** Collected: 03/25/15 10:30 Received: 03/27/15 08:20 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
trans-1,3-Dichloropropene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	10061-02-6	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.25	1	04/01/15 09:05	04/01/15 22:00	60-29-7	
Ethylbenzene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	100-41-4	
Hexachloro-1,3-butadiene	ND	mg/kg	0.31	1	04/01/15 09:05	04/01/15 22:00	87-68-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	99-87-6	
Methylene Chloride	ND	mg/kg	0.25	1	04/01/15 09:05	04/01/15 22:00	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.31	1	04/01/15 09:05	04/01/15 22:00	108-10-1	
Methyl-tert-butyl ether	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	1634-04-4	
Naphthalene	ND	mg/kg	0.25	1	04/01/15 09:05	04/01/15 22:00	91-20-3	
n-Propylbenzene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	103-65-1	
Styrene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	79-34-5	
Tetrachloroethene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	127-18-4	
Tetrahydrofuran	ND	mg/kg	2.5	1	04/01/15 09:05	04/01/15 22:00	109-99-9	
Toluene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	120-82-1	
1,1,1-Trichloroethane	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	79-00-5	
Trichloroethene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.25	1	04/01/15 09:05	04/01/15 22:00	75-69-4	
1,2,3-Trichloropropane	ND	mg/kg	0.25	1	04/01/15 09:05	04/01/15 22:00	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.25	1	04/01/15 09:05	04/01/15 22:00	76-13-1	
1,2,4-Trimethylbenzene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.062	1	04/01/15 09:05	04/01/15 22:00	108-67-8	
Vinyl chloride	ND	mg/kg	0.025	1	04/01/15 09:05	04/01/15 22:00	75-01-4	
Xylene (Total)	ND	mg/kg	0.19	1	04/01/15 09:05	04/01/15 22:00	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	87	%.	55-150	1	04/01/15 09:05	04/01/15 22:00	17060-07-0	
Toluene-d8 (S)	100	%.	61-125	1	04/01/15 09:05	04/01/15 22:00	2037-26-5	
4-Bromofluorobenzene (S)	98	%.	54-131	1	04/01/15 09:05	04/01/15 22:00	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: Trip Blank - SL **Lab ID: 10300830017** Collected: 03/25/15 00:00 Received: 03/27/15 08:20 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Acetone	ND	mg/kg	1.0	1	04/01/15 09:05	04/01/15 15:42	67-64-1	
Allyl chloride	ND	mg/kg	0.20	1	04/01/15 09:05	04/01/15 15:42	107-05-1	
Benzene	ND	mg/kg	0.020	1	04/01/15 09:05	04/01/15 15:42	71-43-2	
Bromobenzene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	108-86-1	
Bromochloromethane	ND	mg/kg	0.20	1	04/01/15 09:05	04/01/15 15:42	74-97-5	
Bromodichloromethane	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	75-27-4	
Bromoform	ND	mg/kg	0.20	1	04/01/15 09:05	04/01/15 15:42	75-25-2	
Bromomethane	ND	mg/kg	0.50	1	04/01/15 09:05	04/01/15 15:42	74-83-9	
2-Butanone (MEK)	ND	mg/kg	0.25	1	04/01/15 09:05	04/01/15 15:42	78-93-3	
n-Butylbenzene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.20	1	04/01/15 09:05	04/01/15 15:42	56-23-5	
Chlorobenzene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	108-90-7	
Chloroethane	ND	mg/kg	0.50	1	04/01/15 09:05	04/01/15 15:42	75-00-3	
Chloroform	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	67-66-3	
Chloromethane	ND	mg/kg	0.20	1	04/01/15 09:05	04/01/15 15:42	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	106-43-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	0.50	1	04/01/15 09:05	04/01/15 15:42	96-12-8	
Dibromochloromethane	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	124-48-1	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	106-93-4	
Dibromomethane	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.20	1	04/01/15 09:05	04/01/15 15:42	75-71-8	
1,1-Dichloroethane	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.20	1	04/01/15 09:05	04/01/15 15:42	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.20	1	04/01/15 09:05	04/01/15 15:42	156-60-5	
Dichlorofluoromethane	ND	mg/kg	0.50	1	04/01/15 09:05	04/01/15 15:42	75-43-4	
1,2-Dichloropropane	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.20	1	04/01/15 09:05	04/01/15 15:42	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	10061-01-5	
trans-1,3-Dichloropropene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	10061-02-6	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.20	1	04/01/15 09:05	04/01/15 15:42	60-29-7	
Ethylbenzene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	100-41-4	
Hexachloro-1,3-butadiene	ND	mg/kg	0.25	1	04/01/15 09:05	04/01/15 15:42	87-68-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	99-87-6	
Methylene Chloride	ND	mg/kg	0.20	1	04/01/15 09:05	04/01/15 15:42	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.25	1	04/01/15 09:05	04/01/15 15:42	108-10-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: Trip Blank - SL **Lab ID: 10300830017** Collected: 03/25/15 00:00 Received: 03/27/15 08:20 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 MSV 5030 Med Level	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Methyl-tert-butyl ether	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	1634-04-4	
Naphthalene	ND	mg/kg	0.20	1	04/01/15 09:05	04/01/15 15:42	91-20-3	
n-Propylbenzene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	103-65-1	
Styrene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	79-34-5	
Tetrachloroethene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	127-18-4	
Tetrahydrofuran	ND	mg/kg	2.0	1	04/01/15 09:05	04/01/15 15:42	109-99-9	
Toluene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	120-82-1	
1,1,1-Trichloroethane	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	79-00-5	
Trichloroethene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.20	1	04/01/15 09:05	04/01/15 15:42	75-69-4	
1,2,3-Trichloropropane	ND	mg/kg	0.20	1	04/01/15 09:05	04/01/15 15:42	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.20	1	04/01/15 09:05	04/01/15 15:42	76-13-1	
1,2,4-Trimethylbenzene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.050	1	04/01/15 09:05	04/01/15 15:42	108-67-8	
Vinyl chloride	ND	mg/kg	0.020	1	04/01/15 09:05	04/01/15 15:42	75-01-4	
Xylene (Total)	ND	mg/kg	0.15	1	04/01/15 09:05	04/01/15 15:42	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	87	%.	55-150	1	04/01/15 09:05	04/01/15 15:42	17060-07-0	
Toluene-d8 (S)	97	%.	61-125	1	04/01/15 09:05	04/01/15 15:42	2037-26-5	
4-Bromofluorobenzene (S)	100	%.	54-131	1	04/01/15 09:05	04/01/15 15:42	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-8W **Lab ID: 10300830018** Collected: 03/25/15 10:20 Received: 03/27/15 08:20 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO GCS	Analytical Method: WI MOD DRO Preparation Method: WI MOD DRO							
WDRO C10-C28	ND	ug/L	116	1	03/31/15 10:53	04/01/15 12:29		
Surrogates								
n-Triacontane (S)	93	%.	50-150	1	03/31/15 10:53	04/01/15 12:29	638-68-6	P4
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020							
Antimony, Dissolved	**13.7**	ug/L	0.50	1	03/30/15 07:07	03/30/15 12:11	7440-36-0	
Arsenic, Dissolved	**348**	ug/L	0.50	1	03/30/15 07:07	03/30/15 12:11	7440-38-2	
Barium, Dissolved	**66.5**	ug/L	0.30	1	03/30/15 07:07	03/30/15 12:11	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.20	1	03/30/15 07:07	03/30/15 12:11	7440-41-7	
Cadmium, Dissolved	ND	ug/L	0.080	1	03/30/15 07:07	03/30/15 12:11	7440-43-9	
Chromium, Dissolved	ND	ug/L	0.50	1	03/30/15 07:07	03/30/15 12:11	7440-47-3	
Copper, Dissolved	ND	ug/L	1.0	1	03/30/15 07:07	03/30/15 12:11	7440-50-8	
Lead, Dissolved	ND	ug/L	0.10	1	03/30/15 07:07	03/30/15 12:11	7439-92-1	
Nickel, Dissolved	**10.8**	ug/L	0.50	1	03/30/15 07:07	03/30/15 12:11	7440-02-0	
Selenium, Dissolved	**2.5**	ug/L	0.50	1	03/30/15 07:07	03/30/15 12:11	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	1	03/30/15 07:07	03/30/15 12:11	7440-22-4	
Thallium, Dissolved	ND	ug/L	0.10	1	03/30/15 07:07	03/30/15 12:11	7440-28-0	
Zinc, Dissolved	ND	ug/L	5.0	1	03/30/15 07:07	03/30/15 12:11	7440-66-6	
7470 Mercury, Dissolved	Analytical Method: EPA 7470 Preparation Method: EPA 7470A							
Mercury, Dissolved	ND	ug/L	0.20	1	03/30/15 10:43	04/01/15 12:37	7439-97-6	
8260 VOC	Analytical Method: EPA 8260							
Acetone	ND	ug/L	20.0	1		04/01/15 23:38	67-64-1	
Allyl chloride	ND	ug/L	4.0	1		04/01/15 23:38	107-05-1	
Benzene	ND	ug/L	1.0	1		04/01/15 23:38	71-43-2	
Bromobenzene	ND	ug/L	1.0	1		04/01/15 23:38	108-86-1	
Bromochloromethane	ND	ug/L	4.0	1		04/01/15 23:38	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	1		04/01/15 23:38	75-27-4	
Bromoform	ND	ug/L	4.0	1		04/01/15 23:38	75-25-2	
Bromomethane	ND	ug/L	4.0	1		04/01/15 23:38	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	1		04/01/15 23:38	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	1		04/01/15 23:38	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	1		04/01/15 23:38	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	1		04/01/15 23:38	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	1		04/01/15 23:38	56-23-5	
Chlorobenzene	ND	ug/L	1.0	1		04/01/15 23:38	108-90-7	
Chloroethane	ND	ug/L	1.0	1		04/01/15 23:38	75-00-3	
Chloroform	ND	ug/L	1.0	1		04/01/15 23:38	67-66-3	
Chloromethane	ND	ug/L	4.0	1		04/01/15 23:38	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	1		04/01/15 23:38	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	1		04/01/15 23:38	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	1		04/01/15 23:38	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	1		04/01/15 23:38	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	1		04/01/15 23:38	106-93-4	
Dibromomethane	ND	ug/L	4.0	1		04/01/15 23:38	74-95-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-8W **Lab ID: 10300830018** Collected: 03/25/15 10:20 Received: 03/27/15 08:20 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 VOC	Analytical Method: EPA 8260							
1,2-Dichlorobenzene	ND	ug/L	1.0	1		04/01/15 23:38	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	1		04/01/15 23:38	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	1		04/01/15 23:38	106-46-7	
Dichlorodifluoromethane	ND	ug/L	4.0	1		04/01/15 23:38	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	1		04/01/15 23:38	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		04/01/15 23:38	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	1		04/01/15 23:38	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		04/01/15 23:38	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		04/01/15 23:38	156-60-5	
Dichlorofluoromethane	ND	ug/L	1.0	1		04/01/15 23:38	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	1		04/01/15 23:38	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	1		04/01/15 23:38	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	1		04/01/15 23:38	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	1		04/01/15 23:38	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	1		04/01/15 23:38	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	1		04/01/15 23:38	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	1		04/01/15 23:38	60-29-7	
Ethylbenzene	ND	ug/L	1.0	1		04/01/15 23:38	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	1		04/01/15 23:38	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	1		04/01/15 23:38	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	1		04/01/15 23:38	99-87-6	
Methylene Chloride	ND	ug/L	4.0	1		04/01/15 23:38	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	1		04/01/15 23:38	108-10-1	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		04/01/15 23:38	1634-04-4	
Naphthalene	ND	ug/L	4.0	1		04/01/15 23:38	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	1		04/01/15 23:38	103-65-1	
Styrene	ND	ug/L	1.0	1		04/01/15 23:38	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	1		04/01/15 23:38	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	1		04/01/15 23:38	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	1		04/01/15 23:38	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	1		04/01/15 23:38	109-99-9	
Toluene	ND	ug/L	1.0	1		04/01/15 23:38	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	1		04/01/15 23:38	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	1		04/01/15 23:38	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	1		04/01/15 23:38	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	1		04/01/15 23:38	79-00-5	
Trichloroethene	ND	ug/L	0.40	1		04/01/15 23:38	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	1		04/01/15 23:38	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	1		04/01/15 23:38	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	1		04/01/15 23:38	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	1		04/01/15 23:38	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	1		04/01/15 23:38	108-67-8	
Vinyl chloride	ND	ug/L	0.40	1		04/01/15 23:38	75-01-4	
Xylene (Total)	ND	ug/L	3.0	1		04/01/15 23:38	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	99	%.	75-125	1		04/01/15 23:38	17060-07-0	
Toluene-d8 (S)	99	%.	75-125	1		04/01/15 23:38	2037-26-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-8W **Lab ID: 10300830018** Collected: 03/25/15 10:20 Received: 03/27/15 08:20 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 VOC	Analytical Method: EPA 8260							
Surrogates								
4-Bromofluorobenzene (S)	104	%.	75-125	1		04/01/15 23:38	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-10W **Lab ID: 10300830019** Collected: 03/25/15 12:30 Received: 03/27/15 08:20 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO GCS	Analytical Method: WI MOD DRO Preparation Method: WI MOD DRO							
WDRO C10-C28	ND	ug/L	110	1	03/31/15 10:53	04/01/15 12:36		
Surrogates								
n-Triacontane (S)	91	%.	50-150	1	03/31/15 10:53	04/01/15 12:36	638-68-6	
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020							
Antimony, Dissolved	ND	ug/L	0.50	1	03/30/15 07:07	03/30/15 12:01	7440-36-0	
Arsenic, Dissolved	**10.8**	ug/L	0.50	1	03/30/15 07:07	03/30/15 12:01	7440-38-2	
Barium, Dissolved	**74.6**	ug/L	0.30	1	03/30/15 07:07	03/30/15 12:01	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.20	1	03/30/15 07:07	03/30/15 12:01	7440-41-7	
Cadmium, Dissolved	ND	ug/L	0.080	1	03/30/15 07:07	03/30/15 12:01	7440-43-9	
Chromium, Dissolved	ND	ug/L	0.50	1	03/30/15 07:07	03/30/15 12:01	7440-47-3	
Copper, Dissolved	ND	ug/L	1.0	1	03/30/15 07:07	03/30/15 12:01	7440-50-8	
Lead, Dissolved	ND	ug/L	0.10	1	03/30/15 07:07	03/30/15 12:01	7439-92-1	
Nickel, Dissolved	**11.0**	ug/L	0.50	1	03/30/15 07:07	03/30/15 12:01	7440-02-0	
Selenium, Dissolved	**0.62**	ug/L	0.50	1	03/30/15 07:07	03/30/15 12:01	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	1	03/30/15 07:07	03/30/15 12:01	7440-22-4	
Thallium, Dissolved	ND	ug/L	0.10	1	03/30/15 07:07	03/30/15 12:01	7440-28-0	
Zinc, Dissolved	ND	ug/L	5.0	1	03/30/15 07:07	03/30/15 12:01	7440-66-6	
7470 Mercury, Dissolved	Analytical Method: EPA 7470 Preparation Method: EPA 7470A							
Mercury, Dissolved	ND	ug/L	0.20	1	03/30/15 10:43	04/01/15 12:40	7439-97-6	
8260 VOC	Analytical Method: EPA 8260							
Acetone	ND	ug/L	20.0	1		04/01/15 23:53	67-64-1	
Allyl chloride	ND	ug/L	4.0	1		04/01/15 23:53	107-05-1	
Benzene	ND	ug/L	1.0	1		04/01/15 23:53	71-43-2	
Bromobenzene	ND	ug/L	1.0	1		04/01/15 23:53	108-86-1	
Bromochloromethane	ND	ug/L	4.0	1		04/01/15 23:53	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	1		04/01/15 23:53	75-27-4	
Bromoform	ND	ug/L	4.0	1		04/01/15 23:53	75-25-2	
Bromomethane	ND	ug/L	4.0	1		04/01/15 23:53	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	1		04/01/15 23:53	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	1		04/01/15 23:53	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	1		04/01/15 23:53	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	1		04/01/15 23:53	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	1		04/01/15 23:53	56-23-5	
Chlorobenzene	ND	ug/L	1.0	1		04/01/15 23:53	108-90-7	
Chloroethane	ND	ug/L	1.0	1		04/01/15 23:53	75-00-3	
Chloroform	ND	ug/L	1.0	1		04/01/15 23:53	67-66-3	
Chloromethane	ND	ug/L	4.0	1		04/01/15 23:53	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	1		04/01/15 23:53	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	1		04/01/15 23:53	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	1		04/01/15 23:53	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	1		04/01/15 23:53	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	1		04/01/15 23:53	106-93-4	
Dibromomethane	ND	ug/L	4.0	1		04/01/15 23:53	74-95-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-10W **Lab ID: 10300830019** Collected: 03/25/15 12:30 Received: 03/27/15 08:20 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 VOC	Analytical Method: EPA 8260							
1,2-Dichlorobenzene	ND	ug/L	1.0	1		04/01/15 23:53	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	1		04/01/15 23:53	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	1		04/01/15 23:53	106-46-7	
Dichlorodifluoromethane	ND	ug/L	4.0	1		04/01/15 23:53	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	1		04/01/15 23:53	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		04/01/15 23:53	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	1		04/01/15 23:53	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		04/01/15 23:53	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		04/01/15 23:53	156-60-5	
Dichlorofluoromethane	ND	ug/L	1.0	1		04/01/15 23:53	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	1		04/01/15 23:53	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	1		04/01/15 23:53	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	1		04/01/15 23:53	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	1		04/01/15 23:53	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	1		04/01/15 23:53	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	1		04/01/15 23:53	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	1		04/01/15 23:53	60-29-7	
Ethylbenzene	ND	ug/L	1.0	1		04/01/15 23:53	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	1		04/01/15 23:53	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	1		04/01/15 23:53	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	1		04/01/15 23:53	99-87-6	
Methylene Chloride	ND	ug/L	4.0	1		04/01/15 23:53	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	1		04/01/15 23:53	108-10-1	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		04/01/15 23:53	1634-04-4	
Naphthalene	ND	ug/L	4.0	1		04/01/15 23:53	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	1		04/01/15 23:53	103-65-1	
Styrene	ND	ug/L	1.0	1		04/01/15 23:53	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	1		04/01/15 23:53	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	1		04/01/15 23:53	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	1		04/01/15 23:53	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	1		04/01/15 23:53	109-99-9	
Toluene	ND	ug/L	1.0	1		04/01/15 23:53	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	1		04/01/15 23:53	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	1		04/01/15 23:53	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	1		04/01/15 23:53	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	1		04/01/15 23:53	79-00-5	
Trichloroethene	**1.0**	ug/L	0.40	1		04/01/15 23:53	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	1		04/01/15 23:53	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	1		04/01/15 23:53	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	1		04/01/15 23:53	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	1		04/01/15 23:53	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	1		04/01/15 23:53	108-67-8	
Vinyl chloride	ND	ug/L	0.40	1		04/01/15 23:53	75-01-4	
Xylene (Total)	ND	ug/L	3.0	1		04/01/15 23:53	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	100	%.	75-125	1		04/01/15 23:53	17060-07-0	
Toluene-d8 (S)	100	%.	75-125	1		04/01/15 23:53	2037-26-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: PP-10W **Lab ID: 10300830019** Collected: 03/25/15 12:30 Received: 03/27/15 08:20 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 VOC	Analytical Method: EPA 8260							
Surrogates								
4-Bromofluorobenzene (S)	100	%.	75-125	1		04/01/15 23:53	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: HA-W **Lab ID: 10300830020** Collected: 03/26/15 11:00 Received: 03/27/15 08:20 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO GCS	Analytical Method: WI MOD DRO Preparation Method: WI MOD DRO							
WDRO C10-C28	ND	ug/L	116	1	03/31/15 10:53	04/01/15 13:31		
Surrogates								
n-Triacontane (S)	94	%.	50-150	1	03/31/15 10:53	04/01/15 13:31	638-68-6	P4
6020A MET ICPMS, Dissolved	Analytical Method: EPA 6020A Preparation Method: EPA 3020							
Antimony, Dissolved	**6.9**	ug/L	0.50	1	03/30/15 07:07	03/30/15 12:06	7440-36-0	
Arsenic, Dissolved	**737**	ug/L	5.0	10	03/30/15 07:07	03/31/15 07:41	7440-38-2	
Barium, Dissolved	**39.9**	ug/L	0.30	1	03/30/15 07:07	03/30/15 12:06	7440-39-3	
Beryllium, Dissolved	ND	ug/L	0.20	1	03/30/15 07:07	03/30/15 12:06	7440-41-7	
Cadmium, Dissolved	ND	ug/L	0.080	1	03/30/15 07:07	03/30/15 12:06	7440-43-9	
Chromium, Dissolved	**0.90**	ug/L	0.50	1	03/30/15 07:07	03/30/15 12:06	7440-47-3	
Copper, Dissolved	ND	ug/L	1.0	1	03/30/15 07:07	03/30/15 12:06	7440-50-8	
Lead, Dissolved	ND	ug/L	0.10	1	03/30/15 07:07	03/30/15 12:06	7439-92-1	
Nickel, Dissolved	**0.50**	ug/L	0.50	1	03/30/15 07:07	03/30/15 12:06	7440-02-0	
Selenium, Dissolved	**2.7**	ug/L	0.50	1	03/30/15 07:07	03/30/15 12:06	7782-49-2	
Silver, Dissolved	ND	ug/L	0.50	1	03/30/15 07:07	03/30/15 12:06	7440-22-4	
Thallium, Dissolved	ND	ug/L	0.10	1	03/30/15 07:07	03/30/15 12:06	7440-28-0	
Zinc, Dissolved	ND	ug/L	5.0	1	03/30/15 07:07	03/30/15 12:06	7440-66-6	
7470 Mercury, Dissolved	Analytical Method: EPA 7470 Preparation Method: EPA 7470A							
Mercury, Dissolved	ND	ug/L	0.20	1	03/30/15 10:43	04/01/15 12:47	7439-97-6	
8260 VOC	Analytical Method: EPA 8260							
Acetone	ND	ug/L	20.0	1		04/02/15 00:07	67-64-1	
Allyl chloride	ND	ug/L	4.0	1		04/02/15 00:07	107-05-1	
Benzene	ND	ug/L	1.0	1		04/02/15 00:07	71-43-2	
Bromobenzene	ND	ug/L	1.0	1		04/02/15 00:07	108-86-1	
Bromochloromethane	ND	ug/L	4.0	1		04/02/15 00:07	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	1		04/02/15 00:07	75-27-4	
Bromoform	ND	ug/L	4.0	1		04/02/15 00:07	75-25-2	
Bromomethane	ND	ug/L	4.0	1		04/02/15 00:07	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	1		04/02/15 00:07	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	1		04/02/15 00:07	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	1		04/02/15 00:07	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	1		04/02/15 00:07	98-06-6	
Carbon tetrachloride	ND	ug/L	1.0	1		04/02/15 00:07	56-23-5	
Chlorobenzene	ND	ug/L	1.0	1		04/02/15 00:07	108-90-7	
Chloroethane	ND	ug/L	1.0	1		04/02/15 00:07	75-00-3	
Chloroform	ND	ug/L	1.0	1		04/02/15 00:07	67-66-3	
Chloromethane	ND	ug/L	4.0	1		04/02/15 00:07	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	1		04/02/15 00:07	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	1		04/02/15 00:07	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	1		04/02/15 00:07	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	1		04/02/15 00:07	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	1		04/02/15 00:07	106-93-4	
Dibromomethane	ND	ug/L	4.0	1		04/02/15 00:07	74-95-3	

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: HA-W **Lab ID: 10300830020** Collected: 03/26/15 11:00 Received: 03/27/15 08:20 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 VOC	Analytical Method: EPA 8260							
1,2-Dichlorobenzene	ND	ug/L	1.0	1		04/02/15 00:07	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	1		04/02/15 00:07	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	1		04/02/15 00:07	106-46-7	
Dichlorodifluoromethane	ND	ug/L	4.0	1		04/02/15 00:07	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	1		04/02/15 00:07	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		04/02/15 00:07	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	1		04/02/15 00:07	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		04/02/15 00:07	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		04/02/15 00:07	156-60-5	
Dichlorofluoromethane	ND	ug/L	1.0	1		04/02/15 00:07	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	1		04/02/15 00:07	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	1		04/02/15 00:07	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	1		04/02/15 00:07	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	1		04/02/15 00:07	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	1		04/02/15 00:07	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	1		04/02/15 00:07	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	1		04/02/15 00:07	60-29-7	
Ethylbenzene	ND	ug/L	1.0	1		04/02/15 00:07	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	1.0	1		04/02/15 00:07	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/L	1.0	1		04/02/15 00:07	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	1		04/02/15 00:07	99-87-6	
Methylene Chloride	ND	ug/L	4.0	1		04/02/15 00:07	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	1		04/02/15 00:07	108-10-1	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		04/02/15 00:07	1634-04-4	
Naphthalene	ND	ug/L	4.0	1		04/02/15 00:07	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	1		04/02/15 00:07	103-65-1	
Styrene	ND	ug/L	1.0	1		04/02/15 00:07	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	1		04/02/15 00:07	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	1		04/02/15 00:07	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	1		04/02/15 00:07	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	1		04/02/15 00:07	109-99-9	
Toluene	ND	ug/L	1.0	1		04/02/15 00:07	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	1		04/02/15 00:07	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	1		04/02/15 00:07	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	1		04/02/15 00:07	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	1		04/02/15 00:07	79-00-5	
Trichloroethene	ND	ug/L	0.40	1		04/02/15 00:07	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	1		04/02/15 00:07	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	1		04/02/15 00:07	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	1.0	1		04/02/15 00:07	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	1		04/02/15 00:07	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	1		04/02/15 00:07	108-67-8	
Vinyl chloride	ND	ug/L	0.40	1		04/02/15 00:07	75-01-4	
Xylene (Total)	ND	ug/L	3.0	1		04/02/15 00:07	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	99	%.	75-125	1		04/02/15 00:07	17060-07-0	
Toluene-d8 (S)	101	%.	75-125	1		04/02/15 00:07	2037-26-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Sample: HA-W **Lab ID: 10300830020** Collected: 03/26/15 11:00 Received: 03/27/15 08:20 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260 VOC	Analytical Method: EPA 8260							
Surrogates								
4-Bromofluorobenzene (S)	98	%.	75-125	1		04/02/15 00:07	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
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QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

QC Batch: GCV/13574 Analysis Method: WI MOD GRO
QC Batch Method: EPA 5030 Medium Soil Analysis Description: WIGRO Solid GCV
Associated Lab Samples: 10300830002, 10300830003, 10300830005, 10300830006, 10300830007

METHOD BLANK: 1932398 Matrix: Solid
Associated Lab Samples: 10300830002, 10300830003, 10300830005, 10300830006, 10300830007

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Gasoline Range Organics	mg/kg	ND	10.0	04/06/15 15:52	
a,a,a-Trifluorotoluene (S)	%.	98	80-150	04/06/15 15:52	

LABORATORY CONTROL SAMPLE & LCSD: 1932399 1932400

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Gasoline Range Organics	mg/kg	50	46.2	50.6	92	101	80-120	9	20	
a,a,a-Trifluorotoluene (S)	%.				101	101	80-150			

MATRIX SPIKE SAMPLE: 1932401

Parameter	Units	10300504004 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Gasoline Range Organics	mg/kg	ND	52.5	69.7	126	80-120	CH,M1
a,a,a-Trifluorotoluene (S)	%.				109	80-150	

SAMPLE DUPLICATE: 1932402

Parameter	Units	10300504005 Result	Dup Result	RPD	Max RPD	Qualifiers
Gasoline Range Organics	mg/kg	ND	ND		20	
a,a,a-Trifluorotoluene (S)	%.	99	99	4		

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

QC Batch: GCV/13582 Analysis Method: WI MOD GRO
QC Batch Method: EPA 5030 Medium Soil Analysis Description: WIGRO Solid GCV
Associated Lab Samples: 10300830008, 10300830010, 10300830011, 10300830012, 10300830013, 10300830014, 10300830016

METHOD BLANK: 1934294 Matrix: Solid
Associated Lab Samples: 10300830008, 10300830010, 10300830011, 10300830012, 10300830013, 10300830014, 10300830016

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Gasoline Range Organics	mg/kg	ND	10.0	04/08/15 15:26	
a,a,a-Trifluorotoluene (S)	%.	91	80-150	04/08/15 15:26	

LABORATORY CONTROL SAMPLE & LCSD: 1934295 1934296

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Gasoline Range Organics	mg/kg	50	50.3	52.6	101	105	80-120	4	20	
a,a,a-Trifluorotoluene (S)	%.				100	101	80-150			

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

QC Batch: MERP/13082 Analysis Method: EPA 7470
QC Batch Method: EPA 7470A Analysis Description: 7470 Mercury Dissolved
Associated Lab Samples: 10300830018, 10300830019, 10300830020

METHOD BLANK: 1927057 Matrix: Water
Associated Lab Samples: 10300830018, 10300830019, 10300830020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury, Dissolved	ug/L	ND	0.20	04/01/15 12:28	

LABORATORY CONTROL SAMPLE: 1927058

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury, Dissolved	ug/L	5	5.3	107	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1927059 1927060

Parameter	Units	10300830019 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury, Dissolved	ug/L	ND	5	5	4.9	5.0	98	100	75-125	1	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

QC Batch: MERP/13087 Analysis Method: EPA 7471B
QC Batch Method: EPA 7471B Analysis Description: 7471B Mercury Solids
Associated Lab Samples: 10300830002, 10300830003, 10300830005, 10300830006, 10300830007, 10300830008, 10300830010, 10300830011, 10300830012, 10300830013, 10300830014, 10300830016

METHOD BLANK: 1927082 Matrix: Solid
Associated Lab Samples: 10300830002, 10300830003, 10300830005, 10300830006, 10300830007, 10300830008, 10300830010, 10300830011, 10300830012, 10300830013, 10300830014, 10300830016

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/kg	ND	0.017	04/01/15 11:13	

LABORATORY CONTROL SAMPLE: 1927083

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	.44	0.45	102	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1927084 1927085

Parameter	Units	10300830002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/kg	0.022	.51	.51	0.53	0.54	100	102	75-125	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

QC Batch: MPRP/53233 Analysis Method: EPA 6020A
QC Batch Method: EPA 3050 Analysis Description: 6020A Solids UPD4
Associated Lab Samples: 10300830002, 10300830003, 10300830005, 10300830006, 10300830007, 10300830008, 10300830010, 10300830011, 10300830012, 10300830013, 10300830014, 10300830016

METHOD BLANK: 1927019 Matrix: Solid
Associated Lab Samples: 10300830002, 10300830003, 10300830005, 10300830006, 10300830007, 10300830008, 10300830010, 10300830011, 10300830012, 10300830013, 10300830014, 10300830016

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony	mg/kg	ND	0.47	04/01/15 08:50	
Arsenic	mg/kg	ND	0.47	04/01/15 08:50	
Barium	mg/kg	ND	0.28	04/01/15 08:50	
Beryllium	mg/kg	ND	0.19	04/01/15 08:50	
Cadmium	mg/kg	ND	0.075	04/01/15 08:50	
Chromium	mg/kg	ND	0.47	04/01/15 08:50	
Copper	mg/kg	ND	0.94	04/01/15 08:50	
Lead	mg/kg	ND	0.094	04/01/15 08:50	
Nickel	mg/kg	ND	0.47	04/01/15 08:50	
Selenium	mg/kg	ND	0.47	04/01/15 08:50	
Silver	mg/kg	ND	0.47	04/01/15 08:50	
Thallium	mg/kg	ND	0.094	04/01/15 08:50	
Zinc	mg/kg	ND	4.7	04/01/15 08:50	

LABORATORY CONTROL SAMPLE: 1927020

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony	mg/kg	19.8	17.1	86	80-120	
Arsenic	mg/kg	19.8	17.3	87	80-120	
Barium	mg/kg	19.8	17.3	87	80-120	
Beryllium	mg/kg	19.8	18.8	95	80-120	
Cadmium	mg/kg	19.8	18.2	92	80-120	
Chromium	mg/kg	19.8	18.6	94	80-120	
Copper	mg/kg	19.8	17.5	88	80-120	
Lead	mg/kg	19.8	18.7	95	80-120	
Nickel	mg/kg	19.8	18.4	93	80-120	
Selenium	mg/kg	19.8	17.3	87	80-120	
Silver	mg/kg	19.8	19.4	98	80-120	
Thallium	mg/kg	19.8	19.0	96	80-120	
Zinc	mg/kg	19.8	18.1	92	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1927021 1927022

Parameter	Units	10300830002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony	mg/kg	ND	20.9	19.2	16.1	12.8	76	66	75-125	23	20	M6,R1
Arsenic	mg/kg	3.0	20.9	19.2	25.7	21.5	109	96	75-125	18	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1927021 1927022

Parameter	Units	10300830002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Barium	mg/kg	65.4	20.9	19.2	90.6	94.6	121	153	75-125	4	20	M6
Beryllium	mg/kg	0.36	20.9	19.2	23.5	18.9	111	97	75-125	22	20	R1
Cadmium	mg/kg	0.17	20.9	19.2	23.8	19.4	113	100	75-125	20	20	
Chromium	mg/kg	8.4	20.9	19.2	36.8	35.9	136	144	75-125	2	20	M6
Copper	mg/kg	7.0	20.9	19.2	31.0	26.2	115	100	75-125	17	20	
Lead	mg/kg	16.2	20.9	19.2	43.6	36.3	131	105	75-125	18	20	M6
Nickel	mg/kg	9.6	20.9	19.2	35.8	36.8	125	142	75-125	3	20	M6
Selenium	mg/kg	ND	20.9	19.2	22.3	17.6	106	91	75-125	24	20	R1
Silver	mg/kg	ND	20.9	19.2	24.6	20.1	117	105	75-125	20	20	
Thallium	mg/kg	0.11	20.9	19.2	24.3	19.9	116	104	75-125	20	20	
Zinc	mg/kg	60.6	20.9	19.2	102	91.5	200	162	75-125	11	20	M6

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

QC Batch: MPRP/53235 Analysis Method: EPA 6020A
QC Batch Method: EPA 3020 Analysis Description: 6020A Water Dissolved UPD4
Associated Lab Samples: 10300830018, 10300830019, 10300830020

METHOD BLANK: 1927032 Matrix: Water
Associated Lab Samples: 10300830018, 10300830019, 10300830020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Antimony, Dissolved	ug/L	ND	0.50	03/30/15 11:51	
Arsenic, Dissolved	ug/L	ND	0.50	03/30/15 11:51	
Barium, Dissolved	ug/L	ND	0.30	03/30/15 11:51	
Beryllium, Dissolved	ug/L	ND	0.20	03/30/15 11:51	
Cadmium, Dissolved	ug/L	ND	0.080	03/30/15 11:51	
Chromium, Dissolved	ug/L	ND	0.50	03/30/15 11:51	
Copper, Dissolved	ug/L	ND	1.0	03/30/15 11:51	
Lead, Dissolved	ug/L	ND	0.10	03/30/15 11:51	
Nickel, Dissolved	ug/L	ND	0.50	03/30/15 11:51	
Selenium, Dissolved	ug/L	ND	0.50	03/30/15 11:51	
Silver, Dissolved	ug/L	ND	0.50	03/30/15 11:51	
Thallium, Dissolved	ug/L	ND	0.10	03/30/15 11:51	
Zinc, Dissolved	ug/L	ND	5.0	03/30/15 11:51	

LABORATORY CONTROL SAMPLE: 1927033

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Antimony, Dissolved	ug/L	80	83.9	105	80-120	
Arsenic, Dissolved	ug/L	80	82.8	103	80-120	
Barium, Dissolved	ug/L	80	85.0	106	80-120	
Beryllium, Dissolved	ug/L	80	85.6	107	80-120	
Cadmium, Dissolved	ug/L	80	85.0	106	80-120	
Chromium, Dissolved	ug/L	80	84.6	106	80-120	
Copper, Dissolved	ug/L	80	85.2	106	80-120	
Lead, Dissolved	ug/L	80	88.2	110	80-120	
Nickel, Dissolved	ug/L	80	83.9	105	80-120	
Selenium, Dissolved	ug/L	80	83.4	104	80-120	
Silver, Dissolved	ug/L	80	85.1	106	80-120	
Thallium, Dissolved	ug/L	80	85.6	107	80-120	
Zinc, Dissolved	ug/L	80	85.2	107	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1927034 1927035

Parameter	Units	10300830018 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Antimony, Dissolved	ug/L	13.7	80	80	100	99.7	108	108	75-125	0	20	
Arsenic, Dissolved	ug/L	348	80	80	430	434	103	107	75-125	1	20	
Barium, Dissolved	ug/L	66.5	80	80	154	153	110	108	75-125	1	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1927034 1927035

Parameter	Units	10300830018 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Beryllium, Dissolved	ug/L	ND	80	80	85.6	85.7	107	107	75-125	0	20	
Cadmium, Dissolved	ug/L	ND	80	80	85.2	85.3	106	107	75-125	0	20	
Chromium, Dissolved	ug/L	ND	80	80	84.8	84.9	106	106	75-125	0	20	
Copper, Dissolved	ug/L	ND	80	80	83.7	83.8	104	104	75-125	0	20	
Lead, Dissolved	ug/L	ND	80	80	87.4	87.4	109	109	75-125	0	20	
Nickel, Dissolved	ug/L	10.8	80	80	93.1	93.8	103	104	75-125	1	20	
Selenium, Dissolved	ug/L	2.5	80	80	87.4	86.2	106	105	75-125	1	20	
Silver, Dissolved	ug/L	ND	80	80	82.7	82.6	103	103	75-125	0	20	
Thallium, Dissolved	ug/L	ND	80	80	91.3	90.9	114	114	75-125	0	20	
Zinc, Dissolved	ug/L	ND	80	80	87.9	90.4	106	109	75-125	3	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

QC Batch: MPRP/53266 Analysis Method: ASTM D2974
QC Batch Method: ASTM D2974 Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 10300830002, 10300830003, 10300830005, 10300830006, 10300830007, 10300830008, 10300830010, 10300830011, 10300830012, 10300830013, 10300830014, 10300830016

SAMPLE DUPLICATE: 1928054

Parameter	Units	10300367001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	0.72	0.70	3	30	

SAMPLE DUPLICATE: 1928055

Parameter	Units	10300830016 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	9.6	8.6	10	30	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

QC Batch: MSV/30929 Analysis Method: EPA 8260
QC Batch Method: EPA 5035/5030B Analysis Description: 8260 MSV 5030 Med Level
Associated Lab Samples: 10300830002, 10300830003, 10300830005, 10300830006

METHOD BLANK: 1928306 Matrix: Solid
Associated Lab Samples: 10300830002, 10300830003, 10300830005, 10300830006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	mg/kg	ND	0.050	03/31/15 17:05	
1,1,1-Trichloroethane	mg/kg	ND	0.050	03/31/15 17:05	
1,1,2,2-Tetrachloroethane	mg/kg	ND	0.050	03/31/15 17:05	
1,1,2-Trichloroethane	mg/kg	ND	0.050	03/31/15 17:05	
1,1,2-Trichlorotrifluoroethane	mg/kg	ND	0.20	03/31/15 17:05	
1,1-Dichloroethane	mg/kg	ND	0.050	03/31/15 17:05	
1,1-Dichloroethene	mg/kg	ND	0.20	03/31/15 17:05	
1,1-Dichloropropene	mg/kg	ND	0.050	03/31/15 17:05	
1,2,3-Trichlorobenzene	mg/kg	ND	0.050	03/31/15 17:05	
1,2,3-Trichloropropane	mg/kg	ND	0.20	03/31/15 17:05	
1,2,4-Trichlorobenzene	mg/kg	ND	0.050	03/31/15 17:05	
1,2,4-Trimethylbenzene	mg/kg	ND	0.050	03/31/15 17:05	
1,2-Dibromo-3-chloropropane	mg/kg	ND	0.50	03/31/15 17:05	
1,2-Dibromoethane (EDB)	mg/kg	ND	0.050	03/31/15 17:05	
1,2-Dichlorobenzene	mg/kg	ND	0.050	03/31/15 17:05	
1,2-Dichloroethane	mg/kg	ND	0.050	03/31/15 17:05	
1,2-Dichloropropane	mg/kg	ND	0.050	03/31/15 17:05	
1,3,5-Trimethylbenzene	mg/kg	ND	0.050	03/31/15 17:05	
1,3-Dichlorobenzene	mg/kg	ND	0.050	03/31/15 17:05	
1,3-Dichloropropane	mg/kg	ND	0.050	03/31/15 17:05	
1,4-Dichlorobenzene	mg/kg	ND	0.050	03/31/15 17:05	
2,2-Dichloropropane	mg/kg	ND	0.20	03/31/15 17:05	
2-Butanone (MEK)	mg/kg	ND	0.25	03/31/15 17:05	
2-Chlorotoluene	mg/kg	ND	0.050	03/31/15 17:05	
4-Chlorotoluene	mg/kg	ND	0.050	03/31/15 17:05	
4-Methyl-2-pentanone (MIBK)	mg/kg	ND	0.25	03/31/15 17:05	
Acetone	mg/kg	ND	1.0	03/31/15 17:05	
Allyl chloride	mg/kg	ND	0.20	03/31/15 17:05	
Benzene	mg/kg	ND	0.020	03/31/15 17:05	
Bromobenzene	mg/kg	ND	0.050	03/31/15 17:05	
Bromochloromethane	mg/kg	ND	0.20	03/31/15 17:05	
Bromodichloromethane	mg/kg	ND	0.050	03/31/15 17:05	
Bromoform	mg/kg	ND	0.20	03/31/15 17:05	
Bromomethane	mg/kg	ND	0.50	03/31/15 17:05	
Carbon tetrachloride	mg/kg	ND	0.20	03/31/15 17:05	
Chlorobenzene	mg/kg	ND	0.050	03/31/15 17:05	
Chloroethane	mg/kg	ND	0.50	03/31/15 17:05	
Chloroform	mg/kg	ND	0.050	03/31/15 17:05	
Chloromethane	mg/kg	ND	0.20	03/31/15 17:05	
cis-1,2-Dichloroethene	mg/kg	ND	0.050	03/31/15 17:05	
cis-1,3-Dichloropropene	mg/kg	ND	0.050	03/31/15 17:05	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

METHOD BLANK: 1928306 Matrix: Solid
Associated Lab Samples: 10300830002, 10300830003, 10300830005, 10300830006

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Dibromochloromethane	mg/kg	ND	0.050	03/31/15 17:05	
Dibromomethane	mg/kg	ND	0.050	03/31/15 17:05	
Dichlorodifluoromethane	mg/kg	ND	0.20	03/31/15 17:05	
Dichlorofluoromethane	mg/kg	ND	0.50	03/31/15 17:05	
Diethyl ether (Ethyl ether)	mg/kg	ND	0.20	03/31/15 17:05	
Ethylbenzene	mg/kg	ND	0.050	03/31/15 17:05	
Hexachloro-1,3-butadiene	mg/kg	ND	0.25	03/31/15 17:05	
Isopropylbenzene (Cumene)	mg/kg	ND	0.050	03/31/15 17:05	
Methyl-tert-butyl ether	mg/kg	ND	0.050	03/31/15 17:05	
Methylene Chloride	mg/kg	ND	0.20	03/31/15 17:05	
n-Butylbenzene	mg/kg	ND	0.050	03/31/15 17:05	
n-Propylbenzene	mg/kg	ND	0.050	03/31/15 17:05	
Naphthalene	mg/kg	ND	0.20	03/31/15 17:05	
p-Isopropyltoluene	mg/kg	ND	0.050	03/31/15 17:05	
sec-Butylbenzene	mg/kg	ND	0.050	03/31/15 17:05	
Styrene	mg/kg	ND	0.050	03/31/15 17:05	
tert-Butylbenzene	mg/kg	ND	0.050	03/31/15 17:05	
Tetrachloroethene	mg/kg	ND	0.050	03/31/15 17:05	
Tetrahydrofuran	mg/kg	ND	2.0	03/31/15 17:05	
Toluene	mg/kg	ND	0.050	03/31/15 17:05	
trans-1,2-Dichloroethene	mg/kg	ND	0.20	03/31/15 17:05	
trans-1,3-Dichloropropene	mg/kg	ND	0.050	03/31/15 17:05	
Trichloroethene	mg/kg	ND	0.050	03/31/15 17:05	
Trichlorofluoromethane	mg/kg	ND	0.20	03/31/15 17:05	
Vinyl chloride	mg/kg	ND	0.020	03/31/15 17:05	
Xylene (Total)	mg/kg	ND	0.15	03/31/15 17:05	
1,2-Dichloroethane-d4 (S)	%.	91	55-150	03/31/15 17:05	
4-Bromofluorobenzene (S)	%.	100	54-131	03/31/15 17:05	
Toluene-d8 (S)	%.	96	61-125	03/31/15 17:05	

LABORATORY CONTROL SAMPLE: 1928307

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	mg/kg	1	0.91	91	75-125	
1,1,1-Trichloroethane	mg/kg	1	0.94	94	66-125	
1,1,2,2-Tetrachloroethane	mg/kg	1	1.1	109	69-125	CH,E,SS
1,1,2-Trichloroethane	mg/kg	1	0.91	91	75-125	
1,1,2-Trichlorotrifluoroethane	mg/kg	1	0.84	84	55-125	
1,1-Dichloroethane	mg/kg	1	0.92	92	67-125	
1,1-Dichloroethene	mg/kg	1	0.90	90	62-125	
1,1-Dichloropropene	mg/kg	1	0.94	94	65-125	
1,2,3-Trichlorobenzene	mg/kg	1	0.92	92	58-132	
1,2,3-Trichloropropane	mg/kg	1	0.89	89	71-125	
1,2,4-Trichlorobenzene	mg/kg	1	0.91	91	63-128	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

LABORATORY CONTROL SAMPLE: 1928307

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trimethylbenzene	mg/kg	1	0.90	90	74-125	
1,2-Dibromo-3-chloropropane	mg/kg	2.5	2.3	94	55-142	
1,2-Dibromoethane (EDB)	mg/kg	1	0.91	91	75-125	
1,2-Dichlorobenzene	mg/kg	1	0.94	94	75-125	
1,2-Dichloroethane	mg/kg	1	0.85	85	71-125	
1,2-Dichloropropane	mg/kg	1	0.88	88	74-125	
1,3,5-Trimethylbenzene	mg/kg	1	0.92	92	72-125	
1,3-Dichlorobenzene	mg/kg	1	0.90	90	75-125	
1,3-Dichloropropane	mg/kg	1	0.88	88	75-125	
1,4-Dichlorobenzene	mg/kg	1	0.96	96	75-125	
2,2-Dichloropropane	mg/kg	1	0.89	89	45-125	
2-Butanone (MEK)	mg/kg	5	4.4	88	39-136	
2-Chlorotoluene	mg/kg	1	0.92	92	73-125	
4-Chlorotoluene	mg/kg	1	0.92	92	74-125	
4-Methyl-2-pentanone (MIBK)	mg/kg	5	4.6	92	55-132	
Acetone	mg/kg	5	4.5	90	55-131	
Allyl chloride	mg/kg	1	0.90	90	53-125	
Benzene	mg/kg	1	0.88	88	69-125	
Bromobenzene	mg/kg	1	0.89	89	75-125	
Bromochloromethane	mg/kg	1	0.94	94	75-125	
Bromodichloromethane	mg/kg	1	0.90	90	75-125	
Bromoform	mg/kg	1	0.90	90	71-125	
Bromomethane	mg/kg	1	0.78	78	42-150	
Carbon tetrachloride	mg/kg	1	0.86	86	62-125	
Chlorobenzene	mg/kg	1	0.94	94	75-125	
Chloroethane	mg/kg	1	0.76	76	41-150	
Chloroform	mg/kg	1	0.87	87	72-125	
Chloromethane	mg/kg	1	0.72	72	50-125	
cis-1,2-Dichloroethene	mg/kg	1	0.92	92	73-125	
cis-1,3-Dichloropropene	mg/kg	1	0.91	91	74-125	
Dibromochloromethane	mg/kg	1	0.95	95	75-125	
Dibromomethane	mg/kg	1	1.0	100	75-125	
Dichlorodifluoromethane	mg/kg	1	0.53	53	30-125	
Dichlorofluoromethane	mg/kg	1	0.73	73	30-150	
Diethyl ether (Ethyl ether)	mg/kg	1	0.87	87	58-125	
Ethylbenzene	mg/kg	1	0.92	92	72-125	
Hexachloro-1,3-butadiene	mg/kg	1	1.0	103	59-138	
Isopropylbenzene (Cumene)	mg/kg	1	0.99	99	72-125	
Methyl-tert-butyl ether	mg/kg	1	0.86	86	72-125	
Methylene Chloride	mg/kg	1	0.96	96	71-125	
n-Butylbenzene	mg/kg	1	0.89	89	65-125	
n-Propylbenzene	mg/kg	1	0.93	93	71-125	
Naphthalene	mg/kg	1	0.95	95	55-139	
p-Isopropyltoluene	mg/kg	1	0.95	95	69-125	
sec-Butylbenzene	mg/kg	1	0.94	94	68-125	
Styrene	mg/kg	1	1.0	102	75-125	
tert-Butylbenzene	mg/kg	1	0.93	93	70-125	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

LABORATORY CONTROL SAMPLE: 1928307

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Tetrachloroethene	mg/kg	1	0.94	94	69-125	
Tetrahydrofuran	mg/kg	10	9.5	95	62-129	
Toluene	mg/kg	1	0.92	92	72-125	
trans-1,2-Dichloroethene	mg/kg	1	0.94	94	68-125	
trans-1,3-Dichloropropene	mg/kg	1	0.91	91	74-125	
Trichloroethene	mg/kg	1	0.96	96	72-125	
Trichlorofluoromethane	mg/kg	1	0.66	66	30-150	
Vinyl chloride	mg/kg	1	0.73	73	53-125	
Xylene (Total)	mg/kg	3	2.9	98	74-125	
1,2-Dichloroethane-d4 (S)	%.			91	55-150	
4-Bromofluorobenzene (S)	%.			96	54-131	
Toluene-d8 (S)	%.			99	61-125	

MATRIX SPIKE SAMPLE: 1928308

Parameter	Units	10300640002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	mg/kg	ND	1.2	1.2	101	62-150	
1,1,1-Trichloroethane	mg/kg	ND	1.2	1.2	103	58-150	
1,1,2,2-Tetrachloroethane	mg/kg	ND	1.2	1.6	134	30-150	E,SS
1,1,2-Trichloroethane	mg/kg	ND	1.2	1.2	103	61-149	
1,1,2-Trichlorotrifluoroethane	mg/kg	ND	1.2	1.1	92	45-150	
1,1-Dichloroethane	mg/kg	ND	1.2	1.2	101	56-150	
1,1-Dichloroethene	mg/kg	ND	1.2	1.1	92	48-150	
1,1-Dichloropropene	mg/kg	ND	1.2	1.1	94	58-150	
1,2,3-Trichlorobenzene	mg/kg	ND	1.2	1.3	107	55-150	
1,2,3-Trichloropropane	mg/kg	ND	1.2	1.2	104	57-148	
1,2,4-Trichlorobenzene	mg/kg	ND	1.2	1.2	104	61-150	
1,2,4-Trimethylbenzene	mg/kg	ND	1.2	1.2	97	64-150	
1,2-Dibromo-3-chloropropane	mg/kg	ND	2.9	3.3	111	40-150	
1,2-Dibromoethane (EDB)	mg/kg	ND	1.2	1.2	101	62-147	
1,2-Dichlorobenzene	mg/kg	ND	1.2	1.2	102	73-133	
1,2-Dichloroethane	mg/kg	ND	1.2	1.0	88	63-132	
1,2-Dichloropropane	mg/kg	ND	1.2	1.1	96	69-127	
1,3,5-Trimethylbenzene	mg/kg	ND	1.2	1.2	99	63-137	
1,3-Dichlorobenzene	mg/kg	ND	1.2	1.2	98	69-133	
1,3-Dichloropropane	mg/kg	ND	1.2	1.2	98	70-130	
1,4-Dichlorobenzene	mg/kg	ND	1.2	1.1	94	69-130	
2,2-Dichloropropane	mg/kg	ND	1.2	1.1	95	54-135	
2-Butanone (MEK)	mg/kg	ND	5.9	5.7	97	49-145	
2-Chlorotoluene	mg/kg	ND	1.2	1.2	98	68-129	
4-Chlorotoluene	mg/kg	ND	1.2	1.1	95	67-134	
4-Methyl-2-pentanone (MIBK)	mg/kg	ND	5.9	6.4	109	60-150	
Acetone	mg/kg	ND	5.9	5.7	97	65-135	
Allyl chloride	mg/kg	ND	1.2	1.1	95	55-126	
Benzene	mg/kg	ND	1.2	1.1	93	63-126	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

MATRIX SPIKE SAMPLE: 1928308

Parameter	Units	10300640002 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Bromobenzene	mg/kg	ND	1.2	1.1	93	68-133	
Bromochloromethane	mg/kg	ND	1.2	1.2	98	66-130	
Bromodichloromethane	mg/kg	ND	1.2	1.2	100	68-129	
Bromoform	mg/kg	ND	1.2	1.2	104	63-135	
Bromomethane	mg/kg	ND	1.2	1.0	84	30-150	
Carbon tetrachloride	mg/kg	ND	1.2	1.1	95	56-140	
Chlorobenzene	mg/kg	ND	1.2	1.2	98	69-130	
Chloroethane	mg/kg	ND	1.2	1.1	92	46-150	
Chloroform	mg/kg	ND	1.2	1.1	95	70-127	
Chloromethane	mg/kg	ND	1.2	0.92	77	51-125	
cis-1,2-Dichloroethene	mg/kg	ND	1.2	1.1	97	68-125	
cis-1,3-Dichloropropene	mg/kg	ND	1.2	1.1	94	67-126	
Dibromochloromethane	mg/kg	ND	1.2	1.2	103	66-135	
Dibromomethane	mg/kg	ND	1.2	1.3	107	68-132	
Dichlorodifluoromethane	mg/kg	ND	1.2	0.75	63	30-138	
Dichlorofluoromethane	mg/kg	ND	1.2	1.1	89	30-150	
Diethyl ether (Ethyl ether)	mg/kg	ND	1.2	1.1	95	56-135	
Ethylbenzene	mg/kg	ND	1.2	1.1	96	69-126	
Hexachloro-1,3-butadiene	mg/kg	ND	1.2	1.2	98	50-150	
Isopropylbenzene (Cumene)	mg/kg	ND	1.2	1.2	104	65-135	
Methyl-tert-butyl ether	mg/kg	ND	1.2	1.2	98	66-129	
Methylene Chloride	mg/kg	ND	1.2	1.1	97	64-125	
n-Butylbenzene	mg/kg	ND	1.2	1.1	95	62-141	
n-Propylbenzene	mg/kg	ND	1.2	1.2	98	65-135	
Naphthalene	mg/kg	ND	1.2	1.3	112	62-150	
p-Isopropyltoluene	mg/kg	ND	1.2	1.2	101	62-139	
sec-Butylbenzene	mg/kg	ND	1.2	1.2	99	64-137	
Styrene	mg/kg	ND	1.2	1.2	103	70-132	
tert-Butylbenzene	mg/kg	ND	1.2	1.2	100	65-136	
Tetrachloroethene	mg/kg	ND	1.2	1.2	101	61-142	
Tetrahydrofuran	mg/kg	ND	11.9	13.1	110	68-138	
Toluene	mg/kg	ND	1.2	1.2	100	66-128	
trans-1,2-Dichloroethene	mg/kg	ND	1.2	1.0	87	63-129	
trans-1,3-Dichloropropene	mg/kg	ND	1.2	1.1	96	67-132	
Trichloroethene	mg/kg	ND	1.2	1.1	96	52-150	
Trichlorofluoromethane	mg/kg	ND	1.2	1.0	87	39-150	
Vinyl chloride	mg/kg	ND	1.2	0.93	78	50-125	
Xylene (Total)	mg/kg	ND	3.5	3.7	103	70-130	
1,2-Dichloroethane-d4 (S)	%.				94	55-150	
4-Bromofluorobenzene (S)	%.				95	54-131	
Toluene-d8 (S)	%.				101	61-125	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

SAMPLE DUPLICATE: 1928309

Parameter	Units	10300640003 Result	Dup Result	RPD	Max RPD	Qualifiers
1,1,1,2-Tetrachloroethane	mg/kg	ND	ND		30	
1,1,1-Trichloroethane	mg/kg	ND	ND		30	
1,1,2,2-Tetrachloroethane	mg/kg	ND	ND		30	
1,1,2-Trichloroethane	mg/kg	ND	ND		30	
1,1,2-Trichlorotrifluoroethane	mg/kg	ND	ND		30	
1,1-Dichloroethane	mg/kg	ND	ND		30	
1,1-Dichloroethene	mg/kg	ND	ND		30	
1,1-Dichloropropene	mg/kg	ND	ND		30	
1,2,3-Trichlorobenzene	mg/kg	ND	ND		30	
1,2,3-Trichloropropane	mg/kg	ND	ND		30	
1,2,4-Trichlorobenzene	mg/kg	ND	ND		30	
1,2,4-Trimethylbenzene	mg/kg	ND	ND		30	
1,2-Dibromo-3-chloropropane	mg/kg	ND	ND		30	
1,2-Dibromoethane (EDB)	mg/kg	ND	ND		30	
1,2-Dichlorobenzene	mg/kg	ND	ND		30	
1,2-Dichloroethane	mg/kg	ND	ND		30	
1,2-Dichloropropane	mg/kg	ND	ND		30	
1,3,5-Trimethylbenzene	mg/kg	ND	ND		30	
1,3-Dichlorobenzene	mg/kg	ND	ND		30	
1,3-Dichloropropane	mg/kg	ND	ND		30	
1,4-Dichlorobenzene	mg/kg	ND	ND		30	
2,2-Dichloropropane	mg/kg	ND	ND		30	
2-Butanone (MEK)	mg/kg	ND	ND		30	
2-Chlorotoluene	mg/kg	ND	ND		30	
4-Chlorotoluene	mg/kg	ND	ND		30	
4-Methyl-2-pentanone (MIBK)	mg/kg	ND	ND		30	
Acetone	mg/kg	ND	ND		30	
Allyl chloride	mg/kg	ND	ND		30	
Benzene	mg/kg	ND	ND		30	
Bromobenzene	mg/kg	ND	ND		30	
Bromochloromethane	mg/kg	ND	ND		30	
Bromodichloromethane	mg/kg	ND	ND		30	
Bromoform	mg/kg	ND	ND		30	
Bromomethane	mg/kg	ND	ND		30	
Carbon tetrachloride	mg/kg	ND	ND		30	
Chlorobenzene	mg/kg	ND	ND		30	
Chloroethane	mg/kg	ND	ND		30	
Chloroform	mg/kg	ND	ND		30	
Chloromethane	mg/kg	ND	ND		30	
cis-1,2-Dichloroethene	mg/kg	ND	ND		30	
cis-1,3-Dichloropropene	mg/kg	ND	ND		30	
Dibromochloromethane	mg/kg	ND	ND		30	
Dibromomethane	mg/kg	ND	ND		30	
Dichlorodifluoromethane	mg/kg	ND	ND		30	
Dichlorofluoromethane	mg/kg	ND	ND		30	
Diethyl ether (Ethyl ether)	mg/kg	ND	ND		30	
Ethylbenzene	mg/kg	ND	ND		30	

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Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

SAMPLE DUPLICATE: 1928309

Parameter	Units	10300640003 Result	Dup Result	RPD	Max RPD	Qualifiers
Hexachloro-1,3-butadiene	mg/kg	ND	ND		30	
Isopropylbenzene (Cumene)	mg/kg	ND	ND		30	
Methyl-tert-butyl ether	mg/kg	ND	ND		30	
Methylene Chloride	mg/kg	ND	ND		30	
n-Butylbenzene	mg/kg	ND	ND		30	
n-Propylbenzene	mg/kg	ND	ND		30	
Naphthalene	mg/kg	ND	ND		30	
p-Isopropyltoluene	mg/kg	ND	ND		30	
sec-Butylbenzene	mg/kg	ND	ND		30	
Styrene	mg/kg	ND	ND		30	
tert-Butylbenzene	mg/kg	ND	ND		30	
Tetrachloroethene	mg/kg	ND	ND		30	
Tetrahydrofuran	mg/kg	ND	ND		30	
Toluene	mg/kg	ND	ND		30	
trans-1,2-Dichloroethene	mg/kg	ND	ND		30	
trans-1,3-Dichloropropene	mg/kg	ND	ND		30	
Trichloroethene	mg/kg	ND	ND		30	
Trichlorofluoromethane	mg/kg	ND	ND		30	
Vinyl chloride	mg/kg	ND	ND		30	
Xylene (Total)	mg/kg	ND	ND		30	
1,2-Dichloroethane-d4 (S)	%.	91	90	2		
4-Bromofluorobenzene (S)	%.	99	100	0		
Toluene-d8 (S)	%.	101	100	1		

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

QC Batch: MSV/30935 Analysis Method: EPA 8260
QC Batch Method: EPA 5035/5030B Analysis Description: 8260 MSV 5030 Med Level
Associated Lab Samples: 10300830007, 10300830008, 10300830010, 10300830011, 10300830012, 10300830013, 10300830014, 10300830016, 10300830017

METHOD BLANK: 1928535 Matrix: Solid
Associated Lab Samples: 10300830007, 10300830008, 10300830010, 10300830011, 10300830012, 10300830013, 10300830014, 10300830016, 10300830017

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	mg/kg	ND	0.050	04/01/15 15:22	
1,1,1-Trichloroethane	mg/kg	ND	0.050	04/01/15 15:22	
1,1,2,2-Tetrachloroethane	mg/kg	ND	0.050	04/01/15 15:22	
1,1,2-Trichloroethane	mg/kg	ND	0.050	04/01/15 15:22	
1,1,2-Trichlorotrifluoroethane	mg/kg	ND	0.20	04/01/15 15:22	
1,1-Dichloroethane	mg/kg	ND	0.050	04/01/15 15:22	
1,1-Dichloroethene	mg/kg	ND	0.20	04/01/15 15:22	
1,1-Dichloropropene	mg/kg	ND	0.050	04/01/15 15:22	
1,2,3-Trichlorobenzene	mg/kg	ND	0.050	04/01/15 15:22	
1,2,3-Trichloropropane	mg/kg	ND	0.20	04/01/15 15:22	
1,2,4-Trichlorobenzene	mg/kg	ND	0.050	04/01/15 15:22	
1,2,4-Trimethylbenzene	mg/kg	ND	0.050	04/01/15 15:22	
1,2-Dibromo-3-chloropropane	mg/kg	ND	0.50	04/01/15 15:22	
1,2-Dibromoethane (EDB)	mg/kg	ND	0.050	04/01/15 15:22	
1,2-Dichlorobenzene	mg/kg	ND	0.050	04/01/15 15:22	
1,2-Dichloroethane	mg/kg	ND	0.050	04/01/15 15:22	
1,2-Dichloropropane	mg/kg	ND	0.050	04/01/15 15:22	
1,3,5-Trimethylbenzene	mg/kg	ND	0.050	04/01/15 15:22	
1,3-Dichlorobenzene	mg/kg	ND	0.050	04/01/15 15:22	
1,3-Dichloropropane	mg/kg	ND	0.050	04/01/15 15:22	
1,4-Dichlorobenzene	mg/kg	ND	0.050	04/01/15 15:22	
2,2-Dichloropropane	mg/kg	ND	0.20	04/01/15 15:22	
2-Butanone (MEK)	mg/kg	ND	0.25	04/01/15 15:22	
2-Chlorotoluene	mg/kg	ND	0.050	04/01/15 15:22	
4-Chlorotoluene	mg/kg	ND	0.050	04/01/15 15:22	
4-Methyl-2-pentanone (MIBK)	mg/kg	ND	0.25	04/01/15 15:22	
Acetone	mg/kg	ND	1.0	04/01/15 15:22	
Allyl chloride	mg/kg	ND	0.20	04/01/15 15:22	
Benzene	mg/kg	ND	0.020	04/01/15 15:22	
Bromobenzene	mg/kg	ND	0.050	04/01/15 15:22	
Bromochloromethane	mg/kg	ND	0.20	04/01/15 15:22	
Bromodichloromethane	mg/kg	ND	0.050	04/01/15 15:22	
Bromoform	mg/kg	ND	0.20	04/01/15 15:22	
Bromomethane	mg/kg	ND	0.50	04/01/15 15:22	
Carbon tetrachloride	mg/kg	ND	0.20	04/01/15 15:22	
Chlorobenzene	mg/kg	ND	0.050	04/01/15 15:22	
Chloroethane	mg/kg	ND	0.50	04/01/15 15:22	
Chloroform	mg/kg	ND	0.050	04/01/15 15:22	
Chloromethane	mg/kg	ND	0.20	04/01/15 15:22	
cis-1,2-Dichloroethene	mg/kg	ND	0.050	04/01/15 15:22	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

METHOD BLANK: 1928535 Matrix: Solid

Associated Lab Samples: 10300830007, 10300830008, 10300830010, 10300830011, 10300830012, 10300830013, 10300830014, 10300830016, 10300830017

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
cis-1,3-Dichloropropene	mg/kg	ND	0.050	04/01/15 15:22	
Dibromochloromethane	mg/kg	ND	0.050	04/01/15 15:22	
Dibromomethane	mg/kg	ND	0.050	04/01/15 15:22	
Dichlorodifluoromethane	mg/kg	ND	0.20	04/01/15 15:22	
Dichlorofluoromethane	mg/kg	ND	0.50	04/01/15 15:22	
Diethyl ether (Ethyl ether)	mg/kg	ND	0.20	04/01/15 15:22	
Ethylbenzene	mg/kg	ND	0.050	04/01/15 15:22	
Hexachloro-1,3-butadiene	mg/kg	ND	0.25	04/01/15 15:22	
Isopropylbenzene (Cumene)	mg/kg	ND	0.050	04/01/15 15:22	
Methyl-tert-butyl ether	mg/kg	ND	0.050	04/01/15 15:22	
Methylene Chloride	mg/kg	ND	0.20	04/01/15 15:22	
n-Butylbenzene	mg/kg	ND	0.050	04/01/15 15:22	
n-Propylbenzene	mg/kg	ND	0.050	04/01/15 15:22	
Naphthalene	mg/kg	ND	0.20	04/01/15 15:22	
p-Isopropyltoluene	mg/kg	ND	0.050	04/01/15 15:22	
sec-Butylbenzene	mg/kg	ND	0.050	04/01/15 15:22	
Styrene	mg/kg	ND	0.050	04/01/15 15:22	
tert-Butylbenzene	mg/kg	ND	0.050	04/01/15 15:22	
Tetrachloroethene	mg/kg	ND	0.050	04/01/15 15:22	
Tetrahydrofuran	mg/kg	ND	2.0	04/01/15 15:22	
Toluene	mg/kg	ND	0.050	04/01/15 15:22	
trans-1,2-Dichloroethene	mg/kg	ND	0.20	04/01/15 15:22	
trans-1,3-Dichloropropene	mg/kg	ND	0.050	04/01/15 15:22	
Trichloroethene	mg/kg	ND	0.050	04/01/15 15:22	
Trichlorofluoromethane	mg/kg	ND	0.20	04/01/15 15:22	
Vinyl chloride	mg/kg	ND	0.020	04/01/15 15:22	
Xylene (Total)	mg/kg	ND	0.15	04/01/15 15:22	
1,2-Dichloroethane-d4 (S)	%.	87	55-150	04/01/15 15:22	
4-Bromofluorobenzene (S)	%.	101	54-131	04/01/15 15:22	
Toluene-d8 (S)	%.	97	61-125	04/01/15 15:22	

LABORATORY CONTROL SAMPLE: 1928536

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	mg/kg	1	1.0	101	75-125	
1,1,1-Trichloroethane	mg/kg	1	1.1	107	66-125	
1,1,2,2-Tetrachloroethane	mg/kg	1	1.2	120	69-125	E,SS
1,1,2-Trichloroethane	mg/kg	1	1.1	105	75-125	
1,1,2-Trichlorotrifluoroethane	mg/kg	1	0.97	97	55-125	
1,1-Dichloroethane	mg/kg	1	1.0	101	67-125	
1,1-Dichloroethene	mg/kg	1	0.93	93	62-125	
1,1-Dichloropropene	mg/kg	1	0.97	97	65-125	
1,2,3-Trichlorobenzene	mg/kg	1	1.1	106	58-132	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

LABORATORY CONTROL SAMPLE: 1928536

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,3-Trichloropropane	mg/kg	1	1.0	105	71-125	
1,2,4-Trichlorobenzene	mg/kg	1	1.0	103	63-128	
1,2,4-Trimethylbenzene	mg/kg	1	0.97	97	74-125	
1,2-Dibromo-3-chloropropane	mg/kg	2.5	2.8	111	55-142	
1,2-Dibromoethane (EDB)	mg/kg	1	1.0	103	75-125	
1,2-Dichlorobenzene	mg/kg	1	1.0	103	75-125	
1,2-Dichloroethane	mg/kg	1	0.91	91	71-125	
1,2-Dichloropropane	mg/kg	1	0.96	96	74-125	
1,3,5-Trimethylbenzene	mg/kg	1	0.98	98	72-125	
1,3-Dichlorobenzene	mg/kg	1	0.95	95	75-125	
1,3-Dichloropropane	mg/kg	1	0.99	99	75-125	
1,4-Dichlorobenzene	mg/kg	1	0.98	98	75-125	
2,2-Dichloropropane	mg/kg	1	0.95	95	45-125	
2-Butanone (MEK)	mg/kg	5	5.0	101	39-136	
2-Chlorotoluene	mg/kg	1	0.97	97	73-125	
4-Chlorotoluene	mg/kg	1	0.93	93	74-125	
4-Methyl-2-pentanone (MIBK)	mg/kg	5	5.3	105	55-132	
Acetone	mg/kg	5	5.3	105	55-131	
Allyl chloride	mg/kg	1	0.96	96	53-125	
Benzene	mg/kg	1	0.94	94	69-125	
Bromobenzene	mg/kg	1	0.93	93	75-125	
Bromochloromethane	mg/kg	1	0.98	98	75-125	
Bromodichloromethane	mg/kg	1	1.0	102	75-125	
Bromoform	mg/kg	1	1.0	101	71-125	
Bromomethane	mg/kg	1	0.83	83	42-150	
Carbon tetrachloride	mg/kg	1	0.96	96	62-125	
Chlorobenzene	mg/kg	1	0.98	98	75-125	
Chloroethane	mg/kg	1	0.87	87	41-150	
Chloroform	mg/kg	1	0.95	95	72-125	
Chloromethane	mg/kg	1	0.73	73	50-125	
cis-1,2-Dichloroethene	mg/kg	1	0.99	99	73-125	
cis-1,3-Dichloropropene	mg/kg	1	0.96	96	74-125	
Dibromochloromethane	mg/kg	1	1.1	107	75-125	
Dibromomethane	mg/kg	1	1.1	111	75-125	
Dichlorodifluoromethane	mg/kg	1	0.66	66	30-125	
Dichlorofluoromethane	mg/kg	1	0.87	87	30-150	
Diethyl ether (Ethyl ether)	mg/kg	1	1.0	102	58-125	
Ethylbenzene	mg/kg	1	0.97	97	72-125	
Hexachloro-1,3-butadiene	mg/kg	1	0.96	96	59-138	
Isopropylbenzene (Cumene)	mg/kg	1	1.0	104	72-125	
Methyl-tert-butyl ether	mg/kg	1	0.99	99	72-125	
Methylene Chloride	mg/kg	1	0.95	95	71-125	
n-Butylbenzene	mg/kg	1	0.94	94	65-125	
n-Propylbenzene	mg/kg	1	0.95	95	71-125	
Naphthalene	mg/kg	1	1.2	115	55-139	
p-Isopropyltoluene	mg/kg	1	0.99	99	69-125	
sec-Butylbenzene	mg/kg	1	0.96	96	68-125	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

LABORATORY CONTROL SAMPLE: 1928536

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Styrene	mg/kg	1	1.0	103	75-125	
tert-Butylbenzene	mg/kg	1	0.98	98	70-125	
Tetrachloroethene	mg/kg	1	1.0	103	69-125	
Tetrahydrofuran	mg/kg	10	11.8	118	62-129	
Toluene	mg/kg	1	0.99	99	72-125	
trans-1,2-Dichloroethene	mg/kg	1	0.91	91	68-125	
trans-1,3-Dichloropropene	mg/kg	1	0.96	96	74-125	
Trichloroethene	mg/kg	1	1.0	101	72-125	
Trichlorofluoromethane	mg/kg	1	0.89	89	30-150	
Vinyl chloride	mg/kg	1	0.76	76	53-125	
Xylene (Total)	mg/kg	3	3.1	104	74-125	
1,2-Dichloroethane-d4 (S)	%.			94	55-150	
4-Bromofluorobenzene (S)	%.			94	54-131	
Toluene-d8 (S)	%.			100	61-125	

MATRIX SPIKE SAMPLE: 1928537

Parameter	Units	10300801001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	mg/kg	ND	1.1	1.1	97	62-150	
1,1,1-Trichloroethane	mg/kg	ND	1.1	1.2	101	58-150	
1,1,2,2-Tetrachloroethane	mg/kg	ND	1.1	1.4	121	30-150	E,SS
1,1,2-Trichloroethane	mg/kg	ND	1.1	1.2	103	61-149	
1,1,2-Trichlorotrifluoroethane	mg/kg	ND	1.1	1.1	92	45-150	
1,1-Dichloroethane	mg/kg	ND	1.1	1.1	93	56-150	
1,1-Dichloroethene	mg/kg	ND	1.1	0.96	83	48-150	
1,1-Dichloropropene	mg/kg	ND	1.1	1.0	88	58-150	
1,2,3-Trichlorobenzene	mg/kg	ND	1.1	1.1	99	55-150	
1,2,3-Trichloropropane	mg/kg	ND	1.1	1.2	104	57-148	
1,2,4-Trichlorobenzene	mg/kg	ND	1.1	1.1	96	61-150	
1,2,4-Trimethylbenzene	mg/kg	ND	1.1	1.1	94	64-150	
1,2-Dibromo-3-chloropropane	mg/kg	ND	2.8	3.0	104	40-150	
1,2-Dibromoethane (EDB)	mg/kg	ND	1.1	1.1	97	62-147	
1,2-Dichlorobenzene	mg/kg	ND	1.1	1.1	97	73-133	
1,2-Dichloroethane	mg/kg	ND	1.1	0.96	84	63-132	
1,2-Dichloropropane	mg/kg	ND	1.1	1.0	91	69-127	
1,3,5-Trimethylbenzene	mg/kg	ND	1.1	1.1	94	63-137	
1,3-Dichlorobenzene	mg/kg	ND	1.1	1.0	88	69-133	
1,3-Dichloropropane	mg/kg	ND	1.1	1.1	95	70-130	
1,4-Dichlorobenzene	mg/kg	ND	1.1	1.0	89	69-130	
2,2-Dichloropropane	mg/kg	ND	1.1	1.0	87	54-135	
2-Butanone (MEK)	mg/kg	ND	5.8	5.6	98	49-145	
2-Chlorotoluene	mg/kg	ND	1.1	1.1	92	68-129	
4-Chlorotoluene	mg/kg	ND	1.1	1.0	87	67-134	
4-Methyl-2-pentanone (MIBK)	mg/kg	ND	5.8	5.9	102	60-150	
Acetone	mg/kg	ND	5.8	5.5	96	65-135	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

MATRIX SPIKE SAMPLE: 1928537

Parameter	Units	10300801001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Allyl chloride	mg/kg	ND	1.1	0.97	84	55-126	
Benzene	mg/kg	ND	1.1	1.0	89	63-126	
Bromobenzene	mg/kg	ND	1.1	1.0	89	68-133	
Bromochloromethane	mg/kg	ND	1.1	0.98	85	66-130	
Bromodichloromethane	mg/kg	ND	1.1	1.1	94	68-129	
Bromoform	mg/kg	ND	1.1	1.1	96	63-135	
Bromomethane	mg/kg	ND	1.1	0.91	77	30-150	
Carbon tetrachloride	mg/kg	ND	1.1	1.1	91	56-140	
Chlorobenzene	mg/kg	ND	1.1	1.0	91	69-130	
Chloroethane	mg/kg	ND	1.1	0.93	81	46-150	
Chloroform	mg/kg	ND	1.1	1.0	87	70-127	
Chloromethane	mg/kg	ND	1.1	0.72	63	51-125	
cis-1,2-Dichloroethene	mg/kg	ND	1.1	0.99	86	68-125	
cis-1,3-Dichloropropene	mg/kg	ND	1.1	1.0	88	67-126	
Dibromochloromethane	mg/kg	ND	1.1	1.2	103	66-135	
Dibromomethane	mg/kg	ND	1.1	1.1	99	68-132	
Dichlorodifluoromethane	mg/kg	ND	1.1	0.56	49	30-138	
Dichlorofluoromethane	mg/kg	ND	1.1	0.99	86	30-150	
Diethyl ether (Ethyl ether)	mg/kg	ND	1.1	1.1	92	56-135	
Ethylbenzene	mg/kg	ND	1.1	1.1	92	69-126	
Hexachloro-1,3-butadiene	mg/kg	ND	1.1	1.1	93	50-150	
Isopropylbenzene (Cumene)	mg/kg	ND	1.1	1.1	96	65-135	
Methyl-tert-butyl ether	mg/kg	ND	1.1	1.1	95	66-129	
Methylene Chloride	mg/kg	ND	1.1	0.95	83	64-125	
n-Butylbenzene	mg/kg	ND	1.1	1.0	90	62-141	
n-Propylbenzene	mg/kg	ND	1.1	1.1	92	65-135	
Naphthalene	mg/kg	ND	1.1	1.2	107	62-150	
p-Isopropyltoluene	mg/kg	ND	1.1	1.1	95	62-139	
sec-Butylbenzene	mg/kg	ND	1.1	1.1	93	64-137	
Styrene	mg/kg	ND	1.1	1.1	94	70-132	
tert-Butylbenzene	mg/kg	ND	1.1	1.1	94	65-136	
Tetrachloroethene	mg/kg	ND	1.1	1.1	97	61-142	
Tetrahydrofuran	mg/kg	ND	11.5	12.8	111	68-138	
Toluene	mg/kg	ND	1.1	1.1	94	66-128	
trans-1,2-Dichloroethene	mg/kg	ND	1.1	0.86	75	63-129	
trans-1,3-Dichloropropene	mg/kg	ND	1.1	1.0	90	67-132	
Trichloroethene	mg/kg	ND	1.1	1.0	90	52-150	
Trichlorofluoromethane	mg/kg	ND	1.1	1.1	92	39-150	
Vinyl chloride	mg/kg	ND	1.1	0.74	64	50-125	
Xylene (Total)	mg/kg	ND	3.4	3.3	97	70-130	
1,2-Dichloroethane-d4 (S)	%.				93	55-150	
4-Bromofluorobenzene (S)	%.				96	54-131	
Toluene-d8 (S)	%.				102	61-125	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

SAMPLE DUPLICATE: 1928538

Parameter	Units	10300801002 Result	Dup Result	RPD	Max RPD	Qualifiers
1,1,1,2-Tetrachloroethane	mg/kg	ND	ND		30	
1,1,1-Trichloroethane	mg/kg	ND	ND		30	
1,1,2,2-Tetrachloroethane	mg/kg	ND	ND		30	
1,1,2-Trichloroethane	mg/kg	ND	ND		30	
1,1,2-Trichlorotrifluoroethane	mg/kg	ND	ND		30	
1,1-Dichloroethane	mg/kg	ND	ND		30	
1,1-Dichloroethene	mg/kg	ND	ND		30	
1,1-Dichloropropene	mg/kg	ND	ND		30	
1,2,3-Trichlorobenzene	mg/kg	ND	ND		30	
1,2,3-Trichloropropane	mg/kg	ND	ND		30	
1,2,4-Trichlorobenzene	mg/kg	ND	ND		30	
1,2,4-Trimethylbenzene	mg/kg	ND	ND		30	
1,2-Dibromo-3-chloropropane	mg/kg	ND	ND		30	
1,2-Dibromoethane (EDB)	mg/kg	ND	ND		30	
1,2-Dichlorobenzene	mg/kg	ND	ND		30	
1,2-Dichloroethane	mg/kg	ND	ND		30	
1,2-Dichloropropane	mg/kg	ND	ND		30	
1,3,5-Trimethylbenzene	mg/kg	ND	ND		30	
1,3-Dichlorobenzene	mg/kg	ND	ND		30	
1,3-Dichloropropane	mg/kg	ND	ND		30	
1,4-Dichlorobenzene	mg/kg	ND	ND		30	
2,2-Dichloropropane	mg/kg	ND	ND		30	
2-Butanone (MEK)	mg/kg	ND	ND		30	
2-Chlorotoluene	mg/kg	ND	ND		30	
4-Chlorotoluene	mg/kg	ND	ND		30	
4-Methyl-2-pentanone (MIBK)	mg/kg	ND	ND		30	
Acetone	mg/kg	ND	ND		30	
Allyl chloride	mg/kg	ND	ND		30	
Benzene	mg/kg	ND	ND		30	
Bromobenzene	mg/kg	ND	ND		30	
Bromochloromethane	mg/kg	ND	ND		30	
Bromodichloromethane	mg/kg	ND	ND		30	
Bromoform	mg/kg	ND	ND		30	
Bromomethane	mg/kg	ND	ND		30	
Carbon tetrachloride	mg/kg	ND	ND		30	
Chlorobenzene	mg/kg	ND	ND		30	
Chloroethane	mg/kg	ND	ND		30	
Chloroform	mg/kg	ND	ND		30	
Chloromethane	mg/kg	ND	ND		30	
cis-1,2-Dichloroethene	mg/kg	ND	ND		30	
cis-1,3-Dichloropropene	mg/kg	ND	ND		30	
Dibromochloromethane	mg/kg	ND	ND		30	
Dibromomethane	mg/kg	ND	ND		30	
Dichlorodifluoromethane	mg/kg	ND	ND		30	
Dichlorofluoromethane	mg/kg	ND	ND		30	
Diethyl ether (Ethyl ether)	mg/kg	ND	ND		30	
Ethylbenzene	mg/kg	ND	ND		30	

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QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

SAMPLE DUPLICATE: 1928538

Parameter	Units	10300801002 Result	Dup Result	RPD	Max RPD	Qualifiers
Hexachloro-1,3-butadiene	mg/kg	ND	ND		30	
Isopropylbenzene (Cumene)	mg/kg	ND	ND		30	
Methyl-tert-butyl ether	mg/kg	ND	ND		30	
Methylene Chloride	mg/kg	ND	ND		30	
n-Butylbenzene	mg/kg	ND	ND		30	
n-Propylbenzene	mg/kg	ND	ND		30	
Naphthalene	mg/kg	ND	ND		30	
p-Isopropyltoluene	mg/kg	ND	ND		30	
sec-Butylbenzene	mg/kg	ND	ND		30	
Styrene	mg/kg	ND	ND		30	
tert-Butylbenzene	mg/kg	ND	ND		30	
Tetrachloroethene	mg/kg	ND	ND		30	
Tetrahydrofuran	mg/kg	ND	ND		30	
Toluene	mg/kg	ND	.014J		30	
trans-1,2-Dichloroethene	mg/kg	ND	ND		30	
trans-1,3-Dichloropropene	mg/kg	ND	ND		30	
Trichloroethene	mg/kg	ND	ND		30	
Trichlorofluoromethane	mg/kg	ND	ND		30	
Vinyl chloride	mg/kg	ND	ND		30	
Xylene (Total)	mg/kg	ND	ND		30	
1,2-Dichloroethane-d4 (S)	%.	92	91	2		
4-Bromofluorobenzene (S)	%.	97	97	2		
Toluene-d8 (S)	%.	100	101	0		

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

QC Batch: MSV/30955 Analysis Method: EPA 8260
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV 465 W
Associated Lab Samples: 10300830018, 10300830019, 10300830020

METHOD BLANK: 1929511 Matrix: Water
Associated Lab Samples: 10300830018, 10300830019, 10300830020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	1.0	04/01/15 19:46	
1,1,1-Trichloroethane	ug/L	ND	1.0	04/01/15 19:46	
1,1,2,2-Tetrachloroethane	ug/L	ND	1.0	04/01/15 19:46	
1,1,2-Trichloroethane	ug/L	ND	1.0	04/01/15 19:46	
1,1,2-Trichlorotrifluoroethane	ug/L	ND	1.0	04/01/15 19:46	
1,1-Dichloroethane	ug/L	ND	1.0	04/01/15 19:46	
1,1-Dichloroethene	ug/L	ND	1.0	04/01/15 19:46	
1,1-Dichloropropene	ug/L	ND	1.0	04/01/15 19:46	
1,2,3-Trichlorobenzene	ug/L	ND	1.0	04/01/15 19:46	
1,2,3-Trichloropropane	ug/L	ND	4.0	04/01/15 19:46	
1,2,4-Trichlorobenzene	ug/L	ND	1.0	04/01/15 19:46	
1,2,4-Trimethylbenzene	ug/L	ND	1.0	04/01/15 19:46	
1,2-Dibromo-3-chloropropane	ug/L	ND	4.0	04/01/15 19:46	
1,2-Dibromoethane (EDB)	ug/L	ND	1.0	04/01/15 19:46	
1,2-Dichlorobenzene	ug/L	ND	1.0	04/01/15 19:46	
1,2-Dichloroethane	ug/L	ND	1.0	04/01/15 19:46	
1,2-Dichloropropane	ug/L	ND	4.0	04/01/15 19:46	
1,3,5-Trimethylbenzene	ug/L	ND	1.0	04/01/15 19:46	
1,3-Dichlorobenzene	ug/L	ND	1.0	04/01/15 19:46	
1,3-Dichloropropane	ug/L	ND	1.0	04/01/15 19:46	
1,4-Dichlorobenzene	ug/L	ND	1.0	04/01/15 19:46	
2,2-Dichloropropane	ug/L	ND	4.0	04/01/15 19:46	
2-Butanone (MEK)	ug/L	ND	5.0	04/01/15 19:46	
2-Chlorotoluene	ug/L	ND	1.0	04/01/15 19:46	
4-Chlorotoluene	ug/L	ND	1.0	04/01/15 19:46	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	5.0	04/01/15 19:46	
Acetone	ug/L	ND	20.0	04/01/15 19:46	
Allyl chloride	ug/L	ND	4.0	04/01/15 19:46	
Benzene	ug/L	ND	1.0	04/01/15 19:46	
Bromobenzene	ug/L	ND	1.0	04/01/15 19:46	
Bromochloromethane	ug/L	ND	4.0	04/01/15 19:46	
Bromodichloromethane	ug/L	ND	1.0	04/01/15 19:46	
Bromoform	ug/L	ND	4.0	04/01/15 19:46	
Bromomethane	ug/L	ND	4.0	04/01/15 19:46	
Carbon tetrachloride	ug/L	ND	1.0	04/01/15 19:46	
Chlorobenzene	ug/L	ND	1.0	04/01/15 19:46	
Chloroethane	ug/L	ND	1.0	04/01/15 19:46	
Chloroform	ug/L	ND	1.0	04/01/15 19:46	
Chloromethane	ug/L	ND	4.0	04/01/15 19:46	
cis-1,2-Dichloroethene	ug/L	ND	1.0	04/01/15 19:46	
cis-1,3-Dichloropropene	ug/L	ND	4.0	04/01/15 19:46	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

METHOD BLANK: 1929511 Matrix: Water
Associated Lab Samples: 10300830018, 10300830019, 10300830020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Dibromochloromethane	ug/L	ND	1.0	04/01/15 19:46	
Dibromomethane	ug/L	ND	4.0	04/01/15 19:46	
Dichlorodifluoromethane	ug/L	ND	4.0	04/01/15 19:46	
Dichlorofluoromethane	ug/L	ND	1.0	04/01/15 19:46	
Diethyl ether (Ethyl ether)	ug/L	ND	4.0	04/01/15 19:46	
Ethylbenzene	ug/L	ND	1.0	04/01/15 19:46	
Hexachloro-1,3-butadiene	ug/L	ND	1.0	04/01/15 19:46	
Isopropylbenzene (Cumene)	ug/L	ND	1.0	04/01/15 19:46	
Methyl-tert-butyl ether	ug/L	ND	1.0	04/01/15 19:46	
Methylene Chloride	ug/L	ND	4.0	04/01/15 19:46	
n-Butylbenzene	ug/L	ND	1.0	04/01/15 19:46	
n-Propylbenzene	ug/L	ND	1.0	04/01/15 19:46	
Naphthalene	ug/L	ND	4.0	04/01/15 19:46	
p-Isopropyltoluene	ug/L	ND	1.0	04/01/15 19:46	
sec-Butylbenzene	ug/L	ND	1.0	04/01/15 19:46	
Styrene	ug/L	ND	1.0	04/01/15 19:46	
tert-Butylbenzene	ug/L	ND	1.0	04/01/15 19:46	
Tetrachloroethene	ug/L	ND	1.0	04/01/15 19:46	
Tetrahydrofuran	ug/L	ND	10.0	04/01/15 19:46	
Toluene	ug/L	ND	1.0	04/01/15 19:46	
trans-1,2-Dichloroethene	ug/L	ND	1.0	04/01/15 19:46	
trans-1,3-Dichloropropene	ug/L	ND	4.0	04/01/15 19:46	
Trichloroethene	ug/L	ND	0.40	04/01/15 19:46	
Trichlorofluoromethane	ug/L	ND	1.0	04/01/15 19:46	
Vinyl chloride	ug/L	ND	0.40	04/01/15 19:46	
Xylene (Total)	ug/L	ND	3.0	04/01/15 19:46	
1,2-Dichloroethane-d4 (S)	%.	94	75-125	04/01/15 19:46	
4-Bromofluorobenzene (S)	%.	101	75-125	04/01/15 19:46	
Toluene-d8 (S)	%.	101	75-125	04/01/15 19:46	

LABORATORY CONTROL SAMPLE: 1929512

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	10	9.8	98	75-125	
1,1,1-Trichloroethane	ug/L	10	9.0	90	75-125	
1,1,2,2-Tetrachloroethane	ug/L	10	9.2	92	75-125	
1,1,2-Trichloroethane	ug/L	10	8.4	84	75-125	
1,1,2-Trichlorotrifluoroethane	ug/L	10	8.6	86	60-135	
1,1-Dichloroethane	ug/L	10	8.6	86	69-125	
1,1-Dichloroethene	ug/L	10	9.6	96	68-125	
1,1-Dichloropropene	ug/L	10	9.6	96	74-125	
1,2,3-Trichlorobenzene	ug/L	10	9.4	94	69-136	
1,2,3-Trichloropropane	ug/L	10	9.7	97	75-125	
1,2,4-Trichlorobenzene	ug/L	10	8.1	81	73-127	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

LABORATORY CONTROL SAMPLE: 1929512

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trimethylbenzene	ug/L	10	10.4	104	75-125	
1,2-Dibromo-3-chloropropane	ug/L	25	22.9	92	65-145	
1,2-Dibromoethane (EDB)	ug/L	10	9.2	92	75-125	
1,2-Dichlorobenzene	ug/L	10	9.1	91	75-125	
1,2-Dichloroethane	ug/L	10	9.2	92	73-125	
1,2-Dichloropropane	ug/L	10	9.7	97	75-125	
1,3,5-Trimethylbenzene	ug/L	10	9.9	99	75-125	
1,3-Dichlorobenzene	ug/L	10	9.5	95	74-125	
1,3-Dichloropropane	ug/L	10	10.2	102	75-125	
1,4-Dichlorobenzene	ug/L	10	9.9	99	75-125	
2,2-Dichloropropane	ug/L	10	9.7	97	59-139	
2-Butanone (MEK)	ug/L	50	52.2	104	63-130	
2-Chlorotoluene	ug/L	10	9.8	98	72-125	
4-Chlorotoluene	ug/L	10	9.7	97	73-125	
4-Methyl-2-pentanone (MIBK)	ug/L	50	51.0	102	71-126	
Acetone	ug/L	50	51.3	103	69-131	
Allyl chloride	ug/L	10	8.9	89	67-125	
Benzene	ug/L	10	9.4	94	71-125	
Bromobenzene	ug/L	10	10.4	104	75-125	
Bromochloromethane	ug/L	10	9.8	98	75-125	
Bromodichloromethane	ug/L	10	9.8	98	75-125	
Bromoform	ug/L	10	9.5	95	70-125	
Bromomethane	ug/L	10	8.2	82	30-150	
Carbon tetrachloride	ug/L	10	9.0	90	75-126	
Chlorobenzene	ug/L	10	11.0	110	75-125	
Chloroethane	ug/L	10	8.4	84	65-134	
Chloroform	ug/L	10	9.6	96	75-125	
Chloromethane	ug/L	10	7.8	78	39-150	
cis-1,2-Dichloroethene	ug/L	10	9.7	97	72-125	
cis-1,3-Dichloropropene	ug/L	10	9.1	91	75-125	
Dibromochloromethane	ug/L	10	9.3	93	75-125	
Dibromomethane	ug/L	10	9.6	96	75-125	
Dichlorodifluoromethane	ug/L	10	8.0	80	50-134	
Dichlorofluoromethane	ug/L	10	10.3	103	69-125	
Diethyl ether (Ethyl ether)	ug/L	10	8.9	89	72-125	
Ethylbenzene	ug/L	10	9.9	99	75-125	
Hexachloro-1,3-butadiene	ug/L	10	10.7	107	70-138	
Isopropylbenzene (Cumene)	ug/L	10	10.0	100	75-125	
Methyl-tert-butyl ether	ug/L	10	10.2	102	73-125	
Methylene Chloride	ug/L	10	9.5	95	73-125	
n-Butylbenzene	ug/L	10	8.0	80	72-133	
n-Propylbenzene	ug/L	10	9.4	94	72-126	
Naphthalene	ug/L	10	8.2	82	70-127	
p-Isopropyltoluene	ug/L	10	9.1	91	72-132	
sec-Butylbenzene	ug/L	10	8.4	84	73-132	
Styrene	ug/L	10	10.3	103	75-125	
tert-Butylbenzene	ug/L	10	9.8	98	73-128	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

LABORATORY CONTROL SAMPLE: 1929512

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Tetrachloroethene	ug/L	10	9.4	94	74-125	
Tetrahydrofuran	ug/L	100	98.5	98	62-133	
Toluene	ug/L	10	10.2	102	74-125	
trans-1,2-Dichloroethene	ug/L	10	10.0	100	69-125	
trans-1,3-Dichloropropene	ug/L	10	9.7	97	75-125	
Trichloroethene	ug/L	10	9.7	97	75-125	
Trichlorofluoromethane	ug/L	10	8.1	81	74-127	
Vinyl chloride	ug/L	10	9.2	92	66-132	
Xylene (Total)	ug/L	30	31.0	103	75-125	
1,2-Dichloroethane-d4 (S)	%.			92	75-125	
4-Bromofluorobenzene (S)	%.			103	75-125	
Toluene-d8 (S)	%.			102	75-125	

MATRIX SPIKE SAMPLE: 1930696

Parameter	Units	10300823003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	10	7.5	75	70-138	
1,1,1-Trichloroethane	ug/L	ND	10	7.6	76	55-150	
1,1,2,2-Tetrachloroethane	ug/L	ND	10	9.8	98	64-140	
1,1,2-Trichloroethane	ug/L	ND	10	7.5	75	67-137	
1,1,2-Trichlorotrifluoroethane	ug/L	ND	10	7.4	74	51-150	
1,1-Dichloroethane	ug/L	ND	10	7.7	77	49-150	
1,1-Dichloroethene	ug/L	ND	10	8.3	83	40-150	
1,1-Dichloropropene	ug/L	ND	10	7.3	73	50-150	
1,2,3-Trichlorobenzene	ug/L	ND	10	10.3	103	59-148	
1,2,3-Trichloropropane	ug/L	ND	10	10	100	65-141	
1,2,4-Trichlorobenzene	ug/L	ND	10	6.0	60	61-140	M1
1,2,4-Trimethylbenzene	ug/L	ND	10	6.8	68	58-141	
1,2-Dibromo-3-chloropropane	ug/L	ND	25	17.1	68	53-150	
1,2-Dibromoethane (EDB)	ug/L	ND	10	6.4	64	65-137	M1
1,2-Dichlorobenzene	ug/L	ND	10	6.1	61	66-133	M1
1,2-Dichloroethane	ug/L	ND	10	7.8	78	54-138	
1,2-Dichloropropane	ug/L	ND	10	7.2	72	62-138	
1,3,5-Trimethylbenzene	ug/L	ND	10	6.8	68	58-140	
1,3-Dichlorobenzene	ug/L	ND	10	6.3	63	66-132	M1
1,3-Dichloropropane	ug/L	ND	10	7.5	75	66-134	
1,4-Dichlorobenzene	ug/L	ND	10	6.2	62	65-129	M1
2,2-Dichloropropane	ug/L	ND	10	7.4	74	40-150	
2-Butanone (MEK)	ug/L	ND	50	37.3	75	51-147	
2-Chlorotoluene	ug/L	ND	10	6.8	68	58-147	
4-Chlorotoluene	ug/L	ND	10	6.4	64	64-138	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	50	38.1	76	59-143	
Acetone	ug/L	ND	50	43.6	87	63-147	
Allyl chloride	ug/L	ND	10	7.4	74	45-150	
Benzene	ug/L	ND	10	8.0	78	53-139	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

MATRIX SPIKE SAMPLE: 1930696

Parameter	Units	10300823003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Bromobenzene	ug/L	ND	10	7.3	73	66-136	
Bromochloromethane	ug/L	ND	10	7.1	71	64-136	
Bromodichloromethane	ug/L	ND	10	8.1	81	66-138	
Bromoform	ug/L	ND	10	7.6	76	59-136	
Bromomethane	ug/L	ND	10	8.3	83	30-150	
Carbon tetrachloride	ug/L	ND	10	7.4	74	56-150	
Chlorobenzene	ug/L	ND	10	7.8	78	65-133	
Chloroethane	ug/L	ND	10	8.7	87	48-150	
Chloroform	ug/L	ND	10	8.0	80	57-145	
Chloromethane	ug/L	ND	10	8.7	87	30-150	
cis-1,2-Dichloroethene	ug/L	ND	10	7.2	72	49-150	
cis-1,3-Dichloropropene	ug/L	ND	10	7.2	72	64-130	
Dibromochloromethane	ug/L	ND	10	6.8	68	68-138	
Dibromomethane	ug/L	ND	10	7.8	78	67-134	
Dichlorodifluoromethane	ug/L	ND	10	8.6	86	45-150	
Dichlorofluoromethane	ug/L	ND	10	10.1	101	54-150	
Diethyl ether (Ethyl ether)	ug/L	ND	10	7.5	75	50-145	
Ethylbenzene	ug/L	ND	10	8.1	76	55-139	
Hexachloro-1,3-butadiene	ug/L	ND	10	4.8	48	49-150	M1
Isopropylbenzene (Cumene)	ug/L	ND	10	6.7	67	64-142	
Methyl-tert-butyl ether	ug/L	ND	10	7.8	78	62-129	
Methylene Chloride	ug/L	ND	10	8.2	82	57-132	
n-Butylbenzene	ug/L	ND	10	5.7	57	55-150	
n-Propylbenzene	ug/L	ND	10	6.3	63	59-142	
Naphthalene	ug/L	ND	10	8.0	80	51-150	
p-Isopropyltoluene	ug/L	ND	10	6.0	60	60-149	
sec-Butylbenzene	ug/L	ND	10	5.8	58	60-150	M1
Styrene	ug/L	ND	10	7.4	74	68-134	
tert-Butylbenzene	ug/L	ND	10	6.2	62	62-146	
Tetrachloroethene	ug/L	ND	10	6.8	68	50-150	
Tetrahydrofuran	ug/L	ND	100	71.2	71	59-145	
Toluene	ug/L	ND	10	10.3	97	52-148	
trans-1,2-Dichloroethene	ug/L	ND	10	7.9	79	45-150	
trans-1,3-Dichloropropene	ug/L	ND	10	7.6	76	68-132	
Trichloroethene	ug/L	ND	10	7.4	74	52-150	
Trichlorofluoromethane	ug/L	ND	10	10	100	55-150	
Vinyl chloride	ug/L	ND	10	9.0	90	43-150	
Xylene (Total)	ug/L	ND	30	22.5	75	54-144	
1,2-Dichloroethane-d4 (S)	%.				95	75-125	HS
4-Bromofluorobenzene (S)	%.				113	75-125	
Toluene-d8 (S)	%.				104	75-125	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

SAMPLE DUPLICATE: 1930697

Parameter	Units	10300823005 Result	Dup Result	RPD	Max RPD	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	ND		30	
1,1,1-Trichloroethane	ug/L	ND	ND		30	
1,1,2,2-Tetrachloroethane	ug/L	ND	ND		30	
1,1,2-Trichloroethane	ug/L	ND	ND		30	
1,1,2-Trichlorotrifluoroethane	ug/L	ND	ND		30	
1,1-Dichloroethane	ug/L	ND	ND		30	
1,1-Dichloroethene	ug/L	ND	ND		30	
1,1-Dichloropropene	ug/L	ND	ND		30	
1,2,3-Trichlorobenzene	ug/L	ND	ND		30	
1,2,3-Trichloropropane	ug/L	ND	ND		30	
1,2,4-Trichlorobenzene	ug/L	ND	ND		30	
1,2,4-Trimethylbenzene	ug/L	ND	ND		30	
1,2-Dibromo-3-chloropropane	ug/L	ND	ND		30	
1,2-Dibromoethane (EDB)	ug/L	ND	ND		30	
1,2-Dichlorobenzene	ug/L	ND	ND		30	
1,2-Dichloroethane	ug/L	ND	ND		30	
1,2-Dichloropropane	ug/L	ND	ND		30	
1,3,5-Trimethylbenzene	ug/L	ND	ND		30	
1,3-Dichlorobenzene	ug/L	ND	ND		30	
1,3-Dichloropropane	ug/L	ND	ND		30	
1,4-Dichlorobenzene	ug/L	ND	ND		30	
2,2-Dichloropropane	ug/L	ND	ND		30	
2-Butanone (MEK)	ug/L	ND	ND		30	
2-Chlorotoluene	ug/L	ND	ND		30	
4-Chlorotoluene	ug/L	ND	ND		30	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	ND		30	
Acetone	ug/L	ND	ND		30	
Allyl chloride	ug/L	ND	ND		30	
Benzene	ug/L	ND	.38J		30	
Bromobenzene	ug/L	ND	ND		30	
Bromochloromethane	ug/L	ND	ND		30	
Bromodichloromethane	ug/L	ND	ND		30	
Bromoform	ug/L	ND	ND		30	
Bromomethane	ug/L	ND	ND		30	
Carbon tetrachloride	ug/L	ND	ND		30	
Chlorobenzene	ug/L	ND	ND		30	
Chloroethane	ug/L	ND	ND		30	
Chloroform	ug/L	ND	ND		30	
Chloromethane	ug/L	ND	ND		30	
cis-1,2-Dichloroethene	ug/L	ND	ND		30	
cis-1,3-Dichloropropene	ug/L	ND	ND		30	
Dibromochloromethane	ug/L	ND	ND		30	
Dibromomethane	ug/L	ND	ND		30	
Dichlorodifluoromethane	ug/L	ND	ND		30	
Dichlorofluoromethane	ug/L	ND	ND		30	
Diethyl ether (Ethyl ether)	ug/L	ND	ND		30	
Ethylbenzene	ug/L	ND	.89J		30	

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REPORT OF LABORATORY ANALYSIS

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Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

SAMPLE DUPLICATE: 1930697

Parameter	Units	10300823005 Result	Dup Result	RPD	Max RPD	Qualifiers
Hexachloro-1,3-butadiene	ug/L	ND	ND		30	
Isopropylbenzene (Cumene)	ug/L	ND	ND		30	
Methyl-tert-butyl ether	ug/L	ND	ND		30	
Methylene Chloride	ug/L	ND	ND		30	
n-Butylbenzene	ug/L	ND	ND		30	
n-Propylbenzene	ug/L	ND	ND		30	
Naphthalene	ug/L	ND	ND		30	
p-Isopropyltoluene	ug/L	ND	ND		30	
sec-Butylbenzene	ug/L	ND	ND		30	
Styrene	ug/L	ND	ND		30	
tert-Butylbenzene	ug/L	ND	ND		30	
Tetrachloroethene	ug/L	ND	ND		30	
Tetrahydrofuran	ug/L	ND	ND		30	
Toluene	ug/L	ND	.88J		30	
trans-1,2-Dichloroethene	ug/L	ND	ND		30	
trans-1,3-Dichloropropene	ug/L	ND	ND		30	
Trichloroethene	ug/L	ND	ND		30	
Trichlorofluoromethane	ug/L	ND	ND		30	
Vinyl chloride	ug/L	ND	ND		30	
Xylene (Total)	ug/L	ND	ND		30	
1,2-Dichloroethane-d4 (S)	%.	100	98	2		HS
4-Bromofluorobenzene (S)	%.	102	96	5		
Toluene-d8 (S)	%.	101	100	1		

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

QC Batch: OEXT/28695 Analysis Method: EPA 8270D by SIM
QC Batch Method: EPA 3550 Analysis Description: 8270D Solid PAH by SIM MSSV
Associated Lab Samples: 10300830002, 10300830003, 10300830005, 10300830006, 10300830007, 10300830008, 10300830010, 10300830011, 10300830012, 10300830013, 10300830014, 10300830016

METHOD BLANK: 1928102 Matrix: Solid
Associated Lab Samples: 10300830002, 10300830003, 10300830005, 10300830006, 10300830007, 10300830008, 10300830010, 10300830011, 10300830012, 10300830013, 10300830014, 10300830016

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Acenaphthene	mg/kg	ND	0.010	03/31/15 08:15	
Acenaphthylene	mg/kg	ND	0.010	03/31/15 08:15	
Anthracene	mg/kg	ND	0.010	03/31/15 08:15	
Benzo(a)anthracene	mg/kg	ND	0.010	03/31/15 08:15	
Benzo(a)pyrene	mg/kg	ND	0.010	03/31/15 08:15	
Benzo(b)fluoranthene	mg/kg	ND	0.010	03/31/15 08:15	
Benzo(g,h,i)perylene	mg/kg	ND	0.010	03/31/15 08:15	
Benzo(k)fluoranthene	mg/kg	ND	0.010	03/31/15 08:15	
Chrysene	mg/kg	ND	0.010	03/31/15 08:15	
Dibenz(a,h)anthracene	mg/kg	ND	0.010	03/31/15 08:15	
Fluoranthene	mg/kg	ND	0.010	03/31/15 08:15	
Fluorene	mg/kg	ND	0.010	03/31/15 08:15	
Indeno(1,2,3-cd)pyrene	mg/kg	ND	0.010	03/31/15 08:15	
Naphthalene	mg/kg	ND	0.010	03/31/15 08:15	
Phenanthrene	mg/kg	ND	0.010	03/31/15 08:15	
Pyrene	mg/kg	ND	0.010	03/31/15 08:15	
2-Fluorobiphenyl (S)	%.	81	55-125	03/31/15 08:15	
p-Terphenyl-d14 (S)	%.	92	30-150	03/31/15 08:15	

LABORATORY CONTROL SAMPLE: 1928103

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Acenaphthene	mg/kg	.033	0.026	79	53-125	
Acenaphthylene	mg/kg	.033	0.027	81	53-125	
Anthracene	mg/kg	.033	0.031	94	61-125	
Benzo(a)anthracene	mg/kg	.033	0.027	80	62-125	
Benzo(a)pyrene	mg/kg	.033	0.029	87	64-125	
Benzo(b)fluoranthene	mg/kg	.033	0.028	85	66-125	
Benzo(g,h,i)perylene	mg/kg	.033	0.027	82	59-125	
Benzo(k)fluoranthene	mg/kg	.033	0.027	80	61-125	
Chrysene	mg/kg	.033	0.026	77	63-125	
Dibenz(a,h)anthracene	mg/kg	.033	0.029	86	59-125	
Fluoranthene	mg/kg	.033	0.026	77	64-125	
Fluorene	mg/kg	.033	0.028	84	57-125	
Indeno(1,2,3-cd)pyrene	mg/kg	.033	0.027	82	58-125	
Naphthalene	mg/kg	.033	0.025	74	52-125	
Phenanthrene	mg/kg	.033	0.026	79	60-125	
Pyrene	mg/kg	.033	0.032	97	63-125	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

LABORATORY CONTROL SAMPLE: 1928103

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
2-Fluorobiphenyl (S)	%.			73	55-125	
p-Terphenyl-d14 (S)	%.			80	30-150	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1928104 1928105

Parameter	Units	10300367001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Acenaphthene	mg/kg	ND	.033	.033	0.030	0.031	82	86	39-125	5	30	
Acenaphthylene	mg/kg	ND	.033	.033	0.036	0.043	79	99	30-150	18	30	
Anthracene	mg/kg	ND	.033	.033	0.042	0.047	97	111	30-150	11	30	
Benzo(a)anthracene	mg/kg	28.2 ug/kg	.033	.033	0.052	0.070	71	125	30-150	30	30	
Benzo(a)pyrene	mg/kg	37.7 ug/kg	.033	.033	0.063	0.080	75	127	30-150	25	30	
Benzo(b)fluoranthene	mg/kg	54.8 ug/kg	.033	.033	0.076	0.10	63	133	30-150	27	30	
Benzo(g,h,i)perylene	mg/kg	34.4 ug/kg	.033	.033	0.058	0.070	71	107	30-150	19	30	
Benzo(k)fluoranthene	mg/kg	22.1 ug/kg	.033	.033	0.045	0.057	70	104	30-150	23	30	
Chrysene	mg/kg	38.9 ug/kg	.033	.033	0.062	0.082	69	128	30-150	28	30	
Dibenz(a,h)anthracene	mg/kg	ND	.033	.033	0.034	0.038	101	114	30-150	12	30	
Fluoranthene	mg/kg	67.0 ug/kg	.033	.033	0.086	0.11	57	125	30-150	23	30	
Fluorene	mg/kg	ND	.033	.033	0.030	0.032	82	89	30-146	7	30	
Indeno(1,2,3-cd)pyrene	mg/kg	25.5 ug/kg	.033	.033	0.049	0.059	71	100	30-150	18	30	
Naphthalene	mg/kg	ND	.033	.033	0.023	0.027	69	79	30-131	14	30	
Phenanthrene	mg/kg	26.1 ug/kg	.033	.033	0.052	0.056	78	88	30-150	7	30	
Pyrene	mg/kg	70.1 ug/kg	.033	.033	0.091	0.12	63	137	30-150	24	30	
2-Fluorobiphenyl (S)	%.						80	80	55-125			
p-Terphenyl-d14 (S)	%.						82	81	30-150			

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

QC Batch: OEXT/28694 Analysis Method: WI MOD DRO
QC Batch Method: WI MOD DRO Analysis Description: WIDRO GCS
Associated Lab Samples: 10300830002, 10300830003, 10300830005, 10300830006, 10300830007, 10300830008, 10300830010, 10300830011, 10300830012, 10300830013, 10300830014, 10300830016

METHOD BLANK: 1928091 Matrix: Solid
Associated Lab Samples: 10300830002, 10300830003, 10300830005, 10300830006, 10300830007, 10300830008, 10300830010, 10300830011, 10300830012, 10300830013, 10300830014, 10300830016

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
WDRO C10-C28	mg/kg	ND	10.0	03/31/15 13:49	
n-Triacontane (S)	%.	52	50-150	03/31/15 13:49	

LABORATORY CONTROL SAMPLE & LCSD: 1928092 1928093

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
WDRO C10-C28	mg/kg	80	69.1	74.3	86	93	70-120	7	20	
n-Triacontane (S)	%.				74	77	50-150			

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300830

QC Batch: OEXT/28707 Analysis Method: WI MOD DRO
QC Batch Method: WI MOD DRO Analysis Description: WIDRO GCS
Associated Lab Samples: 10300830018, 10300830019, 10300830020

METHOD BLANK: 1928671 Matrix: Water
Associated Lab Samples: 10300830018, 10300830019, 10300830020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
WDRO C10-C28	ug/L	ND	100	04/01/15 10:55	
n-Triacontane (S)	%.	90	50-150	04/01/15 10:55	

LABORATORY CONTROL SAMPLE & LCSD: 1928672 1928673

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
WDRO C10-C28	ug/L	2000	1820	1750	91	88	75-115	4	20	
n-Triacontane (S)	%.				93	88	50-150			

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: B1500394 Roof Depot
Pace Project No.: 10300830

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.

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.

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.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

CH	The continuing calibration for this compound is outside of Pace Analytical acceptance limits. The results may be biased high.
D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
E	Analyte concentration exceeded the calibration range. The reported result is estimated.
HS	Results are from sample aliquot taken from VOA vial with headspace (air bubble greater than 6 mm diameter).
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.
P3	Sample extract could not be concentrated to the routine final volume, resulting in elevated reporting limits.
P4	Sample field preservation does not meet EPA or method recommendations for this analysis.
R1	RPD value was outside control limits.
SS	This analyte did not meet the secondary source verification criteria for the initial calibration. The reported result should be considered an estimated value.
T6	High boiling point hydrocarbons are present in the sample.

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10300830002	**PP-2 (2-4)**	WI MOD DRO	OEXT/28694	WI MOD DRO	GCSV/15376
10300830003	**PP-3 (1-2)**	WI MOD DRO	OEXT/28694	WI MOD DRO	GCSV/15376
10300830005	**PP-5 (2-4)**	WI MOD DRO	OEXT/28694	WI MOD DRO	GCSV/15376
10300830006	**PP-6 (3-5)**	WI MOD DRO	OEXT/28694	WI MOD DRO	GCSV/15376
10300830007	**PP-7 (3-5)**	WI MOD DRO	OEXT/28694	WI MOD DRO	GCSV/15376
10300830008	**PP-8 (2)**	WI MOD DRO	OEXT/28694	WI MOD DRO	GCSV/15376
10300830010	**PP-10 (2)**	WI MOD DRO	OEXT/28694	WI MOD DRO	GCSV/15376
10300830011	**PP-11 (1-2)**	WI MOD DRO	OEXT/28694	WI MOD DRO	GCSV/15376
10300830012	**PP-12 (1-2)**	WI MOD DRO	OEXT/28694	WI MOD DRO	GCSV/15376
10300830013	**PP-13 (2-4)**	WI MOD DRO	OEXT/28694	WI MOD DRO	GCSV/15376
10300830014	**PP-14 (2-3)**	WI MOD DRO	OEXT/28694	WI MOD DRO	GCSV/15376
10300830016	**HA-2 (1-3)**	WI MOD DRO	OEXT/28694	WI MOD DRO	GCSV/15376
10300830018	**PP-8W**	WI MOD DRO	OEXT/28707	WI MOD DRO	GCSV/15381
10300830019	**PP-10W**	WI MOD DRO	OEXT/28707	WI MOD DRO	GCSV/15381
10300830020	**HA-W**	WI MOD DRO	OEXT/28707	WI MOD DRO	GCSV/15381
10300830002	**PP-2 (2-4)**	EPA 5030 Medium Soil	GCV/13574	WI MOD GRO	GCV/13577
10300830003	**PP-3 (1-2)**	EPA 5030 Medium Soil	GCV/13574	WI MOD GRO	GCV/13577
10300830005	**PP-5 (2-4)**	EPA 5030 Medium Soil	GCV/13574	WI MOD GRO	GCV/13577
10300830006	**PP-6 (3-5)**	EPA 5030 Medium Soil	GCV/13574	WI MOD GRO	GCV/13577
10300830007	**PP-7 (3-5)**	EPA 5030 Medium Soil	GCV/13574	WI MOD GRO	GCV/13577
10300830008	**PP-8 (2)**	EPA 5030 Medium Soil	GCV/13582	WI MOD GRO	GCV/13588
10300830010	**PP-10 (2)**	EPA 5030 Medium Soil	GCV/13582	WI MOD GRO	GCV/13588
10300830011	**PP-11 (1-2)**	EPA 5030 Medium Soil	GCV/13582	WI MOD GRO	GCV/13588
10300830012	**PP-12 (1-2)**	EPA 5030 Medium Soil	GCV/13582	WI MOD GRO	GCV/13588
10300830013	**PP-13 (2-4)**	EPA 5030 Medium Soil	GCV/13582	WI MOD GRO	GCV/13588
10300830014	**PP-14 (2-3)**	EPA 5030 Medium Soil	GCV/13582	WI MOD GRO	GCV/13588
10300830016	**HA-2 (1-3)**	EPA 5030 Medium Soil	GCV/13582	WI MOD GRO	GCV/13588
10300830002	**PP-2 (2-4)**	EPA 3050	MPRP/53233	EPA 6020A	ICPM/23615
10300830003	**PP-3 (1-2)**	EPA 3050	MPRP/53233	EPA 6020A	ICPM/23615
10300830005	**PP-5 (2-4)**	EPA 3050	MPRP/53233	EPA 6020A	ICPM/23615
10300830006	**PP-6 (3-5)**	EPA 3050	MPRP/53233	EPA 6020A	ICPM/23615
10300830007	**PP-7 (3-5)**	EPA 3050	MPRP/53233	EPA 6020A	ICPM/23615
10300830008	**PP-8 (2)**	EPA 3050	MPRP/53233	EPA 6020A	ICPM/23615
10300830010	**PP-10 (2)**	EPA 3050	MPRP/53233	EPA 6020A	ICPM/23615
10300830011	**PP-11 (1-2)**	EPA 3050	MPRP/53233	EPA 6020A	ICPM/23615
10300830012	**PP-12 (1-2)**	EPA 3050	MPRP/53233	EPA 6020A	ICPM/23615
10300830013	**PP-13 (2-4)**	EPA 3050	MPRP/53233	EPA 6020A	ICPM/23615
10300830014	**PP-14 (2-3)**	EPA 3050	MPRP/53233	EPA 6020A	ICPM/23615
10300830016	**HA-2 (1-3)**	EPA 3050	MPRP/53233	EPA 6020A	ICPM/23615
10300830018	**PP-8W**	EPA 3020	MPRP/53235	EPA 6020A	ICPM/23590
10300830019	**PP-10W**	EPA 3020	MPRP/53235	EPA 6020A	ICPM/23590
10300830020	**HA-W**	EPA 3020	MPRP/53235	EPA 6020A	ICPM/23590
10300830018	**PP-8W**	EPA 7470A	MERP/13082	EPA 7470	MERC/15205
10300830019	**PP-10W**	EPA 7470A	MERP/13082	EPA 7470	MERC/15205
10300830020	**HA-W**	EPA 7470A	MERP/13082	EPA 7470	MERC/15205

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10300830002	**PP-2 (2-4)**	EPA 7471B	MERP/13087	EPA 7471B	MERC/15216
10300830003	**PP-3 (1-2)**	EPA 7471B	MERP/13087	EPA 7471B	MERC/15216
10300830005	**PP-5 (2-4)**	EPA 7471B	MERP/13087	EPA 7471B	MERC/15216
10300830006	**PP-6 (3-5)**	EPA 7471B	MERP/13087	EPA 7471B	MERC/15216
10300830007	**PP-7 (3-5)**	EPA 7471B	MERP/13087	EPA 7471B	MERC/15216
10300830008	**PP-8 (2)**	EPA 7471B	MERP/13087	EPA 7471B	MERC/15216
10300830010	**PP-10 (2)**	EPA 7471B	MERP/13087	EPA 7471B	MERC/15216
10300830011	**PP-11 (1-2)**	EPA 7471B	MERP/13087	EPA 7471B	MERC/15216
10300830012	**PP-12 (1-2)**	EPA 7471B	MERP/13087	EPA 7471B	MERC/15216
10300830013	**PP-13 (2-4)**	EPA 7471B	MERP/13087	EPA 7471B	MERC/15216
10300830014	**PP-14 (2-3)**	EPA 7471B	MERP/13087	EPA 7471B	MERC/15216
10300830016	**HA-2 (1-3)**	EPA 7471B	MERP/13087	EPA 7471B	MERC/15216
10300830002	**PP-2 (2-4)**	ASTM D2974	MPRP/53266		
10300830003	**PP-3 (1-2)**	ASTM D2974	MPRP/53266		
10300830005	**PP-5 (2-4)**	ASTM D2974	MPRP/53266		
10300830006	**PP-6 (3-5)**	ASTM D2974	MPRP/53266		
10300830007	**PP-7 (3-5)**	ASTM D2974	MPRP/53266		
10300830008	**PP-8 (2)**	ASTM D2974	MPRP/53266		
10300830010	**PP-10 (2)**	ASTM D2974	MPRP/53266		
10300830011	**PP-11 (1-2)**	ASTM D2974	MPRP/53266		
10300830012	**PP-12 (1-2)**	ASTM D2974	MPRP/53266		
10300830013	**PP-13 (2-4)**	ASTM D2974	MPRP/53266		
10300830014	**PP-14 (2-3)**	ASTM D2974	MPRP/53266		
10300830016	**HA-2 (1-3)**	ASTM D2974	MPRP/53266		
10300830002	**PP-2 (2-4)**	EPA 3550	OEXT/28695	EPA 8270D by SIM	MSSV/12104
10300830003	**PP-3 (1-2)**	EPA 3550	OEXT/28695	EPA 8270D by SIM	MSSV/12104
10300830005	**PP-5 (2-4)**	EPA 3550	OEXT/28695	EPA 8270D by SIM	MSSV/12104
10300830006	**PP-6 (3-5)**	EPA 3550	OEXT/28695	EPA 8270D by SIM	MSSV/12104
10300830007	**PP-7 (3-5)**	EPA 3550	OEXT/28695	EPA 8270D by SIM	MSSV/12104
10300830008	**PP-8 (2)**	EPA 3550	OEXT/28695	EPA 8270D by SIM	MSSV/12104
10300830010	**PP-10 (2)**	EPA 3550	OEXT/28695	EPA 8270D by SIM	MSSV/12104
10300830011	**PP-11 (1-2)**	EPA 3550	OEXT/28695	EPA 8270D by SIM	MSSV/12104
10300830012	**PP-12 (1-2)**	EPA 3550	OEXT/28695	EPA 8270D by SIM	MSSV/12104
10300830013	**PP-13 (2-4)**	EPA 3550	OEXT/28695	EPA 8270D by SIM	MSSV/12104
10300830014	**PP-14 (2-3)**	EPA 3550	OEXT/28695	EPA 8270D by SIM	MSSV/12104
10300830016	**HA-2 (1-3)**	EPA 3550	OEXT/28695	EPA 8270D by SIM	MSSV/12104
10300830002	**PP-2 (2-4)**	EPA 5035/5030B	MSV/30929	EPA 8260	MSV/30945
10300830003	**PP-3 (1-2)**	EPA 5035/5030B	MSV/30929	EPA 8260	MSV/30945
10300830005	**PP-5 (2-4)**	EPA 5035/5030B	MSV/30929	EPA 8260	MSV/30945
10300830006	**PP-6 (3-5)**	EPA 5035/5030B	MSV/30929	EPA 8260	MSV/30945
10300830007	**PP-7 (3-5)**	EPA 5035/5030B	MSV/30935	EPA 8260	MSV/30956
10300830008	**PP-8 (2)**	EPA 5035/5030B	MSV/30935	EPA 8260	MSV/30956
10300830010	**PP-10 (2)**	EPA 5035/5030B	MSV/30935	EPA 8260	MSV/30956
10300830011	**PP-11 (1-2)**	EPA 5035/5030B	MSV/30935	EPA 8260	MSV/30956
10300830012	**PP-12 (1-2)**	EPA 5035/5030B	MSV/30935	EPA 8260	MSV/30956
10300830013	**PP-13 (2-4)**	EPA 5035/5030B	MSV/30935	EPA 8260	MSV/30956
10300830014	**PP-14 (2-3)**	EPA 5035/5030B	MSV/30935	EPA 8260	MSV/30956

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: B1500394 Roof Depot
Pace Project No.: 10300830

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10300830016	**HA-2 (1-3)**	EPA 5035/5030B	MSV/30935	EPA 8260	MSV/30956
10300830017	**Trip Blank - SL**	EPA 5035/5030B	MSV/30935	EPA 8260	MSV/30956
10300830018	**PP-8W**	EPA 8260	MSV/30955		
10300830019	**PP-10W**	EPA 8260	MSV/30955		
10300830020	**HA-W**	EPA 8260	MSV/30955		

REPORT OF LABORATORY ANALYSIS

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CHAIN-OF-CUSTODY / Analytical Request Document

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

10 300830

Page: 1 of 3

1797139

AETT Project No. 03-21225

Section A Required Client Information:

Company: Braun Intertec
Address: 11001 Hampshire Ave. Bloomington, MN 55438
Email To:
Phone: Fax:
Requested Due Date/TAT: STD

Section B Required Project Information:

Report To: Jeremy Hansen
Copy To:
Purchase Order No.:
Project Name: Roof Depot
Project Number: B15003944

Section C Invoice Information:

Attention:
Company Name:
Address: Same.
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY
☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☒ RCRA ☐ OTHER

Site Location STATE: MN

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information: SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	VOCs	GRO	DRO	PAHs	Priority Pollutant Metals 6020	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	PP-1 (2-4)	SL	G			3/25/15	1545		5							2			X	X	X	X	X			001
2	PP-2 (2-4)					3/25/15	1630		5							2			X	X	X	X	X			002
3	PP-3 (1-2)					3/25/15	1700		5							2										003
4	PP-4 (2-4)					3/25/15	1500		5							2										004
5	PP-5 (2-4)					3/26/15	840		5							2										005
6	PP-6 (3-5)					3/26/15	915		5							2										006
7	PP-7 (3-5)					3/26/15	950		5							2										007
8	PP-8 (2)					3/25/15	945		5							2										008
9	PP-9 (1-3)					3/26/15	1030		5							2										009
10	PP-10 (2)					3/25/15	1200		5							2										010
11	PP-11 (1-2)					3/26/15	1230		5							2										011
12	PP-12 (1-2)					3/26/15	1200		5							2										012

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

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
	Tim Braun	3/27/15	0820		3/27/15	0820	Temp in °C: 4.6
		3/27/15	1040		3/27/15	1040	Received on Ice (Y/N): Y
							Custody Sealed Cooler (Y/N): N
							Samples Intact (Y/N): Y

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Tim Mattson
SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 03/25/15

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

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CHAIN-OF-CUSTODY / Analytical Request Document

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

10300830

Page: 2 of 3

1797141

AET Project No. 03121225

Section A Required Client Information:

Company: Braun Intertec
Address: 11001 Hampshire Ave
Bloomington, MN 55438
Email To:
Phone: Fax:
Requested Due Date/TAT: STD

Section B Required Project Information:

Report To: Jeremy Hansen
Copy To:
Purchase Order No.:
Project Name: Roof Depot
Project Number: B1500394

Section C Invoice Information:

Attention:
Company Name: SAME
Address:
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY
☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☒ RCRA ☐ OTHER

Site Location STATE: MN

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information — SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	VOCs	GRO	DRO	PAHs	Priority Pollutant Metals (only)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	DP-13 (2-4)	SL	G			3/26/15	1300		5							2			X	X	X	X	X		013
2	DP-14 (2-3)	"	"			"	1330		5							2			X	X	X	X	X		014
3	HA-1 (1-3)	"	"			3/25/15	1130		5							2			X	X	X	X	X		015 T.M.
4	HA-2 (1-3)	"	"			"	1030		5							2			X	X	X	X	X		016
5	Trip Blanks								2							2			X						017
6																									
7																									
8																									
9																									
10																									
11																									
12																									

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS
soil trip blanks in each cooler	THM / Braun	3/27/15	820	Pace BL	3/27/15	0820	3/26 Y N Y
	Pace BL	3/27/15	1446		3/27/15	1040	

ORIGINAL

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER: Tim H. Mulitor
SIGNATURE of SAMPLER: T. Mulitor
DATE Signed (MM/DD/YY): 03/25/15

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical®
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

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

1030083c

Page: 3 of 3

1797140

AETT Project No. 03121225

Section A Required Client Information:

Company: Braun Intertec
Address: 11001 Hampshire Ave.
Bloomington, MN 55438
Email To:
Phone: Fax:
Requested Due Date/TAT: STD

Section B Required Project Information:

Report To: Jeremy Hansen
Copy To:
Purchase Order No.:
Project Name: Roof Depot
Project Number: B1500394

Section C Invoice Information:

Attention:
Company Name: Same
Address:
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☒ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: MN

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

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

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N: VOCs	DRO	Priority Pollutant Metals (6020)	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	PP-8W	WT	G			3/25/15	1020		6			1	5					X	X	X		018
2	PP-10W	1	1			1	1230		6			1	5					X	X	X		019
3	HA-W	1	1			3/26/15	1100		6			1	5					X	X	X		020
4																						
5																						
6																						
7																						
8																						
9																						
10																						
11																						
12																						

Requested Analysis Filtered (Y/N): Y

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
	THM/ Braun	3/27/15	@830	Pace BC	3/27/15	0820	1.3/1.6	Y	N	X
	Pace	3/27/15	1040		3/27/15	1040				

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Tim H. Molitor

SIGNATURE of SAMPLER: T. Molitor DATE Signed (MM/DD/YY): 03/25/15

ORIGINAL

"Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical®	Document Name: BLM Sample Condition Upon Receipt Form	Document Revised: 19Mar2015 Page 1 of 1
	Document No.: F-MN-C-161-rev.01	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: Braun **Project #:** WO# : 10300830

10300830

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☒ Client ☐ Commercial ☐ Pace ☐ Spee Dee ☐ Other:

Tracking Number:

Custody Seal on Cooler/Box Present? ☐ Yes ☒ No **Seals Intact?** ☐ Yes ☒ No **Optional:** Proj. Due Date: Proj. Name:

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

Thermom. Used: ☐ B88A0143310092 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 1.3, 1.4 **Cooler Temp Corrected (°C):** 1.5, 1.6 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ N/A

Temp should be above freezing to 6°C **Correction Factor:** +0.2 **Date and Initials of Person Examining Contents:** PW 5/27/15

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☐ Yes	☒ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☒ Yes	☐ No	☒ N/A PW 5/27/15	
Sample Labels Match COC? -Includes Date/Time/ID/Analysis Matrix: SL, WT	☒ Yes	☐ No	☐ N/A	12.
All containers needing acid/base preservation have been checked?	☒ Yes	☐ No	☐ N/A	13. ☒ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide) Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☒ Yes	☐ No	☐ N/A	Sample # 3/3 Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☒ No	☐ N/A	14.
Trip Blank Present?	☒ Yes	☐ No	☐ N/A	15. SL Trip Blanks only
Trip Blank Custody Seals Present?	☐ Yes	☒ No	☐ 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: Steve Albrecht for Steve Albrecht **Date:** 3.30.15

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)

Pace Analytical	Document Name: BLM to MN Sample Transfer Form	Revised Date: 14Nov2014
		Page: 1 of 1
	Document Number: F-MN-C-162-rev.00	Issuing Authority: Pace Minnesota Quality Office

Shipping (circle):	UPS Fed Ex Courier
Tracking #:	
Client:	BS Vann
Due Date:	4/8/15
Pace WO:	10300830
Project Manager:	SJA

BLM to MN Sample Transfer Condition Upon Receipt Form

ANALYSIS REQUESTED

Method Number & Description	Container Type	# of Bottles	Lab ID's	Preservative Yes or No	Verify Arrival Date & Initials
Tests					
VOC, GRO	VG9M	2	10300830[001-003]	Yes	ERL 3/27/15
DRO	BJFG	2	4	NO	ERL 3/27/15
PAH, 8RCRA, Dry Weight	JGNA	1	4	NO	ERL 3/27/15
Trip Blank	VG9M	2	10300830 [017]	Yes	ERL 3/27/15
VOC	VG9H	3	10300830[018-020]	Yes	ERL 3/27/15
DRO	AG1A	2	"	Yes	ERL 3/27/15
8RCRA	BP3N	1	"	Yes	ERL 3/27/15

REPORTING REQUIREMENTS/ADDITIONAL COMMENTS

MINNESOTA SAMPLE RECEIPT INFORMATION

IR Gun (circle): B88A9132521491, B88A912167504, B88A9130516413 Correction Factor: +0.2 Sample Matrix: WT, SL

Cooler Temp Read (°C): 0.4,1.8	Cooler Temp Corrected (°C): 0.6, 2.0	Sample Composites Required:	Yes __ No __ NA X
Arrived on Ice:	Yes X No __	Custody Seal Present:	Yes __ No X
Short Hold Time Requested < 72 Hours:	Yes __ No X	Trip Blank Present:	Yes X No __ NA __
Rush TAT Requested:	Yes __ No X	Trip Blank Custody Seals Present:	Yes __ No __ NA X
Samples Arrived within Hold Time:	Yes X No __	Containers Intact:	Yes X No __

CUSTODY TRANSFER Relinquished by/Affiliation	Date	Time	Accepted By Affiliation	Date	Time
	3/27/15	1430	ERL Pace	3/27/15	1430

FICATION/RESOLUTION

Person Contacted: _____ Date: _____

Comments/Resolution: _____

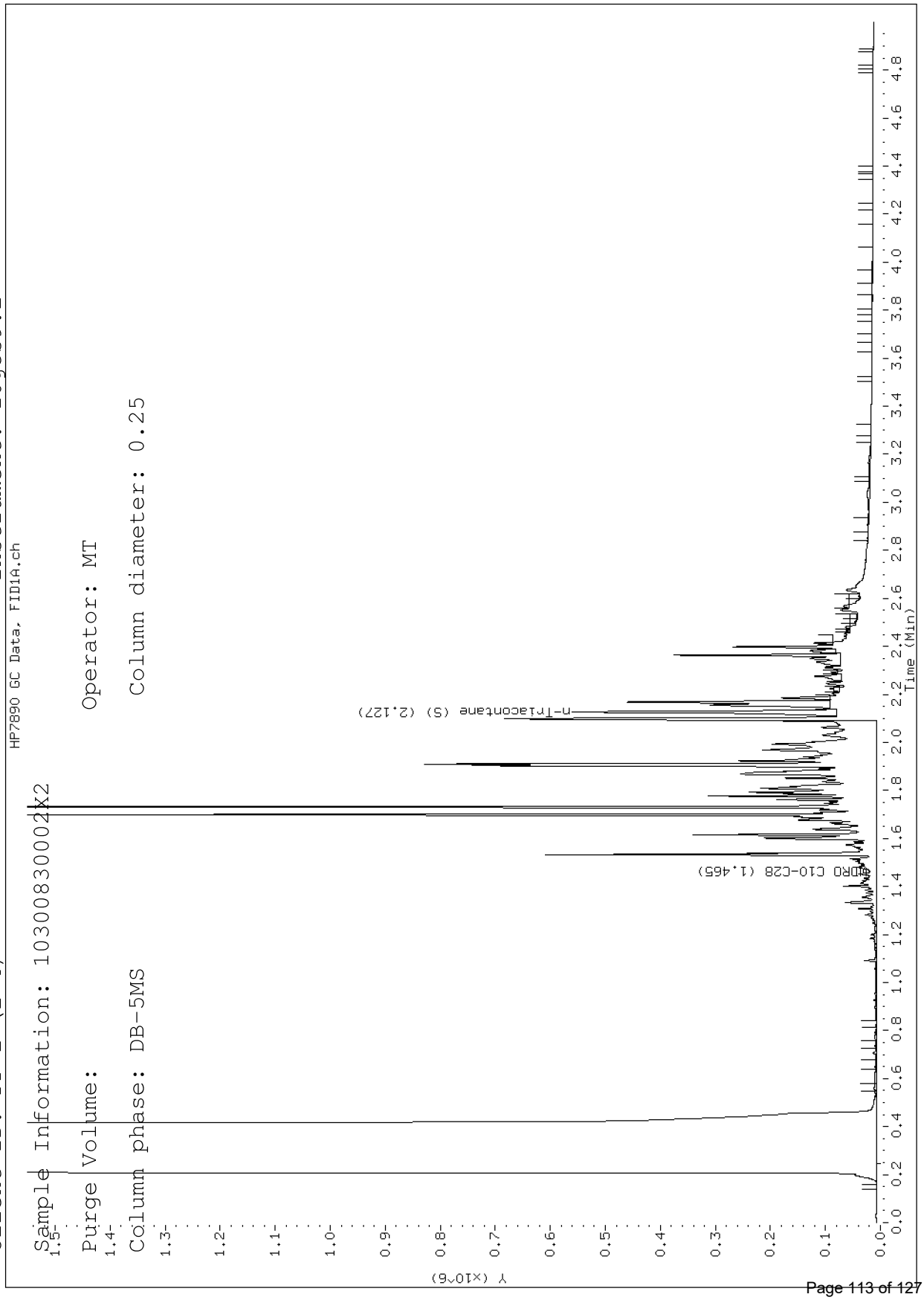
Project Manager Review: Jessica Hellman Date: 3.30.15

Data File: \\192.168.10.12\chem\10gcs9.i\040115dro.b/040115000008.D

Report Date: 04/01/2015

Sample ID: 10300830002

Client ID: PP-2 (2-4) Instrument: 10gcs9.i



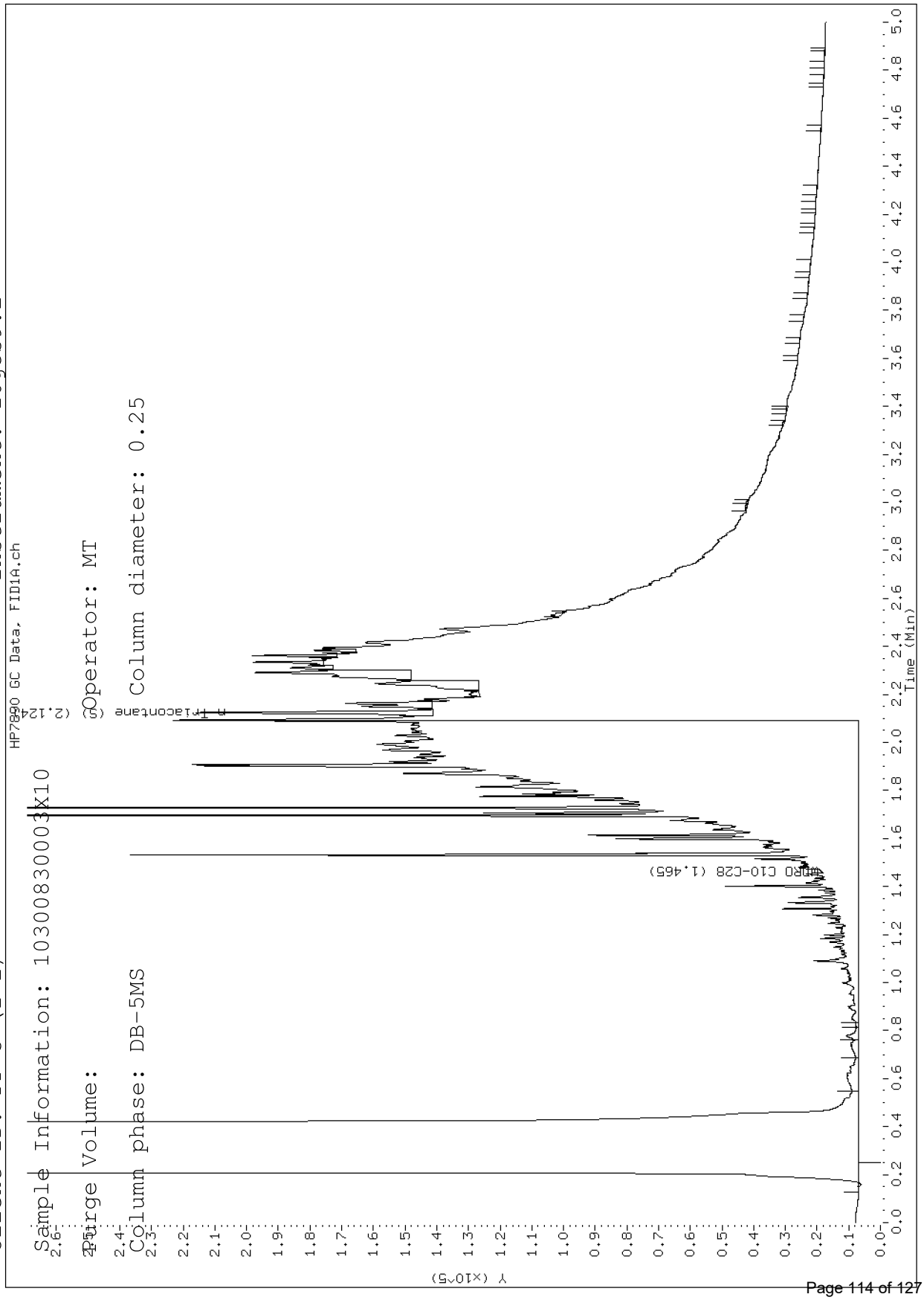
Data File: \\192.168.10.12\chem\10gcs9.i\040115dro.b/040115000009.D

Report Date: 04/01/2015

Sample ID: 10300830003

Client ID: PP-3 (1-2)

Instrument: 10gcs9.i



Data File: \\192.168.10.12\chem\10gcs9.i\033115dro.b/033115000047.D

Report Date: 04/01/2015

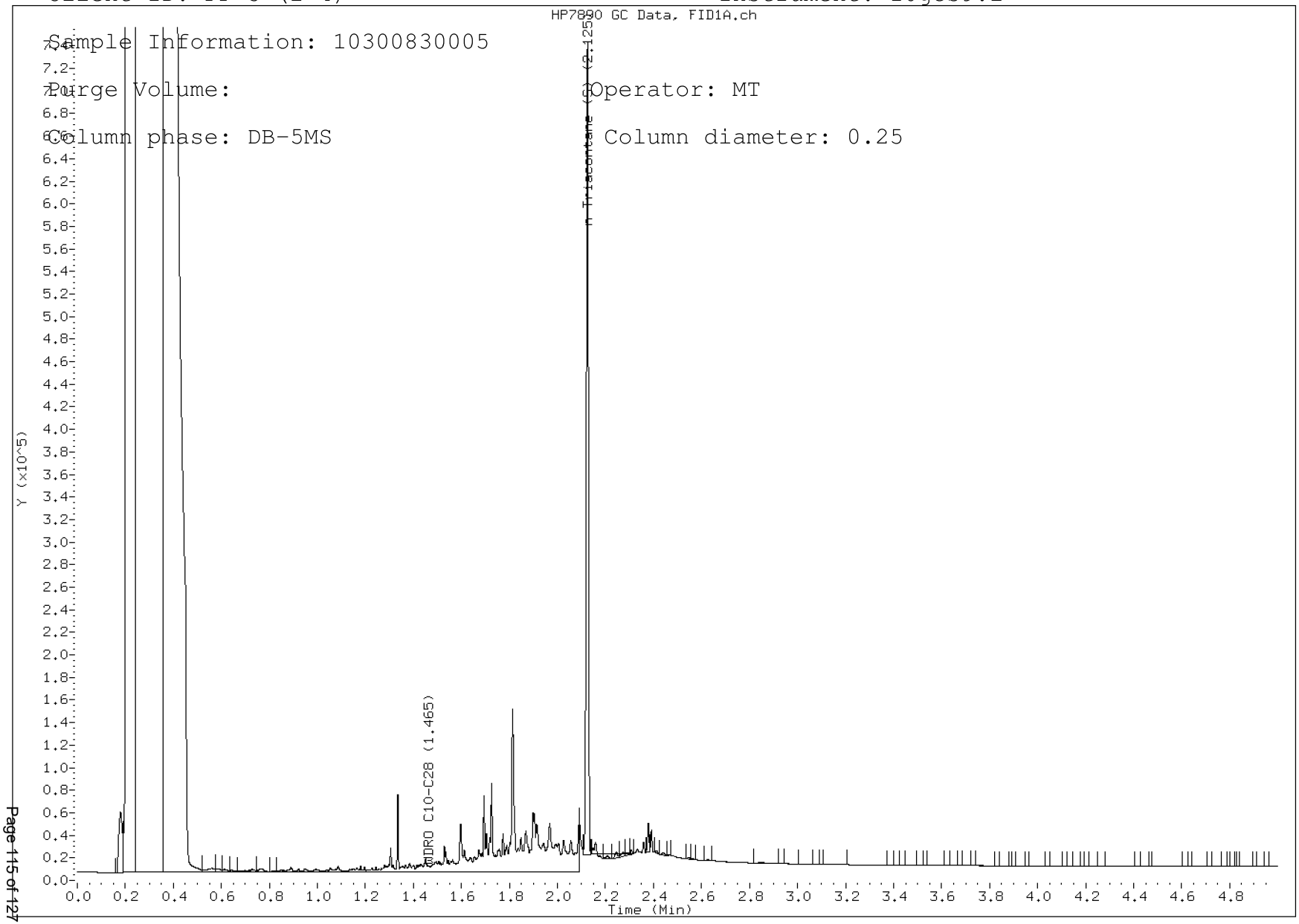
Sample ID: 10300830005

Client ID: PP-5 (2-4) Instrument: 10gcs9.i

Sample Information: 10300830005

Purge Volume: Operator: MT

Column phase: DB-5MS Column diameter: 0.25



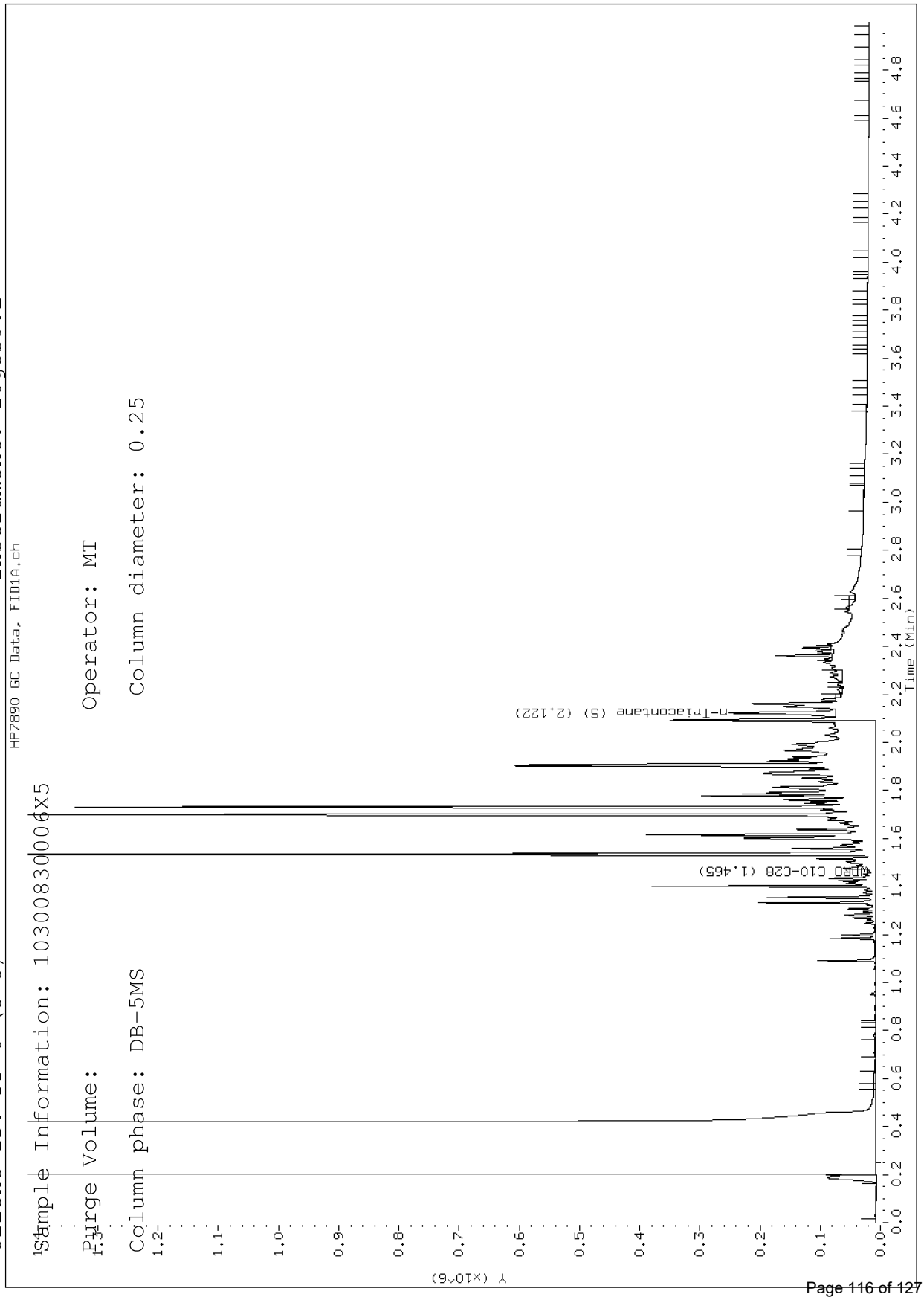
Data File: \\192.168.10.12\chem\10gcs9.i\040115dro.b/040115000011.D

Report Date: 04/01/2015

Sample ID: 10300830006

Client ID: PP-6 (3-5)

Instrument: 10gcs9.i



Data File: \\192.168.10.12\chem\10gcs9.i\040115dro.b/040115000010.D

Report Date: 04/01/2015

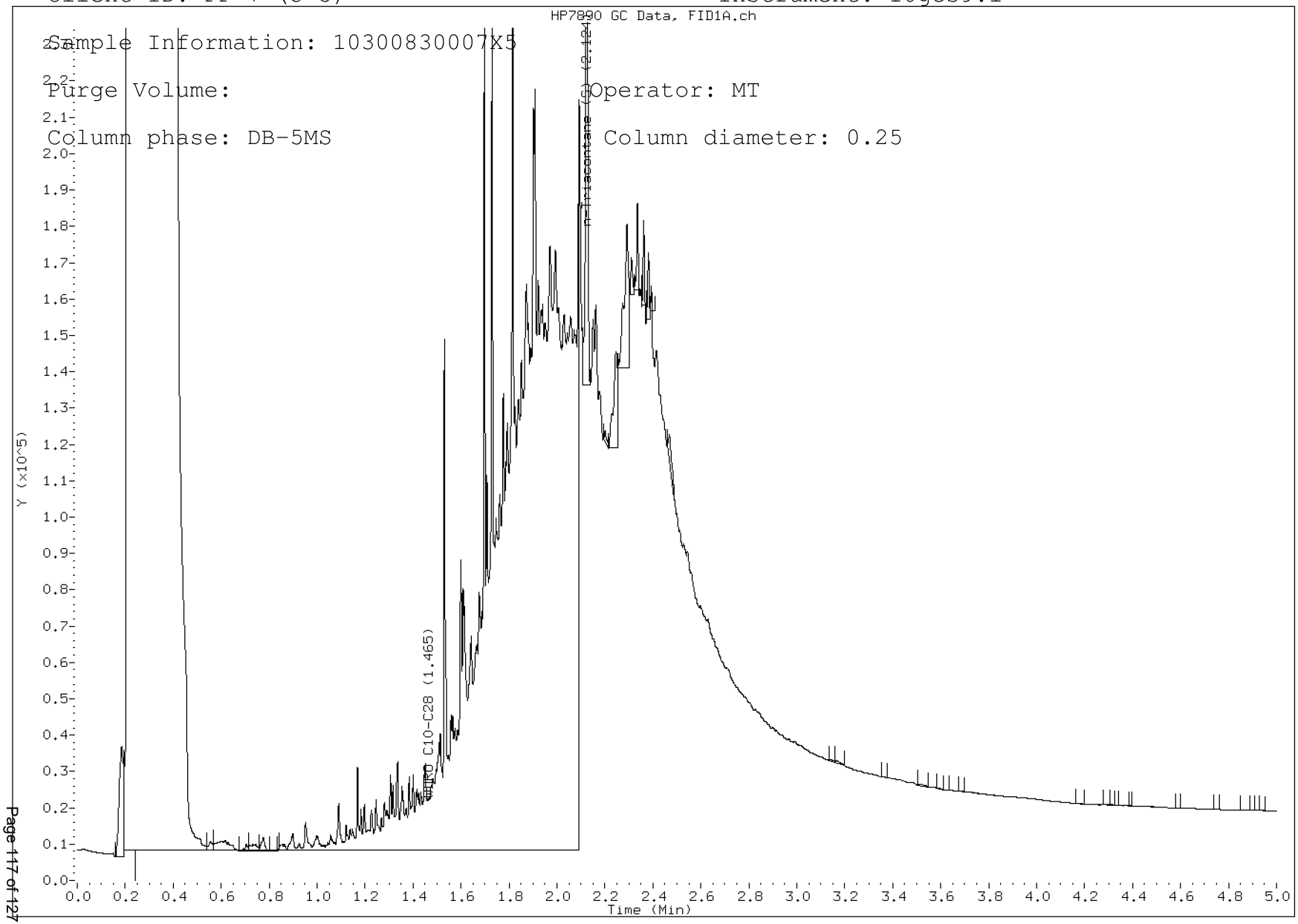
Sample ID: 10300830007

Client ID: PP-7 (3-5) Instrument: 10gcs9.i

Sample Information: 10300830007X5

Purge Volume: Operator: MT

Column phase: DB-5MS Column diameter: 0.25

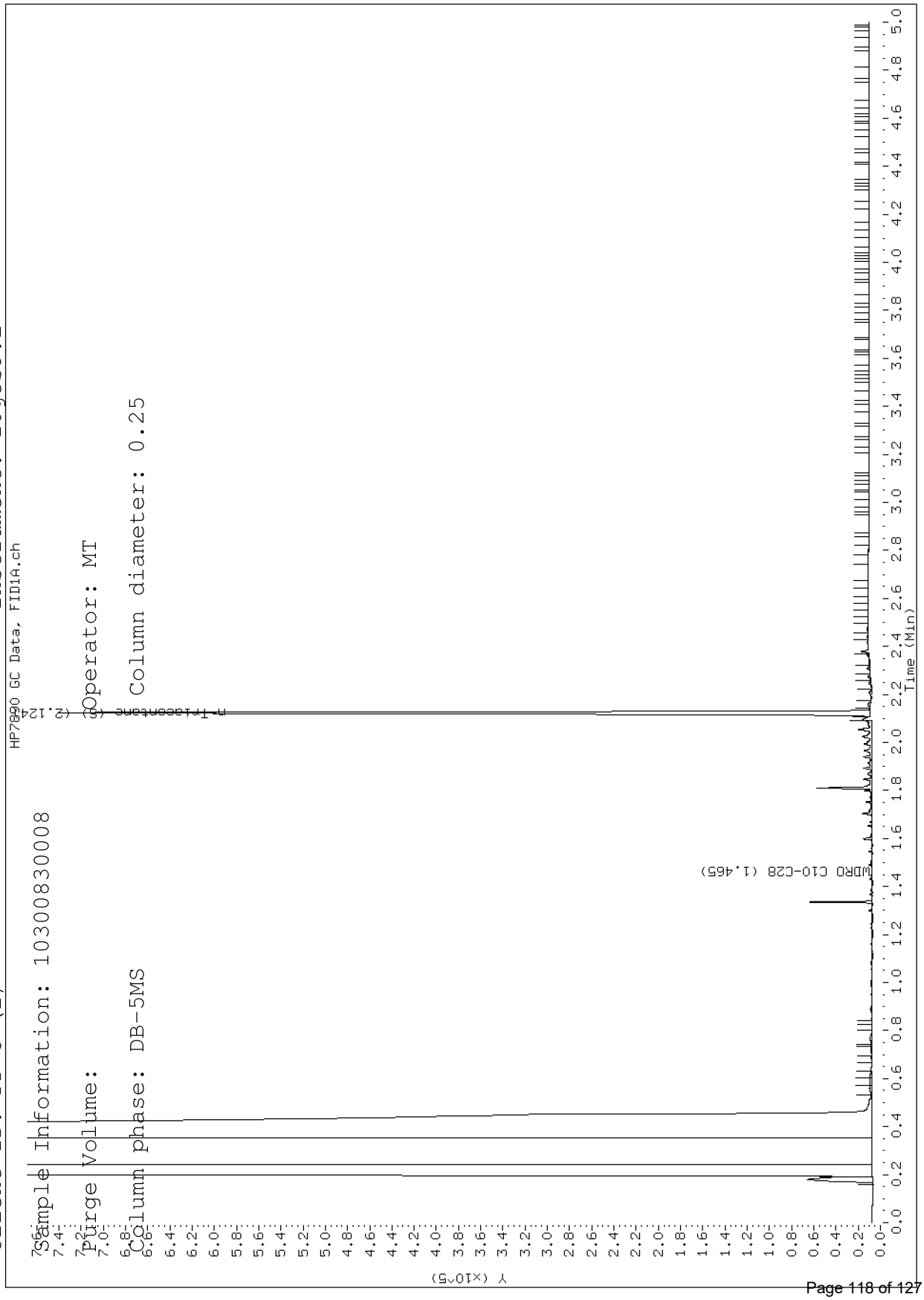


Data File: \\192.168.10.12\chem\10gcs9.i\033115dro.b/033115000054.D

Report Date: 04/01/2015

Sample ID: 10300830008

Client ID: PP-8 (2) Instrument: 10gcs9.i



Data File: \\192.168.10.12\chem\10gcs9.i\033115dro.b/033115000046.D

Report Date: 04/01/2015

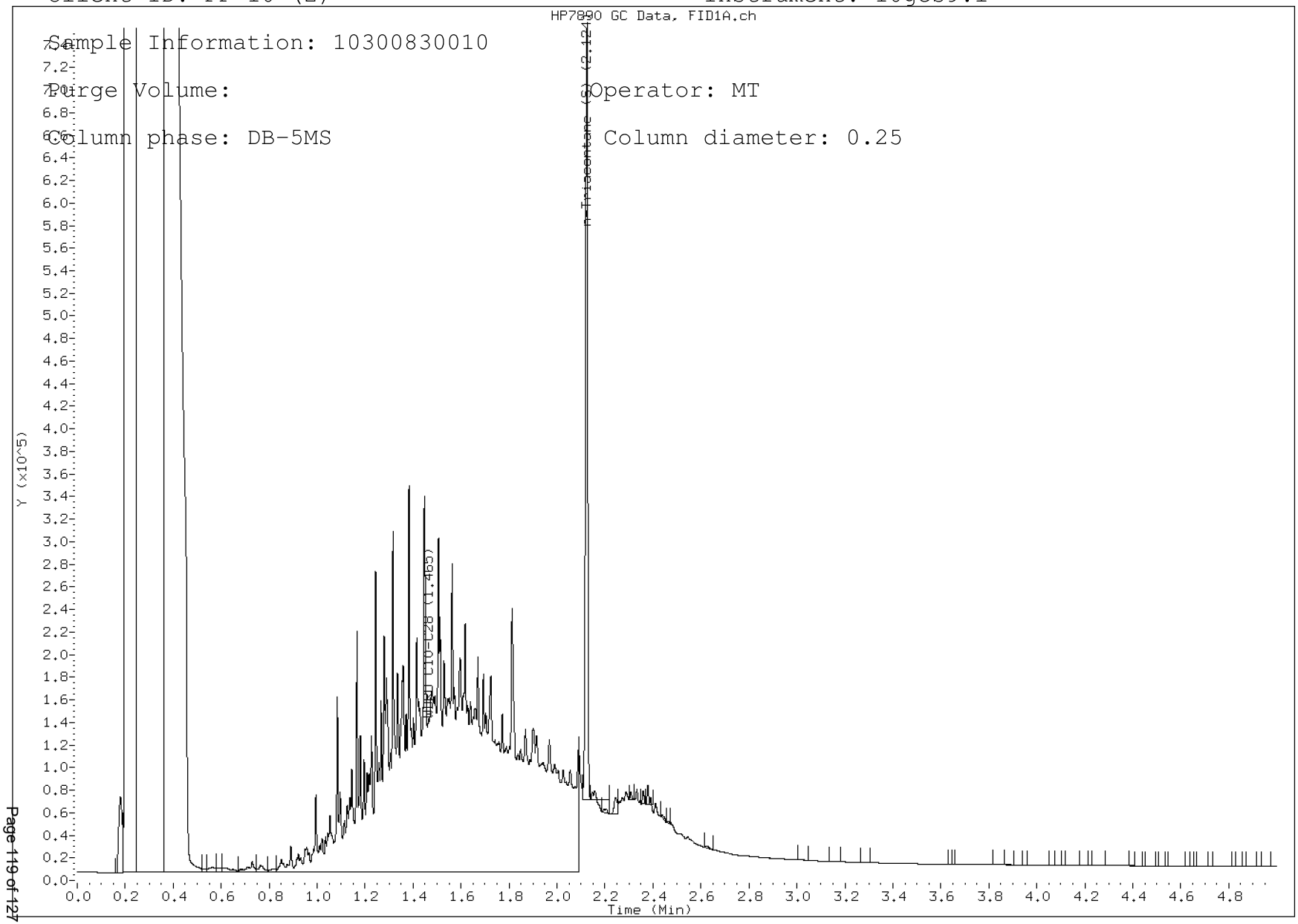
Sample ID: 10300830010

Client ID: PP-10 (2) Instrument: 10gcs9.i

Sample Information: 10300830010

Purge Volume: Operator: MT

Column phase: DB-5MS Column diameter: 0.25



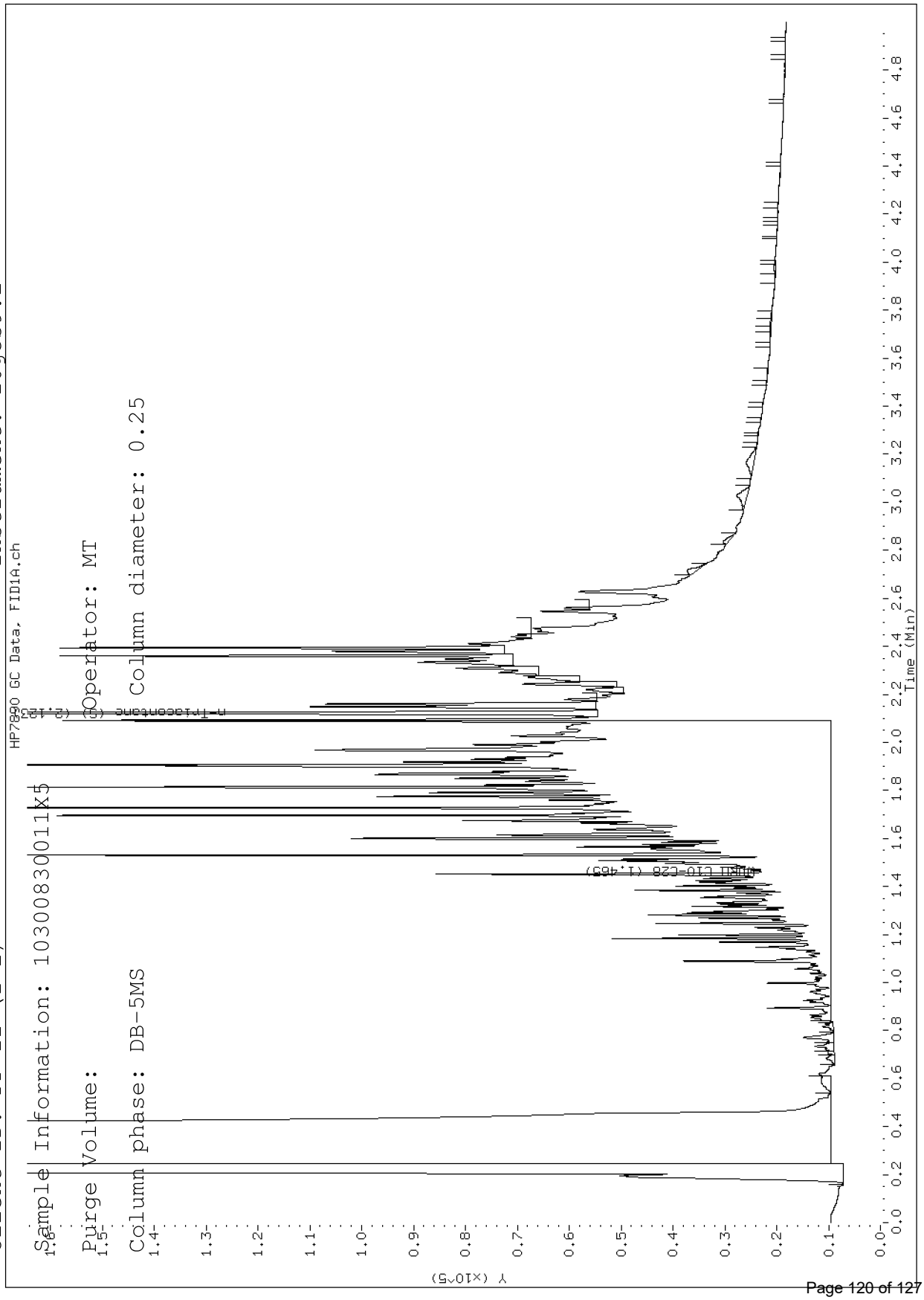
Data File: \\192.168.10.12\chem\10gcs9.i\040115dro.b/040115000012.D

Report Date: 04/01/2015

Sample ID: 10300830011

Client ID: PP-11 (1-2)

Instrument: 10gcs9.i



Data File: \\192.168.10.12\chem\10gcs9.i\033115dro.b/033115000045.D

Report Date: 04/01/2015

Sample ID: 10300830012

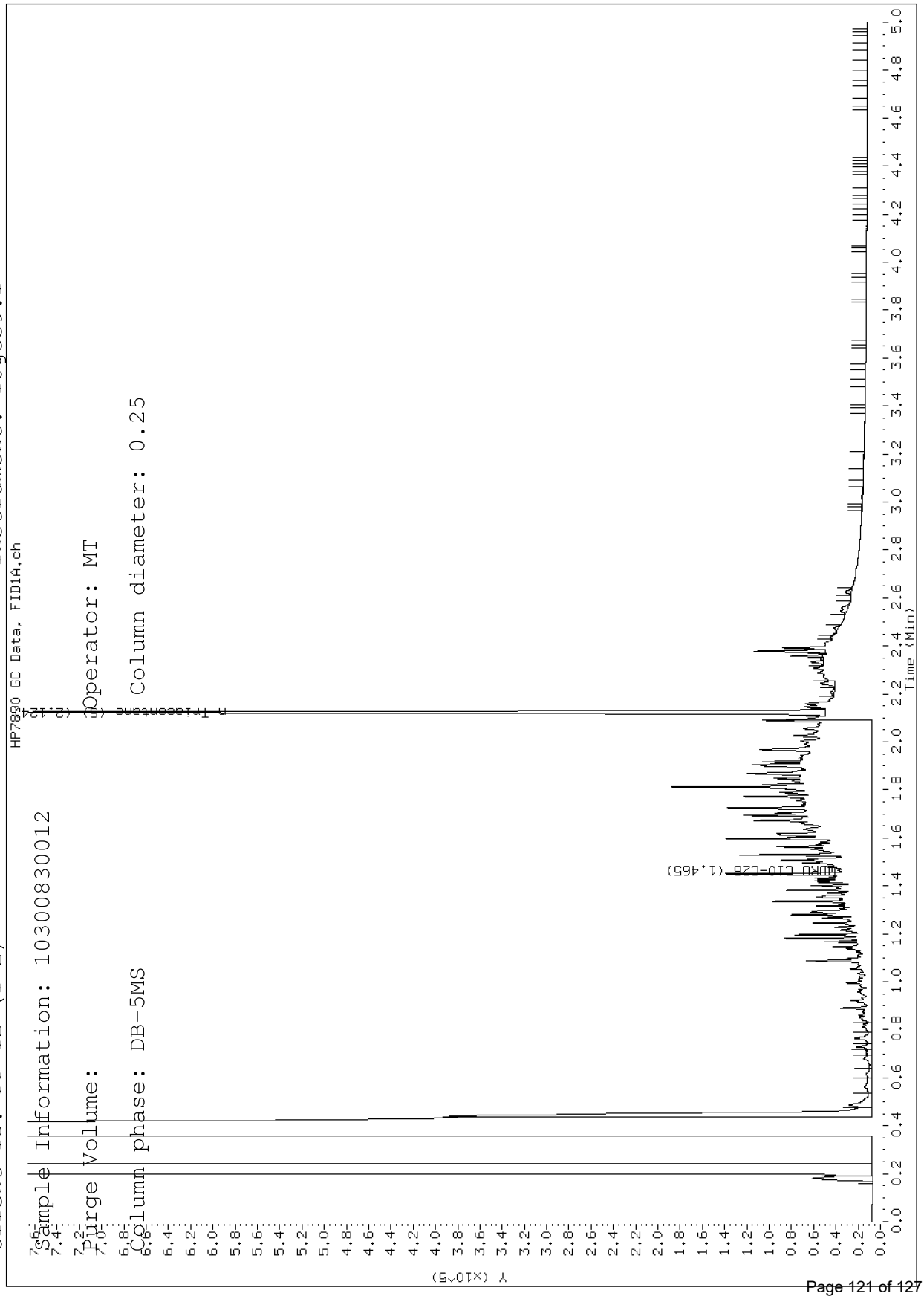
Client ID: PP-12 (1-2) Instrument: 10gcs9.i

Sample Information: 10300830012

Purge Volume:

Column phase: DB-5MS Operator: MT

Column diameter: 0.25

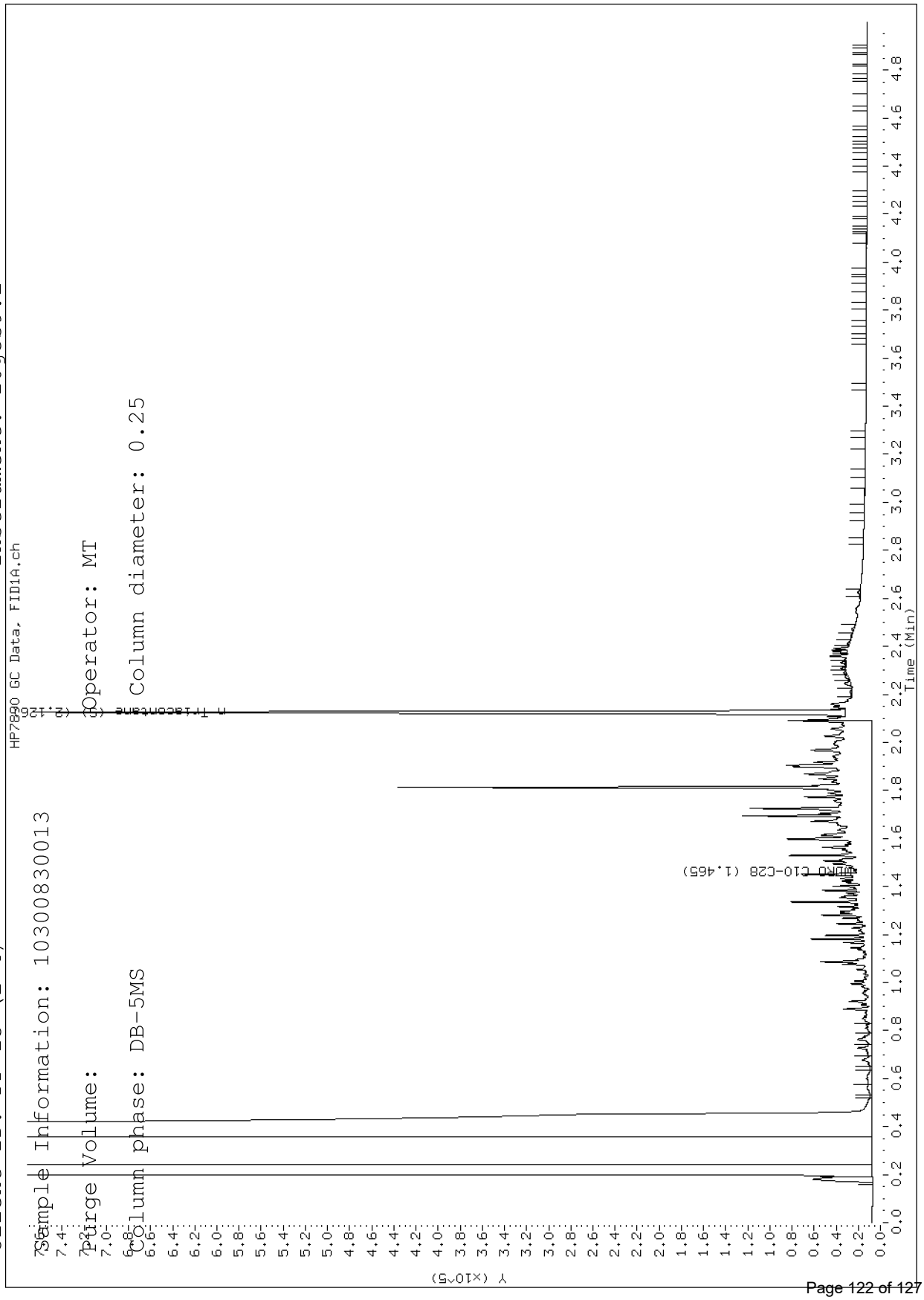


Data File: \\192.168.10.12\chem\10gcs9.i\033115dro.b/033115000048.D

Report Date: 04/01/2015

Sample ID: 10300830013

Client ID: PP-13 (2-4) Instrument: 10gcs9.i



Data File: \\192.168.10.12\chem\10gcs9.i\040115dro.b/040115000007.D

Report Date: 04/01/2015

Sample ID: 10300830014

Client ID: PP-14 (2-3) Instrument: 10gcs9.i

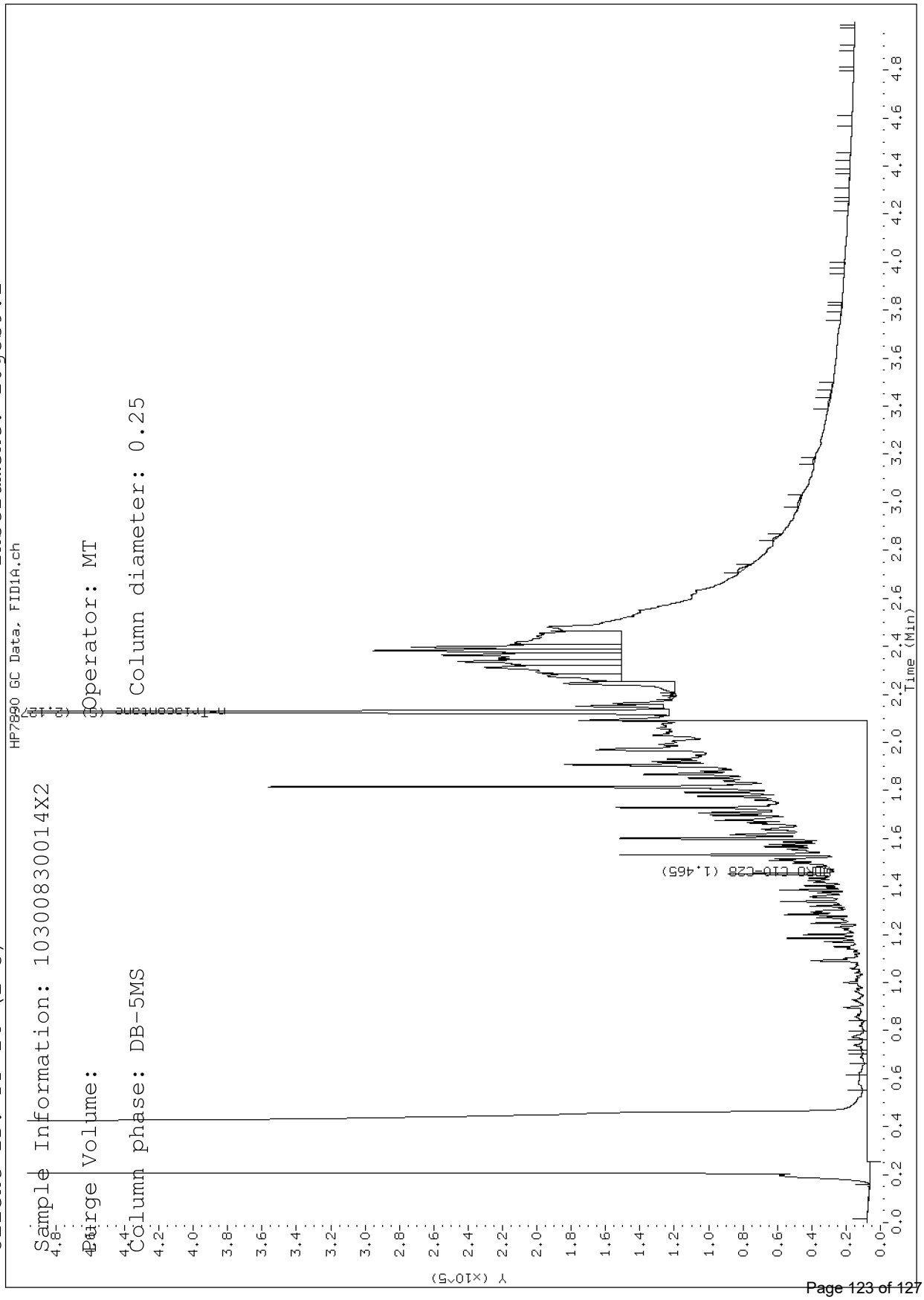
Sample Information: 10300830014X2

Purge Volume:

Column phase: DB-5MS

Operator: MT

Column diameter: 0.25

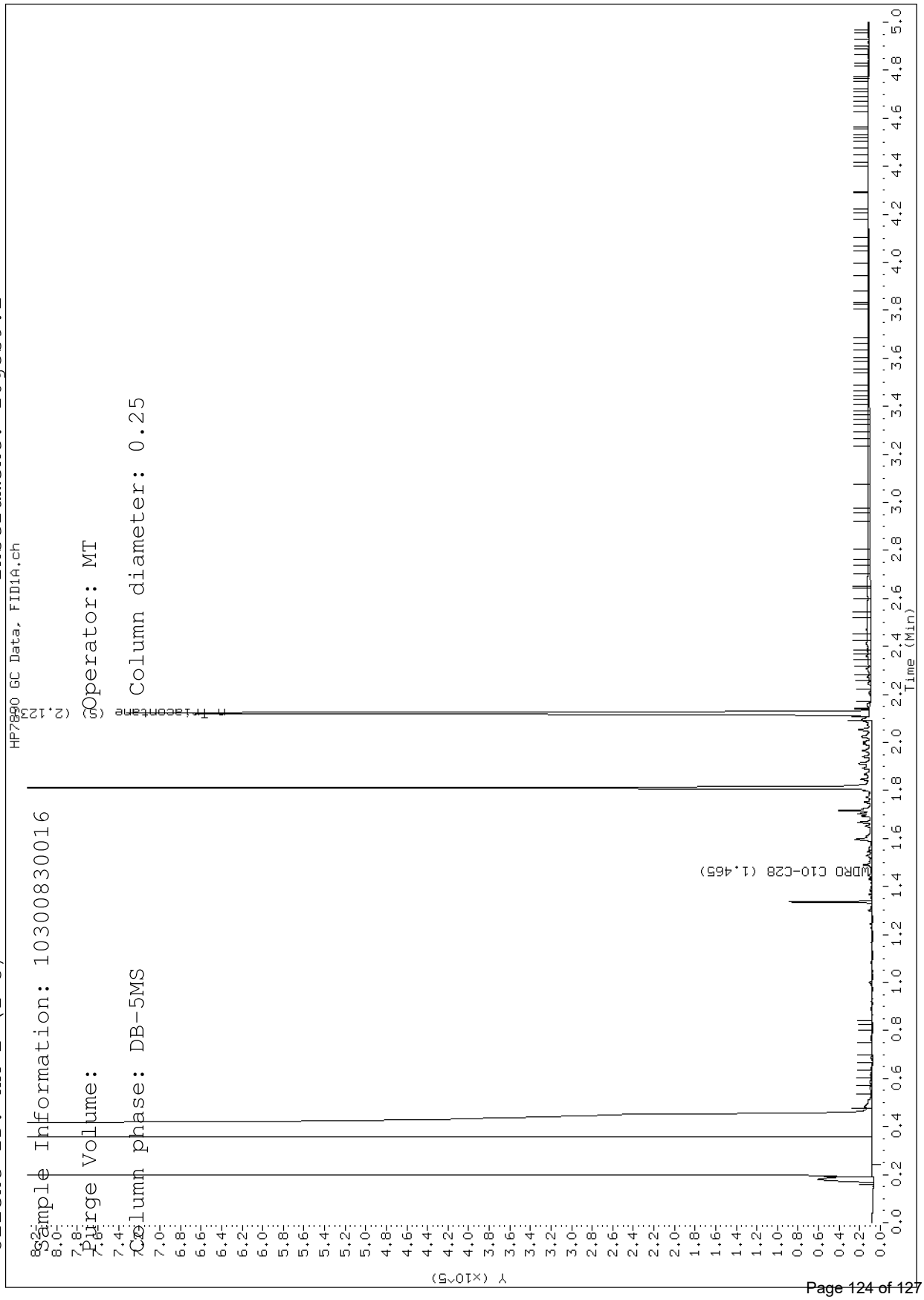


Data File: \\192.168.10.12\chem\10gcs9.i\033115dro.b/033115000049.D

Report Date: 04/01/2015

Sample ID: 10300830016

Client ID: HA-2 (1-3) Instrument: 10gcs9.i



Data File: \\192.168.10.12\chem\10gcs4.i\040115dro.b/04010017.D

Report Date: 04/02/2015

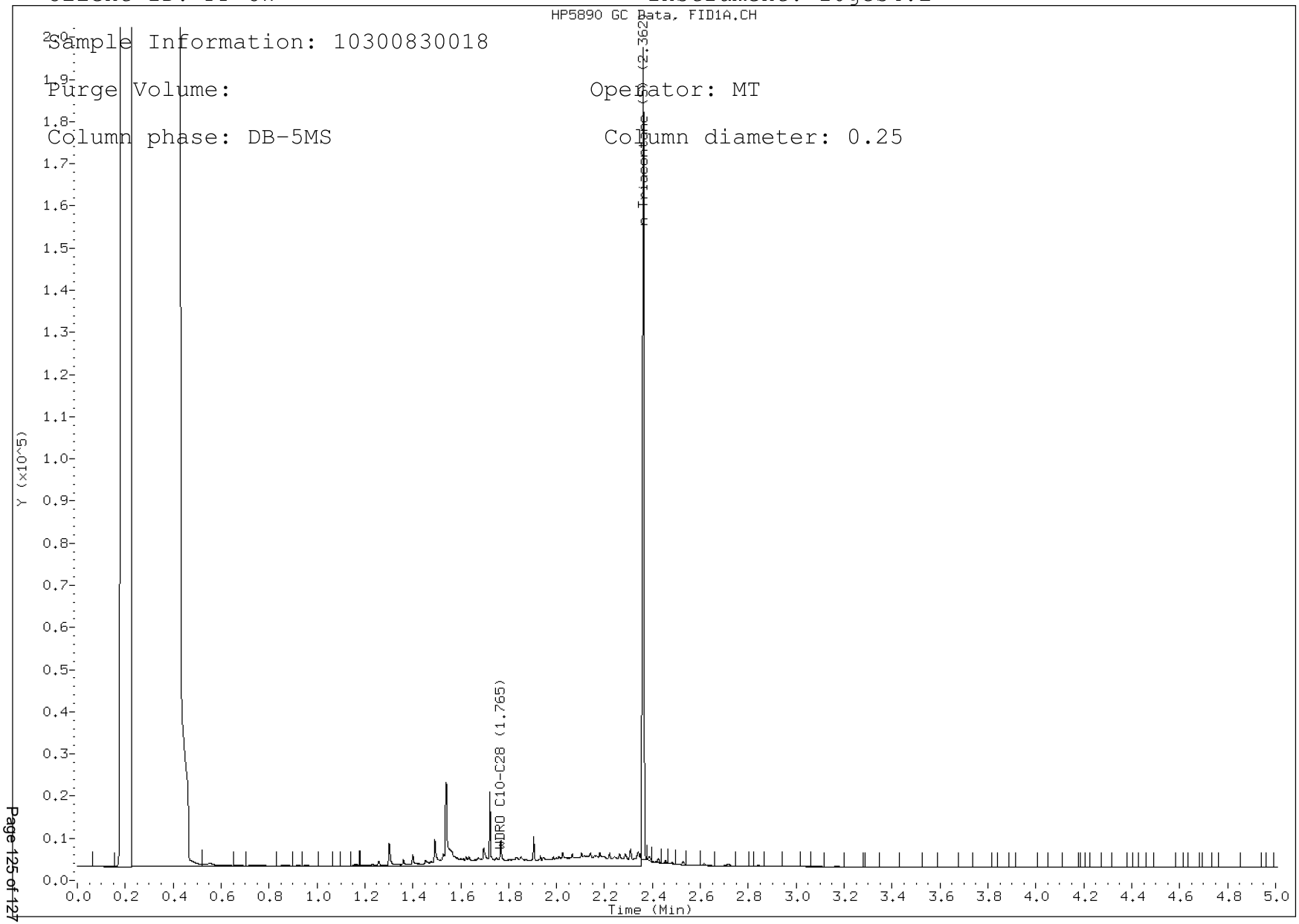
Sample ID: 10300830018

Client ID: PP-8W Instrument: 10gcs4.i

Sample Information: 10300830018

Purge Volume: Operator: MT

Column phase: DB-5MS Column diameter: 0.25



Data File: \\192.168.10.12\chem\10gcs4.i\040115dro.b/04010018.D

Report Date: 04/02/2015

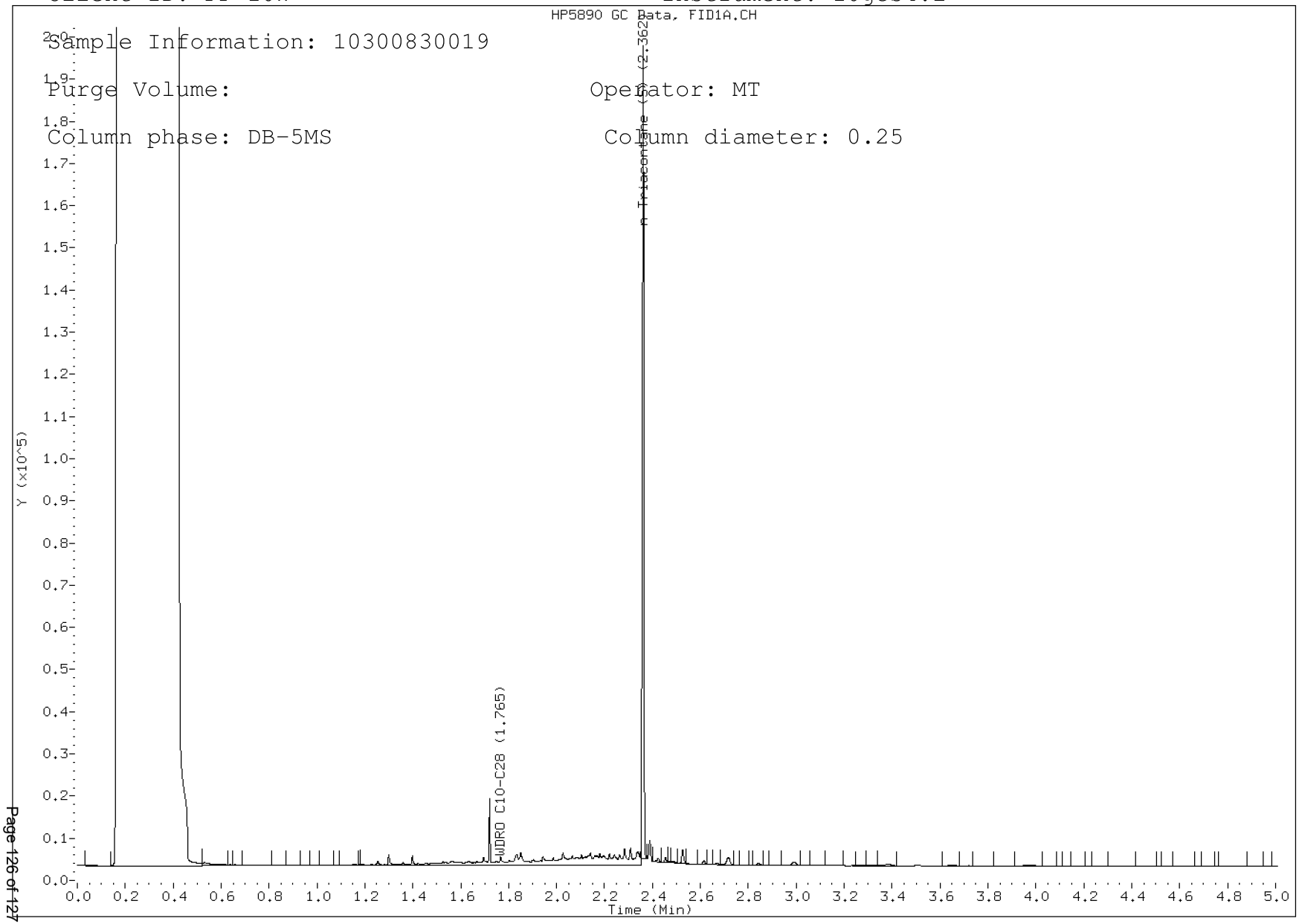
Sample ID: 10300830019

Client ID: PP-10W Instrument: 10gcs4.i

Sample Information: 10300830019

Purge Volume: Operator: MT

Column phase: DB-5MS Column diameter: 0.25



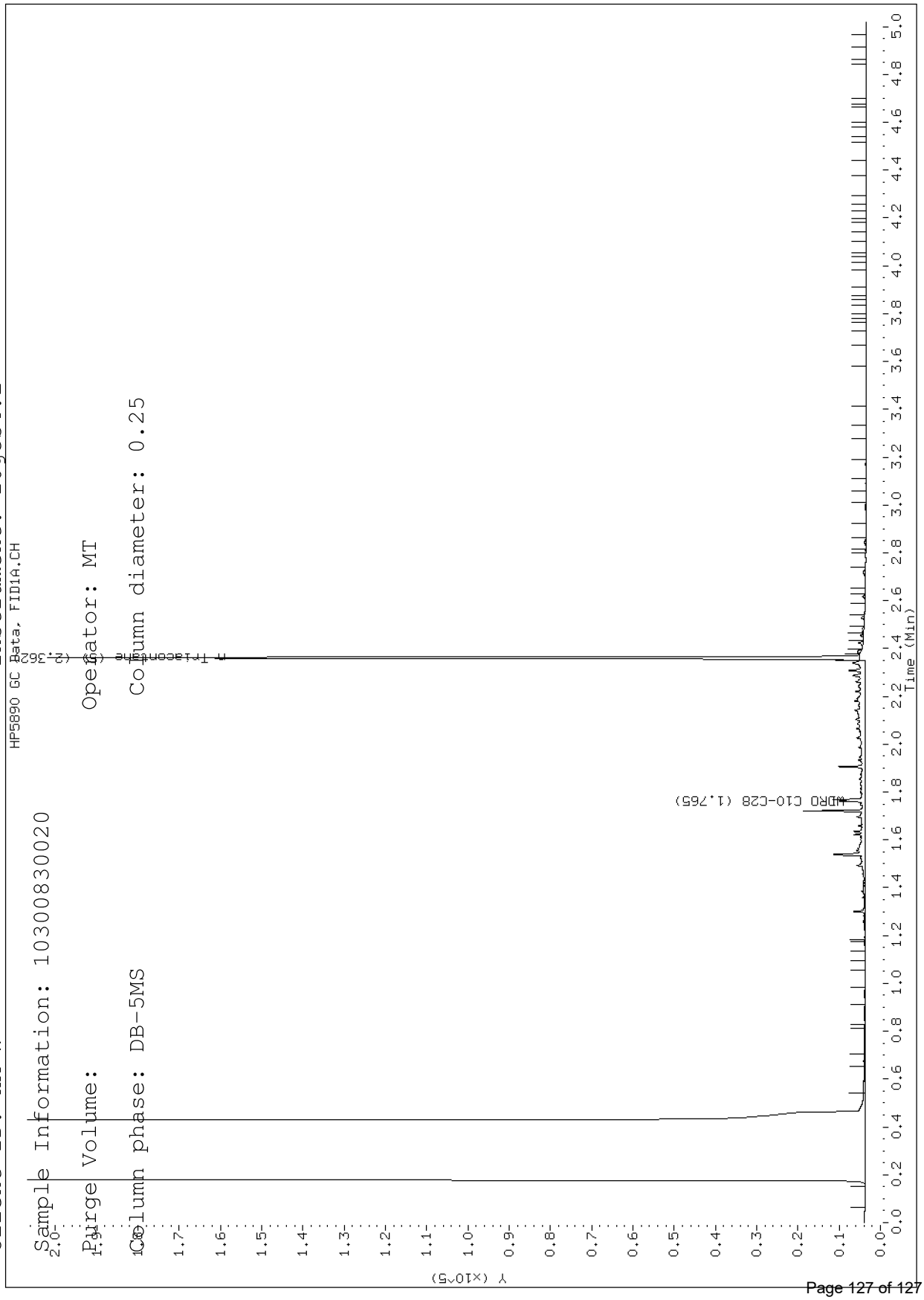
Data File: \\192.168.10.12\chem\10gcs4.i\040115dro.b/04010025.D

Report Date: 04/02/2015

Sample ID: 10300830020

Client ID: HA-W

Instrument: 10gcs4.i



Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

April 02, 2015

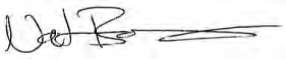
Jeremy Hansen
Braun Intertec Corp.
11001 Hampshire Ave S
Minneapolis, MN 55438

RE: Project: B1500394 Roof Depot
Pace Project No.: 10300700

Dear Jeremy Hansen:
Enclosed are the analytical results for sample(s) received by the laboratory on March 26, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,



Nathan Boberg
nathan.boberg@pacelabs.com
Project Manager

Enclosures

cc: Accounts Payable

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: B1500394 Roof Depot
Pace Project No.: 10300700

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Virginia/VELAP Certification #: Pace
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: B1500394 Roof Depot
Pace Project No.: 10300700

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10300700001	**SV-1**	Air	03/25/15 13:15	03/26/15 12:10
10300700002	**SV-2**	Air	03/25/15 10:45	03/26/15 12:10
10300700003	**SSV-1**	Air	03/25/15 14:26	03/26/15 12:10
10300700004	**SSV-2**	Air	03/25/15 10:33	03/26/15 12:10
10300700005	**SSV-3**	Air	03/25/15 11:52	03/26/15 12:10

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE ANALYTE COUNT

Project: B1500394 Roof Depot
Pace Project No.: 10300700

Lab ID	Sample ID	Method	Analysts	Analytes Reported
10300700001	**SV-1**	TO-15	MLS	81
10300700002	**SV-2**	TO-15	MLS	81
10300700003	**SSV-1**	TO-15	MLS	80
10300700004	**SSV-2**	TO-15	MLS	81
10300700005	**SSV-3**	TO-15	MLS	81

