

Contract Routing Form

ROUTING: Routine

printed on: 05/19/2017

Contract between: Miron Construction Co Inc  
 and Dept. or Division: Engineering Division  
 Name/Phone Number:

Project: Madison Water Utility Storm Water Management Improvement 115  
 S Paterson St

Contract No.: 7936  
 Enactment No.: RES-17-00417  
 Dollar Amount: 396,699.20

File No.: 47003  
 Enactment Date: 05/18/2017

(Please DATE before routing)

Signatures Required	Date Received	Date Signed
City Clerk	5/22/17	5-22-2017
Director of Civil Rights	5.22.17	5-23-17 <sup>FT</sup>
Risk Manager	5.24.17	5/24/17 <sup>REN</sup>
Finance Director	6.20.17	6/20/17
City Attorney	#791 6-21-2017	6-21-2017
Mayor	6.22.17	6.27.17

Please return signed Contracts to the City Clerk's Office  
 Room 103, City-County Building for filing.

Original + 2 Copies

05/19/2017 14:01:10 enjls - Al Larson 266-4653

Dis Rights: OK / N/A / Problem - Hold  
 Prev Wage: NA / Agency / No  
 Contract Value: 396,699.20  
 AA Plan: APPROVED  
 Amendment / Addendum # N/A  
 Type: POS / Dvlp / Sbdv / Gov't /  
 Grant / PWY Goal / Loan / Agrmt



# City of Madison

City of Madison  
Madison, WI 53703  
www.cityofmadison.com

## Legislation Details (With Text)

**File #:** 47003      **Version:** 1      **Name:** Awarding Public Works Contract No. 7936, Madison Water Utility Storm Water Management Improvements, 115 S. Paterson Street.

**Type:** Resolution      **Status:** Passed

**File created:** 4/25/2017      **In control:** BOARD OF PUBLIC WORKS

**On agenda:** 5/16/2017      **Final action:** 5/16/2017

**Enactment date:** 5/18/2017      **Enactment #:** RES-17-00417

**Title:** Awarding Public Works Contract No. 7936, Madison Water Utility Storm Water Management Improvements, 115 S. Paterson Street.

**Sponsors:** BOARD OF PUBLIC WORKS

**Indexes:**

**Code sections:**

**Attachments:** 1. Contract 7936.pdf

Date	Ver.	Action By	Action	Result
5/16/2017	1	COMMON COUNCIL		
5/3/2017	1	BOARD OF PUBLIC WORKS	RECOMMEND TO COUNCIL TO ADOPT UNDER SUSPENSION OF RULES 2.04, 2.05, 2.24, & 2.25 - REPORT OF OFFICER	
4/25/2017	1	Engineering Division	Refer	

The proposed resolution approves plan documents for stormwater management improvements at the Water Utility Operation Center on Paterson Street at an estimated cost of \$428,440. The adopted 2017 capital budget includes \$4,325,000 of revenue bond funding for remaining improvements at the facility via the Paterson Street Remodel project (MUNIS 10442).

MUNIS:  
10442-86-140

Awarding Public Works Contract No. 7936, Madison Water Utility Storm Water Management Improvements, 115 S. Paterson Street.

BE IT RESOLVED, that the following low bids for miscellaneous improvements be accepted and that the Mayor and City Clerk be and are hereby authorized and directed to enter into a contract with the low bidders contained herein, subject to the Contractor's compliance with Section 39.02 of the Madison General Ordinances concerning compliance with the Affirmative Action provisions **and subject to the Contractor's compliance with Section 33.07 of the Madison General Ordinances regarding Best Value Contracting:**

BE IT FURTHER RESOLVED, that the funds be encumbered to cover the cost of the projects contained herein.

See attached document (Contract No. 7936) for itemization of bids.

SJR

PROJECT \_\_\_\_\_ CONTRACTOR \_\_\_\_\_ AMOUNT OF BID \_\_\_\_\_

CONTRACT NO. 7936  
MADISON WATER UTILITY STORM WATER MANAGEMENT IMPROVEMENTS, 115 S. PATERSON STREET

MIRON CONSTRUCTION CO., INC. \$396,699.20

Acct. No. 10442-86-140 \$396,699.20  
Contingency 8%± 31,740.80

GRAND TOTAL \$428,440.00

Name: CODY, KELLY L

NPN: 7835807

Domicile State: Wisconsin

Domicile Country: United States

Resident? Yes

Business Address: GREEN BAY, WI 543014256

<u>Company Name</u>	<u>FEIN</u>	<u>NAIC CoCode</u>	<u>License Type</u>	<u>Line of Authority</u>	<u>Appointment Date</u>	<u>Appointment Effective Date</u>	<u>Appointment Expiration Date</u>
American Fire and Casualty Company	59-0141790	24066	Intermediary (Agent) Individual	Casualty	3/23/2009	3/1/2017	2/28/2018
American Fire and Casualty Company	59-0141790	24066	Intermediary (Agent) Individual	Property	3/23/2009	3/1/2017	2/28/2018
Charter Oak Fire Insurance Company, The	06-0291290	25615	Intermediary (Agent) Individual	Casualty	1/13/2006	3/1/2017	2/28/2018
Charter Oak Fire Insurance Company, The	06-0291290	25615	Intermediary (Agent) Individual	Property	1/13/2006	3/1/2017	2/28/2018
<b>Fidelity and Deposit Company of Maryland</b>	13-3046577	39306	Intermediary (Agent) Individual	Casualty	10/2/2012	3/1/2017	2/28/2018
<b>Fidelity and Deposit Company of Maryland</b>	13-3046577	39306	Intermediary (Agent) Individual	Property	10/2/2012	3/1/2017	2/28/2018
International Fidelity Insurance Company	22-1010450	11592	Intermediary (Agent) Individual	Casualty	4/13/2007	3/1/2017	2/28/2018
Nationwide Affinity Insurance Company of America	48-0470690	26093	Intermediary (Agent) Individual	Casualty	9/28/2006	3/1/2017	2/28/2018
Nationwide Affinity Insurance Company of America	48-0470690	26093	Intermediary (Agent) Individual	Property	9/28/2006	3/1/2017	2/28/2018





# CERTIFICATE OF PROPERTY INSURANCE

DATE (MM/DD/YYYY)  
05/09/2017

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

<b>PRODUCER</b> Aon Risk Services Central, Inc. Green Bay WI Office 111 N. Washington Street, Suite 300 P. O. Box 23004 Green Bay WI 54305-3004 USA	<b>CONTACT NAME:</b> PHONE (A/C. No. Ext): (920) 437-7123      FAX (A/C. No.): (920) 431-6345	
	<b>E-MAIL ADDRESS:</b> PRODUCER CUSTOMER ID #: 10020138	
<b>INSURED</b> Miron Construction Co., Inc. P. O. Box 509 Neenah WI 54957-0509 USA	<b>INSURER(S) AFFORDING COVERAGE</b>	
	INSURER A: Zurich American Ins Co	NAIC # 16535
	INSURER B:	
	INSURER C:	
	INSURER D:	
	INSURER E:	

Holder Identifier :

**COVERAGES**      **CERTIFICATE NUMBER:** 570066426795      **REVISION NUMBER:**

LOCATION OF PREMISES/ DESCRIPTION OF PROPERTY (Attach ACORD 101, Additional Remarks Schedule, if more space is required)  
RE: MADISON WATER UTILITY, STORM WATER MANAGEMENT IMPROVEMENTS, MADISON, WISCONSIN. (CITY OF MADISON - STORM WATER MANAGEMENT, MIRON PROJECT #170670; CONTRACT NO 7936).

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YYYY)	POLICY EXPIRATION DATE (MM/DD/YYYY)	COVERED PROPERTY	LIMITS
	<input type="checkbox"/> PROPERTY <input type="checkbox"/> CAUSES OF LOSS <input type="checkbox"/> DEDUCTIBLES <input type="checkbox"/> BASIC BUILDING <input type="checkbox"/> BROAD CONTENTS <input type="checkbox"/> SPECIAL <input type="checkbox"/> EARTHQUAKE <input type="checkbox"/> WIND <input type="checkbox"/> FLOOD				<input type="checkbox"/> BUILDING <input type="checkbox"/> PERSONAL PROPERTY <input type="checkbox"/> BUSINESS INCOME <input type="checkbox"/> EXTRA EXPENSE <input type="checkbox"/> RENTAL VALUE <input type="checkbox"/> BLANKET BUILDING <input type="checkbox"/> BLANKET PERS PROP <input type="checkbox"/> BLANKET BLDG & PP	
A	<input checked="" type="checkbox"/> INLAND MARINE <input type="checkbox"/> CAUSES OF LOSS <input type="checkbox"/> NAMED PERILS	TYPE OF POLICY Builders Risk  POLICY NUMBER MBR 5323142-10 Master Builders Risk	04/01/2017	04/01/2018	<input checked="" type="checkbox"/> Limit <input checked="" type="checkbox"/> Deductible <input checked="" type="checkbox"/> Flood Limit <input checked="" type="checkbox"/> Earthquake Limit	\$396,699 \$10,000 \$396,699 \$396,699
	<input type="checkbox"/> CRIME <input type="checkbox"/> TYPE OF POLICY					
	<input type="checkbox"/> BOILER & MACHINERY / EQUIPMENT BREAKDOWN					

CERTIFICATE NUMBER: 570066426795

SPECIAL CONDITIONS / OTHER COVERAGES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

<b>CERTIFICATE HOLDER</b>  CITY OF MADISON 1600 EMIL STREET MADISON WI 53713 USA	<b>CANCELLATION</b>  SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.  AUTHORIZED REPRESENTATIVE 
--	--



AGENCY CUSTOMER ID: 10020138

LOC #:

# ADDITIONAL REMARKS SCHEDULE

Page \_ of \_

AGENCY Aon Risk Services Central, Inc.		NAMED INSURED Miron Construction Co., Inc.	
POLICY NUMBER See Certificate Number: 570066426795		EFFECTIVE DATE:	
CARRIER See Certificate Number: 570066426795	NAIC CODE		

**ADDITIONAL REMARKS**

THIS ADDITIONAL REMARKS FORM IS A SCHEDULE TO ACORD FORM,  
FORM NUMBER: ACORD 24 FORM TITLE: Certificate of Property Insurance

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER	
INSURER	
INSURER	
INSURER	

**ADDITIONAL POLICIES** If a policy below does not include limit information, refer to the corresponding policy on the ACORD certificate form for policy limits.

INSR LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YYYY)	POLICY EXPIRATION DATE (MM/DD/YYYY)	COVERED PROPERTY	LIMITS
A	INLAND MARINE	MBR 5323142-10 Master Builders Risk	04/01/2017	04/01/2018	Earthquake Deduct Flood Deductible	\$50,000 \$50,000

\$396,699.20  
FILE

BID OF MIRON CONSTRUCTION CO., INC.

2017

PROPOSAL, CONTRACT, BOND AND SPECIFICATIONS

FOR

MADISON WATER UTILITY  
STORM WATER MANAGEMENT IMPROVEMENT  
115 S. PATERSON STREET

CONTRACT NO. 7936

PROJECT NO. 10442

MUNIS NO. 10442-86-140 140086-53310

IN

MADISON, DANE COUNTY, WISCONSIN

AWARDED BY THE COMMON COUNCIL  
MADISON, WISCONSIN ON MAY 16, 2017

CITY ENGINEERING DIVISION  
1600 EMIL STREET  
MADISON, WISCONSIN 53713

<https://bidexpress.com/login>

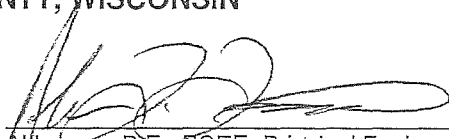
MADISON WATER UTILITY  
STORM WATER MANAGEMENT IMPROVEMENTS  
115 S. PATERSON STREET  
CONTRACT NO. 7936

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This Proposal, and Agreement have  
been prepared by:

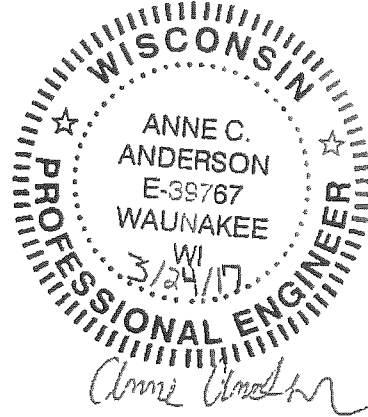
CITY ENGINEERING DIVISION  
CITY OF MADISON  
MADISON, DANE COUNTY, WISCONSIN

  
Al Larson, P.E., BCEE, Principal Engineer Water

3/10/17

RFP:

**CIVIL ENGINEER**  
Mead & Hunt, Inc.  
2440 Deming Way  
Middleton, WI 53562  
Tel: 608.273.6390 Fax: 608.273.6391



END OF SECTION 000107

## SECTION A: ADVERTISEMENT FOR BIDS AND INSTRUCTIONS TO BIDDERS

### REQUEST FOR BID FOR PUBLIC WORKS CONSTRUCTION CITY OF MADISON, WISCONSIN

#### A BEST VALUE CONTRACTING MUNICIPALITY

PROJECT NAME:	MADISON WATER UTILITY <b>STORM WATER MANAGEMENT IMPROVEMENTS</b> 115 S. PATERSON STREET
CONTRACT NO.:	7936
SBE GOAL	12%
BID BOND	5%
PRE BID MEETING (1:00 P.M.)	4/14/17
PREQUALIFICATION APPLICATION DUE (1:00 P.M.)	4/14/17
BID SUBMISSION (1:00 P.M.)	4/21/17
BID OPEN (1:30 P.M.)	4/21/17
PUBLISHED IN WSJ	3/24, 3/31, 4/7 & 4/14

PRE BID MEETING: Representatives of the Affirmative Action Department will be present to discuss the Small Business Enterprise requirements at 1600 Emil Street, Madison Wisconsin.

PREQUALIFICATION APPLICATION: Forms are available on our website, [www.cityofmadison.com/business/pw/forms.cfm](http://www.cityofmadison.com/business/pw/forms.cfm). If not currently prequalified in the categories listed in Section A, an amendment to your Prequalification will need to be submitted prior to the same due date. Postmark is not applicable.

INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS: The Bidder shall review the Bidding Documents and shall report to the Architect errors, inconsistencies or ambiguities discovered. Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request to the architect at least seven days prior to the date for receipt of Bids. Interpretations, corrections and changes of the Bidding Documents will be made by Addendum; any other manner will not be binding. Construction Coordinator: Mead & Hunt, Kent Falligant, 2440 Deming Way, Middleton, WI 53562, [stacey.keller@meadhunt.com](mailto:stacey.keller@meadhunt.com).

BIDS TO BE SUBMITTED by hand to 1600 EMIL ST., MADISON, WI 53713 or online at [www.bidexpress.com](http://www.bidexpress.com).

THE BID OPENING is at 1600 EMIL ST., MADISON, WI 53713.

#### STANDARD SPECIFICATIONS

The City of Madison's Standard Specifications for Public Works Construction - 2017 Edition, as supplemented and amended from time to time, forms a part of these contract documents as if attached hereto.

These standard specifications are available on the City of Madison Public Works website, [www.cityofmadison.com/Business/PW/specs.cfm](http://www.cityofmadison.com/Business/PW/specs.cfm).

The Contractor shall review these Specifications prior to preparation of proposals for the work to be done under this contract, with specific attention to Article 102, "BIDDING REQUIREMENTS AND CONDITIONS" and Article 103, "AWARD AND EXECUTION OF THE CONTRACT." For the convenience of the bidder, below are highlights of three subsections of the specifications.

## SECTION 102.1: PRE-QUALIFICATION OF BIDDERS

In accordance with Wisconsin State Statutes 66.0901 (2) and (3), all bidders must submit to the Board of Public Works proof of responsibility on forms furnished by the City. The City requires that all bidders be qualified on a biennial basis.

Bidders must present satisfactory evidence that they have been regularly engaged in the type of work specified herein and they are fully prepared with necessary capital, materials, machinery and supervisory personnel to conduct the work to be contracted for to the satisfaction of the City. All bidders must be pre-qualified by the Board of Public Works for the type of construction on which they are bidding prior to the opening of the bid.

In accordance with Section 39.02(9)(a)l. of the General Ordinances, all bidders shall submit in writing to the Affirmative Action Division Manager of the City of Madison, a Certificate of Compliance or an Affirmative Action Plan at the same time or prior to the submission of the proof of responsibility forms.

The bidder shall be disqualified if the bidder fails to or refuses to, prior to opening of the bid, submit a Certificate of compliance, Affirmative Action Plan or Affirmative Action Data Update, as applicable, as defined by Section 39.02 of the General Ordinances (entitled Affirmative Action) and as required by Section 102.11 of the Standard Specifications.

## SECTION 102.4 PROPOSAL

No bid will be accepted that does not contain an adequate or reasonable price for each and every item named in the Schedule of Unit Prices.

A lump sum bid for the work in accordance with the plans and specifications is required. The lump sum bid must be the same as the total amounts bid for the various items and it shall be inserted in the space provided.

All papers bound with or attached to the proposal form are considered a part thereof and must not be detached or altered when the proposal is submitted. The plans, specifications and other documents designated in the proposal form will be considered a part of the proposal whether attached or not.

A proposal submitted by an individual shall be signed by the bidder or by a duly authorized agent. A proposal submitted by a partnership shall be signed by a member/partner or by a duly authorized agent thereof. A proposal submitted by a corporation shall be signed by an authorized officer or duly authorized registered agent of such corporation, and the proposal shall show the name of the State under the laws of which such corporation was chartered. The required signatures shall in all cases appear in the space provided thereof on the proposal.

Each proposal shall be placed, together with the proposal guaranty, in a sealed envelope, so marked as to indicate name of project, the contract number or option to which it applies, and the name and address of the Contractor or submitted electronically through Bid Express ([www.bidexpress.com](http://www.bidexpress.com)). Proposals will be accepted at the location, the time and the date designated in the advertisement. Proposals received after the time and date designated will be returned to the bidder unopened.

## SECTION 102.5: BID DEPOSIT (PROPOSAL GUARANTY)

All bids, sealed or electronic, must be accompanied with a Bid Bond equal to at least 5% of the bid or a Certificate of Annual/Biennial Bid Bond or certified check, payable to the City Treasurer. Bid deposit of the successful bidders shall be returned within forty-eight (48) hours following execution of the contract and bond as required.

## MINOR DISCREPENCIES

Bidder is responsible for submitting all forms necessary for the City to determine compliance with State and City bidding requirements. Notwithstanding any language to the contrary contained herein, the City may

exercise its discretion to allow bidders to correct or supplement submissions after bid opening, if the minor discrepancy, bid irregularity or omission is insignificant and not one related to price, quality, quantity, time of completion or performance of the contract.



**Bidders for this Contract(s) must be Pre-Qualified for at least one of the following type(s) of construction denoted by an**

Building Demolition

- 101  Asbestos Removal  
 120  House Mover

- 110  Building Demolition

Street, Utility and Site Construction

- 201  Asphalt Paving  
 205  Blasting  
 210  Boring/Pipe Jacking  
 215  Concrete Paving  
 220  Con. Sidewalk/Curb & Gutter/Misc. Flat Work  
 221  Concrete Bases and Other Concrete Work  
 222  Concrete Removal  
 225  Dredging  
 230  Fencing  
 235  Fiber Optic Cable/Conduit Installation  
 240  Grading and Earthwork  
 241  Horizontal Saw Cutting of Sidewalk  
 242  Infrared Seamless Patching  
 245  Landscaping, Maintenance  
 246  Ecological Restoration  
 250  Landscaping, Site and Street  
 251  Parking Ramp Maintenance  
 252  Pavement Marking  
 255  Pavement Sealcoating and Crack Sealing  
 260  Petroleum Above/Below Ground Storage Tank Removal/Installation  
 262  Playground Installer

- 265  Retaining Walls, Precast Modular Units  
 270  Retaining Walls, Reinforced Concrete  
 275  Sanitary, Storm Sewer and Water Main Construction  
 276  Sawcutting  
 280  Sewer Lateral Drain Cleaning/Internal TV Insp.  
 285  Sewer Lining  
 290  Sewer Pipe Bursting  
 295  Soil Borings  
 300  Soil Nailing  
 305  Storm & Sanitary Sewer Laterals & Water Svc.  
 310  Street Construction  
 315  Street Lighting  
 318  Tennis Court Resurfacing  
 320  Traffic Signals  
 325  Traffic Signing & Marking  
 332  Tree pruning/removal  
 333  Tree, pesticide treatment of  
 335  Trucking  
 340  Utility Transmission Lines including Natural Gas, Electrical & Communications  
 399  Other\_\_\_\_\_

Bridge Construction

- 501  Bridge Construction and/or Repair

Building Construction

- 401  Floor Covering (including carpet, ceramic tile installation, rubber, VCT)  
 402  Building Automation Systems  
 403  Concrete  
 404  Doors and Windows  
 405  Electrical - Power, Lighting & Communications  
 410  Elevator - Lifts  
 412  Fire Suppression  
 413  Furnishings - Furniture and Window Treatments  
 415  General Building Construction, Equal or Less than \$250,000  
 420  General Building Construction, \$250,000 to \$1,500,000  
 425  General Building Construction, Over \$1,500,000  
 428  Glass and/or Glazing  
 429  Hazardous Material Removal  
 430  Heating, Ventilating and Air Conditioning (HVAC)  
 433  Insulation - Thermal  
 435  Masonry/Tuck pointing

- 437  Metals  
 440  Painting and Wallcovering  
 445  Plumbing  
 450  Pump Repair  
 455  Pump Systems  
 460  Roofing and Moisture Protection  
 464  Tower Crane Operator  
 461  Solar Photovoltaic/Hot Water Systems  
 465  Soil/Groundwater Remediation  
 466  Warning Sirens  
 470  Water Supply Elevated Tanks  
 475  Water Supply Wells  
 480  Wood, Plastics & Composites - Structural & Architectural  
 499  Other\_\_\_\_\_

State of Wisconsin Certifications

- 1  Class 5 Blaster - Blasting Operations and Activities 2500 feet and closer to inhabited buildings for quarries, open pits and road cuts.  
 2  Class 6 Blaster - Blasting Operations and Activities 2500 feet and closer to inhabited buildings for trenches, site excavations, basements, underwater demolition, underground excavations, or structures 15 feet or less in height.  
 3  Class 7 Blaster - Blasting Operations and Activities for structures greater than 15' in height, bridges, towers, and any of the objects or purposes listed as "Class 5 Blaster or Class 6 Blaster".  
 4  Petroleum Above/Below Ground Storage Tank Removal and Installation (Attach copies of State Certifications.)  
 5  Hazardous Material Removal (Contractor to be certified for asbestos and lead abatement per the Wisconsin Department of Health Services, Asbestos and Lead Section (A&LS).) See the following link for application: [www.dhs.wisconsin.gov/Asbestos/Cert](http://www.dhs.wisconsin.gov/Asbestos/Cert). State of Wisconsin Performance of Asbestos Abatement Certificate must be attached.  
 6  Certification number as a Certified Arborist or Certified Tree Worker as administered by the International Society of Arboriculture  
 7  Pesticide application (Certification for Commercial Applicator For Hire with the certification in the category of turf and landscape (3.0) and possess a current license issued by the DATCP)  
 8  State of Wisconsin Master Plumbers License.

## SECTION B: PROPOSAL

Please refer to the  
Bid Express Website  
at <https://bidexpress.com>  
look up contract number  
and go to  
Section B: Proposal Page

You can access all City of Madison bid solicitations for FREE at [www.bidexpress.com](http://www.bidexpress.com)

Click on the "Register for Free" button and follow the instructions to register your company and yourself. You will be asked for a payment subscription preference, since you may wish to bid online someday. Simply choose the method to pay on a 'per bid' basis. This requires no payment until / unless you actually bid online. You can also choose the monthly subscription plan at this time. You will, however, be asked to provide payment information. Remember, you can change your preference at anytime. You will then be able to complete your free registration and have full access to the site. Your free access does not require completion of the 'Digital ID' process, so you will have instant access for viewing and downloading. To be prepared in case you ever do wish to bid online, you may wish to establish your digital ID also, since you cannot bid without a Digital ID.

If you have any problems with the free registration process, you can call the bidexpress help team, toll free at 1-888-352-2439 (option 1, option1).

## **SECTION C: SMALL BUSINESS ENTERPRISE**

### **Instructions to Bidders City of Madison SBE Program Information**

#### **2 Small Business Enterprise (SBE) Program Information**

##### **2.1 Policy and Goal**

The City of Madison reaffirms its policy of nondiscrimination in the conduct of City business by maintaining a procurement process which remains open to all who have the potential and ability to sell goods and services to the City. It is the policy of the City of Madison to allow Small Business Enterprises (SBE) maximum feasible opportunity to participate in City of Madison contracting. The bidder acknowledges that its bid has been submitted in accordance with the SBE program and is for the public's protection and welfare.

Please refer to the "ADVERTISEMENT FOR BIDS" for the goal for the utilization of SBEs on this project. SBEs may participate as subcontractors, vendors and/or suppliers, which provide a commercially useful function. The dollar value for SBE suppliers or 'materials only' vendors shall be discounted to 60% for purposes of meeting SBE goals.

A bidder which achieves or exceeds the SBE goal will be in compliance with the SBE requirements of this project. In the event that the bidder is unable to achieve the SBE goal, the bidder must demonstrate that a good faith effort to do so was made. Failure to either achieve the goal or demonstrate a good faith effort to do so will be grounds for the bidder being deemed a non-responsible contractor ineligible for award of this contract.

A bidder may count towards its attainment of the SBE goal only those expenditures to SBEs that perform a commercially useful function. For purposes of evaluating a bidder's responsiveness to the attainment of the SBE goal, the contract participation by an SBE is based on the percentage of the total base bid proposed by the Contractor. The total base bid price is inclusive of all addenda.

Work performed by an SBE firm in a particular transaction can be counted toward the goal only if it involves a commercially useful function. That is, in light of industry practices and other relevant considerations, does the SBE firm have a necessary and useful role in the transaction, of a kind for which there is a market outside the context of the SBE Program, or is the firm's role a superfluous step added in an attempt to obtain credit towards goals? If, in the judgment of the Affirmative Action Division, the SBE firm will not perform a commercially useful function in the transaction, no credit towards goals will be awarded.

The question of whether a firm is performing a commercially useful function is completely separate from the question of whether the firm is an eligible SBE. A firm is eligible if it meets the definitional criteria and ownership and control requirements, as set forth in the City of Madison's SBE Program.

If the City of Madison determines that the SBE firm is performing a commercially useful function, then the City of Madison must then decide what that function is. If the commercially useful function is that of an SBE vendor / supplier that regularly transacts business with the respective product, then the City of Madison will count 60% of the value of the product supplied toward SBE goals.

To be counted, the SBE vendor / supplier must be engaged in selling the product in question to the public. This is important in distinguishing an SBE vendor / supplier, which has a regular trade with a variety of customers, from a firm which performs supplier-like

functions on an ad hoc basis or for only one or two contractors with whom it has a special relationship.

A supplier of bulk goods may qualify as an eligible SBE vendor / supplier if it either maintains an inventory or owns or operates distribution equipment. With respect to the distribution equipment; e.g., a fleet of trucks, the term "operates" is intended to cover a situation in which the supplier leases the equipment on a regular basis for its entire business. It is not intended to cover a situation in which the firm simply provides drivers for trucks owned or leased by another party; e.g., a prime contractor, or leases such a party's trucks on an ad hoc basis for a specific job.

If the commercially useful function being performed is not that of a qualified SBE vendor / supplier, but rather that of delivery of products, obtaining bonding or insurance, procurement of personnel, acting as a broker or manufacturer's representative in the procurement of supplies, facilities, or materials, etc., only the fees or commissions will apply towards the goal.

For example, a business that simply transfers title of a product from manufacturer to ultimate purchaser; e. g., a sales representative who re-invoices a steel product from the steel company to the Contractor, or a firm that puts a product into a container for delivery would not be considered a qualified SBE vendor / supplier. The Contractor would not receive credit based on a percentage of the cost of the product for working with such firms.

Concerning the use of services that help the Contractor obtain needed supplies, personnel, materials or equipment to perform a contract: only the fee received by the service provider will be counted toward the goal. For example, use of a SBE sales representative or distributor for a steel company, if performing a commercially useful function at all, would entitle the Contractor receiving the steel to count only the fee paid to the representative or distributor toward the goal. This provision would also govern fees for professional and other services obtained expressly and solely to perform work relating to a specific contract.

Concerning transportation or delivery services: if an SBE trucking company picks up a product from a manufacturer or a qualified vendor / supplier and delivers the product to the Contractor, the commercially useful function it is performing is not that of a supplier, but simply that of a transporter of goods. Unless the trucking company is itself the manufacturer or a qualified vendor / supplier in the product, credit cannot be given based on a percentage of the cost of the product. Rather, credit would be allowed for the cost of the transportation service.

The City is aware that the rule's language does not explicitly mention every kind of business that may contribute work on this project. In administering these programs, the City would, on a case-by-case basis, determine the appropriate counting formula to apply in a particular situation.

## **2.2 Contract Compliance**

Questions concerning the SBE Program shall be directed to the Contract Compliance Officer of the City of Madison Department of Civil Rights, Affirmative Action Division, 210 Martin Luther King, Jr. Blvd., Room 523, Madison, WI 53703; telephone (608) 266-4910.

## **2.3 Certification of SBE by City of Madison**

The Affirmative Action Division maintains a directory of SBEs which are currently certified as such by the City of Madison. Contact the Contract Compliance Officer as indicated in Section 2.2 to receive a copy of the SBE Directory or you may access the SBE Directory online at [www.cityofmadison.com/dcr/aaTBDDir.cfm](http://www.cityofmadison.com/dcr/aaTBDDir.cfm).

All contractors, subcontractors, vendors and suppliers seeking SBE status must complete and submit the **Targeted Business Certification Application** to the City of Madison Affirmative Action Division by the time and date established for receipt of bids. A copy of the Targeted Business Certification Application is available by contacting the Contract Compliance Officer at the address and telephone indicated in Section 2.2 or you may access the Targeted Business Certification Application online at [www.cityofmadison.com/dcr/aaTBDDir.cfm](http://www.cityofmadison.com/dcr/aaTBDDir.cfm). Submittal of the Targeted Business Certification Application by the time specified does not guarantee that the applicant will be certified as a SBE eligible to be utilized towards meeting the SBE goal for this project.

## **2.4 Small Business Enterprise Compliance Report**

### **2.4.1 Good Faith Efforts**

Bidders shall take all necessary affirmative steps to assure that SBEs are utilized when possible and that the established SBE goal for this project is achieved. A contractor who self performs a portion of the work, and is pre-qualified to perform that category of work, may subcontract that portion of the work, but shall not be required to do so. When a bidder is unable to achieve the established SBE goal, the bidder must demonstrate that a good faith effort to do so was made. Such a good faith effort should include the following:

- 2.4.1.1 Attendance at the pre-bid meeting.
- 2.4.1.2 Using the City of Madison's directory of certified SBEs to identify SBEs from which to solicit bids.
- 2.4.1.3 Assuring that SBEs are solicited whenever they are potential sources.
- 2.4.1.4 Referring prospective SBEs to the City of Madison Affirmative Action Division for certification.
- 2.4.1.5 Dividing total project requirements into smaller tasks and/or quantities, where economically feasible, to permit maximum feasible SBE participation.
- 2.4.1.6 Establishing delivery schedules, where requirements permit, which will encourage participation by SBEs.
- 2.4.1.7 Providing SBEs with specific information regarding the work to be performed.
- 2.4.1.8 Contacting SBEs in advance of the deadline to allow such businesses sufficient time to prepare a bid.
- 2.4.1.9 Utilizing the bid of a qualified and competent SBE when the bid of such a business is deemed reasonable (i.e. 5% above the lowest bidder), although not necessarily low.
- 2.4.1.10 Contacting SBEs which submit a bid, to inquire about the details of the bid and confirm that the scope of the work was interpreted as intended.
- 2.4.1.11 Completion of Cover Page (page C-6), Summary Sheet (page C-7) and SBE Contact Reports (pages C-8 and C9) if applicable.

### **2.4.2 Reporting SBE Utilization and Good Faith Efforts**

The Small Business Enterprise Compliance Report is to be submitted by the bidder with the bid: This report is due by the specified bid closing time and date. Bids submitted without a completed SBE Compliance Report as outlined below may be deemed non-responsible and the bidder ineligible for award of this contract. Notwithstanding any language to the contrary contained herein, the City may exercise its discretion to allow bidders to correct or supplement submissions after bid opening, if the minor discrepancy, bid irregularity or omission is insignificant and not one related to price, quality, quantity, time of completion, performance of the contract, or percentage of SBE utilization.

2.4.2.1 If the Bidder meets or exceeds the goal established for SBE utilization, the Small Business Enterprise Compliance Report shall consist of the following:

2.4.2.1.1 **Cover Page**, Page C-6; and

2.4.2.1.2 **Summary Sheet**, C-7.

2.4.2.2 If the bidder does not meet the goal established for SBE utilization, the Small Business Enterprise Compliance Report shall consist of the following:

2.4.2.2.1 **Cover Page**, Page C-6;

2.4.2.2.2 **Summary Sheet**, C-7; and

2.4.2.2.3 **SBE Contact Report**, C-8 and C-9. (A separate Contact Report must be completed for each applicable SBE which is not utilized.)

## **2.5 Appeal Procedure**

A bidder which does not achieve the established goal and is found non-responsible for failure to demonstrate a good faith effort to achieve such goal and subsequently denied eligibility for award of contract may appeal that decision to the Small Business Enterprises Appeals Committee. All appeals shall be made in writing, and shall be delivered to and received by the City Engineer no later than 4:30 PM on the third business day following the bidder's receipt of the written notification of ineligibility by the Affirmative Action Division Manager. Postmark not acceptable. The notice of appeal shall state the basis for the appeal of the decision of the Affirmative Action Division Manager. The Appeal shall take place in accordance with Madison General Ordinance 33.54.

## **2.6 SBE Requirements After Award of the Contract**

The successful bidder shall identify SBE subcontractors, suppliers and vendors on the subcontractor list in accordance with the specifications. The Contractor shall submit a detailed explanation of any variances between the listing of SBE subcontractors, vendors and/or suppliers on the subcontractor list and the Contractor's SBE Compliance Report for SBE participation.

No change in SBE subcontractors, vendors and/or suppliers from those SBEs indicated in the SBE Compliance Report will be allowed without prior approval from the Engineer and the Affirmative Action Division. The contractor shall submit in writing to the City of Madison Affirmative Action Division a request to change any SBE citing specific reasons which necessitate such a change. The Affirmative Action Division will use a general test of reasonableness in approving or rejecting the contractor's request for change. If the request is approved, the Contractor will make every effort to utilize another SBE if available.

The City will monitor the project to ensure that the actual percentage commitment to SBE firms is carried out.

## **2.7 SBE Definition and Eligibility Guidelines**

A Small Business Enterprise is a business concern awarded certification by the City of Madison. For the purposes of this program a Small Business Enterprise is defined as:

- A. An independent business operated under a single management. The business may not be a subsidiary of any other business and the stock or ownership may not be held by any individual or any business operating in the same or a similar field. In determining whether an entity qualifies as a SBE, the City shall consider all

factors relevant to being an independent business including, but not limited to, the date the business was established, adequacy of its resources for the work in which it proposes to involve itself, the degree to which financial, equipment leasing and other relationships exist with other ineligible firms in the same or similar lines of work. SBE owner(s) shall enjoy the customary incidents of ownership and shall share in the risks and profits commensurate with their enjoyment interests, as demonstrated by an examination of the substance rather than form or arrangements that may be reflected in its ownership documents.

- B. A business that has averaged no more than \$4.0 million in annual gross receipts over the prior three year period and the principal owner(s) do not have a personal net worth in excess of \$1.32 million.

Firm and/or individuals that submit fraudulent documents/testimony may be barred from doing business with the City and/or forfeit existing contracts.

SBE certification is valid for one (1) year unless revoked.

## SECTION D: SPECIAL PROVISIONS

### MADISON WATER UTILITY STORM WATER MANAGEMENT IMPROVEMENTS 115 S. PATERSON STREET CONTRACT NO. 7936

It is the intent of these Special Provisions to set forth the final contractual intent as to the matter involved and shall prevail over the Standard Specifications and plans whenever in conflict therewith. In order that comparisons between the Special Provisions can be readily made, the numbering system for the Special Provisions is equivalent to that of the Specifications.

Whenever in these Specifications the term "Standard Specifications" appears, it shall be taken to refer to the City of Madison Standard Specifications for Public Works Construction and Supplements thereto.

#### **SECTION 102.12: BEST VALUE CONTRACTING**

This Contract shall be considered a Best Value Contract if the Contractor's bid is equal to or greater than \$59,000 for a single trade contract; or equal to or greater than \$288,000 for a multi-trade contract pursuant to MGO 33.07(7).



# Engineering Special Provisions

## Madison Water Utility Storm Water Management Improvements

115 S. Paterson Street

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Mead & Hunt, Inc.  
3235300-131021.09

**Contract No. 7936**

*Prepared for:*

**Madison Water Utility  
Madison, Wisconsin**

*Prepared by:*

**Mead  
& Hunt**

**March 24, 2017**

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END OF SECTION 000110

## **DOCUMENT 000115 - LIST OF DRAWING SHEETS**

### **PART 1 - GENERAL**

#### **1.1 LIST OF DRAWINGS**

- A. Drawings: Drawings consist of the Contract Drawings and other drawings listed on the Table of Contents page of the separately bound drawing set titled Storm Water Management Improvements, dated March 24, 2017, as modified by subsequent Addenda and Contract modifications.
- B. List of Drawings: Drawings consist of the following Contract Drawings and other drawings of type indicated:
  - 1. G-001 COVER SHEET
  - 2. C-141 SITE UTILITY PLAN
  - 3. C-501 DETAILS

### **PART 2 - PRODUCTS (Not Used)**

### **PART 3 - EXECUTION (Not Used)**

**END OF SECTION 000115**

## **SECTION 003126 - EXISTING HAZARDOUS MATERIAL INFORMATION**

### **PART 1 - GENERAL**

#### **1.1 EXISTING HAZARDOUS MATERIAL INFORMATION**

- A. This Section with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information, but are not a warranty of existing conditions.
- B. An existing Contaminated Media Memorandum, and materials management plan for each site of the project, prepared by SCS, dated June 25, 2015, is available for viewing as appended to this Section.
- C. An existing Asbestos Inspection Report for Project, prepared by KPH Environmental, dated February 2015, is available for viewing as appended to this Section.
- D. Related Requirements:
  - 1. Section 003132 "Geotechnical Data" for reports and soil-boring data from geotechnical investigations that are made available to bidders.

### **PART 2 - PRODUCTS (Not Used)**

### **PART 3 - EXECUTION (Not Used)**

**END OF SECTION 003126**

## SCS ENGINEERS

October 7, 2016  
File No. 25215045.00

### MEMORANDUM

TO: Anne Anderson, Mead & Hunt  
FROM: Tony Kollasch  
SUBJECT: Waste Disposal Update

At your request, we checked on the status of the two waste disposal profiles established with Waste Management for disposal of contaminated soil to be generated during construction work for the Madison Water Utility Vehicle Maintenance facility at 115 S. Paterson Street. The profile information is provided on the attached Waste Manifests.

Per our September 29, 2016 communication with Brad Vanderkin of Waste Management, we understand Waste Management should be able to extend the profiles into 2017 with a certification statement to be provided by the City verifying that nothing has changed on the site related to potential environmental concerns and that the supplied analytical is still representative of the material to be disposed. The two profiles are for the shallow fill material and the deeper native material, which are both impacted by petroleum and other volatile contaminants in some locations.

Mr. Vanderkin indicated that the tipping costs for disposal of both profiles will be \$19/ton. This is \$1 more than the costs that were originally approved by Waste Management in 2015.

Attachments: Fill Manifest #BIO123620WI  
Native Soil Manifest #BIO123621WI

TJK/jsn/RL

I:\25215045\Corresp\Client\161007\_Anderson\_MWU\_Waste Profiles.doc





# NON-HAZARDOUS MANIFEST

<b>NON-HAZARDOUS MANIFEST</b>		1. Generator's US EPA ID No.	Manifest Doc No.	2. Page 1 of	
3. Generator's Mailing Address: CITY OF MARSHALL WATER UTILITY 125 S. PATTERSON STREET MARSHALL, WY 82504		Generator's Site Address (if different from mailing): CITY OF MARSHALL WATER UTILITY 125 S. PATTERSON STREET MARSHALL, WY 82504 DANCE COUNTY		A. Manifest Number <b>WMNA</b>	<b>T 419480</b>
4. Generator's Phone 307-242-4033		B. State Generator's ID			
5. Transporter 1 Company Name		6. US EPA ID Number	C. State Transporter's ID		
7. Transporter 2 Company Name		8. US EPA ID Number	D. Transporter's Phone		
9. Designated Facility Name and Site Address Wastewater Plants		10. US EPA ID Number	E. State Transporter's ID		
			F. Transporter's Phone		
			G. State Facility ID		
			H. State Facility Phone		
DESCRIPTION	11. Description of Waste Materials		12. Containers		
	a. <b>Polystyrene Contaminated Soil</b>		Qty	Size	13. Total Quantity
	WM Profile # <b>B10123570W1</b>				14. UIC Number
	b.				15. Site Number
	WM Profile #				16. Date
	c.				17. State
WM Profile #				18. County	
d.				19. City	
WM Profile #				20. Zip	
j. Additional Descriptions for Materials Listed Above		K. Disposal Location			
		Cell			
		Grid			
15. Special Handling Instructions and Additional Information		Tongue County, WY 82804-0000			
Purchase Order #		EMERGENCY CONTACT / PHONE NO.:			
15. GENERATOR'S CERTIFICATE: I hereby certify that the above-described materials are not hazardous wastes as defined by CFR Part 261 or any applicable state law, I have been fully and accurately described, classified and packaged and are in proper condition for transportation according to applicable regulations.					
Printed Name		Signature "On behalf of"		Month	Day
17. Transporter 1 Acknowledgment of Receipt of Materials		Printed Name		Month	Day
		Signature		Year	
18. Transporter 2 Acknowledgment of Receipt of Materials		Printed Name		Month	Day
		Signature		Year	
19. Certificate of Final Treatment/Disposal I certify, on behalf of the above listed treatment facility, that to the best of my knowledge, the above described waste was managed in compliance with all applicable laws, regulations, permits and licenses on the dates listed above.					
20. Facility Owner or Operator: Certification of receipt of non-hazardous materials covered by this manifest.					
Printed Name		Signature		Month	Day
				Year	

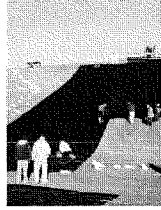
White- TREATMENT, STORAGE, DISPOSAL FACILITY COPY  
For FACILITY USE ONLY

Blue- GENERATOR USE COPY  
606- TRANSPORTER USE COPY

Yellow- OPERATOR USE COPY



**SCS ENGINEERS**



Materials Management Plan

**Madison Water Utility**

**Vehicle and Material Storage Facility  
Redevelopment**

**115 South Paterson Street  
Madison, Wisconsin**

Prepared for:

**City of Madison Water Utility**

110 South Paterson Street  
Madison, Wisconsin 53704

Prepared by:

**SCS ENGINEERS**

2830 Dairy Drive  
Madison, Wisconsin 53718-6751  
(608) 224-2830

June 2015

File No. 25215045.00

Offices Nationwide  
[www.scsengineers.com](http://www.scsengineers.com)



**Materials Management Plan**

**Madison Water Utility  
Vehicle and Material Storage Facility Redevelopment  
115 South Paterson Street  
Madison, Wisconsin**

Prepared for:

**City of Madison Water Utility**  
110 South Paterson Street  
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June 2015  
File No. 25215045.00

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I:\25215045\Reports\Report 1 - MMP\MWU\_Storage\_Site\_Material\_Management\_Plan\_150625.doc

## 1.0 INTRODUCTION

This Material Management Plan (Plan) provides guidance for the management of contaminated soil and groundwater during the redevelopment of the City of Madison Water Utility Vehicle and Material Storage Facility. The facility is located at 115 South Paterson Street in Madison, Wisconsin (**Figure 1** and **Figure 2**). Proposed construction activities include building demolition, pavement and utility removal, building and parking lot construction, and construction of an underground storm water treatment system.

## 2.0 BACKGROUND INFORMATION

### 2.1 SITE GEOLOGY

Geotechnical borings were advanced at the site in November 2005. Borings logs from the geotechnical investigation document brown, orange, gray, and black fill material containing cinders, ash, glass, silt, sand, and gravel extending to a depth of approximately 6 feet below ground surface (bgs). The boring logs show underlying gray colored clay extending beyond 20 feet bgs and underlain by dense brown sand to at least 40 feet bgs.

Soil and groundwater contamination were identified at the site during environmental sampling activities conducted in March 2015. This work was performed to evaluate the need for material management during future construction activities. The March 2015 sampling included installation of soil borings at locations shown on **Figure 1**. Groundwater was encountered at approximately 8 feet bgs during the March 2015 investigation; however, this depth is based on measurements made soon after drilling and may not reflect the actual water table elevation. Groundwater at nearby environmental cleanup sites has been documented at depths as shallow as approximately 3 feet bgs.

### 2.2 SOIL ANALYTICAL RESULTS

Soil analytical results are summarized in **Tables 1** through **3**. Laboratory analytical reports are included in **Appendix 1**. Soil analytical results confirm the presence of volatile organic compounds (VOCs), polynuclear aromatic hydrocarbons (PAHs), and metals at concentrations greater than NR 720 residual contaminant levels (RCLs). Arsenic and lead are the only metals detected at concentrations greater than industrial direct contact RCLs. Several PAH concentrations exceed industrial direct contact RCLs. However, soil samples with metals that exceed both WDNR's Background Threshold Values (BTVs) and NR 720 RCLs, and samples with PAHs in excess of NR 720 RCLs appear to be limited to those collected within the zone of industrial fill.

Other than naphthalene, benzene is the only VOC detected in excess of a groundwater pathway RCL for samples collected above the assumed water table elevation of 8 feet bgs. Benzene concentrations for soil samples GP6 (2.5-5 feet bgs), GP7 (0-2.5 feet bgs), and GP9 (0-2.5 feet bgs) exceed the groundwater pathway RCL (5.1 micrograms per kilogram [ $\mu\text{g}/\text{kg}$ ]), but not the non-industrial direct contact RCL (1,490  $\mu\text{g}/\text{kg}$ ). The GP7 and GP9 soil benzene results are

flagged by the laboratory as estimated concentrations between the laboratory limit of detection (LOD) and limit of quantitation (LOQ), and should therefore be considered approximate.

The only chlorinated volatile organic compound (CVOC) detected in soil is tetrachloroethylene (PCE) for soil sample GP10 (7.5-10 feet bgs). This sample was collected from a depth below the assumed water table elevation. The GP10 PCE concentration (661 µg/kg) exceeds the groundwater pathway RCL (4.5 µg/kg), but is less than the non-industrial direct contact RCL (30,700 µg/kg). The result was flagged by the laboratory as an estimated concentration between the laboratory LOD and LOQ, and should therefore be considered approximate.

## 2.3 GROUNDWATER ANALYTICAL RESULTS

Groundwater samples were collected from borings GP2, GP3, GP5, GP8, and GP10 and analyzed for VOCs. Analytical results are summarized in **Table 4**. Laboratory analytical reports are included in **Appendix 1**. Only petroleum VOCs were detected in the samples. CVOCs were not detected in groundwater, and no VOCs were detected in the sample from boring GP5. Only benzene, ethylbenzene, trimethylbenzenes, and naphthalene concentrations for the GP10 groundwater sample exceed NR 140 enforcement standards (ESs).

## 3.0 PROPOSED DEVELOPMENT

Planned site redevelopment activities include demolishing the paint shop building and removing its foundation, constructing a new storage building, and installing a below-grade storm water system. Soils will be excavated in areas of known soil and groundwater contamination. Existing and proposed site features are shown on **Figure 2**.

## 4.0 MATERIALS MANAGEMENT

The site development plan calls for soil excavation related to demolition, building foundation and utility work, and construction of a subsurface storm water management structure, to a maximum cut depth of approximately 14 feet bgs. Related materials management activities are summarized below.

### 4.1 SOIL MANAGEMENT

In general, soils to be excavated as part of the redevelopment will be taken off site for landfill disposal. Contaminated soil will be transported to an approved landfill by a licensed hauler. Native soils, which show no signs of contamination, may be reused on site or reused on another site.

SCS Engineers (SCS) has identified Waste Management's Madison Prairie Landfill as the most likely landfill to be used in this project. Waste Management has reviewed the site soil data and requested lead Toxicity Characteristic Leaching Procedure (TCLP) testing of the fill material before they will accept this material for disposal.

The TCLP analysis will determine if the lead concentrations in the fill material are hazardous. If the results show the lead as hazardous, pre-treatment or disposal at a hazardous waste facility (other than Waste Management Mad Prairie) will be necessary. SCS collected the TCLP laboratory samples on June 24, 2015, and anticipates results by July 1, 2015. For the purposes of this MMP, it is assumed the industrial fill will pass the TCLP tests and will not be considered a hazardous waste.

Three classes of soil have been identified for management during construction at the site. Definitions of the material classes and a brief outline of the management approach for each are provided in the table below. More detailed information on the identification, management, and reuse of these materials is presented in the following sections.

	<b>Description</b>	<b>Soil Management Approach</b>
Class I Soil - "General Fill"	Unsaturated or saturated soil and non-native fill materials, consisting of gravel, silt, sand, and clay with cinders, ash, glass or other debris. May have petroleum odors and extend to depth of approximately 6 feet.	Class I soil to be excavated will be dewatered as necessary and removed from the site for disposal at an approved landfill. If temporarily stockpiled on site, soil should be placed on plastic tarps and covered.
Class II Soil - "VOC- Contaminated Native Soil"	Unsaturated or saturated native soil with evidence of VOC contamination based on field observations and/or previous analytical data.	Class II soil will be dewatered as needed, excavated and disposed at an approved landfill. If temporarily stockpiled on site, soil should be placed on plastic tarps and covered.
Class III Soil - "Native Soil"	Generally saturated soil containing no evidence of VOC contamination based on field observations and/or previous analytical data.	Class III soil will be reused on site if structurally suitable or taken off site for reuse.

### **Class I Soil Management**

Class I soils are non-native gravel, silt, sand, and clay with varying amounts of cinders, ash, and glass from an unknown source. Class I soils may have petroleum odors. Excavated Class I soils will be transported by a licensed hauler to an approved landfill for disposal. If temporarily stockpiled on site, soil should be placed on plastic tarps and covered.

Class I soils will be identified using existing analytical data, by field screening with a photoionization detector (PID) for analysis of VOCs, or by field observations such as color or odor. Unexcavated Class I soils will remain in place on the site after redevelopment. If necessary, remaining Class I soils will be capped, and a cap maintenance plan will be provided to the Wisconsin Department of Natural Resources (WDNR).

### **Class II Soil Management**

Class II soils are described as native clay soil that has been impacted by historical VOC releases. If excavated, Class II soils will be transported to an approved landfill for disposal. Class II soils will be identified using existing analytical data, field screening with a PID, or field observations such as color or odor. If temporarily stockpiled on site, soil should be placed on plastic tarps and covered.

Unexcavated Class II soils will remain in place on the site. If necessary, remaining Class II soils will be capped, and a cap maintenance plan will be provided to the WDNR.

### **Class III Soil Management**

Based on construction plans, it is unlikely that Class III soils will be excavated. Class III soils are native soils below or outside the limits of Class I and II soils and do not show signs of fill or VOC contamination. If structurally suitable, Class III soil can be reused on or off site.

Class III soils will be identified in the field using existing analytical information and field screening techniques such as a PID, odor, or color.

## **4.2 GROUNDWATER MANAGEMENT**

The excavation contractor will likely need to dewater to below the proposed excavation depth of 14 feet during some construction activities. Groundwater at the site indicated the presence of petroleum VOCs. Based on soil results, water may also be impacted by PAHs and metals. The excavation contractor will need to obtain approval to discharge water to either the storm sewer or sanitary sewer, whichever is appropriate. Additional testing may be required for the permitting.

## **4.3 VAPOR MANAGEMENT**

Vapor issues during construction will be managed by limiting the amount of contaminated soil exposed at one time and using temporary covers (plastic sheeting, tarps, etc.) as necessary to limit the amount of volatilization.

VOCs were detected in soil and groundwater; however, site redevelopment does not include construction of occupied space so vapor barriers or ventilation systems are not planned. Based on investigation findings it does not appear that identified VOCs present a vapor intrusion risk for the existing building.