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300700

Sample: SV-1 **Lab ID: 10300700001** Collected: 03/25/15 13:15 Received: 03/26/15 12:10 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
Acetone	**37.4**	ug/m3	3.2	1.34		03/30/15 21:20	67-64-1	L2
Benzene	**5.6**	ug/m3	0.44	1.34		03/30/15 21:20	71-43-2	
Benzyl chloride	ND	ug/m3	1.4	1.34		03/30/15 21:20	100-44-7	
Bromodichloromethane	ND	ug/m3	1.8	1.34		03/30/15 21:20	75-27-4	
Bromoform	ND	ug/m3	2.8	1.34		03/30/15 21:20	75-25-2	
Bromomethane	ND	ug/m3	1.1	1.34		03/30/15 21:20	74-83-9	
1,3-Butadiene	ND	ug/m3	0.60	1.34		03/30/15 21:20	106-99-0	
2-Butanone (MEK)	**12.6**	ug/m3	0.80	1.34		03/30/15 21:20	78-93-3	
Carbon disulfide	**0.88**	ug/m3	0.84	1.34		03/30/15 21:20	75-15-0	
Carbon tetrachloride	ND	ug/m3	0.86	1.34		03/30/15 21:20	56-23-5	
Chlorobenzene	ND	ug/m3	1.3	1.34		03/30/15 21:20	108-90-7	
Chloroethane	ND	ug/m3	0.72	1.34		03/30/15 21:20	75-00-3	
Chloroform	ND	ug/m3	0.66	1.34		03/30/15 21:20	67-66-3	
Chloromethane	**0.90**	ug/m3	0.56	1.34		03/30/15 21:20	74-87-3	
Cyclohexane	**2.8**	ug/m3	0.94	1.34		03/30/15 21:20	110-82-7	
Dibromochloromethane	ND	ug/m3	2.3	1.34		03/30/15 21:20	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	2.1	1.34		03/30/15 21:20	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	1.6	1.34		03/30/15 21:20	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	1.6	1.34		03/30/15 21:20	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	1.6	1.34		03/30/15 21:20	106-46-7	
Dichlorodifluoromethane	**2.1**	ug/m3	1.4	1.34		03/30/15 21:20	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.1	1.34		03/30/15 21:20	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.55	1.34		03/30/15 21:20	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.1	1.34		03/30/15 21:20	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	2.7	1.34		03/30/15 21:20	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.1	1.34		03/30/15 21:20	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.3	1.34		03/30/15 21:20	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.2	1.34		03/30/15 21:20	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.2	1.34		03/30/15 21:20	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	1.9	1.34		03/30/15 21:20	76-14-2	
Ethanol	**14.1**	ug/m3	1.3	1.34		03/30/15 21:20	64-17-5	
Ethyl acetate	ND	ug/m3	0.98	1.34		03/30/15 21:20	141-78-6	
Ethylbenzene	**2.3**	ug/m3	1.2	1.34		03/30/15 21:20	100-41-4	
4-Ethyltoluene	ND	ug/m3	1.3	1.34		03/30/15 21:20	622-96-8	
n-Heptane	**9.4**	ug/m3	1.1	1.34		03/30/15 21:20	142-82-5	
Hexachloro-1,3-butadiene	ND	ug/m3	2.9	1.34		03/30/15 21:20	87-68-3	
n-Hexane	**10.2**	ug/m3	0.96	1.34		03/30/15 21:20	110-54-3	
2-Hexanone	ND	ug/m3	1.1	1.34		03/30/15 21:20	591-78-6	
Methylene Chloride	ND	ug/m3	4.7	1.34		03/30/15 21:20	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/m3	2.8	1.34		03/30/15 21:20	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	0.98	1.34		03/30/15 21:20	1634-04-4	
Naphthalene	ND	ug/m3	3.6	1.34		03/30/15 21:20	91-20-3	
2-Propanol	ND	ug/m3	1.7	1.34		03/30/15 21:20	67-63-0	
Propylene	**37.3**	ug/m3	0.47	1.34		03/30/15 21:20	115-07-1	E
Styrene	ND	ug/m3	2.9	1.34		03/30/15 21:20	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	0.94	1.34		03/30/15 21:20	79-34-5	
Tetrachloroethene	ND	ug/m3	0.92	1.34		03/30/15 21:20	127-18-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300700

Sample: SV-1 **Lab ID: 10300700001** Collected: 03/25/15 13:15 Received: 03/26/15 12:10 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
Tetrahydrofuran	ND	ug/m3	0.80	1.34		03/30/15 21:20	109-99-9	
Toluene	**11.2**	ug/m3	1.0	1.34		03/30/15 21:20	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	2.0	1.34		03/30/15 21:20	120-82-1	
1,1,1-Trichloroethane	ND	ug/m3	0.94	1.34		03/30/15 21:20	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	0.74	1.34		03/30/15 21:20	79-00-5	
Trichloroethene	ND	ug/m3	0.73	1.34		03/30/15 21:20	79-01-6	
Trichlorofluoromethane	ND	ug/m3	1.5	1.34		03/30/15 21:20	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/m3	2.1	1.34		03/30/15 21:20	76-13-1	
1,2,4-Trimethylbenzene	**2.0**	ug/m3	1.3	1.34		03/30/15 21:20	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	1.3	1.34		03/30/15 21:20	108-67-8	
Vinyl acetate	ND	ug/m3	0.96	1.34		03/30/15 21:20	108-05-4	
Vinyl chloride	ND	ug/m3	0.35	1.34		03/30/15 21:20	75-01-4	
m&p-Xylene	**5.9**	ug/m3	2.4	1.34		03/30/15 21:20	179601-23-1	
o-Xylene	**2.0**	ug/m3	1.2	1.34		03/30/15 21:20	95-47-6	
Tentatively Identified Compounds								
Unknown	**135**	ppbv		1.34		03/30/15 21:20		N
Unknown	**146**	ppbv		1.34		03/30/15 21:20		N
Cyclopropane, 1,1-dimeth	**2.4**	ppbv		1.34		03/30/15 21:20	1630-94-0	N
Pentane, 2-methyl-	**0.69**	ppbv		1.34		03/30/15 21:20	107-83-5	N
Unknown	**0.93**	ppbv		1.34		03/30/15 21:20		N
Unknown	**1.7**	ppbv		1.34		03/30/15 21:20		N
Heptane, 3-methylene-	**2.0**	ppbv		1.34		03/30/15 21:20	1632-16-2	N
Unknown	**5.3**	ppbv		1.34		03/30/15 21:20		N
Undecane, 3-methylene-	**0.95**	ppbv		1.34		03/30/15 21:20	71138-64-2	N
Unknown	**0.16**	ppbv		1.34		03/30/15 21:20		N
Unknown	**0.071**	ppbv		1.34		03/30/15 21:20		N
Unknown	**0.087**	ppbv		1.34		03/30/15 21:20		N
Nonane, 3-methylene-	**0.16**	ppbv		1.34		03/30/15 21:20	51655-64-2	N
2-Decene, (Z)-	**1.8**	ppbv		1.34		03/30/15 21:20	20348-51-0	N
Decane	**2.2**	ppbv		1.34		03/30/15 21:20	124-18-5	N
Unknown	**0.69**	ppbv		1.34		03/30/15 21:20		N
Unknown	**0.60**	ppbv		1.34		03/30/15 21:20		N
Unknown	**1.0**	ppbv		1.34		03/30/15 21:20		N
Unknown	**0.64**	ppbv		1.34		03/30/15 21:20		N
Undecane, 3-methyl-	**0.54**	ppbv		1.34		03/30/15 21:20	1002-43-3	N

Sample: SV-2 **Lab ID: 10300700002** Collected: 03/25/15 10:45 Received: 03/26/15 12:10 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
Acetone	**24.3**	ug/m3	3.2	1.34		03/30/15 22:16	67-64-1	L2
Benzene	**4.2**	ug/m3	0.44	1.34		03/30/15 22:16	71-43-2	
Benzyl chloride	ND	ug/m3	1.4	1.34		03/30/15 22:16	100-44-7	
Bromodichloromethane	ND	ug/m3	1.8	1.34		03/30/15 22:16	75-27-4	
Bromoform	ND	ug/m3	2.8	1.34		03/30/15 22:16	75-25-2	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300700

Sample: SV-2 **Lab ID: 10300700002** Collected: 03/25/15 10:45 Received: 03/26/15 12:10 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
Bromomethane	ND	ug/m3	1.1	1.34		03/30/15 22:16	74-83-9	
1,3-Butadiene	ND	ug/m3	0.60	1.34		03/30/15 22:16	106-99-0	
2-Butanone (MEK)	**10.4**	ug/m3	0.80	1.34		03/30/15 22:16	78-93-3	
Carbon disulfide	**2.6**	ug/m3	0.84	1.34		03/30/15 22:16	75-15-0	
Carbon tetrachloride	ND	ug/m3	0.86	1.34		03/30/15 22:16	56-23-5	
Chlorobenzene	ND	ug/m3	1.3	1.34		03/30/15 22:16	108-90-7	
Chloroethane	ND	ug/m3	0.72	1.34		03/30/15 22:16	75-00-3	
Chloroform	ND	ug/m3	0.66	1.34		03/30/15 22:16	67-66-3	
Chloromethane	ND	ug/m3	0.56	1.34		03/30/15 22:16	74-87-3	
Cyclohexane	**3.1**	ug/m3	0.94	1.34		03/30/15 22:16	110-82-7	
Dibromochloromethane	ND	ug/m3	2.3	1.34		03/30/15 22:16	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	2.1	1.34		03/30/15 22:16	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	1.6	1.34		03/30/15 22:16	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	1.6	1.34		03/30/15 22:16	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	1.6	1.34		03/30/15 22:16	106-46-7	
Dichlorodifluoromethane	**2.1**	ug/m3	1.4	1.34		03/30/15 22:16	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.1	1.34		03/30/15 22:16	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.55	1.34		03/30/15 22:16	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.1	1.34		03/30/15 22:16	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	2.7	1.34		03/30/15 22:16	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.1	1.34		03/30/15 22:16	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.3	1.34		03/30/15 22:16	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.2	1.34		03/30/15 22:16	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.2	1.34		03/30/15 22:16	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	1.9	1.34		03/30/15 22:16	76-14-2	
Ethanol	**6.1**	ug/m3	1.3	1.34		03/30/15 22:16	64-17-5	
Ethyl acetate	ND	ug/m3	0.98	1.34		03/30/15 22:16	141-78-6	
Ethylbenzene	**3.2**	ug/m3	1.2	1.34		03/30/15 22:16	100-41-4	
4-Ethyltoluene	ND	ug/m3	1.3	1.34		03/30/15 22:16	622-96-8	
n-Heptane	**10.0**	ug/m3	1.1	1.34		03/30/15 22:16	142-82-5	
Hexachloro-1,3-butadiene	ND	ug/m3	2.9	1.34		03/30/15 22:16	87-68-3	
n-Hexane	**10.7**	ug/m3	0.96	1.34		03/30/15 22:16	110-54-3	
2-Hexanone	ND	ug/m3	1.1	1.34		03/30/15 22:16	591-78-6	
Methylene Chloride	ND	ug/m3	4.7	1.34		03/30/15 22:16	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/m3	2.8	1.34		03/30/15 22:16	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	0.98	1.34		03/30/15 22:16	1634-04-4	
Naphthalene	ND	ug/m3	3.6	1.34		03/30/15 22:16	91-20-3	
2-Propanol	ND	ug/m3	1.7	1.34		03/30/15 22:16	67-63-0	
Propylene	**38.2**	ug/m3	0.47	1.34		03/30/15 22:16	115-07-1	
Styrene	ND	ug/m3	2.9	1.34		03/30/15 22:16	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	0.94	1.34		03/30/15 22:16	79-34-5	
Tetrachloroethene	ND	ug/m3	0.92	1.34		03/30/15 22:16	127-18-4	
Tetrahydrofuran	ND	ug/m3	0.80	1.34		03/30/15 22:16	109-99-9	
Toluene	**9.8**	ug/m3	1.0	1.34		03/30/15 22:16	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	2.0	1.34		03/30/15 22:16	120-82-1	
1,1,1-Trichloroethane	**2.0**	ug/m3	0.94	1.34		03/30/15 22:16	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	0.74	1.34		03/30/15 22:16	79-00-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300700

Sample: SV-2 **Lab ID: 10300700002** Collected: 03/25/15 10:45 Received: 03/26/15 12:10 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
Trichloroethene	ND	ug/m3	0.73	1.34		03/30/15 22:16	79-01-6	
Trichlorofluoromethane	**1.7**	ug/m3	1.5	1.34		03/30/15 22:16	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/m3	2.1	1.34		03/30/15 22:16	76-13-1	
1,2,4-Trimethylbenzene	**2.7**	ug/m3	1.3	1.34		03/30/15 22:16	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	1.3	1.34		03/30/15 22:16	108-67-8	
Vinyl acetate	ND	ug/m3	0.96	1.34		03/30/15 22:16	108-05-4	
Vinyl chloride	ND	ug/m3	0.35	1.34		03/30/15 22:16	75-01-4	
m&p-Xylene	**7.7**	ug/m3	2.4	1.34		03/30/15 22:16	179601-23-1	
o-Xylene	**2.6**	ug/m3	1.2	1.34		03/30/15 22:16	95-47-6	
Tentatively Identified Compounds								
Unknown	**149**	ppbv		1.34		03/30/15 22:16		N
Unknown	**0.41**	ppbv		1.34		03/30/15 22:16		N
Pentane, 2-methyl-	**2.0**	ppbv		1.34		03/30/15 22:16	107-83-5	N
Unknown	**3.0**	ppbv		1.34		03/30/15 22:16		N
Unknown	**0.66**	ppbv		1.34		03/30/15 22:16		N
Unknown	**1.8**	ppbv		1.34		03/30/15 22:16		N
Heptane, 3-methylene-	**2.9**	ppbv		1.34		03/30/15 22:16	1632-16-2	N
Unknown	**2.9**	ppbv		1.34		03/30/15 22:16		N
Cyclotrisiloxane, hexame	**1.2**	ppbv		1.34		03/30/15 22:16	541-05-9	N
Unknown	**1.2**	ppbv		1.34		03/30/15 22:16		N
Unknown	**0.31**	ppbv		1.34		03/30/15 22:16		N
Unknown	**0.12**	ppbv		1.34		03/30/15 22:16		N
Unknown	**0.14**	ppbv		1.34		03/30/15 22:16		N
Nonane, 3-methylene-	**0.81**	ppbv		1.34		03/30/15 22:16	51655-64-2	N
1-Decene	**1.2**	ppbv		1.34		03/30/15 22:16	872-05-9	N
Decane	**1.7**	ppbv		1.34		03/30/15 22:16	124-18-5	N
1,4-Cyclohexadiene, 1-m	**0.52**	ppbv		1.34		03/30/15 22:16	99-85-4	N
Dodecane, 2,6,10-trimet	**0.36**	ppbv		1.34		03/30/15 22:16	3891-98-3	N
Unknown	**0.45**	ppbv		1.34		03/30/15 22:16		N
Unknown	**0.56**	ppbv		1.34		03/30/15 22:16		N

Sample: SSV-1 **Lab ID: 10300700003** Collected: 03/25/15 14:26 Received: 03/26/15 12:10 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
Acetone	**24.6**	ug/m3	3.7	1.55		03/30/15 20:53	67-64-1	L2
Benzene	**1.0**	ug/m3	0.50	1.55		03/30/15 20:53	71-43-2	
Benzyl chloride	ND	ug/m3	1.6	1.55		03/30/15 20:53	100-44-7	
Bromodichloromethane	ND	ug/m3	2.1	1.55		03/30/15 20:53	75-27-4	
Bromoform	ND	ug/m3	3.3	1.55		03/30/15 20:53	75-25-2	
Bromomethane	ND	ug/m3	1.2	1.55		03/30/15 20:53	74-83-9	
1,3-Butadiene	ND	ug/m3	0.70	1.55		03/30/15 20:53	106-99-0	
2-Butanone (MEK)	**8.4**	ug/m3	0.93	1.55		03/30/15 20:53	78-93-3	
Carbon disulfide	**5.1**	ug/m3	0.98	1.55		03/30/15 20:53	75-15-0	
Carbon tetrachloride	ND	ug/m3	0.99	1.55		03/30/15 20:53	56-23-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300700

Sample: SSV-1 **Lab ID: 10300700003** Collected: 03/25/15 14:26 Received: 03/26/15 12:10 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
Chlorobenzene	ND	ug/m3	1.5	1.55		03/30/15 20:53	108-90-7	
Chloroethane	ND	ug/m3	0.84	1.55		03/30/15 20:53	75-00-3	
Chloroform	ND	ug/m3	0.77	1.55		03/30/15 20:53	67-66-3	
Chloromethane	ND	ug/m3	0.65	1.55		03/30/15 20:53	74-87-3	
Cyclohexane	**3.8**	ug/m3	1.1	1.55		03/30/15 20:53	110-82-7	
Dibromochloromethane	ND	ug/m3	2.7	1.55		03/30/15 20:53	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	2.4	1.55		03/30/15 20:53	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	1.9	1.55		03/30/15 20:53	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	1.9	1.55		03/30/15 20:53	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	1.9	1.55		03/30/15 20:53	106-46-7	
Dichlorodifluoromethane	**11.8**	ug/m3	1.6	1.55		03/30/15 20:53	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.3	1.55		03/30/15 20:53	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.64	1.55		03/30/15 20:53	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.3	1.55		03/30/15 20:53	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	3.1	1.55		03/30/15 20:53	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.3	1.55		03/30/15 20:53	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.5	1.55		03/30/15 20:53	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.4	1.55		03/30/15 20:53	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.4	1.55		03/30/15 20:53	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.2	1.55		03/30/15 20:53	76-14-2	
Ethanol	**9.3**	ug/m3	1.5	1.55		03/30/15 20:53	64-17-5	
Ethyl acetate	ND	ug/m3	1.1	1.55		03/30/15 20:53	141-78-6	
Ethylbenzene	ND	ug/m3	1.4	1.55		03/30/15 20:53	100-41-4	
4-Ethyltoluene	ND	ug/m3	1.6	1.55		03/30/15 20:53	622-96-8	
n-Heptane	ND	ug/m3	1.3	1.55		03/30/15 20:53	142-82-5	
Hexachloro-1,3-butadiene	ND	ug/m3	3.4	1.55		03/30/15 20:53	87-68-3	
n-Hexane	**1.2**	ug/m3	1.1	1.55		03/30/15 20:53	110-54-3	
2-Hexanone	ND	ug/m3	1.3	1.55		03/30/15 20:53	591-78-6	
Methylene Chloride	ND	ug/m3	5.5	1.55		03/30/15 20:53	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/m3	3.2	1.55		03/30/15 20:53	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	1.1	1.55		03/30/15 20:53	1634-04-4	
Naphthalene	ND	ug/m3	4.1	1.55		03/30/15 20:53	91-20-3	
2-Propanol	**4.7**	ug/m3	1.9	1.55		03/30/15 20:53	67-63-0	
Propylene	ND	ug/m3	0.54	1.55		03/30/15 20:53	115-07-1	
Styrene	ND	ug/m3	3.4	1.55		03/30/15 20:53	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.1	1.55		03/30/15 20:53	79-34-5	
Tetrachloroethene	**1.8**	ug/m3	1.1	1.55		03/30/15 20:53	127-18-4	
Tetrahydrofuran	ND	ug/m3	0.93	1.55		03/30/15 20:53	109-99-9	
Toluene	**3.7**	ug/m3	1.2	1.55		03/30/15 20:53	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	2.3	1.55		03/30/15 20:53	120-82-1	
1,1,1-Trichloroethane	**78.2**	ug/m3	1.1	1.55		03/30/15 20:53	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	0.86	1.55		03/30/15 20:53	79-00-5	
Trichloroethene	ND	ug/m3	0.85	1.55		03/30/15 20:53	79-01-6	
Trichlorofluoromethane	**13.9**	ug/m3	1.8	1.55		03/30/15 20:53	75-69-4	
1,1,2-Trichlorotrifluoroethane	**3.7**	ug/m3	2.5	1.55		03/30/15 20:53	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/m3	1.5	1.55		03/30/15 20:53	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	1.5	1.55		03/30/15 20:53	108-67-8	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300700

Sample: SSV-1 **Lab ID: 10300700003** Collected: 03/25/15 14:26 Received: 03/26/15 12:10 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
Vinyl acetate	ND	ug/m3	1.1	1.55		03/30/15 20:53	108-05-4	
Vinyl chloride	ND	ug/m3	0.40	1.55		03/30/15 20:53	75-01-4	
m&p-Xylene	ND	ug/m3	2.7	1.55		03/30/15 20:53	179601-23-1	
o-Xylene	ND	ug/m3	1.4	1.55		03/30/15 20:53	95-47-6	
Tentatively Identified Compounds								
Unknown	**0.46**	ppbv		1.55		03/30/15 20:53		N
Acetaldehyde	**47.0**	ppbv		1.55		03/30/15 20:53	75-07-0	N
Pentane, 2-methyl-	**0.86**	ppbv		1.55		03/30/15 20:53	107-83-5	N
Unknown	**0.32**	ppbv		1.55		03/30/15 20:53		N
Cyclopentane, methyl-	**0.78**	ppbv		1.55		03/30/15 20:53	96-37-7	N
Unknown	**0.34**	ppbv		1.55		03/30/15 20:53		N
Pentanal	**3.1**	ppbv		1.55		03/30/15 20:53	110-62-3	N
Unknown	**0.19**	ppbv		1.55		03/30/15 20:53		N
Cyclohexane, 1,4-dimethy	**0.54**	ppbv		1.55		03/30/15 20:53	624-29-3	N
Hexanal	**1.1**	ppbv		1.55		03/30/15 20:53	66-25-1	N
Cyclotrisiloxane, hexame	**0.73**	ppbv		1.55		03/30/15 20:53	541-05-9	N
Unknown	**0.36**	ppbv		1.55		03/30/15 20:53		N
Heptanal	**0.53**	ppbv		1.55		03/30/15 20:53	111-71-7	N
Unknown	**0.12**	ppbv		1.55		03/30/15 20:53		N
Unknown	**0.40**	ppbv		1.55		03/30/15 20:53		N
Unknown	**2.6**	ppbv		1.55		03/30/15 20:53		N
Unknown	**2.3**	ppbv		1.55		03/30/15 20:53		N
Unknown	**0.74**	ppbv		1.55		03/30/15 20:53		N
Unknown	**0.38**	ppbv		1.55		03/30/15 20:53		N

Sample: SSV-2 **Lab ID: 10300700004** Collected: 03/25/15 10:33 Received: 03/26/15 12:10 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
Acetone	**80.9**	ug/m3	18.0	7.45		03/31/15 16:15	67-64-1	L2
Benzene	**2.9**	ug/m3	0.48	1.49		03/30/15 20:25	71-43-2	
Benzyl chloride	ND	ug/m3	1.6	1.49		03/30/15 20:25	100-44-7	
Bromodichloromethane	ND	ug/m3	2.0	1.49		03/30/15 20:25	75-27-4	
Bromoform	ND	ug/m3	3.1	1.49		03/30/15 20:25	75-25-2	
Bromomethane	ND	ug/m3	1.2	1.49		03/30/15 20:25	74-83-9	
1,3-Butadiene	ND	ug/m3	0.67	1.49		03/30/15 20:25	106-99-0	
2-Butanone (MEK)	**22.6**	ug/m3	0.89	1.49		03/30/15 20:25	78-93-3	
Carbon disulfide	**9.3**	ug/m3	0.94	1.49		03/30/15 20:25	75-15-0	
Carbon tetrachloride	ND	ug/m3	0.95	1.49		03/30/15 20:25	56-23-5	
Chlorobenzene	ND	ug/m3	1.4	1.49		03/30/15 20:25	108-90-7	
Chloroethane	ND	ug/m3	0.80	1.49		03/30/15 20:25	75-00-3	
Chloroform	ND	ug/m3	0.74	1.49		03/30/15 20:25	67-66-3	
Chloromethane	ND	ug/m3	0.63	1.49		03/30/15 20:25	74-87-3	
Cyclohexane	**15.3**	ug/m3	1.0	1.49		03/30/15 20:25	110-82-7	
Dibromochloromethane	ND	ug/m3	2.6	1.49		03/30/15 20:25	124-48-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300700

Sample: SSV-2 **Lab ID: 10300700004** Collected: 03/25/15 10:33 Received: 03/26/15 12:10 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
1,2-Dibromoethane (EDB)	ND	ug/m3	2.3	1.49		03/30/15 20:25	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	1.8	1.49		03/30/15 20:25	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	1.8	1.49		03/30/15 20:25	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	1.8	1.49		03/30/15 20:25	106-46-7	
Dichlorodifluoromethane	ND	ug/m3	1.5	1.49		03/30/15 20:25	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.2	1.49		03/30/15 20:25	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.61	1.49		03/30/15 20:25	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.2	1.49		03/30/15 20:25	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	3.0	1.49		03/30/15 20:25	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.2	1.49		03/30/15 20:25	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.4	1.49		03/30/15 20:25	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.4	1.49		03/30/15 20:25	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.4	1.49		03/30/15 20:25	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.1	1.49		03/30/15 20:25	76-14-2	
Ethanol	**20.2**	ug/m3	1.4	1.49		03/30/15 20:25	64-17-5	
Ethyl acetate	**7.4**	ug/m3	1.1	1.49		03/30/15 20:25	141-78-6	
Ethylbenzene	**2.4**	ug/m3	1.3	1.49		03/30/15 20:25	100-41-4	
4-Ethyltoluene	ND	ug/m3	1.5	1.49		03/30/15 20:25	622-96-8	
n-Heptane	**10.1**	ug/m3	1.2	1.49		03/30/15 20:25	142-82-5	
Hexachloro-1,3-butadiene	ND	ug/m3	3.3	1.49		03/30/15 20:25	87-68-3	
n-Hexane	**35.7**	ug/m3	1.1	1.49		03/30/15 20:25	110-54-3	
2-Hexanone	ND	ug/m3	1.2	1.49		03/30/15 20:25	591-78-6	
Methylene Chloride	**32.0**	ug/m3	5.3	1.49		03/30/15 20:25	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/m3	3.1	1.49		03/30/15 20:25	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	1.1	1.49		03/30/15 20:25	1634-04-4	
Naphthalene	ND	ug/m3	4.0	1.49		03/30/15 20:25	91-20-3	
2-Propanol	ND	ug/m3	1.9	1.49		03/30/15 20:25	67-63-0	
Propylene	**30.5**	ug/m3	2.6	7.45		03/31/15 16:15	115-07-1	
Styrene	ND	ug/m3	3.2	1.49		03/30/15 20:25	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.0	1.49		03/30/15 20:25	79-34-5	
Tetrachloroethene	ND	ug/m3	1.0	1.49		03/30/15 20:25	127-18-4	
Tetrahydrofuran	ND	ug/m3	0.89	1.49		03/30/15 20:25	109-99-9	
Toluene	**52.0**	ug/m3	5.7	7.45		03/31/15 16:15	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	2.2	1.49		03/30/15 20:25	120-82-1	
1,1,1-Trichloroethane	**2.9**	ug/m3	1.0	1.49		03/30/15 20:25	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	0.83	1.49		03/30/15 20:25	79-00-5	
Trichloroethene	ND	ug/m3	0.81	1.49		03/30/15 20:25	79-01-6	
Trichlorofluoromethane	**27.3**	ug/m3	1.7	1.49		03/30/15 20:25	75-69-4	
1,1,2-Trichlorotrifluoroethane	**6.4**	ug/m3	2.4	1.49		03/30/15 20:25	76-13-1	
1,2,4-Trimethylbenzene	**2.1**	ug/m3	1.5	1.49		03/30/15 20:25	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	1.5	1.49		03/30/15 20:25	108-67-8	
Vinyl acetate	ND	ug/m3	1.1	1.49		03/30/15 20:25	108-05-4	
Vinyl chloride	ND	ug/m3	0.39	1.49		03/30/15 20:25	75-01-4	
m&p-Xylene	**9.4**	ug/m3	2.6	1.49		03/30/15 20:25	179601-23-1	
o-Xylene	**3.2**	ug/m3	1.3	1.49		03/30/15 20:25	95-47-6	
Tentatively Identified Compounds								
Unknown	**13.4**	ppbv		1.49		03/30/15 20:25		N

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300700

Sample: SSV-2 **Lab ID: 10300700004** Collected: 03/25/15 10:33 Received: 03/26/15 12:10 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
Tentatively Identified Compounds								
Unknown	**0.63**	ppbv		1.49		03/30/15 20:25		N
Pentane, 2-methyl-	**7.2**	ppbv		1.49		03/30/15 20:25	107-83-5	N
Cyclopentane, methyl-	**2.6**	ppbv		1.49		03/30/15 20:25	96-37-7	N
Hexane, 2-methyl-	**0.34**	ppbv		1.49		03/30/15 20:25	591-76-4	N
Unknown	**0.43**	ppbv		1.49		03/30/15 20:25		N
Cyclohexane, 1,3-dimethy	**0.53**	ppbv		1.49		03/30/15 20:25	638-04-0	N
Unknown	**0.96**	ppbv		1.49		03/30/15 20:25		N
Cyclotrisiloxane, hexame	**0.74**	ppbv		1.49		03/30/15 20:25	541-05-9	N
Unknown	**0.97**	ppbv		1.49		03/30/15 20:25		N
Cyclohexane, 1,1,3-trime	**1.6**	ppbv		1.49		03/30/15 20:25	3073-66-3	N
.alpha.-Pinene	**3.3**	ppbv		1.49		03/30/15 20:25	80-56-8	N
Unknown	**0.46**	ppbv		1.49		03/30/15 20:25		N
Benzene, 1-ethyl-2-methy	**0.51**	ppbv		1.49		03/30/15 20:25	611-14-3	N
Bicyclo[3.1.1]heptane,	**0.90**	ppbv		1.49		03/30/15 20:25	18172-67-3	N
Decane	**0.96**	ppbv		1.49		03/30/15 20:25	124-18-5	N
Unknown	**2.3**	ppbv		1.49		03/30/15 20:25		N
Unknown	**2.6**	ppbv		1.49		03/30/15 20:25		N
Dodecane	**3.8**	ppbv		1.49		03/30/15 20:25	112-40-3	N
Dodecane	**3.1**	ppbv		1.49		03/30/15 20:25	112-40-3	N

Sample: SSV-3 **Lab ID: 10300700005** Collected: 03/25/15 11:52 Received: 03/26/15 12:10 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
Acetone	**32.4**	ug/m3	3.0	1.26		03/30/15 21:48	67-64-1	L2
Benzene	**0.98**	ug/m3	0.41	1.26		03/30/15 21:48	71-43-2	
Benzyl chloride	ND	ug/m3	1.3	1.26		03/30/15 21:48	100-44-7	
Bromodichloromethane	ND	ug/m3	1.7	1.26		03/30/15 21:48	75-27-4	
Bromoform	ND	ug/m3	2.6	1.26		03/30/15 21:48	75-25-2	
Bromomethane	ND	ug/m3	1.0	1.26		03/30/15 21:48	74-83-9	
1,3-Butadiene	ND	ug/m3	0.57	1.26		03/30/15 21:48	106-99-0	
2-Butanone (MEK)	**10.1**	ug/m3	0.76	1.26		03/30/15 21:48	78-93-3	
Carbon disulfide	**4.8**	ug/m3	0.79	1.26		03/30/15 21:48	75-15-0	
Carbon tetrachloride	ND	ug/m3	0.81	1.26		03/30/15 21:48	56-23-5	
Chlorobenzene	ND	ug/m3	1.2	1.26		03/30/15 21:48	108-90-7	
Chloroethane	ND	ug/m3	0.68	1.26		03/30/15 21:48	75-00-3	
Chloroform	ND	ug/m3	0.62	1.26		03/30/15 21:48	67-66-3	
Chloromethane	ND	ug/m3	0.53	1.26		03/30/15 21:48	74-87-3	
Cyclohexane	**5.4**	ug/m3	0.88	1.26		03/30/15 21:48	110-82-7	
Dibromochloromethane	ND	ug/m3	2.2	1.26		03/30/15 21:48	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	2.0	1.26		03/30/15 21:48	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	1.5	1.26		03/30/15 21:48	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	1.5	1.26		03/30/15 21:48	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	1.5	1.26		03/30/15 21:48	106-46-7	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300700

Sample: SSV-3 **Lab ID: 10300700005** Collected: 03/25/15 11:52 Received: 03/26/15 12:10 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
Dichlorodifluoromethane	**2.5**	ug/m3	1.3	1.26		03/30/15 21:48	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.0	1.26		03/30/15 21:48	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.52	1.26		03/30/15 21:48	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.0	1.26		03/30/15 21:48	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	2.5	1.26		03/30/15 21:48	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.0	1.26		03/30/15 21:48	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.2	1.26		03/30/15 21:48	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.2	1.26		03/30/15 21:48	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.2	1.26		03/30/15 21:48	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	1.8	1.26		03/30/15 21:48	76-14-2	
Ethanol	**6.6**	ug/m3	1.2	1.26		03/30/15 21:48	64-17-5	
Ethyl acetate	**2.5**	ug/m3	0.92	1.26		03/30/15 21:48	141-78-6	
Ethylbenzene	ND	ug/m3	1.1	1.26		03/30/15 21:48	100-41-4	
4-Ethyltoluene	ND	ug/m3	1.3	1.26		03/30/15 21:48	622-96-8	
n-Heptane	**3.2**	ug/m3	1.0	1.26		03/30/15 21:48	142-82-5	
Hexachloro-1,3-butadiene	ND	ug/m3	2.8	1.26		03/30/15 21:48	87-68-3	
n-Hexane	**5.6**	ug/m3	0.91	1.26		03/30/15 21:48	110-54-3	
2-Hexanone	ND	ug/m3	1.0	1.26		03/30/15 21:48	591-78-6	
Methylene Chloride	ND	ug/m3	4.4	1.26		03/30/15 21:48	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/m3	2.6	1.26		03/30/15 21:48	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	0.92	1.26		03/30/15 21:48	1634-04-4	
Naphthalene	ND	ug/m3	3.4	1.26		03/30/15 21:48	91-20-3	
2-Propanol	**4.0**	ug/m3	1.6	1.26		03/30/15 21:48	67-63-0	
Propylene	ND	ug/m3	0.44	1.26		03/30/15 21:48	115-07-1	
Styrene	ND	ug/m3	2.7	1.26		03/30/15 21:48	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	0.88	1.26		03/30/15 21:48	79-34-5	
Tetrachloroethene	ND	ug/m3	0.87	1.26		03/30/15 21:48	127-18-4	
Tetrahydrofuran	ND	ug/m3	0.76	1.26		03/30/15 21:48	109-99-9	
Toluene	**16.8**	ug/m3	0.97	1.26		03/30/15 21:48	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	1.9	1.26		03/30/15 21:48	120-82-1	
1,1,1-Trichloroethane	ND	ug/m3	0.88	1.26		03/30/15 21:48	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	0.70	1.26		03/30/15 21:48	79-00-5	
Trichloroethene	ND	ug/m3	0.69	1.26		03/30/15 21:48	79-01-6	
Trichlorofluoromethane	ND	ug/m3	1.4	1.26		03/30/15 21:48	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/m3	2.0	1.26		03/30/15 21:48	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/m3	1.3	1.26		03/30/15 21:48	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	1.3	1.26		03/30/15 21:48	108-67-8	
Vinyl acetate	ND	ug/m3	0.90	1.26		03/30/15 21:48	108-05-4	
Vinyl chloride	ND	ug/m3	0.33	1.26		03/30/15 21:48	75-01-4	
m&p-Xylene	**2.5**	ug/m3	2.2	1.26		03/30/15 21:48	179601-23-1	
o-Xylene	ND	ug/m3	1.1	1.26		03/30/15 21:48	95-47-6	
Tentatively Identified Compounds								
Unknown	**6.5**	ppbv		1.26		03/30/15 21:48		N
Unknown	**0.26**	ppbv		1.26		03/30/15 21:48		N
Unknown	**0.82**	ppbv		1.26		03/30/15 21:48		N
Pentane, 2-methyl-	**1.6**	ppbv		1.26		03/30/15 21:48	107-83-5	N
Cyclopentane, methyl-	**1.2**	ppbv		1.26		03/30/15 21:48	96-37-7	N

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394 Roof Depot
Pace Project No.: 10300700

Sample: SSV-3 **Lab ID: 10300700005** Collected: 03/25/15 11:52 Received: 03/26/15 12:10 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
Tentatively Identified Compounds								
Unknown	**0.49**	ppbv		1.26		03/30/15 21:48		N
Unknown	**0.67**	ppbv		1.26		03/30/15 21:48		N
Cyclohexane, 1,3-dimethy	**0.41**	ppbv		1.26		03/30/15 21:48	638-04-0	N
Unknown	**0.69**	ppbv		1.26		03/30/15 21:48		N
Cyclotrisiloxane, hexame	**1.6**	ppbv		1.26		03/30/15 21:48	541-05-9	N
Cyclohexane, 1,1,3-trime	**0.94**	ppbv		1.26		03/30/15 21:48	3073-66-3	N
Unknown	**0.42**	ppbv		1.26		03/30/15 21:48		N
.alpha.-Pinene	**0.68**	ppbv		1.26		03/30/15 21:48	80-56-8	N
Unknown	**0.87**	ppbv		1.26		03/30/15 21:48		N
Unknown	**1.2**	ppbv		1.26		03/30/15 21:48		N
Unknown	**1.2**	ppbv		1.26		03/30/15 21:48		N
Hydroxylamine, O-decyl-	**1.7**	ppbv		1.26		03/30/15 21:48	29812-79-1	N
Unknown	**1.1**	ppbv		1.26		03/30/15 21:48		N
Heptadecane	**2.0**	ppbv		1.26		03/30/15 21:48	629-78-7	N
Unknown	**1.2**	ppbv		1.26		03/30/15 21:48		N

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300700

QC Batch: AIR/22879 Analysis Method: TO-15
QC Batch Method: TO-15 Analysis Description: TO15 MSV AIR Low Level
Associated Lab Samples: 10300700001, 10300700002, 10300700003, 10300700004, 10300700005

METHOD BLANK: 1928388 Matrix: Air
Associated Lab Samples: 10300700001, 10300700002, 10300700003, 10300700004, 10300700005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/m3	ND	0.70	03/30/15 18:06	
1,1,2,2-Tetrachloroethane	ug/m3	ND	0.70	03/30/15 18:06	
1,1,2-Trichloroethane	ug/m3	ND	0.56	03/30/15 18:06	
1,1,2-Trichlorotrifluoroethane	ug/m3	ND	1.6	03/30/15 18:06	
1,1-Dichloroethane	ug/m3	ND	0.82	03/30/15 18:06	
1,1-Dichloroethene	ug/m3	ND	0.81	03/30/15 18:06	
1,2,4-Trichlorobenzene	ug/m3	ND	1.5	03/30/15 18:06	
1,2,4-Trimethylbenzene	ug/m3	ND	1.0	03/30/15 18:06	
1,2-Dibromoethane (EDB)	ug/m3	ND	1.6	03/30/15 18:06	
1,2-Dichlorobenzene	ug/m3	ND	1.2	03/30/15 18:06	
1,2-Dichloroethane	ug/m3	ND	0.41	03/30/15 18:06	
1,2-Dichloropropane	ug/m3	ND	0.94	03/30/15 18:06	
1,3,5-Trimethylbenzene	ug/m3	ND	1.0	03/30/15 18:06	
1,3-Butadiene	ug/m3	ND	0.45	03/30/15 18:06	
1,3-Dichlorobenzene	ug/m3	ND	1.2	03/30/15 18:06	
1,4-Dichlorobenzene	ug/m3	ND	1.2	03/30/15 18:06	
2-Butanone (MEK)	ug/m3	ND	0.60	03/30/15 18:06	
2-Hexanone	ug/m3	ND	0.83	03/30/15 18:06	
2-Propanol	ug/m3	ND	1.2	03/30/15 18:06	
4-Ethyltoluene	ug/m3	ND	1.0	03/30/15 18:06	
4-Methyl-2-pentanone (MIBK)	ug/m3	ND	2.1	03/30/15 18:06	
Acetone	ug/m3	ND	2.4	03/30/15 18:06	L2
Benzene	ug/m3	ND	0.32	03/30/15 18:06	
Benzyl chloride	ug/m3	ND	1.0	03/30/15 18:06	
Bromodichloromethane	ug/m3	ND	1.4	03/30/15 18:06	
Bromoform	ug/m3	ND	2.1	03/30/15 18:06	
Bromomethane	ug/m3	ND	0.79	03/30/15 18:06	
Carbon disulfide	ug/m3	ND	0.63	03/30/15 18:06	
Carbon tetrachloride	ug/m3	ND	0.64	03/30/15 18:06	
Chlorobenzene	ug/m3	ND	0.94	03/30/15 18:06	
Chloroethane	ug/m3	ND	0.54	03/30/15 18:06	
Chloroform	ug/m3	ND	0.50	03/30/15 18:06	
Chloromethane	ug/m3	ND	0.42	03/30/15 18:06	
cis-1,2-Dichloroethene	ug/m3	ND	2.0	03/30/15 18:06	
cis-1,3-Dichloropropene	ug/m3	ND	0.92	03/30/15 18:06	
Cyclohexane	ug/m3	ND	0.70	03/30/15 18:06	
Dibromochloromethane	ug/m3	ND	1.7	03/30/15 18:06	
Dichlorodifluoromethane	ug/m3	ND	1.0	03/30/15 18:06	
Dichlorotetrafluoroethane	ug/m3	ND	1.4	03/30/15 18:06	
Ethanol	ug/m3	ND	0.96	03/30/15 18:06	
Ethyl acetate	ug/m3	ND	0.73	03/30/15 18:06	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300700

METHOD BLANK: 1928388 Matrix: Air
Associated Lab Samples: 10300700001, 10300700002, 10300700003, 10300700004, 10300700005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Ethylbenzene	ug/m3	ND	0.88	03/30/15 18:06	
Hexachloro-1,3-butadiene	ug/m3	ND	2.2	03/30/15 18:06	
m&p-Xylene	ug/m3	ND	1.8	03/30/15 18:06	
Methyl-tert-butyl ether	ug/m3	ND	0.73	03/30/15 18:06	
Methylene Chloride	ug/m3	ND	3.5	03/30/15 18:06	
n-Heptane	ug/m3	ND	0.83	03/30/15 18:06	
n-Hexane	ug/m3	ND	0.72	03/30/15 18:06	
Naphthalene	ug/m3	ND	2.7	03/30/15 18:06	
o-Xylene	ug/m3	ND	0.88	03/30/15 18:06	
Propylene	ug/m3	ND	0.35	03/30/15 18:06	
Styrene	ug/m3	ND	2.2	03/30/15 18:06	
Tetrachloroethene	ug/m3	ND	0.69	03/30/15 18:06	
Tetrahydrofuran	ug/m3	ND	0.60	03/30/15 18:06	
Toluene	ug/m3	ND	0.77	03/30/15 18:06	
trans-1,2-Dichloroethene	ug/m3	ND	0.81	03/30/15 18:06	
trans-1,3-Dichloropropene	ug/m3	ND	0.92	03/30/15 18:06	
Trichloroethene	ug/m3	ND	0.55	03/30/15 18:06	
Trichlorofluoromethane	ug/m3	ND	1.1	03/30/15 18:06	
Vinyl acetate	ug/m3	ND	0.72	03/30/15 18:06	
Vinyl chloride	ug/m3	ND	0.26	03/30/15 18:06	

LABORATORY CONTROL SAMPLE: 1928389

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/m3	55.5	49.3	89	72-140	
1,1,2,2-Tetrachloroethane	ug/m3	69.8	57.7	83	68-137	
1,1,2-Trichloroethane	ug/m3	55.5	50.4	91	66-138	
1,1,2-Trichlorotrifluoroethane	ug/m3	77.9	67.2	86	70-132	
1,1-Dichloroethane	ug/m3	41.2	35.2	85	68-137	
1,1-Dichloroethene	ug/m3	40.3	32.9	82	73-138	
1,2,4-Trichlorobenzene	ug/m3	75.5	95.1	126	48-150	
1,2,4-Trimethylbenzene	ug/m3	50	61.4	123	75-134	
1,2-Dibromoethane (EDB)	ug/m3	78.1	76.1	97	75-132	
1,2-Dichlorobenzene	ug/m3	61.2	74.9	122	71-129	
1,2-Dichloroethane	ug/m3	41.2	30.8	75	73-139	
1,2-Dichloropropane	ug/m3	47	44.3	94	70-130	
1,3,5-Trimethylbenzene	ug/m3	50	62.3	125	75-133	
1,3-Butadiene	ug/m3	22.5	19.2	85	66-135	
1,3-Dichlorobenzene	ug/m3	61.2	75.0	123	75-131	
1,4-Dichlorobenzene	ug/m3	61.2	67.3	110	69-135	
2-Butanone (MEK)	ug/m3	30	27.6	92	67-131	
2-Hexanone	ug/m3	41.7	41.2	99	72-130	
2-Propanol	ug/m3	25	20.7	83	66-133	
4-Ethyltoluene	ug/m3	50	57.9	116	75-130	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300700

LABORATORY CONTROL SAMPLE: 1928389

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
4-Methyl-2-pentanone (MIBK)	ug/m3	41.7	40.6	97	68-134	
Acetone	ug/m3	24.2	15.0	62	63-144	L2
Benzene	ug/m3	32.5	30.6	94	64-139	
Benzyl chloride	ug/m3	52.5	52.5	100	75-129	
Bromodichloromethane	ug/m3	68.2	62.3	91	75-134	
Bromoform	ug/m3	105	114	109	72-130	
Bromomethane	ug/m3	39.5	31.4	79	71-132	
Carbon disulfide	ug/m3	31.7	26.7	84	56-139	
Carbon tetrachloride	ug/m3	64	62.8	98	75-150	
Chlorobenzene	ug/m3	46.8	42.8	91	71-132	
Chloroethane	ug/m3	26.8	21.7	81	71-129	
Chloroform	ug/m3	49.7	40.1	81	73-136	
Chloromethane	ug/m3	21	16.0	76	52-143	
cis-1,2-Dichloroethene	ug/m3	40.3	36.2	90	64-137	
cis-1,3-Dichloropropene	ug/m3	46.2	54.2	117	75-128	
Cyclohexane	ug/m3	35	32.8	94	62-143	
Dibromochloromethane	ug/m3	86.6	86.4	100	75-136	
Dichlorodifluoromethane	ug/m3	50.3	41.5	83	70-141	
Dichlorotetrafluoroethane	ug/m3	71.1	56.2	79	71-139	
Ethanol	ug/m3	19.2	17.5	91	60-144	
Ethyl acetate	ug/m3	36.6	27.8	76	64-137	
Ethylbenzene	ug/m3	44.2	49.8	113	71-136	
Hexachloro-1,3-butadiene	ug/m3	108	90.8	84	51-150	
m&p-Xylene	ug/m3	44.2	47.2	107	71-134	
Methyl-tert-butyl ether	ug/m3	36.7	42.2	115	73-134	
Methylene Chloride	ug/m3	35.3	26.8	76	64-130	
n-Heptane	ug/m3	41.7	39.2	94	63-135	
n-Hexane	ug/m3	35.8	29.8	83	69-135	
Naphthalene	ug/m3	53.3	68.2	128	43-150	
o-Xylene	ug/m3	44.2	47.6	108	75-134	
Propylene	ug/m3	17.5	13.4	77	58-135	
Styrene	ug/m3	43.3	40.9	94	75-133	
Tetrachloroethene	ug/m3	69	69.4	101	66-137	
Tetrahydrofuran	ug/m3	30	25.0	83	58-135	
Toluene	ug/m3	38.3	37.2	97	70-129	
trans-1,2-Dichloroethene	ug/m3	40.3	34.0	84	61-140	
trans-1,3-Dichloropropene	ug/m3	46.2	40.6	88	75-134	
Trichloroethene	ug/m3	54.6	55.8	102	70-134	
Trichlorofluoromethane	ug/m3	57.1	43.8	77	67-140	
Vinyl acetate	ug/m3	35.8	31.8	89	60-139	
Vinyl chloride	ug/m3	26	21.9	84	72-129	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300700

SAMPLE DUPLICATE: 1928954

Parameter	Units	10300883002 Result	Dup Result	RPD	Max RPD	Qualifiers
1,1,1-Trichloroethane	ug/m3	ND	ND		25	
1,1,2,2-Tetrachloroethane	ug/m3	ND	ND		25	
1,1,2-Trichloroethane	ug/m3	ND	ND		25	
1,1,2-Trichlorotrifluoroethane	ug/m3	ND	ND		25	
1,1-Dichloroethane	ug/m3	ND	ND		25	
1,1-Dichloroethene	ug/m3	ND	ND		25	
1,2,4-Trichlorobenzene	ug/m3	ND	ND		25	
1,2,4-Trimethylbenzene	ug/m3	2.1	2.1	1	25	
1,2-Dibromoethane (EDB)	ug/m3	ND	ND		25	
1,2-Dichlorobenzene	ug/m3	ND	ND		25	
1,2-Dichloroethane	ug/m3	ND	ND		25	
1,2-Dichloropropane	ug/m3	ND	ND		25	
1,3,5-Trimethylbenzene	ug/m3	ND	ND		25	
1,3-Butadiene	ug/m3	ND	ND		25	
1,3-Dichlorobenzene	ug/m3	ND	ND		25	
1,4-Dichlorobenzene	ug/m3	ND	ND		25	
2-Butanone (MEK)	ug/m3	2.0	2.0	2	25	
2-Hexanone	ug/m3	ND	ND		25	
2-Propanol	ug/m3	12.7	12.7	0	25	
4-Ethyltoluene	ug/m3	ND	.77J		25	
4-Methyl-2-pentanone (MIBK)	ug/m3	ND	ND		25	
Acetone	ug/m3	9.1	8.6	6	25	L2
Benzene	ug/m3	4.3	4.2	2	25	
Benzyl chloride	ug/m3	ND	ND		25	
Bromodichloromethane	ug/m3	ND	ND		25	
Bromoform	ug/m3	ND	ND		25	
Bromomethane	ug/m3	ND	ND		25	
Carbon disulfide	ug/m3	ND	ND		25	
Carbon tetrachloride	ug/m3	ND	ND		25	
Chlorobenzene	ug/m3	ND	ND		25	
Chloroethane	ug/m3	ND	ND		25	
Chloroform	ug/m3	ND	ND		25	
Chloromethane	ug/m3	ND	ND		25	
cis-1,2-Dichloroethene	ug/m3	ND	ND		25	
cis-1,3-Dichloropropene	ug/m3	ND	ND		25	
Cyclohexane	ug/m3	4.8	4.7	1	25	
Dibromochloromethane	ug/m3	ND	ND		25	
Dichlorodifluoromethane	ug/m3	1.7	1.6	6	25	
Dichlorotetrafluoroethane	ug/m3	ND	ND		25	
Ethanol	ug/m3	2.8	2.8	2	25	
Ethyl acetate	ug/m3	ND	ND		25	
Ethylbenzene	ug/m3	17.3	17.0	2	25	
Hexachloro-1,3-butadiene	ug/m3	ND	ND		25	
m&p-Xylene	ug/m3	45.6	44.9	2	25	
Methyl-tert-butyl ether	ug/m3	ND	ND		25	
Methylene Chloride	ug/m3	ND	ND		25	
n-Heptane	ug/m3	7.0	6.8	3	25	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394 Roof Depot
Pace Project No.: 10300700

SAMPLE DUPLICATE: 1928954

Parameter	Units	10300883002 Result	Dup Result	RPD	Max RPD	Qualifiers
n-Hexane	ug/m3	9.3	8.7	6	25	
Naphthalene	ug/m3	ND	ND		25	
o-Xylene	ug/m3	14.2	14.0	1	25	
Propylene	ug/m3	ND	ND		25	
Styrene	ug/m3	ND	ND		25	
Tetrachloroethene	ug/m3	ND	ND		25	
Tetrahydrofuran	ug/m3	ND	ND		25	
Toluene	ug/m3	12.0	11.8	2	25	
trans-1,2-Dichloroethene	ug/m3	ND	ND		25	
trans-1,3-Dichloropropene	ug/m3	ND	ND		25	
Trichloroethene	ug/m3	ND	ND		25	
Trichlorofluoromethane	ug/m3	ND	.86J		25	
Vinyl acetate	ug/m3	ND	ND		25	
Vinyl chloride	ug/m3	ND	ND		25	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: B1500394 Roof Depot
Pace Project No.: 10300700

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.

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.

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

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
L2	Analyte recovery in the laboratory control sample (LCS) was below QC limits. Results may be biased low.
N	Tentatively identified compound (TIC) based on mass spectral library search

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: B1500394 Roof Depot
Pace Project No.: 10300700

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10300700001	**SV-1**	TO-15	AIR/22879		
10300700002	**SV-2**	TO-15	AIR/22879		
10300700003	**SSV-1**	TO-15	AIR/22879		
10300700004	**SSV-2**	TO-15	AIR/22879		
10300700005	**SSV-3**	TO-15	AIR/22879		

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AIR: CHAIN-OF-CUSTODY / Analytical Request Document

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

14460 | Page: of

Section A Required Client Information:

Company: Braun Intertec
Address: 11001 Hampshire Ave S.
Bloomington, MN 55438
Email To: jhansen@braunintertec.com
Phone: 952.995.2464 Fax: 952.995.2020
Requested Due Date/TAT:

Section B Required Project Information:

Report To: Jeremy Hansen
Copy To:
Purchase Order No.:
Project Name: Roof Depot
Project Number: ~~BI 00234~~ B1500394

Section C Invoice Information:

Attention:
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager/Sales Rep.
Pace Profile #:

Program: UST | Superfund | Emissions | Clean Air Act | Voluntary Clean Up | Dry Clean | RCRA | Other

Location of Sampling by State:

Reporting Units: ug/m³ mg/m³ PPBV PPMV Other

Report Level II. III. IV. Other

ITEM #	Section D Required Client Information: AIR SAMPLE ID (Sample IDs MUST BE UNIQUE)	MEDIA CODE	PID Reading (Client only)	COLLECTED COMPOSITE START END/GRAB DATE	COLLECTED COMPOSITE START END/GRAB TIME	COMPOSITE - DATE	COMPOSITE - TIME	Canister Pressure (Initial Field - psig)	Canister Pressure (Final Field - psig)	Summa Can Number	Flow Control Number	Method: PM10	3C- Fixed Gas (%)	TO-3	TO-3M (Methane)	TO-4 (PCBs)	TO-13 (PAH)	TO-14	TO-15	TO15 Short List*	Pace Lab ID
1	SV-1		0.7	3-25-15	1315			-29	0	2059								X			001
2	SV-2		6.3	3-25-15	1045			-27	0	2040								X			002
3	SSV-1		0.8	3-25-15	1426			-28	-4	2690								X			003
4	SSV-2		0.8	3-25-15	1033			-22	-4	7487								X			004
5	SSV-3		0.8	3-25-15	1152			-28	-0	2026								X			005
6																					
7																					
8																					
9																					
10																					
11																					
12																					

Valid Media Codes: Tedlar Bag TB; 1 Liter Summa Can 1LC; 6 Liter Summa Can 6LC; Low Volume Puff LVP; High Volume Puff HVP; Other PM10

Comments :

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Jake Fredericks / Braun	3-25-15		Pace BL	3/25/15	1610
Pace DL	3/25/15	1630		3/26/15	1000
	3/26/15	1210	Pace	32615	1210

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Jake Fredericks

SIGNATURE of SAMPLER:

DATE Signed (MM / DD / YY): 3-25-15

SAMPLE CONDITIONS

Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
21	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N
AMB	Y/N	Y/N	Y/N
	Y/N	Y/N	Y/N

ORIGINAL

Pace Analytical	Document Name: Air Sample Condition Upon Receipt	Document Revised: 26Dec2013 Page 1 of 1
	Document No.: F-MN-A-106-rev.09	Issuing Authority: Pace Minnesota Quality Office

Air Sample Condition Upon Receipt

Client Name: Braun Intertec

Project #: WO# : 10300700

10300700

Courier: ☐Fed Ex ☐UPS ☐USPS ☐Client ☐Commercial ☑Pace ☐Other:_____

Tracking Number: _____

Custody Seal on Cooler/Box Present? ☐Yes ☑No **Seals Intact?** ☐Yes ☑No

Optional: Proj. Due Date: Proj. Name:

Packing Material: ☐Bubble Wrap ☐Bubble Bags ☐Foam ☑None ☐Other:_____ **Temp Blank rec:** ☐Yes ☑No

Temp. (TO17 and TO13 samples only) (°C): ~ **Corrected Temp (°C):** ~ **Thermom. Used:** ☐B88A912167504 ☐B88A9132521491 ☐72337080 ☐80512447

Temp should be above freezing to 6°C **Correction Factor:** ✓ **Date & Initials of Person Examining Contents:** 3/26/15

Type of ice Received ☐Blue ☐Wet ☑None

				Comments:
Chain of Custody Present?	☑Yes	☐No	☐N/A	1.
Chain of Custody Filled Out?	☑Yes	☐No	☐N/A	2.
Chain of Custody Relinquished?	☑Yes	☐No	☐N/A	3.
Sampler Name and/or Signature on COC?	☑Yes	☐No	☐N/A	4.
Samples Arrived within Hold Time?	☑Yes	☐No	☐N/A	5.
Short Hold Time Analysis (<72 hr)?	☐Yes	☑No	☐N/A	6.
Rush Turn Around Time Requested?	☐Yes	☑No	☐N/A	7.
Sufficient Volume?	☑Yes	☐No	☐N/A	8.
Correct Containers Used?	☑Yes	☐No	☐N/A	9.
-Pace Containers Used?	☑Yes	☐No	☐N/A	
Containers Intact?	☑Yes	☐No	☐N/A	10.
Media: air can				11.
Sample Labels Match COC?	☑Yes	☐No	☐N/A	12.

Samples Received: rec 2 gauges

Canisters		Flow Controllers		Stand Alone G	
Sample Number	Can ID	Sample Number	Can ID	Sample Number	Can ID
SV-1	2059				
SV-2	2046				
SSV-1	2690				
SSV-2	0947				
SSV-3	2026				

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

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: _____ **Date:** 3/26/15

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)

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

December 23, 2015

Tim Lenway
Braun Intertec
11001 Hampshire Ave S
Bloomington, MN 55438

RE: Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

Dear Tim Lenway:
Enclosed are the analytical results for sample(s) received by the laboratory on December 09, 2015. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

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

Sincerely,

Oyeyemi Odujole
oyeyemi.odujole@pacelabs.com
Project Manager

Enclosures

cc: Mark Keefer, Braun Intertec

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CERTIFICATIONS

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

Minnesota Certification IDs

1700 Elm Street SE Suite 200, Minneapolis, MN 55414
A2LA Certification #: 2926.01
Alaska Certification #: UST-078
Alaska Certification #MN00064
Alabama Certification #40770
Arizona Certification #: AZ-0014
Arkansas Certification #: 88-0680
California Certification #: 01155CA
Colorado Certification #Pace
Connecticut Certification #: PH-0256
EPA Region 8 Certification #: 8TMS-L
Florida/NELAP Certification #: E87605
Guam Certification #:14-008r
Georgia Certification #: 959
Georgia EPD #: Pace
Idaho Certification #: MN00064
Hawaii Certification #MN00064
Illinois Certification #: 200011
Indiana Certification#C-MN-01
Iowa Certification #: 368
Kansas Certification #: E-10167
Kentucky Dept of Envi. Protection - DW #90062
Kentucky Dept of Envi. Protection - WW #:90062
Louisiana DEQ Certification #: 3086
Louisiana DHH #: LA140001
Maine Certification #: 2013011
Maryland Certification #: 322
Michigan DEPH Certification #: 9909
Minnesota Certification #: 027-053-137
Mississippi Certification #: Pace
Montana Certification #: MT0092
Nevada Certification #: MN_00064
Nebraska Certification #: Pace
New Jersey Certification #: MN-002
New York Certification #: 11647
North Carolina Certification #: 530
North Carolina State Public Health #: 27700
North Dakota Certification #: R-036
Ohio EPA #: 4150
Ohio VAP Certification #: CL101
Oklahoma Certification #: 9507
Oregon Certification #: MN200001
Oregon Certification #: MN300001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification
Saipan (CNMI) #:MP0003
South Carolina #:74003001
Texas Certification #: T104704192
Tennessee Certification #: 02818
Utah Certification #: MN000642013-4
Virginia DGS Certification #: 251
Washington Certification #: C486
West Virginia Certification #: 382
West Virginia DHHR #:9952C
Wisconsin Certification #: 999407970

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SAMPLE SUMMARY

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10332647001	**TP-1 (2')**	Solid	12/08/15 10:30	12/09/15 09:30
10332647002	**TP-2 (1')**	Solid	12/08/15 12:00	12/09/15 09:30
10332647003	**TP-4 (1.5')**	Solid	12/08/15 14:15	12/09/15 09:30
10332647004	**TP-3 (5')**	Solid	12/08/15 15:00	12/09/15 09:30
10332647005	**Trip (MeOH)**	Solid	12/08/15 00:00	12/09/15 09:30

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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(612)607-1700

SAMPLE ANALYTE COUNT

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10332647001	**TP-1 (2')**	WI MOD DRO	JRH	2	PASI-M
		WI MOD GRO	EMC	2	PASI-M
		EPA 6010C	DM	7	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	AS1	19	PASI-M
		EPA 8260B	MRB	70	PASI-M
10332647002	**TP-2 (1')**	WI MOD DRO	JRH	2	PASI-M
		WI MOD GRO	EMC	2	PASI-M
		EPA 6010C	DM	7	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	AS1	19	PASI-M
		EPA 8260B	MRB	70	PASI-M
10332647003	**TP-4 (1.5')**	WI MOD DRO	JRH	2	PASI-M
		WI MOD GRO	EMC	2	PASI-M
		EPA 6010C	DM	7	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	AS1	19	PASI-M
		EPA 8260B	MRB	70	PASI-M
10332647004	**TP-3 (5')**	WI MOD DRO	JRH	2	PASI-M
		WI MOD GRO	EMC	2	PASI-M
		EPA 6010C	DM	7	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270D by SIM	AS1	19	PASI-M
		EPA 8260B	MRB	70	PASI-M
10332647005	**Trip (MeOH)**	EPA 8260B	MRB	70	PASI-M

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ANALYTICAL RESULTS

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

Sample: TP-1 (2') **Lab ID: 10332647001** Collected: 12/08/15 10:30 Received: 12/09/15 09:30 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO GCS	Analytical Method: WI MOD DRO Preparation Method: WI MOD DRO							
WDRO C10-C28	ND	mg/kg	9.3	1	12/10/15 08:30	12/13/15 12:47		
Surrogates								
n-Triacontane (S)	74	%.	50-150	1	12/10/15 08:30	12/13/15 12:47	638-68-6	
WIGRO GCV	Analytical Method: WI MOD GRO Preparation Method: EPA 5030 Medium Soil							
Gasoline Range Organics	ND	mg/kg	11.5	1	12/10/15 11:18	12/10/15 22:09		
Surrogates								
a,a,a-Trifluorotoluene (S)	96	%.	80-150	1	12/10/15 11:18	12/10/15 22:09	98-08-8	
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3050							
Arsenic	**1.3**	mg/kg	0.89	1	12/10/15 15:40	12/11/15 11:52	7440-38-2	
Barium	**36.6**	mg/kg	0.44	1	12/10/15 15:40	12/11/15 11:52	7440-39-3	
Cadmium	ND	mg/kg	0.13	1	12/10/15 15:40	12/11/15 11:52	7440-43-9	
Chromium	**4.9**	mg/kg	0.44	1	12/10/15 15:40	12/11/15 11:52	7440-47-3	
Lead	**8.0**	mg/kg	0.44	1	12/10/15 15:40	12/11/15 11:52	7439-92-1	
Selenium	ND	mg/kg	0.89	1	12/10/15 15:40	12/11/15 11:52	7782-49-2	
Silver	ND	mg/kg	0.44	1	12/10/15 15:40	12/11/15 11:52	7440-22-4	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	ND	mg/kg	0.021	1	12/11/15 08:41	12/14/15 16:30	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**9.8**	%	0.10	1		12/16/15 12:57		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Acenaphthene	ND	mg/kg	0.011	1	12/09/15 14:31	12/15/15 10:59	83-32-9	R1
Acenaphthylene	**0.021**	mg/kg	0.011	1	12/09/15 14:31	12/15/15 10:59	208-96-8	
Anthracene	**0.046**	mg/kg	0.011	1	12/09/15 14:31	12/15/15 10:59	120-12-7	M1,R1
Benzo(a)anthracene	**0.19**	mg/kg	0.011	1	12/09/15 14:31	12/15/15 10:59	56-55-3	M1,R1
Benzo(a)pyrene	**0.22**	mg/kg	0.011	1	12/09/15 14:31	12/15/15 10:59	50-32-8	M1,R1
Benzo(b)fluoranthene	**0.29**	mg/kg	0.011	1	12/09/15 14:31	12/15/15 10:59	205-99-2	M1
Benzo(g,h,i)perylene	**0.16**	mg/kg	0.011	1	12/09/15 14:31	12/15/15 10:59	191-24-2	M1
Benzo(k)fluoranthene	**0.12**	mg/kg	0.011	1	12/09/15 14:31	12/15/15 10:59	207-08-9	M1,R1
Chrysene	**0.22**	mg/kg	0.011	1	12/09/15 14:31	12/15/15 10:59	218-01-9	M1,R1
Dibenz(a,h)anthracene	**0.051**	mg/kg	0.011	1	12/09/15 14:31	12/15/15 10:59	53-70-3	M1
Fluoranthene	**0.36**	mg/kg	0.011	1	12/09/15 14:31	12/15/15 10:59	206-44-0	M1,R1
Fluorene	ND	mg/kg	0.011	1	12/09/15 14:31	12/15/15 10:59	86-73-7	
Indeno(1,2,3-cd)pyrene	**0.13**	mg/kg	0.011	1	12/09/15 14:31	12/15/15 10:59	193-39-5	M1
Naphthalene	ND	mg/kg	0.011	1	12/09/15 14:31	12/15/15 10:59	91-20-3	
Phenanthrene	**0.13**	mg/kg	0.011	1	12/09/15 14:31	12/15/15 10:59	85-01-8	M1,R1
Pyrene	**0.29**	mg/kg	0.011	1	12/09/15 14:31	12/15/15 10:59	129-00-0	M1,R1
Total BaP Eq. MN 2006sh. ND=0	**0.33**	mg/kg	0.011	1	12/09/15 14:31	12/15/15 10:59		
Surrogates								
2-Fluorobiphenyl (S)	74	%.	55-125	1	12/09/15 14:31	12/15/15 10:59	321-60-8	
p-Terphenyl-d14 (S)	79	%.	30-150	1	12/09/15 14:31	12/15/15 10:59	1718-51-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
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(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

Sample: TP-1 (2') **Lab ID: 10332647001** Collected: 12/08/15 10:30 Received: 12/09/15 09:30 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV 5030 Med Level	Analytical Method: EPA 8260B Preparation Method: EPA 5035/5030B							
Acetone	ND	mg/kg	2.8	1	12/11/15 12:41	12/22/15 23:01	67-64-1	
Allyl chloride	ND	mg/kg	0.22	1	12/11/15 12:41	12/22/15 23:01	107-05-1	
Benzene	ND	mg/kg	0.022	1	12/11/15 12:41	12/22/15 23:01	71-43-2	
Bromobenzene	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	108-86-1	
Bromochloromethane	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	74-97-5	
Bromodichloromethane	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	75-27-4	
Bromoform	ND	mg/kg	0.22	1	12/11/15 12:41	12/22/15 23:01	75-25-2	
Bromomethane	ND	mg/kg	0.55	1	12/11/15 12:41	12/22/15 23:01	74-83-9	
2-Butanone (MEK)	ND	mg/kg	2.8	1	12/11/15 12:41	12/22/15 23:01	78-93-3	
n-Butylbenzene	ND	mg/kg	0.55	1	12/11/15 12:41	12/22/15 23:01	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.22	1	12/11/15 12:41	12/22/15 23:01	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.22	1	12/11/15 12:41	12/22/15 23:01	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	56-23-5	
Chlorobenzene	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	108-90-7	
Chloroethane	ND	mg/kg	0.55	1	12/11/15 12:41	12/22/15 23:01	75-00-3	
Chloroform	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	67-66-3	
Chloromethane	ND	mg/kg	0.22	1	12/11/15 12:41	12/22/15 23:01	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	106-43-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	1.4	1	12/11/15 12:41	12/22/15 23:01	96-12-8	
Dibromochloromethane	ND	mg/kg	0.22	1	12/11/15 12:41	12/22/15 23:01	124-48-1	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	106-93-4	
Dibromomethane	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.22	1	12/11/15 12:41	12/22/15 23:01	75-71-8	
1,1-Dichloroethane	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	156-60-5	
Dichlorofluoromethane	ND	mg/kg	0.55	1	12/11/15 12:41	12/22/15 23:01	75-43-4	
1,2-Dichloropropane	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.22	1	12/11/15 12:41	12/22/15 23:01	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.22	1	12/11/15 12:41	12/22/15 23:01	10061-01-5	
trans-1,3-Dichloropropene	ND	mg/kg	0.22	1	12/11/15 12:41	12/22/15 23:01	10061-02-6	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.22	1	12/11/15 12:41	12/22/15 23:01	60-29-7	
Ethylbenzene	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	100-41-4	
Hexachloro-1,3-butadiene	ND	mg/kg	0.28	1	12/11/15 12:41	12/22/15 23:01	87-68-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.22	1	12/11/15 12:41	12/22/15 23:01	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.55	1	12/11/15 12:41	12/22/15 23:01	99-87-6	
Methylene Chloride	ND	mg/kg	0.22	1	12/11/15 12:41	12/22/15 23:01	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.28	1	12/11/15 12:41	12/22/15 23:01	108-10-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

Sample: TP-1 (2') **Lab ID: 10332647001** Collected: 12/08/15 10:30 Received: 12/09/15 09:30 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV 5030 Med Level	Analytical Method: EPA 8260B Preparation Method: EPA 5035/5030B							
Methyl-tert-butyl ether	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	1634-04-4	
Naphthalene	ND	mg/kg	0.55	1	12/11/15 12:41	12/22/15 23:01	91-20-3	
n-Propylbenzene	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	103-65-1	
Styrene	ND	mg/kg	0.22	1	12/11/15 12:41	12/22/15 23:01	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	79-34-5	
Tetrachloroethene	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	127-18-4	
Tetrahydrofuran	ND	mg/kg	2.2	1	12/11/15 12:41	12/22/15 23:01	109-99-9	
Toluene	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.55	1	12/11/15 12:41	12/22/15 23:01	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.55	1	12/11/15 12:41	12/22/15 23:01	120-82-1	
1,1,1-Trichloroethane	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	79-00-5	
Trichloroethene	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.22	1	12/11/15 12:41	12/22/15 23:01	75-69-4	
1,2,3-Trichloropropane	ND	mg/kg	0.22	1	12/11/15 12:41	12/22/15 23:01	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.22	1	12/11/15 12:41	12/22/15 23:01	76-13-1	
1,2,4-Trimethylbenzene	ND	mg/kg	0.055	1	12/11/15 12:41	12/22/15 23:01	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.22	1	12/11/15 12:41	12/22/15 23:01	108-67-8	
Vinyl chloride	ND	mg/kg	0.022	1	12/11/15 12:41	12/22/15 23:01	75-01-4	
Xylene (Total)	ND	mg/kg	0.17	1	12/11/15 12:41	12/22/15 23:01	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	101	%.	55-150	1	12/11/15 12:41	12/22/15 23:01	17060-07-0	
Toluene-d8 (S)	98	%.	61-125	1	12/11/15 12:41	12/22/15 23:01	2037-26-5	
4-Bromofluorobenzene (S)	100	%.	54-131	1	12/11/15 12:41	12/22/15 23:01	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

Sample: TP-2 (1') **Lab ID: 10332647002** Collected: 12/08/15 12:00 Received: 12/09/15 09:30 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO GCS	Analytical Method: WI MOD DRO Preparation Method: WI MOD DRO							
WDRO C10-C28	**2940**	mg/kg	419	50	12/10/15 08:30	12/13/15 14:22		T6
Surrogates								
n-Triacontane (S)	0	%.	50-150	50	12/10/15 08:30	12/13/15 14:22	638-68-6	S4
WIGRO GCV	Analytical Method: WI MOD GRO Preparation Method: EPA 5030 Medium Soil							
Gasoline Range Organics	ND	mg/kg	10.5	1	12/10/15 11:18	12/10/15 18:25		
Surrogates								
a,a,a-Trifluorotoluene (S)	97	%.	80-150	1	12/10/15 11:18	12/10/15 18:25	98-08-8	
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3050							
Arsenic	ND	mg/kg	7.2	10	12/10/15 15:40	12/11/15 13:50	7440-38-2	D3
Barium	**32.8**	mg/kg	0.36	1	12/10/15 15:40	12/11/15 11:56	7440-39-3	
Cadmium	**0.72**	mg/kg	0.11	1	12/10/15 15:40	12/11/15 11:56	7440-43-9	
Chromium	**9.9**	mg/kg	0.36	1	12/10/15 15:40	12/11/15 11:56	7440-47-3	
Lead	**19.9**	mg/kg	0.36	1	12/10/15 15:40	12/11/15 11:56	7439-92-1	
Selenium	ND	mg/kg	7.2	10	12/10/15 15:40	12/11/15 13:50	7782-49-2	D3
Silver	ND	mg/kg	0.36	1	12/10/15 15:40	12/11/15 11:56	7440-22-4	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	**0.076**	mg/kg	0.019	1	12/11/15 08:41	12/14/15 16:40	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**5.6**	%	0.10	1		12/16/15 12:57		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Acenaphthene	**10.8**	mg/kg	0.53	5	12/09/15 14:31	12/15/15 15:56	83-32-9	
Acenaphthylene	**17.4**	mg/kg	5.3	50	12/09/15 14:31	12/15/15 18:17	208-96-8	
Anthracene	**70.0**	mg/kg	5.3	50	12/09/15 14:31	12/15/15 18:17	120-12-7	
Benzo(a)anthracene	**159**	mg/kg	5.3	50	12/09/15 14:31	12/15/15 18:17	56-55-3	
Benzo(a)pyrene	**148**	mg/kg	5.3	50	12/09/15 14:31	12/15/15 18:17	50-32-8	
Benzo(b)fluoranthene	**185**	mg/kg	53.0	500	12/09/15 14:31	12/15/15 18:39	205-99-2	
Benzo(g,h,i)perylene	**78.9**	mg/kg	5.3	50	12/09/15 14:31	12/15/15 18:17	191-24-2	
Benzo(k)fluoranthene	**73.3**	mg/kg	5.3	50	12/09/15 14:31	12/15/15 18:17	207-08-9	
Chrysene	**149**	mg/kg	5.3	50	12/09/15 14:31	12/15/15 18:17	218-01-9	
Dibenz(a,h)anthracene	**32.3**	mg/kg	5.3	50	12/09/15 14:31	12/15/15 18:17	53-70-3	
Fluoranthene	**358**	mg/kg	53.0	500	12/09/15 14:31	12/15/15 18:39	206-44-0	
Fluorene	**19.2**	mg/kg	5.3	50	12/09/15 14:31	12/15/15 18:17	86-73-7	
Indeno(1,2,3-cd)pyrene	**80.1**	mg/kg	5.3	50	12/09/15 14:31	12/15/15 18:17	193-39-5	
Naphthalene	**2.2**	mg/kg	0.53	5	12/09/15 14:31	12/15/15 15:56	91-20-3	
Phenanthrene	**157**	mg/kg	5.3	50	12/09/15 14:31	12/15/15 18:17	85-01-8	
Pyrene	**263**	mg/kg	53.0	500	12/09/15 14:31	12/15/15 18:39	129-00-0	
Total BaP Eq. MN 2006sh. ND=0	**217**	mg/kg	53.0	500	12/09/15 14:31	12/15/15 18:39		
Surrogates								
2-Fluorobiphenyl (S)	0	%.	55-125	5	12/09/15 14:31	12/15/15 15:56	321-60-8	D4,P3, S4
p-Terphenyl-d14 (S)	352	%.	30-150	5	12/09/15 14:31	12/15/15 15:56	1718-51-0	S4

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

Sample: TP-2 (1') **Lab ID: 10332647002** Collected: 12/08/15 12:00 Received: 12/09/15 09:30 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV 5030 Med Level	Analytical Method: EPA 8260B Preparation Method: EPA 5035/5030B							
Acetone	ND	mg/kg	2.7	1	12/11/15 12:41	12/22/15 23:20	67-64-1	
Allyl chloride	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 23:20	107-05-1	
Benzene	ND	mg/kg	0.021	1	12/11/15 12:41	12/22/15 23:20	71-43-2	
Bromobenzene	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	108-86-1	
Bromochloromethane	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	74-97-5	
Bromodichloromethane	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	75-27-4	
Bromoform	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 23:20	75-25-2	
Bromomethane	ND	mg/kg	0.53	1	12/11/15 12:41	12/22/15 23:20	74-83-9	
2-Butanone (MEK)	ND	mg/kg	2.7	1	12/11/15 12:41	12/22/15 23:20	78-93-3	
n-Butylbenzene	ND	mg/kg	0.53	1	12/11/15 12:41	12/22/15 23:20	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 23:20	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 23:20	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	56-23-5	
Chlorobenzene	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	108-90-7	
Chloroethane	ND	mg/kg	0.53	1	12/11/15 12:41	12/22/15 23:20	75-00-3	
Chloroform	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	67-66-3	
Chloromethane	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 23:20	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	106-43-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	1.3	1	12/11/15 12:41	12/22/15 23:20	96-12-8	
Dibromochloromethane	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 23:20	124-48-1	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	106-93-4	
Dibromomethane	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 23:20	75-71-8	
1,1-Dichloroethane	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	156-60-5	
Dichlorofluoromethane	ND	mg/kg	0.53	1	12/11/15 12:41	12/22/15 23:20	75-43-4	
1,2-Dichloropropane	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 23:20	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 23:20	10061-01-5	
trans-1,3-Dichloropropene	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 23:20	10061-02-6	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 23:20	60-29-7	
Ethylbenzene	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	100-41-4	
Hexachloro-1,3-butadiene	ND	mg/kg	0.27	1	12/11/15 12:41	12/22/15 23:20	87-68-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 23:20	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.53	1	12/11/15 12:41	12/22/15 23:20	99-87-6	
Methylene Chloride	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 23:20	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.27	1	12/11/15 12:41	12/22/15 23:20	108-10-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

Sample: TP-2 (1') **Lab ID: 10332647002** Collected: 12/08/15 12:00 Received: 12/09/15 09:30 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV 5030 Med Level	Analytical Method: EPA 8260B Preparation Method: EPA 5035/5030B							
Methyl-tert-butyl ether	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	1634-04-4	
Naphthalene	**1.1**	mg/kg	0.53	1	12/11/15 12:41	12/22/15 23:20	91-20-3	
n-Propylbenzene	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	103-65-1	
Styrene	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 23:20	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	79-34-5	
Tetrachloroethene	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	127-18-4	
Tetrahydrofuran	ND	mg/kg	2.1	1	12/11/15 12:41	12/22/15 23:20	109-99-9	
Toluene	**0.072**	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.53	1	12/11/15 12:41	12/22/15 23:20	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.53	1	12/11/15 12:41	12/22/15 23:20	120-82-1	
1,1,1-Trichloroethane	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	79-00-5	
Trichloroethene	ND	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 23:20	75-69-4	
1,2,3-Trichloropropane	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 23:20	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 23:20	76-13-1	
1,2,4-Trimethylbenzene	**0.12**	mg/kg	0.053	1	12/11/15 12:41	12/22/15 23:20	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 23:20	108-67-8	
Vinyl chloride	ND	mg/kg	0.021	1	12/11/15 12:41	12/22/15 23:20	75-01-4	
Xylene (Total)	ND	mg/kg	0.16	1	12/11/15 12:41	12/22/15 23:20	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	101	%.	55-150	1	12/11/15 12:41	12/22/15 23:20	17060-07-0	
Toluene-d8 (S)	98	%.	61-125	1	12/11/15 12:41	12/22/15 23:20	2037-26-5	
4-Bromofluorobenzene (S)	95	%.	54-131	1	12/11/15 12:41	12/22/15 23:20	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

Sample: TP-4 (1.5') **Lab ID: 10332647003** Collected: 12/08/15 14:15 Received: 12/09/15 09:30 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO GCS	Analytical Method: WI MOD DRO Preparation Method: WI MOD DRO							
WDRO C10-C28	**81.6**	mg/kg	9.7	1	12/10/15 08:30	12/13/15 11:59		T6
Surrogates								
n-Triacontane (S)	89	%.	50-150	1	12/10/15 08:30	12/13/15 11:59	638-68-6	
WIGRO GCV	Analytical Method: WI MOD GRO Preparation Method: EPA 5030 Medium Soil							
Gasoline Range Organics	ND	mg/kg	11.5	1	12/10/15 11:18	12/10/15 22:32		
Surrogates								
a,a,a-Trifluorotoluene (S)	96	%.	80-150	1	12/10/15 11:18	12/10/15 22:32	98-08-8	
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3050							
Arsenic	**4.8**	mg/kg	0.83	1	12/10/15 15:40	12/11/15 11:59	7440-38-2	
Barium	**77.2**	mg/kg	0.42	1	12/10/15 15:40	12/11/15 11:59	7440-39-3	
Cadmium	**0.30**	mg/kg	0.13	1	12/10/15 15:40	12/11/15 11:59	7440-43-9	
Chromium	**7.7**	mg/kg	0.42	1	12/10/15 15:40	12/11/15 11:59	7440-47-3	
Lead	**44.5**	mg/kg	0.42	1	12/10/15 15:40	12/11/15 11:59	7439-92-1	
Selenium	ND	mg/kg	0.83	1	12/10/15 15:40	12/11/15 11:59	7782-49-2	
Silver	ND	mg/kg	0.42	1	12/10/15 15:40	12/11/15 11:59	7440-22-4	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	**0.068**	mg/kg	0.020	1	12/11/15 08:41	12/14/15 16:42	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**10.6**	%	0.10	1		12/16/15 12:58		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Acenaphthene	**1.0**	mg/kg	0.056	5	12/09/15 14:31	12/15/15 15:35	83-32-9	
Acenaphthylene	**0.34**	mg/kg	0.056	5	12/09/15 14:31	12/15/15 15:35	208-96-8	
Anthracene	**5.4**	mg/kg	0.56	50	12/09/15 14:31	12/15/15 17:35	120-12-7	
Benzo(a)anthracene	**10.3**	mg/kg	0.56	50	12/09/15 14:31	12/15/15 17:35	56-55-3	
Benzo(a)pyrene	**10.2**	mg/kg	0.56	50	12/09/15 14:31	12/15/15 17:35	50-32-8	
Benzo(b)fluoranthene	**12.2**	mg/kg	0.56	50	12/09/15 14:31	12/15/15 17:35	205-99-2	
Benzo(g,h,i)perylene	**7.0**	mg/kg	0.56	50	12/09/15 14:31	12/15/15 17:35	191-24-2	
Benzo(k)fluoranthene	**5.6**	mg/kg	0.56	50	12/09/15 14:31	12/15/15 17:35	207-08-9	
Chrysene	**10.6**	mg/kg	0.56	50	12/09/15 14:31	12/15/15 17:35	218-01-9	
Dibenz(a,h)anthracene	**1.9**	mg/kg	0.56	50	12/09/15 14:31	12/15/15 17:35	53-70-3	
Fluoranthene	**29.5**	mg/kg	5.6	500	12/09/15 14:31	12/15/15 17:56	206-44-0	
Fluorene	**1.8**	mg/kg	0.056	5	12/09/15 14:31	12/15/15 15:35	86-73-7	
Indeno(1,2,3-cd)pyrene	**6.3**	mg/kg	0.56	50	12/09/15 14:31	12/15/15 17:35	193-39-5	
Naphthalene	**0.22**	mg/kg	0.056	5	12/09/15 14:31	12/15/15 15:35	91-20-3	
Phenanthrene	**18.9**	mg/kg	5.6	500	12/09/15 14:31	12/15/15 17:56	85-01-8	
Pyrene	**22.0**	mg/kg	5.6	500	12/09/15 14:31	12/15/15 17:56	129-00-0	
Total BaP Eq. MN 2006sh. ND=0	**14.8**	mg/kg	0.56	50	12/09/15 14:31	12/15/15 17:35		
Surrogates								
2-Fluorobiphenyl (S)	73	%.	55-125	5	12/09/15 14:31	12/15/15 15:35	321-60-8	D4,P3
p-Terphenyl-d14 (S)	82	%.	30-150	5	12/09/15 14:31	12/15/15 15:35	1718-51-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

Sample: TP-4 (1.5') **Lab ID: 10332647003** Collected: 12/08/15 14:15 Received: 12/09/15 09:30 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV 5030 Med Level	Analytical Method: EPA 8260B Preparation Method: EPA 5035/5030B							
Acetone	ND	mg/kg	2.7	1	12/11/15 12:41	12/22/15 21:29	67-64-1	
Allyl chloride	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 21:29	107-05-1	
Benzene	ND	mg/kg	0.021	1	12/11/15 12:41	12/22/15 21:29	71-43-2	
Bromobenzene	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	108-86-1	
Bromochloromethane	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	74-97-5	
Bromodichloromethane	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	75-27-4	
Bromoform	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 21:29	75-25-2	
Bromomethane	ND	mg/kg	0.54	1	12/11/15 12:41	12/22/15 21:29	74-83-9	
2-Butanone (MEK)	ND	mg/kg	2.7	1	12/11/15 12:41	12/22/15 21:29	78-93-3	
n-Butylbenzene	ND	mg/kg	0.54	1	12/11/15 12:41	12/22/15 21:29	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 21:29	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 21:29	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	56-23-5	
Chlorobenzene	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	108-90-7	
Chloroethane	ND	mg/kg	0.54	1	12/11/15 12:41	12/22/15 21:29	75-00-3	
Chloroform	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	67-66-3	
Chloromethane	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 21:29	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	106-43-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	1.3	1	12/11/15 12:41	12/22/15 21:29	96-12-8	
Dibromochloromethane	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 21:29	124-48-1	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	106-93-4	
Dibromomethane	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 21:29	75-71-8	
1,1-Dichloroethane	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	156-60-5	
Dichlorofluoromethane	ND	mg/kg	0.54	1	12/11/15 12:41	12/22/15 21:29	75-43-4	
1,2-Dichloropropane	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 21:29	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 21:29	10061-01-5	
trans-1,3-Dichloropropene	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 21:29	10061-02-6	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 21:29	60-29-7	
Ethylbenzene	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	100-41-4	
Hexachloro-1,3-butadiene	ND	mg/kg	0.27	1	12/11/15 12:41	12/22/15 21:29	87-68-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 21:29	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.54	1	12/11/15 12:41	12/22/15 21:29	99-87-6	
Methylene Chloride	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 21:29	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.27	1	12/11/15 12:41	12/22/15 21:29	108-10-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

Sample: TP-4 (1.5') **Lab ID: 10332647003** Collected: 12/08/15 14:15 Received: 12/09/15 09:30 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV 5030 Med Level	Analytical Method: EPA 8260B Preparation Method: EPA 5035/5030B							
Methyl-tert-butyl ether	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	1634-04-4	
Naphthalene	ND	mg/kg	0.54	1	12/11/15 12:41	12/22/15 21:29	91-20-3	
n-Propylbenzene	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	103-65-1	
Styrene	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 21:29	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	79-34-5	
Tetrachloroethene	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	127-18-4	
Tetrahydrofuran	ND	mg/kg	2.1	1	12/11/15 12:41	12/22/15 21:29	109-99-9	
Toluene	**0.065**	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.54	1	12/11/15 12:41	12/22/15 21:29	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.54	1	12/11/15 12:41	12/22/15 21:29	120-82-1	
1,1,1-Trichloroethane	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	79-00-5	
Trichloroethene	ND	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 21:29	75-69-4	
1,2,3-Trichloropropane	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 21:29	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 21:29	76-13-1	
1,2,4-Trimethylbenzene	**0.095**	mg/kg	0.054	1	12/11/15 12:41	12/22/15 21:29	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.21	1	12/11/15 12:41	12/22/15 21:29	108-67-8	
Vinyl chloride	ND	mg/kg	0.021	1	12/11/15 12:41	12/22/15 21:29	75-01-4	
Xylene (Total)	ND	mg/kg	0.16	1	12/11/15 12:41	12/22/15 21:29	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	99	%.	55-150	1	12/11/15 12:41	12/22/15 21:29	17060-07-0	
Toluene-d8 (S)	98	%.	61-125	1	12/11/15 12:41	12/22/15 21:29	2037-26-5	
4-Bromofluorobenzene (S)	104	%.	54-131	1	12/11/15 12:41	12/22/15 21:29	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

Sample: TP-3 (5') **Lab ID: 10332647004** Collected: 12/08/15 15:00 Received: 12/09/15 09:30 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO GCS	Analytical Method: WI MOD DRO Preparation Method: WI MOD DRO							
WDRO C10-C28	**20.2**	mg/kg	9.2	1	12/10/15 08:30	12/13/15 12:06		T6
Surrogates								
n-Triacontane (S)	77	%.	50-150	1	12/10/15 08:30	12/13/15 12:06	638-68-6	
WIGRO GCV	Analytical Method: WI MOD GRO Preparation Method: EPA 5030 Medium Soil							
Gasoline Range Organics	ND	mg/kg	12.0	1	12/11/15 10:45	12/11/15 20:53		
Surrogates								
a,a,a-Trifluorotoluene (S)	97	%.	80-150	1	12/11/15 10:45	12/11/15 20:53	98-08-8	
6010C MET ICP	Analytical Method: EPA 6010C Preparation Method: EPA 3050							
Arsenic	**10.4**	mg/kg	0.91	1	12/10/15 15:40	12/11/15 12:08	7440-38-2	
Barium	**250**	mg/kg	0.45	1	12/10/15 15:40	12/11/15 12:08	7440-39-3	
Cadmium	**1.3**	mg/kg	0.14	1	12/10/15 15:40	12/11/15 12:08	7440-43-9	
Chromium	**13.7**	mg/kg	0.45	1	12/10/15 15:40	12/11/15 12:08	7440-47-3	
Lead	**641**	mg/kg	0.45	1	12/10/15 15:40	12/11/15 12:08	7439-92-1	
Selenium	ND	mg/kg	0.91	1	12/10/15 15:40	12/11/15 12:08	7782-49-2	
Silver	ND	mg/kg	0.45	1	12/10/15 15:40	12/11/15 12:08	7440-22-4	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B							
Mercury	**0.21**	mg/kg	0.023	1	12/11/15 08:41	12/14/15 16:44	7439-97-6	
Dry Weight	Analytical Method: ASTM D2974							
Percent Moisture	**15.7**	%	0.10	1		12/16/15 12:58		
8270D MSSV PAH by SIM	Analytical Method: EPA 8270D by SIM Preparation Method: EPA 3550							
Acenaphthene	ND	mg/kg	0.012	1	12/09/15 14:31	12/15/15 14:10	83-32-9	
Acenaphthylene	**0.17**	mg/kg	0.012	1	12/09/15 14:31	12/15/15 14:10	208-96-8	
Anthracene	**0.098**	mg/kg	0.012	1	12/09/15 14:31	12/15/15 14:10	120-12-7	
Benzo(a)anthracene	**0.59**	mg/kg	0.059	5	12/09/15 14:31	12/15/15 17:14	56-55-3	
Benzo(a)pyrene	**0.71**	mg/kg	0.059	5	12/09/15 14:31	12/15/15 17:14	50-32-8	
Benzo(b)fluoranthene	**0.91**	mg/kg	0.059	5	12/09/15 14:31	12/15/15 17:14	205-99-2	
Benzo(g,h,i)perylene	**0.51**	mg/kg	0.059	5	12/09/15 14:31	12/15/15 17:14	191-24-2	
Benzo(k)fluoranthene	**0.37**	mg/kg	0.012	1	12/09/15 14:31	12/15/15 14:10	207-08-9	
Chrysene	**0.51**	mg/kg	0.059	5	12/09/15 14:31	12/15/15 17:14	218-01-9	
Dibenz(a,h)anthracene	**0.13**	mg/kg	0.012	1	12/09/15 14:31	12/15/15 14:10	53-70-3	
Fluoranthene	**1.1**	mg/kg	0.059	5	12/09/15 14:31	12/15/15 17:14	206-44-0	
Fluorene	ND	mg/kg	0.012	1	12/09/15 14:31	12/15/15 14:10	86-73-7	
Indeno(1,2,3-cd)pyrene	**0.46**	mg/kg	0.059	5	12/09/15 14:31	12/15/15 17:14	193-39-5	
Naphthalene	ND	mg/kg	0.012	1	12/09/15 14:31	12/15/15 14:10	91-20-3	
Phenanthrene	**0.13**	mg/kg	0.012	1	12/09/15 14:31	12/15/15 14:10	85-01-8	
Pyrene	**0.93**	mg/kg	0.059	5	12/09/15 14:31	12/15/15 17:14	129-00-0	
Total BaP Eq. MN 2006sh. ND=0	**1.0**	mg/kg	0.059	5	12/09/15 14:31	12/15/15 17:14		
Surrogates								
2-Fluorobiphenyl (S)	65	%.	55-125	1	12/09/15 14:31	12/15/15 14:10	321-60-8	
p-Terphenyl-d14 (S)	68	%.	30-150	1	12/09/15 14:31	12/15/15 14:10	1718-51-0	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

Sample: TP-3 (5') **Lab ID: 10332647004** Collected: 12/08/15 15:00 Received: 12/09/15 09:30 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV 5030 Med Level	Analytical Method: EPA 8260B Preparation Method: EPA 5035/5030B							
Acetone	ND	mg/kg	3.0	1	12/11/15 12:41	12/22/15 21:47	67-64-1	
Allyl chloride	ND	mg/kg	0.24	1	12/11/15 12:41	12/22/15 21:47	107-05-1	
Benzene	ND	mg/kg	0.024	1	12/11/15 12:41	12/22/15 21:47	71-43-2	
Bromobenzene	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	108-86-1	
Bromochloromethane	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	74-97-5	
Bromodichloromethane	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	75-27-4	
Bromoform	ND	mg/kg	0.24	1	12/11/15 12:41	12/22/15 21:47	75-25-2	
Bromomethane	ND	mg/kg	0.60	1	12/11/15 12:41	12/22/15 21:47	74-83-9	
2-Butanone (MEK)	ND	mg/kg	3.0	1	12/11/15 12:41	12/22/15 21:47	78-93-3	
n-Butylbenzene	ND	mg/kg	0.60	1	12/11/15 12:41	12/22/15 21:47	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.24	1	12/11/15 12:41	12/22/15 21:47	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.24	1	12/11/15 12:41	12/22/15 21:47	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	56-23-5	
Chlorobenzene	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	108-90-7	
Chloroethane	ND	mg/kg	0.60	1	12/11/15 12:41	12/22/15 21:47	75-00-3	
Chloroform	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	67-66-3	
Chloromethane	ND	mg/kg	0.24	1	12/11/15 12:41	12/22/15 21:47	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	106-43-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	1.5	1	12/11/15 12:41	12/22/15 21:47	96-12-8	
Dibromochloromethane	ND	mg/kg	0.24	1	12/11/15 12:41	12/22/15 21:47	124-48-1	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	106-93-4	
Dibromomethane	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.24	1	12/11/15 12:41	12/22/15 21:47	75-71-8	
1,1-Dichloroethane	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	156-60-5	
Dichlorofluoromethane	ND	mg/kg	0.60	1	12/11/15 12:41	12/22/15 21:47	75-43-4	
1,2-Dichloropropane	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.24	1	12/11/15 12:41	12/22/15 21:47	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.24	1	12/11/15 12:41	12/22/15 21:47	10061-01-5	
trans-1,3-Dichloropropene	ND	mg/kg	0.24	1	12/11/15 12:41	12/22/15 21:47	10061-02-6	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.24	1	12/11/15 12:41	12/22/15 21:47	60-29-7	
Ethylbenzene	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	100-41-4	
Hexachloro-1,3-butadiene	ND	mg/kg	0.30	1	12/11/15 12:41	12/22/15 21:47	87-68-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.24	1	12/11/15 12:41	12/22/15 21:47	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.60	1	12/11/15 12:41	12/22/15 21:47	99-87-6	
Methylene Chloride	ND	mg/kg	0.24	1	12/11/15 12:41	12/22/15 21:47	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.30	1	12/11/15 12:41	12/22/15 21:47	108-10-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

Sample: TP-3 (5') **Lab ID: 10332647004** Collected: 12/08/15 15:00 Received: 12/09/15 09:30 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV 5030 Med Level	Analytical Method: EPA 8260B Preparation Method: EPA 5035/5030B							
Methyl-tert-butyl ether	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	1634-04-4	
Naphthalene	ND	mg/kg	0.60	1	12/11/15 12:41	12/22/15 21:47	91-20-3	
n-Propylbenzene	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	103-65-1	
Styrene	ND	mg/kg	0.24	1	12/11/15 12:41	12/22/15 21:47	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	79-34-5	
Tetrachloroethene	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	127-18-4	
Tetrahydrofuran	ND	mg/kg	2.4	1	12/11/15 12:41	12/22/15 21:47	109-99-9	
Toluene	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.60	1	12/11/15 12:41	12/22/15 21:47	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.60	1	12/11/15 12:41	12/22/15 21:47	120-82-1	
1,1,1-Trichloroethane	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	79-00-5	
Trichloroethene	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.24	1	12/11/15 12:41	12/22/15 21:47	75-69-4	
1,2,3-Trichloropropane	ND	mg/kg	0.24	1	12/11/15 12:41	12/22/15 21:47	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.24	1	12/11/15 12:41	12/22/15 21:47	76-13-1	
1,2,4-Trimethylbenzene	ND	mg/kg	0.060	1	12/11/15 12:41	12/22/15 21:47	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.24	1	12/11/15 12:41	12/22/15 21:47	108-67-8	
Vinyl chloride	ND	mg/kg	0.024	1	12/11/15 12:41	12/22/15 21:47	75-01-4	
Xylene (Total)	ND	mg/kg	0.18	1	12/11/15 12:41	12/22/15 21:47	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	99	%.	55-150	1	12/11/15 12:41	12/22/15 21:47	17060-07-0	
Toluene-d8 (S)	97	%.	61-125	1	12/11/15 12:41	12/22/15 21:47	2037-26-5	
4-Bromofluorobenzene (S)	103	%.	54-131	1	12/11/15 12:41	12/22/15 21:47	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

Sample: Trip (MeOH) **Lab ID: 10332647005** Collected: 12/08/15 00:00 Received: 12/09/15 09:30 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV 5030 Med Level	Analytical Method: EPA 8260B Preparation Method: EPA 5035/5030B							
Acetone	ND	mg/kg	2.5	1	12/11/15 12:41	12/22/15 18:43	67-64-1	
Allyl chloride	ND	mg/kg	0.20	1	12/11/15 12:41	12/22/15 18:43	107-05-1	
Benzene	ND	mg/kg	0.020	1	12/11/15 12:41	12/22/15 18:43	71-43-2	
Bromobenzene	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	108-86-1	
Bromochloromethane	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	74-97-5	
Bromodichloromethane	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	75-27-4	
Bromoform	ND	mg/kg	0.20	1	12/11/15 12:41	12/22/15 18:43	75-25-2	
Bromomethane	ND	mg/kg	0.50	1	12/11/15 12:41	12/22/15 18:43	74-83-9	
2-Butanone (MEK)	ND	mg/kg	2.5	1	12/11/15 12:41	12/22/15 18:43	78-93-3	
n-Butylbenzene	ND	mg/kg	0.50	1	12/11/15 12:41	12/22/15 18:43	104-51-8	
sec-Butylbenzene	ND	mg/kg	0.20	1	12/11/15 12:41	12/22/15 18:43	135-98-8	
tert-Butylbenzene	ND	mg/kg	0.20	1	12/11/15 12:41	12/22/15 18:43	98-06-6	
Carbon tetrachloride	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	56-23-5	
Chlorobenzene	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	108-90-7	
Chloroethane	ND	mg/kg	0.50	1	12/11/15 12:41	12/22/15 18:43	75-00-3	
Chloroform	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	67-66-3	
Chloromethane	ND	mg/kg	0.20	1	12/11/15 12:41	12/22/15 18:43	74-87-3	
2-Chlorotoluene	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	95-49-8	
4-Chlorotoluene	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	106-43-4	
1,2-Dibromo-3-chloropropane	ND	mg/kg	1.2	1	12/11/15 12:41	12/22/15 18:43	96-12-8	
Dibromochloromethane	ND	mg/kg	0.20	1	12/11/15 12:41	12/22/15 18:43	124-48-1	
1,2-Dibromoethane (EDB)	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	106-93-4	
Dibromomethane	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	74-95-3	
1,2-Dichlorobenzene	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	95-50-1	
1,3-Dichlorobenzene	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	541-73-1	
1,4-Dichlorobenzene	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	106-46-7	
Dichlorodifluoromethane	ND	mg/kg	0.20	1	12/11/15 12:41	12/22/15 18:43	75-71-8	
1,1-Dichloroethane	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	75-34-3	
1,2-Dichloroethane	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	107-06-2	
1,1-Dichloroethene	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	75-35-4	
cis-1,2-Dichloroethene	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	156-59-2	
trans-1,2-Dichloroethene	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	156-60-5	
Dichlorofluoromethane	ND	mg/kg	0.50	1	12/11/15 12:41	12/22/15 18:43	75-43-4	
1,2-Dichloropropane	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	78-87-5	
1,3-Dichloropropane	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	142-28-9	
2,2-Dichloropropane	ND	mg/kg	0.20	1	12/11/15 12:41	12/22/15 18:43	594-20-7	
1,1-Dichloropropene	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	563-58-6	
cis-1,3-Dichloropropene	ND	mg/kg	0.20	1	12/11/15 12:41	12/22/15 18:43	10061-01-5	
trans-1,3-Dichloropropene	ND	mg/kg	0.20	1	12/11/15 12:41	12/22/15 18:43	10061-02-6	
Diethyl ether (Ethyl ether)	ND	mg/kg	0.20	1	12/11/15 12:41	12/22/15 18:43	60-29-7	
Ethylbenzene	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	100-41-4	
Hexachloro-1,3-butadiene	ND	mg/kg	0.25	1	12/11/15 12:41	12/22/15 18:43	87-68-3	
Isopropylbenzene (Cumene)	ND	mg/kg	0.20	1	12/11/15 12:41	12/22/15 18:43	98-82-8	
p-Isopropyltoluene	ND	mg/kg	0.50	1	12/11/15 12:41	12/22/15 18:43	99-87-6	
Methylene Chloride	ND	mg/kg	0.20	1	12/11/15 12:41	12/22/15 18:43	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	mg/kg	0.25	1	12/11/15 12:41	12/22/15 18:43	108-10-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

Sample: Trip (MeOH) **Lab ID: 10332647005** Collected: 12/08/15 00:00 Received: 12/09/15 09:30 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV 5030 Med Level	Analytical Method: EPA 8260B Preparation Method: EPA 5035/5030B							
Methyl-tert-butyl ether	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	1634-04-4	
Naphthalene	ND	mg/kg	0.50	1	12/11/15 12:41	12/22/15 18:43	91-20-3	
n-Propylbenzene	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	103-65-1	
Styrene	ND	mg/kg	0.20	1	12/11/15 12:41	12/22/15 18:43	100-42-5	
1,1,1,2-Tetrachloroethane	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	630-20-6	
1,1,2,2-Tetrachloroethane	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	79-34-5	
Tetrachloroethene	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	127-18-4	
Tetrahydrofuran	ND	mg/kg	2.0	1	12/11/15 12:41	12/22/15 18:43	109-99-9	
Toluene	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	108-88-3	
1,2,3-Trichlorobenzene	ND	mg/kg	0.50	1	12/11/15 12:41	12/22/15 18:43	87-61-6	
1,2,4-Trichlorobenzene	ND	mg/kg	0.50	1	12/11/15 12:41	12/22/15 18:43	120-82-1	
1,1,1-Trichloroethane	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	71-55-6	
1,1,2-Trichloroethane	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	79-00-5	
Trichloroethene	ND	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	79-01-6	
Trichlorofluoromethane	ND	mg/kg	0.20	1	12/11/15 12:41	12/22/15 18:43	75-69-4	
1,2,3-Trichloropropane	ND	mg/kg	0.20	1	12/11/15 12:41	12/22/15 18:43	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	mg/kg	0.20	1	12/11/15 12:41	12/22/15 18:43	76-13-1	
1,2,4-Trimethylbenzene	**0.087**	mg/kg	0.050	1	12/11/15 12:41	12/22/15 18:43	95-63-6	
1,3,5-Trimethylbenzene	ND	mg/kg	0.20	1	12/11/15 12:41	12/22/15 18:43	108-67-8	
Vinyl chloride	ND	mg/kg	0.020	1	12/11/15 12:41	12/22/15 18:43	75-01-4	
Xylene (Total)	ND	mg/kg	0.15	1	12/11/15 12:41	12/22/15 18:43	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	94	%.	55-150	1	12/11/15 12:41	12/22/15 18:43	17060-07-0	
Toluene-d8 (S)	98	%.	61-125	1	12/11/15 12:41	12/22/15 18:43	2037-26-5	
4-Bromofluorobenzene (S)	98	%.	54-131	1	12/11/15 12:41	12/22/15 18:43	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

QC Batch: GCV/14746 Analysis Method: WI MOD GRO
QC Batch Method: EPA 5030 Medium Soil Analysis Description: WIGRO Solid GCV
Associated Lab Samples: 10332647001, 10332647002, 10332647003

METHOD BLANK: 2153972 Matrix: Solid
Associated Lab Samples: 10332647001, 10332647002, 10332647003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Gasoline Range Organics	mg/kg	ND	10.0	12/10/15 14:19	
a,a,a-Trifluorotoluene (S)	%.	98	80-150	12/10/15 14:19	

LABORATORY CONTROL SAMPLE & LCSD: 2153973 2153974

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Gasoline Range Organics	mg/kg	50	50.5	48.5	101	97	80-120	4	20	
a,a,a-Trifluorotoluene (S)	%.				100	96	80-150			

MATRIX SPIKE SAMPLE: 2153975

Parameter	Units	10332466003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Gasoline Range Organics	mg/kg	35.6	55.4	101	118	80-120	
a,a,a-Trifluorotoluene (S)	%.				99	80-150	

SAMPLE DUPLICATE: 2153976

Parameter	Units	10332466004 Result	Dup Result	RPD	Max RPD	Qualifiers
Gasoline Range Organics	mg/kg	ND	3.8J		20	
a,a,a-Trifluorotoluene (S)	%.	96	96	6		

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

QC Batch: GCV/14754
QC Batch Method: EPA 5030 Medium Soil
Analysis Method: WI MOD GRO
Analysis Description: WIGRO Solid GCV
Associated Lab Samples: 10332647004

METHOD BLANK: 2155423 Matrix: Solid
Associated Lab Samples: 10332647004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Gasoline Range Organics	mg/kg	ND	10.0	12/11/15 17:09	
a,a,a-Trifluorotoluene (S)	%.	95	80-150	12/11/15 17:09	

LABORATORY CONTROL SAMPLE & LCSD: 2155424 2155425

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Gasoline Range Organics	mg/kg	50	47.2	49.0	94	98	80-120	4	20	
a,a,a-Trifluorotoluene (S)	%.				95	96	80-150			

MATRIX SPIKE SAMPLE: 2155426

Parameter	Units	10332747001 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Gasoline Range Organics	mg/kg	20.1	58.5	72.4	90	80-120	
a,a,a-Trifluorotoluene (S)	%.				97	80-150	

SAMPLE DUPLICATE: 2155427

Parameter	Units	10332747002 Result	Dup Result	RPD	Max RPD	Qualifiers
Gasoline Range Organics	mg/kg	17.2	12.3	33	20	R1
a,a,a-Trifluorotoluene (S)	%.	95	93	4		

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

QC Batch: MERP/15464 Analysis Method: EPA 7471B
QC Batch Method: EPA 7471B Analysis Description: 7471B Mercury Solids
Associated Lab Samples: 10332647001, 10332647002, 10332647003, 10332647004

METHOD BLANK: 2153937 Matrix: Solid
Associated Lab Samples: 10332647001, 10332647002, 10332647003, 10332647004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/kg	ND	0.019	12/14/15 16:09	

LABORATORY CONTROL SAMPLE: 2153938

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	.45	0.42	93	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2153939 2153940

Parameter	Units	10332647001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/kg	ND	.52	.53	0.50	0.51	93	92	75-125	2	20	

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

QC Batch: MPRP/60230 Analysis Method: EPA 6010C
QC Batch Method: EPA 3050 Analysis Description: 6010C Solids
Associated Lab Samples: 10332647001, 10332647002, 10332647003, 10332647004

METHOD BLANK: 2153654 Matrix: Solid
Associated Lab Samples: 10332647001, 10332647002, 10332647003, 10332647004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/kg	ND	0.96	12/11/15 11:31	
Barium	mg/kg	ND	0.48	12/11/15 11:31	
Cadmium	mg/kg	ND	0.14	12/11/15 11:31	
Chromium	mg/kg	ND	0.48	12/11/15 11:31	
Lead	mg/kg	ND	0.48	12/11/15 11:31	
Selenium	mg/kg	ND	0.96	12/11/15 11:31	
Silver	mg/kg	ND	0.48	12/11/15 11:31	

LABORATORY CONTROL SAMPLE: 2153655

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	48.5	45.7	94	80-120	
Barium	mg/kg	48.5	47.9	99	80-120	
Cadmium	mg/kg	48.5	46.2	95	80-120	
Chromium	mg/kg	48.5	47.9	99	80-120	
Lead	mg/kg	48.5	47.0	97	80-120	
Selenium	mg/kg	48.5	45.2	93	80-120	
Silver	mg/kg	24.3	23.0	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2153656 2153657

Parameter	Units	10332572001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	ND	43.9	42	28.6	28.0	64	65	75-125	2	20	M1
Barium	mg/kg	3320	43.9	42	2160	3060	-2640	-604	75-125	35	20	M6,R1
Cadmium	mg/kg	0.13	43.9	42	30.9	30.4	70	72	75-125	2	20	M1
Chromium	mg/kg	38.9	43.9	42	54.9	73.8	36	83	75-125	29	20	M1,R1
Lead	mg/kg	3.2	43.9	42	31.3	31.9	64	68	75-125	2	20	M1
Selenium	mg/kg	ND	43.9	42	30.9	30.3	69	71	75-125	2	20	M1
Silver	mg/kg	ND	21.9	21	15.9	15.7	72	75	75-125	1	20	M1

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

QC Batch: MPRP/60381 Analysis Method: ASTM D2974
QC Batch Method: ASTM D2974 Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 10332647001, 10332647002, 10332647003, 10332647004

SAMPLE DUPLICATE: 2158748

Parameter	Units	10332262002 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	10.1	11.0	8	30	

SAMPLE DUPLICATE: 2158749

Parameter	Units	10332652001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	9.9	9.3	7	30	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

QC Batch: MSV/34061 Analysis Method: EPA 8260B
QC Batch Method: EPA 5035/5030B Analysis Description: 8260B MSV 5030 Med Level
Associated Lab Samples: 10332647001, 10332647002, 10332647003, 10332647004, 10332647005

METHOD BLANK: 2155460 Matrix: Solid
Associated Lab Samples: 10332647001, 10332647002, 10332647003, 10332647004, 10332647005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	mg/kg	ND	0.050	12/15/15 05:00	
1,1,1-Trichloroethane	mg/kg	ND	0.050	12/15/15 05:00	
1,1,2,2-Tetrachloroethane	mg/kg	ND	0.050	12/15/15 05:00	
1,1,2-Trichloroethane	mg/kg	ND	0.050	12/15/15 05:00	
1,1,2-Trichlorotrifluoroethane	mg/kg	ND	0.20	12/15/15 05:00	
1,1-Dichloroethane	mg/kg	ND	0.050	12/15/15 05:00	
1,1-Dichloroethene	mg/kg	ND	0.050	12/15/15 05:00	
1,1-Dichloropropene	mg/kg	ND	0.050	12/15/15 05:00	
1,2,3-Trichlorobenzene	mg/kg	ND	0.50	12/15/15 05:00	
1,2,3-Trichloropropane	mg/kg	ND	0.20	12/15/15 05:00	
1,2,4-Trichlorobenzene	mg/kg	ND	0.50	12/15/15 05:00	
1,2,4-Trimethylbenzene	mg/kg	ND	0.050	12/15/15 05:00	
1,2-Dibromo-3-chloropropane	mg/kg	ND	1.2	12/15/15 05:00	
1,2-Dibromoethane (EDB)	mg/kg	ND	0.050	12/15/15 05:00	
1,2-Dichlorobenzene	mg/kg	ND	0.050	12/15/15 05:00	
1,2-Dichloroethane	mg/kg	ND	0.050	12/15/15 05:00	
1,2-Dichloropropane	mg/kg	ND	0.050	12/15/15 05:00	
1,3,5-Trimethylbenzene	mg/kg	ND	0.20	12/15/15 05:00	
1,3-Dichlorobenzene	mg/kg	ND	0.050	12/15/15 05:00	
1,3-Dichloropropane	mg/kg	ND	0.050	12/15/15 05:00	
1,4-Dichlorobenzene	mg/kg	ND	0.050	12/15/15 05:00	
2,2-Dichloropropane	mg/kg	ND	0.20	12/15/15 05:00	
2-Butanone (MEK)	mg/kg	ND	2.5	12/15/15 05:00	
2-Chlorotoluene	mg/kg	ND	0.050	12/15/15 05:00	
4-Chlorotoluene	mg/kg	ND	0.050	12/15/15 05:00	
4-Methyl-2-pentanone (MIBK)	mg/kg	ND	0.25	12/15/15 05:00	
Acetone	mg/kg	ND	2.5	12/15/15 05:00	
Allyl chloride	mg/kg	ND	0.20	12/15/15 05:00	
Benzene	mg/kg	ND	0.020	12/15/15 05:00	
Bromobenzene	mg/kg	ND	0.050	12/15/15 05:00	
Bromochloromethane	mg/kg	ND	0.050	12/15/15 05:00	
Bromodichloromethane	mg/kg	ND	0.050	12/15/15 05:00	
Bromoform	mg/kg	ND	0.20	12/15/15 05:00	
Bromomethane	mg/kg	ND	0.50	12/15/15 05:00	
Carbon tetrachloride	mg/kg	ND	0.050	12/15/15 05:00	
Chlorobenzene	mg/kg	ND	0.050	12/15/15 05:00	
Chloroethane	mg/kg	ND	0.50	12/15/15 05:00	
Chloroform	mg/kg	ND	0.050	12/15/15 05:00	
Chloromethane	mg/kg	ND	0.20	12/15/15 05:00	
cis-1,2-Dichloroethene	mg/kg	ND	0.050	12/15/15 05:00	
cis-1,3-Dichloropropene	mg/kg	ND	0.20	12/15/15 05:00	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

METHOD BLANK: 2155460 Matrix: Solid
Associated Lab Samples: 10332647001, 10332647002, 10332647003, 10332647004, 10332647005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Dibromochloromethane	mg/kg	ND	0.20	12/15/15 05:00	
Dibromomethane	mg/kg	ND	0.050	12/15/15 05:00	
Dichlorodifluoromethane	mg/kg	ND	0.20	12/15/15 05:00	
Dichlorofluoromethane	mg/kg	ND	0.50	12/15/15 05:00	
Diethyl ether (Ethyl ether)	mg/kg	ND	0.20	12/15/15 05:00	
Ethylbenzene	mg/kg	ND	0.050	12/15/15 05:00	
Hexachloro-1,3-butadiene	mg/kg	ND	0.25	12/15/15 05:00	
Isopropylbenzene (Cumene)	mg/kg	ND	0.20	12/15/15 05:00	
Methyl-tert-butyl ether	mg/kg	ND	0.050	12/15/15 05:00	
Methylene Chloride	mg/kg	ND	0.20	12/15/15 05:00	
n-Butylbenzene	mg/kg	ND	0.50	12/15/15 05:00	
n-Propylbenzene	mg/kg	ND	0.050	12/15/15 05:00	
Naphthalene	mg/kg	ND	0.50	12/15/15 05:00	
p-Isopropyltoluene	mg/kg	ND	0.50	12/15/15 05:00	
sec-Butylbenzene	mg/kg	ND	0.20	12/15/15 05:00	
Styrene	mg/kg	ND	0.20	12/15/15 05:00	
tert-Butylbenzene	mg/kg	ND	0.20	12/15/15 05:00	
Tetrachloroethene	mg/kg	ND	0.050	12/15/15 05:00	
Tetrahydrofuran	mg/kg	ND	2.0	12/15/15 05:00	
Toluene	mg/kg	ND	0.050	12/15/15 05:00	
trans-1,2-Dichloroethene	mg/kg	ND	0.050	12/15/15 05:00	
trans-1,3-Dichloropropene	mg/kg	ND	0.20	12/15/15 05:00	
Trichloroethene	mg/kg	ND	0.050	12/15/15 05:00	
Trichlorofluoromethane	mg/kg	ND	0.20	12/15/15 05:00	
Vinyl chloride	mg/kg	ND	0.020	12/15/15 05:00	
Xylene (Total)	mg/kg	ND	0.15	12/15/15 05:00	
1,2-Dichloroethane-d4 (S)	%.	89	55-150	12/15/15 05:00	
4-Bromofluorobenzene (S)	%.	97	54-131	12/15/15 05:00	
Toluene-d8 (S)	%.	99	61-125	12/15/15 05:00	

LABORATORY CONTROL SAMPLE: 2155461

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	mg/kg	1	0.87	87	75-125	
1,1,1-Trichloroethane	mg/kg	1	0.91	91	66-125	
1,1,2,2-Tetrachloroethane	mg/kg	1	0.61	61	69-125	L0
1,1,2-Trichloroethane	mg/kg	1	0.87	87	75-125	
1,1,2-Trichlorotrifluoroethane	mg/kg	1	0.88	88	55-125	
1,1-Dichloroethane	mg/kg	1	0.83	83	67-125	
1,1-Dichloroethene	mg/kg	1	0.86	86	62-125	
1,1-Dichloropropene	mg/kg	1	0.82	82	65-125	
1,2,3-Trichlorobenzene	mg/kg	1	0.88	88	58-132	
1,2,3-Trichloropropane	mg/kg	1	0.70	70	71-125	L0
1,2,4-Trichlorobenzene	mg/kg	1	0.87	87	63-128	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

LABORATORY CONTROL SAMPLE: 2155461

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trimethylbenzene	mg/kg	1	0.91	91	74-125	
1,2-Dibromo-3-chloropropane	mg/kg	2.5	1.9	75	55-142	
1,2-Dibromoethane (EDB)	mg/kg	1	0.82	82	75-125	
1,2-Dichlorobenzene	mg/kg	1	0.85	85	75-125	
1,2-Dichloroethane	mg/kg	1	0.82	82	71-125	
1,2-Dichloropropane	mg/kg	1	0.86	86	74-125	
1,3,5-Trimethylbenzene	mg/kg	1	0.89	89	72-125	
1,3-Dichlorobenzene	mg/kg	1	0.91	91	75-125	
1,3-Dichloropropane	mg/kg	1	0.82	82	75-125	
1,4-Dichlorobenzene	mg/kg	1	0.86	86	75-125	
2,2-Dichloropropane	mg/kg	1	0.76	76	45-125	
2-Butanone (MEK)	mg/kg	5	3.5	69	39-136	
2-Chlorotoluene	mg/kg	1	0.88	88	73-125	
4-Chlorotoluene	mg/kg	1	0.83	83	74-125	
4-Methyl-2-pentanone (MIBK)	mg/kg	5	3.8	76	55-132	
Acetone	mg/kg	5	5.3	105	55-131	
Allyl chloride	mg/kg	1	0.85	85	53-125	
Benzene	mg/kg	1	0.85	85	69-125	
Bromobenzene	mg/kg	1	0.80	80	75-125	
Bromochloromethane	mg/kg	1	0.89	89	75-125	
Bromodichloromethane	mg/kg	1	0.88	88	75-125	
Bromoform	mg/kg	1	0.83	83	71-125	
Bromomethane	mg/kg	1	0.81	81	42-150	
Carbon tetrachloride	mg/kg	1	0.88	88	62-125	
Chlorobenzene	mg/kg	1	0.86	86	75-125	
Chloroethane	mg/kg	1	0.68	68	41-150	
Chloroform	mg/kg	1	0.83	83	72-125	
Chloromethane	mg/kg	1	0.71	71	50-125	
cis-1,2-Dichloroethene	mg/kg	1	0.90	90	73-125	
cis-1,3-Dichloropropene	mg/kg	1	0.84	84	74-125	
Dibromochloromethane	mg/kg	1	0.87	87	75-125	
Dibromomethane	mg/kg	1	0.95	95	75-125	
Dichlorodifluoromethane	mg/kg	1	0.45	45	30-125	
Dichlorofluoromethane	mg/kg	1	0.70	70	30-150	
Diethyl ether (Ethyl ether)	mg/kg	1	0.91	91	58-125	
Ethylbenzene	mg/kg	1	0.87	87	72-125	
Hexachloro-1,3-butadiene	mg/kg	1	0.81	81	59-138	
Isopropylbenzene (Cumene)	mg/kg	1	0.93	93	72-125	
Methyl-tert-butyl ether	mg/kg	1	0.81	81	72-125	
Methylene Chloride	mg/kg	1	0.86	86	71-125	
n-Butylbenzene	mg/kg	1	0.76	76	65-125	
n-Propylbenzene	mg/kg	1	0.91	91	71-125	
Naphthalene	mg/kg	1	0.84	84	55-139	
p-Isopropyltoluene	mg/kg	1	0.79	79	69-125	
sec-Butylbenzene	mg/kg	1	0.88	88	68-125	
Styrene	mg/kg	1	0.88	88	75-125	
tert-Butylbenzene	mg/kg	1	1.0	100	70-125	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

LABORATORY CONTROL SAMPLE: 2155461

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Tetrachloroethene	mg/kg	1	0.92	92	69-125	
Tetrahydrofuran	mg/kg	10	9.2	92	62-129	
Toluene	mg/kg	1	0.84	84	72-125	
trans-1,2-Dichloroethene	mg/kg	1	0.88	88	68-125	
trans-1,3-Dichloropropene	mg/kg	1	0.82	82	74-125	
Trichloroethene	mg/kg	1	0.98	98	72-125	
Trichlorofluoromethane	mg/kg	1	0.85	85	30-150	
Vinyl chloride	mg/kg	1	0.79	79	53-125	
Xylene (Total)	mg/kg	3	2.6	88	74-125	
1,2-Dichloroethane-d4 (S)	%.			97	55-150	
4-Bromofluorobenzene (S)	%.			98	54-131	
Toluene-d8 (S)	%.			99	61-125	

MATRIX SPIKE SAMPLE: 2155704

Parameter	Units	10332893003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	mg/kg	ND	1	0.87	81	62-150	
1,1,1-Trichloroethane	mg/kg	ND	1	0.77	71	58-150	
1,1,2,2-Tetrachloroethane	mg/kg	ND	1	0.67	62	30-150	
1,1,2-Trichloroethane	mg/kg	ND	1	0.86	80	61-149	
1,1,2-Trichlorotrifluoroethane	mg/kg	ND	1	0.63	59	45-150	
1,1-Dichloroethane	mg/kg	ND	1	0.71	66	56-150	
1,1-Dichloroethene	mg/kg	ND	1	0.63	59	48-150	
1,1-Dichloropropene	mg/kg	ND	1	0.75	69	58-150	
1,2,3-Trichlorobenzene	mg/kg	ND	1	0.88	82	55-150	
1,2,3-Trichloropropane	mg/kg	ND	1	0.71	66	57-148	
1,2,4-Trichlorobenzene	mg/kg	ND	1	0.85	79	61-150	
1,2,4-Trimethylbenzene	mg/kg	ND	1	0.92	85	64-150	
1,2-Dibromo-3-chloropropane	mg/kg	ND	2.7	2.0	74	40-150	
1,2-Dibromoethane (EDB)	mg/kg	ND	1	0.83	77	62-147	
1,2-Dichlorobenzene	mg/kg	ND	1	0.84	78	73-133	
1,2-Dichloroethane	mg/kg	ND	1	0.79	73	63-132	
1,2-Dichloropropane	mg/kg	ND	1	0.78	72	69-127	
1,3,5-Trimethylbenzene	mg/kg	ND	1	0.88	82	63-137	
1,3-Dichlorobenzene	mg/kg	ND	1	0.87	81	69-133	
1,3-Dichloropropane	mg/kg	ND	1	0.78	72	70-130	
1,4-Dichlorobenzene	mg/kg	ND	1	0.85	79	69-130	
2,2-Dichloropropane	mg/kg	ND	1	0.65	60	54-135	
2-Butanone (MEK)	mg/kg	ND	5.4	3.3	62	49-145	
2-Chlorotoluene	mg/kg	ND	1	0.87	81	68-129	
4-Chlorotoluene	mg/kg	ND	1	0.84	78	67-134	
4-Methyl-2-pentanone (MIBK)	mg/kg	ND	5.4	3.7	68	60-150	
Acetone	mg/kg	ND	5.4	5.1	93	65-135	
Allyl chloride	mg/kg	ND	1	0.67	63	55-126	
Benzene	mg/kg	ND	1	0.78	73	63-126	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

MATRIX SPIKE SAMPLE: 2155704

Parameter	Units	10332893003 Result	Spike Conc.	MS Result	MS % Rec	% Rec Limits	Qualifiers
Bromobenzene	mg/kg	ND	1	0.80	75	68-133	
Bromochloromethane	mg/kg	ND	1	0.81	75	66-130	
Bromodichloromethane	mg/kg	ND	1	0.80	74	68-129	
Bromoform	mg/kg	ND	1	0.82	76	63-135	
Bromomethane	mg/kg	ND	1	0.62	58	30-150	
Carbon tetrachloride	mg/kg	ND	1	0.81	76	56-140	
Chlorobenzene	mg/kg	ND	1	0.84	78	69-130	
Chloroethane	mg/kg	ND	1	0.57	53	46-150	
Chloroform	mg/kg	ND	1	0.74	69	70-127	M1
Chloromethane	mg/kg	ND	1	0.29	27	51-125	M1
cis-1,2-Dichloroethene	mg/kg	ND	1	0.80	74	68-125	
cis-1,3-Dichloropropene	mg/kg	ND	1	0.83	77	67-126	
Dibromochloromethane	mg/kg	ND	1	0.82	77	66-135	
Dibromomethane	mg/kg	ND	1	0.84	78	68-132	
Dichlorodifluoromethane	mg/kg	ND	1	.049J	5	30-138	M1
Dichlorofluoromethane	mg/kg	ND	1	0.69	64	30-150	
Diethyl ether (Ethyl ether)	mg/kg	ND	1	0.79	74	56-135	
Ethylbenzene	mg/kg	ND	1	0.88	82	69-126	
Hexachloro-1,3-butadiene	mg/kg	ND	1	0.83	77	50-150	
Isopropylbenzene (Cumene)	mg/kg	ND	1	1.0	96	65-135	
Methyl-tert-butyl ether	mg/kg	ND	1	0.73	68	66-129	
Methylene Chloride	mg/kg	ND	1	0.84	78	64-125	
n-Butylbenzene	mg/kg	ND	1	0.76	71	62-141	
n-Propylbenzene	mg/kg	ND	1	0.93	86	65-135	
Naphthalene	mg/kg	ND	1	0.84	78	62-150	
p-Isopropyltoluene	mg/kg	ND	1	0.75	70	62-139	
sec-Butylbenzene	mg/kg	ND	1	0.99	92	64-137	
Styrene	mg/kg	ND	1	0.94	87	70-132	
tert-Butylbenzene	mg/kg	ND	1	1.0	96	65-136	
Tetrachloroethene	mg/kg	ND	1	0.92	85	61-142	
Tetrahydrofuran	mg/kg	ND	10.7	9.0	82	68-138	
Toluene	mg/kg	ND	1	0.84	78	66-128	
trans-1,2-Dichloroethene	mg/kg	ND	1	0.70	65	63-129	
trans-1,3-Dichloropropene	mg/kg	ND	1	0.82	76	67-132	
Trichloroethene	mg/kg	ND	1	0.91	85	52-150	
Trichlorofluoromethane	mg/kg	ND	1	0.75	70	39-150	
Vinyl chloride	mg/kg	ND	1	0.46	43	50-125	M1
Xylene (Total)	mg/kg	ND	3.2	2.8	86	70-130	
1,2-Dichloroethane-d4 (S)	%.				92	55-150	
4-Bromofluorobenzene (S)	%.				97	54-131	
Toluene-d8 (S)	%.				101	61-125	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
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Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

SAMPLE DUPLICATE: 2155700

Parameter	Units	10332893002 Result	Dup Result	RPD	Max RPD	Qualifiers
1,1,1,2-Tetrachloroethane	mg/kg	ND	ND		30	
1,1,1-Trichloroethane	mg/kg	ND	ND		30	
1,1,2,2-Tetrachloroethane	mg/kg	ND	ND		30	
1,1,2-Trichloroethane	mg/kg	ND	ND		30	
1,1,2-Trichlorotrifluoroethane	mg/kg	ND	ND		30	
1,1-Dichloroethane	mg/kg	ND	ND		30	
1,1-Dichloroethene	mg/kg	ND	ND		30	
1,1-Dichloropropene	mg/kg	ND	ND		30	
1,2,3-Trichlorobenzene	mg/kg	ND	ND		30	
1,2,3-Trichloropropane	mg/kg	ND	ND		30	
1,2,4-Trichlorobenzene	mg/kg	ND	ND		30	
1,2,4-Trimethylbenzene	mg/kg	ND	ND		30	
1,2-Dibromo-3-chloropropane	mg/kg	ND	ND		30	
1,2-Dibromoethane (EDB)	mg/kg	ND	ND		30	
1,2-Dichlorobenzene	mg/kg	ND	ND		30	
1,2-Dichloroethane	mg/kg	ND	ND		30	
1,2-Dichloropropane	mg/kg	ND	ND		30	
1,3,5-Trimethylbenzene	mg/kg	ND	ND		30	
1,3-Dichlorobenzene	mg/kg	ND	ND		30	
1,3-Dichloropropane	mg/kg	ND	ND		30	
1,4-Dichlorobenzene	mg/kg	ND	ND		30	
2,2-Dichloropropane	mg/kg	ND	ND		30	
2-Butanone (MEK)	mg/kg	ND	ND		30	
2-Chlorotoluene	mg/kg	ND	ND		30	
4-Chlorotoluene	mg/kg	ND	ND		30	
4-Methyl-2-pentanone (MIBK)	mg/kg	ND	ND		30	
Acetone	mg/kg	ND	ND		30	
Allyl chloride	mg/kg	ND	ND		30	
Benzene	mg/kg	ND	ND		30	
Bromobenzene	mg/kg	ND	ND		30	
Bromochloromethane	mg/kg	ND	ND		30	
Bromodichloromethane	mg/kg	ND	ND		30	
Bromoform	mg/kg	ND	ND		30	
Bromomethane	mg/kg	ND	ND		30	
Carbon tetrachloride	mg/kg	ND	ND		30	
Chlorobenzene	mg/kg	ND	ND		30	
Chloroethane	mg/kg	ND	ND		30	
Chloroform	mg/kg	ND	ND		30	
Chloromethane	mg/kg	ND	ND		30	
cis-1,2-Dichloroethene	mg/kg	ND	ND		30	
cis-1,3-Dichloropropene	mg/kg	ND	ND		30	
Dibromochloromethane	mg/kg	ND	ND		30	
Dibromomethane	mg/kg	ND	ND		30	
Dichlorodifluoromethane	mg/kg	ND	ND		30	
Dichlorofluoromethane	mg/kg	ND	ND		30	
Diethyl ether (Ethyl ether)	mg/kg	ND	ND		30	
Ethylbenzene	mg/kg	ND	ND		30	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

SAMPLE DUPLICATE: 2155700

Parameter	Units	10332893002 Result	Dup Result	RPD	Max RPD	Qualifiers
Hexachloro-1,3-butadiene	mg/kg	ND	ND		30	
Isopropylbenzene (Cumene)	mg/kg	ND	ND		30	
Methyl-tert-butyl ether	mg/kg	ND	ND		30	
Methylene Chloride	mg/kg	ND	ND		30	
n-Butylbenzene	mg/kg	ND	ND		30	
n-Propylbenzene	mg/kg	ND	ND		30	
Naphthalene	mg/kg	ND	ND		30	
p-Isopropyltoluene	mg/kg	ND	ND		30	
sec-Butylbenzene	mg/kg	ND	ND		30	
Styrene	mg/kg	ND	ND		30	
tert-Butylbenzene	mg/kg	ND	ND		30	
Tetrachloroethene	mg/kg	ND	ND		30	
Tetrahydrofuran	mg/kg	ND	.22J		30	
Toluene	mg/kg	ND	ND		30	
trans-1,2-Dichloroethene	mg/kg	ND	ND		30	
trans-1,3-Dichloropropene	mg/kg	ND	ND		30	
Trichloroethene	mg/kg	ND	ND		30	
Trichlorofluoromethane	mg/kg	ND	ND		30	
Vinyl chloride	mg/kg	ND	ND		30	
Xylene (Total)	mg/kg	ND	ND		30	
1,2-Dichloroethane-d4 (S)	%.	89	89	10		
4-Bromofluorobenzene (S)	%.	98	100	12		
Toluene-d8 (S)	%.	100	98	8		

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

QC Batch: OEXT/31941 Analysis Method: EPA 8270D by SIM
QC Batch Method: EPA 3550 Analysis Description: 8270D Solid PAH by SIM MSSV
Associated Lab Samples: 10332647001, 10332647002, 10332647003, 10332647004

METHOD BLANK: 2153249 Matrix: Solid
Associated Lab Samples: 10332647001, 10332647002, 10332647003, 10332647004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Acenaphthene	mg/kg	ND	0.010	12/15/15 09:34	
Acenaphthylene	mg/kg	ND	0.010	12/15/15 09:34	
Anthracene	mg/kg	ND	0.010	12/15/15 09:34	
Benzo(a)anthracene	mg/kg	ND	0.010	12/15/15 09:34	
Benzo(a)pyrene	mg/kg	ND	0.010	12/15/15 09:34	
Benzo(b)fluoranthene	mg/kg	ND	0.010	12/15/15 09:34	
Benzo(g,h,i)perylene	mg/kg	ND	0.010	12/15/15 09:34	
Benzo(k)fluoranthene	mg/kg	ND	0.010	12/15/15 09:34	
Chrysene	mg/kg	ND	0.010	12/15/15 09:34	
Dibenz(a,h)anthracene	mg/kg	ND	0.010	12/15/15 09:34	
Fluoranthene	mg/kg	ND	0.010	12/15/15 09:34	
Fluorene	mg/kg	ND	0.010	12/15/15 09:34	
Indeno(1,2,3-cd)pyrene	mg/kg	ND	0.010	12/15/15 09:34	
Naphthalene	mg/kg	ND	0.010	12/15/15 09:34	
Phenanthrene	mg/kg	ND	0.010	12/15/15 09:34	
Pyrene	mg/kg	ND	0.010	12/15/15 09:34	
2-Fluorobiphenyl (S)	%.	83	55-125	12/15/15 09:34	
p-Terphenyl-d14 (S)	%.	93	30-150	12/15/15 09:34	

LABORATORY CONTROL SAMPLE: 2153250

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Acenaphthene	mg/kg	.033	0.022	66	53-125	
Acenaphthylene	mg/kg	.033	0.021	64	53-125	
Anthracene	mg/kg	.033	0.029	88	61-125	
Benzo(a)anthracene	mg/kg	.033	0.024	73	62-125	
Benzo(a)pyrene	mg/kg	.033	0.027	80	64-125	
Benzo(b)fluoranthene	mg/kg	.033	0.027	80	66-125	
Benzo(g,h,i)perylene	mg/kg	.033	0.028	84	59-125	
Benzo(k)fluoranthene	mg/kg	.033	0.027	82	61-125	
Chrysene	mg/kg	.033	0.026	78	63-125	
Dibenz(a,h)anthracene	mg/kg	.033	0.028	84	59-125	
Fluoranthene	mg/kg	.033	0.026	78	64-125	
Fluorene	mg/kg	.033	0.025	76	57-125	
Indeno(1,2,3-cd)pyrene	mg/kg	.033	0.028	83	58-125	
Naphthalene	mg/kg	.033	0.023	68	52-125	
Phenanthrene	mg/kg	.033	0.026	79	60-125	
Pyrene	mg/kg	.033	0.025	74	63-125	
2-Fluorobiphenyl (S)	%.			75	55-125	
p-Terphenyl-d14 (S)	%.			86	30-150	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2153251 2153252

Parameter	Units	10332647001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Acenaphthene	mg/kg	ND	.037	.037	0.040	0.026	82	47	39-125	40	30	R1
Acenaphthylene	mg/kg	0.021	.037	.037	0.035	0.034	38	36	30-150	3	30	
Anthracene	mg/kg	0.046	.037	.037	0.060	0.043	37	-9	30-150	33	30	M1,R1
Benzo(a)anthracene	mg/kg	0.19	.037	.037	0.12	0.083	-188	-290	30-150	37	30	M1,R1
Benzo(a)pyrene	mg/kg	0.22	.037	.037	0.14	0.10	-221	-329	30-150	33	30	M1,R1
Benzo(b)fluoranthene	mg/kg	0.29	.037	.037	0.15	0.12	-373	-450	30-150	21	30	M1
Benzo(g,h,i)perylene	mg/kg	0.16	.037	.037	0.11	0.089	-136	-193	30-150	21	30	M1
Benzo(k)fluoranthene	mg/kg	0.12	.037	.037	0.10	0.067	-42	-135	30-150	41	30	M1,R1
Chrysene	mg/kg	0.22	.037	.037	0.12	0.091	-258	-348	30-150	31	30	M1,R1
Dibenz(a,h)anthracene	mg/kg	0.051	.037	.037	0.055	0.047	10	-10	30-150	15	30	M1
Fluoranthene	mg/kg	0.36	.037	.037	0.22	0.14	-382	-613	30-150	47	30	M1,R1
Fluorene	mg/kg	ND	.037	.037	0.036	0.030	76	59	30-146	19	30	
Indeno(1,2,3-cd)pyrene	mg/kg	0.13	.037	.037	0.097	0.078	-92	-143	30-150	22	30	M1
Naphthalene	mg/kg	ND	.037	.037	0.024	0.025	65	68	30-131	5	30	
Phenanthrene	mg/kg	0.13	.037	.037	0.14	0.074	29	-137	30-150	58	30	M1,R1
Pyrene	mg/kg	0.29	.037	.037	0.18	0.12	-303	-480	30-150	44	30	M1,R1
2-Fluorobiphenyl (S)	%.						70	72	55-125			
p-Terphenyl-d14 (S)	%.						77	79	30-150			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

QC Batch: OEXT/31949 Analysis Method: WI MOD DRO
QC Batch Method: WI MOD DRO Analysis Description: WIDRO GCS
Associated Lab Samples: 10332647001, 10332647002, 10332647003, 10332647004

METHOD BLANK: 2154024 Matrix: Solid
Associated Lab Samples: 10332647001, 10332647002, 10332647003, 10332647004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
WDRO C10-C28	mg/kg	ND	10.0	12/13/15 11:11	
n-Triacontane (S)	%.	67	50-150	12/13/15 11:11	

LABORATORY CONTROL SAMPLE & LCSD: 2154025 2154026

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
WDRO C10-C28	mg/kg	80	68.7	68.2	86	85	70-120	1	20	
n-Triacontane (S)	%.				94	85	50-150			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

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.

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.

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.

LABORATORIES

PASI-M	Pace Analytical Services - Minneapolis

ANALYTE QUALIFIERS

D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
D4	Sample was diluted due to the presence of high levels of target analytes.
L0	Analyte recovery in the laboratory control sample (LCS) was outside QC limits.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
M6	Matrix spike and Matrix spike duplicate recovery not evaluated against control limits due to sample dilution.
P3	Sample extract could not be concentrated to the routine final volume, resulting in elevated reporting limits.
R1	RPD value was outside control limits.
S4	Surrogate recovery not evaluated against control limits due to sample dilution.
T6	High boiling point hydrocarbons are present in the sample.

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: B1500394.00 1860 28th St. Mpls
Pace Project No.: 10332647

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10332647001	**TP-1 (2')**	WI MOD DRO	OEXT/31949	WI MOD DRO	GCSV/17483
10332647002	**TP-2 (1')**	WI MOD DRO	OEXT/31949	WI MOD DRO	GCSV/17483
10332647003	**TP-4 (1.5')**	WI MOD DRO	OEXT/31949	WI MOD DRO	GCSV/17483
10332647004	**TP-3 (5')**	WI MOD DRO	OEXT/31949	WI MOD DRO	GCSV/17483
10332647001	**TP-1 (2')**	EPA 5030 Medium Soil	GCV/14746	WI MOD GRO	GCV/14748
10332647002	**TP-2 (1')**	EPA 5030 Medium Soil	GCV/14746	WI MOD GRO	GCV/14748
10332647003	**TP-4 (1.5')**	EPA 5030 Medium Soil	GCV/14746	WI MOD GRO	GCV/14748
10332647004	**TP-3 (5')**	EPA 5030 Medium Soil	GCV/14754	WI MOD GRO	GCV/14755
10332647001	**TP-1 (2')**	EPA 3050	MPRP/60230	EPA 6010C	ICP/26234
10332647002	**TP-2 (1')**	EPA 3050	MPRP/60230	EPA 6010C	ICP/26234
10332647003	**TP-4 (1.5')**	EPA 3050	MPRP/60230	EPA 6010C	ICP/26234
10332647004	**TP-3 (5')**	EPA 3050	MPRP/60230	EPA 6010C	ICP/26234
10332647001	**TP-1 (2')**	EPA 7471B	MERP/15464	EPA 7471B	MERC/18134
10332647002	**TP-2 (1')**	EPA 7471B	MERP/15464	EPA 7471B	MERC/18134
10332647003	**TP-4 (1.5')**	EPA 7471B	MERP/15464	EPA 7471B	MERC/18134
10332647004	**TP-3 (5')**	EPA 7471B	MERP/15464	EPA 7471B	MERC/18134
10332647001	**TP-1 (2')**	ASTM D2974	MPRP/60381		
10332647002	**TP-2 (1')**	ASTM D2974	MPRP/60381		
10332647003	**TP-4 (1.5')**	ASTM D2974	MPRP/60381		
10332647004	**TP-3 (5')**	ASTM D2974	MPRP/60381		
10332647001	**TP-1 (2')**	EPA 3550	OEXT/31941	EPA 8270D by SIM	MSSV/13588
10332647002	**TP-2 (1')**	EPA 3550	OEXT/31941	EPA 8270D by SIM	MSSV/13588
10332647003	**TP-4 (1.5')**	EPA 3550	OEXT/31941	EPA 8270D by SIM	MSSV/13588
10332647004	**TP-3 (5')**	EPA 3550	OEXT/31941	EPA 8270D by SIM	MSSV/13588
10332647001	**TP-1 (2')**	EPA 5035/5030B	MSV/34061	EPA 8260B	MSV/34082
10332647002	**TP-2 (1')**	EPA 5035/5030B	MSV/34061	EPA 8260B	MSV/34082
10332647003	**TP-4 (1.5')**	EPA 5035/5030B	MSV/34061	EPA 8260B	MSV/34082
10332647004	**TP-3 (5')**	EPA 5035/5030B	MSV/34061	EPA 8260B	MSV/34082
10332647005	**Trip (MeOH)**	EPA 5035/5030B	MSV/34061	EPA 8260B	MSV/34082

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CHAIN-OF-CUSTODY / Analytical Request Document

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

10332647

Page: 1 of 1

1734577

AEI Project No. 03-1225

Section A Required Client Information:

Company: BRAUN INTERTEC
Address: 1001 HAMPSHIRE AVE SO
BLOOMINGTON, MN 55438
Email To: TLenway@BraunIntertec.com
Phone: 612-618-6944 Fax: 952-995-2020
Requested Due Date/TAT: STANDARD

Section B Required Project Information:

Report To: TIM LENWAY
Copy To: SAME
Purchase Order No.:
Project Name: 1860 28TH ST., MPLS, MN.
Project Number: B500394.00

Section C Invoice Information:

Attention: ERIN CAMPBELL
Company Name:
Address: SAME
Pace Quote Reference:
Pace Project Manager:
Pace Profile #:

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: MN

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information — SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	Matrix Codes MATRIX / CODE	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Y/N	Analysis Test: 6010	8260	VOCs	8RCRA	PAHs	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	TP-1 (2')	Drinking Water DW, Water WT, Waste Water WW, Product P, Soil/Solid SL, Oil OL, Wipe WP, Air AR, Tissue TS, Other OT	SL		12/8/15	1030				5										X	X	X	X	X		
2	TP-2 (1')		↓		↓	1200				5										X	X	X	X	X		
3	TP-4 (1.5)					1415				5										X	X	X	X	X		
4	TP-3 (5')		↓		↓	1500				5										X	X	X	X	X		
5	Tr.P (MeOH)									1																
6																										
7																										
8																										
9																										
10																										
11																										
12																										

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS			
	Dan Chelstrom	12/9/15		BL	12/9/15	0930	0.1	Y	N	Y
	Cameron Pace/BL	12/9/15	1400	Joe Smith / Pace	12.9.15	1400				
	Joe Smith / Pace	12.9.15	1500	[illegible] / PACE	12.9.15	1500	1.2	Y	N	Y

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Dan Chelstrom

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY): 12/9/15

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

ORIGINAL

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-Q-020rev.07, 15-May-2007

Pace Analytical®	Document Name: **BLM Sample Condition Upon Receipt Form**	Document Revised: 19Mar2015 Page 1 of 1
	Document No.: **F-MN-C-161-rev.01**	Issuing Authority: Pace Minnesota Quality Office

Sample Condition Upon Receipt

Client Name: Braun Intertec

Project #: WO# : 10332647

10332647

Courier: ☐ Fed Ex ☐ UPS ☐ USPS ☒ Client ☐ Commercial ☐ Pace ☐ Spee Dee ☐ Other:

Tracking Number:

Custody Seal on Cooler/Box Present? ☐ Yes ☒ No **Seals Intact?** ☐ Yes ☒ No

Optional: Proj. Due Date: Proj. Name:

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

Thermom. Used: ☒ B88A0143310092 **Type of Ice:** ☒ Wet ☐ Blue ☐ None ☐ Samples on ice, cooling process has begun

Cooler Temp Read (°C): 0.6 **Cooler Temp Corrected (°C):** 0.1 **Biological Tissue Frozen?** ☐ Yes ☐ No ☒ N/A

Temp should be above freezing to 6°C **Correction Factor:** −0.5 **Date and Initials of Person Examining Contents:** CE 12-9-15

				Comments:
Chain of Custody Present?	☒ Yes	☐ No	☐ N/A	1.
Chain of Custody Filled Out?	☒ Yes	☐ No	☐ N/A	2.
Chain of Custody Relinquished?	☒ Yes	☐ No	☐ N/A	3.
Sampler Name and/or Signature on COC?	☒ Yes	☐ No	☐ N/A	4.
Samples Arrived within Hold Time?	☒ Yes	☐ No	☐ N/A	5.
Short Hold Time Analysis (<72 hr)?	☐ Yes	☒ No	☐ N/A	6.
Rush Turn Around Time Requested?	☐ Yes	☒ No	☐ N/A	7.
Sufficient Volume?	☒ Yes	☐ No	☐ N/A	8.
Correct Containers Used?	☒ Yes	☐ No	☐ N/A	9.
-Pace Containers Used?	☒ Yes	☐ No	☐ N/A	
Containers Intact?	☒ Yes	☐ No	☐ N/A	10.
Filtered Volume Received for Dissolved Tests?	☐ Yes	☐ No	☒ N/A	11.
Sample Labels Match COC?	☒ Yes	☐ No	☐ N/A	12.
-Includes Date/Time/ID/Analysis Matrix: SL				
All containers needing acid/base preservation have been checked?	☐ Yes	☐ No	☒ N/A	13. ☐ HNO_3 ☐ H_2SO_4 ☐ NaOH ☐ HCl
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, HCl<2; NaOH >9 Sulfide, NaOH>12 Cyanide)	☐ Yes	☐ No	☒ N/A	Sample #
Exceptions: VOA, Coliform, TOC, Oil and Grease, DRO/8015 (water) DOC	☐ Yes	☒ No		Initial when completed: Lot # of added preservative:
Headspace in VOA Vials (>6mm)?	☐ Yes	☐ No	☒ N/A	14.
Trip Blank Present?	☒ Yes	☐ No	☐ N/A	15.
Trip Blank Custody Seals Present?	☐ Yes	☒ No	☐ 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:** Dec 9, 2015

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)

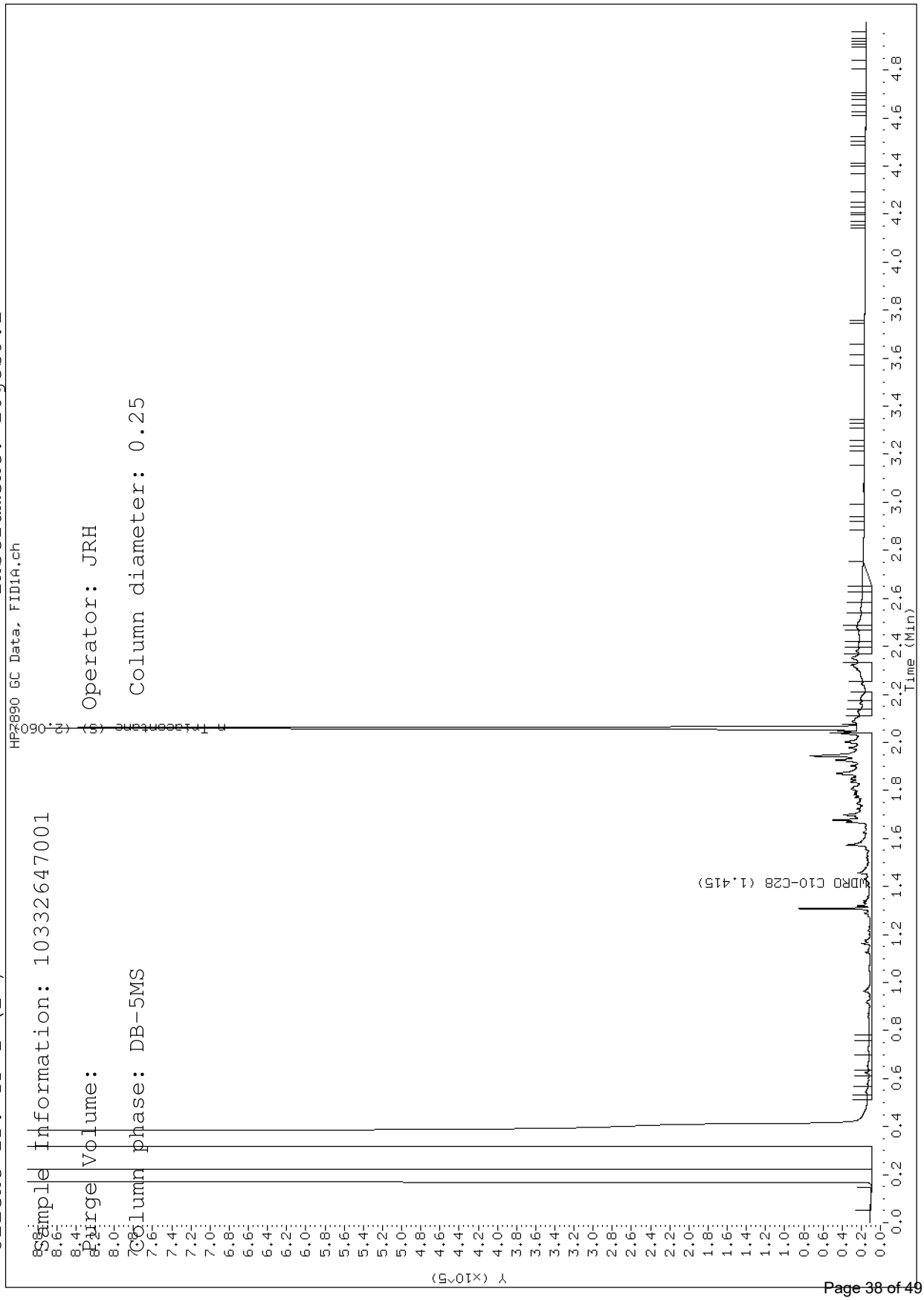
Data File: \\192.168.10.12\chem\10gcs9.i\121315dro.b/121315000021.D

Report Date: 12/13/2015

Sample ID: 10332647001

Client ID: TP-1 (2')

Instrument: 10gcs9.i



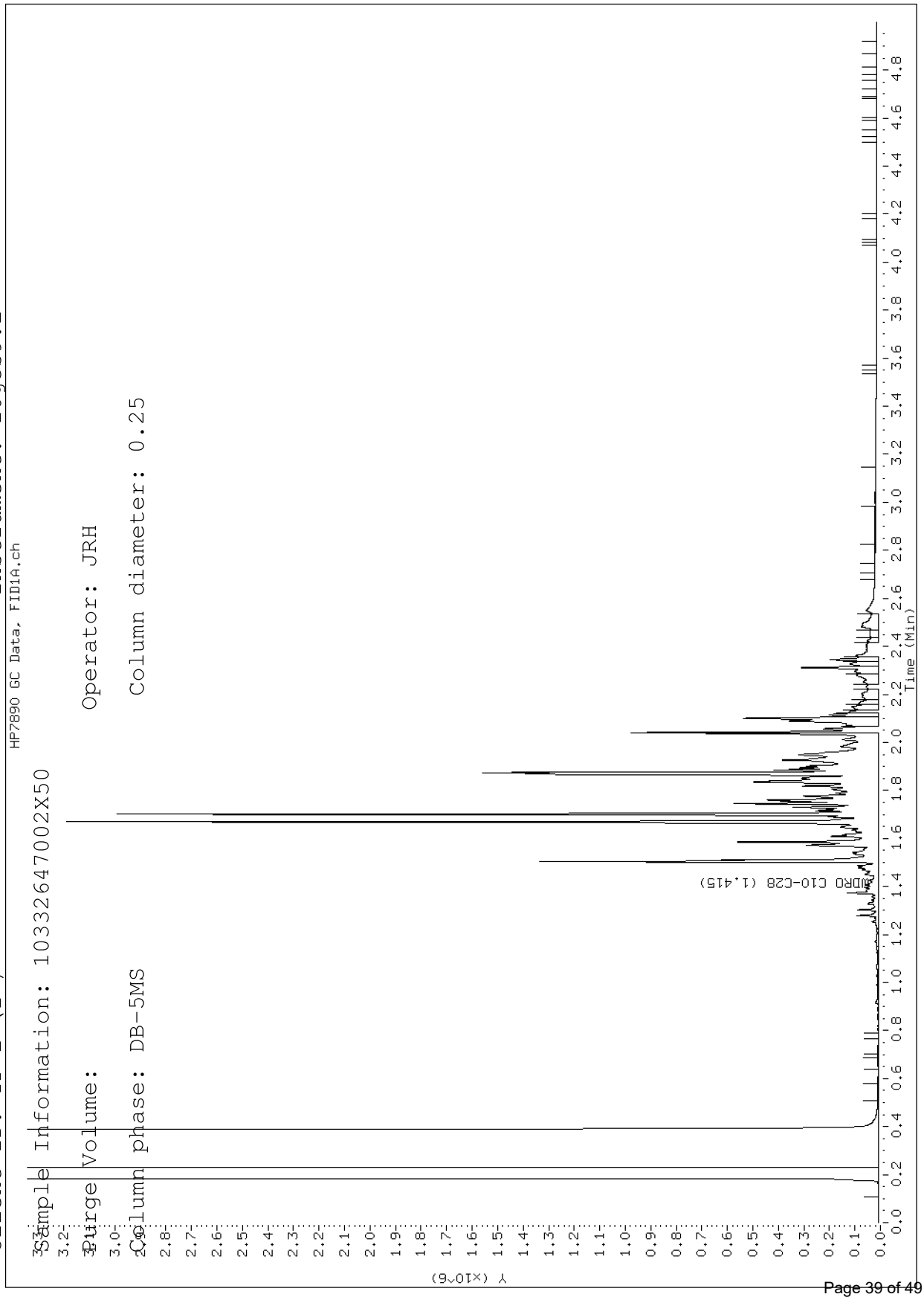
Data File: \\192.168.10.12\chem\10gcs9.i\121315dro.b/121315000034.D

Report Date: 12/13/2015

Sample ID: 10332647002

Client ID: TP-2 (1')

Instrument: 10gcs9.i



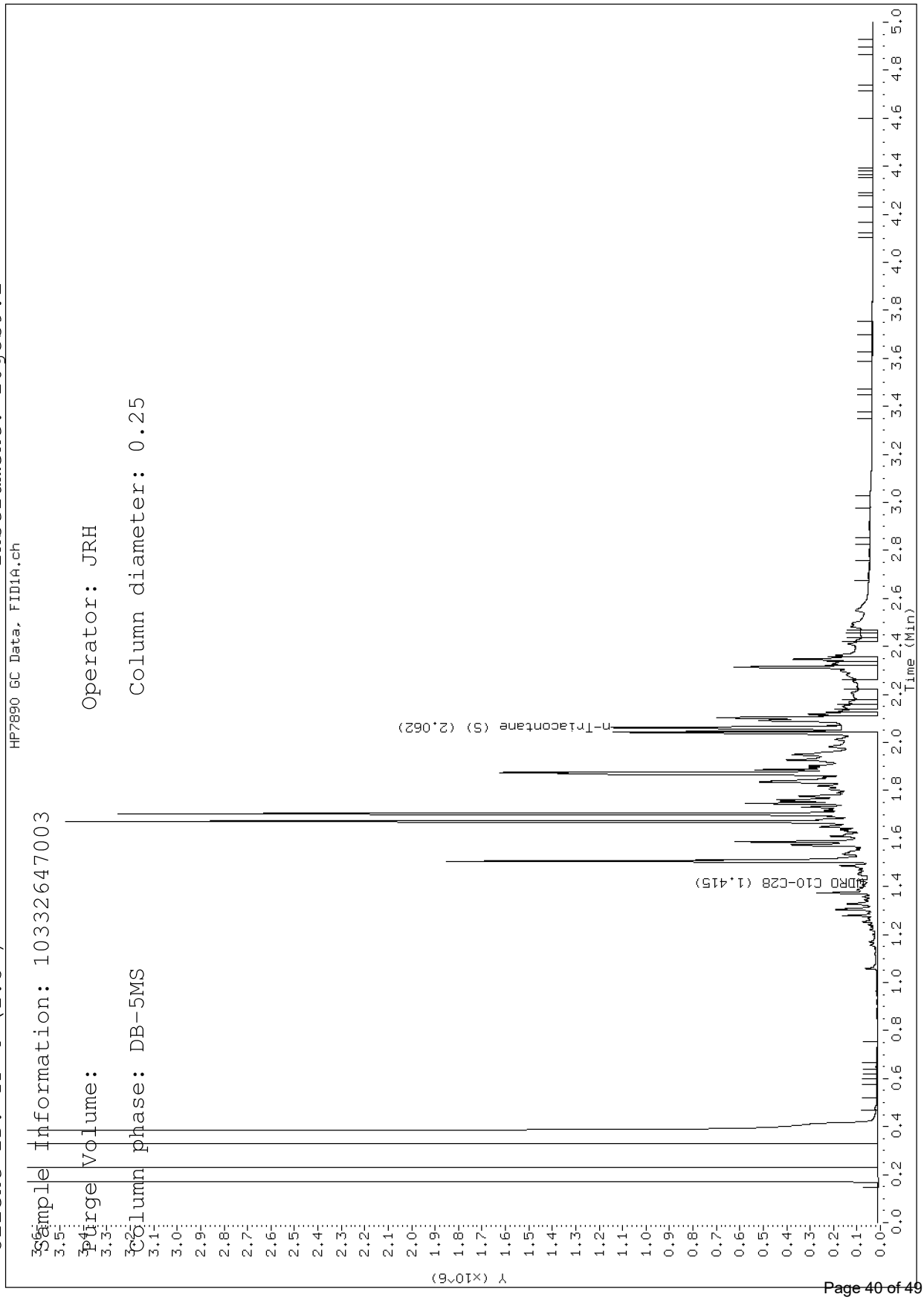
Data File: \\192.168.10.12\chem\10gcs9.i\121315dro.b/121315000014.D

Report Date: 12/13/2015

Sample ID: 103326647003

Client ID: TP-4 (1.5')

Instrument: 10gcs9.i



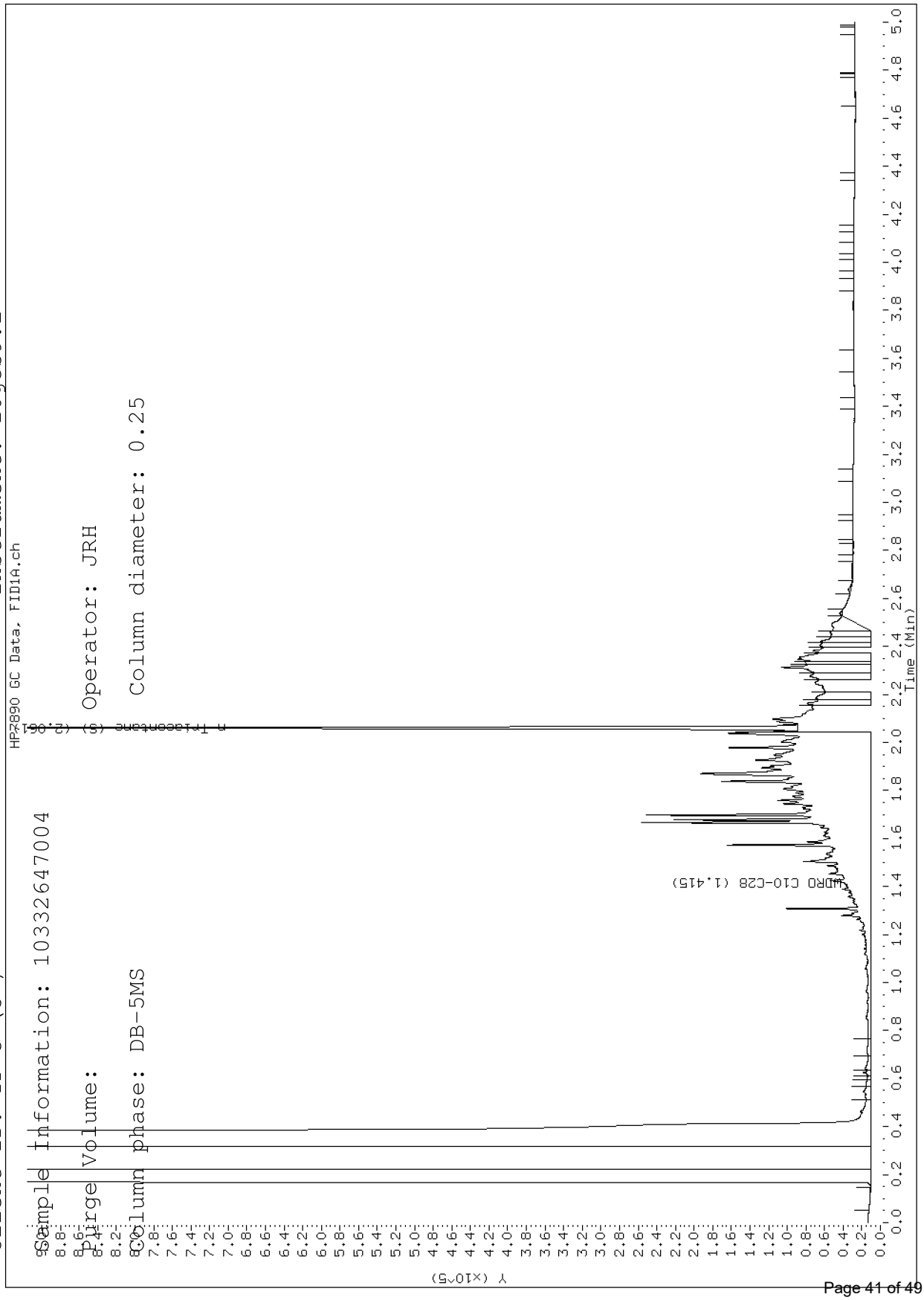
Data File: \\192.168.10.12\chem\10gcs9.i\121315dro.b/121315000015.D

Report Date: 12/13/2015

Sample ID: 103326647004

Client ID: TP-3 (5')

Instrument: 10gcs9.i



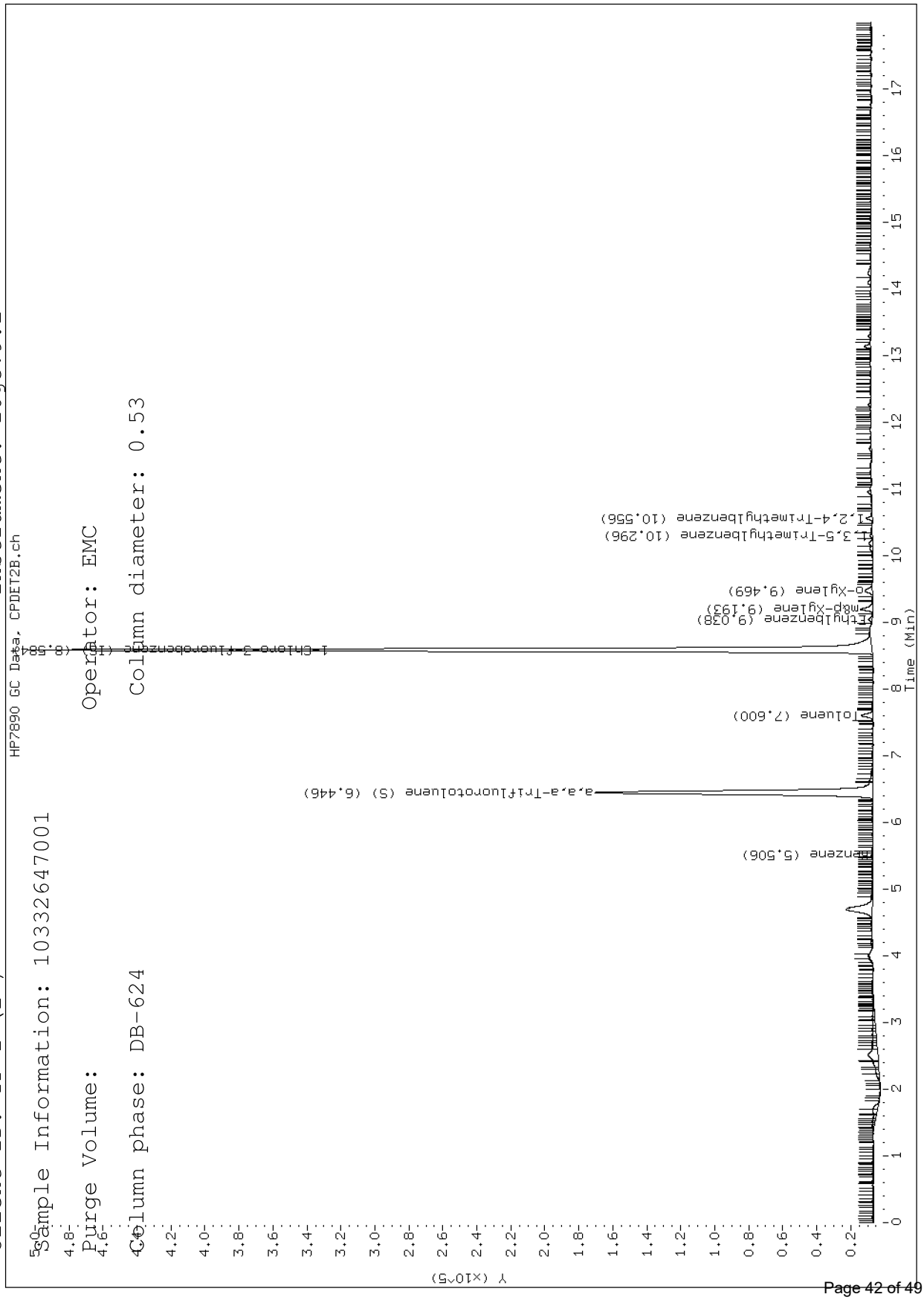
Data File: \\192.168.10.12\chem\10gcv9.i\121015-1.b/34426.d

Report Date: 12/15/2015

Sample ID: 103326647001

Client ID: TP-1 (2')

Instrument: 10gcv9.i



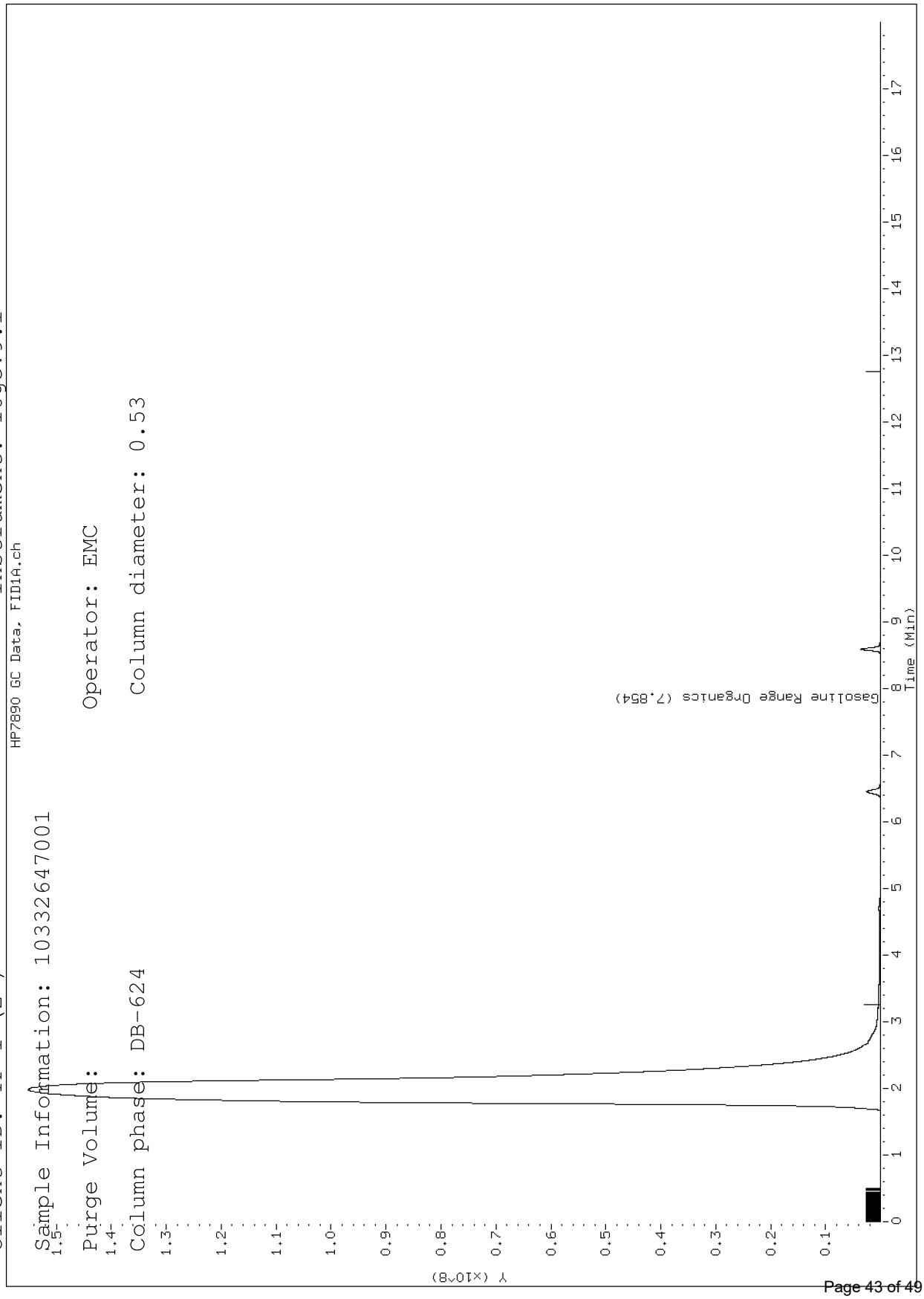
Data File: \\192.168.10.12\chem\10gcv9.i\121015-2.b/34426.d

Report Date: 12/15/2015

Sample ID: 103326647001

Client ID: TP-1 (2')

Instrument: 10gcv9.i



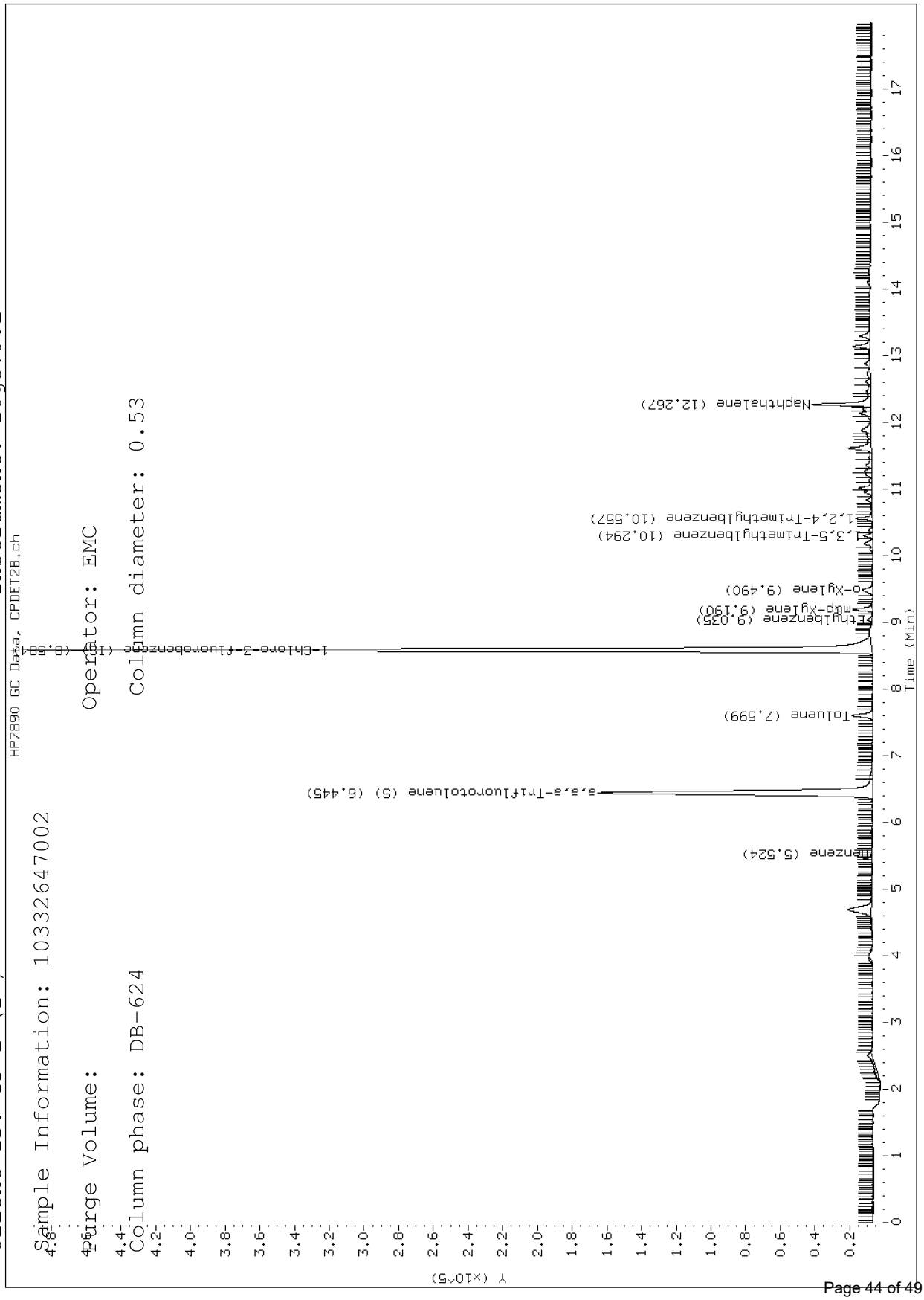
Data File: \\192.168.10.12\chem\10gcv9.i\121015-1.b/34416.d

Report Date: 12/15/2015

Sample ID: 10332647002

Client ID: TP-2 (1')

Instrument: 10gcv9.i



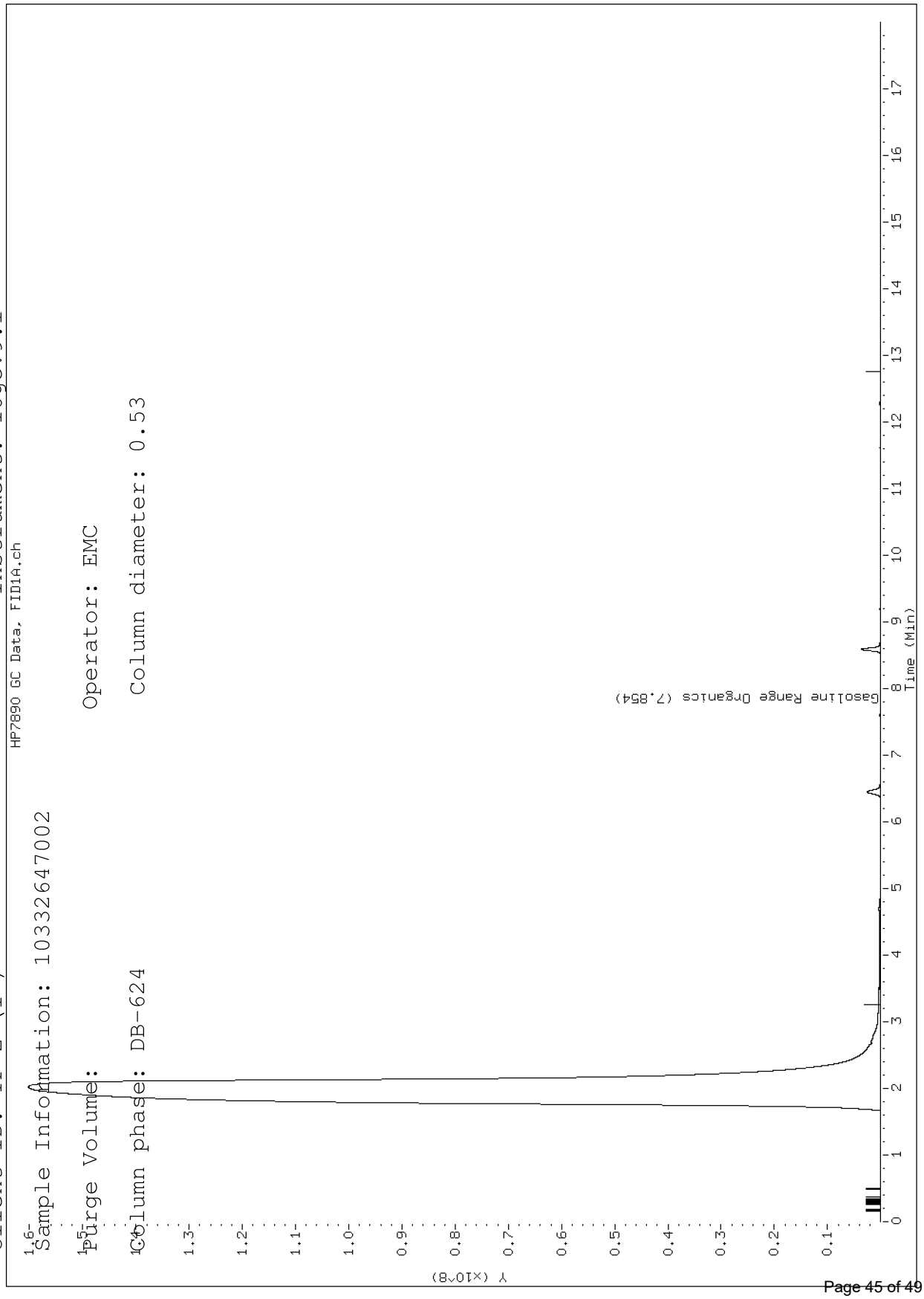
Data File: \\192.168.10.12\chem\10gcv9.i\121015-2.b/34416.d

Report Date: 12/15/2015

Sample ID: 10332647002

Client ID: TP-2 (1')

Instrument: 10gcv9.i



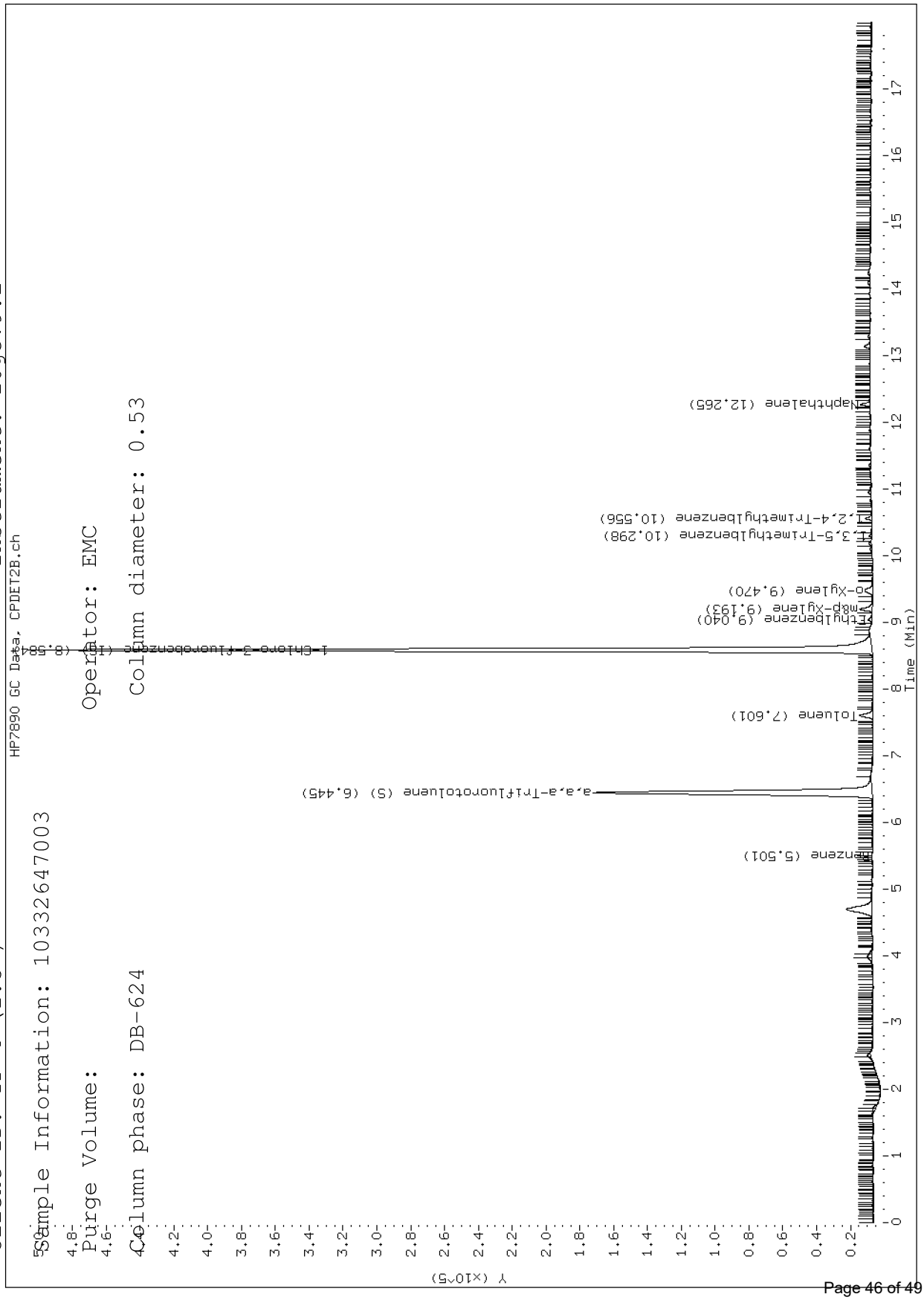
Data File: \\192.168.10.12\chem\10gcv9.i\121015-1.b/34427.d

Report Date: 12/15/2015

Sample ID: 10332647003

Client ID: TP-4 (1.5')

Instrument: 10gcv9.i



Data File: \\192.168.10.12\chem\10gcv9.i\121015-2.b/34427.d

Report Date: 12/15/2015

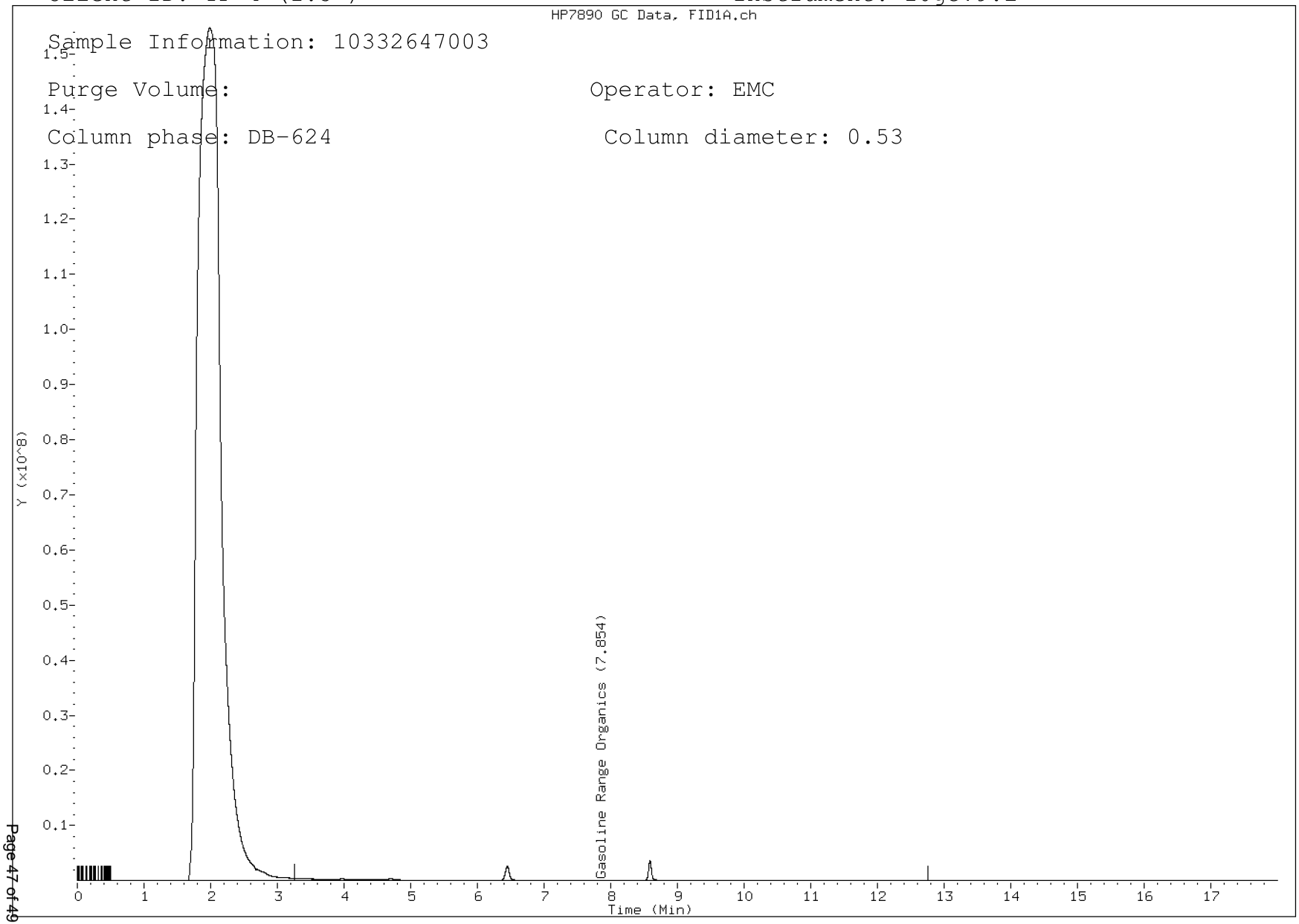
Sample ID: 10332647003

Client ID: TP-4 (1.5') Instrument: 10gcv9.i

Sample Information: 10332647003

Purge Volume: Operator: EMC

Column phase: DB-624 Column diameter: 0.53



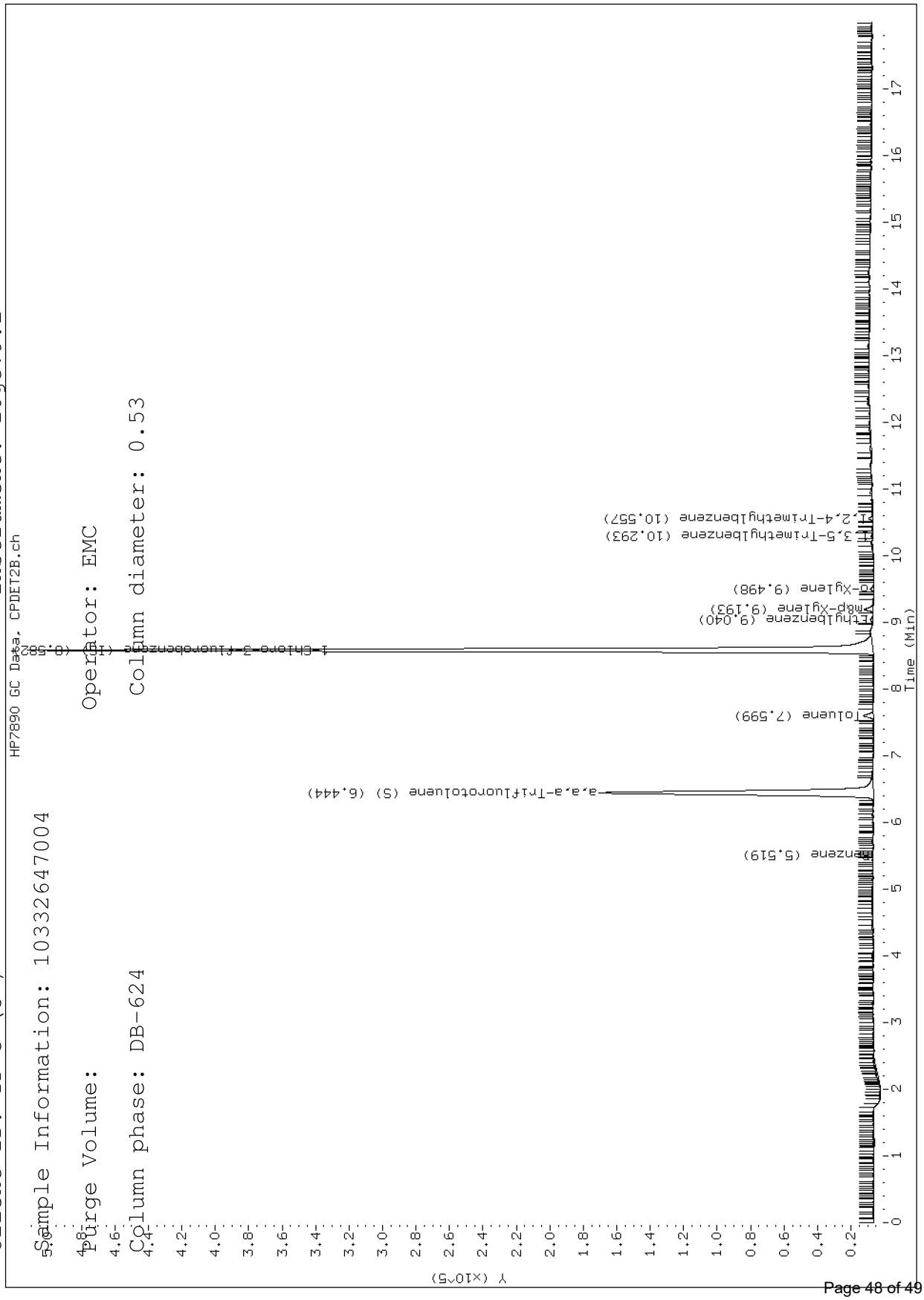
Data File: \\192.168.10.12\chem\10gcv9.i\121115-a1.b/345518.d

Report Date: 12/15/2015

Sample ID: 103326647004

Client ID: TP-3 (5')

Instrument: 10gcv9.i



Data File: \\192.168.10.12\chem\10gcv9.i\121115-a2.b/34518.d

Report Date: 12/15/2015

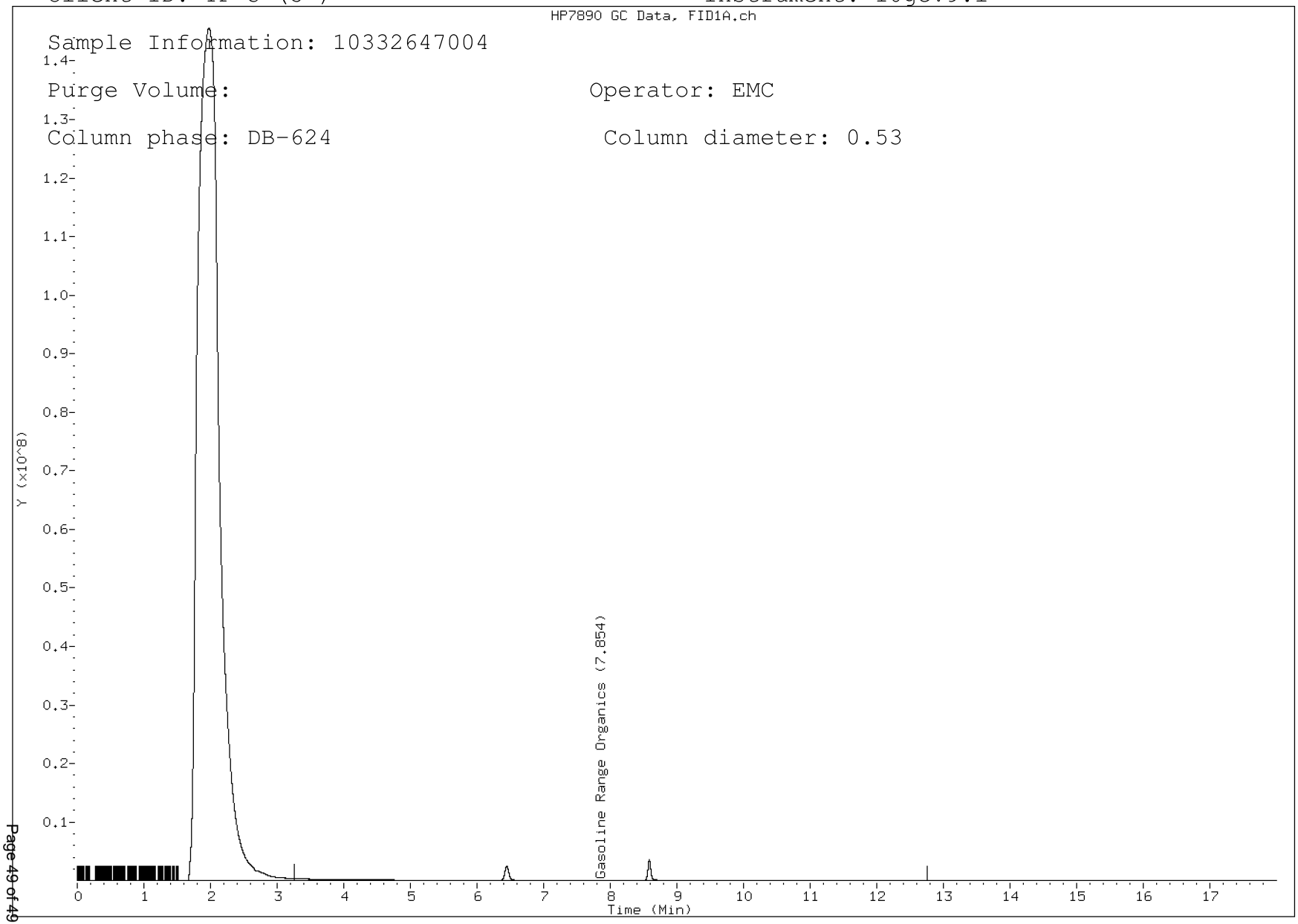
Sample ID: 10332647004

Client ID: TP-3 (5') Instrument: 10gcv9.i

Sample Information: 10332647004

Purge Volume: Operator: EMC

Column phase: DB-624 Column diameter: 0.53



Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

April 30, 2020

Justin Michael
Braun Intertec
11001 Hampshire Ave. S
Bloomington, MN 55438

RE: Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Dear Justin Michael:

Enclosed are the analytical results for sample(s) received by the laboratory on April 23, 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,

Bob Michels
bob.michels@pacelabs.com
(612)709-5046
Project Manager

Enclosures

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Pace Analytical Services Minneapolis

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
CNMI Saipan Certification #: MP0003
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8+Wyoming DW Certification #: via MN 027-053-137
Florida Certification #: E87605
Georgia Certification #: 959
Guam EPA Certification #: MN00064
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 #: 03086
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064
Maryland Certification #: 322
Massachusetts Certification #: M-MN064
Massachusetts DWP Certification #: via MN 027-053-137
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137
Minnesota Dept of Ag Certifcation #: 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

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10515771001	PP-15 (0-2)	Solid	04/21/20 12:38	04/23/20 15:55
10515771002	PP-15 (5-5.5)	Solid	04/21/20 12:40	04/23/20 15:55
10515771003	PP-15 (7.5-8)	Solid	04/21/20 12:42	04/23/20 15:55
10515771004	PP-15 (9.5-10)	Solid	04/21/20 12:44	04/23/20 15:55
10515771005	PP-16 (0-2)	Solid	04/21/20 12:02	04/23/20 15:55
10515771006	PP-16 (2-4)	Solid	04/21/20 12:04	04/23/20 15:55
10515771007	PP-16 (5-5.5)	Solid	04/21/20 12:06	04/23/20 15:55
10515771008	PP-16 (7.5-8)	Solid	04/21/20 12:08	04/23/20 15:55
10515771009	PP-16 (9.5-10)	Solid	04/21/20 12:10	04/23/20 15:55
10515771010	PP-17 (0-2)	Solid	04/20/20 12:47	04/23/20 15:55
10515771011	PP-17 (2-4)	Solid	04/20/20 12:48	04/23/20 15:55
10515771012	PP-17 (5-5.5)	Solid	04/20/20 12:50	04/23/20 15:55
10515771013	PP-17 (7.5-8)	Solid	04/20/20 12:52	04/23/20 15:55
10515771014	PP-17 (9.5-10)	Solid	04/20/20 12:54	04/23/20 15:55
10515771015	PP-18 (0-2)	Solid	04/20/20 10:23	04/23/20 15:55
10515771016	PP-18 (2-4)	Solid	04/20/20 10:25	04/23/20 15:55
10515771017	PP-18 (5-5.5)	Solid	04/20/20 10:27	04/23/20 15:55
10515771018	PP-18 (7.5-8)	Solid	04/20/20 10:30	04/23/20 15:55
10515771019	PP-18 (9.5-10)	Solid	04/20/20 10:32	04/23/20 15:55
10515771020	PP-19 (0-2)	Solid	04/21/20 09:51	04/23/20 15:55
10515771021	PP-19 (2-4)	Solid	04/21/20 09:52	04/23/20 15:55
10515771022	PP-19 (5-5.5)	Solid	04/21/20 09:54	04/23/20 15:55
10515771023	PP-19 (7.5-8)	Solid	04/21/20 09:55	04/23/20 15:55
10515771024	PP-19 (9.5-10)	Solid	04/21/20 09:56	04/23/20 15:55
10515771025	PP-20 (0-2)	Solid	04/21/20 07:46	04/23/20 15:55
10515771026	PP-20 (2-4)	Solid	04/21/20 07:48	04/23/20 15:55
10515771027	PP-20 (5-5.5)	Solid	04/21/20 07:55	04/23/20 15:55
10515771028	PP-20 (7.5-8)	Solid	04/21/20 07:58	04/23/20 15:55
10515771029	PP-20 (9.5-10)	Solid	04/21/20 08:00	04/23/20 15:55
10515771030	PP-21 (0-2)	Solid	04/21/20 10:25	04/23/20 15:55
10515771031	PP-21 (2-4)	Solid	04/21/20 10:27	04/23/20 15:55
10515771032	PP-21 (5-5.5)	Solid	04/21/20 10:30	04/23/20 15:55
10515771033	PP-21 (7.5-8)	Solid	04/21/20 10:31	04/23/20 15:55
10515771034	PP-21 (9.5-10)	Solid	04/21/20 10:32	04/23/20 15:55
10515771035	PP-22 (0-2)	Solid	04/21/20 10:46	04/23/20 15:55
10515771036	PP-22 (2-4)	Solid	04/21/20 10:48	04/23/20 15:55
10515771037	PP-22 (5-5.5)	Solid	04/21/20 10:50	04/23/20 15:55

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10515771038	**PP-22 (7.5-8)**	Solid	04/21/20 10:52	04/23/20 15:55
10515771039	**PP-22 (9.5-10)**	Solid	04/21/20 10:54	04/23/20 15:55
10515771040	**PP-23 (0-2)**	Solid	04/21/20 13:48	04/23/20 15:55
10515771041	**PP-23 (2-4)**	Solid	04/21/20 13:50	04/23/20 15:55
10515771042	**PP-23 (5-5.5)**	Solid	04/21/20 13:53	04/23/20 15:55
10515771043	**PP-23 (7.5-8)**	Solid	04/21/20 13:55	04/23/20 15:55
10515771044	**PP-23 (9.5-10)**	Solid	04/21/20 13:57	04/23/20 15:55
10515771045	**PP-24 (0-2)**	Solid	04/21/20 11:35	04/23/20 15:55
10515771046	**PP-24 (5-5.5)**	Solid	04/21/20 11:42	04/23/20 15:55
10515771047	**PP-24 (7.5-8)**	Solid	04/21/20 11:44	04/23/20 15:55
10515771048	**PP-24 (9.5-10)**	Solid	04/21/20 11:46	04/23/20 15:55
10515771049	**PP-25 (0-2)**	Solid	04/21/20 13:35	04/23/20 15:55
10515771050	**PP-25 (2-4)**	Solid	04/21/20 13:37	04/23/20 15:55
10515771051	**PP-25 (5-5.5)**	Solid	04/21/20 13:38	04/23/20 15:55
10515771052	**PP-25 (7.5-8)**	Solid	04/21/20 13:39	04/23/20 15:55
10515771053	**PP-25 (9.5-10)**	Solid	04/21/20 13:40	04/23/20 15:55
10515771054	**PP-26 (0-2)**	Solid	04/21/20 14:12	04/23/20 15:55
10515771055	**PP-26 (2-4)**	Solid	04/21/20 14:14	04/23/20 15:55
10515771056	**PP-26 (5-5.5)**	Solid	04/21/20 14:16	04/23/20 15:55
10515771057	**PP-26 (7.5-8)**	Solid	04/21/20 14:18	04/23/20 15:55
10515771058	**PP-26 (9.5-10)**	Solid	04/21/20 14:20	04/23/20 15:55
10515771059	**PP-27 (0-2)**	Solid	04/21/20 11:08	04/23/20 15:55
10515771060	**PP-27 (2-4)**	Solid	04/21/20 11:10	04/23/20 15:55
10515771061	**PP-27 (5-5.5)**	Solid	04/21/20 11:13	04/23/20 15:55
10515771062	**PP-27 (7.5-8)**	Solid	04/21/20 11:15	04/23/20 15:55
10515771063	**PP-27 (9.5-10)**	Solid	04/21/20 11:17	04/23/20 15:55
10515771064	**PP-28 (0-2)**	Solid	04/20/20 13:40	04/23/20 15:55
10515771065	**PP-28 (2-4)**	Solid	04/20/20 13:45	04/23/20 15:55
10515771066	**PP-28 (5-5.5)**	Solid	04/20/20 13:47	04/23/20 15:55
10515771067	**PP-28 (7.5-8)**	Solid	04/20/20 13:50	04/23/20 15:55
10515771068	**PP-28 (9.5-10)**	Solid	04/20/20 13:52	04/23/20 15:55
10515771069	**PP-29 (0-2)**	Solid	04/22/20 09:43	04/23/20 15:55
10515771070	**PP-29 (2-4)**	Solid	04/22/20 09:46	04/23/20 15:55
10515771071	**PP-29 (5-5.5)**	Solid	04/22/20 09:47	04/23/20 15:55
10515771072	**PP-29 (7.5-8)**	Solid	04/22/20 09:48	04/23/20 15:55
10515771073	**PP-29 (9.5-10)**	Solid	04/22/20 09:49	04/23/20 15:55
10515771074	**PP-30 (0-2)**	Solid	04/22/20 10:05	04/23/20 15:55

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10515771075	PP-30 (2-4)	Solid	04/22/20 10:08	04/23/20 15:55
10515771076	PP-30 (5-5.5)	Solid	04/22/20 10:10	04/23/20 15:55
10515771077	PP-30 (7.5-8)	Solid	04/22/20 10:11	04/23/20 15:55
10515771078	PP-30 (9.5-10)	Solid	04/22/20 10:12	04/23/20 15:55
10515771079	PP-31 (0-2)	Solid	04/22/20 10:27	04/23/20 15:55
10515771080	PP-31 (2-4)	Solid	04/22/20 10:28	04/23/20 15:55
10515771081	PP-31 (5-5.5)	Solid	04/22/20 10:30	04/23/20 15:55
10515771082	PP-31 (7.5-8)	Solid	04/22/20 10:32	04/23/20 15:55
10515771083	PP-31 (9.5-10)	Solid	04/22/20 10:34	04/23/20 15:55
10515771084	PP-32 (0-2)	Solid	04/22/20 10:42	04/23/20 15:55
10515771085	PP-32 (2-4)	Solid	04/22/20 10:44	04/23/20 15:55
10515771086	PP-32 (5-5.5)	Solid	04/22/20 10:46	04/23/20 15:55
10515771087	PP-32 (7.5-8)	Solid	04/22/20 10:48	04/23/20 15:55
10515771088	PP-32 (9.5-10)	Solid	04/22/20 10:50	04/23/20 15:55
10515771089	PP-33 (0-2)	Solid	04/22/20 11:03	04/23/20 15:55
10515771090	PP-33 (2-4)	Solid	04/22/20 11:05	04/23/20 15:55
10515771091	PP-33 (5-5.5)	Solid	04/22/20 11:06	04/23/20 15:55
10515771092	PP-33 (7.5-8)	Solid	04/22/20 11:07	04/23/20 15:55
10515771093	PP-33 (9.5-10)	Solid	04/22/20 11:08	04/23/20 15:55
10515771094	PP-34 (0-2)	Solid	04/22/20 11:17	04/23/20 15:55
10515771095	PP-34 (2-4)	Solid	04/22/20 11:18	04/23/20 15:55
10515771096	PP-34 (5-5.5)	Solid	04/22/20 11:20	04/23/20 15:55
10515771097	PP-34 (7.5-8)	Solid	04/22/20 11:21	04/23/20 15:55
10515771098	PP-34 (9.5-10)	Solid	04/22/20 11:22	04/23/20 15:55
10515771099	PP-35 (0-2)	Solid	04/22/20 13:32	04/23/20 15:55
10515771100	PP-35 (2-4)	Solid	04/22/20 13:34	04/23/20 15:55
10515771101	PP-35 (5-5.5)	Solid	04/22/20 13:36	04/23/20 15:55
10515771102	PP-35 (7.5-8)	Solid	04/22/20 13:38	04/23/20 15:55
10515771103	PP-35 (9.5-10)	Solid	04/22/20 13:40	04/23/20 15:55
10515771104	PP-36 (0-2)	Solid	04/22/20 12:16	04/23/20 15:55
10515771105	PP-36 (2-4)	Solid	04/22/20 12:18	04/23/20 15:55
10515771106	PP-36 (5-5.5)	Solid	04/22/20 12:20	04/23/20 15:55
10515771107	PP-36 (7.5-8)	Solid	04/22/20 12:21	04/23/20 15:55
10515771108	PP-36 (9.5-10)	Solid	04/22/20 12:22	04/23/20 15:55
10515771109	Dup-1	Solid	04/20/20 12:00	04/23/20 15:55
10515771110	Dup-2	Solid	04/21/20 12:00	04/23/20 15:55
10515771111	Dup-3	Solid	04/21/20 12:00	04/23/20 15:55

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SAMPLE SUMMARY

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10515771112	**Dup-4**	Solid	04/21/20 12:00	04/23/20 15:55
10515771113	**Dup-5**	Solid	04/22/20 12:00	04/23/20 15:55

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SAMPLE ANALYTE COUNT

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10515771001	**PP-15 (0-2)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771002	**PP-15 (5-5.5)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771003	**PP-15 (7.5-8)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771004	**PP-15 (9.5-10)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771005	**PP-16 (0-2)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771006	**PP-16 (2-4)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771007	**PP-16 (5-5.5)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771008	**PP-16 (7.5-8)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771009	**PP-16 (9.5-10)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771010	**PP-17 (0-2)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771011	**PP-17 (2-4)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771012	**PP-17 (5-5.5)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771013	**PP-17 (7.5-8)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771014	**PP-17 (9.5-10)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771015	**PP-18 (0-2)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771016	**PP-18 (2-4)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771017	**PP-18 (5-5.5)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771018	**PP-18 (7.5-8)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771019	**PP-18 (9.5-10)**	EPA 6010D	DM	1	PASI-M

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SAMPLE ANALYTE COUNT

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		ASTM D2974	JDL	1	PASI-M
10515771020	PP-19 (0-2)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771021	PP-19 (2-4)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771022	PP-19 (5-5.5)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771023	PP-19 (7.5-8)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771024	PP-19 (9.5-10)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771025	PP-20 (0-2)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771026	PP-20 (2-4)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771027	PP-20 (5-5.5)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771028	PP-20 (7.5-8)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771029	PP-20 (9.5-10)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771030	PP-21 (0-2)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771031	PP-21 (2-4)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771032	PP-21 (5-5.5)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771033	PP-21 (7.5-8)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771034	PP-21 (9.5-10)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771035	PP-22 (0-2)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771036	PP-22 (2-4)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771037	PP-22 (5-5.5)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M

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SAMPLE ANALYTE COUNT

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10515771038	**PP-22 (7.5-8)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771039	**PP-22 (9.5-10)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771040	**PP-23 (0-2)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771041	**PP-23 (2-4)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771042	**PP-23 (5-5.5)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771043	**PP-23 (7.5-8)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771044	**PP-23 (9.5-10)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771045	**PP-24 (0-2)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771046	**PP-24 (5-5.5)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771047	**PP-24 (7.5-8)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771048	**PP-24 (9.5-10)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771049	**PP-25 (0-2)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771050	**PP-25 (2-4)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771051	**PP-25 (5-5.5)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771052	**PP-25 (7.5-8)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771053	**PP-25 (9.5-10)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771054	**PP-26 (0-2)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771055	**PP-26 (2-4)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771056	**PP-26 (5-5.5)**	EPA 6010D	DM	1	PASI-M

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SAMPLE ANALYTE COUNT

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		ASTM D2974	JDL	1	PASI-M
10515771057	PP-26 (7.5-8)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771058	PP-26 (9.5-10)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771059	PP-27 (0-2)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771060	PP-27 (2-4)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771061	PP-27 (5-5.5)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771062	PP-27 (7.5-8)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771063	PP-27 (9.5-10)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771064	PP-28 (0-2)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771065	PP-28 (2-4)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771066	PP-28 (5-5.5)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771067	PP-28 (7.5-8)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771068	PP-28 (9.5-10)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771069	PP-29 (0-2)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771070	PP-29 (2-4)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771071	PP-29 (5-5.5)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771072	PP-29 (7.5-8)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771073	PP-29 (9.5-10)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771074	PP-30 (0-2)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M

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SAMPLE ANALYTE COUNT

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10515771075	**PP-30 (2-4)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771076	**PP-30 (5-5.5)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771077	**PP-30 (7.5-8)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771078	**PP-30 (9.5-10)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771079	**PP-31 (0-2)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771080	**PP-31 (2-4)**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771081	**PP-31 (5-5.5)**	EPA 6010D	DCF	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771082	**PP-31 (7.5-8)**	EPA 6010D	DCF	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771083	**PP-31 (9.5-10)**	EPA 6010D	DCF	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771084	**PP-32 (0-2)**	EPA 6010D	DCF	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771085	**PP-32 (2-4)**	EPA 6010D	DCF	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771086	**PP-32 (5-5.5)**	EPA 6010D	DCF	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771087	**PP-32 (7.5-8)**	EPA 6010D	DCF	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771088	**PP-32 (9.5-10)**	EPA 6010D	DCF	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771089	**PP-33 (0-2)**	EPA 6010D	DCF	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771090	**PP-33 (2-4)**	EPA 6010D	DCF	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771091	**PP-33 (5-5.5)**	EPA 6010D	DCF	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771092	**PP-33 (7.5-8)**	EPA 6010D	DCF	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771093	**PP-33 (9.5-10)**	EPA 6010D	DCF	1	PASI-M

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SAMPLE ANALYTE COUNT

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
		ASTM D2974	JDL	1	PASI-M
10515771094	PP-34 (0-2)	EPA 6010D	DCF	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771095	PP-34 (2-4)	EPA 6010D	DCF	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771096	PP-34 (5-5.5)	EPA 6010D	DCF	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771097	PP-34 (7.5-8)	EPA 6010D	DCF	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771098	PP-34 (9.5-10)	EPA 6010D	DCF	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771099	PP-35 (0-2)	EPA 6010D	DCF	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771100	PP-35 (2-4)	EPA 6010D	DCF	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771101	PP-35 (5-5.5)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771102	PP-35 (7.5-8)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771103	PP-35 (9.5-10)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771104	PP-36 (0-2)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771105	PP-36 (2-4)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771106	PP-36 (5-5.5)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771107	PP-36 (7.5-8)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771108	PP-36 (9.5-10)	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771109	Dup-1	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771110	Dup-2	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771111	Dup-3	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M

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SAMPLE ANALYTE COUNT

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10515771112	**Dup-4**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
10515771113	**Dup-5**	EPA 6010D	DM	1	PASI-M
		ASTM D2974	JDL	1	PASI-M

PASI-M = Pace Analytical Services - Minneapolis

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PROJECT NARRATIVE

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Method: **EPA 6010D**
Description: 6010D MET ICP
Client: Braun Intertec Corporation
Date: April 30, 2020

General Information:
113 samples were analyzed for EPA 6010D 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.