## **5.0 UNUSUAL CONDITIONS**

The contractor will inform its earthwork subcontractors of the possibility of other unknown sources of contamination on the site. If any tanks, unusual odors, staining, fluids, or piping are found, work will stop in that area, the contractor will notify the owner of the conditions, and SCS or another designated environmental consultant will inspect the site to assess the situation.

If contaminated material is encountered that is significantly different than what has been previously identified, it will be evaluated by an environmental professional.

## 6.0 ROLES AND RESPONSIBILITIES DURING CONSTRUCTION

The following roles and responsibilities have been identified for the project:

### **Owner or Construction Manager/Owner's Agent**

- Performs overall project scheduling and retains civil engineer/architect, environmental consultants, and contractor.

### **Civil Engineer/Architect**

- Develops plans and specifications for project earthwork incorporating the requirements of the soil and groundwater management plan.

### **Environmental Consultant**

- Provides on-site observation and documentation during management of Class I, Class II, and Class III materials.
- Provides field screening to classify soils.
- Manages special or unanticipated environmental conditions encountered during construction.

### **Contractor**

- Performs earthwork in accordance with the project construction plans and specifications.
- Obtain soil profile approval for landfill disposal if a landfill other than Waste Management's Madison Prairie Landfill is required. We assume above-noted June 24, 2015, soil samples pass lead TCLP testing and all waste is considered non-hazardous.
- Complete dewatering activities in accordance with erosion control and general discharge permit specifications, including required sampling and reporting.

- Obtain all appropriate discharge permits for any discharge to the storm sewer or sanitary sewer.

## 7.0 REPORTING

Upon completion of all activities, SCS will provide a written report and documentation of the activities and disposal methods to the WDNR. The documentation will include a description and documentation of a cap and cap maintenance plan, as necessary.



## **TABLES**

- 1 Soil Analytical Results Summary – VOCs
- 2 Soil Analytical Results Summary – PAHs
- 3 Soil Analytical Results Summary – Metals
- 4 Groundwater Analytical Results Summary – VOCs

**Table 1. Soil Analytical Results Summary - VOCs**  
**Madison Water Utility Vehicle and Material Storage, 115 S. Paterson St., Madison / SCS Engineers Project #25215045.00**  
 (Results are in µg/kg, except where noted otherwise)

Sample	Date	Depth (feet)	PID (ppm)	Lab Notes	Benzene	Ethylbenzene	Toluene	Xylenes	1,2,4-TMB	1,3,5-TMB	1,2,4- & 1,3,5-TMB Combined	MTBE	Other VOCs
GP-1 S2	3/11/2015	2.5-5	0.0	(1)	<25.0	<25.0	<25.0	<75.0	<25.0	<25.0	<50.0	<25.0	Naphthalene 56.7 J
GP-2 S2	3/11/2015	2.5-5	0.4	(1)	<25.0	<0.25	<0.25	<75.0	<25.0	<25.0	<50.0	<25.0	ND
GP-2 S4*	3/11/2015	7.5-10	0.4	(1)	<25.0	<25.0	<25.0	<75.0	<25.0	<25.0	<50.0	<25.0	ND
GP-3 S1	3/11/2015	0-2.5	0.6	(1)	<25	<25.0	<25.0	<75.0	<25.0	<25.0	<50.0	<25.0	Naphthalene 54.1 J
GP-3 S4*	3/11/2015	7.5-10	25.8	(1)	<25.0	<25.0	<25.0	<75.0	<25.0	<25.0	<50.0	<25.0	ND
GP-3 S5*	3/11/2015	10-12	572.8	(1)	<25.0	<25.0	<25.0	<75.0	<25.0	<25.0	<50.0	<25.0	sec-Butylbenzene 58.2 J
GP-4 S1	3/11/2015	0-2.5	0.3	(1)	<25.0	<25.0	66.5	122 J	43.3 J	<25.0	43.3	<25.0	Naphthalene 100 J
GP-4 S4*	3/11/2015	7.5-10	919.7	(1)	<25.0	331	<25.0	97.1 J	145	<25.0	145	<25.0	n-Butylbenzene 631 sec-Butylbenzene 305 Isopropylbenzene 495 p-Isopropyltoluene 564 Naphthalene 992 n-Propylbenzene 945
GP-5 S1	3/11/2015	0-2.5	0.4	(1)	<25.0	<25.0	<25.0	<75.0	<25.0	<25.0	<50.0	<25.0	ND
GP-5 S3	3/11/2015	5-7.5	0.4	(1)	<25.0	<25.0	<25.0	<75.0	<25.0	<25.0	<50.0	<25.0	ND
GP-5 S5*	3/11/2015	10-12	0.0	(1)	<25.0	<25.0	<25.0	<75.0	<25.0	<25.0	<50.0	<25.0	ND
GP-6 S2	3/11/2015	2.5-5	1.9	(2)	178	81.8 J	324	404	190	78.4 J	268.4	<25.0	Naphthalene 2,090 Styrene 72.7 J
GP-7 S1	3/11/2015	0-2.5	3.4	(1)	65.5 J	126	354	776	397	165	562	<25.0	n-Butylbenzene 71.4 J Isopropylbenzene 32.2 J Naphthalene 259 J n-Propylbenzene 71.6 J
GP-8 S2	3/11/2015	2.5-5	0.9	(1)	<25.0	<25.0	169	248	77.2	36.4 J	113.6	<25.0	Naphthalene 106 J
GP-8 S3	3/11/2015	5-7.5	46.8	(1)	<25.0	<25.0	<25.0	<75.0	<25.0	<25.0	<50.0	<25.0	ND
GP-9 S1	3/11/2015	0-2.5	1.0	(2)	28.5 J	62.1 J	155	392	156	58.1 J	214.1	<25.0	n-Butylbenzene 37.0 J Naphthalene 180 J
GP-10 S2	3/11/2015	2.5-5	46.2	(2)	<25.0	40.8 J	160	297	106	66.4 J	172.4	<25.0	Naphthalene 341

**Table 1. Soil Analytical Results Summary - VOCs**  
**Madison Water Utility Vehicle and Material Storage, 115 S. Paterson St., Madison / SCS Engineers Project #25215045.00**  
 (Results are in µg/kg, except where noted otherwise)

Sample	Date	Depth (feet)	PID (ppm)	Lab Notes	Benzene	Ethylbenzene	Toluene	Xylenes	1,2,4-TMB	1,3,5-TMB	1,2,4- & 1,3,5-TMB Combined	MTBE	Other VOCs
GP-10 S4*	3/11/2015	7.5-10	1,400	(2)	<500	<b>9,820</b>	<500	<b>11,500</b>	43,100	<500	<b>43,100</b>	<500	n-Butylbenzene 3,800 sec-Butylbenzene 1,700 Isopropylbenzene 3,860 p-Isopropyltoluene 3,760 Naphthalene <b>18,800</b> n-Propylbenzene 6,550 Tetrachloroethene <b>661</b> J
NR 720 Groundwater Pathway RCLs with a Wisconsin-Default Dilution Factor of 2					5.1	1,570	1,107.20	3,940	(a)		1,382.10	27	Naphthalene 658.2 Styrene 220 Tetrachloroethene 4.5
NR 720 Non-Industrial Direct Contact RCLs					1,490	7,470	818,000	258,000	89,800	182,000	182,000	59,400	Naphthalene 5,150 Styrene 867,000 Tetrachloroethene 30,700
NR 720 Industrial Direct Contact RCLs					7,410	37,000	818,000	258,000	219,000	182,000	182,000	293,000	Naphthalene 26,000 Styrene 867,000 Tetrachloroethene 153,000

Abbreviations:

µg/kg = micrograms per kilogram or parts per billion (ppb)  
 -- = Not Applicable  
 RCL = Residual Contaminant Level  
 NA = Not Analyzed

mg/kg - milligrams per kilogram or parts per million (ppm)  
 MTBE = Methyl-tert-butyl ether  
 TMB = Trimethylbenzene  
 ND = Not Detected

VOCs = Volatile Organic Compounds  
 NE = Not Established

Notes:

**Bold+underlined** values exceed an NR 720 RCL, as of January 2015.  
 (a) NR 720 Groundwater Pathway RCLs for 1,2,4 and 1,3,5 Trimethylbenzene Combined = 1,382.1  
 \*Sample collected at or below assumed water table (8 feet below ground surface).

Laboratory Notes/Qualifiers:

J - Estimated concentration at or above the Limit of Detection and below the Limit of Quantitation.

(1) Non-detect results are reported on a wet weight basis. Bromoform - Analyte recovery in the laboratory control sample (LCS) was below QC limits. Results may be biased low.

(2) Non-detect results are reported on a wet weight basis.

Created by: LMH Date: 3/23/2015  
 Last revision by: LMH Date: 3/23/2015  
 Checked by: JSN Date: 3/24/2015

I:\25215045\Data\Tables\[Soil\_VOCs.xls]Soil VOCs

(Results are in µg/kg, except where noted otherwise)

Benzo(a)anthracene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Benzo(ghi)perylene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	1-Methylnaphthalene	2-Methylnaphthalene
<9.7	<8.6	28.9	106	<u>225</u>	92.7	<u>318</u>	407	136	<u>214</u>	200	<9.7 L2	<u>213</u>	<9.7	<9.7
<9.8	16.6 J	77.5	<u>168</u>	134	139	<u>178</u>	91.4	<u>209</u>	<u>35.0</u>	254	20.6 L2	68.0	<9.8	<9.8
<10	<8.9	<10.4	<6.9	<10	<11.0	<7.1	<7.6	<9.2	<7.3	<10	<10 L2	<7.6	<10	<10
4.2 J	127	433	<u>815</u>	<u>951</u>	835	<u>942</u>	595	<u>907</u>	<u>180</u>	1,510	110 L2	<u>527</u>	<45.9	<45.9
<9.7	<8.7	<10.0	<6.7	<9.7	<10.7	<6.9	<7.4	<8.9	<7.1	<9.7	<9.7 L2	<7.4	<9.7	<9.7
<10	<8.9	<10.3	<6.9	<10	<11.0	<7.1	<7.6	<9.2	<7.3	<10	<10 L2	<7.6	54.2	31.7
<9.2	10.4 J	14.0 J	24.0	26.3	30.5	<u>22.6</u>	16.9 J	36.7	<6.7	42.7	<9.2 L2	11.6 J	24.9	39.6
<10.1	<9.0	<10.5	<7.0	<10.1	<11.2	<7.2	<7.7	<9.3	<7.4	13.9 J	<10.1 L2	<7.7	191	496
<8.8	<7.9	<9.1	26.9	23.5	23.8	<u>22.3</u>	13.5 J	33.7	<6.5	73.2	<8.8 L2	9.4 J	<8.8	<8.8
<11.3	<10.1	<11.7	16.4 J	21.7 J	19.2 J	<u>17.9</u> J	12.4 J	25.6	<8.3	39.2	<11.3 L2	8.7 J	<11.3	<11.3
<9.9	<8.9	<10.3	<6.9	<9.9	<11.0	<7.1	<7.6	<9.2	<7.3	<9.9	<9.9 L2	<7.5	<9.9	<9.9
<66.6	1,240	859	<u>1,360</u>	<u>1,520</u>	1,390	<u>1,930</u>	1,120	<u>1,680</u>	<u>338</u>	1,820	103 J <sub>L2</sub>	<u>993</u>	340	605
<40.2	489	324	<u>844</u>	<u>859</u>	947	<u>1,000</u>	540	<u>824</u>	<u>181</u>	1,260	<40.2 L2	<u>523</u>	212	409
<9.6	94.2	115	<u>356</u>	<u>570</u>	430	<u>436</u>	319	<u>435</u>	<u>111</u>	529	10.0 J <sub>L2</sub>	<u>298</u>	47.8	92.5
<10.5	<9.4	<10.9	<7.3	<10.5	<11.6	<7.5	<8.0	<9.7	<7.7	<10.5	<10.5 L2	<8.0	<10.5	<10.5
0.1 J	186	162	<u>502</u>	<u>524</u>	558	<u>624</u>	281	<u>550</u>	<u>102</u>	731	24.6 J <sub>L2</sub>	<u>289</u>	63.4	114
<429	1,650	4,110	<u>12,100</u>	<u>13,300</u>	<u>13,300</u>	<u>15,300</u>	13,700	<u>13,900</u>	<u>4,050</u>	18,800	449 J	<u>11,300</u>	<429	<429
<102	<90.9	<105	<70.5	<102	<112	<72.7	<77.4	<94.0	<74.6	<102	<102	<77.2	953	3,090
NE	NE	197,727.3	NE	479.3	NE	470	NE	144.6	NE	88,877.8	14,802.7	NE	NE	NE
440,000	NE	17,200,000	148	148	1,480	15	NE	14,800	15	2,290,000	2,290,000	148	15,600	229,000
1,000,000	NE	100,000,000	2,110	2,110	21,100	211	NE	211,000	211	22,000,000	22,000,000	2,110	53,100	2,200,000

b) -- = Not Applicable  
RCL = Residual Contaminant Level

NE = Not Established  
WDNR = Wisconsin Department of Natural Resources

as of January 2015.  
(and below ground surface).

ion (LOD) and below the Limit of Quantitation (LOQ).  
(NS) was below QC limits. Results may be biased low.

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**Table 3. Soil Analytical Results Summary - Metals**  
**Madison Water Utility Vehicle and Material Storage, 115 S. Paterson St., Madison / SCS Engineers Project #25215045.00**  
 (Results are in mg/kg)

Sample	Date	Depth (feet)	Lab Notes	Arsenic	Barium	Cadmium	Chromium (Total)	Lead	Mercury	Selenium	Silver
GP-1 S2	3/11/2015	2.5-5	--	<u>2.3</u>	34.8	0.14 J	7.3	<u>29.9</u>	<u>0.22</u>	<0.82	<0.30
GP-2 S2	3/11/2015	2.5-5	--	<u>1.6</u> J	29.4	0.077 J	8.0	16.6	0.12	<0.82	<0.30
GP-2 S4	3/11/2015	7.5-10	--	<u>5.8</u>	40.2	<0.071	12.5	3.4	0.006 J	<0.83	<0.30
GP-3 S1	3/11/2015	0-2.5	(1)	<u>5.0</u> J	144	<u>1.5</u>	8.9	<u>137</u>	0.083	<0.73	0.30 J
GP-3 S4	3/11/2015	2.5-5	--	<u>15.7</u>	44.8	0.089 J	13.4	5.6	0.009	<0.85	0.44 J
GP-3 S5	3/11/2015	10-12	--	<u>4.1</u>	66.4	0.10 J	17.8	6.8	0.010	<0.80	0.38 J
GP-4 S1	3/11/2015	0-2.5	--	<u>6.7</u>	42.1	0.48	8.3	<u>46.3</u>	0.053	<0.71	0.38 J
GP-4 S4	3/11/2015	7.5-10	--	<u>5.0</u>	55.1	<0.079	14.1	5.2	0.009	<0.92	<0.33
GP-5 S1	3/11/2015	0-2.5	(1)	<u>5.9</u> J	21.5	0.29 J	6.2	12.4	0.019	<0.79	<0.29
GP-5 S3	3/11/2015	5-7.5	--	<u>4.1</u>	86.5	0.24 J	22.6	14.7	0.060	<1.0	0.48 J
GP-5 S5	3/11/2015	10-12	--	<u>1.5</u> J	7.0	<0.070	3.9	1.2	<0.0031	<0.82	<0.29
GP-6 S2	3/11/2015	2.5-5	--	<u>23.7</u>	<u>1,920</u>	<u>1.1</u>	69.7	<u>835</u>	<u>0.36</u>	<1.1	0.83 J
GP-7 S1	3/11/2015	0-2.5	--	<u>10.6</u>	81.6	<u>1.2</u>	14.4	<u>248</u>	0.064	<0.86	0.47 J
GP-8 S2	3/11/2015	2.5-5	--	<u>8.3</u>	118	<u>2.0</u>	13.1	<u>395</u>	<u>0.29</u>	<0.87	0.60 J
GP-8 S3	3/11/2015	5-7.5	--	<u>2.6</u>	87.4	<0.075	22.2	7.5	0.021	<0.88	<0.32
GP-9 S1	3/11/2015	0-2.5	--	<u>5.1</u>	61.5	0.34 J	11.5	<u>59.8</u>	<u>0.23</u>	<0.78	0.57 J
GP-10 S2	3/11/2015	2.5-5	--	<u>9.5</u>	126	0.45 J	14.2	<u>457</u>	<u>0.24</u>	<0.94	0.69 J
GP-10 S4	3/11/2015	7.5-10	--	<u>3.6</u>	59.3	0.081 J	14.5	6.5	0.011	<0.80	0.36 J
NR 720 Groundwater Pathway RCLs with a Wisconsin-Default Dilution Factor of 2				0.584	164.8	0.752	360,000	27	0.208	0.52	0.85
NR 720 Non-Industrial Direct Contact RCLs				0.613	15,300	70	NE <sup>1</sup>	400	3.13	391	391
NR 720 Industrial Direct Contact RCLs				2.39	100,000	799	NE <sup>1</sup>	800	3.13	5,110	5,110
Background Threshold Value <sup>2</sup>				8	364	1	44	52	NE	NE	NE

**Table 3. Soil Analytical Results Summary - Metals**  
**Madison Water Utility Vehicle and Material Storage, 115 S. Paterson St., Madison / SCS Engineers Project #25215045.00**

Abbreviations:

mg/kg - milligrams per kilogram or parts per million (ppm)  
-- = Not Applicable

NA = Not Analyzed  
NE = No Standard Established

Notes:

**Bold+underlined** values exceed NR 720 RCLs, as of January 2015.

<sup>1</sup> Chromium Direct Contact Standards: III Non-Industrial Direct Contact RCL = 100,000 mg/kg; Industrial Direct Contact RCL = 100,000 mg/kg

VI Non-Industrial Direct Contact RCL = 0.293 mg/kg; Industrial Direct Contact RCL = 5.58 mg/kg

<sup>2</sup> Background threshold values are non-outlier trace element maximum levels in Wisconsin surface soils from the USGS Report at: <http://pubs.usgs.gov/sir/2011/5202>, as listed in the WDNR RR Program's RCL spreadsheet at: <http://dnr.wi.gov/topic/Brownfields/professionals.html>.

Laboratory Notes/Qualifiers:

J - Estimated concentration at or above the Limit of Detection and below the Limit of Quantitation.

(1) Arsenic - Sample was diluted due to the presence of high levels of non-target analytes or other matrix interference.

Created by:	<u>LMH</u>	Date:	<u>3/23/2015</u>
Last revision by:	<u>LMH</u>	Date:	<u>3/23/2015</u>
Checked by:	<u>JSN</u>	Date:	<u>3/23/2015</u>

I:\25215045\Data\Tables\[Soil\_Metals.xls]Soil Metals

**Table 4. Groundwater Analytical Results Summary - VOCs**  
**Madison Water Utility Vehicle and Material Storage, 115 S. Paterson St., Madison / SCS Engineers Project #25215045.00**  
 (Results are in µg/L)

Sample	Date	Lab Notes	DRO	GRO	Benzene	Ethylbenzene	Toluene	Xylenes	TMBs	MTBE	Other VOCs
GP-2	3/11/2015	--	NA	NA	<0.50	<0.50	0.57 J	<1.5	<1.00	<0.17	ND
GP-3	3/11/2015	(1)	NA	NA	<0.50	<0.50	1.0	<1.5	0.74 J	<0.17	n-Butylbenzene 5.0 sec-Butylbenzene 8.9 tert-Butylbenzene 0.53 J Isopropylbenzene 3.2 n-Propylbenzene 8.5
GP-5	3/11/2015	--	NA	NA	<0.50	<0.50	<0.50	<1.5	<1.00	<0.17	ND
GP-8	3/11/2015	--	NA	NA	<0.50	<0.50	<0.50	<1.5	<1.00	<0.17	Isopropylbenzene 0.17 J
GP-10	3/11/2015	(1)	NA	NA	<b><u>174</u></b>	<b><u>1,380</u></b>	147	<b><u>1,740</u></b>	<b><u>2,130</u></b>	<3.5	n-Butylbenzene 106 sec-Butylbenzene 47.6 J Chloroethane 8.7 J Isopropylbenzene 199 Naphthalene <b><u>1,530</u></b> n-Propylbenzene 326
NR 140 Enforcement Standards (ESs)			NE	NE	5	700	800	2,000	480	60	Chloroethane 400 Naphthalene 100
NR 140 Preventive Action Limits (PALs)			NE	NE	0.5	140	160	400	96	12	Chloroethane 80 Naphthalene 10

Abbreviations:

µg/L = micrograms per liter or parts per billion (ppb)  
 TMBs = 1,2,4- and 1,3,5-trimethylbenzenes  
 -- = Not Applicable

VOCs = Volatile Organic Compounds  
 MTBE = Methyl-tert-butyl ether

ND = Not Detected  
 NE = No Standard Established

Notes:

NR 140 ESs - Wisconsin Administrative Code (WAC), Chapter NR 140.10 Table 1 - Public Health Groundwater Quality Standards.

NR 140 PALs - WAC, Chapter NR 140.10 Table 1 - Public Health Groundwater Quality Standards.

**Bold+underlined** values meet or exceed NR 140 enforcement standards.

**Italic+underlined** values meet or exceed NR 140 preventive action limits.

**Table 4. Groundwater Analytical Results Summary - VOCs**  
**Madison Water Utility Vehicle and Material Storage, 115 S. Paterson St., Madison / SCS Engineers Project #25215045.00**

Laboratory Notes/Qualifiers:

J - Estimated concentration at or above the Limit of Detection and below the Limit of Quantitation.

(1) Surrogate 4-Bromofluorobenzene (S) - Results are from sample aliquot taken from VOA vial with headspace (air bubble greater than 6 mm diameter).

Created by:	<u>LMH</u>	Date:	<u>3/23/2015</u>
Last revision by:	<u>LMH</u>	Date:	<u>3/23/2015</u>
Checked by:	<u>JSN</u>	Date:	<u>3/24/2015</u>

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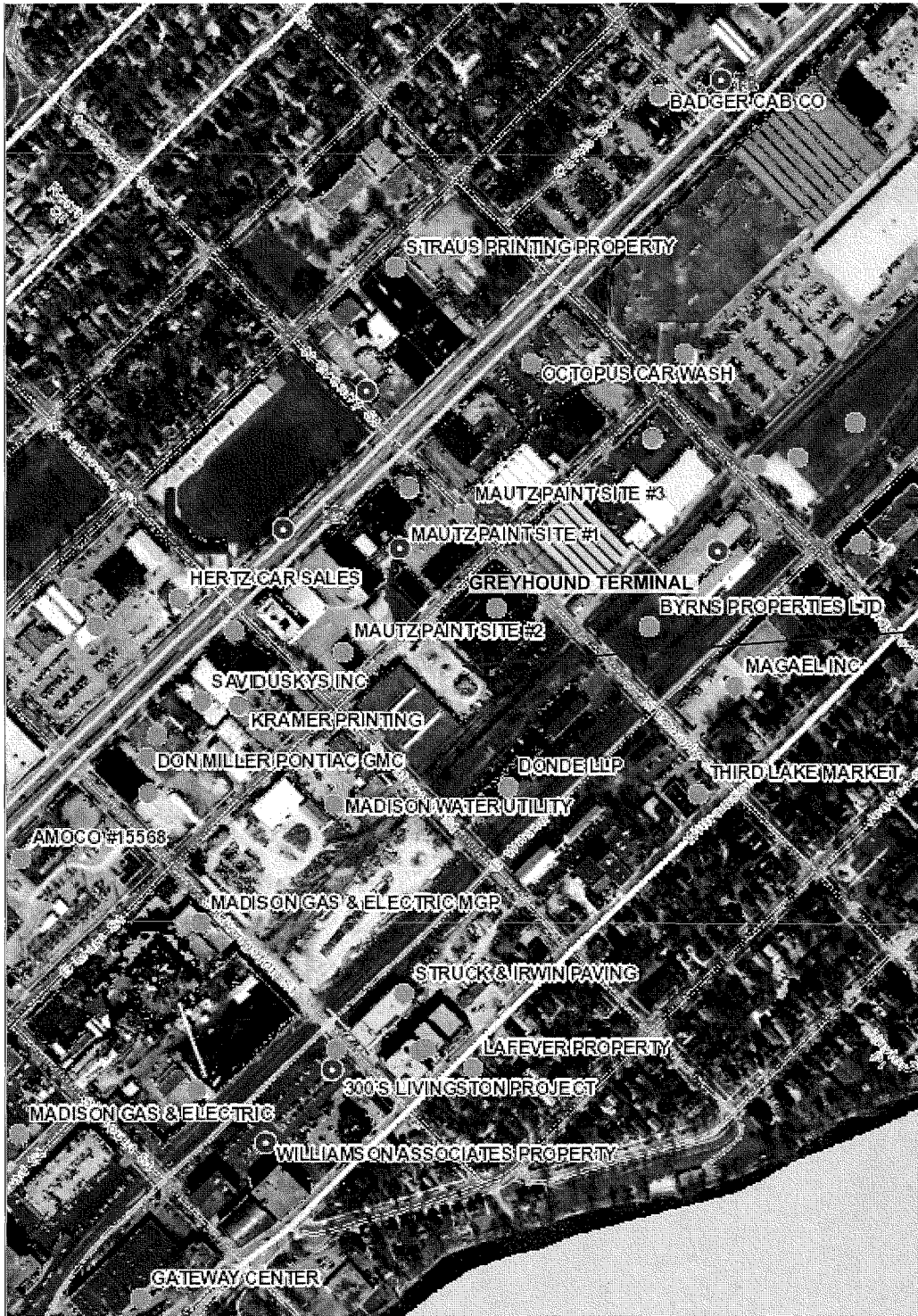


## **FIGURES**

- 1 Site Location
- 2 Site Plan



# Figure 1 - Site Location



### Legend

- Open Site (ongoing cleanup)
- Closed Site (completed cleanup)
- Rivers and Streams
- Open Water
- Cities
- Villages

Site

0.2 0 Distance / 2 0.2 Miles

1:5,664

















































NAD\_1983\_HARN\_Wisconsin\_TM

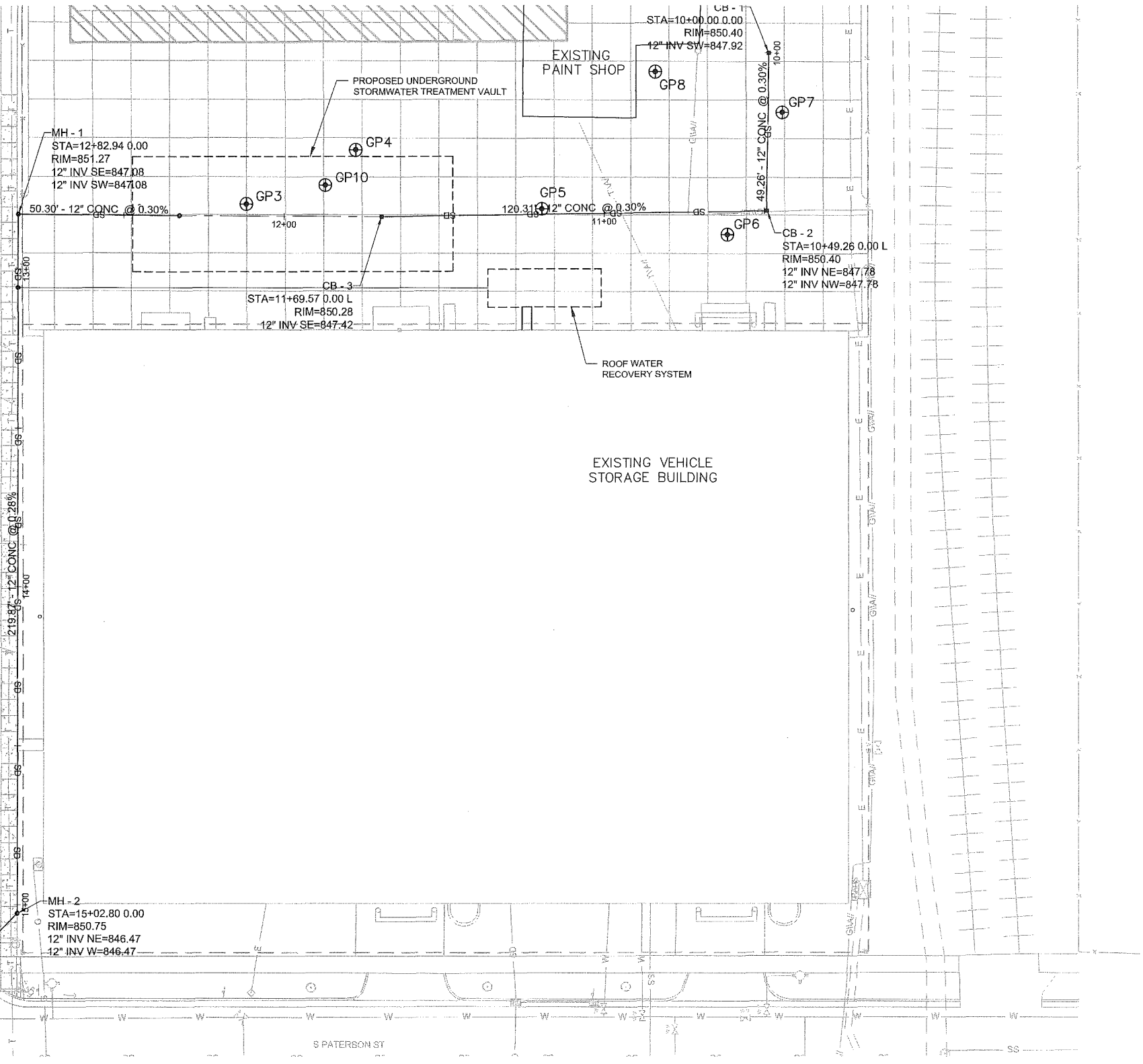
DISCLAIMER: The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access. No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness, or legality of the information depicted on this map. For more information, see the DNR Legal Notices web page: <http://dnr.wi.gov/org/legal/>

Note: Not all sites are mapped.

### Notes

**LEGEND:**

-  STORM INLET, CURB
-  STORM INLET, ROUND
-  STORM INLET, SQUARE
-  STORM FLARED END S
-  STORM SEWER MANHC
-  STORM WATER QUALIT
-  BOLLARD
-  CONTROL POINT
-  DOWNSPOUT
-  ELECTRICAL TRANSFO
-  ELECTRICAL SERVICE I
-  ELECTRICAL HANDHOL
-  FIRE HYDRANT
-  FLAGPOLE
-  GAS METER
-  GAS VALVE
-  INLET, CURB
-  INLET, ROUND
-  INLET, SQUARE
-  IRON PIN
-  LIGHT POLE (SINGLE)
-  MANHOLE, ELECTRIC
-  MANHOLE, SANITARY S
-  MANHOLE, STORM SEV
-  MANHOLE, TELECOMM
-  MARKER, CABLE
-  POWER POLE
-  SIGN (SINGLE POST)
-  SOIL BORING
-  TREE, DECIDUOUS
-  WATER VALVE
-  WATER METER
-  WATER SHUTOFF
-  MONITORING WELL
-  G GAS
-  OHE ELECTRIC, OVERHEAD
-  E ELECTRIC, UNDERGRO
-  XXX.X XXX.X EXISTING CONTOUR LII
-  X FENCE
-  o HANDRAIL
-  SS SANITARY SEWER
-  SD STORM SEWER / ROOF
-  T TELEPHONE
-  TV TV CABLE
-  W WATER
-  RAILROAD TRACKS



**APPENDIX 1**

Laboratory Analytical Reports

March 23, 2015

Rob Langdon  
SCS ENGINEERS  
2830 Dairy Drive  
Madison, WI 53718


RE: Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Dear Rob Langdon:

Enclosed are the analytical results for sample(s) received by the laboratory on March 12, 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,



Tod Noltemeyer for  
Dan Milewsky  
dan.milewsky@pacelabs.com  
Project Manager

Enclosures



## REPORT OF LABORATORY ANALYSIS

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## CERTIFICATIONS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

---

### Green Bay Certification IDs

1241 Bellevue Street, Green Bay, WI 54302  
Florida/NELAP Certification #: E87948  
Illinois Certification #: 200050  
Kentucky Certification #: 82  
Louisiana Certification #: 04168  
Minnesota Certification #: 055-999-334

North Dakota Certification #: R-150  
South Carolina Certification #: 83006001  
Texas Certification #: T104704529-14-1  
US Dept of Agriculture #: S-76505  
Wisconsin Certification #: 405132750

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## REPORT OF LABORATORY ANALYSIS

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### SAMPLE SUMMARY

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40111561001	GP-1 S2	Solid	03/11/15 08:45	03/12/15 08:30
40111561002	GP-2 S2	Solid	03/11/15 09:30	03/12/15 08:30
40111561003	GP-2 S4	Solid	03/11/15 09:35	03/12/15 08:30
40111561004	GP-3 S1	Solid	03/11/15 10:00	03/12/15 08:30
40111561005	GP-3 S4	Solid	03/11/15 10:00	03/12/15 08:30
40111561006	GP-3 S5	Solid	03/11/15 10:15	03/12/15 08:30
40111561007	GP-4 S1	Solid	03/11/15 12:30	03/12/15 08:30
40111561008	GP-4 S4	Solid	03/11/15 12:30	03/12/15 08:30
40111561009	GP-5 S1	Solid	03/11/15 11:10	03/12/15 08:30
40111561010	GP-5 S5	Solid	03/11/15 11:10	03/12/15 08:30
40111561011	GP-5 S3	Solid	03/11/15 11:00	03/12/15 08:30
40111561012	GP-8 S2	Solid	03/11/15 13:30	03/12/15 08:30
40111561013	GP-8 S3	Solid	03/11/15 13:30	03/12/15 08:30
40111561014	GP-7 S1	Solid	03/11/15 13:15	03/12/15 08:30
40111561015	GP-5	Water	03/11/15 00:00	03/12/15 08:30
40111561016	GP-6 S2	Solid	03/11/15 14:00	03/12/15 08:30
40111561017	GP-9 S1	Solid	03/11/15 14:30	03/12/15 08:30
40111561018	GP-10 S2	Solid	03/11/15 15:00	03/12/15 08:30
40111561019	GP-10 S4	Solid	03/11/15 15:00	03/12/15 08:30
40111561020	GP-10	Water	03/11/15 15:00	03/12/15 08:30
40111561021	GP-3	Water	03/11/15 00:00	03/12/15 08:30
40111561022	GP-2	Water	03/11/15 00:00	03/12/15 08:30
40111561023	GP-8	Water	03/11/15 00:00	03/12/15 08:30

### REPORT OF LABORATORY ANALYSIS

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### SAMPLE ANALYTE COUNT

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40111561001	GP-1 S2	EPA 6010	DLB	7	PASI-G
		EPA 7471	AJT	1	PASI-G
		EPA 8270 by SIM	ARO	20	PASI-G
		EPA 8260	SMT	63	PASI-G
		ASTM D2974-87	SKW	1	PASI-G
40111561002	GP-2 S2	EPA 6010	DLB	7	PASI-G
		EPA 7471	AJT	1	PASI-G
		EPA 8270 by SIM	ARO	20	PASI-G
		EPA 8260	SMT	63	PASI-G
		ASTM D2974-87	SKW	1	PASI-G
40111561003	GP-2 S4	EPA 6010	DLB	7	PASI-G
		EPA 7471	AJT	1	PASI-G
		EPA 8270 by SIM	ARO	20	PASI-G
		EPA 8260	SMT	63	PASI-G
		ASTM D2974-87	SKW	1	PASI-G
40111561004	GP-3 S1	EPA 6010	DLB	7	PASI-G
		EPA 7471	AJT	1	PASI-G
		EPA 8270 by SIM	ARO	20	PASI-G
		EPA 8260	SMT	63	PASI-G
		ASTM D2974-87	SKW	1	PASI-G
40111561005	GP-3 S4	EPA 6010	DLB	7	PASI-G
		EPA 7471	AJT	1	PASI-G
		EPA 8270 by SIM	ARO	20	PASI-G
		EPA 8260	SMT	63	PASI-G
		ASTM D2974-87	SKW	1	PASI-G
40111561006	GP-3 S5	EPA 6010	DLB	7	PASI-G
		EPA 7471	AJT	1	PASI-G
		EPA 8270 by SIM	ARO	20	PASI-G
		EPA 8260	SMT	63	PASI-G
		ASTM D2974-87	SKW	1	PASI-G
40111561007	GP-4 S1	EPA 6010	DLB	7	PASI-G
		EPA 7471	AJT	1	PASI-G
		EPA 8270 by SIM	ARO	20	PASI-G
		EPA 8260	SMT	63	PASI-G
		ASTM D2974-87	SKW	1	PASI-G
40111561008	GP-4 S4	EPA 6010	DLB	7	PASI-G
		EPA 7471	AJT	1	PASI-G

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### SAMPLE ANALYTE COUNT

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40111561009	GP-5 S1	EPA 8270 by SIM	ARO	20	PASI-G
		EPA 8260	SMT	63	PASI-G
		ASTM D2974-87	SKW	1	PASI-G
		EPA 6010	DLB	7	PASI-G
		EPA 7471	AJT	1	PASI-G
40111561010	GP-5 S5	EPA 8270 by SIM	ARO	20	PASI-G
		EPA 8260	SMT	63	PASI-G
		ASTM D2974-87	SKW	1	PASI-G
		EPA 6010	DLB	7	PASI-G
		EPA 7471	AJT	1	PASI-G
40111561011	GP-5 S3	EPA 8270 by SIM	ARO	20	PASI-G
		EPA 8260	SMT	63	PASI-G
		ASTM D2974-87	MAV	1	PASI-G
		EPA 6010	DLB	7	PASI-G
		EPA 7471	AJT	1	PASI-G
40111561012	GP-8 S2	EPA 8270 by SIM	ARO	20	PASI-G
		EPA 8260	SMT	63	PASI-G
		ASTM D2974-87	MAV	1	PASI-G
		EPA 6010	DLB	7	PASI-G
		EPA 7471	AJT	1	PASI-G
40111561013	GP-8 S3	EPA 8270 by SIM	ARO	20	PASI-G
		EPA 8260	SMT	63	PASI-G
		ASTM D2974-87	MAV	1	PASI-G
		EPA 6010	DLB	7	PASI-G
		EPA 7471	AJT	1	PASI-G
40111561014	GP-7 S1	EPA 8270 by SIM	ARO	20	PASI-G
		EPA 8260	SMT	63	PASI-G
		ASTM D2974-87	MAV	1	PASI-G
		EPA 6010	DLB	7	PASI-G
		EPA 7471	AJT	1	PASI-G
40111561015	GP-5	EPA 8260	LAP	63	PASI-G
40111561016	GP-6 S2	EPA 6010	DLB	7	PASI-G
		EPA 7471	AJT	1	PASI-G
		EPA 8270 by SIM	ARO	20	PASI-G

### REPORT OF LABORATORY ANALYSIS

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### SAMPLE ANALYTE COUNT

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40111561017	GP-9 S1	EPA 8260	SMT	63	PASI-G
		ASTM D2974-87	MAV	1	PASI-G
		EPA 6010	DLB	7	PASI-G
		EPA 7471	AJT	1	PASI-G
		EPA 8270 by SIM	ARO	20	PASI-G
40111561018	GP-10 S2	EPA 8260	SMT	63	PASI-G
		ASTM D2974-87	MAV	1	PASI-G
		EPA 6010	DLB	7	PASI-G
		EPA 7471	AJT	1	PASI-G
		EPA 8270 by SIM	RJN	20	PASI-G
40111561019	GP-10 S4	EPA 8260	SMT	63	PASI-G
		ASTM D2974-87	MAV	1	PASI-G
		EPA 6010	DLB	7	PASI-G
		EPA 7471	AJT	1	PASI-G
		EPA 8270 by SIM	RJN	20	PASI-G
40111561020	GP-10	EPA 8260	SMT	63	PASI-G
40111561021	GP-3	EPA 8260	LAP	63	PASI-G
40111561022	GP-2	EPA 8260	LAP	63	PASI-G
40111561023	GP-8	EPA 8260	LAP	63	PASI-G

### REPORT OF LABORATORY ANALYSIS

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### SUMMARY OF DETECTION

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Lab Sample ID	Client Sample ID	Result	Units	Report Limit	Analyzed	Qualifiers
Method	Parameters					
<b>40111561001</b>	<b>GP-1 S2</b>					
EPA 6010	Arsenic	2.3	mg/kg	2.1	03/17/15 19:44	
EPA 6010	Barium	34.8	mg/kg	0.53	03/17/15 19:44	
EPA 6010	Cadmium	0.14J	mg/kg	0.53	03/17/15 19:44	
EPA 6010	Chromium	7.3	mg/kg	0.53	03/17/15 19:44	
EPA 6010	Lead	29.9	mg/kg	1.1	03/17/15 19:44	
EPA 7471	Mercury	0.22	mg/kg	0.0077	03/16/15 15:03	
EPA 8270 by SIM	Anthracene	28.9	ug/kg	19.3	03/13/15 14:41	
EPA 8270 by SIM	Benzo(a)anthracene	106	ug/kg	19.3	03/13/15 14:41	
EPA 8270 by SIM	Benzo(a)pyrene	318	ug/kg	19.3	03/13/15 14:41	
EPA 8270 by SIM	Benzo(b)fluoranthene	225	ug/kg	19.3	03/13/15 14:41	
EPA 8270 by SIM	Benzo(g,h,i)perylene	407	ug/kg	19.3	03/13/15 14:41	
EPA 8270 by SIM	Benzo(k)fluoranthene	92.7	ug/kg	19.3	03/13/15 14:41	
EPA 8270 by SIM	Chrysene	136	ug/kg	19.3	03/13/15 14:41	
EPA 8270 by SIM	Dibenz(a,h)anthracene	214	ug/kg	19.3	03/13/15 14:41	
EPA 8270 by SIM	Fluoranthene	200	ug/kg	19.3	03/13/15 14:41	
EPA 8270 by SIM	Indeno(1,2,3-cd)pyrene	213	ug/kg	19.3	03/13/15 14:41	
EPA 8270 by SIM	Naphthalene	11.7J	ug/kg	19.3	03/13/15 14:41	
EPA 8270 by SIM	Phenanthrene	64.1	ug/kg	19.3	03/13/15 14:41	
EPA 8270 by SIM	Pyrene	166	ug/kg	19.3	03/13/15 14:41	
EPA 8260	Naphthalene	56.7J	ug/kg	290	03/13/15 12:50	
ASTM D2974-87	Percent Moisture	13.7	%	0.10	03/16/15 11:25	
<b>40111561002</b>	<b>GP-2 S2</b>					
EPA 6010	Arsenic	1.6J	mg/kg	2.1	03/17/15 19:47	
EPA 6010	Barium	29.4	mg/kg	0.53	03/17/15 19:47	
EPA 6010	Cadmium	0.077J	mg/kg	0.53	03/17/15 19:47	
EPA 6010	Chromium	8.0	mg/kg	0.53	03/17/15 19:47	
EPA 6010	Lead	16.6	mg/kg	1.1	03/17/15 19:47	
EPA 7471	Mercury	0.12	mg/kg	0.0062	03/16/15 15:10	
EPA 8270 by SIM	Acenaphthylene	16.6J	ug/kg	19.5	03/13/15 14:58	
EPA 8270 by SIM	Anthracene	77.5	ug/kg	19.5	03/13/15 14:58	
EPA 8270 by SIM	Benzo(a)anthracene	168	ug/kg	19.5	03/13/15 14:58	
EPA 8270 by SIM	Benzo(a)pyrene	178	ug/kg	19.5	03/13/15 14:58	
EPA 8270 by SIM	Benzo(b)fluoranthene	134	ug/kg	19.5	03/13/15 14:58	
EPA 8270 by SIM	Benzo(g,h,i)perylene	91.4	ug/kg	19.5	03/13/15 14:58	
EPA 8270 by SIM	Benzo(k)fluoranthene	139	ug/kg	19.5	03/13/15 14:58	
EPA 8270 by SIM	Chrysene	209	ug/kg	19.5	03/13/15 14:58	
EPA 8270 by SIM	Dibenz(a,h)anthracene	35.0	ug/kg	19.5	03/13/15 14:58	
EPA 8270 by SIM	Fluoranthene	254	ug/kg	19.5	03/13/15 14:58	
EPA 8270 by SIM	Fluorene	20.6	ug/kg	19.5	03/13/15 14:58	L2
EPA 8270 by SIM	Indeno(1,2,3-cd)pyrene	68.0	ug/kg	19.5	03/13/15 14:58	
EPA 8270 by SIM	Phenanthrene	172	ug/kg	19.5	03/13/15 14:58	
EPA 8270 by SIM	Pyrene	275	ug/kg	19.5	03/13/15 14:58	
ASTM D2974-87	Percent Moisture	14.7	%	0.10	03/16/15 11:25	
<b>40111561003</b>	<b>GP-2 S4</b>					
EPA 6010	Arsenic	5.8	mg/kg	2.1	03/17/15 19:49	
EPA 6010	Barium	40.2	mg/kg	0.54	03/17/15 19:49	

### REPORT OF LABORATORY ANALYSIS

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### SUMMARY OF DETECTION

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Lab Sample ID	Client Sample ID	Result	Units	Report Limit	Analyzed	Qualifiers
Method	Parameters					
<b>40111561003</b>	<b>GP-2 S4</b>					
EPA 6010	Chromium	12.5	mg/kg	0.54	03/17/15 19:49	
EPA 6010	Lead	3.4	mg/kg	1.1	03/17/15 19:49	
EPA 7471	Mercury	0.0062J	mg/kg	0.0074	03/16/15 15:13	
ASTM D2974-87	Percent Moisture	16.5	%	0.10	03/16/15 11:25	
<b>40111561004</b>	<b>GP-3 S1</b>					
EPA 6010	Arsenic	5.0J	mg/kg	9.5	03/17/15 19:52	D3
EPA 6010	Barium	144	mg/kg	0.47	03/17/15 19:54	
EPA 6010	Cadmium	1.5	mg/kg	0.47	03/17/15 19:54	
EPA 6010	Chromium	8.9	mg/kg	0.47	03/17/15 19:54	
EPA 6010	Lead	137	mg/kg	0.95	03/17/15 19:54	
EPA 6010	Silver	0.30J	mg/kg	0.95	03/17/15 19:54	
EPA 7471	Mercury	0.083	mg/kg	0.0068	03/16/15 15:15	
EPA 8270 by SIM	Acenaphthene	74.2J	ug/kg	91.8	03/13/15 16:25	
EPA 8270 by SIM	Acenaphthylene	127	ug/kg	91.8	03/13/15 16:25	
EPA 8270 by SIM	Anthracene	433	ug/kg	91.8	03/13/15 16:25	
EPA 8270 by SIM	Benzo(a)anthracene	815	ug/kg	91.8	03/13/15 16:25	
EPA 8270 by SIM	Benzo(a)pyrene	942	ug/kg	91.8	03/13/15 16:25	
EPA 8270 by SIM	Benzo(b)fluoranthene	951	ug/kg	91.8	03/13/15 16:25	
EPA 8270 by SIM	Benzo(g,h,i)perylene	595	ug/kg	91.8	03/13/15 16:25	
EPA 8270 by SIM	Benzo(k)fluoranthene	835	ug/kg	91.8	03/13/15 16:25	
EPA 8270 by SIM	Chrysene	907	ug/kg	91.8	03/13/15 16:25	
EPA 8270 by SIM	Dibenz(a,h)anthracene	180	ug/kg	91.8	03/13/15 16:25	
EPA 8270 by SIM	Fluoranthene	1510	ug/kg	91.8	03/13/15 16:25	
EPA 8270 by SIM	Fluorene	110	ug/kg	91.8	03/13/15 16:25	L2
EPA 8270 by SIM	Indeno(1,2,3-cd)pyrene	527	ug/kg	91.8	03/13/15 16:25	
EPA 8270 by SIM	Naphthalene	63.0J	ug/kg	91.8	03/13/15 16:25	
EPA 8270 by SIM	Phenanthrene	1050	ug/kg	91.8	03/13/15 16:25	
EPA 8270 by SIM	Pyrene	1580	ug/kg	91.8	03/13/15 16:25	
EPA 8260	Naphthalene	54.1J	ug/kg	275	03/13/15 13:58	
ASTM D2974-87	Percent Moisture	9.2	%	0.10	03/16/15 11:26	
<b>40111561005</b>	<b>GP-3 S4</b>					
EPA 6010	Arsenic	15.7	mg/kg	2.2	03/17/15 19:56	
EPA 6010	Barium	44.8	mg/kg	0.55	03/17/15 19:56	
EPA 6010	Cadmium	0.089J	mg/kg	0.55	03/17/15 19:56	
EPA 6010	Chromium	13.4	mg/kg	0.55	03/17/15 19:56	
EPA 6010	Lead	5.6	mg/kg	1.1	03/17/15 19:56	
EPA 6010	Silver	0.44J	mg/kg	1.1	03/17/15 19:56	
EPA 7471	Mercury	0.0093	mg/kg	0.0074	03/16/15 15:17	
ASTM D2974-87	Percent Moisture	13.9	%	0.10	03/16/15 11:26	
<b>40111561006</b>	<b>GP-3 S5</b>					
EPA 6010	Arsenic	4.1	mg/kg	2.1	03/17/15 19:59	
EPA 6010	Barium	66.4	mg/kg	0.52	03/17/15 19:59	
EPA 6010	Cadmium	0.10J	mg/kg	0.52	03/17/15 19:59	
EPA 6010	Chromium	17.8	mg/kg	0.52	03/17/15 19:59	
EPA 6010	Lead	6.8	mg/kg	1.0	03/17/15 19:59	
EPA 6010	Silver	0.38J	mg/kg	1.0	03/17/15 19:59	

### REPORT OF LABORATORY ANALYSIS

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### SUMMARY OF DETECTION

Project: 25215045 MADISON WATER UTILITY

Pace Project No.: 40111561

Lab Sample ID	Client Sample ID	Result	Units	Report Limit	Analyzed	Qualifiers
Method	Parameters					
<b>40111561006</b>	<b>GP-3 S5</b>					
EPA 7471	Mercury	0.010	mg/kg	0.0063	03/16/15 15:20	
EPA 8270 by SIM	1-Methylnaphthalene	54.2	ug/kg	19.9	03/13/15 12:57	
EPA 8270 by SIM	2-Methylnaphthalene	31.7	ug/kg	19.9	03/13/15 12:57	
EPA 8260	sec-Butylbenzene	58.2J	ug/kg	71.7	03/13/15 14:43	
ASTM D2974-87	Percent Moisture	16.3	%	0.10	03/16/15 11:26	
<b>40111561007</b>	<b>GP-4 S1</b>					
EPA 6010	Arsenic	6.7	mg/kg	1.9	03/17/15 20:05	
EPA 6010	Barium	42.1	mg/kg	0.46	03/17/15 20:05	
EPA 6010	Cadmium	0.48	mg/kg	0.46	03/17/15 20:05	
EPA 6010	Chromium	8.3	mg/kg	0.46	03/17/15 20:05	
EPA 6010	Lead	46.3	mg/kg	0.93	03/17/15 20:05	
EPA 6010	Silver	0.38J	mg/kg	0.93	03/17/15 20:05	
EPA 7471	Mercury	0.053	mg/kg	0.0073	03/16/15 15:27	
EPA 8270 by SIM	Acenaphthylene	10.4J	ug/kg	18.3	03/13/15 14:07	
EPA 8270 by SIM	Anthracene	14.0J	ug/kg	18.3	03/13/15 14:07	
EPA 8270 by SIM	Benzo(a)anthracene	24.0	ug/kg	18.3	03/13/15 14:07	
EPA 8270 by SIM	Benzo(a)pyrene	22.6	ug/kg	18.3	03/13/15 14:07	
EPA 8270 by SIM	Benzo(b)fluoranthene	26.3	ug/kg	18.3	03/13/15 14:07	
EPA 8270 by SIM	Benzo(g,h,i)perylene	16.9J	ug/kg	18.3	03/13/15 14:07	
EPA 8270 by SIM	Benzo(k)fluoranthene	30.5	ug/kg	18.3	03/13/15 14:07	
EPA 8270 by SIM	Chrysene	36.7	ug/kg	18.3	03/13/15 14:07	
EPA 8270 by SIM	Fluoranthene	42.7	ug/kg	18.3	03/13/15 14:07	
EPA 8270 by SIM	Indeno(1,2,3-cd)pyrene	11.6J	ug/kg	18.3	03/13/15 14:07	
EPA 8270 by SIM	1-Methylnaphthalene	24.9	ug/kg	18.3	03/13/15 14:07	
EPA 8270 by SIM	2-Methylnaphthalene	39.6	ug/kg	18.3	03/13/15 14:07	
EPA 8270 by SIM	Naphthalene	37.6	ug/kg	18.3	03/13/15 14:07	
EPA 8270 by SIM	Phenanthrene	38.5	ug/kg	18.3	03/13/15 14:07	
EPA 8270 by SIM	Pyrene	40.2	ug/kg	18.3	03/13/15 14:07	
EPA 8260	Naphthalene	100J	ug/kg	275	03/13/15 15:06	
EPA 8260	Toluene	66.5	ug/kg	65.9	03/13/15 15:06	
EPA 8260	1,2,4-Trimethylbenzene	43.3J	ug/kg	65.9	03/13/15 15:06	
EPA 8260	Xylene (Total)	122J	ug/kg	198	03/13/15 15:06	
ASTM D2974-87	Percent Moisture	9.0	%	0.10	03/16/15 11:26	
<b>40111561008</b>	<b>GP-4 S4</b>					
EPA 6010	Arsenic	5.0	mg/kg	2.4	03/17/15 20:08	
EPA 6010	Barium	55.1	mg/kg	0.60	03/17/15 20:08	
EPA 6010	Chromium	14.1	mg/kg	0.60	03/17/15 20:08	
EPA 6010	Lead	5.2	mg/kg	1.2	03/17/15 20:08	
EPA 7471	Mercury	0.0087	mg/kg	0.0070	03/16/15 15:29	
EPA 8270 by SIM	Fluoranthene	13.9J	ug/kg	20.2	03/13/15 13:15	
EPA 8270 by SIM	1-Methylnaphthalene	191	ug/kg	20.2	03/13/15 13:15	
EPA 8270 by SIM	2-Methylnaphthalene	496	ug/kg	20.2	03/13/15 13:15	
EPA 8270 by SIM	Naphthalene	447	ug/kg	20.2	03/13/15 13:15	
EPA 8270 by SIM	Phenanthrene	17.7J	ug/kg	20.2	03/13/15 13:15	
EPA 8270 by SIM	Pyrene	10.3J	ug/kg	20.2	03/13/15 13:15	
EPA 8260	n-Butylbenzene	631	ug/kg	72.8	03/13/15 18:07	