Sample Preparation:
The samples were prepared in accordance with EPA 3050B 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.

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.

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-15 (0-2) **Lab ID: 10515771001** Collected: 04/21/20 12:38 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.6**	mg/kg	0.99	1	04/27/20 10:52	04/29/20 10:44	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**1.2**	%	0.10	1		04/24/20 11:29		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-15 (5-5.5) **Lab ID: 10515771002** Collected: 04/21/20 12:40 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.2**	mg/kg	0.98	1	04/27/20 10:52	04/29/20 10:52	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**1.6**	%	0.10	1		04/24/20 11:29		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-15 (7.5-8) **Lab ID: 10515771003** Collected: 04/21/20 12:42 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.3**	mg/kg	1.0	1	04/27/20 10:52	04/29/20 10:54	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**2.0**	%	0.10	1		04/24/20 11:29		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-15 (9.5-10) **Lab ID: 10515771004** Collected: 04/21/20 12:44 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.6**	mg/kg	0.96	1	04/27/20 10:52	04/29/20 10:56	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**4.7**	%	0.10	1		04/24/20 11:30		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-16 (0-2) **Lab ID: 10515771005** Collected: 04/21/20 12:02 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**3.3**	mg/kg	0.97	1	04/27/20 10:52	04/29/20 11:01	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**2.5**	%	0.10	1		04/24/20 11:30		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-16 (2-4) **Lab ID: 10515771006** Collected: 04/21/20 12:04 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**174**	mg/kg	1.1	1	04/27/20 10:52	04/29/20 11:02	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**15.4**	%	0.10	1		04/24/20 11:30		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-16 (5-5.5) **Lab ID: 10515771007** Collected: 04/21/20 12:06 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.4**	mg/kg	0.99	1	04/27/20 10:52	04/29/20 11:04	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**2.9**	%	0.10	1		04/24/20 11:30		N2

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-16 (7.5-8) **Lab ID: 10515771008** Collected: 04/21/20 12:08 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**3.6**	mg/kg	1.2	1	04/27/20 10:52	04/29/20 11:06	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**17.1**	%	0.10	1		04/24/20 11:30		N2

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-16 (9.5-10) **Lab ID: 10515771009** Collected: 04/21/20 12:10 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.9**	mg/kg	1.1	1	04/27/20 10:52	04/29/20 11:08	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**10.2**	%	0.10	1		04/24/20 11:31		N2

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-17 (0-2) **Lab ID: 10515771010** Collected: 04/20/20 12:47 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**5.0**	mg/kg	1.0	1	04/27/20 10:52	04/29/20 11:09	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**9.7**	%	0.10	1		04/24/20 11:31		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-17 (2-4) **Lab ID: 10515771011** Collected: 04/20/20 12:48 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**3.8**	mg/kg	1.1	1	04/27/20 10:52	04/29/20 11:11	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**13.9**	%	0.10	1		04/24/20 11:31		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-17 (5-5.5) **Lab ID: 10515771012** Collected: 04/20/20 12:50 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.7**	mg/kg	1.1	1	04/27/20 10:52	04/29/20 11:13	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**10.6**	%	0.10	1		04/24/20 11:31		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-17 (7.5-8) **Lab ID: 10515771013** Collected: 04/20/20 12:52 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.4**	mg/kg	0.99	1	04/27/20 10:52	04/29/20 11:14	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**3.4**	%	0.10	1		04/24/20 11:31		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-17 (9.5-10) **Lab ID: 10515771014** Collected: 04/20/20 12:54 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.4**	mg/kg	1.0	1	04/27/20 10:52	04/29/20 11:16	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**3.5**	%	0.10	1		04/24/20 11:32		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-18 (0-2) **Lab ID: 10515771015** Collected: 04/20/20 10:23 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.8**	mg/kg	1.0	1	04/27/20 10:52	04/29/20 11:21	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**9.9**	%	0.10	1		04/24/20 11:32		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-18 (2-4) **Lab ID: 10515771016** Collected: 04/20/20 10:25 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.2**	mg/kg	0.97	1	04/27/20 10:52	04/29/20 11:23	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**4.1**	%	0.10	1		04/24/20 11:33		N2

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-18 (5-5.5) **Lab ID: 10515771017** Collected: 04/20/20 10:27 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.3**	mg/kg	0.97	1	04/27/20 10:52	04/29/20 11:24	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**2.4**	%	0.10	1		04/24/20 12:28		N2

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-18 (7.5-8) **Lab ID: 10515771018** Collected: 04/20/20 10:30 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.5**	mg/kg	0.98	1	04/27/20 10:52	04/29/20 11:26	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**2.8**	%	0.10	1		04/24/20 12:28		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-18 (9.5-10) **Lab ID: 10515771019** Collected: 04/20/20 10:32 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.6**	mg/kg	0.95	1	04/27/20 10:52	04/29/20 11:28	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**2.9**	%	0.10	1		04/24/20 12:29		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-19 (0-2) **Lab ID: 10515771020** Collected: 04/21/20 09:51 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**4.1**	mg/kg	1.0	1	04/27/20 10:52	04/29/20 11:29	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**7.4**	%	0.10	1		04/24/20 12:29		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-19 (2-4) **Lab ID: 10515771021** Collected: 04/21/20 09:52 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.7**	mg/kg	1.1	1	04/27/20 10:52	04/29/20 11:36	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**11.5**	%	0.10	1		04/24/20 12:29		N2

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-19 (5-5.5) **Lab ID: 10515771022** Collected: 04/21/20 09:54 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.3**	mg/kg	1.1	1	04/27/20 10:52	04/29/20 11:48	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**8.9**	%	0.10	1		04/24/20 12:29		N2

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-19 (7.5-8) **Lab ID: 10515771023** Collected: 04/21/20 09:55 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.5**	mg/kg	1.0	1	04/27/20 10:52	04/29/20 11:49	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**4.5**	%	0.10	1		04/24/20 12:29		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-19 (9.5-10) **Lab ID: 10515771024** Collected: 04/21/20 09:56 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.8**	mg/kg	1.0	1	04/27/20 10:52	04/29/20 11:51	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**4.3**	%	0.10	1		04/24/20 12:29		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-20 (0-2) **Lab ID: 10515771025** Collected: 04/21/20 07:46 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**15.5**	mg/kg	1.1	1	04/27/20 10:52	04/29/20 11:53	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**15.1**	%	0.10	1		04/24/20 12:30		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-20 (2-4) **Lab ID: 10515771026** Collected: 04/21/20 07:48 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.4**	mg/kg	1.0	1	04/27/20 10:52	04/29/20 11:54	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**8.9**	%	0.10	1		04/24/20 12:30		N2

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-20 (5-5.5) **Lab ID: 10515771027** Collected: 04/21/20 07:55 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**3.1**	mg/kg	0.98	1	04/27/20 10:52	04/29/20 11:56	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**6.5**	%	0.10	1		04/24/20 12:30		N2

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-20 (7.5-8) **Lab ID: 10515771028** Collected: 04/21/20 07:58 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.7**	mg/kg	1.0	1	04/27/20 10:52	04/29/20 12:01	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**6.7**	%	0.10	1		04/24/20 12:30		N2

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-20 (9.5-10) **Lab ID: 10515771029** Collected: 04/21/20 08:00 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.2**	mg/kg	0.98	1	04/27/20 10:52	04/29/20 12:03	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**5.4**	%	0.10	1		04/24/20 12:30		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-21 (0-2) **Lab ID: 10515771030** Collected: 04/21/20 10:25 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.6**	mg/kg	1.0	1	04/27/20 10:52	04/29/20 12:05	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**5.8**	%	0.10	1		04/24/20 12:30		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-21 (2-4) **Lab ID: 10515771031** Collected: 04/21/20 10:27 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.0**	mg/kg	0.96	1	04/27/20 10:52	04/29/20 12:06	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**3.0**	%	0.10	1		04/24/20 12:30		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-21 (5-5.5) **Lab ID: 10515771032** Collected: 04/21/20 10:30 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.9**	mg/kg	0.97	1	04/27/20 10:52	04/29/20 12:08	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**2.6**	%	0.10	1		04/24/20 12:31		N2

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-21 (7.5-8) **Lab ID: 10515771033** Collected: 04/21/20 10:31 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.4**	mg/kg	0.99	1	04/27/20 10:52	04/29/20 12:10	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**2.1**	%	0.10	1		04/24/20 12:31		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-21 (9.5-10) **Lab ID: 10515771034** Collected: 04/21/20 10:32 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	ND	mg/kg	0.96	1	04/27/20 10:52	04/29/20 12:11	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**0.70**	%	0.10	1		04/24/20 12:31		N2

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-22 (0-2) **Lab ID: 10515771035** Collected: 04/21/20 10:46 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.9**	mg/kg	1.1	1	04/27/20 10:52	04/29/20 12:13	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**13.2**	%	0.10	1		04/24/20 12:31		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-22 (2-4) **Lab ID: 10515771036** Collected: 04/21/20 10:48 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.9**	mg/kg	0.98	1	04/27/20 10:52	04/29/20 12:15	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**3.2**	%	0.10	1		04/24/20 13:10		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-22 (5-5.5) **Lab ID: 10515771037** Collected: 04/21/20 10:50 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.4**	mg/kg	1.0	1	04/27/20 10:52	04/29/20 12:16	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**3.1**	%	0.10	1		04/24/20 13:10		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-22 (7.5-8) **Lab ID: 10515771038** Collected: 04/21/20 10:52 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.5**	mg/kg	0.96	1	04/27/20 10:52	04/29/20 12:22	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**3.9**	%	0.10	1		04/24/20 13:10		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-22 (9.5-10) **Lab ID: 10515771039** Collected: 04/21/20 10:54 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.5**	mg/kg	0.99	1	04/27/20 10:52	04/29/20 12:24	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**4.2**	%	0.10	1		04/24/20 13:10		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-23 (0-2) **Lab ID: 10515771040** Collected: 04/21/20 13:48 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**3.0**	mg/kg	1.0	1	04/27/20 10:52	04/29/20 12:25	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**9.0**	%	0.10	1		04/24/20 13:10		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-23 (2-4) **Lab ID: 10515771041** Collected: 04/21/20 13:50 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.6**	mg/kg	0.97	1	04/27/20 13:12	04/29/20 13:31	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**2.9**	%	0.10	1		04/24/20 13:11		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-23 (5-5.5) **Lab ID: 10515771042** Collected: 04/21/20 13:53 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**3.0**	mg/kg	0.96	1	04/27/20 13:12	04/29/20 13:40	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**3.1**	%	0.10	1		04/24/20 13:11		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-23 (7.5-8) **Lab ID: 10515771043** Collected: 04/21/20 13:55 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.5**	mg/kg	0.95	1	04/27/20 13:12	04/29/20 13:41	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**2.7**	%	0.10	1		04/24/20 13:11		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-23 (9.5-10) **Lab ID: 10515771044** Collected: 04/21/20 13:57 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.2**	mg/kg	0.93	1	04/27/20 13:12	04/29/20 13:45	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**1.4**	%	0.10	1		04/24/20 13:11		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-24 (0-2) **Lab ID: 10515771045** Collected: 04/21/20 11:35 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**3.2**	mg/kg	1.0	1	04/27/20 13:12	04/29/20 13:51	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**6.9**	%	0.10	1		04/24/20 13:11		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-24 (5-5.5) **Lab ID: 10515771046** Collected: 04/21/20 11:42 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.6**	mg/kg	0.98	1	04/27/20 13:12	04/29/20 13:52	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**3.2**	%	0.10	1		04/24/20 13:11		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-24 (7.5-8) **Lab ID: 10515771047** Collected: 04/21/20 11:44 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.4**	mg/kg	1.0	1	04/27/20 13:12	04/29/20 13:54	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**4.8**	%	0.10	1		04/24/20 13:12		N2

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-24 (9.5-10) **Lab ID: 10515771048** Collected: 04/21/20 11:46 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.5**	mg/kg	0.99	1	04/27/20 13:12	04/29/20 13:56	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**3.6**	%	0.10	1		04/24/20 13:12		N2

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-25 (0-2) **Lab ID: 10515771049** Collected: 04/21/20 13:35 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.1**	mg/kg	1.0	1	04/27/20 13:12	04/29/20 13:57	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**7.9**	%	0.10	1		04/24/20 13:12		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-25 (2-4) **Lab ID: 10515771050** Collected: 04/21/20 13:37 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.5**	mg/kg	0.95	1	04/27/20 13:12	04/29/20 13:59	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**2.4**	%	0.10	1		04/24/20 13:12		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-25 (5-5.5) **Lab ID: 10515771051** Collected: 04/21/20 13:38 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.8**	mg/kg	0.99	1	04/27/20 13:12	04/29/20 14:01	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**3.2**	%	0.10	1		04/24/20 14:47		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-25 (7.5-8) **Lab ID: 10515771052** Collected: 04/21/20 13:39 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.4**	mg/kg	0.96	1	04/27/20 13:12	04/29/20 14:02	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**4.6**	%	0.10	1		04/24/20 14:47		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-25 (9.5-10) **Lab ID: 10515771053** Collected: 04/21/20 13:40 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.3**	mg/kg	0.95	1	04/27/20 13:12	04/29/20 14:04	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**2.8**	%	0.10	1		04/24/20 14:47		N2

REPORT OF LABORATORY ANALYSIS

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(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-26 (0-2) **Lab ID: 10515771054** Collected: 04/21/20 14:12 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**17.4**	mg/kg	1.0	1	04/27/20 13:12	04/29/20 14:06	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**7.2**	%	0.10	1		04/24/20 14:48		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-26 (2-4) **Lab ID: 10515771055** Collected: 04/21/20 14:14 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.8**	mg/kg	1.0	1	04/27/20 13:12	04/29/20 14:11	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**2.9**	%	0.10	1		04/24/20 14:48		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-26 (5-5.5) **Lab ID: 10515771056** Collected: 04/21/20 14:16 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**4.7**	mg/kg	1.0	1	04/27/20 13:12	04/29/20 14:12	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**3.5**	%	0.10	1		04/24/20 14:48		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-26 (7.5-8) **Lab ID: 10515771057** Collected: 04/21/20 14:18 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.6**	mg/kg	0.95	1	04/27/20 13:12	04/29/20 14:14	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**2.6**	%	0.10	1		04/24/20 14:48		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-26 (9.5-10) **Lab ID: 10515771058** Collected: 04/21/20 14:20 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.4**	mg/kg	1.0	1	04/27/20 13:12	04/29/20 14:16	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**3.5**	%	0.10	1		04/24/20 14:48		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-27 (0-2) **Lab ID: 10515771059** Collected: 04/21/20 11:08 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**8.1**	mg/kg	1.0	1	04/27/20 13:12	04/29/20 14:17	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**9.0**	%	0.10	1		04/24/20 14:49		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-27 (2-4) **Lab ID: 10515771060** Collected: 04/21/20 11:10 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.5**	mg/kg	1.0	1	04/27/20 13:12	04/29/20 14:23	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**8.9**	%	0.10	1		04/24/20 14:49		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-27 (5-5.5) **Lab ID: 10515771061** Collected: 04/21/20 11:13 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.6**	mg/kg	1.0	1	04/27/20 13:12	04/29/20 14:30	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**2.5**	%	0.10	1		04/24/20 14:49		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-27 (7.5-8) **Lab ID: 10515771062** Collected: 04/21/20 11:15 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.4**	mg/kg	0.96	1	04/27/20 13:12	04/29/20 14:42	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**2.4**	%	0.10	1		04/24/20 14:49		N2

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-27 (9.5-10) **Lab ID: 10515771063** Collected: 04/21/20 11:17 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.3**	mg/kg	0.96	1	04/27/20 13:12	04/29/20 14:43	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**2.5**	%	0.10	1		04/24/20 14:49		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-28 (0-2) **Lab ID: 10515771064** Collected: 04/20/20 13:40 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**5.3**	mg/kg	1.0	1	04/27/20 13:12	04/29/20 14:45	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**9.9**	%	0.10	1		04/24/20 14:49		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-28 (2-4) **Lab ID: 10515771065** Collected: 04/20/20 13:45 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**3.7**	mg/kg	1.1	1	04/27/20 13:12	04/29/20 14:47	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**10.5**	%	0.10	1		04/24/20 14:49		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-28 (5-5.5) **Lab ID: 10515771066** Collected: 04/20/20 13:47 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.4**	mg/kg	0.94	1	04/27/20 13:12	04/29/20 14:48	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**2.1**	%	0.10	1		04/24/20 14:49		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-28 (7.5-8) **Lab ID: 10515771067** Collected: 04/20/20 13:50 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.5**	mg/kg	0.97	1	04/27/20 13:12	04/29/20 14:50	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**4.7**	%	0.10	1		04/24/20 14:50		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-28 (9.5-10) **Lab ID: 10515771068** Collected: 04/20/20 13:52 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.3**	mg/kg	1.0	1	04/27/20 13:12	04/29/20 14:55	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**1.4**	%	0.10	1		04/24/20 14:50		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-29 (0-2) **Lab ID: 10515771069** Collected: 04/22/20 09:43 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**14.1**	mg/kg	1.1	1	04/27/20 13:12	04/29/20 14:57	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**16.3**	%	0.10	1		04/24/20 14:50		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-29 (2-4) **Lab ID: 10515771070** Collected: 04/22/20 09:46 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.8**	mg/kg	1.1	1	04/27/20 13:12	04/29/20 14:59	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**10.7**	%	0.10	1		04/24/20 14:50		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-29 (5-5.5) **Lab ID: 10515771071** Collected: 04/22/20 09:47 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**3.9**	mg/kg	1.1	1	04/27/20 13:12	04/29/20 15:00	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**11.6**	%	0.10	1		04/24/20 15:15		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-29 (7.5-8) **Lab ID: 10515771072** Collected: 04/22/20 09:48 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.7**	mg/kg	1.0	1	04/27/20 13:12	04/29/20 15:02	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**10.6**	%	0.10	1		04/24/20 15:16		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-29 (9.5-10) **Lab ID: 10515771073** Collected: 04/22/20 09:49 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.4**	mg/kg	1.1	1	04/27/20 13:12	04/29/20 15:04	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**8.3**	%	0.10	1		04/24/20 15:16		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-30 (0-2) **Lab ID: 10515771074** Collected: 04/22/20 10:05 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**3.4**	mg/kg	1.1	1	04/27/20 13:12	04/29/20 15:05	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**11.6**	%	0.10	1		04/24/20 15:16		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-30 (2-4) **Lab ID: 10515771075** Collected: 04/22/20 10:08 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.6**	mg/kg	1.1	1	04/27/20 13:12	04/29/20 15:07	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**9.7**	%	0.10	1		04/24/20 15:16		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-30 (5-5.5) **Lab ID: 10515771076** Collected: 04/22/20 10:10 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.0**	mg/kg	0.98	1	04/27/20 13:12	04/29/20 15:09	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**3.6**	%	0.10	1		04/24/20 15:16		N2

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-30 (7.5-8) **Lab ID: 10515771077** Collected: 04/22/20 10:11 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.1**	mg/kg	1.0	1	04/27/20 13:12	04/29/20 15:10	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**3.6**	%	0.10	1		04/24/20 15:17		N2

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-30 (9.5-10) **Lab ID: 10515771078** Collected: 04/22/20 10:12 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.1**	mg/kg	1.0	1	04/27/20 13:12	04/29/20 15:15	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**4.2**	%	0.10	1		04/24/20 15:17		N2

REPORT OF LABORATORY ANALYSIS

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(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-31 (0-2) **Lab ID: 10515771079** Collected: 04/22/20 10:27 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.3**	mg/kg	1.0	1	04/27/20 13:12	04/29/20 15:17	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**13.3**	%	0.10	1		04/24/20 15:17		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-31 (2-4) **Lab ID: 10515771080** Collected: 04/22/20 10:28 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.6**	mg/kg	1.0	1	04/27/20 13:12	04/29/20 15:19	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**9.1**	%	0.10	1		04/24/20 15:17		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-31 (5-5.5) **Lab ID: 10515771081** Collected: 04/22/20 10:30 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.4**	mg/kg	0.98	1	04/28/20 09:46	04/29/20 15:29	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**5.9**	%	0.10	1		04/24/20 15:17		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-31 (7.5-8) **Lab ID: 10515771082** Collected: 04/22/20 10:32 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.8**	mg/kg	1.0	1	04/28/20 09:46	04/29/20 15:41	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**7.4**	%	0.10	1		04/24/20 15:17		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-31 (9.5-10) **Lab ID: 10515771083** Collected: 04/22/20 10:34 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.2**	mg/kg	1.0	1	04/28/20 09:46	04/29/20 15:42	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**8.0**	%	0.10	1		04/24/20 15:18		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-32 (0-2) **Lab ID: 10515771084** Collected: 04/22/20 10:42 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**6.9**	mg/kg	1.1	1	04/28/20 09:46	04/29/20 15:44	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**12.2**	%	0.10	1		04/24/20 15:18		N2

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-32 (2-4) **Lab ID: 10515771085** Collected: 04/22/20 10:44 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.1**	mg/kg	1.1	1	04/28/20 09:46	04/29/20 15:46	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**9.4**	%	0.10	1		04/24/20 15:18		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-32 (5-5.5) **Lab ID: 10515771086** Collected: 04/22/20 10:46 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.5**	mg/kg	1.0	1	04/28/20 09:46	04/29/20 15:47	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**8.7**	%	0.10	1		04/24/20 15:18		N2

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-32 (7.5-8) **Lab ID: 10515771087** Collected: 04/22/20 10:48 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.9**	mg/kg	1.1	1	04/28/20 09:46	04/29/20 15:49	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**13.8**	%	0.10	1		04/24/20 15:18		N2

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-32 (9.5-10) **Lab ID: 10515771088** Collected: 04/22/20 10:50 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.4**	mg/kg	1.1	1	04/28/20 09:46	04/29/20 15:51	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**10.0**	%	0.10	1		04/24/20 15:18		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-33 (0-2) **Lab ID: 10515771089** Collected: 04/22/20 11:03 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**3.3**	mg/kg	1.1	1	04/28/20 09:46	04/29/20 15:52	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**13.0**	%	0.10	1		04/24/20 15:19		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-33 (2-4) **Lab ID: 10515771090** Collected: 04/22/20 11:05 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.9**	mg/kg	1.1	1	04/28/20 09:46	04/29/20 15:57	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**8.6**	%	0.10	1		04/24/20 15:19		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-33 (5-5.5) **Lab ID: 10515771091** Collected: 04/22/20 11:06 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.1**	mg/kg	1.0	1	04/28/20 09:46	04/29/20 15:59	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**9.0**	%	0.10	1		04/24/20 15:45		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-33 (7.5-8) **Lab ID: 10515771092** Collected: 04/22/20 11:07 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.3**	mg/kg	0.99	1	04/28/20 09:46	04/29/20 16:01	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**7.4**	%	0.10	1		04/24/20 15:45		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-33 (9.5-10) **Lab ID: 10515771093** Collected: 04/22/20 11:08 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.8**	mg/kg	1.0	1	04/28/20 09:46	04/29/20 16:03	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**7.8**	%	0.10	1		04/24/20 15:45		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-34 (0-2) **Lab ID: 10515771094** Collected: 04/22/20 11:17 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.5**	mg/kg	1.0	1	04/28/20 09:46	04/29/20 16:05	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**10.1**	%	0.10	1		04/24/20 15:45		N2

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-34 (2-4) **Lab ID: 10515771095** Collected: 04/22/20 11:18 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.2**	mg/kg	1.0	1	04/28/20 09:46	04/29/20 16:07	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**6.2**	%	0.10	1		04/24/20 15:46		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-34 (5-5.5) **Lab ID: 10515771096** Collected: 04/22/20 11:20 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.8**	mg/kg	0.99	1	04/28/20 09:46	04/29/20 16:08	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**5.0**	%	0.10	1		04/24/20 15:46		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-34 (7.5-8) **Lab ID: 10515771097** Collected: 04/22/20 11:21 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.2**	mg/kg	1.0	1	04/28/20 09:46	04/29/20 16:10	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**5.2**	%	0.10	1		04/24/20 15:46		N2

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-34 (9.5-10) **Lab ID: 10515771098** Collected: 04/22/20 11:22 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.5**	mg/kg	0.98	1	04/28/20 09:46	04/29/20 16:12	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**3.8**	%	0.10	1		04/24/20 15:46		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-35 (0-2) **Lab ID: 10515771099** Collected: 04/22/20 13:32 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**3.5**	mg/kg	1.1	1	04/28/20 09:46	04/29/20 16:13	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**10.2**	%	0.10	1		04/24/20 15:46		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-35 (2-4) **Lab ID: 10515771100** Collected: 04/22/20 13:34 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**6.0**	mg/kg	1.0	1	04/28/20 09:46	04/29/20 16:18	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**10.9**	%	0.10	1		04/27/20 08:36		N2

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-35 (5-5.5) **Lab ID: 10515771101** Collected: 04/22/20 13:36 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.5**	mg/kg	1.0	1	04/28/20 12:34	04/29/20 13:00	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**7.6**	%	0.10	1		04/27/20 08:37		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-35 (7.5-8) **Lab ID: 10515771102** Collected: 04/22/20 13:38 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.3**	mg/kg	0.97	1	04/28/20 12:34	04/29/20 13:01	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**4.9**	%	0.10	1		04/27/20 08:37		N2

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-35 (9.5-10) **Lab ID: 10515771103** Collected: 04/22/20 13:40 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.3**	mg/kg	1.0	1	04/28/20 12:34	04/29/20 13:03	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**6.9**	%	0.10	1		04/27/20 08:37		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-36 (0-2) **Lab ID: 10515771104** Collected: 04/22/20 12:16 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**3.5**	mg/kg	0.99	1	04/28/20 12:34	04/29/20 13:08	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**2.6**	%	0.10	1		04/27/20 08:37		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-36 (2-4) **Lab ID: 10515771105** Collected: 04/22/20 12:18 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**24.2**	mg/kg	1.0	1	04/28/20 12:34	04/29/20 13:10	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**5.8**	%	0.10	1		04/27/20 08:37		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-36 (5-5.5) **Lab ID: 10515771106** Collected: 04/22/20 12:20 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**1.6**	mg/kg	0.96	1	04/28/20 12:34	04/29/20 13:11	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**2.2**	%	0.10	1		04/27/20 08:37		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-36 (7.5-8) **Lab ID: 10515771107** Collected: 04/22/20 12:21 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.7**	mg/kg	0.97	1	04/28/20 12:34	04/29/20 13:13	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**2.3**	%	0.10	1		04/27/20 08:37		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: PP-36 (9.5-10) **Lab ID: 10515771108** Collected: 04/22/20 12:22 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**3.4**	mg/kg	1.1	1	04/28/20 12:34	04/29/20 13:15	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**12.8**	%	0.10	1		04/27/20 08:37		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: Dup-1 **Lab ID: 10515771109** Collected: 04/20/20 12:00 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.5**	mg/kg	1.1	1	04/28/20 12:34	04/29/20 13:16	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**10.9**	%	0.10	1		04/27/20 08:38		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: Dup-2 **Lab ID: 10515771110** Collected: 04/21/20 12:00 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.6**	mg/kg	1.1	1	04/28/20 12:34	04/29/20 13:18	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**9.6**	%	0.10	1		04/27/20 08:38		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: Dup-3 **Lab ID: 10515771111** Collected: 04/21/20 12:00 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**3.5**	mg/kg	1.1	1	04/28/20 12:34	04/29/20 13:20	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**13.4**	%	0.10	1		04/27/20 08:38		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: Dup-4 **Lab ID: 10515771112** Collected: 04/21/20 12:00 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**2.4**	mg/kg	1.1	1	04/28/20 12:34	04/29/20 13:21	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**7.8**	%	0.10	1		04/27/20 09:45		N2

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Sample: Dup-5 **Lab ID: 10515771113** Collected: 04/22/20 12:00 Received: 04/23/20 15:55 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**3.8**	mg/kg	1.1	1	04/28/20 12:34	04/29/20 13:23	7440-38-2	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**12.9**	%	0.10	1		04/27/20 09:46		N2

REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

QC Batch: 671978
QC Batch Method: EPA 3050B
Analysis Method: EPA 6010D
Analysis Description: 6010D Solids
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10515771001, 10515771002, 10515771003, 10515771004, 10515771005, 10515771006, 10515771007, 10515771008, 10515771009, 10515771010, 10515771011, 10515771012, 10515771013, 10515771014, 10515771015, 10515771016, 10515771017, 10515771018, 10515771019, 10515771020

METHOD BLANK: 3599825
Matrix: Solid
Associated Lab Samples: 10515771001, 10515771002, 10515771003, 10515771004, 10515771005, 10515771006, 10515771007, 10515771008, 10515771009, 10515771010, 10515771011, 10515771012, 10515771013, 10515771014, 10515771015, 10515771016, 10515771017, 10515771018, 10515771019, 10515771020

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/kg	ND	0.93	04/29/20 10:41	

LABORATORY CONTROL SAMPLE: 3599826

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	45.9	44.3	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3599827 3599828

Parameter	Units	10515771001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	1.6	50.6	47.8	51.3	48.0	98	97	75-125	7	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

QC Batch: 671979
QC Batch Method: EPA 3050B
Analysis Method: EPA 6010D
Analysis Description: 6010D Solids
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10515771021, 10515771022, 10515771023, 10515771024, 10515771025, 10515771026, 10515771027, 10515771028, 10515771029, 10515771030, 10515771031, 10515771032, 10515771033, 10515771034, 10515771035, 10515771036, 10515771037, 10515771038, 10515771039, 10515771040

METHOD BLANK: 3599829
Matrix: Solid
Associated Lab Samples: 10515771021, 10515771022, 10515771023, 10515771024, 10515771025, 10515771026, 10515771027, 10515771028, 10515771029, 10515771030, 10515771031, 10515771032, 10515771033, 10515771034, 10515771035, 10515771036, 10515771037, 10515771038, 10515771039, 10515771040

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/kg	ND	0.96	04/29/20 11:33	

LABORATORY CONTROL SAMPLE: 3599830

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	47.6	46.5	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3599831 3599832

Parameter	Units	10515771021 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	2.7	52.3	55.4	50.0	51.5	90	88	75-125	3	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

QC Batch: 671980
QC Batch Method: EPA 3050B
Analysis Method: EPA 6010D
Analysis Description: 6010D Solids
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10515771041, 10515771042, 10515771043, 10515771044, 10515771045, 10515771046, 10515771047, 10515771048, 10515771049, 10515771050, 10515771051, 10515771052, 10515771053, 10515771054, 10515771055, 10515771056, 10515771057, 10515771058, 10515771059, 10515771060

METHOD BLANK: 3599833
Matrix: Solid
Associated Lab Samples: 10515771041, 10515771042, 10515771043, 10515771044, 10515771045, 10515771046, 10515771047, 10515771048, 10515771049, 10515771050, 10515771051, 10515771052, 10515771053, 10515771054, 10515771055, 10515771056, 10515771057, 10515771058, 10515771059, 10515771060

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/kg	ND	0.93	04/29/20 13:28	

LABORATORY CONTROL SAMPLE: 3599834

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	47.6	45.5	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3599835 3599836

Parameter	Units	10515771041 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	1.6	48.6	49.5	44.2	45.2	88	88	75-125	2	20	

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QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

QC Batch: 671981
QC Batch Method: EPA 3050B
Analysis Method: EPA 6010D
Analysis Description: 6010D Solids
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10515771061, 10515771062, 10515771063, 10515771064, 10515771065, 10515771066, 10515771067, 10515771068, 10515771069, 10515771070, 10515771071, 10515771072, 10515771073, 10515771074, 10515771075, 10515771076, 10515771077, 10515771078, 10515771079, 10515771080

METHOD BLANK: 3599837
Matrix: Solid
Associated Lab Samples: 10515771061, 10515771062, 10515771063, 10515771064, 10515771065, 10515771066, 10515771067, 10515771068, 10515771069, 10515771070, 10515771071, 10515771072, 10515771073, 10515771074, 10515771075, 10515771076, 10515771077, 10515771078, 10515771079, 10515771080

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/kg	ND	0.97	04/29/20 14:27	

LABORATORY CONTROL SAMPLE: 3599838

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	47.6	45.8	96	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3599839 3599840

Parameter	Units	10515771061 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	1.6	49.3	48.8	45.3	44.6	89	88	75-125	2	20	

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QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

QC Batch: 671982
QC Batch Method: EPA 3050B
Analysis Method: EPA 6010D
Analysis Description: 6010D Solids
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10515771081, 10515771082, 10515771083, 10515771084, 10515771085, 10515771086, 10515771087, 10515771088, 10515771089, 10515771090, 10515771091, 10515771092, 10515771093, 10515771094, 10515771095, 10515771096, 10515771097, 10515771098, 10515771099, 10515771100

METHOD BLANK: 3599841
Matrix: Solid
Associated Lab Samples: 10515771081, 10515771082, 10515771083, 10515771084, 10515771085, 10515771086, 10515771087, 10515771088, 10515771089, 10515771090, 10515771091, 10515771092, 10515771093, 10515771094, 10515771095, 10515771096, 10515771097, 10515771098, 10515771099, 10515771100

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/kg	ND	0.99	04/29/20 15:26	

LABORATORY CONTROL SAMPLE: 3599842

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	47.6	46.1	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3599843 3599844

Parameter	Units	10515771081 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	1.4	51.1	51.5	46.9	47.0	89	88	75-125	0	20	

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QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

QC Batch: 671984
QC Batch Method: EPA 3050B
Analysis Method: EPA 6010D
Analysis Description: 6010D Solids
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10515771101, 10515771102, 10515771103, 10515771104, 10515771105, 10515771106, 10515771107, 10515771108, 10515771109, 10515771110, 10515771111, 10515771112, 10515771113

METHOD BLANK: 3599845 Matrix: Solid
Associated Lab Samples: 10515771101, 10515771102, 10515771103, 10515771104, 10515771105, 10515771106, 10515771107, 10515771108, 10515771109, 10515771110, 10515771111, 10515771112, 10515771113

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/kg	ND	0.93	04/29/20 12:29	

LABORATORY CONTROL SAMPLE: 3599846

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	47.2	46.0	98	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3599847 3599848

Parameter	Units	10515790001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	10.6	56.5	55.9	64.4	61.1	95	90	75-125	5	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

QC Batch: 671844
QC Batch Method: ASTM D2974
Analysis Method: ASTM D2974
Analysis Description: Dry Weight / %M by ASTM D2974
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10515771001, 10515771002, 10515771003, 10515771004, 10515771005, 10515771006, 10515771007, 10515771008, 10515771009, 10515771010, 10515771011, 10515771012, 10515771013, 10515771014, 10515771015, 10515771016

SAMPLE DUPLICATE: 3599463

Parameter	Units	10515771004 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	4.7	4.8	2	30	N2

SAMPLE DUPLICATE: 3599464

Parameter	Units	10515771015 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	9.9	10.1	2	30	N2

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QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

QC Batch: 671874
QC Batch Method: ASTM D2974
Analysis Method: ASTM D2974
Analysis Description: Dry Weight / %M by ASTM D2974
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10515771017, 10515771018, 10515771019, 10515771020, 10515771021, 10515771022, 10515771023, 10515771024, 10515771025, 10515771026, 10515771027, 10515771028, 10515771029, 10515771030, 10515771031, 10515771032, 10515771033, 10515771034, 10515771035

SAMPLE DUPLICATE: 3599322

Parameter	Units	10515771017 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	2.4	2.1	10	30	N2

SAMPLE DUPLICATE: 3599323

Parameter	Units	10515771035 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	13.2	12.3	7	30	N2

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QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

QC Batch: 671927
QC Batch Method: ASTM D2974
Analysis Method: ASTM D2974
Analysis Description: Dry Weight / %M by ASTM D2974
Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10515771036, 10515771037, 10515771038, 10515771039, 10515771040, 10515771041, 10515771042, 10515771043, 10515771044, 10515771045, 10515771046, 10515771047, 10515771048, 10515771049, 10515771050

SAMPLE DUPLICATE: 3599550

Parameter	Units	10515844001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	20.0	20.0	0	30	N2

SAMPLE DUPLICATE: 3599551

Parameter	Units	10515771050 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	2.4	2.3	5	30	N2

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

QC Batch: 671930
QC Batch Method: ASTM D2974
Analysis Method: ASTM D2974
Analysis Description: Dry Weight / %M by ASTM D2974
Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10515771051, 10515771052, 10515771053, 10515771054, 10515771055, 10515771056, 10515771057, 10515771058, 10515771059, 10515771060, 10515771061, 10515771062, 10515771063, 10515771064, 10515771065, 10515771066, 10515771067, 10515771068, 10515771069, 10515771070

SAMPLE DUPLICATE: 3599562

Parameter	Units	10515771070 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	10.7	10.4	2	30	N2

SAMPLE DUPLICATE: 3599743

Parameter	Units	10515771053 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	2.8	3.3	18	30	N2

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

QC Batch: 671931
QC Batch Method: ASTM D2974
Analysis Method: ASTM D2974
Analysis Description: Dry Weight / %M by ASTM D2974
Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10515771071, 10515771072, 10515771073, 10515771074, 10515771075, 10515771076, 10515771077, 10515771078, 10515771079, 10515771080, 10515771081, 10515771082, 10515771083, 10515771084, 10515771085, 10515771086, 10515771087, 10515771088, 10515771089, 10515771090

SAMPLE DUPLICATE: 3599563

Parameter	Units	10515771071 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	11.6	11.5	0	30	N2

SAMPLE DUPLICATE: 3599564

Parameter	Units	10515771090 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	8.6	8.2	5	30	N2

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
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QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

QC Batch: 671960
QC Batch Method: ASTM D2974
Analysis Method: ASTM D2974
Analysis Description: Dry Weight / %M by ASTM D2974
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10515771091, 10515771092, 10515771093, 10515771094, 10515771095, 10515771096, 10515771097, 10515771098, 10515771099

SAMPLE DUPLICATE: 3599782

Parameter	Units	10515771091 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	9.0	9.0	1	30	N2

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

QC Batch: 672087
QC Batch Method: ASTM D2974
Analysis Method: ASTM D2974
Analysis Description: Dry Weight / %M by ASTM D2974
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10515771100, 10515771101, 10515771102, 10515771103, 10515771104, 10515771105, 10515771106, 10515771107, 10515771108, 10515771109, 10515771110, 10515771111

SAMPLE DUPLICATE: 3600351

Parameter	Units	10515771111 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	13.4	13.2	1	30	N2

SAMPLE DUPLICATE: 3600379

Parameter	Units	10515774001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	17.0	16.3	4	30	N2

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

QC Batch: 672094
QC Batch Method: ASTM D2974
Analysis Method: ASTM D2974
Analysis Description: Dry Weight / %M by ASTM D2974
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10515771112, 10515771113

SAMPLE DUPLICATE: 3600373

Parameter	Units	10515771112 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	7.8	8.0	3	30	N2

SAMPLE DUPLICATE: 3600448

Parameter	Units	10515204009 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	27.7	27.2	2	30	N2

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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(612)607-1700

QUALIFIERS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

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

N2	The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request.

Pace Analytical Services, LLC
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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10515771001	PP-15 (0-2)	EPA 3050B	671978	EPA 6010D	672287
10515771002	PP-15 (5-5.5)	EPA 3050B	671978	EPA 6010D	672287
10515771003	PP-15 (7.5-8)	EPA 3050B	671978	EPA 6010D	672287
10515771004	PP-15 (9.5-10)	EPA 3050B	671978	EPA 6010D	672287
10515771005	PP-16 (0-2)	EPA 3050B	671978	EPA 6010D	672287
10515771006	PP-16 (2-4)	EPA 3050B	671978	EPA 6010D	672287
10515771007	PP-16 (5-5.5)	EPA 3050B	671978	EPA 6010D	672287
10515771008	PP-16 (7.5-8)	EPA 3050B	671978	EPA 6010D	672287
10515771009	PP-16 (9.5-10)	EPA 3050B	671978	EPA 6010D	672287
10515771010	PP-17 (0-2)	EPA 3050B	671978	EPA 6010D	672287
10515771011	PP-17 (2-4)	EPA 3050B	671978	EPA 6010D	672287
10515771012	PP-17 (5-5.5)	EPA 3050B	671978	EPA 6010D	672287
10515771013	PP-17 (7.5-8)	EPA 3050B	671978	EPA 6010D	672287
10515771014	PP-17 (9.5-10)	EPA 3050B	671978	EPA 6010D	672287
10515771015	PP-18 (0-2)	EPA 3050B	671978	EPA 6010D	672287
10515771016	PP-18 (2-4)	EPA 3050B	671978	EPA 6010D	672287
10515771017	PP-18 (5-5.5)	EPA 3050B	671978	EPA 6010D	672287
10515771018	PP-18 (7.5-8)	EPA 3050B	671978	EPA 6010D	672287
10515771019	PP-18 (9.5-10)	EPA 3050B	671978	EPA 6010D	672287
10515771020	PP-19 (0-2)	EPA 3050B	671978	EPA 6010D	672287
10515771021	PP-19 (2-4)	EPA 3050B	671979	EPA 6010D	672298
10515771022	PP-19 (5-5.5)	EPA 3050B	671979	EPA 6010D	672298
10515771023	PP-19 (7.5-8)	EPA 3050B	671979	EPA 6010D	672298
10515771024	PP-19 (9.5-10)	EPA 3050B	671979	EPA 6010D	672298
10515771025	PP-20 (0-2)	EPA 3050B	671979	EPA 6010D	672298
10515771026	PP-20 (2-4)	EPA 3050B	671979	EPA 6010D	672298
10515771027	PP-20 (5-5.5)	EPA 3050B	671979	EPA 6010D	672298
10515771028	PP-20 (7.5-8)	EPA 3050B	671979	EPA 6010D	672298
10515771029	PP-20 (9.5-10)	EPA 3050B	671979	EPA 6010D	672298
10515771030	PP-21 (0-2)	EPA 3050B	671979	EPA 6010D	672298
10515771031	PP-21 (2-4)	EPA 3050B	671979	EPA 6010D	672298
10515771032	PP-21 (5-5.5)	EPA 3050B	671979	EPA 6010D	672298
10515771033	PP-21 (7.5-8)	EPA 3050B	671979	EPA 6010D	672298
10515771034	PP-21 (9.5-10)	EPA 3050B	671979	EPA 6010D	672298
10515771035	PP-22 (0-2)	EPA 3050B	671979	EPA 6010D	672298
10515771036	PP-22 (2-4)	EPA 3050B	671979	EPA 6010D	672298
10515771037	PP-22 (5-5.5)	EPA 3050B	671979	EPA 6010D	672298
10515771038	PP-22 (7.5-8)	EPA 3050B	671979	EPA 6010D	672298
10515771039	PP-22 (9.5-10)	EPA 3050B	671979	EPA 6010D	672298
10515771040	PP-23 (0-2)	EPA 3050B	671979	EPA 6010D	672298
10515771041	PP-23 (2-4)	EPA 3050B	671980	EPA 6010D	672316
10515771042	PP-23 (5-5.5)	EPA 3050B	671980	EPA 6010D	672316
10515771043	PP-23 (7.5-8)	EPA 3050B	671980	EPA 6010D	672316
10515771044	PP-23 (9.5-10)	EPA 3050B	671980	EPA 6010D	672316
10515771045	PP-24 (0-2)	EPA 3050B	671980	EPA 6010D	672316
10515771046	PP-24 (5-5.5)	EPA 3050B	671980	EPA 6010D	672316
10515771047	PP-24 (7.5-8)	EPA 3050B	671980	EPA 6010D	672316
10515771048	PP-24 (9.5-10)	EPA 3050B	671980	EPA 6010D	672316

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10515771049	PP-25 (0-2)	EPA 3050B	671980	EPA 6010D	672316
10515771050	PP-25 (2-4)	EPA 3050B	671980	EPA 6010D	672316
10515771051	PP-25 (5-5.5)	EPA 3050B	671980	EPA 6010D	672316
10515771052	PP-25 (7.5-8)	EPA 3050B	671980	EPA 6010D	672316
10515771053	PP-25 (9.5-10)	EPA 3050B	671980	EPA 6010D	672316
10515771054	PP-26 (0-2)	EPA 3050B	671980	EPA 6010D	672316
10515771055	PP-26 (2-4)	EPA 3050B	671980	EPA 6010D	672316
10515771056	PP-26 (5-5.5)	EPA 3050B	671980	EPA 6010D	672316
10515771057	PP-26 (7.5-8)	EPA 3050B	671980	EPA 6010D	672316
10515771058	PP-26 (9.5-10)	EPA 3050B	671980	EPA 6010D	672316
10515771059	PP-27 (0-2)	EPA 3050B	671980	EPA 6010D	672316
10515771060	PP-27 (2-4)	EPA 3050B	671980	EPA 6010D	672316
10515771061	PP-27 (5-5.5)	EPA 3050B	671981	EPA 6010D	672320
10515771062	PP-27 (7.5-8)	EPA 3050B	671981	EPA 6010D	672320
10515771063	PP-27 (9.5-10)	EPA 3050B	671981	EPA 6010D	672320
10515771064	PP-28 (0-2)	EPA 3050B	671981	EPA 6010D	672320
10515771065	PP-28 (2-4)	EPA 3050B	671981	EPA 6010D	672320
10515771066	PP-28 (5-5.5)	EPA 3050B	671981	EPA 6010D	672320
10515771067	PP-28 (7.5-8)	EPA 3050B	671981	EPA 6010D	672320
10515771068	PP-28 (9.5-10)	EPA 3050B	671981	EPA 6010D	672320
10515771069	PP-29 (0-2)	EPA 3050B	671981	EPA 6010D	672320
10515771070	PP-29 (2-4)	EPA 3050B	671981	EPA 6010D	672320
10515771071	PP-29 (5-5.5)	EPA 3050B	671981	EPA 6010D	672320
10515771072	PP-29 (7.5-8)	EPA 3050B	671981	EPA 6010D	672320
10515771073	PP-29 (9.5-10)	EPA 3050B	671981	EPA 6010D	672320
10515771074	PP-30 (0-2)	EPA 3050B	671981	EPA 6010D	672320
10515771075	PP-30 (2-4)	EPA 3050B	671981	EPA 6010D	672320
10515771076	PP-30 (5-5.5)	EPA 3050B	671981	EPA 6010D	672320
10515771077	PP-30 (7.5-8)	EPA 3050B	671981	EPA 6010D	672320
10515771078	PP-30 (9.5-10)	EPA 3050B	671981	EPA 6010D	672320
10515771079	PP-31 (0-2)	EPA 3050B	671981	EPA 6010D	672320
10515771080	PP-31 (2-4)	EPA 3050B	671981	EPA 6010D	672320
10515771081	PP-31 (5-5.5)	EPA 3050B	671982	EPA 6010D	672456
10515771082	PP-31 (7.5-8)	EPA 3050B	671982	EPA 6010D	672456
10515771083	PP-31 (9.5-10)	EPA 3050B	671982	EPA 6010D	672456
10515771084	PP-32 (0-2)	EPA 3050B	671982	EPA 6010D	672456
10515771085	PP-32 (2-4)	EPA 3050B	671982	EPA 6010D	672456
10515771086	PP-32 (5-5.5)	EPA 3050B	671982	EPA 6010D	672456
10515771087	PP-32 (7.5-8)	EPA 3050B	671982	EPA 6010D	672456
10515771088	PP-32 (9.5-10)	EPA 3050B	671982	EPA 6010D	672456
10515771089	PP-33 (0-2)	EPA 3050B	671982	EPA 6010D	672456
10515771090	PP-33 (2-4)	EPA 3050B	671982	EPA 6010D	672456
10515771091	PP-33 (5-5.5)	EPA 3050B	671982	EPA 6010D	672456
10515771092	PP-33 (7.5-8)	EPA 3050B	671982	EPA 6010D	672456
10515771093	PP-33 (9.5-10)	EPA 3050B	671982	EPA 6010D	672456
10515771094	PP-34 (0-2)	EPA 3050B	671982	EPA 6010D	672456
10515771095	PP-34 (2-4)	EPA 3050B	671982	EPA 6010D	672456
10515771096	PP-34 (5-5.5)	EPA 3050B	671982	EPA 6010D	672456

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10515771097	**PP-34 (7.5-8)**	EPA 3050B	671982	EPA 6010D	672456
10515771098	**PP-34 (9.5-10)**	EPA 3050B	671982	EPA 6010D	672456
10515771099	**PP-35 (0-2)**	EPA 3050B	671982	EPA 6010D	672456
10515771100	**PP-35 (2-4)**	EPA 3050B	671982	EPA 6010D	672456
10515771101	**PP-35 (5-5.5)**	EPA 3050B	671984	EPA 6010D	672593
10515771102	**PP-35 (7.5-8)**	EPA 3050B	671984	EPA 6010D	672593
10515771103	**PP-35 (9.5-10)**	EPA 3050B	671984	EPA 6010D	672593
10515771104	**PP-36 (0-2)**	EPA 3050B	671984	EPA 6010D	672593
10515771105	**PP-36 (2-4)**	EPA 3050B	671984	EPA 6010D	672593
10515771106	**PP-36 (5-5.5)**	EPA 3050B	671984	EPA 6010D	672593
10515771107	**PP-36 (7.5-8)**	EPA 3050B	671984	EPA 6010D	672593
10515771108	**PP-36 (9.5-10)**	EPA 3050B	671984	EPA 6010D	672593
10515771109	**Dup-1**	EPA 3050B	671984	EPA 6010D	672593
10515771110	**Dup-2**	EPA 3050B	671984	EPA 6010D	672593
10515771111	**Dup-3**	EPA 3050B	671984	EPA 6010D	672593
10515771112	**Dup-4**	EPA 3050B	671984	EPA 6010D	672593
10515771113	**Dup-5**	EPA 3050B	671984	EPA 6010D	672593
10515771001	**PP-15 (0-2)**	ASTM D2974	671844		
10515771002	**PP-15 (5-5.5)**	ASTM D2974	671844		
10515771003	**PP-15 (7.5-8)**	ASTM D2974	671844		
10515771004	**PP-15 (9.5-10)**	ASTM D2974	671844		
10515771005	**PP-16 (0-2)**	ASTM D2974	671844		
10515771006	**PP-16 (2-4)**	ASTM D2974	671844		
10515771007	**PP-16 (5-5.5)**	ASTM D2974	671844		
10515771008	**PP-16 (7.5-8)**	ASTM D2974	671844		
10515771009	**PP-16 (9.5-10)**	ASTM D2974	671844		
10515771010	**PP-17 (0-2)**	ASTM D2974	671844		
10515771011	**PP-17 (2-4)**	ASTM D2974	671844		
10515771012	**PP-17 (5-5.5)**	ASTM D2974	671844		
10515771013	**PP-17 (7.5-8)**	ASTM D2974	671844		
10515771014	**PP-17 (9.5-10)**	ASTM D2974	671844		
10515771015	**PP-18 (0-2)**	ASTM D2974	671844		
10515771016	**PP-18 (2-4)**	ASTM D2974	671844		
10515771017	**PP-18 (5-5.5)**	ASTM D2974	671874		
10515771018	**PP-18 (7.5-8)**	ASTM D2974	671874		
10515771019	**PP-18 (9.5-10)**	ASTM D2974	671874		
10515771020	**PP-19 (0-2)**	ASTM D2974	671874		
10515771021	**PP-19 (2-4)**	ASTM D2974	671874		
10515771022	**PP-19 (5-5.5)**	ASTM D2974	671874		
10515771023	**PP-19 (7.5-8)**	ASTM D2974	671874		
10515771024	**PP-19 (9.5-10)**	ASTM D2974	671874		
10515771025	**PP-20 (0-2)**	ASTM D2974	671874		
10515771026	**PP-20 (2-4)**	ASTM D2974	671874		
10515771027	**PP-20 (5-5.5)**	ASTM D2974	671874		
10515771028	**PP-20 (7.5-8)**	ASTM D2974	671874		
10515771029	**PP-20 (9.5-10)**	ASTM D2974	671874		
10515771030	**PP-21 (0-2)**	ASTM D2974	671874		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10515771031	PP-21 (2-4)	ASTM D2974	671874		
10515771032	PP-21 (5-5.5)	ASTM D2974	671874		
10515771033	PP-21 (7.5-8)	ASTM D2974	671874		
10515771034	PP-21 (9.5-10)	ASTM D2974	671874		
10515771035	PP-22 (0-2)	ASTM D2974	671874		
10515771036	PP-22 (2-4)	ASTM D2974	671927		
10515771037	PP-22 (5-5.5)	ASTM D2974	671927		
10515771038	PP-22 (7.5-8)	ASTM D2974	671927		
10515771039	PP-22 (9.5-10)	ASTM D2974	671927		
10515771040	PP-23 (0-2)	ASTM D2974	671927		
10515771041	PP-23 (2-4)	ASTM D2974	671927		
10515771042	PP-23 (5-5.5)	ASTM D2974	671927		
10515771043	PP-23 (7.5-8)	ASTM D2974	671927		
10515771044	PP-23 (9.5-10)	ASTM D2974	671927		
10515771045	PP-24 (0-2)	ASTM D2974	671927		
10515771046	PP-24 (5-5.5)	ASTM D2974	671927		
10515771047	PP-24 (7.5-8)	ASTM D2974	671927		
10515771048	PP-24 (9.5-10)	ASTM D2974	671927		
10515771049	PP-25 (0-2)	ASTM D2974	671927		
10515771050	PP-25 (2-4)	ASTM D2974	671927		
10515771051	PP-25 (5-5.5)	ASTM D2974	671930		
10515771052	PP-25 (7.5-8)	ASTM D2974	671930		
10515771053	PP-25 (9.5-10)	ASTM D2974	671930		
10515771054	PP-26 (0-2)	ASTM D2974	671930		
10515771055	PP-26 (2-4)	ASTM D2974	671930		
10515771056	PP-26 (5-5.5)	ASTM D2974	671930		
10515771057	PP-26 (7.5-8)	ASTM D2974	671930		
10515771058	PP-26 (9.5-10)	ASTM D2974	671930		
10515771059	PP-27 (0-2)	ASTM D2974	671930		
10515771060	PP-27 (2-4)	ASTM D2974	671930		
10515771061	PP-27 (5-5.5)	ASTM D2974	671930		
10515771062	PP-27 (7.5-8)	ASTM D2974	671930		
10515771063	PP-27 (9.5-10)	ASTM D2974	671930		
10515771064	PP-28 (0-2)	ASTM D2974	671930		
10515771065	PP-28 (2-4)	ASTM D2974	671930		
10515771066	PP-28 (5-5.5)	ASTM D2974	671930		
10515771067	PP-28 (7.5-8)	ASTM D2974	671930		
10515771068	PP-28 (9.5-10)	ASTM D2974	671930		
10515771069	PP-29 (0-2)	ASTM D2974	671930		
10515771070	PP-29 (2-4)	ASTM D2974	671930		
10515771071	PP-29 (5-5.5)	ASTM D2974	671931		
10515771072	PP-29 (7.5-8)	ASTM D2974	671931		
10515771073	PP-29 (9.5-10)	ASTM D2974	671931		
10515771074	PP-30 (0-2)	ASTM D2974	671931		
10515771075	PP-30 (2-4)	ASTM D2974	671931		
10515771076	PP-30 (5-5.5)	ASTM D2974	671931		
10515771077	PP-30 (7.5-8)	ASTM D2974	671931		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: B1500394.03 Roof Depot
Pace Project No.: 10515771

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10515771078	**PP-30 (9.5-10)**	ASTM D2974	671931		
10515771079	**PP-31 (0-2)**	ASTM D2974	671931		
10515771080	**PP-31 (2-4)**	ASTM D2974	671931		
10515771081	**PP-31 (5-5.5)**	ASTM D2974	671931		
10515771082	**PP-31 (7.5-8)**	ASTM D2974	671931		
10515771083	**PP-31 (9.5-10)**	ASTM D2974	671931		
10515771084	**PP-32 (0-2)**	ASTM D2974	671931		
10515771085	**PP-32 (2-4)**	ASTM D2974	671931		
10515771086	**PP-32 (5-5.5)**	ASTM D2974	671931		
10515771087	**PP-32 (7.5-8)**	ASTM D2974	671931		
10515771088	**PP-32 (9.5-10)**	ASTM D2974	671931		
10515771089	**PP-33 (0-2)**	ASTM D2974	671931		
10515771090	**PP-33 (2-4)**	ASTM D2974	671931		
10515771091	**PP-33 (5-5.5)**	ASTM D2974	671960		
10515771092	**PP-33 (7.5-8)**	ASTM D2974	671960		
10515771093	**PP-33 (9.5-10)**	ASTM D2974	671960		
10515771094	**PP-34 (0-2)**	ASTM D2974	671960		
10515771095	**PP-34 (2-4)**	ASTM D2974	671960		
10515771096	**PP-34 (5-5.5)**	ASTM D2974	671960		
10515771097	**PP-34 (7.5-8)**	ASTM D2974	671960		
10515771098	**PP-34 (9.5-10)**	ASTM D2974	671960		
10515771099	**PP-35 (0-2)**	ASTM D2974	671960		
10515771100	**PP-35 (2-4)**	ASTM D2974	672087		
10515771101	**PP-35 (5-5.5)**	ASTM D2974	672087		
10515771102	**PP-35 (7.5-8)**	ASTM D2974	672087		
10515771103	**PP-35 (9.5-10)**	ASTM D2974	672087		
10515771104	**PP-36 (0-2)**	ASTM D2974	672087		
10515771105	**PP-36 (2-4)**	ASTM D2974	672087		
10515771106	**PP-36 (5-5.5)**	ASTM D2974	672087		
10515771107	**PP-36 (7.5-8)**	ASTM D2974	672087		
10515771108	**PP-36 (9.5-10)**	ASTM D2974	672087		
10515771109	**Dup-1**	ASTM D2974	672087		
10515771110	**Dup-2**	ASTM D2974	672087		
10515771111	**Dup-3**	ASTM D2974	672087		
10515771112	**Dup-4**	ASTM D2974	672094		
10515771113	**Dup-5**	ASTM D2974	672094		

CHAIN-OF-CUSTODY Analytical Request Document

Pace Analytical®

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

ALL SHADED AREAS are for LAB USE ONLY

Company: Braun Intertec	Billing Information: SAME
Address: 11001 Hampshire Ave S	
Report To: Justin Michael	Email To: JMichael@braunintertec.com
Copy To:	Site Collection Info/Address:
Customer Project Name/Number: Roof Depot, B1500394.03	State: / County/City: Time Zone Collected: [ ]PT [ ]MT [ ]CT [ ]ET
Phone: Email:	Site/Facility ID #: Compliance Monitoring? [ ] Yes [ ] No
Collected By (print): Megan Ullery	Purchase Order # : Quote #: DW PWS ID #: DW Location Code:
Collected By (signature): Megan Ullery	Turnaround Date Required: Standard Immediately Packed on Ice: [ ] Yes [ ] No
Sample Disposal: [ ] Dispose as appropriate [ ] Return [ ] Archive: _____ [ ] Hold: _____	Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply) Field Filtered (if applicable): [ ] Yes [ ] No Analysis:

Container Preservative Type **

Lab Project Manager:

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other _____

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Analyses

Lab Profile/Line:

Lab Sample Receipt Checklist:
Custody Seals Present/Intact Y N NA
Custody Signatures Present Y N NA
Collector Signature Present Y N NA
Bottles Intact Y N NA

WO# : 10515771

10515771

pH Strips:
Sulfide Present Y N NA
Lead Acetate Strips: _____

LAB USE ONLY:
Lab Sample # / Comments:

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	Total Arsenic	Lab Sample # / Comments
PP-15 (0-2)	SL	G	21-Apr	1238				1	x	001
PP-15 (5-5.5)	SL	G	21-Apr	1240				1	x	002
PP-15 (7.5-8)	SL	G	21-Apr	1242				1	x	003
PP-15 (9.5-10)	SL	G	21-Apr	1244				1	x	004
PP-16 (0-2)	SL	G	21-Apr	1202				1	x	005
PP-16 (2-4)	SL	G	21-Apr	1204				1	x	006
PP-16 (5-5.5)	SL	G	21-Apr	1206				1	x	007
PP-16 (7.5-8)	SL	G	21-Apr	1208				1	x	008
PP-16 (9.5-10)	SL	G	21-Apr	1210				1	x	009
PP-17 (0-2)	SL	G	20-Apr	1247				1	x	010
PP-17 (2-4)	SL	G	20-Apr	1248				1	x	011
PP-17 (5-5.5)	SL	G	20-Apr	1250				1	x	012
PP-17 (7.5-8)	SL	G	20-Apr	1252				1	x	013
PP-17 (9.5-10)	SL	G	20-Apr	1254				1	x	014
PP-18 (0-2)	SL	G	20-Apr	1023				1	x	015
PP-18 (2-4)	SL	G	20-Apr	1025				1	x	016
PP-18 (5-5.5)	SL	G	20-Apr	1027				1	x	017
PP-18 (7.5-8)	SL	G	20-Apr	1030				1	x	018
PP-18 (9.5-10)	SL	G	20-Apr	1032				1	x	019
PP-19 (0-2)	SL	G	21-Apr	951				1	x	020
PP-19 (2-4)	SL	G	21-Apr	952				1	x	021

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns		Total Arsenic								
PP-19 (5-5.5)	SL	G	21-Apr	954				1		x								022
PP-19 (7.5-8)	SL	G	21-Apr	955				1		x								023
PP-19 (9.5-10)	SL	G	21-Apr	956				1		x								024
PP-20 (0-2)	SL	G	21-Apr	746				1		x								025
PP-20 (2-4)	SL	G	21-Apr	748				1		x								026
PP-20 (5-5.5)	SL	G	21-Apr	755				1		x								027
PP-20 (7.5-8)	SL	G	21-Apr	758				1		x								028
PP-20 (9.5-10)	SL	G	21-Apr	800				1		x								029
PP-21 (0-2)	SL	G	21-Apr	1025				1		x								030
PP-21 (2-4)	SL	G	21-Apr	1027				1		x								031
PP-21 (5-5.5)	SL	G	21-Apr	1030				1		x								032
PP-21 (7.5-8)	SL	G	21-Apr	1031				1		x								033
PP-21 (9.5-10)	SL	G	21-Apr	1032				1		x								034
PP-22 (0-2)	SL	G	21-Apr	1046				1		x								035
PP-22 (2-4)	SL	G	21-Apr	1048				1		x								036
PP-22 (5-5.5)	SL	G	21-Apr	1050				1		x								037
PP-22 (7.5-8)	SL	G	21-Apr	1052				1		x								038
PP-22 (9.5-10)	SL	G	21-Apr	1054				1		x								039
PP-23 (0-2)	SL	G	21-Apr	1348				1		x								040
PP-23 (2-4)	SL	G	21-Apr	1350				1		x								041
PP-23 (5-5.5)	SL	G	21-Apr	1353				1		x								042
PP-23 (7.5-8)	SL	G	21-Apr	1355				1		x								043
PP-23 (9.5-10)	SL	G	21-Apr	1357				1		x								044
PP-24 (0-2)	SL	G	21-Apr	1135				1		x								045
PP-24 (5-5.5)	SL	G	21-Apr	1142				1		x								046
PP-24 (7.5-8)	SL	G	21-Apr	1144				1		x								047
PP-24 (9.5-10)	SL	G	21-Apr	1146				1		x								048
PP-25 (0-2)	SL	G	21-Apr	1335				1		x								049
PP-25 (2-4)	SL	G	21-Apr	1337				1		x								050
PP-25 (5-5.5)	SL	G	21-Apr	1338				1		x								051
PP-25 (7.5-8)	SL	G	21-Apr	1339				1		x								052
PP-25 (9.5-10)	SL	G	21-Apr	1340				1		x								053
PP-26 (0-2)	SL	G	21-Apr	1412				1		x								054
PP-26 (2-4)	SL	G	21-Apr	1414				1		x								055
PP-26 (5-5.5)	SL	G	21-Apr	1416				1		x								056
PP-26 (7.5-8)	SL	G	21-Apr	1418				1		x								057

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns		Total Arsenic							
PP-26 (9.5-10)	SL	G	21-Apr	1420				1		x							058
PP-27 (0-2)	SL	G	21-Apr	1108				1		x							059
PP-27 (2-4)	SL	G	21-Apr	1110				1		x							060
PP-27 (5-5.5)	SL	G	21-Apr	1113				1		x							061
PP-27 (7.5-8)	SL	G	21-Apr	1115				1		x							062
PP-27 (9.5-10)	SL	G	21-Apr	1117				1		x							063
PP-28 (0-2)	SL	G	20-Apr	1340				1		x							064
PP-28 (2-4)	SL	G	20-Apr	1345				1		x							065
PP-28 (5-5.5)	SL	G	20-Apr	1347				1		x							066
PP-28 (7.5-8)	SL	G	20-Apr	1350				1		x							067
PP-28 (9.5-10)	SL	G	20-Apr	1352				1		x							068
PP-29 (0-2)	SL	G	22-Apr	943				1		x							069
PP-29 (2-4)	SL	G	22-Apr	946				1		x							070
PP-29 (5-5.5)	SL	G	22-Apr	947				1		x							071
PP-29 (7.5-8)	SL	G	22-Apr	948				1		x							072
PP-29 (9.5-10)	SL	G	22-Apr	949				1		x							073
PP-30 (0-2)	SL	G	22-Apr	1005				1		x							074
PP-30 (2-4)	SL	G	22-Apr	1008				1		x							075
PP-30 (5-5.5)	SL	G	22-Apr	1010				1		x							076
PP-30 (7.5-8)	SL	G	22-Apr	1011				1		x							077
PP-30 (9.5-10)	SL	G	22-Apr	1012				1		x							078
PP-31 (0-2)	SL	G	22-Apr	1027				1		x							079
PP-31 (2-4)	SL	G	22-Apr	1028				1		x							080
PP-31 (5-5.5)	SL	G	22-Apr	1030				1		x							081
PP-31 (7.5-8)	SL	G	22-Apr	1032				1		x							082
PP-31 (9.5-10)	SL	G	22-Apr	1034				1		x							083
PP-32 (0-2)	SL	G	22-Apr	1042				1		x							084
PP-32 (2-4)	SL	G	22-Apr	1044				1		x							085
PP-32 (5-5.5)	SL	G	22-Apr	1046				1		x							086
PP-32 (7.5-8)	SL	G	22-Apr	1048				1		x							087
PP-32 (9.5-10)	SL	G	22-Apr	1050				1		x							088
PP-33 (0-2)	SL	G	22-Apr	1103				1		x							089
PP-33 (2-4)	SL	G	22-Apr	1105				1		x							090
PP-33 (5-5.5)	SL	G	22-Apr	1106				1		x							091
PP-33 (7.5-8)	SL	G	22-Apr	1107				1		x							092
PP-33 (9.5-10)	SL	G	22-Apr	1108				1		x							093
PP-34 (0-2)	SL	G	22-Apr	1117				1		x							094
PP-34 (2-4)	SL	G	22-Apr	1118				1		x							095

Customer Sample ID	Matrix *	Comp / Grab	Collected (or Composite Start) Date	Collected (or Composite Start) Time	Composite End Date	Composite End Time	Res Cl	# of Ctns		Total Arsenic								
PP-34 (5-5.5)	SL	G	22-Apr	1120				1		x								096
PP-34 (7.5-8)	SL	G	22-Apr	1121				1		x								097
PP-34 (9.5-10)	SL	G	22-Apr	1122				1		x								098
PP-35 (0-2)	SL	G	22-Apr	1332				1		x								099
PP-35 (2-4)	SL	G	22-Apr	1334				1		x								100
PP-35 (5-5.5)	SL	G	22-Apr	1336				1		x								101
PP-35 (7.5-8)	SL	G	22-Apr	1338				1		x								102
PP-35 (9.5-10)	SL	G	22-Apr	1340				1		x								103
PP-36 (0-2)	SL	G	22-Apr	1216				1		x								104
PP-36 (2-4)	SL	G	22-Apr	1218				1		x								105
PP-36 (5-5.5)	SL	G	22-Apr	1220				1		x								106
PP-36 (7.5-8)	SL	G	22-Apr	1221				1		x								107
PP-36 (9.5-10)	SL	G	22-Apr	1222				1		x								108
Dup-1	SL	G	20-Apr	1200				1		x								109
Dup-2	SL	G	21-Apr	1200				1		x								110
Dup-3	SL	G	21-Apr	1200				1		x								111
Dup-4	SL	G	21-Apr	1200				1		x								112
Dup-5	SL	G	22-Apr	1200				1		x								113

Customer Remarks / Special Conditions / Possible Hazards:

Type of Ice Used: Wet Blue Dry None

Packing Material Used:

Radchem sample(s) screened (<500 cpm): Y N NA

SHORT HOLDS PRESENT (<72 hours): Y N N/A

Lab Tracking #:

Samples received via: FEDEX UPS Client Courier Pace Courier

LAB Sample Temperature Info:
Temp Blank Received: Y N NA
Therm ID#:
Cooler 1 Temp Upon Receipt: 2.9 oC
Cooler 1 Therm Corr. Factor: oC
Cooler 1 Corrected Temp: oC
Comments:

Relinquished by/Company: (Signature) **Megan Ullery/ Braun Intertec**	Date/Time:	Received by/Company: (Signature) PACE	Date/Time: 4.23.20 1420	MTJL LAB USE ONLY Table #:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time: 4-23-20 1455	Acctnum: Template: Prelogin:
Relinquished by/Company: (Signature)	Date/Time: 4-23-20 1555	Received by/Company: (Signature) Pace	Date/Time: 4/23/20 1555	PM: PB:

Trip Blank Received: Y N NA
HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: of:

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Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 19Feb2020 Page 1 of 1
	Document No.: **F-MN-L-213-rev.31**	Pace Analytical Services - **Minneapolis**

Sample Condition Upon Receipt **Client Name:** Braun BLM **Project #:** **WO# : 10515771**

PM: BM2 **Due Date: 04/30/20**

CLIENT: Braun-BLM

Courier: ☐Fed Ex ☐UPS ☐USPS ☐Client ☑Pace ☐SpeeDee ☐Commercial **See Exceptions** ☐

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:** 2.9, 3.4 °C **Average Corrected Temp (no temp blank only):** ☐See Exceptions

Correction Factor: True **Cooler Temp Corrected w/temp blank :** 2.9, 3.4 °C ☐1 Container

USDA Regulated Soil: (☐ N/A, water sample/Other:) **Date/Initials of Person Examining Contents:** CAJ 4/23/20

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?	☑Yes	☐No		1.
Chain of Custody Relinquished?	☑Yes	☐No		2.
Sampler Name and/or Signature on COC?	☑Yes	☐No	☐N/A	3.
Samples Arrived within Hold Time?	☒Yes	☐No		4.
Short Hold Time Analysis (<72 hr)?	☐Yes	☒No		5. ☐Fecal Coliform ☐HPC ☐Total Coliform/E coli ☐BOD/cBOD ☐Hex Chrome ☐Turbidity ☐Nitrate ☐Nitrite ☐Orthophos ☐Other
Rush Turn Around Time Requested?	☐Yes	☑No		6.
Sufficient Volume?	☑Yes	☐No		7.
Correct Containers Used? -Pace Containers Used?	☑Yes ☒Yes	☐No ☐No		8.
Containers Intact?	☒Yes	☐No		9.
Field Filtered Volume Received for Dissolved Tests?	☐Yes	☐No	☒N/A	10. Is sediment visible in the dissolved container? ☐Yes ☐No
Is sufficient information available to reconcile the samples to the COC? Matrix: ☐Water ☒Soil ☐Oil ☐Other	☒Yes	☐No		11. **If no, write ID/ Date/Time on Container Below:** **See Exception** ☐
All containers needing acid/base preservation have been checked?	☐Yes	☐No	☑N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, <2pH, NaOH >9 Sulfide, NaOH>12 Cyanide)	☐Yes	☐No	☒N/A	☐ NaOH ☐ HNO_3 ☐ H_2SO_4 ☐Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS	☐Yes	☐No	☒N/A	Positive for Res. Chlorine? ☐Yes ☐No **pH Paper Lot#** **See Exception** ☐
				Res. Chlorine | 0-6 Roll | 0-6 Strip | 0-14 Strip
Extra labels present on soil VOA or WIDRO containers?	☐Yes	☐No	☒N/A	13. **See Exception** ☐
Headspace in VOA Vials (greater than 6mm)?	☐Yes	☐No	☒N/A	
Trip Blank Present?	☐Yes	☐No	☒N/A	14.
Trip Blank Custody Seals Present?	☐Yes	☐No	☒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: BM **Date:** 4/24/2020

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: Clint ②

Pace Analytical®

Document Name:
Service Center Transfer Checklist
Document Number:
ENV-FRM-MIN4-0135 Rev.00

Document Revised: 26Mar2020
Page 1 of 1
Pace Analytical Services -
Minneapolis

Service Center Transfer Checklist

Service Center: MPLS ☐ BLM ☒ AZ ☐

Client: Braun Intertec

Destination Lab: MPLS ☒ VM ☐ Duluth ☐

National ☐ Other _____

Received w/ Custody Seal ? Yes ☑ No ☐

Custody Seal Intact ? Yes ☑ No ☐

	Temp Read	Corr. Factor	Corr. Temp
Temperature °C	7.2	True	7.2

IR Gun: B88A0143310092 ☑ Samples on ice, in cool down

Rush ☐ **Short Hold** ☐ **N/A** ☑

Containers Intact ? Yes ☑ No ☐

Repacked and Re-Iced ? Yes ☐ No ☑

Notes: _____

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

April 30, 2020

Justin Michael
Braun Intertec
11001 Hampshire Ave. S
Bloomington, MN 55438

RE: Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

Dear Justin Michael:

Enclosed are the analytical results for sample(s) received by the laboratory on April 22, 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,

Bob Michels
bob.michels@pacelabs.com
(612)709-5046
Project Manager

Enclosures

Pace Analytical Services, LLC
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CERTIFICATIONS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

Pace Analytical Services Minneapolis

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
CNMI Saipan Certification #: MP0003
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8+Wyoming DW Certification #: via MN 027-053-137
Florida Certification #: E87605
Georgia Certification #: 959
Guam EPA Certification #: MN00064
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 #: 03086
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064
Maryland Certification #: 322
Massachusetts Certification #: M-MN064
Massachusetts DWP Certification #: via MN 027-053-137
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137
Minnesota Dept of Ag Certifcation #: 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

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SAMPLE SUMMARY

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10515647001	**PP-24 (2-4)**	Solid	04/21/20 11:38	04/22/20 15:50
10515647002	**Trip Blank**	Solid	04/21/20 00:00	04/22/20 15:50

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SAMPLE ANALYTE COUNT

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10515647001	**PP-24 (2-4)**	WI MOD DRO	JVM	2	PASI-M
		WI MOD GRO	MJD	2	PASI-M
		EPA 6010D	DM	7	PASI-M
		EPA 7471B	LMW	1	PASI-M
		ASTM D2974	JDL	1	PASI-M
		EPA 8270E by SIM	ZT	19	PASI-M
		EPA 8260B	AB2	70	PASI-M
10515647002	**Trip Blank**	WI MOD GRO	MJD	2	PASI-M
		EPA 8260B	AB2	70	PASI-M

PASI-M = Pace Analytical Services - Minneapolis

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PROJECT NARRATIVE

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

Method: **WI MOD DRO**
Description: WIDRO GCS
Client: Braun Intertec Corporation
Date: April 30, 2020

General Information:
1 sample was analyzed for WI MOD DRO 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.

Sample Preparation:
The samples were prepared in accordance with WI MOD DRO 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.

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

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:

Analyte Comments:

QC Batch: 671717

T6: High boiling point hydrocarbons are present in the sample.
- PP-24 (2-4) (Lab ID: 10515647001)
  - WDRO C10-C28

T7: Low boiling point hydrocarbons are present in the sample.
- PP-24 (2-4) (Lab ID: 10515647001)
  - WDRO C10-C28

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PROJECT NARRATIVE

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

Method: **WI MOD GRO**
Description: WIGRO GCV
Client: Braun Intertec Corporation
Date: April 30, 2020

General Information:
2 samples were analyzed for WI MOD GRO 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.

Sample Preparation:
The samples were prepared in accordance with EPA 5030 Medium Soil 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.

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

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.

QC Batch: 672098

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10514946012

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 3600622)
  - Gasoline Range Organics
- MSD (Lab ID: 3600623)
  - Gasoline Range Organics

Additional Comments:

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PROJECT NARRATIVE

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

Method: **EPA 6010D**
Description: 6010D MET ICP
Client: Braun Intertec Corporation
Date: April 30, 2020

General Information:
1 sample was analyzed for EPA 6010D 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.

Sample Preparation:
The samples were prepared in accordance with EPA 3050B 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.

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.

QC Batch: 671601

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10515196001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 3597846)
  - Barium

Additional Comments:

REPORT OF LABORATORY ANALYSIS

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PROJECT NARRATIVE

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

Method: **EPA 7471B**
Description: 7471B Mercury
Client: Braun Intertec Corporation
Date: April 30, 2020

General Information:
1 sample was analyzed for EPA 7471B 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.

Sample Preparation:
The samples were prepared in accordance with EPA 7471B 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.

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:

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PROJECT NARRATIVE

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

Method: **EPA 8270E by SIM**
Description: 8270E MSSV PAH by SIM
Client: Braun Intertec Corporation
Date: April 30, 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.

Sample Preparation:
The samples were prepared in accordance with EPA 3550C 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.

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.

QC Batch: 672112

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10515540002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 3600437)
  - Acenaphthene
  - Acenaphthylene
  - Anthracene
  - Benzo(a)anthracene
  - Benzo(a)pyrene
  - Benzo(b)fluoranthene
  - Benzo(g,h,i)perylene
  - Benzo(k)fluoranthene

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PROJECT NARRATIVE

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

Method: **EPA 8270E by SIM**
Description: 8270E MSSV PAH by SIM
Client: Braun Intertec Corporation
Date: April 30, 2020

QC Batch: 672112

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10515540002

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- Chrysene
- Dibenz(a,h)anthracene
- Fluoranthene
- Fluorene
- Indeno(1,2,3-cd)pyrene
- Naphthalene
- Phenanthrene
- Pyrene

- MSD (Lab ID: 3600438)
  - Acenaphthene
  - Acenaphthylene
  - Anthracene
  - Benzo(a)anthracene
  - Benzo(a)pyrene
  - Benzo(b)fluoranthene
  - Benzo(g,h,i)perylene
  - Benzo(k)fluoranthene
  - Chrysene
  - Dibenz(a,h)anthracene
  - Fluoranthene
  - Fluorene
  - Indeno(1,2,3-cd)pyrene
  - Naphthalene
  - Phenanthrene
  - Pyrene

R1: RPD value was outside control limits.

- MSD (Lab ID: 3600438)
  - Anthracene
  - Benzo(a)anthracene
  - Benzo(a)pyrene
  - Benzo(b)fluoranthene
  - Benzo(g,h,i)perylene
  - Benzo(k)fluoranthene
  - Chrysene
  - Dibenz(a,h)anthracene
  - Fluoranthene
  - Indeno(1,2,3-cd)pyrene
  - Phenanthrene
  - Pyrene

Additional Comments:

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
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PROJECT NARRATIVE

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

Method: **EPA 8270E by SIM**
Description: 8270E MSSV PAH by SIM
Client: Braun Intertec Corporation
Date: April 30, 2020

Analyte Comments:

QC Batch: 672112

D3: Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

- MS (Lab ID: 3600437)
  - 2-Fluorobiphenyl (S)
- MSD (Lab ID: 3600438)
  - 2-Fluorobiphenyl (S)

N2: The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request.

- PP-24 (2-4) (Lab ID: 10515647001)
  - Total BaP Eq. MN 2006sh. ND=0

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PROJECT NARRATIVE

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

Method: **EPA 8260B**
Description: 8260B MSV 5030 Med Level
Client: Braun Intertec Corporation
Date: April 30, 2020

General Information:
2 samples were analyzed for EPA 8260B 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.

Sample Preparation:
The samples were prepared in accordance with EPA 5035/5030B 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.

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.

QC Batch: 672213

L1: Analyte recovery in the laboratory control sample (LCS) was above QC limits. Results for this analyte in associated samples may be biased high.

- LCS (Lab ID: 3600754)
  - Isopropylbenzene (Cumene)
  - sec-Butylbenzene

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

QC Batch: 672213

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10515647001

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MS (Lab ID: 3600755)
  - Naphthalene

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PROJECT NARRATIVE

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

Method: **EPA 8260B**
Description: 8260B MSV 5030 Med Level
Client: Braun Intertec Corporation
Date: April 30, 2020

Additional Comments:

Analyte Comments:

QC Batch: 672213

- BLANK (Lab ID: 3600753)
  - Dichlorofluoromethane
- LCS (Lab ID: 3600754)
  - Dichlorofluoromethane
- MS (Lab ID: 3600755)
  - Dichlorofluoromethane
- MSD (Lab ID: 3600756)
  - Dichlorofluoromethane
- PP-24 (2-4) (Lab ID: 10515647001)
  - Dichlorofluoromethane
- Trip Blank (Lab ID: 10515647002)
  - Dichlorofluoromethane

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

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

Sample: PP-24 (2-4) **Lab ID: 10515647001** Collected: 04/21/20 11:38 Received: 04/22/20 15:50 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
WIDRO GCS	Analytical Method: WI MOD DRO Preparation Method: WI MOD DRO Pace Analytical Services - Minneapolis							
WDRO C10-C28	**23.3**	mg/kg	8.6	1	04/23/20 13:36	04/25/20 12:51		T6,T7
Surrogates								
n-Triacontane (S)	69	%.	50-150	1	04/23/20 13:36	04/25/20 12:51	638-68-6	
WIGRO GCV	Analytical Method: WI MOD GRO Preparation Method: EPA 5030 Medium Soil Pace Analytical Services - Minneapolis							
Gasoline Range Organics	**15.2**	mg/kg	11.6	1	04/27/20 12:13	04/28/20 13:34		G+
Surrogates								
a,a,a-Trifluorotoluene (S)	97	%.	80-150	1	04/27/20 12:13	04/28/20 13:34	98-08-8	
6010D MET ICP	Analytical Method: EPA 6010D Preparation Method: EPA 3050B Pace Analytical Services - Minneapolis							
Arsenic	**12.1**	mg/kg	0.96	1	04/23/20 13:30	04/28/20 12:50	7440-38-2	
Barium	**300**	mg/kg	0.48	1	04/23/20 13:30	04/28/20 12:50	7440-39-3	
Cadmium	**0.15**	mg/kg	0.14	1	04/23/20 13:30	04/28/20 12:50	7440-43-9	
Chromium	**5.9**	mg/kg	0.48	1	04/23/20 13:30	04/28/20 12:50	7440-47-3	
Lead	**11.0**	mg/kg	0.48	1	04/23/20 13:30	04/28/20 12:50	7439-92-1	
Selenium	ND	mg/kg	0.96	1	04/23/20 13:30	04/28/20 12:50	7782-49-2	
Silver	ND	mg/kg	0.48	1	04/23/20 13:30	04/28/20 12:50	7440-22-4	
7471B Mercury	Analytical Method: EPA 7471B Preparation Method: EPA 7471B Pace Analytical Services - Minneapolis							
Mercury	ND	mg/kg	0.020	1	04/23/20 13:43	04/28/20 14:37	7439-97-6	
Dry Weight / %M by ASTM D2974	Analytical Method: ASTM D2974 Pace Analytical Services - Minneapolis							
Percent Moisture	**5.6**	%	0.10	1		04/23/20 13:06		N2
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3550C Pace Analytical Services - Minneapolis							
Acenaphthene	ND	ug/kg	10.6	1	04/27/20 11:15	04/28/20 14:34	83-32-9	
Acenaphthylene	ND	ug/kg	10.6	1	04/27/20 11:15	04/28/20 14:34	208-96-8	
Anthracene	ND	ug/kg	10.6	1	04/27/20 11:15	04/28/20 14:34	120-12-7	
Benzo(a)anthracene	**36.5**	ug/kg	10.6	1	04/27/20 11:15	04/28/20 14:34	56-55-3	
Benzo(a)pyrene	**32.8**	ug/kg	10.6	1	04/27/20 11:15	04/28/20 14:34	50-32-8	
Benzo(b)fluoranthene	**58.0**	ug/kg	10.6	1	04/27/20 11:15	04/28/20 14:34	205-99-2	
Benzo(g,h,i)perylene	**41.7**	ug/kg	10.6	1	04/27/20 11:15	04/28/20 14:34	191-24-2	
Benzo(k)fluoranthene	**17.1**	ug/kg	10.6	1	04/27/20 11:15	04/28/20 14:34	207-08-9	
Chrysene	**69.2**	ug/kg	10.6	1	04/27/20 11:15	04/28/20 14:34	218-01-9	
Dibenz(a,h)anthracene	ND	ug/kg	10.6	1	04/27/20 11:15	04/28/20 14:34	53-70-3	
Fluoranthene	**64.9**	ug/kg	10.6	1	04/27/20 11:15	04/28/20 14:34	206-44-0	
Fluorene	ND	ug/kg	10.6	1	04/27/20 11:15	04/28/20 14:34	86-73-7	
Indeno(1,2,3-cd)pyrene	**26.3**	ug/kg	10.6	1	04/27/20 11:15	04/28/20 14:34	193-39-5	
Naphthalene	**75.7**	ug/kg	10.6	1	04/27/20 11:15	04/28/20 14:34	91-20-3	

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

Sample: PP-24 (2-4) **Lab ID: 10515647001** Collected: 04/21/20 11:38 Received: 04/22/20 15:50 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8270E MSSV PAH by SIM	Analytical Method: EPA 8270E by SIM Preparation Method: EPA 3550C Pace Analytical Services - Minneapolis							
Phenanthrene	**121**	ug/kg	10.6	1	04/27/20 11:15	04/28/20 14:34	85-01-8	
Pyrene	**59.7**	ug/kg	10.6	1	04/27/20 11:15	04/28/20 14:34	129-00-0	
Total BaP Eq. MN 2006sh. ND=0	**47.3**	ug/kg	10.6	1	04/27/20 11:15	04/28/20 14:34		N2
Surrogates								
2-Fluorobiphenyl (S)	81	%.	30-138	1	04/27/20 11:15	04/28/20 14:34	321-60-8	
p-Terphenyl-d14 (S)	96	%.	30-143	1	04/27/20 11:15	04/28/20 14:34	1718-51-0	
8260B MSV 5030 Med Level	Analytical Method: EPA 8260B Preparation Method: EPA 5035/5030B Pace Analytical Services - Minneapolis							
Acetone	ND	ug/kg	1130	1	04/27/20 15:35	04/29/20 23:00	67-64-1	
Allyl chloride	ND	ug/kg	226	1	04/27/20 15:35	04/29/20 23:00	107-05-1	
Benzene	**309**	ug/kg	22.6	1	04/27/20 15:35	04/29/20 23:00	71-43-2	
Bromobenzene	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	108-86-1	
Bromochloromethane	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	74-97-5	
Bromodichloromethane	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	75-27-4	
Bromoform	ND	ug/kg	226	1	04/27/20 15:35	04/29/20 23:00	75-25-2	
Bromomethane	ND	ug/kg	565	1	04/27/20 15:35	04/29/20 23:00	74-83-9	
2-Butanone (MEK)	ND	ug/kg	283	1	04/27/20 15:35	04/29/20 23:00	78-93-3	
n-Butylbenzene	**60.8**	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	104-51-8	
sec-Butylbenzene	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	135-98-8	L1
tert-Butylbenzene	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	98-06-6	
Carbon tetrachloride	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	56-23-5	
Chlorobenzene	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	108-90-7	
Chloroethane	ND	ug/kg	565	1	04/27/20 15:35	04/29/20 23:00	75-00-3	
Chloroform	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	67-66-3	
Chloromethane	ND	ug/kg	226	1	04/27/20 15:35	04/29/20 23:00	74-87-3	
2-Chlorotoluene	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	95-49-8	
4-Chlorotoluene	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/kg	565	1	04/27/20 15:35	04/29/20 23:00	96-12-8	
Dibromochloromethane	ND	ug/kg	226	1	04/27/20 15:35	04/29/20 23:00	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	106-93-4	
Dibromomethane	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	74-95-3	
1,2-Dichlorobenzene	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	95-50-1	
1,3-Dichlorobenzene	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	541-73-1	
1,4-Dichlorobenzene	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	106-46-7	
Dichlorodifluoromethane	ND	ug/kg	226	1	04/27/20 15:35	04/29/20 23:00	75-71-8	
1,1-Dichloroethane	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	75-34-3	
1,2-Dichloroethane	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	107-06-2	
1,1-Dichloroethene	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	75-35-4	
cis-1,2-Dichloroethene	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	156-59-2	
trans-1,2-Dichloroethene	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	156-60-5	
Dichlorofluoromethane	ND	ug/kg	565	1	04/27/20 15:35	04/29/20 23:00	75-43-4	
1,2-Dichloropropane	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	78-87-5	
1,3-Dichloropropane	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	142-28-9	
2,2-Dichloropropane	ND	ug/kg	226	1	04/27/20 15:35	04/29/20 23:00	594-20-7	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

Sample: PP-24 (2-4) **Lab ID: 10515647001** Collected: 04/21/20 11:38 Received: 04/22/20 15:50 Matrix: Solid

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

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV 5030 Med Level	Analytical Method: EPA 8260B Preparation Method: EPA 5035/5030B Pace Analytical Services - Minneapolis							
1,1-Dichloropropene	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	563-58-6	
cis-1,3-Dichloropropene	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/kg	226	1	04/27/20 15:35	04/29/20 23:00	60-29-7	
Ethylbenzene	**179**	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/kg	283	1	04/27/20 15:35	04/29/20 23:00	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	98-82-8	L1
p-Isopropyltoluene	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	99-87-6	
Methylene Chloride	ND	ug/kg	226	1	04/27/20 15:35	04/29/20 23:00	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/kg	283	1	04/27/20 15:35	04/29/20 23:00	108-10-1	
Methyl-tert-butyl ether	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	1634-04-4	
Naphthalene	**1380**	ug/kg	226	1	04/27/20 15:35	04/29/20 23:00	91-20-3	M1
n-Propylbenzene	**70.2**	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	103-65-1	
Styrene	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	79-34-5	
Tetrachloroethene	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	127-18-4	
Tetrahydrofuran	ND	ug/kg	2260	1	04/27/20 15:35	04/29/20 23:00	109-99-9	
Toluene	**2010**	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	120-82-1	
1,1,1-Trichloroethane	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	71-55-6	
1,1,2-Trichloroethane	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	79-00-5	
Trichloroethene	ND	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	79-01-6	
Trichlorofluoromethane	ND	ug/kg	226	1	04/27/20 15:35	04/29/20 23:00	75-69-4	
1,2,3-Trichloropropane	ND	ug/kg	226	1	04/27/20 15:35	04/29/20 23:00	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/kg	226	1	04/27/20 15:35	04/29/20 23:00	76-13-1	
1,2,4-Trimethylbenzene	**613**	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	95-63-6	
1,3,5-Trimethylbenzene	**176**	ug/kg	56.5	1	04/27/20 15:35	04/29/20 23:00	108-67-8	
Vinyl chloride	ND	ug/kg	22.6	1	04/27/20 15:35	04/29/20 23:00	75-01-4	
Xylene (Total)	**2920**	ug/kg	170	1	04/27/20 15:35	04/29/20 23:00	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	103	%.	75-125	1	04/27/20 15:35	04/29/20 23:00	17060-07-0	
Toluene-d8 (S)	99	%.	75-125	1	04/27/20 15:35	04/29/20 23:00	2037-26-5	
4-Bromofluorobenzene (S)	102	%.	75-125	1	04/27/20 15:35	04/29/20 23:00	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

Sample: Trip Blank **Lab ID: 10515647002** Collected: 04/21/20 00:00 Received: 04/22/20 15:50 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
WIGRO GCV	Analytical Method: WI MOD GRO Preparation Method: EPA 5030 Medium Soil Pace Analytical Services - Minneapolis							
Gasoline Range Organics	ND	mg/kg	10.0	1	04/27/20 12:13	04/28/20 14:48		
Surrogates								
a,a,a-Trifluorotoluene (S)	94	%.	80-150	1	04/27/20 12:13	04/28/20 14:48	98-08-8	
8260B MSV 5030 Med Level	Analytical Method: EPA 8260B Preparation Method: EPA 5035/5030B Pace Analytical Services - Minneapolis							
Acetone	ND	ug/kg	1000	1	04/27/20 15:35	04/28/20 16:06	67-64-1	
Allyl chloride	ND	ug/kg	200	1	04/27/20 15:35	04/28/20 16:06	107-05-1	
Benzene	ND	ug/kg	20.0	1	04/27/20 15:35	04/28/20 16:06	71-43-2	
Bromobenzene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	108-86-1	
Bromochloromethane	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	74-97-5	
Bromodichloromethane	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	75-27-4	
Bromoform	ND	ug/kg	200	1	04/27/20 15:35	04/28/20 16:06	75-25-2	
Bromomethane	ND	ug/kg	500	1	04/27/20 15:35	04/28/20 16:06	74-83-9	
2-Butanone (MEK)	ND	ug/kg	250	1	04/27/20 15:35	04/28/20 16:06	78-93-3	
n-Butylbenzene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	104-51-8	
sec-Butylbenzene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	135-98-8	
tert-Butylbenzene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	98-06-6	
Carbon tetrachloride	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	56-23-5	
Chlorobenzene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	108-90-7	
Chloroethane	ND	ug/kg	500	1	04/27/20 15:35	04/28/20 16:06	75-00-3	
Chloroform	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	67-66-3	
Chloromethane	ND	ug/kg	200	1	04/27/20 15:35	04/28/20 16:06	74-87-3	
2-Chlorotoluene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	95-49-8	
4-Chlorotoluene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/kg	500	1	04/27/20 15:35	04/28/20 16:06	96-12-8	
Dibromochloromethane	ND	ug/kg	200	1	04/27/20 15:35	04/28/20 16:06	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	106-93-4	
Dibromomethane	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	74-95-3	
1,2-Dichlorobenzene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	95-50-1	
1,3-Dichlorobenzene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	541-73-1	
1,4-Dichlorobenzene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	106-46-7	
Dichlorodifluoromethane	ND	ug/kg	200	1	04/27/20 15:35	04/28/20 16:06	75-71-8	
1,1-Dichloroethane	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	75-34-3	
1,2-Dichloroethane	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	107-06-2	
1,1-Dichloroethene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	75-35-4	
cis-1,2-Dichloroethene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	156-59-2	
trans-1,2-Dichloroethene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	156-60-5	
Dichlorofluoromethane	ND	ug/kg	500	1	04/27/20 15:35	04/28/20 16:06	75-43-4	
1,2-Dichloropropane	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	78-87-5	
1,3-Dichloropropane	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	142-28-9	
2,2-Dichloropropane	ND	ug/kg	200	1	04/27/20 15:35	04/28/20 16:06	594-20-7	
1,1-Dichloropropene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	563-58-6	
cis-1,3-Dichloropropene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	10061-02-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

Sample: Trip Blank **Lab ID: 10515647002** Collected: 04/21/20 00:00 Received: 04/22/20 15:50 Matrix: Solid

Results reported on a "wet-weight" basis

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B MSV 5030 Med Level	Analytical Method: EPA 8260B Preparation Method: EPA 5035/5030B Pace Analytical Services - Minneapolis							
Diethyl ether (Ethyl ether)	ND	ug/kg	200	1	04/27/20 15:35	04/28/20 16:06	60-29-7	
Ethylbenzene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/kg	250	1	04/27/20 15:35	04/28/20 16:06	87-68-3	
Isopropylbenzene (Cumene)	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	98-82-8	
p-Isopropyltoluene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	99-87-6	
Methylene Chloride	ND	ug/kg	200	1	04/27/20 15:35	04/28/20 16:06	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/kg	250	1	04/27/20 15:35	04/28/20 16:06	108-10-1	
Methyl-tert-butyl ether	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	1634-04-4	
Naphthalene	ND	ug/kg	200	1	04/27/20 15:35	04/28/20 16:06	91-20-3	
n-Propylbenzene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	103-65-1	
Styrene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	79-34-5	
Tetrachloroethene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	127-18-4	
Tetrahydrofuran	ND	ug/kg	2000	1	04/27/20 15:35	04/28/20 16:06	109-99-9	
Toluene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	120-82-1	
1,1,1-Trichloroethane	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	71-55-6	
1,1,2-Trichloroethane	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	79-00-5	
Trichloroethene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	79-01-6	
Trichlorofluoromethane	ND	ug/kg	200	1	04/27/20 15:35	04/28/20 16:06	75-69-4	
1,2,3-Trichloropropane	ND	ug/kg	200	1	04/27/20 15:35	04/28/20 16:06	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/kg	200	1	04/27/20 15:35	04/28/20 16:06	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/kg	50.0	1	04/27/20 15:35	04/28/20 16:06	108-67-8	
Vinyl chloride	ND	ug/kg	20.0	1	04/27/20 15:35	04/28/20 16:06	75-01-4	
Xylene (Total)	ND	ug/kg	150	1	04/27/20 15:35	04/28/20 16:06	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	103	%.	75-125	1	04/27/20 15:35	04/28/20 16:06	17060-07-0	
Toluene-d8 (S)	98	%.	75-125	1	04/27/20 15:35	04/28/20 16:06	2037-26-5	
4-Bromofluorobenzene (S)	101	%.	75-125	1	04/27/20 15:35	04/28/20 16:06	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

QC Batch: 672098
QC Batch Method: EPA 5030 Medium Soil
Analysis Method: WI MOD GRO
Analysis Description: WIGRO Solid GCV
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10515647001, 10515647002

METHOD BLANK: 3600383 Matrix: Solid
Associated Lab Samples: 10515647001, 10515647002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Gasoline Range Organics	mg/kg	ND	10.0	04/28/20 01:38	
a,a,a-Trifluorotoluene (S)	%.	96	80-150	04/28/20 01:38	

LABORATORY CONTROL SAMPLE & LCSD: 3600384 3600385

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Gasoline Range Organics	mg/kg	50	45.1	43.1	90	86	80-120	5	20	
a,a,a-Trifluorotoluene (S)	%.				99	98	80-150			

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3600622 3600623

Parameter	Units	10514946012 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Gasoline Range Organics	mg/kg	ND	55	56	34.6	40.8	63	73	80-120	16	20	M1
a,a,a-Trifluorotoluene (S)	%.						97	99	80-150			

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

QC Batch: 671607
QC Batch Method: EPA 7471B
Analysis Method: EPA 7471B
Analysis Description: 7471B Mercury Solids
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10515647001

METHOD BLANK: 3597861 Matrix: Solid
Associated Lab Samples: 10515647001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/kg	ND	0.018	04/28/20 14:03	

LABORATORY CONTROL SAMPLE: 3597862

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	0.45	0.45	99	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3597863 3597864

Parameter	Units	10515196001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Mercury	mg/kg	0.030	0.51	0.5	0.54	0.50	97	94	80-120	6	20	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

QC Batch: 671601
QC Batch Method: EPA 3050B
Analysis Method: EPA 6010D
Analysis Description: 6010D Solids
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10515647001

METHOD BLANK: 3597843 Matrix: Solid
Associated Lab Samples: 10515647001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/kg	ND	0.94	04/28/20 12:20	
Barium	mg/kg	ND	0.47	04/28/20 12:20	
Cadmium	mg/kg	ND	0.14	04/28/20 12:20	
Chromium	mg/kg	ND	0.47	04/28/20 12:20	
Lead	mg/kg	ND	0.47	04/28/20 12:20	
Selenium	mg/kg	ND	0.94	04/28/20 12:20	
Silver	mg/kg	ND	0.47	04/28/20 12:20	

LABORATORY CONTROL SAMPLE: 3597844

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	47.6	47.2	99	80-120	
Barium	mg/kg	47.6	50.3	106	80-120	
Cadmium	mg/kg	47.6	49.5	104	80-120	
Chromium	mg/kg	47.6	50.3	106	80-120	
Lead	mg/kg	47.6	49.5	104	80-120	
Selenium	mg/kg	47.6	44.4	93	80-120	
Silver	mg/kg	23.8	23.8	100	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3597845 3597846

Parameter	Units	10515196001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic	mg/kg	3.1	51	49.6	44.7	42.4	82	79	75-125	5	20	
Barium	mg/kg	64.7	51	49.6	105	99.2	78	70	75-125	5	20	M1
Cadmium	mg/kg	0.63	51	49.6	42.7	41.7	82	83	75-125	2	20	
Chromium	mg/kg	7.8	51	49.6	51.4	48.1	85	81	75-125	7	20	
Lead	mg/kg	38.9	51	49.6	91.5	90.7	103	104	75-125	1	20	
Selenium	mg/kg	<0.34	51	49.6	39.0	37.4	76	75	75-125	4	20	
Silver	mg/kg	0.066J	25.5	24.8	22.0	21.0	86	84	75-125	5	20	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

QC Batch: 671673
QC Batch Method: ASTM D2974
Analysis Method: ASTM D2974
Analysis Description: Dry Weight / %M by ASTM D2974
Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10515647001

SAMPLE DUPLICATE: 3598042

Parameter	Units	10515637001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	7.3	7.6	4	30	N2

SAMPLE DUPLICATE: 3598293

Parameter	Units	10515081003 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	13.2	13.1	0	30	N2

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

QC Batch: 672213
QC Batch Method: EPA 5035/5030B
Analysis Method: EPA 8260B
Analysis Description: 8260B MSV 5030 Med Level
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10515647001, 10515647002

METHOD BLANK: 3600753 Matrix: Solid
Associated Lab Samples: 10515647001, 10515647002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	ND	50.0	04/28/20 15:44	
1,1,1-Trichloroethane	ug/kg	ND	50.0	04/28/20 15:44	
1,1,2,2-Tetrachloroethane	ug/kg	ND	50.0	04/28/20 15:44	
1,1,2-Trichloroethane	ug/kg	ND	50.0	04/28/20 15:44	
1,1,2-Trichlorotrifluoroethane	ug/kg	ND	200	04/28/20 15:44	
1,1-Dichloroethane	ug/kg	ND	50.0	04/28/20 15:44	
1,1-Dichloroethene	ug/kg	ND	50.0	04/28/20 15:44	
1,1-Dichloropropene	ug/kg	ND	50.0	04/28/20 15:44	
1,2,3-Trichlorobenzene	ug/kg	ND	50.0	04/28/20 15:44	
1,2,3-Trichloropropane	ug/kg	ND	200	04/28/20 15:44	
1,2,4-Trichlorobenzene	ug/kg	ND	50.0	04/28/20 15:44	
1,2,4-Trimethylbenzene	ug/kg	ND	50.0	04/28/20 15:44	
1,2-Dibromo-3-chloropropane	ug/kg	ND	500	04/28/20 15:44	
1,2-Dibromoethane (EDB)	ug/kg	ND	50.0	04/28/20 15:44	
1,2-Dichlorobenzene	ug/kg	ND	50.0	04/28/20 15:44	
1,2-Dichloroethane	ug/kg	ND	50.0	04/28/20 15:44	
1,2-Dichloropropane	ug/kg	ND	50.0	04/28/20 15:44	
1,3,5-Trimethylbenzene	ug/kg	ND	50.0	04/28/20 15:44	
1,3-Dichlorobenzene	ug/kg	ND	50.0	04/28/20 15:44	
1,3-Dichloropropane	ug/kg	ND	50.0	04/28/20 15:44	
1,4-Dichlorobenzene	ug/kg	ND	50.0	04/28/20 15:44	
2,2-Dichloropropane	ug/kg	ND	200	04/28/20 15:44	
2-Butanone (MEK)	ug/kg	ND	250	04/28/20 15:44	
2-Chlorotoluene	ug/kg	ND	50.0	04/28/20 15:44	
4-Chlorotoluene	ug/kg	ND	50.0	04/28/20 15:44	
4-Methyl-2-pentanone (MIBK)	ug/kg	ND	250	04/28/20 15:44	
Acetone	ug/kg	ND	1000	04/28/20 15:44	
Allyl chloride	ug/kg	ND	200	04/28/20 15:44	
Benzene	ug/kg	ND	20.0	04/28/20 15:44	
Bromobenzene	ug/kg	ND	50.0	04/28/20 15:44	
Bromochloromethane	ug/kg	ND	50.0	04/28/20 15:44	
Bromodichloromethane	ug/kg	ND	50.0	04/28/20 15:44	
Bromoform	ug/kg	ND	200	04/28/20 15:44	
Bromomethane	ug/kg	ND	500	04/28/20 15:44	
Carbon tetrachloride	ug/kg	ND	50.0	04/28/20 15:44	
Chlorobenzene	ug/kg	ND	50.0	04/28/20 15:44	
Chloroethane	ug/kg	ND	500	04/28/20 15:44	
Chloroform	ug/kg	ND	50.0	04/28/20 15:44	
Chloromethane	ug/kg	ND	200	04/28/20 15:44	
cis-1,2-Dichloroethene	ug/kg	ND	50.0	04/28/20 15:44	

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REPORT OF LABORATORY ANALYSIS

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QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

METHOD BLANK: 3600753 Matrix: Solid
Associated Lab Samples: 10515647001, 10515647002

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
cis-1,3-Dichloropropene	ug/kg	ND	50.0	04/28/20 15:44	
Dibromochloromethane	ug/kg	ND	200	04/28/20 15:44	
Dibromomethane	ug/kg	ND	50.0	04/28/20 15:44	
Dichlorodifluoromethane	ug/kg	ND	200	04/28/20 15:44	
Dichlorofluoromethane	ug/kg	ND	500	04/28/20 15:44	
Diethyl ether (Ethyl ether)	ug/kg	ND	200	04/28/20 15:44	
Ethylbenzene	ug/kg	ND	50.0	04/28/20 15:44	
Hexachloro-1,3-butadiene	ug/kg	ND	250	04/28/20 15:44	
Isopropylbenzene (Cumene)	ug/kg	ND	50.0	04/28/20 15:44	
Methyl-tert-butyl ether	ug/kg	ND	50.0	04/28/20 15:44	
Methylene Chloride	ug/kg	ND	200	04/28/20 15:44	
n-Butylbenzene	ug/kg	ND	50.0	04/28/20 15:44	
n-Propylbenzene	ug/kg	ND	50.0	04/28/20 15:44	
Naphthalene	ug/kg	ND	200	04/28/20 15:44	
p-Isopropyltoluene	ug/kg	ND	50.0	04/28/20 15:44	
sec-Butylbenzene	ug/kg	ND	50.0	04/28/20 15:44	
Styrene	ug/kg	ND	50.0	04/28/20 15:44	
tert-Butylbenzene	ug/kg	ND	50.0	04/28/20 15:44	
Tetrachloroethene	ug/kg	ND	50.0	04/28/20 15:44	
Tetrahydrofuran	ug/kg	ND	2000	04/28/20 15:44	
Toluene	ug/kg	ND	50.0	04/28/20 15:44	
trans-1,2-Dichloroethene	ug/kg	ND	50.0	04/28/20 15:44	
trans-1,3-Dichloropropene	ug/kg	ND	50.0	04/28/20 15:44	
Trichloroethene	ug/kg	ND	50.0	04/28/20 15:44	
Trichlorofluoromethane	ug/kg	ND	200	04/28/20 15:44	
Vinyl chloride	ug/kg	ND	20.0	04/28/20 15:44	
Xylene (Total)	ug/kg	ND	150	04/28/20 15:44	
1,2-Dichloroethane-d4 (S)	%.	100	75-125	04/28/20 15:44	
4-Bromofluorobenzene (S)	%.	99	75-125	04/28/20 15:44	
Toluene-d8 (S)	%.	97	75-125	04/28/20 15:44	

LABORATORY CONTROL SAMPLE: 3600754

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	1000	1050	105	64-125	
1,1,1-Trichloroethane	ug/kg	1000	1180	118	60-135	
1,1,2,2-Tetrachloroethane	ug/kg	1000	975	97	61-125	
1,1,2-Trichloroethane	ug/kg	1000	1020	102	66-125	
1,1,2-Trichlorotrifluoroethane	ug/kg	1000	1280	128	51-136	
1,1-Dichloroethane	ug/kg	1000	1090	109	61-125	
1,1-Dichloroethene	ug/kg	1000	1140	114	45-136	
1,1-Dichloropropene	ug/kg	1000	1220	122	51-136	
1,2,3-Trichlorobenzene	ug/kg	1000	1030	103	63-125	
1,2,3-Trichloropropane	ug/kg	1000	1030	103	61-125	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
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QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

LABORATORY CONTROL SAMPLE: 3600754

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trichlorobenzene	ug/kg	1000	1040	104	61-125	
1,2,4-Trimethylbenzene	ug/kg	1000	1170	117	63-126	
1,2-Dibromo-3-chloropropane	ug/kg	2500	2550	102	58-125	
1,2-Dibromoethane (EDB)	ug/kg	1000	1040	104	64-125	
1,2-Dichlorobenzene	ug/kg	1000	1020	102	62-125	
1,2-Dichloroethane	ug/kg	1000	966	97	56-125	
1,2-Dichloropropane	ug/kg	1000	1040	104	64-125	
1,3,5-Trimethylbenzene	ug/kg	1000	1160	116	64-125	
1,3-Dichlorobenzene	ug/kg	1000	1040	104	62-125	
1,3-Dichloropropane	ug/kg	1000	1020	102	63-125	
1,4-Dichlorobenzene	ug/kg	1000	975	97	60-125	
2,2-Dichloropropane	ug/kg	1000	1200	120	61-130	
2-Butanone (MEK)	ug/kg	5000	4970	99	47-129	
2-Chlorotoluene	ug/kg	1000	1090	109	63-125	
4-Chlorotoluene	ug/kg	1000	1090	109	63-125	
4-Methyl-2-pentanone (MIBK)	ug/kg	5000	5260	105	56-125	
Acetone	ug/kg	5000	5160	103	49-132	
Allyl chloride	ug/kg	1000	1040	104	48-130	
Benzene	ug/kg	1000	1040	104	59-125	
Bromobenzene	ug/kg	1000	1050	105	61-125	
Bromochloromethane	ug/kg	1000	1070	107	57-125	
Bromodichloromethane	ug/kg	1000	1050	105	67-125	
Bromoform	ug/kg	1000	1010	101	61-125	
Bromomethane	ug/kg	1000	1070	107	44-136	
Carbon tetrachloride	ug/kg	1000	1270	127	58-134	
Chlorobenzene	ug/kg	1000	993	99	60-125	
Chloroethane	ug/kg	1000	937	94	30-150	
Chloroform	ug/kg	1000	1010	101	63-125	
Chloromethane	ug/kg	1000	798	80	43-125	
cis-1,2-Dichloroethene	ug/kg	1000	1090	109	60-125	
cis-1,3-Dichloropropene	ug/kg	1000	1050	105	63-125	
Dibromochloromethane	ug/kg	1000	1040	104	61-125	
Dibromomethane	ug/kg	1000	1030	103	62-125	
Dichlorodifluoromethane	ug/kg	1000	819	82	35-125	
Dichlorofluoromethane	ug/kg	1000	1100	110	49-128	
Diethyl ether (Ethyl ether)	ug/kg	1000	998	100	42-127	
Ethylbenzene	ug/kg	1000	1080	108	62-125	
Hexachloro-1,3-butadiene	ug/kg	1000	1200	120	59-132	
Isopropylbenzene (Cumene)	ug/kg	1000	1290	129	63-126	L1
Methyl-tert-butyl ether	ug/kg	1000	1030	103	58-125	
Methylene Chloride	ug/kg	1000	992	99	50-125	
n-Butylbenzene	ug/kg	1000	1160	116	60-129	
n-Propylbenzene	ug/kg	1000	1150	115	63-126	
Naphthalene	ug/kg	1000	1050	105	57-125	
p-Isopropyltoluene	ug/kg	1000	1160	116	62-127	
sec-Butylbenzene	ug/kg	1000	1290	129	64-128	L1
Styrene	ug/kg	1000	1090	109	62-125	

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REPORT OF LABORATORY ANALYSIS

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(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

LABORATORY CONTROL SAMPLE: 3600754

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
tert-Butylbenzene	ug/kg	1000	1230	123	62-129	
Tetrachloroethene	ug/kg	1000	1170	117	56-133	
Tetrahydrofuran	ug/kg	10000	10400	104	58-126	
Toluene	ug/kg	1000	1010	101	59-125	
trans-1,2-Dichloroethene	ug/kg	1000	1110	111	46-134	
trans-1,3-Dichloropropene	ug/kg	1000	1090	109	66-125	
Trichloroethene	ug/kg	1000	1090	109	62-125	
Trichlorofluoromethane	ug/kg	1000	1050	105	30-150	
Vinyl chloride	ug/kg	1000	914	91	44-127	
Xylene (Total)	ug/kg	3000	3410	114	65-125	
1,2-Dichloroethane-d4 (S)	%.			101	75-125	
4-Bromofluorobenzene (S)	%.			102	75-125	
Toluene-d8 (S)	%.			100	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3600755 3600756

Parameter	Units	10515647001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1,2-Tetrachloroethane	ug/kg	ND	1180	1180	1110	1150	94	98	55-150	4	30	
1,1,1-Trichloroethane	ug/kg	ND	1180	1180	1280	1260	108	107	48-150	2	30	
1,1,2,2-Tetrachloroethane	ug/kg	ND	1180	1180	1110	1090	94	93	47-150	1	30	
1,1,2-Trichloroethane	ug/kg	ND	1180	1180	1120	1120	95	95	50-150	1	30	
1,1,2-Trichlorotrifluoroethane	ug/kg	ND	1180	1180	1570	1500	123	118	43-150	5	30	
1,1-Dichloroethane	ug/kg	ND	1180	1180	1100	1080	93	92	36-150	1	30	
1,1-Dichloroethene	ug/kg	ND	1180	1180	1130	1100	95	93	43-150	3	30	
1,1-Dichloropropene	ug/kg	ND	1180	1180	1200	1170	102	99	38-150	3	30	
1,2,3-Trichlorobenzene	ug/kg	ND	1180	1180	1030	1030	87	88	48-150	0	30	
1,2,3-Trichloropropane	ug/kg	ND	1180	1180	1100	1120	93	95	48-150	1	30	
1,2,4-Trichlorobenzene	ug/kg	ND	1180	1180	1010	1010	86	86	46-150	0	30	
1,2,4-Trimethylbenzene	ug/kg	613	1180	1180	2160	2050	131	122	53-150	5	30	
1,2-Dibromo-3-chloropropane	ug/kg	ND	2940	2930	2930	2900	99	99	57-150	1	30	
1,2-Dibromoethane (EDB)	ug/kg	ND	1180	1180	1020	1060	86	90	54-150	4	30	
1,2-Dichlorobenzene	ug/kg	ND	1180	1180	1020	1040	86	88	53-150	2	30	
1,2-Dichloroethane	ug/kg	ND	1180	1180	991	943	84	80	50-150	5	30	
1,2-Dichloropropane	ug/kg	ND	1180	1180	1120	1110	95	94	45-150	1	30	
1,3,5-Trimethylbenzene	ug/kg	176	1180	1180	1480	1450	111	109	60-150	2	30	
1,3-Dichlorobenzene	ug/kg	ND	1180	1180	1010	1030	85	88	52-150	2	30	
1,3-Dichloropropane	ug/kg	ND	1180	1180	1030	1050	87	90	49-150	2	30	
1,4-Dichlorobenzene	ug/kg	ND	1180	1180	951	941	81	80	53-150	1	30	
2,2-Dichloropropane	ug/kg	ND	1180	1180	1280	1210	108	103	37-150	5	30	
2-Butanone (MEK)	ug/kg	ND	5900	5870	6330	6080	104	100	35-150	4	30	
2-Chlorotoluene	ug/kg	ND	1180	1180	1160	1160	98	99	50-150	0	30	
4-Chlorotoluene	ug/kg	ND	1180	1180	1080	1060	92	90	52-150	2	30	

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QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3600755 3600756

Parameter	Units	10515647001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
4-Methyl-2-pentanone (MIBK)	ug/kg	ND	5900	5870	6300	6090	107	104	43-150	4	30	
Acetone	ug/kg	ND	5900	5870	6780	6880	115	117	30-150	1	30	
Allyl chloride	ug/kg	ND	1180	1180	1010	948	86	81	30-150	6	30	
Benzene	ug/kg	309	1180	1180	1320	1330	86	87	46-150	0	30	
Bromobenzene	ug/kg	ND	1180	1180	1050	1060	89	90	54-150	1	30	
Bromochloromethane	ug/kg	ND	1180	1180	1040	1050	88	90	45-150	1	30	
Bromodichloromethane	ug/kg	ND	1180	1180	1100	1100	93	94	52-150	0	30	
Bromoform	ug/kg	ND	1180	1180	1060	1110	90	95	51-150	5	30	
Bromomethane	ug/kg	ND	1180	1180	996	911	84	78	30-150	9	30	
Carbon tetrachloride	ug/kg	ND	1180	1180	1340	1320	114	112	42-150	2	30	
Chlorobenzene	ug/kg	ND	1180	1180	1010	1030	85	87	51-150	2	30	
Chloroethane	ug/kg	ND	1180	1180	956	791	81	67	30-150	19	30	
Chloroform	ug/kg	ND	1180	1180	1060	1020	90	87	50-150	4	30	
Chloromethane	ug/kg	ND	1180	1180	771	719	65	61	30-150	7	30	
cis-1,2-Dichloroethene	ug/kg	ND	1180	1180	1090	1060	92	91	45-150	2	30	
cis-1,3-Dichloropropene	ug/kg	ND	1180	1180	1080	1070	92	92	48-150	1	30	
Dibromochloromethane	ug/kg	ND	1180	1180	1110	1130	94	97	51-150	3	30	
Dibromomethane	ug/kg	ND	1180	1180	1040	1040	88	88	53-150	1	30	
Dichlorodifluoromethane	ug/kg	ND	1180	1180	778	694	66	59	30-125	12	30	
Dichlorofluoromethane	ug/kg	ND	1180	1180	1100	1060	93	90	41-150	4	30	
Diethyl ether (Ethyl ether)	ug/kg	ND	1180	1180	1050	982	89	84	35-138	7	30	
Ethylbenzene	ug/kg	179	1180	1180	1350	1330	99	98	59-150	2	30	
Hexachloro-1,3-butadiene	ug/kg	ND	1180	1180	1360	1340	115	114	58-150	2	30	
Isopropylbenzene (Cumene)	ug/kg	ND	1180	1180	1450	1460	118	120	50-150	1	30	
Methyl-tert-butyl ether	ug/kg	ND	1180	1180	1120	1110	95	95	50-150	1	30	
Methylene Chloride	ug/kg	ND	1180	1180	1020	988	86	84	37-150	3	30	
n-Butylbenzene	ug/kg	60.8	1180	1180	1340	1260	108	102	48-150	6	30	
n-Propylbenzene	ug/kg	70.2	1180	1180	1320	1270	106	102	54-150	4	30	
Naphthalene	ug/kg	1380	1180	1180	3240	3120	158	149	50-150	4	30	M1
p-Isopropyltoluene	ug/kg	ND	1180	1180	1350	1350	111	111	51-150	1	30	
sec-Butylbenzene	ug/kg	ND	1180	1180	1410	1380	118	116	52-150	2	30	
Styrene	ug/kg	ND	1180	1180	1100	1130	94	96	52-150	2	30	
tert-Butylbenzene	ug/kg	ND	1180	1180	1330	1340	113	114	54-150	0	30	
Tetrachloroethene	ug/kg	ND	1180	1180	1140	1200	97	103	50-150	5	30	
Tetrahydrofuran	ug/kg	ND	11800	11800	10900	11800	93	101	49-150	8	30	
Toluene	ug/kg	2010	1180	1180	2920	3010	77	85	55-150	3	30	
trans-1,2-Dichloroethene	ug/kg	ND	1180	1180	1040	1010	88	86	43-150	3	30	
trans-1,3-Dichloropropene	ug/kg	ND	1180	1180	1050	1050	89	90	49-150	1	30	
Trichloroethene	ug/kg	ND	1180	1180	1060	1100	90	94	43-150	3	30	
Trichlorofluoromethane	ug/kg	ND	1180	1180	1120	1080	95	92	30-150	4	30	
Vinyl chloride	ug/kg	ND	1180	1180	872	819	74	70	30-150	6	30	
Xylene (Total)	ug/kg	2920	3540	3520	7140	6950	119	115	60-150	3	30	
1,2-Dichloroethane-d4 (S)	%.						102	99	75-125			
4-Bromofluorobenzene (S)	%.						105	101	75-125			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3600755 3600756

Parameter	Units	10515647001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Toluene-d8 (S)	%.						99	99	75-125			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

QC Batch: 672112
QC Batch Method: EPA 3550C
Analysis Method: EPA 8270E by SIM
Analysis Description: 8270E Solid PAH by SIM MSSV
Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10515647001

METHOD BLANK: 3600435 Matrix: Solid
Associated Lab Samples: 10515647001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Acenaphthene	ug/kg	ND	10.0	04/28/20 11:45	
Acenaphthylene	ug/kg	ND	10.0	04/28/20 11:45	
Anthracene	ug/kg	ND	10.0	04/28/20 11:45	
Benzo(a)anthracene	ug/kg	ND	10.0	04/28/20 11:45	
Benzo(a)pyrene	ug/kg	ND	10.0	04/28/20 11:45	
Benzo(b)fluoranthene	ug/kg	ND	10.0	04/28/20 11:45	
Benzo(g,h,i)perylene	ug/kg	ND	10.0	04/28/20 11:45	
Benzo(k)fluoranthene	ug/kg	ND	10.0	04/28/20 11:45	
Chrysene	ug/kg	ND	10.0	04/28/20 11:45	
Dibenz(a,h)anthracene	ug/kg	ND	10.0	04/28/20 11:45	
Fluoranthene	ug/kg	ND	10.0	04/28/20 11:45	
Fluorene	ug/kg	ND	10.0	04/28/20 11:45	
Indeno(1,2,3-cd)pyrene	ug/kg	ND	10.0	04/28/20 11:45	
Naphthalene	ug/kg	ND	10.0	04/28/20 11:45	
Phenanthrene	ug/kg	ND	10.0	04/28/20 11:45	
Pyrene	ug/kg	ND	10.0	04/28/20 11:45	
2-Fluorobiphenyl (S)	%.	77	30-138	04/28/20 11:45	
p-Terphenyl-d14 (S)	%.	100	30-143	04/28/20 11:45	

LABORATORY CONTROL SAMPLE: 3600436

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Acenaphthene	ug/kg	33.3	20.0	60	49-125	
Acenaphthylene	ug/kg	33.3	19.9	60	53-125	
Anthracene	ug/kg	33.3	24.2	73	59-125	
Benzo(a)anthracene	ug/kg	33.3	29.6	89	58-125	
Benzo(a)pyrene	ug/kg	33.3	27.0	81	64-125	
Benzo(b)fluoranthene	ug/kg	33.3	30.0	90	61-125	
Benzo(g,h,i)perylene	ug/kg	33.3	27.6	83	64-125	
Benzo(k)fluoranthene	ug/kg	33.3	28.5	85	62-125	
Chrysene	ug/kg	33.3	31.2	94	65-125	
Dibenz(a,h)anthracene	ug/kg	33.3	28.8	86	63-125	
Fluoranthene	ug/kg	33.3	30.1	90	68-125	
Fluorene	ug/kg	33.3	23.8	71	54-125	
Indeno(1,2,3-cd)pyrene	ug/kg	33.3	29.0	87	63-125	
Naphthalene	ug/kg	33.3	18.5	55	45-125	
Phenanthrene	ug/kg	33.3	27.6	83	63-125	
Pyrene	ug/kg	33.3	31.0	93	65-125	
2-Fluorobiphenyl (S)	%.			59	30-138	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

LABORATORY CONTROL SAMPLE: 3600436

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
p-Terphenyl-d14 (S)	%.			98	30-143	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3600437 3600438

Parameter	Units	10515540002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Acenaphthene	ug/kg	ND	33.3	33.3	58.3	78.3	175	235	30-125	29	30	M1
Acenaphthylene	ug/kg	ND	33.3	33.3	ND	ND	0	0	30-150		30	M1
Anthracene	ug/kg	ND	33.3	33.3	124	226	372	679	30-150	58	30	M1,R1
Benzo(a)anthracene	ug/kg	107	33.3	33.3	275	465	504	1080	30-150	51	30	M1,R1
Benzo(a)pyrene	ug/kg	107	33.3	33.3	234	373	383	798	30-150	46	30	M1,R1
Benzo(b)fluoranthene	ug/kg	159	33.3	33.3	343	544	553	1160	30-150	45	30	M1,R1
Benzo(g,h,i)perylene	ug/kg	120	33.3	33.3	192	270	215	449	30-150	34	30	M1,R1
Benzo(k)fluoranthene	ug/kg	61.7	33.3	33.3	148	227	258	497	30-150	42	30	M1,R1
Chrysene	ug/kg	128	33.3	33.3	301	513	518	1160	30-150	52	30	M1,R1
Dibenz(a,h)anthracene	ug/kg	ND	33.3	33.3	66.6	92.5	200	278	30-147	33	30	M1,R1
Fluoranthene	ug/kg	221	33.3	33.3	606	1010	1160	2370	30-150	50	30	M1,R1
Fluorene	ug/kg	ND	33.3	33.3	60.5	81.7	182	245	30-150	30	30	M1
Indeno(1,2,3-cd)pyrene	ug/kg	67.0	33.3	33.3	142	226	226	478	30-150	45	30	M1,R1
Naphthalene	ug/kg	ND	33.3	33.3	ND	ND	0	0	30-141		30	M1
Phenanthrene	ug/kg	131	33.3	33.3	443	733	935	1810	30-150	49	30	M1,R1
Pyrene	ug/kg	194	33.3	33.3	521	873	979	2040	30-150	50	30	M1,R1
2-Fluorobiphenyl (S)	%.						76	76	30-138			D3
p-Terphenyl-d14 (S)	%.						85	88	30-143			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

QC Batch: 671717
QC Batch Method: WI MOD DRO
Analysis Method: WI MOD DRO
Analysis Description: WIDRO GCS
Laboratory: Pace Analytical Services - Minneapolis

Associated Lab Samples: 10515647001

METHOD BLANK: 3598262 Matrix: Solid
Associated Lab Samples: 10515647001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
WDRO C10-C28	mg/kg	ND	10.0	04/25/20 11:39	
n-Triacontane (S)	%.	88	50-150	04/25/20 11:39	

LABORATORY CONTROL SAMPLE & LCSD: 3598263 3598264

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
WDRO C10-C28	mg/kg	80	77.2	64.9	96	81	70-120	17	20	
n-Triacontane (S)	%.				90	78	50-150			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

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

D3	Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.
G+	Late peaks present outside the GRO window.
L1	Analyte recovery in the laboratory control sample (LCS) was above QC limits. Results for this analyte in associated samples may be biased high.
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
N2	The lab does not hold NELAC/TNI accreditation for this parameter but other accreditations/certifications may apply. A complete list of accreditations/certifications is available upon request.
R1	RPD value was outside control limits.
T6	High boiling point hydrocarbons are present in the sample.
T7	Low boiling point hydrocarbons are present in the sample.

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: B1500394.03 Roof Depot
Pace Project No.: 10515647

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10515647001	**PP-24 (2-4)**	WI MOD DRO	671717	WI MOD DRO	672049
10515647001	**PP-24 (2-4)**	EPA 5030 Medium Soil	672098	WI MOD GRO	672197
10515647002	**Trip Blank**	EPA 5030 Medium Soil	672098	WI MOD GRO	672197
10515647001	**PP-24 (2-4)**	EPA 3050B	671601	EPA 6010D	671832
10515647001	**PP-24 (2-4)**	EPA 7471B	671607	EPA 7471B	671925
10515647001	**PP-24 (2-4)**	ASTM D2974	671673		
10515647001	**PP-24 (2-4)**	EPA 3550C	672112	EPA 8270E by SIM	672358
10515647001	**PP-24 (2-4)**	EPA 5035/5030B	672213	EPA 8260B	672761
10515647002	**Trip Blank**	EPA 5035/5030B	672213	EPA 8260B	672761

Pace Analytical®
www.pacelabs.com

CHAIN-OF-CUSTODY / Analytical Request Document

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

AET Project No. 03-21225

Page: of 2277876

Section A Required Client Information:	Section B Required Project Information:	Section C Invoice Information:
Company: Braun Intertec	Report To: Justin Michael	Attention: SAME
Address: 11007 Hampshire Ave S, Minneapolis MN 55438	Copy To:	Company Name:
Email To: JMichael@braunintertec.com	Purchase Order No.:	Address:
Phone: 612 2141638 Fax:	Project Name: Roof Depot	Pace Quote Reference:
Requested Due Date/TAT: Standard	Project Number: B1500394.03	Pace Project Manager:
		Pace Profile #: 35451

REGULATORY AGENCY: ☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER ☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: MN

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

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

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N	VOCs	GRO	DRO	BRCRA	PAH	Moisture	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	PP-24(3-4)	SL	G			4/21	1138		9	5						4			X	X	X	X	X	X		
2	Methanol Blank								2							2										
3																										
4																										
5																										
6																										
7																										
8																										
9																										
10																										
11																										
12																										

WO#: 10515647

10515647

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	TS	SAMPLE CONDITIONS		
	Megan Ullery / BraunIntertec	4/22	1150	PACE	4.22.20	1435	3.7	Y	N	Y
				Charles D / Pace	4.22.20	0515				
	Charles D / Pace	4.22.20	1550		4/22/20	1550	1.0	Y	N	Y

Temp in °C | Received on Ice (Y/N) | Custody Sealed Cooler (Y/N) | Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Megan Ullery

SIGNATURE of SAMPLER: [signature] DATE Signed (MM/DD/YY):

ORIGINAL

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-C-010-rev.00, 09Nov2017

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 19Feb2020 Page 1 of 1
	Document No.: **F-MN-L-213-rev.31**	Pace Analytical Services - **Minneapolis**

Sample Condition Upon Receipt

Client Name: Braun

Project #: WO#: 10515647

PM: BM2 Due Date: 04/29/20

CLIENT: Braun-BLM

Courier: ☐Fed Ex ☐UPS ☐USPS ☐Client ☒Pace ☐SpeeDee ☐Commercial **See Exceptions** ☐

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:** 1.0 °C

Average Corrected Temp (no temp blank only): ☐See Exceptions °C ☐1 Container

Correction Factor: Tm **Cooler Temp Corrected w/temp blank:** 1.0 °C

USDA Regulated Soil: (☐ N/A, water sample/Other:) **Date/Initials of Person Examining Contents:** CM 4/22/20

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?	☒Yes	☐No		1.
Chain of Custody Relinquished?	☒Yes	☐No		2.
Sampler Name and/or Signature on COC?	☒Yes	☐No	☐N/A	3.
Samples Arrived within Hold Time?	☒Yes	☐No		4.
Short Hold Time Analysis (<72 hr)?	☐Yes	☒No		5. ☐Fecal Coliform ☐HPC ☐Total Coliform/E coli ☐BOD/cBOD ☐Hex Chrome ☐Turbidity ☐Nitrate ☐Nitrite ☐Orthophos ☐Other
Rush Turn Around Time Requested?	☐Yes	☒No		6.
Sufficient Volume?	☒Yes	☐No		7.
Correct Containers Used?	☒Yes	☐No		8.
-Pace Containers Used?	☒Yes	☐No		
Containers Intact?	☒Yes	☐No		9.
Field Filtered Volume Received for Dissolved Tests?	☐Yes	☐No	☒N/A	10. Is sediment visible in the dissolved container? ☐Yes ☐No
Is sufficient information available to reconcile the samples to the COC?	☒Yes	☐No		11. **If no, write ID/ Date/Time on Container Below:** **See Exception** ☐
Matrix: ☐Water ☒Soil ☐Oil ☐Other				
All containers needing acid/base preservation have been checked?	☐Yes	☐No	☒N/A	12. Sample #
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, <2pH, NaOH >9 Sulfide, NaOH>12 Cyanide)	☐Yes	☐No	☒N/A	☐ NaOH ☐ HNO_3 ☐ H_2SO_4 ☐ Zinc Acetate
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS	☐Yes	☐No	☒N/A	Positive for Res. Chlorine? ☐Yes ☐No **pH Paper Lot#** **See Exception** ☐
				Res. Chlorine | 0-6 Roll | 0-6 Strip | 0-14 Strip
Extra labels present on soil VOA or WIDRO containers?	☒Yes	☐No	☐N/A	13. All Samples **See Exception** ☐
Headspace in VOA Vials (greater than 6mm)?	☐Yes	☐No	☒N/A	
Trip Blank Present?	☒Yes	☐No	☐N/A	14.
Trip Blank Custody Seals Present?	☒Yes	☐No	☐N/A	Pace Trip Blank Lot # (if purchased): 012720-3

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

Person Contacted: Date/Time:

Comments/Resolution:

Project Manager Review: BM **Date:** 4/23/2020

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:

Pace Analytical®

Document Name:
Service Center Transfer Checklist
Document Number:
F-MN-C-214-Rev.03

Document Revised: 11Feb2020
Page 1 of 1
Pace Analytical Services - Minneapolis

Service Center Transfer Checklist

Service Center: MPLS ☐ BLM ☒ AZ ☐

Client: Braun Intertec

Destination Lab: MPLS ☒ VM ☐ Duluth ☐

National ☐ Other _____

Received w/ Custody Seal ? Yes ☐ No ☑

Custody Seal Intact ? Yes ☐ No ☑

	Temp Read	Corr. Factor	Corr. Temp
Temperature °C	3.7	True	3.7

IR Gun: B88A0143310092 ☐ Samples on ice, in cool down

Rush ☐ **Short Hold** ☐ **N/A** ☑

Containers Intact ? Yes ☑ No ☐

Repacked and Re-Iced ? Yes ☐ No ☑

Notes: _____

Data File: \\192.168.10.12\chem\10gcs9.i\042520dro.b\042520000014.D

Date : 25-APR-2020 12:51

Client ID: PP-24 (2-4)

Instrument: 10gcs9.i

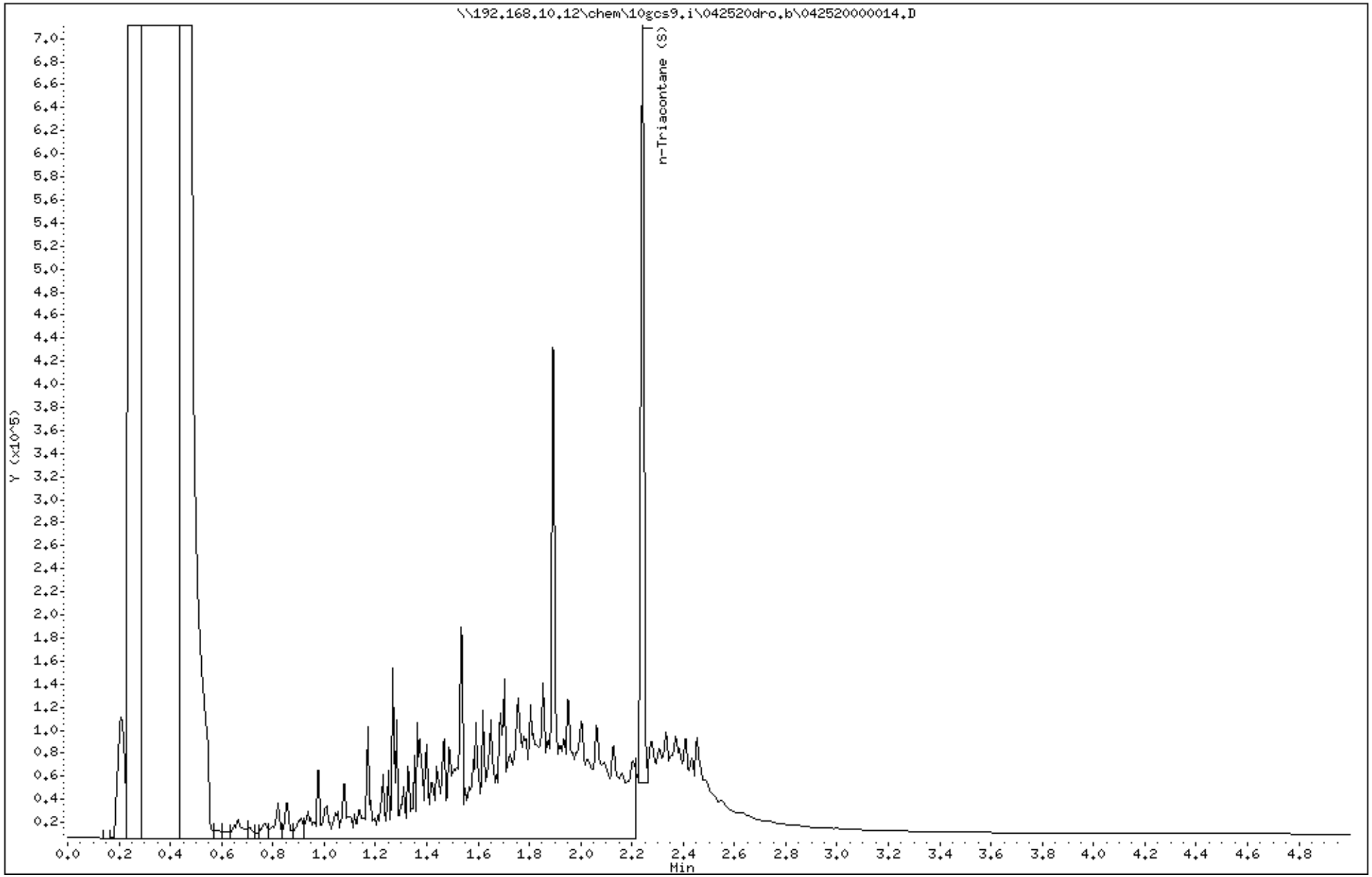
Sample Info: 10515647001

Volume Injected (uL): 1.0

Operator: JVM

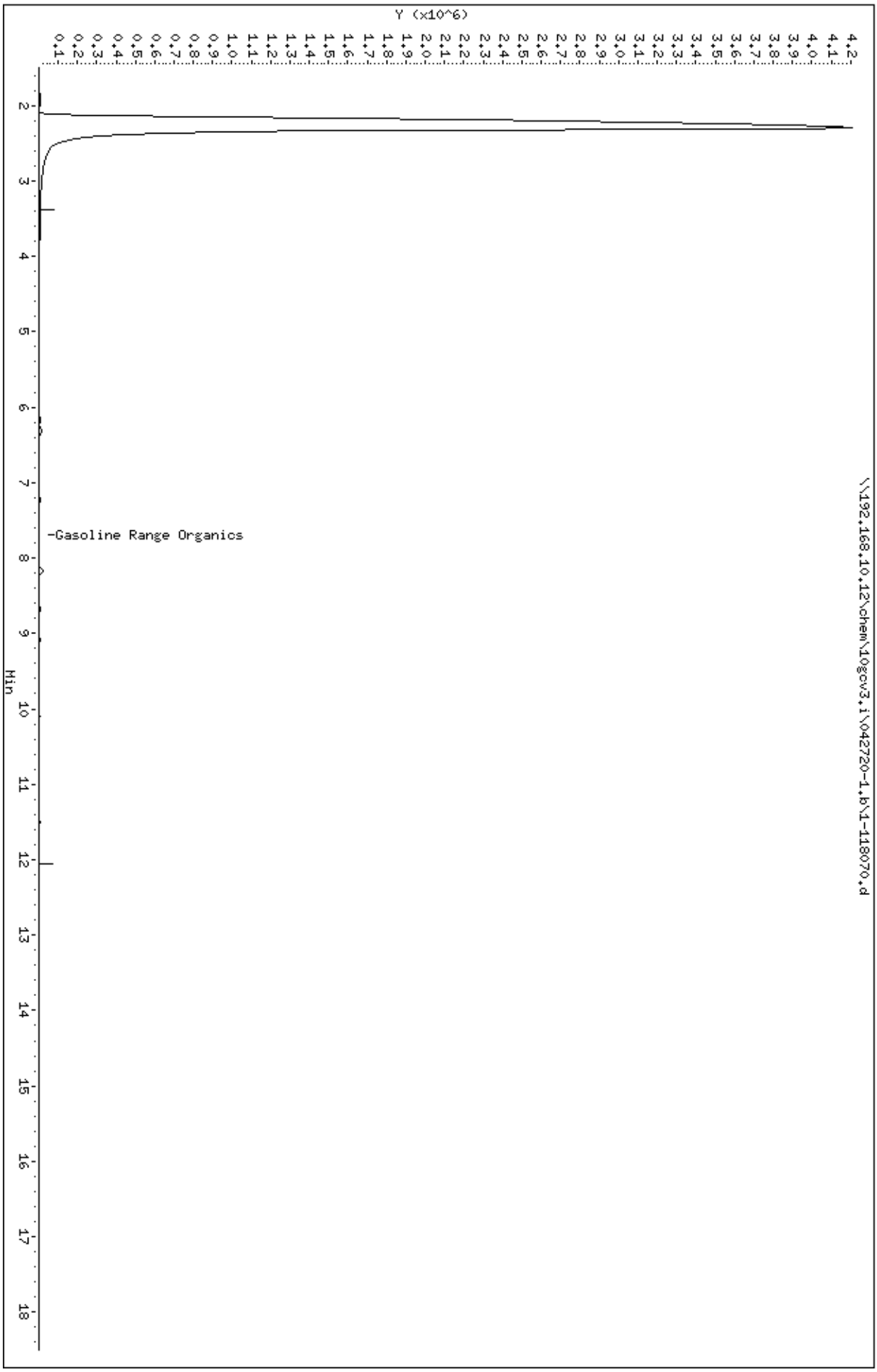
Column phase: DB-5-US20120015

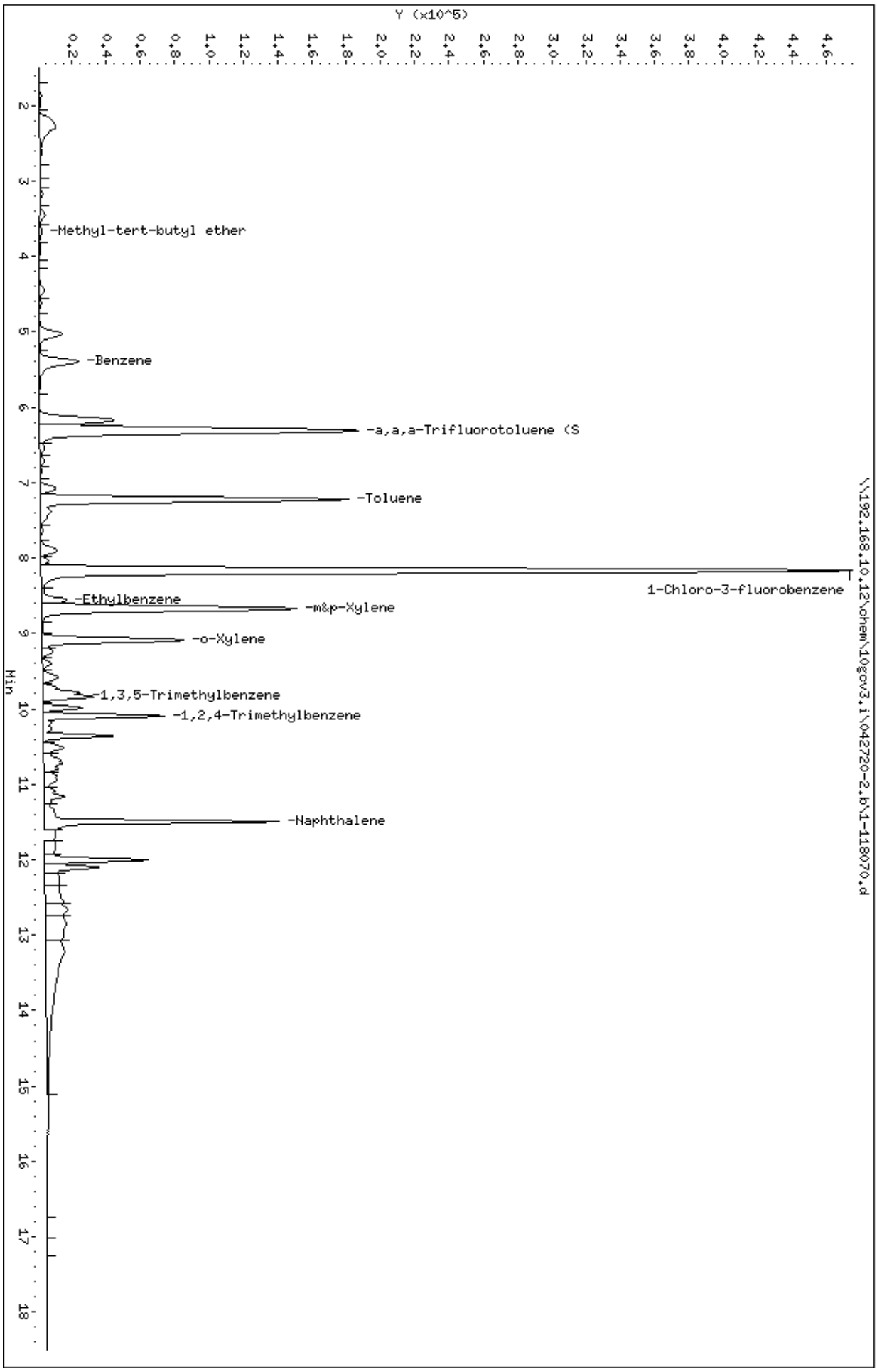
Column diameter: 0.32



Data File: \\192.168.10.12\chem\10gcv3.i\042720-1.b\1-118070.d
Date : 28-APR-2020 13:34
Client ID: PP-24 (2-4)
Sample Info: 10515647001,
Column phase: ZB-624 SN601464

Instrument: 10gcv3.i
Operator: MJD
Column diameter: 0.53



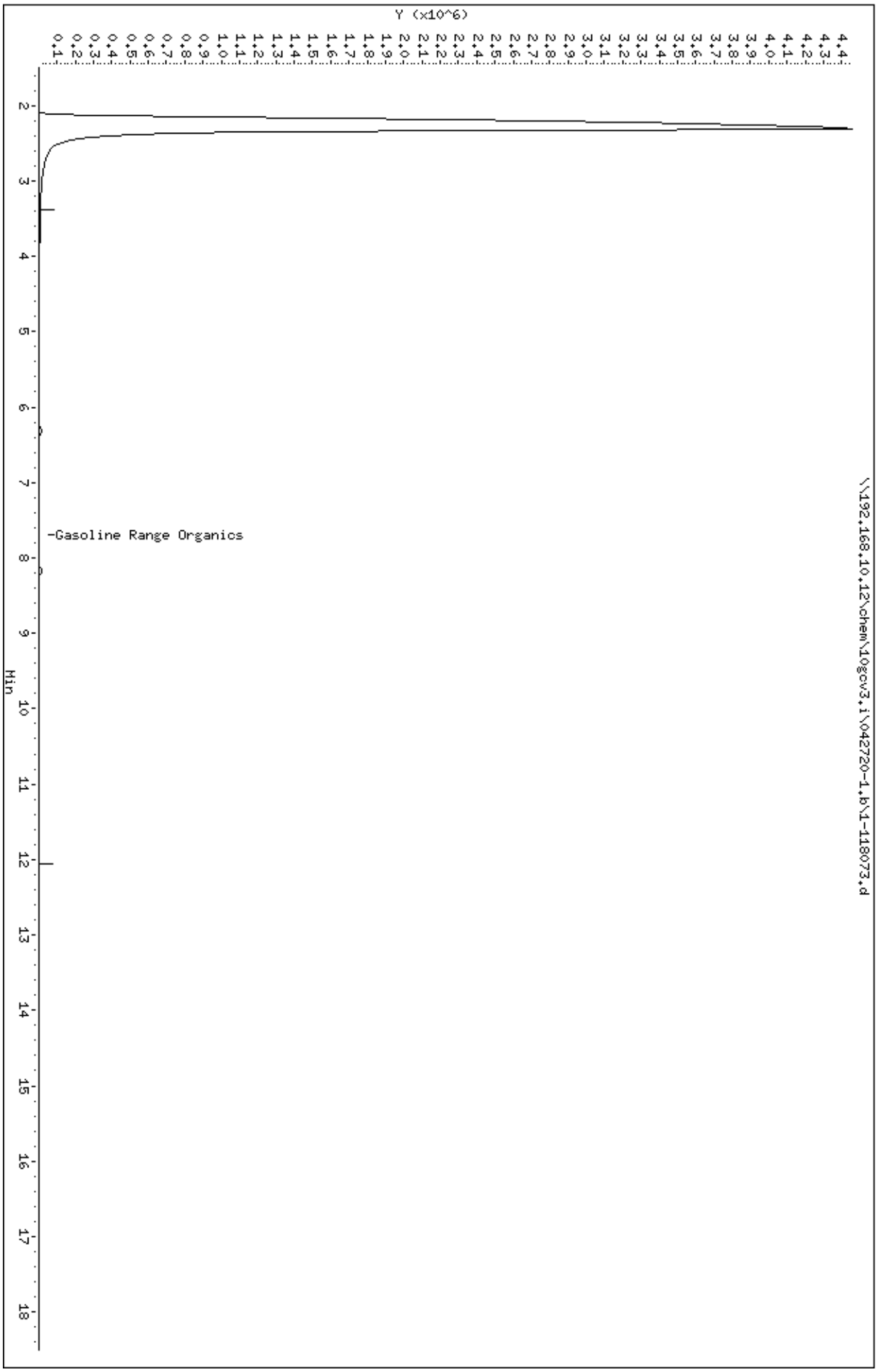

Data File: \\192.168.10.12\chem\10gcv3.i\042720-2.b\1-118070.d
Date : 28-APR-2020 13:34
Client ID: PP-24 (2-4)
Sample Info: 10515647001,
Column phase: ZB-624 SN601464
Instrument: 10gcv3.i
Operator: MJD
Column diameter: 0.53
Page 2
Y (x10^5)
-Methyl-tert-butyl ether
-Benzene
-a,a,a-Trifluorotoluene (S
-Toluene
1-Chloro-3-fluorobenzene
-Ethylbenzene
-m&p-Xylene
-o-Xylene
-1,3,5-Trimethylbenzene
-1,2,4-Trimethylbenzene
-Naphthalene
\\192.168.10.12\chem\10gcv3.i\042720-2.b\1-118070.d
Min

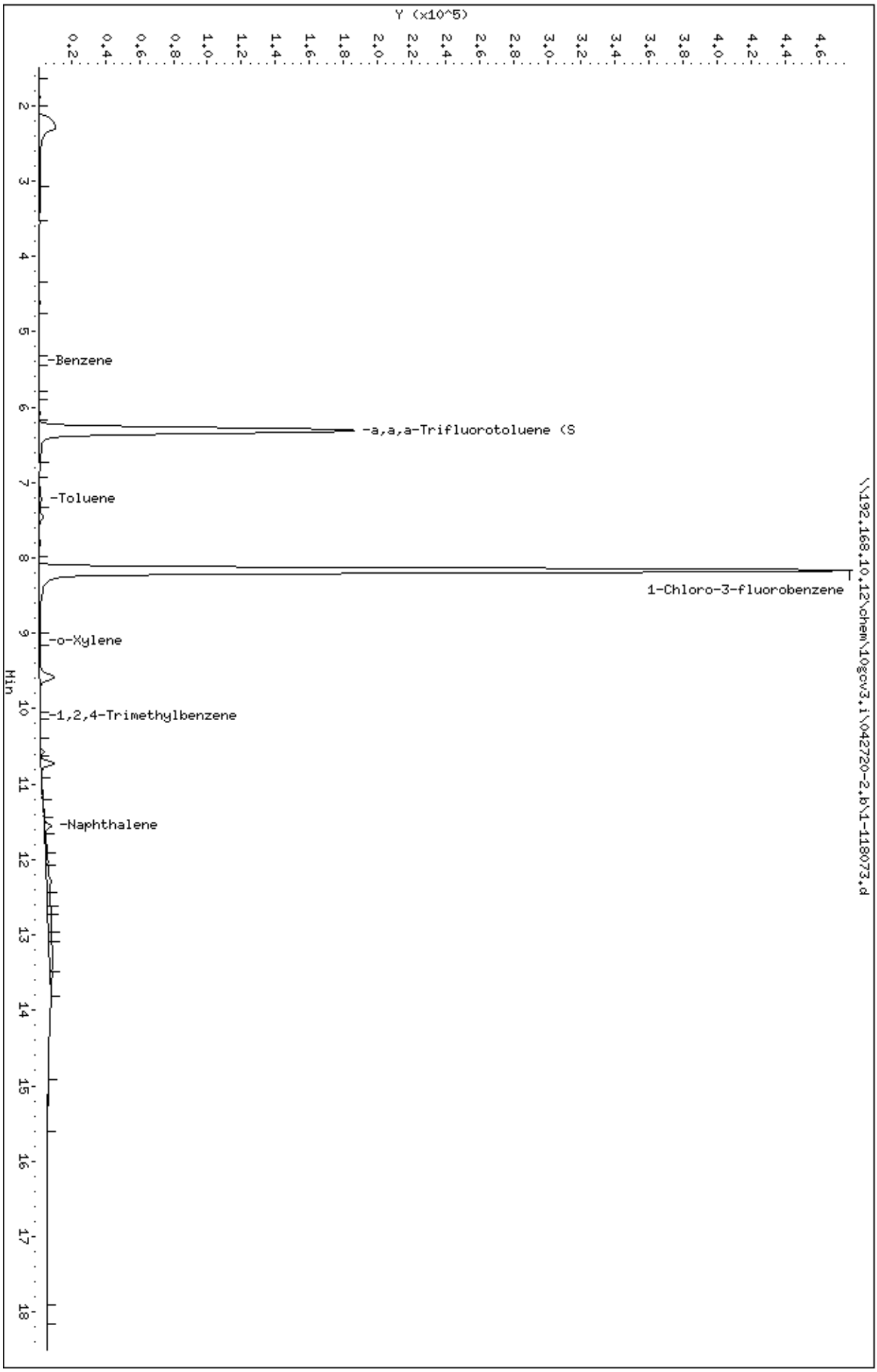
Data File: \\192.168.10.12\chem\10gcv3.i\042720-1.b\1-118073.d
Date : 28-APR-2020 14:48
Client ID: Trip Blank
Sample Info: 10515647002,

Instrument: 10gcv3.i

Operator: MJD
Column diameter: 0.53

Column phase: ZB-624 SN601464




Data File: \\192.168.10.12\chem\10gcv3.i\042720-2.b\1-118073.d
Date : 28-APR-2020 14:48
Client ID: Trip Blank
Sample Info: 10515647002,
Column phase: ZB-624 SN601464
Instrument: 10gcv3.i
Operator: MJD
Column diameter: 0.53
Page 2
Y (x10^5)
-Benzene
-a,a,a-Trifluorotoluene (S
-Toluene
1-Chloro-3-fluorobenzene
-o-Xylene
-1,2,4-Trimethylbenzene
-Naphthalene
Min
\\192.168.10.12\chem\10gcv3.i\042720-2.b\1-118073.d

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
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May 04, 2020

Justin Michael
Braun Intertec
11001 Hampshire Ave. S
Bloomington, MN 55438

RE: Project: B1500394.03 Roof Depot-Revised Report
Pace Project No.: 10515512

Dear Justin Michael:

Enclosed are the analytical results for sample(s) received by the laboratory on April 21, 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

This report was revised on May 4, 2020, to update the project number and to include results of arsenic analysis by method 6020B.

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

Sincerely,

Bob Michels
bob.michels@pacelabs.com
(612)709-5046
Project Manager

Enclosures

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
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CERTIFICATIONS

Project: B1500394.03 Roof Depot-Revised Report
Pace Project No.: 10515512

Pace Analytical Services Minneapolis

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
CNMI Saipan Certification #: MP0003
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8+Wyoming DW Certification #: via MN 027-053-137
Florida Certification #: E87605
Georgia Certification #: 959
Guam EPA Certification #: MN00064
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 #: 03086
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064
Maryland Certification #: 322
Massachusetts Certification #: M-MN064
Massachusetts DWP Certification #: via MN 027-053-137
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137
Minnesota Dept of Ag Certifcation #: 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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE SUMMARY

Project: B1500394.03 Roof Depot-Revised Report
Pace Project No.: 10515512

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10515512001	**PP-28**	Water	04/20/20 15:15	04/21/20 16:35
10515512002	**PP-18**	Water	04/20/20 12:10	04/21/20 16:35
10515512003	**PP-20**	Water	04/21/20 09:00	04/21/20 16:35

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
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(612)607-1700

SAMPLE ANALYTE COUNT

Project: B1500394.03 Roof Depot-Revised Report
Pace Project No.: 10515512

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10515512001	**PP-28**	EPA 6020B	PW1	1	PASI-M
		EPA 8260B	MM3	70	PASI-M
10515512002	**PP-18**	EPA 6020B	PW1	1	PASI-M
		EPA 8260B	MM3	70	PASI-M
10515512003	**PP-20**	EPA 6020B	PW1	1	PASI-M
		EPA 8260B	MM3	70	PASI-M

PASI-M = Pace Analytical Services - Minneapolis

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PROJECT NARRATIVE

Project: B1500394.03 Roof Depot-Revised Report
Pace Project No.: 10515512

Method: **EPA 6020B**
Description: 6020B MET ICPMS, Dissolved
Client: Braun Intertec Corporation
Date: May 04, 2020

General Information:
3 samples were analyzed for EPA 6020B 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.

Sample Preparation:
The samples were prepared in accordance with EPA 3020A 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.

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:

Pace Analytical Services, LLC
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Minneapolis, MN 55414
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PROJECT NARRATIVE

Project: B1500394.03 Roof Depot-Revised Report
Pace Project No.: 10515512

Method: **EPA 8260B**
Description: 8260B VOC
Client: Braun Intertec Corporation
Date: May 04, 2020

General Information:
3 samples were analyzed for EPA 8260B 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.

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.

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.

QC Batch: 671465

A matrix spike and/or matrix spike duplicate (MS/MSD) were performed on the following sample(s): 10515233010

M1: Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.

- MSD (Lab ID: 3597200)
  - Tetrachloroethene

Additional Comments:

Analyte Comments:

QC Batch: 671465

- BLANK (Lab ID: 3597197)
  - Dichlorofluoromethane
- LCS (Lab ID: 3597198)
  - Dichlorofluoromethane

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
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PROJECT NARRATIVE

Project: B1500394.03 Roof Depot-Revised Report
Pace Project No.: 10515512

Method: **EPA 8260B**
Description: 8260B VOC
Client: Braun Intertec Corporation
Date: May 04, 2020

Analyte Comments:

QC Batch: 671465

- MS (Lab ID: 3597199)
  - Dichlorofluoromethane
- MSD (Lab ID: 3597200)
  - Dichlorofluoromethane
- PP-18 (Lab ID: 10515512002)
  - Dichlorofluoromethane
- PP-20 (Lab ID: 10515512003)
  - Dichlorofluoromethane
- PP-28 (Lab ID: 10515512001)
  - Dichlorofluoromethane

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

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
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(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot-Revised Report
Pace Project No.: 10515512

Sample: PP-28 **Lab ID: 10515512001** Collected: 04/20/20 15:15 Received: 04/21/20 16:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis							
Arsenic, Dissolved	**29.0**	ug/L	0.50	1	04/29/20 05:09	04/29/20 15:34	7440-38-2	
8260B VOC	Analytical Method: EPA 8260B Pace Analytical Services - Minneapolis							
Acetone	ND	ug/L	20.0	1		04/22/20 18:50	67-64-1	
Allyl chloride	ND	ug/L	4.0	1		04/22/20 18:50	107-05-1	
Benzene	ND	ug/L	1.0	1		04/22/20 18:50	71-43-2	
Bromobenzene	ND	ug/L	1.0	1		04/22/20 18:50	108-86-1	
Bromochloromethane	ND	ug/L	4.0	1		04/22/20 18:50	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	1		04/22/20 18:50	75-27-4	
Bromoform	ND	ug/L	4.0	1		04/22/20 18:50	75-25-2	
Bromomethane	ND	ug/L	4.0	1		04/22/20 18:50	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	1		04/22/20 18:50	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	1		04/22/20 18:50	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	1		04/22/20 18:50	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	1		04/22/20 18:50	98-06-6	
Carbon tetrachloride	ND	ug/L	4.0	1		04/22/20 18:50	56-23-5	
Chlorobenzene	ND	ug/L	1.0	1		04/22/20 18:50	108-90-7	
Chloroethane	ND	ug/L	1.0	1		04/22/20 18:50	75-00-3	
Chloroform	ND	ug/L	1.0	1		04/22/20 18:50	67-66-3	
Chloromethane	ND	ug/L	4.0	1		04/22/20 18:50	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	1		04/22/20 18:50	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	1		04/22/20 18:50	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	1		04/22/20 18:50	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	1		04/22/20 18:50	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	1		04/22/20 18:50	106-93-4	
Dibromomethane	ND	ug/L	4.0	1		04/22/20 18:50	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	1		04/22/20 18:50	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	1		04/22/20 18:50	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	1		04/22/20 18:50	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	1		04/22/20 18:50	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	1		04/22/20 18:50	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		04/22/20 18:50	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	1		04/22/20 18:50	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		04/22/20 18:50	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		04/22/20 18:50	156-60-5	
Dichlorofluoromethane	ND	ug/L	1.0	1		04/22/20 18:50	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	1		04/22/20 18:50	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	1		04/22/20 18:50	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	1		04/22/20 18:50	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	1		04/22/20 18:50	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	1		04/22/20 18:50	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	1		04/22/20 18:50	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	1		04/22/20 18:50	60-29-7	
Ethylbenzene	ND	ug/L	1.0	1		04/22/20 18:50	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	4.0	1		04/22/20 18:50	87-68-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot-Revised Report
Pace Project No.: 10515512

Sample: PP-28 **Lab ID: 10515512001** Collected: 04/20/20 15:15 Received: 04/21/20 16:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B Pace Analytical Services - Minneapolis							
Isopropylbenzene (Cumene)	ND	ug/L	1.0	1		04/22/20 18:50	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	1		04/22/20 18:50	99-87-6	
Methylene Chloride	ND	ug/L	4.0	1		04/22/20 18:50	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	1		04/22/20 18:50	108-10-1	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		04/22/20 18:50	1634-04-4	
Naphthalene	ND	ug/L	4.0	1		04/22/20 18:50	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	1		04/22/20 18:50	103-65-1	
Styrene	ND	ug/L	1.0	1		04/22/20 18:50	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	1		04/22/20 18:50	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	1		04/22/20 18:50	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	1		04/22/20 18:50	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	1		04/22/20 18:50	109-99-9	
Toluene	ND	ug/L	1.0	1		04/22/20 18:50	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	1		04/22/20 18:50	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	1		04/22/20 18:50	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	1		04/22/20 18:50	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	1		04/22/20 18:50	79-00-5	
Trichloroethene	ND	ug/L	0.40	1		04/22/20 18:50	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	1		04/22/20 18:50	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	1		04/22/20 18:50	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	4.0	1		04/22/20 18:50	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	1		04/22/20 18:50	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	1		04/22/20 18:50	108-67-8	
Vinyl chloride	ND	ug/L	0.20	1		04/22/20 18:50	75-01-4	
Xylene (Total)	ND	ug/L	3.0	1		04/22/20 18:50	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	102	%.	75-125	1		04/22/20 18:50	17060-07-0	HS
Toluene-d8 (S)	107	%.	75-125	1		04/22/20 18:50	2037-26-5	
4-Bromofluorobenzene (S)	106	%.	75-125	1		04/22/20 18:50	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot-Revised Report
Pace Project No.: 10515512

Sample: PP-18 **Lab ID: 10515512002** Collected: 04/20/20 12:10 Received: 04/21/20 16:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis							
Arsenic, Dissolved	**805**	ug/L	5.0	10	04/29/20 05:09	04/30/20 12:42	7440-38-2	
8260B VOC	Analytical Method: EPA 8260B Pace Analytical Services - Minneapolis							
Acetone	ND	ug/L	20.0	1		04/22/20 19:07	67-64-1	
Allyl chloride	ND	ug/L	4.0	1		04/22/20 19:07	107-05-1	
Benzene	ND	ug/L	1.0	1		04/22/20 19:07	71-43-2	
Bromobenzene	ND	ug/L	1.0	1		04/22/20 19:07	108-86-1	
Bromochloromethane	ND	ug/L	4.0	1		04/22/20 19:07	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	1		04/22/20 19:07	75-27-4	
Bromoform	ND	ug/L	4.0	1		04/22/20 19:07	75-25-2	
Bromomethane	ND	ug/L	4.0	1		04/22/20 19:07	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	1		04/22/20 19:07	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	1		04/22/20 19:07	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	1		04/22/20 19:07	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	1		04/22/20 19:07	98-06-6	
Carbon tetrachloride	ND	ug/L	4.0	1		04/22/20 19:07	56-23-5	
Chlorobenzene	ND	ug/L	1.0	1		04/22/20 19:07	108-90-7	
Chloroethane	ND	ug/L	1.0	1		04/22/20 19:07	75-00-3	
Chloroform	ND	ug/L	1.0	1		04/22/20 19:07	67-66-3	
Chloromethane	ND	ug/L	4.0	1		04/22/20 19:07	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	1		04/22/20 19:07	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	1		04/22/20 19:07	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	1		04/22/20 19:07	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	1		04/22/20 19:07	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	1		04/22/20 19:07	106-93-4	
Dibromomethane	ND	ug/L	4.0	1		04/22/20 19:07	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	1		04/22/20 19:07	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	1		04/22/20 19:07	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	1		04/22/20 19:07	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	1		04/22/20 19:07	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	1		04/22/20 19:07	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		04/22/20 19:07	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	1		04/22/20 19:07	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		04/22/20 19:07	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		04/22/20 19:07	156-60-5	
Dichlorofluoromethane	ND	ug/L	1.0	1		04/22/20 19:07	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	1		04/22/20 19:07	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	1		04/22/20 19:07	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	1		04/22/20 19:07	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	1		04/22/20 19:07	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	1		04/22/20 19:07	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	1		04/22/20 19:07	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	1		04/22/20 19:07	60-29-7	
Ethylbenzene	ND	ug/L	1.0	1		04/22/20 19:07	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	4.0	1		04/22/20 19:07	87-68-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot-Revised Report
Pace Project No.: 10515512

Sample: PP-18 **Lab ID: 10515512002** Collected: 04/20/20 12:10 Received: 04/21/20 16:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B Pace Analytical Services - Minneapolis							
Isopropylbenzene (Cumene)	ND	ug/L	1.0	1		04/22/20 19:07	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	1		04/22/20 19:07	99-87-6	
Methylene Chloride	ND	ug/L	4.0	1		04/22/20 19:07	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	1		04/22/20 19:07	108-10-1	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		04/22/20 19:07	1634-04-4	
Naphthalene	ND	ug/L	4.0	1		04/22/20 19:07	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	1		04/22/20 19:07	103-65-1	
Styrene	ND	ug/L	1.0	1		04/22/20 19:07	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	1		04/22/20 19:07	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	1		04/22/20 19:07	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	1		04/22/20 19:07	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	1		04/22/20 19:07	109-99-9	
Toluene	ND	ug/L	1.0	1		04/22/20 19:07	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	1		04/22/20 19:07	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	1		04/22/20 19:07	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	1		04/22/20 19:07	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	1		04/22/20 19:07	79-00-5	
Trichloroethene	ND	ug/L	0.40	1		04/22/20 19:07	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	1		04/22/20 19:07	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	1		04/22/20 19:07	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	4.0	1		04/22/20 19:07	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	1		04/22/20 19:07	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	1		04/22/20 19:07	108-67-8	
Vinyl chloride	ND	ug/L	0.20	1		04/22/20 19:07	75-01-4	
Xylene (Total)	ND	ug/L	3.0	1		04/22/20 19:07	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	102	%.	75-125	1		04/22/20 19:07	17060-07-0	
Toluene-d8 (S)	101	%.	75-125	1		04/22/20 19:07	2037-26-5	
4-Bromofluorobenzene (S)	104	%.	75-125	1		04/22/20 19:07	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot-Revised Report
Pace Project No.: 10515512

Sample: PP-20 **Lab ID: 10515512003** Collected: 04/21/20 09:00 Received: 04/21/20 16:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
6020B MET ICPMS, Dissolved	Analytical Method: EPA 6020B Preparation Method: EPA 3020A Pace Analytical Services - Minneapolis							
Arsenic, Dissolved	**97.8**	ug/L	0.50	1	04/29/20 05:09	04/29/20 15:52	7440-38-2	
8260B VOC	Analytical Method: EPA 8260B Pace Analytical Services - Minneapolis							
Acetone	ND	ug/L	20.0	1		04/22/20 19:24	67-64-1	
Allyl chloride	ND	ug/L	4.0	1		04/22/20 19:24	107-05-1	
Benzene	ND	ug/L	1.0	1		04/22/20 19:24	71-43-2	
Bromobenzene	ND	ug/L	1.0	1		04/22/20 19:24	108-86-1	
Bromochloromethane	ND	ug/L	4.0	1		04/22/20 19:24	74-97-5	
Bromodichloromethane	ND	ug/L	1.0	1		04/22/20 19:24	75-27-4	
Bromoform	ND	ug/L	4.0	1		04/22/20 19:24	75-25-2	
Bromomethane	ND	ug/L	4.0	1		04/22/20 19:24	74-83-9	
2-Butanone (MEK)	ND	ug/L	5.0	1		04/22/20 19:24	78-93-3	
n-Butylbenzene	ND	ug/L	1.0	1		04/22/20 19:24	104-51-8	
sec-Butylbenzene	ND	ug/L	1.0	1		04/22/20 19:24	135-98-8	
tert-Butylbenzene	ND	ug/L	1.0	1		04/22/20 19:24	98-06-6	
Carbon tetrachloride	ND	ug/L	4.0	1		04/22/20 19:24	56-23-5	
Chlorobenzene	ND	ug/L	1.0	1		04/22/20 19:24	108-90-7	
Chloroethane	ND	ug/L	1.0	1		04/22/20 19:24	75-00-3	
Chloroform	ND	ug/L	1.0	1		04/22/20 19:24	67-66-3	
Chloromethane	ND	ug/L	4.0	1		04/22/20 19:24	74-87-3	
2-Chlorotoluene	ND	ug/L	1.0	1		04/22/20 19:24	95-49-8	
4-Chlorotoluene	ND	ug/L	1.0	1		04/22/20 19:24	106-43-4	
1,2-Dibromo-3-chloropropane	ND	ug/L	4.0	1		04/22/20 19:24	96-12-8	
Dibromochloromethane	ND	ug/L	1.0	1		04/22/20 19:24	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/L	1.0	1		04/22/20 19:24	106-93-4	
Dibromomethane	ND	ug/L	4.0	1		04/22/20 19:24	74-95-3	
1,2-Dichlorobenzene	ND	ug/L	1.0	1		04/22/20 19:24	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	1.0	1		04/22/20 19:24	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	1.0	1		04/22/20 19:24	106-46-7	
Dichlorodifluoromethane	ND	ug/L	1.0	1		04/22/20 19:24	75-71-8	
1,1-Dichloroethane	ND	ug/L	1.0	1		04/22/20 19:24	75-34-3	
1,2-Dichloroethane	ND	ug/L	1.0	1		04/22/20 19:24	107-06-2	
1,1-Dichloroethene	ND	ug/L	1.0	1		04/22/20 19:24	75-35-4	
cis-1,2-Dichloroethene	ND	ug/L	1.0	1		04/22/20 19:24	156-59-2	
trans-1,2-Dichloroethene	ND	ug/L	1.0	1		04/22/20 19:24	156-60-5	
Dichlorofluoromethane	ND	ug/L	1.0	1		04/22/20 19:24	75-43-4	
1,2-Dichloropropane	ND	ug/L	4.0	1		04/22/20 19:24	78-87-5	
1,3-Dichloropropane	ND	ug/L	1.0	1		04/22/20 19:24	142-28-9	
2,2-Dichloropropane	ND	ug/L	4.0	1		04/22/20 19:24	594-20-7	
1,1-Dichloropropene	ND	ug/L	1.0	1		04/22/20 19:24	563-58-6	
cis-1,3-Dichloropropene	ND	ug/L	4.0	1		04/22/20 19:24	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/L	4.0	1		04/22/20 19:24	10061-02-6	
Diethyl ether (Ethyl ether)	ND	ug/L	4.0	1		04/22/20 19:24	60-29-7	
Ethylbenzene	ND	ug/L	1.0	1		04/22/20 19:24	100-41-4	
Hexachloro-1,3-butadiene	ND	ug/L	4.0	1		04/22/20 19:24	87-68-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot-Revised Report
Pace Project No.: 10515512

Sample: PP-20 **Lab ID: 10515512003** Collected: 04/21/20 09:00 Received: 04/21/20 16:35 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
8260B VOC	Analytical Method: EPA 8260B Pace Analytical Services - Minneapolis							
Isopropylbenzene (Cumene)	ND	ug/L	1.0	1		04/22/20 19:24	98-82-8	
p-Isopropyltoluene	ND	ug/L	1.0	1		04/22/20 19:24	99-87-6	
Methylene Chloride	ND	ug/L	4.0	1		04/22/20 19:24	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/L	5.0	1		04/22/20 19:24	108-10-1	
Methyl-tert-butyl ether	ND	ug/L	1.0	1		04/22/20 19:24	1634-04-4	
Naphthalene	ND	ug/L	4.0	1		04/22/20 19:24	91-20-3	
n-Propylbenzene	ND	ug/L	1.0	1		04/22/20 19:24	103-65-1	
Styrene	ND	ug/L	1.0	1		04/22/20 19:24	100-42-5	
1,1,1,2-Tetrachloroethane	ND	ug/L	1.0	1		04/22/20 19:24	630-20-6	
1,1,2,2-Tetrachloroethane	ND	ug/L	1.0	1		04/22/20 19:24	79-34-5	
Tetrachloroethene	ND	ug/L	1.0	1		04/22/20 19:24	127-18-4	
Tetrahydrofuran	ND	ug/L	10.0	1		04/22/20 19:24	109-99-9	
Toluene	ND	ug/L	1.0	1		04/22/20 19:24	108-88-3	
1,2,3-Trichlorobenzene	ND	ug/L	1.0	1		04/22/20 19:24	87-61-6	
1,2,4-Trichlorobenzene	ND	ug/L	1.0	1		04/22/20 19:24	120-82-1	
1,1,1-Trichloroethane	ND	ug/L	1.0	1		04/22/20 19:24	71-55-6	
1,1,2-Trichloroethane	ND	ug/L	1.0	1		04/22/20 19:24	79-00-5	
Trichloroethene	ND	ug/L	0.40	1		04/22/20 19:24	79-01-6	
Trichlorofluoromethane	ND	ug/L	1.0	1		04/22/20 19:24	75-69-4	
1,2,3-Trichloropropane	ND	ug/L	4.0	1		04/22/20 19:24	96-18-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/L	4.0	1		04/22/20 19:24	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/L	1.0	1		04/22/20 19:24	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/L	1.0	1		04/22/20 19:24	108-67-8	
Vinyl chloride	ND	ug/L	0.20	1		04/22/20 19:24	75-01-4	
Xylene (Total)	ND	ug/L	3.0	1		04/22/20 19:24	1330-20-7	
Surrogates								
1,2-Dichloroethane-d4 (S)	102	%.	75-125	1		04/22/20 19:24	17060-07-0	
Toluene-d8 (S)	101	%.	75-125	1		04/22/20 19:24	2037-26-5	
4-Bromofluorobenzene (S)	100	%.	75-125	1		04/22/20 19:24	460-00-4	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot-Revised Report
Pace Project No.: 10515512

QC Batch: 672449
QC Batch Method: EPA 3020A
Analysis Method: EPA 6020B
Analysis Description: 6020B Water Dissolved UPD5
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10515512001, 10515512002, 10515512003

METHOD BLANK: 3601729 Matrix: Water
Associated Lab Samples: 10515512001, 10515512002, 10515512003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic, Dissolved	ug/L	ND	0.50	04/29/20 15:27	

LABORATORY CONTROL SAMPLE: 3601730

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic, Dissolved	ug/L	100	94.6	95	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3601731 3601732

Parameter	Units	10515512002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Arsenic, Dissolved	ug/L	805	100	100	915	913	110	108	75-125	0	20	

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
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(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot-Revised Report
Pace Project No.: 10515512

QC Batch: 671465
QC Batch Method: EPA 8260B
Analysis Method: EPA 8260B
Analysis Description: 8260B MSV 465 W
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10515512001, 10515512002, 10515512003

METHOD BLANK: 3597197
Matrix: Water
Associated Lab Samples: 10515512001, 10515512002, 10515512003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	ND	1.0	04/22/20 13:48	
1,1,1-Trichloroethane	ug/L	ND	1.0	04/22/20 13:48	
1,1,2,2-Tetrachloroethane	ug/L	ND	1.0	04/22/20 13:48	
1,1,2-Trichloroethane	ug/L	ND	1.0	04/22/20 13:48	
1,1,2-Trichlorotrifluoroethane	ug/L	ND	4.0	04/22/20 13:48	MN
1,1-Dichloroethane	ug/L	ND	1.0	04/22/20 13:48	
1,1-Dichloroethene	ug/L	ND	1.0	04/22/20 13:48	
1,1-Dichloropropene	ug/L	ND	1.0	04/22/20 13:48	
1,2,3-Trichlorobenzene	ug/L	ND	1.0	04/22/20 13:48	
1,2,3-Trichloropropane	ug/L	ND	4.0	04/22/20 13:48	
1,2,4-Trichlorobenzene	ug/L	ND	1.0	04/22/20 13:48	
1,2,4-Trimethylbenzene	ug/L	ND	1.0	04/22/20 13:48	
1,2-Dibromo-3-chloropropane	ug/L	ND	4.0	04/22/20 13:48	
1,2-Dibromoethane (EDB)	ug/L	ND	1.0	04/22/20 13:48	
1,2-Dichlorobenzene	ug/L	ND	1.0	04/22/20 13:48	
1,2-Dichloroethane	ug/L	ND	1.0	04/22/20 13:48	
1,2-Dichloropropane	ug/L	ND	4.0	04/22/20 13:48	
1,3,5-Trimethylbenzene	ug/L	ND	1.0	04/22/20 13:48	
1,3-Dichlorobenzene	ug/L	ND	1.0	04/22/20 13:48	
1,3-Dichloropropane	ug/L	ND	1.0	04/22/20 13:48	
1,4-Dichlorobenzene	ug/L	ND	1.0	04/22/20 13:48	
2,2-Dichloropropane	ug/L	ND	4.0	04/22/20 13:48	
2-Butanone (MEK)	ug/L	ND	5.0	04/22/20 13:48	
2-Chlorotoluene	ug/L	ND	1.0	04/22/20 13:48	
4-Chlorotoluene	ug/L	ND	1.0	04/22/20 13:48	
4-Methyl-2-pentanone (MIBK)	ug/L	ND	5.0	04/22/20 13:48	
Acetone	ug/L	ND	20.0	04/22/20 13:48	
Allyl chloride	ug/L	ND	4.0	04/22/20 13:48	
Benzene	ug/L	ND	1.0	04/22/20 13:48	
Bromobenzene	ug/L	ND	1.0	04/22/20 13:48	
Bromochloromethane	ug/L	ND	4.0	04/22/20 13:48	MN
Bromodichloromethane	ug/L	ND	1.0	04/22/20 13:48	
Bromoform	ug/L	ND	4.0	04/22/20 13:48	
Bromomethane	ug/L	ND	4.0	04/22/20 13:48	
Carbon tetrachloride	ug/L	ND	4.0	04/22/20 13:48	MN
Chlorobenzene	ug/L	ND	1.0	04/22/20 13:48	
Chloroethane	ug/L	ND	1.0	04/22/20 13:48	
Chloroform	ug/L	ND	1.0	04/22/20 13:48	
Chloromethane	ug/L	ND	4.0	04/22/20 13:48	
cis-1,2-Dichloroethene	ug/L	ND	1.0	04/22/20 13:48	

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
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(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot-Revised Report
Pace Project No.: 10515512

METHOD BLANK: 3597197 Matrix: Water
Associated Lab Samples: 10515512001, 10515512002, 10515512003

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
cis-1,3-Dichloropropene	ug/L	ND	4.0	04/22/20 13:48	
Dibromochloromethane	ug/L	ND	1.0	04/22/20 13:48	
Dibromomethane	ug/L	ND	4.0	04/22/20 13:48	
Dichlorodifluoromethane	ug/L	ND	1.0	04/22/20 13:48	
Dichlorofluoromethane	ug/L	ND	1.0	04/22/20 13:48	
Diethyl ether (Ethyl ether)	ug/L	ND	4.0	04/22/20 13:48	
Ethylbenzene	ug/L	ND	1.0	04/22/20 13:48	
Hexachloro-1,3-butadiene	ug/L	ND	4.0	04/22/20 13:48	MN
Isopropylbenzene (Cumene)	ug/L	ND	1.0	04/22/20 13:48	
Methyl-tert-butyl ether	ug/L	ND	1.0	04/22/20 13:48	
Methylene Chloride	ug/L	ND	4.0	04/22/20 13:48	
n-Butylbenzene	ug/L	ND	1.0	04/22/20 13:48	
n-Propylbenzene	ug/L	ND	1.0	04/22/20 13:48	
Naphthalene	ug/L	ND	4.0	04/22/20 13:48	
p-Isopropyltoluene	ug/L	ND	1.0	04/22/20 13:48	
sec-Butylbenzene	ug/L	ND	1.0	04/22/20 13:48	
Styrene	ug/L	ND	1.0	04/22/20 13:48	
tert-Butylbenzene	ug/L	ND	1.0	04/22/20 13:48	
Tetrachloroethene	ug/L	ND	1.0	04/22/20 13:48	
Tetrahydrofuran	ug/L	ND	10.0	04/22/20 13:48	
Toluene	ug/L	ND	1.0	04/22/20 13:48	
trans-1,2-Dichloroethene	ug/L	ND	1.0	04/22/20 13:48	
trans-1,3-Dichloropropene	ug/L	ND	4.0	04/22/20 13:48	
Trichloroethene	ug/L	ND	0.40	04/22/20 13:48	
Trichlorofluoromethane	ug/L	ND	1.0	04/22/20 13:48	
Vinyl chloride	ug/L	ND	0.20	04/22/20 13:48	
Xylene (Total)	ug/L	ND	3.0	04/22/20 13:48	
1,2-Dichloroethane-d4 (S)	%.	102	75-125	04/22/20 13:48	
4-Bromofluorobenzene (S)	%.	103	75-125	04/22/20 13:48	
Toluene-d8 (S)	%.	99	75-125	04/22/20 13:48	

LABORATORY CONTROL SAMPLE: 3597198

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	20	22.0	110	75-128	
1,1,1-Trichloroethane	ug/L	20	23.3	117	75-128	
1,1,2,2-Tetrachloroethane	ug/L	20	22.2	111	69-129	
1,1,2-Trichloroethane	ug/L	20	22.5	112	75-125	
1,1,2-Trichlorotrifluoroethane	ug/L	20	22.0	110	74-125	
1,1-Dichloroethane	ug/L	20	21.7	109	75-125	
1,1-Dichloroethene	ug/L	20	22.9	114	65-125	
1,1-Dichloropropene	ug/L	20	20.8	104	69-131	
1,2,3-Trichlorobenzene	ug/L	20	24.1	121	75-125	
1,2,3-Trichloropropane	ug/L	20	21.2	106	75-125	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot-Revised Report
Pace Project No.: 10515512

LABORATORY CONTROL SAMPLE: 3597198

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,2,4-Trichlorobenzene	ug/L	20	23.3	117	67-131	
1,2,4-Trimethylbenzene	ug/L	20	23.8	119	75-125	
1,2-Dibromo-3-chloropropane	ug/L	50	53.3	107	65-128	
1,2-Dibromoethane (EDB)	ug/L	20	22.7	114	75-125	
1,2-Dichlorobenzene	ug/L	20	24.5	122	75-125	
1,2-Dichloroethane	ug/L	20	21.6	108	74-125	
1,2-Dichloropropane	ug/L	20	22.0	110	68-125	
1,3,5-Trimethylbenzene	ug/L	20	24.1	121	75-125	
1,3-Dichlorobenzene	ug/L	20	24.7	123	75-125	
1,3-Dichloropropane	ug/L	20	21.8	109	75-125	
1,4-Dichlorobenzene	ug/L	20	23.1	116	75-125	
2,2-Dichloropropane	ug/L	20	23.8	119	70-133	
2-Butanone (MEK)	ug/L	100	110	110	62-142	
2-Chlorotoluene	ug/L	20	22.6	113	75-125	
4-Chlorotoluene	ug/L	20	23.2	116	75-125	
4-Methyl-2-pentanone (MIBK)	ug/L	100	108	108	75-125	
Acetone	ug/L	100	121	121	47-150	
Allyl chloride	ug/L	20	21.4	107	65-125	
Benzene	ug/L	20	21.6	108	75-125	
Bromobenzene	ug/L	20	22.6	113	75-125	
Bromochloromethane	ug/L	20	21.8	109	75-125	
Bromodichloromethane	ug/L	20	23.3	117	75-128	
Bromoform	ug/L	20	22.6	113	75-125	
Bromomethane	ug/L	20	24.8	124	43-150	
Carbon tetrachloride	ug/L	20	22.2	111	75-127	
Chlorobenzene	ug/L	20	23.4	117	75-125	
Chloroethane	ug/L	20	24.4	122	72-130	
Chloroform	ug/L	20	22.4	112	75-125	
Chloromethane	ug/L	20	24.9	124	55-128	
cis-1,2-Dichloroethene	ug/L	20	22.3	112	75-125	
cis-1,3-Dichloropropene	ug/L	20	22.1	111	74-132	
Dibromochloromethane	ug/L	20	23.5	118	75-125	
Dibromomethane	ug/L	20	21.9	109	71-137	
Dichlorodifluoromethane	ug/L	20	24.2	121	69-126	
Dichlorofluoromethane	ug/L	20	24.5	122	75-125	
Diethyl ether (Ethyl ether)	ug/L	20	23.6	118	72-125	
Ethylbenzene	ug/L	20	21.9	109	75-125	
Hexachloro-1,3-butadiene	ug/L	20	24.4	122	74-129	
Isopropylbenzene (Cumene)	ug/L	20	23.7	118	75-125	
Methyl-tert-butyl ether	ug/L	20	24.6	123	69-125	
Methylene Chloride	ug/L	20	22.4	112	72-125	
n-Butylbenzene	ug/L	20	22.5	112	75-128	
n-Propylbenzene	ug/L	20	23.2	116	75-125	
Naphthalene	ug/L	20	21.3	107	70-125	
p-Isopropyltoluene	ug/L	20	23.0	115	75-125	
sec-Butylbenzene	ug/L	20	23.1	116	75-127	
Styrene	ug/L	20	24.3	121	75-125	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot-Revised Report
Pace Project No.: 10515512

LABORATORY CONTROL SAMPLE: 3597198

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
tert-Butylbenzene	ug/L	20	24.2	121	75-125	
Tetrachloroethene	ug/L	20	22.0	110	74-125	
Tetrahydrofuran	ug/L	200	219	110	73-132	
Toluene	ug/L	20	22.4	112	75-125	
trans-1,2-Dichloroethene	ug/L	20	23.7	119	69-125	
trans-1,3-Dichloropropene	ug/L	20	23.0	115	69-130	
Trichloroethene	ug/L	20	23.0	115	75-127	
Trichlorofluoromethane	ug/L	20	25.8	129	71-132	
Vinyl chloride	ug/L	20	23.2	116	65-128	
Xylene (Total)	ug/L	60	68.0	113	75-125	
1,2-Dichloroethane-d4 (S)	%.			101	75-125	
4-Bromofluorobenzene (S)	%.			97	75-125	
Toluene-d8 (S)	%.			102	75-125	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3597199 3597200

Parameter	Units	10515233010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
1,1,1,2-Tetrachloroethane	ug/L	ND	10000	10000	10500	10900	105	109	71-128	3	30	
1,1,1-Trichloroethane	ug/L	ND	10000	10000	10700	10700	107	107	75-144	0	30	
1,1,2,2-Tetrachloroethane	ug/L	ND	10000	10000	11000	11400	110	114	63-125	4	30	
1,1,2-Trichloroethane	ug/L	ND	10000	10000	10800	11000	108	110	75-125	1	30	
1,1,2-Trichlorotrifluoroethane	ug/L	ND	10000	10000	9710	10100	97	101	69-141	4	30	
1,1-Dichloroethane	ug/L	ND	10000	10000	9590	9810	96	98	68-125	2	30	
1,1-Dichloroethene	ug/L	ND	10000	10000	9920	10500	99	105	62-135	6	30	
1,1-Dichloropropene	ug/L	ND	10000	10000	9680	9560	97	96	61-147	1	30	
1,2,3-Trichlorobenzene	ug/L	ND	10000	10000	11300	12400	113	124	59-145	9	30	
1,2,3-Trichloropropane	ug/L	ND	10000	10000	10600	10900	106	109	69-125	2	30	
1,2,4-Trichlorobenzene	ug/L	ND	10000	10000	11000	12000	110	120	59-144	8	30	
1,2,4-Trimethylbenzene	ug/L	ND	10000	10000	11100	11400	111	114	56-139	2	30	
1,2-Dibromo-3-chloropropane	ug/L	ND	25000	25000	28200	28700	113	115	64-125	2	30	
1,2-Dibromoethane (EDB)	ug/L	ND	10000	10000	11000	11400	110	114	71-125	3	30	
1,2-Dichlorobenzene	ug/L	ND	10000	10000	11400	11900	114	119	74-125	4	30	
1,2-Dichloroethane	ug/L	ND	10000	10000	10100	10500	101	105	64-125	4	30	
1,2-Dichloropropane	ug/L	ND	10000	10000	10400	10700	104	107	63-125	2	30	
1,3,5-Trimethylbenzene	ug/L	ND	10000	10000	11400	11500	114	115	63-132	1	30	
1,3-Dichlorobenzene	ug/L	ND	10000	10000	11600	12000	116	120	74-125	3	30	
1,3-Dichloropropane	ug/L	ND	10000	10000	10500	10800	105	108	75-125	3	30	
1,4-Dichlorobenzene	ug/L	ND	10000	10000	10600	11100	106	111	73-125	4	30	
2,2-Dichloropropane	ug/L	ND	10000	10000	11000	10800	110	108	64-145	2	30	
2-Butanone (MEK)	ug/L	ND	50000	50000	49800	51500	100	103	39-125	3	30	
2-Chlorotoluene	ug/L	ND	10000	10000	10700	11100	107	111	68-128	4	30	
4-Chlorotoluene	ug/L	ND	10000	10000	10900	11200	109	112	71-128	3	30	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot-Revised Report
Pace Project No.: 10515512

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3597199 3597200

Parameter	Units	10515233010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
4-Methyl-2-pentanone (MIBK)	ug/L	ND	50000	50000	58100	58600	116	117	65-125	1	30	
Acetone	ug/L	ND	50000	50000	39600	42300	79	85	32-133	7	30	
Allyl chloride	ug/L	ND	10000	10000	9350	9970	93	100	61-125	6	30	
Benzene	ug/L	ND	10000	10000	10100	10200	101	102	63-125	1	30	
Bromobenzene	ug/L	ND	10000	10000	10700	10900	107	109	75-125	2	30	
Bromochloromethane	ug/L	ND	10000	10000	10300	10300	103	103	67-125	0	30	
Bromodichloromethane	ug/L	ND	10000	10000	11300	11300	113	113	67-139	0	30	
Bromoform	ug/L	ND	10000	10000	11300	11400	113	114	75-125	1	30	
Bromomethane	ug/L	ND	10000	10000	12600	14300	126	143	50-150	12	30	
Carbon tetrachloride	ug/L	ND	10000	10000	9970	10100	100	101	70-148	2	30	
Chlorobenzene	ug/L	ND	10000	10000	11000	11300	110	113	75-125	3	30	
Chloroethane	ug/L	ND	10000	10000	11000	11700	110	117	62-142	6	30	
Chloroform	ug/L	ND	10000	10000	10600	10500	106	105	67-125	1	30	
Chloromethane	ug/L	ND	10000	10000	11400	11900	114	119	43-140	4	30	
cis-1,2-Dichloroethene	ug/L	ND	10000	10000	10600	10700	106	107	64-134	1	30	
cis-1,3-Dichloropropene	ug/L	ND	10000	10000	10400	10700	104	107	68-129	3	30	
Dibromochloromethane	ug/L	ND	10000	10000	11200	11700	112	117	71-137	5	30	
Dibromomethane	ug/L	ND	10000	10000	10400	10700	104	107	66-130	3	30	
Dichlorodifluoromethane	ug/L	ND	10000	10000	11800	12700	118	127	61-144	8	30	
Dichlorofluoromethane	ug/L	ND	10000	10000	11100	11800	111	118	68-125	6	30	
Diethyl ether (Ethyl ether)	ug/L	ND	10000	10000	10500	11400	105	114	57-127	8	30	
Ethylbenzene	ug/L	ND	10000	10000	10300	10300	103	103	66-128	0	30	
Hexachloro-1,3-butadiene	ug/L	ND	10000	10000	11200	11400	112	114	52-150	2	30	
Isopropylbenzene (Cumene)	ug/L	ND	10000	10000	11100	11300	111	113	73-138	2	30	
Methyl-tert-butyl ether	ug/L	ND	10000	10000	11400	12000	114	120	60-125	5	30	
Methylene Chloride	ug/L	ND	10000	10000	9950	10500	99	105	59-125	6	30	
n-Butylbenzene	ug/L	ND	10000	10000	10800	11300	108	113	68-146	5	30	
n-Propylbenzene	ug/L	ND	10000	10000	10800	11100	108	111	72-132	2	30	
Naphthalene	ug/L	ND	10000	10000	11000	12200	110	122	55-135	10	30	
p-Isopropyltoluene	ug/L	ND	10000	10000	10900	11100	109	111	69-139	2	30	
sec-Butylbenzene	ug/L	ND	10000	10000	10700	10800	107	108	69-149	1	30	
Styrene	ug/L	ND	10000	10000	11300	11700	113	117	75-126	3	30	
tert-Butylbenzene	ug/L	ND	10000	10000	11200	11300	112	113	67-147	1	30	
Tetrachloroethene	ug/L	53100	10000	10000	65700	68600	126	155	70-141	4	30	M1
Tetrahydrofuran	ug/L	ND	100000	100000	107000	109000	107	109	64-128	1	30	
Toluene	ug/L	ND	10000	10000	10500	10400	105	104	64-125	1	30	
trans-1,2-Dichloroethene	ug/L	ND	10000	10000	10400	10900	104	109	62-135	4	30	
trans-1,3-Dichloropropene	ug/L	ND	10000	10000	10900	11400	109	114	69-125	4	30	
Trichloroethene	ug/L	3950	10000	10000	14900	14800	109	108	69-141	1	30	
Trichlorofluoromethane	ug/L	ND	10000	10000	12300	13100	123	131	61-148	7	30	
Vinyl chloride	ug/L	ND	10000	10000	10800	11500	108	115	56-144	7	30	
Xylene (Total)	ug/L	ND	30000	30000	31200	32100	104	107	64-131	3	30	
1,2-Dichloroethane-d4 (S)	%.						102	102	75-125			
4-Bromofluorobenzene (S)	%.						98	100	75-125			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot-Revised Report
Pace Project No.: 10515512

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 3597199 3597200

Parameter	Units	10515233010 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Toluene-d8 (S)	%.						102	102	75-125			

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
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QUALIFIERS

Project: B1500394.03 Roof Depot-Revised Report
Pace Project No.: 10515512

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

HS	Results are from sample aliquot taken from VOA vial with headspace (air bubble greater than 6 mm diameter).
M1	Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
MN	The reporting limit has been raised in accordance with Minnesota Statutes 4740.2100 Subpart 8. C, D. Reporting Limit Evaluation Rule.