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### SUMMARY OF DETECTION

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Lab Sample ID	Client Sample ID	Result	Units	Report Limit	Analyzed	Qualifiers
Method	Parameters					
<b>40111561008</b>	<b>GP-4 S4</b>					
EPA 8260	sec-Butylbenzene	305	ug/kg	72.8	03/13/15 18:07	
EPA 8260	Ethylbenzene	331	ug/kg	72.8	03/13/15 18:07	
EPA 8260	Isopropylbenzene (Cumene)	495	ug/kg	72.8	03/13/15 18:07	
EPA 8260	p-Isopropyltoluene	564	ug/kg	72.8	03/13/15 18:07	
EPA 8260	Naphthalene	992	ug/kg	303	03/13/15 18:07	
EPA 8260	n-Propylbenzene	945	ug/kg	72.8	03/13/15 18:07	
EPA 8260	1,2,4-Trimethylbenzene	145	ug/kg	72.8	03/13/15 18:07	
EPA 8260	Xylene (Total)	97.1J	ug/kg	218	03/13/15 18:07	
ASTM D2974-87	Percent Moisture	17.5	%	0.10	03/16/15 11:26	
<b>40111561009</b>	<b>GP-5 S1</b>					
EPA 6010	Arsenic	5.9J	mg/kg	10.3	03/17/15 20:10	D3
EPA 6010	Barium	21.5	mg/kg	0.51	03/17/15 20:12	
EPA 6010	Cadmium	0.29J	mg/kg	0.51	03/17/15 20:12	
EPA 6010	Chromium	6.2	mg/kg	0.51	03/17/15 20:12	
EPA 6010	Lead	12.4	mg/kg	1.0	03/17/15 20:12	
EPA 7471	Mercury	0.019	mg/kg	0.0056	03/16/15 15:31	
EPA 8270 by SIM	Benzo(a)anthracene	26.9	ug/kg	17.6	03/13/15 15:33	
EPA 8270 by SIM	Benzo(a)pyrene	22.3	ug/kg	17.6	03/13/15 15:33	
EPA 8270 by SIM	Benzo(b)fluoranthene	23.5	ug/kg	17.6	03/13/15 15:33	
EPA 8270 by SIM	Benzo(g,h,i)perylene	13.5J	ug/kg	17.6	03/13/15 15:33	
EPA 8270 by SIM	Benzo(k)fluoranthene	23.8	ug/kg	17.6	03/13/15 15:33	
EPA 8270 by SIM	Chrysene	33.7	ug/kg	17.6	03/13/15 15:33	
EPA 8270 by SIM	Fluoranthene	73.2	ug/kg	17.6	03/13/15 15:33	
EPA 8270 by SIM	Indeno(1,2,3-cd)pyrene	9.4J	ug/kg	17.6	03/13/15 15:33	
EPA 8270 by SIM	Phenanthrene	31.6	ug/kg	17.6	03/13/15 15:33	
EPA 8270 by SIM	Pyrene	65.3	ug/kg	17.6	03/13/15 15:33	
ASTM D2974-87	Percent Moisture	5.2	%	0.10	03/16/15 13:05	
<b>40111561010</b>	<b>GP-5 S5</b>					
EPA 6010	Arsenic	1.5J	mg/kg	2.1	03/17/15 20:15	
EPA 6010	Barium	7.0	mg/kg	0.53	03/17/15 20:15	
EPA 6010	Chromium	3.9	mg/kg	0.53	03/17/15 20:15	
EPA 6010	Lead	1.2	mg/kg	1.1	03/17/15 20:15	
ASTM D2974-87	Percent Moisture	16.1	%	0.10	03/16/15 15:01	
<b>40111561011</b>	<b>GP-5 S3</b>					
EPA 6010	Arsenic	4.1	mg/kg	2.6	03/17/15 20:17	
EPA 6010	Barium	86.5	mg/kg	0.66	03/17/15 20:17	
EPA 6010	Cadmium	0.24J	mg/kg	0.66	03/17/15 20:17	
EPA 6010	Chromium	22.6	mg/kg	0.66	03/17/15 20:17	
EPA 6010	Lead	14.7	mg/kg	1.3	03/17/15 20:17	
EPA 6010	Silver	0.48J	mg/kg	1.3	03/17/15 20:17	
EPA 7471	Mercury	0.060	mg/kg	0.0078	03/16/15 15:36	
EPA 8270 by SIM	Benzo(a)anthracene	16.4J	ug/kg	22.6	03/13/15 15:50	
EPA 8270 by SIM	Benzo(a)pyrene	17.9J	ug/kg	22.6	03/13/15 15:50	
EPA 8270 by SIM	Benzo(b)fluoranthene	21.7J	ug/kg	22.6	03/13/15 15:50	
EPA 8270 by SIM	Benzo(g,h,i)perylene	12.4J	ug/kg	22.6	03/13/15 15:50	
EPA 8270 by SIM	Benzo(k)fluoranthene	19.2J	ug/kg	22.6	03/13/15 15:50	

### REPORT OF LABORATORY ANALYSIS

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### SUMMARY OF DETECTION

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Lab Sample ID	Client Sample ID	Result	Units	Report Limit	Analyzed	Qualifiers
Method	Parameters					
<b>40111561011</b>	<b>GP-5 S3</b>					
EPA 8270 by SIM	Chrysene	25.6	ug/kg	22.6	03/13/15 15:50	
EPA 8270 by SIM	Fluoranthene	39.2	ug/kg	22.6	03/13/15 15:50	
EPA 8270 by SIM	Indeno(1,2,3-cd)pyrene	8.7J	ug/kg	22.6	03/13/15 15:50	
EPA 8270 by SIM	Phenanthrene	20.0J	ug/kg	22.6	03/13/15 15:50	
EPA 8270 by SIM	Pyrene	34.9	ug/kg	22.6	03/13/15 15:50	
ASTM D2974-87	Percent Moisture	26.1	%	0.10	03/16/15 15:01	
<b>40111561012</b>	<b>GP-8 S2</b>					
EPA 6010	Arsenic	8.3	mg/kg	2.3	03/17/15 20:19	
EPA 6010	Barium	118	mg/kg	0.56	03/17/15 20:19	
EPA 6010	Cadmium	2.0	mg/kg	0.56	03/17/15 20:19	
EPA 6010	Chromium	13.1	mg/kg	0.56	03/17/15 20:19	
EPA 6010	Lead	395	mg/kg	1.1	03/17/15 20:19	
EPA 6010	Silver	0.60J	mg/kg	1.1	03/17/15 20:19	
EPA 7471	Mercury	0.29	mg/kg	0.0062	03/16/15 15:38	
EPA 8270 by SIM	Acenaphthylene	94.2	ug/kg	19.3	03/13/15 16:07	
EPA 8270 by SIM	Anthracene	115	ug/kg	19.3	03/13/15 16:07	
EPA 8270 by SIM	Benzo(a)anthracene	356	ug/kg	19.3	03/13/15 16:07	
EPA 8270 by SIM	Benzo(a)pyrene	436	ug/kg	19.3	03/13/15 16:07	
EPA 8270 by SIM	Benzo(b)fluoranthene	570	ug/kg	19.3	03/13/15 16:07	
EPA 8270 by SIM	Benzo(g,h,i)perylene	319	ug/kg	19.3	03/13/15 16:07	
EPA 8270 by SIM	Benzo(k)fluoranthene	430	ug/kg	19.3	03/13/15 16:07	
EPA 8270 by SIM	Chrysene	435	ug/kg	19.3	03/13/15 16:07	
EPA 8270 by SIM	Dibenz(a,h)anthracene	111	ug/kg	19.3	03/13/15 16:07	
EPA 8270 by SIM	Fluoranthene	529	ug/kg	19.3	03/13/15 16:07	
EPA 8270 by SIM	Fluorene	10.0J	ug/kg	19.3	03/13/15 16:07	L2
EPA 8270 by SIM	Indeno(1,2,3-cd)pyrene	298	ug/kg	19.3	03/13/15 16:07	
EPA 8270 by SIM	1-Methylnaphthalene	47.8	ug/kg	19.3	03/13/15 16:07	
EPA 8270 by SIM	2-Methylnaphthalene	92.5	ug/kg	19.3	03/13/15 16:07	
EPA 8270 by SIM	Naphthalene	254	ug/kg	19.3	03/13/15 16:07	
EPA 8270 by SIM	Phenanthrene	187	ug/kg	19.3	03/13/15 16:07	
EPA 8270 by SIM	Pyrene	586	ug/kg	19.3	03/13/15 16:07	
EPA 8260	Naphthalene	106J	ug/kg	289	03/13/15 16:36	
EPA 8260	Toluene	169	ug/kg	69.4	03/13/15 16:36	
EPA 8260	1,2,4-Trimethylbenzene	77.2	ug/kg	69.4	03/13/15 16:36	
EPA 8260	1,3,5-Trimethylbenzene	36.4J	ug/kg	69.4	03/13/15 16:36	
EPA 8260	Xylene (Total)	248	ug/kg	208	03/13/15 16:36	
ASTM D2974-87	Percent Moisture	13.6	%	0.10	03/16/15 15:01	
<b>40111561013</b>	<b>GP-8 S3</b>					
EPA 6010	Arsenic	2.6	mg/kg	2.3	03/17/15 20:22	
EPA 6010	Barium	87.4	mg/kg	0.57	03/17/15 20:22	
EPA 6010	Chromium	22.2	mg/kg	0.57	03/17/15 20:22	
EPA 6010	Lead	7.5	mg/kg	1.1	03/17/15 20:22	
EPA 7471	Mercury	0.021	mg/kg	0.0064	03/16/15 15:40	
ASTM D2974-87	Percent Moisture	20.7	%	0.10	03/16/15 15:01	
<b>40111561014</b>	<b>GP-7 S1</b>					
EPA 6010	Arsenic	10.6	mg/kg	2.2	03/17/15 20:24	

### REPORT OF LABORATORY ANALYSIS

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### SUMMARY OF DETECTION

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Lab Sample ID	Client Sample ID					
Method	Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
<b>40111561014</b>	<b>GP-7 S1</b>					
EPA 6010	Barium	81.6	mg/kg	0.56	03/17/15 20:24	
EPA 6010	Cadmium	1.2	mg/kg	0.56	03/17/15 20:24	
EPA 6010	Chromium	14.4	mg/kg	0.56	03/17/15 20:24	
EPA 6010	Lead	248	mg/kg	1.1	03/17/15 20:24	
EPA 6010	Silver	0.47J	mg/kg	1.1	03/17/15 20:24	
EPA 7471	Mercury	0.064	mg/kg	0.0080	03/16/15 15:43	
EPA 8270 by SIM	Acenaphthylene	489	ug/kg	80.4	03/13/15 16:42	
EPA 8270 by SIM	Anthracene	324	ug/kg	80.4	03/13/15 16:42	
EPA 8270 by SIM	Benzo(a)anthracene	844	ug/kg	80.4	03/13/15 16:42	
EPA 8270 by SIM	Benzo(a)pyrene	1000	ug/kg	80.4	03/13/15 16:42	
EPA 8270 by SIM	Benzo(b)fluoranthene	859	ug/kg	80.4	03/13/15 16:42	
EPA 8270 by SIM	Benzo(g,h,i)perylene	540	ug/kg	80.4	03/13/15 16:42	
EPA 8270 by SIM	Benzo(k)fluoranthene	947	ug/kg	80.4	03/13/15 16:42	
EPA 8270 by SIM	Chrysene	824	ug/kg	80.4	03/13/15 16:42	
EPA 8270 by SIM	Dibenz(a,h)anthracene	181	ug/kg	80.4	03/13/15 16:42	
EPA 8270 by SIM	Fluoranthene	1260	ug/kg	80.4	03/13/15 16:42	
EPA 8270 by SIM	Indeno(1,2,3-cd)pyrene	523	ug/kg	80.4	03/13/15 16:42	
EPA 8270 by SIM	1-Methylnaphthalene	212	ug/kg	80.4	03/13/15 16:42	
EPA 8270 by SIM	2-Methylnaphthalene	409	ug/kg	80.4	03/13/15 16:42	
EPA 8270 by SIM	Naphthalene	538	ug/kg	80.4	03/13/15 16:42	
EPA 8270 by SIM	Phenanthrene	587	ug/kg	80.4	03/13/15 16:42	
EPA 8270 by SIM	Pyrene	1330	ug/kg	80.4	03/13/15 16:42	
EPA 8260	Benzene	65.5J	ug/kg	72.4	03/13/15 17:22	
EPA 8260	n-Butylbenzene	71.4J	ug/kg	72.4	03/13/15 17:22	
EPA 8260	Ethylbenzene	126	ug/kg	72.4	03/13/15 17:22	
EPA 8260	Isopropylbenzene (Cumene)	32.2J	ug/kg	72.4	03/13/15 17:22	
EPA 8260	Naphthalene	259J	ug/kg	302	03/13/15 17:22	
EPA 8260	n-Propylbenzene	71.6J	ug/kg	72.4	03/13/15 17:22	
EPA 8260	Toluene	354	ug/kg	72.4	03/13/15 17:22	
EPA 8260	1,2,4-Trimethylbenzene	397	ug/kg	72.4	03/13/15 17:22	
EPA 8260	1,3,5-Trimethylbenzene	165	ug/kg	72.4	03/13/15 17:22	
EPA 8260	Xylene (Total)	776	ug/kg	217	03/13/15 17:22	
ASTM D2974-87	Percent Moisture	17.1	%	0.10	03/16/15 15:01	
<b>40111561016</b>	<b>GP-6 S2</b>					
EPA 6010	Arsenic	23.7	mg/kg	2.8	03/17/15 20:26	
EPA 6010	Barium	1920	mg/kg	0.69	03/17/15 20:26	
EPA 6010	Cadmium	1.1	mg/kg	0.69	03/17/15 20:26	
EPA 6010	Chromium	69.7	mg/kg	0.69	03/17/15 20:26	
EPA 6010	Lead	835	mg/kg	1.4	03/17/15 20:26	
EPA 6010	Silver	0.83J	mg/kg	1.4	03/17/15 20:26	
EPA 7471	Mercury	0.36	mg/kg	0.0094	03/16/15 15:45	
EPA 8270 by SIM	Acenaphthylene	1240	ug/kg	133	03/13/15 16:59	
EPA 8270 by SIM	Anthracene	859	ug/kg	133	03/13/15 16:59	
EPA 8270 by SIM	Benzo(a)anthracene	1360	ug/kg	133	03/13/15 16:59	
EPA 8270 by SIM	Benzo(a)pyrene	1930	ug/kg	133	03/13/15 16:59	
EPA 8270 by SIM	Benzo(b)fluoranthene	1520	ug/kg	133	03/13/15 16:59	
EPA 8270 by SIM	Benzo(g,h,i)perylene	1120	ug/kg	133	03/13/15 16:59	

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### SUMMARY OF DETECTION

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Lab Sample ID	Client Sample ID	Result	Units	Report Limit	Analyzed	Qualifiers
Method	Parameters					
<b>40111561016</b>	<b>GP-6 S2</b>					
EPA 8270 by SIM	Benzo(k)fluoranthene	1390	ug/kg	133	03/13/15 16:59	
EPA 8270 by SIM	Chrysene	1680	ug/kg	133	03/13/15 16:59	
EPA 8270 by SIM	Dibenz(a,h)anthracene	338	ug/kg	133	03/13/15 16:59	
EPA 8270 by SIM	Fluoranthene	1820	ug/kg	133	03/13/15 16:59	
EPA 8270 by SIM	Fluorene	103J	ug/kg	133	03/13/15 16:59	L2
EPA 8270 by SIM	Indeno(1,2,3-cd)pyrene	993	ug/kg	133	03/13/15 16:59	
EPA 8270 by SIM	1-Methylnaphthalene	340	ug/kg	133	03/13/15 16:59	
EPA 8270 by SIM	2-Methylnaphthalene	605	ug/kg	133	03/13/15 16:59	
EPA 8270 by SIM	Naphthalene	1590	ug/kg	133	03/13/15 16:59	
EPA 8270 by SIM	Phenanthrene	701	ug/kg	133	03/13/15 16:59	
EPA 8270 by SIM	Pyrene	2110	ug/kg	133	03/13/15 16:59	
EPA 8260	Benzene	178	ug/kg	95.9	03/16/15 11:50	
EPA 8260	Ethylbenzene	81.8J	ug/kg	95.9	03/16/15 11:50	
EPA 8260	Naphthalene	2090	ug/kg	399	03/16/15 11:50	
EPA 8260	Styrene	72.7J	ug/kg	95.9	03/16/15 11:50	
EPA 8260	Toluene	324	ug/kg	95.9	03/16/15 11:50	
EPA 8260	1,2,4-Trimethylbenzene	190	ug/kg	95.9	03/16/15 11:50	
EPA 8260	1,3,5-Trimethylbenzene	78.4J	ug/kg	95.9	03/16/15 11:50	
EPA 8260	Xylene (Total)	404	ug/kg	288	03/16/15 11:50	
ASTM D2974-87	Percent Moisture	37.4	%	0.10	03/16/15 15:01	
<b>40111561017</b>	<b>GP-9 S1</b>					
EPA 6010	Arsenic	5.1	mg/kg	2.0	03/17/15 20:33	
EPA 6010	Barium	61.5	mg/kg	0.51	03/17/15 20:33	
EPA 6010	Cadmium	0.34J	mg/kg	0.51	03/17/15 20:33	
EPA 6010	Chromium	11.5	mg/kg	0.51	03/17/15 20:33	
EPA 6010	Lead	59.8	mg/kg	1.0	03/17/15 20:33	
EPA 6010	Silver	0.57J	mg/kg	1.0	03/17/15 20:33	
EPA 7471	Mercury	0.23	mg/kg	0.0073	03/16/15 15:47	
EPA 8270 by SIM	Acenaphthene	20.1J	ug/kg	37.4	03/13/15 17:16	
EPA 8270 by SIM	Acenaphthylene	186	ug/kg	37.4	03/13/15 17:16	
EPA 8270 by SIM	Anthracene	162	ug/kg	37.4	03/13/15 17:16	
EPA 8270 by SIM	Benzo(a)anthracene	502	ug/kg	37.4	03/13/15 17:16	
EPA 8270 by SIM	Benzo(a)pyrene	624	ug/kg	37.4	03/13/15 17:16	
EPA 8270 by SIM	Benzo(b)fluoranthene	524	ug/kg	37.4	03/13/15 17:16	
EPA 8270 by SIM	Benzo(g,h,i)perylene	281	ug/kg	37.4	03/13/15 17:16	
EPA 8270 by SIM	Benzo(k)fluoranthene	558	ug/kg	37.4	03/13/15 17:16	
EPA 8270 by SIM	Chrysene	550	ug/kg	37.4	03/13/15 17:16	
EPA 8270 by SIM	Dibenz(a,h)anthracene	102	ug/kg	37.4	03/13/15 17:16	
EPA 8270 by SIM	Fluoranthene	731	ug/kg	37.4	03/13/15 17:16	
EPA 8270 by SIM	Fluorene	24.6J	ug/kg	37.4	03/13/15 17:16	L2
EPA 8270 by SIM	Indeno(1,2,3-cd)pyrene	289	ug/kg	37.4	03/13/15 17:16	
EPA 8270 by SIM	1-Methylnaphthalene	63.4	ug/kg	37.4	03/13/15 17:16	
EPA 8270 by SIM	2-Methylnaphthalene	114	ug/kg	37.4	03/13/15 17:16	
EPA 8270 by SIM	Naphthalene	129	ug/kg	37.4	03/13/15 17:16	
EPA 8270 by SIM	Phenanthrene	314	ug/kg	37.4	03/13/15 17:16	
EPA 8270 by SIM	Pyrene	902	ug/kg	37.4	03/13/15 17:16	
EPA 8260	Benzene	28.5J	ug/kg	67.3	03/16/15 12:12	

### REPORT OF LABORATORY ANALYSIS

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### SUMMARY OF DETECTION

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Lab Sample ID	Client Sample ID	Result	Units	Report Limit	Analyzed	Qualifiers
Method	Parameters					
<b>40111561017</b>	<b>GP-9 S1</b>					
EPA 8260	n-Butylbenzene	37.0J	ug/kg	67.3	03/16/15 12:12	
EPA 8260	Ethylbenzene	62.1J	ug/kg	67.3	03/16/15 12:12	
EPA 8260	Naphthalene	180J	ug/kg	281	03/16/15 12:12	
EPA 8260	Toluene	155	ug/kg	67.3	03/16/15 12:12	
EPA 8260	1,2,4-Trimethylbenzene	156	ug/kg	67.3	03/16/15 12:12	
EPA 8260	1,3,5-Trimethylbenzene	58.1J	ug/kg	67.3	03/16/15 12:12	
EPA 8260	Xylene (Total)	392	ug/kg	202	03/16/15 12:12	
ASTM D2974-87	Percent Moisture	10.9	%	0.10	03/16/15 15:02	
<b>40111561018</b>	<b>GP-10 S2</b>					
EPA 6010	Arsenic	9.5	mg/kg	2.4	03/17/15 20:35	
EPA 6010	Barium	126	mg/kg	0.61	03/17/15 20:35	
EPA 6010	Cadmium	0.45J	mg/kg	0.61	03/17/15 20:35	
EPA 6010	Chromium	14.2	mg/kg	0.61	03/17/15 20:35	
EPA 6010	Lead	457	mg/kg	1.2	03/17/15 20:35	
EPA 6010	Silver	0.69J	mg/kg	1.2	03/17/15 20:35	
EPA 7471	Mercury	0.24	mg/kg	0.0074	03/16/15 15:54	
EPA 8270 by SIM	Acenaphthylene	1650	ug/kg	858	03/20/15 11:03	
EPA 8270 by SIM	Anthracene	4110	ug/kg	858	03/20/15 11:03	
EPA 8270 by SIM	Benzo(a)anthracene	12100	ug/kg	858	03/20/15 11:03	
EPA 8270 by SIM	Benzo(a)pyrene	15300	ug/kg	858	03/20/15 11:03	
EPA 8270 by SIM	Benzo(b)fluoranthene	13300	ug/kg	858	03/20/15 11:03	
EPA 8270 by SIM	Benzo(g,h,i)perylene	13700	ug/kg	858	03/20/15 11:03	
EPA 8270 by SIM	Benzo(k)fluoranthene	13300	ug/kg	858	03/20/15 11:03	
EPA 8270 by SIM	Chrysene	13900	ug/kg	858	03/20/15 11:03	
EPA 8270 by SIM	Dibenz(a,h)anthracene	4050	ug/kg	858	03/20/15 11:03	
EPA 8270 by SIM	Fluoranthene	18800	ug/kg	858	03/20/15 11:03	
EPA 8270 by SIM	Fluorene	449J	ug/kg	858	03/20/15 11:03	
EPA 8270 by SIM	Indeno(1,2,3-cd)pyrene	11300	ug/kg	858	03/20/15 11:03	
EPA 8270 by SIM	Naphthalene	895	ug/kg	858	03/20/15 11:03	
EPA 8270 by SIM	Phenanthrene	7230	ug/kg	858	03/20/15 11:03	
EPA 8270 by SIM	Pyrene	16100	ug/kg	858	03/20/15 11:03	
EPA 8260	Ethylbenzene	40.8J	ug/kg	77.2	03/16/15 12:35	
EPA 8260	Naphthalene	341	ug/kg	322	03/16/15 12:35	
EPA 8260	Toluene	160	ug/kg	77.2	03/16/15 12:35	
EPA 8260	1,2,4-Trimethylbenzene	106	ug/kg	77.2	03/16/15 12:35	
EPA 8260	1,3,5-Trimethylbenzene	66.4J	ug/kg	77.2	03/16/15 12:35	
EPA 8260	Xylene (Total)	297	ug/kg	232	03/16/15 12:35	
ASTM D2974-87	Percent Moisture	22.3	%	0.10	03/16/15 15:02	
<b>40111561019</b>	<b>GP-10 S4</b>					
EPA 6010	Arsenic	3.6	mg/kg	2.1	03/17/15 20:37	
EPA 6010	Barium	59.3	mg/kg	0.52	03/17/15 20:37	
EPA 6010	Cadmium	0.081J	mg/kg	0.52	03/17/15 20:37	
EPA 6010	Chromium	14.5	mg/kg	0.52	03/17/15 20:37	
EPA 6010	Lead	6.5	mg/kg	1.0	03/17/15 20:37	
EPA 6010	Silver	0.36J	mg/kg	1.0	03/17/15 20:37	
EPA 7471	Mercury	0.011	mg/kg	0.0067	03/16/15 15:57	