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QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: B1500394.03 Roof Depot-Revised Report
Pace Project No.: 10515512

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10515512001	**PP-28**	EPA 3020A	672449	EPA 6020B	672685
10515512002	**PP-18**	EPA 3020A	672449	EPA 6020B	672685
10515512003	**PP-20**	EPA 3020A	672449	EPA 6020B	672685
10515512001	**PP-28**	EPA 8260B	671465		
10515512002	**PP-18**	EPA 8260B	671465		
10515512003	**PP-20**	EPA 8260B	671465		

CHAIN-OF-CUSTODY / Analytical Request Document

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

Pace Analytical®
www.pacelabs.com

AET Project No. 03-21225

Page: of 2277875

Section A Required Client Information:

Company: Braun Intertec
Address: 11007 Hampshire Ave S, Minneapolis MN 55438
Email To: JMichael@braunintertec.com
Phone: 612 714 1638 Fax:
Requested Due Date/TAT: Standard

Section B Required Project Information:

Report To: Justin Michael
Copy To:
Purchase Order No.:
Project Name: RoofDepot
Project Number: B1500394.02

Section C Invoice Information:

Attention: SAME
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager:
Pace Profile #: 35451

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER
☐ UST ☐ RCRA ☐ OTHER

Site Location STATE: MN

Section D Required Client Information

SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE

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

Requested Analysis Filtered (Y/N)

WO# : 10515512

ITEM #	SAMPLE ID	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Analysis Test Y/N: Arsenic	VOCs	Residual Chl	Pace Project No./ Lab I.D.
1	PP-28	WT	G			4/20	1515		4			1	3					X	X		001
2	PP-18	↓	↓			4/20	1210		4			1	3					↓	↓		002
3	PP-20	↓	↓			4/21	900		4	3		1						↓	↓		003
4																					
5																					
6																					
7																					
8																					
9																					
10																					
11																					
12																					

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	T5 SAMPLE CONDITIONS			
No preserve in PP-20 VOCs	Megan Ullery / Braun Intertec	4/21	1600	[signature] PACE	4.21.20	1600	1.8	Y	N	Y
				Chase D / Pace	4.21.20	1600				
	Chase D / Pace	4.21.20	1635	[signature] Pace	4/21/2020	1635	1.0	Y	N	Y
							Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)

SAMPLER NAME AND SIGNATURE
PRINT Name of SAMPLER:
SIGNATURE of SAMPLER: DATE Signed (MM/DD/YY):

ORIGINAL

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

F-ALL-C-010-rev.00, 09Nov2017

Pace Analytical®	Document Name: **Sample Condition Upon Receipt Form**	Document Revised: 19Feb2020 Page 1 of 1
	Document No.: **F-MN-L-213-rev.31**	Pace Analytical Services - **Minneapolis**

Sample Condition Upon Receipt

Client Name: Braun Intertec

Project #: WO#: 10515512
PM: BM2 Due Date: 04/28/20
CLIENT: Braun-BLM

Courier: ☐Fed Ex ☐UPS ☐USPS ☐Client ☒Pace ☐SpeeDee ☐Commercial See Exceptions ☐

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: PB **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:** 1.0 °C

Average Corrected Temp (no temp blank only): ☐See Exceptions ☐1 Container ____ °C

Correction Factor: +1.0 **Cooler Temp Corrected w/temp blank :** 1.0 °C

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

Date/Initials of Person Examining Contents: GN2 4/21/2020
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?	☒Yes	☐No		1.
Chain of Custody Relinquished?	☒Yes	☐No		2.
Sampler Name and/or Signature on COC?	☒Yes	☐No	☐N/A	3.
Samples Arrived within Hold Time?	☒Yes	☐No		4.
Short Hold Time Analysis (<72 hr)?	☐Yes	☒No		5. ☐Fecal Coliform ☐HPC ☐Total Coliform/E coli ☐BOD/cBOD ☐Hex Chrome ☐Turbidity ☐Nitrate ☐Nitrite ☐Orthophos ☐Other_____
Rush Turn Around Time Requested?	☐Yes	☒No		6.
Sufficient Volume?	☒Yes	☐No		7.
Correct Containers Used? -Pace Containers Used?	☒Yes ☒Yes	☐No ☐No		8.
Containers Intact?	☒Yes	☐No		9.
Field Filtered Volume Received for Dissolved Tests?	☐Yes	☐No	☒N/A	10. Is sediment visible in the dissolved container? ☐Yes ☐No
Is sufficient information available to reconcile the samples to the COC? Matrix: ☒Water ☐Soil ☐Oil ☐Other_____	☒Yes	☐No		11. **If no, write ID/ Date/Time on Container Below:** **See Exception** ☐
All containers needing acid/base preservation have been checked?	☒Yes	☐No	☐N/A	12. Sample # ☐NaOH ☒HNO_3 ☐H_2SO_4 ☐Zinc Acetate 1-31
All containers needing preservation are found to be in compliance with EPA recommendation? (HNO_3, H_2SO_4, <2pH, NaOH >9 Sulfide, NaOH>12 Cyanide)	☒Yes	☐No	☐N/A	Positive for Res. Chlorine? ☐Yes ☐No **pH Paper Lot#** **See Exception** ☐
Exceptions: VOA, Coliform, TOC/DOC Oil and Grease, DRO/8015 (water) and Dioxin/PFAS	☒Yes	☐No	☐N/A	Res. Chlorine: 0-6 Roll 203616 / 0-6 Strip / 0-14 Strip
Extra labels present on soil VOA or WIDRO containers?	☒Yes	☐No	☒N/A	13. **See Exception** ☒
Headspace in VOA Vials (greater than 6mm)?	☒Yes	☐No	☐N/A	
Trip Blank Present?	☐Yes	☒No	☐N/A	14.
Trip Blank Custody Seals Present?	☐Yes	☐No	☒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: BM **Date:** 4/22/2020

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: GN2

Pace Analytical®

Document Name:
Service Center Transfer Checklist
Document Number:
F-MN-C-214-Rev.03

Document Revised: 11Feb2020
Page 1 of 1
Pace Analytical Services - Minneapolis

Service Center Transfer Checklist

Service Center: MPLS ☐ BLM ☒ AZ ☐

Client: Braun Intertec

Destination Lab: MPLS ☒ VM ☐ Duluth ☐

National ☐ Other _____

Received w/ Custody Seal ? Yes ☐ No ☑

Custody Seal Intact ? Yes ☐ No ☑

	Temp Read	Corr. Factor	Corr. Temp
Temperature °C	1.8	True	1.8

IR Gun: B88A0143310092 ☐ Samples on Ice, in cool down

Rush ☐ **Short Hold** ☐ **N/A** ☑

Containers Intact ? Yes ☑ No ☐

Repacked and Re-Iced ? Yes ☐ No ☑

Notes: _____

Pace Analytical	Document Name: **Headspace Exception**	Document Revised: 17Dec2018 Page 1 of 1
	Document No.: **F-MN-C-276-Rev.01**	Issuing Authority: Pace Minnesota Quality Office

Sample ID	Headspace greater than 6mm	Headspace less than 6mm	No Headspace	Total Vials	Sediment Present?
PP-27	3	0	0	3	Y

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

April 29, 2020

Justin Michael
Braun Intertec
11001 Hampshire Ave. S
Bloomington, MN 55438

RE: Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Dear Justin Michael:

Enclosed are the analytical results for sample(s) received by the laboratory on April 24, 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,

Bob Michels
bob.michels@pacelabs.com
(612)709-5046
Project Manager

Enclosures

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

CERTIFICATIONS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Pace Analytical Services Minneapolis

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
CNMI Saipan Certification #: MP0003
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
EPA Region 8+Wyoming DW Certification #: via MN 027-053-137
Florida Certification #: E87605
Georgia Certification #: 959
Guam EPA Certification #: MN00064
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 #: 03086
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064
Maryland Certification #: 322
Massachusetts Certification #: M-MN064
Massachusetts DWP Certification #: via MN 027-053-137
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137
Minnesota Dept of Ag Certifcation #: 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

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SAMPLE SUMMARY

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Lab ID	Sample ID	Matrix	Date Collected	Date Received
10515976001	**SV-3**	Air	04/23/20 11:40	04/24/20 16:35
10515976002	**SV-4**	Air	04/23/20 11:19	04/24/20 16:35
10515976003	**SV-5**	Air	04/23/20 10:56	04/24/20 16:35
10515976004	**SV-6**	Air	04/23/20 09:12	04/24/20 16:35
10515976005	**SV-7**	Air	04/23/20 08:59	04/24/20 16:35
10515976006	**SV-8**	Air	04/23/20 12:11	04/24/20 16:35
10515976007	**SV-9**	Air	04/23/20 12:33	04/24/20 16:35
10515976008	**SV-10**	Air	04/24/20 08:20	04/24/20 16:35
10515976009	**SV-11**	Air	04/24/20 08:46	04/24/20 16:35
10515976010	**SV-12**	Air	04/24/20 09:10	04/24/20 16:35
10515976011	**SV-13**	Air	04/24/20 09:31	04/24/20 16:35
10515976012	**SV-14**	Air	04/24/20 09:54	04/24/20 16:35
10515976013	**SV-15**	Air	04/23/20 10:14	04/24/20 16:35
10515976014	**SV-16**	Air	04/24/20 10:21	04/24/20 16:35
10515976015	**SV-17**	Air	04/24/20 10:47	04/24/20 16:35
10515976016	**SV-18**	Air	04/23/20 09:49	04/24/20 16:35
10515976017	**SV-19**	Air	04/23/20 10:35	04/24/20 16:35

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

SAMPLE ANALYTE COUNT

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
10515976001	**SV-3**	TO-15	MG2	64	PASI-M
10515976002	**SV-4**	TO-15	MG2	64	PASI-M
10515976003	**SV-5**	TO-15	MG2	65	PASI-M
10515976004	**SV-6**	TO-15	MG2	61	PASI-M
10515976005	**SV-7**	TO-15	MLS	62	PASI-M
10515976006	**SV-8**	TO-15	MLS	62	PASI-M
10515976007	**SV-9**	TO-15	MLS	65	PASI-M
10515976008	**SV-10**	TO-15	MLS	61	PASI-M
10515976009	**SV-11**	TO-15	MLS	61	PASI-M
10515976010	**SV-12**	TO-15	MLS	61	PASI-M
10515976011	**SV-13**	TO-15	MLS	62	PASI-M
10515976012	**SV-14**	TO-15	MLS	62	PASI-M
10515976013	**SV-15**	TO-15	MLS	62	PASI-M
10515976014	**SV-16**	TO-15	MLS	61	PASI-M
10515976015	**SV-17**	TO-15	MLS	62	PASI-M
10515976016	**SV-18**	TO-15	MLS	63	PASI-M
10515976017	**SV-19**	TO-15	MLS	61	PASI-M

PASI-M = Pace Analytical Services - Minneapolis

Pace Analytical Services, LLC
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PROJECT NARRATIVE

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Method: **TO-15**
Description: TO15 MSV AIR (TICS)
Client: Braun Intertec Corporation
Date: April 29, 2020

General Information:
17 samples were analyzed for TO-15 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.

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.

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.

Duplicate Sample:
All duplicate sample results were within method acceptance criteria with any exceptions noted below.

Additional Comments:

Analyte Comments:

QC Batch: 672416

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

- SV-3 (Lab ID: 10515976001)
  - Propylene
- SV-4 (Lab ID: 10515976002)
  - Propylene

QC Batch: 672425

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

- DUP (Lab ID: 3602278)
  - Propylene
- SV-14 (Lab ID: 10515976012)
  - Propylene
- SV-19 (Lab ID: 10515976017)
  - Propylene

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

PROJECT NARRATIVE

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Method: **TO-15**
Description: TO15 MSV AIR (TICS)
Client: Braun Intertec Corporation
Date: April 29, 2020

Analyte Comments:

QC Batch: 672425

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

- SV-7 (Lab ID: 10515976005)
  - Propylene

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

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-3 **Lab ID: 10515976001** Collected: 04/23/20 11:40 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Acetone	**110**	ug/m3	12.0	1.98		04/28/20 23:54	67-64-1	
Benzene	**8.2**	ug/m3	0.64	1.98		04/28/20 23:54	71-43-2	
Benzyl chloride	ND	ug/m3	5.2	1.98		04/28/20 23:54	100-44-7	
Bromodichloromethane	ND	ug/m3	2.7	1.98		04/28/20 23:54	75-27-4	
Bromoform	ND	ug/m3	10.4	1.98		04/28/20 23:54	75-25-2	
Bromomethane	ND	ug/m3	1.6	1.98		04/28/20 23:54	74-83-9	
1,3-Butadiene	ND	ug/m3	0.89	1.98		04/28/20 23:54	106-99-0	
2-Butanone (MEK)	**24.6**	ug/m3	5.9	1.98		04/28/20 23:54	78-93-3	
Carbon disulfide	**5.2**	ug/m3	1.3	1.98		04/28/20 23:54	75-15-0	
Carbon tetrachloride	ND	ug/m3	2.5	1.98		04/28/20 23:54	56-23-5	
Chlorobenzene	ND	ug/m3	1.9	1.98		04/28/20 23:54	108-90-7	
Chloroethane	ND	ug/m3	1.1	1.98		04/28/20 23:54	75-00-3	
Chloroform	ND	ug/m3	0.98	1.98		04/28/20 23:54	67-66-3	
Chloromethane	ND	ug/m3	0.83	1.98		04/28/20 23:54	74-87-3	
Cyclohexane	**7.7**	ug/m3	3.5	1.98		04/28/20 23:54	110-82-7	
Dibromochloromethane	ND	ug/m3	3.4	1.98		04/28/20 23:54	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	1.5	1.98		04/28/20 23:54	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	2.4	1.98		04/28/20 23:54	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	2.4	1.98		04/28/20 23:54	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	6.1	1.98		04/28/20 23:54	106-46-7	
Dichlorodifluoromethane	**6.6**	ug/m3	2.0	1.98		04/28/20 23:54	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.6	1.98		04/28/20 23:54	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.81	1.98		04/28/20 23:54	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.6	1.98		04/28/20 23:54	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.6	1.98		04/28/20 23:54	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.6	1.98		04/28/20 23:54	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.9	1.98		04/28/20 23:54	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.8	1.98		04/28/20 23:54	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.8	1.98		04/28/20 23:54	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.8	1.98		04/28/20 23:54	76-14-2	
Ethanol	**16.8**	ug/m3	3.8	1.98		04/28/20 23:54	64-17-5	
Ethyl acetate	ND	ug/m3	1.5	1.98		04/28/20 23:54	141-78-6	
Ethylbenzene	ND	ug/m3	1.7	1.98		04/28/20 23:54	100-41-4	
4-Ethyltoluene	ND	ug/m3	5.0	1.98		04/28/20 23:54	622-96-8	
n-Heptane	**9.5**	ug/m3	1.6	1.98		04/28/20 23:54	142-82-5	
Hexachloro-1,3-butadiene	ND	ug/m3	10.7	1.98		04/28/20 23:54	87-68-3	
n-Hexane	**12.9**	ug/m3	1.4	1.98		04/28/20 23:54	110-54-3	
2-Hexanone	ND	ug/m3	8.2	1.98		04/28/20 23:54	591-78-6	
Methylene Chloride	**9.2**	ug/m3	7.0	1.98		04/28/20 23:54	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/m3	8.2	1.98		04/28/20 23:54	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	7.2	1.98		04/28/20 23:54	1634-04-4	
Naphthalene	ND	ug/m3	5.3	1.98		04/28/20 23:54	91-20-3	
2-Propanol	**6.0**	ug/m3	5.0	1.98		04/28/20 23:54	67-63-0	
Propylene	**127**	ug/m3	0.69	1.98		04/28/20 23:54	115-07-1	E
Styrene	ND	ug/m3	1.7	1.98		04/28/20 23:54	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.4	1.98		04/28/20 23:54	79-34-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-3 **Lab ID: 10515976001** Collected: 04/23/20 11:40 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Tetrachloroethene	ND	ug/m3	1.4	1.98		04/28/20 23:54	127-18-4	
Tetrahydrofuran	ND	ug/m3	1.2	1.98		04/28/20 23:54	109-99-9	
Toluene	**9.1**	ug/m3	1.5	1.98		04/28/20 23:54	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	14.9	1.98		04/28/20 23:54	120-82-1	
1,1,1-Trichloroethane	ND	ug/m3	2.2	1.98		04/28/20 23:54	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	1.1	1.98		04/28/20 23:54	79-00-5	
Trichloroethene	ND	ug/m3	1.1	1.98		04/28/20 23:54	79-01-6	
Trichlorofluoromethane	ND	ug/m3	2.3	1.98		04/28/20 23:54	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/m3	3.1	1.98		04/28/20 23:54	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/m3	2.0	1.98		04/28/20 23:54	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	2.0	1.98		04/28/20 23:54	108-67-8	
Vinyl acetate	ND	ug/m3	1.4	1.98		04/28/20 23:54	108-05-4	
Vinyl chloride	ND	ug/m3	0.51	1.98		04/28/20 23:54	75-01-4	
m&p-Xylene	ND	ug/m3	3.5	1.98		04/28/20 23:54	179601-23-1	
o-Xylene	ND	ug/m3	1.7	1.98		04/28/20 23:54	95-47-6	
Tentatively Identified Compounds								
Unknown	**46.4J**	ppbv		1.98		04/28/20 23:54		
1,3-Cyclopentadiene	**11.0J**	ppbv		1.98		04/28/20 23:54	542-92-7	N
Pentane, 2-methyl-	**7.4J**	ppbv		1.98		04/28/20 23:54	107-83-5	N

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-4 **Lab ID: 10515976002** Collected: 04/23/20 11:19 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15 Pace Analytical Services - Minneapolis							
Acetone	**133**	ug/m3	11.1	1.83		04/29/20 00:20	67-64-1	
Benzene	**19.1**	ug/m3	0.59	1.83		04/29/20 00:20	71-43-2	
Benzyl chloride	ND	ug/m3	4.8	1.83		04/29/20 00:20	100-44-7	
Bromodichloromethane	ND	ug/m3	2.5	1.83		04/29/20 00:20	75-27-4	
Bromoform	ND	ug/m3	9.6	1.83		04/29/20 00:20	75-25-2	
Bromomethane	ND	ug/m3	1.4	1.83		04/29/20 00:20	74-83-9	
1,3-Butadiene	ND	ug/m3	0.82	1.83		04/29/20 00:20	106-99-0	
2-Butanone (MEK)	**31.1**	ug/m3	5.5	1.83		04/29/20 00:20	78-93-3	
Carbon disulfide	**8.4**	ug/m3	1.2	1.83		04/29/20 00:20	75-15-0	
Carbon tetrachloride	ND	ug/m3	2.3	1.83		04/29/20 00:20	56-23-5	
Chlorobenzene	ND	ug/m3	1.7	1.83		04/29/20 00:20	108-90-7	
Chloroethane	ND	ug/m3	0.98	1.83		04/29/20 00:20	75-00-3	
Chloroform	ND	ug/m3	0.91	1.83		04/29/20 00:20	67-66-3	
Chloromethane	ND	ug/m3	0.77	1.83		04/29/20 00:20	74-87-3	
Cyclohexane	**17.7**	ug/m3	3.2	1.83		04/29/20 00:20	110-82-7	
Dibromochloromethane	ND	ug/m3	3.2	1.83		04/29/20 00:20	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	1.4	1.83		04/29/20 00:20	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	2.2	1.83		04/29/20 00:20	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	2.2	1.83		04/29/20 00:20	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	5.6	1.83		04/29/20 00:20	106-46-7	
Dichlorodifluoromethane	**5.5**	ug/m3	1.8	1.83		04/29/20 00:20	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.5	1.83		04/29/20 00:20	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.75	1.83		04/29/20 00:20	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.5	1.83		04/29/20 00:20	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.5	1.83		04/29/20 00:20	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.5	1.83		04/29/20 00:20	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.7	1.83		04/29/20 00:20	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.7	1.83		04/29/20 00:20	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.7	1.83		04/29/20 00:20	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.6	1.83		04/29/20 00:20	76-14-2	
Ethanol	**46.4**	ug/m3	3.5	1.83		04/29/20 00:20	64-17-5	
Ethyl acetate	ND	ug/m3	1.3	1.83		04/29/20 00:20	141-78-6	
Ethylbenzene	**3.5**	ug/m3	1.6	1.83		04/29/20 00:20	100-41-4	
4-Ethyltoluene	ND	ug/m3	4.6	1.83		04/29/20 00:20	622-96-8	
n-Heptane	**15.3**	ug/m3	1.5	1.83		04/29/20 00:20	142-82-5	
Hexachloro-1,3-butadiene	ND	ug/m3	9.9	1.83		04/29/20 00:20	87-68-3	
n-Hexane	**20.9**	ug/m3	1.3	1.83		04/29/20 00:20	110-54-3	
2-Hexanone	ND	ug/m3	7.6	1.83		04/29/20 00:20	591-78-6	
Methylene Chloride	ND	ug/m3	6.5	1.83		04/29/20 00:20	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/m3	7.6	1.83		04/29/20 00:20	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	6.7	1.83		04/29/20 00:20	1634-04-4	
Naphthalene	ND	ug/m3	4.9	1.83		04/29/20 00:20	91-20-3	
2-Propanol	**7.4**	ug/m3	4.6	1.83		04/29/20 00:20	67-63-0	
Propylene	**214**	ug/m3	0.64	1.83		04/29/20 00:20	115-07-1	E
Styrene	ND	ug/m3	1.6	1.83		04/29/20 00:20	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.3	1.83		04/29/20 00:20	79-34-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-4 **Lab ID: 10515976002** Collected: 04/23/20 11:19 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Tetrachloroethene	ND	ug/m3	1.3	1.83		04/29/20 00:20	127-18-4	
Tetrahydrofuran	ND	ug/m3	1.1	1.83		04/29/20 00:20	109-99-9	
Toluene	**22.2**	ug/m3	1.4	1.83		04/29/20 00:20	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	13.8	1.83		04/29/20 00:20	120-82-1	
1,1,1-Trichloroethane	ND	ug/m3	2.0	1.83		04/29/20 00:20	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	1.0	1.83		04/29/20 00:20	79-00-5	
Trichloroethene	ND	ug/m3	1.0	1.83		04/29/20 00:20	79-01-6	
Trichlorofluoromethane	**2.6**	ug/m3	2.1	1.83		04/29/20 00:20	75-69-4	
1,1,2-Trichlorotrifluoroethane	**2.9**	ug/m3	2.9	1.83		04/29/20 00:20	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/m3	1.8	1.83		04/29/20 00:20	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	1.8	1.83		04/29/20 00:20	108-67-8	
Vinyl acetate	ND	ug/m3	1.3	1.83		04/29/20 00:20	108-05-4	
Vinyl chloride	ND	ug/m3	0.48	1.83		04/29/20 00:20	75-01-4	
m&p-Xylene	**8.0**	ug/m3	3.2	1.83		04/29/20 00:20	179601-23-1	
o-Xylene	**4.6**	ug/m3	1.6	1.83		04/29/20 00:20	95-47-6	
Tentatively Identified Compounds								
Isobutane	**29.3J**	ppbv		1.83		04/29/20 00:20	75-28-5	N
Unknown	**119J**	ppbv		1.83		04/29/20 00:20		
Hexane, 1,1,1,2,2,3,3,4,	**6.1J**	ppbv		1.83		04/29/20 00:20	355-37-3	N

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-5 **Lab ID: 10515976003** Collected: 04/23/20 10:56 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Acetone	**106**	ug/m3	12.2	2.02		04/28/20 23:28	67-64-1	
Benzene	**9.4**	ug/m3	0.66	2.02		04/28/20 23:28	71-43-2	
Benzyl chloride	ND	ug/m3	5.3	2.02		04/28/20 23:28	100-44-7	
Bromodichloromethane	ND	ug/m3	2.7	2.02		04/28/20 23:28	75-27-4	
Bromoform	ND	ug/m3	10.6	2.02		04/28/20 23:28	75-25-2	
Bromomethane	ND	ug/m3	1.6	2.02		04/28/20 23:28	74-83-9	
1,3-Butadiene	ND	ug/m3	0.91	2.02		04/28/20 23:28	106-99-0	
2-Butanone (MEK)	**23.0**	ug/m3	6.1	2.02		04/28/20 23:28	78-93-3	
Carbon disulfide	**6.4**	ug/m3	1.3	2.02		04/28/20 23:28	75-15-0	
Carbon tetrachloride	ND	ug/m3	2.6	2.02		04/28/20 23:28	56-23-5	
Chlorobenzene	ND	ug/m3	1.9	2.02		04/28/20 23:28	108-90-7	
Chloroethane	ND	ug/m3	1.1	2.02		04/28/20 23:28	75-00-3	
Chloroform	ND	ug/m3	1.0	2.02		04/28/20 23:28	67-66-3	
Chloromethane	ND	ug/m3	0.85	2.02		04/28/20 23:28	74-87-3	
Cyclohexane	**6.3**	ug/m3	3.5	2.02		04/28/20 23:28	110-82-7	
Dibromochloromethane	ND	ug/m3	3.5	2.02		04/28/20 23:28	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	1.6	2.02		04/28/20 23:28	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	2.5	2.02		04/28/20 23:28	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	2.5	2.02		04/28/20 23:28	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	6.2	2.02		04/28/20 23:28	106-46-7	
Dichlorodifluoromethane	**3.0**	ug/m3	2.0	2.02		04/28/20 23:28	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.7	2.02		04/28/20 23:28	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.83	2.02		04/28/20 23:28	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.6	2.02		04/28/20 23:28	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.6	2.02		04/28/20 23:28	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.6	2.02		04/28/20 23:28	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.9	2.02		04/28/20 23:28	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.9	2.02		04/28/20 23:28	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.9	2.02		04/28/20 23:28	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.9	2.02		04/28/20 23:28	76-14-2	
Ethanol	**31.3**	ug/m3	3.9	2.02		04/28/20 23:28	64-17-5	
Ethyl acetate	ND	ug/m3	1.5	2.02		04/28/20 23:28	141-78-6	
Ethylbenzene	ND	ug/m3	1.8	2.02		04/28/20 23:28	100-41-4	
4-Ethyltoluene	ND	ug/m3	5.0	2.02		04/28/20 23:28	622-96-8	
n-Heptane	**6.8**	ug/m3	1.7	2.02		04/28/20 23:28	142-82-5	
Hexachloro-1,3-butadiene	ND	ug/m3	10.9	2.02		04/28/20 23:28	87-68-3	
n-Hexane	**9.3**	ug/m3	1.4	2.02		04/28/20 23:28	110-54-3	
2-Hexanone	ND	ug/m3	8.4	2.02		04/28/20 23:28	591-78-6	
Methylene Chloride	**8.5**	ug/m3	7.1	2.02		04/28/20 23:28	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/m3	8.4	2.02		04/28/20 23:28	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	7.4	2.02		04/28/20 23:28	1634-04-4	
Naphthalene	ND	ug/m3	5.4	2.02		04/28/20 23:28	91-20-3	
2-Propanol	**8.1**	ug/m3	5.0	2.02		04/28/20 23:28	67-63-0	
Propylene	**80.6**	ug/m3	0.71	2.02		04/28/20 23:28	115-07-1	
Styrene	ND	ug/m3	1.7	2.02		04/28/20 23:28	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.4	2.02		04/28/20 23:28	79-34-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-5 **Lab ID: 10515976003** Collected: 04/23/20 10:56 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Tetrachloroethene	ND	ug/m3	1.4	2.02		04/28/20 23:28	127-18-4	
Tetrahydrofuran	ND	ug/m3	1.2	2.02		04/28/20 23:28	109-99-9	
Toluene	**6.7**	ug/m3	1.5	2.02		04/28/20 23:28	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	15.2	2.02		04/28/20 23:28	120-82-1	
1,1,1-Trichloroethane	ND	ug/m3	2.2	2.02		04/28/20 23:28	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	1.1	2.02		04/28/20 23:28	79-00-5	
Trichloroethene	ND	ug/m3	1.1	2.02		04/28/20 23:28	79-01-6	
Trichlorofluoromethane	**2.7**	ug/m3	2.3	2.02		04/28/20 23:28	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/m3	3.2	2.02		04/28/20 23:28	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/m3	2.0	2.02		04/28/20 23:28	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	2.0	2.02		04/28/20 23:28	108-67-8	
Vinyl acetate	ND	ug/m3	1.4	2.02		04/28/20 23:28	108-05-4	
Vinyl chloride	ND	ug/m3	0.53	2.02		04/28/20 23:28	75-01-4	
m&p-Xylene	ND	ug/m3	3.6	2.02		04/28/20 23:28	179601-23-1	
o-Xylene	ND	ug/m3	1.8	2.02		04/28/20 23:28	95-47-6	
Tentatively Identified Compounds								
1,2-Propadiene	**15.2J**	ppbv		2.02		04/28/20 23:28	463-49-0	N
Unknown	**45.1J**	ppbv		2.02		04/28/20 23:28		
1,3-Cyclopentadiene	**6.7J**	ppbv		2.02		04/28/20 23:28	542-92-7	N
Pentane, 2-methyl-	**5.8J**	ppbv		2.02		04/28/20 23:28	107-83-5	N

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-6 **Lab ID: 10515976004** Collected: 04/23/20 09:12 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Acetone	**67.9**	ug/m3	11.1	1.83		04/28/20 23:02	67-64-1	
Benzene	**8.5**	ug/m3	0.59	1.83		04/28/20 23:02	71-43-2	
Benzyl chloride	ND	ug/m3	4.8	1.83		04/28/20 23:02	100-44-7	
Bromodichloromethane	ND	ug/m3	2.5	1.83		04/28/20 23:02	75-27-4	
Bromoform	ND	ug/m3	9.6	1.83		04/28/20 23:02	75-25-2	
Bromomethane	ND	ug/m3	1.4	1.83		04/28/20 23:02	74-83-9	
1,3-Butadiene	ND	ug/m3	0.82	1.83		04/28/20 23:02	106-99-0	
2-Butanone (MEK)	**16.8**	ug/m3	5.5	1.83		04/28/20 23:02	78-93-3	
Carbon disulfide	**1.4**	ug/m3	1.2	1.83		04/28/20 23:02	75-15-0	
Carbon tetrachloride	ND	ug/m3	2.3	1.83		04/28/20 23:02	56-23-5	
Chlorobenzene	ND	ug/m3	1.7	1.83		04/28/20 23:02	108-90-7	
Chloroethane	ND	ug/m3	0.98	1.83		04/28/20 23:02	75-00-3	
Chloroform	ND	ug/m3	0.91	1.83		04/28/20 23:02	67-66-3	
Chloromethane	ND	ug/m3	0.77	1.83		04/28/20 23:02	74-87-3	
Cyclohexane	**6.3**	ug/m3	3.2	1.83		04/28/20 23:02	110-82-7	
Dibromochloromethane	ND	ug/m3	3.2	1.83		04/28/20 23:02	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	1.4	1.83		04/28/20 23:02	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	2.2	1.83		04/28/20 23:02	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	2.2	1.83		04/28/20 23:02	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	5.6	1.83		04/28/20 23:02	106-46-7	
Dichlorodifluoromethane	**3.2**	ug/m3	1.8	1.83		04/28/20 23:02	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.5	1.83		04/28/20 23:02	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.75	1.83		04/28/20 23:02	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.5	1.83		04/28/20 23:02	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.5	1.83		04/28/20 23:02	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.5	1.83		04/28/20 23:02	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.7	1.83		04/28/20 23:02	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.7	1.83		04/28/20 23:02	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.7	1.83		04/28/20 23:02	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.6	1.83		04/28/20 23:02	76-14-2	
Ethanol	**6.3**	ug/m3	3.5	1.83		04/28/20 23:02	64-17-5	
Ethyl acetate	ND	ug/m3	1.3	1.83		04/28/20 23:02	141-78-6	
Ethylbenzene	ND	ug/m3	1.6	1.83		04/28/20 23:02	100-41-4	
4-Ethyltoluene	ND	ug/m3	4.6	1.83		04/28/20 23:02	622-96-8	
n-Heptane	**33.9**	ug/m3	1.5	1.83		04/28/20 23:02	142-82-5	
Hexachloro-1,3-butadiene	ND	ug/m3	9.9	1.83		04/28/20 23:02	87-68-3	
n-Hexane	**94.1**	ug/m3	1.3	1.83		04/28/20 23:02	110-54-3	
2-Hexanone	ND	ug/m3	7.6	1.83		04/28/20 23:02	591-78-6	
Methylene Chloride	**7.3**	ug/m3	6.5	1.83		04/28/20 23:02	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/m3	7.6	1.83		04/28/20 23:02	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	6.7	1.83		04/28/20 23:02	1634-04-4	
Naphthalene	ND	ug/m3	4.9	1.83		04/28/20 23:02	91-20-3	
2-Propanol	ND	ug/m3	4.6	1.83		04/28/20 23:02	67-63-0	
Propylene	ND	ug/m3	0.64	1.83		04/28/20 23:02	115-07-1	
Styrene	ND	ug/m3	1.6	1.83		04/28/20 23:02	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.3	1.83		04/28/20 23:02	79-34-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-6 **Lab ID: 10515976004** Collected: 04/23/20 09:12 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15 Pace Analytical Services - Minneapolis							
Tetrachloroethene	ND	ug/m3	1.3	1.83		04/28/20 23:02	127-18-4	
Tetrahydrofuran	ND	ug/m3	1.1	1.83		04/28/20 23:02	109-99-9	
Toluene	**6.7**	ug/m3	1.4	1.83		04/28/20 23:02	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	13.8	1.83		04/28/20 23:02	120-82-1	
1,1,1-Trichloroethane	ND	ug/m3	2.0	1.83		04/28/20 23:02	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	1.0	1.83		04/28/20 23:02	79-00-5	
Trichloroethene	ND	ug/m3	1.0	1.83		04/28/20 23:02	79-01-6	
Trichlorofluoromethane	**2.5**	ug/m3	2.1	1.83		04/28/20 23:02	75-69-4	
1,1,2-Trichlorotrifluoroethane	**3.1**	ug/m3	2.9	1.83		04/28/20 23:02	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/m3	1.8	1.83		04/28/20 23:02	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	1.8	1.83		04/28/20 23:02	108-67-8	
Vinyl acetate	ND	ug/m3	1.3	1.83		04/28/20 23:02	108-05-4	
Vinyl chloride	ND	ug/m3	0.48	1.83		04/28/20 23:02	75-01-4	
m&p-Xylene	ND	ug/m3	3.2	1.83		04/28/20 23:02	179601-23-1	
o-Xylene	ND	ug/m3	1.6	1.83		04/28/20 23:02	95-47-6	

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-7 **Lab ID: 10515976005** Collected: 04/23/20 08:59 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Acetone	**141**	ug/m3	11.5	1.9		04/29/20 00:39	67-64-1	
Benzene	**16.3**	ug/m3	0.62	1.9		04/29/20 00:39	71-43-2	
Benzyl chloride	ND	ug/m3	5.0	1.9		04/29/20 00:39	100-44-7	
Bromodichloromethane	ND	ug/m3	2.6	1.9		04/29/20 00:39	75-27-4	
Bromoform	ND	ug/m3	10	1.9		04/29/20 00:39	75-25-2	
Bromomethane	ND	ug/m3	1.5	1.9		04/29/20 00:39	74-83-9	
1,3-Butadiene	ND	ug/m3	0.86	1.9		04/29/20 00:39	106-99-0	
2-Butanone (MEK)	**33.8**	ug/m3	5.7	1.9		04/29/20 00:39	78-93-3	
Carbon disulfide	**40.0**	ug/m3	1.2	1.9		04/29/20 00:39	75-15-0	
Carbon tetrachloride	ND	ug/m3	2.4	1.9		04/29/20 00:39	56-23-5	
Chlorobenzene	ND	ug/m3	1.8	1.9		04/29/20 00:39	108-90-7	
Chloroethane	ND	ug/m3	1.0	1.9		04/29/20 00:39	75-00-3	
Chloroform	ND	ug/m3	0.94	1.9		04/29/20 00:39	67-66-3	
Chloromethane	**3.1**	ug/m3	0.80	1.9		04/29/20 00:39	74-87-3	
Cyclohexane	**15.8**	ug/m3	3.3	1.9		04/29/20 00:39	110-82-7	
Dibromochloromethane	ND	ug/m3	3.3	1.9		04/29/20 00:39	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	1.5	1.9		04/29/20 00:39	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	2.3	1.9		04/29/20 00:39	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	2.3	1.9		04/29/20 00:39	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	5.8	1.9		04/29/20 00:39	106-46-7	
Dichlorodifluoromethane	**2.3**	ug/m3	1.9	1.9		04/29/20 00:39	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.6	1.9		04/29/20 00:39	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.78	1.9		04/29/20 00:39	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.5	1.9		04/29/20 00:39	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.5	1.9		04/29/20 00:39	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.5	1.9		04/29/20 00:39	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.8	1.9		04/29/20 00:39	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.8	1.9		04/29/20 00:39	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.8	1.9		04/29/20 00:39	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.7	1.9		04/29/20 00:39	76-14-2	
Ethanol	**26.3**	ug/m3	3.6	1.9		04/29/20 00:39	64-17-5	
Ethyl acetate	ND	ug/m3	1.4	1.9		04/29/20 00:39	141-78-6	
Ethylbenzene	**12.4**	ug/m3	1.7	1.9		04/29/20 00:39	100-41-4	
4-Ethyltoluene	ND	ug/m3	4.8	1.9		04/29/20 00:39	622-96-8	
n-Heptane	**35.1**	ug/m3	1.6	1.9		04/29/20 00:39	142-82-5	
Hexachloro-1,3-butadiene	ND	ug/m3	10.3	1.9		04/29/20 00:39	87-68-3	
n-Hexane	**41.3**	ug/m3	1.4	1.9		04/29/20 00:39	110-54-3	
2-Hexanone	ND	ug/m3	7.9	1.9		04/29/20 00:39	591-78-6	
Methylene Chloride	ND	ug/m3	6.7	1.9		04/29/20 00:39	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/m3	7.9	1.9		04/29/20 00:39	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	7.0	1.9		04/29/20 00:39	1634-04-4	
Naphthalene	ND	ug/m3	5.1	1.9		04/29/20 00:39	91-20-3	
2-Propanol	**15.6**	ug/m3	4.8	1.9		04/29/20 00:39	67-63-0	
Propylene	**138**	ug/m3	0.66	1.9		04/29/20 00:39	115-07-1	E
Styrene	ND	ug/m3	1.6	1.9		04/29/20 00:39	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.3	1.9		04/29/20 00:39	79-34-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-7 **Lab ID: 10515976005** Collected: 04/23/20 08:59 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Tetrachloroethene	ND	ug/m3	1.3	1.9		04/29/20 00:39	127-18-4	
Tetrahydrofuran	ND	ug/m3	1.1	1.9		04/29/20 00:39	109-99-9	
Toluene	**38.7**	ug/m3	1.5	1.9		04/29/20 00:39	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	14.3	1.9		04/29/20 00:39	120-82-1	
1,1,1-Trichloroethane	ND	ug/m3	2.1	1.9		04/29/20 00:39	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	1.1	1.9		04/29/20 00:39	79-00-5	
Trichloroethene	ND	ug/m3	1.0	1.9		04/29/20 00:39	79-01-6	
Trichlorofluoromethane	ND	ug/m3	2.2	1.9		04/29/20 00:39	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/m3	3.0	1.9		04/29/20 00:39	76-13-1	
1,2,4-Trimethylbenzene	**17.1**	ug/m3	1.9	1.9		04/29/20 00:39	95-63-6	
1,3,5-Trimethylbenzene	**7.1**	ug/m3	1.9	1.9		04/29/20 00:39	108-67-8	
Vinyl acetate	ND	ug/m3	1.4	1.9		04/29/20 00:39	108-05-4	
Vinyl chloride	ND	ug/m3	0.49	1.9		04/29/20 00:39	75-01-4	
m&p-Xylene	**48.8**	ug/m3	3.4	1.9		04/29/20 00:39	179601-23-1	
o-Xylene	**16.4**	ug/m3	1.7	1.9		04/29/20 00:39	95-47-6	
Tentatively Identified Compounds								
Cyclopentane	**14.8J**	ppbv		1.9		04/29/20 00:39	287-92-3	N

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-8 **Lab ID: 10515976006** Collected: 04/23/20 12:11 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Acetone	**39.1**	ug/m3	10.9	1.8		04/28/20 20:55	67-64-1	
Benzene	**2.6**	ug/m3	0.58	1.8		04/28/20 20:55	71-43-2	
Benzyl chloride	ND	ug/m3	4.7	1.8		04/28/20 20:55	100-44-7	
Bromodichloromethane	ND	ug/m3	2.4	1.8		04/28/20 20:55	75-27-4	
Bromoform	ND	ug/m3	9.4	1.8		04/28/20 20:55	75-25-2	
Bromomethane	ND	ug/m3	1.4	1.8		04/28/20 20:55	74-83-9	
1,3-Butadiene	ND	ug/m3	0.81	1.8		04/28/20 20:55	106-99-0	
2-Butanone (MEK)	ND	ug/m3	5.4	1.8		04/28/20 20:55	78-93-3	
Carbon disulfide	**3.7**	ug/m3	1.1	1.8		04/28/20 20:55	75-15-0	
Carbon tetrachloride	ND	ug/m3	2.3	1.8		04/28/20 20:55	56-23-5	
Chlorobenzene	ND	ug/m3	1.7	1.8		04/28/20 20:55	108-90-7	
Chloroethane	ND	ug/m3	0.96	1.8		04/28/20 20:55	75-00-3	
Chloroform	ND	ug/m3	0.89	1.8		04/28/20 20:55	67-66-3	
Chloromethane	ND	ug/m3	0.76	1.8		04/28/20 20:55	74-87-3	
Cyclohexane	**45.0**	ug/m3	3.2	1.8		04/28/20 20:55	110-82-7	
Dibromochloromethane	ND	ug/m3	3.1	1.8		04/28/20 20:55	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	1.4	1.8		04/28/20 20:55	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	2.2	1.8		04/28/20 20:55	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	2.2	1.8		04/28/20 20:55	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	5.5	1.8		04/28/20 20:55	106-46-7	
Dichlorodifluoromethane	**2.9**	ug/m3	1.8	1.8		04/28/20 20:55	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.5	1.8		04/28/20 20:55	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.74	1.8		04/28/20 20:55	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.5	1.8		04/28/20 20:55	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.5	1.8		04/28/20 20:55	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.5	1.8		04/28/20 20:55	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.7	1.8		04/28/20 20:55	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.7	1.8		04/28/20 20:55	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.7	1.8		04/28/20 20:55	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.6	1.8		04/28/20 20:55	76-14-2	
Ethanol	**9.2**	ug/m3	3.5	1.8		04/28/20 20:55	64-17-5	
Ethyl acetate	ND	ug/m3	1.3	1.8		04/28/20 20:55	141-78-6	
Ethylbenzene	ND	ug/m3	1.6	1.8		04/28/20 20:55	100-41-4	
4-Ethyltoluene	ND	ug/m3	4.5	1.8		04/28/20 20:55	622-96-8	
n-Heptane	**5.8**	ug/m3	1.5	1.8		04/28/20 20:55	142-82-5	
Hexachloro-1,3-butadiene	ND	ug/m3	9.8	1.8		04/28/20 20:55	87-68-3	
n-Hexane	**9.1**	ug/m3	1.3	1.8		04/28/20 20:55	110-54-3	
2-Hexanone	ND	ug/m3	7.5	1.8		04/28/20 20:55	591-78-6	
Methylene Chloride	ND	ug/m3	6.4	1.8		04/28/20 20:55	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/m3	7.5	1.8		04/28/20 20:55	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	6.6	1.8		04/28/20 20:55	1634-04-4	
Naphthalene	ND	ug/m3	4.8	1.8		04/28/20 20:55	91-20-3	
2-Propanol	**9.8**	ug/m3	4.5	1.8		04/28/20 20:55	67-63-0	
Propylene	ND	ug/m3	0.63	1.8		04/28/20 20:55	115-07-1	
Styrene	ND	ug/m3	1.6	1.8		04/28/20 20:55	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.3	1.8		04/28/20 20:55	79-34-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-8 **Lab ID: 10515976006** Collected: 04/23/20 12:11 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Tetrachloroethene	ND	ug/m3	1.2	1.8		04/28/20 20:55	127-18-4	
Tetrahydrofuran	ND	ug/m3	1.1	1.8		04/28/20 20:55	109-99-9	
Toluene	**3.3**	ug/m3	1.4	1.8		04/28/20 20:55	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	13.6	1.8		04/28/20 20:55	120-82-1	
1,1,1-Trichloroethane	ND	ug/m3	2.0	1.8		04/28/20 20:55	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	1.0	1.8		04/28/20 20:55	79-00-5	
Trichloroethene	ND	ug/m3	0.98	1.8		04/28/20 20:55	79-01-6	
Trichlorofluoromethane	**2.3**	ug/m3	2.1	1.8		04/28/20 20:55	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/m3	2.8	1.8		04/28/20 20:55	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/m3	1.8	1.8		04/28/20 20:55	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	1.8	1.8		04/28/20 20:55	108-67-8	
Vinyl acetate	ND	ug/m3	1.3	1.8		04/28/20 20:55	108-05-4	
Vinyl chloride	ND	ug/m3	0.47	1.8		04/28/20 20:55	75-01-4	
m&p-Xylene	ND	ug/m3	3.2	1.8		04/28/20 20:55	179601-23-1	
o-Xylene	ND	ug/m3	1.6	1.8		04/28/20 20:55	95-47-6	
Tentatively Identified Compounds								
Butanal	**17.3J**	ppbv		1.8		04/28/20 20:55	123-72-8	N

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-9 **Lab ID: 10515976007** Collected: 04/23/20 12:33 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Acetone	**50.5**	ug/m3	10.7	1.77		04/28/20 22:47	67-64-1	
Benzene	**51.6**	ug/m3	0.58	1.77		04/28/20 22:47	71-43-2	
Benzyl chloride	ND	ug/m3	4.7	1.77		04/28/20 22:47	100-44-7	
Bromodichloromethane	ND	ug/m3	2.4	1.77		04/28/20 22:47	75-27-4	
Bromoform	ND	ug/m3	9.3	1.77		04/28/20 22:47	75-25-2	
Bromomethane	ND	ug/m3	1.4	1.77		04/28/20 22:47	74-83-9	
1,3-Butadiene	ND	ug/m3	0.80	1.77		04/28/20 22:47	106-99-0	
2-Butanone (MEK)	ND	ug/m3	5.3	1.77		04/28/20 22:47	78-93-3	
Carbon disulfide	**3.2**	ug/m3	1.1	1.77		04/28/20 22:47	75-15-0	
Carbon tetrachloride	ND	ug/m3	2.3	1.77		04/28/20 22:47	56-23-5	
Chlorobenzene	ND	ug/m3	1.7	1.77		04/28/20 22:47	108-90-7	
Chloroethane	ND	ug/m3	0.95	1.77		04/28/20 22:47	75-00-3	
Chloroform	ND	ug/m3	0.88	1.77		04/28/20 22:47	67-66-3	
Chloromethane	ND	ug/m3	0.74	1.77		04/28/20 22:47	74-87-3	
Cyclohexane	**175**	ug/m3	3.1	1.77		04/28/20 22:47	110-82-7	
Dibromochloromethane	ND	ug/m3	3.1	1.77		04/28/20 22:47	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	1.4	1.77		04/28/20 22:47	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	2.2	1.77		04/28/20 22:47	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	2.2	1.77		04/28/20 22:47	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	5.4	1.77		04/28/20 22:47	106-46-7	
Dichlorodifluoromethane	**2.3**	ug/m3	1.8	1.77		04/28/20 22:47	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.5	1.77		04/28/20 22:47	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.73	1.77		04/28/20 22:47	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.4	1.77		04/28/20 22:47	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.4	1.77		04/28/20 22:47	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.4	1.77		04/28/20 22:47	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.7	1.77		04/28/20 22:47	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.6	1.77		04/28/20 22:47	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.6	1.77		04/28/20 22:47	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.5	1.77		04/28/20 22:47	76-14-2	
Ethanol	**36.1**	ug/m3	3.4	1.77		04/28/20 22:47	64-17-5	
Ethyl acetate	ND	ug/m3	1.3	1.77		04/28/20 22:47	141-78-6	
Ethylbenzene	ND	ug/m3	1.6	1.77		04/28/20 22:47	100-41-4	
4-Ethyltoluene	ND	ug/m3	4.4	1.77		04/28/20 22:47	622-96-8	
n-Heptane	**36.8**	ug/m3	1.5	1.77		04/28/20 22:47	142-82-5	
Hexachloro-1,3-butadiene	ND	ug/m3	9.6	1.77		04/28/20 22:47	87-68-3	
n-Hexane	**92.1**	ug/m3	1.3	1.77		04/28/20 22:47	110-54-3	
2-Hexanone	ND	ug/m3	7.4	1.77		04/28/20 22:47	591-78-6	
Methylene Chloride	ND	ug/m3	6.2	1.77		04/28/20 22:47	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/m3	7.4	1.77		04/28/20 22:47	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	6.5	1.77		04/28/20 22:47	1634-04-4	
Naphthalene	ND	ug/m3	4.7	1.77		04/28/20 22:47	91-20-3	
2-Propanol	**7.0**	ug/m3	4.4	1.77		04/28/20 22:47	67-63-0	
Propylene	ND	ug/m3	0.62	1.77		04/28/20 22:47	115-07-1	
Styrene	ND	ug/m3	1.5	1.77		04/28/20 22:47	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.2	1.77		04/28/20 22:47	79-34-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-9 **Lab ID: 10515976007** Collected: 04/23/20 12:33 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Tetrachloroethene	ND	ug/m3	1.2	1.77		04/28/20 22:47	127-18-4	
Tetrahydrofuran	ND	ug/m3	1.1	1.77		04/28/20 22:47	109-99-9	
Toluene	**73.8**	ug/m3	1.4	1.77		04/28/20 22:47	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	13.3	1.77		04/28/20 22:47	120-82-1	
1,1,1-Trichloroethane	ND	ug/m3	2.0	1.77		04/28/20 22:47	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	0.98	1.77		04/28/20 22:47	79-00-5	
Trichloroethene	ND	ug/m3	0.97	1.77		04/28/20 22:47	79-01-6	
Trichlorofluoromethane	**2.4**	ug/m3	2.0	1.77		04/28/20 22:47	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/m3	2.8	1.77		04/28/20 22:47	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/m3	1.8	1.77		04/28/20 22:47	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	1.8	1.77		04/28/20 22:47	108-67-8	
Vinyl acetate	ND	ug/m3	1.3	1.77		04/28/20 22:47	108-05-4	
Vinyl chloride	ND	ug/m3	0.46	1.77		04/28/20 22:47	75-01-4	
m&p-Xylene	**9.4**	ug/m3	3.1	1.77		04/28/20 22:47	179601-23-1	
o-Xylene	**4.0**	ug/m3	1.6	1.77		04/28/20 22:47	95-47-6	
Tentatively Identified Compounds								
Unknown	**30.3J**	ppbv		1.77		04/28/20 22:47		
Pentane, 2-methyl-	**15.1J**	ppbv		1.77		04/28/20 22:47	107-83-5	N
Cyclopentane, methyl-	**22.5J**	ppbv		1.77		04/28/20 22:47	96-37-7	N
Cyclohexane, 1,1,3-trime	**8.4J**	ppbv		1.77		04/28/20 22:47	3073-66-3	N

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-10 **Lab ID: 10515976008** Collected: 04/24/20 08:20 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Acetone	**35.7**	ug/m3	11.1	1.83		04/28/20 19:31	67-64-1	
Benzene	**4.1**	ug/m3	0.59	1.83		04/28/20 19:31	71-43-2	
Benzyl chloride	ND	ug/m3	4.8	1.83		04/28/20 19:31	100-44-7	
Bromodichloromethane	ND	ug/m3	2.5	1.83		04/28/20 19:31	75-27-4	
Bromoform	ND	ug/m3	9.6	1.83		04/28/20 19:31	75-25-2	
Bromomethane	ND	ug/m3	1.4	1.83		04/28/20 19:31	74-83-9	
1,3-Butadiene	ND	ug/m3	0.82	1.83		04/28/20 19:31	106-99-0	
2-Butanone (MEK)	ND	ug/m3	5.5	1.83		04/28/20 19:31	78-93-3	
Carbon disulfide	**4.0**	ug/m3	1.2	1.83		04/28/20 19:31	75-15-0	
Carbon tetrachloride	ND	ug/m3	2.3	1.83		04/28/20 19:31	56-23-5	
Chlorobenzene	ND	ug/m3	1.7	1.83		04/28/20 19:31	108-90-7	
Chloroethane	ND	ug/m3	0.98	1.83		04/28/20 19:31	75-00-3	
Chloroform	ND	ug/m3	0.91	1.83		04/28/20 19:31	67-66-3	
Chloromethane	ND	ug/m3	0.77	1.83		04/28/20 19:31	74-87-3	
Cyclohexane	**20.8**	ug/m3	3.2	1.83		04/28/20 19:31	110-82-7	
Dibromochloromethane	ND	ug/m3	3.2	1.83		04/28/20 19:31	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	1.4	1.83		04/28/20 19:31	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	2.2	1.83		04/28/20 19:31	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	2.2	1.83		04/28/20 19:31	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	5.6	1.83		04/28/20 19:31	106-46-7	
Dichlorodifluoromethane	**3.1**	ug/m3	1.8	1.83		04/28/20 19:31	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.5	1.83		04/28/20 19:31	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.75	1.83		04/28/20 19:31	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.5	1.83		04/28/20 19:31	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.5	1.83		04/28/20 19:31	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.5	1.83		04/28/20 19:31	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.7	1.83		04/28/20 19:31	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.7	1.83		04/28/20 19:31	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.7	1.83		04/28/20 19:31	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.6	1.83		04/28/20 19:31	76-14-2	
Ethanol	**15.1**	ug/m3	3.5	1.83		04/28/20 19:31	64-17-5	
Ethyl acetate	ND	ug/m3	1.3	1.83		04/28/20 19:31	141-78-6	
Ethylbenzene	ND	ug/m3	1.6	1.83		04/28/20 19:31	100-41-4	
4-Ethyltoluene	ND	ug/m3	4.6	1.83		04/28/20 19:31	622-96-8	
n-Heptane	**9.7**	ug/m3	1.5	1.83		04/28/20 19:31	142-82-5	
Hexachloro-1,3-butadiene	ND	ug/m3	9.9	1.83		04/28/20 19:31	87-68-3	
n-Hexane	**11.3**	ug/m3	1.3	1.83		04/28/20 19:31	110-54-3	
2-Hexanone	ND	ug/m3	7.6	1.83		04/28/20 19:31	591-78-6	
Methylene Chloride	ND	ug/m3	6.5	1.83		04/28/20 19:31	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/m3	7.6	1.83		04/28/20 19:31	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	6.7	1.83		04/28/20 19:31	1634-04-4	
Naphthalene	ND	ug/m3	4.9	1.83		04/28/20 19:31	91-20-3	
2-Propanol	**6.1**	ug/m3	4.6	1.83		04/28/20 19:31	67-63-0	
Propylene	ND	ug/m3	0.64	1.83		04/28/20 19:31	115-07-1	
Styrene	ND	ug/m3	1.6	1.83		04/28/20 19:31	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.3	1.83		04/28/20 19:31	79-34-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-10 **Lab ID: 10515976008** Collected: 04/24/20 08:20 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Tetrachloroethene	ND	ug/m3	1.3	1.83		04/28/20 19:31	127-18-4	
Tetrahydrofuran	ND	ug/m3	1.1	1.83		04/28/20 19:31	109-99-9	
Toluene	**5.0**	ug/m3	1.4	1.83		04/28/20 19:31	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	13.8	1.83		04/28/20 19:31	120-82-1	
1,1,1-Trichloroethane	**3.8**	ug/m3	2.0	1.83		04/28/20 19:31	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	1.0	1.83		04/28/20 19:31	79-00-5	
Trichloroethene	ND	ug/m3	1.0	1.83		04/28/20 19:31	79-01-6	
Trichlorofluoromethane	**24.2**	ug/m3	2.1	1.83		04/28/20 19:31	75-69-4	
1,1,2-Trichlorotrifluoroethane	**10.3**	ug/m3	2.9	1.83		04/28/20 19:31	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/m3	1.8	1.83		04/28/20 19:31	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	1.8	1.83		04/28/20 19:31	108-67-8	
Vinyl acetate	ND	ug/m3	1.3	1.83		04/28/20 19:31	108-05-4	
Vinyl chloride	ND	ug/m3	0.48	1.83		04/28/20 19:31	75-01-4	
m&p-Xylene	ND	ug/m3	3.2	1.83		04/28/20 19:31	179601-23-1	
o-Xylene	ND	ug/m3	1.6	1.83		04/28/20 19:31	95-47-6	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-11 **Lab ID: 10515976009** Collected: 04/24/20 08:46 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Acetone	**29.5**	ug/m3	9.8	1.63		04/28/20 20:27	67-64-1	
Benzene	**6.0**	ug/m3	0.53	1.63		04/28/20 20:27	71-43-2	
Benzyl chloride	ND	ug/m3	4.3	1.63		04/28/20 20:27	100-44-7	
Bromodichloromethane	ND	ug/m3	2.2	1.63		04/28/20 20:27	75-27-4	
Bromoform	ND	ug/m3	8.6	1.63		04/28/20 20:27	75-25-2	
Bromomethane	ND	ug/m3	1.3	1.63		04/28/20 20:27	74-83-9	
1,3-Butadiene	ND	ug/m3	0.73	1.63		04/28/20 20:27	106-99-0	
2-Butanone (MEK)	ND	ug/m3	4.9	1.63		04/28/20 20:27	78-93-3	
Carbon disulfide	**5.1**	ug/m3	1.0	1.63		04/28/20 20:27	75-15-0	
Carbon tetrachloride	ND	ug/m3	2.1	1.63		04/28/20 20:27	56-23-5	
Chlorobenzene	ND	ug/m3	1.5	1.63		04/28/20 20:27	108-90-7	
Chloroethane	ND	ug/m3	0.87	1.63		04/28/20 20:27	75-00-3	
Chloroform	ND	ug/m3	0.81	1.63		04/28/20 20:27	67-66-3	
Chloromethane	ND	ug/m3	0.68	1.63		04/28/20 20:27	74-87-3	
Cyclohexane	**18.4**	ug/m3	2.9	1.63		04/28/20 20:27	110-82-7	
Dibromochloromethane	ND	ug/m3	2.8	1.63		04/28/20 20:27	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	1.3	1.63		04/28/20 20:27	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	2.0	1.63		04/28/20 20:27	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	2.0	1.63		04/28/20 20:27	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	5.0	1.63		04/28/20 20:27	106-46-7	
Dichlorodifluoromethane	**5.1**	ug/m3	1.6	1.63		04/28/20 20:27	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.3	1.63		04/28/20 20:27	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.67	1.63		04/28/20 20:27	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.3	1.63		04/28/20 20:27	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.3	1.63		04/28/20 20:27	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.3	1.63		04/28/20 20:27	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.5	1.63		04/28/20 20:27	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.5	1.63		04/28/20 20:27	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.5	1.63		04/28/20 20:27	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.3	1.63		04/28/20 20:27	76-14-2	
Ethanol	**14.3**	ug/m3	3.1	1.63		04/28/20 20:27	64-17-5	
Ethyl acetate	ND	ug/m3	1.2	1.63		04/28/20 20:27	141-78-6	
Ethylbenzene	ND	ug/m3	1.4	1.63		04/28/20 20:27	100-41-4	
4-Ethyltoluene	ND	ug/m3	4.1	1.63		04/28/20 20:27	622-96-8	
n-Heptane	**7.7**	ug/m3	1.4	1.63		04/28/20 20:27	142-82-5	
Hexachloro-1,3-butadiene	ND	ug/m3	8.8	1.63		04/28/20 20:27	87-68-3	
n-Hexane	**9.2**	ug/m3	1.2	1.63		04/28/20 20:27	110-54-3	
2-Hexanone	ND	ug/m3	6.8	1.63		04/28/20 20:27	591-78-6	
Methylene Chloride	ND	ug/m3	5.8	1.63		04/28/20 20:27	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/m3	6.8	1.63		04/28/20 20:27	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	6.0	1.63		04/28/20 20:27	1634-04-4	
Naphthalene	ND	ug/m3	4.3	1.63		04/28/20 20:27	91-20-3	
2-Propanol	**5.9**	ug/m3	4.1	1.63		04/28/20 20:27	67-63-0	
Propylene	**74.8**	ug/m3	0.57	1.63		04/28/20 20:27	115-07-1	
Styrene	ND	ug/m3	1.4	1.63		04/28/20 20:27	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.1	1.63		04/28/20 20:27	79-34-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-11 **Lab ID: 10515976009** Collected: 04/24/20 08:46 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Tetrachloroethene	ND	ug/m3	1.1	1.63		04/28/20 20:27	127-18-4	
Tetrahydrofuran	ND	ug/m3	0.98	1.63		04/28/20 20:27	109-99-9	
Toluene	**5.4**	ug/m3	1.2	1.63		04/28/20 20:27	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	12.3	1.63		04/28/20 20:27	120-82-1	
1,1,1-Trichloroethane	ND	ug/m3	1.8	1.63		04/28/20 20:27	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	0.90	1.63		04/28/20 20:27	79-00-5	
Trichloroethene	ND	ug/m3	0.89	1.63		04/28/20 20:27	79-01-6	
Trichlorofluoromethane	**8.8**	ug/m3	1.9	1.63		04/28/20 20:27	75-69-4	
1,1,2-Trichlorotrifluoroethane	**14.8**	ug/m3	2.5	1.63		04/28/20 20:27	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/m3	1.6	1.63		04/28/20 20:27	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	1.6	1.63		04/28/20 20:27	108-67-8	
Vinyl acetate	ND	ug/m3	1.2	1.63		04/28/20 20:27	108-05-4	
Vinyl chloride	ND	ug/m3	0.42	1.63		04/28/20 20:27	75-01-4	
m&p-Xylene	ND	ug/m3	2.9	1.63		04/28/20 20:27	179601-23-1	
o-Xylene	ND	ug/m3	1.4	1.63		04/28/20 20:27	95-47-6	

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-12 **Lab ID: 10515976010** Collected: 04/24/20 09:10 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Acetone	**51.9**	ug/m3	10.9	1.8		04/28/20 21:23	67-64-1	
Benzene	**1.2**	ug/m3	0.58	1.8		04/28/20 21:23	71-43-2	
Benzyl chloride	ND	ug/m3	4.7	1.8		04/28/20 21:23	100-44-7	
Bromodichloromethane	ND	ug/m3	2.4	1.8		04/28/20 21:23	75-27-4	
Bromoform	ND	ug/m3	9.4	1.8		04/28/20 21:23	75-25-2	
Bromomethane	ND	ug/m3	1.4	1.8		04/28/20 21:23	74-83-9	
1,3-Butadiene	ND	ug/m3	0.81	1.8		04/28/20 21:23	106-99-0	
2-Butanone (MEK)	ND	ug/m3	5.4	1.8		04/28/20 21:23	78-93-3	
Carbon disulfide	**5.1**	ug/m3	1.1	1.8		04/28/20 21:23	75-15-0	
Carbon tetrachloride	ND	ug/m3	2.3	1.8		04/28/20 21:23	56-23-5	
Chlorobenzene	ND	ug/m3	1.7	1.8		04/28/20 21:23	108-90-7	
Chloroethane	ND	ug/m3	0.96	1.8		04/28/20 21:23	75-00-3	
Chloroform	ND	ug/m3	0.89	1.8		04/28/20 21:23	67-66-3	
Chloromethane	ND	ug/m3	0.76	1.8		04/28/20 21:23	74-87-3	
Cyclohexane	**72.4**	ug/m3	3.2	1.8		04/28/20 21:23	110-82-7	
Dibromochloromethane	ND	ug/m3	3.1	1.8		04/28/20 21:23	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	1.4	1.8		04/28/20 21:23	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	2.2	1.8		04/28/20 21:23	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	2.2	1.8		04/28/20 21:23	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	5.5	1.8		04/28/20 21:23	106-46-7	
Dichlorodifluoromethane	**4.2**	ug/m3	1.8	1.8		04/28/20 21:23	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.5	1.8		04/28/20 21:23	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.74	1.8		04/28/20 21:23	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.5	1.8		04/28/20 21:23	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.5	1.8		04/28/20 21:23	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.5	1.8		04/28/20 21:23	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.7	1.8		04/28/20 21:23	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.7	1.8		04/28/20 21:23	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.7	1.8		04/28/20 21:23	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.6	1.8		04/28/20 21:23	76-14-2	
Ethanol	**16.7**	ug/m3	3.5	1.8		04/28/20 21:23	64-17-5	
Ethyl acetate	ND	ug/m3	1.3	1.8		04/28/20 21:23	141-78-6	
Ethylbenzene	ND	ug/m3	1.6	1.8		04/28/20 21:23	100-41-4	
4-Ethyltoluene	ND	ug/m3	4.5	1.8		04/28/20 21:23	622-96-8	
n-Heptane	**5.4**	ug/m3	1.5	1.8		04/28/20 21:23	142-82-5	
Hexachloro-1,3-butadiene	ND	ug/m3	9.8	1.8		04/28/20 21:23	87-68-3	
n-Hexane	**5.1**	ug/m3	1.3	1.8		04/28/20 21:23	110-54-3	
2-Hexanone	ND	ug/m3	7.5	1.8		04/28/20 21:23	591-78-6	
Methylene Chloride	ND	ug/m3	6.4	1.8		04/28/20 21:23	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/m3	7.5	1.8		04/28/20 21:23	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	6.6	1.8		04/28/20 21:23	1634-04-4	
Naphthalene	ND	ug/m3	4.8	1.8		04/28/20 21:23	91-20-3	
2-Propanol	**6.1**	ug/m3	4.5	1.8		04/28/20 21:23	67-63-0	
Propylene	**32.4**	ug/m3	0.63	1.8		04/28/20 21:23	115-07-1	
Styrene	ND	ug/m3	1.6	1.8		04/28/20 21:23	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.3	1.8		04/28/20 21:23	79-34-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-12 **Lab ID: 10515976010** Collected: 04/24/20 09:10 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Tetrachloroethene	ND	ug/m3	1.2	1.8		04/28/20 21:23	127-18-4	
Tetrahydrofuran	ND	ug/m3	1.1	1.8		04/28/20 21:23	109-99-9	
Toluene	**3.3**	ug/m3	1.4	1.8		04/28/20 21:23	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	13.6	1.8		04/28/20 21:23	120-82-1	
1,1,1-Trichloroethane	**3.6**	ug/m3	2.0	1.8		04/28/20 21:23	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	1.0	1.8		04/28/20 21:23	79-00-5	
Trichloroethene	ND	ug/m3	0.98	1.8		04/28/20 21:23	79-01-6	
Trichlorofluoromethane	**2.4**	ug/m3	2.1	1.8		04/28/20 21:23	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/m3	2.8	1.8		04/28/20 21:23	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/m3	1.8	1.8		04/28/20 21:23	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	1.8	1.8		04/28/20 21:23	108-67-8	
Vinyl acetate	ND	ug/m3	1.3	1.8		04/28/20 21:23	108-05-4	
Vinyl chloride	ND	ug/m3	0.47	1.8		04/28/20 21:23	75-01-4	
m&p-Xylene	ND	ug/m3	3.2	1.8		04/28/20 21:23	179601-23-1	
o-Xylene	ND	ug/m3	1.6	1.8		04/28/20 21:23	95-47-6	

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-13 **Lab ID: 10515976011** Collected: 04/24/20 09:31 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Acetone	**210**	ug/m3	10.7	1.77		04/29/20 01:07	67-64-1	
Benzene	**2.5**	ug/m3	0.58	1.77		04/29/20 01:07	71-43-2	
Benzyl chloride	ND	ug/m3	4.7	1.77		04/29/20 01:07	100-44-7	
Bromodichloromethane	ND	ug/m3	2.4	1.77		04/29/20 01:07	75-27-4	
Bromoform	ND	ug/m3	9.3	1.77		04/29/20 01:07	75-25-2	
Bromomethane	ND	ug/m3	1.4	1.77		04/29/20 01:07	74-83-9	
1,3-Butadiene	ND	ug/m3	0.80	1.77		04/29/20 01:07	106-99-0	
2-Butanone (MEK)	**9.9**	ug/m3	5.3	1.77		04/29/20 01:07	78-93-3	
Carbon disulfide	**164**	ug/m3	1.1	1.77		04/29/20 01:07	75-15-0	
Carbon tetrachloride	ND	ug/m3	2.3	1.77		04/29/20 01:07	56-23-5	
Chlorobenzene	ND	ug/m3	1.7	1.77		04/29/20 01:07	108-90-7	
Chloroethane	ND	ug/m3	0.95	1.77		04/29/20 01:07	75-00-3	
Chloroform	ND	ug/m3	0.88	1.77		04/29/20 01:07	67-66-3	
Chloromethane	**3.3**	ug/m3	0.74	1.77		04/29/20 01:07	74-87-3	
Cyclohexane	**70.8**	ug/m3	3.1	1.77		04/29/20 01:07	110-82-7	
Dibromochloromethane	ND	ug/m3	3.1	1.77		04/29/20 01:07	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	1.4	1.77		04/29/20 01:07	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	2.2	1.77		04/29/20 01:07	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	2.2	1.77		04/29/20 01:07	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	5.4	1.77		04/29/20 01:07	106-46-7	
Dichlorodifluoromethane	**8.2**	ug/m3	1.8	1.77		04/29/20 01:07	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.5	1.77		04/29/20 01:07	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.73	1.77		04/29/20 01:07	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.4	1.77		04/29/20 01:07	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.4	1.77		04/29/20 01:07	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.4	1.77		04/29/20 01:07	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.7	1.77		04/29/20 01:07	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.6	1.77		04/29/20 01:07	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.6	1.77		04/29/20 01:07	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.5	1.77		04/29/20 01:07	76-14-2	
Ethanol	**74.1**	ug/m3	3.4	1.77		04/29/20 01:07	64-17-5	
Ethyl acetate	ND	ug/m3	1.3	1.77		04/29/20 01:07	141-78-6	
Ethylbenzene	**1.9**	ug/m3	1.6	1.77		04/29/20 01:07	100-41-4	
4-Ethyltoluene	ND	ug/m3	4.4	1.77		04/29/20 01:07	622-96-8	
n-Heptane	**9.7**	ug/m3	1.5	1.77		04/29/20 01:07	142-82-5	
Hexachloro-1,3-butadiene	ND	ug/m3	9.6	1.77		04/29/20 01:07	87-68-3	
n-Hexane	**12.1**	ug/m3	1.3	1.77		04/29/20 01:07	110-54-3	
2-Hexanone	ND	ug/m3	7.4	1.77		04/29/20 01:07	591-78-6	
Methylene Chloride	**9.5**	ug/m3	6.2	1.77		04/29/20 01:07	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/m3	7.4	1.77		04/29/20 01:07	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	6.5	1.77		04/29/20 01:07	1634-04-4	
Naphthalene	ND	ug/m3	4.7	1.77		04/29/20 01:07	91-20-3	
2-Propanol	**16.9**	ug/m3	4.4	1.77		04/29/20 01:07	67-63-0	
Propylene	ND	ug/m3	0.62	1.77		04/29/20 01:07	115-07-1	
Styrene	ND	ug/m3	1.5	1.77		04/29/20 01:07	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.2	1.77		04/29/20 01:07	79-34-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-13 **Lab ID: 10515976011** Collected: 04/24/20 09:31 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Tetrachloroethene	**1270**	ug/m3	24.4	35.4		04/29/20 09:54	127-18-4	
Tetrahydrofuran	ND	ug/m3	1.1	1.77		04/29/20 01:07	109-99-9	
Toluene	**7.3**	ug/m3	1.4	1.77		04/29/20 01:07	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	13.3	1.77		04/29/20 01:07	120-82-1	
1,1,1-Trichloroethane	**18.0**	ug/m3	2.0	1.77		04/29/20 01:07	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	0.98	1.77		04/29/20 01:07	79-00-5	
Trichloroethene	**1.5**	ug/m3	0.97	1.77		04/29/20 01:07	79-01-6	
Trichlorofluoromethane	**4.6**	ug/m3	2.0	1.77		04/29/20 01:07	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/m3	2.8	1.77		04/29/20 01:07	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/m3	1.8	1.77		04/29/20 01:07	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	1.8	1.77		04/29/20 01:07	108-67-8	
Vinyl acetate	ND	ug/m3	1.3	1.77		04/29/20 01:07	108-05-4	
Vinyl chloride	ND	ug/m3	0.46	1.77		04/29/20 01:07	75-01-4	
m&p-Xylene	**3.4**	ug/m3	3.1	1.77		04/29/20 01:07	179601-23-1	
o-Xylene	ND	ug/m3	1.6	1.77		04/29/20 01:07	95-47-6	
Tentatively Identified Compounds								
Cyclohexane, 1,1,3-trime	**9.7J**	ppbv		1.77		04/29/20 01:07	3073-66-3	N

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-14 **Lab ID: 10515976012** Collected: 04/24/20 09:54 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Acetone	**61.4**	ug/m3	10.5	1.74		04/28/20 22:19	67-64-1	
Benzene	**3.1**	ug/m3	0.57	1.74		04/28/20 22:19	71-43-2	
Benzyl chloride	ND	ug/m3	4.6	1.74		04/28/20 22:19	100-44-7	
Bromodichloromethane	ND	ug/m3	2.4	1.74		04/28/20 22:19	75-27-4	
Bromoform	ND	ug/m3	9.1	1.74		04/28/20 22:19	75-25-2	
Bromomethane	ND	ug/m3	1.4	1.74		04/28/20 22:19	74-83-9	
1,3-Butadiene	ND	ug/m3	0.78	1.74		04/28/20 22:19	106-99-0	
2-Butanone (MEK)	ND	ug/m3	5.2	1.74		04/28/20 22:19	78-93-3	
Carbon disulfide	**11.7**	ug/m3	1.1	1.74		04/28/20 22:19	75-15-0	
Carbon tetrachloride	ND	ug/m3	2.2	1.74		04/28/20 22:19	56-23-5	
Chlorobenzene	ND	ug/m3	1.6	1.74		04/28/20 22:19	108-90-7	
Chloroethane	ND	ug/m3	0.93	1.74		04/28/20 22:19	75-00-3	
Chloroform	ND	ug/m3	0.86	1.74		04/28/20 22:19	67-66-3	
Chloromethane	ND	ug/m3	0.73	1.74		04/28/20 22:19	74-87-3	
Cyclohexane	**78.8**	ug/m3	3.0	1.74		04/28/20 22:19	110-82-7	
Dibromochloromethane	ND	ug/m3	3.0	1.74		04/28/20 22:19	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	1.4	1.74		04/28/20 22:19	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	2.1	1.74		04/28/20 22:19	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	2.1	1.74		04/28/20 22:19	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	5.3	1.74		04/28/20 22:19	106-46-7	
Dichlorodifluoromethane	**10.3**	ug/m3	1.8	1.74		04/28/20 22:19	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.4	1.74		04/28/20 22:19	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.72	1.74		04/28/20 22:19	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.4	1.74		04/28/20 22:19	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.4	1.74		04/28/20 22:19	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.4	1.74		04/28/20 22:19	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.6	1.74		04/28/20 22:19	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.6	1.74		04/28/20 22:19	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.6	1.74		04/28/20 22:19	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.5	1.74		04/28/20 22:19	76-14-2	
Ethanol	**10.8**	ug/m3	3.3	1.74		04/28/20 22:19	64-17-5	
Ethyl acetate	ND	ug/m3	1.3	1.74		04/28/20 22:19	141-78-6	
Ethylbenzene	ND	ug/m3	1.5	1.74		04/28/20 22:19	100-41-4	
4-Ethyltoluene	ND	ug/m3	4.4	1.74		04/28/20 22:19	622-96-8	
n-Heptane	**4.0**	ug/m3	1.4	1.74		04/28/20 22:19	142-82-5	
Hexachloro-1,3-butadiene	ND	ug/m3	9.4	1.74		04/28/20 22:19	87-68-3	
n-Hexane	**4.1**	ug/m3	1.2	1.74		04/28/20 22:19	110-54-3	
2-Hexanone	ND	ug/m3	7.2	1.74		04/28/20 22:19	591-78-6	
Methylene Chloride	ND	ug/m3	6.1	1.74		04/28/20 22:19	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/m3	7.2	1.74		04/28/20 22:19	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	6.4	1.74		04/28/20 22:19	1634-04-4	
Naphthalene	ND	ug/m3	4.6	1.74		04/28/20 22:19	91-20-3	
2-Propanol	**4.5**	ug/m3	4.4	1.74		04/28/20 22:19	67-63-0	
Propylene	**118**	ug/m3	0.61	1.74		04/28/20 22:19	115-07-1	E
Styrene	ND	ug/m3	1.5	1.74		04/28/20 22:19	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.2	1.74		04/28/20 22:19	79-34-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-14 **Lab ID: 10515976012** Collected: 04/24/20 09:54 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Tetrachloroethene	ND	ug/m3	1.2	1.74		04/28/20 22:19	127-18-4	
Tetrahydrofuran	ND	ug/m3	1.0	1.74		04/28/20 22:19	109-99-9	
Toluene	**3.4**	ug/m3	1.3	1.74		04/28/20 22:19	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	13.1	1.74		04/28/20 22:19	120-82-1	
1,1,1-Trichloroethane	**4.2**	ug/m3	1.9	1.74		04/28/20 22:19	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	0.97	1.74		04/28/20 22:19	79-00-5	
Trichloroethene	ND	ug/m3	0.95	1.74		04/28/20 22:19	79-01-6	
Trichlorofluoromethane	**8.0**	ug/m3	2.0	1.74		04/28/20 22:19	75-69-4	
1,1,2-Trichlorotrifluoroethane	ND	ug/m3	2.7	1.74		04/28/20 22:19	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/m3	1.7	1.74		04/28/20 22:19	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	1.7	1.74		04/28/20 22:19	108-67-8	
Vinyl acetate	ND	ug/m3	1.2	1.74		04/28/20 22:19	108-05-4	
Vinyl chloride	ND	ug/m3	0.45	1.74		04/28/20 22:19	75-01-4	
m&p-Xylene	ND	ug/m3	3.1	1.74		04/28/20 22:19	179601-23-1	
o-Xylene	ND	ug/m3	1.5	1.74		04/28/20 22:19	95-47-6	
Tentatively Identified Compounds								
Pentane, 2-methyl-	**5.1J**	ppbv		1.74		04/28/20 22:19	107-83-5	N

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-15 **Lab ID: 10515976013** Collected: 04/23/20 10:14 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Acetone	**23.3**	ug/m3	10.5	1.74		04/28/20 23:43	67-64-1	
Benzene	**2.8**	ug/m3	0.57	1.74		04/28/20 23:43	71-43-2	
Benzyl chloride	ND	ug/m3	4.6	1.74		04/28/20 23:43	100-44-7	
Bromodichloromethane	ND	ug/m3	2.4	1.74		04/28/20 23:43	75-27-4	
Bromoform	ND	ug/m3	9.1	1.74		04/28/20 23:43	75-25-2	
Bromomethane	ND	ug/m3	1.4	1.74		04/28/20 23:43	74-83-9	
1,3-Butadiene	ND	ug/m3	0.78	1.74		04/28/20 23:43	106-99-0	
2-Butanone (MEK)	ND	ug/m3	5.2	1.74		04/28/20 23:43	78-93-3	
Carbon disulfide	**2.1**	ug/m3	1.1	1.74		04/28/20 23:43	75-15-0	
Carbon tetrachloride	ND	ug/m3	2.2	1.74		04/28/20 23:43	56-23-5	
Chlorobenzene	ND	ug/m3	1.6	1.74		04/28/20 23:43	108-90-7	
Chloroethane	ND	ug/m3	0.93	1.74		04/28/20 23:43	75-00-3	
Chloroform	ND	ug/m3	0.86	1.74		04/28/20 23:43	67-66-3	
Chloromethane	ND	ug/m3	0.73	1.74		04/28/20 23:43	74-87-3	
Cyclohexane	**4.1**	ug/m3	3.0	1.74		04/28/20 23:43	110-82-7	
Dibromochloromethane	ND	ug/m3	3.0	1.74		04/28/20 23:43	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	1.4	1.74		04/28/20 23:43	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	2.1	1.74		04/28/20 23:43	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	2.1	1.74		04/28/20 23:43	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	5.3	1.74		04/28/20 23:43	106-46-7	
Dichlorodifluoromethane	**2.8**	ug/m3	1.8	1.74		04/28/20 23:43	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.4	1.74		04/28/20 23:43	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.72	1.74		04/28/20 23:43	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.4	1.74		04/28/20 23:43	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.4	1.74		04/28/20 23:43	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.4	1.74		04/28/20 23:43	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.6	1.74		04/28/20 23:43	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.6	1.74		04/28/20 23:43	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.6	1.74		04/28/20 23:43	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.5	1.74		04/28/20 23:43	76-14-2	
Ethanol	**5.9**	ug/m3	3.3	1.74		04/28/20 23:43	64-17-5	
Ethyl acetate	ND	ug/m3	1.3	1.74		04/28/20 23:43	141-78-6	
Ethylbenzene	ND	ug/m3	1.5	1.74		04/28/20 23:43	100-41-4	
4-Ethyltoluene	ND	ug/m3	4.4	1.74		04/28/20 23:43	622-96-8	
n-Heptane	**4.3**	ug/m3	1.4	1.74		04/28/20 23:43	142-82-5	
Hexachloro-1,3-butadiene	ND	ug/m3	9.4	1.74		04/28/20 23:43	87-68-3	
n-Hexane	**5.8**	ug/m3	1.2	1.74		04/28/20 23:43	110-54-3	
2-Hexanone	ND	ug/m3	7.2	1.74		04/28/20 23:43	591-78-6	
Methylene Chloride	ND	ug/m3	6.1	1.74		04/28/20 23:43	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/m3	7.2	1.74		04/28/20 23:43	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	6.4	1.74		04/28/20 23:43	1634-04-4	
Naphthalene	ND	ug/m3	4.6	1.74		04/28/20 23:43	91-20-3	
2-Propanol	ND	ug/m3	4.4	1.74		04/28/20 23:43	67-63-0	
Propylene	**32.6**	ug/m3	0.61	1.74		04/28/20 23:43	115-07-1	
Styrene	ND	ug/m3	1.5	1.74		04/28/20 23:43	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.2	1.74		04/28/20 23:43	79-34-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-15 **Lab ID: 10515976013** Collected: 04/23/20 10:14 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Tetrachloroethene	**2.8**	ug/m3	1.2	1.74		04/28/20 23:43	127-18-4	
Tetrahydrofuran	ND	ug/m3	1.0	1.74		04/28/20 23:43	109-99-9	
Toluene	**6.2**	ug/m3	1.3	1.74		04/28/20 23:43	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	13.1	1.74		04/28/20 23:43	120-82-1	
1,1,1-Trichloroethane	**2.2**	ug/m3	1.9	1.74		04/28/20 23:43	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	0.97	1.74		04/28/20 23:43	79-00-5	
Trichloroethene	ND	ug/m3	0.95	1.74		04/28/20 23:43	79-01-6	
Trichlorofluoromethane	**3.3**	ug/m3	2.0	1.74		04/28/20 23:43	75-69-4	
1,1,2-Trichlorotrifluoroethane	**10.5**	ug/m3	2.7	1.74		04/28/20 23:43	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/m3	1.7	1.74		04/28/20 23:43	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	1.7	1.74		04/28/20 23:43	108-67-8	
Vinyl acetate	ND	ug/m3	1.2	1.74		04/28/20 23:43	108-05-4	
Vinyl chloride	ND	ug/m3	0.45	1.74		04/28/20 23:43	75-01-4	
m&p-Xylene	ND	ug/m3	3.1	1.74		04/28/20 23:43	179601-23-1	
o-Xylene	ND	ug/m3	1.5	1.74		04/28/20 23:43	95-47-6	
Tentatively Identified Compounds								
Benzeneethanamine, N-[(	**8.7J**	ppbv		1.74		04/28/20 23:43	55429-85-1	N

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-16 **Lab ID: 10515976014** Collected: 04/24/20 10:21 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Acetone	**64.0**	ug/m3	10.3	1.71		04/28/20 21:51	67-64-1	
Benzene	**4.4**	ug/m3	0.56	1.71		04/28/20 21:51	71-43-2	
Benzyl chloride	ND	ug/m3	4.5	1.71		04/28/20 21:51	100-44-7	
Bromodichloromethane	ND	ug/m3	2.3	1.71		04/28/20 21:51	75-27-4	
Bromoform	ND	ug/m3	9.0	1.71		04/28/20 21:51	75-25-2	
Bromomethane	ND	ug/m3	1.3	1.71		04/28/20 21:51	74-83-9	
1,3-Butadiene	ND	ug/m3	0.77	1.71		04/28/20 21:51	106-99-0	
2-Butanone (MEK)	**9.1**	ug/m3	5.1	1.71		04/28/20 21:51	78-93-3	
Carbon disulfide	**30.3**	ug/m3	1.1	1.71		04/28/20 21:51	75-15-0	
Carbon tetrachloride	ND	ug/m3	2.2	1.71		04/28/20 21:51	56-23-5	
Chlorobenzene	ND	ug/m3	1.6	1.71		04/28/20 21:51	108-90-7	
Chloroethane	ND	ug/m3	0.92	1.71		04/28/20 21:51	75-00-3	
Chloroform	ND	ug/m3	0.85	1.71		04/28/20 21:51	67-66-3	
Chloromethane	ND	ug/m3	0.72	1.71		04/28/20 21:51	74-87-3	
Cyclohexane	**18.6**	ug/m3	3.0	1.71		04/28/20 21:51	110-82-7	
Dibromochloromethane	ND	ug/m3	3.0	1.71		04/28/20 21:51	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	1.3	1.71		04/28/20 21:51	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	2.1	1.71		04/28/20 21:51	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	2.1	1.71		04/28/20 21:51	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	5.2	1.71		04/28/20 21:51	106-46-7	
Dichlorodifluoromethane	**3.5**	ug/m3	1.7	1.71		04/28/20 21:51	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.4	1.71		04/28/20 21:51	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.70	1.71		04/28/20 21:51	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.4	1.71		04/28/20 21:51	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.4	1.71		04/28/20 21:51	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.4	1.71		04/28/20 21:51	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.6	1.71		04/28/20 21:51	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.6	1.71		04/28/20 21:51	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.6	1.71		04/28/20 21:51	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.4	1.71		04/28/20 21:51	76-14-2	
Ethanol	**19.5**	ug/m3	3.3	1.71		04/28/20 21:51	64-17-5	
Ethyl acetate	ND	ug/m3	1.3	1.71		04/28/20 21:51	141-78-6	
Ethylbenzene	ND	ug/m3	1.5	1.71		04/28/20 21:51	100-41-4	
4-Ethyltoluene	ND	ug/m3	4.3	1.71		04/28/20 21:51	622-96-8	
n-Heptane	**13.5**	ug/m3	1.4	1.71		04/28/20 21:51	142-82-5	
Hexachloro-1,3-butadiene	ND	ug/m3	9.3	1.71		04/28/20 21:51	87-68-3	
n-Hexane	**14.2**	ug/m3	1.2	1.71		04/28/20 21:51	110-54-3	
2-Hexanone	ND	ug/m3	7.1	1.71		04/28/20 21:51	591-78-6	
Methylene Chloride	ND	ug/m3	6.0	1.71		04/28/20 21:51	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/m3	7.1	1.71		04/28/20 21:51	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	6.3	1.71		04/28/20 21:51	1634-04-4	
Naphthalene	ND	ug/m3	4.5	1.71		04/28/20 21:51	91-20-3	
2-Propanol	**5.9**	ug/m3	4.3	1.71		04/28/20 21:51	67-63-0	
Propylene	**67.9**	ug/m3	0.60	1.71		04/28/20 21:51	115-07-1	
Styrene	ND	ug/m3	1.5	1.71		04/28/20 21:51	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.2	1.71		04/28/20 21:51	79-34-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-16 **Lab ID: 10515976014** Collected: 04/24/20 10:21 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Tetrachloroethene	ND	ug/m3	1.2	1.71		04/28/20 21:51	127-18-4	
Tetrahydrofuran	ND	ug/m3	1.0	1.71		04/28/20 21:51	109-99-9	
Toluene	**4.4**	ug/m3	1.3	1.71		04/28/20 21:51	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	12.9	1.71		04/28/20 21:51	120-82-1	
1,1,1-Trichloroethane	**8.2**	ug/m3	1.9	1.71		04/28/20 21:51	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	0.95	1.71		04/28/20 21:51	79-00-5	
Trichloroethene	**2.1**	ug/m3	0.93	1.71		04/28/20 21:51	79-01-6	
Trichlorofluoromethane	**3.8**	ug/m3	1.9	1.71		04/28/20 21:51	75-69-4	
1,1,2-Trichlorotrifluoroethane	**7.9**	ug/m3	2.7	1.71		04/28/20 21:51	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/m3	1.7	1.71		04/28/20 21:51	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	1.7	1.71		04/28/20 21:51	108-67-8	
Vinyl acetate	ND	ug/m3	1.2	1.71		04/28/20 21:51	108-05-4	
Vinyl chloride	ND	ug/m3	0.44	1.71		04/28/20 21:51	75-01-4	
m&p-Xylene	ND	ug/m3	3.0	1.71		04/28/20 21:51	179601-23-1	
o-Xylene	ND	ug/m3	1.5	1.71		04/28/20 21:51	95-47-6	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-17 **Lab ID: 10515976015** Collected: 04/24/20 10:47 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Acetone	**110**	ug/m3	11.1	1.83		04/28/20 19:59	67-64-1	
Benzene	**4.3**	ug/m3	0.59	1.83		04/28/20 19:59	71-43-2	
Benzyl chloride	ND	ug/m3	4.8	1.83		04/28/20 19:59	100-44-7	
Bromodichloromethane	ND	ug/m3	2.5	1.83		04/28/20 19:59	75-27-4	
Bromoform	ND	ug/m3	9.6	1.83		04/28/20 19:59	75-25-2	
Bromomethane	ND	ug/m3	1.4	1.83		04/28/20 19:59	74-83-9	
1,3-Butadiene	ND	ug/m3	0.82	1.83		04/28/20 19:59	106-99-0	
2-Butanone (MEK)	**12.7**	ug/m3	5.5	1.83		04/28/20 19:59	78-93-3	
Carbon disulfide	**8.1**	ug/m3	1.2	1.83		04/28/20 19:59	75-15-0	
Carbon tetrachloride	ND	ug/m3	2.3	1.83		04/28/20 19:59	56-23-5	
Chlorobenzene	ND	ug/m3	1.7	1.83		04/28/20 19:59	108-90-7	
Chloroethane	ND	ug/m3	0.98	1.83		04/28/20 19:59	75-00-3	
Chloroform	ND	ug/m3	0.91	1.83		04/28/20 19:59	67-66-3	
Chloromethane	ND	ug/m3	0.77	1.83		04/28/20 19:59	74-87-3	
Cyclohexane	**29.2**	ug/m3	3.2	1.83		04/28/20 19:59	110-82-7	
Dibromochloromethane	ND	ug/m3	3.2	1.83		04/28/20 19:59	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	1.4	1.83		04/28/20 19:59	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	2.2	1.83		04/28/20 19:59	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	2.2	1.83		04/28/20 19:59	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	5.6	1.83		04/28/20 19:59	106-46-7	
Dichlorodifluoromethane	**3.3**	ug/m3	1.8	1.83		04/28/20 19:59	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.5	1.83		04/28/20 19:59	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.75	1.83		04/28/20 19:59	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.5	1.83		04/28/20 19:59	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.5	1.83		04/28/20 19:59	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.5	1.83		04/28/20 19:59	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.7	1.83		04/28/20 19:59	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.7	1.83		04/28/20 19:59	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.7	1.83		04/28/20 19:59	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.6	1.83		04/28/20 19:59	76-14-2	
Ethanol	**37.9**	ug/m3	3.5	1.83		04/28/20 19:59	64-17-5	
Ethyl acetate	ND	ug/m3	1.3	1.83		04/28/20 19:59	141-78-6	
Ethylbenzene	ND	ug/m3	1.6	1.83		04/28/20 19:59	100-41-4	
4-Ethyltoluene	ND	ug/m3	4.6	1.83		04/28/20 19:59	622-96-8	
n-Heptane	**20.3**	ug/m3	1.5	1.83		04/28/20 19:59	142-82-5	
Hexachloro-1,3-butadiene	ND	ug/m3	9.9	1.83		04/28/20 19:59	87-68-3	
n-Hexane	**14.2**	ug/m3	1.3	1.83		04/28/20 19:59	110-54-3	
2-Hexanone	ND	ug/m3	7.6	1.83		04/28/20 19:59	591-78-6	
Methylene Chloride	**7.9**	ug/m3	6.5	1.83		04/28/20 19:59	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/m3	7.6	1.83		04/28/20 19:59	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	6.7	1.83		04/28/20 19:59	1634-04-4	
Naphthalene	ND	ug/m3	4.9	1.83		04/28/20 19:59	91-20-3	
2-Propanol	**12.3**	ug/m3	4.6	1.83		04/28/20 19:59	67-63-0	
Propylene	ND	ug/m3	0.64	1.83		04/28/20 19:59	115-07-1	
Styrene	ND	ug/m3	1.6	1.83		04/28/20 19:59	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.3	1.83		04/28/20 19:59	79-34-5	

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-17 **Lab ID: 10515976015** Collected: 04/24/20 10:47 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Tetrachloroethene	ND	ug/m3	1.3	1.83		04/28/20 19:59	127-18-4	
Tetrahydrofuran	ND	ug/m3	1.1	1.83		04/28/20 19:59	109-99-9	
Toluene	**7.6**	ug/m3	1.4	1.83		04/28/20 19:59	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	13.8	1.83		04/28/20 19:59	120-82-1	
1,1,1-Trichloroethane	**16.1**	ug/m3	2.0	1.83		04/28/20 19:59	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	1.0	1.83		04/28/20 19:59	79-00-5	
Trichloroethene	**2.6**	ug/m3	1.0	1.83		04/28/20 19:59	79-01-6	
Trichlorofluoromethane	**8.9**	ug/m3	2.1	1.83		04/28/20 19:59	75-69-4	
1,1,2-Trichlorotrifluoroethane	**23.0**	ug/m3	2.9	1.83		04/28/20 19:59	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/m3	1.8	1.83		04/28/20 19:59	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	1.8	1.83		04/28/20 19:59	108-67-8	
Vinyl acetate	ND	ug/m3	1.3	1.83		04/28/20 19:59	108-05-4	
Vinyl chloride	ND	ug/m3	0.48	1.83		04/28/20 19:59	75-01-4	
m&p-Xylene	**3.9**	ug/m3	3.2	1.83		04/28/20 19:59	179601-23-1	
o-Xylene	**2.0**	ug/m3	1.6	1.83		04/28/20 19:59	95-47-6	
Tentatively Identified Compounds								
Pentane, 2-methyl-	**7.4J**	ppbv		1.83		04/28/20 19:59	107-83-5	N

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-18 **Lab ID: 10515976016** Collected: 04/23/20 09:49 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Acetone	**46.7**	ug/m3	10.5	1.74		04/28/20 23:15	67-64-1	
Benzene	**8.0**	ug/m3	0.57	1.74		04/28/20 23:15	71-43-2	
Benzyl chloride	ND	ug/m3	4.6	1.74		04/28/20 23:15	100-44-7	
Bromodichloromethane	ND	ug/m3	2.4	1.74		04/28/20 23:15	75-27-4	
Bromoform	ND	ug/m3	9.1	1.74		04/28/20 23:15	75-25-2	
Bromomethane	ND	ug/m3	1.4	1.74		04/28/20 23:15	74-83-9	
1,3-Butadiene	ND	ug/m3	0.78	1.74		04/28/20 23:15	106-99-0	
2-Butanone (MEK)	**11.7**	ug/m3	5.2	1.74		04/28/20 23:15	78-93-3	
Carbon disulfide	**10.8**	ug/m3	1.1	1.74		04/28/20 23:15	75-15-0	
Carbon tetrachloride	ND	ug/m3	2.2	1.74		04/28/20 23:15	56-23-5	
Chlorobenzene	ND	ug/m3	1.6	1.74		04/28/20 23:15	108-90-7	
Chloroethane	ND	ug/m3	0.93	1.74		04/28/20 23:15	75-00-3	
Chloroform	ND	ug/m3	0.86	1.74		04/28/20 23:15	67-66-3	
Chloromethane	ND	ug/m3	0.73	1.74		04/28/20 23:15	74-87-3	
Cyclohexane	**20.1**	ug/m3	3.0	1.74		04/28/20 23:15	110-82-7	
Dibromochloromethane	ND	ug/m3	3.0	1.74		04/28/20 23:15	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	1.4	1.74		04/28/20 23:15	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	2.1	1.74		04/28/20 23:15	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	2.1	1.74		04/28/20 23:15	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	5.3	1.74		04/28/20 23:15	106-46-7	
Dichlorodifluoromethane	**2.8**	ug/m3	1.8	1.74		04/28/20 23:15	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.4	1.74		04/28/20 23:15	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.72	1.74		04/28/20 23:15	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.4	1.74		04/28/20 23:15	75-35-4	
cis-1,2-Dichloroethene	ND	ug/m3	1.4	1.74		04/28/20 23:15	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.4	1.74		04/28/20 23:15	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.6	1.74		04/28/20 23:15	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.6	1.74		04/28/20 23:15	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.6	1.74		04/28/20 23:15	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.5	1.74		04/28/20 23:15	76-14-2	
Ethanol	**8.3**	ug/m3	3.3	1.74		04/28/20 23:15	64-17-5	
Ethyl acetate	ND	ug/m3	1.3	1.74		04/28/20 23:15	141-78-6	
Ethylbenzene	ND	ug/m3	1.5	1.74		04/28/20 23:15	100-41-4	
4-Ethyltoluene	ND	ug/m3	4.4	1.74		04/28/20 23:15	622-96-8	
n-Heptane	**13.2**	ug/m3	1.4	1.74		04/28/20 23:15	142-82-5	
Hexachloro-1,3-butadiene	ND	ug/m3	9.4	1.74		04/28/20 23:15	87-68-3	
n-Hexane	**31.5**	ug/m3	1.2	1.74		04/28/20 23:15	110-54-3	
2-Hexanone	ND	ug/m3	7.2	1.74		04/28/20 23:15	591-78-6	
Methylene Chloride	ND	ug/m3	6.1	1.74		04/28/20 23:15	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/m3	7.2	1.74		04/28/20 23:15	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	6.4	1.74		04/28/20 23:15	1634-04-4	
Naphthalene	ND	ug/m3	4.6	1.74		04/28/20 23:15	91-20-3	
2-Propanol	**4.8**	ug/m3	4.4	1.74		04/28/20 23:15	67-63-0	
Propylene	ND	ug/m3	0.61	1.74		04/28/20 23:15	115-07-1	
Styrene	ND	ug/m3	1.5	1.74		04/28/20 23:15	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.2	1.74		04/28/20 23:15	79-34-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-18 **Lab ID: 10515976016** Collected: 04/23/20 09:49 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Tetrachloroethene	**2.6**	ug/m3	1.2	1.74		04/28/20 23:15	127-18-4	
Tetrahydrofuran	ND	ug/m3	1.0	1.74		04/28/20 23:15	109-99-9	
Toluene	**9.2**	ug/m3	1.3	1.74		04/28/20 23:15	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	13.1	1.74		04/28/20 23:15	120-82-1	
1,1,1-Trichloroethane	ND	ug/m3	1.9	1.74		04/28/20 23:15	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	0.97	1.74		04/28/20 23:15	79-00-5	
Trichloroethene	**1.3**	ug/m3	0.95	1.74		04/28/20 23:15	79-01-6	
Trichlorofluoromethane	**5.3**	ug/m3	2.0	1.74		04/28/20 23:15	75-69-4	
1,1,2-Trichlorotrifluoroethane	**27.0**	ug/m3	2.7	1.74		04/28/20 23:15	76-13-1	
1,2,4-Trimethylbenzene	ND	ug/m3	1.7	1.74		04/28/20 23:15	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	1.7	1.74		04/28/20 23:15	108-67-8	
Vinyl acetate	ND	ug/m3	1.2	1.74		04/28/20 23:15	108-05-4	
Vinyl chloride	ND	ug/m3	0.45	1.74		04/28/20 23:15	75-01-4	
m&p-Xylene	**3.3**	ug/m3	3.1	1.74		04/28/20 23:15	179601-23-1	
o-Xylene	**1.9**	ug/m3	1.5	1.74		04/28/20 23:15	95-47-6	
Tentatively Identified Compounds								
Pentane, 2-methyl-	**11.6J**	ppbv		1.74		04/28/20 23:15	107-83-5	N
Benzeneethanamine, N-[(	**57.2J**	ppbv		1.74		04/28/20 23:15	55429-85-1	N

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-19 **Lab ID: 10515976017** Collected: 04/23/20 10:35 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Acetone	**176**	ug/m3	11.5	1.9		04/29/20 00:11	67-64-1	
Benzene	**8.2**	ug/m3	0.62	1.9		04/29/20 00:11	71-43-2	
Benzyl chloride	ND	ug/m3	5.0	1.9		04/29/20 00:11	100-44-7	
Bromodichloromethane	ND	ug/m3	2.6	1.9		04/29/20 00:11	75-27-4	
Bromoform	ND	ug/m3	10	1.9		04/29/20 00:11	75-25-2	
Bromomethane	ND	ug/m3	1.5	1.9		04/29/20 00:11	74-83-9	
1,3-Butadiene	ND	ug/m3	0.86	1.9		04/29/20 00:11	106-99-0	
2-Butanone (MEK)	**27.3**	ug/m3	5.7	1.9		04/29/20 00:11	78-93-3	
Carbon disulfide	**4.5**	ug/m3	1.2	1.9		04/29/20 00:11	75-15-0	
Carbon tetrachloride	ND	ug/m3	2.4	1.9		04/29/20 00:11	56-23-5	
Chlorobenzene	ND	ug/m3	1.8	1.9		04/29/20 00:11	108-90-7	
Chloroethane	ND	ug/m3	1.0	1.9		04/29/20 00:11	75-00-3	
Chloroform	ND	ug/m3	0.94	1.9		04/29/20 00:11	67-66-3	
Chloromethane	**1.7**	ug/m3	0.80	1.9		04/29/20 00:11	74-87-3	
Cyclohexane	**7.3**	ug/m3	3.3	1.9		04/29/20 00:11	110-82-7	
Dibromochloromethane	ND	ug/m3	3.3	1.9		04/29/20 00:11	124-48-1	
1,2-Dibromoethane (EDB)	ND	ug/m3	1.5	1.9		04/29/20 00:11	106-93-4	
1,2-Dichlorobenzene	ND	ug/m3	2.3	1.9		04/29/20 00:11	95-50-1	
1,3-Dichlorobenzene	ND	ug/m3	2.3	1.9		04/29/20 00:11	541-73-1	
1,4-Dichlorobenzene	ND	ug/m3	5.8	1.9		04/29/20 00:11	106-46-7	
Dichlorodifluoromethane	**2.6**	ug/m3	1.9	1.9		04/29/20 00:11	75-71-8	
1,1-Dichloroethane	ND	ug/m3	1.6	1.9		04/29/20 00:11	75-34-3	
1,2-Dichloroethane	ND	ug/m3	0.78	1.9		04/29/20 00:11	107-06-2	
1,1-Dichloroethene	ND	ug/m3	1.5	1.9		04/29/20 00:11	75-35-4	
cis-1,2-Dichloroethene	**24.2**	ug/m3	1.5	1.9		04/29/20 00:11	156-59-2	
trans-1,2-Dichloroethene	ND	ug/m3	1.5	1.9		04/29/20 00:11	156-60-5	
1,2-Dichloropropane	ND	ug/m3	1.8	1.9		04/29/20 00:11	78-87-5	
cis-1,3-Dichloropropene	ND	ug/m3	1.8	1.9		04/29/20 00:11	10061-01-5	
trans-1,3-Dichloropropene	ND	ug/m3	1.8	1.9		04/29/20 00:11	10061-02-6	
Dichlorotetrafluoroethane	ND	ug/m3	2.7	1.9		04/29/20 00:11	76-14-2	
Ethanol	**14.7**	ug/m3	3.6	1.9		04/29/20 00:11	64-17-5	
Ethyl acetate	ND	ug/m3	1.4	1.9		04/29/20 00:11	141-78-6	
Ethylbenzene	**14.4**	ug/m3	1.7	1.9		04/29/20 00:11	100-41-4	
4-Ethyltoluene	ND	ug/m3	4.8	1.9		04/29/20 00:11	622-96-8	
n-Heptane	**11.5**	ug/m3	1.6	1.9		04/29/20 00:11	142-82-5	
Hexachloro-1,3-butadiene	ND	ug/m3	10.3	1.9		04/29/20 00:11	87-68-3	
n-Hexane	**12.3**	ug/m3	1.4	1.9		04/29/20 00:11	110-54-3	
2-Hexanone	ND	ug/m3	7.9	1.9		04/29/20 00:11	591-78-6	
Methylene Chloride	ND	ug/m3	6.7	1.9		04/29/20 00:11	75-09-2	
4-Methyl-2-pentanone (MIBK)	ND	ug/m3	7.9	1.9		04/29/20 00:11	108-10-1	
Methyl-tert-butyl ether	ND	ug/m3	7.0	1.9		04/29/20 00:11	1634-04-4	
Naphthalene	ND	ug/m3	5.1	1.9		04/29/20 00:11	91-20-3	
2-Propanol	**8.7**	ug/m3	4.8	1.9		04/29/20 00:11	67-63-0	
Propylene	**147**	ug/m3	0.66	1.9		04/29/20 00:11	115-07-1	E
Styrene	ND	ug/m3	1.6	1.9		04/29/20 00:11	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ug/m3	1.3	1.9		04/29/20 00:11	79-34-5	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

ANALYTICAL RESULTS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Sample: SV-19 **Lab ID: 10515976017** Collected: 04/23/20 10:35 Received: 04/24/20 16:35 Matrix: Air

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
TO15 MSV AIR (TICS)	Analytical Method: TO-15							
	Pace Analytical Services - Minneapolis							
Tetrachloroethene	**4.2**	ug/m3	1.3	1.9		04/29/20 00:11	127-18-4	
Tetrahydrofuran	ND	ug/m3	1.1	1.9		04/29/20 00:11	109-99-9	
Toluene	**49.0**	ug/m3	1.5	1.9		04/29/20 00:11	108-88-3	
1,2,4-Trichlorobenzene	ND	ug/m3	14.3	1.9		04/29/20 00:11	120-82-1	
1,1,1-Trichloroethane	ND	ug/m3	2.1	1.9		04/29/20 00:11	71-55-6	
1,1,2-Trichloroethane	ND	ug/m3	1.1	1.9		04/29/20 00:11	79-00-5	
Trichloroethene	ND	ug/m3	1.0	1.9		04/29/20 00:11	79-01-6	
Trichlorofluoromethane	ND	ug/m3	2.2	1.9		04/29/20 00:11	75-69-4	
1,1,2-Trichlorotrifluoroethane	**3.1**	ug/m3	3.0	1.9		04/29/20 00:11	76-13-1	
1,2,4-Trimethylbenzene	**2.9**	ug/m3	1.9	1.9		04/29/20 00:11	95-63-6	
1,3,5-Trimethylbenzene	ND	ug/m3	1.9	1.9		04/29/20 00:11	108-67-8	
Vinyl acetate	ND	ug/m3	1.4	1.9		04/29/20 00:11	108-05-4	
Vinyl chloride	ND	ug/m3	0.49	1.9		04/29/20 00:11	75-01-4	
m&p-Xylene	**62.2**	ug/m3	3.4	1.9		04/29/20 00:11	179601-23-1	
o-Xylene	**16.2**	ug/m3	1.7	1.9		04/29/20 00:11	95-47-6	

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QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

QC Batch: 672416 | Analysis Method: TO-15
QC Batch Method: TO-15 | Analysis Description: TO15 MSV AIR Low Level
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10515976001, 10515976002, 10515976003, 10515976004

METHOD BLANK: 3601513 Matrix: Air
Associated Lab Samples: 10515976001, 10515976002, 10515976003, 10515976004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/m3	ND	0.56	04/28/20 08:34	
1,1,2,2-Tetrachloroethane	ug/m3	ND	0.35	04/28/20 08:34	
1,1,2-Trichloroethane	ug/m3	ND	0.28	04/28/20 08:34	
1,1,2-Trichlorotrifluoroethane	ug/m3	ND	0.78	04/28/20 08:34	
1,1-Dichloroethane	ug/m3	ND	0.41	04/28/20 08:34	
1,1-Dichloroethene	ug/m3	ND	0.40	04/28/20 08:34	
1,2,4-Trichlorobenzene	ug/m3	ND	3.8	04/28/20 08:34	
1,2,4-Trimethylbenzene	ug/m3	ND	0.50	04/28/20 08:34	
1,2-Dibromoethane (EDB)	ug/m3	ND	0.39	04/28/20 08:34	
1,2-Dichlorobenzene	ug/m3	ND	0.61	04/28/20 08:34	
1,2-Dichloroethane	ug/m3	ND	0.21	04/28/20 08:34	
1,2-Dichloropropane	ug/m3	ND	0.47	04/28/20 08:34	
1,3,5-Trimethylbenzene	ug/m3	ND	0.50	04/28/20 08:34	
1,3-Butadiene	ug/m3	ND	0.22	04/28/20 08:34	
1,3-Dichlorobenzene	ug/m3	ND	0.61	04/28/20 08:34	
1,4-Dichlorobenzene	ug/m3	ND	1.5	04/28/20 08:34	
2-Butanone (MEK)	ug/m3	ND	1.5	04/28/20 08:34	
2-Hexanone	ug/m3	ND	2.1	04/28/20 08:34	
2-Propanol	ug/m3	ND	1.2	04/28/20 08:34	
4-Ethyltoluene	ug/m3	ND	1.2	04/28/20 08:34	
4-Methyl-2-pentanone (MIBK)	ug/m3	ND	2.1	04/28/20 08:34	
Acetone	ug/m3	ND	3.0	04/28/20 08:34	
Benzene	ug/m3	ND	0.16	04/28/20 08:34	
Benzyl chloride	ug/m3	ND	1.3	04/28/20 08:34	
Bromodichloromethane	ug/m3	ND	0.68	04/28/20 08:34	
Bromoform	ug/m3	ND	2.6	04/28/20 08:34	
Bromomethane	ug/m3	ND	0.39	04/28/20 08:34	
Carbon disulfide	ug/m3	ND	0.32	04/28/20 08:34	
Carbon tetrachloride	ug/m3	ND	0.64	04/28/20 08:34	
Chlorobenzene	ug/m3	ND	0.47	04/28/20 08:34	
Chloroethane	ug/m3	ND	0.27	04/28/20 08:34	
Chloroform	ug/m3	ND	0.25	04/28/20 08:34	
Chloromethane	ug/m3	ND	0.21	04/28/20 08:34	
cis-1,2-Dichloroethene	ug/m3	ND	0.40	04/28/20 08:34	
cis-1,3-Dichloropropene	ug/m3	ND	0.46	04/28/20 08:34	
Cyclohexane	ug/m3	ND	0.88	04/28/20 08:34	
Dibromochloromethane	ug/m3	ND	0.86	04/28/20 08:34	
Dichlorodifluoromethane	ug/m3	ND	0.50	04/28/20 08:34	
Dichlorotetrafluoroethane	ug/m3	ND	0.71	04/28/20 08:34	
Ethanol	ug/m3	ND	0.96	04/28/20 08:34	

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

METHOD BLANK: 3601513 Matrix: Air
Associated Lab Samples: 10515976001, 10515976002, 10515976003, 10515976004

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Ethyl acetate	ug/m3	ND	0.37	04/28/20 08:34	
Ethylbenzene	ug/m3	ND	0.44	04/28/20 08:34	
Hexachloro-1,3-butadiene	ug/m3	ND	2.7	04/28/20 08:34	
m&p-Xylene	ug/m3	ND	0.88	04/28/20 08:34	
Methyl-tert-butyl ether	ug/m3	ND	1.8	04/28/20 08:34	
Methylene Chloride	ug/m3	ND	1.8	04/28/20 08:34	
n-Heptane	ug/m3	ND	0.42	04/28/20 08:34	
n-Hexane	ug/m3	ND	0.36	04/28/20 08:34	
Naphthalene	ug/m3	ND	1.3	04/28/20 08:34	
o-Xylene	ug/m3	ND	0.44	04/28/20 08:34	
Propylene	ug/m3	ND	0.18	04/28/20 08:34	
Styrene	ug/m3	ND	0.43	04/28/20 08:34	
Tetrachloroethene	ug/m3	ND	0.34	04/28/20 08:34	
Tetrahydrofuran	ug/m3	ND	0.30	04/28/20 08:34	
Toluene	ug/m3	ND	0.38	04/28/20 08:34	
trans-1,2-Dichloroethene	ug/m3	ND	0.40	04/28/20 08:34	
trans-1,3-Dichloropropene	ug/m3	ND	0.46	04/28/20 08:34	
Trichloroethene	ug/m3	ND	0.27	04/28/20 08:34	
Trichlorofluoromethane	ug/m3	ND	0.57	04/28/20 08:34	
Vinyl acetate	ug/m3	ND	0.36	04/28/20 08:34	
Vinyl chloride	ug/m3	ND	0.13	04/28/20 08:34	

LABORATORY CONTROL SAMPLE: 3601514

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/m3	57	65.7	115	70-130	
1,1,2,2-Tetrachloroethane	ug/m3	71.9	83.5	116	70-132	
1,1,2-Trichloroethane	ug/m3	57.3	67.4	118	70-133	
1,1,2-Trichlorotrifluoroethane	ug/m3	80.3	95.2	119	70-130	
1,1-Dichloroethane	ug/m3	42.7	49.1	115	70-130	
1,1-Dichloroethene	ug/m3	41.4	51.5	124	69-137	
1,2,4-Trichlorobenzene	ug/m3	156	168	108	70-130	
1,2,4-Trimethylbenzene	ug/m3	51.5	65.4	127	70-137	
1,2-Dibromoethane (EDB)	ug/m3	80.3	89.7	112	70-138	
1,2-Dichlorobenzene	ug/m3	63.1	78.1	124	70-136	
1,2-Dichloroethane	ug/m3	42.4	51.3	121	70-130	
1,2-Dichloropropane	ug/m3	48.6	61.0	125	70-132	
1,3,5-Trimethylbenzene	ug/m3	51.6	65.2	126	70-136	
1,3-Butadiene	ug/m3	23.3	29.9	128	67-139	
1,3-Dichlorobenzene	ug/m3	63.4	78.7	124	70-138	
1,4-Dichlorobenzene	ug/m3	63.4	76.0	120	70-145	
2-Butanone (MEK)	ug/m3	31.4	37.6	120	61-130	
2-Hexanone	ug/m3	42.8	52.0	122	70-138	
2-Propanol	ug/m3	119	115	96	70-136	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

LABORATORY CONTROL SAMPLE: 3601514

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
4-Ethyltoluene	ug/m3	52.4	64.1	122	70-142	
4-Methyl-2-pentanone (MIBK)	ug/m3	43.6	55.3	127	70-134	
Acetone	ug/m3	126	148	117	59-137	
Benzene	ug/m3	33.5	36.2	108	70-133	
Benzyl chloride	ug/m3	55.1	63.4	115	70-139	
Bromodichloromethane	ug/m3	71.5	85.1	119	70-130	
Bromoform	ug/m3	110	128	117	60-140	
Bromomethane	ug/m3	41.3	50.9	123	70-131	
Carbon disulfide	ug/m3	33.3	36.8	110	70-130	
Carbon tetrachloride	ug/m3	66.2	80.3	121	70-133	
Chlorobenzene	ug/m3	48.3	51.5	107	70-131	
Chloroethane	ug/m3	28.1	35.9	128	70-141	
Chloroform	ug/m3	51.1	58.7	115	70-130	
Chloromethane	ug/m3	21.9	27.1	124	64-137	
cis-1,2-Dichloroethene	ug/m3	41.6	47.3	113	70-132	
cis-1,3-Dichloropropene	ug/m3	47.7	58.7	123	70-138	
Cyclohexane	ug/m3	36.7	45.7	125	70-133	
Dibromochloromethane	ug/m3	90.7	103	114	70-139	
Dichlorodifluoromethane	ug/m3	51.6	52.0	101	70-130	
Dichlorotetrafluoroethane	ug/m3	72.7	86.8	119	65-133	
Ethanol	ug/m3	103	113	110	65-135	
Ethyl acetate	ug/m3	38.6	45.2	117	70-135	
Ethylbenzene	ug/m3	45.6	53.3	117	70-142	
Hexachloro-1,3-butadiene	ug/m3	112	140	125	70-134	
m&p-Xylene	ug/m3	91.2	111	121	70-141	
Methyl-tert-butyl ether	ug/m3	38.4	42.4	111	70-131	
Methylene Chloride	ug/m3	182	187	103	69-130	
n-Heptane	ug/m3	43.6	54.1	124	70-130	
n-Hexane	ug/m3	37.6	43.9	117	70-131	
Naphthalene	ug/m3	57.7	61.8	107	63-130	
o-Xylene	ug/m3	45.5	55.8	123	70-135	
Propylene	ug/m3	18.2	19.5	107	63-139	
Styrene	ug/m3	44.9	54.4	121	70-143	
Tetrachloroethene	ug/m3	71	76.9	108	70-136	
Tetrahydrofuran	ug/m3	31.5	39.1	124	70-137	
Toluene	ug/m3	39.5	47.0	119	70-136	
trans-1,2-Dichloroethene	ug/m3	42.2	47.4	112	70-132	
trans-1,3-Dichloropropene	ug/m3	47.7	57.0	120	70-139	
Trichloroethene	ug/m3	56.3	63.3	112	70-132	
Trichlorofluoromethane	ug/m3	59.7	76.5	128	65-136	
Vinyl acetate	ug/m3	34.5	40.9	119	66-140	
Vinyl chloride	ug/m3	26.7	32.2	121	68-141	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

SAMPLE DUPLICATE: 3602364

Parameter	Units	10516082001 Result	Dup Result	RPD	Max RPD	Qualifiers
1,1,1-Trichloroethane	ug/m3	ND	ND		25	
1,1,2,2-Tetrachloroethane	ug/m3	ND	ND		25	
1,1,2-Trichloroethane	ug/m3	ND	ND		25	
1,1,2-Trichlorotrifluoroethane	ug/m3	ND	.63J		25	
1,1-Dichloroethane	ug/m3	ND	ND		25	
1,1-Dichloroethene	ug/m3	ND	ND		25	
1,2,4-Trichlorobenzene	ug/m3	ND	ND		25	
1,2,4-Trimethylbenzene	ug/m3	ND	ND		25	
1,2-Dibromoethane (EDB)	ug/m3	ND	ND		25	
1,2-Dichlorobenzene	ug/m3	ND	ND		25	
1,2-Dichloroethane	ug/m3	ND	ND		25	
1,2-Dichloropropane	ug/m3	ND	ND		25	
1,3,5-Trimethylbenzene	ug/m3	ND	ND		25	
1,3-Butadiene	ug/m3	ND	ND		25	
1,3-Dichlorobenzene	ug/m3	ND	ND		25	
1,4-Dichlorobenzene	ug/m3	ND	ND		25	
2-Butanone (MEK)	ug/m3	ND	ND		25	
2-Hexanone	ug/m3	ND	ND		25	
2-Propanol	ug/m3	ND	1.6J		25	
4-Ethyltoluene	ug/m3	ND	ND		25	
4-Methyl-2-pentanone (MIBK)	ug/m3	ND	ND		25	
Acetone	ug/m3	ND	4J		25	
Benzene	ug/m3	ND	.38J		25	
Benzyl chloride	ug/m3	ND	ND		25	
Bromodichloromethane	ug/m3	ND	ND		25	
Bromoform	ug/m3	ND	ND		25	
Bromomethane	ug/m3	ND	ND		25	
Carbon disulfide	ug/m3	ND	ND		25	
Carbon tetrachloride	ug/m3	ND	.39J		25	
Chlorobenzene	ug/m3	ND	ND		25	
Chloroethane	ug/m3	ND	ND		25	
Chloroform	ug/m3	ND	ND		25	
Chloromethane	ug/m3	1.1	1.1	2	25	
cis-1,2-Dichloroethene	ug/m3	ND	ND		25	
cis-1,3-Dichloropropene	ug/m3	ND	ND		25	
Cyclohexane	ug/m3	ND	.57J		25	
Dibromochloromethane	ug/m3	ND	ND		25	
Dichlorodifluoromethane	ug/m3	2.6	2.5	3	25	
Dichlorotetrafluoroethane	ug/m3	ND	ND		25	
Ethanol	ug/m3	5.1	5.0	4	25	
Ethyl acetate	ug/m3	ND	ND		25	
Ethylbenzene	ug/m3	ND	ND		25	
Hexachloro-1,3-butadiene	ug/m3	ND	ND		25	
m&p-Xylene	ug/m3	ND	ND		25	
Methyl-tert-butyl ether	ug/m3	ND	ND		25	
Methylene Chloride	ug/m3	ND	3.2J		25	
n-Heptane	ug/m3	ND	ND		25	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

SAMPLE DUPLICATE: 3602364

Parameter	Units	10516082001 Result	Dup Result	RPD	Max RPD	Qualifiers
n-Hexane	ug/m3	ND	.55J		25	
Naphthalene	ug/m3	ND	ND		25	
o-Xylene	ug/m3	ND	ND		25	
Propylene	ug/m3	ND	ND		25	
Styrene	ug/m3	ND	ND		25	
Tetrachloroethene	ug/m3	ND	ND		25	
Tetrahydrofuran	ug/m3	ND	ND		25	
Toluene	ug/m3	ND	.49J		25	
trans-1,2-Dichloroethene	ug/m3	8.7	8.5	2	25	
trans-1,3-Dichloropropene	ug/m3	ND	ND		25	
Trichloroethene	ug/m3	ND	ND		25	
Trichlorofluoromethane	ug/m3	1.7	1.8	4	25	
Vinyl acetate	ug/m3	ND	ND		25	
Vinyl chloride	ug/m3	ND	ND		25	

SAMPLE DUPLICATE: 3602365

Parameter	Units	10516082003 Result	Dup Result	RPD	Max RPD	Qualifiers
1,1,1-Trichloroethane	ug/m3	ND	ND		25	
1,1,2,2-Tetrachloroethane	ug/m3	ND	ND		25	
1,1,2-Trichloroethane	ug/m3	ND	ND		25	
1,1,2-Trichlorotrifluoroethane	ug/m3	ND	.64J		25	
1,1-Dichloroethane	ug/m3	ND	ND		25	
1,1-Dichloroethene	ug/m3	ND	ND		25	
1,2,4-Trichlorobenzene	ug/m3	ND	ND		25	
1,2,4-Trimethylbenzene	ug/m3	ND	ND		25	
1,2-Dibromoethane (EDB)	ug/m3	ND	ND		25	
1,2-Dichlorobenzene	ug/m3	ND	ND		25	
1,2-Dichloroethane	ug/m3	ND	ND		25	
1,2-Dichloropropane	ug/m3	ND	ND		25	
1,3,5-Trimethylbenzene	ug/m3	ND	ND		25	
1,3-Butadiene	ug/m3	ND	ND		25	
1,3-Dichlorobenzene	ug/m3	ND	ND		25	
1,4-Dichlorobenzene	ug/m3	ND	ND		25	
2-Butanone (MEK)	ug/m3	ND	ND		25	
2-Hexanone	ug/m3	ND	ND		25	
2-Propanol	ug/m3	ND	3.4J		25	
4-Ethyltoluene	ug/m3	ND	ND		25	
4-Methyl-2-pentanone (MIBK)	ug/m3	ND	ND		25	
Acetone	ug/m3	ND	7.4J		25	
Benzene	ug/m3	ND	.41J		25	
Benzyl chloride	ug/m3	ND	ND		25	
Bromodichloromethane	ug/m3	ND	ND		25	
Bromoform	ug/m3	ND	ND		25	
Bromomethane	ug/m3	ND	ND		25	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

SAMPLE DUPLICATE: 3602365

Parameter	Units	10516082003 Result	Dup Result	RPD	Max RPD	Qualifiers
Carbon disulfide	ug/m3	ND	ND		25	
Carbon tetrachloride	ug/m3	ND	ND		25	
Chlorobenzene	ug/m3	ND	ND		25	
Chloroethane	ug/m3	ND	ND		25	
Chloroform	ug/m3	ND	ND		25	
Chloromethane	ug/m3	1.3	1.2	7	25	
cis-1,2-Dichloroethene	ug/m3	ND	ND		25	
cis-1,3-Dichloropropene	ug/m3	ND	ND		25	
Cyclohexane	ug/m3	ND	1.3J		25	
Dibromochloromethane	ug/m3	ND	ND		25	
Dichlorodifluoromethane	ug/m3	2.7	2.9	5	25	
Dichlorotetrafluoroethane	ug/m3	ND	ND		25	
Ethanol	ug/m3	9.0	8.5	6	25	
Ethyl acetate	ug/m3	ND	ND		25	
Ethylbenzene	ug/m3	ND	ND		25	
Hexachloro-1,3-butadiene	ug/m3	ND	ND		25	
m&p-Xylene	ug/m3	ND	ND		25	
Methyl-tert-butyl ether	ug/m3	ND	ND		25	
Methylene Chloride	ug/m3	ND	3.1J		25	
n-Heptane	ug/m3	ND	ND		25	
n-Hexane	ug/m3	ND	.75J		25	
Naphthalene	ug/m3	ND	ND		25	
o-Xylene	ug/m3	ND	ND		25	
Propylene	ug/m3	ND	ND		25	
Styrene	ug/m3	ND	ND		25	
Tetrachloroethene	ug/m3	ND	ND		25	
Tetrahydrofuran	ug/m3	ND	ND		25	
Toluene	ug/m3	ND	.68J		25	
trans-1,2-Dichloroethene	ug/m3	ND	.53J		25	
trans-1,3-Dichloropropene	ug/m3	ND	ND		25	
Trichloroethene	ug/m3	ND	ND		25	
Trichlorofluoromethane	ug/m3	2.0	2.0	4	25	
Vinyl acetate	ug/m3	ND	ND		25	
Vinyl chloride	ug/m3	ND	ND		25	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

QC Batch: 672425
QC Batch Method: TO-15
Analysis Method: TO-15
Analysis Description: TO15 MSV AIR Low Level
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 10515976005, 10515976006, 10515976007, 10515976008, 10515976009, 10515976010, 10515976011, 10515976012, 10515976013, 10515976014, 10515976015, 10515976016, 10515976017

METHOD BLANK: 3601567
Matrix: Air
Associated Lab Samples: 10515976005, 10515976006, 10515976007, 10515976008, 10515976009, 10515976010, 10515976011, 10515976012, 10515976013, 10515976014, 10515976015, 10515976016, 10515976017

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1-Trichloroethane	ug/m3	ND	0.56	04/28/20 13:22	
1,1,2,2-Tetrachloroethane	ug/m3	ND	0.35	04/28/20 13:22	
1,1,2-Trichloroethane	ug/m3	ND	0.28	04/28/20 13:22	
1,1,2-Trichlorotrifluoroethane	ug/m3	ND	0.78	04/28/20 13:22	
1,1-Dichloroethane	ug/m3	ND	0.41	04/28/20 13:22	
1,1-Dichloroethene	ug/m3	ND	0.40	04/28/20 13:22	
1,2,4-Trichlorobenzene	ug/m3	ND	3.8	04/28/20 13:22	
1,2,4-Trimethylbenzene	ug/m3	ND	0.50	04/28/20 13:22	
1,2-Dibromoethane (EDB)	ug/m3	ND	0.39	04/28/20 13:22	
1,2-Dichlorobenzene	ug/m3	ND	0.61	04/28/20 13:22	
1,2-Dichloroethane	ug/m3	ND	0.21	04/28/20 13:22	
1,2-Dichloropropane	ug/m3	ND	0.47	04/28/20 13:22	
1,3,5-Trimethylbenzene	ug/m3	ND	0.50	04/28/20 13:22	
1,3-Butadiene	ug/m3	ND	0.22	04/28/20 13:22	
1,3-Dichlorobenzene	ug/m3	ND	0.61	04/28/20 13:22	
1,4-Dichlorobenzene	ug/m3	ND	1.5	04/28/20 13:22	
2-Butanone (MEK)	ug/m3	ND	1.5	04/28/20 13:22	
2-Hexanone	ug/m3	ND	2.1	04/28/20 13:22	
2-Propanol	ug/m3	ND	1.2	04/28/20 13:22	
4-Ethyltoluene	ug/m3	ND	1.2	04/28/20 13:22	
4-Methyl-2-pentanone (MIBK)	ug/m3	ND	2.1	04/28/20 13:22	
Acetone	ug/m3	ND	3.0	04/28/20 13:22	
Benzene	ug/m3	ND	0.16	04/28/20 13:22	
Benzyl chloride	ug/m3	ND	1.3	04/28/20 13:22	
Bromodichloromethane	ug/m3	ND	0.68	04/28/20 13:22	
Bromoform	ug/m3	ND	2.6	04/28/20 13:22	
Bromomethane	ug/m3	ND	0.39	04/28/20 13:22	
Carbon disulfide	ug/m3	ND	0.32	04/28/20 13:22	
Carbon tetrachloride	ug/m3	ND	0.64	04/28/20 13:22	
Chlorobenzene	ug/m3	ND	0.47	04/28/20 13:22	
Chloroethane	ug/m3	ND	0.27	04/28/20 13:22	
Chloroform	ug/m3	ND	0.25	04/28/20 13:22	
Chloromethane	ug/m3	ND	0.21	04/28/20 13:22	
cis-1,2-Dichloroethene	ug/m3	ND	0.40	04/28/20 13:22	
cis-1,3-Dichloropropene	ug/m3	ND	0.46	04/28/20 13:22	
Cyclohexane	ug/m3	ND	0.88	04/28/20 13:22	
Dibromochloromethane	ug/m3	ND	0.86	04/28/20 13:22	
Dichlorodifluoromethane	ug/m3	ND	0.50	04/28/20 13:22	
Dichlorotetrafluoroethane	ug/m3	ND	0.71	04/28/20 13:22	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

METHOD BLANK: 3601567 Matrix: Air

Associated Lab Samples: 10515976005, 10515976006, 10515976007, 10515976008, 10515976009, 10515976010, 10515976011, 10515976012, 10515976013, 10515976014, 10515976015, 10515976016, 10515976017

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Ethanol	ug/m3	ND	0.96	04/28/20 13:22	
Ethyl acetate	ug/m3	ND	0.37	04/28/20 13:22	
Ethylbenzene	ug/m3	ND	0.44	04/28/20 13:22	
Hexachloro-1,3-butadiene	ug/m3	ND	2.7	04/28/20 13:22	
m&p-Xylene	ug/m3	ND	0.88	04/28/20 13:22	
Methyl-tert-butyl ether	ug/m3	ND	1.8	04/28/20 13:22	
Methylene Chloride	ug/m3	ND	1.8	04/28/20 13:22	
n-Heptane	ug/m3	ND	0.42	04/28/20 13:22	
n-Hexane	ug/m3	ND	0.36	04/28/20 13:22	
Naphthalene	ug/m3	ND	1.3	04/28/20 13:22	
o-Xylene	ug/m3	ND	0.44	04/28/20 13:22	
Propylene	ug/m3	ND	0.18	04/28/20 13:22	
Styrene	ug/m3	ND	0.43	04/28/20 13:22	
Tetrachloroethene	ug/m3	ND	0.34	04/28/20 13:22	
Tetrahydrofuran	ug/m3	ND	0.30	04/28/20 13:22	
Toluene	ug/m3	ND	0.38	04/28/20 13:22	
trans-1,2-Dichloroethene	ug/m3	ND	0.40	04/28/20 13:22	
trans-1,3-Dichloropropene	ug/m3	ND	0.46	04/28/20 13:22	
Trichloroethene	ug/m3	ND	0.27	04/28/20 13:22	
Trichlorofluoromethane	ug/m3	ND	0.57	04/28/20 13:22	
Vinyl acetate	ug/m3	ND	0.36	04/28/20 13:22	
Vinyl chloride	ug/m3	ND	0.13	04/28/20 13:22	

LABORATORY CONTROL SAMPLE: 3601568

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1,1,1-Trichloroethane	ug/m3	57	55.0	96	70-130	
1,1,2,2-Tetrachloroethane	ug/m3	71.9	76.3	106	70-132	
1,1,2-Trichloroethane	ug/m3	57.3	55.9	98	70-133	
1,1,2-Trichlorotrifluoroethane	ug/m3	80.3	73.9	92	70-130	
1,1-Dichloroethane	ug/m3	42.7	39.0	91	70-130	
1,1-Dichloroethene	ug/m3	41.4	38.7	93	69-137	
1,2,4-Trichlorobenzene	ug/m3	156	157	101	70-130	
1,2,4-Trimethylbenzene	ug/m3	51.5	58.9	114	70-137	
1,2-Dibromoethane (EDB)	ug/m3	80.3	82.6	103	70-138	
1,2-Dichlorobenzene	ug/m3	63.1	65.0	103	70-136	
1,2-Dichloroethane	ug/m3	42.4	38.4	91	70-130	
1,2-Dichloropropane	ug/m3	48.6	45.5	94	70-132	
1,3,5-Trimethylbenzene	ug/m3	51.6	59.6	115	70-136	
1,3-Butadiene	ug/m3	23.3	30.1	129	67-139	
1,3-Dichlorobenzene	ug/m3	63.4	66.2	104	70-138	
1,4-Dichlorobenzene	ug/m3	63.4	66.8	105	70-145	
2-Butanone (MEK)	ug/m3	31.4	31.3	100	61-130	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

LABORATORY CONTROL SAMPLE: 3601568

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
2-Hexanone	ug/m3	42.8	49.5	116	70-138	
2-Propanol	ug/m3	119	142	119	70-136	
4-Ethyltoluene	ug/m3	52.4	63.8	122	70-142	
4-Methyl-2-pentanone (MIBK)	ug/m3	43.6	50.1	115	70-134	
Acetone	ug/m3	126	157	124	59-137	
Benzene	ug/m3	33.5	30.9	92	70-133	
Benzyl chloride	ug/m3	55.1	54.5	99	70-139	
Bromodichloromethane	ug/m3	71.5	75.7	106	70-130	
Bromoform	ug/m3	110	113	103	60-140	
Bromomethane	ug/m3	41.3	43.6	106	70-131	
Carbon disulfide	ug/m3	33.3	32.1	96	70-130	
Carbon tetrachloride	ug/m3	66.2	73.2	111	70-133	
Chlorobenzene	ug/m3	48.3	44.1	91	70-131	
Chloroethane	ug/m3	28.1	32.1	114	70-141	
Chloroform	ug/m3	51.1	51.2	100	70-130	
Chloromethane	ug/m3	21.9	24.7	113	64-137	
cis-1,2-Dichloroethene	ug/m3	41.6	37.2	89	70-132	
cis-1,3-Dichloropropene	ug/m3	47.7	51.9	109	70-138	
Cyclohexane	ug/m3	36.7	36.2	99	70-133	
Dibromochloromethane	ug/m3	90.7	109	120	70-139	
Dichlorodifluoromethane	ug/m3	51.6	46.4	90	70-130	
Dichlorotetrafluoroethane	ug/m3	72.7	88.7	122	65-133	
Ethanol	ug/m3	103	105	102	65-135	
Ethyl acetate	ug/m3	38.6	38.4	99	70-135	
Ethylbenzene	ug/m3	45.6	50.5	111	70-142	
Hexachloro-1,3-butadiene	ug/m3	112	111	100	70-134	
m&p-Xylene	ug/m3	91.2	99.7	109	70-141	
Methyl-tert-butyl ether	ug/m3	38.4	37.1	97	70-131	
Methylene Chloride	ug/m3	182	183	100	69-130	
n-Heptane	ug/m3	43.6	41.3	95	70-130	
n-Hexane	ug/m3	37.6	32.3	86	70-131	
Naphthalene	ug/m3	57.7	59.0	102	63-130	
o-Xylene	ug/m3	45.5	48.2	106	70-135	
Propylene	ug/m3	18.2	16.3	90	63-139	
Styrene	ug/m3	44.9	45.9	102	70-143	
Tetrachloroethene	ug/m3	71	64.6	91	70-136	
Tetrahydrofuran	ug/m3	31.5	30.9	98	70-137	
Toluene	ug/m3	39.5	42.2	107	70-136	
trans-1,2-Dichloroethene	ug/m3	42.2	38.4	91	70-132	
trans-1,3-Dichloropropene	ug/m3	47.7	56.8	119	70-139	
Trichloroethene	ug/m3	56.3	52.4	93	70-132	
Trichlorofluoromethane	ug/m3	59.7	61.5	103	65-136	
Vinyl acetate	ug/m3	34.5	40.2	117	66-140	
Vinyl chloride	ug/m3	26.7	26.5	99	68-141	

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

SAMPLE DUPLICATE: 3602278

Parameter	Units	10516023001 Result	Dup Result	RPD	Max RPD	Qualifiers
1,1,1-Trichloroethane	ug/m3	ND	ND		25	
1,1,2,2-Tetrachloroethane	ug/m3	ND	ND		25	
1,1,2-Trichloroethane	ug/m3	ND	ND		25	
1,1,2-Trichlorotrifluoroethane	ug/m3	ND	ND		25	
1,1-Dichloroethane	ug/m3	ND	ND		25	
1,1-Dichloroethene	ug/m3	ND	ND		25	
1,2,4-Trichlorobenzene	ug/m3	ND	ND		25	
1,2,4-Trimethylbenzene	ug/m3	2.7	2.8	6	25	
1,2-Dibromoethane (EDB)	ug/m3	ND	ND		25	
1,2-Dichlorobenzene	ug/m3	ND	ND		25	
1,2-Dichloroethane	ug/m3	ND	ND		25	
1,2-Dichloropropane	ug/m3	ND	ND		25	
1,3,5-Trimethylbenzene	ug/m3	ND	ND		25	
1,3-Butadiene	ug/m3	ND	ND		25	
1,3-Dichlorobenzene	ug/m3	ND	ND		25	
1,4-Dichlorobenzene	ug/m3	13.8	13.5	2	25	
2-Butanone (MEK)	ug/m3	9.5	9.8	3	25	
2-Hexanone	ug/m3	ND	ND		25	
2-Propanol	ug/m3	106	114	7	25	
4-Ethyltoluene	ug/m3	ND	.91J		25	
4-Methyl-2-pentanone (MIBK)	ug/m3	ND	2J		25	
Acetone	ug/m3	51.3	57.3	11	25	
Benzene	ug/m3	28.0	27.9	0	25	
Benzyl chloride	ug/m3	ND	ND		25	
Bromodichloromethane	ug/m3	ND	ND		25	
Bromoform	ug/m3	ND	ND		25	
Bromomethane	ug/m3	ND	ND		25	
Carbon disulfide	ug/m3	5.8	6.0	2	25	
Carbon tetrachloride	ug/m3	ND	ND		25	
Chlorobenzene	ug/m3	ND	ND		25	
Chloroethane	ug/m3	ND	ND		25	
Chloroform	ug/m3	ND	ND		25	
Chloromethane	ug/m3	2.0	1.8	10	25	
cis-1,2-Dichloroethene	ug/m3	ND	ND		25	
cis-1,3-Dichloropropene	ug/m3	ND	ND		25	
Cyclohexane	ug/m3	22.9	23.8	4	25	
Dibromochloromethane	ug/m3	ND	ND		25	
Dichlorodifluoromethane	ug/m3	20.5	19.7	4	25	
Dichlorotetrafluoroethane	ug/m3	ND	ND		25	
Ethanol	ug/m3	19.4	21.5	11	25	
Ethyl acetate	ug/m3	ND	ND		25	
Ethylbenzene	ug/m3	19.8	20.2	2	25	
Hexachloro-1,3-butadiene	ug/m3	ND	ND		25	
m&p-Xylene	ug/m3	11.6	11.4	1	25	
Methyl-tert-butyl ether	ug/m3	ND	ND		25	
Methylene Chloride	ug/m3	ND	2.2J		25	
n-Heptane	ug/m3	29.7	29.0	2	25	

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

SAMPLE DUPLICATE: 3602278

Parameter	Units	10516023001 Result	Dup Result	RPD	Max RPD	Qualifiers
n-Hexane	ug/m3	62.8	62.5	1	25	
Naphthalene	ug/m3	ND	ND		25	
o-Xylene	ug/m3	4.7	4.8	1	25	
Propylene	ug/m3	494	500	1	25	E
Styrene	ug/m3	2.1	2.1	3	25	
Tetrachloroethene	ug/m3	ND	.68J		25	
Tetrahydrofuran	ug/m3	ND	ND		25	
Toluene	ug/m3	47.2	46.8	1	25	
trans-1,2-Dichloroethene	ug/m3	ND	ND		25	
trans-1,3-Dichloropropene	ug/m3	ND	ND		25	
Trichloroethene	ug/m3	ND	ND		25	
Trichlorofluoromethane	ug/m3	13.7	14.2	4	25	
Vinyl acetate	ug/m3	ND	ND		25	
Vinyl chloride	ug/m3	ND	ND		25	

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

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALIFIERS

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

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

E	Analyte concentration exceeded the calibration range. The reported result is estimated.
N	The reported TIC has an 85% or higher match on a mass spectral library search.

Pace Analytical Services, LLC
1700 Elm Street - Suite 200
Minneapolis, MN 55414
(612)607-1700

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: B1500394.03 Roof Depot
Pace Project No.: 10515976

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
10515976001	**SV-3**	TO-15	672416		
10515976002	**SV-4**	TO-15	672416		
10515976003	**SV-5**	TO-15	672416		
10515976004	**SV-6**	TO-15	672416		
10515976005	**SV-7**	TO-15	672425		
10515976006	**SV-8**	TO-15	672425		
10515976007	**SV-9**	TO-15	672425		
10515976008	**SV-10**	TO-15	672425		
10515976009	**SV-11**	TO-15	672425		
10515976010	**SV-12**	TO-15	672425		
10515976011	**SV-13**	TO-15	672425		
10515976012	**SV-14**	TO-15	672425		
10515976013	**SV-15**	TO-15	672425		
10515976014	**SV-16**	TO-15	672425		
10515976015	**SV-17**	TO-15	672425		
10515976016	**SV-18**	TO-15	672425		
10515976017	**SV-19**	TO-15	672425		

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AIR: CHAIN-OF-CUSTODY / Analytical Request Document

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

44999

Page: 1 of 2

Section A Required Client Information:

Company: Braun Intertec
Address: 11001 Hampshire Ave S
Minneapolis MN 55438
Email To: JMichael@braunintertec.com
Phone: 6122141638 Fax:
Requested Due Date/TAT: Standard

Section B Required Project Information:

Report To: Justin Michael
Copy To:
Purchase Order No.:
Project Name: Roof Depot
Project Number: B1200394.03

Section C Invoice Information:

Attention: SAME
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager/Sales Rep.
Pace Profile #: 35451

Program: ☐ UST ☐ Superfund ☐ Emissions ☐ Clean Air Act ☐ Voluntary Clean Up ☐ Dry Clean ☐ RCRA ☐ Other

Location of Sampling by State: MN

Reporting Units: ug/m³ mg/m³ PPBV PPMV Other

Report Level: II. III. IV. Other

Section D Required Client Information

AIR SAMPLE ID
Sample IDs MUST BE UNIQUE

Valid Media Codes: MEDIA / CODE — Tedlar Bag TB; 1 Liter Summa Can 1LC; 6 Liter Summa Can 6LC; Low Volume Puff LVP; High Volume Puff HVP; Other PM10

ITEM #	AIR SAMPLE ID	MEDIA CODE	PID Reading (Client only)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	Canister Pressure (Initial Field - in Hg)	Canister Pressure (Final Field - In Hg)	Summa Can Number	Flow Control Number	Method: TO-14	Pace Lab ID
1	SV-3	1LC	0.8	4/23	1134	4/23	1140	-28	-4	37352	23788	X	001
2	SV-4		1.4	4/23	1112	4/23	1119	-28	-4	39281	16677		002
3	SV-5		1.1	4/23	1050	4/23	1056	-30	-3	39702	23533		003
4	SV-6		0.9	4/23	906	4/23	912	-28	-4	37611	18554		004
5	SV-7		0.5	4/23	837	4/23	859	-27	-4	37911	18211		005
6	SV-8		0.9	4/23	1204	4/23	1211	-28	-3	30571	16177		006
7	SV-9		1.3	4/23	1227	4/23	1233	-29	-3	06919	18111		007
8	SV-10		0.4	4/24	813	4/24	820	-30	-4	24492	24556		008
9	SV-11		0.7		835		846	-28	-2	30160	71919		009
10	SV-12		0.4		902		910	-27	-3	25590	62626		010
11	SV-13		0.6		924		931	-28	-3	39401	61610		011
12	SV-14		0.2		947		954	-29	-3	24921	51516		012

Comments:

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Megan Ulleny / Braun Intertec	4/24	1120	[illegible] / Pace	4/24/2020	12:00
[illegible] / Pace	4/24/2020	12:00	Charles D / Pace	4-24-20	1550
Charles D / Pace	4-24-20	1635	[illegible] / Pace	4/24/20	16:35

SAMPLE CONDITIONS

Temp in °C	Received on Ice	Custody Sealed Cooler	Samples Intact
-	Y/N	Y/N	N/A
	Y/N	Y/N	N/A
-	Y/N	Y/N	N/A

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Megan Ulleny
SIGNATURE of SAMPLER:
DATE Signed (MM / DD / YY): 04/24/20

WO#: 10515976

10515976

Air Technical Phone: 612.607.6386

FC046Rev.01, 03Feb2010

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AIR: CHAIN-OF-CUSTODY / Analytical Request Document

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

45000

Section A Required Client Information:

Company: Braun Intertec
Address: 11001 Hampshire Ave S
Minneapolis, MN 55438
Email To: jmichael@braunintertec.com
Phone: 6122141638 Fax:
Requested Due Date/TAT: Standard

Section B Required Project Information:

Report To: Justin Michael
Copy To:
Purchase Order No.:
Project Name: Roof Depot
Project Number: B1500394.03

Section C Invoice Information:

Attention: SAME
Company Name:
Address:
Pace Quote Reference:
Pace Project Manager/Sales Rep.
Pace Profile #:

Program: ☐ UST ☐ Superfund ☐ Emissions ☐ Clean Air Act ☐ Voluntary Clean Up ☐ Dry Clean ☐ RCRA ☐ Other

Location of Sampling by State: MN

Reporting Units: ug/m³ ___ mg/m³ ___ PPBV ___ PPMV ___ Other ___

Report Level: II. ___ III. ___ IV. ___ Other ___

Section D Required Client Information

AIR SAMPLE ID
Sample IDs MUST BE UNIQUE

Valid Media Codes

MEDIA	CODE
Tedlar Bag	TB
1 Liter Summa Can	1LC
6 Liter Summa Can	6LC
Low Volume Puff	LVP
High Volume Puff	HVP
Other	PM10

ITEM #	Section D Required Client Information (AIR SAMPLE ID)	MEDIA CODE	PID Reading (Client only)	COLLECTED COMPOSITE START DATE	COLLECTED COMPOSITE START TIME	COLLECTED COMPOSITE END/GRAB DATE	COLLECTED COMPOSITE END/GRAB TIME	Canister Pressure (Initial Field - In Hg)	Canister Pressure (Final Field - In Hg)	Summa Can Number	Flow Control Number	Method: PM10	3C - Fixed Gas (%)	TO-3 BTEX	TO-3M (Methane)	TO-14	TO-15 Full List VOCs	TO-15 Short List BTEX	TO-15 Short List Chlorinated	TO-15 Short List (other)	Pace Lab ID
1	SV-15	1LC	0.3	4/23	1006	4/23	1014	-29	-3	3727	16477										013
2	SV-16	1	0.3	4/24	1038	4/24	1021	-29	-2	2889	08166										014
3	SV-17	1	0.4	4/24	1041	4/24	1047	-27	-3	2529	16350										015
4	SV-18	1	0.6	4/23	941	4/23	949	-29	-3	3767	11988										016
5	SV-19	↓	1.2	4/23	1029	4/23	1035	-27	-4	3748	16500										017
6																					
7																					
8																					
9																					
10																					
11																					
12																					

Comments :

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Megan Ulleg/Braun Intertec	4/24	1120	Pace	4/24/2020	12:00
Pace	4/24/2020	12:00	Client	4.24.20	1550
Client	4.24.20	1635	Pace	4/24/20	16:35

SAMPLE CONDITIONS

	Temp in °C	Received on Ice Y/N	Custody Sealed Cooler Y/N	Samples Intact Y/N
–		Y/N	Y/N	Y/N
		Y/N	Y/N	Y/N
A		Y/N	Y/N	Y/N
		Y/N	Y/N	Y/N

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Megan Ulleg

SIGNATURE of SAMPLER:

DATE Signed (MM / DD / YY): 04/24/20

ORIGINAL

Pace Analytical®	Document Name: Air Sample Condition Upon Receipt	Document Revised: 19Nov2019 Page 1 of 1
	Document No.: F-MN-A-106-rev.20	Pace Analytical Services - Minneapolis

Air Sample Condition Upon Receipt

Client Name: Braun

Project #: WO#: 10515976

Courier: ☐Fed Ex ☐UPS ☐USPS ☐Client ☒Pace ☐SpeeDee ☐Commercial See Exception ☐

PM: BM2 Due Date: 05/01/20

CLIENT: Braun-BLM

Tracking Number: _____

Custody Seal on Cooler/Box Present? ☐Yes ☒No **Seals Intact?** ☐Yes ☐No

Packing Material: ☐Bubble Wrap ☐Bubble Bags ☐Foam ☒None ☐Tin Can ☐Other:_____ **Temp Blank rec:** ☐Yes ☒No

Temp. (TO17 and TO13 samples only) (°C): — **Corrected Temp (°C):** —

Thermometer Used: ☐G87A9170600254 ☐G87A9155100842

Temp should be above freezing to 6°C **Correction Factor:** —

Date & Initials of Person Examining Contents: 4/27/20 MI

Type of ice Received ☐Blue ☐Wet ☒None

		Comments:
Chain of Custody Present?	☒Yes ☐No	1.
Chain of Custody Filled Out?	☒Yes ☐No	2.
Chain of Custody Relinquished?	☒Yes ☐No	3.
Sampler Name and/or Signature on COC?	☒Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time?	☒Yes ☐No	5.
Short Hold Time Analysis (<72 hr)?	☐Yes ☒No	6.
Rush Turn Around Time Requested?	☐Yes ☒No	7.
Sufficient Volume?	☒Yes ☐No	8.
Correct Containers Used? **(Tedlar bags not acceptable container for TO-14, TO-15 or APH)** -Pace Containers Used?	☒Yes ☐No ☒Yes ☐No	9.
Containers Intact? **(visual inspection/no leaks when pressurized)**	☒Yes ☐No	10.
Media: Air Can Airbag Filter TDT Passive		11. Individually Certified Cans Y (N) (list which samples)
Is sufficient information available to reconcile samples to the COC?	☒Yes ☐No	12.
Do cans need to be pressurized? **(DO NOT PRESSURIZE 3C or ASTM 1946!!!)**	☒Yes ☐No	13.

Gauge # ☐10AIR26 ☒10AIR34 ☐10AIR35 ☐4097

Canisters					Canisters				
Sample Number	Can ID	Flow Controller	Initial Pressure	Final Pressure	Sample Number	Can ID	Flow Controller	Initial Pressure	Final Pressure
SV-3	3735	2378	-4.5	+10	SV-11	3016	719	+0.5	+10
SV-4	3928	1667	-2.5		SV-12	2559	626	-2	
SV-5	3970	2353	-5		SV-13	3940	1610	-1.5	
SV-6	3761	1854	-2.5		SV-14	2492	1516	-1	
SV-7	3791	1821	-3.5		SV-15	3727	1647	-1	
SV-8	3057	1617	-2		SV-16	2889	816	-0.5	
SV-9	919	1811	-1.5		SV-17	2529	1635	-2.5	
SV-10	2449	2456	-2.5		SV-18	3767	1198	-1	
					SV-19	3748	1650	-3.5	

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

Person Contacted: _____ Date/Time: _____

Comments/Resolution: _____

Project Manager Review: BM **Date:** 4/28/2020

Pace Analytical®

Document Name:
Service Center Transfer Checklist
Document Number:
ENV-FRM-MIN4-0135 Rev.00

Document Revised: 26Mar2020
Page 1 of 1
Pace Analytical Services -
Minneapolis

Service Center Transfer Checklist

Service Center: MPLS ☐ BLM ☒ AZ ☐

Client: Braun Intertec

Destination Lab: MPLS ☒ VM ☐ Duluth ☐

National ☐ Other _____

Received w/ Custody Seal ? Yes ☐ No ☒

Custody Seal Intact ? Yes ☐ No ☒

	Temp Read	Corr. Factor	Corr. Temp
Temperature °C	—	True	—

IR Gun: B88A0143310092 ☐ Samples on ice, in cool down

Rush ☐ **Short Hold** ☐ **N/A** ☒

Containers Intact ? Yes ☒ No ☐

Repacked and Re-Iced ? Yes ☐ No ☒

Notes: _____

Appendix B

References

Peer Engineering, Inc., *Groundwater Monitoring Report – November 2006 and May 2007 Sample Events, Hiawatha Business Center, 2020 East 28th Street, Minneapolis, Minnesota,* MDA Case File No. 95-0100B, dated October 2007.

Peer Engineering, Inc., *Groundwater Monitoring Report – December 2013 Sample Event, Hiawatha Business Center, 2020 East 28th Street, Minneapolis, Minnesota,* MDA Case File No. 95-0100B, dated February 2014.

Braun Intertec Corporation, *Phase I Environmental Site Assessment, Roof Depot, 1860 East 28th Street & 2717 Longfellow Avenue, Minneapolis, Minnesota*, Project Number B1500394, dated April 6, 2015.

Braun Intertec Corporation, *Phase II Environmental Site Assessment, Roof Depot, 1860 East 28th Street & 2717 Longfellow Avenue, Minneapolis, Minnesota*, Project Number B1500394, dated April 21, 2015.

Braun Intertec Corporation, *Test Pit Investigation Report, Roof Depot, 1860 East 28th Street & 2717 Longfellow Avenue, Minneapolis, Minnesota*, Project Number B1500394.00, dated January 5, 2016.

Attachment C

Hazardous Building Materials Inspection Report

AET Project No. 03-21225

Hazardous Building Materials Inspection Report

Commercial Building – Roof Depot Site
1860 28th Street
Minneapolis, Minnesota

Prepared for

City of Minneapolis

Project B1500394
April 7, 2015

Braun Intertec Corporation

BRAUN INTERTEC
The Science You Build On.

Braun Intertec Corporation
11001 Hampshire Avenue S
Minneapolis, MN 55438

Phone: 952.995.2000
Fax: 952.995.2020
Web: braunintertec.com

April 7, 2015

Project B1500394

Mr. Chris Backes
City of Minneapolis
309 2nd Avenue South, Suite 300
Minneapolis, MN 55401

Re: Hazardous Building Materials Inspection Report
Commercial Building – Roof Depot Site
1860 28th Street
Minneapolis, Minnesota

Dear Mr. Backes:

The enclosed report provides the results of the hazardous building materials inspection conducted on March 25-26, 2015 at the commercial building located 1860 28th Street in Minneapolis, Minnesota (site). Braun Intertec Corporation was authorized to provide a hazardous building material inspection in accordance with our Proposal QTB013985 dated December 11, 2014.

The following outline provides the structure of the report.

- Scope of Services
- Site Description
- Results
- Discussion
- Limitations

If you have any questions or need further assistance, please call Jerry Wallerius at 952.995.2478 or Robert Nordby at 952.995.2424.

Sincerely,

BRAUN INTERTEC CORPORATION

for Gerald J. Wallerius, CHMM
Project Scientist

Robert E. Nordby
Associate Principal – Senior Scientist

Attachment:
Hazardous Building Materials Inspection Report

AA/EOE

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Description **Page**

Appendices

A. Scope of Services

The scope of our services was limited to:

- Visually examine accessible areas and identify the locations of suspect asbestos-containing materials (ACM), lead, poly-chlorinated biphenyls (PCBs), mercury, and other miscellaneous hazardous materials.
- Collect and analyze representative bulk samples of materials suspected of containing asbestos.
- Conduct limited lead-based paint testing of painted surfaces suspected of containing lead. Testing will be accomplished using a Niton X-ray fluorescence (XRF) spectrum analyzer.
- Assign a hazard rating based on asbestos content with respect to the materials condition, friability, accessibility, and hazard potential.
- Document the various materials current conditions and quantities of ACM.
- Generate a final report, documenting the sample locations, analysis results, conditions, and ACM quantities.

B. Site Description

The subject Site included the commercial building (Roof Depot Site) located at 1860 28th Street in Minneapolis, Minnesota. The building is a one story with a basement boiler room has an approximate footprint of 201,000 square feet and was built in 1947. The typical interior finishes included sheetrock/joint compound, plaster, lay-in ceiling panels, floor tile, and carpeting. The typical exterior finish was brick with metal fascia and soffits and newer metal framed windows. The roofing material was rubber membrane with stone. The property was occupied at the time of this inspection.

C. Results

C.1. Asbestos

A total of 66 bulk samples were collected on March 25-26, 2015 and submitted to Pace Analytical, Inc. for Polarized Light Microscopy (PLM) analysis.

C.1.a. Asbestos-Containing Materials

The following is a summary of materials found or assumed to contain greater than one percent asbestos (ACMs by regulatory definition).

- Exterior boiler insulation contains 60 percent chrysotile (asbestos).
- Boiler breeching insulation contains 60 percent chrysotile and 10 percent amosite (asbestos).
- Silver exterior boiler brick insulation contains 5 percent chrysotile.
- 1” – 6” felt with tar paper and fibrous layer pipe insulation contains 40 percent chrysotile in the tar paper layer and 60 percent chrysotile in the fibrous layer.
- 1” – 6” pipe fitting insulation on felt with tar paper and fibrous layer insulated piping contains 15 percent chrysotile and 10 percent amosite.
- 1” – 6” air cell pipe insulation contains 60 percent chrysotile.
- 1” – 6” pipe fitting insulation on air cell insulated piping contains 5 percent chrysotile and 10 percent amosite.
- 7” – 12” air cell pipe insulation contains 70 percent chrysotile.
- 7” – 12” pipe fitting insulation on air cell insulated piping contains 20 percent chrysotile and 10 percent amosite.
- 13” – 20” air cell pipe insulation (including header and main steam lines) contains 70 percent chrysotile.
- 13” – 20” pipe fitting insulation on air cell insulated piping (including header and main steam lines) contains 20 percent chrysotile and 10 percent amosite.
- 13” – 20” boiler header pipe insulation contains 5 percent chrysotile and 10 percent amosite.
- 24” heat exchanger tank insulation contains 70 percent chrysotile.
- 9” x 9” brown floor tile contains 7 percent chrysotile.
- 12” x 12” red floor tile cross-contaminated by the associated black mastic contains 7 percent chrysotile.
- Transite panels/pieces contain 12 percent chrysotile.
- Interior boiler lining – assumed due to sampling constraints.
- Boiler gasket material – assumed due to sampling constraints.
- Roofing materials - assumed due to sampling constraints.

C.1.b. Non-Asbestos-Containing Materials

The following is a summary of building materials found to contain no asbestos or materials that contain one percent or less asbestos (non-ACMs by regulatory definition).

- Interior boiler refractory
- Boiler brick
- Sheetrock/joint compound
- Plaster
- Tan ceramic floor tile with grout
- White ceramic wall tile with grout
- Gray ceramic floor tile with grout
- 2’ x 4’ ceiling panels pitted
- 12” x 12” tan floor tile with adhesive
- 12” x 12” gray floor tile with adhesive
- 12” x 12” gray with white floor tile with adhesive
- Tan vinyl base with adhesive
- Gray vinyl base with adhesive
- Gray duct seam sealer
- Tan brown carpet adhesive
- White sink undercoating
- Interior and exterior gray and brown rubbery window frame caulking
- Exterior gray door frame caulking

Refer to Table I in Appendix A, which lists individual functional spaces of the building, the suspect materials identified in that functional space, whether the suspect material was identified by analysis to be an ACM, an estimated amount of each suspect material for the functional space, and includes condition, assessment categories and hazard ratings based on subjective observations made by our representatives.

Bulk asbestos analysis was conducted in accordance with the Environmental Protection Agency's (EPA) Method 40 CFR, Chapter 1, Part 763, Subpart F, and Appendix A (7/1/87 Edition). Refer to Appendix B for Table II, which lists the homogenous material sample numbers, sample locations, suspect material descriptions, and the analysis results for each sample. This table summarizes the results from the Bulk Asbestos Laboratory Report, which is attached in Appendix D.

Bulk asbestos analysis was conducted in accordance with the EPA Method 40 CFR, Chapter 1, Part 763, Subpart F, and Appendix A (7/1/87 Edition). Bulk samples are retained at the laboratory for 60 days and then disposed of, unless instructed otherwise. Detailed quality-control information is available upon request.

C.2. Lead-Based Paint

Braun Intertec Corporation performed limited lead-based paint testing on March 25, 2015. A total of 50 XRF tests were performed on painted surfaces. The EPA and Minnesota Department of Health (MDH) define "lead-based paint" as equal to or greater than 1.0 milligram per square centimeter (mg/cm^2) via XRF analysis. The following painted surface had lead-based paint.

- Red water tower metal framing
- Gray metal fire door
- Gray metal fire door frame
- Blue metal stair railing
- Gray wood door frame
- Tan steel beams
- Red steel beams
- Tan metal ceiling decking
- Blue steel columns
- White steel columns
- Yellow steel columns
- Red steel columns
- White large metal garage door
- Red exterior metal corner guard
- Red exterior steel beam

The U.S. Occupational Safety and Health Administration (OSHA) Lead in Construction Standard 29 CFR 1926.62 applies to all situations where employees are engaged in the disturbance of lead-containing coatings, regardless of the quantity of lead involved. Therefore, any XRF result above 0.0 mg/cm^2 is considered "lead-containing coatings" in order to be in compliance with the OSHA standard. The following painted surfaces had lead-containing paint.

- Red concrete floor
- Green concrete block wall
- White concrete block wall

- Silver boiler insulation
- Silver steel ladder
- Blue concrete wall
- Gray concrete floor
- Gray wood door
- White brick wall
- Yellow striped concrete floor
- Gray wall plaster
- Tan wall plaster
- Red exterior steel overhang

Refer to Table III. Lead-Based Paint Testing Results in Appendix C, which lists the sample numbers (1 through 53), sample locations, component descriptions, XRF field results, and the paint condition for each sample.

Field screening for lead-based paint was accomplished utilizing a XRF field portable analyzer, Model No. XLP703 (Serial No. 26139) equipped with a 40-milocurie CD-109 Source Model #XFB-3 installed on November 1, 2014.

C.3. Miscellaneous Regulated Waste

A visual inspection for miscellaneous regulated waste materials that require separate handling and disposal prior to disturbance during building renovation/demolition was also performed as part of this assessment. The following is a list of items documented at the Site:

- Emergency lighting systems
- Exit signs
- Security systems and alarms
- Fluorescent lights
- High intensity discharge lamps
- Boilers with controls
- Firestats
- Manometers
- Gauges
- Space heater controls
- Mercury thermostats
- Microwave oven
- Television sets
- Water heater
- Door closers
- Fuel oil tanks
- Grease
- Motors
- Motor oil
- Lubricating oil
- Gasket remover
- Chain lube
- Air compressor

- Lead acid batteries
- Exit signs
- Security Systems
- Fire extinguishers
- Roof top air conditioners
- In wall air conditioner units
- Water fountains
- Refrigerator/freezers
- Vending machines
- Food display cases
- Light ballasts
- Transformers
- Electrical panels
- Fuses
- Switch gear
- Pumps and motors
- Used oil
- Bio hazard storage container
- Automotive parts/chemicals
- Computer equipment
- Gasoline containers
- Meters
- Miscellaneous cleaning supplies
- Overhead garage door openers
- Paint
- Paint thinner
- Polyurethane
- Solvents
- Spray paint
- Stains
- Tires
- Boiler chemicals
- Propane tanks
- Diesel fuel container
- Snow blower
- Parts degreaser

D. Discussion

D.1. Asbestos-Containing Materials

D.1.a. Friable ACM

The following ACMs are classified as friable materials according to EPA 40 CFR Part 61 National Emission Standard for Hazardous Air Pollutants (NESHAPs):

- Exterior boiler insulation
- Boiler breeching insulation
- Silver exterior boiler brick insulation
- 1” – 6” felt with tar paper and fibrous layer pipe insulation
- 1” – 6” pipe fitting insulation on felt with tar paper and fibrous layer insulated piping
- 1” – 6” air cell pipe insulation
- 1” – 6” pipe fitting insulation on air cell insulated piping

- 7” – 12” air cell pipe insulation
- 7” – 12” pipe fitting insulation on air cell insulated piping
- 13” – 20” air cell pipe insulation (including header and main steam lines)
- 13” – 20” pipe fitting insulation on air cell insulated piping (including header and main steam lines)
- 13” – 20” boiler header pipe insulation
- 24” heat exchanger tank insulation
- Interior boiler lining – assumed due to sampling constraints.

Approximately 8-feet of damaged 1” – 6” felt with tar paper and fibrous layer pipe insulation was observed on the boiler room floor at the time of our assessment. In addition, approximately 10-feet of damaged 13” – 20” air cell pipe insulation was observed north warehouse area. These materials should be repaired and maintained in good condition to prevent potential exposure to asbestos. The remaining friable ACM’s were observed to be in good condition at the time of our assessment. Friable ACMs are to be removed prior to disturbance by renovation/demolition in accordance with applicable state and federal regulations.

D.1.b. Category I Non-Friable ACM

The following ACMs are classified as Category I non-friable materials according to EPA 40 CFR Part 61 National Emission Standard for Hazardous Air Pollutants (NESHAPs):

- 9” x 9” brown floor tile
- 12” x 12” red floor tile cross-contaminated by the associated black mastic
- Boiler gasket material – assumed due to sampling constraints.
- Roofing materials – assumed due to sampling constraints.

The above Category I non-friable ACMs were observed to be in good condition at the time of our assessment. These materials should be maintained in good condition to prevent potential exposure to asbestos. Category I non-friable ACMs are not considered a hazard unless cut, drilled, sanded, or otherwise abraded. However, any Category I material that may become friable during demolition must be removed prior to that activity. Category I materials in good condition may be left in place for demolition. However, if left in place, the crushing or recycling of demolition debris is strictly prohibited. In addition, all demolition debris containing Category I materials must be disposed of at a landfill specifically permitted to accept this type of waste.

D.1.c. Category II Non-Friable ACM

The following ACM is classified as a Category II non-friable material according to EPA NESHAPs:

- Transite panels and pieces

The above Category II non-friable ACM was observed to be in fair condition at the time of our assessment. These materials should be maintained in good condition to prevent potential exposure to asbestos. Category II non-friable ACMs are not considered a hazard unless cut, drilled, sanded, or otherwise abraded. However, Category II non-friable ACMs are to be removed prior to disturbance by demolition in accordance with applicable state and federal regulations.

D.2. Lead-Based Paint

The U.S. Occupational Safety and Health Administration (OSHA) Lead in Construction Standard 29 CFR 1926.62 applies to all situations where employees are engaged in the disturbance of lead-containing coatings, regardless of the quantity of lead involved. Therefore, any XRF result above 0.0 mg/cm^2 is considered "lead-containing coatings" in order to be in compliance with the OSHA standard. Renovation/demolition of the building may involve disturbing lead-containing coatings. Contractors should be informed of the presence of lead coatings and that they will be required to comply with the OSHA lead standard.

D.3. Miscellaneous Regulated Waste

In the case of building renovation/demolition, any of the miscellaneous regulated waste items listed in Section C.3 that will be disturbed, must be removed prior to disturbance and must be recycled or disposed of in accordance with state and federal guidelines. In addition, all solid waste must be disposed of accordingly.

E. Limitations

In any building, the potential exists for hazardous building materials to be located inside walls, above ceilings, under floors, and other inaccessible areas. This inspection was limited to areas available for observation via non-destructive means. Therefore, Braun Intertec cannot be held responsible for the presence of any such hidden materials. In the case of building renovation or demolition, a more thorough destructive investigation should be completed prior to any disturbance.

Note: The rubber membrane roofing materials and associated sub layers were not sampled for asbestos content as part of this evaluation in order to maintain the integrity of the roof seal. The assumed ACM roofing materials should be sampled for asbestos content prior to building renovation/demolition.

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

F. Asbestos Building Inspector Certification

I, the undersigned, do hereby certify that I am an accredited Asbestos Building Inspector in the State of Minnesota. A photocopy of my current asbestos building inspector certificate is attached in Appendix E.

Signature: _____ Date: 4/8/15

for Gerald J. Wallerius, CHMM
Project Scientist
Minnesota Department of Health Asbestos Inspector No: AI2305

Appendix A

Table I. Asbestos Building Inspection Results

BRAUN INTERTEC
The Science You Build On.

Table I. Asbestos Building Inspection Results

Client: City of Minneapolis
Location: 1860 28th Street; Minneapolis, Minnesota
Date of Inspection: March 25-26, 2015
Project: B1500394

Functional Space	Homogeneous Material Description	Contains Asbestos (Yes/No)	Ref. Client Sample No. (See Table II)	Estimated Quantity Units	Material Condition[1]	Hazard Category[2]
Boiler Room (3 Boilers)	**Exterior boiler insulation**	**Yes**	**1A-C**	**5,200 ft.²**	**ND**	**2**
Boiler Room (3 Boilers)	**Boiler breeching insulation**	**Yes**	**2A-C**	**2,200 ft.²**	**ND**	**2**
Boiler Room (3 Boilers)	Interior boiler refractory	No	3A-C	1,200 ft.²	ND	0
Boiler Room (3 Boilers) Under Refractory	**Interior boiler lining**	**Assume**	**No Sample Taken**	**1,200 ft.²**	**ND**	**2**
Boiler Room (3 Boilers)	**Boiler gasket material**	**Assume**	**No Sample Taken**	**120 lin. ft.**	**ND**	**2**
Boiler Room (3 Boilers)	Boiler brick	No	4	1,500 ft.²	ND	0
Boiler Room (3 Boilers)	**Exterior boiler brick insulation (silver)**	**Yes**	**5A-C**	**1,500 ft.²**	**ND**	**2**
Boiler Room	**1"-6" pipe insulation - felt with tar paper & fibrous layer**	**Yes**	**6A-C**	**200 lin. ft.**	**ND**	**2**
Boiler Room	**1"-6" pipe-fitting insulation on felt with tar paper pipe insulation**	**Yes**	**7A-C**	**30 fittings**	**ND**	**2**
Boiler Room - On Floor	**1"-6" pipe insulation - felt with tar paper & fibrous layer**	**Yes**	**6A-C**	**8 lin. ft.**	**D**	**4**
Boiler Room	**1"-6" pipe insulation - air cell**	**Yes**	**8A-C**	**500 lin. ft.**	**ND**	**2**
Boiler Room	**1"-6" pipe-fitting insulation on air cell pipe insulation**	**Yes**	**9A-C**	**180 fittings**	**ND**	**2**
Boiler Room	**7"-12" Pipe insulation - air cell**	**Yes**	**10A-C**	**200 lin. ft.**	**ND**	**2**
Boiler Room	**7"-12" pipe-fitting insulation on air cell pipe insulation**	**Yes**	**11A-C**	**40 fittings**	**ND**	**2**
Boiler Room - Including Header and Main Steam Line	**13"-20" Pipe insulation - air cell**	**Yes**	**12A-C**	**120 lin. ft.**	**ND**	**2**

Table I. Asbestos Building Inspection Results
1860 28th Street; Minneapolis, Minnesota
Project B1500394
Page 2

Functional Space	Homogeneous Material Description	Contains Asbestos (Yes/No)	Ref. Client Sample No. (See Table II)	Estimated Quantity Units	Material Condition[1]	Hazard Category[2]
Boiler Room - Including Header and Main Steam Line	**13"-20" pipe-fitting insulation on air cell pipe insulation**	**Yes**	**13A-C**	**20 fittings**	**ND**	**2**
Fuel Oil Tank Room	**7"-12" Pipe insulation - air cell**	**Yes**	**10A-C**	**230 lin. ft.**	**ND**	**2**
Fuel Oil Tank Room	**7"-12" pipe-fitting insulation on air cell pipe insulation**	**Yes**	**11A-C**	**50 fittings**	**ND**	**2**
Boiler Room & Fuel Tank Room	Metal/wood core fire doors	No	---	3 doors	ND	0
Hazardous Materials Office/Storage Area	Sheetrock/Joint compound	No	14	800 ft.²	ND	0
Hazardous Materials Storage Restroom	Ceramic floor tile (tan) with grout	No	15	75 ft.²	ND	0
Hazardous Materials Storage Restroom	Ceramic (white) wall tile with grout	No	16	200 ft.²	ND	0
Hazardous Materials Storage Area	Metal/wood core fire doors	No	---	100 lin. ft.	ND	0
Hazardous Materials Storage Area	**1"-6" pipe insulation - air cell**	**Yes**	**8A-C**	**100 lin. ft.**	**ND**	**2**
Hazardous Materials Storage Area	**1"-6" pipe-fitting insulation on air cell pipe insulation**	**Yes**	**9A-C**	**4 fittings**	**ND**	**2**
South Warehouse Area, Offices & Showroom (Plus Above Ceilings)	**1"-6" pipe insulation - felt with tar paper & fibrous layer**	**Yes**	**6A-C**	**850 lin. ft.**	**ND**	**2**
South Warehouse Area, Offices & Showroom (Plus Above Ceilings)	**1"-6" pipe-fitting insulation on felt with tar paper pipe insulation**	**Yes**	**7A-C**	**120 fittings**	**ND**	**2**
South Warehouse Area, Offices & Showroom (Plus Above Ceilings)	**1"-6" pipe insulation - air cell**	**Yes**	**8A-C**	**2,110 lin. ft.**	**ND**	**2**
South Warehouse Area, Offices & Showroom (Plus Above Ceilings)	**1"-6" pipe-fitting insulation on air cell pipe insulation**	**Yes**	**9A-C**	**300 fittings**	**ND**	**2**
South Warehouse Area, Offices & Showroom (Plus Above Ceilings)	**13"-20" Pipe insulation - air cell**	**Yes**	**12A-C**	**400 lin. ft.**	**ND**	**2**

Table I. Asbestos Building Inspection Results
1860 28th Street; Minneapolis, Minnesota
Project B1500394
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Functional Space	Homogeneous Material Description	Contains Asbestos (Yes/No)	Ref. Client Sample No. (See Table II)	Estimated Quantity Units	Material Condition[1]	Hazard Category[2]
South Warehouse Area, Offices & Showroom (Plus Above Ceilings)	**13"-20" pipe-fitting insulation on air cell pipe insulation**	**Yes**	**13A-C**	**12 fittings**	**ND**	**2**
South Warehouse Area, Offices	**13"-20" Pipe insulation - air cell**	**Yes**	**12A-C**	**200 ft.²**	**ND**	**2**
South Warehouse Area, Offices	**9"x 9" floor tile (brown) with black mastic**	**Yes (Floor Tile)**	**18**	**500 ft.²**	**ND**	**1**
South Warehouse Area, Offices & Storage	Sheetrock/joint compound	No	14	2,000 ft.²	ND	0
South Warehouse Area Northwest Locker Room	2' x 4' ceiling panels - pitted	No	17	144 ft.²	ND	0
South Warehouse Area Northwest Locker Room	Sheetrock/joint compound	No	14	300 ft.²	ND	0
South Warehouse Area - Above and Below Beams & Transformer Area	**Transite panels & pieces**	**Yes**	**19**	**1,200 scattered**	**ND**	**2**
North Warehouse Area and Offices (Plus Above Ceilings)	**1"-6" pipe insulation - felt with tar paper & fibrous layer**	**Yes**	**6A-C**	**1,150 lin. ft.**	**ND**	**2**
North Warehouse Area and Offices (Plus Above Ceilings)	**1"-6" pipe-fitting insulation on felt with tar paper pipe insulation**	**Yes**	**7A-C**	**160 fittings**	**ND**	**2**
North Warehouse Area and Offices (Plus Above Ceilings)	**1"-6" pipe insulation - air cell**	**Yes**	**8A-C**	**2,600 lin. ft.**	**ND**	**2**
North Warehouse Area and Offices (Plus Above Ceilings)	**1"-6" pipe-fitting insulation on air cell pipe insulation**	**Yes**	**9A-C**	**340 fittings**	**ND**	**2**
North Warehouse Area and Offices (Plus Above Ceilings)	**13"-20" Pipe insulation - air cell**	**Yes**	**12A-C**	**500 lin. ft.**	**D (limited)**	**4**
North Warehouse Area and Offices (Plus Above Ceilings)	**13"-20" pipe-fitting insulation on air cell pipe insulation**	**Yes**	**13A-C**	**15 fittings**	**ND**	**2**
North Warehouse Area and Offices (Above and Below Beams/ Transformer Area)	**Transite panels & pieces**	**Yes**	**19**	**2,000 ft.²**	**ND**	**2**
North Warehouse Shipping/Receiving Restroom	12" x 12" tan floor tile with adhesive	No	20	100 ft.²	ND	0

Table I. Asbestos Building Inspection Results
1860 28th Street; Minneapolis, Minnesota
Project B1500394
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Functional Space	Homogeneous Material Description	Contains Asbestos (Yes/No)	Ref. Client Sample No. (See Table II)	Estimated Quantity Units	Material Condition[1]	Hazard Category[2]
North Warehouse Shipping/Receiving Restroom	Vinyl base (tan) with adhesive	No	21	40 lin. ft.	ND	0
North Warehouse Shipping/Receiving Restroom	Sheetrock/joint compound	No	22	300 ft.²	ND	0
Shipping/Receiving Office and Storage	Sheetrock/joint compound	No	22	1,600 ft.²	ND	0
Shipping/Receiving Office and Storage	12"x 12" floor tile (gray) with adhesive	No	23	400 ft.²	ND	0
Shipping/Receiving Office and Storage	Vinyl base (gray) with adhesive	No	24	50 lin. ft.	ND	0
North Office Warehouse and Office Windows	Interior gray silicon caulking	No	25	2,680 lin. ft.	ND	0
North Warehouse Southwest Office Area	2' x 4' ceiling panels - pitted	No	26	2,000 ft.²	ND	0
North Warehouse Southwest Office Area	12"x 12" floor tile (gray) with adhesive	No	23	2,000 ft.²	ND	0
North Warehouse Southwest Office Area	Vinyl case (gray) with adhesive	No	24	240 lin. ft.	ND	0
North Warehouse Southwest Office Area	Sheetrock/joint compound	No	22	4,000 ft.²	ND	0
North Warehouse Southwest Office Area	Plaster	No	27A	4,000 ft.²	ND	0
North Warehouse South Training Rooms/Restrooms/ Janitor's Closet	2'x4' ceiling panels - pitted	No	26	160 ft.²	ND	0
North Warehouse South Training Rooms/Restrooms/ Janitor's Closet	Vinyl base (gray) with adhesive	No	24	100 lin. ft.	ND	0
North Warehouse South Training Rooms/Restrooms/ Janitor's Closet	Plaster	No	27B-C	8,000 ft.²	ND	0
North Warehouse South Training Rooms/Restrooms/ Janitor's Closet	Metal/wood core fire doors	No	---	No Quantity	---	0
North Warehouse - South Restrooms	Ceramic floor tile (gray) with grout	No	28	160 ft.²	ND	0

Table I. Asbestos Building Inspection Results
1860 28th Street; Minneapolis, Minnesota
Project B1500394
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Functional Space	Homogeneous Material Description	Contains Asbestos (Yes/No)	Ref. Client Sample No. (See Table II)	Estimated Quantity Units	Material Condition[1]	Hazard Category[2]
North Warehouse - South Restrooms	Ceramic wall tile (white) with grout	No	29	300 ft.²	ND	0
North Warehouse - South Restrooms	Sheetrock/joint compound	No	22	400 ft.²	ND	0
South Warehouse and Office Windows	Interior silicon caulking (gray)	No	30	2,000 lin. ft.	ND	0
South Warehouse Southwest Storage	Sheetrock/joint compound	No	31	2,500 lin. ft.	ND	0
Southwest Main Offices & Showroom Area	2' x 4' ceiling panels pitted	No	32	18,750 lin. ft.	ND	0
Southwest Main Offices & Showroom Area	Sheetrock/joint compound	No	31	22,000 ft.²	ND	0
Southwest Main Offices & Showroom Area	Plaster	No	27A-C	8,000 ft.²	ND	0
Southwest Main Offices & Showroom Area	Duct seam sealer (gray)	No	33	200 lin. ft.	ND	0
Southwest Main Offices & Showroom Area	Carpet adhesive (tan, brown)	No	34	14,000 ft.²	ND	0
Southwest Main Offices & Showroom Area	12" x 12" floor tile (gray) with adhesive	No	35	3,600 ft.²	ND	0
Southwest Main Offices & Showroom Area	**12" x 12" floor tile (red) with adhesive & black mastic**	**Yes**	**36**	**400 ft.²**	**ND**	**1**
Southwest Main Offices & Showroom Area - Break Room	12" x 12" floor tile (gray with white) with adhesive	No	37	400 ft.²	ND	0
Southwest Main Offices & Showroom Area - Break Room	Sink undercoating (white)	No	38	1 sink	ND	0
Exterior - Roof at Ladder Access	**Transite panels**	**Yes**	**19**	**120 ft.²**	**ND**	**2**
Exterior - Roof	**Rubber membrane with stone & sublayers**	**Assume**	**No Sample Taken**	**201,000 ft.²**	**ND**	**1**
Exterior - West at Windows	Silicon caulking (brown)	No	39	No Quantity	ND	0
Exterior - South at Door Frame	Door frame caulking (gray)	No	40	2 doors 50 lin. ft.	ND	0
Exterior - South at Windows	Silicon caulking (brown)	No	39	No Quantity	ND	0

Table I. Asbestos Building Inspection Results
1860 28th Street; Minneapolis, Minnesota
Project B1500394
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Functional Space	Homogeneous Material Description	Contains Asbestos (Yes/No)	Ref. Client Sample No. (See Table II)	Estimated Quantity Units	Material Condition[1]	Hazard Category[2]
Exterior at East Windows	Silicon caulking (brown)	No	39	No Quantity	ND	0
Exterior at East Lower	Door frame caulking (gray)	No	40	32 lin. ft.	ND	0
Exterior at North Windows	Silicon caulking (brown)	No	39	No Quantity	ND	0

1. Condition of ACM:
   ND = Not Damaged
   D = Damaged
   SD = Significantly Damaged

2. Hazard Category:
   0 = No hazard - material does not contain asbestos
   1 = ACM with potential for damage
   2 = ACM with potential for significant damage
   3 = Damaged or significantly damaged asbestos-containing miscellaneous material
   4 = Damaged or significantly damaged friable asbestos-containing thermal system insulation
   5 = Damaged or significantly damaged friable asbestos-containing surfacing material

Appendix B

Table II. Bulk Asbestos Analytical Results

BRAUN INTERTEC
The Science You Build On.