### REPORT OF LABORATORY ANALYSIS

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### SUMMARY OF DETECTION

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Lab Sample ID	Client Sample ID	Result	Units	Report Limit	Analyzed	Qualifiers
Method	Parameters					
<b>40111561019</b>	<b>GP-10 S4</b>					
EPA 8270 by SIM	1-Methylnaphthalene	953	ug/kg	203	03/20/15 12:46	
EPA 8270 by SIM	2-Methylnaphthalene	3090	ug/kg	203	03/20/15 12:46	
EPA 8270 by SIM	Naphthalene	5720	ug/kg	203	03/20/15 12:46	
EPA 8270 by SIM	Pyrene	128J	ug/kg	203	03/20/15 12:46	
EPA 8260	n-Butylbenzene	3800	ug/kg	1460	03/16/15 19:46	
EPA 8260	sec-Butylbenzene	1700	ug/kg	1460	03/16/15 19:46	
EPA 8260	Ethylbenzene	9820	ug/kg	1460	03/16/15 19:46	
EPA 8260	Isopropylbenzene (Cumene)	3860	ug/kg	1460	03/16/15 19:46	
EPA 8260	p-Isopropyltoluene	3760	ug/kg	1460	03/16/15 19:46	
EPA 8260	Naphthalene	18800	ug/kg	6100	03/16/15 19:46	
EPA 8260	n-Propylbenzene	6550	ug/kg	1460	03/16/15 19:46	
EPA 8260	Tetrachloroethene	661J	ug/kg	1460	03/16/15 19:46	
EPA 8260	1,2,4-Trimethylbenzene	43100	ug/kg	1460	03/16/15 19:46	
EPA 8260	Xylene (Total)	11500	ug/kg	4390	03/16/15 19:46	
ASTM D2974-87	Percent Moisture	18.0	%	0.10	03/16/15 15:02	
<b>40111561020</b>	<b>GP-10</b>					
EPA 8260	Benzene	174	ug/L	20.0	03/13/15 18:29	
EPA 8260	n-Butylbenzene	106	ug/L	20.0	03/13/15 18:29	
EPA 8260	sec-Butylbenzene	47.6J	ug/L	100	03/13/15 18:29	
EPA 8260	Chloroethane	8.7J	ug/L	20.0	03/13/15 18:29	
EPA 8260	Ethylbenzene	1380	ug/L	20.0	03/13/15 18:29	
EPA 8260	Isopropylbenzene (Cumene)	199	ug/L	20.0	03/13/15 18:29	
EPA 8260	Naphthalene	1530	ug/L	100	03/13/15 18:29	
EPA 8260	n-Propylbenzene	326	ug/L	20.0	03/13/15 18:29	
EPA 8260	Toluene	147	ug/L	20.0	03/13/15 18:29	
EPA 8260	1,2,4-Trimethylbenzene	2130	ug/L	20.0	03/13/15 18:29	
EPA 8260	Xylene (Total)	1740	ug/L	60.0	03/13/15 18:29	
<b>40111561021</b>	<b>GP-3</b>					
EPA 8260	n-Butylbenzene	5.0	ug/L	1.0	03/13/15 18:07	
EPA 8260	sec-Butylbenzene	8.9	ug/L	5.0	03/13/15 18:07	
EPA 8260	tert-Butylbenzene	0.53J	ug/L	1.0	03/13/15 18:07	
EPA 8260	Isopropylbenzene (Cumene)	3.2	ug/L	1.0	03/13/15 18:07	
EPA 8260	n-Propylbenzene	8.5	ug/L	1.0	03/13/15 18:07	
EPA 8260	Toluene	1.0	ug/L	1.0	03/13/15 18:07	
EPA 8260	1,2,4-Trimethylbenzene	0.74J	ug/L	1.0	03/13/15 18:07	
<b>40111561022</b>	<b>GP-2</b>					
EPA 8260	Toluene	0.57J	ug/L	1.0	03/13/15 15:38	
<b>40111561023</b>	<b>GP-8</b>					
EPA 8260	Isopropylbenzene (Cumene)	0.17J	ug/L	1.0	03/13/15 16:01	

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-1 S2 Lab ID: 40111561001 Collected: 03/11/15 08:45 Received: 03/12/15 08:30 Matrix: Solid  
Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>									
Analytical Method: EPA 6010 Preparation Method: EPA 3050									
Arsenic	2.3	mg/kg	2.1	0.68	1	03/16/15 07:20	03/17/15 19:44	7440-38-2	
Barium	34.8	mg/kg	0.53	0.13	1	03/16/15 07:20	03/17/15 19:44	7440-39-3	
Cadmium	0.14J	mg/kg	0.53	0.071	1	03/16/15 07:20	03/17/15 19:44	7440-43-9	
Chromium	7.3	mg/kg	0.53	0.21	1	03/16/15 07:20	03/17/15 19:44	7440-47-3	
Lead	29.9	mg/kg	1.1	0.46	1	03/16/15 07:20	03/17/15 19:44	7439-92-1	
Selenium	<0.82	mg/kg	2.1	0.82	1	03/16/15 07:20	03/17/15 19:44	7782-49-2	
Silver	<0.30	mg/kg	1.1	0.30	1	03/16/15 07:20	03/17/15 19:44	7440-22-4	
<b>7471 Mercury</b>									
Analytical Method: EPA 7471 Preparation Method: EPA 7471									
Mercury	0.22	mg/kg	0.0077	0.0038	1	03/13/15 12:05	03/16/15 15:03	7439-97-6	
<b>8270 MSSV PAH by SIM</b>									
Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546									
Acenaphthene	<9.7	ug/kg	19.3	9.7	1	03/13/15 08:18	03/13/15 14:41	83-32-9	
Acenaphthylene	<8.6	ug/kg	19.3	8.6	1	03/13/15 08:18	03/13/15 14:41	208-96-8	
Anthracene	28.9	ug/kg	19.3	10.0	1	03/13/15 08:18	03/13/15 14:41	120-12-7	
Benzo(a)anthracene	106	ug/kg	19.3	6.7	1	03/13/15 08:18	03/13/15 14:41	56-55-3	
Benzo(a)pyrene	318	ug/kg	19.3	6.9	1	03/13/15 08:18	03/13/15 14:41	50-32-8	
Benzo(b)fluoranthene	225	ug/kg	19.3	9.7	1	03/13/15 08:18	03/13/15 14:41	205-99-2	
Benzo(g,h,i)perylene	407	ug/kg	19.3	7.4	1	03/13/15 08:18	03/13/15 14:41	191-24-2	
Benzo(k)fluoranthene	92.7	ug/kg	19.3	10.7	1	03/13/15 08:18	03/13/15 14:41	207-08-9	
Chrysene	136	ug/kg	19.3	8.9	1	03/13/15 08:18	03/13/15 14:41	218-01-9	
Dibenz(a,h)anthracene	214	ug/kg	19.3	7.1	1	03/13/15 08:18	03/13/15 14:41	53-70-3	
Fluoranthene	200	ug/kg	19.3	9.7	1	03/13/15 08:18	03/13/15 14:41	206-44-0	
Fluorene	<9.7	ug/kg	19.3	9.7	1	03/13/15 08:18	03/13/15 14:41	86-73-7	L2
Indeno(1,2,3-cd)pyrene	213	ug/kg	19.3	7.3	1	03/13/15 08:18	03/13/15 14:41	193-39-5	
1-Methylnaphthalene	<9.7	ug/kg	19.3	9.7	1	03/13/15 08:18	03/13/15 14:41	90-12-0	
2-Methylnaphthalene	<9.7	ug/kg	19.3	9.7	1	03/13/15 08:18	03/13/15 14:41	91-57-6	
Naphthalene	11.7J	ug/kg	19.3	9.7	1	03/13/15 08:18	03/13/15 14:41	91-20-3	
Phenanthrene	64.1	ug/kg	19.3	9.7	1	03/13/15 08:18	03/13/15 14:41	85-01-8	
Pyrene	166	ug/kg	19.3	9.7	1	03/13/15 08:18	03/13/15 14:41	129-00-0	
<b>Surrogates</b>									
2-Fluorobiphenyl (S)	62	%	39-130		1	03/13/15 08:18	03/13/15 14:41	321-60-8	
Terphenyl-d14 (S)	71	%	37-130		1	03/13/15 08:18	03/13/15 14:41	1718-51-0	
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Benzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	71-43-2	W
Bromobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	108-86-1	W
Bromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	74-97-5	W
Bromodichloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	75-27-4	W
Bromoform	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	75-25-2	L2,W
Bromomethane	<69.9	ug/kg	250	69.9	1	03/13/15 07:30	03/13/15 12:50	74-83-9	W
n-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	104-51-8	W
sec-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	135-98-8	W
tert-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	98-06-6	W
Carbon tetrachloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	56-23-5	W

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-1 S2 Lab ID: 40111561001 Collected: 03/11/15 08:45 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Chlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	108-90-7	W
Chloroethane	<67.0	ug/kg	250	67.0	1	03/13/15 07:30	03/13/15 12:50	75-00-3	W
Chloroform	<46.4	ug/kg	250	46.4	1	03/13/15 07:30	03/13/15 12:50	67-66-3	W
Chloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	74-87-3	W
2-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	95-49-8	W
4-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	106-43-4	W
1,2-Dibromo-3-chloropropane	<91.2	ug/kg	250	91.2	1	03/13/15 07:30	03/13/15 12:50	96-12-8	W
Dibromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	124-48-1	W
1,2-Dibromoethane (EDB)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	106-93-4	W
Dibromomethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	74-95-3	W
1,2-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	95-50-1	W
1,3-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	541-73-1	W
1,4-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	106-46-7	W
Dichlorodifluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	75-71-8	W
1,1-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	75-34-3	W
1,2-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	107-06-2	W
1,1-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	75-35-4	W
cis-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	156-59-2	W
trans-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	156-60-5	W
1,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	78-87-5	W
1,3-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	142-28-9	W
2,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	594-20-7	W
1,1-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	563-58-6	W
cis-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	10061-01-5	W
trans-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	10061-02-6	W
Diisopropyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	108-20-3	W
Ethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	100-41-4	W
Hexachloro-1,3-butadiene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	87-68-3	W
Isopropylbenzene (Cumene)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	98-82-8	W
p-Isopropyltoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	99-87-6	W
Methylene Chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	75-09-2	W
Methyl-tert-butyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	1634-04-4	W
Naphthalene	56.7J	ug/kg	290	46.4	1	03/13/15 07:30	03/13/15 12:50	91-20-3	
n-Propylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	103-65-1	W
Styrene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	100-42-5	W
1,1,1,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	630-20-6	W
1,1,2,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	79-34-5	W
Tetrachloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	127-18-4	W
Toluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	108-88-3	W
1,2,3-Trichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	87-61-6	W
1,2,4-Trichlorobenzene	<47.6	ug/kg	250	47.6	1	03/13/15 07:30	03/13/15 12:50	120-82-1	W
1,1,1-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	71-55-6	W
1,1,2-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	79-00-5	W
Trichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	79-01-6	W
Trichlorofluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	75-69-4	W

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-1 S2 Lab ID: 40111561001 Collected: 03/11/15 08:45 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
1,2,3-Trichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	96-18-4	W
1,2,4-Trimethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	95-63-6	W
1,3,5-Trimethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	108-67-8	W
Vinyl chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 12:50	75-01-4	W
Xylene (Total)	<75.0	ug/kg	180	75.0	1	03/13/15 07:30	03/13/15 12:50	1330-20-7	W
<b>Surrogates</b>									
Dibromofluoromethane (S)	110	%	37-152		1	03/13/15 07:30	03/13/15 12:50	1868-53-7	
Toluene-d8 (S)	112	%	38-154		1	03/13/15 07:30	03/13/15 12:50	2037-26-5	
4-Bromofluorobenzene (S)	101	%	39-139		1	03/13/15 07:30	03/13/15 12:50	460-00-4	
<b>Percent Moisture</b>	Analytical Method: ASTM D2974-87								
Percent Moisture	13.7	%	0.10	0.10	1		03/16/15 11:25		

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-2 S2 Lab ID: 40111561002 Collected: 03/11/15 09:30 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>									
Analytical Method: EPA 6010 Preparation Method: EPA 3050									
Arsenic	1.6J	mg/kg	2.1	0.68	1	03/16/15 07:20	03/17/15 19:47	7440-38-2	
Barium	29.4	mg/kg	0.53	0.13	1	03/16/15 07:20	03/17/15 19:47	7440-39-3	
Cadmium	0.077J	mg/kg	0.53	0.071	1	03/16/15 07:20	03/17/15 19:47	7440-43-9	
Chromium	8.0	mg/kg	0.53	0.21	1	03/16/15 07:20	03/17/15 19:47	7440-47-3	
Lead	16.6	mg/kg	1.1	0.46	1	03/16/15 07:20	03/17/15 19:47	7439-92-1	
Selenium	<0.82	mg/kg	2.1	0.82	1	03/16/15 07:20	03/17/15 19:47	7782-49-2	
Silver	<0.30	mg/kg	1.1	0.30	1	03/16/15 07:20	03/17/15 19:47	7440-22-4	
<b>7471 Mercury</b>									
Analytical Method: EPA 7471 Preparation Method: EPA 7471									
Mercury	0.12	mg/kg	0.0062	0.0031	1	03/13/15 12:05	03/16/15 15:10	7439-97-6	
<b>8270 MSSV PAH by SIM</b>									
Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546									
Acenaphthene	<9.8	ug/kg	19.5	9.8	1	03/13/15 08:18	03/13/15 14:58	83-32-9	
Acenaphthylene	16.6J	ug/kg	19.5	8.7	1	03/13/15 08:18	03/13/15 14:58	208-96-8	
Anthracene	77.5	ug/kg	19.5	10.1	1	03/13/15 08:18	03/13/15 14:58	120-12-7	
Benzo(a)anthracene	168	ug/kg	19.5	6.8	1	03/13/15 08:18	03/13/15 14:58	56-55-3	
Benzo(a)pyrene	178	ug/kg	19.5	7.0	1	03/13/15 08:18	03/13/15 14:58	50-32-8	
Benzo(b)fluoranthene	134	ug/kg	19.5	9.8	1	03/13/15 08:18	03/13/15 14:58	205-99-2	
Benzo(g,h,i)perylene	91.4	ug/kg	19.5	7.4	1	03/13/15 08:18	03/13/15 14:58	191-24-2	
Benzo(k)fluoranthene	139	ug/kg	19.5	10.8	1	03/13/15 08:18	03/13/15 14:58	207-08-9	
Chrysene	209	ug/kg	19.5	9.0	1	03/13/15 08:18	03/13/15 14:58	218-01-9	
Dibenz(a,h)anthracene	35.0	ug/kg	19.5	7.2	1	03/13/15 08:18	03/13/15 14:58	53-70-3	
Fluoranthene	254	ug/kg	19.5	9.8	1	03/13/15 08:18	03/13/15 14:58	206-44-0	
Fluorene	20.6	ug/kg	19.5	9.8	1	03/13/15 08:18	03/13/15 14:58	86-73-7	L2
Indeno(1,2,3-cd)pyrene	68.0	ug/kg	19.5	7.4	1	03/13/15 08:18	03/13/15 14:58	193-39-5	
1-Methylnaphthalene	<9.8	ug/kg	19.5	9.8	1	03/13/15 08:18	03/13/15 14:58	90-12-0	
2-Methylnaphthalene	<9.8	ug/kg	19.5	9.8	1	03/13/15 08:18	03/13/15 14:58	91-57-6	
Naphthalene	<9.8	ug/kg	19.5	9.8	1	03/13/15 08:18	03/13/15 14:58	91-20-3	
Phenanthrene	172	ug/kg	19.5	9.8	1	03/13/15 08:18	03/13/15 14:58	85-01-8	
Pyrene	275	ug/kg	19.5	9.8	1	03/13/15 08:18	03/13/15 14:58	129-00-0	
<b>Surrogates</b>									
2-Fluorobiphenyl (S)	58	%	39-130		1	03/13/15 08:18	03/13/15 14:58	321-60-8	
Terphenyl-d14 (S)	64	%	37-130		1	03/13/15 08:18	03/13/15 14:58	1718-51-0	
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Benzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	71-43-2	W
Bromobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	108-86-1	W
Bromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	74-97-5	W
Bromodichloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	75-27-4	W
Bromoform	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	75-25-2	L2,W
Bromomethane	<69.9	ug/kg	250	69.9	1	03/13/15 07:30	03/13/15 13:13	74-83-9	W
n-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	104-51-8	W
sec-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	135-98-8	W
tert-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	98-06-6	W
Carbon tetrachloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	56-23-5	W

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-2 S2 Lab ID: 40111561002 Collected: 03/11/15 09:30 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Chlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	108-90-7	W
Chloroethane	<67.0	ug/kg	250	67.0	1	03/13/15 07:30	03/13/15 13:13	75-00-3	W
Chloroform	<46.4	ug/kg	250	46.4	1	03/13/15 07:30	03/13/15 13:13	67-66-3	W
Chloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	74-87-3	W
2-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	95-49-8	W
4-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	106-43-4	W
1,2-Dibromo-3-chloropropane	<91.2	ug/kg	250	91.2	1	03/13/15 07:30	03/13/15 13:13	96-12-8	W
Dibromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	124-48-1	W
1,2-Dibromoethane (EDB)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	106-93-4	W
Dibromomethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	74-95-3	W
1,2-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	95-50-1	W
1,3-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	541-73-1	W
1,4-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	106-46-7	W
Dichlorodifluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	75-71-8	W
1,1-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	75-34-3	W
1,2-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	107-06-2	W
1,1-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	75-35-4	W
cis-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	156-59-2	W
trans-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	156-60-5	W
1,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	78-87-5	W
1,3-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	142-28-9	W
2,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	594-20-7	W
1,1-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	563-58-6	W
cis-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	10061-01-5	W
trans-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	10061-02-6	W
Diisopropyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	108-20-3	W
Ethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	100-41-4	W
Hexachloro-1,3-butadiene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	87-68-3	W
Isopropylbenzene (Cumene)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	98-82-8	W
p-Isopropyltoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	99-87-6	W
Methylene Chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	75-09-2	W
Methyl-tert-butyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	1634-04-4	W
Naphthalene	<40.0	ug/kg	250	40.0	1	03/13/15 07:30	03/13/15 13:13	91-20-3	W
n-Propylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	103-65-1	W
Styrene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	100-42-5	W
1,1,1,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	630-20-6	W
1,1,2,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	79-34-5	W
Tetrachloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	127-18-4	W
Toluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	108-88-3	W
1,2,3-Trichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	87-61-6	W
1,2,4-Trichlorobenzene	<47.6	ug/kg	250	47.6	1	03/13/15 07:30	03/13/15 13:13	120-82-1	W
1,1,1-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	71-55-6	W
1,1,2-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	79-00-5	W
Trichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	79-01-6	W
Trichlorofluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	75-69-4	W

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY

Pace Project No.: 40111561

Sample: GP-2 S2 Lab ID: 40111561002 Collected: 03/11/15 09:30 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
1,2,3-Trichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	96-18-4	W
1,2,4-Trimethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	95-63-6	W
1,3,5-Trimethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	108-67-8	W
Vinyl chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:13	75-01-4	W
Xylene (Total)	<75.0	ug/kg	180	75.0	1	03/13/15 07:30	03/13/15 13:13	1330-20-7	W
<b>Surrogates</b>									
Dibromofluoromethane (S)	107	%	37-152		1	03/13/15 07:30	03/13/15 13:13	1868-53-7	
Toluene-d8 (S)	108	%	38-154		1	03/13/15 07:30	03/13/15 13:13	2037-26-5	
4-Bromofluorobenzene (S)	101	%	39-139		1	03/13/15 07:30	03/13/15 13:13	460-00-4	
<b>Percent Moisture</b>	Analytical Method: ASTM D2974-87								
Percent Moisture	14.7	%	0.10	0.10	1		03/16/15 11:25		

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: **GP-2 S4** Lab ID: **40111561003** Collected: 03/11/15 09:35 Received: 03/12/15 08:30 Matrix: Solid  
Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>									
Analytical Method: EPA 6010 Preparation Method: EPA 3050									
Arsenic	5.8	mg/kg	2.1	0.68	1	03/16/15 07:20	03/17/15 19:49	7440-38-2	
Barium	40.2	mg/kg	0.54	0.13	1	03/16/15 07:20	03/17/15 19:49	7440-39-3	
Cadmium	<0.071	mg/kg	0.54	0.071	1	03/16/15 07:20	03/17/15 19:49	7440-43-9	
Chromium	12.5	mg/kg	0.54	0.21	1	03/16/15 07:20	03/17/15 19:49	7440-47-3	
Lead	3.4	mg/kg	1.1	0.46	1	03/16/15 07:20	03/17/15 19:49	7439-92-1	
Selenium	<0.83	mg/kg	2.1	0.83	1	03/16/15 07:20	03/17/15 19:49	7782-49-2	
Silver	<0.30	mg/kg	1.1	0.30	1	03/16/15 07:20	03/17/15 19:49	7440-22-4	
<b>7471 Mercury</b>									
Analytical Method: EPA 7471 Preparation Method: EPA 7471									
Mercury	0.0062J	mg/kg	0.0074	0.0037	1	03/13/15 12:05	03/16/15 15:13	7439-97-6	
<b>8270 MSSV PAH by SIM</b>									
Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546									
Acenaphthene	<10	ug/kg	20.0	10	1	03/13/15 08:18	03/13/15 12:23	83-32-9	
Acenaphthylene	<8.9	ug/kg	20.0	8.9	1	03/13/15 08:18	03/13/15 12:23	208-96-8	
Anthracene	<10.4	ug/kg	20.0	10.4	1	03/13/15 08:18	03/13/15 12:23	120-12-7	
Benzo(a)anthracene	<6.9	ug/kg	20.0	6.9	1	03/13/15 08:18	03/13/15 12:23	56-55-3	
Benzo(a)pyrene	<7.1	ug/kg	20.0	7.1	1	03/13/15 08:18	03/13/15 12:23	50-32-8	
Benzo(b)fluoranthene	<10	ug/kg	20.0	10	1	03/13/15 08:18	03/13/15 12:23	205-99-2	
Benzo(g,h,i)perylene	<7.6	ug/kg	20.0	7.6	1	03/13/15 08:18	03/13/15 12:23	191-24-2	
Benzo(k)fluoranthene	<11.0	ug/kg	20.0	11.0	1	03/13/15 08:18	03/13/15 12:23	207-08-9	
Chrysene	<9.2	ug/kg	20.0	9.2	1	03/13/15 08:18	03/13/15 12:23	218-01-9	
Dibenz(a,h)anthracene	<7.3	ug/kg	20.0	7.3	1	03/13/15 08:18	03/13/15 12:23	53-70-3	
Fluoranthene	<10	ug/kg	20.0	10	1	03/13/15 08:18	03/13/15 12:23	206-44-0	
Fluorene	<10	ug/kg	20.0	10	1	03/13/15 08:18	03/13/15 12:23	86-73-7	L2
Indeno(1,2,3-cd)pyrene	<7.6	ug/kg	20.0	7.6	1	03/13/15 08:18	03/13/15 12:23	193-39-5	
1-Methylnaphthalene	<10	ug/kg	20.0	10	1	03/13/15 08:18	03/13/15 12:23	90-12-0	
2-Methylnaphthalene	<10	ug/kg	20.0	10	1	03/13/15 08:18	03/13/15 12:23	91-57-6	
Naphthalene	<10	ug/kg	20.0	10	1	03/13/15 08:18	03/13/15 12:23	91-20-3	
Phenanthrene	<10	ug/kg	20.0	10	1	03/13/15 08:18	03/13/15 12:23	85-01-8	
Pyrene	<10	ug/kg	20.0	10	1	03/13/15 08:18	03/13/15 12:23	129-00-0	
<b>Surrogates</b>									
2-Fluorobiphenyl (S)	70	%	39-130		1	03/13/15 08:18	03/13/15 12:23	321-60-8	
Terphenyl-d14 (S)	91	%	37-130		1	03/13/15 08:18	03/13/15 12:23	1718-51-0	
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Benzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	71-43-2	W
Bromobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	108-86-1	W
Bromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	74-97-5	W
Bromodichloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	75-27-4	W
Bromoform	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	75-25-2	L2,W
Bromomethane	<69.9	ug/kg	250	69.9	1	03/13/15 07:30	03/13/15 13:35	74-83-9	W
n-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	104-51-8	W
sec-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	135-98-8	W
tert-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	98-06-6	W
Carbon tetrachloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	56-23-5	W

### REPORT OF LABORATORY ANALYSIS

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## ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY

Pace Project No.: 40111561

Sample: GP-2 S4 Lab ID: 40111561003 Collected: 03/11/15 09:35 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>		Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Chlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	108-90-7	W
Chloroethane	<67.0	ug/kg	250	67.0	1	03/13/15 07:30	03/13/15 13:35	75-00-3	W
Chloroform	<46.4	ug/kg	250	46.4	1	03/13/15 07:30	03/13/15 13:35	67-66-3	W
Chloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	74-87-3	W
2-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	95-49-8	W
4-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	106-43-4	W
1,2-Dibromo-3-chloropropane	<91.2	ug/kg	250	91.2	1	03/13/15 07:30	03/13/15 13:35	96-12-8	W
Dibromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	124-48-1	W
1,2-Dibromoethane (EDB)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	106-93-4	W
Dibromomethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	74-95-3	W
1,2-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	95-50-1	W
1,3-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	541-73-1	W
1,4-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	106-46-7	W
Dichlorodifluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	75-71-8	W
1,1-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	75-34-3	W
1,2-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	107-06-2	W
1,1-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	75-35-4	W
cis-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	156-59-2	W
trans-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	156-60-5	W
1,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	78-87-5	W
1,3-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	142-28-9	W
2,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	594-20-7	W
1,1-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	563-58-6	W
cis-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	10061-01-5	W
trans-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	10061-02-6	W
Diisopropyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	108-20-3	W
Ethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	100-41-4	W
Hexachloro-1,3-butadiene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	87-68-3	W
Isopropylbenzene (Cumene)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	98-82-8	W
p-Isopropyltoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	99-87-6	W
Methylene Chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	75-09-2	W
Methyl-tert-butyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	1634-04-4	W
Naphthalene	<40.0	ug/kg	250	40.0	1	03/13/15 07:30	03/13/15 13:35	91-20-3	W
n-Propylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	103-65-1	W
Styrene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	100-42-5	W
1,1,1,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	630-20-6	W
1,1,2,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	79-34-5	W
Tetrachloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	127-18-4	W
Toluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	108-88-3	W
1,2,3-Trichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	87-61-6	W
1,2,4-Trichlorobenzene	<47.6	ug/kg	250	47.6	1	03/13/15 07:30	03/13/15 13:35	120-82-1	W
1,1,1-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	71-55-6	W
1,1,2-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	79-00-5	W
Trichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	79-01-6	W
Trichlorofluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	75-69-4	W

## REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY

Pace Project No.: 40111561

**Sample: GP-2 S4**      **Lab ID: 40111561003**      Collected: 03/11/15 09:35      Received: 03/12/15 08:30      Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>		Analytical Method: EPA 8260    Preparation Method: EPA 5035/5030B							
1,2,3-Trichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	96-18-4	W
1,2,4-Trimethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	95-63-6	W
1,3,5-Trimethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	108-67-8	W
Vinyl chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:35	75-01-4	W
Xylene (Total)	<75.0	ug/kg	180	75.0	1	03/13/15 07:30	03/13/15 13:35	1330-20-7	W
<b>Surrogates</b>									
Dibromofluoromethane (S)	114	%	37-152		1	03/13/15 07:30	03/13/15 13:35	1868-53-7	
Toluene-d8 (S)	121	%	38-154		1	03/13/15 07:30	03/13/15 13:35	2037-26-5	
4-Bromofluorobenzene (S)	109	%	39-139		1	03/13/15 07:30	03/13/15 13:35	460-00-4	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87							
Percent Moisture	16.5	%	0.10	0.10	1		03/16/15 11:25		

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY

Pace Project No.: 40111561

Sample: GP-3 S1 Lab ID: 40111561004 Collected: 03/11/15 10:00 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b> Analytical Method: EPA 6010 Preparation Method: EPA 3050									
Arsenic	5.0J	mg/kg	9.5	3.0	5	03/16/15 07:20	03/17/15 19:52	7440-38-2	D3
Barium	144	mg/kg	0.47	0.11	1	03/16/15 07:20	03/17/15 19:54	7440-39-3	
Cadmium	1.5	mg/kg	0.47	0.063	1	03/16/15 07:20	03/17/15 19:54	7440-43-9	
Chromium	8.9	mg/kg	0.47	0.18	1	03/16/15 07:20	03/17/15 19:54	7440-47-3	
Lead	137	mg/kg	0.95	0.41	1	03/16/15 07:20	03/17/15 19:54	7439-92-1	
Selenium	<0.73	mg/kg	1.9	0.73	1	03/16/15 07:20	03/17/15 19:54	7782-49-2	
Silver	0.30J	mg/kg	0.95	0.26	1	03/16/15 07:20	03/17/15 19:54	7440-22-4	
<b>7471 Mercury</b> Analytical Method: EPA 7471 Preparation Method: EPA 7471									
Mercury	0.083	mg/kg	0.0068	0.0034	1	03/13/15 12:05	03/16/15 15:15	7439-97-6	
<b>8270 MSSV PAH by SIM</b> Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546									
Acenaphthene	74.2J	ug/kg	91.8	45.9	5	03/13/15 08:18	03/13/15 16:25	83-32-9	
Acenaphthylene	127	ug/kg	91.8	41.1	5	03/13/15 08:18	03/13/15 16:25	208-96-8	
Anthracene	433	ug/kg	91.8	47.6	5	03/13/15 08:18	03/13/15 16:25	120-12-7	
Benzo(a)anthracene	815	ug/kg	91.8	31.8	5	03/13/15 08:18	03/13/15 16:25	56-55-3	
Benzo(a)pyrene	942	ug/kg	91.8	32.8	5	03/13/15 08:18	03/13/15 16:25	50-32-8	
Benzo(b)fluoranthene	951	ug/kg	91.8	45.9	5	03/13/15 08:18	03/13/15 16:25	205-99-2	
Benzo(g,h,i)perylene	595	ug/kg	91.8	35.0	5	03/13/15 08:18	03/13/15 16:25	191-24-2	
Benzo(k)fluoranthene	835	ug/kg	91.8	50.8	5	03/13/15 08:18	03/13/15 16:25	207-08-9	
Chrysene	907	ug/kg	91.8	42.5	5	03/13/15 08:18	03/13/15 16:25	218-01-9	
Dibenz(a,h)anthracene	180	ug/kg	91.8	33.7	5	03/13/15 08:18	03/13/15 16:25	53-70-3	
Fluoranthene	1510	ug/kg	91.8	45.9	5	03/13/15 08:18	03/13/15 16:25	206-44-0	
Fluorene	110	ug/kg	91.8	45.9	5	03/13/15 08:18	03/13/15 16:25	86-73-7	L2
Indeno(1,2,3-cd)pyrene	527	ug/kg	91.8	34.9	5	03/13/15 08:18	03/13/15 16:25	193-39-5	
1-Methylnaphthalene	<45.9	ug/kg	91.8	45.9	5	03/13/15 08:18	03/13/15 16:25	90-12-0	
2-Methylnaphthalene	<45.9	ug/kg	91.8	45.9	5	03/13/15 08:18	03/13/15 16:25	91-57-6	
Naphthalene	63.0J	ug/kg	91.8	45.9	5	03/13/15 08:18	03/13/15 16:25	91-20-3	
Phenanthrene	1050	ug/kg	91.8	45.9	5	03/13/15 08:18	03/13/15 16:25	85-01-8	
Pyrene	1580	ug/kg	91.8	45.9	5	03/13/15 08:18	03/13/15 16:25	129-00-0	
<b>Surrogates</b>									
2-Fluorobiphenyl (S)	52	%	39-130		5	03/13/15 08:18	03/13/15 16:25	321-60-8	
Terphenyl-d14 (S)	63	%	37-130		5	03/13/15 08:18	03/13/15 16:25	1718-51-0	
<b>8260 MSV Med Level Normal List</b> Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Benzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	71-43-2	W
Bromobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	108-86-1	W
Bromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	74-97-5	W
Bromodichloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	75-27-4	W
Bromoform	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	75-25-2	L2,W
Bromomethane	<69.9	ug/kg	250	69.9	1	03/13/15 07:30	03/13/15 13:58	74-83-9	W
n-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	104-51-8	W
sec-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	135-98-8	W
tert-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	98-06-6	W
Carbon tetrachloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	56-23-5	W

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY

Pace Project No.: 40111561

Sample: GP-3 S1 Lab ID: 40111561004 Collected: 03/11/15 10:00 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Chlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	108-90-7	W
Chloroethane	<67.0	ug/kg	250	67.0	1	03/13/15 07:30	03/13/15 13:58	75-00-3	W
Chloroform	<46.4	ug/kg	250	46.4	1	03/13/15 07:30	03/13/15 13:58	67-66-3	W
Chloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	74-87-3	W
2-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	95-49-8	W
4-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	106-43-4	W
1,2-Dibromo-3-chloropropane	<91.2	ug/kg	250	91.2	1	03/13/15 07:30	03/13/15 13:58	96-12-8	W
Dibromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	124-48-1	W
1,2-Dibromoethane (EDB)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	106-93-4	W
Dibromomethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	74-95-3	W
1,2-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	95-50-1	W
1,3-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	541-73-1	W
1,4-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	106-46-7	W
Dichlorodifluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	75-71-8	W
1,1-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	75-34-3	W
1,2-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	107-06-2	W
1,1-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	75-35-4	W
cis-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	156-59-2	W
trans-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	156-60-5	W
1,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	78-87-5	W
1,3-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	142-28-9	W
2,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	594-20-7	W
1,1-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	563-58-6	W
cis-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	10061-01-5	W
trans-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	10061-02-6	W
Diisopropyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	108-20-3	W
Ethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	100-41-4	W
Hexachloro-1,3-butadiene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	87-68-3	W
Isopropylbenzene (Cumene)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	98-82-8	W
p-Isopropyltoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	99-87-6	W
Methylene Chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	75-09-2	W
Methyl-tert-butyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	1634-04-4	W
Naphthalene	54.1J	ug/kg	275	44.1	1	03/13/15 07:30	03/13/15 13:58	91-20-3	
n-Propylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	103-65-1	W
Styrene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	100-42-5	W
1,1,1,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	630-20-6	W
1,1,2,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	79-34-5	W
Tetrachloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	127-18-4	W
Toluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	108-88-3	W
1,2,3-Trichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	87-61-6	W
1,2,4-Trichlorobenzene	<47.6	ug/kg	250	47.6	1	03/13/15 07:30	03/13/15 13:58	120-82-1	W
1,1,1-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	71-55-6	W
1,1,2-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	79-00-5	W
Trichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	79-01-6	W
Trichlorofluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	75-69-4	W

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY

Pace Project No.: 40111561

Sample: GP-3 S1 Lab ID: 40111561004 Collected: 03/11/15 10:00 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>		Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
1,2,3-Trichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	96-18-4	W
1,2,4-Trimethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	95-63-6	W
1,3,5-Trimethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	108-67-8	W
Vinyl chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 13:58	75-01-4	W
Xylene (Total)	<75.0	ug/kg	180	75.0	1	03/13/15 07:30	03/13/15 13:58	1330-20-7	W
<b>Surrogates</b>									
Dibromofluoromethane (S)	131	%	37-152		1	03/13/15 07:30	03/13/15 13:58	1868-53-7	
Toluene-d8 (S)	134	%	38-154		1	03/13/15 07:30	03/13/15 13:58	2037-26-5	
4-Bromofluorobenzene (S)	116	%	39-139		1	03/13/15 07:30	03/13/15 13:58	460-00-4	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87							
Percent Moisture	9.2	%	0.10	0.10	1		03/16/15 11:26		

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-3 S4 Lab ID: 40111561005 Collected: 03/11/15 10:00 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>									
Analytical Method: EPA 6010 Preparation Method: EPA 3050									
Arsenic	15.7	mg/kg	2.2	0.70	1	03/16/15 07:20	03/17/15 19:56	7440-38-2	
Barium	44.8	mg/kg	0.55	0.13	1	03/16/15 07:20	03/17/15 19:56	7440-39-3	
Cadmium	0.089J	mg/kg	0.55	0.073	1	03/16/15 07:20	03/17/15 19:56	7440-43-9	
Chromium	13.4	mg/kg	0.55	0.21	1	03/16/15 07:20	03/17/15 19:56	7440-47-3	
Lead	5.6	mg/kg	1.1	0.48	1	03/16/15 07:20	03/17/15 19:56	7439-92-1	
Selenium	<0.85	mg/kg	2.2	0.85	1	03/16/15 07:20	03/17/15 19:56	7782-49-2	
Silver	0.44J	mg/kg	1.1	0.31	1	03/16/15 07:20	03/17/15 19:56	7440-22-4	
<b>7471 Mercury</b>									
Analytical Method: EPA 7471 Preparation Method: EPA 7471									
Mercury	0.0093	mg/kg	0.0074	0.0037	1	03/13/15 12:05	03/16/15 15:17	7439-97-6	
<b>8270 MSSV PAH by SIM</b>									
Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546									
Acenaphthene	<9.7	ug/kg	19.4	9.7	1	03/13/15 08:18	03/13/15 12:40	83-32-9	
Acenaphthylene	<8.7	ug/kg	19.4	8.7	1	03/13/15 08:18	03/13/15 12:40	208-96-8	
Anthracene	<10.0	ug/kg	19.4	10.0	1	03/13/15 08:18	03/13/15 12:40	120-12-7	
Benzo(a)anthracene	<6.7	ug/kg	19.4	6.7	1	03/13/15 08:18	03/13/15 12:40	56-55-3	
Benzo(a)pyrene	<6.9	ug/kg	19.4	6.9	1	03/13/15 08:18	03/13/15 12:40	50-32-8	
Benzo(b)fluoranthene	<9.7	ug/kg	19.4	9.7	1	03/13/15 08:18	03/13/15 12:40	205-99-2	
Benzo(g,h,i)perylene	<7.4	ug/kg	19.4	7.4	1	03/13/15 08:18	03/13/15 12:40	191-24-2	
Benzo(k)fluoranthene	<10.7	ug/kg	19.4	10.7	1	03/13/15 08:18	03/13/15 12:40	207-08-9	
Chrysene	<8.9	ug/kg	19.4	8.9	1	03/13/15 08:18	03/13/15 12:40	218-01-9	
Dibenz(a,h)anthracene	<7.1	ug/kg	19.4	7.1	1	03/13/15 08:18	03/13/15 12:40	53-70-3	
Fluoranthene	<9.7	ug/kg	19.4	9.7	1	03/13/15 08:18	03/13/15 12:40	206-44-0	
Fluorene	<9.7	ug/kg	19.4	9.7	1	03/13/15 08:18	03/13/15 12:40	86-73-7	L2
Indeno(1,2,3-cd)pyrene	<7.4	ug/kg	19.4	7.4	1	03/13/15 08:18	03/13/15 12:40	193-39-5	
1-Methylnaphthalene	<9.7	ug/kg	19.4	9.7	1	03/13/15 08:18	03/13/15 12:40	90-12-0	
2-Methylnaphthalene	<9.7	ug/kg	19.4	9.7	1	03/13/15 08:18	03/13/15 12:40	91-57-6	
Naphthalene	<9.7	ug/kg	19.4	9.7	1	03/13/15 08:18	03/13/15 12:40	91-20-3	
Phenanthrene	<9.7	ug/kg	19.4	9.7	1	03/13/15 08:18	03/13/15 12:40	85-01-8	
Pyrene	<9.7	ug/kg	19.4	9.7	1	03/13/15 08:18	03/13/15 12:40	129-00-0	
<b>Surrogates</b>									
2-Fluorobiphenyl (S)	65	%	39-130		1	03/13/15 08:18	03/13/15 12:40	321-60-8	
Terphenyl-d14 (S)	80	%	37-130		1	03/13/15 08:18	03/13/15 12:40	1718-51-0	
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Benzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	71-43-2	W
Bromobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	108-86-1	W
Bromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	74-97-5	W
Bromodichloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	75-27-4	W
Bromoform	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	75-25-2	L2,W
Bromomethane	<69.9	ug/kg	250	69.9	1	03/13/15 07:30	03/13/15 14:21	74-83-9	W
n-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	104-51-8	W
sec-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	135-98-8	W
tert-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	98-06-6	W
Carbon tetrachloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	56-23-5	W

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY

Pace Project No.: 40111561

Sample: GP-3 S4 Lab ID: 40111561005 Collected: 03/11/15 10:00 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Chlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	108-90-7	W
Chloroethane	<67.0	ug/kg	250	67.0	1	03/13/15 07:30	03/13/15 14:21	75-00-3	W
Chloroform	<46.4	ug/kg	250	46.4	1	03/13/15 07:30	03/13/15 14:21	67-66-3	W
Chloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	74-87-3	W
2-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	95-49-8	W
4-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	106-43-4	W
1,2-Dibromo-3-chloropropane	<91.2	ug/kg	250	91.2	1	03/13/15 07:30	03/13/15 14:21	96-12-8	W
Dibromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	124-48-1	W
1,2-Dibromoethane (EDB)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	106-93-4	W
Dibromomethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	74-95-3	W
1,2-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	95-50-1	W
1,3-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	541-73-1	W
1,4-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	106-46-7	W
Dichlorodifluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	75-71-8	W
1,1-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	75-34-3	W
1,2-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	107-06-2	W
1,1-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	75-35-4	W
cis-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	156-59-2	W
trans-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	156-60-5	W
1,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	78-87-5	W
1,3-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	142-28-9	W
2,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	594-20-7	W
1,1-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	563-58-6	W
cis-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	10061-01-5	W
trans-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	10061-02-6	W
Diisopropyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	108-20-3	W
Ethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	100-41-4	W
Hexachloro-1,3-butadiene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	87-68-3	W
Isopropylbenzene (Cumene)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	98-82-8	W
p-Isopropyltoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	99-87-6	W
Methylene Chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	75-09-2	W
Methyl-tert-butyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	1634-04-4	W
Naphthalene	<40.0	ug/kg	250	40.0	1	03/13/15 07:30	03/13/15 14:21	91-20-3	W
n-Propylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	103-65-1	W
Styrene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	100-42-5	W
1,1,1,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	630-20-6	W
1,1,2,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	79-34-5	W
Tetrachloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	127-18-4	W
Toluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	108-88-3	W
1,2,3-Trichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	87-61-6	W
1,2,4-Trichlorobenzene	<47.6	ug/kg	250	47.6	1	03/13/15 07:30	03/13/15 14:21	120-82-1	W
1,1,1-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	71-55-6	W
1,1,2-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	79-00-5	W
Trichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	79-01-6	W
Trichlorofluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	75-69-4	W

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

**Sample: GP-3 S4**      **Lab ID: 40111561005**      Collected: 03/11/15 10:00      Received: 03/12/15 08:30      Matrix: Solid  
*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>	Analytical Method: EPA 8260    Preparation Method: EPA 5035/5030B								
1,2,3-Trichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	96-18-4	W
1,2,4-Trimethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	95-63-6	W
1,3,5-Trimethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	108-67-8	W
Vinyl chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:21	75-01-4	W
Xylene (Total)	<75.0	ug/kg	180	75.0	1	03/13/15 07:30	03/13/15 14:21	1330-20-7	W
<b>Surrogates</b>									
Dibromofluoromethane (S)	90	%	37-152		1	03/13/15 07:30	03/13/15 14:21	1868-53-7	
Toluene-d8 (S)	96	%	38-154		1	03/13/15 07:30	03/13/15 14:21	2037-26-5	
4-Bromofluorobenzene (S)	86	%	39-139		1	03/13/15 07:30	03/13/15 14:21	460-00-4	
<b>Percent Moisture</b>	Analytical Method: ASTM D2974-87								
Percent Moisture	13.9	%	0.10	0.10	1		03/16/15 11:26		

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-3 S5 Lab ID: 40111561006 Collected: 03/11/15 10:15 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>									
Analytical Method: EPA 6010 Preparation Method: EPA 3050									
Arsenic	4.1	mg/kg	2.1	0.66	1	03/16/15 07:20	03/17/15 19:59	7440-38-2	
Barium	66.4	mg/kg	0.52	0.12	1	03/16/15 07:20	03/17/15 19:59	7440-39-3	
Cadmium	0.10J	mg/kg	0.52	0.069	1	03/16/15 07:20	03/17/15 19:59	7440-43-9	
Chromium	17.8	mg/kg	0.52	0.20	1	03/16/15 07:20	03/17/15 19:59	7440-47-3	
Lead	6.8	mg/kg	1.0	0.45	1	03/16/15 07:20	03/17/15 19:59	7439-92-1	
Selenium	<0.80	mg/kg	2.1	0.80	1	03/16/15 07:20	03/17/15 19:59	7782-49-2	
Silver	0.38J	mg/kg	1.0	0.29	1	03/16/15 07:20	03/17/15 19:59	7440-22-4	
<b>7471 Mercury</b>									
Analytical Method: EPA 7471 Preparation Method: EPA 7471									
Mercury	0.010	mg/kg	0.0063	0.0032	1	03/13/15 12:05	03/16/15 15:20	7439-97-6	
<b>8270 MSSV PAH by SIM</b>									
Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546									
Acenaphthene	<10	ug/kg	19.9	10	1	03/13/15 08:18	03/13/15 12:57	83-32-9	
Acenaphthylene	<8.9	ug/kg	19.9	8.9	1	03/13/15 08:18	03/13/15 12:57	208-96-8	
Anthracene	<10.3	ug/kg	19.9	10.3	1	03/13/15 08:18	03/13/15 12:57	120-12-7	
Benzo(a)anthracene	<6.9	ug/kg	19.9	6.9	1	03/13/15 08:18	03/13/15 12:57	56-55-3	
Benzo(a)pyrene	<7.1	ug/kg	19.9	7.1	1	03/13/15 08:18	03/13/15 12:57	50-32-8	
Benzo(b)fluoranthene	<10	ug/kg	19.9	10	1	03/13/15 08:18	03/13/15 12:57	205-99-2	
Benzo(g,h,i)perylene	<7.6	ug/kg	19.9	7.6	1	03/13/15 08:18	03/13/15 12:57	191-24-2	
Benzo(k)fluoranthene	<11.0	ug/kg	19.9	11.0	1	03/13/15 08:18	03/13/15 12:57	207-08-9	
Chrysene	<9.2	ug/kg	19.9	9.2	1	03/13/15 08:18	03/13/15 12:57	218-01-9	
Dibenz(a,h)anthracene	<7.3	ug/kg	19.9	7.3	1	03/13/15 08:18	03/13/15 12:57	53-70-3	
Fluoranthene	<10	ug/kg	19.9	10	1	03/13/15 08:18	03/13/15 12:57	206-44-0	
Fluorene	<10	ug/kg	19.9	10	1	03/13/15 08:18	03/13/15 12:57	86-73-7	L2
Indeno(1,2,3-cd)pyrene	<7.6	ug/kg	19.9	7.6	1	03/13/15 08:18	03/13/15 12:57	193-39-5	
1-Methylnaphthalene	54.2	ug/kg	19.9	10	1	03/13/15 08:18	03/13/15 12:57	90-12-0	
2-Methylnaphthalene	31.7	ug/kg	19.9	10	1	03/13/15 08:18	03/13/15 12:57	91-57-6	
Naphthalene	<10	ug/kg	19.9	10	1	03/13/15 08:18	03/13/15 12:57	91-20-3	
Phenanthrene	<10	ug/kg	19.9	10	1	03/13/15 08:18	03/13/15 12:57	85-01-8	
Pyrene	<10	ug/kg	19.9	10	1	03/13/15 08:18	03/13/15 12:57	129-00-0	
<b>Surrogates</b>									
2-Fluorobiphenyl (S)	54	%	39-130		1	03/13/15 08:18	03/13/15 12:57	321-60-8	
Terphenyl-d14 (S)	87	%	37-130		1	03/13/15 08:18	03/13/15 12:57	1718-51-0	
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Benzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	71-43-2	W
Bromobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	108-86-1	W
Bromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	74-97-5	W
Bromodichloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	75-27-4	W
Bromoform	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	75-25-2	L2,W
Bromomethane	<69.9	ug/kg	250	69.9	1	03/13/15 07:30	03/13/15 14:43	74-83-9	W
n-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	104-51-8	W
sec-Butylbenzene	58.2J	ug/kg	71.7	29.9	1	03/13/15 07:30	03/13/15 14:43	135-98-8	
tert-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	98-06-6	W
Carbon tetrachloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	56-23-5	W

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-3 S5 Lab ID: 40111561006 Collected: 03/11/15 10:15 Received: 03/12/15 08:30 Matrix: Solid  
Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>		Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
Chlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	108-90-7	W
Chloroethane	<67.0	ug/kg	250	67.0	1	03/13/15 07:30	03/13/15 14:43	75-00-3	W
Chloroform	<46.4	ug/kg	250	46.4	1	03/13/15 07:30	03/13/15 14:43	67-66-3	W
Chloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	74-87-3	W
2-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	95-49-8	W
4-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	106-43-4	W
1,2-Dibromo-3-chloropropane	<91.2	ug/kg	250	91.2	1	03/13/15 07:30	03/13/15 14:43	96-12-8	W
Dibromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	124-48-1	W
1,2-Dibromoethane (EDB)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	106-93-4	W
Dibromomethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	74-95-3	W
1,2-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	95-50-1	W
1,3-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	541-73-1	W
1,4-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	106-46-7	W
Dichlorodifluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	75-71-8	W
1,1-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	75-34-3	W
1,2-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	107-06-2	W
1,1-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	75-35-4	W
cis-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	156-59-2	W
trans-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	156-60-5	W
1,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	78-87-5	W
1,3-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	142-28-9	W
2,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	594-20-7	W
1,1-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	563-58-6	W
cis-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	10061-01-5	W
trans-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	10061-02-6	W
Diisopropyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	108-20-3	W
Ethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	100-41-4	W
Hexachloro-1,3-butadiene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	87-68-3	W
Isopropylbenzene (Cumene)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	98-82-8	W
p-Isopropyltoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	99-87-6	W
Methylene Chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	75-09-2	W
Methyl-tert-butyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	1634-04-4	W
Naphthalene	<40.0	ug/kg	250	40.0	1	03/13/15 07:30	03/13/15 14:43	91-20-3	W
n-Propylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	103-65-1	W
Styrene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	100-42-5	W
1,1,1,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	630-20-6	W
1,1,2,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	79-34-5	W
Tetrachloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	127-18-4	W
Toluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	108-88-3	W
1,2,3-Trichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	87-61-6	W
1,2,4-Trichlorobenzene	<47.6	ug/kg	250	47.6	1	03/13/15 07:30	03/13/15 14:43	120-82-1	W
1,1,1-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	71-55-6	W
1,1,2-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	79-00-5	W
Trichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	79-01-6	W
Trichlorofluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	75-69-4	W

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY

Pace Project No.: 40111561

Sample: GP-3 S5 Lab ID: 40111561006 Collected: 03/11/15 10:15 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
1,2,3-Trichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	96-18-4	W
1,2,4-Trimethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	95-63-6	W
1,3,5-Trimethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	108-67-8	W
Vinyl chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 14:43	75-01-4	W
Xylene (Total)	<75.0	ug/kg	180	75.0	1	03/13/15 07:30	03/13/15 14:43	1330-20-7	W
<b>Surrogates</b>									
Dibromofluoromethane (S)	99	%	37-152		1	03/13/15 07:30	03/13/15 14:43	1868-53-7	
Toluene-d8 (S)	105	%	38-154		1	03/13/15 07:30	03/13/15 14:43	2037-26-5	
4-Bromofluorobenzene (S)	94	%	39-139		1	03/13/15 07:30	03/13/15 14:43	460-00-4	
<b>Percent Moisture</b>	Analytical Method: ASTM D2974-87								
Percent Moisture	16.3	%	0.10	0.10	1		03/16/15 11:26		