Table II. Bulk Asbestos Analytical Results

Client: City of Minneapolis
Location: 1860 28th Street; Minneapolis, Minnesota
Date of Inspection: March 25-26, 2015
Project: B1500394

Sample No.	Sample Location		Material	Asbestos Content (%)[1]
1A	**Basement**	**Boiler Room**	**Exterior boiler insulation**	**Chrysotile 60**
1B	Basement	Boiler Room	Exterior boiler insulation	N.A.[2]
1C	Basement	Boiler Room	Exterior boiler insulation	N.A.
2A	**Basement**	**Boiler Room**	**Boiler breeching insulation**	**Chrysotile 60** **Amosite 10**
2B	Basement	Boiler Room	Boiler breeching insulation	N.A.
2C	Basement	Boiler Room	Boiler breeching insulation	N.A.
3A	Basement	Boiler Room	Interior boiler refractory	N.D.[3]
3B	Basement	Boiler Room	Interior boiler refractory	N.D.
3C	Basement	Boiler Room	Interior boiler refractory	N.D.
4	Basement	Boiler Room	Boiler brick	N.D.
5A	**Basement**	**Boiler Room**	**Exterior boiler brick insulation (silver)**	**Chrysotile 5**
5B	Basement	Boiler Room	Exterior boiler brick insulation (silver)	N.A.
5C	Basement	Boiler Room	Exterior boiler brick insulation (silver)	N.A.
6A	**Basement**	**Boiler Room**	**1"-6" pipe insulation - felt with tar paper & fibrous layer**	**Tan Fibrous: Chrysotile 60** **Tar Paper: Chrysotile 40**
6B	Basement	Boiler Room	1"-6" pipe insulation - felt with tar paper & fibrous layer	N.A.
6C	Basement	Boiler Room	1"-6" pipe insulation - felt with tar paper & fibrous layer	N.A.
7A	**Basement**	**Boiler Room**	**1"-6" pipe-fitting insulation on felt with tar paper pipe insulation**	**Chrysotile 15** **Amosite 10**
7B	Basement	Boiler Room	1"-6" pipe-fitting insulation on felt with tar paper pipe insulation	N.A.
7C	Basement	Boiler Room	1"-6" pipe-fitting insulation on felt with tar paper pipe insulation	N.A.
8A	**Basement**	**Boiler Room**	**1"-6" pipe insulation - air cell**	**Chrysotile 60**
8B	Basement	Boiler Room	1"-6" pipe insulation - air cell	N.A.

Table II. Bulk Asbestos Analytical Results
1860 28th Street; Minneapolis, Minnesota
Project B1500394
Page 2

Sample No.	Sample Location		Material	Asbestos Content (%)[1]
8C	Basement	Boiler Room	1"-6" pipe insulation - air cell	N.A.
9A	**Basement**	**Boiler Room**	**1"-6" pipe-fitting insulation on air cell pipe insulation**	**Chrysotile 5** **Amosite 10**
9B	Basement	Boiler Room	1"-6" pipe-fitting insulation on air cell pipe insulation	N.A.
9C	Basement	Boiler Room	1"-6" pipe-fitting insulation on air cell pipe insulation	N.A.
10A	**Basement**	**Boiler Room**	**7"-12" Pipe insulation - air cell**	**Chrysotile 70**
10B	Basement	Boiler Room	7"-12" Pipe insulation - air cell	N.A.
10C	Basement	Boiler Room	7"-12" Pipe insulation - air cell	N.A.
11A	**Basement**	**Boiler Room**	**7"-12" pipe-fitting insulation on air cell pipe insulation**	**Chrysotile 20** **Amosite 10**
11B	Basement	Boiler Room	7"-12" pipe-fitting insulation on air cell pipe insulation	N.A.
11C	Basement	Boiler Room	7"-12" pipe-fitting insulation on air cell pipe insulation	N.A.
12A	Basement	Boiler Room	13"-20" Pipe insulation - air cell	Chrysotile 70
12B	Basement	Boiler Room	13"-20" Pipe insulation - air cell	N.A.
12C	Basement	Boiler Room	13"-20" Pipe insulation - air cell	N.A.
13A	**Basement**	**Boiler Room**	**13"-20" pipe-fitting insulation on air cell pipe insulation**	**Chrysotile 20** **Amosite 10**
13B	Basement	Boiler Room	13"-20" pipe-fitting insulation on air cell pipe insulation	N.A.
13C	Basement	Boiler Room	13"-20" pipe-fitting insulation on air cell pipe insulation	N.A.
14	Main Level	Hazardous Materials Office	Sheetrock/joint compound	N.D.
15	Main Level	Hazardous Materials Restroom	Ceramic floor tile (tan) with grout	N.D.
16	Main Level	Hazardous Materials Restroom	Ceramic (white) wall tile with grout	N.D.
17	Main Level	South Warehouse Northwest Locker Room	2'x 4' ceiling panels pitted	N.D.
18	**Main Level**	**South Warehouse by North Wall**	**9"x 9" floor tile (brown) with black mastic**	**Floor Tile: Chrysotile 7** **Black Mastic: N.D.**
19	**Main Level**	**South Warehouse Beams & Transformer Area**	**Transite panels**	**Chrysotile 12**
20	Main Level	North Warehouse Shipping/Receiving Restroom	12" x 12" tan floor tile with adhesive	N.D.
21	Main Level	North Warehouse Shipping/Receiving Restroom	Vinyl base (tan) with adhesive	N.D.

Table II. Bulk Asbestos Analytical Results
1860 28th Street; Minneapolis, Minnesota
Project B1500394
Page 3

Sample No.	Sample Location			Material	Asbestos Content (%)[1]
22	Main Level	North Warehouse Shipping/Receiving Restroom		Sheetrock/joint compound	N.D.
23	Main Level	North Warehouse Shipping/Receiving Office		12"x 12" floor tile (gray) with adhesive	N.D.
24	Main Level	North Warehouse Shipping/Receiving Office		Vinyl case (gray) with adhesive	N.D.
25	Main Level	North Warehouse & Office Windows		Interior silicon caulking (gray)	N.D.
26	Main Level	North Warehouse Southwest Office Area		2'x 4' ceiling panels - pitted	N.D.
27A	Main Level	North Warehouse Southwest Office Area		Plaster	N.D.
27B	Main Level	North Warehouse Southwest Office Area		Plaster	N.D.
27C	Main Level	North Warehouse Southwest Office Area		Plaster	N.D.
28	Main Level	North Warehouse Southwest Office Area Restrooms		Ceramic floor tile (gray) with grout	N.D.
29	Main Level	North Warehouse Southwest Office Area Restrooms		Ceramic wall tile (white) with grout	N.D.
30	Main Level	South Warehouse & Office Windows		Interior silicon caulking (gray)	N.D.
31	Main Level	South Warehouse Southwest Storage Rooms		Sheetrock/joint compound	N.D.
32	Main Level	Southwest Main Offices & Showroom Area		2' x 4' ceiling panels pitted	N.D.
33	Main Level	Southwest Main Offices & Showroom Area		Duct seam sealer (gray)	N.D.
34	Main Level	Southwest Main Offices & Showroom Area		Carpet adhesive (tan, brown)	N.D.
35	Main Level	Southwest Main Offices & Showroom Area		12" x 12" floor tile (gray) with adhesive	N.D.
36	Main Level	Southwest Main Offices & Showroom Area		12" x 12" floor tile (red) with adhesive	**Floor Tile:** **N.D.** **Black Mastic:** **Chrysotile** **7**
37	Main Level	Southwest Main Offices & Showroom Area	Break Rooms	12" x 12" floor tile (gray with white) with adhesive	N.D.
38	Main Level	Southwest Main Offices & Showroom Area	Break Rooms	Sink undercoating (white)	N.D.

Table II. Bulk Asbestos Analytical Results
1860 28th Street; Minneapolis, Minnesota
Project B1500394
Page 4

Sample No.	Sample Location		Material	Asbestos Content (%)[1]
39	Exterior	West Office Window	Silicon caulking (brown)	N.D.
40	Exterior	South at Door Frame	Door frame caulking (gray)	N.D.

* Materials containing 1 percent of asbestos or less are not considered to be asbestos-containing materials by the U.S.EPA.

1. Asbestos content is indicated as an approximate percent by area.
2. NA = Not Analyzed
3. ND = None Detected

Appendix C

Table III. Lead-Based Paint Testing

BRAUN INTERTEC
The Science You Build On.

Table III. Lead-Based Paint Testing

Client: City of Minneapolis
Location: 1860 28th Street; Minneapolis, Minnesota
Date of Inspection: March 25-26, 2015
Project: B1500394

Sample I.D. No.	Room/Area	Component Description			Results	Paint Condition G = Good P = Peeling
1	---	Calibration			1.00	---
2	---	Calibration			1.10	---
3	---	Calibration			1.00	---
Roof						
4	Water Tower	Framing	Metal	Red	15.90	G
Basement						
5	Boiler Room	Floor	Concrete	Red	0.08	G
6	Boiler Room	Wall	Concrete Block	Green	0.24	G
7	Boiler Room	Wall	Concrete Block	White	0.05	G
8	Boiler Room	Boiler	Insulation	Silver	0.03	G
9	Boiler Room	Column	Steel	Silver	0.00	G
10	Boiler Room	Ladder	Steel	Silver	0.02	G
11	Boiler Room	Wall	Concrete	Blue	0.23	G
12	Boiler Room	Fire Door	Metal	Gray	4.30	G
13	Boiler Room	Door Frame	Metal	Gray	1.60	G
14	Stairwell to Main Level	Railing	Metal	Blue	2.20	G
Main Level						
15	Hazardous Materials Storage	Floor	Concrete	Gray	0.01	G
16	Hazardous Materials Storage	Wall	Sheetrock	White	0.00	G
17	Hazardous Materials Storage	Door	Wood	Grey	0.07	G

Table III. Lead-Based Paint Testing
1860 28th Street; Minneapolis, Minnesota
Project B1500394
Page 2

Sample I.D. No.	Room/Area	Component Description			Results	Paint Condition G = Good P = Peeling
18	Hazardous Materials Storage	Door Frame	Wood	Grey	3.00	G
19	Hazardous Materials Storage	Wall	Concrete Block	White	0.22	G
20	Hazardous Materials Storage	Beam	Steel	Tan	3.30	G
21	Hazardous Materials Storage	Ceiling Deck	Metal	Tan	3.20	G
22	South Warehouse	Wall	Brick	White	0.06	G
23	South Warehouse	Column	Steel	Blue	4.60	G
24	South Warehouse	Column	Steel	White	4.20	G
25	South Warehouse	Wall	Concrete Block	White	0.28	G
26	South Warehouse	Large Garage Door	Metal	White	1.50	G
27	South Warehouse	Floor	Concrete	Yellow Stripe	0.50	G
28	South Warehouse	Window Frame	Metal	Brown	0.00	G
29	South Warehouse	Wall	Sheetrock	White	0.00	G
30	Southwest Showroom Office	Wall	Sheetrock	White	0.00	G
31	Southwest Showroom Office	Door	Wood	Tan	0.00	G
32	Southwest Showroom Office	Door Frame	Metal	White	0.00	G
33	Southwest Showroom Office	Wall	Plaster	Gray	0.03	G
34	Southwest Showroom Office	Wall	Plaster	Tan	0.05	G
35	Southwest Showroom Office	Window Frame	Metal	Gray	0.00	G
36	Southwest Showroom Office	Door	Metal	Black	0.00	G
37	Southwest Showroom Office	Door Frame	Metal	Black	0.00	G
38	North Warehouse	Wall	Concrete Block	White	0.23	G

Table III. Lead-Based Paint Testing
1860 28th Street; Minneapolis, Minnesota
Project B1500394
Page 3

Sample I.D. No.	Room/Area	Component Description			Results	Paint Condition G = Good P = Peeling
39	North Warehouse	Wall	Brick	White	0.06	G
40	North Warehouse	Wall	Sheetrock	White	0.00	G
41	North Warehouse	Door	Wood	Tan	0.00	G
42	North Warehouse	Door Frame	Metal	Gray	0.00	G
43	North Warehouse	Door	Wood	Gray	0.03	G
44	North Warehouse	Door Frame	Wood	Gray	3.30	G
45	North Warehouse	Column	Steel	Yellow	3.40	G
46	North Warehouse	Column	Steel	White	4.90	G
47	North Warehouse	Column	Steel	Red	4.00	G
Exterior West						
48	Loading Dock	Overhang	Steel	Red	0.50	P
49	Loading Dock	Beam	Steel	Red	1.70	P
50	Loading Dock	New Soffit	Metal	Red	0.00	G
51	Loading Dock	New Fascia	Metal	Red	0.00	G
52	Loading Dock	Corner Guard	Metal	Red	4.10	G
53	Loading Dock	Window Frame	Metal	Brown	0.00	G

mg/cm^2 = milligrams of lead per square centimeter of paint

Appendix D

Bulk Asbestos Analysis Report

Pace Analytical Services, Inc.
1800 Elm St. SE - Suite 1830
Minneapolis, MN 55414
(612) 607-6457

Mr. Jerry Wallerius
Braun Intertec-Bloomington
11001 Hampshire Ave. South
Bloomington, MN 55438

April 03, 2015

Work Order #: 1500620

RE: 1860 28th Street, MPLS

B15-00394

Dear Jerry Wallerius:

Bulk Asbestos Analysis Report

The microscopy department of Pace Analytical Services, Inc. received your analytical request on March 30, 2015. The sample(s) were analyzed in the Pace Industrial Hygiene laboratory unless otherwise noted. The objective of this analysis was to determine the presence of asbestos using polarized light microscopy (PLM) and to determine the percent of asbestos and non-asbestos fibrous components by calibrated visual area estimation. Analytical results are summarized on the following laboratory report.

Discussion

None-detected floor tile results obtained by PLM analysis may contain thin asbestos fibers below the limits of resolution of the polarized light microscope. The EPA Method EPA/600/R-93/116 recommends the use of transmission electron microscopy to confirm the absence of asbestos.

Methodology

Bulk asbestos analysis is conducted in accordance with the Environmental Protection Agency's (EPA) methods 40 CFR, Part 763, Ch. 1, Subpart F, Appendix A (7-1-87 Edition) and EPA/600/R-93/116. All analyses are in compliance with the quality control procedures specified by the methods. All samples are examined for homogeneity. If a sample contains more than one layer, each layer is analyzed individually. Total fibrous content is calculated for joint compound/wallboard systems by combining layer results according to their percentages of the total sample. All routine quality assurance procedures were followed, unless otherwise noted.

Pace Analytical Services, Inc.
1800 Elm St. SE - Suite 1830
Minneapolis, MN 55414
(612) 607-6457

April 03, 2015

Work Order #: 1500620

Remarks

This test report relates only to the items submitted for analysis.

Samples are retained at our laboratory for a period of 30 days and will be disposed of unless otherwise instructed by the client.

We appreciate your decision to use Pace Analytical Services, Inc. for this project. We are committed to being your vendor of choice to meet your analytical needs.

If you have any questions please contact me at 612-607-6457.

Sincerely,

Kevin R. Osborn

Project Manager

Client: **Braun Intertec-Bloomington**
Laboratory: **Pace Analytical Services, Inc. (IH Laboratory)**
Date Reported: 4/3/2015
Log-In: 03/30/15
Lab Contact: Kevin R. Osborn
Page 3 of 24
Client Reference: 1860 28th Street, MPLS
PO Number: B15-00394

Sample No: 1500620-01 Client ID: 1A

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Insulation	2	100	-	-		-		03/30/15
Tan woven fibers	(A)	15	3,11	Cellulose 90		None Detected		
Gray fibrous	(B)	85	1,2,3	None Detected		Chrysotile 60		

Sample No: 1500620-02 Client ID: 1B

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date

NO ANALYSIS PERFORMED ON THIS SAMPLE

Sample No: 1500620-03 Client ID: 1C

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date

NO ANALYSIS PERFORMED ON THIS SAMPLE

Sample No: 1500620-04 Client ID: 2A

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Insulation	2	100	-	-		-		03/30/15
Tan woven fibers	(A)	50	3,11	Cellulose 90		None Detected		
White/gray fibrous	(B)	50	1,2,3	None Detected		Chrysotile 10 Amosite 10		

Client: **Braun Intertec-Bloomington** | Laboratory: **Pace Analytical Services, Inc. (IH Laboratory)** | Date Reported: 4/3/2015

Log-In: 03/30/15 | Lab Contact: Kevin R. Osborn | **Page 4 of 24**

Client Reference: 1860 28th Street, MPLS | PO Number: B15-00394

Sample No: 1500620-05 Client ID: 2B

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date

NO ANALYSIS PERFORMED ON THIS SAMPLE

Sample No: 1500620-06 Client ID: 2C

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date

NO ANALYSIS PERFORMED ON THIS SAMPLE

Sample No: 1500620-07 Client ID: 3A

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Tan/gray granular	1	100	1,3	None Detected		None Detected		03/30/15

Sample No: 1500620-08 Client ID: 3B

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Tan/gray granular	1	100	1,3	None Detected		None Detected		03/30/15

Sample No: 1500620-09 Client ID: 3C

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Tan/gray granular	1	100	1,3	None Detected		None Detected		03/30/15

Client: **Braun Intertec-Bloomington**
Laboratory: **Pace Analytical Services, Inc. (IH Laboratory)**
Date Reported: 4/3/2015
Log-In: 03/30/15
Lab Contact: Kevin R. Osborn
Page 5 of 24
Client Reference: 1860 28th Street, MPLS
PO Number: B15-00394

Sample No: 1500620-10 Client ID: 4

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Tan cementitious	1	100	1,3	None Detected		None Detected		03/31/15

Sample No: 1500620-11 Client ID: 5A

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Silver/gray fibrous	1	100	1,3,11	Cellulose <1 Glass Fibers 30		Chrysotile 5		03/31/15

Sample No: 1500620-12 Client ID: 5B

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date

NO ANALYSIS PERFORMED ON THIS SAMPLE

Sample No: 1500620-13 Client ID: 5C

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date

NO ANALYSIS PERFORMED ON THIS SAMPLE

Client: **Braun Intertec-Bloomington**
Laboratory: **Pace Analytical Services, Inc. (IH Laboratory)**
Date Reported: 4/3/2015
Log-In: 03/30/15
Lab Contact: Kevin R. Osborn
Page 6 of 24
Client Reference: 1860 28th Street, MPLS
PO Number: B15-00394

Sample No: 1500620-14 Client ID: 6A

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Insulation	4	100	-	-		-		03/31/15
Tan woven fibers	(A)	15	3,11	Cellulose 85		Chrysotile 1		
Tan fibrous	(B)	25	3,4	Cellulose 80		Chrysotile <1		
Tan fibrous	(C)	25	3,4	Cellulose <1		Chrysotile 60		
Black tar paper	(D)	35	1,8	Cellulose <1 Hair <1		Chrysotile 40		

Sample No: 1500620-15 Client ID: 6B

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date

NO ANALYSIS PERFORMED ON THIS SAMPLE

Sample No: 1500620-16 Client ID: 6C

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date

NO ANALYSIS PERFORMED ON THIS SAMPLE

Client: **Braun Intertec-Bloomington** | Laboratory: **Pace Analytical Services, Inc. (IH Laboratory)** | Date Reported: 4/3/2015

Log-In: 03/30/15 | Lab Contact: Kevin R. Osborn | **Page 7 of 24**

Client Reference: 1860 28th Street, MPLS | PO Number: B15-00394

Sample No: 1500620-17 Client ID: 7A

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Insulation	2	100	-	-		-		03/31/15
Brown fibrous	(A)	70	None Detected	Hair 100		None Detected		
White fibrous micaceous	(B)	30	1,2,3	None Detected		Chrysotile 15 Amosite 10		

Sample No: 1500620-18 Client ID: 7B

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date

NO ANALYSIS PERFORMED ON THIS SAMPLE

Sample No: 1500620-19 Client ID: 7C

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date

NO ANALYSIS PERFORMED ON THIS SAMPLE

Sample No: 1500620-20 Client ID: 8A

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Insulation	2	100	-	-		-		03/31/15
Tan woven fibers	(A)	20	3	Cellulose 90		None Detected		
White fibrous	(B)	80	3,4	None Detected		Chrysotile 60		

Client: **Braun Intertec-Bloomington**
Laboratory: **Pace Analytical Services, Inc. (IH Laboratory)**
Date Reported: 4/3/2015
Log-In: 03/30/15
Lab Contact: Kevin R. Osborn
Page 8 of 24
Client Reference: 1860 28th Street, MPLS
PO Number: B15-00394

Sample No: 1500620-21 Client ID: 8B

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date

NO ANALYSIS PERFORMED ON THIS SAMPLE

Sample No: 1500620-22 Client ID: 8C

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date

NO ANALYSIS PERFORMED ON THIS SAMPLE

Sample No: 1500620-23 Client ID: 9A

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
White fibrous	1	100	1,3	Cellulose 5		Chrysotile 5 Amosite 10		03/31/15

Sample No: 1500620-24 Client ID: 9B

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date

NO ANALYSIS PERFORMED ON THIS SAMPLE

Sample No: 1500620-25 Client ID: 9C

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date

NO ANALYSIS PERFORMED ON THIS SAMPLE

Client: **Braun Intertec-Bloomington**
Laboratory: **Pace Analytical Services, Inc. (IH Laboratory)**
Date Reported: 4/3/2015
Log-In: 03/30/15
Lab Contact: Kevin R. Osborn
Page 9 of 24
Client Reference: 1860 28th Street, MPLS
PO Number: B15-00394

Sample No: 1500620-26 Client ID: 10A

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Insulation	2	100	-	-		-		03/31/15
Tan woven fibers	(A)	10	3,11	Cellulose 80		None Detected		
White fibrous	(B)	90	3,4	Cellulose <1		Chrysotile 70		

Sample No: 1500620-27 Client ID: 10B

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date

NO ANALYSIS PERFORMED ON THIS SAMPLE

Sample No: 1500620-28 Client ID: 10C

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date

NO ANALYSIS PERFORMED ON THIS SAMPLE

Sample No: 1500620-29 Client ID: 11A

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
White/gray fibrous	1	100	3,4,11	Cellulose 2		Chrysotile 20 Amosite 10		03/31/15

Client: **Braun Intertec-Bloomington** | Laboratory: **Pace Analytical Services, Inc. (IH Laboratory)** | Date Reported: 4/3/2015

Log-In: 03/30/15 | Lab Contact: Kevin R. Osborn | **Page 10 of 24**

Client Reference: 1860 28th Street, MPLS | PO Number: B15-00394

Sample No: 1500620-30 Client ID: 11B

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date

NO ANALYSIS PERFORMED ON THIS SAMPLE

Sample No: 1500620-31 Client ID: 11C

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date

NO ANALYSIS PERFORMED ON THIS SAMPLE

Sample No: 1500620-32 Client ID: 12A

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Insulation	2	100	-	-		-		03/31/15
Tan woven fibers	(A)	10	3,11	Cellulose 80		None Detected		
White fibrous	(B)	90	3,4	None Detected		Chrysotile 70		

Sample No: 1500620-33 Client ID: 12B

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date

NO ANALYSIS PERFORMED ON THIS SAMPLE

Client: **Braun Intertec-Bloomington** | Laboratory: **Pace Analytical Services, Inc. (IH Laboratory)** | Date Reported: 4/3/2015

Log-In: 03/30/15 | Lab Contact: Kevin R. Osborn | **Page 11 of 24**

Client Reference: 1860 28th Street, MPLS | PO Number: B15-00394

Sample No: 1500620-34 Client ID: 12C

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date

NO ANALYSIS PERFORMED ON THIS SAMPLE

Sample No: 1500620-35 Client ID: 13A

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Insulation	2	100	-	-		-		03/31/15
White woven fibers	(A)	15	3,11	Cellulose 80		None Detected		
White/gray fibrous	(B)	85	1,2,3	None Detected		Chrysotile 20 Amosite 10		

Sample No: 1500620-36 Client ID: 13B

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date

NO ANALYSIS PERFORMED ON THIS SAMPLE

Sample No: 1500620-37 Client ID: 13C

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date

NO ANALYSIS PERFORMED ON THIS SAMPLE

Client: **Braun Intertec-Bloomington** | Laboratory: **Pace Analytical Services, Inc. (IH Laboratory)** | Date Reported: 4/3/2015

Log-In: 03/30/15 | Lab Contact: Kevin R. Osborn | **Page 12 of 24**

Client Reference: 1860 28th Street, MPLS | PO Number: B15-00394

Sample No: 1500620-38 Client ID: 14

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Sheetrock	3	100	1,3,6,11	Cellulose 9 Glass Fibers <1		None Detected		03/31/15
White powdery compound with paint	(A)	2	1,3,6,11	None Detected		None Detected		
Brown paper	(B)	10	3,11	Cellulose 90		None Detected		
White chalky	(C)	88	1,3	Glass Fibers <1		None Detected		

Sample No: 1500620-39 Client ID: 15

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Tile with grout	2	100	-	-		-		03/31/15
Tan cementitious tile	(A)	80	1,3	None Detected		None Detected		
Tan granular	(B)	20	1,3	Cellulose <1		None Detected		

Sample No: 1500620-40 Client ID: 16

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
White cementitious	1	100	1,3	None Detected		None Detected		03/31/15

Client: **Braun Intertec-Bloomington**
Laboratory: **Pace Analytical Services, Inc. (IH Laboratory)**
Date Reported: 4/3/2015
Log-In: 03/30/15
Lab Contact: Kevin R. Osborn
Page 13 of 24
Client Reference: 1860 28th Street, MPLS
PO Number: B15-00394

Sample No: 1500620-41 Client ID: 17

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Gray fibrous ceiling tile with paint	1	100	3,6,11	Cellulose 40 Glass Fibers 25		None Detected		03/31/15

Sample No: 1500620-42 Client ID: 18

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Floor tile with mastic	2	100	-	-		-		03/31/15
Brown floor tile	(A)	99	1,3,9	None Detected		Chrysotile 7		
Black mastic	(B)	1	1,7	None Detected		None Detected		

Sample No: 1500620-43 Client ID: 19

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Gray fibrous cementitious	1	100	1,3,11	None Detected		Chrysotile 12		03/31/15

Sample No: 1500620-44 Client ID: 20

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Floor tile with adhesive	2	100	-	-		-		03/31/15
Tan floor tile	(A)	99	1,3,9	None Detected		None Detected		
Yellow adhesive	(B)	1	1,7	None Detected		None Detected		

Client: **Braun Intertec-Bloomington** | Laboratory: **Pace Analytical Services, Inc. (IH Laboratory)** | Date Reported: 4/3/2015

Log-In: 03/30/15 | Lab Contact: Kevin R. Osborn | **Page 14 of 24**

Client Reference: 1860 28th Street, MPLS | PO Number: B15-00394

Sample No: 1500620-45 Client ID: 21

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Baseboard with adhesive	2	100	-	-		-		03/31/15
Tan vinyl	(A)	95	1,3,9	None Detected		None Detected		
Yellow adhesive	(B)	5	1,7	None Detected		None Detected		

Sample No: 1500620-46 Client ID: 22

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Sheetrock	3	100	1,2,3,11	Cellulose 10 Glass Fibers <1		None Detected		03/31/15
White powdery compound with paint	(A)	10	1,2,3,11	None Detected		None Detected		
Brown/white paper	(B)	10	3	Cellulose 95		None Detected		
White chalky	(C)	80	1,3	Cellulose <1 Glass Fibers <1		None Detected		

Sample No: 1500620-47 Client ID: 23

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Floor tile with adhesive	2	100	-	-		-		03/31/15
Gray floor tile	(A)	99	1,3,9	None Detected		None Detected		
Yellow adhesive	(B)	1	1,7	None Detected		None Detected		

Client: **Braun Intertec-Bloomington** | Laboratory: **Pace Analytical Services, Inc. (IH Laboratory)** | Date Reported: 4/3/2015

Log-In: 03/30/15 | Lab Contact: Kevin R. Osborn | **Page 15 of 24**

Client Reference: 1860 28th Street, MPLS | PO Number: B15-00394

Sample No: 1500620-48 Client ID: 24

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Baseboard with adhesive	2	100	-	-		-		03/31/15
Gray vinyl	(A)	>99	1,3,9	None Detected		None Detected		
Yellow adhesive	(B)	<1	1,3,7	None Detected		None Detected		

Sample No: 1500620-49 Client ID: 25

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Brown rubbery	1	100	1,3	None Detected		None Detected		03/31/15

Sample No: 1500620-50 Client ID: 26

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Gray fibrous ceiling tile with paint	1	100	3,6,11	Cellulose 50 Glass Fibers 20		None Detected		03/31/15

Sample No: 1500620-51 Client ID: 27A

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
White/gray granular	1	100	1,3,11	Cellulose <1		None Detected		03/31/15

Client: **Braun Intertec-Bloomington** | Laboratory: **Pace Analytical Services, Inc. (IH Laboratory)** | Date Reported: 4/3/2015

Log-In: 03/30/15 | Lab Contact: Kevin R. Osborn | **Page 16 of 24**

Client Reference: 1860 28th Street, MPLS | PO Number: B15-00394

Sample No: 1500620-52 Client ID: 27B

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
White/gray granular	1	100	1,3,11	None Detected		None Detected		03/31/15

Sample No: 1500620-53 Client ID: 27C

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
White/gray granular	1	100	1,3,11	None Detected		None Detected		03/31/15

Sample No: 1500620-54 Client ID: 28

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Tile with grout	2	100	-	-		-		03/31/15
Gray/brown cementitious	(A)	75	1,3	None Detected		None Detected		
Gray granular cementitious	(B)	25	1,3	Cellulose <1		None Detected		

Sample No: 1500620-55 Client ID: 29

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
White cementitious	1	100	1,3	Cellulose <1		None Detected		04/01/15

Client: **Braun Intertec-Bloomington** | Laboratory: **Pace Analytical Services, Inc. (IH Laboratory)** | Date Reported: 4/3/2015

Log-In: 03/30/15 | Lab Contact: Kevin R. Osborn | **Page 17 of 24**

Client Reference: 1860 28th Street, MPLS | PO Number: B15-00394

Sample No: 1500620-56 Client ID: 30

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Dark brown rubbery	1	100	1,3	None Detected		None Detected		04/01/15

Sample No: 1500620-57 Client ID: 31

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Sheetrock	2	100	1,3	Cellulose 10 Glass Fibers <1		None Detected		04/01/15
Brown/purple paper	(A)	10	3	Cellulose 95		None Detected		
White chalky	(B)	90	1,3	Cellulose <1 Glass Fibers <1		None Detected		

Sample No: 1500620-58 Client ID: 32

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Gray fibrous ceiling tile with paint	1	100	3,6,11	Cellulose 60 Glass Fibers 10		None Detected		04/01/15

Sample No: 1500620-59 Client ID: 33

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Gray compound	1	100	1,3	None Detected		None Detected		04/01/15

Client: **Braun Intertec-Bloomington**
Laboratory: **Pace Analytical Services, Inc. (IH Laboratory)**
Date Reported: 4/3/2015
Log-In: 03/30/15
Lab Contact: Kevin R. Osborn
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Client Reference: 1860 28th Street, MPLS
PO Number: B15-00394

Sample No: 1500620-60 Client ID: 34

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Yellow adhesive	1	100	1,3,7,11	None Detected		None Detected		04/01/15

Sample No: 1500620-61 Client ID: 35

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Floor tile with adhesive	2	100	-	-		-		04/01/15
Gray floor tile	(A)	99	1,3,9	None Detected		None Detected		
Yellow adhesive	(B)	1	1,7	None Detected		None Detected		

Sample No: 1500620-62 Client ID: 36

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Floor tile with adhesive and mastic	2	100	-	-		-		04/01/15
Red floor tile	(A)	99	1,3,9	None Detected		None Detected		
Black mastic/yellow adhesive	(B)	1	1,7	None Detected		Chrysotile 7		

Client: **Braun Intertec-Bloomington**
Log-In: 03/30/15
Client Reference: 1860 28th Street, MPLS

Laboratory: **Pace Analytical Services, Inc. (IH Laboratory)**
Lab Contact: Kevin R. Osborn
PO Number: B15-00394

Date Reported: 4/3/2015
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Sample No: 1500620-63 Client ID: 37

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Floor tile with adhesive	2	100	-	-		-		04/01/15
Gray floor tile	(A)	>99	1,3,9	None Detected		None Detected		
Yellow adhesive	(B)	<1	1,7	None Detected		None Detected		

Sample No: 1500620-64 Client ID: 38

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
White compound	1	100	1,3	Cellulose 20		None Detected		04/01/15

Sample No: 1500620-65 Client ID: 39

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Brown tacky compound	1	100	1,3	None Detected		None Detected		04/01/15

Sample No: 1500620-66 Client ID: 40

Macroscopic Description	No. of Layers and Layer Designator	Percent of Total Sample	Non-Fibrous Components*	Other Fibrous Non-Asbestos Content Total or Layer %	Footnotes	Asbestos Content Total or Layer %	Footnotes	Analytical Date
Gray rubbery compound	1	100	1,3	None Detected		None Detected		04/01/15

Client:	**Braun Intertec-Bloomington**	Laboratory:	**Pace Analytical Services, Inc. (IH Laboratory)**	Date Reported:	4/3/2015
Log-In:	03/30/15	Lab Contact:	Kevin R. Osborn	**Page 20 of 24**	
Client Reference:	1860 28th Street, MPLS	PO Number:	B15-00394		

Footnotes and Definitions

bmya	Black mastic/yellow adhesive
<	Less Than
>	Greater Than

*** Key to Non-Fibrous Components**

1 = Rock/Mineral fragments	5 = Diatoms	9 = Vinyl	13 = Spores/Pollen
2 = Mica/Vermiculite	6 = Perlite	10 = Foam/Rubber	14 = Foil
3 = Binders	7 = Adhesive/Mastic	11 = Paint	
4 = Opaques	8 = Tar	12 = Other	

Date Reported:

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1500620

BRAUN
INTERTEC

Table II. Bulk Asbestos Analytical Results

Client: CITY OF MINNEAPOLIS
Location: 1860 28th STREET, MPLS, MN
Date of Inspection: 3-25-15 → 3/26/2015
Project No.: B1500394

Laboratory: **Pace Analytical Services, Inc. (IH Laboratory)**
Lab Contact: Kevin R. Osborn
PO Number: B15-00394

	Sample No.	Sample Location	Material	Asbestos Content (%)*
01	1A	BASEMENT – BOILER ROOM	EXTERIOR BOILER INSULATION	
02	1B	↓	↓	
03	1C	↓	↓	
04	2A		BOILER BREECHING INSULATION	
05	2B			
06	2C	↓	↓	
07	3A		INTERIOR BOILER REFRACTORY	
08	3B		↓	
09	3C	↓	↓	
10	4	↓	BOILER BRICK	
11	5A		SILVER EXTERIOR BOILER BACK INSULATION	
12	5B			
13	5C	↓	↓	
14	6A		1"-6" PIPE INSULATION – FELT W/ TAR PAPER	
15	6B			
16	6C	↓	↓	
17	7A		1"-6" PFI ON FELT W/ TARPAPER P.I.	
18	7B			
19	7C	↓	↓	
20	8A		1"-6" PIPE INSULATION – AIR CELL	
21	8B			
22	8C	↓	↓	
23	9A		1"-6" PFI ON AIR CELL P.I.	
24	9B			
25	9C	↓	↓	

* Materials containing 1 percent of asbestos or less are not considered to be Asbestos-Containing-Materials (ACMs) by the US EPA.

1. Asbestos content is indicated as an approximate percent by weight

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1500620

BRAUN
INTERTEC

Table II. Bulk Asbestos Analytical Results

Client: CITY OF MINNEAPOLIS
Location: 1860 28TH STREET, MPLS, MN
Date of Inspection: 3-25-15 → 3/26/2015
Project No.: B1500394

	Sample No.	Sample Location	Material	Asbestos Content (%)
26	10A	BASEMENT – BOILER ROOM	7"-12" PIPE INSULATION AIR CELL	–
27	10B	–		
28	10C	–		
29	11A	–	7"-12" PFI ON AIR CELL P.I.	
30	11B	–		
31	11C	–		
32	12A	–	13"-20" PIPE INSULATION – AIR CELL	
33	12B	–		
34	12C	–		
35	13A	–	13"-20" PFI ON AIR CELL P.I.	
36	13B	–		
37	13C	–		
38	14	MAIN LEVEL – HAZ MAT OFFICE	SHEETROCK/JOINT COMPOUND	
39	15	– HAZ MAT RESTROOM	TAN CERAMIC FLOOR TILE W/GROUT	
40	16	–	WHITE CERAMIC WALL TILE W/GROUT	
41	17	– SOUTH WAREHOUSE NW LOCKER ROOM	2'X4' CEILING PANELS - PITTED	
42	18	– SOUTH WAREHOUSE BY NORTH WALL	9" X 9" BROWN FLOOR TILE W/BLACK MASTIC	
43	19	– SOUTH WAREHOUSE BEAMS & TRANSFORMER AREA	TRANSITE PANELS	
44	20	– NORTH WAREHOUSE SHIPPING/RECEIVING RESTROOM	12"X12" TAN FLOOR TILE W/ADHESIVE	
45	21	–	TAN VINYL BASE W/ADHESIVE	
46	22	–	SHEETROCK/JOINT COMPOUND	
47	23	– NORTH WAREHOUSE SHIPPING/RECEIVING OFFICE	12"X12" GRAY FLOOR TILE W/ADHESIVE	
48	24	–	GRAY VINYL CASE W/ADHESIVE	
49	25	– NORTH WAREHOUSE & OFFICE WINDOWS	INTERIOR GRAY SILICON CAULKING	
50	26	– NORTH WAREHOUSE SW OFFICE AREA	2'X4' CEILING PANELS - PITTED	

* Materials containing 1 percent of asbestos or less are not considered to be Asbestos-Containing-Materials (ACMs) by the US EPA.

2 of 3

Client: **Braun Intertec-Bloomington** Laboratory: **Pace Analytical Services, Inc. (IH Laboratory)** Date Reported:

AET Project No. 03-21225

Log-In: 03/30/15 Lab Contact: Kevin R. Osborn **Page 23 of 24**

Client Reference: 1860 28th Street, MPLS PO Number: B15-00394

1500620

BRAUN INTERTEC

Table II. Bulk Asbestos Analytical Results

Client: CITY OF MINNEAPOLIS
Location: 1860 28th STREET, MPLS, MN
Date of Inspection: 3-25-15 → 3/26/2015
Project No.: B1500394

	Sample No.	Sample Location	Material	Asbestos Content (%)*
51	27A	MAIN LEVEL - NORTH WAREHOUSE & OFFICE AREA	PLASTER	
52	27B	↓ - ↓	↓	
53	27C	↓ - ↓	↓	
54	28	↓ - ↓ - RESTROOMS	GRAY CERAMIC FLOOR TILE W/ GROUT	
55	29	↓ - ↓ - ↓	WHITE CERAMIC WALL TILE W/ GROUT	
56	30	↓ - SOUTH WAREHOUSE & OFFICE WINDOWS	INTERIOR GRAY SILICON CAULKING	
57	31	↓ - SOUTH WAREHOUSE & SW STORAGE ROOMS	SHEETROCK/JOINT COMPOUND	
58	32	↓ - SW MAIN OFFICES & SHOWROOM AREA	2'X4' CEILING PANEL - PITTED	
59	33	↓ - ↓	DUCT SEAM SEALER - GRAY	
60	34	↓ - ↓	TAN BROWN CARPET ADHESIVE	
61	35	↓ - ↓	12" X12" GRAY FLOOR TILE W/ ADHESIVE	
62	36	↓ - ↓	12"X12" RED FLOOR TILE W/ ADHESIVE	
63	37	↓ - ↓ - BREAK ROOM	12"X12" GRAY W/ WHITE FLOOR TILE W/ ADHESIVE	
64	38	↓ - ↓ - ↓	WHITE SINK UNDERCOATING	
65	39	EXTERIOR WEST OFFICE WINDOW	BROWN SILICON CAULKING	
66	40	EXTERIOR SOUTH AT DOOR FRAME	GRAY DOOR FRAME CAULKING	

* Materials containing 1 percent of asbestos or less are not considered to be Asbestos-Containing-Materials (ACMs) by the US EPA.

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Client:	**Braun Intertec-Bloomington**	Laboratory:	**Pace Analytical Services, Inc. (IH Laboratory)**	Date Reported:	4/3/2015
Log-In:	03/30/15	Lab Contact:	Kevin R. Osborn		**Page 24 of 24**
Client Reference:	1860 28th Street, MPLS	PO Number:	B15-00394		

MICROSCOPY

REQUEST FOR IH LABORATORY ANALYTICAL SERVICES

For PASI Lab Use Only
Laboratory Work Order No.
1500620

Pace Analytical®
Pace Analytical Services, Inc.
1800 Elm St. SE – Suite 1830
Minneapolis, MN 55414

Bottle orders and sampling inquires:
Phone: 612.656.1139

IMPORTANT
Date Results Requested: 4-2-2015
Time: 10:00AM
Rush Charges Authorized? Yes (No)
Rush/Quote #:

Page 1 of 1

REPORT RESULTS TO
Contact Name: JERRY WALLERIUS | Project ID/Name: 1860 28th STREET, MPLS | P.O. #/Project #: B15-00394
Company: BRAUN INTERTEC CORPORATION
Mailing Address: 11001 HAMPSHIRE AVENUE SOUTH
City, State, Zip: BLOOMINGTON, MN 55438
Telephone #: 952-995-2478 | Fax #: 952-995-2020
E-mail: JWALLERIUS@BRAUNINTERTEC.COM

SEND INVOICE TO
Contact Name: Erin Campbell | Company: Braun Intertec
Address: 11001 Hampshire Ave So
City, State, Zip: Bloomington, MN 55438
Telephone #: 952.995.2000 | Fax #: 952.995.2020

Special Instructions and/or Specific Regulatory Requirements:
(method, limit of detection, petrofund, reporting units)
20.00 PLM EACH

Site Location (State)
MN

Analysis Requested
(Enter an "X" in the boxes below to indicate request.)

Lab ID#	Client Sample Identification (IDs must be unique)	Date Sampled	Time Sampled	Matrix/ Media	Volume/Area (specify units)	Number of Containers	Metals Field Filtered Y/N	PLM ASBESTOS	FOR LAB USE ONLY
	1A THROUGH 40	3-25 → 3-26-15	—	BULK	—	66		✓	
	"SEE TABLE II"								

CHAIN OF CUSTODY
Collected by: (Print) JERRY WALLERIUS / DAN CHELSTROM | Collector's Signature:
Relinquished by: | Date/Time: 3-27-15 1:10 PM | Received by: | Date/Time: 3/27/15 1315
Relinquished by: | Date/Time: | Received Contents Not Verified: | Date/Time:
Custody Seal Intact: ☐ Yes ☐ No ☑ N/A ☐ Hand Delivered by Client
On Ice: ☐ Yes ☐ No | Received Contents Verified: | Date/Time: 3/30/15 9:45
Temp Blank: ☐ Yes ☒ No
Temp: — °C
Comments: ALL REPORTS TO JERRY WALLERIUS AT BRAUN BLOOMINGTON 612-360-0733

Form # eCS01.02 F:\Groups\QA-QC\Forms\Client Services\COC-eCS01.02 Effective 10/02/14

Appendix E

Asbestos Building Inspector Certificate

Certificate No: 5LM09031405IR

Expiration Date: September 3, 2015

Director, Env. Health Div.

No AI2305 Issued: 09/08/2014

MDH ASBESTOS INSPECTOR

Certified by:
State of Minnesota
Department of Health

Gerald J Wallerius
3040 Garland Ln N
Plymouth, MN 55447

Expires: 09/03/2015

This is to certify that

Gerald J. Wallerius

has attended and successfully completed an

ASBESTOS INSPECTOR REFRESHER TRAINING COURSE

permitted by
the State of Minnesota under Minnesota Rules 4620.3702 to 4620.3722
and meets the requirements of
Section 206 of Title II of the Toxic Substances Control Act (TSCA)
conducted by

Lake States Environmental, Ltd.

in

White Bear Lake, MN on September 3, 2014
Examination Date: September 3, 2014

Lake States Environmental, Ltd
P. O. Box 645, Rice Lake, WI 54868
(800) 254-9811

Training Instructor

Appendix F

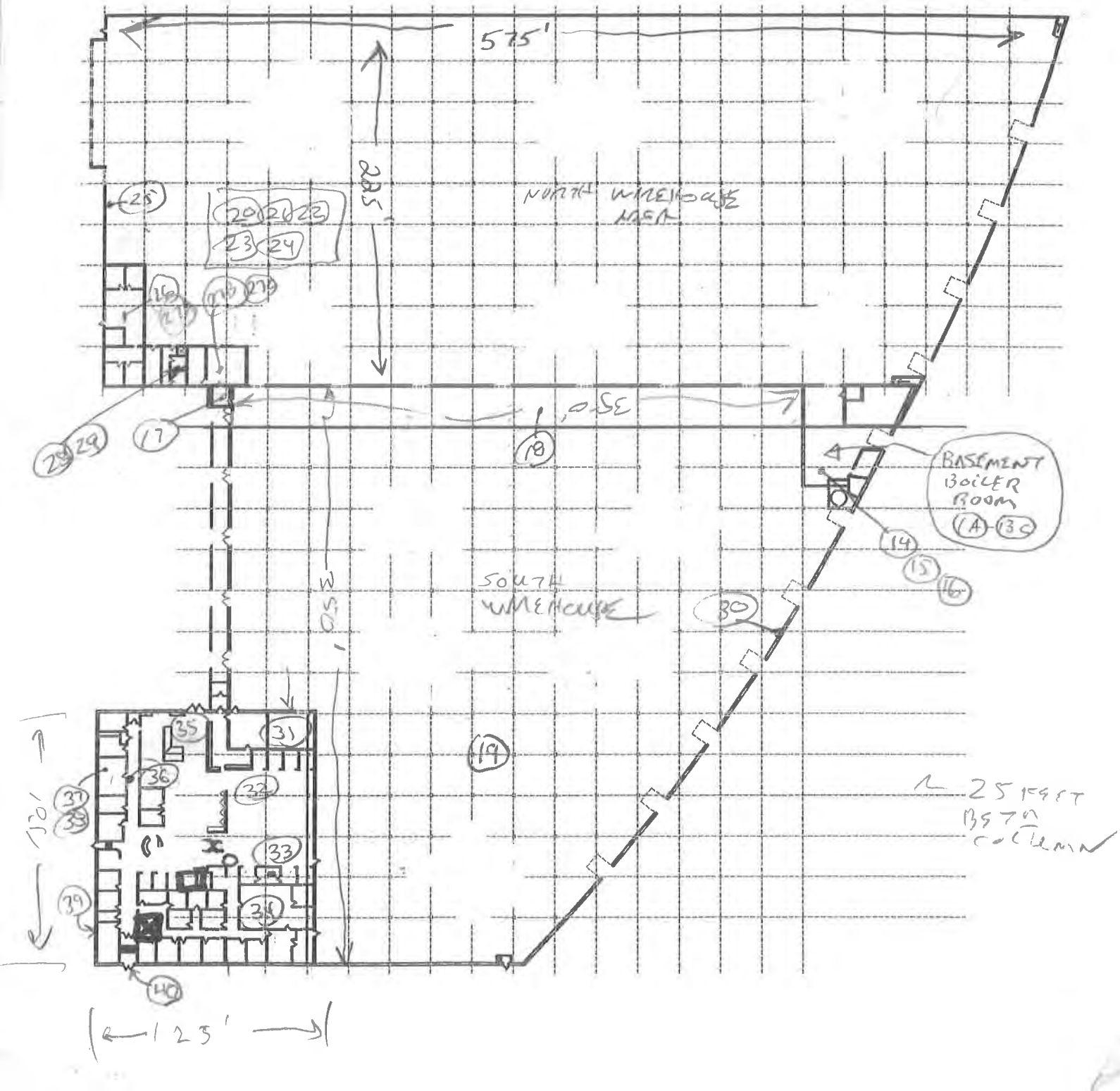
Asbestos Bulk Sample Location Maps
XRF Lead Paint Sample Locations Maps

BRAUN INTERTEC
B1500394

(#) = ASBESTOS BULK SAMPLE LOCATIONS

N

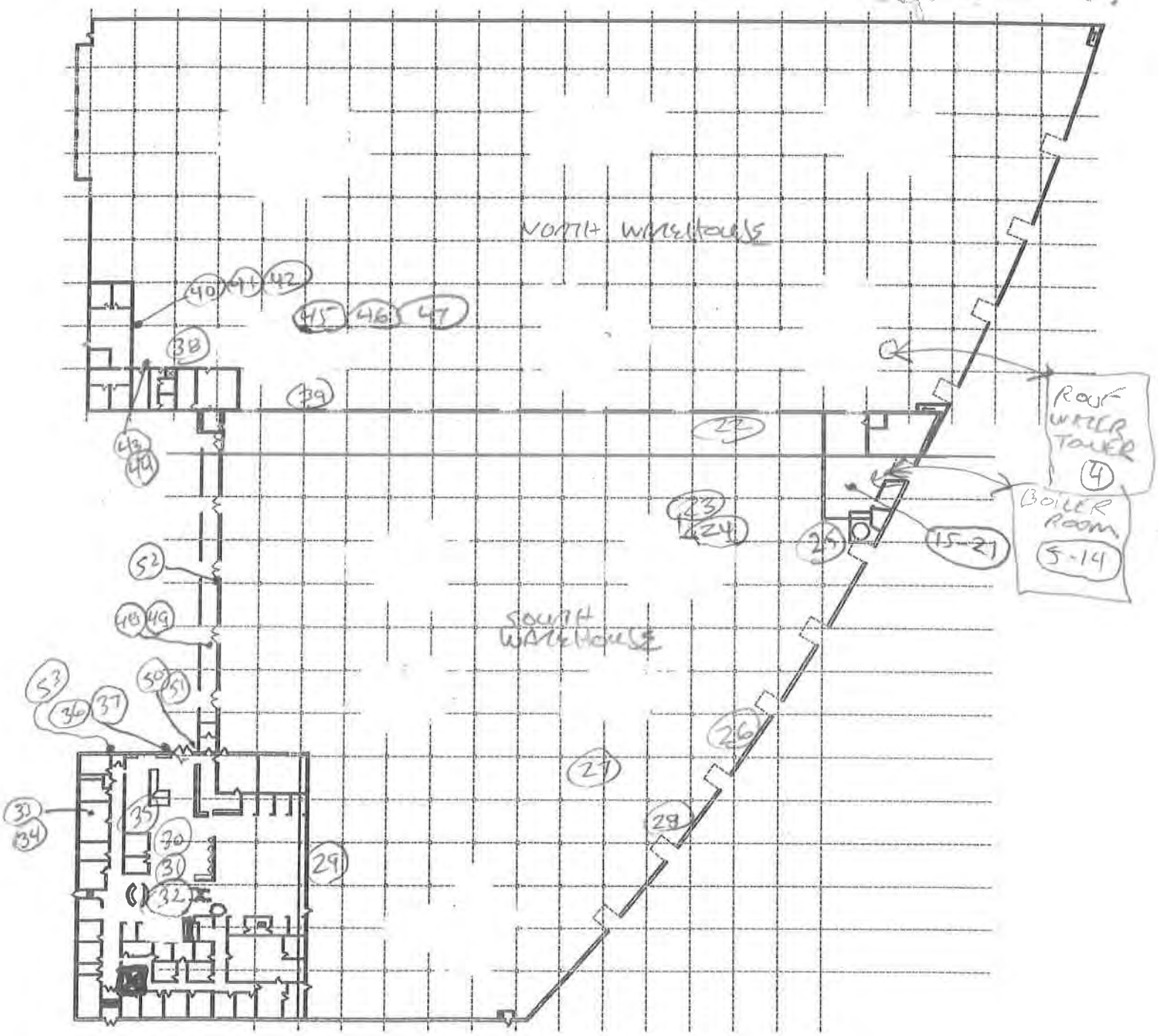
3-25-2015
JW & DW. C.
3-26-2015



BRAUN INTERTEC
B15-00394

3-26-2015

(4) WIPE SAMPLE LOCATIONS
W/W - DAN. C.



3/18/20

1153

Minnesota Pollution Control Agency/Minnesota Dept. of Health

Notification of Asbestos Related Work

DEPARTMENT OF HEALTH

Type of Notification: Original

Asbestos Abatement Contractor: Lic. # AC167

Name: VCI Environmental, Inc.
Address: 7094 Lake Drive, Suite 200
City, State, Zip: Lino Lakes, MN 55014
Contact Person: Jade Nustvold
Phone: 651-784-7077

Air Monitoring Consultant/Lab.: Lic. # AC412

Name: Braun Intertec Corporation
Address: 11001 Hampshire Ave S
City, State, Zip: Minneapolis, MN 55438
Contact Person:
Phone: 952-995-2000

Building Owner:

Name: City of Minneapolis
Address: 330 S 2nd Ave. Rm 552
City, State, Zip: Minneapolis, MN 55401
Contact Person: Chris Backes
Phone: 612-673-3774

Building Information:

Building Name: Former Roof Depot Bldg
Address/Location: 1860 28th ST E
City, State, Zip: Minneapolis, MN 55407
County: Hennepin
Phone: 612-673-3774
Size of Bldg.(sq.ft.): 50000.0 Age of Bldg.(yrs): 60
Number of Floors Including Basement Level 2
Present Use of Vacant
Prior Use of Bldg.: Warehouse

1. Type of Project: Renovation

2. Amount(s) of RACM(Regulated Asbestos Containing Material) to be Abated:

Friable	Non Friable	
8140.00		Linear feet on pipes
10000.00		Square feet on facility components(ex. tanks,boilers,ceilings,ceiling tiles,flooring)
		Cubic feet off facility components if linear footage or square footage cannot be determined

3. Asbestos Abatement Activity

a. Precleaning Work Are to Final Visual Inspection: Start: 03/23/2020 End: 12/31/2020
b. Dates when RACM will be distributed: Start: 03/23/2020 End: 12/31/2020
c. Workshifts, time and days: 7AM-3PM M-F

4. Building Inspection: ***Prior to renovation or demolition, all buildings must be inspected by an EPA accredited inspector.***

Company and / or individual that conducted the building inspection: Braun Intertec

5. Description & Location of RACM to be abated (including floor # and room #):

TSI throughout (main level/boiler room), Floor tile & mastic in sales area, transite panels in warehouse area

6. Describe in detail the following procedures specicific to this site:

[X] Containment [ ] Glove Bag

[ ] Mini Containment [ ] Facility Component Removal

7. For emergency Renovation/Demolition Abatement Projects:

a. Date and hour of emergency: _____

b. Description of sudden unexpected event: _____

_____

c. Explanation of how the event caused unsafe conditions or would cause equipment damage:

_____

8. Waste Transporter(s) Information:

Transporter Name:	DEM-CON Dumpsters
Transporter Contact:	John Pippert
Transporter Address:	3280 99th Ct NE
City, State, Zip:	Blaine, MN 55449
Phone:	763-780-0404

9. Waste Disposal Information:

Landfill Name:	Dem-Con Landfill, LLC
Owner/Operator:	
Address/Location:	3601 West 130th Street
City, State, Zip:	Shakopee, MN 55379
Phone:	

10. MN Department of Health Permit Fee: (Check the one that applies)

[ ] **$35 permit fee**

For all residential projects with less than 260 linear and 160 square feet but more than 10 linear and 6 square feet of

[X] **1% permit fee** Total Cost of Project: _____

For all projects, residential and nonresidential, with more than 260 linear and 160 square feet of RACM.

Attach a signed copy of the bid acceptance document or other cost verification document.

Does this 1% permit fee includes air monitoring costs? **No**

Is this a "Time and Materials" project? **No**

I certify that an individual trained in the provisions of Federal Regulations 40 CFR Part 61, Subpart M (a Minnesota Site Supervisor) will be on-site during the asbestos abatement project. I certify that the above information is correct and I am a bonafide representative of the abatement contractor or building owner and have authority to enter into agreements for my employer.

Submitted by: Jade Nustvold **Date** 03/18/2020

Send a copy of this notice to:

Minnesota Pollution Control Agency
Industrial Division - Asbestos Program
520 Lafayette Road N
St. Paul, MN 55155-4194

Email: asbestos.demolition.pca@state.mn.us
Fax:651-297-1438

Postmarked or delivered at least 10 working days (Mon.-Fri.) before RACM disturbance for all projects.

For questions call: 651-296-6300 or 1-800-657-3864

#7153

Minnesota Pollution Control Agency/Minnesota Dept. of Health

Notification of Asbestos Related Work

DEPARTMENT OF HEALTH

Type of Notification: Amendment

Asbestos Abatement Contractor: Lic. # AC167

Name: VCI Environmental, Inc.
Address: 7094 Lake Drive, Suite 200
City, State, Zip: Lino Lakes, MN 55014
Contact Person: Jade Nustvold
Phone: 651-784-7077

Air Monitoring Consultant/Lab.: Lic. # AC412

Name: Braun Intertec Corporation
Address: 11001 Hampshire Ave S
City, State, Zip: Minneapolis, MN 55438
Contact Person:
Phone: 952-995-2000

Building Owner:

Name: City of Minneapolis
Address: 330 S 2nd Ave. Rm 552
City, State, Zip: Minneapolis, MN 55401
Contact Person: Chris Backes
Phone: 612-673-3774

Building Information:

Building Name: Former Roof Depot Bldg
Address/Location: 1860 28th ST E
City, State, Zip: Minneapolis, MN 55407
County: Hennepin
Phone: 612-673-3774
Size of Bldg.(sq.ft.): 50000.0 Age of Bldg.(yrs): 60
Number of Floors Including Basement Level 2
Present Use of Vacant
Prior Use of Bldg.: Warehouse

1. Type of Project: Renovation

2. Amount(s) of RACM(Regulated Asbestos Containing Material) to be Abated:

Friable	Non Friable	
8140.00		Linear feet on pipes
10000.00		Square feet on facility components(ex. tanks,boilers,ceilings,ceiling tiles,flooring)
		Cubic feet off facility components if linear footage or square footage cannot be determined

3. Asbestos Abatement Activity

a. Precleaning Work Are to Final Visual Inspection: Start: 03/23/2020 End: 12/31/2020
b. Dates when RACM will be distributed: Start: 03/23/2020 End: 12/31/2020
c. Workshifts, time and days: 7AM-3PM M-F Amendment #1 Offsite until 3/24/20

4. Building Inspection: ***Prior to renovation or demolition, all buildings must be inspected by an EPA accredited inspector.***

Company and / or individual that conducted the building inspection: Braun Intertec

5. Description & Location of RACM to be abated (including floor # and room #):

TSI throughout (main level/boiler room), Floor tile & mastic in sales area, transite panels in warehouse area

Minnesota Pollution Control Agency/Minnesota Dept. of Health

Notification of Asbestos Related Work

DEPARTMENT OF HEALTH

Type of Notification: Amendment

Asbestos Abatement Contractor: Lic. # AC167

Name: VCI Environmental, Inc.
Address: 7094 Lake Drive, Suite 200
City, State, Zip: Lino Lakes, MN 55014
Contact Person: Jade Nustvold
Phone: 651-784-7077

Air Monitoring Consultant/Lab.: Lic. # AC412

Name: Braun Intertec Corporation
Address: 11001 Hampshire Ave S
City, State, Zip: Minneapolis, MN 55438
Contact Person:
Phone: 952-995-2000

Building Owner:

Name: City of Minneapolis
Address: 330 S 2nd Ave. Rm 552
City, State, Zip: Minneapolis, MN 55401
Contact Person: Chris Backes
Phone: 612-673-3774

Building Information:

Building Name: Former Roof Depot Bldg
Address/Location: 1860 28th ST E
City, State, Zip: Minneapolis, MN 55407
County: Hennepin
Phone: 612-673-3774
Size of Bldg.(sq.ft.): 50000.0 Age of Bldg.(yrs): 60
Number of Floors Including Basement Level 2
Present Use of Vacant
Prior Use of Bldg.: Warehouse

1. Type of Project: Renovation

2. Amount(s) of RACM(Regulated Asbestos Containing Material) to be Abated:

Friable	Non Friable	
8140.00		Linear feet on pipes
10000.00		Square feet on facility components(ex. tanks,boilers,ceilings,ceiling tiles,flooring)
		Cubic feet off facility components if linear footage or square footage cannot be determined

3. Asbestos Abatement Activity

a. Precleaning Work Are to Final Visual Inspection: Start: 03/23/2020 End: 12/31/2020
b. Dates when RACM will be distributed: Start: 03/23/2020 End: 12/31/2020
c. Workshifts, time and days: 7AM-3PM M-F Amendment #1 Offsite until 3/24/20 Amendment #2: Offsite 5/5/20 back onsite 5/6/20.

4. Building Inspection: ***Prior to renovation or demolition, all buildings must be inspected by an EPA accredited inspector.***

Company and / or individual that conducted the building inspection: Braun Intertec

5. Description & Location of RACM to be abated (including floor # and room #):

TSI throughout (main level/boiler room), Floor tile & mastic in sales area, transite panels in warehouse area

7153

Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Notification of Asbestos-Related Work

Solid Waste Program

Doc Type: Asbestos & Demolition/Amendments

MINNESOTA MDH DEPARTMENT OF HEALTH

Type of notification: NOTIFICATION
☒ Original ☐ Amended #_
☐ Project cancellation
☐ Residential ☒ Nonresidential and/or Regulated

Submit a copy of this notice to the Minnesota Pollution Control Agency (MPCA) at:

Industrial Division Asbestos Program
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

E-mail to: asbestos.demolition.pca@state.mn.us
Fax to: 651-297-1438

Postmarked or delivered at least ten (10) working days before Regulated Asbestos-Containing Material (RACM) disturbance for all projects.

For questions call: 651-296-6300 or 1-800-657-3864

Submit a copy of this notice, permit fee, and cost verification to Minnesota Department of Health (MDH) at:

Asbestos Unit
Minnesota Department of Health
P.O. Box 64497
St. Paul, MN 55164-0497

Received at least five (5) calendar days before the start of a project.

For questions call: 651-201-4620

Asbestos Abatement Contractor

License number: AC 167
Name: VCI Environmental, Inc.
Address: 7094 Lake Dr.
City, State, Zip: Lino Lakes, MN 55014
Phone number: 651-784-7077
Contact name: Aaron Ostermann
Phone number: 651-784-7077

Air Monitoring Consultant/Laboratory

License number:
Name: Braun Intertec
Address: 11001 Hampshire Ave. S
City, State, Zip: Minneapolis, MN
Phone number: 952-995-2000
Contact name: Robert Norby
Phone number:

☐ *Air sample analysis only*

Building Information

Building name: Former Roof Depot Bldg
Address/Location: 1860 28th St. E
City, State, Zip: Minneapolis, MN
County: Hennepin
Phone number: n/a
Age of bldg (yrs): 60 Size of bldg (sq ft): 50,000
Number of floors, including basement level(s): 2
Present use of bldg: Vacant
Prior use of bldg: Warehouse

Building Owner

Name: City of Minneapolis
Address: 330 S 2nd Ave. Rm 552
City, State, Zip: Minneapolis, MN 55401
Phone number: 612-673-3774
Contact name: Chris Backes
Phone number:

1. **Type of project (check all that apply):** ☐ Renovation ☒ Demolition ☐ Encapsulation ☐ Permanent enclosure
   ☐ Emergency (#7 must be completed to validate an Emergency)
   ☐ MDH Demolition Abatement Rules – Demolition by Destruction to the Ground (Minn. R. 4620.3585)
2. **Amount(s) of RACM to be abated:**

friable	nonfriable	
8140		Linear feet on pipes
10000		Square feet on facility components (e.g., tanks, boilers, ceilings, air ducts, and flooring)
		Cubic feet off facility components if linear footage or square footage cannot be determined

3. **Asbestos abatement activity dates** (mm/dd/yyyy):
   a. Precleaning work area to final visual inspection dates: Start: 3/23/20 End: 12/31/20
   b. Dates when RACM will be disturbed: Start: 3/23/20 End: 12/31/20
   c. Workshifts, time and days (e.g., 7 AM to 3 PM Mon.-Fri.): M-F 7am-3pm

4. **Building inspection:**
   Prior to a renovation or demolition, all buildings must be inspected by an MDH accredited inspector.
   a. Company and/or individual that conducted the building inspection: Braun Intertec
   b. Procedure, including analytic method, used to determine the presence of RACM:
      PLM

5. **Description and location of RACM to be abated (including floor # and room #):**
   TSI throughout (main level/boiler room) Floor tile & mastic in sales area, transite panels in warehouse area.

6. **Describe in detail the following procedures *specific to this site*:** (use a separate sheet if necessary)
   a. Asbestos abatement emissions control procedures:
      Wet acm to controll visble emissions
   b. Waste handling emission control procedures:
      Waste to be placed in lined asbestos dumpsters
   c. Description of procedures to be followed in the event that unexpected RACM is found or Cat. II nonfriable ACM becomes crumbled, pulverized, or reduced to a powder:
      stop work, isolate area, contact owner
   d. Description of work practice, including specific abatement procedures and techniques to be used:
      Wrap & cut TSI, Gross removal within full containment

7. **For Emergency Renovation/demolition abatement projects: (*Telephone MDH and MPCA for guidance on this option*)**
   a. Date and hour of emergency:
   b. Description of the sudden and unexpected event:
   c. Explanation of how the event caused unsafe conditions or would cause equipment damage:

8. **Waste transporter(s) information:**
   Transporter name: DemCon Dumpsters
   Transporter contact: Russ Reager
   Transporter address: 3280 99th Ct. NE
   City, State, Zip: Blaine, MN
   Phone number: 952-224-7105

9. **Waste Disposal Information:**
   Landfill name: Dem-Con Landfill
   Owner/operator: Dem Con Comapanies
   Address/location: 13020 Dem Con Dr,.
   City, State, Zip: Shakopee, MN 55379
   Phone number(s): 952-445-5755

10. **MDH permit fee: (Check the one that applies)**
    ☐ **$35 permit fee** (For all residential projects with less than 260 linear and 160 square feet but more than 10 linear and 6 square feet of RACM.)
    ☐ **1% permit fee** Total Cost of Project: $
    For all projects, residential and nonresidential, with more than 260 linear or 160 square feet of RACM.
    Attach a signed copy of the bid acceptance document or other cost verification document.
    Does this 1% permit fee include air monitoring costs? ☐ Yes ☐ No
    Is this a "Time and Materials" project? ☐ Yes ☐ No

Certification

- I certify that an individual trained in the provisions of Federal Regulations 40 CFR Part 61, Subpart M (a Minnesota Site Supervisor) will be on-site during the asbestos abatement project.
- I certify that the above information is correct, and I am an authorized representative of the abatement contractor or building owner and have authority to enter into agreements for my employer.

Print name: Aaron Ostermann Title: PM
Signature: Date: 3/6/20

Minnesota Department Of Health

Asbestos-Related Work Project Permit

Permit Number: 52722 **Issued On: March 18, 2020**

To: VCI Environmental, Inc. **License No: AC167**

For the project at: Former Roof Depot Bldg

Located at: 1860 28th ST E in Minneapolis, Minnesota

Amount of asbestos-containing material reported:

8140 Linear Feet, 10000 Square Feet, and Cubic Feet

Activity Dates: March 23, 2020 To December 31, 2020

This permit must be posted in a conspicuous place outside the asbestos work area until the asbestos-related work is completed.

Thomas P. Hogan, Director
Environmental Health Division

BRAUN INTERTEC
The Science You Build On.

Onsite Daily Log

Date: Client:
Location: Project #:
On-Site Tech: Contractor:
Foreman: Crew size: /Sign In/Out:

Days Nights Tech: Arrival time: /Finish time:

Crew: Arrival time: /Finish time:

Prelims Set-up Abatement Cleaning Visual Finals Tear-down

Full Containment Mini-containment Glovebag Other:

Type of Removal:

Personal Protection: 1/2 Face HEPA Manometer Readings:

Waste Storage: Number of Bags:

Time **Notes/Observations**

BRAUN INTERTEC
The Science You Build On.

Onsite Daily Log

Date: Client:
Location: Project #:
On-Site Tech: Contractor:
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Personal Protection: 1/2 Face HEPA Manometer Readings:

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Time **Notes/Observations**

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The Science You Build On.

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Time **Notes/Observations**

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Full Containment Mini-containment Glovebag Other:

Type of Removal:

Personal Protection: 1/2 Face HEPA Manometer Readings:

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Time **Notes/Observations**

BRAUN INTERTEC
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The Science You Build On.

Onsite Daily Log

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Time **Notes/Observations**

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The Science You Build On.

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Waste Storage: Number of Bags:

Time **Notes/Observations**

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The Science You Build On.

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Full Containment Mini-containment Glovebag Other:

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Personal Protection: 1/2 Face HEPA Manometer Readings:

Waste Storage: Number of Bags:

Time **Notes/Observations**

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The Science You Build On.

Onsite Daily Log

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Type of Removal:

Personal Protection: 1/2 Face HEPA Manometer Readings:

Waste Storage: Number of Bags:

Time **Notes/Observations**

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The Science You Build On.

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Personal Protection: 1/2 Face HEPA Manometer Readings:

Waste Storage: Number of Bags:

Time **Notes/Observations**

BRAUN INTERTEC
The Science You Build On.

Onsite Daily Log

Date: Client:
Location: Project #:
On-Site Tech: Contractor:
Foreman: Crew size: /Sign In/Out:

Days Nights Tech: Arrival time: /Finish time:

Crew: Arrival time: /Finish time:

Prelims Set-up Abatement Cleaning Visual Finals Tear-down

Full Containment Mini-containment Glovebag Other:

Type of Removal:

Personal Protection: 1/2 Face HEPA Manometer Readings:

Waste Storage: Number of Bags:

Time **Notes/Observations**

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Onsite Daily Log

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Prelims Set-up Abatement Cleaning Visual Finals Tear-down

Full Containment Mini-containment Glovebag Other:

Type of Removal:

Personal Protection: 1/2 Face HEPA Manometer Readings:

Waste Storage: Number of Bags:

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Prelims Set-up Abatement Cleaning Visual Finals Tear-down

Full Containment Mini-containment Glovebag Other:

Type of Removal:

Personal Protection: 1/2 Face HEPA Manometer Readings:

Waste Storage: Number of Bags:

Time **Notes/Observations**

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Prelims Set-up Abatement Cleaning Visual Finals Tear-down

Full Containment Mini-containment Glovebag Other:

Type of Removal:

Personal Protection: 1/2 Face HEPA Manometer Readings:

Waste Storage: Number of Bags:

Time **Notes/Observations**

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Days Nights Tech: Arrival time: /Finish time:

Crew: Arrival time: /Finish time:

Prelims Set-up Abatement Cleaning Visual Finals Tear-down

Full Containment Mini-containment Glovebag Other:

Type of Removal:

Personal Protection: 1/2 Face HEPA Manometer Readings:

Waste Storage: Number of Bags:

Time **Notes/Observations**

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The Science You Build On.

Onsite Daily Log

Date: Client:
Location: Project #:
On-Site Tech: Contractor:
Foreman: Crew size: /Sign In/Out:

Days Nights Tech: Arrival time: /Finish time:

Crew: Arrival time: /Finish time:

Prelims Set-up Abatement Cleaning Visual Finals Tear-down

Full Containment Mini-containment Glovebag Other:

Type of Removal:

Personal Protection: 1/2 Face HEPA Manometer Readings:

Waste Storage: Number of Bags:

Time **Notes/Observations**

BRAUN INTERTEC
The Science You Build On.

Onsite Daily Log

Date: Client:
Location: Project #:
On-Site Tech: Contractor:
Foreman: Crew size: /Sign In/Out:

Days Nights Tech: Arrival time: /Finish time:

Crew: Arrival time: /Finish time:

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Full Containment Mini-containment Glovebag Other:

Type of Removal:

Personal Protection: 1/2 Face HEPA Manometer Readings:

Waste Storage: Number of Bags:

Time **Notes/Observations**

BRAUN INTERTEC
The Science You Build On.

Onsite Daily Log

Date: Client:
Location: Project #:
On-Site Tech: Contractor:
Foreman: Crew size: /Sign In/Out:

Days Nights Tech: Arrival time: /Finish time:

Crew: Arrival time: /Finish time:

Prelims Set-up Abatement Cleaning Visual Finals Tear-down

Full Containment Mini-containment Glovebag Other:

Type of Removal:

Personal Protection: 1/2 Face HEPA Manometer Readings:

Waste Storage: Number of Bags:

Time **Notes/Observations**

BRAUN INTERTEC
The Science You Build On.

Onsite Daily Log

Date: Client:
Location: Project #:
On-Site Tech: Contractor:
Foreman: Crew size: /Sign In/Out:

Days Nights Tech: Arrival time: /Finish time:

Crew: Arrival time: /Finish time:

Prelims Set-up Abatement Cleaning Visual Finals Tear-down

Full Containment Mini-containment Glovebag Other:

Type of Removal:

Personal Protection: 1/2 Face HEPA Manometer Readings:

Waste Storage: Number of Bags:

Time **Notes/Observations**

BRAUN INTERTEC
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Onsite Daily Log

Date: Client:
Location: Project #:
On-Site Tech: Contractor:
Foreman: Crew size: /Sign In/Out:

Days Nights Tech: Arrival time: /Finish time:

Crew: Arrival time: /Finish time:

Prelims Set-up Abatement Cleaning Visual Finals Tear-down

Full Containment Mini-containment Glovebag Other:

Type of Removal:

Personal Protection: 1/2 Face HEPA Manometer Readings:

Waste Storage: Number of Bags:

Time **Notes/Observations**

BRAUN INTERTEC
The Science You Build On.

Onsite Daily Log

Date: Client:
Location: Project #:
On-Site Tech: Contractor:
Foreman: Crew size: /Sign In/Out:

Days Nights Tech: Arrival time: /Finish time:

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Full Containment Mini-containment Glovebag Other:

Type of Removal:

Personal Protection: 1/2 Face HEPA Manometer Readings:

Waste Storage: Number of Bags:

Time **Notes/Observations**

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Date: Client:
Location: Project #:
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Days Nights Tech: Arrival time: /Finish time:

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Prelims Set-up Abatement Cleaning Visual Finals Tear-down

Full Containment Mini-containment Glovebag Other:

Type of Removal:

Personal Protection: 1/2 Face HEPA Manometer Readings:

Waste Storage: Number of Bags:

Time **Notes/Observations**

BRAUN INTERTEC
The Science You Build On.

Table I. PCM Air Sample Results

Client: City of Minneapolis
Location: Former Roof Deport - 1860 28th Street, Minneapolis, MN
Date of Sampling: March 30, 2020 to May 15, 2020
Project No.: B1500394.01

Field Sample No.	Location	Description	Fiber Concentration (f/cc)[1]
March 30, 2020			
1	---	Field Blank	N.D.[2]
2	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01[3]
3	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
4	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
5	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
6	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
7	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
8	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
9	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
10	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
11	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
12	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
13	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
March 31, 2020			
14	---	Field Blank	N.D.
15	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
16	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
17	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
18	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
19	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
20	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
21	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
22	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
23	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01

Table I. PCM Air Sample Results
1860 28th Street, Minneapolis, MN
Project B1500394.01
Page 2

24	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
25	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
26	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
April 1, 2020			
27	---	Field Blank	N.D.
28	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
29	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
30	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
31	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
32	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
33	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
34	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
35	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
36	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
37	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
38	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
39	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
April 2, 2020			
40	---	Field Blank	N.D.
41	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
42	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
43	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
44	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
45	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
46	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
47	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
48	Central warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
49	South office space	Ambient/Adjacent <10' of non-friable floor tile mastic removal	<0.01
50	South office space	Ambient/Adjacent <10' of non-friable floor tile mastic removal	<0.01
51	South office space	Ambient/Adjacent <10' of non-friable floor tile mastic removal	<0.01

Table I. PCM Air Sample Results
1860 28th Street, Minneapolis, MN
Project B1500394.01
Page 3

52	South office space	Ambient/Adjacent <10' of non-friable floor tile mastic removal	<0.01
April 3, 2020			
---	---	No Air Sampling Required for Project	---
April 7, 2020			
53	---	Field Blank	N.D.
54	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
55	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
56	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
57	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
April 8, 2020			
58	---	Field Blank	N.D.
59	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
60	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
61	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
62	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
April 13, 2020			
62	---	Field Blank	N.D.
63	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
64	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
65	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
66	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
67	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
68	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
69	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
70	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
71	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
72	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
73	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
74	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
April 14, 2020			
75	---	Field Blank	N.D.
76	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01

Table I. PCM Air Sample Results
1860 28th Street, Minneapolis, MN
Project B1500394.01
Page 4

77	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
78	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
79	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
80	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
81	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
82	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
83	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
84	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
85	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
86	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
87	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
April 15, 2020			
88	---	Field Blank	N.D.
89	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
90	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
91	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
92	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
April 16, 2020			
93	---	Field Blank	N.D.
94	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
95	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
96	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
97	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
April 17, 2020			
98	---	Field Blank	N.D.
99	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
100	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
101	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
102	North warehouse	Ambient/Adjacent <10' of glovebag removal	<0.01
103	South office space	Ambient/Adjacent <10' of glovebag removal	<0.01
104	South office space	Ambient/Adjacent <10' of glovebag removal	<0.01

Table I. PCM Air Sample Results
1860 28th Street, Minneapolis, MN
Project B1500394.01
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April 20, 2020			
105	---	Field Blank	N.D.
106	South office space	Ambient/Adjacent <10' of glovebag removal	<0.01
107	South office space	Ambient/Adjacent <10' of glovebag removal	<0.01
108	South office space	Ambient/Adjacent <10' of glovebag removal	<0.01
109	South office space	Ambient/Adjacent <10' of glovebag removal	<0.01
April 21, 2020			
110	---	Field Blank	N.D.
111	South office space	Ambient/Adjacent <10' of glovebag removal	<0.01
112	South office space	Ambient/Adjacent <10' of glovebag removal	<0.01
113	South office space	Ambient/Adjacent <10' of glovebag removal	<0.01
114	South office space	Ambient/Adjacent <10' of glovebag removal	<0.01
April 22, 2020			
115	---	Field Blank	N.D.
116	South office space	Ambient/Adjacent <10' of decon unit	<0.01
117	South office space	Ambient/Adjacent <10' of critical barrier	<0.01
118	South office space	HEPA exhaust	<0.01
119	South office space	Ambient/Adjacent <10' of decon unit	<0.01
120	South office space	Ambient/Adjacent <10' of critical barrier	<0.01
121	South office space	Hepa exhaust	<0.01
April 23, 2020			
122	---	Field Blank	N.D.
123	South office space	Ambient/Adjacent <10' of decon unit	<0.01
124	South office space	Ambient/Adjacent <10' of critical barrier	<0.01
125	South office space	Hepa exhaust	<0.01
126	South office space	PCM Final Air Clearance	<0.01
127	South office space	PCM Final Air Clearance	<0.01
128	South office space	PCM Final Air Clearance	<0.01
129	South office space	PCM Final Air Clearance	<0.01
130	South office space	PCM Final Air Clearance	<0.01
April 24, 2020			
---	---	No Air Sampling Required for Project	---
May 4, 2020			
131	---	Field Blank	N.D.
132	Boiler Room	Ambient/Adjacent <10' of decon unit	<0.01
133	Boiler Room	Ambient/Adjacent <10' of critical barrier	<0.01
May 6, 2020			
134	---	Field Blank	N.D.
135	Boiler Room	Ambient/Adjacent <10' of decon unit	<0.01
136	Boiler Room	Ambient/Adjacent <10' of critical barrier	<0.01
137	Boiler Room	Ambient/Adjacent <10' of decon unit	<0.01
138	Boiler Room	Ambient/Adjacent <10' of critical barrier	<0.01

Table I. PCM Air Sample Results
1860 28th Street, Minneapolis, MN
Project B1500394.01
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May 7, 2020			
139	---	Field Blank	N.D.
140	Boiler Room	Ambient/Adjacent <10' of decon unit	<0.01
141	Boiler Room	Ambient/Adjacent <10' of critical barrier	<0.01
142	Boiler Room	Ambient/Adjacent <10' of decon unit	<0.01
143	Boiler Room	Ambient/Adjacent <10' of critical barrier	<0.01
May 8, 2020			
144	---	Field Blank	N.D.
145	Boiler Room	Ambient/Adjacent <10' of decon unit	<0.01
146	Boiler Room	Ambient/Adjacent <10' of critical barrier	<0.01
147	Boiler Room	Ambient/Adjacent <10' of decon unit	<0.01
148	Boiler Room	Ambient/Adjacent <10' of critical barrier	<0.01
May 11, 2020			
149	---	Field Blank	N.D.
150	Boiler Room	Ambient/Adjacent <10' of decon unit	<0.01
151	Boiler Room	Ambient/Adjacent <10' of critical barrier	<0.01
152	Boiler Room	Ambient/Adjacent <10' of decon unit	<0.01
153	Boiler Room	Ambient/Adjacent <10' of critical barrier	<0.01
May 12, 2020			
154	---	Field Blank	N.D.
155	Boiler Room	Ambient/Adjacent <10' of decon unit	<0.01
156	Boiler Room	Ambient/Adjacent <10' of critical barrier	<0.01
157	Boiler Room	Ambient/Adjacent <10' of decon unit	<0.01
158	Boiler Room	Ambient/Adjacent <10' of critical barrier	<0.01
May 13, 2020			
159	---	Field Blank	N.D.
160	Boiler Room	Ambient/Adjacent <10' of decon unit	<0.01
161	Boiler Room	Ambient/Adjacent <10' of critical barrier	<0.01
162	Boiler Room	Ambient/Adjacent <10' of decon unit	<0.01
163	Boiler Room	Ambient/Adjacent <10' of critical barrier	<0.01
May 14, 2020			
164	---	Field Blank	N.D.
165	Tank Room	Ambient/Adjacent <10' of glovebag removal	<0.01
166	Tank Room	Ambient/Adjacent <10' of glovebag removal	<0.01
167	Boiler Room	PCM Final Air Clearance	<0.01
168	Boiler Room	PCM Final Air Clearance	<0.01
169	Boiler Room	PCM Final Air Clearance	<0.01
170	Boiler Room	PCM Final Air Clearance	<0.01
171	Boiler Room	PCM Final Air Clearance	<0.01
May 15, 2020			
---	---	No Air Sampling Required for Project	---

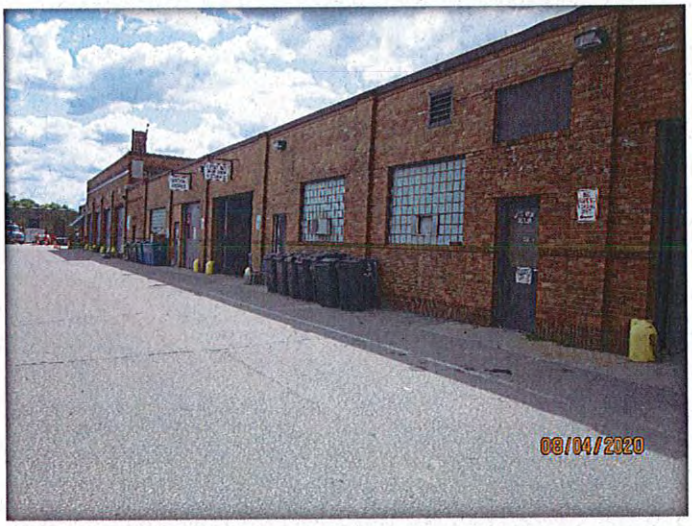
1. f/cc = feet per cubic centimeter
2. N.D. = None Detected
3. < = less than

INDUSTRIAL HYGIENE SERVICES CORPORATION

PRE-RENOVATION SURVEY
ASBESTOS CONTAINING MATERIALS AND REGULATED MATERIALS INVENTORY

CITY OF MINNEAPOLIS, CENTRAL STORES BUILDING
1858 EAST 27TH STREET
MINNEAPOLIS, MINNESOTA 55407

IHSC PROJECT NUMBER: M20-697



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August 5, 2020

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PRE-RENOVATION SURVEY
ASBESTOS CONTAINING MATERIALS AND
REGULATED MATERIALS INVENTORY

CITY OF MINNEAPOLIS, CENTRAL STORES BUILDING
1858 EAST 27TH STREET
MINNEAPOLIS, MINNESOTA 55407
IHSC PROJECT NUMBER: M20-697

1.0 INTRODUCTION

On July 8 and July 9, 2020, representatives from Industrial Hygiene Services Corporation (IHSC) conducted a survey for asbestos containing materials (ACM) and other regulated materials at the City of Minneapolis, Central Stores Building facility located at 1858 East 27th Street in Minneapolis, Minnesota. The property contained one large building that is broken into separate buildings. The intent of the investigation was to identify and quantify regulated materials associated with the structure that may require abatement or remediation prior to renovation activities.

2.0 RESULTS

Asbestos Containing Materials

Building components were penetrated to inspect for potential suspect ACM. These included walls, ceilings, flooring, and roofing materials.

Representative bulk samples of suspect materials were collected throughout the building. The samples were analyzed using polarized light microscopy (PLM). Materials sampled, sample locations, approximate material amount, and analytical results are summarized in Appendix A, Asbestos Material Identification Table. Figures identifying sample locations are included in Appendix B.

The Environmental Protection Agency (EPA) regulates asbestos materials related to building renovation or demolition in its Asbestos National Emissions Standards for Hazardous Air Pollutants (NESHAP) regulation, 40 CFR Part 61. In the NESHAP, ACM is divided into categories, which affect removal and disposal options. Suspect ACM not specifically identified as being sampled in this report should be presumed to be asbestos containing until sampling and analysis prove them to be otherwise.

Of the materials sampled, the following were found to be asbestos containing, per EPA definitions:

Material	Location	Total Quantity
Gray Door Caulk	Paving and Bridge Storage	20 Linear Feet
Pipe Insulation (with Elbows)	Authorized Personnel Room, Street Department, Central Stores, Bathroom Hallway	485 Linear Feet
Tan Expansion Joint	Authorized Personnel Room, Room 8	60 Linear Feet
Beige and Tan Window Glazes	Paving and Bridge Storage, Street Department	42 Linear Feet
Black Sink Coating	Street Department	4 Square Feet
Gray Square Block Window	Paving and Bridge Storage	24 Linear Feet
Black Floor Tile Adhesive	General Storage, Sewer Office	400 Square Feet
Roof Flashing	Lower South Roof	300 Linear Feet
Gray Expansion Joint	Exterior	40 Linear Feet

Lead-Based Paint

Industrial Hygiene Services Corporation completed a lead-based paint survey of the predominant paint surfaces. A Niton X-Ray Fluorescence Analyzer (XRF) was used to quantify lead concentrations in paint surfaces.

According to the EPA and the Minnesota Department of Health, results equal to or above one milligram per centimeter squared (mg/cm^2) or 0.5 percent by weight are considered lead-based paint. Lead-based paint that is firmly bonded to the substrate can be managed as normal demolition debris and taken to a permitted demolition debris disposal landfill. Demolition debris that has lead-based paint attached cannot be used for recycling.

Lead concentrations below 5,000 milligram/kilogram have been known to produce airborne lead levels over the Occupational Safety and Health Administration (OSHA) action level of 30 micrograms per cubic meter of air ($\mu g/m^3$). The OSHA Lead-In Construction Standard 29 CFR 1926.62 does not specify what surface concentrations are affected by this standard.

Any activity on any surface which generates airborne lead dust or fumes over the action level of 30 $\mu g/m^3$ is covered by this regulation.

X-Ray Fluorescence Analyzer testing results determined that multiple paint surfaces inside the structure contained lead concentrations equal to or above the regulatory standard of one mg/cm^2. The XRF sampling results and lead-based paint inventory are presented in Appendix D, Lead Paint Results. Lead paint sample locations are presented in Appendix B.

Regulated Materials

Industrial Hygiene Services Corporation personnel followed Minnesota Pollution Control Agency (MPCA) guidelines to identify and inventory other regulated waste materials that are required to be removed prior to demolition. Minnesota Statutes, Chapters 115 and 116, and Minnesota Rules 7011, 7027, 7035, and 7045 govern regulated materials. Items inventoried as regulated materials cannot be considered as demolition debris. These items may include hazardous substances within fixtures and devices associated with electrical, plumbing, heating, cooling, safety, or lighting systems. Other materials such as municipal solid waste, household hazardous waste, industrial or hazardous wastes, tires, appliances, and electronics are prohibited from being disposed of in a demolition landfill in accordance with the MPCA. The Regulated Materials Inventory is attached in Appendix C.

3.0 METHODOLOGY

The bulk building material samples were analyzed by a laboratory which successfully participates in the asbestos bulk analysis program of the American Industrial Hygiene Association. Bulk asbestos analysis is conducted in accordance with the EPA methods 40 CFR, Part 763, Ch.1, Subpart F, Appendix A (07/01/87 Edition) and EPA 600/R-93/116, July, 1993, utilizing PLM and dispersion staining techniques. The analytical method's lower detection is one percent asbestos by volume. The method provides the percentage of asbestos present and distinguishes the following types of asbestos: chrysotile, amosite, crocidolite, tremolite, actinolite, and anthophyllite. Analyses were in compliance with the quality control procedures specified by the methods.

The portion of the samples not consumed in the analysis will be retained by IHSC for a period of 30 days and then disposed of unless IHSC receives notification to return the samples to you.

Lead-in paint was evaluated by qualified IHSC personnel using an XRF. Certifications are included in Appendix E. Industrial Hygiene Services Corporation personnel who performed

the building survey and sampling have completed, at a minimum, an EPA approved training course in asbestos survey and the applicable refresher training courses.

4.0 LIMITATIONS OF BUILDING SURVEY/REMARKS

The quantity of samples, sample locations, and analyses performed were selected to provide analytical data to document and evaluate current site conditions. The reporting of bulk analytical results is presented as an estimate resulting from analysis by EPA approved methods.

Any discussion or recommendations contained in this report represent our professional opinions. These opinions are based on currently available information and are arrived at in accordance with currently accepted industrial hygiene practices at this time and location. Other than this, no guarantee is implied or intended.

Every effort was made to completely evaluate materials associated with the City of Minneapolis Central Stores Building located in Minneapolis, Minnesota. This evaluation was based on past experience with similar materials, similar buildings, similar budgeting, and time constraints. Industrial Hygiene Services Corporation maintains that materials observed, samples collected, and results reported are factual and accurate.

We appreciate the opportunity to be of service to you on this project. If you have any questions or concerns regarding this report, please contact Nick Mueller at (651) 287-5373.

Sincerely:

INDUSTRIAL HYGIENE SERVICES CORPORATION

Report Prepared by:

Mike Soumie
Field Technician

Report Reviewed by:

Nicholas Mueller
Senior Project Manager

APPENDIX A

Asbestos Material Identification Results and Chain of Custody

ASBESTOS MATERIAL IDENTIFICATION TABLE

Project Name: City of Minneapolis
Central Stores Building
1858 East 27th Street
Minneapolis, MN

IHSC Project No.: M20-697

Date Sampled: July 8, July 9 and July 31, 2020

Inspectors: Frank Reed, Mike Suomie, and Nicholas Mueller

INDUSTRIAL HYGIENE SERVICES CORPORATION

Room ID	Material Identification		Sample Number	Quantity	Units	ACM Results
Paving and Bridge Storage	Window Glaze	Clear	1A	24	Linear Feet	None Detected
	Window Caulk	Cream	2A	120	Linear Feet	<1% Chrysotile
	Expansion Joint	White	3A	20	Linear Feet	None Detected
	Door Caulk	Gray	4A	20	Linear Feet	2% Chrysotile
	Plexiglass Adhesive	White	5A	20	Linear Feet	None Detected
	Gypsum Board	With Joint Compound	6A	20	Linear Feet	None Detected
	Window Glaze	White	7A	400	Linear Feet	None Detected
	Window Glaze	Beige and Tan	13A	10	Linear Feet	2% Chrysotile
	PBS Pipe Elbow Insulation	Gray	8A	7	Linear Feet	None Detected
	Window Caulk	Gray Square Block	16A	24	Linear Feet	None Detected
	Window Caulk	Gray Square Block	16B**	24	Linear Feet	3% Chrysotile
	Canvas	With Joint Compound	17A	48	Square Feet	None Detected
Authorized Personnel Room	Old Shelving Caulk	White	9A	50	Linear Feet	None Detected
	Pipe Insulation	Including 2 Elbows	10A	40	Linear Feet	6% Amosite
	Plaster	Ceiling	11A	400	Linear Feet	None Detected
	Expansion Joint	Tan	12A	30	Linear Feet	3% Chrysotile
Room 8	Window Glaze	White	7B	80	Linear Feet	None Detected
	Old Shelving Caulk	White	9B	30	Linear Feet	None Detected
	Plaster	Ceiling	11B	400	Square Feet	None Detected
	Expansion Joint	Tan	12B	30	Linear Feet	3% Chrysotile

* This result is inferred as consistent with an analyzed sample of the same material from another area.

ASBESTOS MATERIAL IDENTIFICATION TABLE

Room ID	Material Identification		Sample Number	Quantity	Units	ACM Results
Street Department	Expansion Joint	White	3B	115	Linear Feet	None Detected
	Door Caulk	Gray	4B	15	Linear Feet	None Detected
	Window Glaze	Beige and Tan	13B	32	Linear Feet	3% Chrysotile
	Pipe Insulation	Including 2 Elbows	10B	200	Linear Feet	TTP
	Sink Undercoating	Black	14A	4	Square Feet	2% Chrysotile
	12 X 12 Floor Tile	White	47A	160	Square Feet	None Detected
	Floor Tile Mastic	Black	48A	160	Square Feet	None Detected
Central Store 1	Door Caulk	Gray	4C	15	Linear Feet	None Detected
Central Store 2	PBS Pipe Elbow Insulation	Gray	8C	30	Linear Feet	2% Chrysotile <1% Amosite
	Pipe Insulation	Including 3 Elbows	10C	15	Linear Feet	TTP
	Gypsum Board	With Joint Compound	6B	20	Linear Feet	None Detected
	Fire Caulk	Red	18A	10	Linear Feet	None Detected
	Vent Caulk	Dark Gray	19A	10	Linear Feet	None Detected
	Pipe Insulation	Including 1 Elbow	20A	10	Linear Feet	12% Amosite
Central Store 3	Pipe Insulation	Including 3 Elbows	20B	40	Linear Feet	12% Amosite
Central Store Office	Ceiling Tile	White	21A	440	Square Feet	None Detected
Bathroom Hallway	Door Caulk	Gray	22A	15	Linear Feet	None Detected
	Expansion Joint	Gray	23A	2	Linear Feet	None Detected
	Pipe Elbow	Including 4 Elbows	24A	10	Linear Feet	40% Chrysotile
Men's Bathroom	Sink Caulk	Tan	25A	10	Linear Feet	None Detected
	Urinal Caulk	White	26A	25	Linear Feet	None Detected
	Wallpaper Adhesive	Tan	27A	150	Square Feet	None Detected
	Ceiling Texture	White	28A&B	320	Square Feet	None Detected
Women's Bathroom	Ceiling Texture	White	28C	180	Square Feet	None Detected
	Tile	Brown	29A	40	Square Feet	None Detected
	Grout	Tan	30A	40	Square Feet	None Detected
	Adhesive	Tan	31A	40	Square Feet	None Detected

* This result is inferred as consistent with an analyzed sample of the same material from another area.

ASBESTOS MATERIAL IDENTIFICATION TABLE

Room ID	Material Identification		Sample Number	Quantity	Units	ACM Results
Central Office 4	Pipe Insulation	Gray	32A	70	Linear Feet	20% Amosite
	Pipe Insulation Elbow	7 Elbows	33A	20	Linear Feet	<1% Amosite
Central Office 5	Door Caulk	Gray	22B	15	Linear Feet	None Detected
	Cement Flooring	White (From Mezzanine)	34A	540	Square Feet	None Detected
	Pipe Insulation	Including 5 Elbows	35A	70	Linear Feet	40% Chrysotile 4% Amosite
Sewer Department	Door Caulk	White	36A	140	Linear Feet	None Detected
Sewer Dept. Storage	Ceiling Tile	Tan	37A	240	Linear Feet	None Detected
Asphalt Lab	Ceiling Tile	Tan	37B&C	600	Square Feet	None Detected
General Storage & Sewer Office	Square Block Window	Gray	38A	24	Linear Feet	<1% Chrysotile
	Pinhole Ceiling Tile	White	39A	400	Square Feet	None Detected
	Floor Tile	Tan	40A-C	400	Square Feet	<1% Chrysotile
	Floor Tile Adhesive	Black	41A-C	400	Square Feet	2% Chrysotile
	Baseboard Adhesive	Brown	42A	40	Linear Feet	None Detected
Boiler Room/Basement	Boiler Rope Gasket	Tan	43A	5	Linear Feet	None Detected
	Boiler Floor	Gray	44A	15	Linear Feet	None Detected
	Boiler Brick	Gray	45A	8	Linear Feet	None Detected
	Boiler Door Insulation	White	46A	1	Linear Feet	None Detected
	Wall Texture	Tan	37D	570	Square Feet	None Detected

* This result is inferred as consistent with an analyzed sample of the same material from another area.

ASBESTOS MATERIAL IDENTIFICATION TABLE

Room ID	Material Identification		Sample Number	Quantity	Units	ACM Results
Roof	Window Caulk	Gray	49A	50	Linear Feet	<1% Chrysotile
	Roof Caulk	Gray	50A	100	Linear Feet	None Detected
	Roof Caulk	Gray	50B	100	Linear Feet	None Detected
	Roof Caulk	Gray	50C	100	Linear Feet	None Detected
	AC Caulk	Black	51A	50	Linear Feet	None Detected
	Roof Flashing, Lower South Section	Black	52A**	300	Linear Feet	3% Chrysotile
	Roof Flashing, Upper	Black	52B	200	Linear Feet	None Detected
	Roof Flashing, Lower North Section	Black	52C	500	Linear Feet	None Detected
	Flat Roof, Lower	Foam, Tar	01 Roof	19,000	Square Feet	None Detected
	Flat Roof, Upper	Foam, Tar	02 Roof	19,000	Square Feet	None Detected
Exterior	Window Glaze	Gray	53A	250	Square Feet	None Detected
	Door Caulk	Dark Gray	54A	12	Linear Feet	None Detected
	Door Caulk	Tan & Brown	55A	210	Linear Feet	None Detected
	Expansion Joint	Gray	56A	40	Linear Feet	6% Chrysotile
	Door Caulk	Light Gray	57A	60	Linear Feet	None Detected
	Expansion Joint	Dark Gray	58A	20	Linear Feet	None Detected
	Window Caulk	Gray	59A	40	Linear Feet	None Detected

** = This sample is different from the other samples in the sample series.

* This result is inferred as consistent with an analyzed sample of the same material from another area.

MATERIAL IDENTIFICATION RESULTS

Prepared By: INDUSTRIAL HYGIENE SERVICES CORPORATION
4205 White Bear Parkway, Suite 500
Vadnais Heights, Minnesota 55110

INDUSTRIAL HYGIENE SERVICES CORPORATION

IHSC Project Name: City of Minneapolis, Central Store Building, 1858 E 27th Street, Minneapolis, MN
IHSC Project Number: M20-697

Date Sampled: 07/08/20
Date Received: 07/10/20
Date Analyzed: 07/13/20 and 07/14/20

Location	Material Identification	Sample Number	Type of Asbestos	Percent Asbestos
Paving and Bridge Storage	Clear Window Glaze	1A	None Detected	None Detected
Paving and Bridge Storage	Cream Window Caulk	2A	Chrysotile	<1%
Paving and Bridge Storage	White Expansion Joint	3A	None Detected	None Detected
Paving and Bridge Storage	Gray Door Caulk	4A	Chrysotile	2%
Paving and Bridge Storage	White Plexiglass Adhesive	5A	None Detected	None Detected
Paving and Bridge Storage	Gypsum Board with Joint Compound	6A	None Detected	None Detected
Paving and Bridge Storage	White Window Glaze	7A	None Detected	None Detected
Paving and Bridge Storage	PBS Gray Pipe Elbow Insulation	8A	None Detected	None Detected
Authorized Personnel Room	Old White Shelving Caulk	9A	None Detected	None Detected
Authorized Personnel Room	Pipe Insulation	10A	Amosite	6%
Authorized Personnel Room, Ceiling	Plaster	11A	None Detected	None Detected
Authorized Personnel Room	Tan Expansion Joint	12A	Chrysotile	3%
Room #8, Ceiling	Plaster	11B	None Detected	None Detected
Paving and Bridge Storage	Beige and Tan Window Glazes	13A	Chrysotile	2%
Street Department	Gray Door Caulk	4B	None Detected	None Detected
Street Department	Gray Pipe Insulation	10B	TTP	TTP
Street Department	Black Sink Coating	14A	Chrysotile	2%

Analyst: Susan Grubb

MATERIAL IDENTIFICATION RESULTS

Prepared By: INDUSTRIAL HYGIENE SERVICES CORPORATION
4205 White Bear Parkway, Suite 500
Vadnais Heights, Minnesota 55110

IHSC Project Name: City of Minneapolis, Central Store Building, 1858 E 27th Street, Minneapolis, MN
IHSC Project Number: M20-697

INDUSTRIAL HYGIENE SERVICES CORPORATION

Date Sampled: 07/08/20
Date Received: 07/10/20
Date Analyzed: 07/13/20 and 07/14/20

Location	Material Identification	Sample Number	Type of Asbestos	Percent Asbestos
Street Department	White Expansion Joint	3B	None Detected	None Detected
Street Department (Large Door)	Gray Door Caulk	15A	None Detected	None Detected
Street Department	Gray Square Block Window Caulk	16A	None Detected	None Detected
Painting and Bridge Storage	Gray Square Block Window Caulk	16B**	Chrysotile	3%
Painting and Bridge Storage	Canvas and Joint Compound	17A	None Detected	None Detected
Central Stores 2	Red Fire Caulk	18A	None Detected	None Detected
Central Stores 1	Gray Door Caulk	4C	None Detected	None Detected
Central Stores 2	Dark Gray Vent Caulk	19A	None Detected	None Detected
Central Stores 2	Gypsum Board with Joint Compound	6B	None Detected	None Detected
Central Stores 2	Pipe Elbow Insulation	8C	Chrysotile Amosite	2% <1%
Central Stores 2	Pipe Insulation	20A	No Sample	No Sample
Central Stores 3	Pipe Insulation	20B	Amosite	12%
Central Stores Office	White Ceiling Tile	21A	None Detected	None Detected
Bathroom Hallway	Gray Door Caulk	22A	None Detected	None Detected
Bathroom Hallway	Gray Expansion Joint	23A	None Detected	None Detected
Bathroom Hallway	Pipe Elbow Insulation	24A	Chrysotile	40%
Men's Bathroom	Tan Sink Caulk	25A	None Detected	None Detected

Analyst: Susan Grubb

MATERIAL IDENTIFICATION RESULTS

Prepared By: INDUSTRIAL HYGIENE SERVICES CORPORATION
4205 White Bear Parkway, Suite 500
Vadnais Heights, Minnesota 55110

INDUSTRIAL HYGIENE SERVICES CORPORATION

IHSC Project Name: City of Minneapolis, Central Store Building, 1858 E 27th Street, Minneapolis, MN
IHSC Project Number: M20-697

Date Sampled: 07/08/20
Date Received: 07/10/20
Date Analyzed: 07/13/20 and 07/14/20

Location	Material Identification	Sample Number	Type of Asbestos	Percent Asbestos
Men's Bathroom	White Urinal Caulk	26A	None Detected	None Detected
Men's Bathroom	Tan Wall Paper Adhesive	27A	None Detected	None Detected
Men's Bathroom	White Ceiling Texture	28A	None Detected	None Detected
Men's Bathroom	White Ceiling Texture	28B	None Detected	None Detected
Women's Bathroom	White Ceiling Texture	28C	None Detected	None Detected
Women's Bathroom	Brown Tile	29A	None Detected	None Detected
Women's Bathroom	Tan Grout	30A	None Detected	None Detected
Women's Bathroom	Tan Adhesive	31A	None Detected	None Detected
Central Stores 4	Pipe Insulation	32A	Amosite	20%
Central Stores 4	Pipe Elbow Insulation	33A	Amosite	<1%
Central Stores 5	Gray Door Caulk	22B	None Detected	None Detected
Central Stores 5, Mezzanine	Cement Flooring	34A	None Detected	None Detected
Central Stores 5	Pipe Insulation	35A	Chrysotile Amosite	40% 4%
Sewer Department	White Door Caulk	36A	None Detected	None Detected
Sewer Department Storage	Tan Ceiling Texture	37A	None Detected	None Detected
Asphalt Lab	Tan Ceiling Texture	37B	None Detected	None Detected

Analyst: Susan Grubb

MATERIAL IDENTIFICATION RESULTS

Prepared By: INDUSTRIAL HYGIENE SERVICES CORPORATION
4205 White Bear Parkway, Suite 500
Vadnais Heights, Minnesota 55110

INDUSTRIAL HYGIENE SERVICES CORPORATION

IHSC Project Name: City of Minneapolis, Central Store Building, 1858 E 27th Street, Minneapolis, MN
IHSC Project Number: M20-697

Date Sampled: 07/08/20
Date Received: 07/10/20
Date Analyzed: 07/13/20 and 07/14/20

Location	Material Identification	Sample Number	Type of Asbestos	Percent Asbestos
Asphalt Lab	Tan Wall Texture	37C	None Detected	None Detected
General Storage	Gray Square Block Window Glaze	38A	Chrysotile	<1%
General Storage	White Pinhole Ceiling Tile	39A	None Detected	None Detected
General Storage	Tan Floor Tile	40A	Chrysotile	<1%
General Storage	Black Adhesive	41A	Chrysotile	2%
General Storage	Tan Floor Tile	40B**	None Detected	None Detected
General Storage	Black Adhesive	41B**	None Detected	None Detected
General Storage	Tan Floor Tile	40C	Chrysotile	<1%
General Storage	Black Adhesive	41C	TTP	TTP
General Storage	Dark Brown Baseboard Adhesive	42A	None Detected	None Detected
Basement	Boiler Rope Gasket	43A	None Detected	None Detected
Basement	Boiler Floor	44A	None Detected	None Detected
Basement	Boiler Brick	45A	None Detected	None Detected
Basement	Boiler Door Insulation	46A	None Detected	None Detected
Basement	Tan Wall Texture	37D	None Detected	None Detected
Street Department	White 12" x 12" Floor Tile	47A	None Detected	None Detected
Street Department	Black Mastic	48A	None Detected	None Detected

Analyst: Susan Grubb

MATERIAL IDENTIFICATION RESULTS

Prepared By: INDUSTRIAL HYGIENE SERVICES CORPORATION
4205 White Bear Parkway, Suite 500
Vadnais Heights, Minnesota 55110

IHSC Project Name: City of Minneapolis, Central Store Building, 1858 E 27th Street, Minneapolis, MN
IHSC Project Number: M20-697

INDUSTRIAL HYGIENE SERVICES CORPORATION

Date Sampled: 07/08/20
Date Received: 07/10/20
Date Analyzed: 07/13/20 and 07/14/20

Location	Material Identification	Sample Number	Type of Asbestos	Percent Asbestos
Roof	Gray Window Caulk	49A	Chrysotile	<1%
Roof	Roof Caulk	50A	None Detected	None Detected
Roof	Roof Caulk	50B	None Detected	None Detected
Roof	Roof Caulk	50C	None Detected	None Detected
Roof	AC Caulk	51A	None Detected	None Detected
Roof	Roof Flashing	52A**	Chrysotile	3%
Roof	Roof Flashing	52B	None Detected	None Detected
Roof	Roof Flashing	52C	None Detected	None Detected
Exterior	Gray Exterior Window Glaze	53A	None Detected	None Detected
Exterior (East)	Dark Gray Door Caulk	54A	None Detected	None Detected
Exterior	Tan Door Caulk	55A	None Detected	None Detected
Exterior	Gray Expansion Joint	56A	Chrysotile	6%
Exterior	Light Gray Door Caulk	57A	None Detected	None Detected
Exterior	Dark Gray Expansion Joint	58A	None Detected	None Detected
Exterior	Gray Window Caulk	59A	None Detected	None Detected
Central Stores -2	Pipe Insulation	10C	TTP	TTP

Analyst: Susan Grubb

MATERIAL IDENTIFICATION RESULTS

Prepared By: INDUSTRIAL HYGIENE SERVICES CORPORATION
4205 White Bear Parkway, Suite 500
Vadnais Heights, Minnesota 55110

INDUSTRIAL HYGIENE SERVICES CORPORATION

IHSC Project Name: City of Minneapolis, Central Store Building, 1858 E 27th Street, Minneapolis, MN
IHSC Project Number: M20-697

Date Sampled: 07/08/20
Date Received: 07/10/20
Date Analyzed: 07/13/20 and 07/14/20

Location	Material Identification	Sample Number	Type of Asbestos	Percent Asbestos
Street Department	Gray Pipe Elbow Insulation	8B	TTP	TTP

None Detected = No asbestos was detected in the portions of the sample analyzed.

** = This sample is different from the other samples in the sample series.

The samples were analyzed using polarized light microscopy and dispersion staining techniques utilizing the EPA-approved methodology 600/R-93/116, dated July, 1993. This method estimates the amount of asbestos present and distinguishes between the following types of asbestos: chrysotile, amosite, crocidolite, tremolite, actinolite, and anthophyllite. The results are presented as estimates based on this method for the portions of the samples analyzed.

Analyst: Susan Grubb

CHAIN-OF-CUSTODY RECORD

4205 White Bear Parkway
Suite 500
Vadnais Heights, MN 55110
Office 651-766-9811
FAX 651-766-9822

IHSC Project No: M20-697
Project Manager: Nicholas Mueller
Project Name: City of Minneapolis Central Store Building
Project Location: 1858 E 27th Street, Minneapolis, MN 55407
Sampler Signature:

Page: 1 of 9
Turn Request
Normal: _____x_____
Rush: _____
Other: _____

Lab Name: IHSC
LAB USE ONLY
Lab Project No.

Sample ID	Sample Location/Description	Date/Time Sampled	Sample Matrix: (S)oil, (A)ir, (B)ulk, A(q)ueous, S(l)udge, (O)ther	Analysis Requested: PLM	Number of Containers	Accept (A) Reject (R)	Sample Condition as Received (Chilled YES / NO; Sealed YES / NO) Sample Condition Comments	Laboratory Sample Number
1A	Paving &Bridge Storage, Clear Window Glaze	7/8/2020, 9:30:00 AM	B	X	1			ND
2A	Paving &Bridge Storage,Cream Window Caulk	7/8/2020, 9:35:00 AM	B	X	1			<1% CHR
3A	Paving &Bridge Storage,White Expansion Joint	7/8/2020, 9:40:00 AM	B	X	1			ND
4A	Paving &Bridge Storage,Gray Door Caulk	7/8/2020, 9:45:00 AM	B	X	1			2% CHR
5A	Paving &Bridge Storage,White Plexiglass Adhesive	7/8/2020, 9:54:00 AM	B	X	1			ND
6A	Paving &Bridge Storage,Gypsum With Joint	7/8/2020, 10:00:00 AM	B	X	1			ND
7A	Paving &Bridge Storage,White Window Glaze	7/8/2020, 10:05:00 AM	B	X	1			ND
8A	Paving &Bridge Storage,PBS Gray Pipe Elbow Insulation	7/8/2020, 10:30:00 AM	B	X	1			ND
9A	Authorized Personnel Room, Old White Shelving Caulk	7/8/2020, 10:35:00 AM	B	X	1			ND
10A	Authorized Personnel Room, Pipe Insulation	7/8/2020, 10:45:00 AM	B	X	1			6% AMOS

General Comments: Send Results to Paul

10 ← Total Number of Containers

Relinquished by: Mike Suomie 07/10/20	Relinquished by:	Relinquished by:
Company: IHSC	Company:	Company:
Received by:	Received by:	Received by:
Company: IHSC 07/10/20	Company:	Company:

CHAIN-OF-CUSTODY RECORD

4205 White Bear Parkway
Suite 500
Vadnais Heights, MN 55110
Office 651-766-9811
FAX 651-766-9822

IHSC Project No: M20-697
Project Manager: Nicjolas Mueller
Project Name: City of Minneapolis Central Store Building
Project Location: 1858 E 27th Street, Minneapolis, MN 55407
Sampler Signature:

Page: 2 of 9
Turn Request
Normal: _____x_____
Rush: _____
Other: _____

Lab Name: IHSC
LAB USE ONLY
Lab Project No.

Sample ID	Sample Location/Description	Date/Time Sampled	Sample Matrix: (S)oil, (A)ir, (B)ulk, A(q)ueous, S(l)udge, (O)ther	Analysis Requested: PLM					Number of Containers	Accept (A) Reject (R)	Sample Condition as Received: Chilled YES / NO; Sealed YES / NO; Sample Condition Comments	Laboratory Sample Number
11A	Authorized Personnel Room, Ceiling Plaster	7/8/20, 10:45	B	X					1			ND
12A	Authorized Personnel Room, Tan Expansion Joint	7/8/20, 10:52	B	X					1			3% CHR
11B	Room #8 Ceiling Plaster	7/8/20, 11:14	B	X					1			ND
13A	Paving & Bridge Storage, Gray Window Glaze	7/8/20, 12:22	B	X					1			2% CHR
4B	Street Dep., Gray Door Caulk	7/8/20, 12:28	B	X					1			ND
10B	Street Dep.,Gray Pipe Insulation	7/8/20, 12:34	B	X					1			ND
14A	Street Dep.,Black Sink Coating	7/8/20, 12:36	B	X					1			2% CHR
3B	Street Dep.,White Expansion Joint	7/8/20, 12:40	B	X					1			ND
15A	Street Dep., Gray Door Caulk (Large Door)	7/8/20, 1:05	B	X					1			ND
16A	Gray Square Block Window Caulk	7/8/20, 1:08	B	X					1			ND

Total Number of Containers: 10

General Comments: Send Results to Paul

Relinquished by: Mike Suomie 07/10/20	Relinquished by:	Relinquished by:
Company: IHSC	Company:	Company:
Received by:	Received by:	Received by:
Company: IHSC 07/10/20	Company:	Company:

CHAIN-OF-CUSTODY RECORD

4205 White Bear Parkway
Suite 500
Vadnais Heights, MN 55110
Office 651-766-9811
FAX 651-766-9822

IHSC Project No:	M20-697
Project Manager:	Nicholas Mueller
Project Name:	City of Minneapolis Central Store Building
Project Location:	1858 E 27th Street Minneapolis, MN 55407
Sampler Signature:	

Page: 3 of 9

Turn Request
Normal: _____x_____
Rush: _____
Other: _____

Lab Name: IHSC

LAB USE ONLY

Lab Project No.

Sample ID	Sample Location/Description	Date/Time Sampled	Sample Matrix: (S)oil, (A)ir, (B)ulk, A(q)ueous, S(l)udge, (O)ther	Analysis Requested: PLM	Number of Containers	Accept (A) Reject (R)	Sample Condition as Received (Chilled YES / NO; Sealed YES / NO) Sample Condition Comments	Laboratory Sample Number
16B	Painting and Bridge Storage Gray Square Block Window caulk	7/8/2020, 1:15:00 PM	B	X	1			3% chr
17A	Painting and Bridge Storage Canvas and Joint Compound	7/8/2020, 1:15:00 PM	B	X	1			ND
18A	Central Storage 2Red Fire Caulk	7/8/2020, 1:50:00 PM	B	X	1			ND
4C	Central Storage 1 Gray Door Caulk	7/8/2020, 1:50:00 PM	B	X	1			ND
19A	Central Storage 2 Dark Gray Vent Caulk	7/8/2020, 1:55 PM	B	X	1			ND
6B	Central Storage 2 Gypsum Board w/JC	7/8/2020, 2:05:00 PM	B	X	1			ND
8C	Central Storage 2 Pipe Elbow Insulation	7/8/2020, 2:10:00 PM	B	X	1			7% CHR 18% AMOS
20A X	Central Storage 2 Pipe Insulation	7/8/2020, 2:15:00 PM	B	X	1			No Sample
20B	Central Storage 3 Pipe Insulation	7/8/2020, 2:45:00 PM	B	X	1			12% AMOS
21A	Central Storage Office, White Ceiling Tile	7/8/2020, 3:05:00 PM	B	X	1			ND
					10		Total Number of Containers	

General Comments: Send Results to Paul

Relinquished by: Mike Suomie 07/10/20	Relinquished by:	Relinquished by:
Company: IHSC	Company:	Company:
Received by: Susan M Hall	Received by:	Received by:
Company: IHSC 7/10/20	Company:	Company:

CHAIN-OF-CUSTODY RECORD

4205 White Bear Parkway
Suite 500
Vadnais Heights, MN 55110
Office 651-766-9811
FAX 651-766-9822

IHSC Project No: M20-697
Project Manager: Nick Mueller
Project Name: City of Minneapolis Central Store Building
Project Location: 1858 E 27th Street, Minneapolis, MN 55407
Sampler Signature:

Page: 4 of 9
Turn Request
Normal: _____x_____
Rush: _____
Other: _____

Lab Name: IHSC
LAB USE ONLY
Lab Project No.

Sample ID	Sample Location/Description	Date/Time Sampled	Sample Matrix: (S)oil, (A)ir, (B)ulk, A(q)ueous, S(l)udge, (O)ther	Analysis Requested: PLM					Number of Containers	Accept (A) Reject (R)	Sample Condition as Received (Chilled YES / NO, Sealed YES / NO) Sample Condition Comments	Laboratory Sample Number
22A	Bathroom Hallway, Gray Door Caulk	7/9/2020, 9:20	B	X					1			
23A	Bathroom Hallway,Grey Expansion Joint	7/9/2020, 9:21	B	X					1			
24A	Bathroom Hallway, Pipe Elbow	7/9/2020, 9:22	B	X					1			40% CHR
25A	Men's Bathroom, Tan Sink Caulk	7/9/2020, 9:23	B	X					1			
26A	Men's Bathroom, White Urinal Caulk	7/9/2020, 9:24	B	X					1			
27A	Men's Bathroom, Tan Wall Paper Adhesive	7/9/2020, 9:25	B	X					1			
28A	Men's Bathroom, White Ceiling Texture	7/9/2020, 9:26	B	X					1			
28B	Men's Bathroom, White Ceiling Texture	7/9/2020, 9:27	B	X					1			
28C	Women's Bathroom, White Ceiling Texture	7/9/2020, 9:28	B	X					1			

General Comments: Send Results to Paul

9 Total Number of Containers

Relinquished by: Mike Suomie 07/10/20	Relinquished by:	Relinquished by:
Company: IHSC	Company:	Company:
Received by: IHSC	Received by:	Received by:
Company:	Company:	Company:
Date: 07/10/20	Date:	Date:

CHAIN-OF-CUSTODY RECORD

4205 White Bear Parkway
Suite 500
Vadnais Heights, MN 55110
Office 651-766-9811
FAX 651-766-9822

IHSC Project No:	M20-697
Project Manager:	Nick Mueller
Project Name:	City of Minneapolis Central Store Building
Project Location:	1858 E 27th Street Minneapolis, MN 55407
Sampler Signature:	

Page: 5 of 9

Turn Request
Normal: _____x_____
Rush: _____
Other: _____

Lab Name: IHSC

LAB USE ONLY

Lab Project No.

Sample ID	Sample Location/Description	Date/Time Sampled	Sample Matrix: (S)oil, (A)ir, (B)ulk, A(q)ueous, S(l)udge, (O)ther	Analysis Requested: PLM					Number of Containers	Accept (A) Reject (R)	Sample Condition as Received (Chilled YES / NO; Sealed YES / NO) Sample Condition Comments	Laboratory Sample Number
29A	Women's Bathroom, Brown Tile	7/9/2020, 9:55	B	X					1			ND
30A	Women's Bathroom, Tan Grout	7/9/2020, 9:56	B	X					1			ND
31A	Women's Bathroom, Tan Adhesive	7/9/2020, 9:57	B	X					1			ND
32A	Central Store 4, Pipe Insulation	7/9/2020, 10:15	B	X					1			20% Amos
33A	Central Store 4, Pipe Elbow Insulation	7/9/2020, 10:20	B	X					1			< 1% Amos
22B	Central Store 5, Grey Door Caulk	7/9/2020, 10:30	B	X					1			ND
34A	Central Store 5, Mezzanine Cement Flooring	7/9/2020, 10:35	B	X					1			ND
35A	Central Store 5, Pipe Insulation	7/9/2020, 10:45	B	X					1			40% CHR 40% Amos
36A	Sewer Department, white door caulk	7/9/2020, 11:10	B	X					1			ND
37A	Sewer Dept Storage, Tan Ceiling Texture	7/9/2020, 11:20	B	X					1			ND

General Comments: Send Results to Paul

10 ← Total Number of Containers

Relinquished by: Mike Suomie 07/10/20	Relinquished by:	Relinquished by:
Company: IHSC	Company:	Company:
Received by:	Received by:	Received by:
Company: IHSC 07/10/20	Company:	Company:

CHAIN-OF-CUSTODY RECORD

4205 White Bear Parkway
Suite 500
Vadnais Heights, MN 55110
Office 651-766-9811
FAX 651-766-9822

IHSC Project No:	M20-697
Project Manager:	Nick Mueller
Project Name:	City of Minneapolis Central Store Building
Project Location:	1858 E 27th Street Minneapolis, MN 55407
Sampler Signature:	

Page: 6 of 9

Turn Request
Normal: _____x_____
Rush: _____
Other: _____

Lab Name: IHSC

LAB USE ONLY

Lab Project No.

Sample ID	Sample Location/Description	Date/Time Sampled	Sample Matrix: (S)oil, (A)ir, (B)ulk, A(q)ueous, S(l)udge, (O)ther	Analysis Requested: PLM	Number of Containers	Accept (A) Reject (R)	Sample Condition as Received (Chilled YES / NO; Sealed YES / NO) Sample Condition Comments	Laboratory Sample Number
37B	Asphalt Lab, Tan Ceiling Texture	7/9/20, 12:30	B	X	1			ND
37C	Asphalt Lab, Tan Wall Texture	7/9/20, 12:31	B	X	1			ND
38A	Gray Square Block Window Glaze General Storage	7/9/20, 12:35	B	X	1			<1% CHR
39A	General Storage, White Pinhole Ceiling Tile	7/9/20, 12:45	B	X	1			ND
40A	General Storage, Tan Floor Tile	7/9/20, 12:46	B	X	1			<1% CHR
41A	General Storage, Black Adhesive	7/9/20, 12:47	B	X	1			7% CHR *
40B	General Storage, Tan Floor Tile	7/9/20, 12:48	B	X	1			ND
41B	General Storage, Black Adhesive	7/9/20, 12:49	B	X	1			ND
40C	General Storage, Tan Floor Tile	7/9/20, 12:50	B	X	1			<1% CHR
41C	General Storage, Black Adhesive	7/9/20, 12:51	B	X	1			ND

General Comments: Send Results to Paul

10 ← Total Number of Containers

Relinquished by: Mike Suomie 07/10/20	Relinquished by:	Relinquished by:
Company: IHSC	Company:	Company:
Received by: Susan L Mc Dale	Received by:	Received by:
Company: IHSC 07/10/20	Company:	Company:

CHAIN-OF-CUSTODY RECORD

4205 White Bear Parkway
Suite 500
Vadnais Heights, MN 55110
Office 651-766-9811
FAX 651-766-9822

IHSC Project No:	M20-697
Project Manager:	Nicholas Mueller
Project Name:	City of Minneapolis Central Store Building
Project Location:	1858 E 27th Street Minneapolis, MN 55407
Sampler Signature:	

Page: 7 of 9

Turn Request
Normal: _____x_____
Rush: _____
Other: _____

Lab Name: IHSC
LAB USE ONLY
Lab Project No.

Sample ID	Sample Location/Description	Date/Time Sampled	Sample Matrix: (S)oil, (A)ir, (B)ulk, A(q)ueous, S(l)udge, (O)ther	Analysis Requested: PLM					Number of Containers	Accept (A) Reject (R)	Sample Condition as Received; Chilled YES / NO; Sealed YES / NO; Sample Condition Comments	Laboratory Sample Number
42A	General Storage, Dark Brown Baseboard Adhsive	7/9/20, 1:10	B	X					1			ND
43A	Basement, Boiler Rope Gasket	7/9/20, 1:20	B	X					1			ND
44A	Basement, Boiler Floor	7/9/20, 1:21	B	X					1			ND
45A	Basement, Boiler Brick	7/9/20, 1:22	B	X					1			ND
46A	Basement, Boiler Door Insulation	7/9/20, 1:24	B	X					1			ND
37D	Basement, Tan Wall Texture	7/9/20, 1:40	B	X					1			ND
47A	Street Department, White 12 * 12 Floor Tile	7/9/2020, 2:55	B	X					1			ND
48A	Street Department, Black mastic	7/9/2020, 2:55	B	X					1			ND
49A	Roof, Gray Window Caulk	7/9/2020	B	X					1			< 1% CHRY ND
50A	Roof, Roof Caulk	7/9/2020	B	X					1			ND

General Comments: Send Results to Paul

10 ← Total Number of Containers

Relinquished by:	Relinquished by:	Relinquished by:
Company: IHSC	Company:	Company:
Received by:	Received by:	Received by:
Company: IHSC	Company:	Company:
Date: 07/10/20	Date:	Date:

CHAIN-OF-CUSTODY RECORD

4205 White Bear Parkway
Suite 500
Vadnais Heights, MN 55110
Office 651-766-9811
FAX 651-766-9822

IHSC Project No:	M20-697
Project Manager:	Nick Mueller
Project Name:	City of Minneapolis Central Store Building
Project Location:	1858 E 27th Street Minneapolis, MN 55407
Sampler Signature:	

Page: 8 of 9

Turn Request
Normal: _____x_____
Rush: _____
Other: _____

Lab Name: IHSC

LAB USE ONLY

Lab Project No.

Sample ID	Sample Location/Description	Date/Time Sampled	Sample Matrix: (S)oil, (A)ir, (B)ulk, A(q)ueous, S(l)udge, (O)ther	Analysis Requested: PLM					Number of Containers	Accept (A) Reject (R)	Sample Condition as Received: Chilled YES / NO; Sealed YES / NO; Sample Condition Comments	Laboratory Sample Number
50B	Roof, Roof Caulk	7/9/2020	B	X					1			ND
50C	Roof, Roof Caulk	7/9/2020	B	X					1			ND
51A	Roof, AC Caulk	7/9/2020	B	X					1			ND
52A	Roof, Roof Flashing	7/9/2020	B	X					1			3% CHR *
52B	Roof, Roof Flashing	7/9/2020	B	X					1			ND
52C	Roof, Roof Flashing	7/9/2020	B	X					1			ND
53A	Exterior, Gray Exterior Window Glaze	7/9/2020	B	X					1			ND
54A	Exterior (East), Dark Gray Door Caulk	7/9/2020	B	X					1			ND
55A	Exterior, Tan Door Caulk + brown door caulk	7/9/2020	B	X					1			ND
56A	Exterior, Gray Expansion Joint	7/9/2020	B	X					1			6% CHR

General Comments: Send Results to Paul

10 ← Total Number of Containers

Relinquished by:	Mike Suomie 07/10/20	Relinquished by:
Company:	IHSC	Company:
Received by:	[signature]	Received by:
Company:	IHSC 07/10/20	Company:

CHAIN-OF-CUSTODY RECORD

4205 White Bear Parkway
Suite 500
Vadnais Heights, MN 55110
Office 651-766-9811
FAX 651-766-9822

IHSC Project No:	M20-697	Page:	9 of 9
Project Manager:	Nick Mueller	Turn Request	
Project Name:	City of Minneapolis Central Store Building	Normal:	x
		Rush:	
Project Location:	1858 E 27th Street	Other:	
	Minneapolis, MN 55407		
Sampler Signature:			

Lab Name: IHSC

LAB USE ONLY

Lab Project No.

Sample ID	Sample Location/Description	Date/Time Sampled	Sample Matrix: (S)oil, (A)ir, (B)ulk, A(q)ueous, S(l)udge, (O)ther	Analysis Requested: PLM					Number of Containers	Accept (A) / Reject (R)	Sample Condition as Received: Chilled YES / NO; Sealed YES / NO / Sample Condition Comments	Laboratory Sample Number
57A	Exterior, Light Gray door Caulk	7/9/2020	B	X					1			
58A	Exterior, Dark Gray Expansion Joint	7/9/2020	B	X					1			
59A (handwritten 9 over printed 58A)	Exterior, Gray Window Caulk	7/9/2020	B	X					1			
10C	CS-2 / pipe insulation		B	X					1			
8B	Sheet Dept / GRAY PIPE Elbow Insulation		B	X					1			
~~[illegible]~~	~~[illegible]~~		B	X					1			
			B	X					1			
			B	X					1			
			B	X					1			
			B	X					1			

General Comments: Send Results to Paul

Total Number of Containers: 5

Relinquished by: Mike Suomie 07/10/20	Relinquished by:	Relinquished by:
Company: IHSC	Company:	Company:
Received by: [signature]	Received by:	Received by:
Company: IHSC	Company:	Company:
Date: 07/10/20	Date:	Date:

MATERIAL IDENTIFICATION RESULTS

Prepared By: INDUSTRIAL HYGIENE SERVICES CORPORATION
4205 White Bear Parkway, Suite 500
Vadnais Heights, Minnesota 55110

INDUSTRIAL HYGIENE SERVICES CORPORATION

IHSC Project Name: City of Minneapolis Central Stores Building, Minneapolis, Minnesota
IHSC Project Number: M20-697

Date Sampled: 07/31/20
Date Received: 07/31/20
Date Analyzed: 08/03/20

Location	Material Identification	Sample Number	Type of Asbestos	Percent Asbestos
North Roof, Lower Roof	Roofing Material	01 Roof	None Detected	None Detected
South Roof, Upper Roof	Roofing Material	02 Roof	None Detected	None Detected

None Detected = No asbestos was detected in the portions of the sample analyzed.

The samples were analyzed using polarized light microscopy and dispersion staining techniques utilizing the EPA-approved methodology 600/R-93/116, dated July, 1993. This method estimates the amount of asbestos present and distinguishes between the following types of asbestos: chrysotile, amosite, crocidolite, tremolite, actinolite, and anthophyllite. The results are presented as estimates based on this method for the portions of the samples analyzed.

Analyst: Susan Grubb

INDUSTRIAL HYGIENE SERVICES CORPORATION

4205 White Bear Parkway
Suite 500
Vadnais Heights, MN 55110
651-766-9811
651-766-9822 Fax

CHAIN - OF - CUSTODY RECORD

AET Project No. 03-21225

IHSC PROJECT NO	M20-697
PROJECT MANAGER	Nicholas Mueller
PROJECT NAME	City of Minneapolis Central Stores Building
PROJECT LOCATION	Minneapolis, MN
SAMPLERS SIGNATURE	

PAGE 1 OF 1

TURNAROUND REQUESTED
- [x] NORMAL
- [ ] RUSH
- [ ] OTHER

LAB NAME IHSC

LAB USE ONLY

LABORATORY PROJECT NO

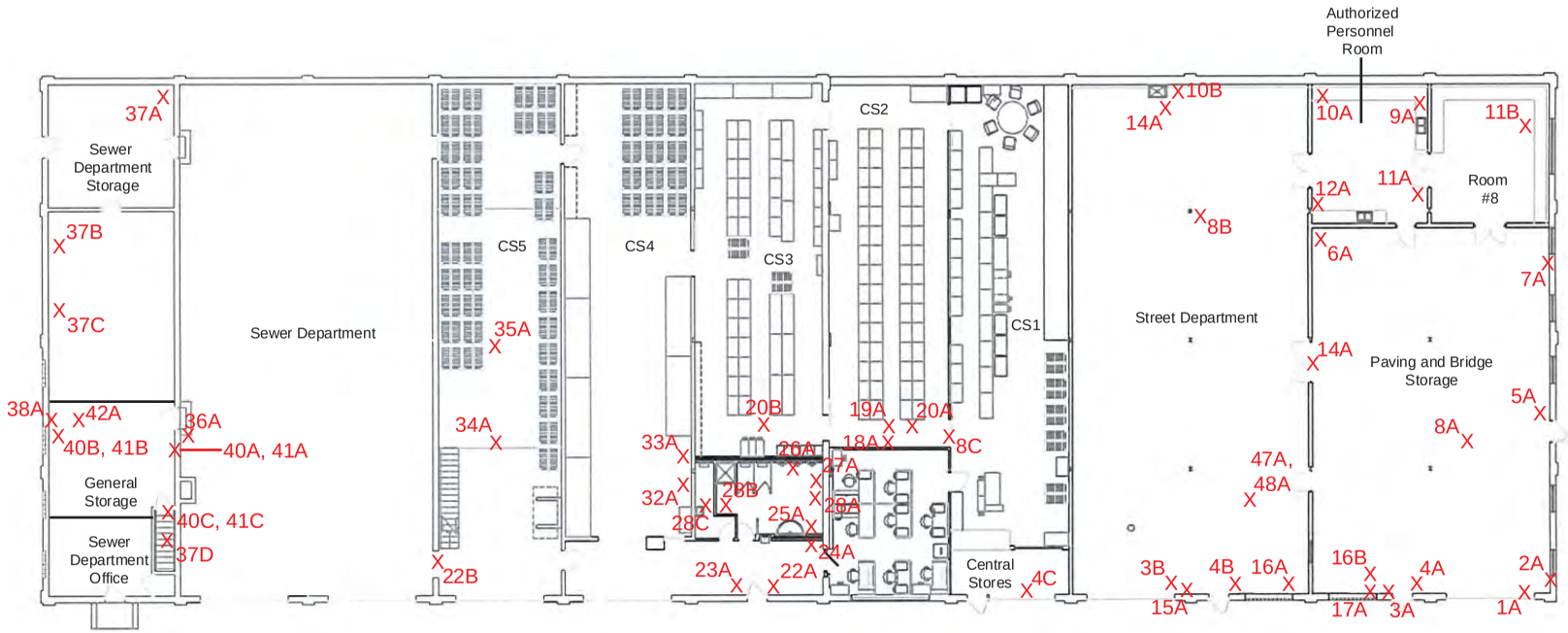
SAMPLE ID	SAMPLE LOCATION / DESCRIPTION	DATE / TIME SAMPLED	SAMPLE MATRIX- SOIL(S), (A)IR, (B)ULK, A(Q)UEOUS, S(L)UDGE, (O)THER	ANALYSIS REQUESTED: Asbestos (PLM)	NUMBER OF CONTAINERS	ACCEPT -A REJECT -R	SAMPLE CONDITION AS RECEIVED (CHILLED Y/N, SEALED Y/N) / SAMPLE CONDITION / COMMENTS	LABORATORY SAMPLE NUMBER
01 Roof	North Roof, Lower Roof	07/31/20	B	X	1			
02 Roof	South Roof, Upper Roof	07/31/20	B	X	1			
					2	←	TOTAL NUMBER OF CONTAINERS	

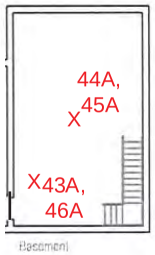
1 RELINQUISHED BY (SIGNATURE)	DATE 7/31	3 RELINQUISHED BY (SIGNATURE)	DATE	5 RELINQUISHED BY (SIGNATURE)	DATE
COMPANY IHSC	TIME 1045am	COMPANY	TIME	COMPANY	TIME
2 RECIEVED BY (SIGNATURE)	DATE 07/31/20	4 RECIEVED BY (SIGNATURE)	DATE	6 RECIEVED BY (SIGNATURE)	DATE
COMPANY IHSC	TIME	COMPANY	TIME	COMPANY	TIME

APPENDIX B

Figures with Sample Locations

Not to Scale





LEGEND

X = Asbestos Samples

N

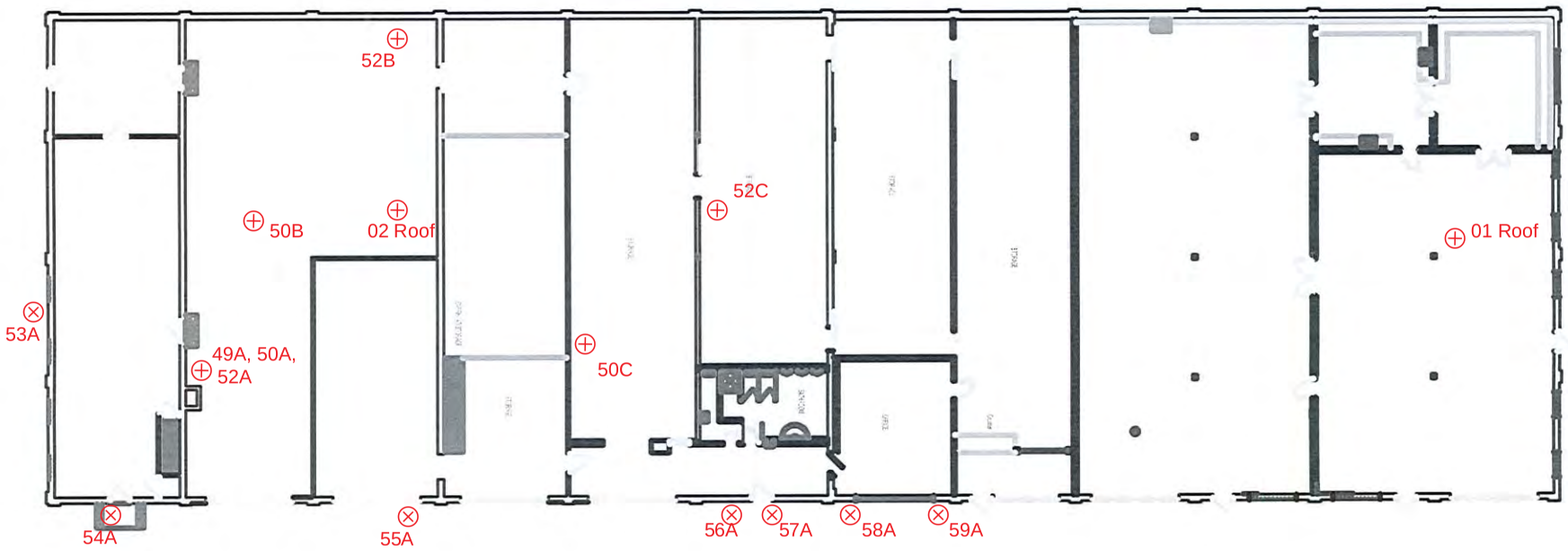
FIGURE 1
Asbestos Sample Locations

Central Stores Building
1858 East 27th Street
Minneapolis, MN

PROJECT NO: M20-697	PREPARED BY: NM
DRAWN BY: CG	DATE: 07/16/20

INDUSTRIAL HYGIENE SERVICES CORPORATION

Not to Scale



LEGEND

⊗ = Exterior Asbestos Sample

⊕ = Asbestos Roof Sample

N

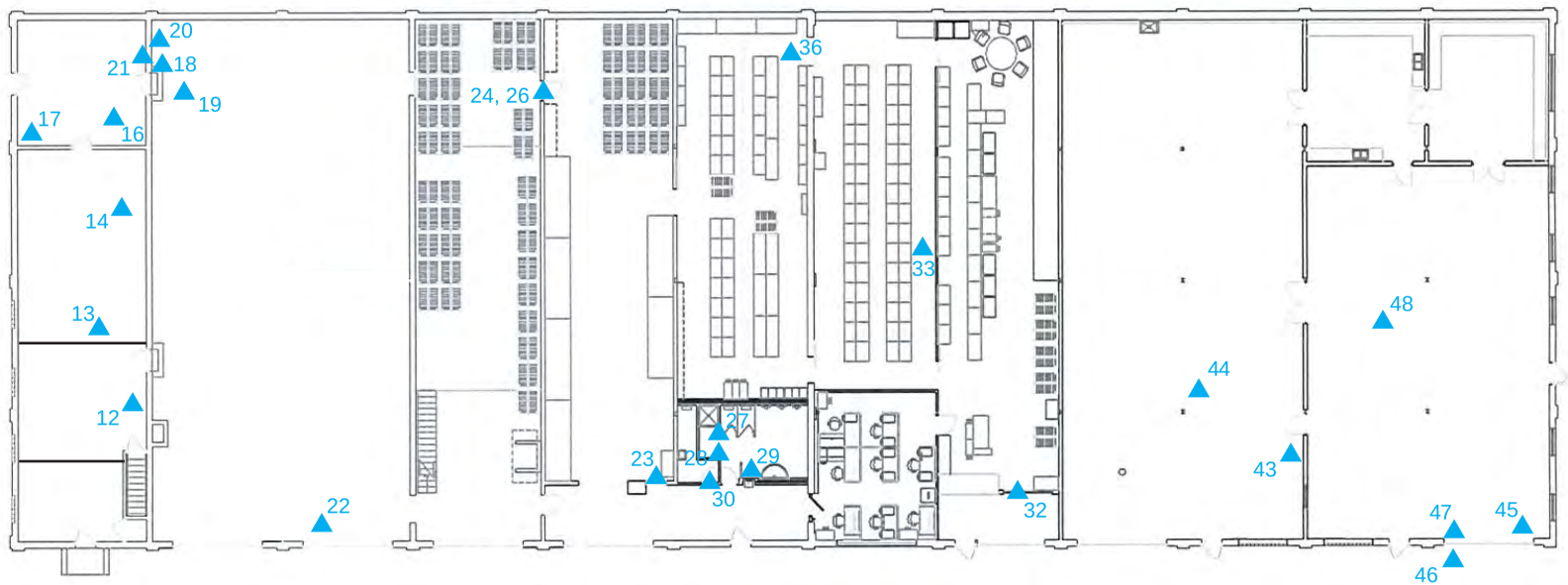
FIGURE 2
Exterior and Roof Asbestos Sample Locations

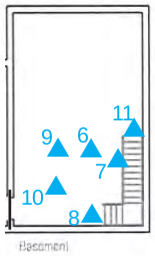
Central Stores Building
1858 East 27th Street
Minneapolis, MN

PROJECT NO: M20-697	PREPARED BY: NM
DRAWN BY: CG	DATE: 07/16/20

INDUSTRIAL HYGIENE SERVICES CORPORATION

Not to Scale





LEGEND

▲ = Lead Sample

N

FIGURE 3
XRF Sample Locations

Central Stores Building
1858 East 27th Street
Minneapolis, Minnesota

PROJECT NO: M20-697	PREPARED BY: NM
DRAWN BY: CG	DATE: 07/16/20

INDUSTRIAL HYGIENE SERVICES CORPORATION

APPENDIX C

Regulated Waste/Materials Inventory

REGULATED WASTE/MATERIALS INVENTORY

City of Minneapolis - Central Stores Building
1858 East 27th Street
Minneapolis, MN 554057
IHSC PROJECT NUMBER: M20-697

Regulated Material Individual Locations		
Room	**Item**	**Quantity**
Paving and Bridge Storage	Wall Air Conditioning Unit	2
	Thermostat	1
	Telephone Wall Panel	1
	Ballasts	32
	4' Fluorescent Light Bulb	64
	Water Pump Regulator	1
	Fire Extinguisher	1
Room 8	Compact Flourescent Light	3
Authorized Personnel Room	8' Flourescent Light Bulb	6
	4' Fluorescent Light Bulb	4
	Ballasts	5
	Compact Flourescent Light	1
	Hydraulic Door	1
Street Department	8' Flourescent Light Bulb	38
	4' Fluorescent Light Bulb	30
	Ballasts	34
	Telecom Panel	1
	Hydraulic Door	3
	Thermostat	2
	Alarm	1
	Fire extinguisher	1
	Wall Air Condiioning Unit	1
Central Store 1	8' Flourescent Light Bulb	18
	4' Fluorescent Light Bulb	12
	Ballasts	15
	Telecom Panel	1
	Hydraulic Door	1
	Thermostat	2
	Alarm	1
	AED	1
	Fire extinguisher	1
	Fire Doors	2

Regulated Material Individual Locations

Room	Item	Quantity
Central Store 2	8' Flourescent Light Bulb	36
	4' Fluorescent Light Bulb	8
	Ballasts	22
	Emergency Lights	1
	Fire Control Panel	1
	Thermostat	2
	Fire Doors	2
Central Store 3	8' Flourescent Light Bulb	36
	4' Fluorescent Light Bulb	4
	Ballasts	20
	Thermostat	1
	Fire Door	1
	Phone	1
Central Stores Office, Bathrooms and Hallway	Motion Sensor	1
	4' Fluorescent Light Bulb	14
	Ballasts	7
	Thermostat	3
	Radiator	1
	Urinal Sensors	3
	Hydraulic Door	4
	Compact Flourescent Light	2
Central Store 4	8' Flourescent Light Bulb	12
	Ballasts	6
	Compact Flourescent Light	5
	Emergency Light	1
	Motion Sensor	1
	Hydraulic Door	1
Central Store 5	8' Flourescent Light Bulb	28
	Ballasts	14
	Compact Flourescent Light	4
	Emergency Light	1
	Thermostat	1
	Hydraulic Door	1
Sewer Department	8' Flourescent Light Bulb	2
	Ballasts	1
	Drinking Fountain	1
	Telecom Panel	1
	Hydraulic Door	2
	Thermostat	3
	HID Bulbs	15
	Fire Extinguisher	3

Regulated Material Individual Locations

Room	Item	Quantity
Sewer Department Storage	8' Flourescent Light Bulb	2
	4' Flourescent Light Bulb	2
	Ballasts	2
	Telecom Panel	1
	Hydraulic Door	1
	Alarm Box	1
Asphalt Lab	Emergency Lights	1
	Wall Air Conditioning Unit	1
General Storage	4' Flourescent Light Bulb	24
	Ballasts	12
	Radiator	1
	Hydraulic Door	1
	Fire Extinguisher	1
Sewer Office	4' Flourescent Light Bulb	16
	Ballasts	8
	Hydraulic Door	1
	Thermostat	1
	Emergency Lights	1
	Alarm System	1
Boiler Room	8' Flourescent Light Bulb	4
	4' Flourescent Light Bulb	2
	Ballasts	3
	Exit Sign	1
	Pressure Controller	4
	Fire Extinguisher	1
	Flame Monitor	1
Roof	Large Air Conditioning Units	2
Exterior	HID Bulbs	7
	Security Camera	1

APPENDIX D

Lead Paint Results

XRF Raw Data Table

Building Name: City of Minneapolis - Central Stores
1858 East 27th Street
Hiawatha Stores and Storage

IHSC Project No.: M20-697

Date Sampled: July 9, 2020

Inspectors: Frank Reed, Mike Suomie

INDUSTRIAL HYGIENE SERVICES CORPORATION

Sample ID Number	Location	Paint Color	Substrate	Lead Concentration (mg/cm^2)	Lead Concentration Error (+/-)
1	Calibration	---	---	---	---
2	Calibration	---	---	---	---
3	Calibration	---	---	---	---
4	Calibration	---	---	---	---
5	Calibration	---	---	---	---
6	Basement	Blue Gray	Cement Floor	0.03	0.02
7	**Basement**	**White**	**Beam**	**3.4**	**0.20**
8	Basement	White	Brick Wall	0.03	0.03
9	Basement	Gray	Boiler Brick	0.03	0.02
10	Basement	Black	Metal	0.06	0.02
11	**Basement**	**Orange**	**Wood Door**	**3.00**	**0.20**
12	General Storage	Brown	Wood Door	0.05	0.02
13	Sewer Department	Blue	Cement Floor	0.03	0.02
14	**Sewer Department**	**Yellow**	**Cement Floor**	**1.00**	**0.10**
16	Sewer Department	Red	Cement Floor	0.01	0.02
17	Sewer Department	White	Gypsum Wall	0.00	0.02
18	**Sewer Department**	**Dark Yellow**	**Metal Stairs**	**4.00**	**0.80**
19	**Sewer Department**	**Light Yellow**	**Cement Floor**	**8.80**	**1.00**
20	**Central Stores**	**Dark Gray**	**Brick Wall**	**1.50**	**0.10**
21	Central Stores	White	Brick Wall	0.01	0.02
22	Central Stores	Pink	Cement Floor	0.04	0.02
23	Central Stores	Light Blue	Cement Floor	0.07	0.02
24	Central Stores	Light Brown	Wood Door	0.09	0.03
26	Central Stores	Dark Gray	Wood Door	0.04	0.02
27	Central Stores	Tan	Cement Block	0.00	0.02
28	Central Stores	White	Cement Block	0.00	0.02
29	Central Stores	Tan	Cement Block	0.00	0.02
30	Central Stores	Dark Gray	Wood Door	0.03	0.02
32	Central Stores	Brown	Brick Wall	0.06	0.04
33	**Central Stores**	**Red**	**Beam**	**1.00**	**0.10**
36	**Central Stores**	**Yellow**	**Cement Floor**	**14.00**	**1.10**

XRF Raw Data Table

Sample ID Number	Location	Paint Color	Substrate	Lead Concentration (mg/cm^2)	Lead Concentration Error (+/-)
37	Street Department	Dark Gray	Brick Wall	0.02	0.02
43	Street Department	Tan	Cement Block	0.06	0.02
44	Street Department	Turquoise	Cement Floor	0.00	0.02
45	**Paving and Bridge Storage**	**Dark Gray**	**Metal Door**	**1.00**	**0.10**
46	Paving and Bridge Storage	Yellow	Cement Door Curbs	0.01	0.02
47	Paving and Bridge Storage	Gray/Brown	Metal Door Frame	0.16	0.02
48	Paving and Bridge Storage	Light Gray	Cement Floor	0.00	0.02

Lead Concentration reported in milligrams per centimeter squared (mg/cm^2)

Environmental Protection Agency (EPA) and Minnesota Department of Health (MDH) standard for lead-based paint are greater than or equal to 1.0 mg/cm^2 or 0.5% by weight.

Bold Results = Lead Concentration $\geq$ 1.0 mg/cm^2 (Lead-Based Paint)

APPENDIX E

Minnesota Department of Health Certifications

Certificate No: 5LM10021901IR

Expiration Date: Ovtober 2, 2020

This is to certify that

Francis Reed

has attended and successfully completed an

ASBESTOS INSPECTOR

REFRESHER TRAINING COURSE

permitted by

the State of Minnesota under Minnesota Rules 4620.3702 to 4620.3722

and meets the requirements of

Section 206 of Title II of the Toxic Substances Control Act (TSCA)

conducted by

Lake States Environmental, Ltd.

in

White Bear Lake, MN on October 2, 2019

Examination Date: October 2, 2019

Lake States Environmental, Ltd
P. O. Box 645, Rice Lake, WI 54868
(800) 254-9811

Grant J Grassle

Training Instructor

Director, Env. Health Div.

No AI13798 Issued: 10/07/2019

Francis L. Reed
2228 Carter Ave #2
St Paul, MN 55108

Certified by:
State of Minnesota
Department of Health
Expires: 10/02/2020

DEPARTMENT OF HEALTH ASBESTOS INSPECTOR

Certificate of Completion

This is to certify that

Francis Reed

Has completed

US Regulations for Handheld XRF Analyzers with Radioactive Sealed Sources

9/11/2017

Supervisor signature

Erin Poitras, RSO Thermo Fisher Scientific
Portable Analytical Instruments

Certificate of Completion

This is to certify that

Francis Reed

Has completed the

Transport of Radioactive Sealed Sources in XRF Analyzers

Online training course

On

9/5/2017

Supervisor signature

Erin Poitras, RSO Thermo Fisher Scientific
Portable Analytical Instruments

Certificate of Completion

This is to certify that

Francis Reed

Has completed the

Radiation Safety for X-ray Tube Based Instruments

Online training course

On

9/5/2017

Supervisor signature

Erin Poitras, RSO Thermo Fisher Scientific
Portable Analytical Instruments

Certificate of Completion

This is to certify that

Francis Reed

Has completed the

Transport of LI Ion Batteries

Online training course

On

9/11/2017

Supervisor signature

Erin Poitras, RSO Thermo Fisher Scientific
Portable Analytical Instruments

Certificate of Completion

This is to certify that

Francis Reed

Has completed the

Sealed Source XRF - Radiation Safety

Online training course

On

9/11/2017

Supervisor signature

Erin Poitras, RSO Thermo Fisher Scientific
Portable Analytical Instruments

Certificate No: 5LM12051909II

Expiration Date: December 5, 2020

This is to certify that

Michael Suomie

has attended and successfully completed an

ASBESTOS INSPECTOR INITIAL TRAINING COURSE

permitted by
the State of Minnesota under Minnesota Rules 4620.3702 to 4620.3722
and meets the requirements of
Section 206 of Title II of the Toxic Substances Control Act (TSCA)
conducted by

Lake States Environmental, Ltd.

in

White Bear Lake, MN on December 3 - 5, 2019

Examination Date: December 5, 2019

Lake States Environmental, Ltd
P. O. Box 645, Rice Lake, WI 54868
(800) 254-9811

Grant J Grosse

Training Instructor

ThermoFisher
SCIENTIFIC

CERTIFICATE

This Certifies that

Mike Suomie

Has successfully completed

Safety Training for
~ Sealed Source XRF - Radiation Safety~

Supervisor Signature

10/10/2019
COMPLETION DATE

Jean Geslin
Jean Geslin, RSO
Thermo Fisher Scientific

Certificate No: 5LM01022001IR

Expiration Date: January 2, 2021

This is to certify that

Nicholas S. Mueller

has attended and successfully completed an

ASBESTOS INSPECTOR REFRESHER TRAINING COURSE

permitted by
the State of Minnesota under Minnesota Rules 4620.3702 to 4620.3722
and meets the requirements of
Section 206 of Title II of the Toxic Substances Control Act (TSCA)
conducted by

Lake States Environmental, Ltd.

in

Hudson, WI on January 2, 2020

Examination Date: January 2, 2020

Lake States Environmental, Ltd
P. O. Box 645, Rice Lake, WI 54868
(800) 254-9811

Grant J Grosse

Training Instructor

Attachment D

NHIS Information Request and DNR Response

AET Project No. 03-21225

NO STAPLES PLEASE

2012	For Agency Use Only:	
	Received _____ Due _____ Inv _____	#Sec _____ Contact Rqsted? _____
	Search Radius _____mi. L / I / D EM Map'd _____	#EOs _____ Survey Rqsted? _____
	NoR / NoF / NoE / Std / Sub Let _____ Log out _____	#Com _____
		Related ERDB# _____

Minnesota DEPARTMENT OF NATURAL RESOURCES

NATURAL HERITAGE INFORMATION SYSTEM (NHIS) DATA REQUEST FORM

Please read the instructions on page 3 before filling out the form. Thank you!

WHO IS REQUESTING THE INFORMATION?

☐ Mr.
☐ Ms.

Name and Title

Agency/Company

Mailing Address

(Street) (City) (State) (Zip Code)

Phone e-mail

Responses will be sent via email. If you prefer US Mail check here: ☐

THIS INFORMATION IS BEING REQUESTED FOR A:

☐ Federal EA ☐ State EAW ☐ PUC Site or Route Application ☐ Watershed Plan ☐ BER
☐ Federal EIS ☐ State EIS ☐ Local Government Permit ☐ Research Project
☐ NEPA Checklist ☐ Other (describe) _____

☐ Check here if this project is funded through any of the following grant programs: Lessard-Sams Outdoor Heritage Council (L-SOHC), Conservation Partners Legacy (CPL), or Legislative-Citizen Commission on Minnesota Resources (LCCMR).

INFORMATION WE NEED FROM YOU:

1) **Enclose a map** of the project boundary/area of interest (topographic maps or aerial photos are preferred).
2) Please **provide a GIS shapefile*** (NAD 83, UTM Zone 15N) of the project boundary/area of interest.
3) List the following locational information* (attach additional sheets if necessary):

For Agency Use: TRS Confirmed ☐

For Agency Use: Region / MBS Status	County	Township #	Range #	Section(s) (please list **all** sections)

4) Please provide the following information (attach additional sheets if necessary):

Project Name:

Project Proposer:

Description of Project (including types of disturbance anticipated from the project):

* Please see the instructions on page 3.

Describe the existing land use of the project site. What types of land cover / habitat will be impacted by the proposed project?

List any waterbodies (e.g., rivers, intermittent streams, lakes, wetlands) that may be affected by the proposed project, and discuss how they may be impacted (e.g., dewatering, discharge, riverbed disturbance).

Does the project have the potential to affect any groundwater resources (e.g., groundwater appropriation, change in recharge, or contamination)?

To your knowledge, has the project undergone a previous Natural Heritage review? If so, please list the correspondence #: ERDB # _____. How does this request differ from the previous request (e.g., change in scope, change in boundary, project being revived, project expansion, different phase)?

To your knowledge, have any native plant community or rare species surveys been conducted within the site? If so, please list:

List any DNR Permits or Licenses that you will be applying for or have already applied for as part of this project:

INFORMATION WE PROVIDE TO YOU:

1) The response will include a Natural Heritage letter. If applicable, the letter will discuss potential effects to rare features.

☐ Check here if you are interested in a list of rare features in the vicinity of the area of interest but you do **not** need a review of potential effects to rare features. Please list the reason a review is not needed:

_____

2) Depending on the results of the query or review, the response may include an Index Report of known aggregation sites and known occurrences of federally and state-listed plants and animals* within an approximate one-mile radius of the project boundary/area of interest. The Index Report and Natural Heritage letter can be included in any public environmental review document.

3) A Detailed Report that contains more information on each occurrence may also be requested. Please note that the Detailed Report may contain specific location information that is protected under *Minnesota Statutes*, section 84.0872, subd. 2, and, as such, the Detailed Report may not be included in any public document (e.g., an EAW).

☐ Check here if you would like to request a Detailed Report. Please note that if the results of the review are 'No Effects' or a standard comment, a Detailed Report may not be available.

FEES / TURNAROUND TIME

There is a fee* for this service. Requests generally take **3-4 weeks** from date of receipt to process, and are processed in the order received.

I have read the entire form and instructions, and the information supplied above is complete and accurate. I understand that material supplied to me from the Natural Heritage Information System is copyrighted and that I am not permitted to reproduce or publish any of this copyrighted material without prior written permission from the DNR. Further, if permission to publish is given, I understand that I must credit the Minnesota Division of Ecological and Water Resources, Minnesota Department of Natural Resources, as the source of the material.

Signature (**required**) Eric Hesse	Note: Digital signatures representing the name of a person shall be sufficient to show that such person has signed this document.

Mail or email completed form to:
Lisa Joyal, Endangered Species Review Coordinator
Division of Ecological and Water Resources
Minnesota Department of Natural Resources
500 Lafayette Road, Box 25
St. Paul, Minnesota 55155
Review.NHIS@state.mn.us

Online version of the form

Revised March 2, 2012

* Please see the instructions on page 3.

Instructions for the Natural Heritage Information System (NHIS) Data Request Form

The Division of Ecological and Water Resources maintains the Natural Heritage Information System (NHIS), a collection of databases that provides information on Minnesota's rare plants and animals, native plant communities, and other rare features. The NHIS is continually updated as new information becomes available, and the Minnesota County Biological Survey (MBS) is a major source of this information.

- Use this form to request information on rare features within an approximate one-mile radius of an area of interest. You may reproduce this form for your own use or to distribute. An **electronic copy** of the form is available at the DNR's web site.
- If you are interested in obtaining the Rare Features Database electronically as a GIS shapefile, do not fill out this form. Please see this Natural Heritage Data document for more information on this option.

WHO IS REQUESTING THE INFORMATION?

- The person whose name is entered on the form under the "Who is Requesting the Information" section must sign the form as an acknowledgment of the State of Minnesota's copyright on all generated reports. All correspondence and invoices will be sent to this person. Please do not ask us to send this information to a different party.
- Please include a complete mailing address. Responses will be sent via email unless you specify differently.

INFORMATION WE NEED FROM YOU:

- Include a legible map (topographic maps or aerial photographs are preferred) clearly showing:

  1) location and boundaries of the project,
  2) associated infrastructure, and
  3) any waterbodies that may be affected by the proposed project.

- If the project boundary is large **or** complex, please provide a **GIS shapefile** (NAD 83, UTM Zone 15) of the project boundary/area of interest. Do not include any buffers. An additional "digitizing fee" may be charged for projects that require a substantial amount of time to digitize.
- Provide a complete list of sections that the proposed project or area of interest falls within. Do not include any buffer area. Please double-check this information. Incorrect sections can delay the processing of your request, and may result in an invalid review.
- Please provide a detailed **project description**, attaching separate pages to the form if necessary. Identify the type of development (e.g., housing, commercial, utility, ethanol facility, wind farm) being proposed, the size and # of units (if applicable), construction methods, and **any associated infrastructure** such as access roads, utility connections, and water supply and/or discharge pipelines.
- We cannot begin processing data requests until we receive all parts of the request, including a map and a completed, signed form.

INFORMATION WE PROVIDE TO YOU:

- The Natural Heritage review and database reports are valid for environmental review purposes for one year, and they are only valid for the project location and description provided on the form. Please contact Lisa Joyal at lisa.joyal@state.mn.us if project details change or if a data update is needed.
- Please note that the Natural Heritage review and database reports do not address/contain locations of the gray wolf (*Canis lupus*), state-listed as special concern, or Canada lynx (*Lynx canadensis*), federally-listed as threatened, as these species are not currently tracked in the Natural Heritage Information System. See page 4.

FEES / TURNAROUND TIME:

- There is a fee for this service. All fees are subject to change. The current fee schedule is available online. The minimum charge is $90.00, and increases based on the time it takes us to process the request (dependent upon project size and the results of the query). Please do not include payment with your request; an invoice will be sent to you.
- There is generally a **3-4 week turn-around time** to process requests.

PLEASE SEE NEXT PAGE FOR ADDITIONAL SOURCES OF INFORMATION

ADDITIONAL SOURCES OF INFORMATION:

- The DNR Rare Species Guide is the state's authoritative reference for Minnesota's endangered, threatened, and special concern species. It is a dynamic, interactive source that can be queried by county, ECS subsection, watershed, or habitat.

- Information on the gray wolf (*Canis lupus*):
  DNR website gray wolf Species Profile
  USFWS website Monitoring Report

- Information on the Canada lynx (*Lynx Canadensis*):
  DNR website Canada Lynx Species Profile
  USFWS website Canada Lynx profile

- Minnesota's Comprehensive Wildlife Conservation Strategy is an action plan focused on managing Minnesota's native animals whose populations are rare, declining, or vulnerable to decline. It identifies Species in Greatest Conservation Need and the Key Habitats that support them.

- The Minnesota Geospatial Commons allows users to download GIS shapefiles of MBS Sites of Biodiversity Significance, MBS Native Plant Communities, MBS Railroad Rights-of-Way Prairies, and Scientific and Natural Area Boundaries.

- Information on MBS Site Biodiversity Significance Ranks

- Information on MBS Native Plant Communities

- Questions? Please contact Lisa Joyal at 651-259-5109 or lisa.joyal@state.mn.us.

DEPARTMENT OF NATURAL RESOURCES

Minnesota Department of Natural Resources
Division of Ecological & Water Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155-4025

December 15, 2020
Correspondence # ERDB 20210127

Eric Hesse
American Engineering Testing, Inc.
550 Cleveland Avenue North
St. Paul, MN 55114

RE: Natural Heritage Review of the proposed Hiawatha Public Works Facility Expansion, T29N R24W Section 36; Hennepin County

Dear Eric Hesse,

As requested, the above project has been reviewed for potential effects to known occurrences of rare features. Given the project details provided with the data request form, I do not believe the proposed project will negatively affect any known occurrences of state-listed threatened or endangered species. To ensure compliance with federal law, conduct a federal regulatory review using the U.S. Fish and Wildlife Service's (USFWS) online Information for Planning and Consultation (IPaC) tool.

The Natural Heritage Information System (NHIS), a collection of databases that contains information about Minnesota's rare natural features, is maintained by the Division of Ecological and Water Resources, Department of Natural Resources. The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. However, the NHIS is not an exhaustive inventory and thus does not represent all of the occurrences of rare features within the state. Therefore, ecologically significant features for which we have no records may exist within the project area. **If additional information becomes available regarding rare features in the vicinity of the project, further review may be necessary.**

For environmental review purposes, the results of this Natural Heritage Review are valid for one year; the results are only valid for the project location (noted above) and the project description provided on the NHIS Data Request Form. Please contact me if project details change or construction has not occurred within one year as additional review may be required.

The Natural Heritage Review does not constitute review or approval by the Department of Natural Resources as a whole. Instead, it identifies issues regarding known occurrences of rare features and potential effects to these rare features. For information on the environmental review process or other natural resource concerns, you may contact your DNR Regional Environmental Assessment Ecologist.

Thank you for consulting us on this matter, and for your interest in preserving Minnesota's rare natural resources. Please include a copy of this letter in any state or local license or permit application. An invoice will be mailed to you under separate cover.

Sincerely,

Samantha Bump

Samantha Bump
Natural Heritage Review Specialist
Samantha.Bump@state.mn.us

Links: DNR Regional Environmental Assessment Ecologist Contact Info
http://www.dnr.state.mn.us/eco/ereview/erp_regioncontacts.html
USFWS IPaC Tool
https://ecos.fws.gov/ipac/

Attachment E

SHPO Information Request and SHPO Response

AET Project No. 03-21225

AMERICAN ENGINEERING TESTING, INC.

CONSULTANTS
- ENVIRONMENTAL
- GEOTECHNICAL
- MATERIALS
- FORENSICS

August 18, 2020

State Historic Preservation Office
Attn: Kelly Gragg-Johnson
Review and Compliance Specialist
203 Administrative Building
50 Sherburne Avenue
Saint Paul, Minnesota 55155

Subject: Request for Project Review
City of Minneapolis – Hiawatha Maintenance Facility Expansion
Environmental Assessment Worksheet

Dear Ms. Gragg-Johnson:

American Engineering Testing, Inc. (AET) is submitting the attached Request for Project Review Form/Attachments on behalf of the City of Minneapolis Public Works Department. This review is being requested as part an environmental review (Environmental Assessment Worksheet) being conducted for the proposed expansion of the Hiawatha Maintenance Facility located at 1911 East 26th Street in Minneapolis, Minnesota.

Please contact me with any comments or questions at ehesse@amengtest.com or (651) 659-1307 (direct) or (612) 718-8879 (mobile).

Sincerely,

American Engineering Testing, Inc.

Eric Hesse, PE
Principal Engineer

Please mail the completed form and required material to:

State Historic Preservation Office
203 Administration Building
50 Sherburne Ave
St. Paul, MN 55155

DEPARTMENT OF ADMINISTRATION

Request for Project Review by the State Historic Preservation Office (SHPO)

(●) This is a new submittal
( ) This is additional information relating to SHPO Project #: _____ **DATE:** 8/6/2020

I. GENERAL PROJECT INFORMATION

Project Title: City of Minneapolis - Hiawatha Maintenance Facility Expansion

Project Address (or Location): 1911 East 26th Street

City / Township (circle one): Minneapolis Zip: 55404 County: Hennepin

Legal Description: Township 29N Range 24W E/W (circle one) Section 36 Quarter-section NW

II. PROJECT CONTACT INFORMATION

Project Contact Name: Eric Hesse Title: Principal Engineer

Company/Agency: American Engineering Testing, Inc.

Street Address: 550 Cleveland Avenue North Phone Number: 612.718.8879

City: St. Paul State: MN Zip: 55114 Email: ehesse@amengtest.com

III. FEDERAL AND/OR STATE INVOLVEMENT

Federal Agency (if applicable): NA
(Agency providing funds, licenses, or permits)
Permit or Project Reference #: _____

State Agency (if applicable): NA
(Agency providing funds, licenses, or permits)
Permit or Project Reference #: _____

Local Agency (if applicable): City of Minneapolis

(Continued on Reverse Side)

Please refer to the **Instructions for Completing the Request for Project Review Form.** Submit one *Request for Project Review* form for each project. Project submittals will not be accepted via fax or e-mail. For questions regarding the SHPO review process, please visit our website or contact Kelly Gragg-Johnson, Environmental Review Specialist, at 651-201-3285 or kelly.graggjohnson@state.mn.us.

IV. PROJECT DESCRIPTION AND BOUNDARIES

A) REQUIRED FOR ALL PROJECTS

☑ Write a detailed description of the proposed project. (See attached.)

See attached

☑ Attach a map of project location, with project area(s) clearly marked. Road names must be included and legible.

B) Architecture

Are there any buildings or structures within the project area? ◉ Yes ○ No

If **No**, continue to the Archaeology section below. If **Yes**, submit all of the following information:

☑ List all buildings and structures within the project area and the year they were built. (See attached.)

Office/Maintenance Building (1914); Supply Storage Building (1914)
Former Roofing Materials Supply Company Building (1947)

☑ Photographs of ***each*** building and structure located within the project area, along with a photo key. Include streetscape images, if applicable. All photographs must be clear, crisp, focused, and taken at ground level. Aerial photos are insufficient.

☑ List known historic buildings or structures located within the project area (i.e., individual properties or districts which are listed in the National Register or which meet the criteria for listing in the National Register). (See attached.)

No known historic structures

C) Archaeology

Does the proposed undertaking involve ground-disturbing activity? ◉ Yes ○ No

If **No**, this form is complete. If **Yes**, submit all of the following information:

☑ Attach the relevant portion of a 1:24000-scale USGS topographic map (photocopied or computer generated) ***with the project boundary marked***.

☑ Description of current and previous land use and disturbances: (See attached.)

See attached.

☑ Any available information concerning known or suspected archaeological resources within the project area. (See attached.)

Unknown

HIAWATHA MAINTENANCE FACILITY EXPANSION
CITY OF MINNEAPOLIS

Project Description

The current City of Minneapolis Public Works (the City) Hiawatha Maintenance Facility (HMF) is located at 1911 East 26th Street. Refer to the attached aerial photograph illustrating the current site location. As part of on-going efforts to increase the efficiency of facility operations and provide value for residents and customers, as well as improve working conditions for employees, the City has been upgrading facilities and consolidating operations of maintenance facilities located throughout the City. As part of these efforts, the City has recognized the need for expansion of the HMF facility. This expansion is referred to as Phase II of the HMF and will involve the following:

- Physical expansion of the facility onto the 7+ acre Roof Depot property immediately south of the current facility;
- Relocation and consolidation of the Water Distribution Maintenance functions from the Fridley Water Works and East Site Water Yard;
- Relocation of Surface Water and Sewer staff from the City of Lakes Building in downtown Minneapolis; and
- Relocation of sanitary sewer staff from the South Transfer Station.

Refer to the attached figure illustrating the current site and the proposed area of expansion.

Major construction activities that will take place as part of this expansion include the additional of office space in the northwest portion of the property, expansion of the existing maintenance facility, construction of a parking ramp in the north eastern portion of the property, relocation of the fuel island and underground petroleum storage tank system, demolition of the former Roof Depot building, construction of additional storage space for materials and vehicles, construction of a training center and relocation of the CIPP operations. In addition, open retention ponds are planned for the management of storm water prior to discharge to the City storm sewer system. Refer to the attached figure illustrating conceptual layout of the expansion. Additional excavation activities will include the relocation of existing and installation of new utilities. Final locations of relocations and new utilities is undetermined at this time.

The expansion of the HMF onto the Roof Depot property and consolidation of the above referenced staff will allow for efficient collaboration between departments resulting in increased responsiveness, sharing of responsibilities between departments, creation of jobs, improve efforts on Green Zone development, integration with the neighborhood, mitigate and manage effects of site development and be a location for recruitment and training.

City staff from Finance and Property Services (FPS), Public Works, Neighborhood Community Relations (NCR) and Community Planning and Economic Development (CPED) have met with members of the community under several different formats to discuss to present and discuss ideas for the expansion. It is understood that, although much progress has been made, community members remain concerned with some aspects of the expansion, namely additional traffic, added pollution from demolition and vehicle operations.

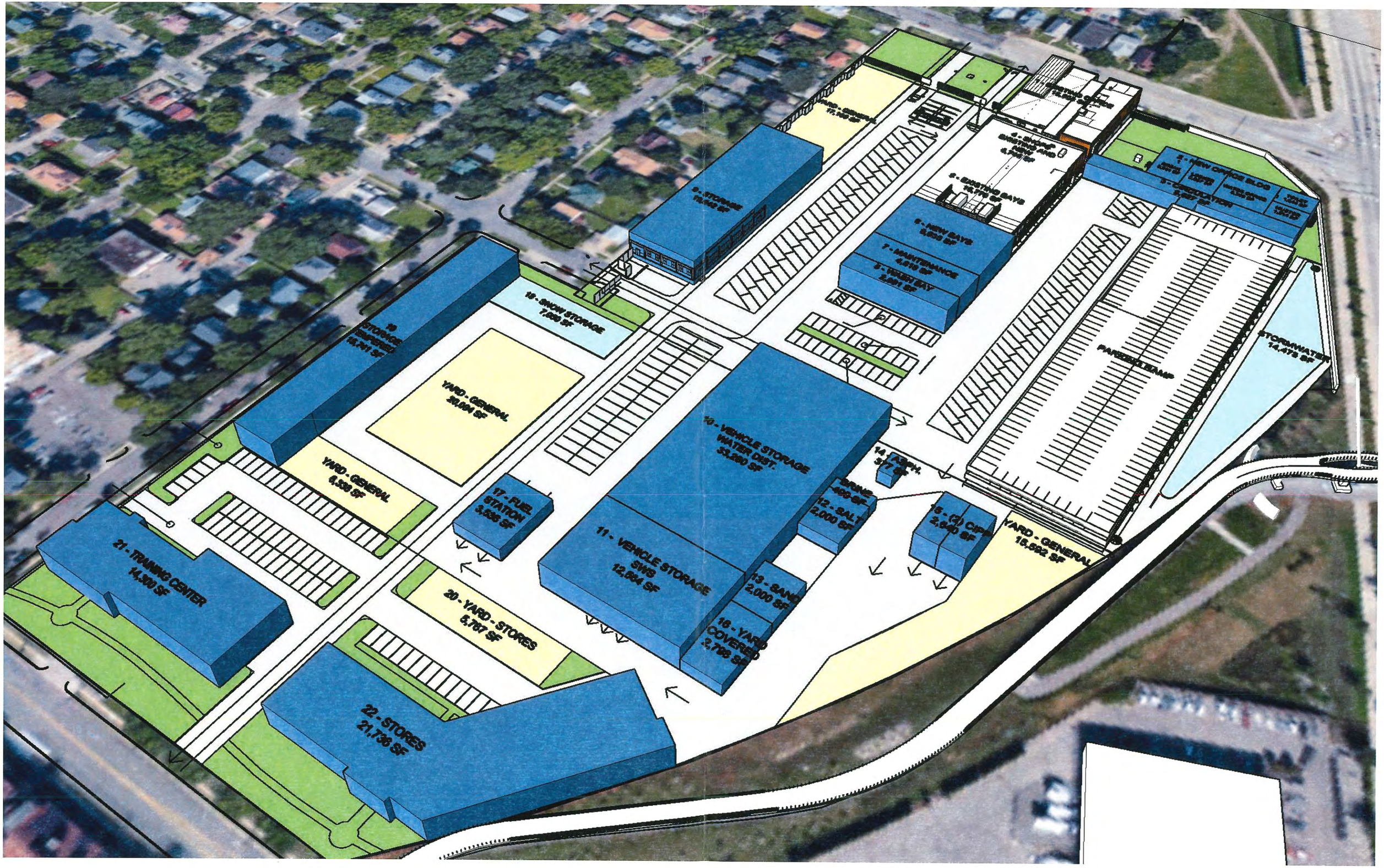
In an effort to continue to engage the community and address their concerns, the City has elected to perform environmental review by preparing a discretionary Environmental Assessment Worksheet (EAW) under Minnesota Rules Chapter 4410. This following presents a scope of services for preparation of an EAW consistent with the requirements of Minnesota Rules 4410 and the EAW Guidelines prepared by the Minnesota Environmental Quality Board dated October 2013.

Current and Previous Land Use

Current land use at the existing HMF includes office space, vehicle maintenance facilities, outdoor storage of concrete and plastic sewer pipe, materials storage facilities, salt/sand storage, vehicle fueling station and parking. This property use has been on-going since 1914.

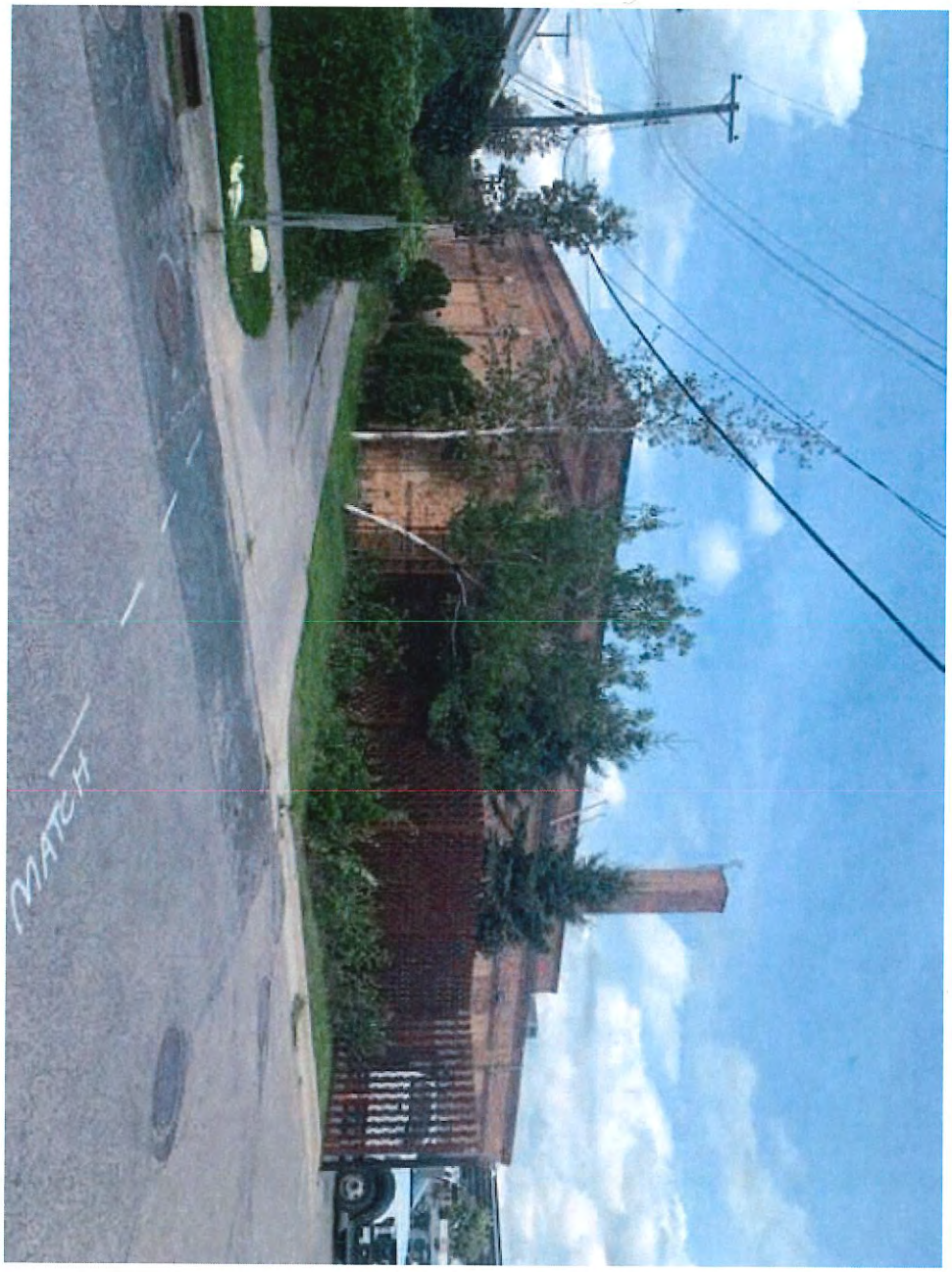
Current land use of the former Roof Depot property is warehousing of roofing supply materials. The current building has been used for warehousing and other commercial purposes since it was built in 1947. The current structure was purchased by the City of Minneapolis in 2019 and has been vacant since that time. Prior to the existence of the current structure, the property was used for coal storage, machining, auto parts storage and repair, and residential housing.

CONCEPTUAL SITE PLAN

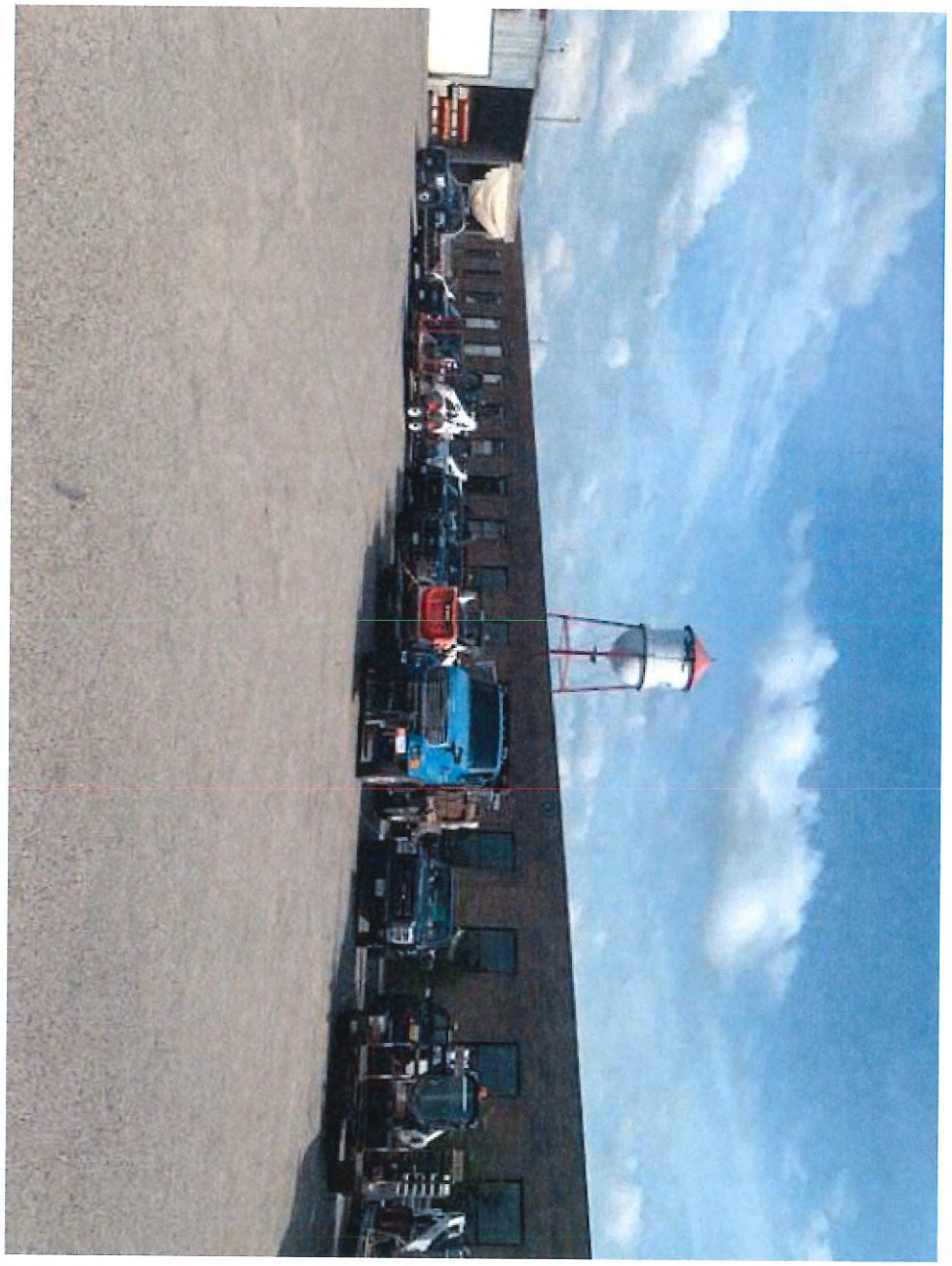



Trail
Jefferson Partners LP
Jefferson Lines
Cedar Food & Grill
Takeout
E 26th St
E 26th St
E 26th St
E 26th St
18th Ave S
Cedar Ave
Longfellow Ave
E 27th St
Department of Public Works: Hiawatha...
MAINTENANCE OFFICE
Hiawatha LRT Trail
Aurora Charter School
Temporarily closed
Super Duty
Little Earth Trail
Martin Olav Sabo Bridge
Better Futures
STORE
Current Property Boundaries
Phillips Garden
E 27th St
55
Hiawatha LRT Trail
Midtown Greenway
Expansion Area
1860 East 28th Street
11 min drive - work
Warehouse Depot
ROOFING DEPOT
Agiliti
Hwy 55
Hiawatha Ave
Cedar 28 Condos
E 28th St
E 28th St
E 28th St
Smith Foundry Co
Midtown Greenway
20th Ave S
21st Ave S
Climate Generation: A Will Steger Legacy
John A. Dalsin
Google


City of Minneapolis
Department of Public Works
Hiawatha Maintenance Facility


MATCH


5



Minneapolis
City of Lakes

Community Planning and Economic Development
250 S. 4th Street - Room 300
Minneapolis, MN 55415
TEL 612.673.3000
www.minneapolismn.gov

January 3, 2020

Bob Friddle, Director of Facilities Design and Construction
City of Minneapolis – Department of Finance and Property Services
350 S. 5th St, Suite 223
Minneapolis, MN 55415

RE: Historic Review Letter for 1860 28th St E
Longfellow Warehouse/Sears, Roebuck & Co. Building
PID: 3602924320003 – PLAN10256

Bob Friddle,

On December 16, 2019, the Minneapolis Community Planning and Economic Development Department (CPED) received your application for a historic review letter. The subject property is located at 1860 28th Street East. Section 599.110 defines a historic resource as, "A property that is believed to have historical, cultural, architectural, archaeological or engineering significance and to meet at least one of the criteria for designation as a landmark or historic district as provided in this chapter." CPED last reviewed this property in a historic review letter dated January 28, 2015.

Historic Name: Longfellow Warehouse/Sears, Roebuck & Co. Building
Historic Address: 1860 E. 28th St.
Date of Construction: 1945
Architect: Magney, Tusler, & Setter
Builder: Madsen Construction Company
Original Owner and Occupant: Madsen Construction Company/Sears, Roebuck & Co.
Style: Industrial with minimal Art Moderne details

Previous findings:

The property is not locally designated or listed in the National Register of Historic Places. The property was included in the study area of a 2001 historic resource survey of south Minneapolis, but not identified for further research. The property was also included in a 2001 survey of properties near the proposed Midtown Greenway. That survey recommended that the property not be considered eligible for listing on the National Register of Historic Places. The criteria for listing on the National Register are different from the historic resource criteria in the Minneapolis Code of Ordinances.

The January 28, 2015 historic review letter determined that the building did not meet Criteria 1 through 5 or 7, and that further research would be needed to determine if the property would meet Criteria 6: the property exemplifies works of master builders, engineers, designers, artists, craftsmen, or architects. A historical analysis, *Historical Assessment: Work of a Master for the Longfellow Warehouse Sears, Roebuck and Co.*, was completed by Preservation Design Works LLC in March 2015 and concluded that although Magney & Tusler and Madsen Construction have earned the distinctions of "master architects" and "master builders," the building does not exemplify the work of either party.

Historic Overview of the Property:

According to city building permit records, the subject property was originally a coal yard for the nearby rail line. All existing structures were demolished prior to the 1945-47 construction of the large, one-story brick warehouse located in the southwest corner of the Longfellow neighborhood. The site is bound by East 28th Street on the south, Longfellow Avenue on the west, the Department of Public Works Hiawatha Maintenance Facility on the north, and by the Midtown Greenway - once a historic rail line - on the east.

The original warehouse measured 562 feet by 573 feet and had wood floors and a cafeteria. The building was constructed on a poured concrete foundation and the exterior walls are clad in light brown brick laid in American bond. The historic primary façade is located on East 28th Street at the southwest corner and is differentiated from the rest of the building by a series of decorative brick patterns created by alternating even horizontal rows of extruded brick. The historic entrance on East 28th street is emphasized by a brick frame that stands out from the façade and features original lighting sconces on each side of the entrance.[i] A continuous ribbon course of light stone underlines the windows and forms their sills. The original windows have been replaced with new double hung aluminum or vinyl windows with a nine-over-nine interior muntin pattern, and a wide, dark aluminum flashing now covers the sills below each window, creating a dashed line effect in the original light stone ribbon course detail. Black metal security screens cover the lower half of the fenestrations on the south façade.

The west façade is separated from Longfellow Avenue by a deep parking lot. The façade is separated into three blocks, with the center block being even further recessed from the street. A rhythmic pattern of window, entrance and loading dock fenestrations forms the prominent feature of the façade. A replacement, standing seam metal roof in bright red forms a Mansard-like roof line at the parapet – a prominent and incompatible detail. Matching red metal flashing appears around the entire structure, including the main façade. The original windows on all facades have been replaced. The east (Greenway) façade is notable for its long, curved wall and rhythmic fenestrations for both windows and loading dock doors which provided easy access from the warehouse to the railroad. The building also features a tall, tapered, brick smokestack and a large, highly visible metal cistern on a four-legged support structure. This cistern features the logo of Roof Depot, the current main tenant in the building.

Much of the interior space has been reconfigured. The western portion of the building has been subdivided to create a showroom, offices, and a conference room. The finishes in these spaces - gypsum board walls, dropped acoustical tile ceilings, and carpeting - are not consistent with historic warehouse space. Additionally, some of the historic windows have been covered in drywall at the interior because of these modifications. The basement rear portion of the warehouse features historic masonry, exposed structural systems, and the original boiler, therefore retaining some historic integrity.[ii]

Stylistically, the building has few defining characteristics and displays common, simplified Art Moderne motifs and features that were common in industrial building designs in the Twin Cities of that time – these include linear geometric forms and ornamentation, minimally accented with brick linear courses and varying brown hues or bond patterns, as well as decorative brick piers/pilasters. The building design is not a notable example of Art Moderne or industrial architecture in the City of Minneapolis. The property retains poor to fair integrity. Much of the building's association, materials, and feeling has been compromised by alterations.

Architects:

Gottlieb Magney and Wilbur Tusler formed the Minneapolis architectural firm of Magney & Tusler in 1917. Magney studied at the University of Minnesota and held a series of architecture and engineering jobs in Seattle, San Francisco, and Duluth before returning to Minneapolis in 1908. Tusler studied at the University of Minnesota and the University of Pennsylvania and worked in Pennsylvania from 1914 until 1917, then returned to Minneapolis and partnered with Magney. Donald Setter joined the firm in 1936 after studying at Cornell University and working in two New York firms before moving back to Minneapolis. Magney & Tusler was considered among the top

architectural firms in Minneapolis and many of their buildings have been locally and nationally designated, including The Foshay Tower (1929, with Leon Arnal), the Forum Cafeteria interior and the Minneapolis branch of the U.S. Post Office (1935), all considered art deco masterpieces.[iii]

Magney & Tusler also designed warehouses and industrial buildings in the 1920s and 1930s, including the Classical Revival additions to the Buzza Building (1923-27) and the S.T. McKnight Building (1925) at 615 Third Street North in Minneapolis. Contributing to the locally designated Minneapolis Warehouse Historic District, the McKnight Building is a two-story masonry building that features light brown brick and an entrance that is similar in design to the entrance of the Longfellow Warehouse. The McKnight Building may have served as a precedent for the design of the Longfellow Warehouse and is a better example of the firm's more utilitarian designs.[iv]

During the 1940s and 1950s, the firm of Magney, Tusler & Setter grew to a staff of 44 men and women who worked on a range of high-profile projects including many buildings for the University of Minnesota, the regional office for Prudential Insurance in Minneapolis, and the Sumner Field housing project, yet only a few warehouses were designed in that era. As such, the Longfellow Sears, Roebuck & Co. warehouse is not representative of the mid-century work of Magney, Tusler & Setter.[v]

Builder:

According to Minneapolis City Directories, Madsen Construction was formed as "Madsen Brothers" in Minneapolis in 1901. Madsen Construction was a prolific construction firm that appears to have specialized in masonry construction. Mads Madsen was identified as a "bricklayer" in the 1905 Minneapolis City Directory and as a "stone contr." in the 1906 directory. Madsen Construction worked with many prominent architects and engineers, including Magney & Tusler, Hewitt & Brown, Frank Lloyd Wright, and C.A.P. Turner, among others.[vi]

One of Madsen's early projects of significance is the 1909 Albert Lea Packing Company, which was profiled in a 1912 edition of the industry journal The Cement Era for its use of the "interesting combination" of a reinforced concrete frame and cement brick walls. Madsen Construction built two warehouse buildings in the locally designated Minneapolis Warehouse Historic District: the Gurley Candy Factory (Hewitt & Brown, 1915) and the S.T. McKnight Building—in the early decades of the twentieth century.[vii]

Two buildings that are representative of Madsen Construction's masterworks are Williams Arena on the University of Minnesota Campus (1928) and the Frank Lloyd Wright-designed Henry and Freida Neils House (1951) at 2801 Burnham Road in Minneapolis. Williams Arena, historically known as the University of Minnesota Field House, was designed by Clarence Johnston Sr. and is known for its raised floor. The building is one of the most famous college basketball arenas in the country, could hold 14,000 fans upon completion, and was considered a feat of engineering at the time.[viii]

The Wright-designed Neils House is locally designated and listed in the National Register of Historic Places. It sits on a concrete foundation, has bearing walls and a chimney "constructed of thousands of various sized blocks of cull marble laid in a horizontal pattern," dramatic aluminum-framed windows, and an asymmetrical cantilevered gable roof. Lyle Halverson of Madsen Construction was reputed to be the only contractor who "did not throw up [his] hands" when he saw Wright's design. Williams Arena and the Neils house demonstrate Madsen Construction's skills as master builders in the twenty-year period between 1928 and 1949. The Longfellow Sears, Roebuck & Co. warehouse is, by comparison, a relatively straightforward design and, therefore, is not considered a masterwork by Madsen Construction.[ix]

Integrity:

The warehouse has undergone alterations, including an addition, changes to interior circulation, several roof

alterations and replacements, and the comprehensive replacement of historic windows, all of which have compromised the structure's material integrity. New roof design has altered the visual character and integrity of the west façade but has not affected the character of the main (south), east and north facades. The building retains integrity of massing, size, scale and setting.

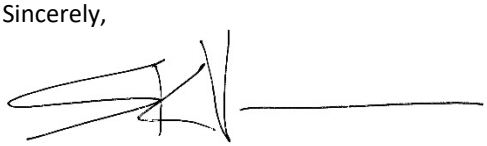
Analysis:

The Longfellow Sears, Roebuck & Co. warehouse has lost integrity and does not appear to be tangibly associated with significant events, people, or broader patterns of history. The property was built by the Madsen Construction Company, an important regional builder, but is not a notable example of their work and appears to be among the less notable projects completed by the company in the region. Architecturally, the building currently shows some characteristic Art Moderne details on only one facade; these simplified Art Moderne motifs were very common of industrial buildings in the Twin Cities at the time. The Sears, Roebuck & Co. warehouse is not an exceptional example of such style. Magney & Tusler's high-style designs from the 1920s and 1930s have warranted the firm's designation as master architects, and Madsen Construction's ability to realize complex designs confirm that they are master builders, however, when situated in the careers of each firm, the subject property does not exemplify the work of Magney, Tusler & Setter or Madsen Construction.

Based on the available evidence, **the property does not appear to meet local designation criteria listed in section 599.210 of the Minneapolis Code of Ordinances and has been determined to not be a historic resource.**

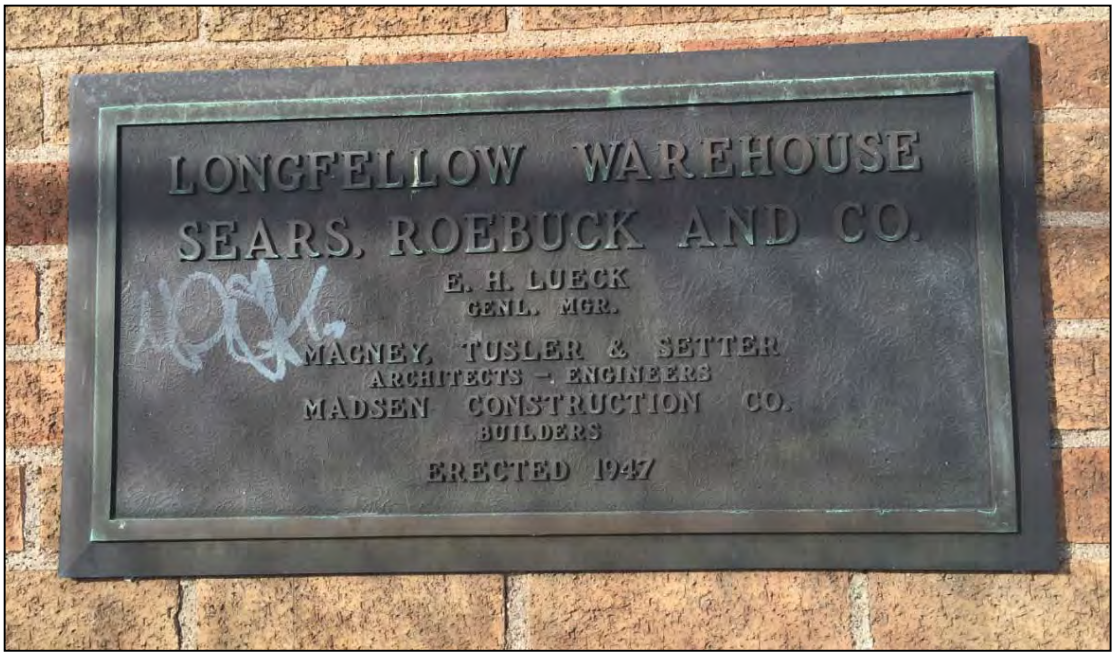
CPED's determinations shall be valid for one (1) year from the date of this letter. In light of additional information that may become available in the future, CPED reserves the right to reevaluate our determination in this letter.

Sincerely,



Sheila Vemmer
Senior City Planner, Historic Preservation

[i] Halvorsen Ludt, Tamara. "HISTORICAL ASSESSMENT: WORK OF A MASTER for the Longfellow Warehouse Sears, Roebuck and Co." Preservation Design Works, Minneapolis, MN, 2015, pg. 2.
[ii] Halvorsen Ludt, Tamara. "HISTORICAL ASSESSMENT: WORK OF A MASTER for the Longfellow Warehouse Sears, Roebuck and Co." Preservation Design Works, Minneapolis, MN, 2015, pg. 2.
[iii] Halvorsen Ludt, Tamara. "HISTORICAL ASSESSMENT: WORK OF A MASTER for the Longfellow Warehouse Sears, Roebuck and Co." Preservation Design Works, Minneapolis, MN, 2015, pg. 3.
[iv] Halvorsen Ludt, Tamara. "HISTORICAL ASSESSMENT: WORK OF A MASTER for the Longfellow Warehouse Sears, Roebuck and Co." Preservation Design Works, Minneapolis, MN, 2015, pg. 3.
[v] Halvorsen Ludt, Tamara. "HISTORICAL ASSESSMENT: WORK OF A MASTER for the Longfellow Warehouse Sears, Roebuck and Co." Preservation Design Works, Minneapolis, MN, 2015, pg. 4.
[vi] Halvorsen Ludt, Tamara. "HISTORICAL ASSESSMENT: WORK OF A MASTER for the Longfellow Warehouse Sears, Roebuck and Co." Preservation Design Works, Minneapolis, MN, 2015, pg. 4.
[vii] Halvorsen Ludt, Tamara. "HISTORICAL ASSESSMENT: WORK OF A MASTER for the Longfellow Warehouse Sears, Roebuck and Co." Preservation Design Works, Minneapolis, MN, 2015, pg. 4.
[viii] Halvorsen Ludt, Tamara. "HISTORICAL ASSESSMENT: WORK OF A MASTER for the Longfellow Warehouse Sears, Roebuck and Co." Preservation Design Works, Minneapolis, MN, 2015, pg. 5.
[ix] Halvorsen Ludt, Tamara. "HISTORICAL ASSESSMENT: WORK OF A MASTER for the Longfellow Warehouse Sears, Roebuck and Co." Preservation Design Works, Minneapolis, MN, 2015, pg. 5.



HISTORICAL ASSESSMENT: WORK OF A MASTER

for the

Longfellow Warehouse Sears, Roebuck and Co.

1860 E. 28th Street

Minneapolis, Minnesota

PID: #3602924320002

16 March 2015

PRESERVATION
DESIGN WORKS, LLC

Historical Assessment: Work of a Master
Longfellow Warehouse Sears, Roebuck and Co.
1860 E. 28th Street
Minneapolis, Minnesota
PID: #3602924320002

16 March 2015

Prepared for:
Bob Friddle, Director Facilities Design and Construction
Property Services, City of Minneapolis
350 S. 5th St., Room 223, Minneapolis, MN 55415
Bob.Friddle@minneapolismn.gov

By:
Preservation Design Works (PVN)
575 9th Street SE, Ste 215
Minneapolis, Minnesota 55414

Copy to:
Chris Backes, Chris.Backes@minneapolismn.gov

For questions and comments:
Tamara Halvorsen Ludt
ludt@pvnworks.com
(612) 843-4140

Introduction

In 2015, the City of Minneapolis contacted Preservation Design Works (PVN) to assess the building at 1860 E. 28th Street in Minneapolis to determine if the building, a former Sears, Roebuck and Co. warehouse, represents the work of a master architect or builder, as described in Section 599.210 in the Minneapolis Code of Ordinances. According to Section 599.210, the criteria that should be considered when determining the historic significance of a property are as follows:

1. The property is associated with significant events or with periods that exemplify broad patterns of cultural, political, economic or social history.
2. The property contains or is associated with the lives of significant persons or groups.
3. The property contains or is associated with distinctive elements of city of neighborhood identity.
4. The property embodies the distinctive characteristics of an architectural or engineering type or style, or method of construction.
5. The property exemplifies a landscape design or development pattern distinguished by innovation, rarity, uniqueness or quality of design or detail.
6. The property exemplifies works of master builders, engineers, designers, artists, craftsmen or architects.
7. The property has yielded, or may be likely to yield, information important in prehistory or history.

In an Historic Review Letter dated January 28, 2015, City of Minneapolis staff determined that the Longfellow Sears, Roebuck & Co. warehouse did not meet Criteria 1-5 or Criteria 7. The report that follows, which includes a building description and histories of Magney, Tusler & Setter and Madsen Construction, details PVN's findings with regard to Criteria 6: "The property exemplifies works of master buildings, engineers, designers, artists, craftsmen, or architects."

Constructed in 1947, the warehouse was designed by the renowned Minneapolis architectural firm of Magney, Tusler & Setter and built by Madsen Construction. While Magney & Tusler are considered "master architects" and Madsen Construction was a prolific and adept firm that was responsible for many historically significant buildings in Minneapolis, the Sears, Roebuck & Co. warehouse on E. 28th Street does not represent a masterwork of either firm. Further, the warehouse has undergone alterations, including changes to interior circulation, an addition, several roof alterations and replacements, and the complete replacement of historic windows, which have compromised its historic integrity.

Building Description

The Longfellow Sears, Roebuck and Co. warehouse is a large, one-story brick warehouse (Images 1 and 2). The site is bound by East 28th Street on the south, Longfellow Avenue on the west, and by an historic rail line on the east. The building sits on a poured concrete foundation and the exterior walls are clad in light brown brick laid in American bond. The original warehouse was 562 ft. by 573 ft and had wood floors and a cafeteria.[1]

The historic primary façade (south) fronts East 28th Street and is differentiated from the rest of the building by a series of decorative brick patterns created by alternating rows of bricks that stand proud (Image 3). The historic entrance on East 28th street is emphasized by a brick frame that stands proud of the façade and features original sconces on each side of the entrance (Image 4). The original warehouse windows, likely double hung windows, have been replaced with black panels and metal security screens cover the lower half of the panels on the south façade (Image 4).

The west façade fronts a parking lot, houses seven loading dock truck bays, and now functions as the primary entrance for Roof Depot, the current building tenant (Image 1). The northern portion of this façade includes an addition that features a series of truck bays with overhead doors (Image 5). The original warehouse windows on this facade have been replaced (Images 5 & 6). The windows at the north façade have been replaced and are obscured by tall pine trees. The historic windows and some of the historic loading doors on the east façade have been replaced (Image 7). Finally, the roof, which features a water tank, has been replaced with a red thin line panel metal roof that has a mansard-style overhang at the west façade that is consistent with Roof Depot's logo and branding (Images 1, 2, 5, 6, & 7).[2]

At the interior, much of the space has been reconfigured. The western portion of the building has been subdivided to create a showroom, offices, and a conference room. The finishes in these spaces—gypsum board walls, dropped acoustical tile ceilings, and carpeting—are not consistent with historic warehouse space (Images 8-13). Additionally, some of the historic windows have been covered in drywall at the interior as a result of these modifications. The basement and the

[1] Minneapolis Building Permit A-30672, January 30, 1953; Minneapolis Building Permit A-35970, September 21, 1965.

[2] The water tower does not appear on permit cards or available aerial photographs from the period of construction. Therefore, the water tower does not appear to be historic.

rear portion of the warehouse feature historic masonry, exposed structural systems, and the original boiler, therefore retaining some historic integrity (Images 14-16).

Magney, Tusler & Setter

Gottlieb Magney and Wilbur Tusler formed the Minneapolis architectural firm of Magney & Tusler in 1917. Magney studied at the University of Minnesota and held a series of architecture and engineering jobs in Seattle, San Francisco, and Duluth before returning to Minneapolis in 1908 to work for Edwin Hewitt. Tusler studied at the University of Minnesota and the University of Pennsylvania. He worked in Pennsylvania from 1914 until 1917, when he returned to Minneapolis and partnered with Magney.[3] Donald Setter joined the firm in 1939, after studying at Cornell University and working in two New York firms before moving to Minneapolis to join Hewitt and Brown.[4]

Magney & Tusler was considered "one of the best known and most successful" architectural firms in Minneapolis and many of their buildings have been locally and nationally designated. In the 1920s and 1930s, Magney, Tusler, and staff member Leon Arnal — whose 1919 to 1934 tenure with the firm was integral to its success — designed some of the most prominent buildings in Minneapolis.[5] The Foshay Tower (1929), the Forum Cafeteria interior, and the Minneapolis-branch of the U.S. Post Office (1935) are all considered art deco masterpieces (Images 17 & 18). Magney, Tusler, and Arnal's high-style expertise can also be seen in the Renaissance Revival designs of the Hardware Mutual Insurance Co. Building (1923), the Young Quinlan Building (1926), the Women's Club of Minneapolis (1927), and the Calhoun Beach Club (1928-1946) (Images 19 & 20).

Magney & Tusler also designed warehouses and industrial buildings in the 1920s and 1930s, including the Classical Revival additions to the Buzza Building (1923-1927) and the S.T. McKnight Building at 615 Third Street North in Minneapolis (Image 21). The McKnight Building, which was constructed in 1925 and is a contributing building to the locally and nationally-designated Minneapolis Warehouse District, is a two-story masonry structure that features light brown brick and an entrance that is similar in design to the entrance of the Sears, Roebuck and Co. warehouse.

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[3] Alan Lathrop, *Minnesota Architects: A Biographical Dictionary* (Minneapolis: University of Minnesota Press, 2010), 148-149 and 216-217.

[4] Lathrop, *Minnesota Architects*, 192.

[5] Lathrop, *Minnesota Architects*, 9.

The McKnight Building may have served as a precedent for the design of the Sears, Roebuck and Co. warehouse on E. 28th Street. As an intact building designed and constructed during the period that defined Magney & Tusler as "master architects," the McKnight Building is a better example of the firm's more utilitarian designs than does the Sears, Roebuck and Co. warehouse.

During the 1940s and 1950s, the firm of Magney, Tusler & Setter grew to a staff of 44 men and women who worked on a range of high-profile projects including many buildings for the University of Minnesota, the regional office for Prudential Insurance in Minneapolis, and the Sumner Field housing project. The firm designed few warehouses in the 1940s and 1950s, rather the practice seemed to focus particularly on office buildings and hospitals (with an anticipated $6,000,000 worth of hospital construction project costs in the office in 1947). As such, the Longfellow Sears, Roebuck & Co. warehouse is not representative of the mid-century work of Magney, Tusler & Setter.[6]

Madsen Construction

According to Minneapolis City Directories, Madsen Construction was formed as "Madsen Brothers" in Minneapolis in 1901. Madsen Construction was a prolific construction firm that appears to have specialized in masonry construction. Mads Madsen was identified as a "bricklayer" in the 1905 Minneapolis City Directory and as a "stone contr." in the 1906 directory.[7] Madsen Construction worked with many prominent architects and engineers, including Magney & Tusler, Hewitt & Brown, Frank Lloyd Wright, and C.A.P. Turner, among others.

One of Madsen's early projects of significance is the 1909 Albert Lea Packing Company, which was profiled in a 1912 edition of the industry journal *The Cement Era* for its use of the "interesting combination" of a reinforced concrete frame and cement brick walls.[8]

Madsen Construction built two warehouse buildings in the locally and nationally-designated Minneapolis Warehouse District—the Gurley Candy Factory (Hewitt & Brown, 1915) and Magney &

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[6] Magney, Tusler & Setter, "American Institute of Architects Architects' Roster Questionnaire Supplemental Data Sheet," February 9, 1953 (Minneapolis) http://public.aia.org/sites/hdoaa/wiki/AIA%20scans/Rosters/MagneyTuslerSetter_roster.pdf

[7] *Minneapolis City Directory, 1901*, 885, Minneapolis City Directory Collection 1859-1922, Hennepin County Library, http://box2.nmtvault.com/Hennepin2/; *Minneapolis City Directory, 1905*, 1163, Minneapolis City Directory Collection 1859-1922, Hennepin County Library, http://box2.nmtvault.com/Hennepin2/; *Minneapolis City Directory, 1906*, 1249, Minneapolis City Directory Collection 1859-1922, http://box2.nmtvault.com/Hennepin2/.

[8] "Cement Brick Combined with Reinforced Concrete," *The Cement Era* X, no. 1 (January, 1912): 36-37.

Tusler's S.T. McKnight Building—in the early decades of the twentieth century. The firm also built high schools around the state of Minnesota, including the Red Wing High School and the Lamberton High School (Image 22).

Two buildings that are representative of Madsen Construction's masterworks are Williams Arena on the University of Minnesota Campus (1928) and the Frank Lloyd Wright-designed Henry and Freida Neils House at 2801 Burnham Road in Minneapolis.

Williams Arena, historically known as the University of Minnesota Field House, was designed by Clarence Johnston Sr. and built by Madsen Construction in 1928 (Image 23). Known for it's raised floor, the building is one of the most famous college basketball arenas in the country. The large red brick building could hold 14,000 fans upon completion. Considered a feat of engineering at the time, the steel-framed masonry-clad structure has an arched roof.[9]

The Neils house was designed by Frank Lloyd Wright and built by Madsen Construction in 1949. The nationally-designated house sits on a concrete foundation, has bearing walls and a chimney "constructed of thousands of various sized blocks of cull marble laid in a horizontal pattern," dramatic aluminum-framed windows, and an asymmetrical cantilevered gable roof (Image 24). Lyle Halverson of Madsen Construction was reputed to be the only contractor who "did not throw up [his] hands" when he saw Wright's design.[10]

Williams Arena and the Neils house demonstrate Madsen Construction's skills as master builders in the twenty-year period between 1928 and 1949. The Longfellow Sears, Roebuck & Co. warehouse is, by comparison, a relatively straightforward design and, therefore, is not considered a masterwork by Madsen Construction.

Conclusion

Magney and Tusler's high-style designs from the 1920s and 1930s have earned the firm the designation "master architects." Madsen Construction's ability to realize complex designs indicates that they are "master builders." However, when situated in the careers of each firm, the Sears, Roebuck & Co. warehouse on E. 28th Street does not exemplify the work of Magney, Tusler & Setter or Madsen Construction.

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[9] "#TBT: Barn History Series: Tunnels," *The Daily Gopher,* January 22, 2015 http://www.thedailygopher.com/2015/1/22/7869065/tbt-barn-history-series-tunnels-heating-more

[10] National Register of Historic Places, Henry and Freida Neils House, Minneapolis, Hennepin, Minnesota, National Register #04000531

Appendix: Photographs

Image 1

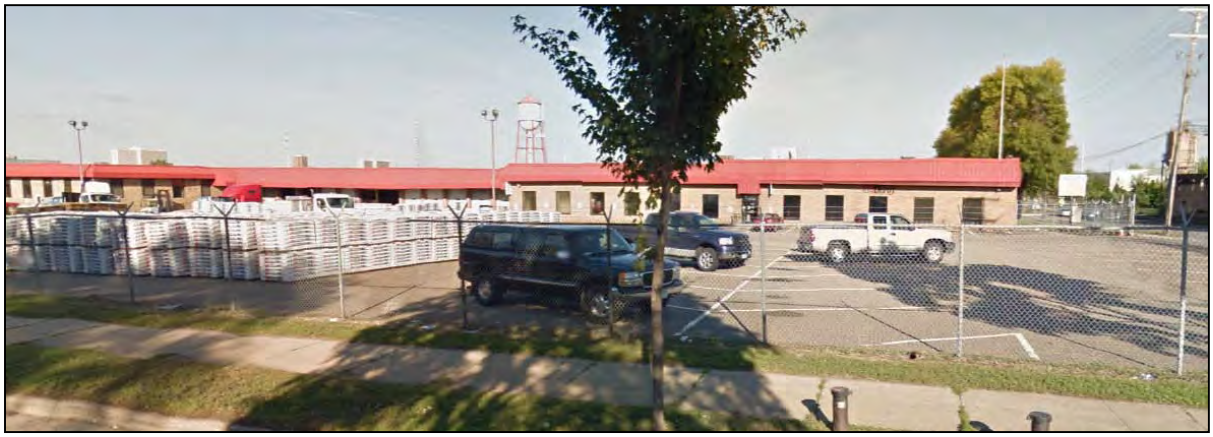

Image 2

Image 3

Image 4

Image 5

Image 6

Image 7

Image 8

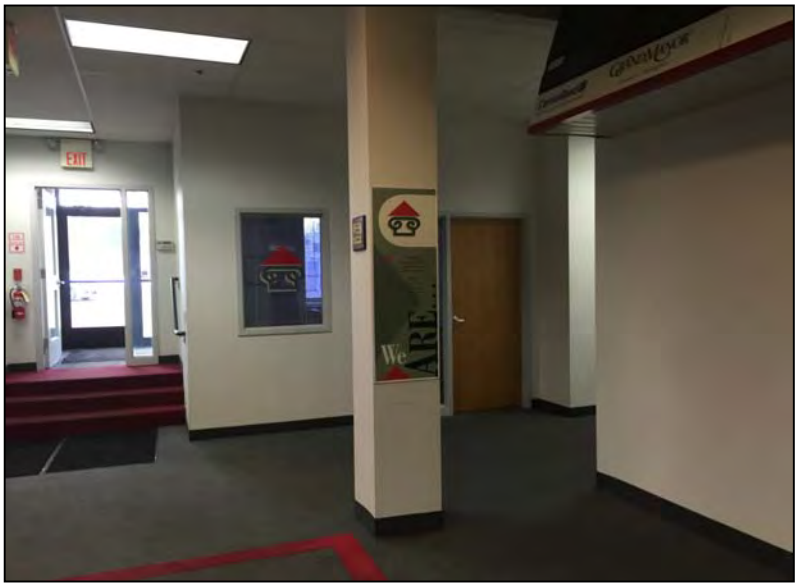

Image 9

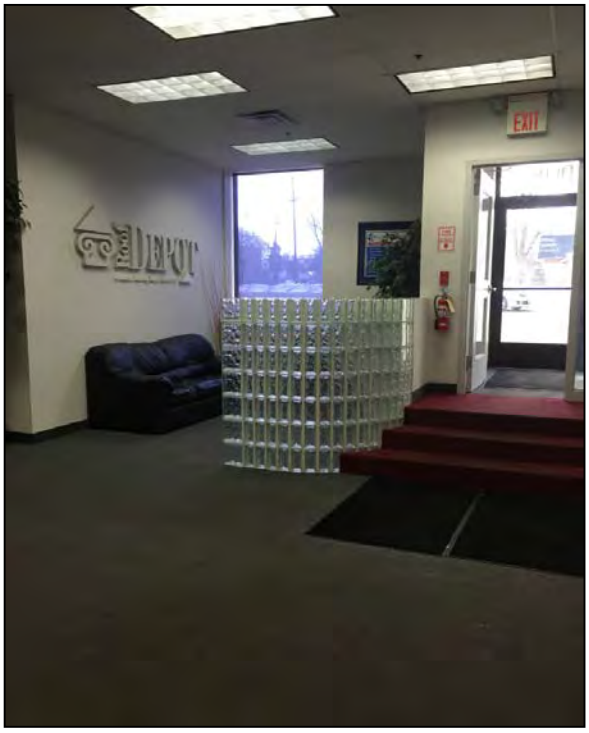

Image 10

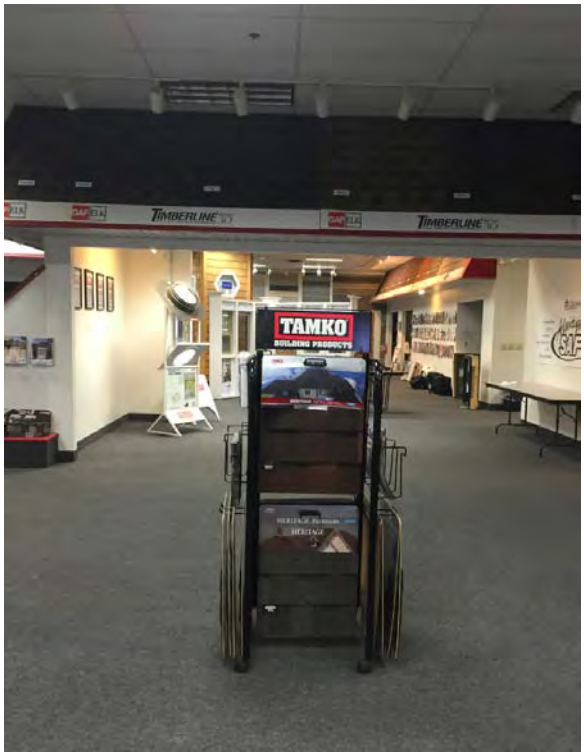

Image 11

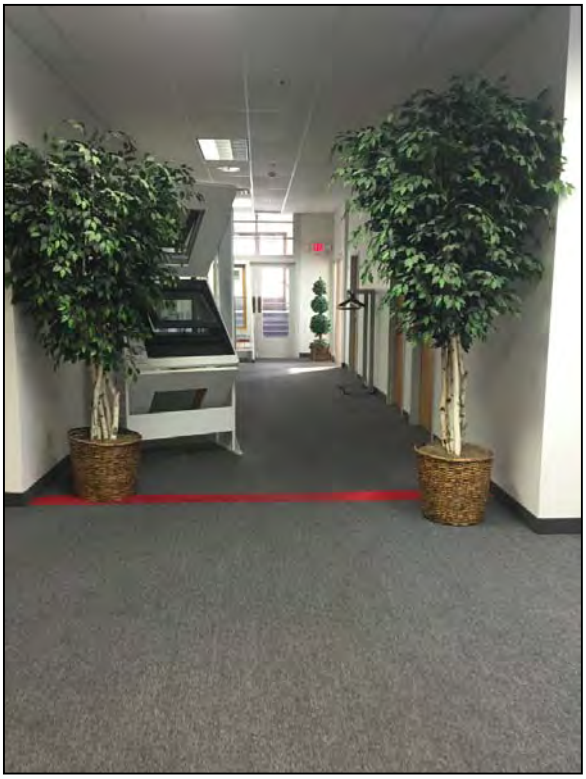

Image 12

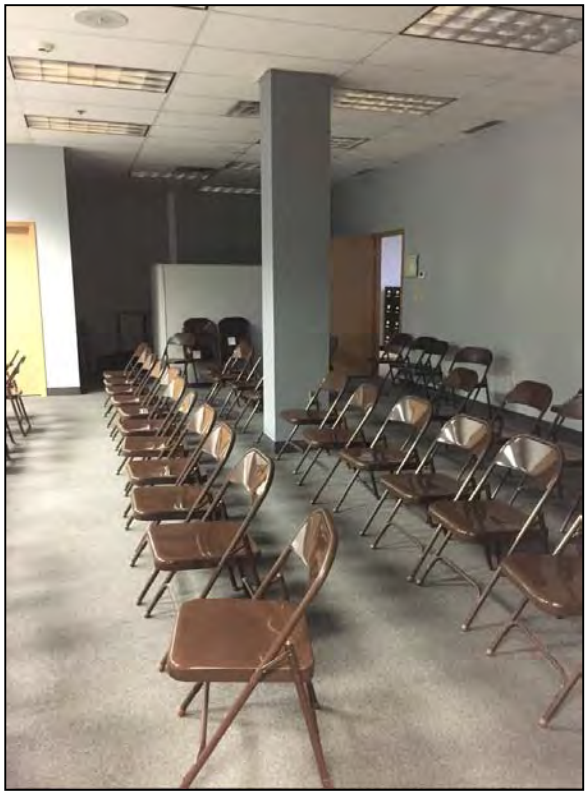

Image 13

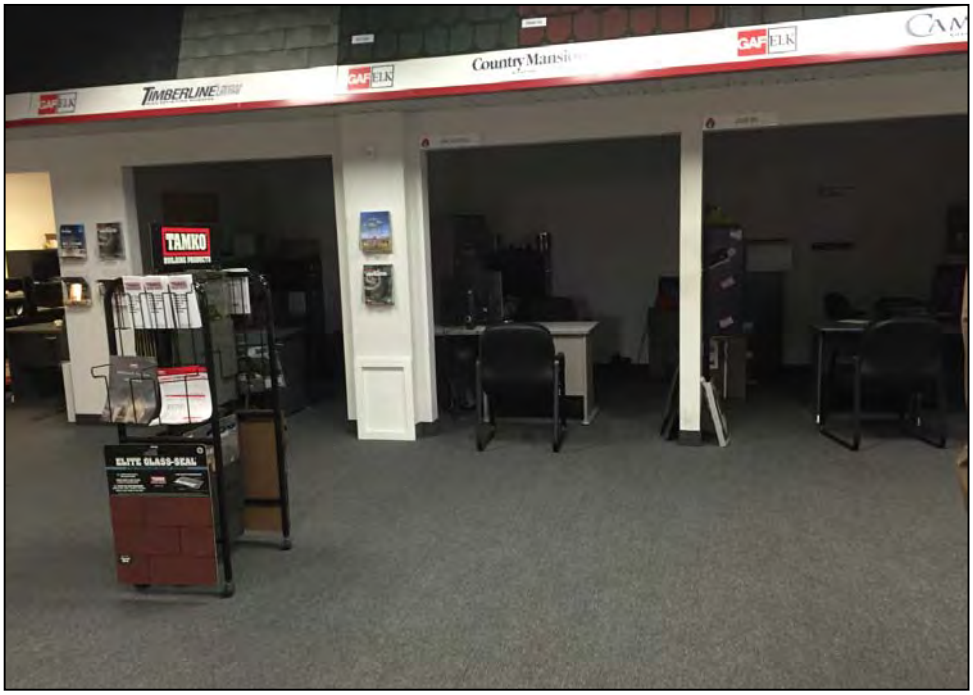

Image 14

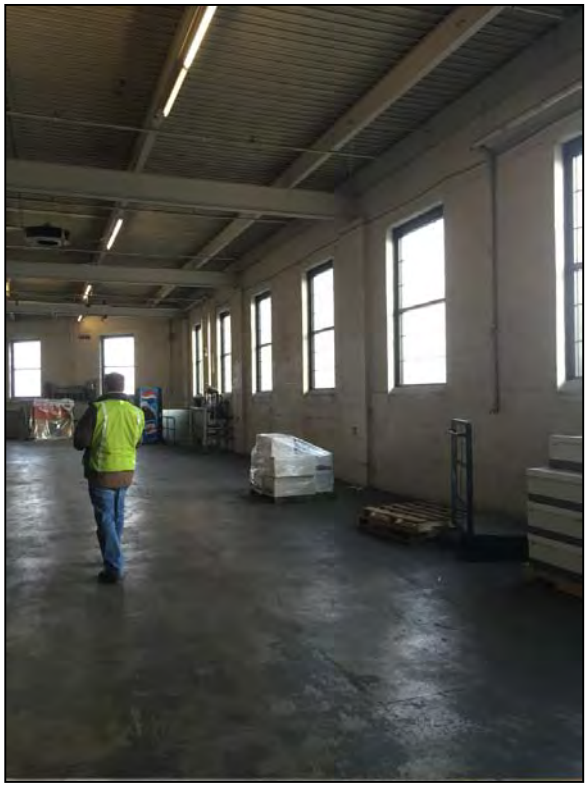

Image 15

Image 16

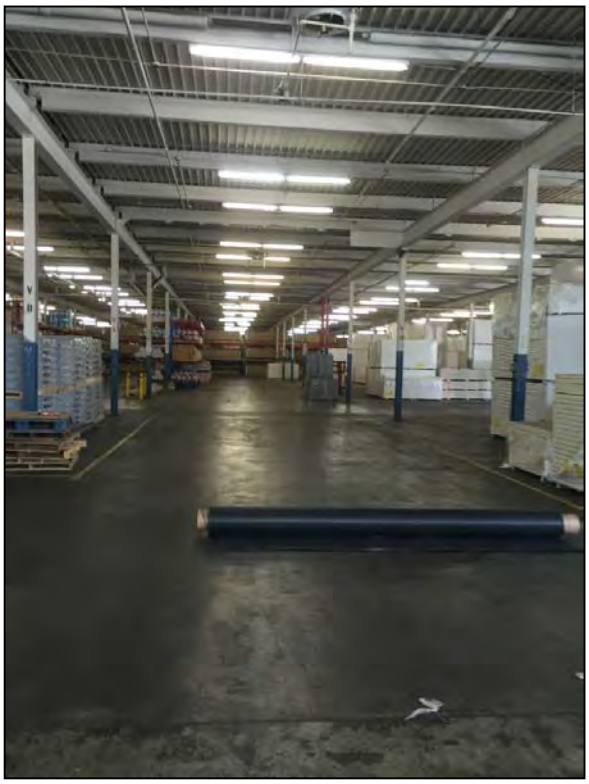

Image 17

Image of the Foshay Tower courtesy of the Minnesota Historical Society

Image 18

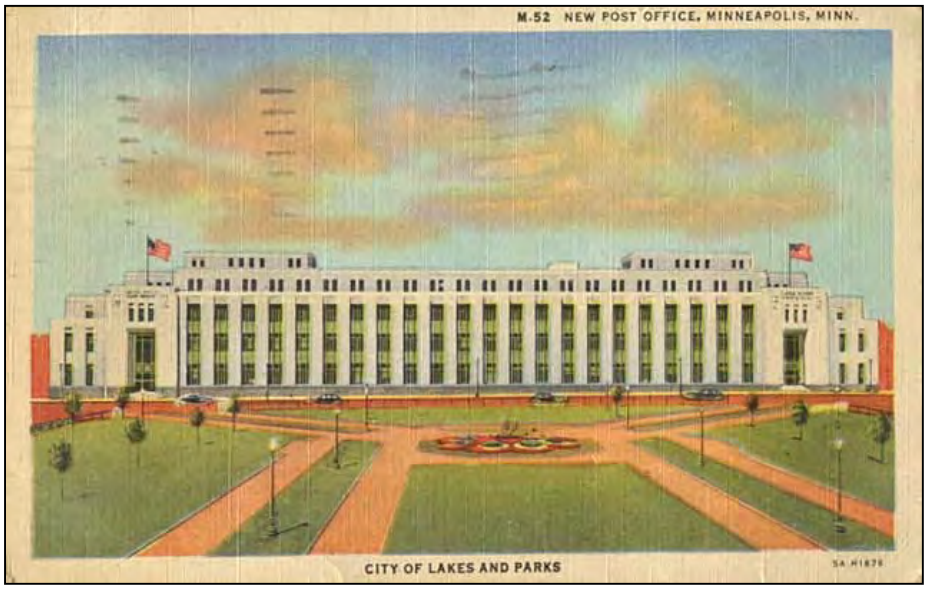

Image of the Minneapolis Post Office courtesy of the Minnesota Historical Society

Image 19

Image of the Young-Quinlan Building courtesy of the Minnesota Historical Society

Image 20

Image of the Hardware Mutual Building courtesy of the Minnesota Historical Society

Image 21

Image of the S.T. McKnight Building courtesy of the City of Minneapolis

Image 22

Image of Lamberton High School courtesy of the Minnesota Historical Society

Image 23

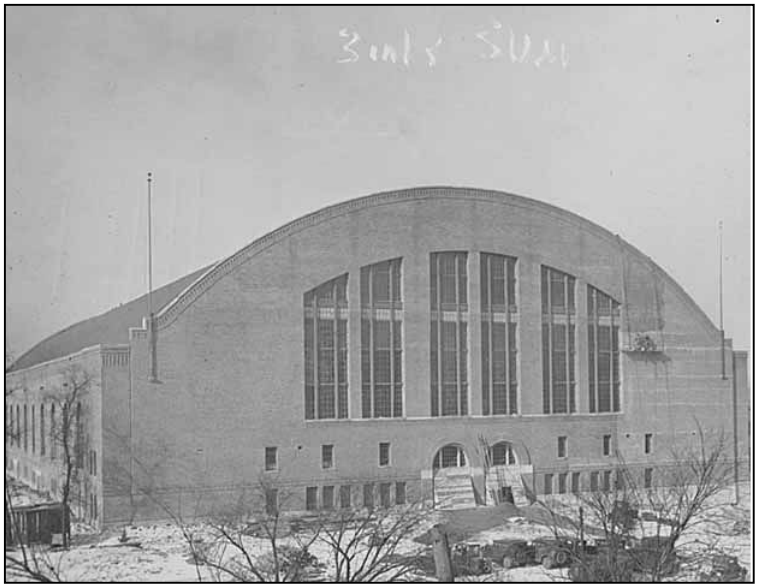

Image of the University of Minnesota Field House (Williams Arena)
courtesy of the Universtiy of Minnesota

Image 24

Image of the Henry and Freida Neils House courtesy of the Minnesota Historical Society

DEPARTMENT OF ADMINISTRATION
STATE HISTORIC PRESERVATION OFFICE

September 21, 2020

Mr. Eric Hesse
American Engineering Testing
550 Cleveland Avenue North
St. Paul, MN 55114

RE: Hiawatha Maintenance Facility Expansion
1911 East 26th Street, Minneapolis, Hennepin County
SHPO Number: 2020-2535

Dear Mr. Hesse:

Thank you for consulting with our office during the preparation of an Environmental Assessment Worksheet for the above-referenced project.

As we understand it, the City of Minneapolis is proposing to expand the existing Minneapolis Public Works Hiawatha Maintenance Facility, which is located at 1911 East 26th Street. The proposed project includes the construction of additional office space, expansion of the existing maintenance facility, construction of a parking ramp, relocation of a fuel island and underground petroleum storage tank system, installation of stormwater retention ponds, demolition of the former Roof Depot building, construction of additional storage space for materials and vehicles, construction of a training center, and relocation of certain City staff and operations.

We have reviewed the documentation included with your submittal and our comments are provided below.

Based on information that is available to us at this time, we have determined that the potential for this project to impact intact archaeological resources is low. Therefore, we do not believe that an archaeological survey is warranted for the project as it is currently proposed.

According to our records, there are two historic properties located within the vicinity of the proposed project that are listed in the National Register of Historic Places (NRHP), the **Minneapolis Pioneers and Soldiers Memorial Cemetery**, and the **Chicago, Milwaukee & St. Paul Grade Separation** (Midtown Greenway). The **Southside Destructor**, which has been determined eligible for listing in the NRHP, is also located within the vicinity of the proposed project. There are also a number of previously inventoried properties located within the proposed project area including the **Minneapolis Public Works Complex** itself (HE-MPC-3505 through HE-MPC-3509), and the former **Sears & Roebucks Machine Warehouse** (Roof Depot) (HE-MPC-13810) located at 1860 E. 28th Street. These properties were identified during previous survey efforts but have not been formally evaluated to determine their eligibility for listing in the NRHP. Based on information that is available to us at this time, it appears that this project will have no adverse effect on properties listed in the National or State Registers of Historic Places

Please note that this comment letter does not address the requirements of Section 106 of the National Historic Preservation Act of 1966 and 36 CFR § 800. If this project is considered for federal financial assistance, or requires a federal permit or license, then review and consultation with our office will need to be initiated by the lead federal agency. Be advised that comments and recommendations provided by our office for this state-level review may differ from findings and determinations made by the federal agency as part of review and consultation under Section 106.

Please contact Kelly Gragg-Johnson, Environmental Review Specialist, at kelly.graggjohnson@state.mn.us if you have any questions regarding our review of this project.

Sincerely,

Sarah J. Beimers
Environmental Review Program Manager

Attachment F

Architectural Renderings

AET Project No. 03-21225

MATERIALS LEGEND - NORTH

DECKING

SYMBOL	DESCRIPTION
DK-01	BRIDGE - WOOD DECKING

FENCE & GUARDRAIL

SYMBOL	DESCRIPTION
FE-01	FENCE TYPE 1 - PERMITER GABION FREESTANDING WALL
FE-02	FENCE TYPE 2 - 6` GARDEN FENCE

LANDSCAPE AMENITY

SYMBOL	DESCRIPTION
LA-01	LIMESTONE BOULDER - 36"X48"X18" NATURAL FACE

PAVING

SYMBOL	DESCRIPTION
P-01	PAVING TYPE 1 - 4" CONCRETE PAVING
P-02	PAVING TYPE 2 - UNIT PAVING

SITE FURNITURE

SYMBOL	DESCRIPTION
SF-01	BACKED BENCH - 6` L IPE WOOD SLAT
SF-03	TRASH RECEPTACLE
SF-05	ADIRONDACK CHAIRS
SF-06	BISTRO TABLE AND CHAIRS
SF-07	UPFIT STRUCTURE - LANDSCAPE FORMS
SF-08	GAS GRIL STATION

0 30' 60' 90'
SCALE: 1"=30'

NORTH

RENDERED PLAN
NORTH SIDE

0-L200N

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Consultants

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401 North 2nd Avenue, Suite 410
Minneapolis, MN 55401
p: 612.332.7522

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License Number
Date Signed

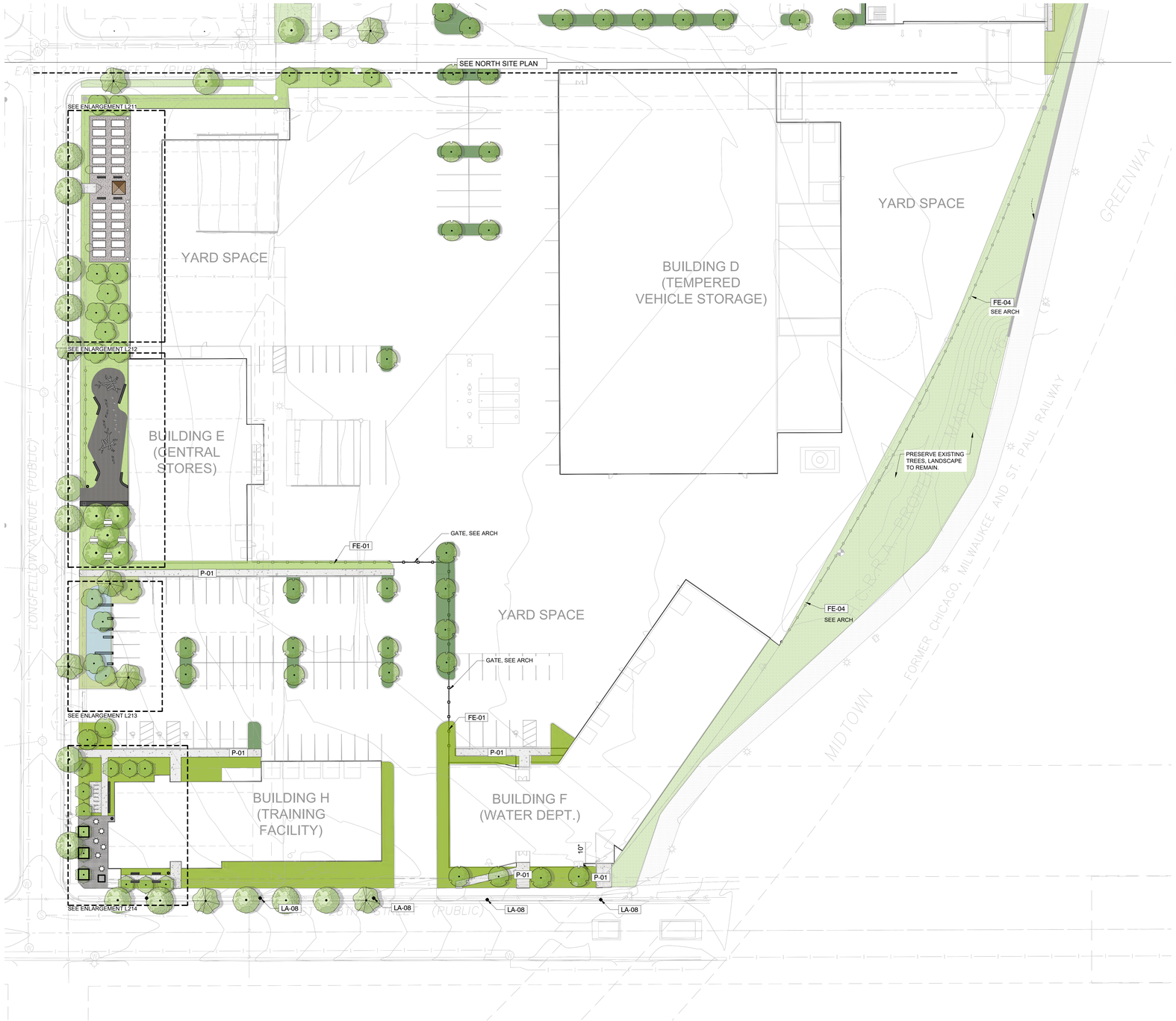
Project For

Key Plan

Project No.
Drawn By
Checked By
Date

Sheet Issues / Revisions

No.	Date	Description



MATERIALS LEGEND - SOUTH

SYMBOL	FENCE & GUARDRAIL DESCRIPTION	QTY
FE-01	FENCE TYPE 1 - PERMITER GABION FREESTANDING WALL	299 LF
FE-02	FENCE TYPE 2 - 6' GARDEN FENCE	183 LF
FE-03	FENCE TYPE 3 - 4' PLAY SCREEN FENCE	101 LF
FE-04	FENCE TYPE 4 - 8-12' GREENWAY SCREEN FENCE	501 LF

SYMBOL	LANDSCAPE AMENITY DESCRIPTION	QTY
LA-02	RAISED GARDEN BED	24
LA-04	PUBLIC ART SCULPTURE	
LA-05	TOOL SHED	1
LA-06	RAIN BARREL	6
LA-07	RAISED PLANTER - 18" HGT WELDED STEEL	
LA-08	STREET LIGHT	

SYMBOL	PAVING DESCRIPTION	QTY
P-01	PAVING TYPE 1 - 4" CONCRETE PAVING	4,109 SF
P-02	PAVING TYPE 2 - UNIT PAVING	1,018 SF
P-03	PAVING TYPE 3 - ENGINEERED WOOD FIBER	2,241 SF

SYMBOL	PAVING DESCRIPTION	QTY
P-04	PAVING TYPE 4 - 3/8" DRESSER TRAP ROCK	40.88 CY

SYMBOL	PLAY EQUIPMENT DESCRIPTION	QTY
PE-01	LOG TOWER PLAY FEATURE - CUSTOM MFR: WHOLETREES	2
PE-02	LOG RUN PLAY FEATURE - CUSTOM MFR: WHOLETREES	4
PE-03	LOG STEPPER PLAY FEATURE - CUSTOM MFR: WHOLETREES	8

SYMBOL	SITE FURNITURE DESCRIPTION	QTY
SF-01	BACKED BENCH - 6' L IPE WOOD SLAT	8
SF-02	BIKE RACK	7
SF-03	TRASH RECEPTACLE	3
SF-04	PICNIC TABLE	4
SF-06	BISTRO TABLE AND CHAIRS	6

SYMBOL	WALL DESCRIPTION	QTY
WL-01	WALL TYPE 1 - PRECAST SEATWALL WITH WOOD BENCH TOP	

0 30' 60' 90'
SCALE: 1"=30'

NORTH

RENDERED PLAN
SOUTH SIDE

0-L201S

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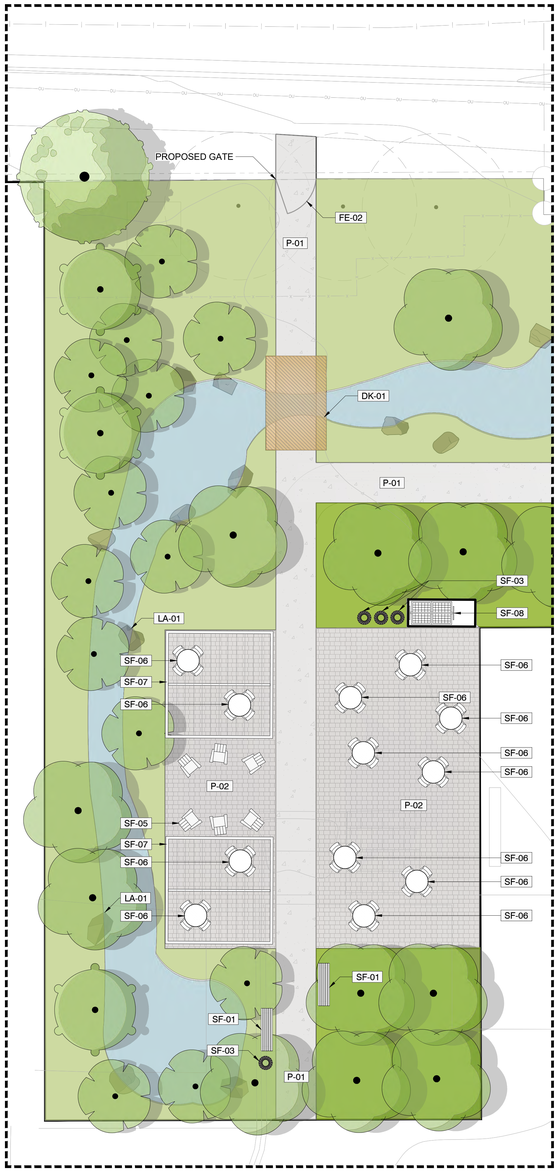


ENLARGEMENT 0-L210

0 8' 16' 24'

SCALE: 1"=8'

NORTH

REFERENCE NOTES SCHEDULE 0-L210

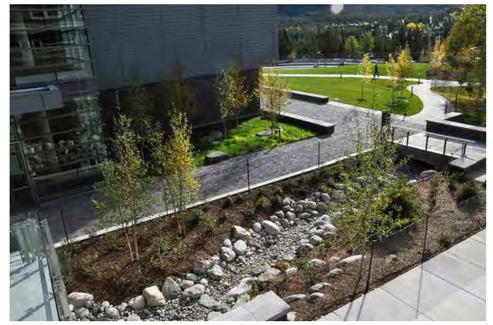
SYMBOL	DECKING DESCRIPTION
DK-01	BRIDGE - WOOD DECKING

SYMBOL	FENCE & GUARDRAIL DESCRIPTION
FE-02	FENCE TYPE 2 - 6` GARDEN FENCE

SYMBOL	LANDSCAPE AMENITY DESCRIPTION
LA-01	LIMESTONE BOULDER - 36"X48"X18" NATURAL FACE

SYMBOL	PAVING DESCRIPTION
P-01	PAVING TYPE 1 - 4" CONCRETE PAVING
P-02	PAVING TYPE 2 - UNIT PAVING

SYMBOL	SITE FURNITURE DESCRIPTION
SF-01	BACKED BENCH - 6` L IPE WOOD SLAT
SF-03	TRASH RECEPTACLE
SF-05	ADIRONDACK CHAIRS
SF-06	BISTRO TABLE AND CHAIRS
SF-07	UPFIT STRUCTURE - LANDSCAPE FORMS
SF-08	GAS GRIL STATION



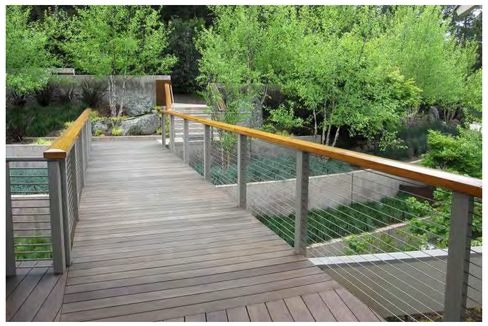
INFILTRATION AREAS INCLUDING NATIVE GRASSES AND FORBS

SF-06 LIMESTONE BOULDER OUTCROPPING IN PLANTING AREAS

PATH INTO EMPLOYEE PATIO / TERRACE AREA

SF-06 UNIT PAVING IN PLAZA - SIZE, COLOR, PRODUCT TBD

SF-06 LANDSCAPE FORMS 'UPFIT' PERGOLA PROVIDING SHADE COVER OVER SEATING/DINING



SF-06 BRIDGE FROM EMPLOYEE TERRACE TO 26TH AVE

SF-06 LANDSCAPE FORMS BISTRO TABLES AND CHAIRS AT EMPLOYEE ENTRANCE

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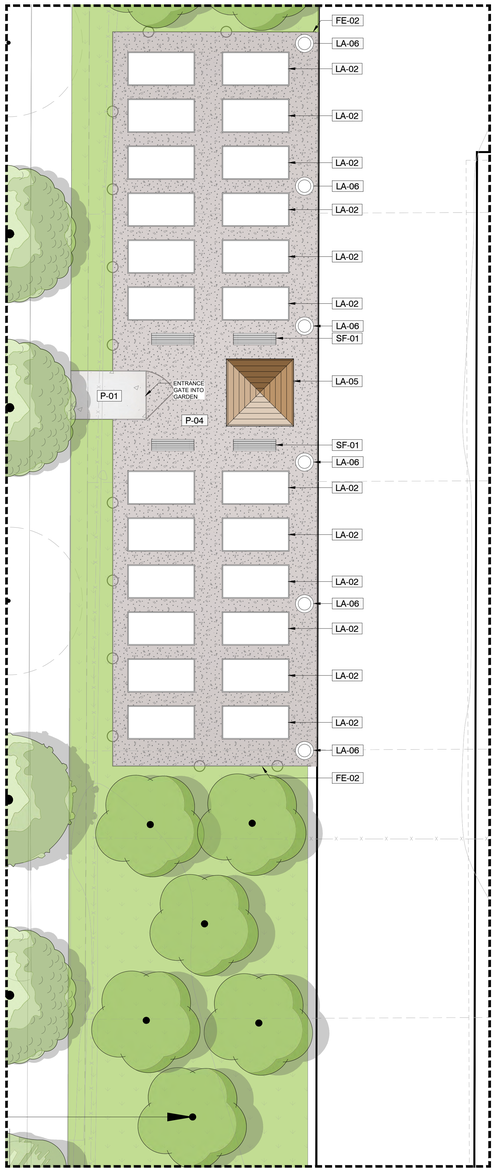
No.	Date	Description

EMPLOYEE PATIO ENLARGEMENT

0-L210

INSET 0-L210



ENLARGEMENT 0-L211

0 8' 16' 24'

SCALE: 1"=8'

NORTH

REFERENCE NOTES SCHEDULE 0-L211

SYMBOL	FENCE & GUARDRAIL DESCRIPTION
FE-02	FENCE TYPE 2 - 6' GARDEN FENCE

SYMBOL	LANDSCAPE AMENITY DESCRIPTION
LA-02	RAISED GARDEN BED
LA-05	TOOL SHED
LA-06	RAIN BARREL

SYMBOL	PAVING DESCRIPTION
P-01	PAVING TYPE 1 - 4" CONCRETE PAVING

SYMBOL	PAVING DESCRIPTION
P-04	PAVING TYPE 4 - 3/8" DRESSER TRAP ROCK

SYMBOL	SITE FURNITURE DESCRIPTION
SF-01	BACKED BENCH - 6' L IPE WOOD SLAT

SF-06 RAIN BARREL TO CAPTURE AND STORE REUSABLE WATER

SF-06 RAISED GARDEN BED

SF-06 10' X 10' TOOL SHED

SF-06 6' HT GARDEN FENCE

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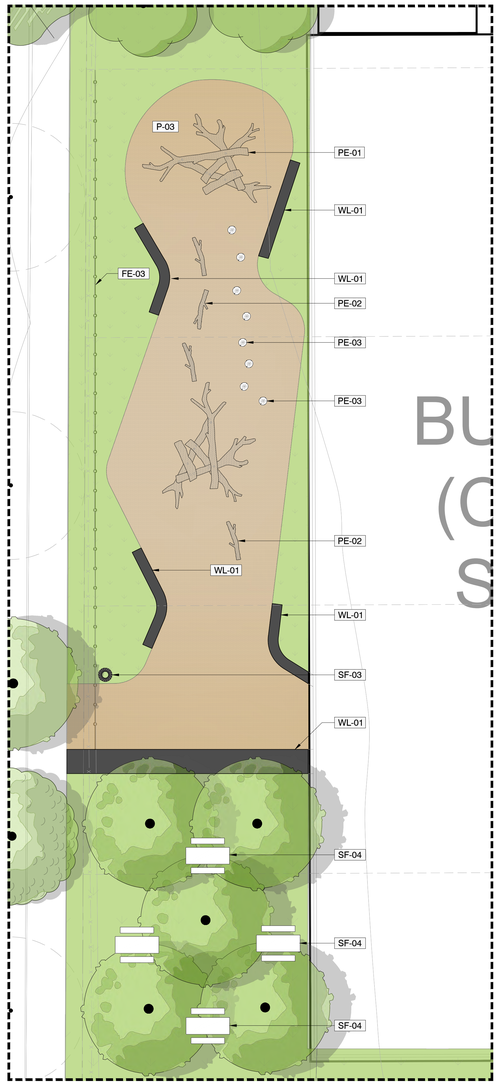
No.	Date	Description

COMMUNITY GARDEN/ORCHARD ENLARGEMENT

0-L211



ENLARGEMENT 0-L212

0 8' 16' 24'

SCALE: 1"=8'

NORTH

REFERENCE NOTES SCHEDULE 0-L212

SYMBOL	FENCE & GUARDRAIL DESCRIPTION
FE-03	FENCE TYPE 3 - 4' PLAY SCREEN FENCE

SYMBOL	PAVING DESCRIPTION
P-03	PAVING TYPE 3 - ENGINEERED WOOD FIBER

SYMBOL	PLAY EQUIPMENT DESCRIPTION
PE-01	LOG TOWER PLAY FEATURE - CUSTOM MFR: WHOLETREES
PE-02	LOG RUN PLAY FEATURE - CUSTOM MFR: WHOLETREES
PE-03	LOG STEPPER PLAY FEATURE - CUSTOM MFR: WHOLETREES

SYMBOL	SITE FURNITURE DESCRIPTION
SF-03	TRASH RECEPTACLE
SF-04	PICNIC TABLE

SYMBOL	WALL DESCRIPTION
WL-01	WALL TYPE 1 - PRECAST SEATWALL WITH WOOD BENCH TOP

SF-06 LOG STEPPER PLAY FEATURE

SF-06 LOG TOWER PLAY FEATURE

SF-06 LOG RUN PLAY FEATURE

SF-06 ENGINEERED WOOD FIBER PLAY SURFACING

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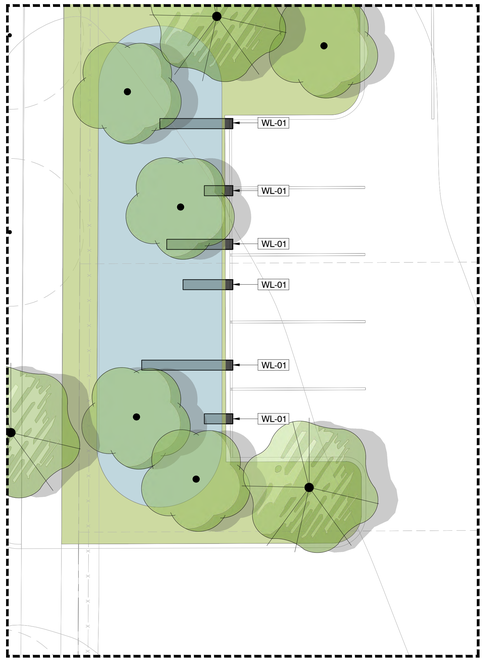
No.	Date	Description

COMMUNITY
PLAN / PICNIC
ENLARGEMENT

0-L212



ENLARGEMENT 0-L213

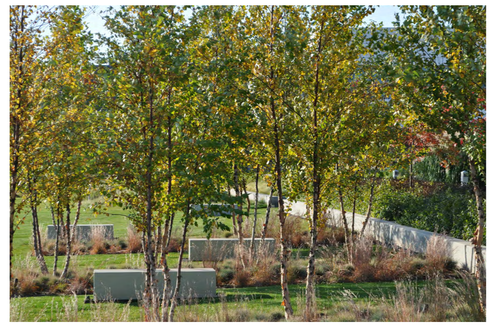
0 8' 16' 24'

SCALE: 1"=8'

NORTH

REFERENCE NOTES SCHEDULE 0-L213

SYMBOL	WALL DESCRIPTION
WL-01	WALL TYPE 1 - PRECAST SEATWALL WITH WOOD BENCH TOP



SF-06 WALL TYPE 1 - PRECAST SEATWALL

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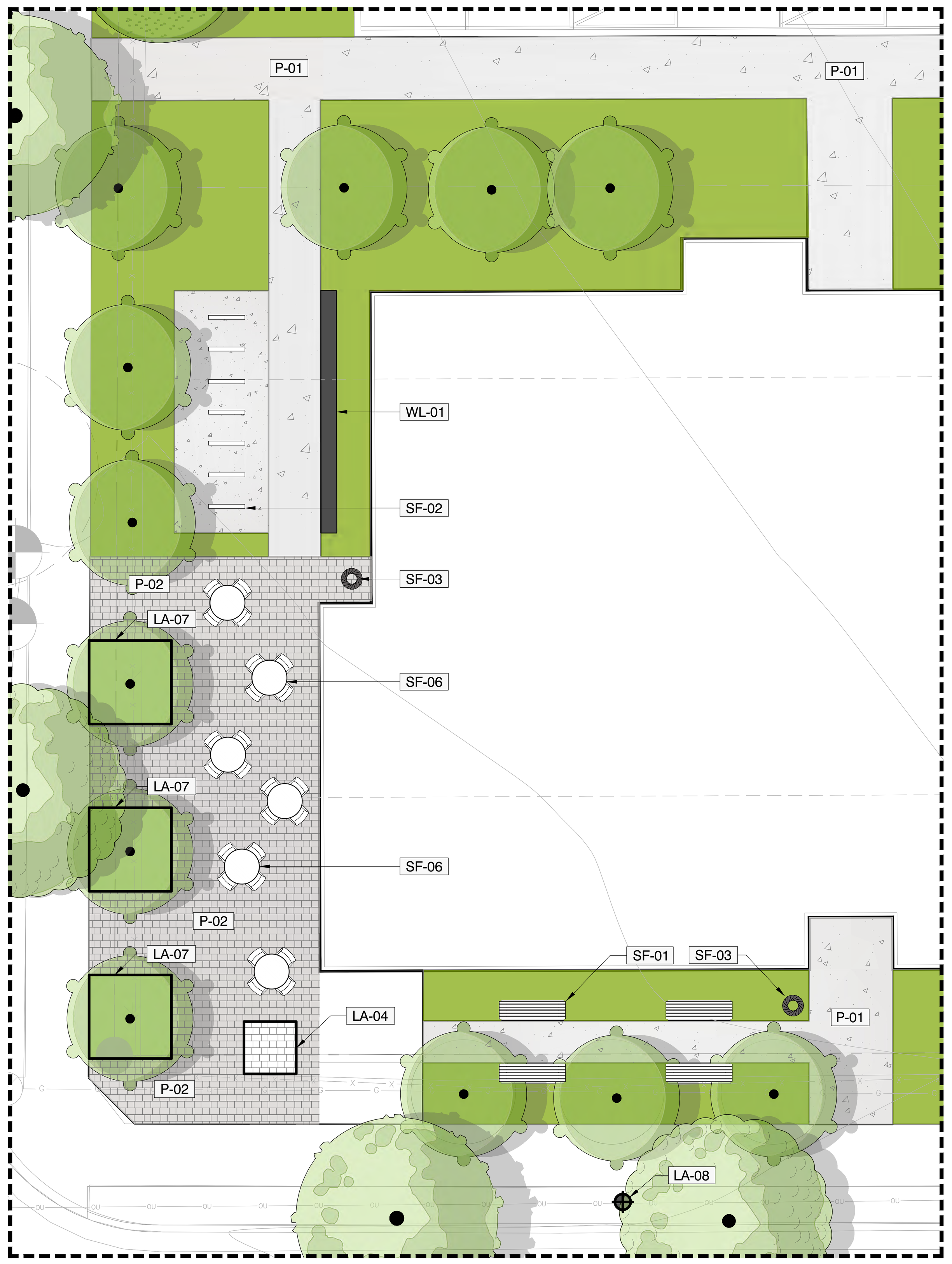
Sheet Issues / Revisions

No.	Date	Description

STORMWATER PLANTING AREA ENLARGEMENT

0-L213



ENLARGEMENT 0-L210

0 8' 16' 24'
SCALE: 1"=8'

NORTH

REFERENCE NOTES SCHEDULE 0-L214

SYMBOL	LANDSCAPE AMENITY DESCRIPTION
LA-04	PUBLIC ART SCULPTURE
LA-07	RAISED PLANTER - 18" HGT WELDED STEEL
LA-08	STREET LIGHT

SYMBOL	PAVING DESCRIPTION
P-01	PAVING TYPE 1 - 4" CONCRETE PAVING
P-02	PAVING TYPE 2 - UNIT PAVING

SYMBOL	SITE FURNITURE DESCRIPTION
SF-01	BACKED BENCH - 6` L IPE WOOD SLAT
SF-02	BIKE RACK
SF-03	TRASH RECEPTACLE
SF-06	BISTRO TABLE AND CHAIRS

SYMBOL	WALL DESCRIPTION
WL-01	WALL TYPE 1 - PRECAST SEATWALL WITH WOOD BENCH TOP

SF-06 WALL TYPE 1 - PRECAST SEATWALL WITH WOOD TOP BENCH

SF-06 RAISED PLANTER

SF-06 UNIT PAVING IN PLAZA - SIZE, COLOR, PRODUCT TBD

SF-06 BIKE RACK

SF-06 LANDSCAPE FORMS BISTRO TABLES AND CHAIRS AT EMPLOYEE ENTRANCE

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Sheet Issues / Revisions

No.	Date	Description

COMMUNITY PLAZA / ART ENLARGEMENT

0-L214

HIAWATHA PUBLIC WORKS

PHASE 2 - SCHEMATIC DESIGN
06.12.2020

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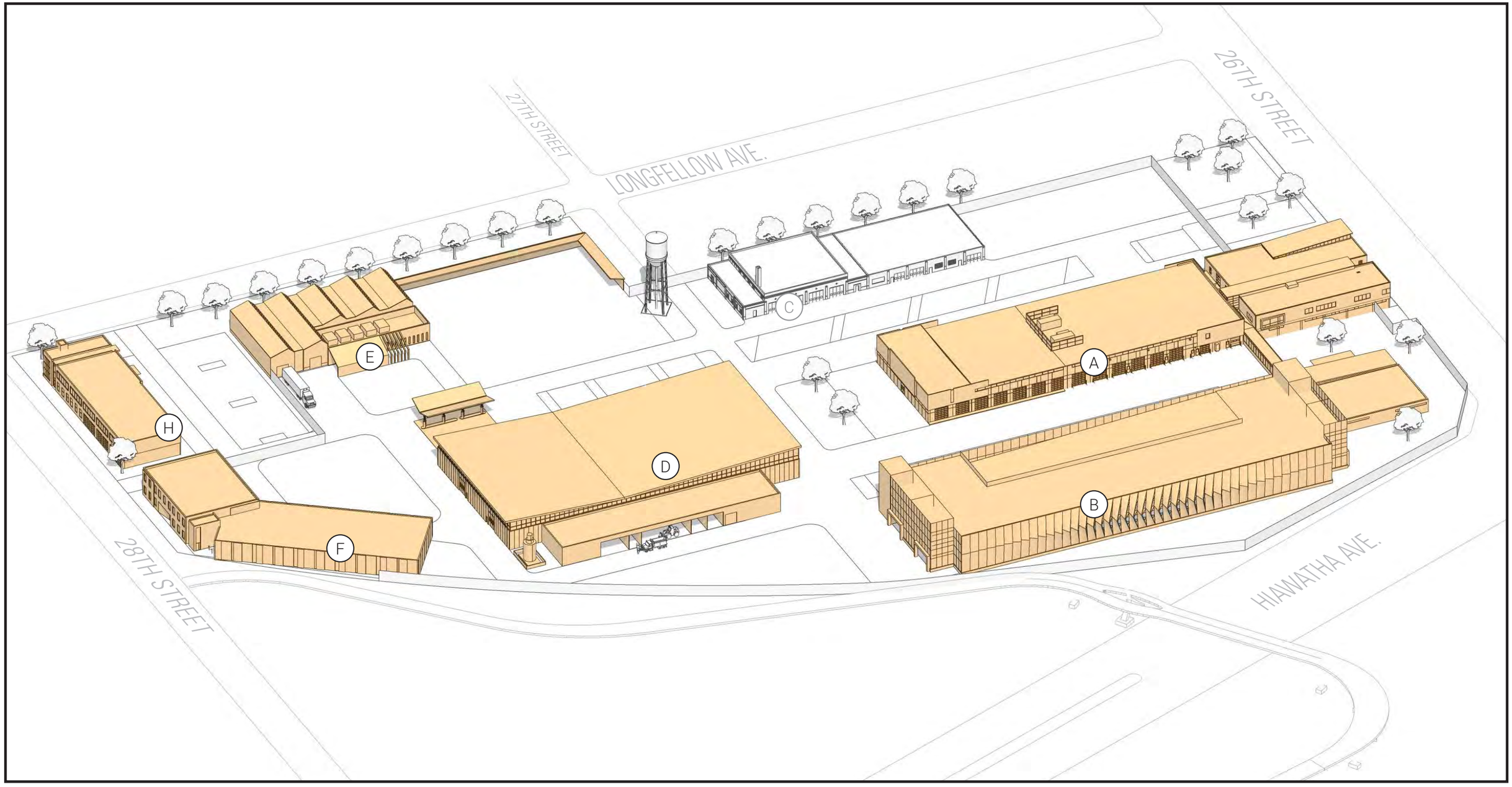


A. Existing Office + Addition
B. Parking Ramp
C. Storage Building
D. Vehicle Storage Building
E. Central Stores
F. Water Department
H. Training Center

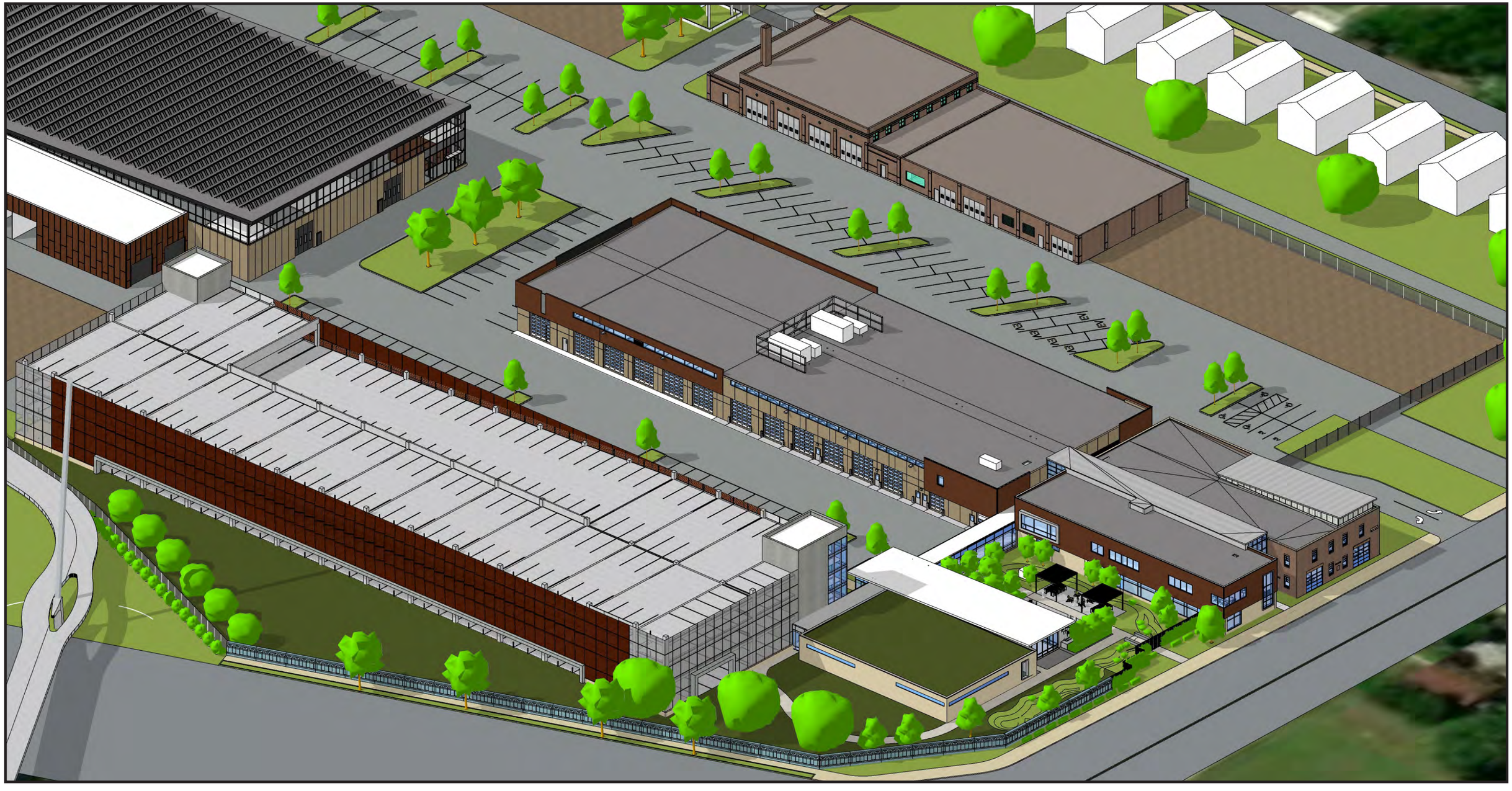
SITE AXON

HIAWATHA PUBLIC WORKS

CITY OF MINNEAPOLIS | RSP ARCHITECTS

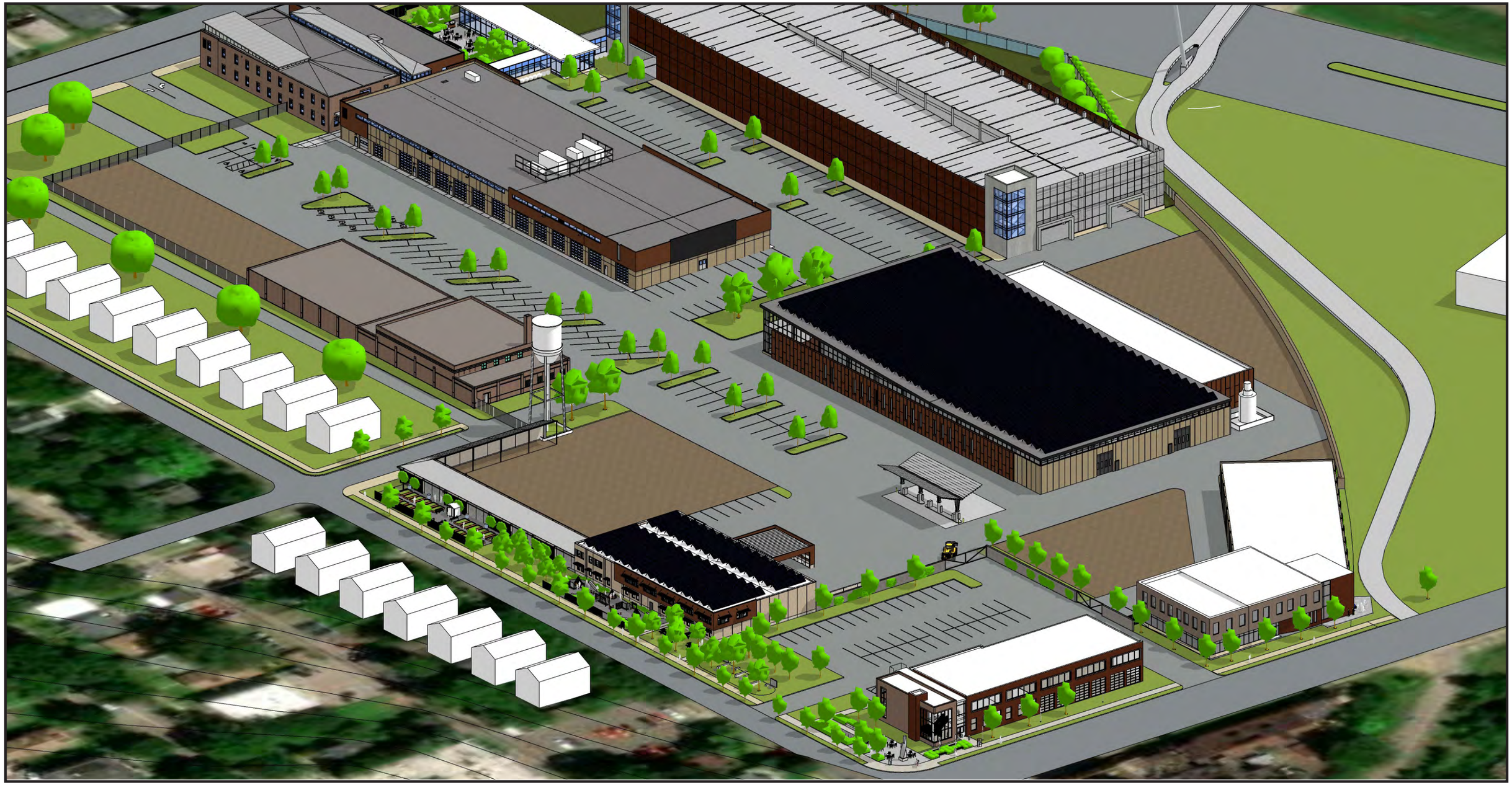
06.12.2020 |

NW ISOMETRIC



NE ISOMETRIC

SE ISOMETRIC



SW ISOMETRIC

BUILDING A

EXISTING OFFICE BUILDING + ADDITION

BUILDING A

EXISTING BUILDING + ADDITION

VIEW: 26TH STREET FRONTAGE

BUILDING A

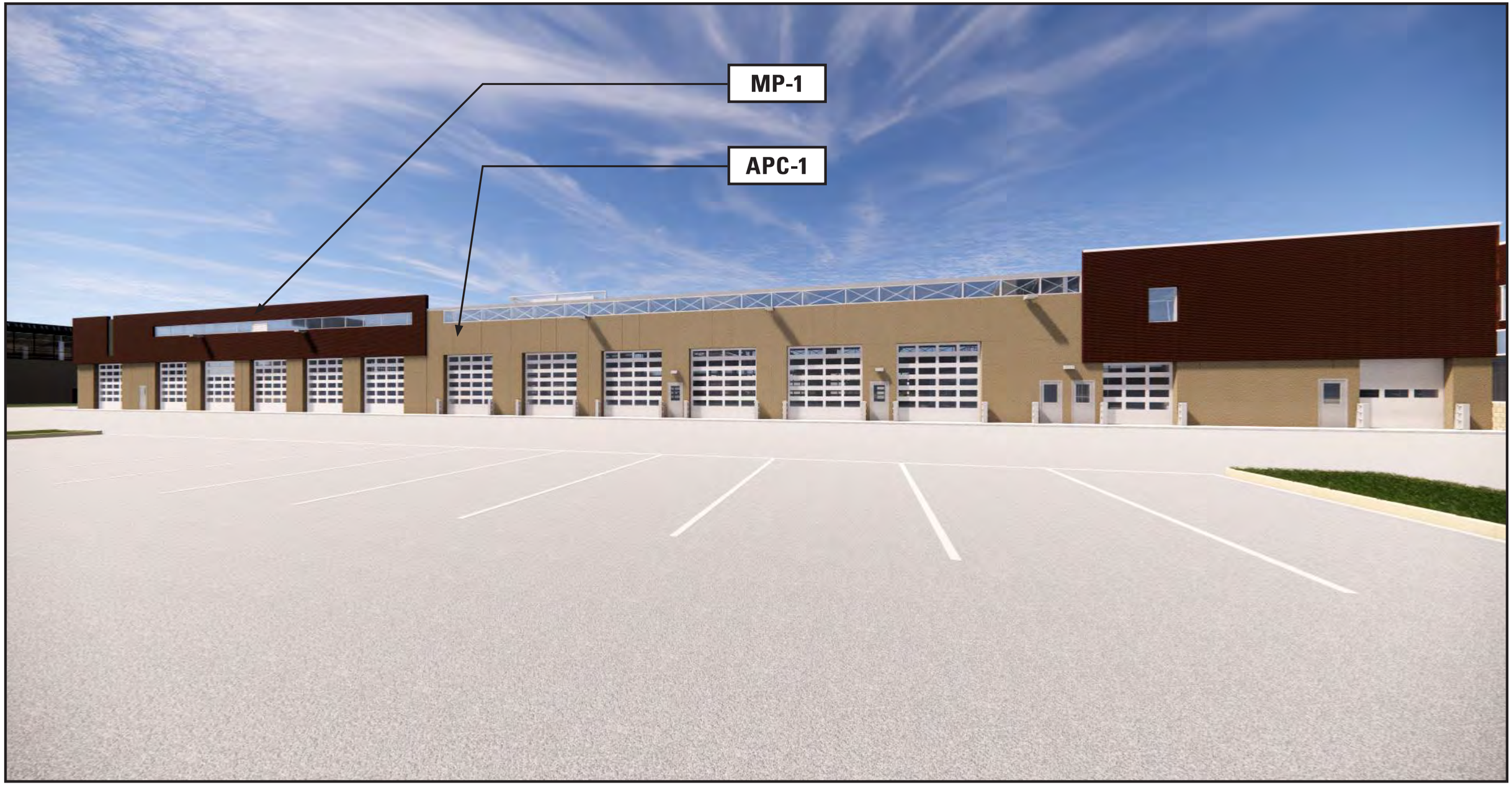
EXISTING BUILDING + ADDITION

VIEW: COURTYARD LINK OPTION 1B

BUILDING A

EXISTING BUILDING + ADDITION

VIEW: SOUTH OF LINK



BUILDING A

EXISTING BUILDING + ADDITION

VIEW: MAINTENANCE BAYS EAST PERSPECTIVE

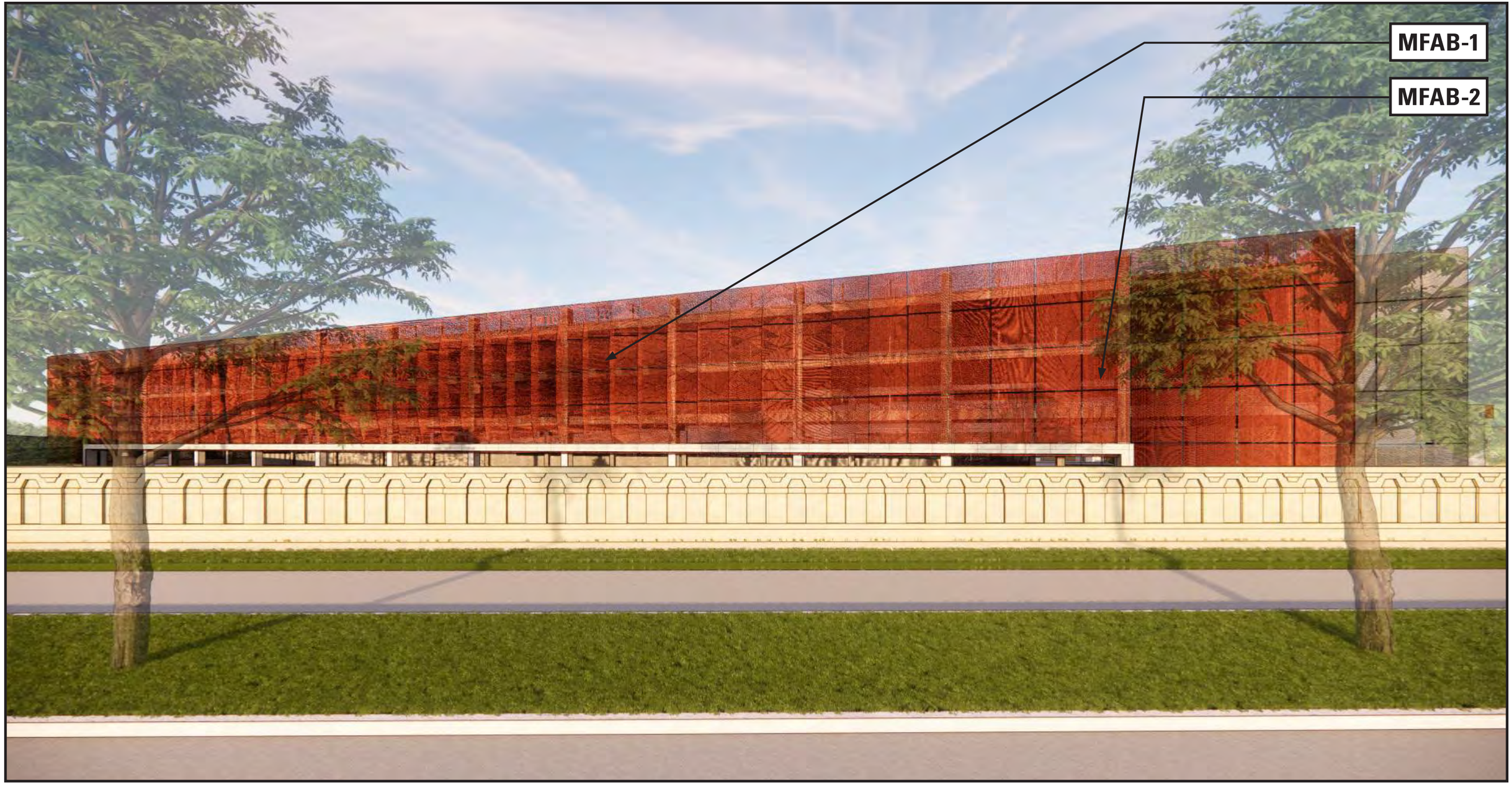
BUILDING B

PARKING RAMP

BUILDING B

PARKING STRUCTURE

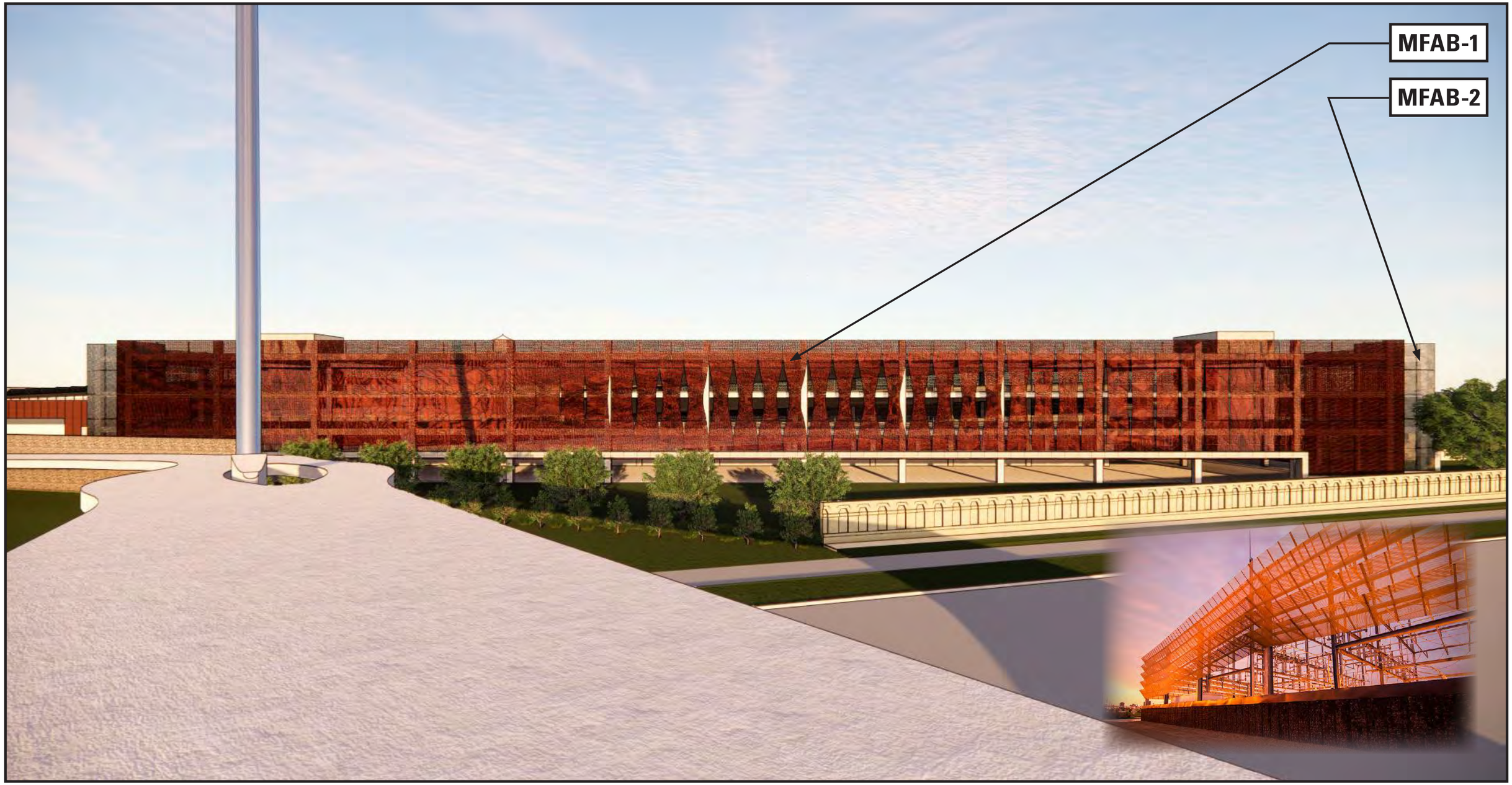
VIEW: NORTH PARKING RAMP PERSPECTIVE



BUILDING B

PARKING STRUCTURE

VIEW: HIAWATHA & 26TH STREET INTERSECTION



BUILDING B

PARKING STRUCTURE

VIEW: SABO BRIDGE

BUILDING B

PARKING STRUCTURE

VIEW: SABO BRIDGE EAST PERSPECTIVE

BUILDING B

PARKING STRUCTURE

VIEW: SABO BRIDGE SOUTH

BUILDING B

PARKING STRUCTURE

VIEW: NORTH OF VEHICLE STORAGE BUILDING

BUILDING D

VEHICLE STORAGE BUILDING

BUILDING D

VEHICLE STORAGE BUILDING

VIEW: NORTH WEST CORNER PERSPECTIVE

BUILDING D

VEHICLE STORAGE BUILDING

VIEW: NORTH EAST CORNER PERSPECTIVE

BUILDING D

VEHICLE STORAGE BUILDING

VIEW: SOUTH WEST CORNER PERSPECTIVE

BUILDING E

CENTRAL STORES

BUILDING E/F

CENTRAL STORES/WATER DEPARTMENT

VIEW: LONGFELLOW PERSPECTIVE

BUILDING E

CENTRAL STORES

VIEW: SOUTH WEST PERSPECTIVE

BUILDING E

CENTRAL STORES

VIEW: NORTH WEST PERSPECTIVE

BUILDING E

CENTRAL STORES

VIEW: LONGFELLOW STORES FRONTAGE

BUILDING E/F

CENTRAL STORES/WATER DEPARTMENT GABION WALL

BUILDING E/F

CENTRAL STORES/WATER DEPARTMENT

VIEW: NORTH MATERIAL CHANGE

BUILDING E/F

CENTRAL STORES/WATER DEPARTMENT

VIEW: SOUTH PARKING LOT PERSPECTIVE

BUILDING F

WATER DEPARTMENT BUILDING

BUILDING F

WATER BUILDING

VIEW: SOUTH EAST PERSPECTIVE OPTION 2

BUILDING F

WATER BUILDING

VIEW: SOUTH WEST PERSPECTIVE OPTION 2

BUILDING F

WATER BUILDING

VIEW: NORTH WEST PERSPECTIVE OPTION 2

BUILDING H

TRAINING CENTER

BUILDING H

WATER BUILDING

VIEW: CORNER OF LONGFELLOW AND 28TH STREET

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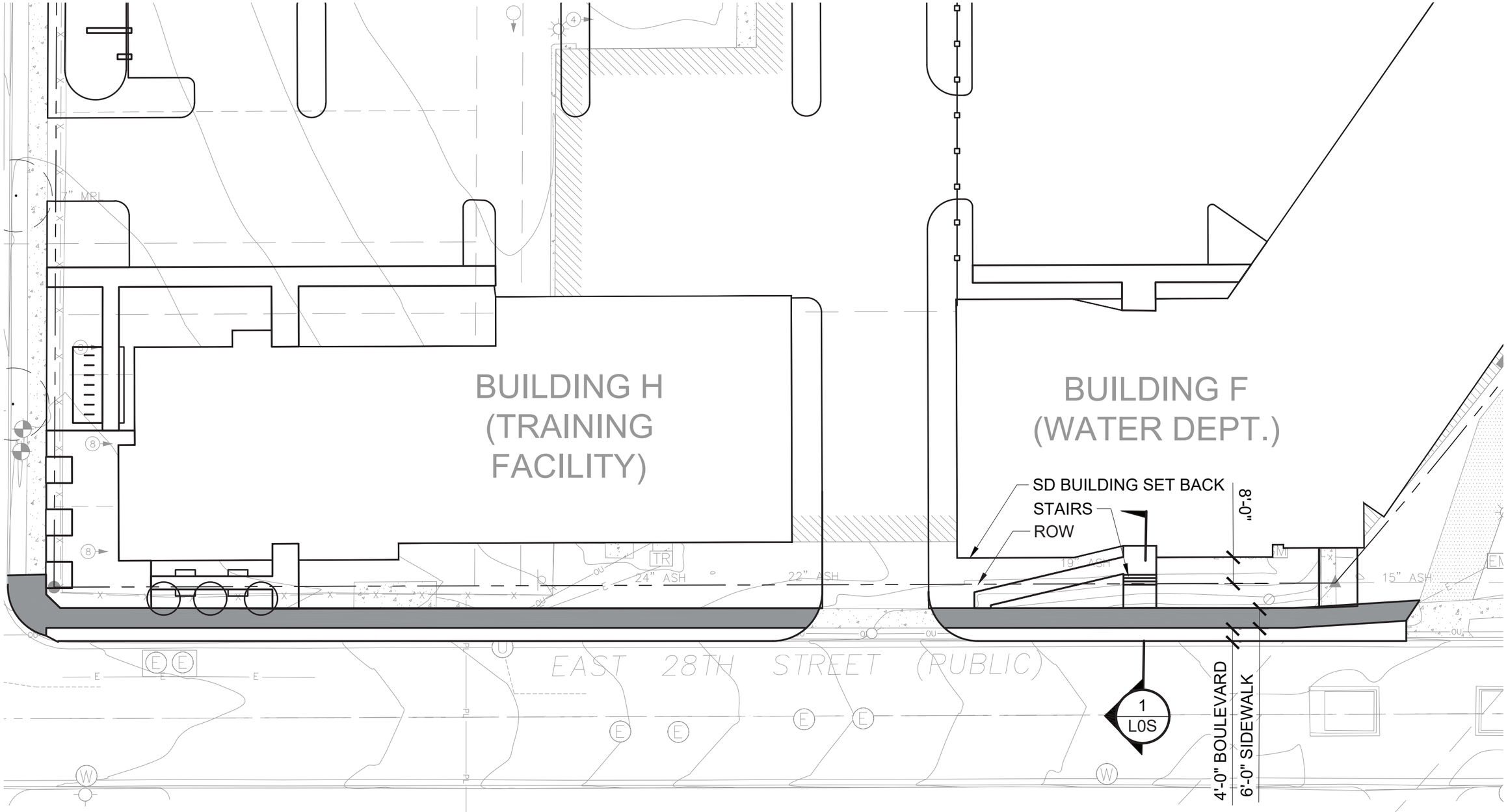
Minneapolis
City of Lakes

HIAWATHA MAINTENANCE FACILITY
28TH STREET BIKE LANE STUDY

06.26.2020



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Minneapolis, MN 55401 p: 612.332.7522

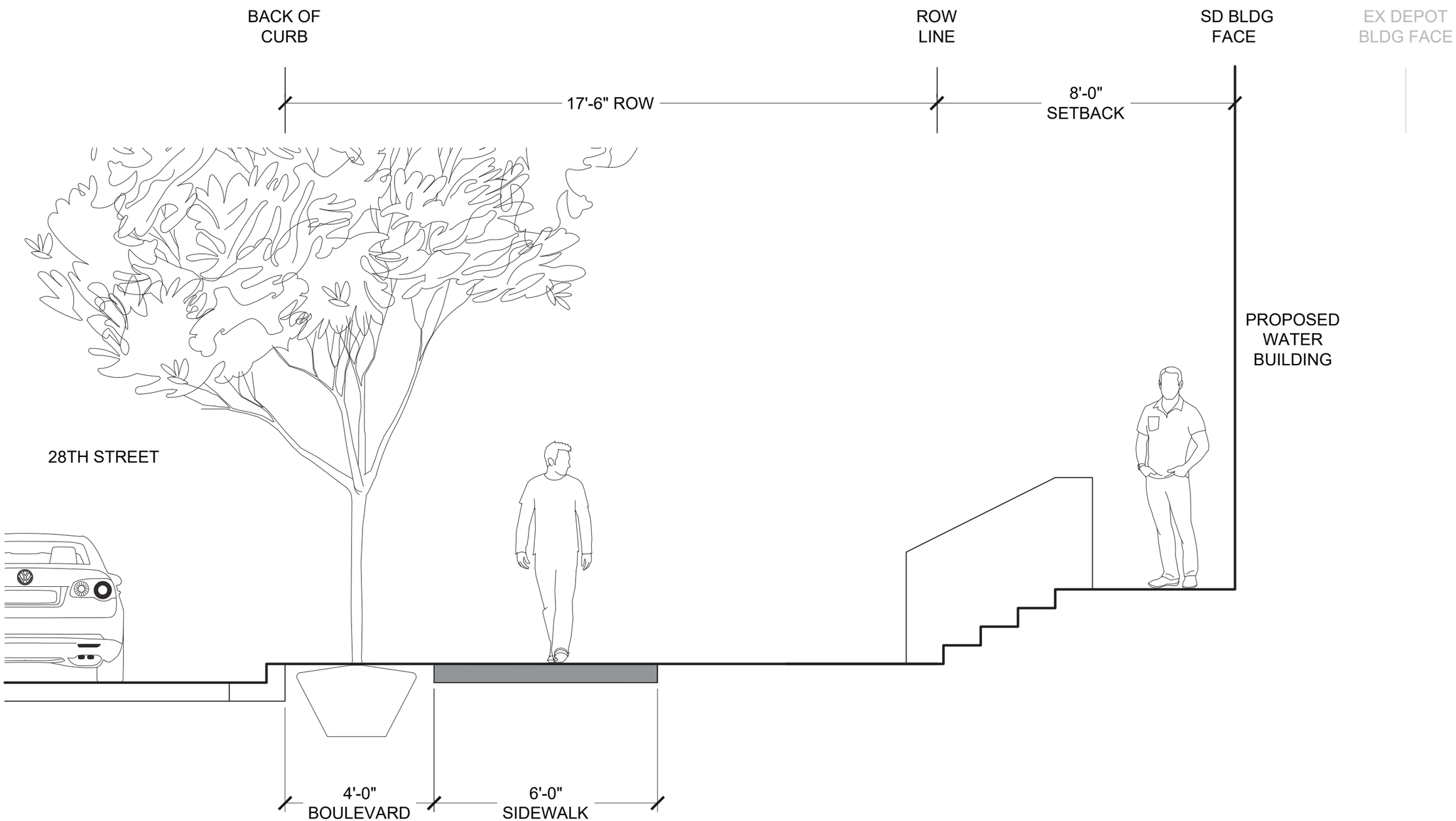
HIAWATHA MAINTENANCE FACILITY: PHASE 2

EAST 28TH STREETSCAPE STUDIES

0 15' 30' 45
SCALE: 1:30

NORTH

L0P
SCHEMATIC
DESIGN



1 SECTION - SCHEMATIC DESIGN CONCEPT

3/8" = 1'-0"

P-19 217-04

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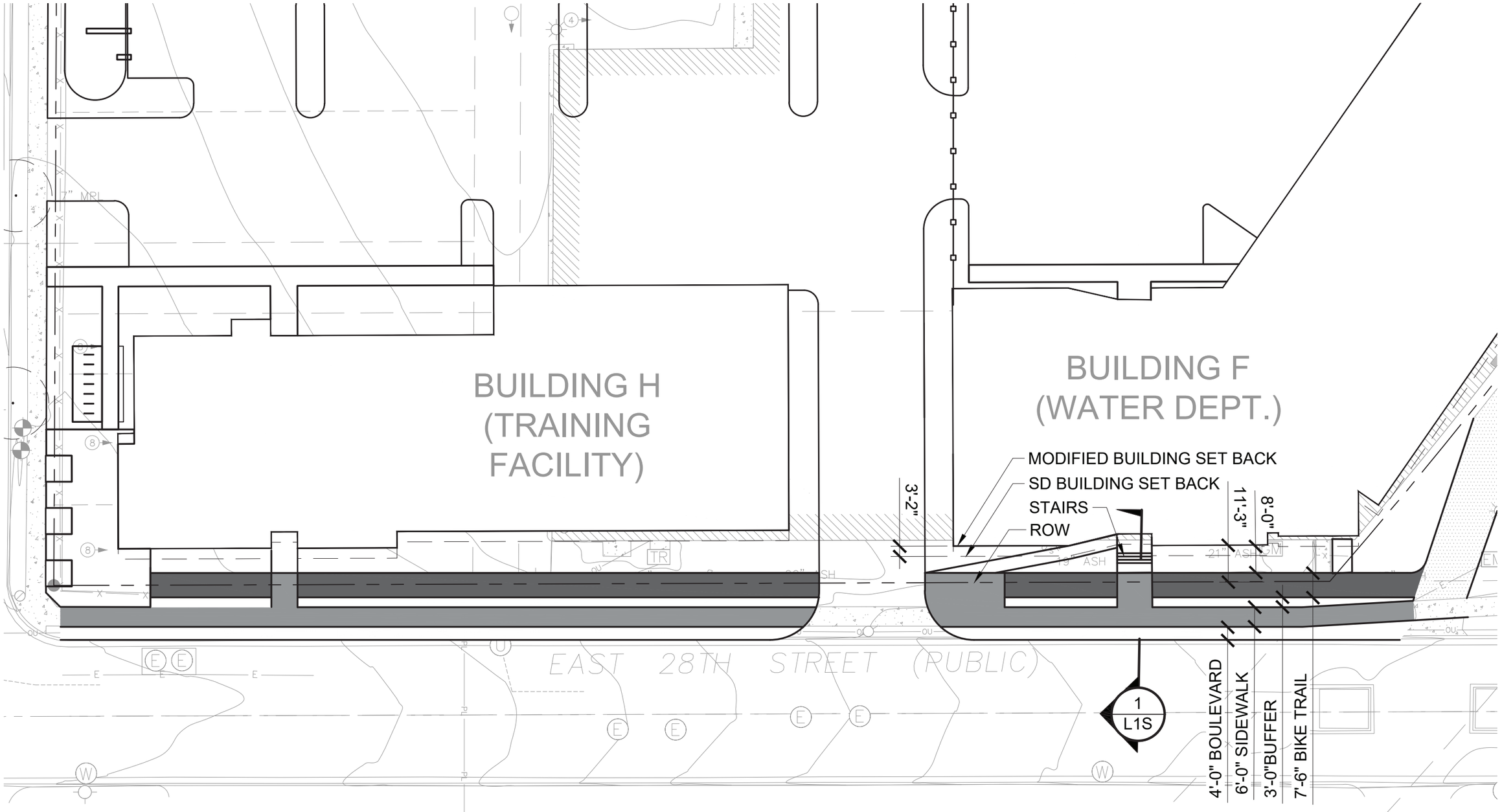
HIAWATHA MAINTENANCE FACILITY: PHASE 2

EAST 28TH STREETSCAPE STUDIES

L0S

SCHEMATIC DESIGN



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HIAWATHA MAINTENANCE FACILITY: PHASE 2

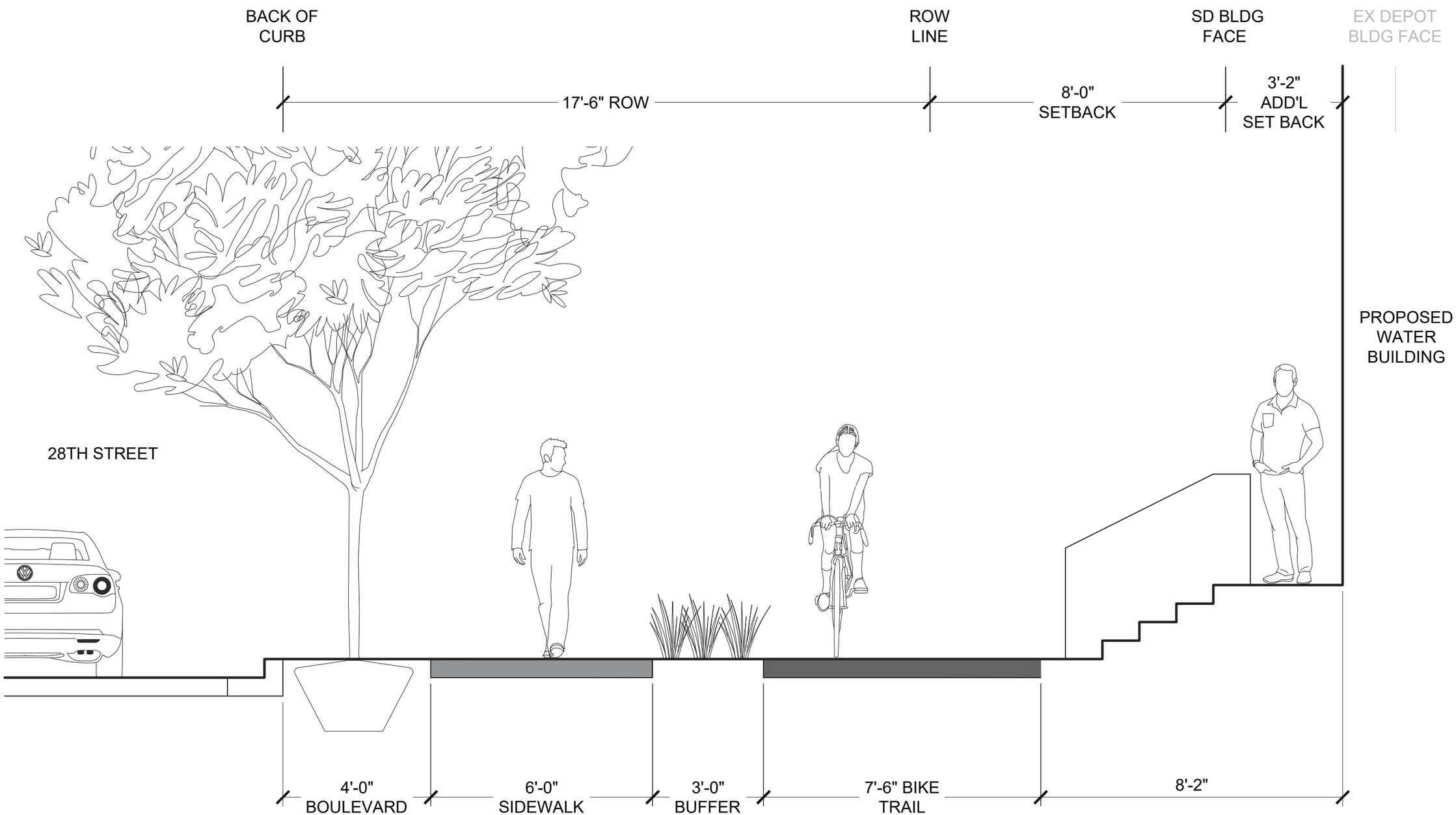
EAST 28TH STREETSCAPE STUDIES

0 15' 30' 45
SCALE: 1:30

NORTH

L1P

BIKE LANE
OPTION 1



1 SECTION - BIKE LANE OPTION 1

3/8" = 1'-0"

P-19 217-03

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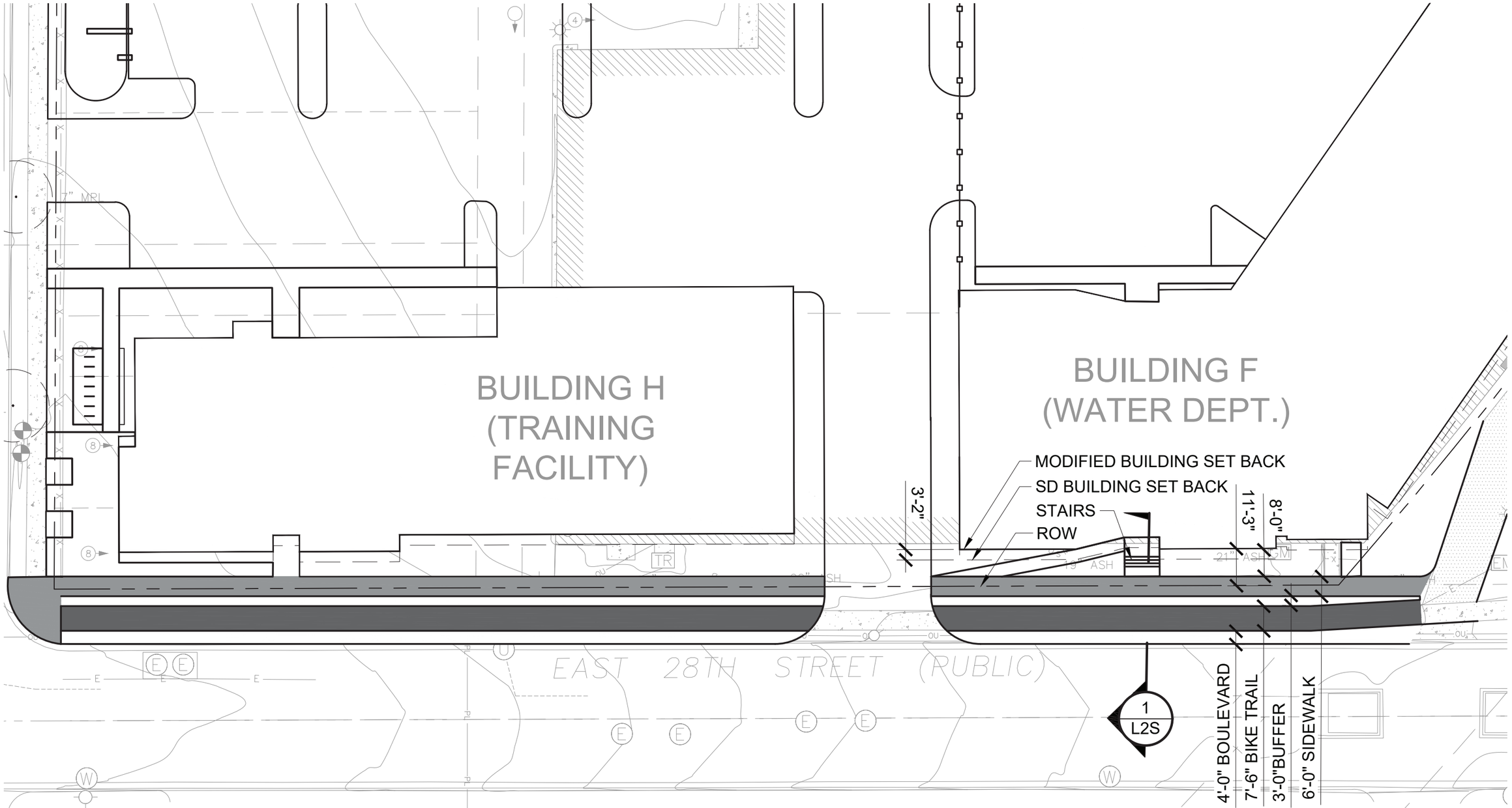
HIAWATHA MAINTENANCE FACILITY: PHASE 2

EAST 28TH STREETSCAPE STUDIES

L1S

BIKE LANE OPTION 1



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HIAWATHA MAINTENANCE FACILITY: PHASE 2

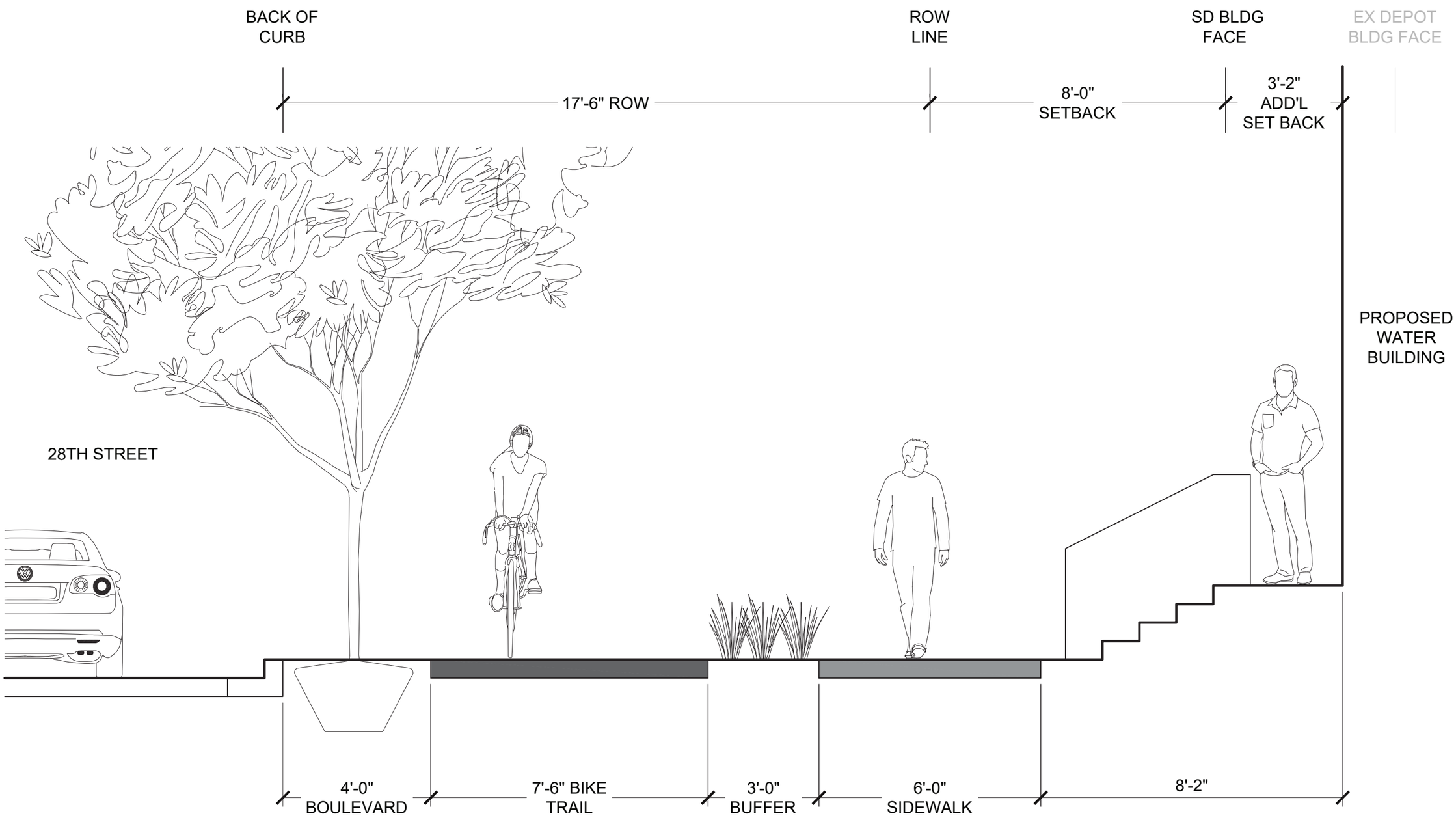
EAST 28TH STREETSCAPE STUDIES

0 15' 30' 45
SCALE: 1:30

NORTH

L2P

BIKE LANE
OPTION 2



1 SECTION - BIKE LANE OPTION 2

3/8" = 1'-0"

P-19 217-02

DF/ DAMON FARBER LANDSCAPE ARCHITECTS
401 North 2nd Avenue, Suite 410
Minneapolis, MN 55401 p: 612.332.7522

HIAWATHA MAINTENANCE FACILITY: PHASE 2

EAST 28TH STREETSCAPE STUDIES

L2S

BIKE LANE OPTION 2

Attachment G

Air Permit Assessment Report

AET Project No. 03-21225

AMERICAN ENGINEERING TESTING, INC.

· GEOTECHNICAL
· CONSTRUCTION MATERIALS
· ENVIRONMENTAL
· BUILDING TECHNOLOGY
· PETROGRAPHY/CHEMISTRY

Air Permit Assessment

Hiawatha Maintenance Facility
1901 E 26th Street
Minneapolis, MN 55404

AET Project No. 03-21058

Report Date:

September 23, 2020

Prepared for:

Bob Friddle
City of Minneapolis
350 S. 5th St, Room 223
Minneapolis, MN 55415

Prepared By:

American Engineering Testing, Inc.
550 Cleveland Avenue North
Saint Paul, Minnesota 55114

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EXECUTIVE SUMMARY

An air quality permit is not required for the existing City of Minneapolis Hiawatha Maintenance Facility (Facility) located at 1901 E 26th Street, Minneapolis, MN 55404 including the proposed expansion to the Facility. The Facility's unlimited Potential to Emit (PTE) is less than the State and Federal Thresholds based on the information provided by the City of Minneapolis (City) and the assumptions presented in this report. A cumulative levels and effects (CL&E) analysis, which is a comprehensive look at all the environmental health related information in the area that could be affected by a project, was not completed for this proposed expansion as the Facility does not require an air quality permit at this time.

Information was provided to AET during a site visit to the Facility on April 24, 2020 along with research of the individual sources and their materials. AET obtained information during site visits to the East Side Yard Water facility (East Side Wateryard) and the Water Distribution Maintenance functions at the Minneapolis Water Works-Fridley on April 22, 2020. The addition of the operations from the East Side Wateryard and the Water Distribution Maintenance functions to the expanded Facility will not require an air quality construction permit or require the Facility to obtain an operating permit. A summary of the unlimited PTE in tons per year (TPY) is presented in the Table below:

Unlimited Potential to Emit Hiawatha Maintenance Facility

Unlimited Facility Potential to Emit (TPY)						
Pollutant	**Existing Facility**	**Proposed Additions**	**Total Facility Emissions**	**MPCA Air Permitting Thresholds**	**Federal Part 70 Air Permitting Thresholds**	**Exceeds Air Permitting Thresholds?**
Particulate Matter (PM)	1.36	0.09	**1.45**	**100**	**100**	**N**
Particulate Matter Less than 10 Microns (PM_{10})	0.83	0.09	**0.92**	**25**	**100**	**N**
Particulate Matter Less than 2.5 Microns ($PM_{2.5}$)	0.45	0.08	**0.54**	**100**	**100**	**N**
Nitrogen Oxides (NO_x)	5.11	1.07	**6.19**	**100**	**100**	**N**
Volatile Organic Compounds (VOC)	1.40	0.31	**1.71**	**100**	**100**	**N**
Carbon Monoxide (CO)	4.77	0.90	**5.24**	**100**	**100**	**N**
Sulfur Dioxide (SO_2)	0.03	0.01	**0.04**	**50**	**100**	**N**
Greenhouse Gases (Expressed as CO_2e)	6,142	1290	**7,432**	**100,000**	**100,000**	**N**
Single Hazardous Air Pollutant (HAP)[1]	0.20	N/A	**0.20**	**10**	**10**	**N**
Total HAP	0.78	0.12	**0.90**	**25**	**25**	**N**

(1) Single largest HAP is Styrene

1.0 INTRODUCTION

American Engineering Testing, Inc. (AET) was contracted to complete an air permit assessment for the City of Minneapolis (City) to evaluate the air emissions of Facility located at the following address:

Hiawatha Maintenance Facility
1901 E 26th Street
Minneapolis, MN 55404

Figure 1 shows the specific location of the Facility, Figure 5 shows the specific location of the East Side Wateryard and Figure 6 shows the specific location of the Minneapolis Water Works-Fridley. The air permit assessment determines the air emissions of the current operations at the Facility and the air emissions of the proposed expansion to the Facility for the purpose of submitting a permit applicability determination to the Minnesota Pollution Control Agency.

2.0 AIR PERMIT THRESHOLDS

An air permit is required for any facility that operates a source or sources that have the potential to emit pollutants that exceed certain emissions thresholds. If a facility's unlimited PTE exceeds any of individual MPCA air permitting thresholds, an air permit is required. The following table summarizes the state and federal air permitting thresholds applicable to the Facility.

Air Permit Thresholds

Pollutant	MPCA Air Permitting Thresholds (TPY)	Federal Part 70 Air Permitting Thresholds (TPY)	Federal New Source Review Air Permitting Thresholds (TPY)
Particulate Matter (PM)	100	100	250
Particulate Matter < 10 Microns (PM_{10})	25	100	250
Particulate Matter < 2.5 Microns ($PM_{2.5}$)	100	100	250
Nitrogen Oxides (NO_x)	100	100	250
Volatile Organic Compounds (VOC)	100	100	250
Carbon Monoxide (CO)	100	100	250
Sulfur Dioxide (SO_2)	50	100	250
Lead	0.5	10	N/A
Greenhouse Gases (Expressed as CO_2e)	100,000	100,000	100,000
Single Hazardous Air Pollutant (HAP)	10	10	N/A
Total HAP	25	25	N/A

3.0 EXISTING FACILITY

The existing Facility is made up of five main areas with potentially significant contributions to air emissions. These areas consist of the Main Building, the Central Stores Building, Bulk Material Storage, the Fuel Island and Parking Lot/Vehicle Traffic. See Figure 2 for a layout of the main areas of the Facility. The subsequent sections discuss these five areas in greater detail.

3.1 Main Building

The main building contains office space, a vehicle maintenance area, and a laboratory. The building is heated by four natural gas fired boilers with a rating of 2 million btu/hr each. The laboratory contains an electric oven that is used to test materials such as concrete, asphalt, and soil.

The Main Building's maintenance area contains the following aboveground storage tanks (AST) and degreasers:

Quantity of AST	AST Volume (gallons)	AST Contents
1	120	Coolant
4	120	Used Oil
1	500	Oil
1	30	Degreaser

The Main Building's maintenance area contains a welding area where miscellaneous maintenance welding operations occur. The vehicle maintenance area also contains a woodshop area with various saws and sanding operations that are connected to a dust collection system that vents inside the building. The woodshop is not used for routine production, rather it is used for repairs and to support various other projects. Another specific area housed in the Main Building's maintenance area is a specific vehicle maintenance area that is used to service vehicles and other equipment.

The vehicle maintenance area contains a hot water power washer that is heated with a natural fired gas heater with a maximum heat input rating of 0.44 million btu/hr. Two of the maintenance bays have heated eye wash stations and are heated by two natural gas fired heaters with max heat input rating of 0.38 million but/hr each.

One of the service bays contains equipment for a cure-in-place process (CIPP). The CIPP consists of mixers and equipment used to deposit a liquid resin into a lining that is installed in sewer pipes. The lining cures into a hard surface thus increasing the life of the underground pipe. CIPP typically only occurs during the months of April through August. The estimated amount of resin used in a year is 200 drums.

Additional miscellaneous activities that occur in the Main Building are routine maintenance on equipment, roll on painting and touchup spray painting (aerosol cans), and grinding, cutting, sanding on equipment that is unvented.

3.2 Central Stores Building

The Central Stores Building mainly consists of storage space and houses an inventory of supplies for other departments. The building is heated by a natural gas fired boiler with a maximum rating of 2.52 million btu/hr and also houses a natural gas hot water heater with a rating of 0.156 million btu/hr.

3.3 Bulk Material Storage

The Facility has four covered areas that are used to store salt, sand, soil, and gravel. The salt and sand are only for treating roads and sidewalks in the winter and are generally only stored in the winter. Soil and gravel are generally only stored in the summer for use on ground repair. The salt and sand are stored under two covered areas that measure approximately 40 feet by 15 feet each. The soil and gravel are stored under areas that measure approximately 15 feet by 15 feet.

The material is delivered by truck and placed into the storage area with a front-end loader. The front-end loader is used to load the material into the various Facility's trucks for offsite use.

Sandblasting is occasionally done to remove material (concrete or tar) from trailers and other equipment. Approximately 500 pounds of sand per year is used in the sandblasting operation.

One brine storage tank is present near the sand/salt storage area and it is heated during the cold season with natural gas heater with maximum heat input of 0.03 million btu/hr.

One 7,500-gallon liquid asphalt storage tank is present at the Facility. The storage tank is equipped with an electric tank heater keeping the material at 325 F. The liquid asphalt product is pumped into portable tanks to be used for various road repairs. The storage tank is bulk filled via a tanker truck.

3.4 Fuel Island

The Facility has a fuel island with multiple pumps used to fuel City of Minneapolis owned vehicles. The fuel island contains the following underground storage tanks (UST):

Quantity of UST	UST Volume (gallons)	UST Contents
1	15,000	Gasoline (E-10)
1	15,000	Diesel (Biodiesel)
1	10,000	Gasoline (E-85)

3.5 Parking and Vehicle Traffic

The parking lot area and all travel areas at the Facility are paved. There is one gravel based storage area that houses piping, road signs, and miscellaneous items.

4.0 EXISTING FACILTY AIR EMISSIONS TO THE ATMOSPHERE

The following sections describe and quantify the PTE for the areas described in Sections 3.1 through 3.5. Table 1 shows a summary of the existing Facility's PTE.

4.1 Main Building Emissions

The Main Building has four boilers and three process heaters that emit air emissions. The PTE for the emission sources in the Main Building is shown in Table 2-3 and the emissions assume worst case scenario at 8760 hours per year and operating at maximum capacity.

The emissions that come from the laboratory are insignificant according to MPCA's insignificant activities rule. The six ASTs in the maintenance area have insignificant emissions as well.

Similarly, the five lubricating oil tanks and the emissions from the welding operations are considered insignificant activities and not used towards the facility's total PTE.

The wood shop is used for maintenance activities, therefore the small about of PM and PM_{10} emissions that it generates are considered insignificant per MPCA rules.

The Cure in place (CIPP) process is operated according to the following procedure:

- Mix resin and initiator together
- Apply the mixture to the felt pipe lining
- Transport the lining via refrigerated truck to the jobsite
- Insert the lining into a pipe (occurs offsite)
- Allow the resin mixture to cure in the felt lining of the pipe (occurs offsite)

The resin contains styrene, which is hazardous air pollutant (HAP), and a polyester based resin which in the presence of the initiator causes the material to cure and harden in a few hours depending on the temperature. The greater the temperature the quicker the curing takes place. A small amount of styrene is lost to the atmosphere during the curing process. It is estimated that less than 1 percent is lost during the process. The uncontrolled emissions assume that 1 percent styrene is lost to the atmosphere. The Facility uses two initiators, Perakox 16 and Trigonox 42S. The safety data sheets (SDS) are located in Appendix A. The Facility uses about 100 drums of resin per year, for this assessment the calculations are based on 200 drums per year. The emission calculations and emission summary are shown in Table 4.

Additional miscellaneous activities (roll and touchup aerosol spray painting, welding, grinding, cutting, and sanding) that occur in the maintenance area are all considered insignificant under MPCA rules.

4.2 Central Stores Building Emissions

The Central Stores Building has one boiler and one hot water heater that emit air emissions. The PTE for the emission sources in the Central Stores Building is shown in Tables 5-6 and the emissions assume worst case scenario at 8760 hours per year and operating at maximum capacity.

4.3 Bulk Material Storage Emissions

The transfer of the bulk materials (salt, sand, soil, and gravel) does create PM and PM_{10} emissions. The materials are covered therefore wind erosion does not apply to the storage piles. The materials are loaded/unloaded (transferred) three times from the time it is brought onsite to the time it leaves the facility. The bulk material handling material air emissions are quantified in Table 7 and use the given throughputs of 3,000 tpy of salt and 500,000 tpy of sand per season. The amount of soil and gravel used is minimal and both are considered insignificant.

Sandblasting emits PM, PM_{10}, and $PM_{2.5}$ into the atmosphere and the emissions are dependent on the amount of abrasive (sand) that is used in the process. Current operations use about 500 lbs of black beauty abrasive per year, but historic use has shown up to 4,000 lbs. The emissions are calculated using 4,000 lbs of abrasive and are shown in Table 8.

The brine storage tank heater vents to the atmosphere and the PTE is shown in Table 9. The emissions assume worst case scenario at 8760 hours per year and operating at maximum capacity.

One 7,500-gallon liquid asphalt storage tank is present at the Facility. VOC, HAP, and carbon monoxide (CO) air emissions are emitted during the loading, unloading, and the venting of the heated storage of the product. The facility only uses this product during the summer months for road repair and estimates around two or three tank volumes are used each year. The calculated emissions from the liquid asphalt process assumes five tank volumes or 37,500 gallons are used per year. AP-42 Chapter 7.1 and 11.1 are utilized for the calculations and the emission are shown in Tables 10-11.

4.4 Fuel Island Emissions

The PTE emissions from the underground storage tanks in the fuel island are calculated using the following fuel throughputs:

Unleaded gasoline tank (E-10) - 150,000 gal/yr
E-85 tank (E-10) - 12,000 gal/yr
Bio-diesel tank -100,000 gal/yr

The amount of fuel used is based upon the City's vehicle use and the emissions are calculated using AP-42 Chapter 7.1. The emissions are shown in Table 1 and the calculations are shown in Appendix C.

4.5 Parking and Vehicle Traffic

Vehicle traffic on the paved surfaces causes PM and PM_{10} emissions. The vehicle traffic activity and emissions generated from the traffic on this property meet MPCA's classification as an insignificant activity, per MPCA Administrative Rule 7007.1300 (Insignificant Activities List), and are not provided.

5.0 PROPOSED FACILITY ADDITIONS

The City has acquired the adjoining 7+ acre Roof Depot property (1860 28th St E and 2717 Longfellow Avenue) and proposes to relocate the Water Distribution Maintenance functions from separate locations at the Fridley Water Works and East Side Wateryard to the Facility.

5.1 East Side Wateryard

The City's water maintenance facility, known as the East Side Wateryard, is currently located at 935 5th Ave SE, Minneapolis, MN 55421 on 2.4 acres. It is the hub for maintaining the City's 1,000 miles of water mains, 16,000 valves and street holes, and 8,000 hydrants. The East Side Wateryard maintenance staff performs valve operations, greasing and packing of hydrants, street manhole repairs, water main repairs, and leak detection. The facility is primarily used for hydrant maintenance activities but also has a small office space and a warehouse for equipment storage. The facility is heated by a natural gas fired boiler with a maximum rating of 2.5 million btu/hr.

The facility has two underground storage tanks USTs with the following specifications:

Quantity of UST	UST Volume (gallons)	UST Contents
1	2,000	Gasoline (E-10)
1	2,000	Diesel (Biodiesel)

5.2 Minneapolis Water Works-Fridley

The Minneapolis Water Works-Fridley is located at 4300 Marshall St NE, Fridley, MN 55421. Only the water distribution maintenance functions from the Minneapolis Water Works-Fridley are proposed move to the Facility. This department works on repairing water meters for the City. The department mainly consists of water meter maintenance equipment, a water meter parts warehouse, and water meter testing equipment. The department has one sandblasting station that is vented to atmosphere.

6.0 PROPOSED FACILTY ADDITIONS AIR EMISSIONS TO THE ATMOSPHERE

6.1 East Side Wateryard

The East Side Wateryard operations emit emissions into the atmosphere and the PTE for the facility is summarized in Table 12. The East Side Water has one natural gas fired boiler that emits air emissions. The PTE for the boiler is summarized in Table 13 and the emissions assume worst case scenario at 8760 hours per year and operating at maximum capacity.

The PTE emissions from the underground storage tanks are calculated using the following fuel throughputs:

Unleaded gasoline tank (E-10) - 50,000 gal/yr
Bio-diesel tank -50,000 gal/yr

The amount of fuel used is based upon the City's vehicle use and the emissions are calculated using AP-42 Chapter 7.1. The emission calculations are shown in Appendix C.

The hydrant shop activities mainly consist of hydrant repair (grinding and welding) which is only conducted only when necessary; therefore, it is considered an insignificant activity per MPCA rules.

6.2 Minneapolis Water Works-Fridley Water Meter Department

The Minneapolis Water Works-Fridley water meter department activities mainly consist of water meter repair (grinding and welding) which is considered an insignificant activity per MPCA rules. The operations that emit significant emissions into the atmosphere are summarized in Table 14.

Water meters are sandblasted using a Trinco Dry Blast Model DP850 which is vented to a dust collector and ultimately in the atmosphere. Sandblasting produces PM and PM_{10} emissions. According to the facility staff, it takes about 15 minutes to sandblast a water meter and the department sandblasts about 500 water meters per year. Based on 500 water meters per year, this equates to 125 hours of sandblasting per year. Using the abrasive consumption rate of 380 lb/hr, this results in 47,500 lbs of abrasive used per year. The PTE for the abrasive blasting is calculated in Table 15.

7.0 SUMMARY

7.1 Existing Hiawatha Maintenance Facility

Sections 3.1 through 3.5 explain the emissions sources that emit emissions to the atmosphere and Sections 4.1 through 4.5 describe how the PTE is calculated. Table 1 displays the unlimited PTE

for each source at the existing Facility. The Facility has a total PTE that is below the State air permit thresholds and does not require an air permit.

7.2 Proposed Facility Additions

Section 5.0, more specifically Section 5.1 and Section 5.2, describes the activities and their emission sources that are proposed to be added to the Facility. Sections 6.1 and Section 6.2 describe how the PTE for the proposed sources is calculated. Table 13 and Table 14 shows the unlimited PTE for each of the proposed additions to the Facility.

The addition of the proposed emission sources to the existing Facility will result in a total Facility PTE that is below the State air permit thresholds and will not require an air permit prior to the construction of the proposed Facility addition. Table 16 shows the PTE of the existing Facility and the PTE of the proposed additions.

8.0 SIGNATURES

The services performed by American Engineering Testing, Inc. for this project have been conducted in a manner consistent with that level of skill and care ordinarily exercised by other members of the profession currently practicing in this area.

Report Prepared By:
American Engineering Testing, Inc.

Matthew M. DesJardins
Senior Environmental Scientist

Report Reviewed By:
American Engineering Testing, Inc.

Eric Hesse, PE
Principal Engineer

Tables

Table 1
Unlimited PTE of Existing Hiawatha Facility
City of Minneapolis
Hiawatha Maintenance Facility

Criteria Pollutants Unlimited Potential to Emit

	Pollutant (TPY)							
Emission Unit	**PM**	**PM_{10}**	**$PM_{2.5}$**	**SO2**	**NOx**	**VOC**	**CO**	**CO_2e**
Main Building Boilers	2.61E-01	2.61E-01	2.61E-01	2.06E-02	3.44E+00	1.89E-01	2.89E+00	4.13E+03
Main Building Process Heaters	3.92E-02	3.92E-02	3.92E-02	3.09E-03	5.15E-01	2.83E-02	4.33E-01	6.19E+02
Bulk Material Handling	9.05E-01	4.28E-01	6.48E-02					
Cure in Place Process (CIPP)						5.77E-01		
Central Stores Boiler	8.22E-02	8.22E-02	8.22E-02	6.49E-03	1.08E+00	5.95E-02	9.09E-01	1.30E+03
Central Stores Hot Water Heater	5.09E-03	5.09E-03	5.09E-03	4.02E-04	6.70E-02	3.68E-03	5.63E-02	8.05E+01
Brine Tank Heater	9.79E-04	9.79E-04	9.79E-04	7.73E-05	1.29E-02	7.09E-04	1.08E-02	1.55E+01
Sand Blasting	5.50E-02	1.30E-02	1.30E-03					
PG 64-22 Tank Loadout						7.80E-02	2.53E-02	
PG 64-22 Tank Storage/Filling	9.79E-03					9.79E-03	2.21E-02	
PG 64-22 Tank Venting						2.60E-03		
Fuel Island[1]						4.50E-01		
Total Facility Emissions	**1.36**	**0.83**	**0.45**	**0.03**	**5.11**	**1.40**	**4.34**	**6,142**

[1]Fuel Island PTE is calculated using to EPA AP-42 Section 7.1 and the calculations are attached in Appendix C

Hazardous Air Pollutants Unlimited Potential to Emit

Emission Units	**Main Building Boilers**	**Main Building Process Heaters**	**Cure in Place Process (CIPP)**	**Central Stores Boiler**	**Central Stores Hot Water Heater**	**Brine Tank Heater**	**PG 64-22 Tank Loadout**	**PG 64-22 Tank Storage/ Filling**	**Facility Total HAPs**	**Max Single HAP**
Total HAPs by Unit	**TPY 0.39**	**TPY 0.06**	**TPY 0.20**	**TPY 0.12**	**TPY 0.01**	**TPY 0.001**	**TPY[1] 0.00**	**TPY[1] 0.00**	**TPY 0.78**	**TPY 0.20**
Pollutant										**Single HAPs**
Benzene	7.21E-05	1.08E-05		2.27E-05	1.41E-06	2.71E-07				**1.07E-04**
Butane	7.21E-02	1.08E-02		2.27E-02	1.41E-03	2.71E-04				**1.07E-01**
Dichlorobenzene	4.12E-05	6.18E-06		1.30E-05	8.04E-07	1.55E-07				**6.14E-05**
Ethane	1.06E-01	1.60E-02		3.35E-02	2.08E-03	3.99E-04				**1.58E-01**
Formaldehyde	2.58E-03	3.86E-04		8.12E-04	5.02E-05	9.66E-06				**3.83E-03**
Hexane	6.18E-02	9.28E-03		1.95E-02	1.21E-03	2.32E-04				**9.20E-02**
Naphthalene	2.10E-05	3.14E-06		6.60E-06	4.09E-07	7.86E-08				**3.12E-05**
Pentane	8.93E-02	1.34E-02		2.81E-02	1.74E-03	3.35E-04				**1.33E-01**
Propane	5.50E-02	8.24E-03		1.73E-02	1.07E-03	2.06E-04				**8.18E-02**
Styrene			1.96E-01							**1.96E-01**
Toluene	1.17E-04	1.75E-05		3.68E-05	2.28E-06	4.38E-07				**1.74E-04**
Acenaphthene	6.18E-08	9.28E-09		1.95E-08	1.21E-09	2.32E-10				**9.20E-08**
Acenaphthylene	6.18E-08	9.28E-09		1.95E-08	1.21E-09	2.32E-10				**9.20E-08**
Anthracene	8.24E-08	1.24E-08		2.60E-08	1.61E-09	3.09E-10				**1.23E-07**
Benz(a)anthracene	6.18E-08	9.28E-09		1.95E-08	1.21E-09	2.32E-10				**9.20E-08**
Benzo(a)pyrene	4.12E-08	6.18E-09		1.30E-08	8.04E-10	1.55E-10				**6.14E-08**
Benzo(b)fluroanthene	6.18E-08	9.28E-09		1.95E-08	1.21E-09	2.32E-10				**9.20E-08**
Benzo(g,h,i)perylene	4.12E-08	6.18E-09		1.30E-08	8.04E-10	1.55E-10				**6.14E-08**
Benzo(k)fluoranthene	6.18E-08	9.28E-09		1.95E-08	1.21E-09	2.32E-10				**9.20E-08**
Chrysene	6.18E-08	9.28E-09		1.95E-08	1.21E-09	2.32E-10				**9.20E-08**
Dibenzo(a,h)anthracene	4.12E-08	6.18E-09		1.30E-08	8.04E-10	1.55E-10				**6.14E-08**
7,12-Dimethylbenz(a)anthracene	5.50E-07	8.24E-08		1.73E-07	1.07E-08	2.06E-09				**8.18E-07**
Fluoranthene	1.03E-07	1.55E-08		3.25E-08	2.01E-09	3.86E-10				**1.53E-07**
Fluorene	9.62E-08	1.44E-08		3.03E-08	1.88E-09	3.61E-10				**1.43E-07**
Indeno(1,2,3-cd)pyrene	6.18E-08	9.28E-09		1.95E-08	1.21E-09	2.32E-10				**9.20E-08**
2-Methylnaphthalene	8.24E-07	1.24E-07		2.60E-07	1.61E-08	3.09E-09				**1.23E-06**
3-Methylchloranthrene	6.18E-08	9.28E-09		1.95E-08	1.21E-09	2.32E-10				**9.20E-08**
Phenanthrene	5.84E-07	8.76E-08		1.84E-07	1.14E-08	2.19E-09				**8.69E-07**
Pyrene	1.72E-06	2.58E-07		5.41E-07	3.35E-08	6.44E-09				**2.56E-06**
Arsenic	6.87E-06	1.03E-06		2.16E-06	1.34E-07	2.58E-08				**1.02E-05**
Barium	1.51E-04	2.27E-05		4.76E-05	2.95E-06	5.67E-07				**2.25E-04**
Berylium	4.12E-07	6.18E-08		1.30E-07	8.04E-09	1.55E-09				**6.14E-07**
Cadmium	3.78E-05	5.67E-06		1.19E-05	7.37E-07	1.42E-07				**5.62E-05**
Chromium	4.81E-05	7.21E-06		1.51E-05	9.38E-07	1.80E-07				**7.16E-05**
Cobalt	2.89E-06	4.33E-07		9.09E-07	5.63E-08	1.08E-08				**4.29E-06**
Copper	2.92E-05	4.38E-06		9.20E-06	5.69E-07	1.10E-07				**4.35E-05**
Lead	1.72E-05	2.58E-06		5.41E-06	3.35E-07	6.44E-08				**2.56E-05**
Manganese	1.31E-05	1.96E-06		4.11E-06	2.55E-07	4.90E-08				**1.94E-05**
Mercury	8.93E-06	1.34E-06		2.81E-06	1.74E-07	3.35E-08				**1.33E-05**
Molybdenum	3.78E-05	5.67E-06		1.19E-05	7.37E-07	1.42E-07				**5.62E-05**
Nickel	7.21E-05	1.08E-05		2.27E-05	1.41E-06	2.71E-07				**1.07E-04**
Selenium	8.24E-07	1.24E-07		2.60E-07	1.61E-08	3.09E-09				**1.23E-06**
Vanadium	7.90E-05	1.19E-05		2.49E-05	1.54E-06	2.96E-07				**1.18E-04**
Zinc	9.96E-04	1.49E-04		3.14E-04	1.94E-05	3.74E-06				**1.48E-03**

[1] Total HAP is calculated as a percent of VOC

Table 2
Main Building Boiler Emissions
City of Minneapolis
Hiawatha Maintenance Facility

Parameter	Value	Units	Source
Make	AERCO		
Model	Benchmark 2.0		
Maximum Heat Input	2	MMBtu/hr	Per Boiler
Fuel	Natural Gas		
Maximum Fuel Input	0.0020	MMSCF/hr	(Maximum Heat Input) / (Fuel Heat Value)
Annual Operation	8760	hr/yr	Used for Limitied Emission Rate
Annual Fuel Input	17.18	MMSCF/yr	(Max Fuel Input) * (Annual Operation)
Number of Identical Boilers	4	boilers	
Fuel Heat Value	1020	Btu/scf	AP-42 Section 1.4

Natural Gas Criteria Pollutants Potential to Emit

Pollutant	CAS No.	Emission Factor		Emission Rate (lb/hr-boiler)	Unlimited Emission Rate (tpy)	Limited Emission Rate (tpy)	Footnotes
PM		7.60	lb/MMSCF	0.015	0.26	0.26	A
PM_{10}		7.60	lb/MMSCF	0.015	0.26	0.26	A
$PM_{2.5}$		7.60	lb/MMSCF	0.015	0.26	0.26	A
SO_2	744-09-5	0.60	lb/MMSCF	0.001	0.02	0.02	A
NO_x		100.00	lb/MMSCF	0.196	3.44	3.44	B
VOC		5.50	lb/MMSCF	0.011	0.19	0.19	A
CO	7440-48-4	84.00	lb/MMSCF	0.165	2.89	2.89	B

Natural Gas Greenhouse Gas Potential to Emit

Pollutant	CAS No.	Emission Factor		Emission Rate (lb/hr-boiler)	Unlimited Emission Rate (tpy)	Limited Emission Rate (tpy)	Footnotes
Greenhouse Gas (CO_2e)							G
CO_2	124-38-9	120019	lb/MMSCF	235.331	4122.99	4123	E
CH_4	74-82-8	2.26	lb/MMSCF	0.111	1.94	1.94	F
N_2O	10024-97-2	0.23	lb/MMSCF	0.132	2.32	2.32	F

Natural Gas Hazardous Air Pollutants Potential To Emit

Pollutant	CAS No.	Emission Factor		Emission Rate (lb/hr-boiler)	Unlimited Emission Rate (tpy)	Limited Emission Rate (tpy)	Footnotes
Organics							
Benzene	71-43-2	2.10E-03	lb/MMSCF	4.12E-06	7.21E-05	7.21E-05	C
Butane	106-97-8	2.10E+00	lb/MMSCF	4.12E-03	7.21E-02	7.21E-02	C
Dichlorobenzene	25321-22-6	1.20E-03	lb/MMSCF	2.35E-06	4.12E-05	4.12E-05	C
Ethane	75-84-0	3.10E+00	lb/MMSCF	6.08E-03	1.06E-01	1.06E-01	C
Formaldehyde	50-00-0	7.50E-02	lb/MMSCF	1.47E-04	2.58E-03	2.58E-03	C
Hexane	110-54-3	1.80E+00	lb/MMSCF	3.53E-03	6.18E-02	6.18E-02	C
Naphthalene	91-20-3	6.10E-04	lb/MMSCF	1.20E-06	2.10E-05	2.10E-05	C
Pentane	109-66-0	2.60E+00	lb/MMSCF	5.10E-03	8.93E-02	8.93E-02	C
Propane	74-98-6	1.60E+00	lb/MMSCF	3.14E-03	5.50E-02	5.50E-02	C
Toluene	108-88-3	3.40E-03	lb/MMSCF	6.67E-06	1.17E-04	1.17E-04	C
Acenaphthene	83-32-9	1.80E-06	lb/MMSCF	3.53E-09	6.18E-08	6.18E-08	C
Acenaphthylene	203-96-8	1.80E-06	lb/MMSCF	3.53E-09	6.18E-08	6.18E-08	C
Anthracene	120-12-7	2.40E-06	lb/MMSCF	4.71E-09	8.24E-08	8.24E-08	C
Benz(a)anthracene	56-55-3	1.80E-06	lb/MMSCF	3.53E-09	6.18E-08	6.18E-08	C
Benzo(a)pyrene	50-32-8	1.20E-06	lb/MMSCF	2.35E-09	4.12E-08	4.12E-08	C
Benzo(b)fluroanthene	205-99-2	1.80E-06	lb/MMSCF	3.53E-09	6.18E-08	6.18E-08	C
Benzo(g,h,i)perylene	191-24-2	1.20E-06	lb/MMSCF	2.35E-09	4.12E-08	4.12E-08	C
Benzo(k)fluoranthene	205-82-3	1.80E-06	lb/MMSCF	3.53E-09	6.18E-08	6.18E-08	C
Chrysene	218-01-9	1.80E-06	lb/MMSCF	3.53E-09	6.18E-08	6.18E-08	C
Dibenzo(a,h)anthracene	53-70-3	1.20E-06	lb/MMSCF	2.35E-09	4.12E-08	4.12E-08	C
7,12-Dimethylbenz(a)anthracene	57-97-6	1.60E-05	lb/MMSCF	3.14E-08	5.50E-07	5.50E-07	C
Fluoranthene	206-44-0	3.00E-06	lb/MMSCF	5.88E-09	1.03E-07	1.03E-07	C
Fluorene	86-73-7	2.80E-06	lb/MMSCF	5.49E-09	9.62E-08	9.62E-08	C
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06	lb/MMSCF	3.53E-09	6.18E-08	6.18E-08	C
2-Methylnaphthalene	91-57-6	2.40E-05	lb/MMSCF	4.71E-08	8.24E-07	8.24E-07	C
3-Methylchloranthrene	56-49-5	1.80E-06	lb/MMSCF	3.53E-09	6.18E-08	6.18E-08	C
Phenanthrene	85-01-8	1.70E-05	lb/MMSCF	3.33E-08	5.84E-07	5.84E-07	C
Pyrene	129-00-0	5.00E-05	lb/MMSCF	9.80E-08	1.72E-06	1.72E-06	C
HAP Metals							
Arsenic	7440-38-2	2.00E-04	lb/MMSCF	3.92E-07	6.87E-06	6.87E-06	D
Barium	7440-39-3	4.40E-03	lb/MMSCF	8.63E-06	1.51E-04	1.51E-04	D
Berylium	7440-41-7	1.20E-05	lb/MMSCF	2.35E-08	4.12E-07	4.12E-07	D
Cadmium	7440-43-9	1.10E-03	lb/MMSCF	2.16E-06	3.78E-05	3.78E-05	D
Chromium	7440-47-3	1.40E-03	lb/MMSCF	2.75E-06	4.81E-05	4.81E-05	D
Cobalt	7440-48-4	8.40E-05	lb/MMSCF	1.65E-07	2.89E-06	2.89E-06	D
Copper	7440-50-8	8.50E-04	lb/MMSCF	1.67E-06	2.92E-05	2.92E-05	D
Lead	7139-92-1	5.00E-04	lb/MMSCF	9.80E-07	1.72E-05	1.72E-05	D
Manganese	7439-96-5	3.80E-04	lb/MMSCF	7.45E-07	1.31E-05	1.31E-05	D
Mercury	7439-97-6	2.60E-04	lb/MMSCF	5.10E-07	8.93E-06	8.93E-06	D
Molybdenum	7439-98-7	1.10E-03	lb/MMSCF	2.16E-06	3.78E-05	3.78E-05	D
Nickel	7440-02-0	2.10E-03	lb/MMSCF	4.12E-06	7.21E-05	7.21E-05	D
Selenium	7782-49-2	2.40E-05	lb/MMSCF	4.71E-08	8.24E-07	8.24E-07	D
Vanadium	7440-62-2	2.30E-03	lb/MMSCF	4.51E-06	7.90E-05	7.90E-05	D
Zinc	7440-66-6	2.90E-02	lb/MMSCF	5.69E-05	9.96E-04	9.96E-04	D
Max. Single HAP					**1.06E-01**	**1.06E-01**	H
Total HAP					**3.89E-01**	**3.89E-01**	

Emission Factor Footnotes

A AP-42 Table 1.4-2
B AP-42 Table 1.4-2
C AP-42 Table 1.4-3
D AP-42 Table 1.4-4
E 40 CFR Part 98 Table C-1: Pipeline natural gas = 1026 Btu/scf, CO_2 emission = 53.06 kg CO_2/MMBtu = 120162 lb/MMBtu = 120019 lb/MI
F 40 CFR Part 98 Table C-2: Pipeline natural gas = 1026 Btu/scf, CH_4 = 0.001 kg CH_4/MMBtu, N_2O = 0.0001 kg N_2O/MMBtu
G CO_2e = (Global Warming Potential, GWP) * (Emission). GWP from 40 CFR Part 98 Table A-1. CO_2 = 1, CH_4 = 25, N_2O= 298
H Largest single HAP is Ethane

Table 3
Main Building Process Heater Emissions
City of Minneapolis
Hiawatha Maintenance Facility

Parameter	Value	Units	Source
Make	varies		
Model	varies		
Maximum Heat Input	1.2	MMBtu/hr	2 Eye Wash Heaters @ 0.38 MMBtw/hr, 1 Power Wash Heater @ 0.44 MMBtu/hr
Fuel	Natural Gas		
Maximum Fuel Input	0.0012	MMSCF/hr	(Maximum Heat Input) / (Fuel Heat Value)
Annual Operation	8760	hr/yr	Used for Limitied Emission Rate
Annual Fuel Input	10.31	MMSCF/yr	(Max Fuel Input) * (Annual Operation)
Number of Identical Boilers	1	boilers	
Fuel Heat Value	1020	Btu/scf	AP-42 Section 1.4

Natural Gas Criteria Pollutants Potential to Emit

Pollutant	CAS No.	Emission Factor		Emission Rate (lb/hr-boiler)	Unlimited Emission Rate (tpy)	Limited Emission Rate (tpy)	Footnotes
PM		7.60	lb/MMSCF	0.009	0.04	0.04	A
PM_{10}		7.60	lb/MMSCF	0.009	0.04	0.04	A
$PM_{2.5}$		7.60	lb/MMSCF	0.009	0.04	0.04	A
SO_2	744-09-5	0.60	lb/MMSCF	0.001	0.00	0.00	A
NO_x		100.00	lb/MMSCF	0.118	0.52	0.52	B
VOC		5.50	lb/MMSCF	0.006	0.03	0.03	A
CO	7440-48-4	84.00	lb/MMSCF	0.099	0.43	0.43	B

Natural Gas Greenhouse Gas Potential to Emit

Pollutant	CAS No.	Emission Factor		Emission Rate (lb/hr-boiler)	Unlimited Emission Rate (tpy)	Limited Emission Rate (tpy)	Footnotes
Greenhouse Gas (CO_2e)							G
CO_2	124-38-9	120019	lb/MMSCF	141.198	618.45	618	E
CH_4	74-82-8	2.26	lb/MMSCF	0.067	0.29	2.91E-01	F
N_2O	10024-97-2	0.23	lb/MMSCF	0.079	0.35	3.47E-01	F

Natural Gas Hazardous Air Pollutants Potential To Emit

Pollutant	CAS No.	Emission Factor		Emission Rate (lb/hr-boiler)	Unlimited Emission Rate (tpy)	Limited Emission Rate (tpy)	Footnotes
Organics							
Benzene	71-43-2	2.10E-03	lb/MMSCF	2.47E-06	1.08E-05	1.08E-05	C
Butane	106-97-8	2.10E+00	lb/MMSCF	2.47E-03	1.08E-02	1.08E-02	C
Dichlorobenzene	25321-22-6	1.20E-03	lb/MMSCF	1.41E-06	6.18E-06	6.18E-06	C
Ethane	75-84-0	3.10E+00	lb/MMSCF	3.65E-03	1.60E-02	1.60E-02	C
Formaldehyde	50-00-0	7.50E-02	lb/MMSCF	8.82E-05	3.86E-04	3.86E-04	C
Hexane	110-54-3	1.80E+00	lb/MMSCF	2.12E-03	9.28E-03	9.28E-03	C
Naphthalene	91-20-3	6.10E-04	lb/MMSCF	7.18E-07	3.14E-06	3.14E-06	C
Pentane	109-66-0	2.60E+00	lb/MMSCF	3.06E-03	1.34E-02	1.34E-02	C
Propane	74-98-6	1.60E+00	lb/MMSCF	1.88E-03	8.24E-03	8.24E-03	C
Toluene	108-88-3	3.40E-03	lb/MMSCF	4.00E-06	1.75E-05	1.75E-05	C
Acenaphthene	83-32-9	1.80E-06	lb/MMSCF	2.12E-09	9.28E-09	9.28E-09	C
Acenaphthylene	203-96-8	1.80E-06	lb/MMSCF	2.12E-09	9.28E-09	9.28E-09	C
Anthracene	120-12-7	2.40E-06	lb/MMSCF	2.82E-09	1.24E-08	1.24E-08	C
Benz(a)anthracene	56-55-3	1.80E-06	lb/MMSCF	2.12E-09	9.28E-09	9.28E-09	C
Benzo(a)pyrene	50-32-8	1.20E-06	lb/MMSCF	1.41E-09	6.18E-09	6.18E-09	C
Benzo(b)fluroanthene	205-99-2	1.80E-06	lb/MMSCF	2.12E-09	9.28E-09	9.28E-09	C
Benzo(g,h,i)perylene	191-24-2	1.20E-06	lb/MMSCF	1.41E-09	6.18E-09	6.18E-09	C
Benzo(k)fluoranthene	205-82-3	1.80E-06	lb/MMSCF	2.12E-09	9.28E-09	9.28E-09	C
Chrysene	218-01-9	1.80E-06	lb/MMSCF	2.12E-09	9.28E-09	9.28E-09	C
Dibenzo(a,h)anthracene	53-70-3	1.20E-06	lb/MMSCF	1.41E-09	6.18E-09	6.18E-09	C
7,12-Dimethylbenz(a)anthracene	57-97-6	1.60E-05	lb/MMSCF	1.88E-08	8.24E-08	8.24E-08	C
Fluoranthene	206-44-0	3.00E-06	lb/MMSCF	3.53E-09	1.55E-08	1.55E-08	C
Fluorene	86-73-7	2.80E-06	lb/MMSCF	3.29E-09	1.44E-08	1.44E-08	C
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06	lb/MMSCF	2.12E-09	9.28E-09	9.28E-09	C
2-Methylnaphthalene	91-57-6	2.40E-05	lb/MMSCF	2.82E-08	1.24E-07	1.24E-07	C
3-Methylchloranthrene	56-49-5	1.80E-06	lb/MMSCF	2.12E-09	9.28E-09	9.28E-09	C
Phenanthrene	85-01-8	1.70E-05	lb/MMSCF	2.00E-08	8.76E-08	8.76E-08	C
Pyrene	129-00-0	5.00E-05	lb/MMSCF	5.88E-08	2.58E-07	2.58E-07	C
HAP Metals							
Arsenic	7440-38-2	2.00E-04	lb/MMSCF	2.35E-07	1.03E-06	1.03E-06	D
Barium	7440-39-3	4.40E-03	lb/MMSCF	5.18E-06	2.27E-05	2.27E-05	D
Berylium	7440-41-7	1.20E-05	lb/MMSCF	1.41E-08	6.18E-08	6.18E-08	D
Cadmium	7440-43-9	1.10E-03	lb/MMSCF	1.29E-06	5.67E-06	5.67E-06	D
Chromium	7440-47-3	1.40E-03	lb/MMSCF	1.65E-06	7.21E-06	7.21E-06	D
Cobalt	7440-48-4	8.40E-05	lb/MMSCF	9.88E-08	4.33E-07	4.33E-07	D
Copper	7440-50-8	8.50E-04	lb/MMSCF	1.00E-06	4.38E-06	4.38E-06	D
Lead	7139-92-1	5.00E-04	lb/MMSCF	5.88E-07	2.58E-06	2.58E-06	D
Manganese	7439-96-5	3.80E-04	lb/MMSCF	4.47E-07	1.96E-06	1.96E-06	D
Mercury	7439-97-6	2.60E-04	lb/MMSCF	3.06E-07	1.34E-06	1.34E-06	D
Molybdenum	7439-98-7	1.10E-03	lb/MMSCF	1.29E-06	5.67E-06	5.67E-06	D
Nickel	7440-02-0	2.10E-03	lb/MMSCF	2.47E-06	1.08E-05	1.08E-05	D
Selenium	7782-49-2	2.40E-05	lb/MMSCF	2.82E-08	1.24E-07	1.24E-07	D
Vanadium	7440-62-2	2.30E-03	lb/MMSCF	2.71E-06	1.19E-05	1.19E-05	D
Zinc	7440-66-6	2.90E-02	lb/MMSCF	3.41E-05	1.49E-04	1.49E-04	D
Max. Single HAP					**1.60E-02**	**1.60E-02**	H
Total HAP					**0.06**	**5.84E-02**	

Emission Factor Footnotes

A AP-42 Table 1.4-2
B AP-42 Table 1.4-2
C AP-42 Table 1.4-3
D AP-42 Table 1.4-4
E 40 CFR Part 98 Table C-1: Pipeline natural gas = 1026 Btu/scf, CO_2 emission = 53.06 kg CO_2/MMBtu = 120162 lb/MMBtu = 120019 lb/MMsc
F 40 CFR Part 98 Table C-2: Pipeline natural gas = 1026 Btu/scf, CH_4 = 0.001 kg CH_4/MMBtu, N_2O = 0.0001 kg N_2O/MMBtu
G CO_2e = (Global Warming Potential, GWP) * (Emission). GWP from 40 CFR Part 98 Table A-1. CO_2 = 1, CH_4 = 25, N_2O= 298
H Largest single HAP is Ethane

Table 4
Cure in Place Process Emissions
City of Minneapolis
Hiawatha Maintenance Facility

Resin Mixture Formula			
Ingredient	**Mass**		**Wt %**
Resin[1]	504.9	lb/batch	98.79%
Trigonx 425	3.0	lb/batch	0.58%
Perkadox 16	3.2	lb/batch	0.63%
Resin Mixture	511.1	lb/batch	100.00%

Operating Data			
Annual Use of Resin	200	drums/yr	City of Minneapolis, 2019
Volume per drum Resin	55	gal/drum	Assumed based on barrel size
Volume per year Resin	11000	gal/yr	(Resin Used) * (Volume per Drum)
Denisty of Resin	10.85	lb/gal	MSDS[2]
Mass of Resin Used	59.68	tpy	(Annual Use) * (Density) / 2000 lb/ton
Mass of Resin Mixture Used	60.41	tpy	(Resin) / (wt% polyester Resin in Mixture)
Mass of Trigonox 425 Used	0.35	tpy	(Mass Resin Mixture Used) * (wt% of Ingredient)
Mass of Perkadox 16 Used	0.38	tpy	(Mass Resin Mixture Used) * (wt% of Ingredient)
Styrene lost during the curing process	1	Wt %	Engineering estimate based on discussions with the resin manufacturer

Components of Each Ingredient	**Wt %**	**VOC Emission (tpy)**	**HAP Emission (tpy)**
Resin			
Unsaturated Polyester Base Resin	0.671	0	0
Styrene	0.329	0.20	0.20
Perkadox 16			
DTBPODC[3]	0.94	0.36	0
Other	0.06	0.02	0

[1]"Resin" is product name "COR78-AT-329LC CIPP RESIN" manufactured by Interplastic Corporation

[2] See Appendix B for MSDS

[3]DTBPODC stands for Di-(4-tert butylcyclohexyl) peroxydicarbonate. It is assumed to be a VOC and is not listed as a HAP

Table 5
Central Stores Boiler Emissions
City of Minneapolis
Hiawatha Maintenance Facility

Parameter	Value	Units	Source
Make	Pacific Steel		
Model	R8.3-60-15		
Maximum Heat Input	2.52	MMBtu/hr	Per Boiler
Fuel	Natural Gas		Previously on fuel oil, however fuel oil line no longer exists
Maximum Fuel Input	0.0025	MMSCF/hr	(Maximum Heat Input) / (Fuel Heat Value)
Annual Operation	8760	hr/yr	Used for Limitied Emission Rate
Annual Fuel Input	21.64	MMSCF/yr	(Max Fuel Input) * (Annual Operation)
Number of Identical Boilers	1	boilers	
Fuel Heat Value	1020	Btu/scf	AP-42 Section 1.4

Natural Gas Criteria Pollutants Potential to Emit

Pollutant	CAS No.	Emission Factor		Emission Rate (lb/hr-boiler)	Unlimited Emission Rate (tpy)	Limited Emission Rate (tpy)	Footnotes
PM		7.60	lb/MMSCF	0.019	0.08	0.08	A
PM_{10}		7.60	lb/MMSCF	0.019	0.08	0.08	A
$PM_{2.5}$		7.60	lb/MMSCF	0.019	0.08	0.08	A
SO_2	744-09-5	0.60	lb/MMSCF	0.001	0.01	0.01	A
NO_x		100.00	lb/MMSCF	0.247	1.08	1.08	B
VOC		5.50	lb/MMSCF	0.014	0.06	0.06	A
CO	7440-48-4	84.00	lb/MMSCF	0.208	0.91	0.91	B

Natural Gas Greenhouse Gas Potential to Emit

Pollutant	CAS No.	Emission Factor		Emission Rate (lb/hr-boiler)	Unlimited Emission Rate (tpy)	Limited Emission Rate (tpy)	Footnotes
Greenhouse Gas (CO_2e)							G
CO_2	124-38-9	120019	lb/MMSCF	297	1299	1299	E
CH_4	74-82-8	2.26	lb/MMSCF	0.140	0.61	0.61	F
N_2O	10024-97-2	0.23	lb/MMSCF	0.167	0.73	0.73	F

Natural Gas Hazardous Air Pollutants Potential To Emit

Pollutant	CAS No.	Emission Factor		Emission Rate (lb/hr-boiler)	Unlimited Emission Rate (tpy)	Limited Emission Rate (tpy)	Footnotes
Organics							
Benzene	71-43-2	2.10E-03	lb/MMSCF	5.19E-06	2.27E-05	2.27E-05	C
Butane	106-97-8	2.10E+00	lb/MMSCF	5.19E-03	2.27E-02	2.27E-02	C
Dichlorobenzene	25321-22-6	1.20E-03	lb/MMSCF	2.96E-06	1.30E-05	1.30E-05	C
Ethane	75-84-0	3.10E+00	lb/MMSCF	7.66E-03	3.35E-02	3.35E-02	C
Formaldehyde	50-00-0	7.50E-02	lb/MMSCF	1.85E-04	8.12E-04	8.12E-04	C
Hexane	110-54-3	1.80E+00	lb/MMSCF	4.45E-03	1.95E-02	1.95E-02	C
Naphthalene	91-20-3	6.10E-04	lb/MMSCF	1.51E-06	6.60E-06	6.60E-06	C
Pentane	109-66-0	2.60E+00	lb/MMSCF	6.42E-03	2.81E-02	2.81E-02	C
Propane	74-98-6	1.60E+00	lb/MMSCF	3.95E-03	1.73E-02	1.73E-02	C
Toluene	108-88-3	3.40E-03	lb/MMSCF	8.40E-06	3.68E-05	3.68E-05	C
Acenaphthene	83-32-9	1.80E-06	lb/MMSCF	4.45E-09	1.95E-08	1.95E-08	C
Acenaphthylene	203-96-8	1.80E-06	lb/MMSCF	4.45E-09	1.95E-08	1.95E-08	C
Anthracene	120-12-7	2.40E-06	lb/MMSCF	5.93E-09	2.60E-08	2.60E-08	C
Benz(a)anthracene	56-55-3	1.80E-06	lb/MMSCF	4.45E-09	1.95E-08	1.95E-08	C
Benzo(a)pyrene	50-32-8	1.20E-06	lb/MMSCF	2.96E-09	1.30E-08	1.30E-08	C
Benzo(b)fluroanthene	205-99-2	1.80E-06	lb/MMSCF	4.45E-09	1.95E-08	1.95E-08	C
Benzo(g,h,i)perylene	191-24-2	1.20E-06	lb/MMSCF	2.96E-09	1.30E-08	1.30E-08	C
Benzo(k)fluoranthene	205-82-3	1.80E-06	lb/MMSCF	4.45E-09	1.95E-08	1.95E-08	C
Chrysene	218-01-9	1.80E-06	lb/MMSCF	4.45E-09	1.95E-08	1.95E-08	C
Dibenzo(a,h)anthracene	53-70-3	1.20E-06	lb/MMSCF	2.96E-09	1.30E-08	1.30E-08	C
7,12-Dimethylbenz(a)anthracene	57-97-6	1.60E-05	lb/MMSCF	3.95E-08	1.73E-07	1.73E-07	C
Fluoranthene	206-44-0	3.00E-06	lb/MMSCF	7.41E-09	3.25E-08	3.25E-08	C
Fluorene	86-73-7	2.80E-06	lb/MMSCF	6.92E-09	3.03E-08	3.03E-08	C
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06	lb/MMSCF	4.45E-09	1.95E-08	1.95E-08	C
2-Methylnaphthalene	91-57-6	2.40E-05	lb/MMSCF	5.93E-08	2.60E-07	2.60E-07	C
3-Methylchloranthrene	56-49-5	1.80E-06	lb/MMSCF	4.45E-09	1.95E-08	1.95E-08	C
Phenanthrene	85-01-8	1.70E-05	lb/MMSCF	4.20E-08	1.84E-07	1.84E-07	C
Pyrene	129-00-0	5.00E-05	lb/MMSCF	1.24E-07	5.41E-07	5.41E-07	C
HAP Metals							
Arsenic	7440-38-2	2.00E-04	lb/MMSCF	4.94E-07	2.16E-06	2.16E-06	D
Barium	7440-39-3	4.40E-03	lb/MMSCF	1.09E-05	4.76E-05	4.76E-05	D
Berylium	7440-41-7	1.20E-05	lb/MMSCF	2.96E-08	1.30E-07	1.30E-07	D
Cadmium	7440-43-9	1.10E-03	lb/MMSCF	2.72E-06	1.19E-05	1.19E-05	D
Chromium	7440-47-3	1.40E-03	lb/MMSCF	3.46E-06	1.51E-05	1.51E-05	D
Cobalt	7440-48-4	8.40E-05	lb/MMSCF	2.08E-07	9.09E-07	9.09E-07	D
Copper	7440-50-8	8.50E-04	lb/MMSCF	2.10E-06	9.20E-06	9.20E-06	D
Lead	7139-92-1	5.00E-04	lb/MMSCF	1.24E-06	5.41E-06	5.41E-06	D
Manganese	7439-96-5	3.80E-04	lb/MMSCF	9.39E-07	4.11E-06	4.11E-06	D
Mercury	7439-97-6	2.60E-04	lb/MMSCF	6.42E-07	2.81E-06	2.81E-06	D
Molybdenum	7439-98-7	1.10E-03	lb/MMSCF	2.72E-06	1.19E-05	1.19E-05	D
Nickel	7440-02-0	2.10E-03	lb/MMSCF	5.19E-06	2.27E-05	2.27E-05	D
Selenium	7782-49-2	2.40E-05	lb/MMSCF	5.93E-08	2.60E-07	2.60E-07	D
Vanadium	7440-62-2	2.30E-03	lb/MMSCF	5.68E-06	2.49E-05	2.49E-05	D
Zinc	7440-66-6	2.90E-02	lb/MMSCF	7.16E-05	3.14E-04	3.14E-04	D
Max. Single HAP					**3.35E-02**	**3.35E-02**	H
Total HAP					**1.23E-01**	**1.23E-01**	

Emisison Factor Footnotes

A AP-42 Table 1.4-2
B AP-42 Table 1.4-2
C AP-42 Table 1.4-3
D AP-42 Table 1.4-4
E 40 CFR Part 98 Table C-1: Pipeline natural gas = 1026 Btu/scf, CO_2 emission = 53.06 kg CO_2/MMBtu = 120162 lb/MMBtu = 120019 lb/M
F 40 CFR Part 98 Table C-2: Pipeline natural gas = 1026 Btu/scf, CH_4 = 0.001 kg CH_4/MMBtu, N_2O = 0.0001 kg N_2O/MMBtu
G CO_2e = (Global Warming Potential, GWP) * (Emission). GWP from 40 CFR Part 98 Table A-1. CO_2 = 1, CH_4 = 25, N_2O= 298
H Largest single HAP is Ethane

Table 6
Central Stores Hot Water Heater Emissions
City of Minneapolis
Hiawatha Maintenance Facility

Parameter	Value	Units	Source
Make	Ruud		
Model	GS85-156-5		
Maximum Heat Input	0.156	MMBtu/hr	Per Boiler
Fuel	Natural Gas		Previously on fuel oil, however fuel oil line no longer exists
Maximum Fuel Input	0.0002	MMSCF/hr	(Maximum Heat Input) / (Fuel Heat Value)
Annual Operation	8760	hr/yr	Used for Limitied Emission Rate
Annual Fuel Input	1.340	MMSCF/yr	(Max Fuel Input) * (Annual Operation)
Number of Identical Boilers	1	boilers	
Fuel Heat Value	1020	Btu/scf	AP-42 Section 1.4

Natural Gas Criteria Pollutants Potential to Emit

Pollutant		Emission Factor		Emission Rate (lb/hr-boiler)	Ulimited Emission Rate (tpy)	Limited Emission Rate (tpy)	Footnotes
PM		7.60	lb/MMSCF	0.001	0.01	0.01	A
PM_{10}		7.60	lb/MMSCF	0.001	0.01	0.01	A
$PM_{2.5}$		7.60	lb/MMSCF	0.001	0.01	0.01	A
SO_2	744-09-5	0.60	lb/MMSCF	0.000	0.00	0.00	A
NO_x		100.00	lb/MMSCF	0.015	0.07	0.07	B
VOC		5.50	lb/MMSCF	0.001	0.00	0.00	A
CO	7440-48-4	84.00	lb/MMSCF	0.013	0.06	0.06	B

Natural Gas Greenhouse Gas Potential to Emit

Pollutant	CAS No.	Emission Factor		Emission Rate (lb/hr-boiler)	Ulimited Emission Rate (tpy)	Limited Emission Rate (tpy)	Footnotes
Greenhouse Gas (CO_2e)							G
CO_2	124-38-9	120019	lb/MMSCF	18	80	80	E
CH_4	74-82-8	2.26	lb/MMSCF	8.65E-03	3.79E-02	3.79E-02	F
N_2O	10024-97-2	0.23	lb/MMSCF	1.03E-02	4.52E-02	4.52E-02	F

Natural Gas Hazardous Air Pollutants Potential To Emit

Pollutant	CAS No.	Emission Factor		Emission Rate (lb/hr-boiler)	Ulimited Emission Rate (tpy)	Limited Emission Rate (tpy)	Footnotes
Organics							
Benzene	71-43-2	2.10E-03	lb/MMSCF	3.21E-07	1.41E-06	1.41E-06	C
Butane	106-97-8	2.10E+00	lb/MMSCF	3.21E-04	1.41E-03	1.41E-03	C
Dichlorobenzene	25321-22-6	1.20E-03	lb/MMSCF	1.84E-07	8.04E-07	8.04E-07	C
Ethane	75-84-0	3.10E+00	lb/MMSCF	4.74E-04	2.08E-03	2.08E-03	C
Formaldehyde	50-00-0	7.50E-02	lb/MMSCF	1.15E-05	5.02E-05	5.02E-05	C
Hexane	110-54-3	1.80E+00	lb/MMSCF	2.75E-04	1.21E-03	1.21E-03	C
Naphthalene	91-20-3	6.10E-04	lb/MMSCF	9.33E-08	4.09E-07	4.09E-07	C
Pentane	109-66-0	2.60E+00	lb/MMSCF	3.98E-04	1.74E-03	1.74E-03	C
Propane	74-98-6	1.60E+00	lb/MMSCF	2.45E-04	1.07E-03	1.07E-03	C
Toluene	108-88-3	3.40E-03	lb/MMSCF	5.20E-07	2.28E-06	2.28E-06	C
Acenaphthene	83-32-9	1.80E-06	lb/MMSCF	2.75E-10	1.21E-09	1.21E-09	C
Acenaphthylene	203-96-8	1.80E-06	lb/MMSCF	2.75E-10	1.21E-09	1.21E-09	C
Anthracene	120-12-7	2.40E-06	lb/MMSCF	3.67E-10	1.61E-09	1.61E-09	C
Benz(a)anthracene	56-55-3	1.80E-06	lb/MMSCF	2.75E-10	1.21E-09	1.21E-09	C
Benzo(a)pyrene	50-32-8	1.20E-06	lb/MMSCF	1.84E-10	8.04E-10	8.04E-10	C
Benzo(b)fluroanthene	205-99-2	1.80E-06	lb/MMSCF	2.75E-10	1.21E-09	1.21E-09	C
Benzo(g,h,i)perylene	191-24-2	1.20E-06	lb/MMSCF	1.84E-10	8.04E-10	8.04E-10	C
Benzo(k)fluoranthene	205-82-3	1.80E-06	lb/MMSCF	2.75E-10	1.21E-09	1.21E-09	C
Chrysene	218-01-9	1.80E-06	lb/MMSCF	2.75E-10	1.21E-09	1.21E-09	C
Dibenzo(a,h)anthracene	53-70-3	1.20E-06	lb/MMSCF	1.84E-10	8.04E-10	8.04E-10	C
7,12-Dimethylbenz(a)anthracene	57-97-6	1.60E-05	lb/MMSCF	2.45E-09	1.07E-08	1.07E-08	C
Fluoranthene	206-44-0	3.00E-06	lb/MMSCF	4.59E-10	2.01E-09	2.01E-09	C
Fluorene	86-73-7	2.80E-06	lb/MMSCF	4.28E-10	1.88E-09	1.88E-09	C
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06	lb/MMSCF	2.75E-10	1.21E-09	1.21E-09	C
2-Methylnaphthalene	91-57-6	2.40E-05	lb/MMSCF	3.67E-09	1.61E-08	1.61E-08	C
3-Methylchloranthrene	56-49-5	1.80E-06	lb/MMSCF	2.75E-10	1.21E-09	1.21E-09	C
Phenanthrene	85-01-8	1.70E-05	lb/MMSCF	2.60E-09	1.14E-08	1.14E-08	C
Pyrene	129-00-0	5.00E-05	lb/MMSCF	7.65E-09	3.35E-08	3.35E-08	C
HAP Metals							
Arsenic	7440-38-2	2.00E-04	lb/MMSCF	3.06E-08	1.34E-07	1.34E-07	D
Barium	7440-39-3	4.40E-03	lb/MMSCF	6.73E-07	2.95E-06	2.95E-06	D
Berylium	7440-41-7	1.20E-05	lb/MMSCF	1.84E-09	8.04E-09	8.04E-09	D
Cadmium	7440-43-9	1.10E-03	lb/MMSCF	1.68E-07	7.37E-07	7.37E-07	D
Chromium	7440-47-3	1.40E-03	lb/MMSCF	2.14E-07	9.38E-07	9.38E-07	D
Cobalt	7440-48-4	8.40E-05	lb/MMSCF	1.28E-08	5.63E-08	5.63E-08	D
Copper	7440-50-8	8.50E-04	lb/MMSCF	1.30E-07	5.69E-07	5.69E-07	D
Lead	7139-92-1	5.00E-04	lb/MMSCF	7.65E-08	3.35E-07	3.35E-07	D
Manganese	7439-96-5	3.80E-04	lb/MMSCF	5.81E-08	2.55E-07	2.55E-07	D
Mercury	7439-97-6	2.60E-04	lb/MMSCF	3.98E-08	1.74E-07	1.74E-07	D
Molybdenum	7439-98-7	1.10E-03	lb/MMSCF	1.68E-07	7.37E-07	7.37E-07	D
Nickel	7440-02-0	2.10E-03	lb/MMSCF	3.21E-07	1.41E-06	1.41E-06	D
Selenium	7782-49-2	2.40E-05	lb/MMSCF	3.67E-09	1.61E-08	1.61E-08	D
Vanadium	7440-62-2	2.30E-03	lb/MMSCF	3.52E-07	1.54E-06	1.54E-06	D
Zinc	7440-66-6	2.90E-02	lb/MMSCF	4.44E-06	1.94E-05	1.94E-05	D
Max. Single HAP					**2.08E-03**	**2.08E-03**	H
Total HAP					**7.59E-03**	**7.59E-03**	

Emission Facotr Footnotes

A AP-42 Table 1.4-2
B AP-42 Table 1.4-2
C AP-42 Table 1.4-3
D AP-42 Table 1.4-4
E 40 CFR Part 98 Table C-1: Pipeline natural gas = 1026 Btu/scf, CO_2 emission = 53.06 kg CO_2/MMBtu = 120162 lb/MMBtu = 120019 lb/M
F 40 CFR Part 98 Table C-2: Pipeline natural gas = 1026 Btu/scf, CH_4 = 0.001 kg CH_4/MMBtu, N_2O = 0.0001 kg N_2O/MMBtu
G CO_2e = (Global Warming Potential, GWP) * (Emission). GWP from 40 CFR Part 98 Table A-1. CO_2 = 1, CH_4 = 25, N_2O= 298
H Largest single HAP is Ethane

Table 7
Bulk Material Handling Emissions
City of Minneapolis
Hiawatha Maintenance Facility

Calculation Parameters			
Wind Speed (U)	10.6	mph	The material is stored inside an enclosure and will not experience this wind speed. However, a wind speed is required to calcuate dust emissions according to AP-42 Section 13.2.4, so it will be assumed transfer occurs in the open.
Particle Size Multipliers (k)			
PM	0.74	unitless	AP-42 Section 13.2.4
PM_{10}	0.35	unitless	AP-42 Section 13.2.4
$PM_{2.5}$	0.053	unitless	AP-42 Section 13.2.4

Sand			
Annual Throughput	500000	tpy	City of Minneapolis, 2019
Transfer Points	3		Delivered, Piled, Truck Loadout
Material Handled	1500000	tpy	(Annual Throughput) * (Transfer Points)
Moisture Content (M)	7.40	%	AP-42 Table 13.2.4-1
PM Emission	1510.87	lb/yr	AP-42 Section 13.2.4 Eqn. 1 (k) * 0.0032 * (U / 5)^1.3 / (M / 2)^1.4 * (Throughput)
PM_{10} Emission	714.60	lb/yr	
$PM_{2.5}$ Emission	108.21	lb/yr	

Salt			
Annual Throughput	3000	tpy	City of Minneapolis, 2019
Transfer Points	3		Delivered, Piled, Truck Loadout
Material Handled	9000	tpy	(Annual Throughput) * (Transfer Points)
Moisture Content (M)	1.00	%	Estimation by feel. Product felt wet in 2011
PM Emission	149.38	lb/yr	AP-42 Section 13.2.4 Eqn. 1 (k) * 0.0032 * (U / 5)^1.3 / (M / 2)^1.4 * (Throughput)
PM_{10} Emission	70.65	lb/yr	
$PM_{2.5}$ Emission	10.70	lb/yr	

Treated Salt (Mixture of Sand and Salt)			
Annual Throughput	3000	tpy	City of Minneapolis, 2019
Transfer Points	3		Delivered, Piled, Truck Loadout
Material Handled	9000	tpy	(Annual Throughput) * (Transfer Points)
Moisture Content (M)	1.00	%	Estimation by feel. Product felt wet in 2011
PM Emission	149.38	lb/yr	AP-42 Section 13.2.4 Eqn. 1 (k) * 0.0032 * (U / 5)^1.3 / (M / 2)^1.4 * (Throughput)
PM_{10} Emission	70.65	lb/yr	
$PM_{2.5}$ Emission	10.70	lb/yr	

Table 8
Sand Blasting Emissions
City of Minneapolis
Hiawatha Maintenance Facility

Sand Blasters			
Parameter	**Value**	**Units**	**Source**
Abrasive Throughput	2	tpy	City of Minneapolis estimates that approximately 4,000 lb of Black Beauty Blasting Abrasive is used annualy.

Pollutant	**Emission Factor[1]**		**Unlimited Emission Rate (tpy)**	**Limited Emission Rate (tpy)**
PM	55	lb/ton	0.055	0.055
PM_{10}	13	lb/ton	0.013	0.013
$PM_{2.5}$	1.3	lb/ton	0.001	0.001

[1]AP 42 Table 13.2.6-1

Table 9
Brine Tank Heater Emissions
City of Minneapolis
Hiawatha Maintenance Facility

Parameter	Value	Units	Source
Make	REZNOR		
Model	UDAP 30		
Maximum Heat Input	0.03	MMBtu/hr	Per Boiler
Fuel	Natural Gas		Previously on fuel oil, however fuel oil line no longer exists
Maximum Fuel Input	0.000029	MMSCF/hr	(Maximum Heat Input) / (Fuel Heat Value)
Annual Operation	8760	hr/yr	Used for Limitied Emission Rate
Annual Fuel Input	0.258	MMSCF/yr	(Max Fuel Input) * (Annual Operation)
Number of Identical Boilers	1	boilers	
Fuel Heat Value	1020	Btu/scf	AP-42 Section 1.4

Natural Gas Criteria Pollutants Potential to Emit

Pollutant	CAS No.	Emission Factor		Emission Rate (lb/hr-boiler)	Ulimited Emission Rate (tpy)	Limited Emission Rate (tpy)	Footnotes
PM		7.60	lb/MMSCF	2.24E-04	9.79E-04	9.79E-04	A
PM_{10}		7.60	lb/MMSCF	2.24E-04	9.79E-04	9.79E-04	A
$PM_{2.5}$		7.60	lb/MMSCF	2.24E-04	9.79E-04	9.79E-04	A
SO_2	744-09-5	0.60	lb/MMSCF	1.76E-05	7.73E-05	7.73E-05	A
NO_x		100.00	lb/MMSCF	2.94E-03	1.29E-02	1.29E-02	B
VOC		5.50	lb/MMSCF	1.62E-04	7.09E-04	7.09E-04	A
CO	7440-48-4	84.00	lb/MMSCF	2.47E-03	1.08E-02	1.08E-02	B

Natural Gas Greenhouse Gas Potential to Emit

Pollutant	CAS No.	Emission Factor		Emission Rate (lb/hr-boiler)	Ulimited Emission Rate (tpy)	Limited Emission Rate (tpy)	Footnotes
Greenhouse Gas (CO_2e)							G
CO_2	124-38-9	120019	lb/MMSCF	4	15	15	E
CH_4	74-82-8	2.26	lb/MMSCF	1.66E-03	7.28E-03	7.28E-03	F
N_2O	10024-97-2	0.23	lb/MMSCF	1.98E-03	8.68E-03	8.68E-03	F

Natural Gas Hazardous Air Pollutants Potential To Emit

Pollutant	CAS No.	Emission Factor		Emission Rate (lb/hr-boiler)	Ulimited Emission Rate (tpy)	Limited Emission Rate (tpy)	Footnotes
Organics							
Benzene	71-43-2	2.10E-03	lb/MMSCF	6.18E-08	2.71E-07	2.71E-07	C
Butane	106-97-8	2.10E+00	lb/MMSCF	6.18E-05	2.71E-04	2.71E-04	C
Dichlorobenzene	25321-22-6	1.20E-03	lb/MMSCF	3.53E-08	1.55E-07	1.55E-07	C
Ethane	75-84-0	3.10E+00	lb/MMSCF	9.12E-05	3.99E-04	3.99E-04	C
Formaldehyde	50-00-0	7.50E-02	lb/MMSCF	2.21E-06	9.66E-06	9.66E-06	C
Hexane	110-54-3	1.80E+00	lb/MMSCF	5.29E-05	2.32E-04	2.32E-04	C
Naphthalene	91-20-3	6.10E-04	lb/MMSCF	1.79E-08	7.86E-08	7.86E-08	C
Pentane	109-66-0	2.60E+00	lb/MMSCF	7.65E-05	3.35E-04	3.35E-04	C
Propane	74-98-6	1.60E+00	lb/MMSCF	4.71E-05	2.06E-04	2.06E-04	C
Toluene	108-88-3	3.40E-03	lb/MMSCF	1.00E-07	4.38E-07	4.38E-07	C
Acenaphthene	83-32-9	1.80E-06	lb/MMSCF	5.29E-11	2.32E-10	2.32E-10	C
Acenaphthylene	203-96-8	1.80E-06	lb/MMSCF	5.29E-11	2.32E-10	2.32E-10	C
Anthracene	120-12-7	2.40E-06	lb/MMSCF	7.06E-11	3.09E-10	3.09E-10	C
Benz(a)anthracene	56-55-3	1.80E-06	lb/MMSCF	5.29E-11	2.32E-10	2.32E-10	C
Benzo(a)pyrene	50-32-8	1.20E-06	lb/MMSCF	3.53E-11	1.55E-10	1.55E-10	C
Benzo(b)fluroanthene	205-99-2	1.80E-06	lb/MMSCF	5.29E-11	2.32E-10	2.32E-10	C
Benzo(g,h,i)perylene	191-24-2	1.20E-06	lb/MMSCF	3.53E-11	1.55E-10	1.55E-10	C
Benzo(k)fluoranthene	205-82-3	1.80E-06	lb/MMSCF	5.29E-11	2.32E-10	2.32E-10	C
Chrysene	218-01-9	1.80E-06	lb/MMSCF	5.29E-11	2.32E-10	2.32E-10	C
Dibenzo(a,h)anthracene	53-70-3	1.20E-06	lb/MMSCF	3.53E-11	1.55E-10	1.55E-10	C
7,12-Dimethylbenz(a)anthracene	57-97-6	1.60E-05	lb/MMSCF	4.71E-10	2.06E-09	2.06E-09	C
Fluoranthene	206-44-0	3.00E-06	lb/MMSCF	8.82E-11	3.86E-10	3.86E-10	C
Fluorene	86-73-7	2.80E-06	lb/MMSCF	8.24E-11	3.61E-10	3.61E-10	C
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06	lb/MMSCF	5.29E-11	2.32E-10	2.32E-10	C
2-Methylnaphthalene	91-57-6	2.40E-05	lb/MMSCF	7.06E-10	3.09E-09	3.09E-09	C
3-Methylchloranthrene	56-49-5	1.80E-06	lb/MMSCF	5.29E-11	2.32E-10	2.32E-10	C
Phenanthrene	85-01-8	1.70E-05	lb/MMSCF	5.00E-10	2.19E-09	2.19E-09	C
Pyrene	129-00-0	5.00E-05	lb/MMSCF	1.47E-09	6.44E-09	6.44E-09	C
HAP Metals							
Arsenic	7440-38-2	2.00E-04	lb/MMSCF	5.88E-09	2.58E-08	2.58E-08	D
Barium	7440-39-3	4.40E-03	lb/MMSCF	1.29E-07	5.67E-07	5.67E-07	D
Berylium	7440-41-7	1.20E-05	lb/MMSCF	3.53E-10	1.55E-09	1.55E-09	D
Cadmium	7440-43-9	1.10E-03	lb/MMSCF	3.24E-08	1.42E-07	1.42E-07	D
Chromium	7440-47-3	1.40E-03	lb/MMSCF	4.12E-08	1.80E-07	1.80E-07	D
Cobalt	7440-48-4	8.40E-05	lb/MMSCF	2.47E-09	1.08E-08	1.08E-08	D
Copper	7440-50-8	8.50E-04	lb/MMSCF	2.50E-08	1.10E-07	1.10E-07	D
Lead	7139-92-1	5.00E-04	lb/MMSCF	1.47E-08	6.44E-08	6.44E-08	D
Manganese	7439-96-5	3.80E-04	lb/MMSCF	1.12E-08	4.90E-08	4.90E-08	D
Mercury	7439-97-6	2.60E-04	lb/MMSCF	7.65E-09	3.35E-08	3.35E-08	D
Molybdenum	7439-98-7	1.10E-03	lb/MMSCF	3.24E-08	1.42E-07	1.42E-07	D
Nickel	7440-02-0	2.10E-03	lb/MMSCF	6.18E-08	2.71E-07	2.71E-07	D
Selenium	7782-49-2	2.40E-05	lb/MMSCF	7.06E-10	3.09E-09	3.09E-09	D
Vanadium	7440-62-2	2.30E-03	lb/MMSCF	6.76E-08	2.96E-07	2.96E-07	D
Zinc	7440-66-6	2.90E-02	lb/MMSCF	8.53E-07	3.74E-06	3.74E-06	D
Max. Single HAP					**3.99E-04**	**3.99E-04**	H
Total HAP					**1.46E-03**	**1.46E-03**	

Emission Factor Footnotes

A AP-42 Table 1.4-2
B AP-42 Table 1.4-2
C AP-42 Table 1.4-3
D AP-42 Table 1.4-4
E 40 CFR Part 98 Table C-1: Pipeline natural gas = 1026 Btu/scf, CO_2 emission = 53.06 kg CO_2/MMBtu = 120162 lb/MMBtu = 120019 lb/M
F 40 CFR Part 98 Table C-2: Pipeline natural gas = 1026 Btu/scf, CH_4 = 0.001 kg CH_4/MMBtu, N_2O = 0.0001 kg N_2O/MMBtu
G CO_2e = (Global Warming Potential, GWP) * (Emission). GWP from 40 CFR Part 98 Table A-1. CO_2 = 1, CH_4 = 25, N_2O= 298
H Largest single HAP is Ethane

Table 10
Asphalt Binder Tank Storage/Filling Emissions
City of Minneapolis
Hiawatha Maintenance Facility

PG 64-22 Storage Parameters			
Parameters	**Value**	**Units**	**Source**
Annual Throughput	37,500	gal	City of Minneapolis uses 2-3 tank volumes/yr. This calculation uses 5 tank volumes/yr
Temperature	325	°F	City of Minneapolis
Volatility	-0.5		Default value AP-42 Table 11.1-14 footnote a

Tank Storage/Filling (SCC 3-05-002-13) Criteria Pollutants Potential to Emit

Pollutant	CAS No.	Emission Factor[1]		Unlimited Emission Rate (tpy)	Limited Emission Rate (tpy)
PM		0.001	lb/ton	0.010	0.010
VOC		0.012	lb/ton	0.229	0.229
CO	7440-48-4	0.001	lb/ton	0.022	0.022

Tank Storage/Filling (SCC 3-05-002-13) Hazardous Air Pollutants Potential To Emit

Pollutant	CAS No.	Emission Factor[2]	Unlimited Emission Rate (tpy)	Limited Emission Rate (tpy)
Total HAP Emissions[3]		1.3 % of TOC	0.003	0.003

[1]AP-42 Table 11.1.14, asphalt cement is the main polluting component of Hot Mix Asphalt; therefore, calculations are based on asphalt cement

[2]AP-42 Table 11.1.16 shows VOC is assumed to be total hydrocarbons

[3] Individual HAPs not speculated, but total HAPs are less than limits for maximum single HAPs emission

Table 11
Asphalt Binder Tank Loadout Emissions
City of Minneapolis
Hiawatha Maintenance Facility

PG 64-22 Storage Parameters			
Parameters	**Value**	**Units**	**Source**
Annual Throughput	37,500	gal	City of Minneapolis uses 2-3 tank volumes/yr. This calculation uses 5 tank volumes/yr
Temperature	325	°F	City of Minneapolis
Volatility	-0.5		Default value AP-42 Table 11.1-14 footnote a

Tank Loadout (SCC 3-05-002-14) Criteria Pollutants Potential to Emit

Pollutant	CAS No.	Emission Factor[1]		Unlimited Emission Rate (tpy)	Limited Emission Rate (tpy)
PM		0.001	lb/ton	0.010	0.010
VOC		0.004	lb/ton	0.078	0.078
CO	7440-48-4	0.001	lb/ton	0.025	0.025

Tank Loadout (SCC 3-05-002-14) Hazardous Air Pollutants Potential To Emit

Pollutant	CAS No.	Emission Factor[2]	Unlimited Emission Rate (tpy)	Limited Emission Rate (tpy)
Total HAP Emissions[3]		1.5 % of TOC	0.001	0.001

[1]AP-42 Table 11.1.14, asphalt cement is the main polluting component of Hot Mix Asphalt; therefore, calculations are based on asphalt cement

[2]AP-42 Table 11.1.16 shows VOC is assumed to be total hydrocarbons

[3] Individual HAPs not speculated, but total HAPs are less than limits for maximum single HAPs emission

Table 12
Unlimited PTE
City of Minneapolis
East Side Wateryard

Criteria Pollutants Unlimited Potential to Emit

Emission Unit	Pollutant (TPY)							
	PM	PM_{10}	$PM_{2.5}$	SO2	NOx	VOC	CO	CO_2e
Main Building Boiler	8.16E-02	8.16E-02	8.16E-02	6.44E-03	1.07E+00	5.90E-02	9.02E-01	1.29E+03
Fuel Island[1,2]						2.52E-01		
Total Facility Emissions	**0.08**	**0.08**	**0.08**	**0.01**	**1.07**	**0.31**	**0.90**	**1,290**

[1] Fuel Island PTE is calculated using to EPA AP-42 Section 7.1 and calculations are attached in Appendix C

[2] Gasoline and Diesel emissions from the Fuel Island contain HAPs but not calculated due to their extremely low emissions

Hazardous Air Pollutants Unlimited Potential to Emit

Emission Units	Main Building Boiler	Facility Total HAPs	Max Single HAP
Total HAPs by Unit	**TPY 0.12**	**TPY 0.12**	**TPY 0.033**
Pollutant			**Single HAPs**
Benzene	2.25E-05		**2.25E-05**
Butane	2.25E-02		**2.25E-02**
Dichlorobenzene	1.29E-05		**1.29E-05**
Ethane	3.33E-02		**3.33E-02**
Formaldehyde	8.05E-04		**8.05E-04**
Hexane	1.93E-02		**1.93E-02**
Naphthalene	6.55E-06		**6.55E-06**
Pentane	2.79E-02		**2.79E-02**
Propane	1.72E-02		**1.72E-02**
Toluene	3.65E-05		**3.65E-05**
Acenaphthene	1.93E-08		**1.93E-08**
Acenaphthylene	1.93E-08		**1.93E-08**
Anthracene	2.58E-08		**2.58E-08**
Benz(a)anthracene	1.93E-08		**1.93E-08**
Benzo(a)pyrene	1.29E-08		**1.29E-08**
Benzo(b)fluroanthene	1.93E-08		**1.93E-08**
Benzo(g,h,i)perylene	1.29E-08		**1.29E-08**
Benzo(k)fluoranthene	1.93E-08		**1.93E-08**
Chrysene	1.93E-08		**1.93E-08**
Dibenzo(a,h)anthracene	1.29E-08		**1.29E-08**
7,12-Dimethylbenz(a)anthracene	1.72E-07		**1.72E-07**
Fluoranthene	3.22E-08		**3.22E-08**
Fluorene	3.01E-08		**3.01E-08**
Indeno(1,2,3-cd)pyrene	1.93E-08		**1.93E-08**
2-Methylnaphthalene	2.58E-07		**2.58E-07**
3-Methylchloranthrene	1.93E-08		**1.93E-08**
Phenanthrene	1.83E-07		**1.83E-07**
Pyrene	5.37E-07		**5.37E-07**
Arsenic	2.15E-06		**2.15E-06**
Barium	4.72E-05		**4.72E-05**
Berylium	1.29E-07		**1.29E-07**
Cadmium	1.18E-05		**1.18E-05**
Chromium	1.50E-05		**1.50E-05**
Cobalt	9.02E-07		**9.02E-07**
Copper	9.13E-06		**9.13E-06**
Lead	5.37E-06		**5.37E-06**
Manganese	4.08E-06		**4.08E-06**
Mercury	2.79E-06		**2.79E-06**
Molybdenum	1.18E-05		**1.18E-05**
Nickel	2.25E-05		**2.25E-05**
Selenium	2.58E-07		**2.58E-07**
Vanadium	2.47E-05		**2.47E-05**
Zinc	3.11E-04		**3.11E-04**

Table 13
Main Building Boiler Emissions
City of Minneapolis
East Side Wateryard

Parameter	Value	Units	Source
Make	John Zink Co.		
Model	R10.9-G-10		
Maximum Heat Input	2.5	MMBtu/hr	Per Boiler
Fuel	Natural Gas		
Maximum Fuel Input	0.0025	MMSCF/hr	(Maximum Heat Input) / (Fuel Heat Value)
Annual Operation	8760	hr/yr	Used for Limitied Emission Rate
Annual Fuel Input	21.47	MMSCF/yr	(Max Fuel Input) * (Annual Operation)
Fuel Heat Value	1020	Btu/scf	AP-42 Section 1.4

Natural Gas Criteria Pollutants Potential to Emit

Pollutant	CAS No.	Emission Factor		Unlimited Emission Rate (lb/hr)	Unlimited Emission Rate (tpy)	Limited Emission Rate (tpy)	Footnotes
PM		7.60	lb/MMSCF	0.019	0.08	0.08	A
PM_{10}		7.60	lb/MMSCF	0.019	0.08	0.08	A
$PM_{2.5}$		7.60	lb/MMSCF	0.019	0.08	0.08	A
SO_2	744-09-5	0.60	lb/MMSCF	0.001	0.01	0.01	A
NO_x		100.00	lb/MMSCF	0.245	1.07	1.07	B
VOC		5.50	lb/MMSCF	0.013	0.06	0.06	A
CO	7440-48-4	84.00	lb/MMSCF	0.206	0.90	0.90	B

Natural Gas Greenhouse Gas Potential to Emit

Pollutant	CAS No.	Emission Factor		Emission Rate (lb/hr-boiler)	Unlimited Emission Rate (tpy)	Limited Emission Rate (tpy)	Footnotes
Greenhouse Gas (CO_2e)							G
CO_2	124-38-9	120019	lb/MMSCF	294.163	1288.44	1288	E
CH_4	74-82-8	2.26	lb/MMSCF	0.139	0.61	0.61	F
N_2O	10024-97-2	0.23	lb/MMSCF	0.165	0.72	0.72	F

Natural Gas Hazardous Air Pollutants Potential To Emit

Pollutant	CAS No.	Emission Factor		Emission Rate (lb/hr-boiler)	Unlimited Emission Rate (tpy)	Limited Emission Rate (tpy)	Footnotes
Benzene	71-43-2	2.10E-03	lb/MMSCF	5.15E-06	2.25E-05	2.25E-05	C
Butane	106-97-8	2.10E+00	lb/MMSCF	5.15E-03	2.25E-02	2.25E-02	C
Dichlorobenzene	25321-22-6	1.20E-03	lb/MMSCF	2.94E-06	1.29E-05	1.29E-05	C
Ethane	75-84-0	3.10E+00	lb/MMSCF	7.60E-03	3.33E-02	3.33E-02	C
Formaldehyde	50-00-0	7.50E-02	lb/MMSCF	1.84E-04	8.05E-04	8.05E-04	C
Hexane	110-54-3	1.80E+00	lb/MMSCF	4.41E-03	1.93E-02	1.93E-02	C
Naphthalene	91-20-3	6.10E-04	lb/MMSCF	1.50E-06	6.55E-06	6.55E-06	C
Pentane	109-66-0	2.60E+00	lb/MMSCF	6.37E-03	2.79E-02	2.79E-02	C
Propane	74-98-6	1.60E+00	lb/MMSCF	3.92E-03	1.72E-02	1.72E-02	C
Toluene	108-88-3	3.40E-03	lb/MMSCF	8.33E-06	3.65E-05	3.65E-05	C
Acenaphthene	83-32-9	1.80E-06	lb/MMSCF	4.41E-09	1.93E-08	1.93E-08	C
Acenaphthylene	203-96-8	1.80E-06	lb/MMSCF	4.41E-09	1.93E-08	1.93E-08	C
Anthracene	120-12-7	2.40E-06	lb/MMSCF	5.88E-09	2.58E-08	2.58E-08	C
Benz(a)anthracene	56-55-3	1.80E-06	lb/MMSCF	4.41E-09	1.93E-08	1.93E-08	C
Benzo(a)pyrene	50-32-8	1.20E-06	lb/MMSCF	2.94E-09	1.29E-08	1.29E-08	C
Benzo(b)fluroanthene	205-99-2	1.80E-06	lb/MMSCF	4.41E-09	1.93E-08	1.93E-08	C
Benzo(g,h,i)perylene	191-24-2	1.20E-06	lb/MMSCF	2.94E-09	1.29E-08	1.29E-08	C
Benzo(k)fluoranthene	205-82-3	1.80E-06	lb/MMSCF	4.41E-09	1.93E-08	1.93E-08	C
Chrysene	218-01-9	1.80E-06	lb/MMSCF	4.41E-09	1.93E-08	1.93E-08	C
Dibenzo(a,h)anthracene	53-70-3	1.20E-06	lb/MMSCF	2.94E-09	1.29E-08	1.29E-08	C
7,12-Dimethylbenz(a)anthracene	57-97-6	1.60E-05	lb/MMSCF	3.92E-08	1.72E-07	1.72E-07	C
Fluoranthene	206-44-0	3.00E-06	lb/MMSCF	7.35E-09	3.22E-08	3.22E-08	C
Fluorene	86-73-7	2.80E-06	lb/MMSCF	6.86E-09	3.01E-08	3.01E-08	C
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06	lb/MMSCF	4.41E-09	1.93E-08	1.93E-08	C
2-Methylnaphthalene	91-57-6	2.40E-05	lb/MMSCF	5.88E-08	2.58E-07	2.58E-07	C
3-Methylchloranthrene	56-49-5	1.80E-06	lb/MMSCF	4.41E-09	1.93E-08	1.93E-08	C
Phenanthrene	85-01-8	1.70E-05	lb/MMSCF	4.17E-08	1.83E-07	1.83E-07	C
Pyrene	129-00-0	5.00E-05	lb/MMSCF	1.23E-07	5.37E-07	5.37E-07	C
Arsenic	7440-38-2	2.00E-04	lb/MMSCF	4.90E-07	2.15E-06	2.15E-06	D
Barium	7440-39-3	4.40E-03	lb/MMSCF	1.08E-05	4.72E-05	4.72E-05	D
Berylium	7440-41-7	1.20E-05	lb/MMSCF	2.94E-08	1.29E-07	1.29E-07	D
Cadmium	7440-43-9	1.10E-03	lb/MMSCF	2.70E-06	1.18E-05	1.18E-05	D
Chromium	7440-47-3	1.40E-03	lb/MMSCF	3.43E-06	1.50E-05	1.50E-05	D
Cobalt	7440-48-4	8.40E-05	lb/MMSCF	2.06E-07	9.02E-07	9.02E-07	D
Copper	7440-50-8	8.50E-04	lb/MMSCF	2.08E-06	9.13E-06	9.13E-06	D
Lead	7139-92-1	5.00E-04	lb/MMSCF	1.23E-06	5.37E-06	5.37E-06	D
Manganese	7439-96-5	3.80E-04	lb/MMSCF	9.31E-07	4.08E-06	4.08E-06	D
Mercury	7439-97-6	2.60E-04	lb/MMSCF	6.37E-07	2.79E-06	2.79E-06	D
Molybdenum	7439-98-7	1.10E-03	lb/MMSCF	2.70E-06	1.18E-05	1.18E-05	D
Nickel	7440-02-0	2.10E-03	lb/MMSCF	5.15E-06	2.25E-05	2.25E-05	D
Selenium	7782-49-2	2.40E-05	lb/MMSCF	5.88E-08	2.58E-07	2.58E-07	D
Vanadium	7440-62-2	2.30E-03	lb/MMSCF	5.64E-06	2.47E-05	2.47E-05	D
Zinc	7440-66-6	2.90E-02	lb/MMSCF	7.11E-05	3.11E-04	3.11E-04	D
Max. Single HAP					**3.33E-02**	**3.33E-02**	H
Total HAP					**1.22E-01**	**1.22E-01**	

Emission Factor Notes

A AP-42 Table 1.4-2
B AP-42 Table 1.4-2
C AP-42 Table 1.4-3
D AP-42 Table 1.4-4
E 40 CFR Part 98 Table C-1: Pipeline natural gas = 1026 Btu/scf, CO_2 emission = 53.06 kg CO_2/MMBtu = 120162 lb/MMBtu = 120019 lb/M
F 40 CFR Part 98 Table C-2: Pipeline natural gas = 1026 Btu/scf, CH_4 = 0.001 kg CH_4/MMBtu, N_2O = 0.0001 kg N_2O/MMBtu
G CO_2e = (Global Warming Potential, GWP) * (Emission). GWP from 40 CFR Part 98 Table A-1. CO_2 = 1, CH_4 = 25, N_2O= 298
H Largest single HAP is Ethane

Table 14
Unlimited PTE
City of Minneapolis
Minneapolis Water Works-Fridley Water Meter Department

Criteria Pollutants Unlimited Potential to Emit

Emission Unit	Pollutant (TPY)							
	PM	PM_{10}	$PM_{2.5}$	SO2	NOx	VOC	CO	CO_2e
Abrasive Blasting	8.19E-03	8.19E-03						
Total Facility Emissions	**0.008**	**0.008**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0**

Table 15
Abrasive Blasting Emissions
City of Minneapolis
Minneapolis Water Works-Fridley Water Meter Department

Parameter	Value	Units
Make	Trinco Dry Blast	
Model	DP850	
Abrasive Consumption Rate	380	lb/hr
Number of Water Meters Cleaned	500	year
Water Meter Abrasive blast time	15	minutes
Annual Operation	125	hr/yr

Sand Blaster			
Parameter	**Value**	**Units**	**Source**
Abrasive Throughput	23.75	tpy	Based on 500 water meters per year, this equates to 125 hours of abrasive blasting per year. Using the abrasive consumption rate of 380 lb/hr, this results in 47,500 lbs of abrasive used per year.

Pollutant	Emission Factor[1]		Unlimited Emission Rate (tpy)	Limited Emission Rate (tpy)
PM	0.69	lb/ton	0.008	0.008
PM_{10}	0.69	lb/ton	0.008	0.008

[1]AP 42 Table 13.2.6-1

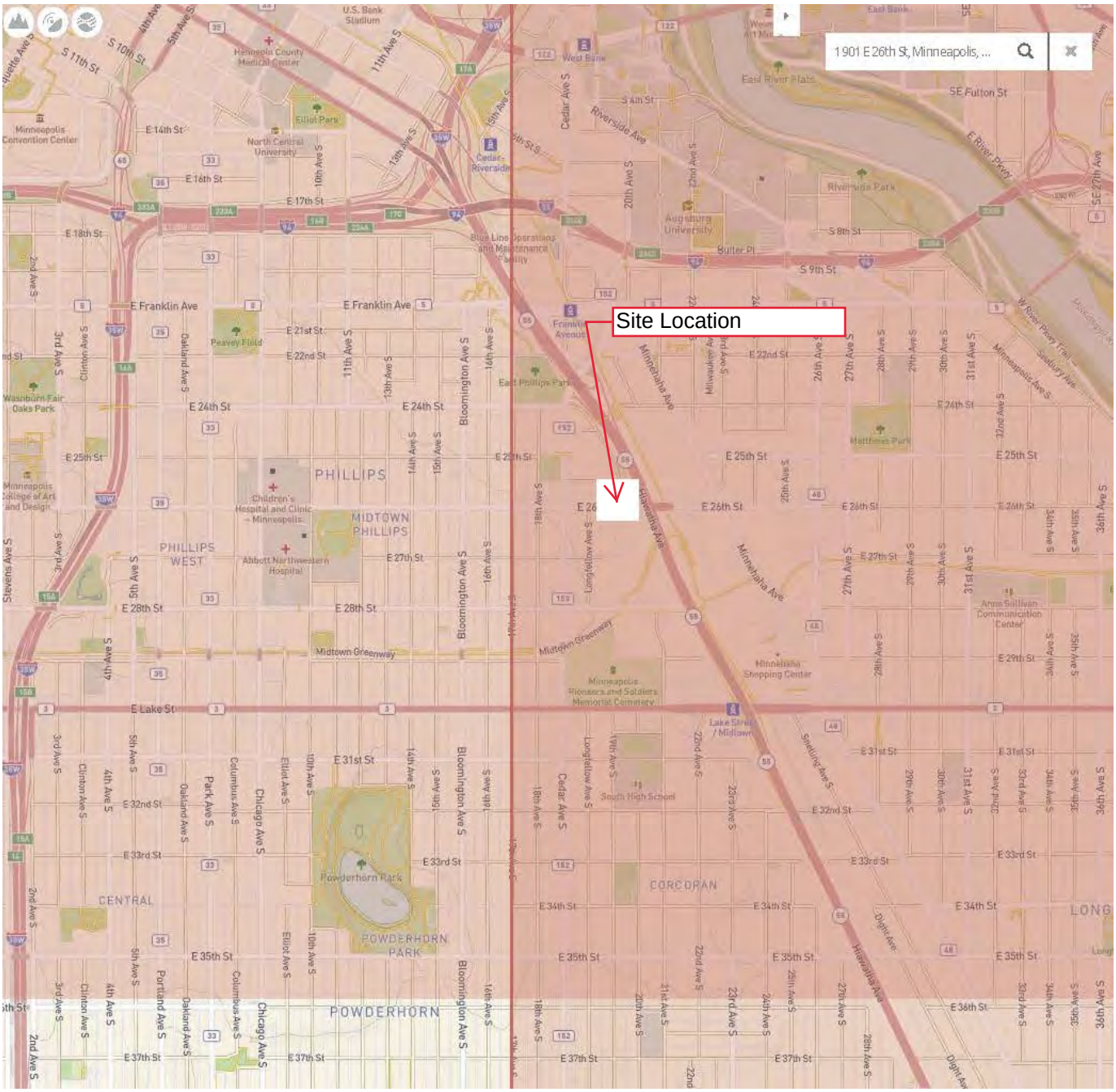
Table 16
Unlimited PTE of Existing Hiawatha Facility Plus Proposed Additions
City of Minneapolis
Hiawatha Maintenance Facility

Unlimited Potential to Emit

	Pollutant (TPY)									
Emission Unit	**PM**	**PM_{10}**	**$PM_{2.5}$**	**SO2**	**NOx**	**VOC**	**CO**	**CO_2e**	**Single HAP (max)**	**Total HAP**
Total Existing Hiawatha Facility	1.36E+00	8.30E-01	4.55E-01	3.07E-02	5.11E+00	1.40E+00	4.34E+00	6.14E+03	1.96E-01	7.80E-01
East Side Wateryard	8.16E-02	8.16E-02	8.16E-02	6.44E-03	1.07E+00	3.11E-01	9.02E-01	1.29E+03		1.22E-01
Minneapolis Water Work-Fridley	8.19E-03	8.19E-03								
Total Facility Emissions	**1.45**	**0.92**	**0.54**	**0.04**	**6.19**	**1.71**	**5.24**	**7,432**	**0.20**	**0.90**

[1] Max single HAP is Styrene

Figures



AMERICAN ENGINEERING TESTING, INC.	N Scale:	**Figure 1** Hiawatha Maintenance Facility Site Location Map Air Permit Assessment 26th Street & Hiawatha Avenue Minneapolis, Minnesota Date: 06/25/2020 AET Project No. 03-21058

AMERICAN ENGINEERING TESTING, INC.

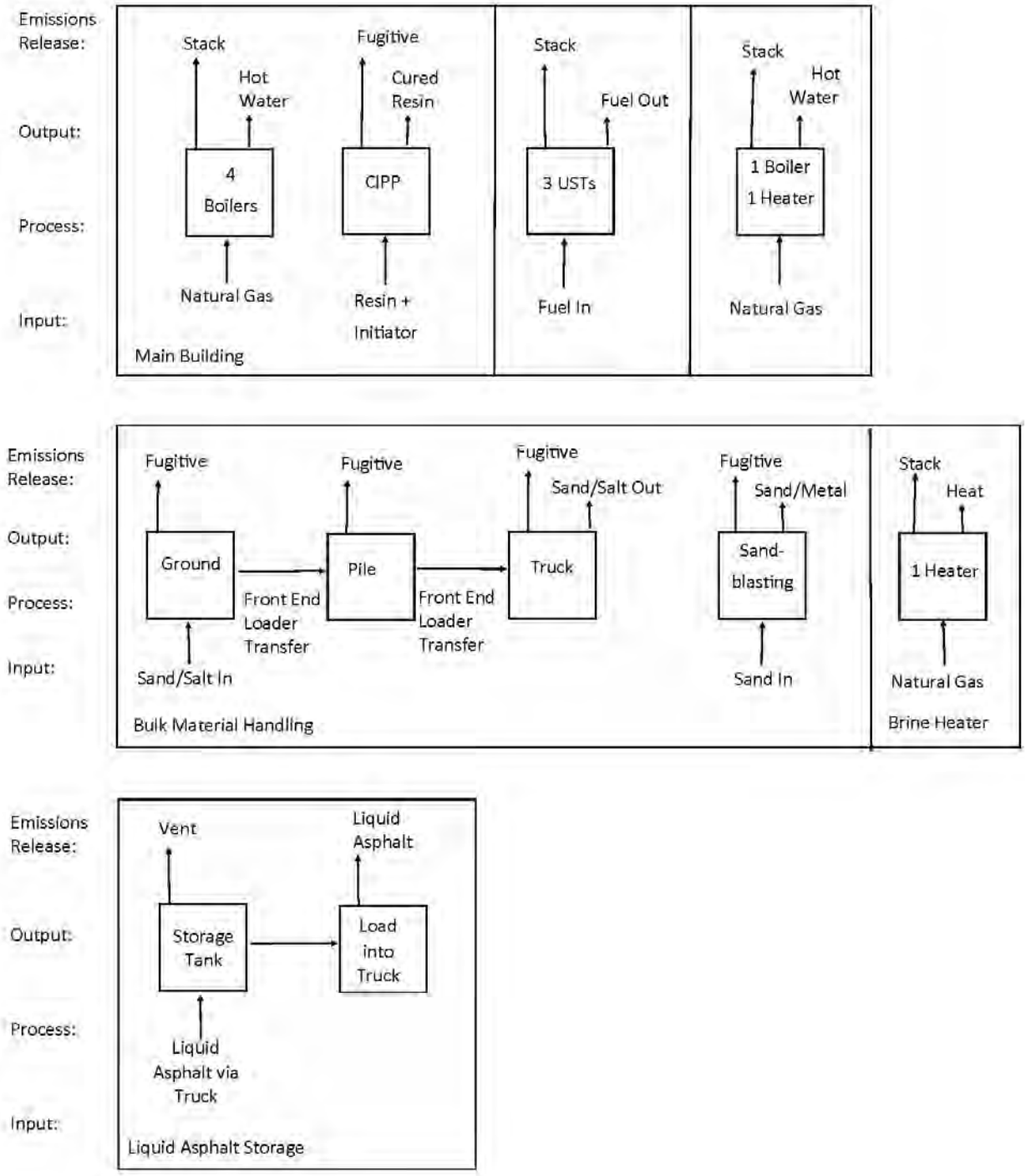
N

Scale:

Figure 2

Hiawatha Maintenance Facility Site Layout
Air Permit Assessment
26th Street & Hiawatha Avenue
Minneapolis, Minnesota

Date: 06/25/2020 AET Proposal No. 03-21058



AMERICAN ENGINEERING TESTING, INC.

Scale:

N

Figure 3

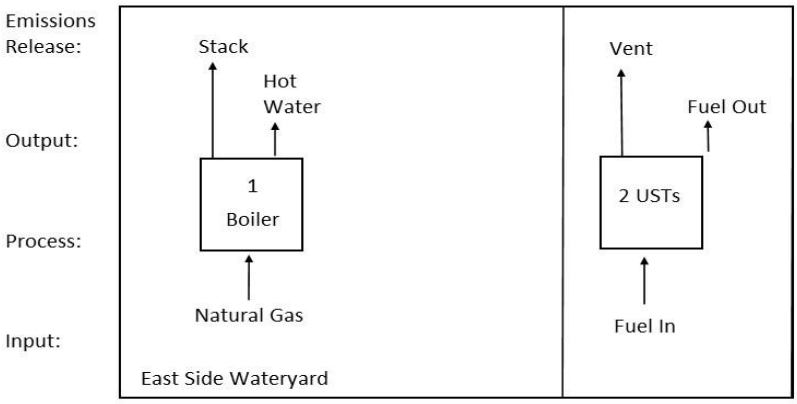
Process Flow Diagram

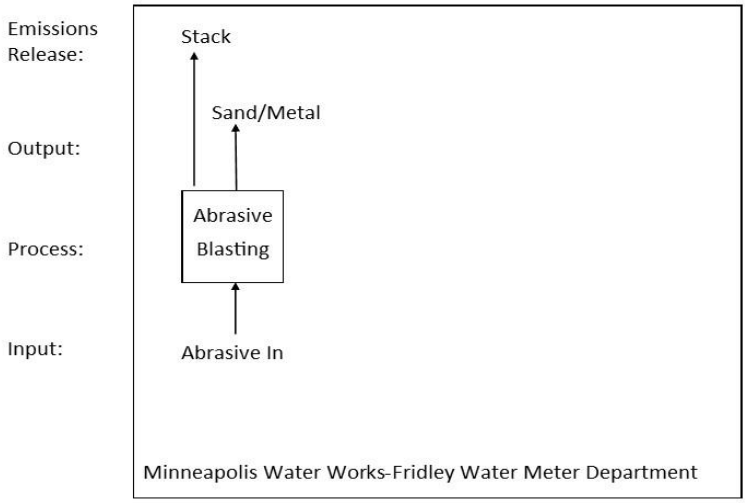
Air Permit Assessment

26th Street & Hiawatha Avenue

Minneapolis, Minnesota

Date: 06/25/2020 AET Project No. 03-21058





AMERICAN ENGINEERING TESTING, INC.

N

Scale:

Figure 4

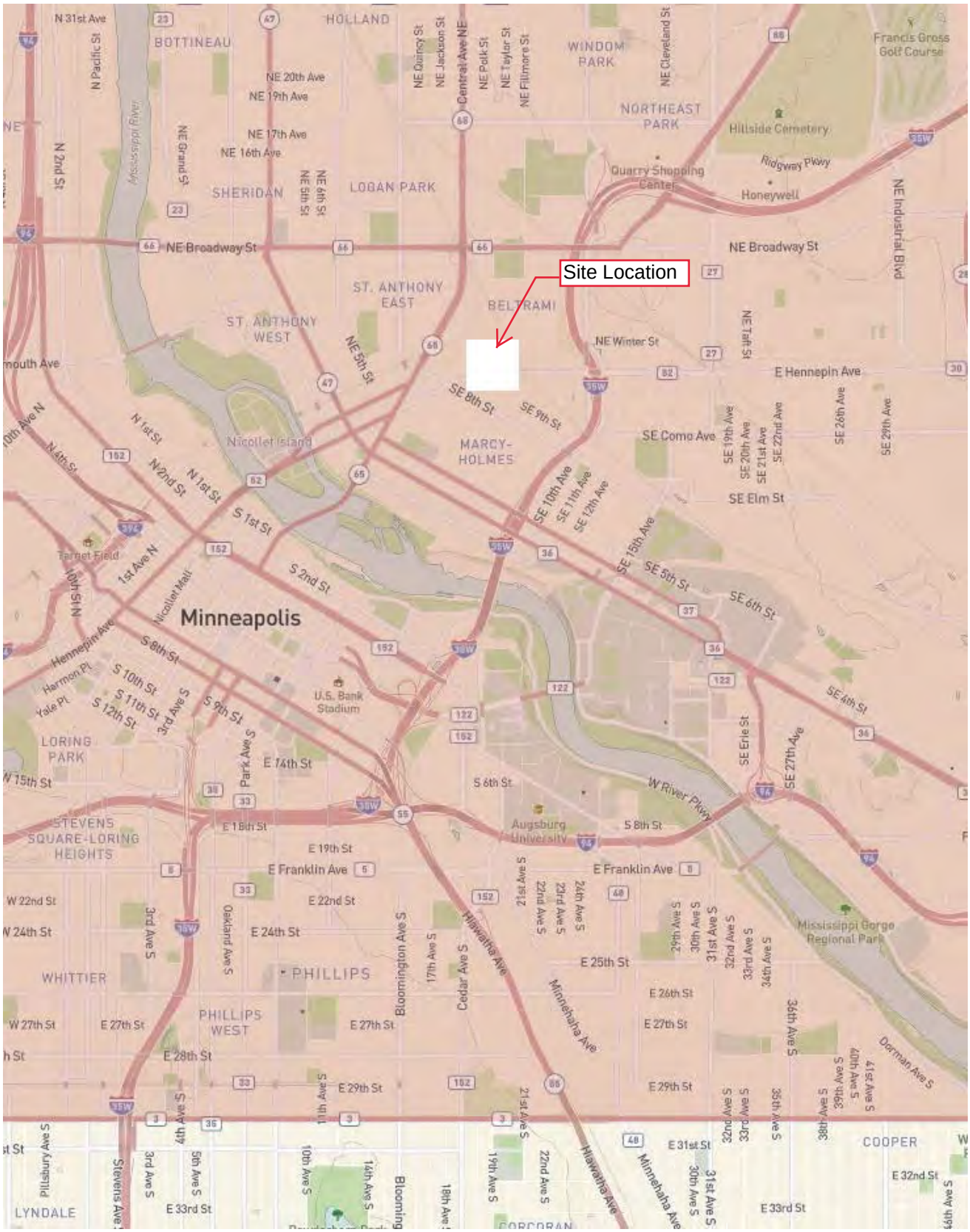
Process Flow Diagram Proposed Hiawatha Additions

Air Permit Assessment

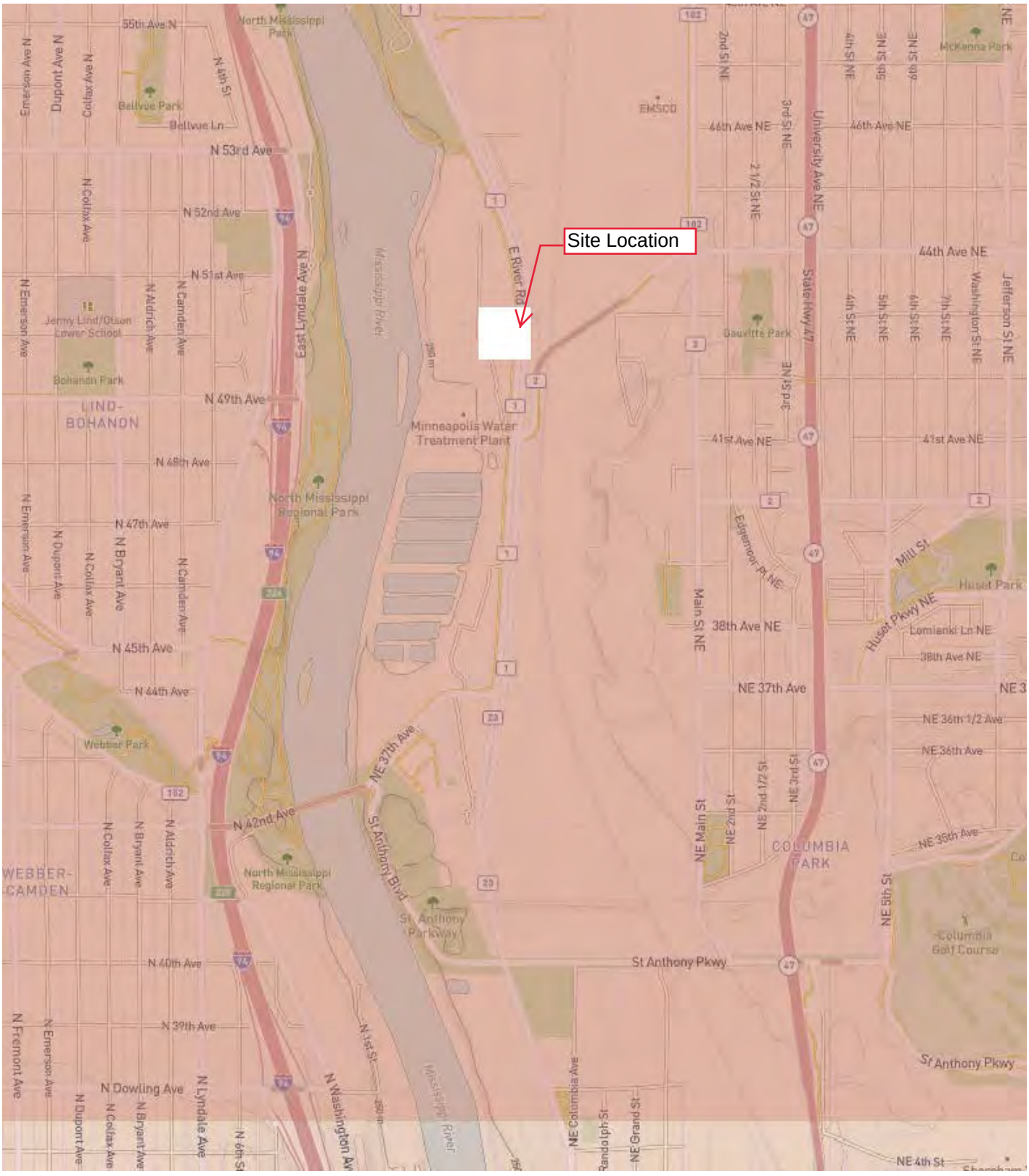
26th Street & Hiawatha Avenue

Minneapolis, Minnesota

Date: 07/09/2020 AET Project No. 03-21058



AMERICAN ENGINEERING TESTING, INC.	N Scale:	**Figure 5** East Side Yard Water Facility Site Location 935 5th Ave SE, Minneapolis, MN 55421 Air Permit Assessment 26th Street & Hiawatha Avenue Minneapolis, Minnesota Date: 06/25/2020 AET Project No. 03-21058



AMERICAN ENGINEERING TESTING, INC.

N

Scale:

Figure 6

Minneapolis Water Works Fridley Facility Site Location
4300 Marshall St NE, Fridley, MN 55421

Air Permit Assessment
26th Street & Hiawatha Avenue
Minneapolis, Minnesota

Date: 06/25/2020 AET Project No. 03-21058

Appendix A

Safety Data Sheets for Cure in Place Process

MATERIAL SAFETY DATA SHEET

INTERPLASTIC CORPORATION
1225 Willow Lake Boulevard
St. Paul, MN 55110-5145
(651) 481-6860

CHEMTREC 24-Hour Emergency Telephone (800) 424-9300

ATTN: PLANT MGR/SAFETY DIR

Date Printed: 02/14/11
Revision Date: 02/14/11
MSDS File ID: MSDSLET0
Customer No:
Warehouse No: 0001

This MSDS complies with 29 CFR 1910.1200 (Hazard Communication).

SECTION I - PRODUCT IDENTIFICATION

Product Name: COR78-AT-329LC CIPP RESIN
General or Generic ID: Unsaturated Polyester Resin
Hazard Classification: Flammable Liquid

SECTION II - HAZARDOUS COMPONENTS

INGREDIENT	CAS NO.	PERCENT	OSHA-PEL	ACGIH-TL	NOTE
Unsaturated Polyester Base Resin	See Index	66-71	None-Estb.	None-Est	
Styrene	100-42-5	32.9	50 ppm TWA	50 ppm	(1&2)

(1) OSHA has formally endorsed a styrene industry proposal for a voluntary 50 ppm PEL for workplace exposure to styrene. This proposal was agreed upon by representatives of the UPR industry. The OSHA STEL is 100 ppm. The ACGIH recently changed the TLV for styrene from 50 ppm to 20 ppm, and the STEL from 100 ppm to 40 ppm.
(2) HMIS Rating for Styrene: Health=2; Fire=3; Physical Hazard=2

SECTION III - PHYSICAL DATA

PROPERTY		MEASUREMENT
Initial Boiling Point	For Styrene	293.40 Deg F (145.22 Deg C) @ 760.00 mm Hg
Vapor Pressure	For Styrene	4.3 mm Hg 68 Deg F (20 Deg C)
Specific Gravity		1.01-1.30 @ 77 Deg F (25 Deg C)
Vapor Density	Air = 1	3.6
Evaporation Rate		Slower than Ether

COR78-AT-329LC

SECTION IV - FIRE AND EXPLOSION DATA

Flash Point: 88 Deg F (31.1 Deg C) for Volatile Component

Flammable: (Lowest Value of Styrene) Lower - 1.1%
(Upper Value of Styrene) Upper - 6.1%

Extinguishing Media: Foam, carbon dioxide, dry chemical, or water fog.

Hazardous Decomposition Products: May form toxic materials such as carbon dioxide, carbon monoxide, and various hydrocarbons.

Special Firefighting Procedures: Wear self-contained breathing apparatus with a full facepiece operated in pressure demand or other positive pressure mode when fighting fires.

Vapors are heavier than air and may travel along the ground or may be moved by ventilation and ignited by ignition sources at locations distant from material handling point.

Never use welding or cutting torch on or near drum (even empty) because product vapor can ignite explosively.

SECTION V - HEALTH DATA

Permissible Exposure Level: Not established for product. See Section II.

POTENTIAL HEALTH EFFECTS

Eyes - Can cause severe irritation, redness, tearing, blurred vision.

Skin - Prolonged or repeated contact can cause moderate irritation, defatting, dermatitis.

Inhalation - Excessive inhalation of vapors can cause nasal irritation, dizziness, weakness, fatigue, nausea, headache, possible unconsciousness, and even asphyxiation.

Swallowing - Can cause gastrointestinal irritation, nausea, vomiting, diarrhea. Aspiration of material into the lungs can cause chemical pneumonitis.

COR78-AT-329LC

SECTION V - HEALTH DATA (continued)

TARGET ORGAN EFFECTS

Overexposure to this material (or its components) has been suggested as a cause of the following effects in laboratory animals, and may aggravate pre-existing disorders of these organs in humans: mild, reversible kidney effects, effects on hearing, respiratory tract (nose, throat, and airways), testis, liver. Overexposure to this material (or its components) has been suggested as a cause of the following effects in humans, and may aggravate pre-existing disorders of these organs: central nervous system effects, mild effects on color vision, effects on hearing, and respiratory tract damage (nose, throat, and airways).

FIRST AID

If on Skin: Thoroughly wash exposed area with soap and water. Remove contaminated clothing. Launder contaminated clothing before re-use.

If in Eyes: Flush with large amount of water, lifting upper and lower lids occasionally. Get medical attention.

If Swallowed: Do not induce vomiting. Keep person warm, quiet, and get medical attention. Aspiration of material into the lungs due to vomiting can cause chemical pneumonitis which can be fatal.

If Inhaled: If affected, remove individual to fresh air. If breathing is difficult, administer oxygen. If breathing has stopped, give artificial respiration. Keep person warm, quiet, and get medical attention.

PRIMARY ROUTE(S) OF ENTRY

Inhalation, skin absorption, skin contact, eye contact.

COR78-AT-329LC

SECTION VI - REACTIVITY DATA

Hazardous Polymerization:	Possible
Stability:	Stable
Incompatibility:	Avoid contact with strong alkalies, strong mineral acids, and oxidizing agents.
Conditions to Avoid:	Exposure to excessive heat or open flame, storage in open containers, prolonged storage (6 months), storage above 100 Deg F (38 Deg C), and contamination with oxidizing agents.
Hazardous Decomposition Products:	Carbon monoxide, carbon dioxide, low molecular weight hydrocarbons, and organic acids.

SECTION VII - SPILL OR LEAK PROCEDURES

Eliminate all ignition sources (flares, flames (including pilot lights), and electrical sparks). Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed. Stop spill at source, dike area of spill to prevent spreading, shovel or pump to tank or drums. Remaining liquid may be absorbed in sand, clay, earth, or other absorbent material and shoveled into containers.

SECTION VIII - PROTECTIVE EQUIPMENT TO BE USED

Respiratory Protection:	If PEL of the product or any component is exceeded, an NIOSH/MSHA approved respirator is advised in absence of proper engineering control (see your safety equipment supplier). Engineering or administrative controls should be implemented to reduce exposure.
Ventilation:	Provide sufficient mechanical (general and/or local exhaust) ventilation to maintain exposure below TLV(s).
Protective Gloves:	Wear chemical resistant gloves that afford proper protection to the hands, such barrier creams maybe used in some environments as long as proper skin protection is afforded.
Eye Protection:	Chemical splash goggles in compliance with OSHA regulations are advised; however, OSHA regulations also permit other type safety glasses. (Consult your safety equipment supplier.)
Other Protective Equipment:	Work clothing that covers arms and legs.

COR78-AT-329LC

SECTION IX - SPECIAL PRECAUTIONS

Containers of this material may be hazardous when empty. Since empty containers retain product residues (vapors, liquid, and/or solids), all hazard precautions given in this MSDS must be observed.

The information accumulated herein is believed to be accurate, but is not warranted to be, whether originating with Interplastic or not. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances.

SECTION X - SUPPLEMENT

Styrene has been identified as a possible human carcinogen by the International Agency for Research on Cancer (IARC). The IARC determination is based on "limited evidence" in animals and other "relevant data." IARC concedes there is "inadequate evidence" on humans for its findings.

The Styrene Information and Research Center (SIRC) recently sponsored studies to evaluate potential health effects in laboratory rats and mice exposed by inhalation to styrene for six hours per day for five days per week of their lifetime. The rat study, completed in 1996, showed no increased incidence of tumors related to styrene exposure at levels up to 1000 parts per million (ppm). The results of the mouse study are in the process of being analyzed, and so far only the lungs have been evaluated. The number of lung tumors observed at exposure levels of 20 to 160 ppm was increased as compared to the number of tumors seen in unexposed mice. These lung tumor results from the mouse study have been added to the MSDS for styrene.

The lung effects in the new mouse study are in contrast to findings in other studies in both rodents and humans, including the recent SIRC-sponsored study in rats. No link between styrene exposure and an increased incidence of cancer has been found collectively in eight studies of workers in the reinforced plastics and composites industries prior to 1992, or in two subsequent studies of composites/reinforced plastics workers. All together, over 90,000 people have been studied. Exposure levels in these industries are above the levels routinely measured in styrene and polystyrene production.

Also in the recent animal studies, irritation and degenerative effects on the olfactory cells in the nose (responsible for the sense of smell) were observed in mice exposed repeatedly by inhalation to 20 ppm and above, and in rats exposed to 50 ppm and above. Atrophy (degeneration) of the olfactory nerve was observed at levels at or above 40 ppm in mice and at or above 500 ppm in rats. SIRC is conducting follow-up research to further understand these findings and their possible importance to humans. Liver damage has been reported in mice at exposure levels of 100 ppm or above; comparable liver damage has not been reported in rats or humans exposed to styrene. It appears that mice are more sensitive to styrene than are other species. Information about potential damage to olfactory cells, irritation in the respiratory tract, and potential liver damage has been added to the MSDS for styrene.

We recommend that the precautions in this MSDS be followed.

COR78-AT-329LC

SECTION XI - SUPPLIER NOTIFICATION

This product contains toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372. Please refer to "Section II - Hazardous Components" for the specific product and concentration.

SECTION XII - TRANSPORTATION INFORMATION

Regulatory Information	UN Number	Proper Shipping Name	Class	Packaging Group	Label	Additional Information
US DOT	UN-1866	Resin Solution	3	III	Flammable Liquid	RQ for Styrene=1000 pounds*

* For shipments in a single container exceeding the RQ for styrene the letters RQ must appear in the proper shipping name.

BASE RESIN CAS INDEX

The base resins indicated under Section II are identified by one or more of the following CAS numbers:

113060-15-4	28572-30-7	58182-50-6	67859-89-6
135108-89-3	28679-80-3	61224-63-3	49624-93-3
141224-31-9	29011-83-4	62569-28-2	79-41-1
14807-96-6	29350-58-1	64386-66-9	
149717-53-3	29403-69-8	67380-21-6	
155122-62-6	29403-69-8	64386-67-0	
21645-51-2	30110-00-0	67599-39-7	
25037-66-5	30946-90-8	67712-08-7	
25101-03-5	31260-98-7	67845-68-5	
25215-72-9	31472-46-5	67939-08-6	
25464-21-5	32505-78-5	67939-40-6	
25609-89-6	32677-47-7	68002-44-8	
25749-46-6	32762-75-7	68140-84-1	
25749-49-9	36346-15-3	68140-88-5	
25987-82-0	36425-15-7	68171-28-8	
26098-37-3	36425-16-8	68238-98-2	
26123-45-5	37339-47-2	68299-40-1	
26265-08-7	37347-86-7	68492-68-2	
26301-26-8	37999-57-8	68511-26-2	
26588-55-6	42133-45-9	68585-94-4	
26795-76-6	464920-01-2	68647-07-4	
27342-37-6	52453-94-8	72259-64-4	
27837-75-8	54228-09-0	81192-92-9	
27863-48-6	56083-98-8	9003-20-7	
28472-89-1	56083-99-9	9065-68-3	
28516-30-5	57863-48-6	37625-93-7	

Akzo Nobel Chemicals Inc.
MATERIAL SAFETY DATA SHEET

DATE PRINTED: 3/12/1998 PAGE 1
MSDS NO. 11-066203

Perkadox 16 3216/DRUM RESIN

SECTION 1. CHEMICAL PRODUCT AND COMPANY INFORMATION

PRODUCT NAME
Perkadox 16

CHEMICAL NAME
Di-(4-tert-butylcyclohexyl) peroxydicarbonate

SYNONYM
Peroxydicarbonic acid, bis (4-(1,1-dimethyl)-cyclohexyl ester

CHEMICAL FORMULA
C22 H38 O6

CAS #
15520-11-3

CHEMICAL FAMILY
Organic peroxides/peroxydicarbonates

MANUFACTURERS NAME
Akzo Nobel Chemicals Inc.

PRODUCT/TECHNICAL INFORMATION
1-800-828-7929

ADDRESS
300 South Riverside Plaza
Chicago, IL 60606

MEDICAL/HANDLING EMERGENCY
1-914-693-6946

COUNTRY
USA

TRANSPORTATION EMERGENCY
CHEMTREC 1-800-424-9300

PRODUCT USE
Polymerization initiator

REVISION DATE
6/05/1997

ISSUE DATE
3/31/1994

REVISION NO.
006

SECTION 2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE DESCRIPTION	PERCENT	CAS#
Di-(4-tert-butylcyclohexyl) peroxydicarbonate	94.000	15520-11-3

SECTION 3. HAZARDS IDENTIFICATION

Appearance & Odor
White powder with a slight odor.

STATEMENT OF HAZARDS
DANGER!
ORGANIC PEROXIDE.
REFRIGERATED ORGANIC PEROXIDE- MAINTAIN COOLING.
HEAT OR CONTAMINATION MAY CAUSE HAZARDOUS DECOMPOSITION.
MAY CAUSE RESPIRATORY TRACT IRRITATION.

Fire & Explosion Hazards
Peroxides and peroxide decomposition products are flammable and can ignite with explosive force if confined.

Primary Route of Exposure
Skin and eye contact are the primary routes of exposure to this product.

Inhalation Acute Exposure
Inhalation of dust may cause irritation to nose, throat and upper respiratory system.

Skin Contact - ACUTE
Skin contact is not expected to cause irritation.

SECTION 3. HAZARDS IDENTIFICATION (CONTINUED)

Eye contact - ACUTE
Eye contact may cause slight irritation.

Ingestion - ACUTE
Irritation to the mouth, throat, esophagus and stomach may be caused by ingestion of this material.

CARCINOGENICITY

IARC	....NO	OSHA	....NO
NTP	....NO	ACGIH	....NO

SECTION 4. FIRST AID MEASURES

Inhalation First Aid
Remove to fresh air. If breathing becomes difficult, oxygen may be given, preferably with a physician's advice. If not breathing, give artificial respiration. Get medical attention.

Skin Contact - First Aid
Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Seek medical attention if indicated. Wash clothing before reuse.

Eye Contact - First Aid
Immediately flush eyes with large amounts of water for at least 15 minutes. Hold eyelids apart to ensure rinsing of the entire surface of the eye and lids with water. Do not attempt to neutralize the material. Seek immediate medical attention.

Ingestion - First Aid
DO NOT induce vomiting. If victim is conscious and alert, give plenty of water to drink. Call a physician or a poison control center immediately. If vomiting occurs, keep head below hips to reduce risk of aspiration. Give victim water again. Never give anything by mouth to a person who is unconscious or convulsing. Get medical attention immediately.

Medical conditions aggravated
There is no data available that addresses specific medical conditions that are generally recognized as being aggravated by exposure to this product. However, existing skin conditions, ie: dermatitis, may be aggravated by contact with this material.

Note to Physician
No specific antidote is known. Based on the individual reactions of the patient, the physician's judgement should be used to control symptoms and clinical conditions.

SECTION 5. FIRE FIGHTING MEASURES

FLASH POINT
N/D F N/D C

FLASH METHOD

AUTO IGNITION TEMPERATURE
N/D F N/D C

UPPER EXPLOSION LIMIT
N/D

LOWER EXPLOSION LIMIT
N/D

SECTION 5. FIRE FIGHTING MEASURES (CONTINUED)

Extinguishing Media
Use water fog or spray, dry powder, foam or carbon dioxide extinguishing agents.

Fire Fighting Procedures
As in any fire, prevent human exposure to fire, smoke, fumes or products of combustion. Evacuate nonessential personnel from the fire area. Firefighters should wear full-face, self-contained breathing apparatus and impervious protective clothing. If possible, move containers from the fire area. Use water to cool fire exposed containers.

Fire & Explosion Hazards
Peroxides and peroxide decomposition products are flammable and can ignite with explosive force if confined.

Other Fire + Explosion Hazards
This product can produce vapors which may travel to a source of ignition and flash back.

Hazardous Products/Combustion
Thermal decomposition products may include toxic oxides of carbon and flammable gases and vapors.

NFPA HEALTH RATING	NFPA FLAMMABILITY RATING
2	2
NFPA REACTIVITY RATING	**NFPA OTHER**
2	

SECTION 6. ACCIDENTAL RELEASE MEASURES

Cleanup
Remove all sources of ignition from the spill area. Stop source of spill. If tools are needed, they should be non-sparking.

Evacuate all non-essential personnel. Any person entering an area of a significant spill or an unknown concentration of a gas, vapor and/or dust should use a NIOSH-approved, positive-pressure/pressure-demand, self-contained breathing apparatus. Protective equipment to prevent skin and eye contact should be worn.

Sweep up spilled solid material and place in a chemical waste container for disposal.

SECTION 7. HANDLING AND STORAGE

Handling
Containers should be located in an area where they can be rotated regularly (first in, first out) and visually inspected for damage or bulging on a regular basis.

Use approved equipment for transport of containers to avoid puncturing or rupturing containers. Do not use air pressure to empty containers.

Protective equipment should be worn when handling this product to avoid eye and skin contact.

Emptied container may retain product residues. Follow all warnings and precautions even after container is emptied.

Akzo Nobel Chemicals Inc.
MATERIAL SAFETY DATA SHEET

DATE PRINTED: 3/12/1998 PAGE 4
MSDS NO. 11-066203

Perkadox 16

SECTION 7. HANDLING AND STORAGE (CONTINUED)

Storage

To insure product quality, storage temperature should not exceed 68 F (20 C).
To insure against possible exothermic self-accelerating decomposition, storage temperatures must not exceed 95 F (35 C). This emergency temperature is derived from the SADT (see Section 10).
Keep containers tightly closed. Store away from reducing agents and accelerators.

MAXIMUM STORAGE TEMPERATURE

68.00 F 20.00 C

General Comments

Containers should not be opened until ready for use. Use clean non-sparking equipment and tools when handling.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Respiratory protection

Use of respiratory protection generally is not required. However, if use conditions (e.g., elevated temperatures) generate vapors, aerosols, or fumes, use a NIOSH-approved organic vapor respirator with dust, mist, and fume filters to reduce potential for inhalation exposure. Where exposure potential necessitates a higher level of protection, use a NIOSH-approved, positive-pressure, pressure-demand, air-supplied respirator.

When using respirator cartridges or canisters, they must be changed frequently (following each use or at the end of the workshift) to assure breakthrough exposure does not occur.

Skin Protection

Skin contact with this product should be prevented through the use of suitable protective clothing, gloves, and footwear selected with regard for use condition exposure potential.

Eye Protection

Dust-tight goggles are recommended when handling this product.

Ventilation protection

Prevent the circulation or accumulation of dust in the air with sufficient ventilation.

Other Protection

Safety showers, with quick opening valves which stay open, and eye wash fountains, or other means of washing the eyes with a gentle flow of cool to tepid tap water, should be readily available in all areas where this material is handled or stored. Water should be supplied through insulated and heat-traced lines to prevent freeze-ups in cold weather.

APPLICABLE EXPOSURE LIMITS

There are no available exposure limits for this product.

EXPOSURE LIMITS/REGULATORY INFORMATION (IN MG/M3)

SUBSTANCE DESCRIPTION	REG. AGCY	PEL	TLV	TWA	STEL	CEIL

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION (CONTINUED)

Di-(4-tert-butylcyclohexyl) peroxydicarbonate

OSHA	N/D	N/D	N/D	N/D	N/D
ACGIH	N/D	N/D	N/D	N/D	N/D
NIOSH	N/D	N/D	N/D	N/D	N/D
SUPPLIER	N/D	N/D	N/D	N/D	N/D

LEGEND:

EXPOSURE LIMIT DESCRIPTIONS

CEIL	Ceiling Exposure Limit
PEL	Permissible Exposure Limit
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TWA	Time Weighted Average

N/D = Not Determined

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

VAPOR PRESSURE (mm Hg)
N/D

VAPOR DENSITY (Air = 1.0)
GT 1

EVAPORATION RATE
N/D

VOLATILE %
N/D

BOILING POINT
N/D F N/D C

ODOR THRESHOLD (ppm)
N/D

SPECIFIC GRAVITY
AP 1.13 @ 20 deg C (68 deg F)

BULK DENSITY
AP 465 kg/m3

SOLUBILITY IN WATER
LT 25 mg/kg @ 0 deg C (32 deg F)

SOLUBILITY IN OTHER SOLVENTS

COEFFICIENT OF OIL/WATER
N/D

POUR POINT
N/D F N/D C

MELTING POINT
158.00 F 70.00 C
Decomposes

pH FACTOR
LT 7 Slightly acidic character

CLOUD POINT
N/D F N/D C

FLASH POINT
N/D F N/D C

FLASH METHOD
N/D

UPPER EXPLOSION LIMIT

LOWER EXPLOSION LIMIT
N/D

AUTO IGNITION TEMPERATURE
N/D F N/D C

Other
SADT 104 F (40 C) see Sect.10

SECTION 10. STABILITY AND REACTIVITY

Stability
This product is stable at ambient temperatures but may decompose if exposed to temperatures above 95 F (35 C).

Incompatibilities
This material is incompatible with strong acids, strong alkalis, strong oxidizing agents, reducing agents and accelerators.

Polymerization
Hazardous polymerization will not occur.

Decomposition
Thermal decomposition will produce oxides of carbon and can produce flammable and/or combustible vapors and gases.

Conditions to Avoid
The SADT for this product is 104 F (40 C).
The SADT (self-accelerating decomposition temperature) is an experimentally derived temperature at which a typical package of the product will undergo self-accelerating decomposition. Decomposition can be expected to be hazardous and uncontrollable.
Under no circumstances should this product be exposed to temperatures near or above the emergency temperature of 95 F (35 C). Such an exposure could initiate hazardous decomposition.
Contact with incompatible materials such as acids, alkalis, heavy metals and reducing agents will also result in hazardous decomposition.

SECTION 11. TOXICOLOGICAL INFORMATION

Toxicological - Inhalation
Inhalation toxicity data are not available for this product.

Inhalation Chronic Exposure
Chronic inhalation exposure effects of this product are not known. However, it may cause irritation of the respiratory tract.

Toxicological - Dermal
When tested, di-(4-tert-butylcyclohexyl) peroxydicarbonate was not irritating to rabbit skin (24 hour exposure).

Skin Contact - CHRONIC
Chronic dermal exposure effects of this product are not known. However, prolonged or repeated contact may cause irritation.

Toxicological - Eye
This product was determined to be a slight eye irritant in tests with rabbits. No Draize Score is available.

Toxicological - Ingestion
When di-(4-tert-butylcyclohexyl) peroxydicarbonate was tested as a 50% solution in Shelsol T, the oral (rat) LD50 was >5000 mg/kg.

Ingestion - CHRONIC
Chronic ingestion effects of this product are not known. However, ingestion may irritate the mouth, throat, esophagus, and stomach.

CARCINOGENICITY/MUTAGENICITY
This product is not classified as a carcinogen by IARC, NTP, OSHA or ACGIH.

This product gave negative results on the Ames test for mutagenicity.

SECTION 11. TOXICOLOGICAL INFORMATION (CONTINUED)

REPRODUCTIVE EFFECTS
The reproductive toxicity of this product is not known.

NEUROTOXICITY
The neurotoxic effects of this product are not known.

Other Toxicological Effects
No other toxic effects for this product are known.

Target Organs
Overexposure to this product may affect the respiratory system.

SECTION 12. ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION
The ecological toxicity of this product is not known.

DISTRIBUTION
Other ecological information on this product is not known.

CHEMICAL FATE
Chemical fate information on this product is not known.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste Disposal
The characteristic of reactivity per RCRA would be exhibited by the unused product if it becomes a waste material. The EPA Hazardous Waste Number of D003 would be applicable.

CONTAINER DISPOSAL
Containers should be emptied of all residual product before disposal. Empty containers should be disposed of in accordance with all applicable laws and regulations.

SECTION 14. TRANSPORT INFORMATION

SHIPPING DESCRIPTION
ORGANIC PEROXIDE TYPE C, SOLID, TEMPERATURE CONTROLLED
(DI-(4-TERT-BUTYLCYCLOHEXYL) PEROXYDICARBONATE, 95%)
5.2, UN3114, PG II
NORTH AMERICAN ERG NO: 148
CONTROL TEMPERATURE: 30 C (86 F)
EMERGENCY TEMPERATURE: 35 C (95 F)

REQUIRED LABELS
ORGANIC PEROXIDE.

ENVIRON. HAZARDOUS SUBSTANCE
This product does not contain an environmentally hazardous substance per 49 CFR 172.101, Appendix B.

Akzo Nobel Chemicals Inc.
MATERIAL SAFETY DATA SHEET

DATE PRINTED: 3/12/1998 PAGE 8
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Perkadox 16

SECTION 15. REGULATORY INFORMATION

Component Di-(4-tert-butylcyclohexyl) peroxydicarbonate is subject to the following

Enviromental List

DSL	Domestic Substance List-Canada
NJ R-T-K	New Jersey R-T-K Hazard. Sub.
TSCA	Toxic Subst. Cont. Act -listed

OTHER REGULATORY INFORMATION
No other regulatory information is available on this product.

WHMIS HAZARD CLASS
C, D-2B, F

HAZARD RATING SOURCE
HMIS

HEALTH
2

REACTIVITY
2

FLAMMABILITY
2

OTHER

SECTION 16. OTHER INFORMATION

OTHER INFORMATION
PERKADOX is a registered trademark of Akzo Nobel Chemicals Inc.

CREATED BY
Product Safety 312-906-7500

KEY TO ABBREVIATIONS:

EQ=EQual	LT=Less Than	GT=Greater Than
AP=APproximately	TR=TRace	ND=No Data available

Akzo Nobel Chemicals Inc.
MATERIAL SAFETY DATA SHEET

DATE PRINTED: 12/02/1997 PAGE 1
MSDS NO. 11-065832

Trigonox 42S 1500 mL/DRUM RESIN

SECTION 1. CHEMICAL PRODUCT AND COMPANY INFORMATION

PRODUCT NAME
Trigonox 42S

CHEMICAL NAME
tert-Butyl peroxy-3,5,5-trimethylhexanoate

SYNONYM
Hexaneperoxoic acid, 3,5,5-trimethyl-, 1,1-dimethylethyl ester

CHEMICAL FORMULA
C13 H26 O3

CAS #
13122-18-4

CHEMICAL FAMILY
Organic peroxides/peroxyesters

MANUFACTURERS NAME
Akzo Nobel Chemicals Inc.

PRODUCT/TECHNICAL INFORMATION
1-800-828-7929

ADDRESS
300 South Riverside Plaza
Chicago, IL 60606

MEDICAL/HANDLING EMERGENCY
1-914-693-6946

COUNTRY
USA

TRANSPORTATION EMERGENCY
CHEMTREC 1-800-424-9300

PRODUCT USE
Polymerization initiator

REVISION DATE
2/24/1997

ISSUE DATE
3/31/1994

REVISION NO.
003

SECTION 2. COMPOSITION/INFORMATION ON INGREDIENTS

SUBSTANCE DESCRIPTION	PERCENT	CAS#
tert-Butyl peroxy-3,5,5-trimethylhexanoate	93.000- 97.000	13122-18-4

SECTION 3. HAZARDS IDENTIFICATION

Appearance & Odor
Clear liquid with a sharp, unpleasant odor.

STATEMENT OF HAZARDS
DANGER!
ORGANIC PEROXIDE.
HEAT OR CONTAMINATION MAY CAUSE HAZARDOUS DECOMPOSITION.
MAY CAUSE EYE IRRITATION.
MAY CAUSE SKIN IRRITATION.
MAY CAUSE RESPIRATORY TRACT IRRITATION.
COMBUSTIBLE LIQUID AND VAPOR.

Fire & Explosion Hazards
This product is a combustible liquid. Peroxides and decomposition products are flammable and can ignite with explosive force if confined.

Primary Route of Exposure
Skin and eye contact are the primary routes of exposure to this product.

Inhalation Acute Exposure
Inhalation of vapors and/or mists may cause irritation of the nose, throat and lungs.

SECTION 3. HAZARDS IDENTIFICATION (CONTINUED)

Skin Contact - ACUTE
Prolonged skin contact may cause skin irritation and redness.

Eye contact - ACUTE
Eye contact may cause irritation.

Ingestion - ACUTE
Irritation to the mouth, throat, esophagus and stomach may be caused by ingestion of this material.

CARCINOGENICITY

IARC	....NO	OSHA	....NO
NTP	....NO	ACGIH	....NO

SECTION 4. FIRST AID MEASURES

Inhalation First Aid
Remove to fresh air. If breathing becomes difficult, oxygen may be given, preferably with a physician's advice. If not breathing, give artificial respiration. Get medical attention.

Skin Contact - First Aid
Remove contaminated clothing and equipment. Wash all affected areas with plenty of soap and water for at least 15 minutes. DO NOT attempt to neutralize with chemical agents. Wash any contaminated clothing before reuse. Obtain medical advice if irritation occurs.

Eye Contact - First Aid
Immediately flush eyes with large quantities of running water for a minimum of 15 minutes. If the victim is wearing contact lenses, remove them. Take care not to contaminate the victim's healthy skin and eyes. Hold the eyelids apart during the flushing to ensure rinsing of the entire surface of the eye and lids. DO NOT let victim rub eye(s). Do not attempt to neutralize with chemical agents. Obtain medical attention as soon as possible. Oils or ointments should not be used at this time. Continue the flushing for an additional 15 minutes if a physician is not immediately available.

Ingestion - First Aid
DO NOT induce vomiting. Call a physician or a poison control center immediately. Give victim plenty of water to drink. Never give anything by mouth to an unconscious or convulsing person. Get medical attention immediately.

Medical conditions aggravated
There are no data available that address medical conditions that are generally recognized as being aggravated by exposure to this product.

Note to Physician

SECTION 5. FIRE FIGHTING MEASURES

FLASH POINT
219.20 F 104.00 C

FLASH METHOD
Seta CC

SECTION 5. FIRE FIGHTING MEASURES (CONTINUED)

AUTO IGNITION TEMPERATURE
N/D F N/D C

UPPER EXPLOSION LIMIT
N/D

LOWER EXPLOSION LIMIT
N/D

Extinguishing Media
Use water fog or spray, dry powder, foam or carbon dioxide extinguishing agents.

Fire Fighting Procedures
As in any fire, prevent human exposure to fire, smoke, fumes or products of combustion. Evacuate non-essential personnel from the fire area. Firefighters should wear full-face, self-contained breathing apparatus and impervious protective clothing. If possible, move containers from the fire area. If not leaking, keep fire exposed containers cool with a water fog or spray to prevent rupture due to excessive heat. High pressure water may spread product from broken containers increasing contamination or fire hazard.

Contaminated buildings, areas and equipment must not be used until they are properly decontaminated. Dike fire water for later disposal. Do not allow contaminated water to enter waterways.

Fire & Explosion Hazards
This product is a combustible liquid. Peroxides and decomposition products are flammable and can ignite with explosive force if confined.

Other Fire + Explosion Hazards
This product can produce flammable vapors which may travel to a source of ignition and flash back. Product is sensitive to static discharge.

Hazardous Products/Combustion
Thermal decomposition produces oxides of carbon and/or hazardous fumes, vapors and/or gasses.

NFPA HEALTH RATING
2

NFPA FLAMMABILITY RATING
1

NFPA REACTIVITY RATING
2

NFPA OTHER

SECTION 6. ACCIDENTAL RELEASE MEASURES

Cleanup
Remove all sources of ignition from the spill area. Stop source of spill. If tools are needed, they should be non-sparking. Dike area to prevent spill from spreading. If permitted to enter sewers, this material may create a fire or explosion hazard. Ventilate enclosed areas to prevent formation of flammable or oxygen deficient atmosphere. A water fog, fine spray or blanket of fire-fighting foam can be used to reduce vapors.

Evacuate all non-essential personnel upwind. Any person entering an area of a significant spill or of an unknown concentration of a gas or a vapor should use a NIOSH-approved, positive-pressure/pressure-demand, self-contained breathing apparatus. Protective equipment to prevent skin and eye contact should be worn.

Soak up liquid with a suitable absorbent such as clay, vermiculite, sand or earth. Sweep up absorbed material and place in a chemical

SECTION 6. ACCIDENTAL RELEASE MEASURES (CONTINUED)

waste container for disposal.

Contaminated areas, buildings and equipment must not be used until they are properly decontaminated. Generously cover contaminated area with a slurry of common household, powdered laundry detergent and water. Using a stiff brush, work the slurry into cracks and crevices. Allow to stand for 2-3 minutes. Then flush with water. Repeat if necessary. Dike water for later disposal. Do not allow contaminated water to enter waterways.

SECTION 7. HANDLING AND STORAGE

Handling

Containers should be located in an area where they can be rotated regularly (first in, first out) and visually inspected for damage or bulging on a regular basis.

Use approved equipment for transport of containers to avoid puncturing or rupturing containers. Do not use air pressure to empty containers.

Protective equipment should be worn when handling this product to avoid eye and skin contact.

Emptied container may retain product residues. Follow all warnings and precautions even after container is emptied.

Storage

To insure product quality, storage temperature should not exceed 77 F (25 C).
To insure against possible exothermic self-accelerating decomposition, storage temperatures must not exceed 122 F (50 C). This emergency temperature is derived from the SADT (see Section 10).
Keep containers tightly closed. Store away from reducing agents and accelerators.

MAXIMUM STORAGE TEMPERATURE

77.00 F 25.00 C

General Comments

Containers should not be opened until ready for use. Use clean non-sparking equipment and tools when handling.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Respiratory protection

Use a NIOSH-approved organic vapor respirator with dust, mist and fume filters to reduce potential for inhalation exposure if use conditions generate vapor, mist or aerosol and adequate ventilation (e.g., outdoor or well-ventilated area) is not available. Where exposure potential necessitates a higher level of protection, use a NIOSH-approved, positive-pressure/pressure-demand, air-supplied respirator.

When using respirator cartridges or canisters, they must be changed frequently (following each use or at the end of the workshift) to assure breakthrough exposure does not occur.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION (CONTINUED)

Skin Protection
Skin contact with liquid or its aerosol should be minimized through the use of suitable protective clothing, gloves and footwear selected with regard for use condition exposure potential.

Neoprene and nitrile rubber are recommended.

Eye Protection
Eye contact with liquid or aerosol must be prevented through the use of chemical safety goggles or a face shield selected with regard for use condition exposure potential.

Eye wash fountains or other means of washing the eyes with a gentle flow of water should be readily available in all areas where this product is handled or stored. Water should be supplied through insulated and/or heat-traced pipes to prevent freeze-up in winter.

Ventilation protection
Sufficient to prevent hazardous accumulation of vapors or mists.

Other Protection
Safety showers, with quick opening valves which stay open, and eye wash fountains, or other means of washing the eyes with a gentle flow of cool to tepid tap water, should be readily available in all areas where this material is handled or stored. Water should be supplied through insulated and heat-traced lines to prevent freeze-ups in cold weather. Long sleeved clothing may be used to minimize skin contact.

APPLICABLE EXPOSURE LIMITS
Applicable exposure limits for this product or its components have not been developed.

EXPOSURE LIMITS/REGULATORY INFORMATION
(IN MG/M3)

SUBSTANCE DESCRIPTION	REG. AGCY	PEL	TLV	TWA	STEL	CEIL
tert-Butyl peroxy-3,5,5-trimethylhexanoate						
	OSHA	N/D	N/D	N/D	N/D	N/D
	ACGIH	N/D	N/D	N/D	N/D	N/D
	NIOSH	N/D	N/D	N/D	N/D	N/D
	SUPPLIER	N/D	N/D	N/D	N/D	N/D

LEGEND:

EXPOSURE LIMIT DESCRIPTIONS
CEIL Ceiling Exposure Limit
PEL Permissible Exposure Limit
STEL Short Term Exposure Limit
TLV Threshold Limit Value
TWA Time Weighted Average
N/D = Not Determined

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SECTION 12. ECOLOGICAL INFORMATION (CONTINUED)

CHEMICAL FATE
Chemical fate information on this product is not known.

SECTION 13. DISPOSAL CONSIDERATIONS

Waste Disposal
The characteristic of reactivity per RCRA would be exhibited by unused product if it becomes a waste material.

CONTAINER DISPOSAL
Containers should be drained of residual product before disposal. Empty containers should be disposed of in accordance with all applicable laws and regulations.

SECTION 14. TRANSPORT INFORMATION

SHIPPING DESCRIPTION
ORGANIC PEROXIDE TYPE D, LIQUID
(TERT-BUTYL PEROXY-3,5,5-TRIMETHYLHEXANOATE, 95%)
5.2, UN3105, PG II
NORTH AMERICAN ERG NO: 145

REQUIRED LABELS
ORGANIC PEROXIDE.

ENVIRON. HAZARDOUS SUBSTANCE
This product does not contain an environmentally hazardous substance per 49 CFR 172.101, Appendix B.

SECTION 15. REGULATORY INFORMATION

Component tert-Butyl peroxy-3,5,5-trimethylhexanoate is subject to the following

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Enviromental List

DSL	Domestic Substance List-Canada
NJ R-T-K	New Jersey R-T-K Hazard. Sub.
TSCA	Toxic Subst. Cont. Act -listed

OTHER REGULATORY INFORMATION
No other regulatory information is available on this product.

WHMIS HAZARD CLASS
C,D-2B

HAZARD RATING SOURCE
HMIS

HEALTH
2

REACTIVITY
2

FLAMMABILITY
1

OTHER

SECTION 16. OTHER INFORMATION

OTHER INFORMATION
TRIGONOX is a registered trademark of Akzo Nobel Chemicals Inc.

CREATED BY
Product Safety 312-906-7500

KEY TO ABBREVIATIONS:

EQ=EQual	LT=Less Than	GT=Greater Than
AP=APproximately	TR=TRace	ND=No Data available

Appendix B

Safety Data Sheet for Liquid Asphalt Tank Material

SAFETY DATA SHEET

1. Identification

Product identifier **ASPHALT BINDER**

Other means of identification

SDS number 9569

Synonyms ASPHALT FLUX * ALL ASPHALT CEMENT BINDERS * ALL POLYMER MODIFIED ASPHALT CEMENT BINDERS * BITUMINOUS BASE

Recommended use Hot mix asphalt production

Recommended restrictions Other uses are not recommended unless an assessment is completed, prior to commencement of that use, which demonstrates that the use will be controlled.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer Flint Hills Resources Pine Bend, LLC
P.O. Box 2917
Wichita, KS
67201-2917
United States

Telephone numbers – 24 hour emergency assistance

Chemtrec 800-424-9300 (CCN:8586)

Telephone numbers – general assistance

8-5 (M-F, CST) SDS Assistance 316-828-7988

Email: msdsrequest@fhr.com

2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Skin corrosion/irritation	Category 2
	Carcinogenicity	Category 2
	Specific target organ toxicity, single exposure	Category 3 narcotic effects
	Specific target organ toxicity, repeated exposure	Category 2 (liver, thymus, bone marrow)
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 3
	Hazardous to the aquatic environment, long-term hazard	Category 3
OSHA defined hazards	Not classified.	

Label elements

Signal word Danger

Hazard statement Causes skin irritation. Suspected of causing cancer. May cause drowsiness or dizziness. May cause damage to organs (liver, thymus, bone marrow) through prolonged or repeated exposure. Harmful to aquatic life with long lasting effects.

Precautionary statement

Prevention	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe mist or vapor. Wash thoroughly after handling. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Wear protective gloves/protective clothing/eye protection/face protection.
Response	If on skin: Wash with plenty of water. If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center/ doctor if you feel unwell. If exposed or concerned: Get medical advice/attention. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse. Specific treatment (see first aid instructions on this label).
Storage	Store in a well-ventilated place. Keep container tightly closed. Store locked up.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	Contains or releases hydrogen sulfide, an extremely flammable and toxic gas. Gas may evolve from this material and accumulate in confined spaces. When it is heated, this material may cause thermal burns. Use personal protective equipment as required.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
PETROLEUM ASPHALT		8052-42-4	≤ 100
OIL DISTILLATES		Proprietary	≤ 20
POLYMER MODIFIER		Proprietary	≤ 12

Additional components

Chemical name	Common name and synonyms	CAS number	%
ADDITIVE		Proprietary	≤ 3
ANTISTRIP		Proprietary	≤ 3
VULCANIZING AGENT		Proprietary	≤ 2
HYDROGEN SULFIDE		7783-06-4	≤ 0.1
POLYCYCLIC AROMATIC COMPOUNDS		130498-29-2	< 0.1

Composition comments Values do not reflect absolute minimums and maximums; these values are typical which may vary from time to time.

The specific identities of some of the components of this product are being withheld as trade secrets. However, all pertinent hazards are addressed in this SDS.

This Safety Data Sheet is intended to communicate potential health hazards and potential physical hazards associated with the product(s) covered by this sheet, and is not intended to communicate product specification information. For product specification information, contact your Flint Hills Resources, LP representative.

4. First-aid measures

Inhalation Remove to fresh air. If not breathing, institute rescue breathing. If breathing is difficult, ensure airway is clear and give oxygen. If heart has stopped, immediately begin cardiopulmonary resuscitation (CPR).

Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION.

Skin contact

If hot material gets on skin, immediately flush affected area with large amounts of cool water. Do not attempt to remove the material from the skin, or to remove contaminated clothing. Get immediate medical attention.

For cold material, immediately wash skin with plenty of soap and water after removing contaminated clothing and shoes. Get medical attention if irritation persists.

Place contaminated clothing in closed container for storage until laundered or discarded. If clothing is to be laundered, inform person performing operation of contaminant's hazardous properties. Discard contaminated leather goods.

Eye contact

If hot material comes in contact with eyes hold the eyelids apart and flush the eye with a large amount of cool water for at least 15 minutes. Get immediate medical attention.

Ingestion

If spontaneous vomiting occurs, keep head below hips to prevent aspiration and monitor for breathing difficulty.

Never give anything by mouth to an unconscious person.

Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION.

Most important symptoms/effects, acute and delayed

INHALATION:
Contains hydrogen sulfide gas. Hydrogen sulfide can cause respiratory paralysis and death, depending on the concentration and duration of exposure. Do not rely on ability to smell vapors, since odor fatigue rapidly occurs. Effects of overexposure include irritation of the nose and throat, nausea, vomiting, diarrhea, abdominal pain and signs of nervous system depression (e.g. headache, drowsiness, dizziness, loss of coordination and fatigue), irregular heartbeats, pulmonary edema, weakness and convulsions.

Fumes, mists, or vapors from the heated material may be irritating to the respiratory tract. Symptoms may include headache, excitation, euphoria, dizziness, incoordination, drowsiness, light-headedness, blurred vision, fatigue, tremors, convulsions, loss of consciousness, coma, respiratory arrest and death, depending on the concentration and duration of exposure.

SKIN:
Contact may cause reddening, itching and inflammation. Prolonged skin contact may defat the skin and cause drying, cracking and/or dermatitis.

Skin contact may cause harmful effects in other parts of the body.

EYES:
May cause slight to mild eye irritation with tearing, redness, or a stinging or burning sensation. May cause temporary swelling of the eyes with blurred vision. Effects may become more serious with repeated or prolonged contact.

Vapors may cause eye irritation and sensitivity to light.

INGESTION:
Ingestion may cause gastrointestinal irritation and diarrhea. Ingestion of large amounts may cause gastrointestinal blockage.

Indication of immediate medical attention and special treatment needed

INHALATION: Inhalation exposure can produce toxic effects. Treat intoxications as hydrogen sulfide exposures. Monitor for respiratory distress. If cough or difficulty in breathing develops, evaluate for upper respiratory tract inflammation, bronchitis, and pneumonitis.

SKIN: Hot material may cause skin burns. Immerse skin covered with hot material in cool water to limit tissue damage and prevent spread of liquid material. Consider leaving cooled material on skin unless contraindicated by contamination or potential for tattooing. If removal is necessary, mineral oil may be of assistance in minimizing skin loss when removing cool, hardened asphalt.

EYES: Hot material may cause burns to the eyes. Early ophthalmologic evaluation is recommended.

5. Fire-fighting measures

Suitable extinguishing media

Use water spray, dry chemical, carbon dioxide or fire-fighting foam for Class B fires to extinguish fire.

Unsuitable extinguishing media

Do not use a solid water stream as it may scatter and spread fire.

Specific hazards arising from the chemical

Combustion may produce COx, SOx, NOx, reactive hydrocarbons, irritating vapors, and other decomposition products in the case of incomplete combustion. Fires involving this product may release hydrogen sulfide.

Material will burn in a fire.

Fires involving this product may release hydrogen sulfide.

Hydrogen sulfide can react with the iron in an asphalt storage tank to form iron sulfide. Iron sulfide is pyrophoric. When exposed to air, iron sulfide is capable of igniting spontaneously.

Special protective equipment and precautions for firefighters

Evacuate area and fight fire from a safe distance.

Use water spray to cool adjacent structures and to protect personnel. Shut off source of flow, if possible. Stay away from storage tank ends. Withdraw immediately in case of rising sound from venting safety device or any discoloration of storage tank due to fire. Always stay away from tanks engulfed in flame.

Exercise extreme care when using water spray on asphalt tank fires. When water is mixed with hot asphalt, steam may rapidly develop resulting in violent asphalt foaming and possible tank eruptions from increased pressure.

Firefighters must wear NIOSH approved positive pressure breathing apparatus (SCBA) with full face mask and full protective equipment.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Keep unnecessary people away; isolate hazard area and deny entry. For spills in confined areas, ensure adequate ventilation. For spills outdoors, stay upwind. IF TANK, RAILCAR OR TANK TRUCK IS INVOLVED IN A FIRE, isolate for 800 meters (1/2 mile) in all directions. Evacuate area endangered by release as required. Wear appropriate personal protective equipment. See Exposure Controls/Personal Protection (Section 8).

Methods and materials for containment and cleaning up

Keep unnecessary people away. Isolate area for at least 50 meters (164 feet) in all directions to preserve public safety. For large spills, if downwind consider initial evacuation for at least 300 meters (1000 feet).

For spills on land, scrape up spilled material for disposal. For large spills, dike ahead of spill to contain. For spills on water, contain as much as possible with booms and begin recovery as soon as possible. If material sinks or becomes dispersed, consult with local, state and regional authorities for approved clean up procedures.

Use vapor suppressing foam to reduce vapors. Do not touch or walk through spilled material. Stop leak when safe to do so.

See Exposure Controls/Personal Protection (Section 8).

Environmental precautions

Prevent entry into water ways, sewers, basements or confined areas. Notify local authorities and National Response Center, if required.

7. Handling and storage

Precautions for safe handling

Avoid contact with strong oxidizing agents. Prevent small spills to minimize slip hazard or release to the environment. Do not cut, grind, drill, weld (or introduce any other ignition source) on empty containers or reuse containers unless adequate precautions are taken. Avoid extreme temperatures to minimize product degradation.

Avoid personal contact with this material. Always observe good personal hygiene measures, such as removing contaminated clothing and protective equipment, washing after handling the material and before entering public areas. Restrict eating, drinking and smoking to designated areas to prevent personal chemical contamination. Routinely wash work clothing and protective equipment to remove contaminants. Do not breathe fumes, vapor or gas. Heated material can cause thermal burns. See Section 8 of the SDS for Personal Protective Equipment.

Conditions for safe storage, including any incompatibilities

Store in tightly closed containers in a cool, dry, isolated, well-ventilated area away from heat, sources of ignition and incompatibles. Avoid contact with strong oxidizing agents.

Empty containers may contain material residue. Do not reuse without adequate precautions.

Hydrogen sulfide can build up in the head space of storage vessels containing this material. Use appropriate respiratory protection to prevent exposure. See Exposure Controls/Personal Protection (Section 8).

When entering a storage vessel that has previously contained this material it is recommended that the atmosphere be monitored for the presence of hydrogen sulfide. See Occupational exposure limits (Section 8) for exposure limits.

8. Exposure controls/personal protection

Occupational exposure limits

The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Additional components	Type	Value
POLYCYCLIC AROMATIC COMPOUNDS (CAS 130498-29-2)	PEL	0.2 mg/m3
	TWA	0.2 mg/m3

US. OSHA Table Z-2 (29 CFR 1910.1000)

Additional components	Type	Value
HYDROGEN SULFIDE (CAS 7783-06-4)	Ceiling	20 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
PETROLEUM ASPHALT (CAS 8052-42-4)	TWA	0.5 mg/m3	Inhalable fraction (as benzene-soluble aerosol)

Additional components	Type	Value	Form
HYDROGEN SULFIDE (CAS 7783-06-4)	STEL	5 ppm	
	TWA	1 ppm	
POLYCYCLIC AROMATIC COMPOUNDS (CAS 130498-29-2)	TWA	0.2 mg/m3	Coal tar pitch volatiles (benzene soluble fraction)
		0.2 mg/m3	Aerosol.

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
PETROLEUM ASPHALT (CAS 8052-42-4)	Ceiling	5 mg/m3	Fume.

Additional components	Type	Value	Form
HYDROGEN SULFIDE (CAS 7783-06-4)	Ceiling	10 ppm	
POLYCYCLIC AROMATIC COMPOUNDS (CAS 130498-29-2)	TWA	0.1 mg/m3	Cyclohexane-extractable fraction.

Biological limit values

ACGIH Biological Exposure Indices

Additional components	Value	Determinant	Specimen	Sampling Time
POLYCYCLIC AROMATIC COMPOUNDS (CAS 130498-29-2)	2.5 µg/l	1-Hydroxypyrene, with hydrolysis (1-HP)	Urine	*
	2.5 µg/l		1-Hydroxypyrene in urine	*

* - For sampling details, please see the source document.

Appropriate engineering controls	Consider the following when employing engineering controls and selecting personal protective equipment: potential hazards of the material, applicable exposure limits, job activities, and other substances in the work place. Ventilation and other forms of engineering controls are the preferred means for controlling exposures below occupational exposure limits and guidelines.

Individual protection measures, such as personal protective equipment

Eye/face protection	Keep away from eyes and face. Contact can be avoided by using chemical safety glasses, goggles and/or face shield. Have eye washing facilities readily available where eye contact can occur.
Skin protection	
Hand protection	Avoid skin contact with this material. Use chemical resistant gloves when handling this material. Contact the glove manufacturer for specific advice on glove selection regarding permeability and breakthrough times for your use conditions. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough. When handling hot material, use heat resistant gloves.
Other	Avoid skin contact with this material. Additional protective clothing may be necessary.
Respiratory protection	The use of air purifying respirators is not recommended where hydrogen sulfide levels may exceed exposure limits. Use a positive pressure air supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air purifying respirators may not provide adequate protection. See OSHA 29 CFR 1910.134 for more information regarding respiratory protection and Assigned Protection Factors (APFs).
Thermal hazards	Contact with hot material can cause thermal burns which may result in permanent damage. Wear appropriate thermal protective clothing. Additional protection may be necessary to prevent skin contact including use of apron, arm covers, face shield, or boots.

9. Physical and chemical properties

Appearance	
Physical state	Liquid.
Form	Viscous
Color	Dark brown to black
Odor	Asphalt
Odor threshold	Not available.
pH	Not available
Melting point/freezing point	Not available
Initial boiling point and boiling range	> 600 °F (> 315.6 °C)
Flash point	> 450 °F (> 232.22 °C) COC (ASTM D92)
Evaporation rate	Not available
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available
Vapor density	Not available
Relative density	0.9 - 1.1 at 60/60 °F (15.6/15.6 °C)
Solubility(ies)	
Solubility (water)	Insoluble
Partition coefficient (n-octanol/water)	Not available
Auto-ignition temperature	Not available
Decomposition temperature	Not available.
Viscosity	250 - 24000 P at 140 °F (60 °C)

10. Stability and reactivity

Reactivity	See statements below.
Chemical stability	Material is stable under normal conditions.

Possibility of hazardous reactions	Not anticipated under normal conditions.
Conditions to avoid	Avoid overheating, emissions generation, unventilated areas, heat, open flames.
Incompatible materials	Incompatible with strong oxidizing agents. See precautions under Handling & Storage (Section 7).
Hazardous decomposition products	Not anticipated under normal conditions.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Likely route of exposure
Skin contact	Likely route of exposure
Eye contact	Likely route of exposure
Ingestion	Likely route of exposure

Symptoms related to the physical, chemical and toxicological characteristics

INHALATION:
Contains hydrogen sulfide gas. Hydrogen sulfide can cause respiratory paralysis and death, depending on the concentration and duration of exposure. Do not rely on ability to smell vapors, since odor fatigue rapidly occurs. Effects of overexposure include irritation of the nose and throat, nausea, vomiting, diarrhea, abdominal pain and signs of nervous system depression (e.g. headache, drowsiness, dizziness, loss of coordination and fatigue), irregular heartbeats, pulmonary edema, weakness and convulsions.

Fumes, mists, or vapors from the heated material may be irritating to the respiratory tract. Symptoms may include headache, excitation, euphoria, dizziness, incoordination, drowsiness, light-headedness, blurred vision, fatigue, tremors, convulsions, loss of consciousness, coma, respiratory arrest and death, depending on the concentration and duration of exposure.

SKIN:
Contact may cause reddening, itching and inflammation. Prolonged skin contact may defat the skin and cause drying, cracking and/or dermatitis.

Skin contact may cause harmful effects in other parts of the body.

EYES:

May cause slight to mild eye irritation with tearing, redness, or a stinging or burning sensation. May cause temporary swelling of the eyes with blurred vision. Effects may become more serious with repeated or prolonged contact.

Vapors may cause eye irritation and sensitivity to light.

INGESTION:
Ingestion may cause gastrointestinal irritation and diarrhea. Ingestion of large amounts may cause gastrointestinal blockage.

Information on toxicological effects

Acute toxicity Not classified.

Components	Species	Test Results
OIL DISTILLATES		
Acute		
Inhalation		
Mist		
LC50		4.1 mg/l
PETROLEUM ASPHALT (CAS 8052-42-4)		
Acute		
Dermal		
LD50	Rat	> 2000 mg/kg
Inhalation		
LC50		> 94.4 mg/m³, 4.5 hr
Oral		
LD50	Rat	> 5000 mg/kg

Skin corrosion/irritation Causes skin irritation.

Serious eye damage/eye irritation Not classified.

Respiratory or skin sensitization

Respiratory sensitization Not classified.

Skin sensitization Not classified.

Germ cell mutagenicity Not classified.

Carcinogenicity May cause cancer.

ACGIH Carcinogens

PETROLEUM ASPHALT (CAS 8052-42-4)	A4 Not classifiable as a human carcinogen.
POLYCYCLIC AROMATIC COMPOUNDS (CAS 130498-29-2)	A1 Confirmed human carcinogen.

IARC Monographs. Overall Evaluation of Carcinogenicity

PETROLEUM ASPHALT (CAS 8052-42-4)	2B Possibly carcinogenic to humans.
POLYCYCLIC AROMATIC COMPOUNDS (CAS 130498-29-2)	1 Carcinogenic to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1052)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

POLYCYCLIC AROMATIC COMPOUNDS (CAS 130498-29-2)	Reasonably Anticipated to be a Human Carcinogen.

Reproductive toxicity Not classified.

Specific target organ toxicity - single exposure May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure May cause damage to organs (liver, thymus, bone marrow) through prolonged or repeated exposure.

Aspiration hazard Not classified.

Toxicological data

HYDROGEN SULFIDE: Hydrogen sulfide causes rapid death due to metabolic asphyxiation. It has an unpleasant "rotten egg" odor that diminishes with increased exposure and is not a reliable indicator for warning of exposure. Eye irritation may occur at levels above 4 ppm. Olfactory fatigue occurs rapidly at levels of 50 ppm or higher. Respiratory effects include irritation with possible pulmonary edema at levels above 50 ppm. At 500 ppm immediate loss of consciousness and death can occur. NIOSH has determined that 100 ppm hydrogen sulfide is immediately dangerous to life and health (IDLH).

ASPHALT/ASPHALT LIKE PRODUCTS: Asphalt fumes from heated material have been reported to cause eye, respiratory tract and skin irritation, as well as nausea and headaches. Symptoms may include coughing, wheezing and shortness of breath. An adverse effect on pulmonary function has not been conclusively demonstrated. Studies in humans to determine the potential long-term health effects of asphalt also have had inconsistent results. Epidemiological studies in European paving asphalt worker populations indicated a slight positive association between lung cancer mortality and exposure to asphalt fumes. A case-control examination of these data found no consistent evidence of an association between bitumen and lung cancer risk, possibly due to the confounding effects of potential exposure to coal tar cigarette smoking, and other substances. Additional studies of workers exposed to asphalt emissions during paving with straight-run asphalt showed mutagenic and genotoxic/cytogenetic effects in these workers.

Studies in experimental animals have not established a link between lung cancer and asphalt fume exposure. However, an increase in skin tumors was observed in lifetime studies of laboratory rodents exposed to extracts of asphalt (bitumen) as well as “cutbacks” of asphalt (asphalts that are diluted, dissolved or liquefied in hydrocarbon solvents).

An increased incidence of skin tumors was also observed in lifetime dermal bioassays of laboratory rodents exposed to distillates of fumes generated from roofing flux, an asphalt that is further processed or oxidized. These condensed fumes were collected from an oxidized roofing asphalt at high temperatures (>450 degrees F). Follow up studies suggest that the roofing asphalt distillates act as tumor initiators, involving a genotoxic mechanism. No increases in skin tumors were found in a lifetime study of rodents dermally exposed to distillates of fumes generated from paving asphalt.

The International Agency for Research on Cancer (IARC) recently determined that occupational exposures to oxidized asphalt and their emissions during roofing applications are “probably carcinogenic to humans” (Group 2A). They also determined that occupation exposures to hard asphalts and their emissions during mastic asphalt work and occupational exposures to straight-run asphalts and their emissions during paving operations are “possibly carcinogenic to humans” (Group 2B).

POLYCYCLIC AROMATIC HYDROCARBONS (PAHs): Cancer is the most significant endpoint for PAHs. Certain PAHs are weak carcinogens which become carcinogenic after undergoing metabolism. Chronic or repeated exposure increases the likelihood of tumor initiation. Increased incidence of tumors of the skin, bladder, lung and gastrointestinal tract have been described in individuals overexposed to certain PAHs. Overexposure to PAHs has also been associated with photosensitivity and eye irritation. Inhalation overexposure of PAHs has been associated with respiratory tract irritation, cough, and bronchitis. Dermal overexposure has been associated with precancerous lesions, erythema, dermal burns, photosensitivity, acneiform lesions and irritation. Oral overexposure to PAHs has been associated with precancerous growths of the mouth (leukoplakia). Mild nephrotoxicity, congestion and renal cortical hemorrhages and elevated liver function tests, changes in the immune system and other effects have been observed in rats exposed to high levels of PAHs by ingestion.

12. Ecological information

Ecotoxicity Harmful to aquatic life with long lasting effects.

Components		Species	Test Results
PETROLEUM ASPHALT (CAS 8052-42-4)			
Aquatic			
Acute			
Algae	EC50	Algae	> 1000 mg/l, 72 hr
Crustacea	EC50	Daphnia magna	> 1000 mg/l, 48 hr
Fish	LC50	Fish	> 1000 mg/l, 96 hr
Chronic			
Crustacea	NOEL	Daphnia	> 1000 mg/l
Fish	NOEL	Fish	> 1000 mg/l

Persistence and degradability Not readily biodegradable.

Bioaccumulative potential May bioaccumulate in aquatic organisms.

Mobility in soil May partition into soil and water.

Other adverse effects No other adverse effects expected.

13. Disposal considerations

Disposal instructions

This material, as supplied, when discarded or disposed of, is not a hazardous waste according to Federal Regulations (40 CFR 261).

The transportation, storage, treatment and disposal of waste material must be conducted in compliance with federal, state, and local regulations. Under RCRA it is the responsibility of the user of the material to determine, at the time of disposal, whether this material meets RCRA criteria for hazardous waste. For additional handling information and protection of employees, see Section 7 (Handling and Storage) and Section 8 (Exposure Controls/Personal Protection).

Hazardous waste code

The proper waste code must be evaluated at the time of disposal and should be determined by the user and waste disposal company.

Waste from residues / unused products

Dispose of this material in accordance with all applicable local and national regulations.

Contaminated packaging

Empty containers should be taken to an approved waste handling site for recycling or disposal in accordance with government regulations. Packaging may contain residue that can be hazardous.

14. Transport information

General information

This description may not cover shipping in all cases, please consult 49 CFR 100-185 for specific shipping information or Transport Compliance Specialist (CSO).

In accordance with US DOT, bulk and non-bulk shipments of this product, which are offered for transportation below 212 °F (100 °C), are not regulated.

BILL OF LADING - NON-BULK (U. S. DOT): Non-regulated by DOT

DOT

UN number	UN3257
UN proper shipping name	Elevated Temperature Liquid, n.o.s. (Asphalt)
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Label(s)	Class 9
Packing group	III
Special precautions for user	Not available.
ERG number	128

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not classified for MARPOL. Please contact the Transportation Compliance CSO if transportation mode is ship or vessel to determine the need for a MARPOL classification.

DOT

15. Regulatory information

US federal regulations

All ingredients are on the active TSCA inventory, or are not required to be listed on the active TSCA inventory.

A release of this material, as supplied, may be exempt from reporting under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA - 40 CFR 302) by the petroleum exclusion. Releases may be reportable to the National Response Center (800-424-8802) under the Clean Water Act, 33 U.S.C. 1321(b)(3) and (5).

This material does not contain toxic chemicals (in excess of the applicable de minimis concentration) that are subject to the annual toxic chemical release reporting requirements of the Superfund Amendments and Reauthorization Act (SARA) Section 313 (40 CFR 372).

Check local, regional or state/provincial regulations for any additional requirements as these may be more restrictive than federal laws and regulations. Failure to comply may result in substantial civil and criminal penalties.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

HYDROGEN SULFIDE (CAS 7783-06-4) Listed.

SARA 304 Emergency release notification

HYDROGEN SULFIDE (CAS 7783-06-4) 100 LBS

US EPCRA (SARA Title III) Section 313 - Toxic Chemical: De minimis concentration

HYDROGEN SULFIDE (CAS 7783-06-4) 1.0 %
POLYCYCLIC AROMATIC COMPOUNDS (CAS 130498-29-2) 0.1 %

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1052)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Chemical name	CAS number	Reportable quantity (pounds)	Threshold planning quantity (pounds)	Threshold planning quantity, lower value (pounds)	Threshold planning quantity, upper value (pounds)
HYDROGEN SULFIDE	7783-06-4	100	500		

SARA 311/312 Hazardous chemical Yes

Classified hazard categories
Skin corrosion or irritation
Carcinogenicity
Specific target organ toxicity (single or repeated exposure)

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

POLYCYCLIC AROMATIC COMPOUNDS (CAS 130498-29-2)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

HYDROGEN SULFIDE (CAS 7783-06-4)

Clean Water Act (CWA) Section 112(r) (40 CFR 68.130) Hazardous substance

US state regulations

California Proposition 65

WARNING: This product can expose you to chemicals including PETROLEUM ASPHALT, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

California Proposition 65 - CRT: Listed date/Carcinogenic substance

PETROLEUM ASPHALT (CAS 8052-42-4) Listed: January 1, 1990

16. Other information, including date of preparation or last revision

Issue date	03-24-2015
Revision date	06-04-2018
Version #	04
HMIS® ratings	Health: 2* Flammability: 1 Physical hazard: 0 * Indicates chronic health hazard
NFPA ratings	Health: 2 Flammability: 1 Instability: 0
Disclaimer	THIS SDS HAS BEEN PREPARED TO COMPLY WITH FEDERAL REGULATIONS THAT ARE INTENDED TO QUICKLY PROVIDE USEFUL INFORMATION TO THE USER(S) OF THIS MATERIAL OR PRODUCT - IT IS NOT INTENDED TO SERVE AS A COMPREHENSIVE DISCUSSION OF ALL POSSIBLE RISKS OF HAZARDS, BUT RATHER PROVIDES INFORMATION GENERALLY ACCEPTED IN THE SCIENTIFIC COMMUNITY AS RELEVANT REGARDING THE POTENTIAL HAZARDS OF THIS PRODUCT. ADEQUATE TRAINING, INSTRUCTION, WARNINGS AND SAFE HANDLING PROCEDURES SHOULD BE PROVIDED TO HANDLERS AND USERS. USERS SHOULD REVIEW THE INFORMATION IN THE SDS, AND SATISFY THEMSELVES AS TO ITS SUITABILITY AND COMPLETENESS, INCLUDING ENSURING THAT THIS IS THE MOST CURRENT SDS.
Revision information	Product and Company Identification: Synonyms Physical & Chemical Properties: Multiple Properties
Completed by	Flint Hills Resources, LP - Operations EH&S

Appendix C

AP-42 Chapter 7.1 Tank Emission Calculations

NWP 4/30/2020

VOC emissions from Tank #1

Enter tank specific information in ALL blue cells BEFORE clicking the Input Tank Information button

Tank information

Tank identification	City of Minneapolis Gasoline Tank
Description	15,000 gal UST
Location (city)	Minneapolis-St. Paul

	Property	Value	Units	Description
Input Tank Information	**Fuel type**	Motor Gasoline RVP 10		Type of fuel stored in the tank.
	Storage tank position	Under		Fixed roof tank location, above or underground.
	Storage tank orientation	Horizontal		Fixed roof tank orientation, horizontal or vertical
	Storage tank roof type	Horizontal		Fixed roof type, cone, dome, or the tank is horizontal
	Actual throughput	120,000	gal/yr	Gallons stored in his tank over the period of 12 consecutive months.
	Actual hours operated	8760	hours/year	Number of hours the tank is being used, usually assumed to be 8760
	Potential throughput	156,000	gal/yr	Calculated based on actual tank throughput divided by the hours operated and m Annual hours operated
	VOC actual emissions	**0.33**	ton/yr	Amount of VOC actually released over the 12-month period.
	VOC potential emissions	**0.44**	ton/yr	Amount of VOCs potentially released over a 12-month period.

Physical properties of the tank

Property		Value	Units	Description
Shell length	H_S	26	feet	This is actual length of the tank.
Shell diameter	D	10	feet	This is the width of the cylindrical shell.
Shell radius	R_S	5	feet	Calculated radius
Working volume		15274.4	gallons	Calculated volume
Turnovers per year (actual)		7.9	turnover/year	Calculated number the tank is emptied and refilled, annually.
Turnovers per year (potential)		10.2	turnover/year	Calculated number the tank could be emptied and refilled, annually.
Shell color/shade		NA	select one	Tank shell color and shade are used to identify **paint solar absorptance** .
Shell condition		NA	select one	Tank condition is used to identify **paint solar absorptance** . Only aboveground.
Paint solar absorptance	α	0	dimensionless	Values from table 7.1-6. Paint effectiveness in absorbing radiant energy.
Roof color/shade		NA		Tank shell color and shade are used to identify **paint solar absorptance** .
Roof condition		NA		Tank condition is used to identify **paint solar absorptance** . Only aboveground.
Rooftop Paint solar abosrptance	α	0	dimensionless	Values from table 7.1-6. Paint effectiveness in absorbing radiant energy.
Insulation		Insulated		Tank may be surrounded with thermal insulation
Vacuum setting		-0.03	psig	Vacuum setting is a value set for the tank at the facility.
Pressure setting		0.03	psig	Breather vent pressure is a reading from the tank monitoring system.

Weather data

Property		Value	Units	Description
Nearest major city		Minneapolis-St Paul, MN	Select one	Nearest major city to the tank location.
Average annual maximum temperature	T_{AN}	38.1	°F	Average over a calendar year.
Average annual minimum temperature	T_{AX}	54.5	°F	Average over a calendar year.
Atmospheric pressure	P_A	14.26	psia	Average for the location.
Solar insolation	I	1163.00	Btu/(ft^2·day)	Total for a horizontal surface.

Calculation of VOC Emission = Total Losses (L_T)

Variable		Calculated value		Notes (equations are from AP-42, Chapter 7)
Vapor space outage	H_{vo}	3.93	ft	Equation 1-16
Vapor space volume	V_V	1021.05	ft^3	Equation 1-3
Stock vapor density	W_V	0.048	lb/ft^3	Equation 1-21
Vapor Molecular Weight	M_V	66	lb/lb-mole	Table 7.1-2
Vapor pressure	P_{VA}	3.947139135	psia	Table 7.1-2
Vapor space expansion factor	K_E	0.081	dimensionless	Equation 1-7
Vented vapor saturation factor	K_S	0.5490	dimensionless	Constant, see Equation 1-20
Annual net throughput (actual)	Q_a	2857.64	bbl/yr	Equation 1-33
Annual net throughput (potential)	Q_p	3714.93	bbl/yr	Equation 1-33
Working loss turnover factor (actual)	K_{Na}	1.00	dimensionless	Saturation; turnovers >36 = (180 + N) / 6 * N; turnovers at 36 or lower = 1
Working loss turnover factor (potential)	K_{Np}	1.00	dimensionless	Saturation; turnovers >36 = (180 + N) / 6 * N; turnovers at 36 or lower = 1
Working loss product factor	K_P	1	dimensionless	Assume value of 1 for gasoline or diesel.
Ideal gas constant	R	10.731	psia *ft^3/lb-mole*°R	Constant, see Equation 1-22
Daily average liquid surface temperature	T_{LA}	505.97	°R	Equation 1-26
Daily vapor temperature range	ΔT_V	14.68	°R	Equation 1-5
Daily ambient temperature range	ΔT_A	16.40	°R	Equation 1-12
Daily maximum ambient temperature	T_{AX}	514.2	°R	Table 7-1-7. Conversion factor: Rankine = Fahrenheit + 459.67
Daily minimum ambient temperature	T_{AN}	497.8	°R	Table 7-1-7. Conversion factor: Rankine = Fahrenheit + 459.67
Daily average ambient temperature	T_{AA}	505.97	°R	Equation 1-27
Liquid bulk temperature	T_B	505.97	°R	Equation 1-28
Daily vapor pressure range	ΔP_V	0.59	psia	Equation 1-9
Breather vent pressure setting range	ΔP_B	0.06	psi	Equation 1-10
~~Stock ASTM D86 distillation slope~~	~~S~~	~~3.0~~	~~°F/vol%~~	~~Figure 7.1-14a upper range for naphtha. Does not apply to diesel~~
~~Stock Reid vapor pressure~~	~~RVP~~	~~8.0~~	~~psi~~	~~Constant in table 7.1-2 for motor gasoline. S = stock ASTM D86 distillation slope percent evaporation (deg F/vol%). Does not apply to diesel~~.
Total losses (VOC actual emissions)	L_T	**669.85**	lb/yr	Equation 1-1
Total losses (VOC potential emissions)	L_T	**870.81**	lb/yr	Equation 1-1
Standing storage losses	L_S	0.00	lb/yr	Equation 1-2
Working losses (actual)	L_W	669.85	lb/yr	Equation 1-29
Working losses (potential)	L_W	870.81	lb/yr	Equation 1-29

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VOC emissions from Tank #2

Enter tank specific information in ALL blue cells BEFORE clicking the Input Tank Information button

Tank information

Tank identification	E85
Description	10,000 gal UST
Location (city)	Minneapolis-St. Paul

	Property	Value	Units	Description
Input Tank Information	**Fuel type**	Motor Gasoline RVP 7		Type of fuel stored in the tank.
	Storage tank position	Under		Fixed roof tank location, above or underground.
	Storage tank orientation	Horizontal		Fixed roof tank orientation, horizontal or vertical
	Storage tank roof type	Horizontal		Fixed roof type, cone, dome, or the tank is horizontal
	Actual throughput	6,000	gal/yr	Gallons stored in his tank over the period of 12 consecutive months.
	Actual hours operated	8760	hours/year	Number of hours the tank is being used.
	Potential throughput	7,800	gal/yr	Calculated based on actual tank throughput divided by the hours operated and m 8760 hours/day.
	VOC actual emissions	**0.01**	ton/yr	Amount of VOC actually released over the 12-month period.
	VOC potential emissions	**0.01**	ton/yr	Amount of VOCs potentially released over a 12-month period.

Physical properties of the tank

Property		Value	Units	Description
Shell length	H_S	20	feet	This is actual length of the tank.
Shell diameter	D	10	feet	This is the width of the cylindrical shell.
Shell radius	R_S	5	feet	Calculated radius
Working volume		11749.6	gallons	Calculated volume
Turnovers per year (actual)		0.5	turnover/year	Calculated number the tank is emptied and refilled, annually.
Turnovers per year (potential)		0.7	turnover/year	Calculated number the tank could be emptied and refilled, annually.
Shell color/shade		NA	select one	Tank shell color and shade are used to identify **paint solar absorptance** .
Shell condition		NA	select one	Tank condition is used to identify **paint solar absorptance** . Only aboveground.
Paint solar absorptance	α	0	dimensionless	Values from table 7.1-6.Paint effectiveness in absorbing radiant energy.
Roof color/shade		NA		Tank shell color and shade are used to identify **paint solar absorptance** .
Roof condition		NA		Tank condition is used to identify **paint solar absorptance** . Only aboveground.
Rooftop Paint solar abosrptance	α	0	dimensionless	Values from table 7.1-6.Paint effectiveness in absorbing radiant energy.
Insulation		Insulated		Tank may be surrounded with thermal insulation
Vacuum setting		-0.03	psig	Vacuum setting is a value set for the tank at the facility.
Pressure setting		0.03	psig	Breather vent pressure is a reading from the tank monitoring system.

Weather data

Property		Value	Units	Description
Nearest major city		Minneapolis-St Paul, MN	Select one	Nearest major city to the tank location.
Average annual maximum temperature	T_{AN}	38.1	°F	Average over a calendar year.
Average annual minimum temperature	T_{AX}	54.5	°F	Average over a calendar year.
Atmospheric pressure	P_A	14.26	psia	Average for the location.
Solar insolation	I	1163.00	Btu/(ft^2·day)	Total for a horizontal surface.

Calculation of VOC Emission = Total Losses (L_T)

Variable		Calculated value		Notes (equations are from AP-42, Chapter 7)
Vapor space outage	H_{vo}	3.93	ft	Equation 1-16
Vapor space volume	V_V	785.42	ft^3	Equation 1-3
Stock vapor density	W_V	0.033	lb/ft^3	Equation 1-21
Vapor Molecular Weight	M_V	68	lb/lb-mole	Table 7.1-2
Vapor pressure	P_{VA}	2.615890206	psia	Table 7.1-2
Vapor space expansion factor	K_E	0.091	dimensionless	Equation 1-7
Vented vapor saturation factor	K_S	0.6475	dimensionless	Constant, see Equation 1-20
Annual net throughput (actual)	Q_a	142.88	bbl/yr	Equation 1-33
Annual net throughput (potential)	Q_p	185.75	bbl/yr	Equation 1-33
Working loss turnover factor (actual)	K_{Na}	1.00	dimensionless	Saturation; turnovers >36 = (180 + N) / 6 * N; turnovers at 36 or lower = 1
Working loss turnover factor (potential)	K_{Np}	1.00	dimensionless	Saturation; turnovers >36 = (180 + N) / 6 * N; turnovers at 36 or lower = 1
Working loss product factor	K_P	1	dimensionless	Assume value of 1 for gasoline or diesel.
Ideal gas constant	R	10.731	psia *ft^3/lb-mole*°R	Constant, see Equation 1-22
Daily average liquid surface temperature	T_{LA}	505.97	°R	Equation 1-26
Daily vapor temperature range	ΔT_V	14.32	°R	Equation 1-5
Daily ambient temperature range	ΔT_A	16.40	°R	Equation 1-12
Daily maximum ambient temperature	T_{AX}	514.2	°R	Table 7-1-7. Conversion factor: Rankine = Fahrenheit + 459.67
Daily minimum ambient temperature	T_{AN}	497.8	°R	Table 7-1-7. Conversion factor: Rankine = Fahrenheit + 459.67
Daily average ambient temperature	T_{AA}	505.97	°R	Equation 1-27
Liquid bulk temperature	T_B	505.97	°R	Equation 1-28
Daily vapor pressure range	ΔP_V	0.79	psia	Equation 1-9
Breather vent pressure setting range	ΔP_B	0.06	psi	Equation 1-10
~~Stock ASTM D86 distillation slope~~	~~S~~	~~3.0~~	~~°F/vol%~~	~~Figure 7.1-14a upper range for naphtha. Does not apply to diesel~~
~~Stock Reid vapor pressure~~	~~RVP~~	~~8.0~~	~~psi~~	~~Constant in table 7.1-2 for motor gasoline. S = stock ASTM D86 distillation slope percent evaporation (deg F/vol%). Does not apply to diesel~~.
Total losses (VOC actual emissions)	L_T	**22.87**	lb/yr	Equation 1-1
Total losses (VOC potential emissions)	L_T	**29.73**	lb/yr	Equation 1-1
Standing storage losses	L_S	0.00	lb/yr	Equation 1-2
Working losses (actual)	L_W	22.87	lb/yr	Equation 1-29
Working losses (potential)	L_W	29.73	lb/yr	Equation 1-29

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VOC emissions from Tank #3

Enter tank specific information in ALL blue cells BEFORE clicking the Input Tank Information button

Tank information

Tank identification	City of Minneapolis Biodiesel
Description	15,000 gal UST
Location (city)	Minneapolis-St. Paul

	Property	Value	Units	Description
Input Tank Information	**Fuel type**	No. 2 Fuel Oil (Diesel)		Type of fuel stored in the tank.
	Storage tank position	Under		Fixed roof tank location, above or underground.
	Storage tank orientation	Horizontal		Fixed roof tank orientation, horizontal or vertical
	Storage tank roof type	Horizontal		Fixed roof type, cone, dome, or the tank is horizontal
	Actual throughput	72,000	gal/yr	Gallons stored in his tank over the period of 12 consecutive months.
	Actual hours operated	8760	hours/year	Number of hours the tank is being used.
	Potential throughput	93,600	gal/yr	Calculated based on actual tank throughput divided by the hours operated and m 8760 hours/day.
	VOC actual emissions	**0.0004**	ton/yr	Amount of VOC actually released over the 12-month period.
	VOC potential emissions	**0.0005**	ton/yr	Amount of VOCs potentially released over a 12-month period.

Physical properties of the tank

Property		Value	Units	Description
Shell length	H_S	26	feet	This is actual length of the tank.
Shell diameter	D	10	feet	This is the width of the cylindrical shell.
Shell radius	R_S	5	feet	Calculated radius
Working volume		15274.4	gallons	Calculated volume
Turnovers per year (actual)		4.7	turnover/year	Calculated number the tank is emptied and refilled, annually.
Turnovers per year (potential)		6.1	turnover/year	Calculated number the tank could be emptied and refilled, annually.
Shell color/shade		NA	select one	Tank shell color and shade are used to identify **paint solar absorptance** .
Shell condition		NA	select one	Tank condition is used to identify **paint solar absorptance** . Only aboveground.
Paint solar absorptance	α	0	dimensionless	Values from table 7.1-6.Paint effectiveness in absorbing radiant energy.
Roof color/shade		NA		Tank shell color and shade are used to identify **paint solar absorptance** .
Roof condition		NA		Tank condition is used to identify **paint solar absorptance** . Only aboveground.
Rooftop Paint solar abosrptance	α	0	dimensionless	Values from table 7.1-6.Paint effectiveness in absorbing radiant energy.
Insulation		Insulated		Tank may be surrounded with thermal insulation
Vacuum setting		-0.03	psig	Vacuum setting is a value set for the tank at the facility.
Pressure setting		0.03	psig	Breather vent pressure is a reading from the tank monitoring system.

Weather data

Property		Value	Units	Description
Nearest major city		Minneapolis-St Paul, MN	Select one	Nearest major city to the tank location.
Average annual maximum temperature	T_{AN}	38.1	°F	Average over a calendar year.
Average annual minimum temperature	T_{AX}	54.5	°F	Average over a calendar year.
Atmospheric pressure	P_A	14.26	psia	Average for the location.
Solar insolation	I	1163.00	Btu/(ft^2·day)	Total for a horizontal surface.

Calculation of VOC Emission = Total Losses (L_T)

Variable		Calculated value		Notes (equations are from AP-42, Chapter 7)
Vapor space outage	H_{vo}	3.93	ft	Equation 1-16
Vapor space volume	V_V	1021.05	ft^3	Equation 1-3
Stock vapor density	W_V	0.000	lb/ft^3	Equation 1-21
Vapor Molecular Weight	M_V	130	lb/lb-mole	Table 7.1-2
Vapor pressure	P_{VA}	0.004075302	psia	Table 7.1-2
Vapor space expansion factor	K_E	0.021	dimensionless	Equation 1-7
Vented vapor saturation factor	K_S	0.9992	dimensionless	Constant, see Equation 1-20
Annual net throughput (actual)	Q_a	1714.58	bbl/yr	Equation 1-33
Annual net throughput (potential)	Q_p	2228.96	bbl/yr	Equation 1-33
Working loss turnover factor (actual)	K_{Na}	1.00	dimensionless	Saturation; turnovers >36 = (180 + N) / 6 * N; turnovers at 36 or lower = 1
Working loss turnover factor (potential)	K_{Np}	1.00	dimensionless	Saturation; turnovers >36 = (180 + N) / 6 * N; turnovers at 36 or lower = 1
Working loss product factor	K_P	1	dimensionless	Assume value of 1 for gasoline or diesel.
Ideal gas constant	R	10.731	psia *ft^3/lb-mole*°R	Constant, see Equation 1-22
Daily average liquid surface temperature	T_{LA}	505.97	°R	Equation 1-26
Daily vapor temperature range	ΔT_V	14.68	°R	Equation 1-5
Daily ambient temperature range	ΔT_A	16.40	°R	Equation 1-12
Daily maximum ambient temperature	T_{AX}	514.2	°R	Table 7-1-7. Conversion factor: Rankine = Fahrenheit + 459.67
Daily minimum ambient temperature	T_{AN}	497.8	°R	Table 7-1-7. Conversion factor: Rankine = Fahrenheit + 459.67
Daily average ambient temperature	T_{AA}	505.97	°R	Equation 1-27
Liquid bulk temperature	T_B	505.97	°R	Equation 1-28
Daily vapor pressure range	ΔP_V	0.00	psia	Equation 1-9
Breather vent pressure setting range	ΔP_B	0.06	psi	Equation 1-10
~~Stock ASTM D86 distillation slope~~	~~S~~	~~3.0~~	~~°F/vol%~~	~~Figure 7.1-14a upper range for naphtha. Does not apply to diesel~~
~~Stock Reid vapor pressure~~	~~RVP~~	~~8.0~~	~~psi~~	~~Constant in table 7.1-2 for motor gasoline. S = stock ASTM D86 distillation slope percent evaporation (deg F/vol%). Does not apply to diesel~~.
Total losses (VOC actual emissions)	L_T	**0.82**	lb/yr	Equation 1-1
Total losses (VOC potential emissions)	L_T	**1.06**	lb/yr	Equation 1-1
Standing storage losses	L_S	0.00	lb/yr	Equation 1-2
Working losses (actual)	L_W	0.82	lb/yr	Equation 1-29
Working losses (potential)	L_W	1.06	lb/yr	Equation 1-29

NWP 4/30/2020

VOC emissions from Tank #1

Enter tank specific information in ALL blue cells BEFORE clicking the Input Tank Information button

Tank information

Tank identification	Liquid Asphalt Tank
Description	SN: 7500 EATV-1768-15
Location (city)	Minneapolis-St. Paul

	Property	Value	Units	Description
Input Tank Information	**Fuel type**	PG 22-64		Type of fuel stored in the tank.
	Storage tank position	Above		Fixed roof tank location, above or underground.
	Storage tank orientation	Vertical		Fixed roof tank orientation, horizontal or vertical
	Storage tank roof type	Horizontal		Fixed roof type, cone, dome, or the tank is horizontal
	Actual throughput	37,500	gal/yr	Gallons stored in his tank over the period of 12 consecutive months.
	Actual hours operated	8760	hours/year	Number of hours the tank is being used, usually assumed to be 8760
	Potential throughput	48,750	gal/yr	Calculated based on actual tank throughput divided by the hours operated and m Annual hours operated
	VOC actual emissions	**0.00225**	ton/yr	Amount of VOC actually released over the 12-month period.
	VOC potential emissions	**0.00260**	ton/yr	Amount of VOCs potentially released over a 12-month period.

Physical properties of the tank

Property		Value	Units	Description
Shell length	H_S	11	feet	This is actual length of the tank.
Shell diameter	D	11	feet	This is the width of the cylindrical shell.
Shell radius	R_S	6	feet	Calculated radius
Working volume		7819.3	gallons	Calculated volume
Turnovers per year (actual)		4.8	turnover/year	Calculated number the tank is emptied and refilled, annually.
Turnovers per year (potential)		6.2	turnover/year	Calculated number the tank could be emptied and refilled, annually.
Shell color/shade		Aluminum/unpainted	select one	Tank shell color and shade are used to identify **paint solar absorptance** .
Shell condition		Average	select one	Tank condition is used to identify **paint solar absorptance** . Only aboveground.
Paint solar absorptance	α	0.12	dimensionless	Values from table 7.1-6.Paint effectiveness in absorbing radiant energy.
Roof color/shade		Gray/Medium		Tank shell color and shade are used to identify **paint solar absorptance** .
Roof condition		Average		Tank condition is used to identify **paint solar absorptance** . Only aboveground.
Rooftop Paint solar abosrptance	α	0.71	dimensionless	Values from table 7.1-6.Paint effectiveness in absorbing radiant energy.
Insulation		Insulated		Tank may be surrounded with thermal insulation
Vacuum setting		0	psig	Vacuum setting is a value set for the tank at the facility.
Pressure setting		0	psig	Breather vent pressure is a reading from the tank monitoring system.

Weather data

Property		Value	Units	Description
Nearest major city		Minneapolis-St Paul, MN	Select one	Nearest major city to the tank location.
Average annual maximum temperature	T_{AN}	38.1	°F	Average over a calendar year.
Average annual minimum temperature	T_{AX}	54.5	°F	Average over a calendar year.
Atmospheric pressure	P_A	14.26	psia	Average for the location.
Solar insolation	I	1163.00	Btu/(ft^2·day)	Total for a horizontal surface.

Calculation of VOC Emission = Total Losses (L_T)

Variable		Calculated value		Notes (equations are from AP-42, Chapter 7)
Vapor space outage	H_{vo}	4.32	ft	Equation 1-16
Vapor space volume	V_V	522.70	ft^3	Equation 1-3
Stock vapor density	W_V	0.001	lb/ft^3	Equation 1-21
Vapor Molecular Weight	M_V	105	lb/lb-mole	Table 7.1-2
Vapor pressure	P_{VA}	0.0182	psia	Table 7.1-2
Vapor space expansion factor	K_E	0.026	dimensionless	Equation 1-7
Vented vapor saturation factor	K_S	0.9959	dimensionless	Constant, see Equation 1-20
Annual net throughput (actual)	Q_a	893.01	bbl/yr	Equation 1-33
Annual net throughput (potential)	Q_p	1160.92	bbl/yr	Equation 1-33
Working loss turnover factor (actual)	K_{Na}	1.00	dimensionless	Saturation; turnovers >36 = (180 + N) / 6 * N; turnovers at 36 or lower = 1
Working loss turnover factor (potential)	K_{Np}	1.00	dimensionless	Saturation; turnovers >36 = (180 + N) / 6 * N; turnovers at 36 or lower = 1
Working loss product factor	K_P	1	dimensionless	Assume value of 1 for gasoline or diesel.
Ideal gas constant	R	10.731	psia *ft^3/lb-mole*°R	Constant, see Equation 1-22
Daily average liquid surface temperature	T_{LA}	325.00	°R	Equation 1-26
Daily vapor temperature range	ΔT_V	22.54	°R	Equation 1-5
Daily ambient temperature range	ΔT_A	16.40	°R	Equation 1-12
Daily maximum ambient temperature	T_{AX}	514.2	°R	Table 7-1-7. Conversion factor: Rankine = Fahrenheit + 459.67
Daily minimum ambient temperature	T_{AN}	497.8	°R	Table 7-1-7. Conversion factor: Rankine = Fahrenheit + 459.67
Daily average ambient temperature	T_{AA}	505.97	°R	Equation 1-27
Liquid bulk temperature	T_B	325.00	°R	Equation 1-28
Daily vapor pressure range	ΔP_V	0.02	psia	Equation 1-9
Breather vent pressure setting range	ΔP_B	0.00	psi	Equation 1-10
~~Stock ASTM-D86 distillation slope~~	~~S~~	~~3.0~~	~~°F/vol%~~	~~Figure 7.1-14a upper range for naphtha. Does not apply to diesel~~
~~Stock Reid vapor pressure~~	~~RVP~~	~~8.0~~	~~psi~~	~~Constant in table 7.1-2 for motor gasoline. S = stock ASTM-D86 distillation slope percent evaporation (deg F/vol%). Does not apply to diesel~~.
Total losses (VOC actual emissions)	L_T	**4.49**	lb/yr	Equation 1-1
Total losses (VOC potential emissions)	L_T	**5.21**	lb/yr	Equation 1-1
Standing storage losses	L_S	2.10	lb/yr	Equation 1-2
Working losses (actual)	L_W	2.39	lb/yr	Equation 1-29
Working losses (potential)	L_W	3.11	lb/yr	Equation 1-29

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VOC emissions from horizontal tank #1

Enter tank specific information in all blue cells.

Tank information

Tank identification	East Yard Gasoline Tank
Description	2000 gal UST
Location (city)	Minneapolis, MN

Property	Value	Units
Fuel type	Gasoline	select one
Storage tank position	Under	select one
Actual throughput	50,000	gal/yr
Actual hours operated	8760	hours/year
Potential throughput	65,000	gal/yr
VOC actual emissions	**0.208**	ton/yr
VOC potential emissions	**0.244**	ton/yr

Physical properties of the tank

Property		Value	Units
Shell length	H_S	12	feet
Shell diameter	D	5	feet
Shell effective height	H_E	3.93	feet
Shell effective diameter	D_E	8.74	feet
Shell radius	R_S	2.5	feet
Working volume		576.8	gallons
Turnovers per year (actual)	N	86.7	dimensionless
Turnovers per year (potential)	N	112.7	dimensionless
Shell color/shade		White/NA	select one
Shell condition		Average	select one
Paint solar absorptance	α	0.25	dimensionless
Vacuum setting	P_{BV}	-0.03	psig
Pressure setting	P_{BP}	0.03	psig

Weather data

Property		Value	Units
Nearest major city		Minneapolis - St. Paul	Select one
Average annual maximum temperature	T_{AX}	54.2	°F
Average annual minimum temperature	T_{AN}	35.2	°F
Atmospheric pressure	P_A	14.3	psia
Solar insolation	I	1170.0	Btu/(ft^2·day)

Calculation of VOC Emission = Total Losses (L_T)

Variable		Calculated value	
Total losses (VOC actual emissions)	L_T	**416.40**	lb/yr
Total losses (VOC potential emissions)	L_T	**487.29**	lb/yr
Standing storage losses	L_S	0.00	lb/yr
Working losses (actual)	L_W	416.40	lb/yr
Working losses (potential)	L_W	487.29	lb/yr
Annual net throughput (actual)	Q	3638.46	bbl/yr
Annual net throughput (potential)	Q	4730.00	bbl/yr
Working loss turnover factor (actual)	K_N	0.51	dimensionless
Working loss turnover factor (potential)	K_N	0.43	dimensionless
Stock vapor density	W_V	0.04	lb/ft^3
Vapor Molecular Weight at 60 °F	M_V	68	lb/lb-mole
Vapor pressure	P_{VA}	3.5	psia
Vapor space volume	V_V	117.81	ft^3
Vapor space tank outage	H_{VO}	1.96	feet
Vapor space expansion factor	K_E	0.083	dimensionless
Vented vapor saturation factor	K_S	0.73	dimensionless
Working loss product factor	K_P	1	dimensionless
Ideal gas constant	R	10.731	psia*ft^3/lb-mole*°R
Average vapor temperature	T_V	557.82	°R
Daily average liquid surface temperature	T_{LA}	506.39	°R
Daily vapor temperature range	ΔT_V	19.15	°R
Daily ambient temperature range	ΔT_A	19.00	°R
Daily maximum ambient temperature	T_{AX}	513.90	°R
Daily minimum ambient temperature	T_{AN}	494.90	°R
Daily average ambient temperature	T_{AA}	504.40	°R
Liquid bulk temperature	T_B	505.28	°R
Daily vapor pressure range	ΔP_V	0.54	psia
Breather vent pressure setting range	ΔP_B	0.06	psi
Vapor pressure equation constant	A	11.833	dimensionless
Vapor pressure equation constant	B	5500.6	°R
Vapor pressure at T_{LX}	P_{VX}	2.9222	psia
Vapor pressure at T_{LN}	P_{VN}	2.3796	psia
Maximum T_{LA}	T_{LX}	511.18	°R
Minimum T_{LA}	T_{LN}	501.60	°R

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VOC emissions from horizontal tank #1

Enter tank specific information in all blue cells.

Tank information

Tank identification	East Yard Diesel Tank
Description	2,000 gal UST
Location (city)	Minneapolis, MN

Property	Value	Units
Fuel type	Diesel	select one
Storage tank position	Under	select one
Actual throughput	50,000	gal/yr
Actual hours operated	8760	hours/year
Potential throughput	65,000	gal/yr
VOC actual emissions	**0.0007**	ton/yr
VOC potential emissions	**0.0008**	ton/yr

Physical properties of the tank

Property		Value	Units
Shell length	H_S	12	feet
Shell diameter	D	5	feet
Shell effective height	H_E	3.93	feet
Shell effective diameter	D_E	8.74	feet
Shell radius	R_S	2.5	feet
Working volume		576.8	gallons
Turnovers per year (actual)	N	86.7	dimensionless
Turnovers per year (potential)	N	112.7	dimensionless
Shell color/shade		White/NA	select one
Shell condition		Average	select one
Paint solar absorptance	α	0.25	dimensionless
Vacuum setting	P_{BV}	-0.03	psig
Pressure setting	P_{BP}	0.03	psig

Weather data

Property		Value	Units
Nearest major city		Minneapolis - St. Paul	Select one
Average annual maximum temperature	T_{AX}	54.2	°F
Average annual minimum temperature	T_{AN}	35.2	°F
Atmospheric pressure	P_A	14.3	psia
Solar insolation	I	1170.0	Btu/(ft^2·day)

Calculation of VOC Emission = Total Losses (L_T)

Variable		Calculated value	
Total losses (VOC actual emissions)	L_T	**1.36**	lb/yr
Total losses (VOC potential emissions)	L_T	**1.60**	lb/yr
Standing storage losses	L_S	0.00	lb/yr
Working losses (actual)	L_W	1.36	lb/yr
Working losses (potential)	L_W	1.60	lb/yr
Annual net throughput (actual)	Q	3638.46	bbl/yr
Annual net throughput (potential)	Q	4730.00	bbl/yr
Working loss turnover factor (actual)	K_N	0.51	dimensionless
Working loss turnover factor (potential)	K_N	0.43	dimensionless
Stock vapor density	W_V	0.00	lb/ft^3
Vapor Molecular Weight at 60 °F	M_V	130	lb/lb-mole
Vapor pressure	P_{VA}	0.006	psia
Vapor space volume	V_V	117.81	ft^3
Vapor space tank outage	H_{VO}	1.96	feet
Vapor space expansion factor	K_E	0.034	dimensionless
Vented vapor saturation factor	K_S	1.00	dimensionless
Working loss product factor	K_P	1	dimensionless
Ideal gas constant	R	10.731	psia*ft^3/lb-mole*°R
Average vapor temperature	T_V	557.82	°R
Daily average liquid surface temperature	T_{LA}	506.39	°R
Daily vapor temperature range	ΔT_V	19.15	°R
Daily ambient temperature range	ΔT_A	19.00	°R
Daily maximum ambient temperature	T_{AX}	513.90	°R
Daily minimum ambient temperature	T_{AN}	494.90	°R
Daily average ambient temperature	T_{AA}	504.40	°R
Liquid bulk temperature	T_B	505.28	°R
Daily vapor pressure range	ΔP_V	0.00	psia
Breather vent pressure setting range	ΔP_B	0.06	psi
Vapor pressure equation constant	A	12.101	dimensionless
Vapor pressure equation constant	B	8907	°R
Vapor pressure at T_{LX}	P_{VX}	0.0049	psia
Vapor pressure at T_{LN}	P_{VN}	0.0035	psia
Maximum T_{LA}	T_{LX}	511.18	°R
Minimum T_{LA}	T_{LN}	501.60	°R

Attachment H

Travel Demand Management Plan

AET Project No. 03-21225

TRAVEL DEMAND MANAGEMENT PLAN

HIAWATHA MAINTENANCE FACILITY

MINNEAPOLIS, MINNESOTA

Prepared for:

City of Minneapolis
350 S. 5th St, Room 223
Minneapolis, MN 55415

Prepared by:

Kimley-Horn and Associates, Inc.
767 Eustis Street, Suite 100
St. Paul, MN 55114

December 2020

Kimley»Horn

TRAVEL DEMAND MANAGEMENT PLAN

HIAWATHA MAINTENANCE FACILITY

MINNEAPOLIS, MINNESOTA

PLAN APPROVAL

City of Minneapolis

By: _____ Dated: _____

Minneapolis Community Planning and Economic Development Department

By: _____ Dated: _____

Minneapolis Public Works Department

By: _____ Dated: _____

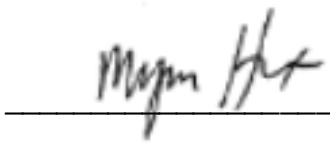
TRAVEL DEMAND MANAGEMENT PLAN

HIAWATHA MAINTENANCE FACILITY

MINNEAPOLIS, MINNESOTA

REPORT CERTIFICATION

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



Morgan Hoxsie, P.E.

License No. 52819

January 14, 2021

Date

Table of Contents

Tables

Figures (Provided in Appendix A)

1.0 BACKGROUND

The City of Minneapolis is proposing to expand the existing Hiawatha Maintenance Facility located on the southwest corner of Hiawatha Avenue (TH 55) and East 26th Street. The proposed redevelopment (Hiawatha Campus) of the facility includes expanding the site to encompass the former Roof Depot property between East 26th Street and East 28th Street along Hiawatha Avenue. This expansion will provide space to expand the current departments on site as well as space for the City of Minneapolis Water Department to expand their services and relocate from their current building at 935 5th Avenue SE.

The existing site currently has access along East 26th Street as well as East 27th Street. The two existing access points will remain in the future and an additional access with be added along East 28th Street. There will be an additional access on Longfellow Avenue that will have direct access to the parking lot for the training center building on the southwest corner of the site.

The new buildings on the redeveloped site are anticipated to be begin construction in 2021 with construction completed in 2024. Full occupancy of the site, which includes growth in the number of total employees at the site, is anticipated by 2025.

A summary of the current and proposed Hiawatha Campus is shown in **Table 1-1**. The building square footage includes the levels above grade including the three-level parking structure.

Table 1-1: Hiawatha Campus Overview

	Current Campus	Proposed Campus
Site Size (acres)	9.06	16.73
Building Size (sq. ft.)	75,472	389,604
Employees	299	529

Figure 1-1 shows the project location as well as the three site accesses that were included in the capacity analysis. All figures in the report are included in **Appendix A**. The proposed site plan is included in **Appendix B**.

CITY OF MINNEAPOLIS TRANSPORTATION GOALS

The following policies for transportation are included in Minneapolis 2040 that was adopted in 2019 by the Minneapolis City Council and effective as of January 1, 2020:

> Policy 6: Regulate land uses, building design, and site design of new development consistent with a transportation system that prioritizes walking first, followed by bicycling and transit use, and lastly motor vehicle use.
>
> Policy 7: Proactively improve the public realm to support a pedestrian friendly, high-quality and distinctive built environment.
>
> Policy 15: Ensure that the quality and function of the transportation system contributes to equitable outcomes for all people.
>
> Policy 16: Reduce the energy, carbon, and health impacts of transportation through reduced single-occupancy vehicle trips and phasing out of fossil fuel vehicles.
>
> Policy 17: Plan, design, build, maintain, and operate the city's transportation system in a way that prioritizes pedestrians first, followed by bicycling and transit use, and lastly motor vehicle use.

Policy 18: Improve the pedestrian environment in order to encourage walking and the use of mobility aids as a mode of transportation.

Policy 19: Improve and expand bicycle facilities in order to encourage bicycling as a mode of transportation.

Policy 25: Support the development and deployment of new transportation technologies that position Minneapolis to benefit from these advancements.

Policy 26: Eliminate fatalities and severe injuries that are a result of crashes on City streets by 2027.

Based on these transportation related policies and the recently adopted *Transportation Action Plan*, the Citywide 2030 mode split goal for all trips is presented in the **Table 1.2**. The City of Minneapolis Public Works, as the developer of this site, has identified an initial employee mode split goal for the Campus. The proposed project is expected to be completed and ready for full use by 2025. So, the initial goal represents the best estimate of what can be accomplished towards meeting the Citywide goal in the first 5 years (2025 to 2030). It should be noted that the Citywide Goal seeks to reduce single occupancy vehicle (SOV) use by 20% (40% to 20%) from 2019 to 2030.

It should be noted that these goals are dependent on future transportation infrastructure such as the METRO Green Line Extension that is expected to be operational by 2025. These goals do not assume the completion of the METRO Blue Line Extension.

Table 1-2: Employee Commute Mode Split Goals

Employee Trip Type	Employee Commuting for the Current Site	Initial Employee Commuting Goal for the Proposed Site	Citywide 2030 Mode Split Goal for All Trips
Walk	<1%	2%	25%
Bike	1-2%	5%	10%
Transit	<1%	11%	25%
Remote Working, Flex Days, Park & Ride, Pool, and Other	10%	15%	20%
Auto (SOV)	88%	66%	20%
Total	**100%**	**100%**	**100%**

With the Travel Demand Management Strategies in this report, the proposed redevelopment will work toward the initial mode split goal listed in Table 1-2. A baseline survey at the proposed development will be performed within one year of full site occupancy to assess employees' and visitors' commuting habits. An additional survey will be performed within two years of full site occupancy and annually until the mode split goal is achieved. Re-assessment of the employee commuting goals will be part of the future survey efforts. In the addition, the employee work activities will be re-considered related to remote meeting technology, electric vehicles, and other existing and future ideas that align with and support the transportation policies.

TRAVEL DEMAND MANAGEMENT GOALS

In an effort to work toward these goals, the City of Minneapolis requires the preparation of a Travel Demand Management Plan (TDMP) for all non-residential development or additions over 100,000 square feet or more of gross floor area or any development or redevelopment projects deemed to have a potential for substantial traffic impact.

This TDMP details the proposed project, including the site's design, location, and proposed amenities that will foster reduction in single occupancy auto vehicle (SOVs) trips, reduced demand for work trips, plus the increased use of alternate transportation modes by employees and visitors. It also references the anticipated traffic and parking changes and any potential impacts of these changes. Finally, the plan outlines specific strategies that the City of Minneapolis will implement to minimize the development's impact on the surrounding neighborhood. These strategies are intended to reinforce the site design and amenities proposed to encourage the use of alternate modes of travel, enhance pedestrian friendliness, and create a balance between all users of the local transportation system.

2.0 ZONING AND LAND USES

The zoning classifications of the site has historically been Medium Industrial District, with Light Industrial District covering the small portion of the site immediately adjacent to Longfellow Avenue. The City of Minneapolis describes Light (I1) and Medium (I2) Industrial Districts as follows:

The I1 Light Industrial District is established to provide clean, attractive locations for low impact and technology-based light industrial uses, research and development, and similar uses which produce little or no noise, odor, vibration, glare or other objectionable influences, and have little or no adverse effect on surrounding properties.

The I2 Medium Industrial District is established to provide locations for medium industrial uses and other specific uses which have the potential to produce greater amounts of noise, odor, vibration, glare or other objectionable influences than uses allowed in the I1 District and which may have an adverse effect on surrounding properties.

In future land use guidance laid out by the City in Minneapolis 2040, the site is identified for Production Mixed Use. The City describes this land use as follows:

Production Mixed Use is a land use designation that allows both production and non-production uses, recognizing that while many buildings in these areas are no longer viable for modern production industries, they are increasingly occupied by a wide variety of uses that contribute to the economic health and diversity of the city. Residential uses are allowed as part of mixed-use buildings that provide production space and must incorporate mitigation strategies to address potential conflicts between existing production uses and new residences. Adaptive re-use of older industrial property is encouraged.

Minneapolis 2040 goes further in describing Built Form guidance for the site, placing it in a Corridor 6 district:

New and remodeled buildings in the Corridor 6 district should reflect a variety of building types on both moderate and large sized lots. Building heights should be 2 to 6 stories. Building heights should be at least 2 stories in order to best take advantage of the access to transit, jobs, and goods and services provided by the Corridor 6 district. Requests to exceed 6 stories will be evaluated on the basis of whether or not a taller building is a reasonable means for further achieving Comprehensive Plan goals.

3.0 PEDESTRIAN, BICYCLE, AND TRANSIT

PEDESTRIAN

The site is located in the Phillips neighborhood in South Minneapolis. Bordering Hiawatha Avenue, residential areas, and industrial/commercial land uses, the site is surrounded by important pedestrian connections.

This location in the Phillips neighborhood has a street grid network that is interrupted by Hiawatha Avenue that is parallel to a railroad corridor as well as the Metro Transit Light Rail Corridor. Existing pedestrian crossing infrastructure along Hiawatha at East 26th Street and East 28th Street provides access to neighborhoods and businesses east of the busy corridor. Both East 26th and East 28th Streets, as well as Cedar Avenue to the west and Hiawatha Avenue to the east, are identified as priority pedestrian corridors in the City's recently adopted *Transportation Action Plan*.

The site is located in an ACP50, an area of concentrated poverty where more than 50 percent of residents are people of color (a Metropolitan Council designation). Historically ACP50s have a higher percentage of renters and lower household car ownership levels, leading to more pedestrian activity.

The City of Minneapolis, through the Metropolitan Council Regional Solicitation Grant Program, is in the process of seeking grant funding to improve pedestrian conditions throughout the Phillips neighborhood and across this ACP50. More information about the location and grant application can be found on the Metropolitan Council website. This grant application has scored well, and final funding awards will be announced in early 2021. This project demonstrates how the City is listening, identifying needs, exploring ideas and seeking internal and external funding that will improve our public transportation infrastructure in ACP50 areas.

The proposed site plan offers an improved pedestrian experience along Longfellow Avenue and East 28th Street. Additional green space on the east side of Longfellow Avenue, south of 27th Street, will replace what is currently aging pavement and a chain-link fence bordering the sidewalk.

BICYCLE

The site is well situated within the surrounding trail and protected on-street bicycling network. **Figure 3-1** shows the existing bicycle infrastructure accessible from the site, including protected on-street bicycle lanes and paved trails. According to the City's recently adopted *Transportation Action Plan*, these facilities are all part of the existing low stress bikeway network.

The Midtown Greenway is adjacent to the proposed site and connects the West River Parkway to the East with the western suburbs, as well as the many neighborhoods in between. Traffic counts from 2017 and 2018 show around 3,000 daily cyclists on the trail just south of East 28th Street. Just east of the site, the Little Earth Trail runs north to Franklin Avenue and south to the Midtown Greenway.

The site is located between two protected on-street bike lanes that serve as vital east-west connections across South Minneapolis. Both East 26th Street and East 28th Street link Hennepin Avenue in Uptown with the trails adjacent to the project site. The project proposes a new shared trail facility along the north side of East 28th Street from Longfellow Avenue easterly to the Midtown Greenway to improve access and connection to the Longfellow residential area and to serve the Campus. The proposed trail is shown in **Appendix B**.

The site will begin with bicycle parking for a total of 53 bicycles, representing 10% of the total employees. The bicycle parking spaces will be located throughout the site with visitors' spaces at the training center and the main office, several spaces at the new water department building, and the majority of the spaces in the dedicated bicycle storage room(s) for the employees. There will be showers and locker rooms provided in two locations on site, in the existing office on the north side of the site and in the new Water building.

The proposed 53 bicycle parking spaces meets the requirements for the site to be LEED certified. The City of Minneapolis provides bicycle parking space requirements for developments based on the land use. This development is considered a street and equipment maintenance facility which does not have a specific bicycle parking space requirement. The site will include some office space and based on table 541-3 in section 541.180 in the Zoning Code, an office land use should provide three bicycle spaces or one bicycle space per 15,000 sq. ft. of GFA, whichever is greater. Therefore, per code and based on the proposed square footage of on-site office, the office use of the proposed site requires a minimum of five bicycle parking spaces with not less than 50 percent of the bicycle parking meeting the standards for long-term bicycle parking. This will be met with the proposed 53 bicycle parking spaces. Public Works intends to increase the bicycle parking spaces to meet the bicycling demand.

TRANSIT

The project site is transit accessible with multiple Metro Transit routes adjacent to or within a few blocks of the proposed site. Details for bus routes that have stops on the streets adjacent to the site are provided below:

Route 22 is a local bus route that runs north-south on Cedar Avenue, one block west of the site. This route connects Brooklyn Center to the VA Medical Center in South Minneapolis via Downtown Minneapolis. This route operates during the weekdays and the weekend. Weekday service is provided with 10-20-minute headways during peak periods and 20-30-minute headways during the midday and evening hours. The buses run on 20-30-minute headways on Saturdays and 30-minute headways on Sundays.

Route 27 is a local bus route that circulates from 4th Avenue and East 28th Street to Hiawatha Avenue and Lake Street. This route connects neighborhoods along Lake Street with Abbott Northwestern, Children's Hospital and Clinic, and Wells Fargo Home Mortgage campuses. This route operates on weekdays only with 30-minute headways.

Lake Street is 0.4 miles from the southern end of the site and serves as an existing high frequency transit resource. **Routes 21** and **53** provide high frequency and limited stop service, respectively, from Uptown Minneapolis to Downtown St. Paul.

The **METRO Blue Line** light rail between downtown Minneapolis and the Mall of America in Bloomington has a station at Lake Street and Hiawatha Avenue. The METRO Blue Line is in the planning stages for a future extension to Brooklyn Park serving north Minneapolis and northwest metro suburbs. The **METRO B Line** arterial bus rapid transit will also serve this corridor in the future.

Cedar Avenue is identified as a future transit priority corridor in the City's recently adopted *Transportation Action Plan*, as is the Midtown Greenway. Unlike Metro Transit that utilizes busy streets for transit stops, Minneapolis Public Schools (MPS) tries to avoid placing bus stops on busy thoroughfares. As a result, MPS has a bus stop at 27th Street and Longfellow Avenue that serves multiple elementary schools. Additional information has been requested from MPS Transportation to better understand the school bus activity around the site, including the number of school buses and routing of school buses to this stop.

4.0 COMPLETE STREETS

When the City Council approved the Hiawatha Campus Expansion concept, one of the staff directions was as follows:

5. Directing Public Works to apply the City's Complete Streets and Vision Zero policies to perform continued analysis of improvements to 26th Street and 28th Street to improve multimodal mobility and community safety.

Public Works not only examined these two streets between Cedar and Hiawatha but also included the streets in the residential area immediately west of the site:

- Cedar Avenue (CSAH 152) between East 26th Street and East 28th Street
- Longfellow Avenue from East 26th Street to East 28th Street
- East 27th Street from Cedar Avenue to the site
- Alleys in the area

The consultant and the City staff met several times and generated a comprehensive and creative list of options to be considered by Public Works for all five streets and the alleys. This comprehensive brainstorming list was further sorted by street and then examined for Quick Implementation Projects in the next five years, Long Term Vision Opportunities that need significant time or resources, and ideas not recommended at this time. This Complete Streets and Vision Zero analysis is presented in **Appendix C**.

Public Works continues to evaluate how best to include several of these ideas in coordination with the Campus project, as part of the existing and future Public Works Capital Improvement Program, and/or with other partners and funding resources. Before moving forward Public Works will be engaging with neighborhood residents about these Complete Streets and Vision Zero ideas. Several of these ideas are long term opportunities and Public Works expects to continue its "good neighbor" outreach and subsequent commitments over many years.

Public Works considers these Complete Streets and Vision Zero brainstorming ideas to be "good neighbor" actions that meet the City Council staff direction, are additive to the TDMP and they are not transportation mitigation strategies required as part of the typical TDMP development approval process.

These good neighbor actions are proposed to be accomplished over the 1 to 5 years. These actions are detailed in Appendix C and are summarized in **Table 4-1**.

Table 4-1: Summary of the Proposed Complete Streets Short-Term Actions

Location	Proposed Next Steps (1-5 Year Short-Term Actions)
East 28th Street & 20th/21st Avenue	**Short-term**: Evaluate raised crossing for the bike trail • Understand Hiawatha Campus Project needs to realign Midtown Greenway for temporary construction
East 28th Street & Midtown Greenway Crossing	**Short-term:** Support Hennepin County's project while evaluating other options and safety improvements. • Study moving 28th St northerly curb as part of Hiawatha campus.
East 26th & East 28th Streets	**Short-term:** Four-to-three (or four-to-two) conversion • Develop road diet restriping layout using low cost treatments and maximize protected bikeway with buffer width and bollards • Hiawatha Campus Project proposes to add a two-way trail on north side of 28th Street from Greenway to Longfellow. • 28th Street northerly curb may be rebuilt and relocated.
Longfellow Avenue & East 26th & East 28th Street Intersections	**Short-term:** Mark crosswalks • Begin with painted crosswalks and painted refuge area for peds to cross 26th & 28th St with low-cost road diet conversion layout noted above • Hiawatha Campus Project may do bump outs on the 28th St portion, if curbs are reconstructed.
Longfellow Avenue	**Short-term:** Consider future traffic calming after other key short-term actions • Monitor travel patterns and changes along Longfellow over the next several years to see how the Cedar Ave temporary changes and any 26th & 28th Street changes impact this street. If issues arise, explore and consider other ideas.
Longfellow Avenue & East 27th Street	**Short-term:** Consider future traffic calming after other key short-term actions
Alleys/East 27th Street	**Short-term:** Retain 27th Street Campus access for emergency purposes only. Prohibit any regular use to/from the Campus for any users thru education and managed operations.
Cedar Avenue	**Short-term:** Leverage the Hennepin County temporary project to improve long-term safety for all users Consider and pilot: • Other paint and bollard treatments at intersections • Right-in and right-out only for both sides of 27th at Cedar and other pedestrian crossing safety treatments at this intersection • Monitor and continue to explore opportunities for a long-term conversion

The streets surrounding the Campus where Complete Streets solutions were considered for this analysis are shown in **Figure 4-1** in **Appendix A.**

5.0 PARKING & SITE CIRCULATION

PARKING

EXISTING SITE

The existing Hiawatha Maintenance Facility has approximately 350 surface parking spaces that serve city fleet vehicles, employees and visitors of the Hiawatha Maintenance Facility. Some of the parking spaces on site are used for the storage of equipment and not all are utilized by vehicles parking. The approximate split of these 350 spaces is presented in **Table 5.1**. It should be noted that the existing site is highly constrained for space and that many employees are parking in fleet spaces after that fleet departs the site each day. The site will expand into the property that was formerly a Roof Depot supply store. The Roof Depot has a surface parking lot on the west side of the property that includes surface parking spaces. The Roof Depot site parking will be repurposed as part of the proposed Campus Expansion.

REDEVELOPED SITE

The site plan proposes approximately 315 employee parking spaces and 353 fleet parking spaces for over the road fleet vehicles. To accommodate the increased parking needs on site, a three-story parking ramp is proposed on site. There will also be surface parking adjacent to the north-south drive aisle and near the parking ramp. A summary of the existing and the proposed parking is shown in **Table 5-1.**

Table 5-1: Parking Summary

Parking Type	Existing (surface only)	Proposed (surface & structured)
Fleet (vehicles)	approx. 150	353
Fleet (equipment storage)	approx. 50	146
Employees	approx. 150	315
Visitors	8	9
Training/Community Center	Not Applicable.	65
Total	**358**	**888**

The existing site is constrained to accommodate the various site needs including, but not limited to buildings, green space, parking for employees and fleet vehicles as well as storage of fleet equipment plus yard storage of materials. The above summary includes approximately 150 designated storage spaces for fleet equipment to be stored/parked when not in use. Examples of fleet equipment include air compressors, trailers and trailered equipment like a skid loader that would be stored in a designated storage space.

The proposed site project design starting point was to identify the unconstrained needs and demands of the site. This unconstrained approach started with every employee, fleet vehicle and fleet equipment being counted as a singular parking/storage space on site. Through the site design process, this unconstrained approach was changed to a constrained approach based on several factors. Factors to reduce the parking supply were examined such as shared parking, and dual use spaces. Based on the results of reviewing those factors, the proposed site was able to reduce its parking demand/supply from the unconstrained condition of having one space per employee/fleet vehicle.

The proposed site includes 315 employee parking spaces for the 529 employees which is 214 spaces less than the original unconstrained approach of one space per employee (40% less employee parking). This was determined based on the existing and future expected sick/vacation time, employees commuting by other modes, remote office and field work, split shifts, flex workdays, as well as shared parking with fleet

vehicles. The proposed employee parking spaces allow for a 3-story parking ramp compared to the originally unconstrained approach which included a 4-story parking ramp.

The site falls into the street and equipment maintenance facility category in the City Code parking requirements. The City Code states that parking minimums and maximums will be as approved by the Conditional Use Permit.

SITE CIRCULATION

The site will have two main access driveways that will be full access for all users (East 26th Street and East 28th Street) as well as a site access on East 27th Street for employees only. As seen in the site plan in **Appendix B**, there will be a north-south drive aisle through the site between East 26th Street and East 28th Street. Appendix B also presents the draft versions of the pedestrian, bicycle, and vehicular circulation. These circulation maps will evolve and will be finalized with the Campus design and transportation management efforts.

Currently, the East 27th Street driveway is limited to use by employees only and no fleet vehicles are permitted to use it. The analysis included in this report will include an analysis with both employee and fleet vehicles being able to access the site at East 27th Street as well as a review of the site operations with no site access at East 27th Street.

The fuel station, which is re-located in the new southerly portion of the site, will be used by City fleet vehicles that are housed on site as well as by City vehicles such as Police, Fire Department, and Public Works that are housed at other city sites.

On the southwest corner of the site is the proposed Training Center building. The Training Center has a surface parking lot and an access onto Longfellow Avenue. The trips to and from the training center were assumed to be included in the total site trips that were provided by the City. To be conservative, all site trips to and from the Training Center were distributed to the main accesses on East 26th Street, East 27th Street, and East 28th Street and no site trips were assigned to the Longfellow driveway for the analysis.

In addition to the proposed Training Center parking, there is visitor parking on the north end of the site near the existing office space, adjacent to the proposed Water building and adjacent to the proposed Central Stores.

6.0 TRAFFIC OPERATIONS

An analysis of the potential traffic impacts associated with the expanded Hiawatha Maintenance Facility site was completed. The assumptions, methodology, results, and recommended improvements are detailed in this section. The following intersections were analyzed for potential traffic impacts:

- East 26th Street and Cedar Avenue
- East 26th Street and Longfellow Avenue
- East 26th Street and Hiawatha Avenue
- East 27th Street and Longfellow Avenue
- East 28th Street and Cedar Avenue
- East 28th Street and Longfellow Avenue
- East 28th Street and Hiawatha Avenue

Additionally, the existing driveway on East 26th Street and the proposed driveway on East 28th Street were also evaluated for traffic operations impacts.

The traffic conditions at these intersections were analyzed under three scenarios during the AM and PM peak hours using Synchro and SimTraffic: Existing Conditions (2020), No-Build Conditions (2025), and Build Conditions (2025). The 2025 analysis assumed that the entire site was fully developed and fully occupied.

EXISTING TRAFFIC CONDITIONS

East 26th Street is a two-way street adjacent to the northern border of the project site. It serves as a westbound one-way roadway from Hennepin Avenue South on the west to Cedar Avenue and extends as a two-way roadway through the Seward neighborhood to the West River Parkway. It is classified as Other Arterial from Hennepin Avenue South to Cedar Avenue and as a local roadway from Cedar Avenue to West River Parkway according to the Metropolitan Council Functional Class System map. The City is in the process of updating several transportation planning documents including the Street Design Guide. The draft Street Design Guide designates East 26th Street as a "Mixed Use Community Connector" street.

In the vicinity of the site, East 26th Street has two westbound lanes, one eastbound lane, and a posted speed limit of 25 miles per hour (mph). Adjacent to the site, street parking is not allowed and there is a westbound protected bike lane. The 2016 AADT volume on this section of East 26th Street was 7,600 vehicles per day (vpd) according to data provided in the City of Minneapolis Transportation Data Management System.

East 28th Street is a two-way street adjacent to the southern border of the project site. It serves as an eastbound one-way roadway from Hennepin Avenue South on the west to Cedar Avenue and extends as a two-way roadway to Hiawatha Avenue. It is classified as Other Arterial from Hennepin Avenue South to Cedar Avenue and as a local roadway from Cedar Avenue to Hiawatha Avenue according to the Metropolitan Council Functional Class System map. The draft Street Design Guide designates East 28th Street as a "Mixed Use Community Connector" street.

In the vicinity of the site, East 28th Street has two eastbound lanes, one westbound lane, and a posted speed limit of 25 mph. Adjacent to the site, street parking is not allowed and there is an eastbound protected bike lane. The 2016 AADT volume on this section of East 28th Street was 6,700 vpd according to data provided in the City of Minneapolis Transportation Data Management System.

Cedar Avenue (CSAH 152) is a two-way Hennepin County roadway that spans from Downtown Minneapolis to the north and transitions to Trunk Highway 77 at the south border of Minneapolis. According to the Metropolitan Council Functional Class System map, Cedar Avenue is an A-minor Augmentor. The draft Street Design Guide designates Cedar Avenue as a "Mixed Use Community Connector" street.

In the vicinity of the site there are two lanes in each direction (northbound and southbound) with parking restrictions during peak periods. During the AM peak period, there is no parking allowed in the northbound lanes and in the PM peak period there is no parking allowed in the southbound lanes. The 2016 AADT volume on this section of Cedar Avenue was 15,000 vpd according to data provided in the City of Minneapolis Transportation Data Management System. In Fall 2020, Hennepin County implemented a temporary change on Cedar Avenue to address pavement conditions in the curb lanes in each direction from 24th Street to 38th Street. A restriping of the street will result in a two-lane roadway with select turn lanes at some intersection.

Longfellow Avenue is a local street that runs north-south on the west side of the project site. There is one lane in each direction between East 26th Street and East 28th Street. The speed limit was 30 mph and was reduced to 20 mph with the citywide speed limit changes in Fall 2020. Parking is used by the neighborhood residential uses. The draft Street Design Guide designates Longfellow Avenue as an "Urban Neighborhood" street.

East 27th Street is a local street that runs westerly from the project site. There is one lane in each direction between the site and Cedar Avenue. The speed limit is currently 30 mph, which will be reduced to 20 mph with the citywide speed limit changes in fall 2020. Parking is used by neighborhood residential uses. The draft Street Design Guide designates 27th Street as an "Urban Neighborhood" street.

Hiawatha Avenue (Trunk Highway 55) is a principal arterial that connects I-94 and I-35W in downtown Minneapolis with Trunk Highway 62 in south Minneapolis. Hiawatha Avenue runs north-south on the east side of the project site. Through this section there are three southbound lanes with one to two additional turn lanes at East 28th Street and East 26th Street, respectively. There are two northbound lanes and a turn lane at East 28th Street, expanding to three northbound lanes and two turn lanes at East 26th Street. The 2016 AADT volume on this section of Hiawatha Avenue was 31,500 vpd according to data provided in the City of Minneapolis Transportation Data Management System. The speed limit on Hiawatha Avenue between East 26th and East 28th Streets is 40 mph. The draft Street Design Guide designates Hiawatha Avenue as a "Mixed Use Regional Connector" street.

The existing geometry of the roadways at the study intersections is illustrated in **Figure 6-1.**

EXISTING TRAFFIC VOLUMES

To analyze traffic operations at the study intersections, turning movement counts were collected on Thursday March 19, 2020 at the study intersections. These counts were collected during the COVID-19 related business and school closures and therefore it was known that they would not be representative of typical existing conditions.

Historic 2017 turning movement counts at the intersection of Hiawatha Avenue and East 26th Street and the 2020 turning movement counts were compared over a 12-hour period to identify adjustment factors that would be needed to normalize the March 2020 intersection counts. In comparing the AM and PM peak periods as well as the 12-hour total on East 26th Street, it was calculated that the 12-hour 2020 volumes were approximately 68% of the 2017 volumes. In the AM Peak, the 2020 volumes were 70% of 2017 volumes resulting in a 42% adjustment factor. In the PM Peak the 2020 volumes were 61% of 2017 traffic volumes so a 63% adjustment factor was needed. The East 26th Street volume comparisons, which found

that that the March 2020 traffic was approximately 30% lower than normal, is consistent with various reports by INRIX and other big data producers regarding the reduction in traffic volumes due to COVID-19. For the study, volumes were rounded to the nearest 5 and were balanced between the intersections where it was appropriate. The peak hour volumes from each intersection were used in the analysis rather than volumes based on a network peak hour.

The adjusted turning movement volumes for the Existing Conditions (2020) are shown in **Figure 6-2.** Additionally, raw 2020 traffic count data for the study intersections and driveways is shown in **Appendix D**.

BACKGROUND GROWTH

No-Build (2025) traffic was calculated by applying a 0.25% annual growth rate from 2020 to 2025. This growth rate percentage was determined based on historic AADTs in the vicinity of the site, knowledge of the area as well as conversations with the City of Minneapolis. This growth rate is appropriate due to no known significant background growth or redevelopment in the area that will impact the traffic volumes on the roadways surrounding the site. The No-Build (2025) volumes assumed the same peak hours and peak hour factors as the Existing Conditions (2020) volumes. The forecasted No-Build (2025) turning movement volumes are provided in **Figure 6-3.**

TRIP GENERATION

The trip-generating potential of the proposed site is unique and the land use types in the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, Tenth Edition are not applicable. Instead, the trip generation was calculated using the following three sources:

- Site-specific trip generation data that was summarized in a January 16, 2019 *Hiawatha Yards Master Plan Traffic Analysis* memo
- Existing site trips that were collected on Thursday March 19, 2020
- Information on projected site operations provided by the City

To create the-site specific trip generation information, interviews were conducted with employees of the Hiawatha Maintenance Facility to determine the site trip patterns throughout the day. Based on the interviews, the daily trips for each department on site were determined. Most of the departments have two types of trips:

- Personal Vehicles
    - Employees enter the site in their personal vehicles, typically before or during the street network AM peak hour, and park on site.
    - Employees leave the site in their personal vehicles after their shift, which is typically before the street network PM peak hour.
- Fleet Vehicles
    - Within a half hour or so of the employees' arrival, fleet vehicles leave the site for daily work off site.
    - Fleet vehicles sometimes return to the site during the day for lunch or to pick up additional supplies.
    - The fleet vehicles arrive back on site at the end of the work shift, typically between 2:00PM and 3:00PM.

The employee interviews were used to determine the number of vehicles on site for every hour during the day for both passenger vehicles and fleet vehicles (passenger and heavy). **Figure 6-1** shows the

anticipated number of vehicles on site throughout a 24-hour period for all the vehicle types as well as for the total vehicles.

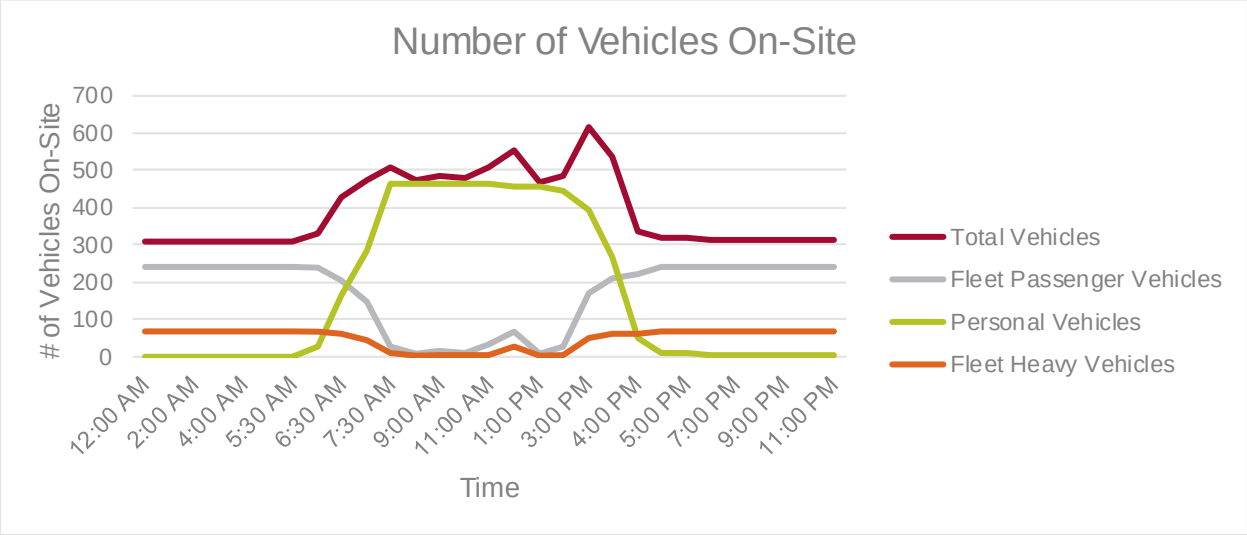


Exhibit 6-1 – Number of Vehicles On-Site

The peak number of vehicles on site in the AM peak period is at 7:30AM and the peak number of vehicles on site in the PM peak period is at 3:00PM. The peak times for the number of vehicles on site are important because the site will generate the most trips right before and after these time periods. The site AM peak hour with employees arriving and fleet vehicles departing the site overlaps partially with the AM peak hour of the adjacent street network. The site PM peak hour occurs earlier than the PM peak hour of the adjacent street network. It was also noted that this time-of-day pattern is slightly different during winter operations, when employees and fleet vehicles are operating overnight for street plowing. However, the time period analyzed reflects the spring/summer/fall operations when overall traffic in and out of the site is highest.

The number of vehicles on site along with the estimated arrival and departure time of the site vehicles were used to determine the number of site trips during the weekday peak hours. With the redevelopment of the site and full occupancy, it is estimated that the site will generate 365 total trips during the weekday AM peak hour and 68 total trips during the weekday PM peak hour.

To determine the magnitude of additional trips during the AM and PM peak hours due to the expanded site, the Build Conditions (2025) trip generation was compared to the existing site trips. Based on the March 2020 turning movements counts that were factored based on the historic counts, there are currently 165 AM peak hour site trips and 50 PM peak hour site trips. The net change in site trips during peak hours will be the net new site trips and is shown in **Table 6-1**. The peak hours analyzed the peak hours for site trips.

Table 6-1: Trip Generation

	AM Peak Hour (7:30AM – 8:30AM)			PM Peak Hour (3:00PM – 4:00PM)		
	Trips Enter	Trips Exit	Total Trips	Trips Enter	Trips Exit	Total Trips
Proposed Site Trips (Full Occupancy)	181	184	365	26	42	68
Existing Site Trips	65	100	165	25	25	50
Net New Site Trips	**+116**	**+84**	**+200**	**+1**	**+17**	**+18**

The net new site trips represent the additional new traffic that the site will be generating in addition to the existing site trips.

TRIP DISTRIBUTION AND ASSIGNMENT

It was assumed that the personal vehicle traffic would be distributed to the three driveways East 26th Street, East 27th Street, and East 28th Street as follows:

- 45% to/from East 26th Street driveway
- 45% to/from East 28th Street driveway
- 10% to/from East 27th Street driveway

All fleet vehicles were distributed evenly between the East 26th Street and East 28th Street accesses. Fleet vehicles will not be allowed to use the East 27th Street access to the site to limit the traffic impact on the residential streets of Longfellow Avenue and East 27th Street. With this future distribution of passenger vehicles and fleet vehicles, some of the existing site trips will be redistributed from the existing East 27th Street driveway to the East 26th Street driveway and the East 28th Street driveway.

This distribution is based on the current traffic patterns in the area and a general assessment of the major regional roadways outside of the study area. The trip distribution for the site-generated traffic is shown in **Figure 6-4.** The distribution is shown for all three site accesses. A map displaying the site-generated trip assignment is provided in **Figure 6-5.**

BUILD TRAFFIC

Figure 6-6 provides the total peak hour traffic volumes for Build Conditions (2025). This is a combination of the No-Build (2025) traffic volumes and the site-generated traffic volumes for the proposed development.

INTERSECTION CAPACITY ANALYSIS

Models of each scenario were developed using Synchro, and the delay and queueing were evaluated for each scenario using SimTraffic. The light rail train (LRT) operations at the intersection of East 26th Street & Hiawatha Avenue were not included in the analysis. There are frequent LRT disruptions and the resulting operations reported in this report may not fully represent those conditions.

The Existing Conditions (2020) scenario was analyzed first to provide an understanding of the existing delay and queueing issues within the study area. The No-Build Conditions (2025) were then analyzed to provide an understanding of any potential delay or queueing issues within the project area that are likely to occur without the development of the site. Lastly, the Build Conditions (2025) were analyzed to identify any locations within the network that may be directly impacted by the site and the new trips it is anticipated to generate.

The signal timing for the study intersections was provided by the City of Minneapolis. The citywide speed limit changes that occurred in Fall 2020 were included in the No-Build Conditions (2025) model as well as the Build Conditions (2025).

EXISTING CONDITIONS (2020)

Under Existing Conditions (2020) in the AM peak hour all intersections are operating at LOS D or better and in the PM peak hour all intersections are operating at LOS C or better except for the intersection of East 26th Street & Hiawatha Avenue and the intersection of East 28th Street & Hiawatha Avenue which are LOS E.

The SimTraffic results for the Existing Conditions (2020) are shown in **Table 6-2** for the AM Peak and **Table 6-3** for the PM Peak. The SimTraffic reports are provided in **Appendix E**.

Table 6-2: Existing Conditions (2020) AM Peak Operations

Intersection			Left		Through		Right		Intersection	
			Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
East 26th Street & Cedar Avenue	Signalized	WB	37.8	D	36.9	D	30.9	C	18.0	B
		WB	12.2	B	8.9	A	5.9	A		
		SB	17.6	B	7.3	A	4.3	A		
East 26th Street & Longfellow Avenue	NB Stop controlled	EB	--	--	0.2	A	0.3	A	0.5	A
		WB	1.8	A	0.4	A	--	--		
		NB	5.9	A	--	--	3.4	A		
East 26th Street & Site Access	NB Stop controlled	EB	--	--	0.2	A	0.1	A	3.7	A
		WB	6.0	A	3.9	A	--	--		
		NB	8.4	A	--	--	3.3	A		
East 26th Street & Hiawatha Avenue	Signalized	EB	56.9	E	42.8	D	19.6	B	35.2	D
		WB	100+	F	61.6	E	14.1	B		
		NB	66.2	E	46.8	D	4.1	A		
		SB	49.5	D	28.3	C	5.1	A		
East 27th Street & Longfellow Avenue	NB/SB Stop controlled	EB	1.1	A	0.0	A	0.0	A	1.9	A
		WB	1.1	A	0.0	A	0.0	A		
		NB	0.0	A	3.9	A	2.6	A		
		SB	0.0	A	3.8	A	2.5	A		
East 28th Street & Cedar Avenue	Signalized	EB	69.7	E	57.8	E	49.1	D	27.8	C
		WB	56.6	E	--	--	14.3	B		
		NB	--	--	6.7	A	4.8	A		
		SB	22.5	C	11.9	B	--	--		
East 28th Street & Longfellow Avenue	SB Stop controlled	EB	2.7	A	2.4	A	--	--	2.4	A
		WB	--	--	0.2	A	0.1	A		
		SB	5.6	A	--	--	3.8	A		
East 28th Street & Hiawatha Avenue	Signalized	EB	80.3	F	0.5	A	11.8	B	23.6	C
		NB2	86.0	F	--	--	14.6	B		
		NB1	82.9	F	16.9	B	--	--		
		SB	--	--	22.3	C	2.6	A		

Table 6-3: Existing Conditions (2020) PM Peak Operations

Intersection			Left		Through		Right		Intersection	
			Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
East 26th Street & Cedar Avenue	Signalized	WB	63.1	E	67.8	E	63.5	E	33.1	C
		WB	41.9	D	32.4	C	32.3	C		
		SB	32.1	C	11.9	B	10.3	B		
East 26th Street & Longfellow Avenue	NB Stop controlled	EB	--	--	0.3	A	0.5	A	10.8	B
		WB	7.9	A	11.9	B	--	--		
		NB	42.4	E	1.2	A	9.3	A		
East 26th Street & Site Access	NB Stop controlled	EB	--	--	0.2	A	0.0	A	5.5	A
		WB	9.8	A	6.3	A	--	--		
		NB	13.3	B	--	--	3.5	A		
East 26th Street & Hiawatha Avenue	Signalized	EB	57.8	E	46.3	D	28.5	C	57.1	E
		WB	100+	F	100+	F	34.2	C		
		NB	59.3	E	89.6	F	17.3	B		
		SB	55.0	D	33.0	C	5.2	A		
East 27th Street & Longfellow Avenue	NB/SB Stop controlled	EB	1.8	A	0.0	A	0.1	A	3.0	A
		WB	0.0	A	0.0	A	0.0	A		
		NB	4.2	A	5.0	A	2.7	A		
		SB	4.5	A	3.9	A	2.5	A		
East 28th Street & Cedar Avenue	Signalized	EB	47.7	D	44.0	D	43.6	D	30.3	C
		WB	99.8	F	0.5	A	36.2	D		
		NB	--	--	16.8	B	8.0	A		
		SB	26.9	C	14.2	B	--	--		
East 28th Street & Longfellow Avenue	SB Stop controlled	EB	6.8	A	9.2	A	--	--	8.5	A
		WB	--	--	0.6	A	0.1	A		
		SB	27.6	D	--	--	5.5	A		
East 28th Street & Hiawatha Avenue	Signalized	EB	100+	F	24.1	C	28.5	C	79.1	E
		NB2	92.2	F	--	--	58.2	E		
		NB1	88.4	F	93.1	F	--	--		
		SB	--	--	79.4	E	6.8	A		

NO-BUILD CONDITIONS (2025)

For No-Build Conditions (2025), all signal timing remained the same as the Existing Conditions (2020). Under No-Build Conditions (2025) in the AM peak hour all intersections are operating at LOS D or better and in the PM peak hour all intersections are operating at LOS C or better except for the intersection of East 26th Street & Hiawatha Avenue and the intersection of East 28th Street & Hiawatha Avenue which are LOS E and LOS F, respectively.

The intersection delay SimTraffic results for the No-Build Conditions (2025) are shown in **Table 6-4** for the AM Peak and **Table 6-5** for the PM Peak. The SimTraffic reports are provided in **Appendix E**.

Table 6-4: No-Build Conditions (2025) AM Peak Operations

Intersection			Left		Through		Right		Intersection	
			Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
East 26th Street & Cedar Avenue	Signalized	WB	35.1	D	36.5	D	27.8	C	18.1	B
		WB	11.8	B	9.2	A	7.1	A		
		SB	19.7	B	8.0	A	4.6	A		
East 26th Street & Longfellow Avenue	NB Stop controlled	EB	--	--	0.2	A	0.1	A	0.5	A
		WB	1.7	A	0.4	A	--	--		
		NB	4.7	A	--	--	3.5	A		
East 26th Street & Site Access	NB Stop controlled	EB	--	--	0.2	A	0.2	A	3.8	A
		WB	5.8	A	3.9	A	--	--		
		NB	7.3	A	--	--	3.1	A		
East 26th Street & Hiawatha Avenue	Signalized	EB	57.7	E	47.0	D	24.3	C	36.5	D
		WB	100+	F	60.9	E	14.6	B		
		NB	66.3	E	49.5	D	5.2	A		
		SB	48.5	D	29.2	C	5.2	A		
East 27th Street & Longfellow Avenue	NB/SB Stop controlled	EB	0.9	A	0.1	A	0.0	A	1.9	A
		WB	1.2	A	0.0	A	0.0	A		
		NB	0.0	A	3.9	A	2.8	A		
		SB	0.0	A	3.7	A	2.9	A		
East 28th Street & Cedar Avenue	Signalized	EB	68.8	E	59.4	E	47.6	D	27.5	C
		WB	49.5	D	--	--	11.0	B		
		NB	--	--	6.7	A	5.1	A		
		SB	19.2	B	12.0	B	--	--		
East 28th Street & Longfellow Avenue	SB Stop controlled	EB	2.6	A	2.4	A	--	--	2.3	A
		WB	--	--	0.1	A	0.1	A		
		SB	6.1	A	--	--	2.9	A		
East 28th Street & Hiawatha Avenue	Signalized	EB	78.4	E	0.5	A	12.5	B	35.1	D
		NB2	88.2	F	--	--	24.7	C		
		NB1	78.5	E	35.6	D	--	--		
		SB	--	--	33.2	C	3.5	A		

Table 6-5: No-Build Conditions (2025) PM Peak Operations

Intersection			Left		Through		Right		Intersection	
			Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
East 26th Street & Cedar Avenue	Signalized	WB	60.0	E	66.7	E	64.3	E	30.9	C
		WB	37.9	D	27.8	C	25.5	C		
		SB	35.7	D	11.8	B	10.6	B		
East 26th Street & Longfellow Avenue	NB Stop controlled	EB	--	--	0.3	A	0.2	A	1.5	A
		WB	12.9	B	11.8	B	--	--		
		NB	32.0	D	--	--	19.3	C		
East 26th Street & Site Access	NB Stop controlled	EB	--	--	0.1	A	--	--	4.7	A
		WB	10.9	B	5.4	A	--	--		
		NB	11.8	B	--	--	3.1	A		
East 26th Street & Hiawatha Avenue	Signalized	EB	56.6	E	44.3	D	26.2	C	56.7	E
		WB	100+	F	84.2	F	32.6	C		
		NB	65.8	E	91.4	F	20.5	C		
		SB	57.2	E	35.1	D	5.4	A		
East 27th Street & Longfellow Avenue	NB/SB Stop controlled	EB	1.1	A	0.0	A	0.1	A	2.4	A
		WB	0.0	A	0.0	A	0.0	A		
		NB	3.6	A	3.4	A	2.4	A		
		SB	4.1	A	3.4	A	2.4	A		
East 28th Street & Cedar Avenue	Signalized	EB	43.5	D	44.5	D	49.4	D	28.8	C
		WB	68.3	E	--	--	19.2	B		
		NB	--	--	16.2	B	8.6	A		
		SB	23.2	C	13.6	B	--	--		
East 28th Street & Longfellow Avenue	SB Stop controlled	EB	6.5	A	11.2	B	--	--	10.3	B
		WB	--	--	0.4	A	0.2	A		
		SB	25.2	D	--	--	25.9	D		
East 28th Street & Hiawatha Avenue	Signalized	EB	100+	F	29.5	C	29.8	C	100+	F
		NB2	88.6	F	--	--	59.0	E		
		NB1	100+	F	100+	F	--	--		
		SB	--	--	79.4	E	7.0	A		

BUILD CONDITIONS (2025)

For Build Conditions (2025), all signal timing remained the same as Existing Conditions (2020). Under Build Conditions (2025) in the AM peak hour all intersections are operating at LOS D or better and in the PM peak hour all intersections are operating at LOS C or better except for the intersection of East 26th Street & Hiawatha Avenue which is anticipated to operate at LOS E.

The intersection delay SimTraffic results for the development with Build Conditions (2025) are shown in **Table 6-6** and **Table 6-7** for the AM and PM Peaks respectively. In this scenario, the proposed site driveway was analyzed along 28th Street. The SimTraffic reports are provided in **Appendix E**.

Table 6-6: Build Conditions (2025) AM Peak Operations

Intersection			Left		Through		Right		Intersection	
			Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
East 26th Street & Cedar Avenue	Signalized	WB	33.5	C	35.5	D	31.9	C	17.7	B
		WB	12.4	B	9.2	A	6.2	A		
		SB	19.7	B	9.0	A	7.1	A		
East 26th Street & Longfellow Avenue	NB Stop controlled	EB	--	--	0.3	A	0.2	A	0.6	A
		WB	2.1	A	0.4	A	--	--		
		NB	7.5	A	0.9	A	3.8	A		
East 26th Street & Site Access	NB Stop controlled	EB	--	--	0.2	A	0.2	A	4.0	A
		WB	5.6	A	4.1	A	--	--		
		NB	8.5	A	--	--	3.5	A		
East 26th Street & Hiawatha	Signalized	EB	55.7	E	46.7	D	26.5	C	36.0	D
		WB	100+	F	65.2	E	14.3	B		
		NB	64.9	E	48.2	D	4.5	A		
		SB	48.5	D	29.3	C	5.6	A		
East 27th Street & Longfellow Avenue	NB/SB Stop controlled	EB	1.0	A	0.0	A	0.1	A	2.1	A
		WB	0.9	A	0.0	A	--	--		
		NB	--	--	3.7	A	2.6	A		
		SB	3.5	A	--	--	2.4	A		
East 28th Street & Cedar Avenue	Signalized	EB	66.4	E	58.2	E	42.3	D	27.3	C
		WB	49.9	D	0.4	A	20.3	C		
		NB	--	--	7.5	A	5.1	A		
		SB	16.6	B	14.2	B	--	--		
East 28th Street & Longfellow Avenue	SB Stop controlled	EB	2.9	A	2.0	A	--	--	1.9	A
		WB	--	--	0.3	A	0.2	A		
		SB	10.0	A	0.6	A	3.2	A		
East 28th Street & Site Access	SB Stop controlled	EB	2.0	A	1.0	A	--	--	1.7	A
		WB	--	--	0.3	A	0.1	A		
		SB	--	--	--	--	--	--		
East 28th Street & Hiawatha Avenue	Signalized	EB	8.4	A	--	--	3.8	A	25.5	C
		NB2	80.9	F	1.4	A	12.1	B		
		NB1	87.7	F	--	--	18.2	B		
		SB	81.2	F	16.9	B	--	--		

Table 6-7: Build Conditions (2025) PM Peak Operations

Intersection			Left		Through		Right		Intersection	
			Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS	Delay (s/veh)	LOS
East 26th Street & Cedar Avenue	Signalized	WB	54.2	D	59.9	E	57.8	E	31.8	C
		WB	44.7	D	35.0	C	30.7	C		
		SB	43.6	D	12.2	B	10.9	B		
East 26th Street & Longfellow Avenue	NB Stop controlled	EB	--	--	0.3	A	0.1	A	7.3	A
		WB	8.2	A	8.1	A	--	--		
		NB	27.5	D	0.9	A	10.9	B		
East 26th Street & Site Access	NB Stop controlled	EB	--	--	0.1	A	0.0	A	4.4	A
		WB	6.0	A	5.2	A	--	--		
		NB	6.4	A	--	--	3.0	A		
East 26th Street & Hiawatha	Signalized	EB	60.3	E	50.0	D	23.8	C	60.3	E
		WB	100+	F	99.7	F	35.4	D		
		NB	63.1	E	69.8	E	29.0	C		
		SB	56.4	E	34.6	C	5.6	A		
East 27th Street & Longfellow Avenue	NB/SB Stop controlled	EB	1.0	A	--	--	0.0	A	2.2	A
		WB	--	--	0.1	A	--	--		
		NB	3.5	A	3.6	A	--	--		
		SB	--	--	3.5	A	2.6	A		
East 28th Street & Cedar Avenue	Signalized	EB	52.1	D	40.5	D	43.4	D	30.1	C
		WB	88.7	F	2.1	A	37.4	D		
		NB	--	--	18.3	B	7.4	A		
		SB	25.4	C	14.2	B	--	--		
East 28th Street & Longfellow Avenue	SB Stop controlled	EB	4.1	A	5.3	A	--	--	4.8	A
		WB	--	--	0.3	A	0.3	A		
		SB	14.6	B	0.5	A	3.7	A		
East 28th Street & Site Access	SB Stop controlled	EB	2.4	A	4.0	A	--	--	3.6	A
		WB	--	--	0.2	A	0.0	A		
		SB	13.5	B	--	--	3.0	A		
East 28th Street & Hiawatha Avenue	Signalized	EB	84.4	F	8.6	A	28.3	C	41.7	D
		NB2	92.5	F	--	--	--	--		
		NB1	86.8	F	27.2	C	--	--		
		SB	--	--	44.2	D	4.6	A		

Build Conditions (2025) Without East 27th Street Site Access

The impacts on the study intersections was reviewed if the East 27th Street access was removed. The proposed site will already prohibit fleet vehicles from using the East 27th Street access and is anticipating that only 10% of the personal vehicle site traffic will utilize the East 27th Street access. There are currently 25 AM peak hour trips and 35 PM peak hour site trips. The proposed net new trips will be adding 12 AM peak hour trips and reducing the PM peak hour site by 2 site trips. The impact on the study intersections if these site trips were to be redistributed would be insignificant on the operations. The reduction of site trips on East 27th Street and Longfellow Avenue would be a benefit to the adjacent residential area.

CAPACITY ANALYSIS SUMMARY

Based on the capacity analysis, the delay and LOS at the study intersections is not significantly impacted by the expansion of the Hiawatha Maintenance Facility. There are currently capacity issues at some of the study intersections and the additional site traffic does not significantly increase the delay at these intersections. As a result, there are no improvements required at the study intersections to maintain the current and reasonable traffic operations.

As noted in the previous Section 4 Complete Streets, there are current projects along with a proposed list of short-term and long-term projects that could further improve streets around the Hiawatha Campus. Public Works intends to pursue these ideas and engage the neighborhood regarding these proposed short and long-term improvements. The City goal is to make improvements to the site and the surrounding streets to improve the accessibility, safety and options for all transportation users.

7.0 TRAVEL DEMAND MANAGEMENT STRATEGIES

The purpose of this TDMP is to assist the City of Minneapolis to achieve their overall transportation goals as they relate specifically to the Hiawatha Maintenance Facility site, by managing and minimizing the vehicle trips generated by the development.

This section outlines specific travel demand management strategies to be implemented by the City of Minneapolis at the Hiawatha Maintenance facility. The strategies detail the duties of the City as the site developers in addressing the transportation issues cited in this document.

The City of Minneapolis Public Works, by accepting the responsibility of implementing the items below for the proposed development, desires to achieve the City's goal of enhancing the local transportation system by lowering peak period demands, reducing single occupant vehicle (SOV) use as noted in Exhibit 6-1, and helping to achieve improved conditions for the most vulnerable users of the transportation system.

STRATEGY COMMITMENTS

The City of Minneapolis Public Works specifically commits to the implementation of the following measures for the project:

General

1. Designate a TDM liaison for the site that will maintain, monitor, and coordinate the various TDM strategies that require ongoing attention.
2. Conduct baseline surveys to assess employee commuting habits within one year of the site opening. Conduct a follow-up survey within two years of site opening, and annually until mode split goals are achieved.
3. Provide information and educate Public Works employees on how to access and use all the modal options to/from the site.
4. Provide a flyer in each employee's paperwork outlining the multi-modal options around and to/from the site.
5. Reach out to shared bicycle and scooter companies to discuss existing and future services for the site.

Pedestrians

6. Maintain clear, well-lit sidewalks within the site to connect to the municipal sidewalk system.
7. Provide and maintain a pedestrian connection to the Midtown Greenway.
8. Further explore other pedestrian amenities and benefits that encourage and support increased walking for work trips and commuting trips.

Bicyclists

9. Provide a new direct employee pedestrian and bicycle access to/from the east side Campus gate connecting with the trail and sidewalk systems near the Martin Sabo Midtown Greenway bridge.
10. Provide a new trail along the north side of 28th Street from Longfellow Avenue easterly to the Midtown Greenway trail to improve access and connection to the Longfellow residential area and to serve the Campus.
11. Post a map and/or other current information pertaining to the Regional Trail system.

12. Provide on-site lockers/showers in the proposed Water Department building and in the existing office building.
13. The City will begin with 53 bicycle parking spaces for employees/visitors and will further expand bicycle parking based on demand.
14. Educate employees of the on-site employee bike parking facility and the on-site locker and shower facilities.
15. Further explore other bicycle amenities and benefits that encourage and support increased bicycle use for work trips and commuting trips. Some amenity ideas to encourage and sustain bicycle ridership include, but are not limited to, bicycle fix-it station near East 28th Street/Greenway location, employee bikes for work and after work use for health benefits, form a bike club, "buddy ride system" to encourage and support new riders, ride to work days, etc. More exploration and development of ideas will occur in the next few years prior to construction completion.

Transit

16. Provide a real-time transit screen inside the front office that will provide detailed information about transit routes and schedules in real time. The City will work with Metro Transit in providing this service.
17. Make available transit pass/cards to promote transit use for employee work trips to City Hall, new city public service building, and other Public Works facilities.
18. Provide a free transit pass/cards for all Hiawatha employees that commute by transit three or more days per week. Public Works will pilot this strategy at Hiawatha Campus and examine how it may be expanded to other Public Works facilities and locations. Currently, the City provides a discounted monthly transit employee benefit ($83/month pass is discounted to $40 or $50/month.). This proposed city pilot would be a unique application to aggressively encourage transit use to a non-downtown City facility with the focus on increasing the employee commuting transit mode shift goal. Use of LRT and direct bus routes in tandem with park & ride will be key to the success of increasing the transit mode shift goal.
19. Provide appropriate maps within the development to guide and direct employees and visitors to the Metro Transit stations and stops adjacent to the site.

Parking

20. Public Works and the Hiawatha Project Team have taken considerable efforts to examine the parking demand and supply for the site with the goal to minimize parking to support citywide climate and transportation goals. As previously noted in this document, considerable efforts have been taken to reduce and minimize the overall parking supply. This reduced parking supply was accomplished by various ways such as existing and future expected sick/vacation time, commuting by other modes, remote office work based on COVID pandemic actions, possible field workers reporting directly to the field site, split shifts, flex workdays such as four 10 hour days or flex office start times or flex field jobsite start times, as well as shared parking with fleet vehicles. Public Works will continue to explore other parking reduction ideas and actively manage the parking supply/use during the project design process and project construction. To maximize the site, a robust parking space monitoring system is being explored and tested for possible future use.

21. Public Works will develop a parking operations and management plan to be implemented for opening day. This plan will include, but is not limited to:

    a. Bicycle parking

    b. Shared employee and fleet parking provisions

    c. Prohibit parking in the adjacent neighborhoods by Public Works employees commuting or visiting the site through employee education, actively manage employee parking, and site access controls along the west side of the campus.

Fleet and Employee Vehicle Traffic

22. Public Works will develop employee guidance and an action plan to maximize work trips away from the nearby residential areas. This will result in fleet and employee vehicular trips using Hiawatha Avenue as the primary entry and exit route.

    The existing driveway via East 27th Street will be retained for emergency use only based on the two analysis scenarios. Emergency use may include snow emergencies that average about 3 to 5 times each winter season. Regular daily use by pedestrians, bicyclists, employees and fleet will not be allowed to minimize site traffic and parking in the adjacent residential area. Public Works will manage this reduced use of the 27th Street gated driveway.

Adjacent Street Improvements

24. As noted in Section 4 and Appendix C, there has been a Complete Streets and Vision Zero review, analysis and brainstorming of ideas for improvements to nearby streets. Public Works has identified some short-term next steps to pursue, develop and engage with the community with the intent to implement over the next 1 to 5 years.

Other

25. Public Works Management and the Divisions located at the Campus will continue to explore, analyze, and potentially develop further transportation management strategies during the project design process, project construction, and after opening day.

8.0 APPENDIX

A. Figures

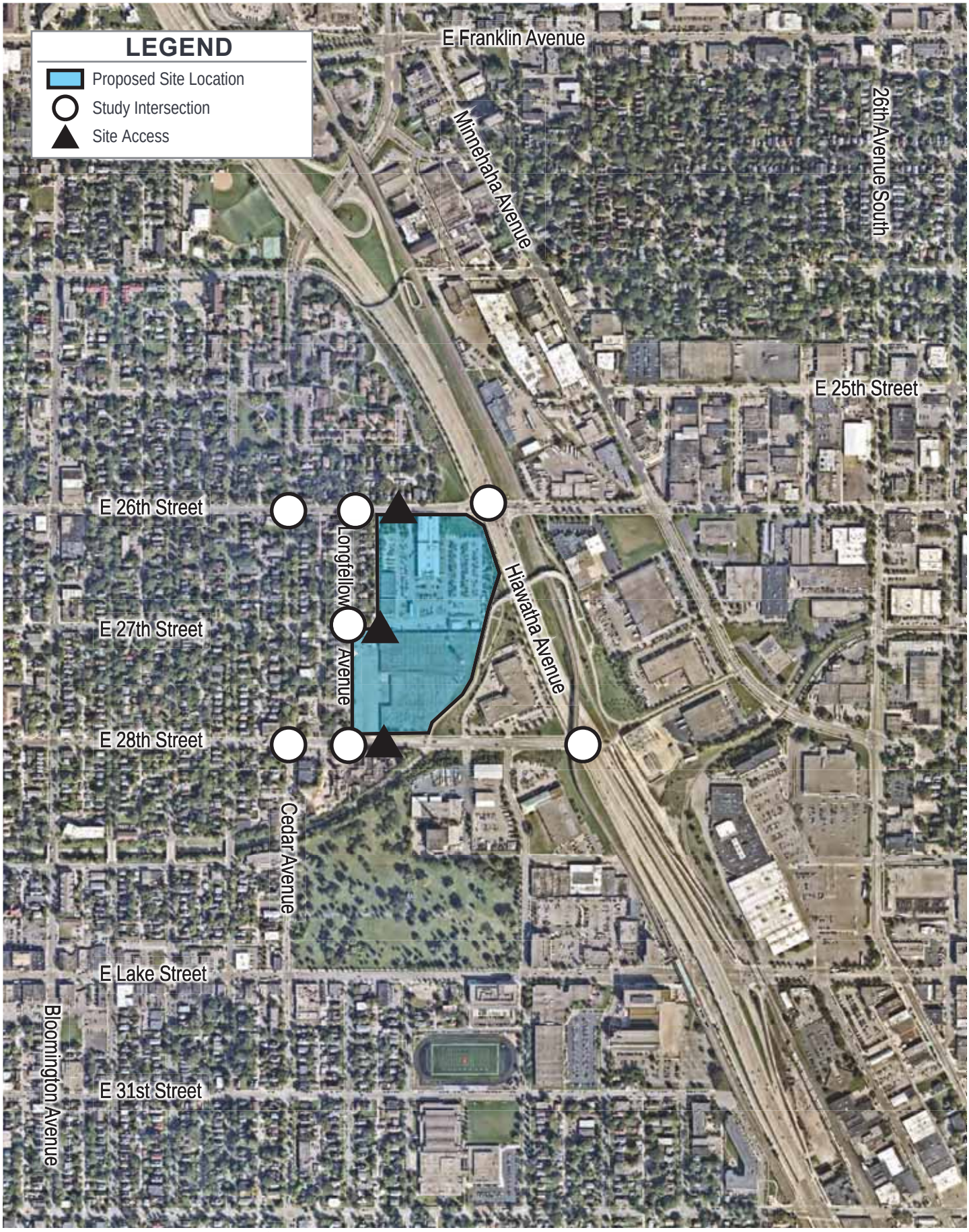
B. Site Plan, Proposed Bike Connection and Draft Site Circulation Maps

C. Complete Streets

D. Existing Traffic Counts

E. SimTraffic Reports

Appendix A: Figures



Kimley»Horn

N

NOT TO SCALE

FIGURE 1-1

PROJECT SITE LOCATION AND STUDY AREA

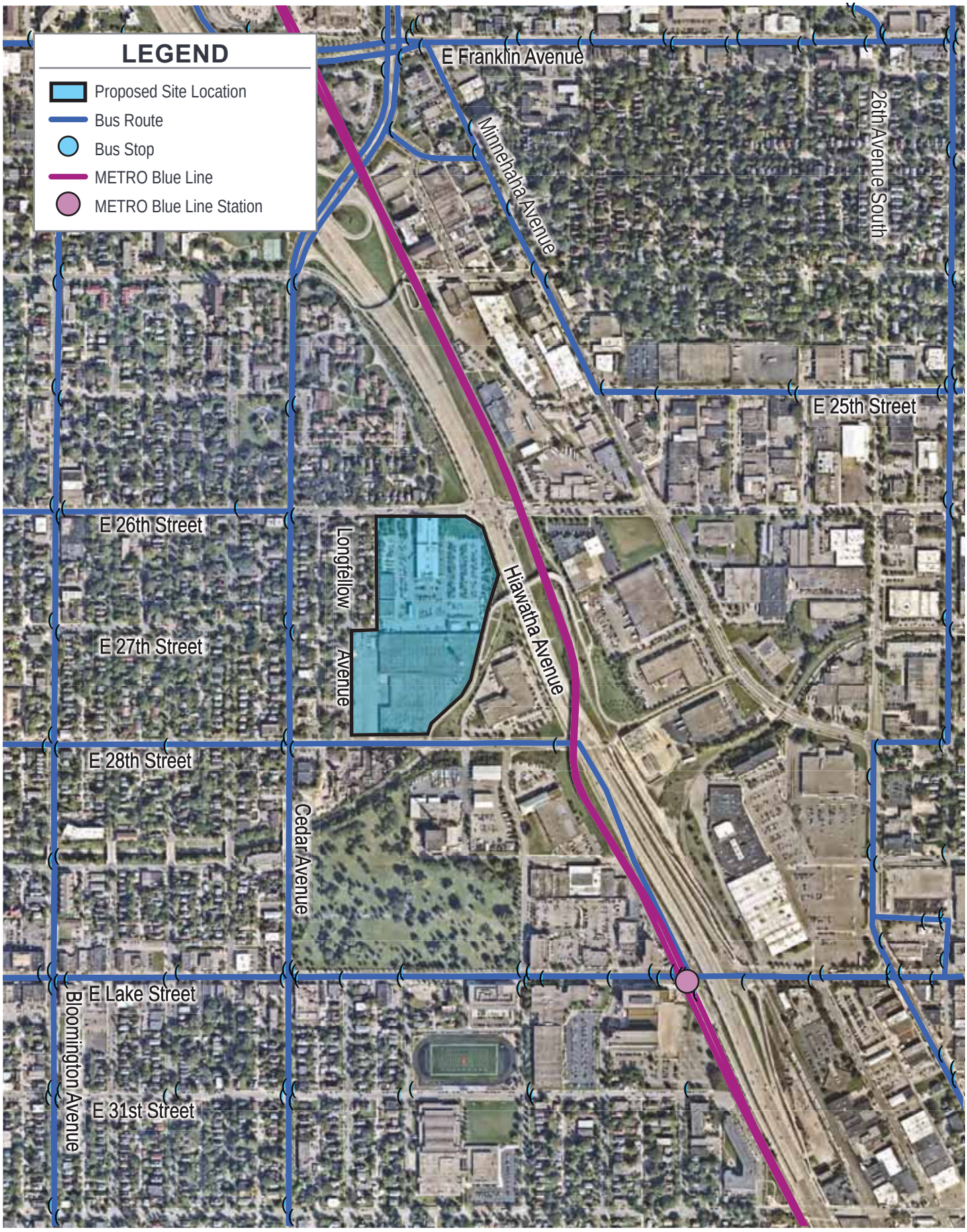
Kimley»Horn

N

NOT TO SCALE

FIGURE 3-1

BICYCLE INFRASTRUCTURE



Kimley»Horn

FIGURE 3-2
TRANSIT INFRASTRUCTURE

Kimley»Horn

FIGURE 4-1

POTENTIAL COMPLETE STREETS IMPROVEMENTS

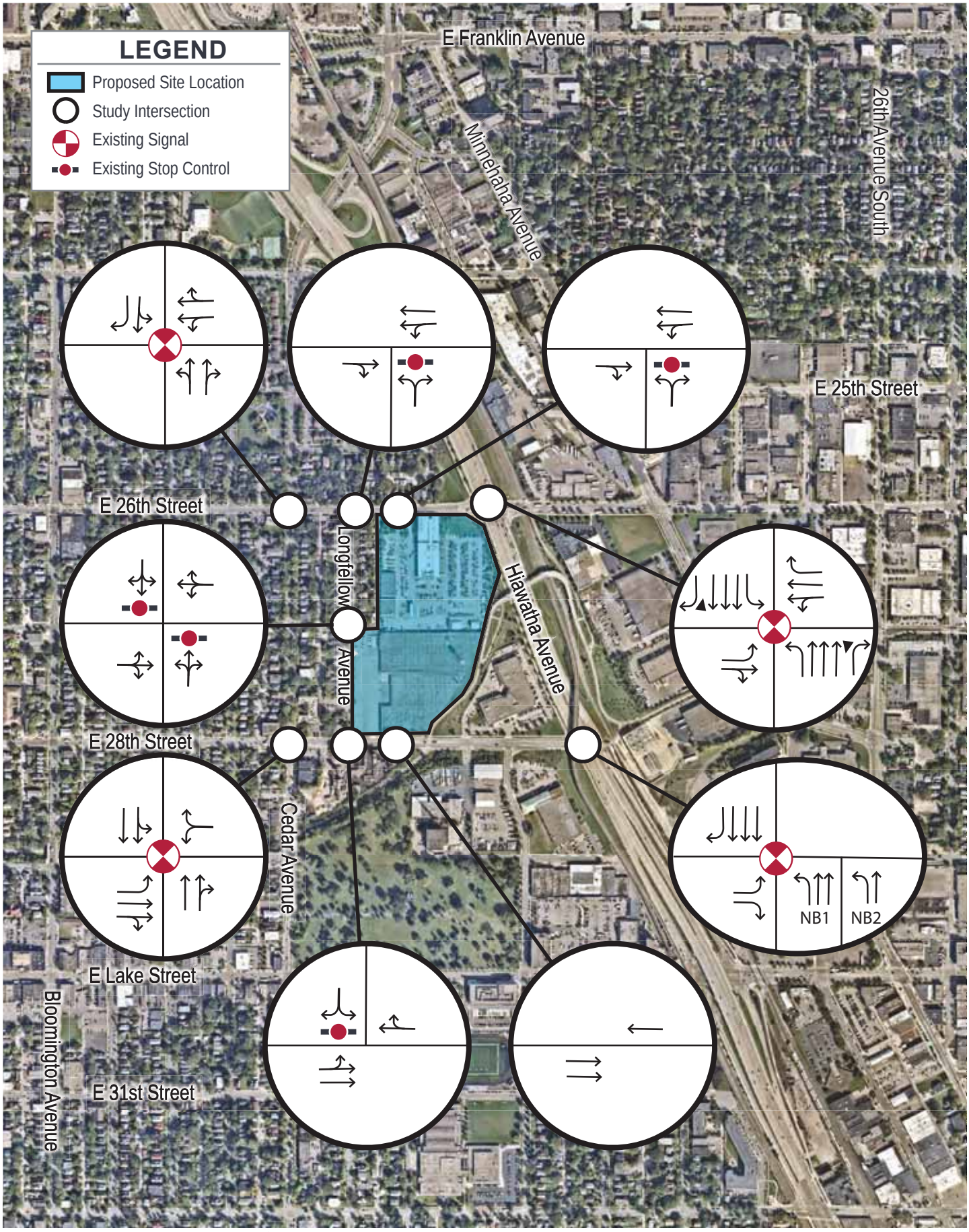


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FIGURE 6-1

EXISTING GEOMETRY AND INTERSECTION CONTROL

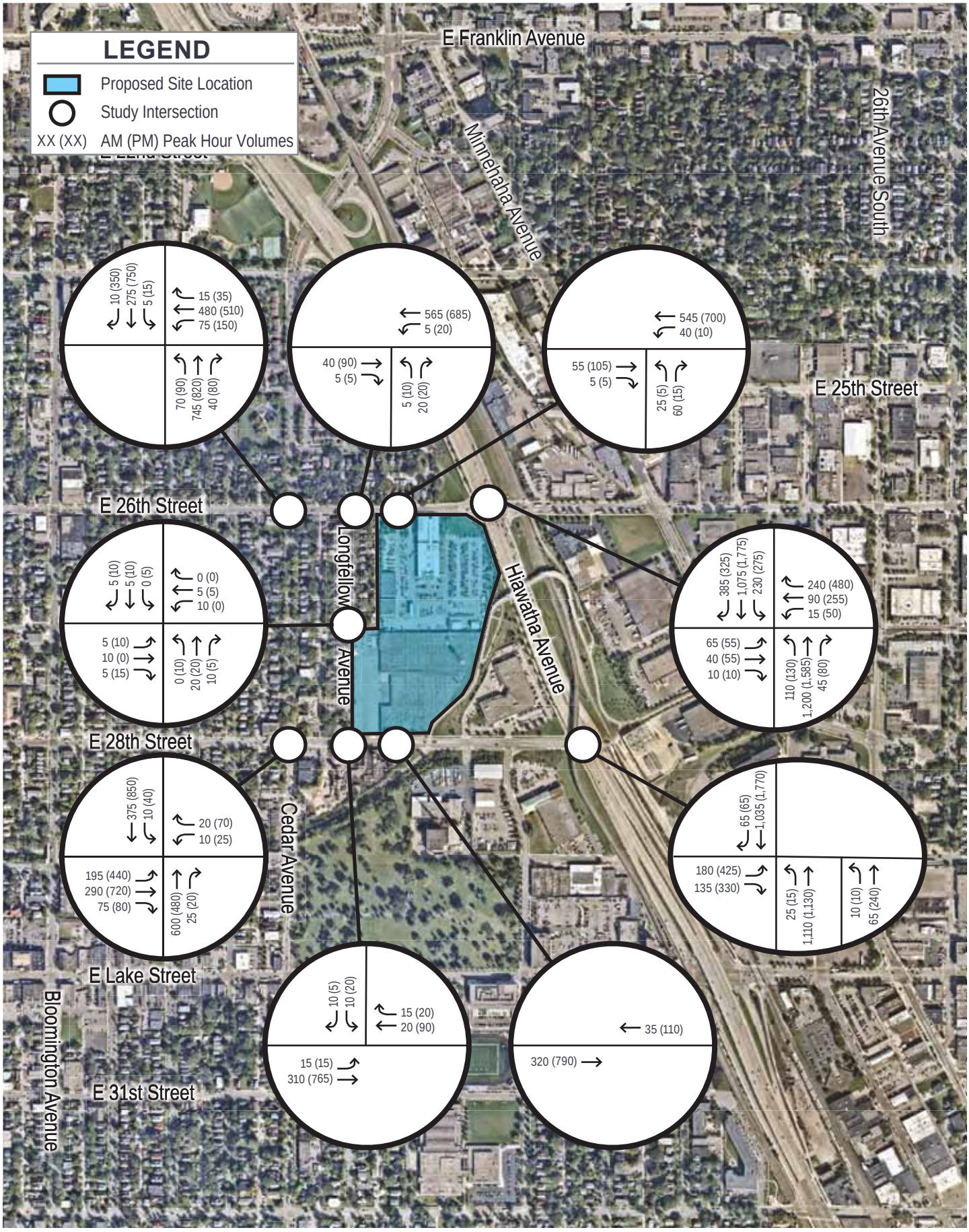

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FIGURE 6-2

EXISTING CONDITIONS (2020)
PEAK HOUR TRAFFIC VOLUMES

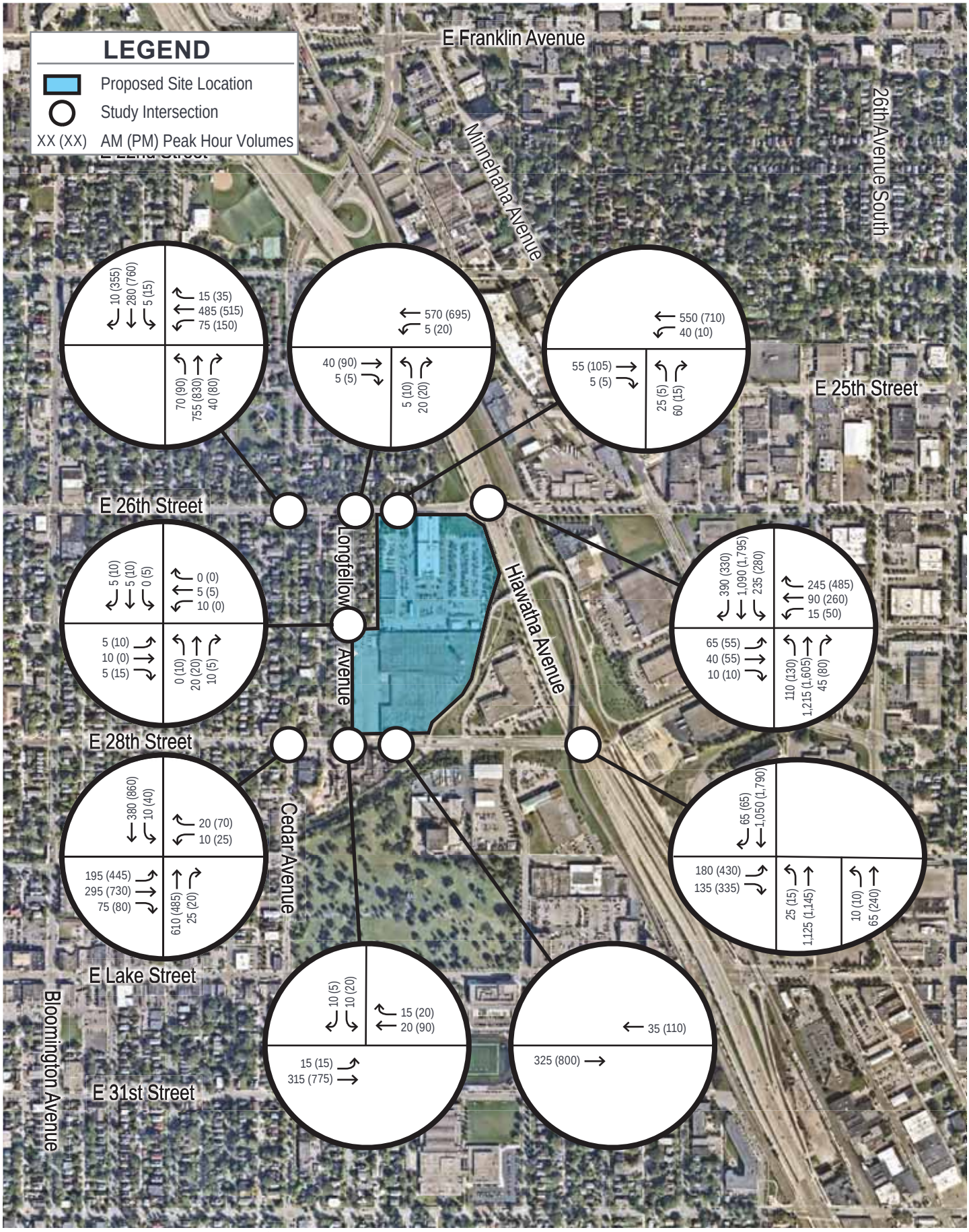

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FIGURE 6-3

NO-BUILD CONDITIONS (2025)
PEAK HOUR TRAFFIC VOLUMES

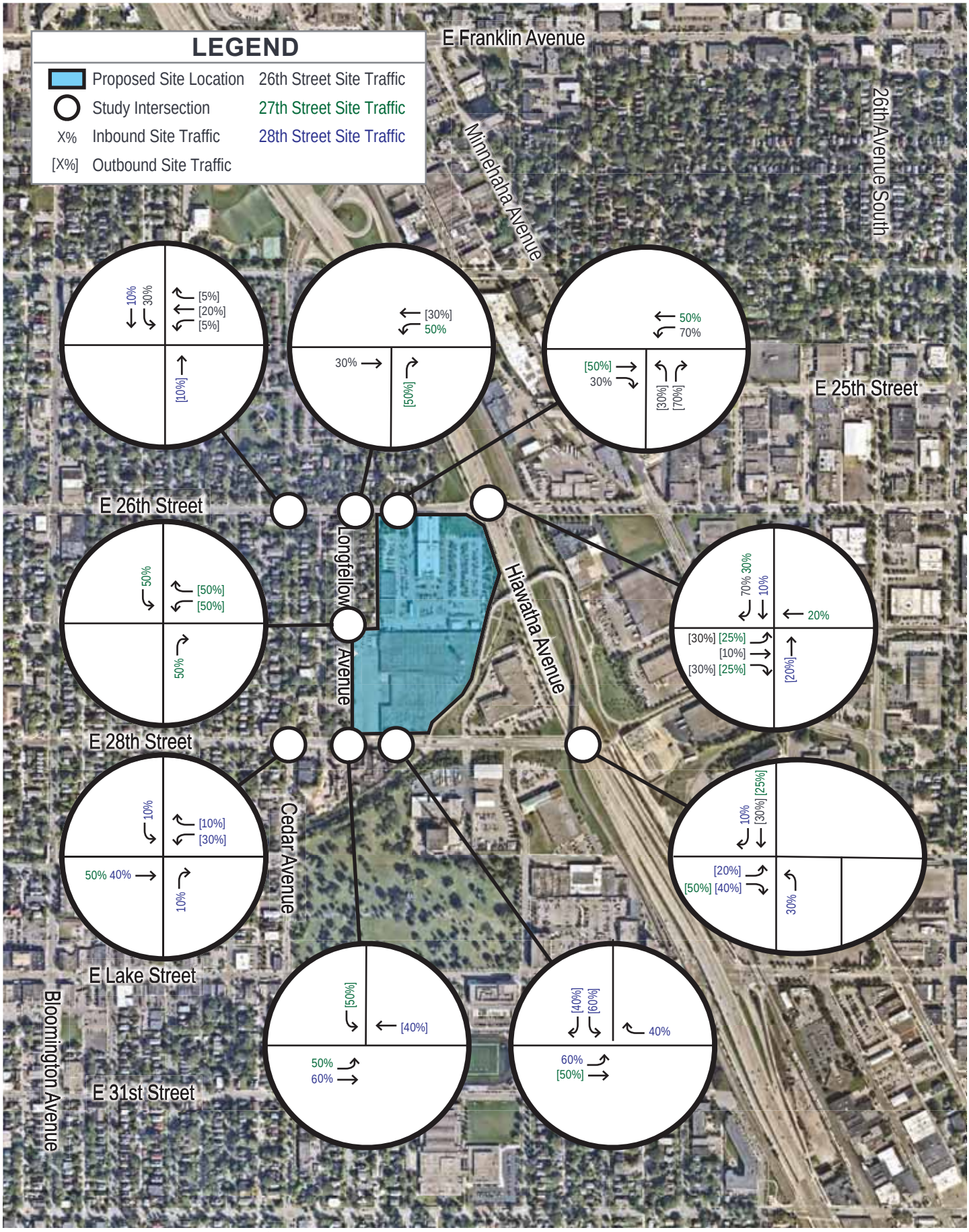

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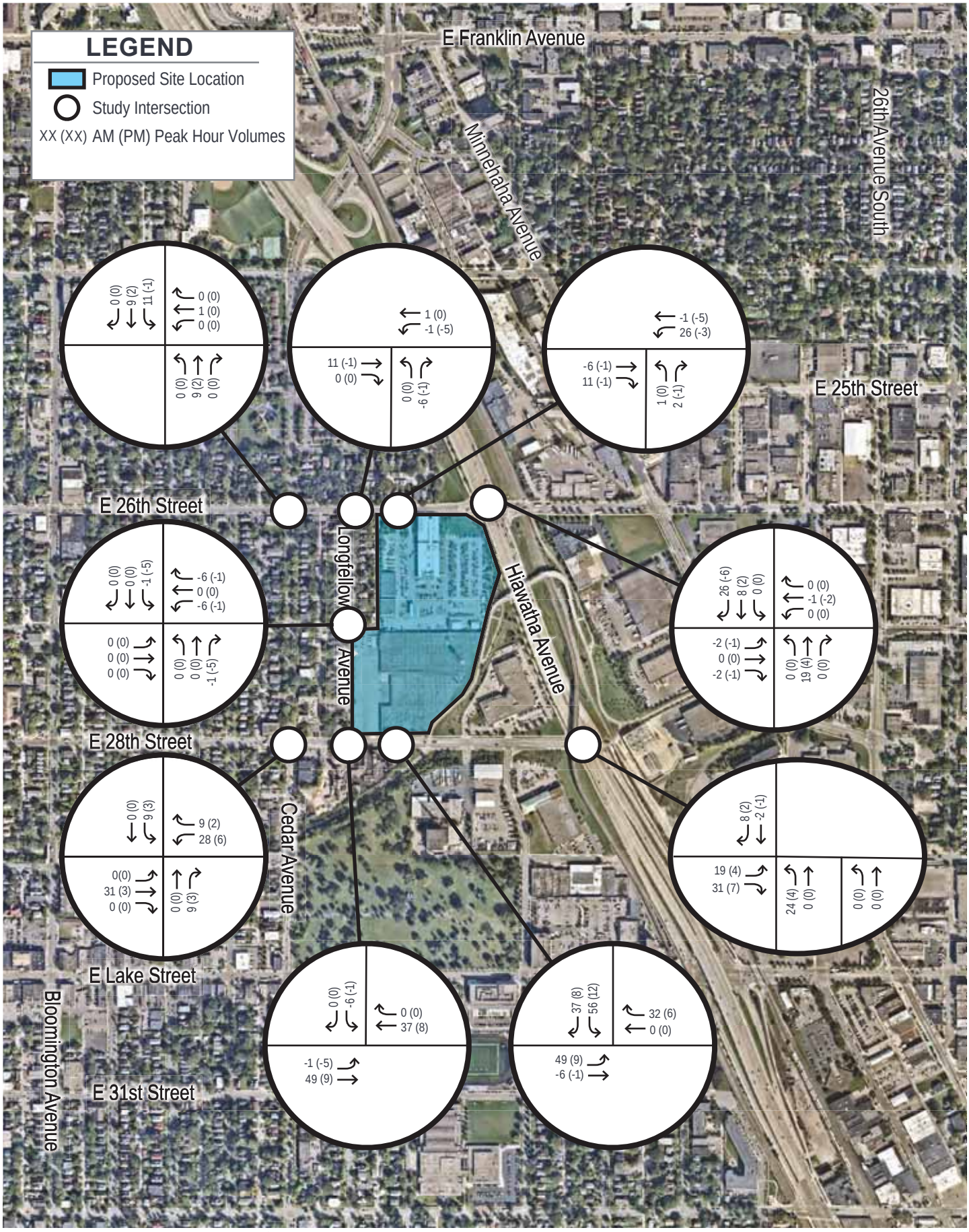
FIGURE 6-4

SITE TRIP DISTRIBUTION



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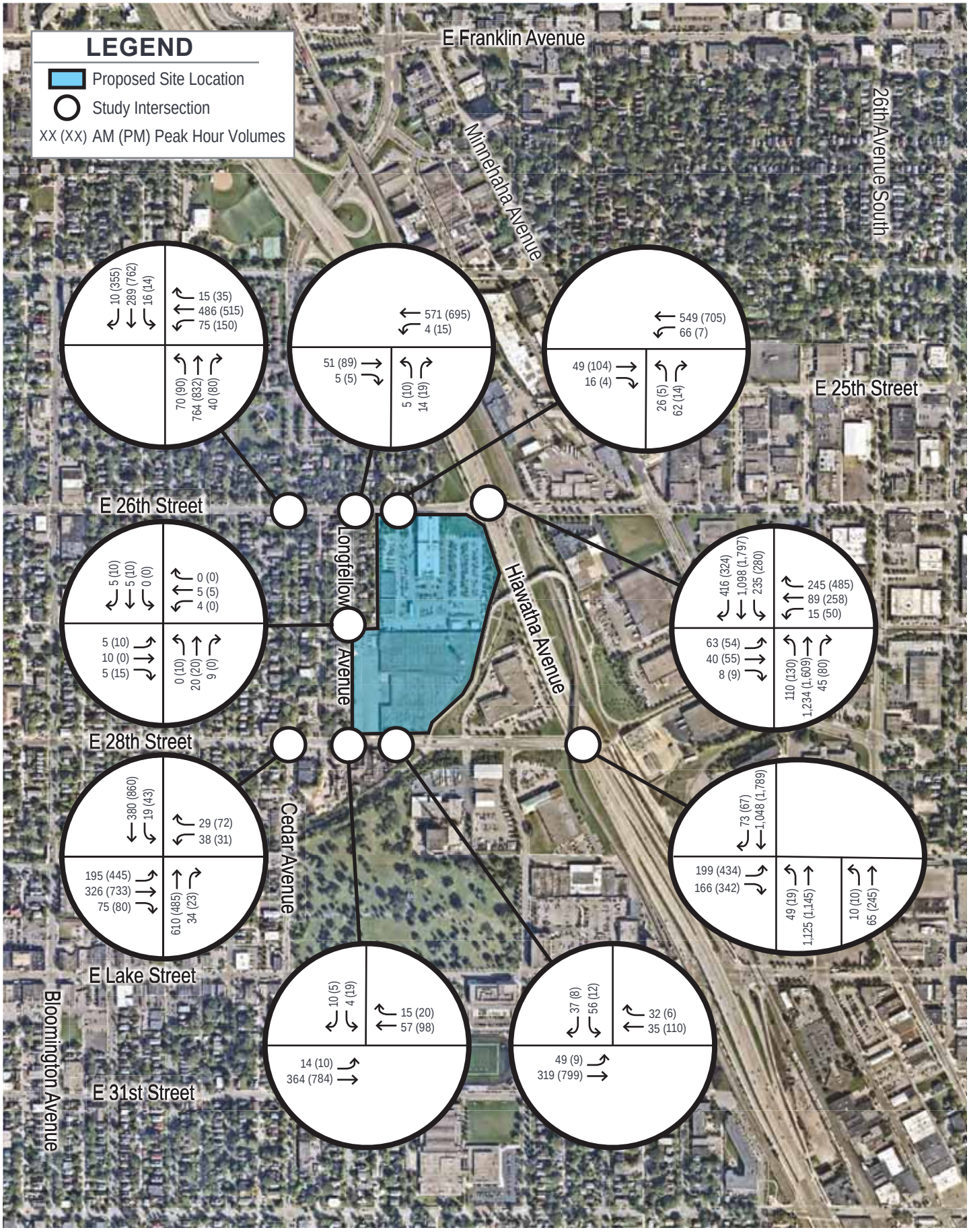
N

NOT TO SCALE

FIGURE 6-5

NET NEW SITE TRIPS



Kimley»Horn

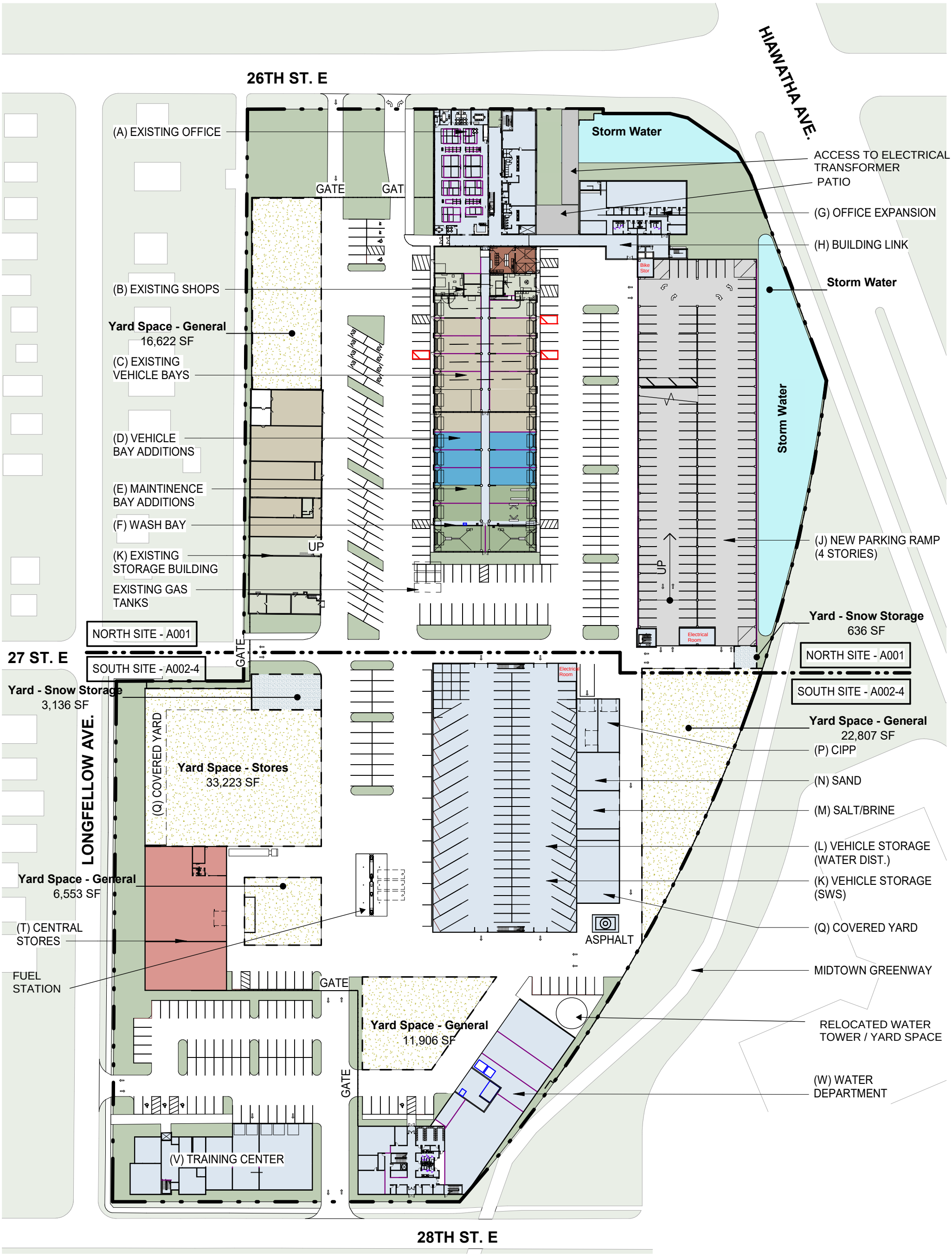
N

NOT TO SCALE

FIGURE 6-6

BUILD CONDITIONS (2025)
PEAK HOUR TRAFFIC VOLUMES

Appendix B: Site Plan, Proposed Bike Connection and Draft Site Circulation Maps



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www.rsparch.com

FIRST FLOOR

CITY OF MINNEAPOLIS - HIAWATHA PUBLIC WORKS - PHASE 2

A005

Project No.: 1053.015.10
04/03/20

4/8/2020 2:50:52 PM

HIAWATHA MAINTENANCE FACILITY
28TH STREET BIKE LANE STUDY

06.26.2020

BUILDING H
(TRAINING
FACILITY)

BUILDING F
(WATER DEPT.)

MODIFIED BUILDING SET BACK
SD BUILDING SET BACK
STAIRS
ROW

3'-2"

11'-3"

5'-0" BOULEVARD

12'-0" SHARED TRAIL

EAST 28TH STREET (PUBLIC)

1
L2S

24" ASH

22" ASH

21" ASH

15" ASH

TR

7" MPL

DF/ DAMON FARBER LANDSCAPE ARCHITECTS
401 North 2nd Avenue, Suite 410
Minneapolis, MN 55401 p: 612.332.7522

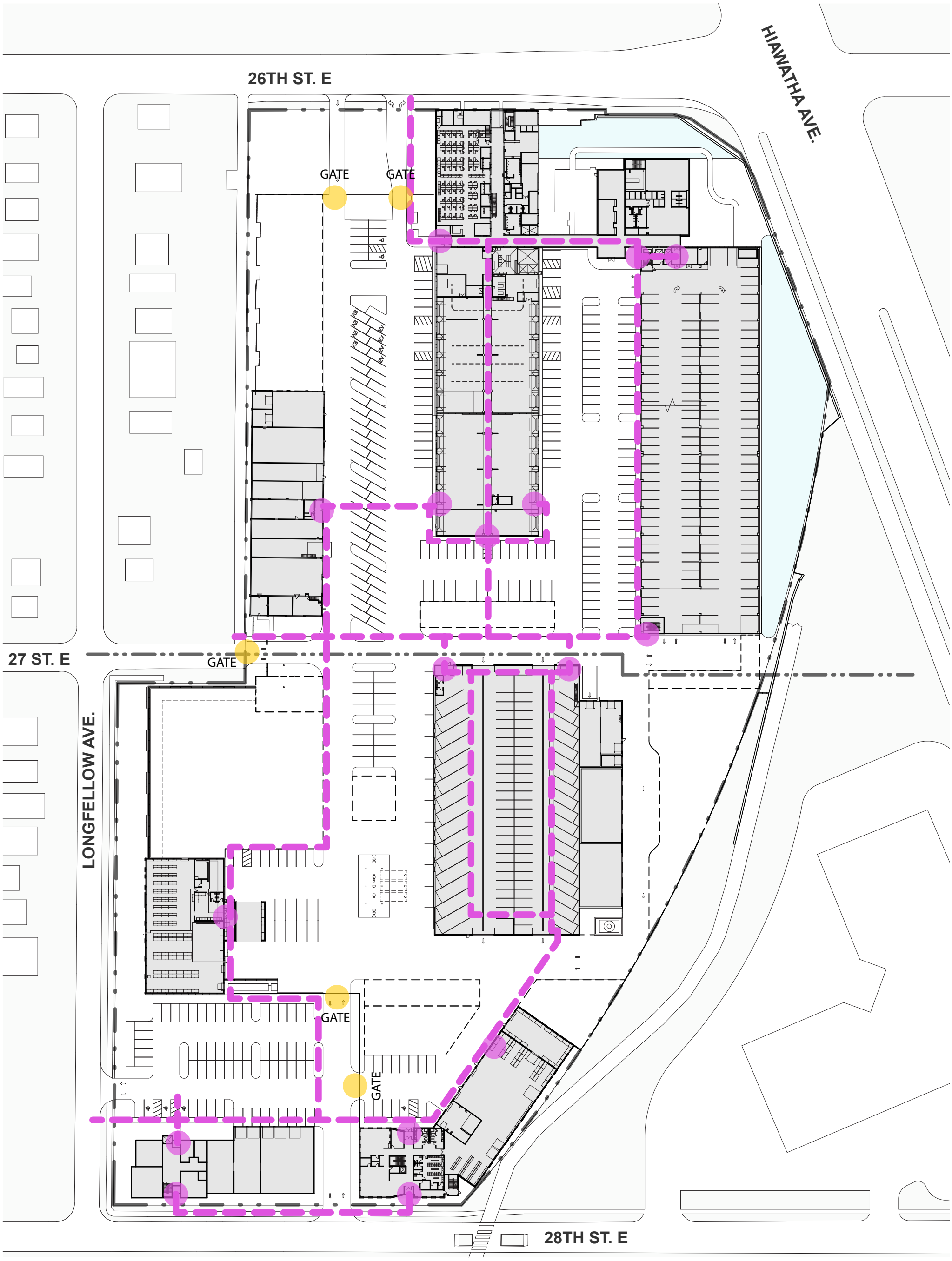
HIAWATHA MAINTENANCE FACILITY: PHASE 2

EAST 28TH STREETSCAPE STUDIES

0 15' 30' 45
SCALE: 1:30

NORTH

L3P
BIKE LANE
OPTION 3



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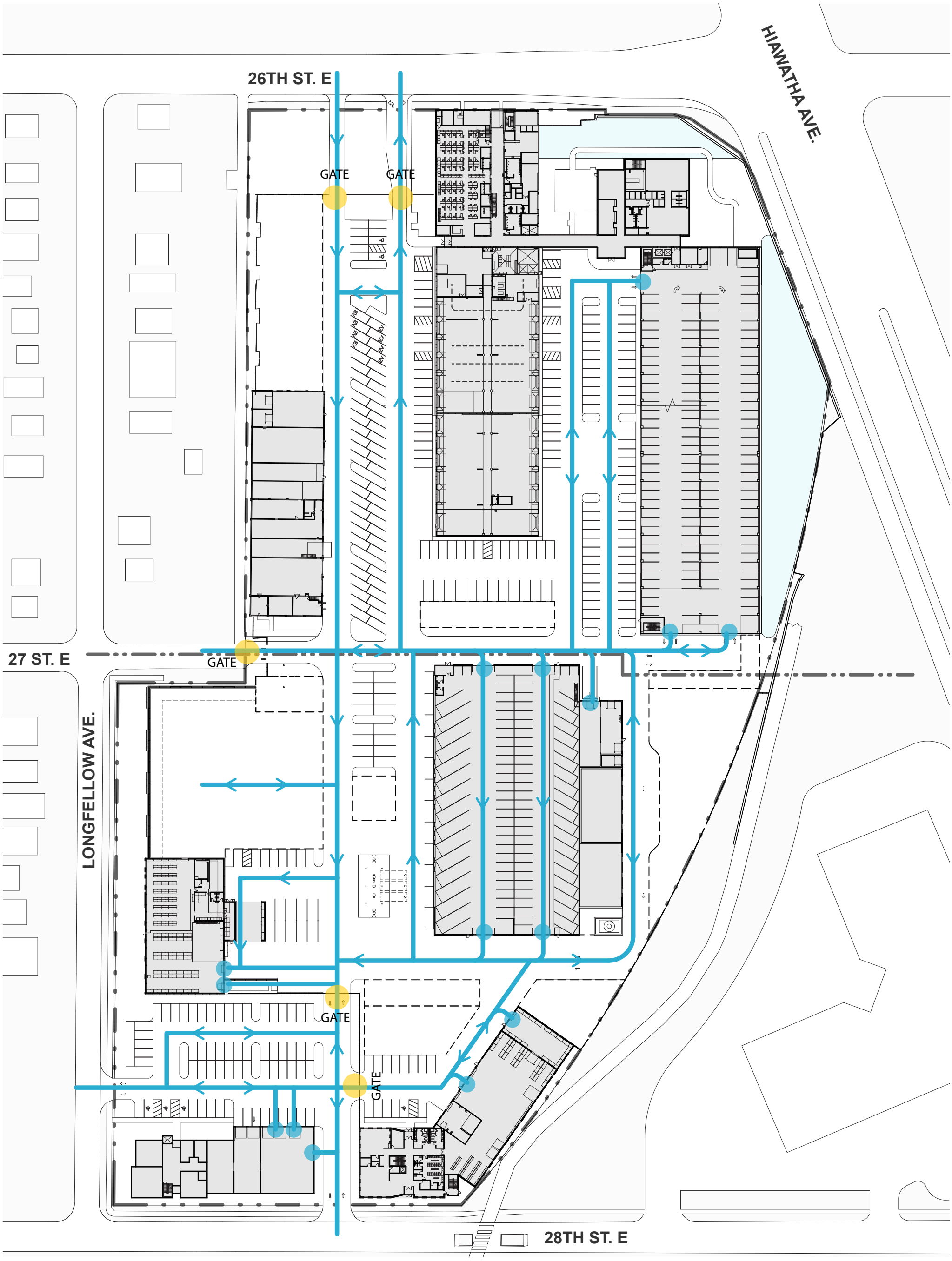
HIAWATHA CAMPUS - PEDESTRIAN CIRCULATION

CITY OF MINNEAPOLIS - HIAWATHA PUBLIC WORKS - PHASE 2

1"=100'-0"

Project No.: 1053.015.10
06/04/20



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HIAWATHA CAMPUS - VEHICLE CIRCULATION

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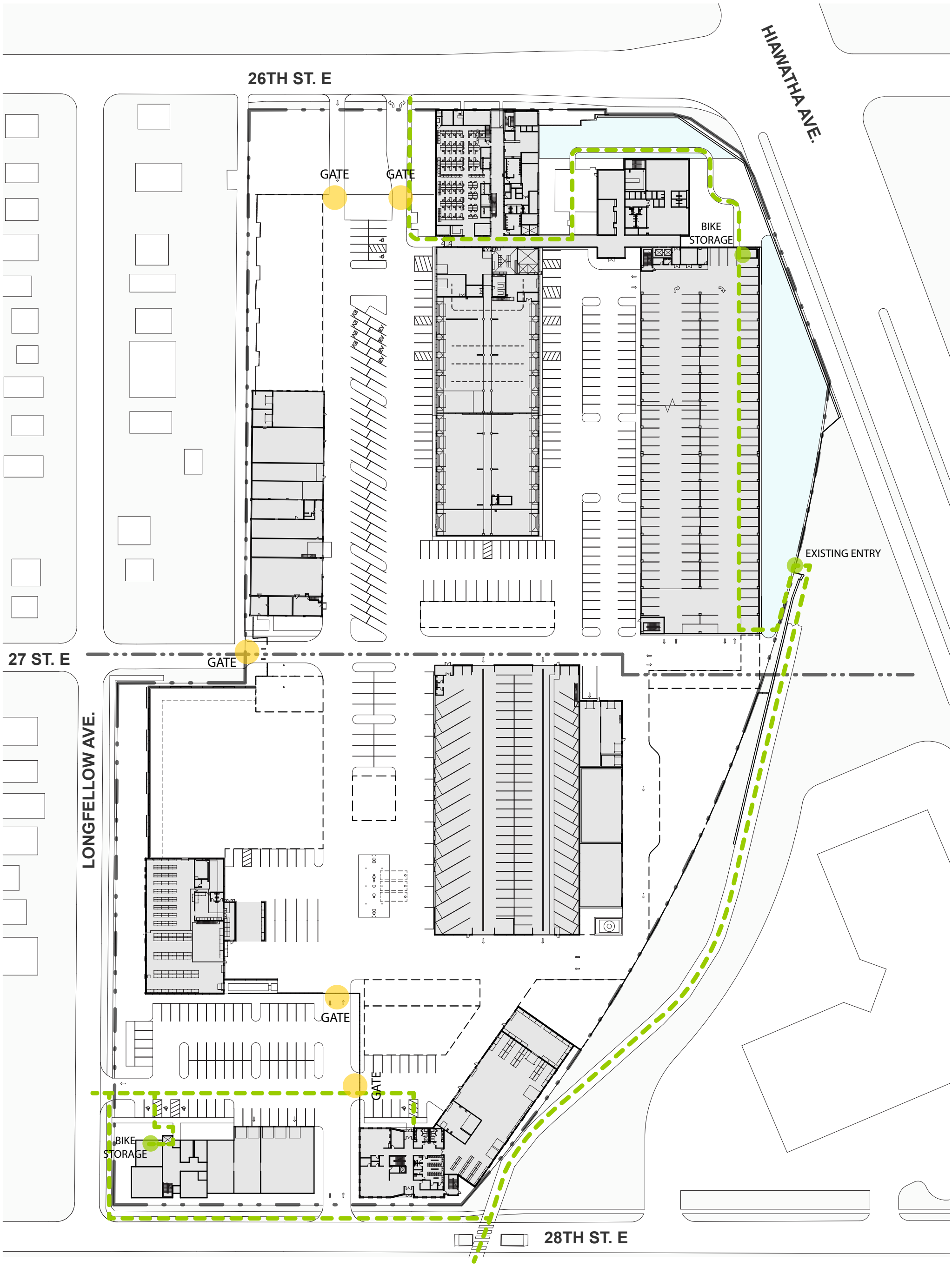
1"=100'-0"

Project No.: 1053.015.10
06/04/20



RSP Architects
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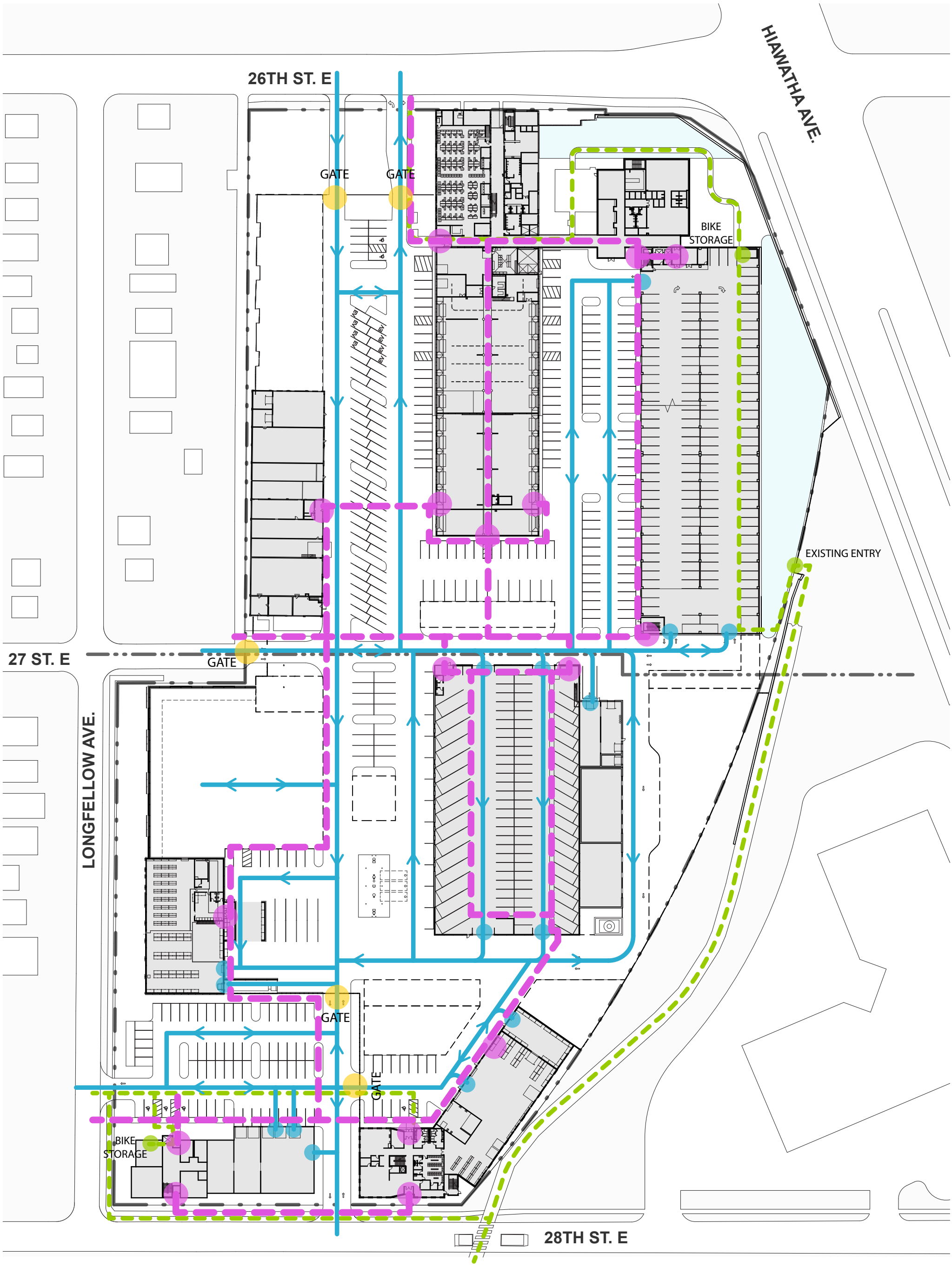
HIAWATHA CAMPUS - BIKE CIRCULATION

CITY OF MINNEAPOLIS - HIAWATHA PUBLIC WORKS - PHASE 2

1"=100'-0"

Project No.: 1053.015.10
06/04/20



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HIAWATHA CAMPUS - COMBINED CIRCULATION PLAN

CITY OF MINNEAPOLIS - HIAWATHA PUBLIC WORKS - PHASE 2

1"=100'-0"

Project No.: 1053.015.10
06/04/20

Appendix C: Complete Streets

GUIDING POLICIES

Minneapolis has put a number of guiding policies in place to ensure that streets are safe and accessible for everyone. Foundational to that effort is the *Complete Streets Policy.* Enacted in 2016, the *Complete Streets Policy* establishes a modal priority framework to inform City transportation related decision making. The framework – graphically shown to the right - prioritizes people as they walk, bicycle, and take transit over people when they drive.

Additionally, in 2017 the Minneapolis City Council passed a Vision Zero Resolution committing to reducing traffic deaths and serious injuries on City streets to zero by 2027. Through a resulting *Vision Zero Crash Study* (2018) and Vision Zero *Action Plan* (2019), the City identified strategies to create safer street design, encourage safe behavior, and increase accountability to the public.

The City's *Americans with Disabilities Act Transition Plan for Public Works* also informs the accessibility of transportation infrastructure. This plan identifies physical barriers in the public right of way per ADA standards, establishes priorities for removing barriers, and outlines an implementation plan for removing barriers and achieving compliance with ADA standards and requirements.

In 2020, the City completed the *ADA Transition Plan for Public Works* which identifies the need for accessible infrastructure in the public right of way, including best practices in design. Released for public comment in March 2020, the recently adopted *Transportation Action Plan* (2020) translates the priorities established in the *Complete Streets Policy*, *Vision Zero Action Plan*, and *ADA Transition Plan for Public Works* into citywide actions that will guide the planning, design, and implementation of future transportation projects for the next ten years.

CRASH ANALYSIS

The *Vision Zero Crash Study* identified streets with the highest crash incidences as Crash Concentration Corridors (identified by mode as well as overall crashes). Streets where crashes are more likely to result in serious injury or death similarly comprise a High Injury Network. The project site is surrounded by both types of corridors. Both East 26th Street and East 28th Street are Crash Concentration Corridors for all modes, as well as Cedar Avenue to the west. East 28th Street is also part of the High Injury Network for all modes.

Recent crash history in the study area supports these corridor designations. Between January 2016 and September 2019, there were 188 crashes at or between the study intersections, or 50 crashes per year. Analysis of the MnDOT crash data at the study intersections revealed that:

- 182 of the 188 crashes did not involve Public Works fleet vehicles.

- There were 6 accidents involving City vehicles at/near the intersections listed in Table 4-1. None of them involved pedestrians or bikes.
- The study area has a higher percent of bicycle and pedestrian crashes than the city as a whole (based on Vision Zero Crash Study findings). While citywide pedestrian and bicycle crashes represent three percent of crashes, in the study area people walking account for four percent of crashes and people biking account for over seven percent of crashes.
    - Out of the study intersections, the three intersections with the most bicycle crashes are all on East 28th Street. All three of these intersections include at-grade trail crossings.
    - All pedestrian crashes at the study intersections occurred at intersections along Cedar Avenue or Hiawatha Avenue.
- The highest percent of serious injury crashes occurred at East 26th Street & Hiawatha Avenue.
- Failure to yield was the most frequently cited contributing factor across all crashes, though two thirds of crashes did not identify a contributing factor.
- One third of crashes were rear-ends and another 18 percent were turning-related.

Table C.1 shows the MnDOT crash data within the study area between January 2016 and September 2019.

Table C.1: MnDOT Crash Data by Intersection

Intersection	Total Crashes	% Pedestrian Crashes	% Bicycle Crashes
East 26th Street & Cedar Avenue	43	2%	0%
East 26th Street & Longfellow Avenue	0	-	-
East 26th Street & Hiawatha Avenue	57	5%	2%
East 27th Street & Cedar Avenue	23	4%	0%
East 27th Street & Longfellow Avenue	0	-	-
East 28th Street & 21st Avenue	14	0%	21%
East 28th Street & Cedar Avenue	11	18%	9%
East 28th Street & Hiawatha Avenue	19	5%	21%
East 28th Street & Longfellow Avenue	5	0%	0%
East 28th Street & Midtown Greenway	4	0%	75%
Not at Intersection	12	0%	17%

*Notable crash trends are highlighted grey.

These crash trends reinforce that bicyclist and pedestrian safety need to be prioritized around the project site. Most notably, additional protection may be needed at roadway intersections where separated bicycle facilities exist and connect to the surrounding street grid; especially along East 28th Street. This could include protection from turning vehicles, or additional infrastructure to encourage appropriate yielding and enhanced visibility of bicyclists.

COMPLETE STREET & VISION ZERO RECOMMENDATIONS

Based on the crash analysis and discussion with the City of Minneapolis staff, recommendations have been developed to support the City's transportation goals. These recommendations are focused on improved safety for all road users in and around the Hiawatha Maintenance Facility.

A summary of these efforts is presented in Section 4 of the report. More details and short-term efforts are presented in **Table C.2** that follows. In addition to the table and because the site will have new transportation elements, it will be important to develop and implement an Employee and Fleet Driver Education Program. Along with other goals and measure this education program would include: Encouraging safe employee driving practices through an in-person training or educational materials, potentially in tandem with existing trainings. Especially with the proposed bicycle and pedestrian path on the south side of the site, employees should be reminded of how to navigate safety in an area with such dense active transportation activity. Reminders to yield, safe turning practices, and where to look for people walking, rolling and biking are all smart preventative measures for site employees.

Table C.2: Complete Street and Vision Zero Brainstorm Ideas

Location	Proposed Improvement	Analysis/Vetting Approach and Additional Considerations	Level of Impact[1]	Level of Effort[2]	Feasibility[3]	Proposed Improvement	
						Short-term	1-5 Year Actions
East 28th Street & 20th/21st Avenue	Create raised crossing for a bike trail	Determine the cost feasibility	1	1	1	Evaluate a raised crossing for a bike trail	Understand the Hiawatha Campus Project needs to realign the Midtown Greenway for temporary construction
	Realign the Midtown Greenway to cross at 20th Avenue	Evaluate the appropriate intersection control	3	3	2	-	-
East 28th Street & Midtown Greenway Crossing	RRFB flasher and mast arm, ramp upgrades *Note: County is installing in 2020*	-	0	0	0	Support Hennepin County's project while evaluating other options and improvements	Study moving East 28th Street northerly curb as part of the Hiawatha campus.
	Widen the median further / change the geometry of the intersection / create less concentrated conflict points	Assess ROW availability, reconsider how East 28th Street bike lanes access the Midtown Greenway, reconsider East 28th Street cross-section	2	2	2		
	Add a regular pedestrian/bicycle signal phase, not just detection/push button	Perform signal warrants; cost estimate; final signal design & coordination	3	3	1		
	Grade separate the crossing (bridge or tunnel)	Determine the cost feasibility	3	3	2/3		

1 - Level of Impact is on a scale from 1 to 3 with 1 being low and 3 being high.

2 - Level of Effort is on a scale from 1 to 3 with 1 being low and 3 being high.

3 – Feasibility is on a scale from 1 to 3 with 1 being a quick win and 3 being recommended.

Table C.2 Continued: Complete Street and Vision Zero Brainstorm Ideas

Location	Proposed Improvement	Analysis/Vetting Approach and Additional Considerations	Level of Impact[1]	Level of Effort[2]	Feasibility[3]	Proposed Improvement	
						Short-term	1-5 Year Actions
East 26th & East 28th Streets	Four-to-three lane or four-to-two lane conversion	Assess ROW availability, cross-section, and traffic impacts; may change TDMP traffic analysis	3	2	1	Four-to-three lane or four-to-two lane conversion	Develop a road diet restriping layout using low cost treatments and maximize the protected bikeway with buffer width and bollards Hiawatha Campus Project proposes to add a 2-way trail on the north side of 28th Street from Midtown Greenway to Longfellow Avenue. East 28th Street northerly curb may be rebuilt and relocated
	Install a raised center median	Assess ROW availability, cross-section, and traffic impacts; may change TDMP traffic analysis	2	3	2		
	Remove the slip turns at Hiawatha Avenue and East 26th Street	May change TDMP traffic analysis	3	3	2		
	Restrict the turns at the site driveways	May change TDMP traffic analysis	2	1	1		
	Pedestrian median at site entrance and East 28th Street	None	1	1	1		
	Add curb protection to existing bike lanes	Assess cross-section impacts, complete minor design work; cost estimate	2	3	1/2		
	Add a green buffer between the sidewalks and the travel lanes	Assess cross-section impacts, complete minor design work; cost estimate	2	3	1		
	Extend the one-way pairs to the east, reduce to one lane in each direction to add space for protected bike lanes	Assess ROW availability, cross-section, and traffic impacts; may change TDMP traffic analysis	3	3	2		
Longfellow Avenue & East 26th / East 28th Street Intersections	Install raised crosswalks across East 26th & East 28th Streets	Assess maintenance impacts against ped benefits; cost estimate	1	2	2	Mark the crosswalks	Begin with painted crosswalks and painted refuge area for peds to cross East 26th & East 28th Streets with low-cost road diet conversion layout noted above Hiawatha Campus Project may do bump outs on the East 28th Street portion, if curbs are reconstructed
	Mark crosswalks (E-W on Longfellow Avenue at East 26th/East 28th Streets)	None	1	1	1		
	Add a pedestrian median at Longfellow Avenue crossing East 26th/East 28th Streets	Determine the cost feasibility and the geometric impacts	2	2	1		
	Install bump outs	Determine the cost feasibility and the geometric impacts	2	2	2/3		
	Improve the pedestrian space with green stormwater infrastructure	Determine the cost feasibility and the geometric impacts	2	2	2/3		

1 - Level of Impact is on a scale from 1 to 3 with 1 being low and 3 being high.

2 - Level of Effort is on a scale from 1 to 3 with 1 being low and 3 being high.

3 – Feasibility is on a scale from 1 to 3 with 1 being a quick win and 3 being recommended.

Table C.2 Continued: Complete Street and Vision Zero Brainstorm Ideas

Location	Proposed Improvement	Analysis/Vetting Approach and Additional Considerations	Level of Impact[1]	Level of Effort[2]	Feasibility[3]	Proposed Improvement	
						Short-term	1-5 Year Actions
Longfellow Avenue	Mill and overlay pavement *Note: Planned for Aug/Sept 2020*	Spot curb replacement, mill edges and pavement overlay	0	0	0	Consider future traffic calming after other key short-term actions	Monitor travel patterns and changes along Longfellow over the next several years to see how the Cedar Avenue temporary changes and any East 26th & East 28th Street changes impact this street. If issues arise, explore and consider other ideas
	Add mid-block speed humps	Assess maintenance impacts against ped benefits; cost estimate	1	1	1		
	Add mid-block chicanes	Assess ROW availability – some parking impacts, determine the cost feasibility	2	2	2		
	Create "yield street" by narrowing street and significantly removing/alternating parking	Assess parking utilization, cost estimate	3	3	2		
	Convert to a one-way road	May change TDMP traffic analysis	2	3	3		
	Landscape screen/buffer along the site border at Longfellow Avenue	None	3	1	1		
Longfellow Avenue & East 27th Street	Create a traffic circle at Longfellow Avenue	Assess ROW availability; assess turning movements/geometry from site traffic; cost estimate	2	2	2	Consider future traffic calming after other key short-term actions	-
	Add bump outs & mark the intersection	Assess ROW availability – some parking impacts; determine cost feasibility	2	2	1		
Alleys & East 27th Street	Add chicane/yield street elements to make this route less attractive to through traffic	Assess ROW availability – determine ownership of the green space on the east side of East 27th Street	1	3	3	Retain East 27th Street Campus access for emergency purposes only. Prohibit any regular use to/from the Campus for any users.	-
	Add signage prohibiting through traffic	None	1	1	1		
	Add speed humps	Assess maintenance impacts against ped benefits; cost estimate	1	1	1		
	Permanently close the access gate at East 27th Street	May change TDMP traffic analysis	1	1	1		

1 - Level of Impact is on a scale from 1 to 3 with 1 being low and 3 being high.

2 - Level of Effort is on a scale from 1 to 3 with 1 being low and 3 being high.

3 – Feasibility is on a scale from 1 to 3 with 1 being a quick win and 3 being recommended.

Table C.2 Continued: Complete Street and Vision Zero Brainstorm Ideas

Location	Proposed Improvement	Analysis/Vetting Approach and Additional Considerations	Level of Impact[1]	Level of Effort[2]	Feasibility[3]	Proposed Improvement	
						Short-term	1-5 Year Actions
Cedar Avenue	Improve the transit waiting areas with street furniture	Assess ROW availability – some potential parking and/or traffic impacts on Cedar Avenue; determine the cost feasibility	2	2	2	Leverage the Hennepin County temporary project to improve the long-term safety for all users	Consider and pilot: a) Other paint and bollard treatments at intersections b) Right-in and right-out only for both sides of East 27th Street at Cedar Avenue and other pedestrian crossing safety treatments at this intersection c) Monitor and continue to explore opportunities for a long-term conversion
	Add a leading pedestrian interval or pedestrian only phase to signals at East 26th & East 28th Streets	May change the TDMP traffic analysis	1	2	2		
	Prevent left turns off of Cedar Avenue during AM/PM peaks, etc. – at East 27th Street specifically, and/or at East 26th/East 28th Streets	May change the TDMP traffic analysis	1	2	2		
	Right-in and right-out only for both sides of East 27th Street at Cedar Avenue	May change the TDMP traffic analysis	2	1	1		
	Pedestrian median and RRFB at East 27th Street and Cedar Avenue	Verify that conditions justify a crossing here	3	2	2		
	Reconfigure intersections at East 26th/East 28th Streets, add bump outs and move bike facility behind bump out/ shared with sidewalk etc. *Note: May be able to test temporary bump out bollard treatments with or after HC project noted below*	Determine cost feasibility and geometric impacts	2	3	2		
	Four-to-three lane conversion and change parking restrictions *Note: Hennepin County will do a four-to-two lane change in Fall 2020 to address curb lane pavement challenges*	Traffic study; coordination with Hennepin County; may change TDMP traffic analysis	3	3	2		

1 - Level of Impact is on a scale from 1 to 3 with 1 being low and 3 being high.

2 - Level of Effort is on a scale from 1 to 3 with 1 being low and 3 being high.

3 – Feasibility is on a scale from 1 to 3 with 1 being a quick win and 3 being recommended.

Phillips Pedestrian Safety Improvements

2020 federal funding application

Project Background

Minneapolis Public Works has applied for funding to support pedestrian safety and accessibility improvements at seven intersections in the Midtown Phillips and East Phillips neighborhoods. The proposed project will provide improvements at select intersections along Chicago Ave, E 24th St, and E 28th St. All three project corridors are designated as High Injury Streets in the Minneapolis Vision Zero Action Plan and Pedestrian Priority Network routes in the draft Minneapolis Transportation Action Plan.

The improvements in this grant application will complement additional planned safety improvements on these streets in 2021 and 2022.

Project Location

● Potential intersection

Minneapolis
City of Lakes

Potential improvements

Improvements may include curb extensions (or bump outs), pedestrian crossing medians, improvements to traffic signals, and new pedestrian ramps.

Traffic control device and APS push buttons

Curb Extensions

ADA-Compliant Curb Ramps

Pedestrian Median

Project Schedule

Public Works applied for federal funding for this project in spring 2020. If selected, improvements would be implemented in 2024 or 2025. Public Works plans to install temporary improvements ahead of any permanent improvements in 2021 or 2022.

Contact:

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Appendix D: Existing Traffic Counts

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1001 Warrenville Road, Suite 350

Lisle, Illinois, United States 60532
331.481.7332 jack.olsson@kimley-horn.com

Count Name: East 26th Street & Cedar Avenue
Site Code:
Start Date: 03/19/2020

Turning Movement Data

Start Time	E 26th Street Westbound						E 26th Street Eastbound						Cedar Avenue Southbound						Cedar Avenue Northbound						Int. Total
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	
6:00 AM	0	2	33	0	0	35	0	0	0	0	0	0	0	0	30	34	0	64	0	5	41	3	0	49	148
6:15 AM	0	6	67	2	1	75	0	0	0	0	0	0	0	0	39	41	0	80	0	9	69	1	0	79	234
6:30 AM	0	9	104	1	0	114	0	0	0	0	0	0	0	0	35	80	0	115	0	12	93	5	0	110	339
6:45 AM	0	13	74	2	0	89	0	0	0	0	0	0	0	0	36	54	0	90	0	14	95	4	0	113	292
Hourly Total	0	30	278	5	1	313	0	0	0	0	0	0	0	0	140	209	0	349	0	40	298	13	0	351	1013
7:00 AM	0	6	77	1	0	84	0	0	0	0	0	0	0	2	38	32	0	72	0	5	106	4	0	115	271
7:15 AM	0	8	67	1	2	76	0	0	0	0	0	0	0	0	42	39	0	81	0	10	97	3	1	110	267
7:30 AM	0	18	77	1	0	96	0	0	0	0	1	0	0	0	36	60	0	96	0	11	126	3	1	140	332
7:45 AM	0	11	81	2	1	94	0	0	0	0	0	0	0	1	50	58	0	109	0	8	127	9	0	144	347
Hourly Total	0	43	302	5	3	350	0	0	0	0	1	0	0	3	166	189	0	358	0	34	456	19	2	509	1217
8:00 AM	0	7	67	3	1	77	0	0	0	0	2	0	0	1	39	37	0	77	0	12	107	7	2	126	280
8:15 AM	0	17	61	2	0	80	0	0	0	0	0	0	0	0	49	29	0	78	0	16	80	9	0	105	263
8:30 AM	0	18	67	1	4	86	0	0	0	0	4	0	0	2	41	27	2	70	0	13	91	4	4	108	264
8:45 AM	0	12	59	4	2	75	0	0	0	0	6	0	0	0	56	34	4	90	0	16	76	5	3	97	262
Hourly Total	0	54	254	10	7	318	0	0	0	0	12	0	0	3	185	127	6	315	0	57	354	25	9	436	1069
9:00 AM	0	13	46	2	1	61	0	0	0	0	2	0	0	0	47	37	1	84	0	10	68	8	3	86	231
9:15 AM	0	13	38	3	6	54	0	1	0	0	3	1	0	1	48	34	2	83	0	10	76	4	3	90	228
9:30 AM	0	21	35	2	5	58	0	0	0	0	2	0	0	1	53	34	0	88	0	10	74	4	1	88	234
9:45 AM	0	18	39	3	4	60	0	0	0	0	19	0	0	2	45	31	3	78	0	8	74	4	4	86	224
Hourly Total	0	65	158	10	16	233	0	1	0	0	26	1	0	4	193	136	6	333	0	38	292	20	11	350	917
10:00 AM	0	10	49	3	3	62	0	0	0	0	10	0	0	1	50	34	5	85	0	14	77	9	7	100	247
10:15 AM	0	17	43	3	1	63	0	0	0	0	1	0	0	1	67	36	1	104	0	5	72	2	0	79	246
10:30 AM	0	12	62	2	5	76	0	0	0	0	2	0	0	1	61	36	1	98	0	16	78	7	6	101	275
10:45 AM	0	23	60	3	4	86	0	0	0	0	12	0	0	2	52	30	1	84	0	16	89	5	1	110	280
Hourly Total	0	62	214	11	13	287	0	0	0	0	25	0	0	5	230	136	8	371	0	51	316	23	14	390	1048
11:00 AM	0	18	61	1	0	80	0	0	0	0	0	0	0	0	72	32	0	104	0	8	91	6	2	105	289
11:15 AM	0	9	48	3	2	60	0	0	0	0	3	0	0	3	61	32	2	96	0	10	103	0	1	113	269
11:30 AM	0	16	73	3	2	92	0	0	0	0	2	0	0	6	82	36	0	124	0	15	84	4	1	103	319
11:45 AM	0	19	45	8	4	72	0	0	0	0	5	0	0	2	74	43	0	119	0	11	81	5	3	97	288
Hourly Total	0	62	227	15	8	304	0	0	0	0	10	0	0	11	289	143	2	443	0	44	359	15	7	418	1165
12:00 PM	0	22	58	6	1	86	0	0	0	0	13	0	0	2	73	45	6	120	0	11	83	6	3	100	306
12:15 PM	0	6	69	3	2	78	0	0	0	0	2	0	0	3	82	31	1	116	0	13	86	3	5	102	296
12:30 PM	0	17	59	5	0	81	0	0	0	0	5	0	0	5	77	43	3	125	0	18	97	1	2	116	322
12:45 PM	0	21	66	2	4	89	0	0	0	0	11	0	0	2	92	48	2	142	0	18	86	9	1	113	344
Hourly Total	0	66	252	16	7	334	0	0	0	0	31	0	0	12	324	167	12	503	0	60	352	19	11	431	1268
1:00 PM	0	7	69	7	10	83	0	0	0	0	5	0	0	1	79	49	0	129	0	10	95	7	9	112	324
1:15 PM	0	15	70	2	7	87	0	0	0	0	14	0	0	4	83	68	1	155	0	16	133	8	8	157	399
1:30 PM	0	20	79	2	0	101	0	0	0	0	5	0	0	1	97	54	1	152	0	17	135	5	1	157	410

1:45 PM	0	16	78	2	2	96	0	0	0	0	9	0	0	3	84	52	0	139	0	10	112	8	4	130	365
Hourly Total	0	58	296	13	19	367	0	0	0	0	33	0	0	9	343	223	2	575	0	53	475	28	22	556	1498
2:00 PM	0	17	62	6	4	85	0	0	0	0	10	0	0	0	93	42	4	135	0	16	115	4	7	135	355
2:15 PM	0	17	81	6	3	104	0	0	0	0	6	0	0	2	107	44	2	153	0	15	115	7	4	137	394
2:30 PM	0	26	84	4	8	114	0	0	0	0	2	0	0	1	90	69	0	160	0	21	127	5	4	153	427
2:45 PM	0	24	99	4	8	127	0	0	0	0	9	0	0	2	109	65	4	176	0	13	115	6	6	134	437
Hourly Total	0	84	326	20	23	430	0	0	0	0	27	0	0	5	399	220	10	624	0	65	472	22	21	559	1613
3:00 PM	0	24	67	1	0	92	0	0	0	0	12	0	0	2	98	53	1	153	0	9	125	10	1	144	389
3:15 PM	0	23	81	7	1	111	0	0	0	0	10	0	0	2	102	48	5	152	0	17	141	11	1	169	432
3:30 PM	0	21	80	3	5	104	0	0	0	0	6	0	0	0	123	54	3	177	0	12	154	11	4	177	458
3:45 PM	0	21	78	6	2	105	0	0	0	0	14	0	0	1	113	47	3	161	0	12	123	6	4	141	407
Hourly Total	0	89	306	17	8	412	0	0	0	0	42	0	0	5	436	202	12	643	0	50	543	38	10	631	1686
4:00 PM	0	29	72	3	12	104	0	0	0	0	5	0	0	1	107	56	0	164	0	13	143	8	11	164	432
4:15 PM	0	25	83	6	1	114	0	0	0	0	11	0	0	2	121	60	0	183	0	15	96	16	2	127	424
4:30 PM	0	16	87	6	2	109	0	0	0	0	12	0	0	3	100	55	3	158	0	12	130	7	2	149	416
4:45 PM	0	20	78	6	4	104	0	0	0	0	6	0	0	2	132	43	0	177	0	15	132	14	4	161	442
Hourly Total	0	90	320	21	19	431	0	0	0	0	34	0	0	8	460	214	3	682	0	55	501	45	19	601	1714
5:00 PM	0	25	60	6	5	91	0	0	0	0	3	0	0	1	117	40	3	158	0	12	114	5	4	131	380
5:15 PM	0	19	74	6	1	99	0	0	0	0	17	0	0	4	123	45	9	172	0	12	124	5	6	141	412
5:30 PM	0	10	71	6	3	87	0	0	0	0	6	0	0	3	111	35	8	149	0	10	115	5	3	130	366
5:45 PM	0	20	69	3	4	92	0	0	0	0	12	0	0	1	104	36	1	141	0	19	109	7	4	135	368
Hourly Total	0	74	274	21	13	369	0	0	0	0	38	0	0	9	455	156	21	620	0	53	462	22	17	537	1526
6:00 PM	0	20	69	4	10	93	0	0	0	0	10	0	0	0	91	37	3	128	0	11	96	4	9	111	332
6:15 PM	0	16	58	8	11	82	0	0	0	0	18	0	0	2	83	31	6	116	0	10	86	8	10	104	302
6:30 PM	0	16	78	5	9	99	0	0	0	0	24	0	0	1	80	49	3	130	0	15	71	3	7	89	318
6:45 PM	0	15	53	8	5	76	0	0	0	0	18	0	0	0	72	38	10	110	0	13	79	4	4	96	282
Hourly Total	0	67	258	25	35	350	0	0	0	0	70	0	0	3	326	155	22	484	0	49	332	19	30	400	1234
Grand Total	0	844	3465	189	172	4498	0	1	0	0	349	1	0	77	3946	2277	104	6300	0	649	5212	308	173	6169	16968
Approach %	0.0	18.8	77.0	4.2	-	-	0.0	100.0	0.0	0.0	-	-	0.0	1.2	62.6	36.1	-	-	0.0	10.5	84.5	5.0	-	-	-
Total %	0.0	5.0	20.4	1.1	-	26.5	0.0	0.0	0.0	0.0	-	0.0	0.0	0.5	23.3	13.4	-	37.1	0.0	3.8	30.7	1.8	-	36.4	-
Lights	0	815	3389	183	-	4387	0	0	0	0	-	0	0	71	3804	2234	-	6109	0	608	5064	300	-	5972	16468
% Lights	-	96.6	97.8	96.8	-	97.5	-	0.0	-	-	-	0.0	-	92.2	96.4	98.1	-	97.0	-	93.7	97.2	97.4	-	96.8	97.1
Mediums	0	26	70	5	-	101	0	0	0	0	-	0	0	4	130	40	-	174	0	38	133	6	-	177	452
% Mediums	-	3.1	2.0	2.6	-	2.2	-	0.0	-	-	-	0.0	-	5.2	3.3	1.8	-	2.8	-	5.9	2.6	1.9	-	2.9	2.7
Articulated Trucks	0	3	2	1	-	6	0	0	0	0	-	0	0	2	12	3	-	17	0	3	15	2	-	20	43
% Articulated Trucks	-	0.4	0.1	0.5	-	0.1	-	0.0	-	-	-	0.0	-	2.6	0.3	0.1	-	0.3	-	0.5	0.3	0.6	-	0.3	0.3
Bicycles on Road	0	0	4	0	-	4	0	1	0	0	-	1	0	0	0	0	-	0	0	0	0	0	-	0	5
% Bicycles on Road	-	0.0	0.1	0.0	-	0.1	-	100.0	-	-	-	100.0	-	0.0	0.0	0.0	-	0.0	-	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	15	-	-	-	-	-	15	-	-	-	-	-	2	-	-	-	-	-	4	-	-
% Bicycles on Crosswalk	-	-	-	-	8.7	-	-	-	-	-	4.3	-	-	-	-	-	1.9	-	-	-	-	-	2.3	-	-
Pedestrians	-	-	-	-	157	-	-	-	-	-	334	-	-	-	-	-	102	-	-	-	-	-	169	-	-
% Pedestrians	-	-	-	-	91.3	-	-	-	-	-	95.7	-	-	-	-	-	98.1	-	-	-	-	-	97.7	-	-

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Count Name: Longfellow Avenue & East 26th Street
Site Code:
Start Date: 03/19/2020

Turning Movement Data

Start Time	E 26th Street Eastbound					E 26th Street Westbound					Longfellow Avenue Northbound					Int. Total
	U-Turn	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Peds	App. Total	U-Turn	Left	Right	Peds	App. Total	
6:00 AM	0	4	0	0	4	0	0	35	0	35	0	0	1	0	1	40
6:15 AM	0	1	0	0	1	0	2	75	0	77	0	0	1	0	1	79
6:30 AM	0	5	0	0	5	0	3	121	0	124	0	1	0	0	1	130
6:45 AM	0	4	0	1	4	0	0	76	0	76	0	1	1	0	2	82
Hourly Total	0	14	0	1	14	0	5	307	0	312	0	2	3	0	5	331
7:00 AM	0	6	0	0	6	0	1	78	0	79	0	2	0	0	2	87
7:15 AM	0	3	0	0	3	0	3	78	0	81	0	0	3	0	3	87
7:30 AM	0	3	0	0	3	0	0	97	0	97	0	0	0	0	0	100
7:45 AM	0	10	0	0	10	0	1	90	0	91	0	0	1	0	1	102
Hourly Total	0	22	0	0	22	0	5	343	0	348	0	2	4	0	6	376
8:00 AM	0	8	0	0	8	0	0	76	0	76	0	1	4	0	5	89
8:15 AM	0	10	0	0	10	0	1	73	0	74	0	2	2	0	4	88
8:30 AM	0	5	1	0	6	0	2	85	0	87	0	2	2	0	4	97
8:45 AM	0	5	0	0	5	1	4	75	0	80	0	1	3	0	4	89
Hourly Total	0	28	1	0	29	1	7	309	0	317	0	6	11	0	17	363
9:00 AM	0	8	0	0	8	0	0	66	0	66	0	0	0	0	0	74
9:15 AM	0	5	0	0	5	0	2	52	0	54	0	1	2	1	3	62
9:30 AM	0	6	0	0	6	0	0	56	0	56	0	1	3	2	4	66
9:45 AM	0	5	0	0	5	0	2	59	0	61	0	1	2	0	3	69
Hourly Total	0	24	0	0	24	0	4	233	0	237	0	3	7	3	10	271
10:00 AM	0	10	0	0	10	0	1	57	1	58	0	1	2	0	3	71
10:15 AM	0	2	1	0	3	0	1	64	0	65	0	0	1	0	1	69
10:30 AM	0	8	0	0	8	0	1	79	0	80	0	2	3	0	5	93
10:45 AM	0	7	1	0	8	1	2	75	0	78	0	1	3	0	4	90
Hourly Total	0	27	2	0	29	1	5	275	1	281	0	4	9	0	13	323
11:00 AM	0	6	0	0	6	0	0	82	0	82	0	3	3	0	6	94
11:15 AM	0	2	1	0	3	0	5	62	0	67	0	0	1	3	1	71
11:30 AM	1	10	0	0	11	0	2	87	0	89	0	0	0	1	0	100
11:45 AM	0	8	0	0	8	0	3	68	0	71	0	1	2	1	3	82
Hourly Total	1	26	1	0	28	0	10	299	0	309	0	4	6	5	10	347
12:00 PM	0	7	2	1	9	0	4	94	0	98	0	2	1	1	3	110
12:15 PM	0	6	0	0	6	0	2	77	0	79	0	1	1	2	2	87
12:30 PM	0	2	1	0	3	0	0	80	0	80	0	1	4	0	5	88
12:45 PM	0	11	0	0	11	0	2	87	0	89	0	0	3	0	3	103
Hourly Total	0	26	3	1	29	0	8	338	0	346	0	4	9	3	13	388
1:00 PM	0	7	1	0	8	0	0	84	0	84	0	1	1	3	2	94
1:15 PM	0	9	2	0	11	0	2	92	2	94	1	0	4	2	5	110
1:30 PM	0	8	0	0	8	0	3	93	0	96	0	4	5	6	9	113
1:45 PM	0	10	2	0	12	0	3	92	0	95	0	2	1	0	3	110

Hourly Total	0	34	5	0	39	0	8	361	2	369	1	7	11	11	19	427
2:00 PM	0	4	0	0	4	0	2	91	0	93	0	0	1	4	1	98
2:15 PM	0	8	1	1	9	0	2	102	0	104	0	1	5	0	6	119
2:30 PM	0	6	0	0	6	0	1	113	0	114	0	1	6	0	7	127
2:45 PM	0	9	0	1	9	0	5	118	0	123	0	2	1	1	3	135
Hourly Total	0	27	1	2	28	0	10	424	0	434	0	4	13	5	17	479
3:00 PM	0	12	0	1	12	0	2	91	0	93	0	4	5	1	9	114
3:15 PM	0	14	1	1	15	0	2	109	0	111	0	1	5	1	6	132
3:30 PM	0	8	0	0	8	0	3	106	0	109	0	4	3	1	7	124
3:45 PM	0	9	2	0	11	0	1	97	0	98	0	3	5	2	8	117
Hourly Total	0	43	3	2	46	0	8	403	0	411	0	12	18	5	30	487
4:00 PM	0	9	0	0	9	0	4	106	0	110	0	1	1	0	2	121
4:15 PM	0	17	1	0	18	0	5	109	0	114	0	1	4	0	5	137
4:30 PM	0	11	0	2	11	0	1	109	0	110	0	2	5	1	7	128
4:45 PM	0	14	2	0	16	0	1	106	0	107	0	2	2	4	4	127
Hourly Total	0	51	3	2	54	0	11	430	0	441	0	6	12	5	18	513
5:00 PM	0	6	0	0	6	0	7	91	0	98	0	2	3	0	5	109
5:15 PM	0	7	2	0	9	0	1	98	0	99	0	2	2	3	4	112
5:30 PM	0	7	1	0	8	0	1	79	0	80	0	2	0	0	2	90
5:45 PM	0	8	0	4	8	0	3	92	0	95	0	2	5	2	7	110
Hourly Total	0	28	3	4	31	0	12	360	0	372	0	8	10	5	18	421
6:00 PM	0	4	0	0	4	0	2	93	1	95	0	1	2	2	3	102
6:15 PM	0	10	2	2	12	0	1	80	0	81	0	1	4	0	5	98
6:30 PM	0	4	0	0	4	0	0	101	0	101	0	1	5	0	6	111
6:45 PM	0	5	0	2	5	0	0	72	1	72	0	0	0	2	0	77
Hourly Total	0	23	2	4	25	0	3	346	2	349	0	3	11	4	14	388
Grand Total	1	373	24	16	398	2	96	4428	5	4526	1	65	124	46	190	5114
Approach %	0.3	93.7	6.0	-	-	0.0	2.1	97.8	-	-	0.5	34.2	65.3	-	-	-
Total %	0.0	7.3	0.5	-	7.8	0.0	1.9	86.6	-	88.5	0.0	1.3	2.4	-	3.7	-
Lights	1	356	23	-	380	2	95	4319	-	4416	1	62	119	-	182	4978
% Lights	100.0	95.4	95.8	-	95.5	100.0	99.0	97.5	-	97.6	100.0	95.4	96.0	-	95.8	97.3
Mediums	0	12	1	-	13	0	1	95	-	96	0	3	4	-	7	116
% Mediums	0.0	3.2	4.2	-	3.3	0.0	1.0	2.1	-	2.1	0.0	4.6	3.2	-	3.7	2.3
Articulated Trucks	0	4	0	-	4	0	0	9	-	9	0	0	1	-	1	14
% Articulated Trucks	0.0	1.1	0.0	-	1.0	0.0	0.0	0.2	-	0.2	0.0	0.0	0.8	-	0.5	0.3
Bicycles on Road	0	1	0	-	1	0	0	5	-	5	0	0	0	-	0	6
% Bicycles on Road	0.0	0.3	0.0	-	0.3	0.0	0.0	0.1	-	0.1	0.0	0.0	0.0	-	0.0	0.1
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	4	-	-
% Bicycles on Crosswalk	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	8.7	-	-
Pedestrians	-	-	-	16	-	-	-	-	5	-	-	-	-	42	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	91.3	-	-

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Count Name: East 26th Street & Hiawatha Avenue
Site Code:
Start Date: 03/19/2020

Turning Movement Data

Start Time	E 26th Street Westbound						E 26th Street Eastbound						Hiawatha Avenue Southbound						Hiawatha Avenue Northbound						Int. Total
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	
6:00 AM	0	3	8	15	0	26	0	4	3	0	0	7	0	26	150	40	0	216	0	9	84	6	0	99	348
6:15 AM	0	3	6	17	0	26	0	1	1	0	0	2	0	26	143	73	0	242	0	15	98	2	0	115	385
6:30 AM	0	1	7	31	0	39	0	6	3	0	0	9	0	39	179	115	0	333	0	24	154	3	0	181	562
6:45 AM	0	2	12	28	0	42	0	4	3	0	0	7	0	39	181	69	0	289	0	20	169	6	0	195	533
Hourly Total	0	9	33	91	0	133	0	15	10	0	0	25	0	130	653	297	0	1080	0	68	505	17	0	590	1828
7:00 AM	0	1	9	32	0	42	0	11	9	1	0	21	0	46	130	67	0	243	0	17	176	5	0	198	504
7:15 AM	0	3	6	38	0	47	0	6	4	1	0	11	0	35	175	55	0	265	0	13	209	9	0	231	554
7:30 AM	0	3	20	46	0	69	0	6	3	0	0	9	0	43	185	64	0	292	0	14	211	4	0	229	599
7:45 AM	0	5	20	36	0	61	0	14	8	0	1	22	0	30	192	63	0	285	0	15	182	7	0	204	572
Hourly Total	0	12	55	152	0	219	0	37	24	2	1	63	0	154	682	249	0	1085	0	59	778	25	0	862	2229
8:00 AM	0	3	9	49	0	61	0	11	7	0	0	18	0	47	157	52	0	256	0	22	180	12	0	214	549
8:15 AM	0	3	18	33	0	54	0	7	7	1	0	15	0	25	152	50	0	227	0	7	179	12	0	198	494
8:30 AM	0	7	12	35	0	54	0	3	7	0	0	10	0	42	162	64	1	268	0	9	191	5	0	205	537
8:45 AM	0	4	18	37	0	59	0	3	8	0	0	11	0	28	161	50	0	239	0	13	155	5	0	173	482
Hourly Total	0	17	57	154	0	228	0	24	29	1	0	54	0	142	632	216	1	990	0	51	705	34	0	790	2062
9:00 AM	0	3	17	37	0	57	0	4	7	0	0	11	1	45	130	39	0	215	0	12	139	4	0	155	438
9:15 AM	0	6	11	40	0	57	0	6	2	2	2	10	2	38	155	35	0	230	0	8	147	9	0	164	461
9:30 AM	0	4	18	31	0	53	0	6	10	0	0	16	0	30	160	36	1	226	0	5	141	5	1	151	446
9:45 AM	0	3	11	30	0	44	0	4	5	1	0	10	1	29	150	48	0	228	0	6	179	10	0	195	477
Hourly Total	0	16	57	138	0	211	0	20	24	3	2	47	4	142	595	158	1	899	0	31	606	28	1	665	1822
10:00 AM	0	11	21	36	0	68	0	9	8	2	0	19	1	35	143	35	2	214	0	4	151	10	0	165	466
10:15 AM	0	2	20	41	0	63	0	2	3	0	1	5	1	30	137	32	0	200	0	14	173	5	0	192	460
10:30 AM	0	4	19	45	0	68	0	5	8	1	0	14	0	35	167	53	0	255	0	13	175	8	0	196	533
10:45 AM	0	2	30	38	0	70	0	5	6	1	0	12	0	36	196	41	0	273	1	9	173	13	0	196	551
Hourly Total	0	19	90	160	0	269	0	21	25	4	1	50	2	136	643	161	2	942	1	40	672	36	0	749	2010
11:00 AM	0	5	25	41	0	71	0	5	6	0	0	11	1	46	152	49	0	248	0	8	153	19	0	180	510
11:15 AM	0	5	25	42	0	72	0	7	1	3	0	11	2	30	152	37	0	221	0	9	159	10	1	178	482
11:30 AM	0	6	40	40	0	86	0	5	8	0	0	13	1	45	208	47	0	301	1	13	208	11	0	233	633
11:45 AM	0	14	25	50	0	89	0	5	6	1	1	12	0	40	200	36	0	276	0	11	150	8	0	169	546
Hourly Total	0	30	115	173	0	318	0	22	21	4	1	47	4	161	712	169	0	1046	1	41	670	48	1	760	2171
12:00 PM	0	8	37	54	0	99	0	4	5	2	0	11	0	37	199	46	0	282	0	16	154	18	0	188	580
12:15 PM	0	6	33	43	0	82	0	3	5	2	1	10	0	40	204	36	0	280	0	16	171	16	0	203	575
12:30 PM	0	3	26	45	0	74	0	5	1	1	0	7	0	56	176	38	1	270	0	13	226	10	0	249	600
12:45 PM	0	4	25	62	0	91	0	3	9	0	0	12	0	27	210	45	0	282	0	14	208	12	0	234	619
Hourly Total	0	21	121	204	0	346	0	15	20	5	1	40	0	160	789	165	1	1114	0	59	759	56	0	874	2374
1:00 PM	0	7	37	58	0	102	0	6	7	0	0	13	3	28	158	35	0	224	1	18	196	19	0	234	573
1:15 PM	0	7	21	53	1	81	0	5	11	1	0	17	2	25	187	50	0	264	0	18	195	17	0	230	592
1:30 PM	0	8	23	55	0	86	0	9	5	0	0	14	4	39	203	56	4	302	0	19	195	11	3	225	627

1:45 PM	0	13	38	54	0	105	0	10	4	2	0	16	2	29	186	50	0	267	0	15	218	14	0	247	635
Hourly Total	0	35	119	220	1	374	0	30	27	3	0	60	11	121	734	191	4	1057	1	70	804	61	3	936	2427
2:00 PM	0	15	34	50	0	99	0	4	7	2	1	13	0	45	265	45	0	355	0	20	215	16	1	251	718
2:15 PM	0	2	34	73	2	109	0	5	7	0	0	12	0	40	193	56	0	289	0	19	236	13	2	268	678
2:30 PM	0	13	30	52	0	95	0	17	10	0	0	27	3	40	190	73	0	306	0	20	252	11	0	283	711
2:45 PM	0	10	37	64	0	111	0	12	4	1	0	17	3	29	250	66	0	348	0	16	201	19	0	236	712
Hourly Total	0	40	135	239	2	414	0	38	28	3	1	69	6	154	898	240	0	1298	0	75	904	59	3	1038	2819
3:00 PM	0	3	38	62	0	103	0	29	13	3	0	45	3	43	207	46	0	299	0	10	277	12	1	299	746
3:15 PM	0	6	34	66	0	106	0	28	9	3	0	40	0	43	227	49	1	319	0	16	230	20	2	266	731
3:30 PM	0	8	41	77	0	126	0	15	6	5	0	26	1	31	259	52	0	343	0	18	259	8	2	285	780
3:45 PM	0	3	24	55	0	82	0	6	9	0	0	15	6	40	213	57	0	316	0	18	300	11	0	329	742
Hourly Total	0	20	137	260	0	417	0	78	37	11	0	126	10	157	906	204	1	1277	0	62	1066	51	5	1179	2999
4:00 PM	0	13	48	79	0	140	0	4	9	1	0	14	1	42	227	56	0	326	0	11	240	15	0	266	746
4:15 PM	0	7	27	64	0	98	0	11	6	2	2	19	0	49	243	61	1	353	0	22	239	14	2	275	745
4:30 PM	0	4	46	92	0	142	0	9	12	3	0	24	0	44	279	48	0	371	0	16	254	20	0	290	827
4:45 PM	0	9	39	74	0	122	0	9	8	0	0	17	0	44	260	45	0	349	0	22	280	8	2	310	798
Hourly Total	0	33	160	309	0	502	0	33	35	6	2	74	1	179	1009	210	1	1399	0	71	1013	57	4	1141	3116
5:00 PM	0	13	44	74	0	131	0	6	6	1	1	13	1	40	285	39	0	365	0	19	229	8	0	256	765
5:15 PM	0	4	33	67	0	104	0	1	7	1	2	9	0	38	293	49	2	380	0	12	271	13	0	296	789
5:30 PM	0	6	20	50	3	76	0	3	4	0	0	7	1	31	206	36	0	274	1	25	264	17	3	307	664
5:45 PM	0	5	36	44	0	85	0	1	5	1	0	7	0	30	196	47	1	273	0	17	191	11	0	219	584
Hourly Total	0	28	133	235	3	396	0	11	22	3	3	36	2	139	980	171	3	1292	1	73	955	49	3	1078	2802
6:00 PM	0	4	42	54	0	100	0	7	5	1	0	13	0	26	186	40	0	252	0	16	202	9	0	227	592
6:15 PM	0	3	24	30	0	57	0	5	8	2	0	15	0	32	156	45	0	233	0	13	166	8	0	187	492
6:30 PM	0	5	29	26	0	60	0	4	4	0	0	8	1	31	171	48	0	251	0	23	168	6	0	197	516
6:45 PM	0	6	21	24	0	51	0	3	2	0	0	5	0	30	150	33	1	213	0	14	131	6	0	151	420
Hourly Total	0	18	116	134	0	268	0	19	19	3	0	41	1	119	663	166	1	949	0	66	667	29	0	762	2020
Grand Total	0	298	1328	2469	6	4095	0	363	321	48	12	732	41	1894	9896	2597	15	14428	4	766	10104	550	20	11424	30679
Approach %	0.0	7.3	32.4	60.3	-	-	0.0	49.6	43.9	6.6	-	-	0.3	13.1	68.6	18.0	-	-	0.0	6.7	88.4	4.8	-	-	-
Total %	0.0	1.0	4.3	8.0	-	13.3	0.0	1.2	1.0	0.2	-	2.4	0.1	6.2	32.3	8.5	-	47.0	0.0	2.5	32.9	1.8	-	37.2	-
Lights	0	262	1293	2265	-	3820	0	348	307	44	-	699	41	1726	9437	2540	-	13744	4	748	9623	505	-	10880	29143
% Lights	-	87.9	97.4	91.7	-	93.3	-	95.9	95.6	91.7	-	95.5	100.0	91.1	95.4	97.8	-	95.3	100.0	97.7	95.2	91.8	-	95.2	95.0
Mediums	0	26	29	133	-	188	0	13	8	4	-	25	0	117	340	54	-	511	0	18	348	26	-	392	1116
% Mediums	-	8.7	2.2	5.4	-	4.6	-	3.6	2.5	8.3	-	3.4	0.0	6.2	3.4	2.1	-	3.5	0.0	2.3	3.4	4.7	-	3.4	3.6
Articulated Trucks	0	10	4	71	-	85	0	2	6	0	-	8	0	51	119	3	-	173	0	0	133	19	-	152	418
% Articulated Trucks	-	3.4	0.3	2.9	-	2.1	-	0.6	1.9	0.0	-	1.1	0.0	2.7	1.2	0.1	-	1.2	0.0	0.0	1.3	3.5	-	1.3	1.4
Bicycles on Road	0	0	2	0	-	2	0	0	0	0	-	0	0	0	0	0	-	0	0	0	0	0	-	0	2
% Bicycles on Road	-	0.0	0.2	0.0	-	0.0	-	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	-	0.0	0.0
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	7	-	-	-	-	-	0	-	-	-	-	-	2	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	58.3	-	-	-	-	-	0.0	-	-	-	-	-	10.0	-	-
Pedestrians	-	-	-	-	6	-	-	-	-	-	5	-	-	-	-	-	15	-	-	-	-	-	18	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	41.7	-	-	-	-	-	100.0	-	-	-	-	-	90.0	-	-

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Count Name: East 27th Street & Longfellow Avenue
Site Code:
Start Date: 03/19/2020

Turning Movement Data

Start Time	E 27th Street Eastbound						E 27th Street Westbound						Longfellow Avenue Northbound						Longfellow Avenue Southbound						Int. Total
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	
6:00 AM	0	0	3	1	0	4	0	0	0	1	0	1	0	0	0	1	0	1	0	0	0	0	0	0	6
6:15 AM	0	0	5	0	0	5	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2	0	0	2	8
6:30 AM	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	2	0	4	7
6:45 AM	0	1	5	0	0	6	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	1	0	1	9
Hourly Total	0	1	15	1	0	17	0	0	0	1	0	1	0	1	0	4	0	5	0	1	3	3	0	7	30
7:00 AM	0	0	1	0	0	1	0	1	2	0	0	3	0	1	1	6	0	8	0	0	1	0	0	1	13
7:15 AM	0	1	0	1	0	2	0	1	0	0	0	1	0	0	1	0	0	1	0	0	1	1	0	2	6
7:30 AM	0	0	1	0	0	1	0	1	1	0	0	2	0	0	0	1	0	1	0	0	0	0	0	0	4
7:45 AM	0	1	1	1	0	3	0	2	0	0	0	2	0	0	1	1	0	2	0	0	1	0	0	1	8
Hourly Total	0	2	3	2	0	7	0	5	3	0	0	8	0	1	3	8	0	12	0	0	3	1	0	4	31
8:00 AM	0	1	0	1	0	2	0	0	0	0	0	0	0	0	4	2	0	6	0	0	0	1	0	1	9
8:15 AM	0	1	0	1	0	2	0	5	1	0	0	6	0	0	2	1	0	3	0	0	0	2	0	2	13
8:30 AM	0	0	0	1	0	1	0	0	0	0	0	0	0	0	4	1	0	5	0	0	1	1	0	2	8
8:45 AM	0	0	4	0	1	4	0	1	0	0	0	1	0	0	3	0	1	3	0	0	5	2	0	7	15
Hourly Total	0	2	4	3	1	9	0	6	1	0	0	7	0	0	13	4	1	17	0	0	6	6	0	12	45
9:00 AM	0	0	2	0	0	2	0	0	0	0	0	0	1	2	0	1	0	4	0	0	0	0	0	0	6
9:15 AM	0	2	1	1	0	4	0	2	0	0	0	2	0	0	1	2	0	3	0	0	0	2	0	2	11
9:30 AM	0	2	2	1	0	5	0	1	0	1	1	2	0	0	1	0	0	1	0	0	0	0	0	0	8
9:45 AM	0	2	1	1	0	4	0	0	1	0	1	1	0	2	1	0	0	3	0	0	0	1	0	1	9
Hourly Total	0	6	6	3	0	15	0	3	1	1	2	5	1	4	3	3	0	11	0	0	0	3	0	3	34
10:00 AM	0	2	1	1	0	4	0	0	1	0	1	1	0	0	1	0	0	1	0	0	0	0	0	0	6
10:15 AM	0	0	3	1	1	4	0	0	3	0	0	3	0	3	1	1	1	5	0	0	1	1	0	2	14
10:30 AM	0	1	1	0	0	2	0	0	3	3	1	6	0	7	1	0	0	8	0	0	1	0	0	1	17
10:45 AM	1	2	0	6	0	9	0	0	0	1	0	1	0	1	0	0	0	1	0	0	1	0	0	1	12
Hourly Total	1	5	5	8	1	19	0	0	7	4	2	11	0	11	3	1	1	15	0	0	3	1	0	4	49
11:00 AM	0	1	2	4	0	7	0	1	2	0	0	3	0	2	4	1	0	7	0	0	0	0	0	0	17
11:15 AM	0	0	1	1	1	2	0	0	1	0	0	1	0	1	0	1	0	2	0	0	2	2	0	4	9
11:30 AM	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	1	0	2	1	3	5
11:45 AM	0	1	2	0	0	3	0	1	2	0	0	3	0	1	2	1	2	4	0	0	1	1	0	2	12
Hourly Total	0	2	5	6	1	13	0	2	5	0	0	7	0	5	6	3	2	14	0	1	3	5	1	9	43
12:00 PM	0	0	0	2	0	2	0	0	0	0	0	0	0	0	1	2	0	3	0	0	3	3	0	6	11
12:15 PM	0	1	1	1	1	3	0	0	1	0	0	1	0	0	1	1	1	2	0	0	1	1	0	2	8
12:30 PM	0	2	2	0	0	4	0	1	1	1	0	3	1	0	2	2	0	5	0	0	0	1	0	1	13
12:45 PM	0	2	2	0	0	4	0	1	2	0	0	3	0	2	3	0	0	5	0	0	2	1	0	3	15
Hourly Total	0	5	5	3	1	13	0	2	4	1	0	7	1	2	7	5	1	15	0	0	6	6	0	12	47
1:00 PM	0	1	3	1	0	5	0	1	1	0	0	2	0	2	1	3	0	6	0	0	0	0	0	0	13
1:15 PM	0	1	2	2	8	5	0	0	4	0	0	4	0	3	3	0	0	6	0	0	3	1	0	4	19
1:30 PM	0	1	0	1	0	2	0	1	2	2	0	5	1	2	3	3	0	9	1	0	0	2	0	3	19

1:45 PM	0	0	0	1	0	1	0	2	0	0	0	2	0	2	2	4	0	8	0	0	2	3	0	5	16
Hourly Total	0	3	5	5	8	13	0	4	7	2	0	13	1	9	9	10	0	29	1	0	5	6	0	12	67
2:00 PM	0	0	0	1	0	1	0	0	0	0	0	0	1	1	2	3	0	7	0	0	1	0	0	1	9
2:15 PM	0	2	3	2	0	7	0	0	2	0	0	2	0	1	5	1	0	7	1	0	1	0	0	2	18
2:30 PM	0	2	2	0	0	4	0	3	3	1	0	7	0	1	3	3	0	7	0	0	1	3	0	4	22
2:45 PM	0	1	1	3	0	5	0	0	3	0	0	3	0	1	3	4	0	8	0	0	4	0	0	4	20
Hourly Total	0	5	6	6	0	17	0	3	8	1	0	12	1	4	13	11	0	29	1	0	7	3	0	11	69
3:00 PM	0	3	1	4	1	8	0	2	3	1	0	6	0	2	4	2	0	8	0	0	0	0	1	0	22
3:15 PM	0	2	1	1	0	4	0	3	0	1	0	4	0	4	4	0	0	8	0	0	1	5	0	6	22
3:30 PM	0	2	2	3	0	7	0	1	1	1	0	3	0	2	6	1	0	9	0	0	1	1	0	2	21
3:45 PM	0	0	0	1	0	1	0	0	0	0	0	0	0	3	6	1	0	10	0	0	2	0	0	2	13
Hourly Total	0	7	4	9	1	20	0	6	4	3	0	13	0	11	20	4	0	35	0	0	4	6	1	10	78
4:00 PM	0	0	0	2	0	2	0	0	0	0	0	0	0	1	2	0	0	3	0	1	4	0	0	5	10
4:15 PM	0	0	0	2	0	2	0	0	0	0	0	0	0	1	4	0	0	5	2	0	0	5	0	7	14
4:30 PM	0	2	0	3	0	5	0	0	1	0	0	1	0	2	6	1	0	9	0	0	1	1	0	2	17
4:45 PM	0	1	0	1	0	2	0	0	1	0	0	1	0	1	1	0	0	2	1	0	0	0	0	1	6
Hourly Total	0	3	0	8	0	11	0	0	2	0	0	2	0	5	13	1	0	19	3	1	5	6	0	15	47
5:00 PM	0	1	0	1	0	2	0	0	0	0	2	0	0	3	2	1	0	6	0	0	5	0	2	5	13
5:15 PM	0	1	0	2	0	3	0	1	0	0	0	1	0	1	3	0	0	4	0	0	0	3	0	3	11
5:30 PM	0	3	0	0	0	3	0	0	0	0	0	0	0	0	2	0	0	2	0	0	2	0	0	2	7
5:45 PM	0	1	0	1	0	2	0	0	0	0	0	0	0	1	4	1	0	6	0	0	1	3	0	4	12
Hourly Total	0	6	0	4	0	10	0	1	0	0	2	1	0	5	11	2	0	18	0	0	8	6	2	14	43
6:00 PM	0	1	0	0	0	1	0	0	0	1	0	1	0	1	2	0	0	3	1	0	0	3	0	4	9
6:15 PM	0	3	0	0	0	3	0	0	0	0	0	0	0	2	3	0	0	5	0	0	1	1	0	2	10
6:30 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	1	3	0	0	4	0	0	1	0	0	1	6
6:45 PM	0	1	0	1	0	2	0	0	0	1	0	1	1	1	1	0	0	3	0	0	0	0	0	0	6
Hourly Total	0	6	0	1	0	7	0	0	0	2	0	2	1	5	9	0	0	15	1	0	2	4	0	7	31
Grand Total	1	53	58	59	13	171	0	32	42	15	6	89	5	63	110	56	5	234	6	3	55	56	4	120	614
Approach %	0.6	31.0	33.9	34.5	-	-	0.0	36.0	47.2	16.9	-	-	2.1	26.9	47.0	23.9	-	-	5.0	2.5	45.8	46.7	-	-	-
Total %	0.2	8.6	9.4	9.6	-	27.9	0.0	5.2	6.8	2.4	-	14.5	0.8	10.3	17.9	9.1	-	38.1	1.0	0.5	9.0	9.1	-	19.5	-
Lights	1	52	53	57	-	163	0	29	38	14	-	81	5	59	104	50	-	218	6	3	54	55	-	118	580
% Lights	100.0	98.1	91.4	96.6	-	95.3	-	90.6	90.5	93.3	-	91.0	100.0	93.7	94.5	89.3	-	93.2	100.0	100.0	98.2	98.2	-	98.3	94.5
Mediums	0	1	5	1	-	7	0	2	3	0	-	5	0	0	6	4	-	10	0	0	1	1	-	2	24
% Mediums	0.0	1.9	8.6	1.7	-	4.1	-	6.3	7.1	0.0	-	5.6	0.0	0.0	5.5	7.1	-	4.3	0.0	0.0	1.8	1.8	-	1.7	3.9
Articulated Trucks	0	0	0	0	-	0	0	0	0	1	-	1	0	0	0	1	-	1	0	0	0	0	-	0	2
% Articulated Trucks	0.0	0.0	0.0	0.0	-	0.0	-	0.0	0.0	6.7	-	1.1	0.0	0.0	0.0	1.8	-	0.4	0.0	0.0	0.0	0.0	-	0.0	0.3
Bicycles on Road	0	0	0	1	-	1	0	1	1	0	-	2	0	4	0	1	-	5	0	0	0	0	-	0	8
% Bicycles on Road	0.0	0.0	0.0	1.7	-	0.6	-	3.1	2.4	0.0	-	2.2	0.0	6.3	0.0	1.8	-	2.1	0.0	0.0	0.0	0.0	-	0.0	1.3
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	13	-	-	-	-	-	6	-	-	-	-	-	5	-	-	-	-	-	4	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

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Count Name: East 28th Street & Cedar Avenue
Site Code:
Start Date: 03/19/2020

Turning Movement Data

Start Time	E 28th Street Westbound						E 28th Street Eastbound						Cedar Avenue Southbound						Cedar Avenue Northbound						Int. Total
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	
6:00 AM	0	2	0	2	0	4	0	7	18	2	0	27	0	0	31	0	0	31	0	0	39	3	0	42	104
6:15 AM	0	0	0	4	0	4	0	10	17	5	0	32	0	2	45	0	2	47	0	0	71	3	0	74	157
6:30 AM	0	2	0	2	0	4	0	29	32	2	0	63	0	2	41	0	0	43	0	0	78	6	1	84	194
6:45 AM	0	0	0	6	0	6	0	26	30	3	0	59	0	2	54	0	0	56	0	0	83	5	0	88	209
Hourly Total	0	4	0	14	0	18	0	72	97	12	0	181	0	6	171	0	2	177	0	0	271	17	1	288	664
7:00 AM	0	2	0	1	0	3	0	22	27	6	0	55	0	3	44	0	0	47	0	0	98	4	0	102	207
7:15 AM	0	2	0	1	0	3	0	18	29	3	1	50	0	1	50	0	0	51	0	0	94	6	1	100	204
7:30 AM	0	0	0	2	0	2	0	30	55	13	0	98	0	1	55	0	0	56	0	0	93	8	1	101	257
7:45 AM	0	1	0	1	1	2	0	35	46	11	0	92	0	1	59	0	0	60	0	0	101	1	1	102	256
Hourly Total	0	5	0	5	1	10	0	105	157	33	1	295	0	6	208	0	0	214	0	0	386	19	3	405	924
8:00 AM	0	3	0	6	1	9	1	33	40	8	1	82	0	0	45	0	0	45	0	0	88	2	0	90	226
8:15 AM	0	0	0	1	0	1	0	20	38	12	1	70	0	3	70	0	0	73	0	0	86	3	1	89	233
8:30 AM	0	1	0	4	0	5	0	29	30	7	0	66	0	1	59	0	0	60	0	0	74	4	0	78	209
8:45 AM	0	4	0	1	0	5	0	25	34	4	1	63	0	2	65	0	0	67	0	0	61	5	0	66	201
Hourly Total	0	8	0	12	1	20	1	107	142	31	3	281	0	6	239	0	0	245	0	0	309	14	1	323	869
9:00 AM	0	3	0	7	1	10	0	17	34	8	0	59	0	3	60	0	0	63	0	0	62	0	2	62	194
9:15 AM	0	1	0	4	1	5	0	17	26	7	1	50	0	8	57	0	0	65	0	0	68	1	2	69	189
9:30 AM	0	2	0	4	0	6	0	25	26	6	0	57	0	1	71	0	0	72	0	0	58	0	1	58	193
9:45 AM	0	2	0	2	0	4	0	27	33	13	1	73	0	1	67	0	0	68	0	0	60	7	1	67	212
Hourly Total	0	8	0	17	2	25	0	86	119	34	2	239	0	13	255	0	0	268	0	0	248	8	6	256	788
10:00 AM	0	2	0	3	1	5	0	30	39	10	0	79	0	2	58	0	0	60	0	0	65	6	0	71	215
10:15 AM	0	2	0	5	2	7	0	17	45	6	0	68	0	4	82	0	0	86	0	0	55	1	1	56	217
10:30 AM	0	4	0	6	0	10	0	29	33	9	0	71	0	0	75	0	1	75	0	0	71	4	0	75	231
10:45 AM	0	3	0	7	1	10	0	26	43	8	1	77	0	6	72	0	0	78	0	0	72	3	0	75	240
Hourly Total	0	11	0	21	4	32	0	102	160	33	1	295	0	12	287	0	1	299	0	0	263	14	1	277	903
11:00 AM	0	2	0	9	0	11	0	32	48	9	2	89	0	3	90	0	1	93	0	0	60	6	0	66	259
11:15 AM	0	3	0	7	0	10	0	25	51	9	6	85	0	2	70	0	1	72	0	0	85	6	2	91	258
11:30 AM	0	5	0	7	0	12	0	32	48	12	1	92	0	3	93	0	0	96	0	0	55	3	0	58	258
11:45 AM	0	4	0	3	1	7	0	23	59	6	0	88	0	4	87	0	0	91	0	0	62	0	1	62	248
Hourly Total	0	14	0	26	1	40	0	112	206	36	9	354	0	12	340	0	2	352	0	0	262	15	3	277	1023
12:00 PM	0	6	0	4	3	10	0	37	55	18	0	110	0	6	91	0	2	97	0	0	58	4	1	62	279
12:15 PM	0	4	0	6	0	10	0	35	56	9	2	100	0	4	92	0	0	96	0	0	60	2	0	62	268
12:30 PM	0	2	0	9	1	11	0	37	62	14	0	113	0	3	93	0	0	96	0	0	68	2	0	70	290
12:45 PM	0	5	0	8	3	13	0	39	60	7	0	106	0	6	114	0	0	120	0	0	66	3	0	69	308
Hourly Total	0	17	0	27	7	44	0	148	233	48	2	429	0	19	390	0	2	409	0	0	252	11	1	263	1145
1:00 PM	0	3	0	5	0	8	0	39	70	15	2	124	0	4	82	0	0	86	0	0	68	1	1	69	287
1:15 PM	0	2	0	10	0	12	0	44	81	7	3	132	0	3	95	0	0	98	0	0	99	2	0	101	343
1:30 PM	0	3	0	7	0	10	0	57	52	12	3	121	0	2	114	0	0	116	0	0	89	5	0	94	341

1:45 PM	0	5	0	11	0	16	0	41	78	16	6	135	0	2	100	0	0	102	0	0	79	9	1	88	341
Hourly Total	0	13	0	33	0	46	0	181	281	50	14	512	0	11	391	0	0	402	0	0	335	17	2	352	1312
2:00 PM	0	7	1	8	0	16	0	39	72	20	0	131	0	9	103	0	0	112	0	0	79	3	0	82	341
2:15 PM	0	7	0	11	2	18	0	51	70	13	0	134	0	5	121	0	0	126	0	0	80	2	0	82	360
2:30 PM	0	3	0	14	2	17	0	59	72	15	1	146	0	5	114	0	0	119	0	0	69	6	0	75	357
2:45 PM	0	2	0	6	0	8	0	57	98	12	0	167	0	4	123	0	1	127	0	0	70	3	0	73	375
Hourly Total	0	19	1	39	4	59	0	206	312	60	1	578	0	23	461	0	1	484	0	0	298	14	0	312	1433
3:00 PM	0	5	0	4	0	9	0	69	96	16	1	181	0	6	123	0	1	129	0	0	71	3	0	74	393
3:15 PM	0	4	0	5	0	9	0	51	74	17	1	142	0	1	119	0	0	120	0	0	93	3	1	96	367
3:30 PM	0	12	0	10	0	22	0	81	100	8	2	189	0	7	133	0	1	140	0	0	94	2	1	96	447
3:45 PM	0	1	0	8	0	9	0	48	104	11	2	163	0	7	146	0	1	153	0	0	68	8	2	76	401
Hourly Total	0	22	0	27	0	49	0	249	374	52	6	675	0	21	521	0	3	542	0	0	326	16	4	342	1608
4:00 PM	0	2	1	13	0	16	0	80	120	15	0	215	0	4	132	0	0	136	0	0	73	2	1	75	442
4:15 PM	0	2	0	6	1	8	0	53	121	8	0	182	0	5	134	0	0	139	0	0	73	2	1	75	404
4:30 PM	0	6	0	13	1	19	0	69	105	11	1	185	0	7	112	0	1	119	0	0	65	5	1	70	393
4:45 PM	0	3	0	10	2	13	0	65	94	14	2	173	0	6	142	0	2	148	0	0	82	3	1	85	419
Hourly Total	0	13	1	42	4	56	0	267	440	48	3	755	0	22	520	0	3	542	0	0	293	12	4	305	1658
5:00 PM	0	3	0	6	0	9	0	50	96	19	0	165	0	5	132	0	0	137	0	0	70	7	0	77	388
5:15 PM	0	5	0	6	2	11	0	49	82	12	0	143	0	10	143	0	1	153	0	0	80	4	0	84	391
5:30 PM	0	8	0	6	2	14	0	56	78	17	0	151	0	4	114	0	1	118	0	0	77	5	1	82	365
5:45 PM	0	3	0	9	0	12	0	58	74	18	0	150	0	7	112	0	0	119	0	0	69	3	0	72	353
Hourly Total	0	19	0	27	4	46	0	213	330	66	0	609	0	26	501	0	2	527	0	0	296	19	1	315	1497
6:00 PM	0	1	0	9	3	10	0	37	81	4	3	122	0	4	98	0	1	102	0	0	65	0	0	65	299
6:15 PM	0	4	0	4	1	8	0	37	55	11	0	103	0	2	107	0	0	109	0	0	57	4	1	61	281
6:30 PM	0	2	0	2	3	4	0	29	61	10	0	100	0	3	87	0	1	90	0	0	49	2	0	51	245
6:45 PM	0	3	0	6	2	9	0	38	50	10	0	98	0	3	93	0	1	96	0	0	56	2	0	58	261
Hourly Total	0	10	0	21	9	31	0	141	247	35	3	423	0	12	385	0	3	397	0	0	227	8	1	235	1086
Grand Total	0	163	2	311	37	476	1	1989	3098	538	45	5626	0	189	4669	0	19	4858	0	0	3766	184	28	3950	14910
Approach %	0.0	34.2	0.4	65.3	-	-	0.0	35.4	55.1	9.6	-	-	0.0	3.9	96.1	0.0	-	-	0.0	0.0	95.3	4.7	-	-	-
Total %	0.0	1.1	0.0	2.1	-	3.2	0.0	13.3	20.8	3.6	-	37.7	0.0	1.3	31.3	0.0	-	32.6	0.0	0.0	25.3	1.2	-	26.5	-
Lights	0	155	2	302	-	459	1	1965	2988	528	-	5482	0	181	4513	0	-	4694	0	0	3607	173	-	3780	14415
% Lights	-	95.1	100.0	97.1	-	96.4	100.0	98.8	96.4	98.1	-	97.4	-	95.8	96.7	-	-	96.6	-	-	95.8	94.0	-	95.7	96.7
Mediums	0	6	0	7	-	13	0	23	95	8	-	126	0	7	143	0	-	150	0	0	139	7	-	146	435
% Mediums	-	3.7	0.0	2.3	-	2.7	0.0	1.2	3.1	1.5	-	2.2	-	3.7	3.1	-	-	3.1	-	-	3.7	3.8	-	3.7	2.9
Articulated Trucks	0	2	0	1	-	3	0	0	9	2	-	11	0	1	13	0	-	14	0	0	17	3	-	20	48
% Articulated Trucks	-	1.2	0.0	0.3	-	0.6	0.0	0.0	0.3	0.4	-	0.2	-	0.5	0.3	-	-	0.3	-	-	0.5	1.6	-	0.5	0.3
Bicycles on Road	0	0	0	1	-	1	0	1	6	0	-	7	0	0	0	0	-	0	0	0	3	1	-	4	12
% Bicycles on Road	-	0.0	0.0	0.3	-	0.2	0.0	0.1	0.2	0.0	-	0.1	-	0.0	0.0	-	-	0.0	-	-	0.1	0.5	-	0.1	0.1
Bicycles on Crosswalk	-	-	-	-	4	-	-	-	-	-	5	-	-	-	-	-	3	-	-	-	-	-	0	-	-
% Bicycles on Crosswalk	-	-	-	-	10.8	-	-	-	-	-	11.1	-	-	-	-	-	15.8	-	-	-	-	-	0.0	-	-
Pedestrians	-	-	-	-	33	-	-	-	-	-	40	-	-	-	-	-	16	-	-	-	-	-	28	-	-
% Pedestrians	-	-	-	-	89.2	-	-	-	-	-	88.9	-	-	-	-	-	84.2	-	-	-	-	-	100.0	-	-

Kimley-Horn : Lisle (IL)
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Lisle, Illinois, United States 60532
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Count Name: Longfellow Avenue & East 28th Street
Site Code:
Start Date: 03/19/2020

Turning Movement Data

Start Time	E 28th Street Eastbound						E 28th Street Westbound						Smith Foundry Co. Driveway Northbound						Longfellow Avenue Southbound						Int. Total
	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	U-Turn	Left	Thru	Right	Peds	App. Total	
6:00 AM	0	2	19	0	0	21	0	0	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	25
6:15 AM	0	2	18	1	0	21	0	0	3	0	1	3	0	0	0	0	0	0	0	2	0	1	0	3	27
6:30 AM	0	0	36	1	1	37	0	0	3	2	1	5	0	0	0	1	1	1	0	0	0	0	1	0	43
6:45 AM	0	1	37	1	0	39	0	1	4	1	1	6	0	0	0	0	0	0	0	0	0	0	0	0	45
Hourly Total	0	5	110	3	1	118	0	1	14	3	3	18	0	0	0	1	1	1	0	2	0	1	1	3	140
7:00 AM	0	3	31	0	2	34	0	0	2	6	5	8	0	0	0	1	0	1	0	0	0	2	0	2	45
7:15 AM	0	1	35	1	1	37	0	0	1	1	0	2	0	0	0	0	2	0	0	3	0	0	1	3	42
7:30 AM	0	1	62	0	0	63	0	0	2	1	1	3	0	0	0	0	1	0	0	1	0	0	0	1	67
7:45 AM	0	1	43	0	0	44	0	0	3	3	0	6	0	0	0	0	1	0	0	0	0	3	1	3	53
Hourly Total	0	6	171	1	3	178	0	0	8	11	6	19	0	0	0	1	4	1	0	4	0	5	2	9	207
8:00 AM	0	3	39	0	0	42	0	0	4	2	2	6	0	1	0	0	1	1	0	1	0	0	1	1	50
8:15 AM	0	2	46	0	0	48	0	0	2	1	2	3	0	0	0	0	1	0	0	4	0	0	0	4	55
8:30 AM	0	4	30	0	0	34	0	1	4	1	1	6	0	0	0	0	0	0	0	3	0	0	0	3	43
8:45 AM	0	3	37	0	1	40	0	0	4	0	3	4	0	0	0	2	1	2	0	1	0	2	0	3	49
Hourly Total	0	12	152	0	1	164	0	1	14	4	8	19	0	1	0	2	3	3	0	9	0	2	1	11	197
9:00 AM	0	1	37	0	0	38	0	0	8	1	1	9	0	1	0	0	0	1	0	0	0	2	1	2	50
9:15 AM	0	2	32	0	1	34	0	0	5	1	1	6	1	0	0	2	2	3	0	3	0	1	2	4	47
9:30 AM	0	0	28	0	0	28	0	0	5	1	3	6	0	0	0	1	0	1	0	2	0	1	3	3	38
9:45 AM	0	2	40	0	0	42	0	0	3	2	0	5	0	0	0	0	1	0	0	3	0	0	0	3	50
Hourly Total	0	5	137	0	1	142	0	0	21	5	5	26	1	1	0	3	3	5	0	8	0	4	6	12	185
10:00 AM	0	1	45	0	0	46	0	0	6	1	2	7	0	0	0	1	1	1	0	1	0	0	0	1	55
10:15 AM	0	5	42	0	2	47	0	0	4	2	1	6	0	0	0	0	0	0	0	0	0	2	3	2	55
10:30 AM	0	1	36	0	3	37	0	0	10	6	6	16	0	0	0	0	0	0	0	6	0	1	0	7	60
10:45 AM	0	2	47	0	3	49	0	0	9	1	4	10	0	0	0	1	0	1	0	3	0	1	1	4	64
Hourly Total	0	9	170	0	8	179	0	0	29	10	13	39	0	0	0	2	1	2	0	10	0	4	4	14	234
11:00 AM	0	4	54	0	1	58	0	0	8	2	2	10	0	0	0	0	0	0	0	2	0	1	1	3	71
11:15 AM	0	1	62	0	0	63	0	0	8	1	0	9	0	0	0	0	2	0	0	3	0	1	0	4	76
11:30 AM	0	1	54	0	0	55	0	0	8	1	2	9	1	1	0	0	0	2	0	0	0	2	0	2	68
11:45 AM	0	2	62	0	1	64	0	0	6	3	0	9	0	0	0	1	1	1	0	1	0	1	0	2	76
Hourly Total	0	8	232	0	2	240	0	0	30	7	4	37	1	1	0	1	3	3	0	6	0	5	1	11	291
12:00 PM	0	2	61	0	1	63	0	0	5	2	0	7	0	0	0	0	3	0	0	3	0	2	2	5	75
12:15 PM	0	1	60	0	1	61	0	0	11	2	0	13	0	0	0	1	0	1	0	3	0	1	0	4	79
12:30 PM	0	3	65	0	0	68	0	0	8	1	0	9	0	0	0	2	2	2	0	1	0	1	0	2	81
12:45 PM	0	2	68	0	1	70	0	0	11	0	0	11	1	0	0	2	5	3	0	2	0	1	2	3	87
Hourly Total	0	8	254	0	3	262	0	0	35	5	0	40	1	0	0	5	10	6	0	9	0	5	4	14	322
1:00 PM	0	2	73	0	1	75	0	0	8	3	1	11	0	0	0	0	1	0	0	2	0	1	1	3	89
1:15 PM	0	2	84	0	0	86	0	0	13	1	2	14	0	0	0	0	0	0	0	3	0	1	3	4	104
1:30 PM	0	4	58	0	1	62	1	0	10	4	0	15	0	0	0	0	1	0	0	2	0	0	2	2	79

1:45 PM	0	4	82	0	0	86	0	0	14	5	0	19	0	0	0	1	0	1	0	7	0	0	1	7	113
Hourly Total	0	12	297	0	2	309	1	0	45	13	3	59	0	0	0	1	2	1	0	14	0	2	7	16	385
2:00 PM	0	3	78	0	0	81	0	0	15	2	0	17	0	0	1	0	0	1	0	1	0	1	0	2	101
2:15 PM	0	5	72	0	0	77	0	0	14	5	1	19	0	0	0	1	1	1	0	2	0	3	0	5	102
2:30 PM	0	4	79	0	0	83	0	0	16	4	0	20	0	0	0	0	0	0	0	3	0	1	0	4	107
2:45 PM	0	3	99	0	0	102	0	0	6	3	0	9	0	0	0	0	0	0	0	6	0	0	5	6	117
Hourly Total	0	15	328	0	0	343	0	0	51	14	1	65	0	0	1	1	1	2	0	12	0	5	5	17	427
3:00 PM	0	5	98	0	2	103	0	0	6	6	0	12	0	0	0	0	2	0	0	4	0	2	1	6	121
3:15 PM	0	3	77	0	0	80	0	0	6	3	2	9	0	0	0	0	0	0	0	2	1	3	1	6	95
3:30 PM	0	2	109	0	1	111	0	0	18	4	8	22	2	1	0	1	0	4	0	6	0	3	1	9	146
3:45 PM	0	7	110	0	0	117	0	0	8	2	1	10	0	0	0	1	2	1	0	8	1	1	1	10	138
Hourly Total	0	17	394	0	3	411	0	0	38	15	11	53	2	1	0	2	4	5	0	20	2	9	4	31	500
4:00 PM	0	3	118	0	0	121	0	0	11	0	1	11	0	2	0	0	1	2	0	4	0	3	1	7	141
4:15 PM	0	2	126	0	0	128	0	0	8	2	2	10	0	0	0	3	0	3	0	2	0	0	1	2	143
4:30 PM	0	2	115	0	1	117	0	0	21	2	2	23	0	0	0	0	4	0	0	4	0	1	3	5	145
4:45 PM	0	1	109	0	1	110	0	0	13	3	0	16	0	0	0	0	2	0	0	0	1	0	1	1	127
Hourly Total	0	8	468	0	2	476	0	0	53	7	5	60	0	2	0	3	7	5	0	10	1	4	6	15	556
5:00 PM	1	2	109	0	0	112	0	0	7	2	1	9	0	0	0	0	0	0	0	6	0	3	1	9	130
5:15 PM	0	2	99	0	0	101	0	0	10	2	0	12	0	0	0	0	0	0	0	2	0	1	1	3	116
5:30 PM	0	1	81	0	0	82	0	0	12	1	0	13	0	0	0	0	1	0	0	2	0	0	1	2	97
5:45 PM	0	5	81	0	0	86	0	0	11	1	0	12	0	0	0	0	0	0	0	2	0	0	1	2	100
Hourly Total	1	10	370	0	0	381	0	0	40	6	1	46	0	0	0	0	1	0	0	12	0	4	4	16	443
6:00 PM	0	2	84	0	0	86	0	0	9	1	0	10	0	0	0	0	0	0	0	0	0	0	0	0	96
6:15 PM	0	2	59	0	0	61	0	0	7	3	1	10	0	0	0	0	1	0	0	1	0	0	1	1	72
6:30 PM	0	1	67	0	0	68	0	0	2	1	0	3	0	0	0	0	0	0	0	0	0	1	0	1	72
6:45 PM	0	1	48	0	0	49	0	0	8	2	0	10	0	0	0	0	0	0	0	1	0	0	1	1	60
Hourly Total	0	6	258	0	0	264	0	0	26	7	1	33	0	0	0	0	1	0	0	2	0	1	2	3	300
Grand Total	1	121	3341	4	26	3467	1	2	404	107	61	514	5	6	1	22	41	34	0	118	3	51	47	172	4187
Approach %	0.0	3.5	96.4	0.1	-	-	0.2	0.4	78.6	20.8	-	-	14.7	17.6	2.9	64.7	-	-	0.0	68.6	1.7	29.7	-	-	-
Total %	0.0	2.9	79.8	0.1	-	82.8	0.0	0.0	9.6	2.6	-	12.3	0.1	0.1	0.0	0.5	-	0.8	0.0	2.8	0.1	1.2	-	4.1	-
Lights	1	117	3223	3	-	3344	1	1	383	97	-	482	0	5	1	8	-	14	0	117	3	48	-	168	4008
% Lights	100.0	96.7	96.5	75.0	-	96.5	100.0	50.0	94.8	90.7	-	93.8	0.0	83.3	100.0	36.4	-	41.2	-	99.2	100.0	94.1	-	97.7	95.7
Mediums	0	4	100	1	-	105	0	1	13	6	-	20	0	0	0	10	-	10	0	0	0	3	-	3	138
% Mediums	0.0	3.3	3.0	25.0	-	3.0	0.0	50.0	3.2	5.6	-	3.9	0.0	0.0	0.0	45.5	-	29.4	-	0.0	0.0	5.9	-	1.7	3.3
Articulated Trucks	0	0	13	0	-	13	0	0	7	1	-	8	5	1	0	4	-	10	0	0	0	0	-	0	31
% Articulated Trucks	0.0	0.0	0.4	0.0	-	0.4	0.0	0.0	1.7	0.9	-	1.6	100.0	16.7	0.0	18.2	-	29.4	-	0.0	0.0	0.0	-	0.0	0.7
Bicycles on Road	0	0	5	0	-	5	0	0	1	3	-	4	0	0	0	0	-	0	0	1	0	0	-	1	10
% Bicycles on Road	0.0	0.0	0.1	0.0	-	0.1	0.0	0.0	0.2	2.8	-	0.8	0.0	0.0	0.0	0.0	-	0.0	-	0.8	0.0	0.0	-	0.6	0.2
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	3	-	-
% Bicycles on Crosswalk	-	-	-	-	0.0	-	-	-	-	-	0.0	-	-	-	-	-	2.4	-	-	-	-	-	6.4	-	-
Pedestrians	-	-	-	-	26	-	-	-	-	-	61	-	-	-	-	-	40	-	-	-	-	-	44	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	97.6	-	-	-	-	-	93.6	-	-

Study Name East 28th Street & Hiawatha Avenue
Start Date 03/19/2020
Start Time 6:00 AM
Site Code
Project Twin Cities: 2020: Hiawatha Maintenance Facility_M
Type Road
assification Totals

	E 28th Street Eastbound					Hiawatha Avenue Southbound				Hiawatha Avenue Northbound					Hiawatha Avenue Ramp Northwestbound				
Start Time	U-Turn	Left	Bear Left	Bear Right	Right	Hard Left	Bear Left	Thru	Right	U-Turn	Left	Thru	Bear Right	Hard Right	U-Turn	Hard Left	Bear Left	Bear Right	Right
6:00 AM	0	13	0	0	6	0	0	137	5	0	0	78	0	0	0	0	0	0	17
6:15 AM	0	15	0	0	6	0	0	136	9	0	1	101	0	0	0	0	1	0	18
6:30 AM	0	26	0	0	9	0	0	167	12	0	1	139	0	0	0	0	0	0	29
6:45 AM	0	14	0	0	15	0	0	169	14	0	1	161	0	0	0	0	1	0	32
7:00 AM	0	23	0	0	9	0	0	138	10	0	1	153	0	0	0	0	1	0	32
7:15 AM	0	30	0	0	16	0	0	166	6	0	3	183	0	0	0	0	1	0	34
7:30 AM	0	32	0	0	31	0	0	189	5	0	3	173	0	0	0	0	1	0	33
7:45 AM	0	24	0	0	18	0	0	160	20	0	6	147	0	0	0	0	2	0	32
8:00 AM	0	23	0	0	15	0	0	122	7	0	1	175	1	0	0	0	2	0	35
8:15 AM	0	33	0	0	15	0	0	148	11	0	3	133	0	0	0	0	0	0	29
8:30 AM	0	17	0	0	14	0	0	160	8	0	3	171	0	0	0	0	1	0	45
8:45 AM	0	20	0	0	18	0	0	160	9	1	1	130	0	0	0	1	1	0	34
9:00 AM	0	22	0	0	13	0	0	128	4	0	2	114	0	0	0	0	0	0	26
9:15 AM	0	19	0	0	15	0	0	157	8	0	1	127	0	0	0	0	0	0	34
9:30 AM	0	20	0	0	18	0	0	144	6	0	2	101	0	0	0	0	0	0	39
9:45 AM	0	27	0	0	15	0	0	137	8	0	1	122	0	0	0	0	0	0	34
10:00 AM	0	23	0	0	19	0	0	160	11	1	1	128	0	0	0	0	2	0	34
10:15 AM	0	25	0	0	21	0	0	142	7	0	2	122	0	0	0	0	1	0	37
10:30 AM	0	26	0	0	16	0	0	170	10	0	5	142	0	0	0	0	0	0	41
10:45 AM	0	36	0	0	16	0	0	182	5	0	1	115	0	0	0	0	0	0	46
11:00 AM	0	34	0	0	24	0	0	150	10	1	3	104	0	0	0	0	3	0	42
11:15 AM	0	36	0	0	26	0	0	140	9	0	1	132	0	0	0	0	2	0	40
11:30 AM	0	28	0	0	31	0	0	184	9	0	2	133	0	0	0	1	2	0	60
11:45 AM	0	36	0	0	24	0	0	172	14	0	1	102	0	0	0	0	1	0	29
12:00 PM	0	37	0	0	27	0	0	189	13	0	5	117	0	0	0	0	1	0	61
12:15 PM	1	43	0	0	32	0	0	182	15	0	0	136	0	0	0	1	3	0	49
12:30 PM	0	40	0	0	30	0	0	179	3	0	2	148	0	0	0	0	0	0	58
12:45 PM	0	34	0	0	22	0	0	204	16	0	1	160	0	0	0	0	1	0	53
1:00 PM	0	46	0	0	40	0	0	146	13	0	5	144	0	0	0	0	4	0	44
1:15 PM	0	40	0	0	40	0	0	179	19	0	3	141	0	0	0	0	0	0	56
1:30 PM	0	46	0	0	22	0	0	201	14	0	0	159	0	0	0	0	1	0	60
1:45 PM	0	38	0	0	40	0	0	194	13	0	2	138	0	0	0	0	2	0	57
2:00 PM	0	54	0	0	36	0	0	231	23	0	2	152	0	0	0	0	2	0	53
2:15 PM	0	46	0	0	27	0	0	200	13	0	2	167	0	0	0	0	3	0	63
2:30 PM	0	54	0	0	24	0	0	195	7	0	3	193	0	0	0	0	0	0	59
2:45 PM	0	54	0	0	51	0	0	223	18	0	2	124	0	0	0	0	0	0	59
3:00 PM	0	70	0	0	35	0	0	207	14	0	3	192	0	0	0	0	2	0	57
3:15 PM	0	51	0	0	41	0	0	219	15	0	3	160	0	0	0	0	0	0	65
3:30 PM	0	60	0	0	51	0	0	277	16	0	2	183	0	0	0	0	0	0	78
3:45 PM	0	68	0	0	46	0	0	227	16	0	0	195	0	0	0	1	1	0	67
4:00 PM	0	65	0	0	50	0	0	241	11	0	0	164	0	0	0	0	0	0	55
4:15 PM	0	79	0	0	52	0	0	218	12	0	3	164	0	0	0	0	1	0	69
4:30 PM	1	69	0	0	54	0	0	278	10	0	4	184	0	0	0	0	0	0	57
4:45 PM	0	63	0	0	51	0	0	270	11	1	1	193	0	0	0	0	2	0	77
5:00 PM	0	76	0	0	43	0	0	274	10	0	2	145	0	0	0	0	1	2	58
5:15 PM	0	51	0	0	53	0	0	295	8	0	1	169	0	0	0	0	0	0	74
5:30 PM	0	57	0	0	40	0	0	193	9	0	2	172	0	0	0	0	0	0	74
5:45 PM	0	41	0	0	26	0	0	197	11	0	5	130	0	0	0	0	0	0	49
6:00 PM	0	39	0	0	43	0	0	164	8	0	1	133	0	0	0	0	1	0	56
6:15 PM	0	29	0	0	33	0	0	164	9	0	1	115	0	0	0	0	1	0	41
6:30 PM	0	34	0	0	38	0	0	166	4	0	1	124	0	0	0	0	0	0	39
6:45 PM	0	25	0	0	25	0	0	159	7	0	4	99	0	0	0	0	1	0	44

Study Name East 26th Street & Hiawatha Maintenance Facility - East Intersection
Start Date 03/19/2020
Start Time 12:00 AM
Site Code
Project Twin Cities: 2020: Hiawatha Maintenance Facility_M

Type Road
Classification Totals

	E 26th Street Eastbound				E 26th Street Westbound				Hiawatha Maintenance Facility Northbound				n/a Southbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
12:00 AM	0		2	1	1	2	13		0	0		0				
12:15 AM	0		0	0	0	0	17		0	0		3				
12:30 AM	0		3	1	0	0	12		0	0		0				
12:45 AM	0		5	2	0	2	9		0	1		0				
1:00 AM	0		1	0	0	0	9		0	0		1				
1:15 AM	0		0	2	0	1	8		0	0		0				
1:30 AM	0		2	0	0	0	6		0	0		2				
1:45 AM	0		1	0	0	1	10		0	0		0				
2:00 AM	0		2	0	0	0	7		0	0		0				
2:15 AM	0		3	0	0	0	3		0	0		0				
2:30 AM	0		3	1	0	0	4		0	0		1				
2:45 AM	0		0	1	0	0	1		0	0		1				
3:00 AM	0		3	0	0	0	9		0	0		0				
3:15 AM	0		3	0	0	1	7		0	0		0				
3:30 AM	0		2	1	0	0	3		0	0		0				
3:45 AM	0		3	1	0	0	7		0	0		1				
4:00 AM	0		3	0	0	0	5		0	1		0				
4:15 AM	0		2	0	0	5	6		0	1		0				
4:30 AM	0		3	0	0	1	11		0	0		1				
4:45 AM	0		4	0	0	0	13		0	0		0				
5:00 AM	0		4	0	0	1	18		0	0		0				
5:15 AM	0		2	1	0	5	26		0	0		10				
5:30 AM	0		4	0	0	4	34		0	0		0				
5:45 AM	0		6	0	0	7	45		0	0		1				
6:00 AM	0		5	0	0	20	36		0	0		1				
6:15 AM	0		2	0	0	17	74		0	1		1				
6:30 AM	0		6	0	0	28	124		0	0		3				
6:45 AM	0		5	0	0	29	71		0	5		7				
7:00 AM	0		6	0	0	13	79		0	3		9				
7:15 AM	0		7	0	0	1	74		0	4		5				
7:30 AM	0		3	0	0	5	91		0	5		10				
7:45 AM	0		12	0	0	5	93		0	1		10				
8:00 AM	0		12	0	0	5	75		0	1		4				
8:15 AM	0		11	1	0	6	74		0	3		4				
8:30 AM	0		8	0	0	5	83		0	2		2				
8:45 AM	0		9	0	0	1	79		0	1		4				
9:00 AM	0		8	0	0	2	64		0	3		2				
9:15 AM	0		6	1	0	6	52		0	2		4				
9:30 AM	0		8	1	0	6	53		0	3		7				
9:45 AM	0		7	0	0	5	59		0	3		3				
10:00 AM	0		11	1	0	5	56		0	2		7				
10:15 AM	0		3	0	0	5	63		0	2		4				
10:30 AM	0		11	0	0	6	81		0	3		1				
10:45 AM	0		10	1	0	5	75		0	0		3				
11:00 AM	0		8	1	0	7	77		0	5		3				
11:15 AM	0		3	0	0	3	66		0	2		7				
11:30 AM	0		9	1	0	8	92		0	2		2				
11:45 AM	0		11	0	0	4	66		0	2		3				
12:00 PM	0		8	1	1	5	96		0	0		1				
12:15 PM	0		7	0	0	1	80		0	1		1				
12:30 PM	0		6	1	0	1	77		0	1		3				
12:45 PM	0		13	1	0	1	92		0	0		0				
1:00 PM	0		9	0	0	6	82		0	1		4				
1:15 PM	0		11	0	0	3	91		0	3		6				
1:30 PM	0		12	2	0	6	93		0	3		4				
1:45 PM	0		11	0	0	7	96		0	0		5				
2:00 PM	0		5	0	0	5	92		0	0		5				
2:15 PM	0		12	1	0	5	104		0	1		6				
2:30 PM	0		11	0	0	6	112		0	3		10				
2:45 PM	0		9	1	0	9	116		0	2		17				
3:00 PM	0		16	2	0	2	89		0	6		19				
3:15 PM	0		20	1	0	1	105		0	2		23				
3:30 PM	0		12	0	0	2	109		0	0		12				

Study Name East 26th Street & Hiawatha Maintenance Facility - East Intersection
Start Date 03/19/2020
Start Time 12:00 AM
Site Code
Project Twin Cities: 2020: Hiawatha Maintenance Facility_M

Type Road
Classification Totals

	E 26th Street Eastbound				E 26th Street Westbound				Hiawatha Maintenance Facility Northbound				n/a Southbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
3:45 PM	0		14	0	0	0	100		0	1		2				
4:00 PM	0		11	0	1	1	111		0	0		0				
4:15 PM	0		21	0	0	0	110		0	0		4				
4:30 PM	0		16	0	0	1	110		0	0		2				
4:45 PM	0		16	0	0	1	104		0	0		3				
5:00 PM	0		9	0	0	0	98		0	0		1				
5:15 PM	0		9	0	0	0	96		0	0		0				
5:30 PM	0		7	0	0	1	79		0	0		0				
5:45 PM	0		13	0	0	2	96		0	0		2				
6:00 PM	0		6	0	0	0	97		0	0		0				
6:15 PM	0		13	1	0	1	80		0	1		1				
6:30 PM	1		7	1	0	0	99		0	0		0				
6:45 PM	0		5	1	0	0	72		0	0		1				
7:00 PM	0		8	1	0	0	58		0	0		0				
7:15 PM	0		5	2	0	0	65		0	1		2				
7:30 PM	0		6	0	0	0	49		0	0		0				
7:45 PM	0		6	1	0	0	45		0	1		0				
8:00 PM	0		5	1	0	1	42		0	0		0				
8:15 PM	0		8	0	0	2	65		0	0		1				
8:30 PM	0		2	1	0	3	46		0	1		1				
8:45 PM	0		4	1	0	3	45		0	0		0				
9:00 PM	0		3	1	0	1	45		0	1		0				
9:15 PM	0		9	0	0	3	51		0	0		0				
9:30 PM	0		5	1	0	0	38		0	0		0				
9:45 PM	0		4	1	0	1	39		0	0		0				
10:00 PM	0		4	0	0	2	33		0	0		0				
10:15 PM	0		2	0	0	0	38		0	0		0				
10:30 PM	0		1	0	0	0	37		0	1		0				
10:45 PM	0		2	1	0	2	39		0	1		2				
11:00 PM	0		2	0	0	0	20		0	1		1				
11:15 PM	0		2	2	0	2	21		0	0		1				
11:30 PM	0		4	0	0	0	18		0	0		1				
11:45 PM	0		2	0	0	1	11		0	0		2				

Kimley-Horn : Lisle (IL)
1001 Warrenville Road, Suite 350

Lisle, Illinois, United States 60532
331.481.7332 bailey.waters@kimley-horn.com

Count Name: East 27th Street & Hiawatha Maintenance Facility
Site Code:
Start Date: 03/19/2020

Direction (Westbound)

Start Time	Lights	Mediums	Articulated Trucks	Bicycles on Road	Total
03/19/2020 12:00 AM	0	0	0	0	0
12:15 AM	0	0	0	0	0
12:30 AM	0	0	0	0	0
12:45 AM	1	0	0	0	1
1:00 AM	1	0	0	0	1
1:15 AM	0	0	0	0	0
1:30 AM	1	0	0	0	1
1:45 AM	0	0	0	0	0
2:00 AM	0	0	0	0	0
2:15 AM	0	0	0	0	0
2:30 AM	0	0	0	0	0
2:45 AM	0	0	0	0	0
3:00 AM	0	0	0	0	0
3:15 AM	0	0	0	0	0
3:30 AM	0	0	0	0	0
3:45 AM	0	0	0	0	0
4:00 AM	0	0	0	0	0
4:15 AM	0	0	0	0	0
4:30 AM	0	0	0	0	0
4:45 AM	0	0	0	0	0
5:00 AM	1	0	0	0	1
5:15 AM	0	0	0	0	0
5:30 AM	0	0	0	0	0
5:45 AM	0	0	0	0	0
6:00 AM	0	0	0	0	0
6:15 AM	0	0	0	0	0
6:30 AM	0	0	0	0	0
6:45 AM	0	0	0	0	0
7:00 AM	3	0	0	0	3
7:15 AM	2	0	0	0	2
7:30 AM	2	0	0	0	2
7:45 AM	1	0	0	0	1
8:00 AM	0	0	0	0	0
8:15 AM	1	1	0	0	2
8:30 AM	0	0	0	0	0
8:45 AM	1	0	0	0	1
9:00 AM	0	0	0	0	0
9:15 AM	1	1	0	0	2
9:30 AM	2	0	0	0	2
9:45 AM	1	0	0	0	1
10:00 AM	0	1	0	0	1
10:15 AM	3	0	0	0	3

10:30 AM	6	0	0	0	6
10:45 AM	1	0	0	0	1
11:00 AM	3	0	0	0	3
11:15 AM	1	0	0	0	1
11:30 AM	1	0	0	0	1
11:45 AM	2	0	0	0	2
12:00 PM	0	0	0	0	0
12:15 PM	1	0	0	0	1
12:30 PM	2	2	0	0	4
12:45 PM	2	0	0	0	2
1:00 PM	2	0	0	0	2
1:15 PM	3	1	0	0	4
1:30 PM	4	0	1	0	5
1:45 PM	2	0	0	0	2
2:00 PM	1	0	0	0	1
2:15 PM	1	0	0	0	1
2:30 PM	7	1	0	0	8
2:45 PM	3	0	0	0	3
3:00 PM	5	0	0	0	5
3:15 PM	4	0	0	0	4
3:30 PM	1	0	0	0	1
3:45 PM	0	0	0	0	0
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	1	0	0	0	1
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	1	1
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
6:00 PM	0	0	0	0	0
6:15 PM	0	0	0	0	0
6:30 PM	0	0	0	0	0
6:45 PM	0	0	0	0	0
7:00 PM	1	0	0	0	1
7:15 PM	1	0	0	0	1
7:30 PM	0	0	0	0	0
7:45 PM	0	0	0	0	0
8:00 PM	1	0	0	0	1
8:15 PM	0	0	0	0	0
8:30 PM	0	0	0	0	0
8:45 PM	0	0	0	0	0
9:00 PM	0	0	0	0	0
9:15 PM	0	0	0	0	0
9:30 PM	0	0	0	0	0
9:45 PM	0	0	0	0	0
10:00 PM	0	0	0	0	0
10:15 PM	0	0	0	0	0
10:30 PM	1	0	0	0	1
10:45 PM	0	0	0	0	0
11:00 PM	0	0	0	0	0
11:15 PM	0	0	0	0	0

Kimley-Horn : Lisle (IL)
1001 Warrenville Road, Suite 350

Lisle, Illinois, United States 60532
331.481.7332 bailey.waters@kimley-horn.com

Count Name: East Water Yards, 935 5th Avenue SE
Site Code:
Start Date: 03/19/2020

Direction (Westbound)

Start Time	Lights	Mediums	Articulated Trucks	Bicycles on Road	Total
03/19/2020 12:00 AM	0	0	0	0	0
12:15 AM	0	0	0	0	0
12:30 AM	0	0	0	0	0
12:45 AM	0	0	0	0	0
1:00 AM	0	0	0	0	0
1:15 AM	0	0	0	0	0
1:30 AM	0	0	0	0	0
1:45 AM	0	0	0	0	0
2:00 AM	0	0	0	0	0
2:15 AM	0	0	0	0	0
2:30 AM	0	0	0	0	0
2:45 AM	0	0	0	0	0
3:00 AM	0	0	0	0	0
3:15 AM	0	0	0	0	0
3:30 AM	0	0	0	0	0
3:45 AM	0	0	0	0	0
4:00 AM	0	0	0	0	0
4:15 AM	0	0	0	0	0
4:30 AM	0	0	0	0	0
4:45 AM	0	0	0	0	0
5:00 AM	0	0	0	0	0
5:15 AM	0	0	0	1	1
5:30 AM	0	0	0	0	0
5:45 AM	0	0	0	0	0
6:00 AM	0	0	0	0	0
6:15 AM	0	0	0	0	0
6:30 AM	1	0	0	0	1
6:45 AM	1	0	0	0	1
7:00 AM	0	0	0	0	0
7:15 AM	0	0	0	0	0
7:30 AM	0	0	0	0	0
7:45 AM	2	0	0	0	2
8:00 AM	0	0	0	0	0
8:15 AM	0	1	0	0	1
8:30 AM	1	0	0	0	1
8:45 AM	0	0	0	0	0
9:00 AM	0	1	0	0	1
9:15 AM	5	1	0	0	6
9:30 AM	2	0	0	0	2
9:45 AM	2	1	0	0	3
10:00 AM	0	0	0	0	0
10:15 AM	0	3	0	0	3

10:30 AM	2	1	0	0	3
10:45 AM	2	1	0	0	3
11:00 AM	2	2	0	0	4
11:15 AM	2	0	0	0	2
11:30 AM	3	2	0	0	5
11:45 AM	2	1	0	0	3
12:00 PM	1	0	0	0	1
12:15 PM	3	1	0	0	4
12:30 PM	1	1	0	0	2
12:45 PM	0	0	0	0	0
1:00 PM	1	0	0	0	1
1:15 PM	1	1	0	0	2
1:30 PM	2	2	0	0	4
1:45 PM	1	1	0	0	2
2:00 PM	5	1	0	0	6
2:15 PM	7	1	0	0	8
2:30 PM	6	0	0	0	6
2:45 PM	5	1	0	0	6
3:00 PM	0	1	0	0	1
3:15 PM	2	2	0	0	4
3:30 PM	3	2	0	0	5
3:45 PM	2	2	0	0	4
4:00 PM	0	0	0	0	0
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
6:00 PM	0	0	0	0	0
6:15 PM	0	0	0	0	0
6:30 PM	0	0	0	0	0
6:45 PM	0	0	0	0	0
7:00 PM	0	0	0	0	0
7:15 PM	0	0	0	0	0
7:30 PM	0	0	0	0	0
7:45 PM	0	0	0	0	0
8:00 PM	0	0	0	0	0
8:15 PM	0	0	0	0	0
8:30 PM	0	0	0	0	0
8:45 PM	0	0	0	0	0
9:00 PM	0	0	0	0	0
9:15 PM	0	0	0	0	0
9:30 PM	0	0	0	0	0
9:45 PM	0	0	0	0	0
10:00 PM	0	0	0	0	0
10:15 PM	0	0	0	0	0
10:30 PM	0	0	0	0	0
10:45 PM	0	0	0	0	0
11:00 PM	0	0	0	0	0
11:15 PM	0	0	0	0	0

11:30 PM	0	0	0	0	0
11:45 PM	0	0	0	0	0
Total	67	30	0	1	98
Total %	68.4	30.6	0.0	1.0	100.0
AM Times	10:45 AM	10:15 AM	12:00 AM	4:30 AM	7:00 AM
AM Peaks	9	7	0	1	2
PM Times	2:00 PM	1:15 PM	12:00 PM	12:00 PM	2:00 PM
PM Peaks	23	5	0	0	26

Kimley-Horn : Lisle (IL)
1001 Warrenville Road, Suite 350

Lisle, Illinois, United States 60532
331.481.7332 bailey.waters@kimley-horn.com

Count Name: East Water Yards, 935 5th Avenue SE
Site Code:
Start Date: 03/19/2020

Direction (Eastbound)

Start Time	Lights	Mediums	Articulated Trucks	Bicycles on Road	Total
03/19/2020 12:00 AM	0	0	0	0	0
12:15 AM	0	0	0	0	0
12:30 AM	0	0	0	0	0
12:45 AM	0	0	0	0	0
1:00 AM	0	0	0	0	0
1:15 AM	0	0	0	0	0
1:30 AM	0	0	0	0	0
1:45 AM	0	0	0	0	0
2:00 AM	0	0	0	0	0
2:15 AM	0	0	0	0	0
2:30 AM	0	0	0	0	0
2:45 AM	0	0	0	0	0
3:00 AM	0	0	0	0	0
3:15 AM	0	0	0	0	0
3:30 AM	0	0	0	0	0
3:45 AM	0	0	0	0	0
4:00 AM	0	0	0	0	0
4:15 AM	0	0	0	0	0
4:30 AM	0	0	0	0	0
4:45 AM	0	0	0	0	0
5:00 AM	0	0	0	0	0
5:15 AM	0	0	0	0	0
5:30 AM	0	0	0	0	0
5:45 AM	0	0	0	0	0
6:00 AM	0	0	0	0	0
6:15 AM	0	0	0	0	0
6:30 AM	4	0	0	0	4
6:45 AM	2	0	0	0	2
7:00 AM	4	3	0	0	7
7:15 AM	2	5	0	0	7
7:30 AM	5	3	0	0	8
7:45 AM	4	0	0	0	4
8:00 AM	2	0	0	0	2
8:15 AM	1	0	0	0	1
8:30 AM	0	1	0	0	1
8:45 AM	1	0	0	0	1
9:00 AM	1	1	0	0	2
9:15 AM	1	1	0	0	2
9:30 AM	3	1	0	0	4
9:45 AM	1	0	0	0	1
10:00 AM	0	2	0	0	2
10:15 AM	2	1	0	0	3

10:30 AM	1	2	0	0	3
10:45 AM	3	1	0	0	4
11:00 AM	0	2	0	0	2
11:15 AM	2	0	0	0	2
11:30 AM	4	1	0	0	5
11:45 AM	0	0	0	0	0
12:00 PM	0	0	0	0	0
12:15 PM	1	0	0	0	1
12:30 PM	3	0	0	0	3
12:45 PM	3	0	0	0	3
1:00 PM	4	1	0	0	5
1:15 PM	1	0	0	0	1
1:30 PM	3	2	0	0	5
1:45 PM	0	0	0	0	0
2:00 PM	1	2	0	0	3
2:15 PM	0	0	0	0	0
2:30 PM	0	0	0	0	0
2:45 PM	0	0	0	0	0
3:00 PM	3	0	0	0	3
3:15 PM	2	0	0	0	2
3:30 PM	3	0	0	0	3
3:45 PM	1	0	0	0	1
4:00 PM	2	0	0	0	2
4:15 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0
4:45 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0
6:00 PM	0	0	0	0	0
6:15 PM	0	0	0	0	0
6:30 PM	0	0	0	0	0
6:45 PM	0	0	0	0	0
7:00 PM	0	0	0	0	0
7:15 PM	0	0	0	0	0
7:30 PM	0	0	0	0	0
7:45 PM	0	0	0	0	0
8:00 PM	0	0	0	0	0
8:15 PM	0	0	0	0	0
8:30 PM	0	0	0	0	0
8:45 PM	0	0	0	0	0
9:00 PM	0	0	0	0	0
9:15 PM	0	0	0	0	0
9:30 PM	0	0	0	0	0
9:45 PM	0	0	0	0	0
10:00 PM	0	0	0	0	0
10:15 PM	0	0	0	0	0
10:30 PM	0	0	0	0	0
10:45 PM	0	0	0	0	0
11:00 PM	0	0	0	0	0
11:15 PM	0	0	0	0	0

11:30 PM	0	0	0	0	0
11:45 PM	0	0	0	0	0
Total	70	29	0	0	99
Total %	70.7	29.3	0.0	0.0	100.0
AM Times	10:45 AM	10:15 AM	12:00 AM	4:30 AM	7:00 AM
AM Peaks	9	6	0	0	26
PM Times	2:00 PM	1:15 PM	12:00 PM	12:00 PM	2:00 PM
PM Peaks	1	4	0	0	3

Appendix E: SimTraffic Reports

1: Cedar Av S & 26th St E Performance by movement

Movement	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Total Delay (hr)	0.8	5.0	0.1	0.2	1.9	0.1	0.0	0.6	0.0	8.6
Total Del/Veh (s)	37.8	36.9	30.9	12.2	8.9	5.9	17.6	7.3	4.3	18.0

2: Longfellow Ave & 26th St E Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1
Total Del/Veh (s)	0.2	0.3	1.8	0.4	5.9	0.5	3.4	0.5

3: Driveway 1 & 26th St E Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Delay (hr)	0.0	0.0	0.1	0.6	0.0	0.1	0.8
Total Del/Veh (s)	0.2	0.1	6.0	3.9	8.4	3.3	3.7

4: Hiawatha Av S & 26th St E Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Denied Del/Veh (s)	0.1	0.0	0.0	0.1	0.1	0.2	0.0	0.1	0.0	1.3	0.2	1.2
Total Delay (hr)	1.0	0.5	0.1	0.6	1.5	1.0	2.0	15.8	0.1	3.2	8.6	0.6
Total Del/Veh (s)	56.9	42.8	19.6	142.3	61.6	14.1	66.2	46.8	4.1	49.5	28.3	5.1

4: Hiawatha Av S & 26th St E Performance by movement

Movement	All
Denied Delay (hr)	0.3
Denied Del/Veh (s)	0.3
Total Delay (hr)	35.0
Total Del/Veh (s)	35.2

5: Longfellow Ave & 27th St E Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBR	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	1.1	0.0	0.0	1.1	0.0	3.9	2.6	3.8	2.5	1.9

6: Cedar Av S & 28th St E Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.1
Total Delay (hr)	3.8	5.0	1.1	0.2	0.0	0.1	1.1	0.0	0.1	1.2	12.6
Total Del/Veh (s)	69.7	57.8	49.1	56.6	0.1	14.3	6.7	4.8	22.5	11.9	27.8

7: 28th St E & Longfellow Ave Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.3
Total Del/Veh (s)	2.7	2.4	0.2	0.1	5.6	0.3	3.8	2.4

9: Hiawatha Av S & Hiawatha Av S NB Ramp & 28th St E Performance by movement

Movement	EBL2	EBT	EBR2	NBL	NBT	SBT	SBR	NWL	NWR2	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	0.0	0.0	0.0	1.2	0.2	0.0	0.0	4.3	0.1	0.1
Total Delay (hr)	4.2	0.0	0.5	0.5	5.2	6.4	0.0	0.2	0.3	17.3
Total Del/Veh (s)	80.3	0.5	11.8	82.9	16.9	22.3	2.6	86.0	14.6	23.6

Total Zone Performance

Denied Delay (hr)	0.4
Denied Del/Veh (s)	0.4
Total Delay (hr)	74.8
Total Del/Veh (s)	1201.5

Intersection: 1: Cedar Av S & 26th St E

Movement	WB	WB	NB	NB	SB	SB
Directions Served	LT	TR	LT	TR	LT	R
Maximum Queue (ft)	249	265	168	179	164	45
Average Queue (ft)	164	175	86	90	68	6
95th Queue (ft)	234	246	148	161	136	29
Link Distance (ft)	256	256	1244	1244	357	
Upstream Blk Time (%)	0	1				
Queuing Penalty (veh)	0	2				
Storage Bay Dist (ft)						25
Storage Blk Time (%)					20	1
Queuing Penalty (veh)					2	2

Intersection: 2: Longfellow Ave & 26th St E

Movement	WB	WB	NB
Directions Served	LT	T	LR
Maximum Queue (ft)	6	51	36
Average Queue (ft)	0	2	17
95th Queue (ft)	4	18	42
Link Distance (ft)	225	225	606
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Driveway 1 & 26th St E

Movement	WB	WB	NB
Directions Served	LT	T	LR
Maximum Queue (ft)	53	16	59
Average Queue (ft)	6	1	32
95th Queue (ft)	33	11	52
Link Distance (ft)	375	375	310
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Hiawatha Av S & 26th St E

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB	SB
Directions Served	L	TR	LT	T	R	L	T	T	T	R	L	T
Maximum Queue (ft)	125	132	138	115	173	221	417	423	417	349	277	284
Average Queue (ft)	57	42	67	23	76	79	257	264	249	12	157	187
95th Queue (ft)	109	98	120	71	140	156	378	387	363	119	244	261
Link Distance (ft)		375	1125	1125	1125		425	425	425			2018
Upstream Blk Time (%)						0	0	0	0			
Queuing Penalty (veh)						0	0	0	0			
Storage Bay Dist (ft)	125					275				175	225	
Storage Blk Time (%)	1	0					9		27		2	2
Queuing Penalty (veh)	1	0					10		12		6	6

Intersection: 4: Hiawatha Av S & 26th St E

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	286	261	47
Average Queue (ft)	193	179	4
95th Queue (ft)	263	254	50
Link Distance (ft)	2018	2018	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			300
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Longfellow Ave & 27th St E

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (ft)	6	6	50	31
Average Queue (ft)	0	0	20	10
95th Queue (ft)	4	4	46	34
Link Distance (ft)	212	236	593	606
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Cedar Av S & 28th St E

Movement	EB	EB	EB	B3888	WB	NB	NB	SB
Directions Served	L	T	TR	T	LTR	T	TR	LT
Maximum Queue (ft)	238	231	259	6	74	133	156	262
Average Queue (ft)	142	114	147	0	24	63	63	117
95th Queue (ft)	221	191	226	4	60	109	120	207
Link Distance (ft)	612	612	612	576	278	1956	1956	1244
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 7: 28th St E & Longfellow Ave

Movement	EB	EB	SB
Directions Served	LT	T	LR
Maximum Queue (ft)	18	24	45
Average Queue (ft)	1	1	16
95th Queue (ft)	8	10	43
Link Distance (ft)	278	278	593
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 9: Hiawatha Av S & Hiawatha Av S NB Ramp & 28th St E

Movement	EB	EB	NB	NB	NB	SB	SB	SB	SB	NW	NW
Directions Served	<	>	L	T	T	T	T	T	R	L	>
Maximum Queue (ft)	349	110	59	381	391	341	338	332	61	48	70
Average Queue (ft)	170	33	11	160	170	122	132	134	15	9	13
95th Queue (ft)	303	83	39	319	333	295	310	309	45	34	45
Link Distance (ft)	746			2597	2597	704	704	704			651
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)		650	290						480	130	
Storage Blk Time (%)				2							
Queuing Penalty (veh)				0							

Zone Summary

Zone wide Queuing Penalty: 43

1: Cedar Av S & 26th St E Performance by movement

Movement	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.3
Denied Del/Veh (s)	0.7	0.4	1.6	0.0	0.4	0.0	0.5	0.2	0.4	0.4
Total Delay (hr)	2.7	9.8	0.7	1.0	7.7	0.7	0.1	2.5	1.0	26.3
Total Del/Veh (s)	63.1	67.8	63.5	41.9	32.4	32.3	32.1	11.9	10.3	33.1

2: Longfellow Ave & 26th St E Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	0.0	0.0	0.0	2.3	0.1	0.0	0.0	2.5
Total Del/Veh (s)	0.3	0.5	7.9	11.9	42.4	1.2	9.3	10.8

3: Driveway 1 & 26th St E Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Delay (hr)	0.0	0.0	0.0	1.2	0.0	0.0	1.3
Total Del/Veh (s)	0.2	0.0	9.8	6.3	13.3	3.5	5.5

4: Hiawatha Av S & 26th St E Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.1	0.1
Denied Del/Veh (s)	0.0	0.0	0.0	0.2	0.1	0.3	0.1	0.4	0.6	1.1	0.3	1.1
Total Delay (hr)	0.8	0.7	0.1	3.9	7.8	4.7	2.2	39.1	0.4	4.3	16.1	0.5
Total Del/Veh (s)	57.8	46.3	28.5	292.9	105.7	34.2	59.3	89.6	17.3	55.0	33.0	5.2

4: Hiawatha Av S & 26th St E Performance by movement

Movement	All
Denied Delay (hr)	0.6
Denied Del/Veh (s)	0.4
Total Delay (hr)	80.5
Total Del/Veh (s)	57.1

5: Longfellow Ave & 27th St E Performance by movement

Movement	EBL	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	1.8	0.1	0.0	4.2	5.0	2.7	4.5	3.9	2.5	3.0

6: Cedar Av S Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	0.2	0.1	0.1	1.1	0.0	0.0	0.1	0.1	0.1	0.0	0.1
Total Delay (hr)	6.0	9.3	1.0	0.7	0.0	0.7	2.4	0.0	0.3	3.4	23.8
Total Del/Veh (s)	47.7	44.0	43.6	99.8	0.5	36.2	16.8	8.0	26.9	14.2	30.3

7: Longfellow Ave Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	0.0	2.0	0.0	0.0	0.1	0.0	0.0	2.2
Total Del/Veh (s)	6.8	9.2	0.6	0.1	27.6	1.0	5.5	8.5

9: Hiawatha Av S & Hiawatha Av S NB Ramp Performance by movement

Movement	EBL2	EBT	EBR2	NBL	NBT	SBT	SBR	NWL	NWR2	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.5	0.0	0.0	0.0	0.6
Denied Del/Veh (s)	0.0	0.0	0.0	1.9	0.2	1.0	0.3	3.5	0.3	0.5
Total Delay (hr)	12.8	0.2	2.8	0.4	29.8	40.0	0.1	0.2	3.8	90.2
Total Del/Veh (s)	105.6	24.1	28.5	88.4	93.1	79.4	6.8	92.2	58.2	79.1

Total Zone Performance

Denied Delay (hr)	1.5
Denied Del/Veh (s)	0.7
Total Delay (hr)	227.0
Total Del/Veh (s)	1702.3

Intersection: 1: Cedar Av S & 26th St E

Movement	WB	WB	NB	NB	B13	B13	SB	SB
Directions Served	LT	TR	L	TR	T		LT	TR
Maximum Queue (ft)	278	275	56	877	130	52	285	298
Average Queue (ft)	237	238	34	439	11	3	143	145
95th Queue (ft)	302	300	59	914	80	33	243	252
Link Distance (ft)	250	250		1031	157	157	1119	1119
Upstream Blk Time (%)	22	25		3	1	0		
Queuing Penalty (veh)	77	88		27	3	0		
Storage Bay Dist (ft)			25					
Storage Blk Time (%)			20	25				
Queuing Penalty (veh)			184	22				

Intersection: 2: Longfellow Ave & 26th St E

Movement	WB	WB	NB
Directions Served	LT	T	LR
Maximum Queue (ft)	225	227	52
Average Queue (ft)	73	74	19
95th Queue (ft)	206	206	47
Link Distance (ft)	225	225	606
Upstream Blk Time (%)	2	2	
Queuing Penalty (veh)	8	7	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Driveway 1 & 26th St E

Movement	WB	WB	NB
Directions Served	LT	T	LR
Maximum Queue (ft)	127	90	43
Average Queue (ft)	10	8	17
95th Queue (ft)	75	76	43
Link Distance (ft)	374	374	310
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Hiawatha Av S & 26th St E

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB	SB
Directions Served	L	TR	LT	T	R	L	T	T	T	R	L	T
Maximum Queue (ft)	104	122	384	353	424	422	466	472	567	350	349	484
Average Queue (ft)	43	49	238	207	221	175	428	436	471	164	212	307
95th Queue (ft)	90	101	385	356	375	409	467	479	579	450	341	420
Link Distance (ft)		374	1145	1145	1145		423	423	423			1801
Upstream Blk Time (%)						0	33	33	22			
Queuing Penalty (veh)						0	196	199	135			
Storage Bay Dist (ft)	125					275				175	225	
Storage Blk Time (%)	0	0				0	58		68		6	21
Queuing Penalty (veh)	0	0				1	75		54		36	57

Intersection: 4: Hiawatha Av S & 26th St E

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	479	428	174
Average Queue (ft)	308	291	16
95th Queue (ft)	413	389	96
Link Distance (ft)	1801	1801	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			300
Storage Blk Time (%)		5	
Queuing Penalty (veh)		17	

Intersection: 5: Longfellow Ave & 27th St E

Movement	NB	SB
Directions Served	LTR	LTR
Maximum Queue (ft)	41	31
Average Queue (ft)	21	14
95th Queue (ft)	45	39
Link Distance (ft)	593	606
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: Cedar Av S

Movement	EB	EB	EB	WB	NB	NB	SB	SB	B13	B13
Directions Served	L	T	TR	LTR	T	TR	LT	T	T	T
Maximum Queue (ft)	468	460	472	210	327	281	226	230	37	64
Average Queue (ft)	278	245	277	73	160	44	132	144	3	6
95th Queue (ft)	447	399	422	175	272	171	222	242	28	39
Link Distance (ft)	2428	2428	2428	274	2799	2799	157	157	1031	1031
Upstream Blk Time (%)				1			8	9		
Queuing Penalty (veh)				1			36	42		
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 7: Longfellow Ave

Movement	EB	EB	WB	SB
Directions Served	LT	T	TR	LR
Maximum Queue (ft)	176	214	10	48
Average Queue (ft)	31	52	1	17
95th Queue (ft)	166	193	9	44
Link Distance (ft)	274	274	203	593
Upstream Blk Time (%)	1	1		
Queuing Penalty (veh)	4	5		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: Hiawatha Av S & Hiawatha Av S NB Ramp

Movement	EB	EB	B3286	NB	NB	NB	SB	SB	SB	SB	NW	NW
Directions Served	<	>	T	L	T	T	T	T	T	R	L	>
Maximum Queue (ft)	824	675	160	377	937	917	704	728	724	668	118	345
Average Queue (ft)	505	237	32	53	573	564	536	550	549	59	11	161
95th Queue (ft)	837	610	140	291	975	955	751	760	757	308	63	289
Link Distance (ft)	746		105		2006	2006	715	715	715			651
Upstream Blk Time (%)	9		7				2	2	2			
Queuing Penalty (veh)	70		51				12	13	15			
Storage Bay Dist (ft)		650		290						480	130	
Storage Blk Time (%)	11	0			42				24			24
Queuing Penalty (veh)	36	0			6				16			2

Zone Summary

Zone wide Queuing Penalty: 1496

1: Cedar Av S & 26th St E Performance by movement

Movement	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.1	0.7	0.0	0.0	0.0	0.2	0.0	0.3	0.0
Total Delay (hr)	0.8	5.0	0.1	0.2	1.9	0.1	0.0	0.6	0.0	8.8
Total Del/Veh (s)	35.1	36.5	27.8	11.8	9.2	7.1	19.7	8.0	4.6	18.1

2: Longfellow Ave & 26th St E Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	0.0	0.0	0.0	0.1	0.0	0.0	0.1
Total Del/Veh (s)	0.2	0.1	1.7	0.4	4.7	3.5	0.5

3: Driveway 1 & 26th St E Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Delay (hr)	0.0	0.0	0.1	0.6	0.0	0.1	0.8
Total Del/Veh (s)	0.2	0.2	5.8	3.9	7.3	3.1	3.8

4: Hiawatha Av S & 26th St E Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Denied Del/Veh (s)	0.1	0.0	0.0	0.2	0.1	0.2	0.0	0.1	0.0	1.2	0.2	1.2
Total Delay (hr)	0.9	0.6	0.1	0.5	1.4	1.0	2.2	17.3	0.1	3.4	9.2	0.6
Total Del/Veh (s)	57.7	47.0	24.3	123.9	60.9	14.6	66.3	49.5	5.2	48.5	29.2	5.2

4: Hiawatha Av S & 26th St E Performance by movement

Movement	All
Denied Delay (hr)	0.3
Denied Del/Veh (s)	0.3
Total Delay (hr)	37.1
Total Del/Veh (s)	36.5

5: Longfellow Ave & 27th St E Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	NBT	NBR	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	0.9	0.1	0.0	1.2	0.0	3.9	2.8	3.7	2.9	1.9

6: Cedar Av S & 28th St E Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1
Total Delay (hr)	3.7	5.1	1.0	0.2	0.0	0.1	1.1	0.0	0.1	1.3	12.5
Total Del/Veh (s)	68.8	59.4	47.6	49.5	0.1	11.0	6.7	5.1	19.2	12.0	27.5

7: 28th St E & Longfellow Ave Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.3
Total Del/Veh (s)	2.6	2.4	0.1	0.1	6.1	0.2	2.9	2.3

9: Hiawatha Av S & Hiawatha Av S NB Ramp & 28th St E Performance by movement

Movement	EBL2	EBT	EBR2	NBL	NBT	SBT	SBR	NWL	NWR2	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	0.0	0.0	0.0	1.5	0.2	0.0	0.0	3.9	0.3	0.1
Total Delay (hr)	4.1	0.0	0.5	0.6	11.2	9.9	0.1	0.3	1.7	28.3
Total Del/Veh (s)	78.4	0.5	12.5	78.5	35.6	33.2	3.5	88.2	24.7	35.1

Total Zone Performance

Denied Delay (hr)	0.5
Denied Del/Veh (s)	0.4
Total Delay (hr)	87.8
Total Del/Veh (s)	1339.1

Intersection: 1: Cedar Av S & 26th St E

Movement	WB	WB	NB	NB	SB	SB
Directions Served	LT	TR	LT	TR	LT	R
Maximum Queue (ft)	264	264	201	223	169	50
Average Queue (ft)	168	178	88	94	71	9
95th Queue (ft)	247	255	155	173	141	36
Link Distance (ft)	256	256	1244	1244	357	
Upstream Blk Time (%)	1	1				
Queuing Penalty (veh)	2	2				
Storage Bay Dist (ft)						25
Storage Blk Time (%)					21	1
Queuing Penalty (veh)					2	2

Intersection: 2: Longfellow Ave & 26th St E

Movement	WB	WB	NB
Directions Served	LT	T	LR
Maximum Queue (ft)	17	37	36
Average Queue (ft)	1	2	17
95th Queue (ft)	13	17	42
Link Distance (ft)	225	225	606
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Driveway 1 & 26th St E

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	35	58
Average Queue (ft)	3	31
95th Queue (ft)	17	49
Link Distance (ft)	375	310
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Hiawatha Av S & 26th St E

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB	SB
Directions Served	L	TR	LT	T	R	L	T	T	T	R	L	T
Maximum Queue (ft)	121	123	153	120	209	219	411	424	477	278	287	291
Average Queue (ft)	49	41	66	22	79	91	267	279	277	27	159	197
95th Queue (ft)	99	94	127	75	151	174	410	416	409	182	256	275
Link Distance (ft)		375	1025	1025	1025		431	431	431			2018
Upstream Blk Time (%)							0	1	0			
Queuing Penalty (veh)							2	3	2			
Storage Bay Dist (ft)	125					275				175	225	
Storage Blk Time (%)	1	0					13		34		3	3
Queuing Penalty (veh)	0	0					14		15		11	8

Intersection: 4: Hiawatha Av S & 26th St E

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	304	300	81
Average Queue (ft)	204	188	4
95th Queue (ft)	280	273	52
Link Distance (ft)	2018	2018	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			300
Storage Blk Time (%)		0	
Queuing Penalty (veh)		0	

Intersection: 5: Longfellow Ave & 27th St E

Movement	WB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	6	50	35
Average Queue (ft)	0	20	8
95th Queue (ft)	4	46	31
Link Distance (ft)	236	593	606
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Cedar Av S & 28th St E

Movement	EB	EB	EB	WB	NB	NB	SB
Directions Served	L	T	TR	LTR	T	TR	LT
Maximum Queue (ft)	256	194	236	78	134	138	216
Average Queue (ft)	143	114	149	26	57	67	116
95th Queue (ft)	226	187	216	60	109	121	208
Link Distance (ft)	612	612	612	278	2287	2287	1244
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 7: 28th St E & Longfellow Ave

Movement	EB	SB
Directions Served	T	LR
Maximum Queue (ft)	12	40
Average Queue (ft)	1	14
95th Queue (ft)	8	40
Link Distance (ft)	278	593
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9: Hiawatha Av S & Hiawatha Av S NB Ramp & 28th St E

Movement	EB	EB	NB	NB	NB	SB	SB	SB	SB	NW	NW
Directions Served	<	>	L	T	T	T	T	T	R	L	>
Maximum Queue (ft)	356	126	62	632	612	380	375	382	73	48	270
Average Queue (ft)	170	33	14	275	284	170	180	184	16	10	93
95th Queue (ft)	305	96	46	526	529	359	374	381	48	34	202
Link Distance (ft)	746			2597	2597	675	675	675			651
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)		650	290						480	130	
Storage Blk Time (%)				10							5
Queuing Penalty (veh)				3							1

Zone Summary

Zone wide Queuing Penalty: 66

1: Cedar Av S & 26th St E Performance by movement

Movement	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Denied Del/Veh (s)	0.7	0.7	0.1	0.1	0.1	0.0	0.4	0.2	0.4	0.3
Total Delay (hr)	2.4	9.8	0.7	1.0	6.7	0.6	0.1	2.5	1.1	24.8
Total Del/Veh (s)	60.0	66.7	64.3	37.9	27.8	25.5	35.7	11.8	10.6	30.9

2: Longfellow Ave & 26th St E Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	0.0	0.0	0.1	2.3	0.1	0.0	0.1	2.5
Total Del/Veh (s)	0.3	0.2	12.9	11.8	32.0	0.9	19.3	10.8

3: Driveway 1 & 26th St E Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Delay (hr)	0.0	0.0	0.0	1.1	0.0	0.0	1.1
Total Del/Veh (s)	0.1	0.1	10.9	5.4	11.8	3.1	4.7

4: Hiawatha Av S & 26th St E Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.1	0.1	0.1
Denied Del/Veh (s)	0.0	0.0	0.0	0.2	0.1	0.2	0.2	0.5	1.5	1.1	0.3	1.0
Total Delay (hr)	0.9	0.7	0.1	3.3	6.0	4.6	2.4	40.0	0.4	4.6	17.8	0.5
Total Del/Veh (s)	56.6	44.3	26.2	247.0	84.2	32.6	65.8	91.4	20.5	57.2	35.1	5.4

4: Hiawatha Av S & 26th St E Performance by movement

Movement	All
Denied Delay (hr)	0.6
Denied Del/Veh (s)	0.5
Total Delay (hr)	81.2
Total Del/Veh (s)	56.7

5: Longfellow Ave & 27th St E Performance by movement

Movement	EBL	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	1.1	0.1	0.0	3.6	3.4	2.4	4.1	3.4	2.4	2.4

6: Cedar Av S Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	0.2	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1
Total Delay (hr)	5.5	9.3	1.1	0.4	0.0	0.4	2.3	0.0	0.3	3.3	22.6
Total Del/Veh (s)	43.5	44.5	49.4	68.3	0.2	19.2	16.2	8.6	23.2	13.6	28.8

7: Longfellow Ave Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	0.0	2.4	0.0	0.0	0.1	0.0	0.0	2.7
Total Del/Veh (s)	6.5	11.2	0.4	0.2	25.2	0.2	25.9	10.3

9: Hiawatha Av S & Hiawatha Av S NB Ramp Performance by movement

Movement	EBL2	EBT	EBR2	NBL	NBT	SBT	SBR	NWL	NWR2	All
Denied Delay (hr)	0.0	0.0	0.0	0.1	2.0	0.2	0.0	0.0	0.0	2.3
Denied Del/Veh (s)	0.0	0.0	0.0	13.4	6.3	0.4	0.3	3.7	0.3	2.0
Total Delay (hr)	13.9	0.2	2.8	0.7	54.2	40.8	0.1	0.2	3.9	116.9
Total Del/Veh (s)	113.4	29.5	29.8	144.5	164.1	79.4	7.0	88.6	59.0	100.9

Total Zone Performance

Denied Delay (hr)	3.2
Denied Del/Veh (s)	1.5
Total Delay (hr)	251.9
Total Del/Veh (s)	1616.8

Intersection: 1: Cedar Av S & 26th St E

Movement	WB	WB	NB	NB	B13	SB	SB
Directions Served	LT	TR	L	TR	T	LT	TR
Maximum Queue (ft)	272	276	49	836	70	257	307
Average Queue (ft)	237	238	35	398	2	139	150
95th Queue (ft)	303	301	57	765	35	233	268
Link Distance (ft)	250	250		1031	157	1119	1119
Upstream Blk Time (%)	22	23		0	0		
Queuing Penalty (veh)	78	83		2	0		
Storage Bay Dist (ft)			25				
Storage Blk Time (%)			24	24			
Queuing Penalty (veh)			217	22			

Intersection: 2: Longfellow Ave & 26th St E

Movement	WB	WB	NB
Directions Served	LT	T	LR
Maximum Queue (ft)	218	234	57
Average Queue (ft)	73	76	22
95th Queue (ft)	202	208	52
Link Distance (ft)	225	225	606
Upstream Blk Time (%)	3	4	
Queuing Penalty (veh)	11	13	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Driveway 1 & 26th St E

Movement	WB	WB	NB
Directions Served	LT	T	LR
Maximum Queue (ft)	91	70	31
Average Queue (ft)	10	8	16
95th Queue (ft)	56	55	40
Link Distance (ft)	374	374	310
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Hiawatha Av S & 26th St E

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB	SB
Directions Served	L	TR	LT	T	R	L	T	T	T	R	L	T
Maximum Queue (ft)	124	114	310	288	414	422	454	467	561	350	350	492
Average Queue (ft)	53	47	200	172	225	169	426	436	481	146	244	338
95th Queue (ft)	107	95	299	279	376	396	464	470	582	429	394	460
Link Distance (ft)		374	1145	1145	1145		423	423	423			1801
Upstream Blk Time (%)						0	37	36	27			
Queuing Penalty (veh)						0	222	216	161			
Storage Bay Dist (ft)	125					275				175	225	
Storage Blk Time (%)	1	0				1	60		68		9	25
Queuing Penalty (veh)	0	0				5	78		54		54	69

Intersection: 4: Hiawatha Av S & 26th St E

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	508	469	148
Average Queue (ft)	338	321	9
95th Queue (ft)	451	429	71
Link Distance (ft)	1801	1801	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			300
Storage Blk Time (%)		9	
Queuing Penalty (veh)		29	

Intersection: 5: Longfellow Ave & 27th St E

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	6	45	40
Average Queue (ft)	0	22	17
95th Queue (ft)	4	46	42
Link Distance (ft)	212	593	606
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Cedar Av S

Movement	EB	EB	EB	WB	NB	NB	SB	SB	B13	B13
Directions Served	L	T	TR	LTR	T	TR	LT	T	T	T
Maximum Queue (ft)	511	420	452	151	305	259	219	238	51	74
Average Queue (ft)	275	247	287	54	154	35	132	139	3	5
95th Queue (ft)	435	386	421	114	261	153	218	229	28	36
Link Distance (ft)	2428	2428	2428	274	2799	2799	157	157	1031	1031
Upstream Blk Time (%)							6	7		
Queuing Penalty (veh)							30	34		
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 7: Longfellow Ave

Movement	EB	EB	WB	SB
Directions Served	LT	T	TR	LR
Maximum Queue (ft)	221	242	6	70
Average Queue (ft)	55	88	0	21
95th Queue (ft)	213	245	5	57
Link Distance (ft)	274	274	203	593
Upstream Blk Time (%)	2	2		
Queuing Penalty (veh)	8	10		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: Hiawatha Av S & Hiawatha Av S NB Ramp

Movement	EB	EB	B3286	NB	NB	NB	SB	SB	SB	SB	NW	NW
Directions Served	<	>	T	L	T	T	T	T	T	R	L	>
Maximum Queue (ft)	791	608	129	469	1537	1515	725	734	729	546	130	325
Average Queue (ft)	541	278	36	65	875	858	551	564	564	69	10	165
95th Queue (ft)	873	673	151	321	1621	1595	758	767	761	358	52	295
Link Distance (ft)	746		105		2006	2006	715	715	715			651
Upstream Blk Time (%)	12		10		5	5	1	1	2			
Queuing Penalty (veh)	96		78		0	0	6	8	9			
Storage Bay Dist (ft)		650		290						480	130	
Storage Blk Time (%)	14	0			59				25			26
Queuing Penalty (veh)	48	0			11				16			3

Zone Summary

Zone wide Queuing Penalty: 1672

1: Cedar Av S & 26th St E Performance by movement

Movement	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0
Total Delay (hr)	0.7	5.0	0.1	0.3	2.0	0.1	0.1	0.8	0.0	9.0
Total Del/Veh (s)	33.5	35.5	31.9	12.4	9.2	6.2	19.7	9.0	7.1	17.7

2: Longfellow Ave & 26th St E Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1
Total Del/Veh (s)	0.3	0.2	2.1	0.4	7.5	0.9	3.8	0.6

3: Driveway 1 & 26th St E Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.2	0.1	0.0
Total Delay (hr)	0.0	0.0	0.1	0.6	0.1	0.1	0.9
Total Del/Veh (s)	0.2	0.2	5.6	4.1	8.5	3.5	4.0

4: Hiawatha Av S & 26th St E Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Denied Del/Veh (s)	0.0	0.0	0.0	0.2	0.1	0.2	0.0	0.0	0.0	1.3	0.2	1.2
Total Delay (hr)	1.1	0.6	0.1	0.6	1.6	1.0	2.1	16.9	0.1	3.2	9.2	0.7
Total Del/Veh (s)	55.7	46.7	26.5	127.3	65.2	14.3	64.9	48.2	4.5	48.5	29.3	5.6

4: Hiawatha Av S & 26th St E Performance by movement

Movement	All
Denied Delay (hr)	0.3
Denied Del/Veh (s)	0.3
Total Delay (hr)	37.1
Total Del/Veh (s)	36.0

5: Longfellow Ave & 27th St E Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBR	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	1.0	0.0	0.1	0.9	0.0	3.7	2.6	3.5	2.4	2.1

6: Cedar Av S & 28th St E Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.1
Total Delay (hr)	3.6	5.1	0.9	0.5	0.0	0.2	1.3	0.1	0.1	1.6	13.3
Total Del/Veh (s)	66.4	58.2	42.3	49.9	0.4	20.3	7.5	5.1	16.6	14.2	27.3

7: 28th St E & Longfellow Ave Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.2
Total Del/Veh (s)	2.9	2.0	0.3	0.2	10.0	0.6	3.2	1.9

8: 28th St E & Driveway 2 Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.2	0.1	0.0
Total Delay (hr)	0.0	0.1	0.0	0.0	0.1	0.0	0.3
Total Del/Veh (s)	2.0	1.0	0.3	0.1	8.4	3.8	1.7

9: Hiawatha Av S & Hiawatha Av S NB Ramp & 28th St E Performance by movement

Movement	EBL2	EBT	EBR2	NBL	NBT	SBT	SBR	NWL	NWR2	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	0.0	0.0	0.0	1.5	0.2	0.0	0.0	4.0	0.2	0.1
Total Delay (hr)	4.5	0.0	0.5	1.3	5.3	7.5	0.1	0.2	0.4	19.7
Total Del/Veh (s)	80.9	1.4	12.1	81.2	16.9	25.0	3.2	87.7	18.2	25.5

Total Zone Performance

Denied Delay (hr)	0.5
Denied Del/Veh (s)	0.4
Total Delay (hr)	80.8
Total Del/Veh (s)	902.9

Intersection: 1: Cedar Av S & 26th St E

Movement	WB	WB	NB	NB	SB	SB
Directions Served	LT	TR	LT	TR	LT	R
Maximum Queue (ft)	259	261	201	197	182	47
Average Queue (ft)	163	171	87	96	81	7
95th Queue (ft)	246	251	157	171	149	30
Link Distance (ft)	256	256	1244	1244	357	
Upstream Blk Time (%)	1	1				
Queuing Penalty (veh)	2	3				
Storage Bay Dist (ft)						25
Storage Blk Time (%)					26	1
Queuing Penalty (veh)					3	2

Intersection: 2: Longfellow Ave & 26th St E

Movement	WB	WB	NB
Directions Served	LT	T	LR
Maximum Queue (ft)	34	46	40
Average Queue (ft)	2	3	15
95th Queue (ft)	18	21	40
Link Distance (ft)	225	225	606
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Driveway 1 & 26th St E

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	4	54	78
Average Queue (ft)	0	7	34
95th Queue (ft)	3	30	57
Link Distance (ft)	225	375	310
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Hiawatha Av S & 26th St E

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB	SB
Directions Served	L	TR	LT	T	R	L	T	T	T	R	L	T
Maximum Queue (ft)	134	125	142	133	164	273	436	440	456	348	296	303
Average Queue (ft)	57	41	70	26	74	91	280	286	272	24	158	197
95th Queue (ft)	111	89	131	81	132	189	403	403	394	167	265	272
Link Distance (ft)		375	1025	1025	1025		428	428	428			2018
Upstream Blk Time (%)						0	1	1	0			
Queuing Penalty (veh)						0	4	3	2			
Storage Bay Dist (ft)	125					275				175	225	
Storage Blk Time (%)	0	1					12		32		3	3
Queuing Penalty (veh)	0	0					13		14		12	8

Intersection: 4: Hiawatha Av S & 26th St E

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	313	294	145
Average Queue (ft)	203	186	7
95th Queue (ft)	283	272	65
Link Distance (ft)	2018	2018	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			300
Storage Blk Time (%)		0	
Queuing Penalty (veh)		1	

Intersection: 5: Longfellow Ave & 27th St E

Movement	NB	SB
Directions Served	LTR	LTR
Maximum Queue (ft)	45	31
Average Queue (ft)	20	10
95th Queue (ft)	46	34
Link Distance (ft)	593	606
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: Cedar Av S & 28th St E

Movement	EB	EB	EB	WB	NB	NB	SB
Directions Served	L	T	TR	LTR	T	TR	LT
Maximum Queue (ft)	247	202	220	117	143	149	312
Average Queue (ft)	146	118	142	48	68	78	134
95th Queue (ft)	223	187	206	105	120	136	252
Link Distance (ft)	612	612	612	278	2287	2287	1244
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 7: 28th St E & Longfellow Ave

Movement	EB	EB	SB
Directions Served	LT	T	LR
Maximum Queue (ft)	33	11	36
Average Queue (ft)	1	0	13
95th Queue (ft)	12	8	39
Link Distance (ft)	278	278	593
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 8: 28th St E & Driveway 2

Movement	EB	EB	SB
Directions Served	L	T	LR
Maximum Queue (ft)	40	7	76
Average Queue (ft)	4	0	34
95th Queue (ft)	21	6	59
Link Distance (ft)	207	207	278
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 9: Hiawatha Av S & Hiawatha Av S NB Ramp & 28th St E

Movement	EB	EB	NB	NB	NB	SB	SB	SB	SB	NW	NW
Directions Served	<	>	L	T	T	T	T	T	R	L	>
Maximum Queue (ft)	376	136	190	405	425	342	354	367	55	35	81
Average Queue (ft)	180	40	42	167	174	148	159	163	18	7	19
95th Queue (ft)	331	102	122	330	339	326	345	347	48	25	57
Link Distance (ft)	746			2597	2597	698	698	698			651
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)		650	290						480	130	
Storage Blk Time (%)				2							0
Queuing Penalty (veh)				1							0

Zone Summary

Zone wide Queuing Penalty: 67

1: Cedar Av S & 26th St E Performance by movement

Movement	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.3
Denied Del/Veh (s)	0.0	0.4	0.0	0.8	0.5	0.0	0.4	0.2	0.4	0.3
Total Delay (hr)	2.3	8.6	0.5	1.1	8.5	0.8	0.1	2.6	1.1	25.6
Total Del/Veh (s)	54.2	59.9	57.8	44.7	35.0	30.7	43.6	12.2	10.9	31.8

2: Longfellow Ave & 26th St E Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	0.0	0.0	0.0	1.5	0.1	0.0	0.1	1.7
Total Del/Veh (s)	0.3	0.1	8.2	8.1	27.5	0.9	10.9	7.3

3: Driveway 1 & 26th St E Performance by movement

Movement	EBT	EBR	WBL	WBT	NBL	NBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Delay (hr)	0.0	0.0	0.0	1.0	0.0	0.0	1.0
Total Del/Veh (s)	0.1	0.0	6.0	5.2	6.4	3.0	4.4

4: Hiawatha Av S & 26th St E Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.1	0.1	0.1
Denied Del/Veh (s)	0.0	0.0	0.0	0.2	0.1	0.3	0.2	0.8	1.7	1.2	0.3	1.1
Total Delay (hr)	0.9	0.9	0.1	4.9	7.1	5.0	2.1	42.6	0.7	4.6	17.6	0.5
Total Del/Veh (s)	60.3	50.0	23.8	300.4	99.7	35.4	63.1	96.8	29.0	56.4	34.6	5.6

4: Hiawatha Av S & 26th St E Performance by movement

Movement	All
Denied Delay (hr)	0.8
Denied Del/Veh (s)	0.5
Total Delay (hr)	86.9
Total Del/Veh (s)	60.3

5: Longfellow Ave & 27th St E Performance by movement

Movement	EBL	EBR	WBT	NBL	NBT	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total Del/Veh (s)	1.0	0.0	0.1	3.5	3.6	3.5	2.6	2.2

6: Cedar Av S Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBL	SBT	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Denied Del/Veh (s)	0.2	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1
Total Delay (hr)	6.6	8.2	1.0	0.8	0.0	0.8	2.6	0.1	0.3	3.5	23.7
Total Del/Veh (s)	52.1	40.5	43.4	88.7	2.1	37.4	18.3	7.4	25.4	14.2	30.1

7: Longfellow Ave Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	0.0	1.1	0.0	0.0	0.1	0.0	0.0	1.2
Total Del/Veh (s)	4.1	5.3	0.3	0.3	14.6	0.5	3.7	4.8

8: Driveway 2 Performance by movement

Movement	EBL	EBT	WBT	WBR	SBL	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total Delay (hr)	0.0	0.8	0.0	0.0	0.0	0.0	0.9
Total Del/Veh (s)	2.4	4.0	0.2	0.0	13.5	3.0	3.6

9: Hiawatha Av S & Hiawatha Av S NB Ramp Performance by movement

Movement	EBL2	EBT	EBR2	NBL	NBT	SBT	SBR	NWL	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1
Denied Del/Veh (s)	0.0	0.0	0.0	2.1	0.2	0.1	0.0	4.1	0.1
Total Delay (hr)	10.0	0.1	2.6	0.5	8.5	22.4	0.1	0.3	44.4
Total Del/Veh (s)	84.4	8.6	28.3	86.8	27.2	44.2	4.6	92.5	41.7

Total Zone Performance

Denied Delay (hr)	1.3
Denied Del/Veh (s)	0.6
Total Delay (hr)	185.5
Total Del/Veh (s)	1365.6

Intersection: 1: Cedar Av S & 26th St E

Movement	WB	WB	NB	NB	B13	B13	SB	SB
Directions Served	LT	TR	L	TR	T		LT	TR
Maximum Queue (ft)	273	281	52	982	108	32	357	346
Average Queue (ft)	231	233	35	464	17	1	138	156
95th Queue (ft)	300	300	57	945	110	24	260	273
Link Distance (ft)	250	250		1031	157	157	1119	1119
Upstream Blk Time (%)	16	20		4	1	0		
Queuing Penalty (veh)	55	69		41	7	1		
Storage Bay Dist (ft)			25					
Storage Blk Time (%)			22	25				
Queuing Penalty (veh)			205	23				

Intersection: 2: Longfellow Ave & 26th St E

Movement	WB	WB	NB
Directions Served	LT	T	LR
Maximum Queue (ft)	208	207	71
Average Queue (ft)	52	54	21
95th Queue (ft)	167	167	57
Link Distance (ft)	225	225	606
Upstream Blk Time (%)	1	1	
Queuing Penalty (veh)	3	5	
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Driveway 1 & 26th St E

Movement	WB	WB	NB
Directions Served	LT	T	LR
Maximum Queue (ft)	88	75	36
Average Queue (ft)	7	5	14
95th Queue (ft)	49	49	39
Link Distance (ft)	374	374	310
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Hiawatha Av S & 26th St E

Movement	EB	EB	WB	WB	WB	NB	NB	NB	NB	NB	SB	SB
Directions Served	L	TR	LT	T	R	L	T	T	T	R	L	T
Maximum Queue (ft)	126	139	404	368	480	422	468	474	594	350	350	499
Average Queue (ft)	48	56	246	215	239	190	427	443	555	188	245	329
95th Queue (ft)	97	113	376	344	417	440	462	471	601	474	382	452
Link Distance (ft)		374	1145	1145	1145		423	423	423			1801
Upstream Blk Time (%)						0	32	41	57			
Queuing Penalty (veh)						0	192	247	345			
Storage Bay Dist (ft)	125					275				175	225	
Storage Blk Time (%)	1	1				0	60		69		8	24
Queuing Penalty (veh)	0	1				0	77		55		48	66

Intersection: 4: Hiawatha Av S & 26th St E

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	486	461	175
Average Queue (ft)	332	315	12
95th Queue (ft)	451	423	83
Link Distance (ft)	1801	1801	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			300
Storage Blk Time (%)		9	
Queuing Penalty (veh)		30	

Intersection: 5: Longfellow Ave & 27th St E

Movement	NB	SB
Directions Served	LTR	LTR
Maximum Queue (ft)	45	36
Average Queue (ft)	20	15
95th Queue (ft)	47	40
Link Distance (ft)	593	606
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: Cedar Av S

Movement	EB	EB	EB	WB	NB	NB	SB	SB	B13	B13
Directions Served	L	T	TR	LTR	T	TR	LT	T	T	T
Maximum Queue (ft)	614	861	427	229	314	277	229	232	88	99
Average Queue (ft)	306	233	266	80	167	48	140	149	5	8
95th Queue (ft)	509	377	396	168	286	184	231	242	38	46
Link Distance (ft)	2428	2428	2428	274	2799	2799	157	157	1031	1031
Upstream Blk Time (%)		0		0			7	8		
Queuing Penalty (veh)		0		0			32	38		
Storage Bay Dist (ft)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 7: Longfellow Ave

Movement	EB	EB	WB	SB
Directions Served	LT	T	TR	LR
Maximum Queue (ft)	163	178	6	48
Average Queue (ft)	14	40	0	17
95th Queue (ft)	86	134	5	44
Link Distance (ft)	274	274	203	593
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: Driveway 2

Movement	EB	EB	WB	SB
Directions Served	L	T	TR	LR
Maximum Queue (ft)	120	259	6	40
Average Queue (ft)	7	40	0	17
95th Queue (ft)	65	181	4	43
Link Distance (ft)	207	207	105	278
Upstream Blk Time (%)	0	1		
Queuing Penalty (veh)	1	4		
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: Hiawatha Av S & Hiawatha Av S NB Ramp

Movement	EB	EB	B3286	NB	NB	NB	SB	SB	SB	SB	NW
Directions Served	<	>	T	L	T	T	T	T	T	R	L
Maximum Queue (ft)	799	675	66	42	465	466	585	626	616	55	56
Average Queue (ft)	432	177	3	8	241	244	340	366	371	17	9
95th Queue (ft)	713	445	35	29	443	447	598	617	622	44	35
Link Distance (ft)	746		105		2006	2006	715	715	715		
Upstream Blk Time (%)	1		1								
Queuing Penalty (veh)	12		4								
Storage Bay Dist (ft)		650		290						480	130
Storage Blk Time (%)	3	0			8				6		
Queuing Penalty (veh)	11	0			2				4		

Zone Summary

Zone wide Queuing Penalty: 1580