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-4 S1 Lab ID: 40111561007 Collected: 03/11/15 12:30 Received: 03/12/15 08:30 Matrix: Solid  
Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>									
Analytical Method: EPA 6010 Preparation Method: EPA 3050									
Arsenic	6.7	mg/kg	1.9	0.59	1	03/16/15 07:20	03/17/15 20:05	7440-38-2	
Barium	42.1	mg/kg	0.46	0.11	1	03/16/15 07:20	03/17/15 20:05	7440-39-3	
Cadmium	0.48	mg/kg	0.46	0.061	1	03/16/15 07:20	03/17/15 20:05	7440-43-9	
Chromium	8.3	mg/kg	0.46	0.18	1	03/16/15 07:20	03/17/15 20:05	7440-47-3	
Lead	46.3	mg/kg	0.93	0.40	1	03/16/15 07:20	03/17/15 20:05	7439-92-1	
Selenium	<0.71	mg/kg	1.9	0.71	1	03/16/15 07:20	03/17/15 20:05	7782-49-2	
Silver	0.38J	mg/kg	0.93	0.26	1	03/16/15 07:20	03/17/15 20:05	7440-22-4	
<b>7471 Mercury</b>									
Analytical Method: EPA 7471 Preparation Method: EPA 7471									
Mercury	0.053	mg/kg	0.0073	0.0037	1	03/13/15 12:05	03/16/15 15:27	7439-97-6	
<b>8270 MSSV PAH by SIM</b>									
Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546									
Acenaphthene	<9.2	ug/kg	18.3	9.2	1	03/13/15 08:18	03/13/15 14:07	83-32-9	
Acenaphthylene	10.4J	ug/kg	18.3	8.2	1	03/13/15 08:18	03/13/15 14:07	208-96-8	
Anthracene	14.0J	ug/kg	18.3	9.5	1	03/13/15 08:18	03/13/15 14:07	120-12-7	
Benzo(a)anthracene	24.0	ug/kg	18.3	6.3	1	03/13/15 08:18	03/13/15 14:07	56-55-3	
Benzo(a)pyrene	22.6	ug/kg	18.3	6.5	1	03/13/15 08:18	03/13/15 14:07	50-32-8	
Benzo(b)fluoranthene	26.3	ug/kg	18.3	9.2	1	03/13/15 08:18	03/13/15 14:07	205-99-2	
Benzo(g,h,i)perylene	16.9J	ug/kg	18.3	7.0	1	03/13/15 08:18	03/13/15 14:07	191-24-2	
Benzo(k)fluoranthene	30.5	ug/kg	18.3	10.1	1	03/13/15 08:18	03/13/15 14:07	207-08-9	
Chrysene	36.7	ug/kg	18.3	8.5	1	03/13/15 08:18	03/13/15 14:07	218-01-9	
Dibenz(a,h)anthracene	<6.7	ug/kg	18.3	6.7	1	03/13/15 08:18	03/13/15 14:07	53-70-3	
Fluoranthene	42.7	ug/kg	18.3	9.2	1	03/13/15 08:18	03/13/15 14:07	206-44-0	
Fluorene	<9.2	ug/kg	18.3	9.2	1	03/13/15 08:18	03/13/15 14:07	86-73-7	L2
Indeno(1,2,3-cd)pyrene	11.6J	ug/kg	18.3	7.0	1	03/13/15 08:18	03/13/15 14:07	193-39-5	
1-Methylnaphthalene	24.9	ug/kg	18.3	9.2	1	03/13/15 08:18	03/13/15 14:07	90-12-0	
2-Methylnaphthalene	39.6	ug/kg	18.3	9.2	1	03/13/15 08:18	03/13/15 14:07	91-57-6	
Naphthalene	37.6	ug/kg	18.3	9.2	1	03/13/15 08:18	03/13/15 14:07	91-20-3	
Phenanthrene	38.5	ug/kg	18.3	9.2	1	03/13/15 08:18	03/13/15 14:07	85-01-8	
Pyrene	40.2	ug/kg	18.3	9.2	1	03/13/15 08:18	03/13/15 14:07	129-00-0	
<b>Surrogates</b>									
2-Fluorobiphenyl (S)	61	%	39-130		1	03/13/15 08:18	03/13/15 14:07	321-60-8	
Terphenyl-d14 (S)	71	%	37-130		1	03/13/15 08:18	03/13/15 14:07	1718-51-0	
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Benzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	71-43-2	W
Bromobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	108-86-1	W
Bromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	74-97-5	W
Bromodichloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	75-27-4	W
Bromoform	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	75-25-2	L2,W
Bromomethane	<69.9	ug/kg	250	69.9	1	03/13/15 07:30	03/13/15 15:06	74-83-9	W
n-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	104-51-8	W
sec-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	135-98-8	W
tert-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	98-06-6	W
Carbon tetrachloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	56-23-5	W

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-4 S1 Lab ID: 40111561007 Collected: 03/11/15 12:30 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Chlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	108-90-7	W
Chloroethane	<67.0	ug/kg	250	67.0	1	03/13/15 07:30	03/13/15 15:06	75-00-3	W
Chloroform	<46.4	ug/kg	250	46.4	1	03/13/15 07:30	03/13/15 15:06	67-66-3	W
Chloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	74-87-3	W
2-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	95-49-8	W
4-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	106-43-4	W
1,2-Dibromo-3-chloropropane	<91.2	ug/kg	250	91.2	1	03/13/15 07:30	03/13/15 15:06	96-12-8	W
Dibromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	124-48-1	W
1,2-Dibromoethane (EDB)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	106-93-4	W
Dibromomethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	74-95-3	W
1,2-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	95-50-1	W
1,3-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	541-73-1	W
1,4-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	106-46-7	W
Dichlorodifluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	75-71-8	W
1,1-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	75-34-3	W
1,2-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	107-06-2	W
1,1-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	75-35-4	W
cis-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	156-59-2	W
trans-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	156-60-5	W
1,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	78-87-5	W
1,3-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	142-28-9	W
2,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	594-20-7	W
1,1-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	563-58-6	W
cis-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	10061-01-5	W
trans-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	10061-02-6	W
Diisopropyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	108-20-3	W
Ethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	100-41-4	W
Hexachloro-1,3-butadiene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	87-68-3	W
Isopropylbenzene (Cumene)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	98-82-8	W
p-Isopropyltoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	99-87-6	W
Methylene Chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	75-09-2	W
Methyl-tert-butyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	1634-04-4	W
Naphthalene	100J	ug/kg	275	44.0	1	03/13/15 07:30	03/13/15 15:06	91-20-3	
n-Propylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	103-65-1	W
Styrene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	100-42-5	W
1,1,1,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	630-20-6	W
1,1,2,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	79-34-5	W
Tetrachloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	127-18-4	W
Toluene	66.5	ug/kg	65.9	27.5	1	03/13/15 07:30	03/13/15 15:06	108-88-3	
1,2,3-Trichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	87-61-6	W
1,2,4-Trichlorobenzene	<47.6	ug/kg	250	47.6	1	03/13/15 07:30	03/13/15 15:06	120-82-1	W
1,1,1-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	71-55-6	W
1,1,2-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	79-00-5	W
Trichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	79-01-6	W
Trichlorofluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	75-69-4	W

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY

Pace Project No.: 40111561

Sample: GP-4 S1 Lab ID: 40111561007 Collected: 03/11/15 12:30 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>	Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B								
1,2,3-Trichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	96-18-4	W
1,2,4-Trimethylbenzene	43.3J	ug/kg	65.9	27.5	1	03/13/15 07:30	03/13/15 15:06	95-63-6	
1,3,5-Trimethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	108-67-8	W
Vinyl chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:06	75-01-4	W
Xylene (Total)	122J	ug/kg	198	82.4	1	03/13/15 07:30	03/13/15 15:06	1330-20-7	
<b>Surrogates</b>									
Dibromofluoromethane (S)	98	%	37-152		1	03/13/15 07:30	03/13/15 15:06	1868-53-7	
Toluene-d8 (S)	105	%	38-154		1	03/13/15 07:30	03/13/15 15:06	2037-26-5	
4-Bromofluorobenzene (S)	95	%	39-139		1	03/13/15 07:30	03/13/15 15:06	460-00-4	
<b>Percent Moisture</b>	Analytical Method: ASTM D2974-87								
Percent Moisture	9.0	%	0.10	0.10	1		03/16/15 11:26		

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-4 S4 Lab ID: 40111561008 Collected: 03/11/15 12:30 Received: 03/12/15 08:30 Matrix: Solid  
Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b> Analytical Method: EPA 6010 Preparation Method: EPA 3050									
Arsenic	5.0	mg/kg	2.4	0.76	1	03/16/15 07:20	03/17/15 20:08	7440-38-2	
Barium	55.1	mg/kg	0.60	0.14	1	03/16/15 07:20	03/17/15 20:08	7440-39-3	
Cadmium	<0.079	mg/kg	0.60	0.079	1	03/16/15 07:20	03/17/15 20:08	7440-43-9	
Chromium	14.1	mg/kg	0.60	0.23	1	03/16/15 07:20	03/17/15 20:08	7440-47-3	
Lead	5.2	mg/kg	1.2	0.51	1	03/16/15 07:20	03/17/15 20:08	7439-92-1	
Selenium	<0.92	mg/kg	2.4	0.92	1	03/16/15 07:20	03/17/15 20:08	7782-49-2	
Silver	<0.33	mg/kg	1.2	0.33	1	03/16/15 07:20	03/17/15 20:08	7440-22-4	
<b>7471 Mercury</b> Analytical Method: EPA 7471 Preparation Method: EPA 7471									
Mercury	0.0087	mg/kg	0.0070	0.0035	1	03/13/15 12:05	03/16/15 15:29	7439-97-6	
<b>8270 MSSV PAH by SIM</b> Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546									
Acenaphthene	<10.1	ug/kg	20.2	10.1	1	03/13/15 08:18	03/13/15 13:15	83-32-9	
Acenaphthylene	<9.0	ug/kg	20.2	9.0	1	03/13/15 08:18	03/13/15 13:15	208-96-8	
Anthracene	<10.5	ug/kg	20.2	10.5	1	03/13/15 08:18	03/13/15 13:15	120-12-7	
Benzo(a)anthracene	<7.0	ug/kg	20.2	7.0	1	03/13/15 08:18	03/13/15 13:15	56-55-3	
Benzo(a)pyrene	<7.2	ug/kg	20.2	7.2	1	03/13/15 08:18	03/13/15 13:15	50-32-8	
Benzo(b)fluoranthene	<10.1	ug/kg	20.2	10.1	1	03/13/15 08:18	03/13/15 13:15	205-99-2	
Benzo(g,h,i)perylene	<7.7	ug/kg	20.2	7.7	1	03/13/15 08:18	03/13/15 13:15	191-24-2	
Benzo(k)fluoranthene	<11.2	ug/kg	20.2	11.2	1	03/13/15 08:18	03/13/15 13:15	207-08-9	
Chrysene	<9.3	ug/kg	20.2	9.3	1	03/13/15 08:18	03/13/15 13:15	218-01-9	
Dibenz(a,h)anthracene	<7.4	ug/kg	20.2	7.4	1	03/13/15 08:18	03/13/15 13:15	53-70-3	
Fluoranthene	13.9J	ug/kg	20.2	10.1	1	03/13/15 08:18	03/13/15 13:15	206-44-0	
Fluorene	<10.1	ug/kg	20.2	10.1	1	03/13/15 08:18	03/13/15 13:15	86-73-7	L2
Indeno(1,2,3-cd)pyrene	<7.7	ug/kg	20.2	7.7	1	03/13/15 08:18	03/13/15 13:15	193-39-5	
1-Methylnaphthalene	191	ug/kg	20.2	10.1	1	03/13/15 08:18	03/13/15 13:15	90-12-0	
2-Methylnaphthalene	496	ug/kg	20.2	10.1	1	03/13/15 08:18	03/13/15 13:15	91-57-6	
Naphthalene	447	ug/kg	20.2	10.1	1	03/13/15 08:18	03/13/15 13:15	91-20-3	
Phenanthrene	17.7J	ug/kg	20.2	10.1	1	03/13/15 08:18	03/13/15 13:15	85-01-8	
Pyrene	10.3J	ug/kg	20.2	10.1	1	03/13/15 08:18	03/13/15 13:15	129-00-0	
<b>Surrogates</b>									
2-Fluorobiphenyl (S)	58	%	39-130		1	03/13/15 08:18	03/13/15 13:15	321-60-8	
Terphenyl-d14 (S)	67	%	37-130		1	03/13/15 08:18	03/13/15 13:15	1718-51-0	
<b>8260 MSV Med Level Normal List</b> Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Benzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	71-43-2	W
Bromobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	108-86-1	W
Bromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	74-97-5	W
Bromodichloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	75-27-4	W
Bromoform	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	75-25-2	L2,W
Bromomethane	<69.9	ug/kg	250	69.9	1	03/13/15 07:30	03/13/15 18:07	74-83-9	W
n-Butylbenzene	631	ug/kg	72.8	30.3	1	03/13/15 07:30	03/13/15 18:07	104-51-8	
sec-Butylbenzene	305	ug/kg	72.8	30.3	1	03/13/15 07:30	03/13/15 18:07	135-98-8	
tert-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	98-06-6	W
Carbon tetrachloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	56-23-5	W

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY

Pace Project No.: 40111561

Sample: GP-4 S4 Lab ID: 40111561008 Collected: 03/11/15 12:30 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Chlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	108-90-7	W
Chloroethane	<67.0	ug/kg	250	67.0	1	03/13/15 07:30	03/13/15 18:07	75-00-3	W
Chloroform	<46.4	ug/kg	250	46.4	1	03/13/15 07:30	03/13/15 18:07	67-66-3	W
Chloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	74-87-3	W
2-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	95-49-8	W
4-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	106-43-4	W
1,2-Dibromo-3-chloropropane	<91.2	ug/kg	250	91.2	1	03/13/15 07:30	03/13/15 18:07	96-12-8	W
Dibromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	124-48-1	W
1,2-Dibromoethane (EDB)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	106-93-4	W
Dibromomethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	74-95-3	W
1,2-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	95-50-1	W
1,3-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	541-73-1	W
1,4-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	106-46-7	W
Dichlorodifluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	75-71-8	W
1,1-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	75-34-3	W
1,2-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	107-06-2	W
1,1-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	75-35-4	W
cis-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	156-59-2	W
trans-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	156-60-5	W
1,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	78-87-5	W
1,3-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	142-28-9	W
2,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	594-20-7	W
1,1-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	563-58-6	W
cis-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	10061-01-5	W
trans-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	10061-02-6	W
Diisopropyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	108-20-3	W
Ethylbenzene	331	ug/kg	72.8	30.3	1	03/13/15 07:30	03/13/15 18:07	100-41-4	
Hexachloro-1,3-butadiene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	87-68-3	W
Isopropylbenzene (Cumene)	495	ug/kg	72.8	30.3	1	03/13/15 07:30	03/13/15 18:07	98-82-8	
p-Isopropyltoluene	564	ug/kg	72.8	30.3	1	03/13/15 07:30	03/13/15 18:07	99-87-6	
Methylene Chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	75-09-2	W
Methyl-tert-butyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	1634-04-4	W
Naphthalene	992	ug/kg	303	48.6	1	03/13/15 07:30	03/13/15 18:07	91-20-3	
n-Propylbenzene	945	ug/kg	72.8	30.3	1	03/13/15 07:30	03/13/15 18:07	103-65-1	
Styrene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	100-42-5	W
1,1,1,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	630-20-6	W
1,1,2,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	79-34-5	W
Tetrachloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	127-18-4	W
Toluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	108-88-3	W
1,2,3-Trichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	87-61-6	W
1,2,4-Trichlorobenzene	<47.6	ug/kg	250	47.6	1	03/13/15 07:30	03/13/15 18:07	120-82-1	W
1,1,1-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	71-55-6	W
1,1,2-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	79-00-5	W
Trichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	79-01-6	W
Trichlorofluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	75-69-4	W

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY

Pace Project No.: 40111561

Sample: GP-4 S4 Lab ID: 40111561008 Collected: 03/11/15 12:30 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>		Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
1,2,3-Trichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	96-18-4	W
1,2,4-Trimethylbenzene	145	ug/kg	72.8	30.3	1	03/13/15 07:30	03/13/15 18:07	95-63-6	
1,3,5-Trimethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	108-67-8	W
Vinyl chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 18:07	75-01-4	W
Xylene (Total)	97.1J	ug/kg	218	90.9	1	03/13/15 07:30	03/13/15 18:07	1330-20-7	
<b>Surrogates</b>									
Dibromofluoromethane (S)	88	%	37-152		1	03/13/15 07:30	03/13/15 18:07	1868-53-7	
Toluene-d8 (S)	102	%	38-154		1	03/13/15 07:30	03/13/15 18:07	2037-26-5	
4-Bromofluorobenzene (S)	99	%	39-139		1	03/13/15 07:30	03/13/15 18:07	460-00-4	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87							
Percent Moisture	17.5	%	0.10	0.10	1		03/16/15 11:26		

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-5 S1 Lab ID: 40111561009 Collected: 03/11/15 11:10 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>									
Analytical Method: EPA 6010 Preparation Method: EPA 3050									
Arsenic	5.9J	mg/kg	10.3	3.3	5	03/16/15 07:20	03/17/15 20:10	7440-38-2	D3
Barium	21.5	mg/kg	0.51	0.12	1	03/16/15 07:20	03/17/15 20:12	7440-39-3	
Cadmium	0.29J	mg/kg	0.51	0.068	1	03/16/15 07:20	03/17/15 20:12	7440-43-9	
Chromium	6.2	mg/kg	0.51	0.20	1	03/16/15 07:20	03/17/15 20:12	7440-47-3	
Lead	12.4	mg/kg	1.0	0.44	1	03/16/15 07:20	03/17/15 20:12	7439-92-1	
Selenium	<0.79	mg/kg	2.1	0.79	1	03/16/15 07:20	03/17/15 20:12	7782-49-2	
Silver	<0.29	mg/kg	1.0	0.29	1	03/16/15 07:20	03/17/15 20:12	7440-22-4	
<b>7471 Mercury</b>									
Analytical Method: EPA 7471 Preparation Method: EPA 7471									
Mercury	0.019	mg/kg	0.0056	0.0028	1	03/13/15 12:05	03/16/15 15:31	7439-97-6	
<b>8270 MSSV PAH by SIM</b>									
Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546									
Acenaphthene	<8.8	ug/kg	17.6	8.8	1	03/13/15 08:18	03/13/15 15:33	83-32-9	
Acenaphthylene	<7.9	ug/kg	17.6	7.9	1	03/13/15 08:18	03/13/15 15:33	208-96-8	
Anthracene	<9.1	ug/kg	17.6	9.1	1	03/13/15 08:18	03/13/15 15:33	120-12-7	
Benzo(a)anthracene	26.9	ug/kg	17.6	6.1	1	03/13/15 08:18	03/13/15 15:33	56-55-3	
Benzo(a)pyrene	22.3	ug/kg	17.6	6.3	1	03/13/15 08:18	03/13/15 15:33	50-32-8	
Benzo(b)fluoranthene	23.5	ug/kg	17.6	8.8	1	03/13/15 08:18	03/13/15 15:33	205-99-2	
Benzo(g,h,i)perylene	13.5J	ug/kg	17.6	6.7	1	03/13/15 08:18	03/13/15 15:33	191-24-2	
Benzo(k)fluoranthene	23.8	ug/kg	17.6	9.7	1	03/13/15 08:18	03/13/15 15:33	207-08-9	
Chrysene	33.7	ug/kg	17.6	8.1	1	03/13/15 08:18	03/13/15 15:33	218-01-9	
Dibenz(a,h)anthracene	<6.5	ug/kg	17.6	6.5	1	03/13/15 08:18	03/13/15 15:33	53-70-3	
Fluoranthene	73.2	ug/kg	17.6	8.8	1	03/13/15 08:18	03/13/15 15:33	206-44-0	
Fluorene	<8.8	ug/kg	17.6	8.8	1	03/13/15 08:18	03/13/15 15:33	86-73-7	L2
Indeno(1,2,3-cd)pyrene	9.4J	ug/kg	17.6	6.7	1	03/13/15 08:18	03/13/15 15:33	193-39-5	
1-Methylnaphthalene	<8.8	ug/kg	17.6	8.8	1	03/13/15 08:18	03/13/15 15:33	90-12-0	
2-Methylnaphthalene	<8.8	ug/kg	17.6	8.8	1	03/13/15 08:18	03/13/15 15:33	91-57-6	
Naphthalene	<8.8	ug/kg	17.6	8.8	1	03/13/15 08:18	03/13/15 15:33	91-20-3	
Phenanthrene	31.6	ug/kg	17.6	8.8	1	03/13/15 08:18	03/13/15 15:33	85-01-8	
Pyrene	65.3	ug/kg	17.6	8.8	1	03/13/15 08:18	03/13/15 15:33	129-00-0	
<b>Surrogates</b>									
2-Fluorobiphenyl (S)	57	%	39-130		1	03/13/15 08:18	03/13/15 15:33	321-60-8	
Terphenyl-d14 (S)	75	%	37-130		1	03/13/15 08:18	03/13/15 15:33	1718-51-0	
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Benzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	71-43-2	W
Bromobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	108-86-1	W
Bromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	74-97-5	W
Bromodichloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	75-27-4	W
Bromoform	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	75-25-2	L2,W
Bromomethane	<69.9	ug/kg	250	69.9	1	03/13/15 07:30	03/13/15 15:28	74-83-9	W
n-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	104-51-8	W
sec-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	135-98-8	W
tert-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	98-06-6	W
Carbon tetrachloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	56-23-5	W

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-5 S1 Lab ID: 40111561009 Collected: 03/11/15 11:10 Received: 03/12/15 08:30 Matrix: Solid  
Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Chlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	108-90-7	W
Chloroethane	<67.0	ug/kg	250	67.0	1	03/13/15 07:30	03/13/15 15:28	75-00-3	W
Chloroform	<46.4	ug/kg	250	46.4	1	03/13/15 07:30	03/13/15 15:28	67-66-3	W
Chloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	74-87-3	W
2-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	95-49-8	W
4-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	106-43-4	W
1,2-Dibromo-3-chloropropane	<91.2	ug/kg	250	91.2	1	03/13/15 07:30	03/13/15 15:28	96-12-8	W
Dibromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	124-48-1	W
1,2-Dibromoethane (EDB)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	106-93-4	W
Dibromomethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	74-95-3	W
1,2-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	95-50-1	W
1,3-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	541-73-1	W
1,4-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	106-46-7	W
Dichlorodifluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	75-71-8	W
1,1-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	75-34-3	W
1,2-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	107-06-2	W
1,1-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	75-35-4	W
cis-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	156-59-2	W
trans-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	156-60-5	W
1,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	78-87-5	W
1,3-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	142-28-9	W
2,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	594-20-7	W
1,1-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	563-58-6	W
cis-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	10061-01-5	W
trans-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	10061-02-6	W
Diisopropyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	108-20-3	W
Ethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	100-41-4	W
Hexachloro-1,3-butadiene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	87-68-3	W
Isopropylbenzene (Cumene)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	98-82-8	W
p-Isopropyltoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	99-87-6	W
Methylene Chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	75-09-2	W
Methyl-tert-butyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	1634-04-4	W
Naphthalene	<40.0	ug/kg	250	40.0	1	03/13/15 07:30	03/13/15 15:28	91-20-3	W
n-Propylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	103-65-1	W
Styrene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	100-42-5	W
1,1,1,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	630-20-6	W
1,1,2,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	79-34-5	W
Tetrachloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	127-18-4	W
Toluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	108-88-3	W
1,2,3-Trichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	87-61-6	W
1,2,4-Trichlorobenzene	<47.6	ug/kg	250	47.6	1	03/13/15 07:30	03/13/15 15:28	120-82-1	W
1,1,1-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	71-55-6	W
1,1,2-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	79-00-5	W
Trichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	79-01-6	W
Trichlorofluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	75-69-4	W

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-5 S1 Lab ID: 40111561009 Collected: 03/11/15 11:10 Received: 03/12/15 08:30 Matrix: Solid  
Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>		Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
1,2,3-Trichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	96-18-4	W
1,2,4-Trimethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	95-63-6	W
1,3,5-Trimethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	108-67-8	W
Vinyl chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:28	75-01-4	W
Xylene (Total)	<75.0	ug/kg	180	75.0	1	03/13/15 07:30	03/13/15 15:28	1330-20-7	W
<b>Surrogates</b>									
Dibromofluoromethane (S)	101	%	37-152		1	03/13/15 07:30	03/13/15 15:28	1868-53-7	
Toluene-d8 (S)	112	%	38-154		1	03/13/15 07:30	03/13/15 15:28	2037-26-5	
4-Bromofluorobenzene (S)	102	%	39-139		1	03/13/15 07:30	03/13/15 15:28	460-00-4	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87							
Percent Moisture	5.2	%	0.10	0.10	1		03/16/15 13:05		

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-5 S5 Lab ID: 40111561010 Collected: 03/11/15 11:10 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>									
Analytical Method: EPA 6010 Preparation Method: EPA 3050									
Arsenic	1.5J	mg/kg	2.1	0.67	1	03/16/15 07:20	03/17/15 20:15	7440-38-2	
Barium	7.0	mg/kg	0.53	0.13	1	03/16/15 07:20	03/17/15 20:15	7440-39-3	
Cadmium	<0.070	mg/kg	0.53	0.070	1	03/16/15 07:20	03/17/15 20:15	7440-43-9	
Chromium	3.9	mg/kg	0.53	0.21	1	03/16/15 07:20	03/17/15 20:15	7440-47-3	
Lead	1.2	mg/kg	1.1	0.46	1	03/16/15 07:20	03/17/15 20:15	7439-92-1	
Selenium	<0.82	mg/kg	2.1	0.82	1	03/16/15 07:20	03/17/15 20:15	7782-49-2	
Silver	<0.29	mg/kg	1.1	0.29	1	03/16/15 07:20	03/17/15 20:15	7440-22-4	
<b>7471 Mercury</b>									
Analytical Method: EPA 7471 Preparation Method: EPA 7471									
Mercury	<0.0031	mg/kg	0.0063	0.0031	1	03/13/15 12:05	03/16/15 15:33	7439-97-6	
<b>8270 MSSV PAH by SIM</b>									
Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546									
Acenaphthene	<9.9	ug/kg	19.9	9.9	1	03/13/15 08:18	03/13/15 13:32	83-32-9	
Acenaphthylene	<8.9	ug/kg	19.9	8.9	1	03/13/15 08:18	03/13/15 13:32	208-96-8	
Anthracene	<10.3	ug/kg	19.9	10.3	1	03/13/15 08:18	03/13/15 13:32	120-12-7	
Benzo(a)anthracene	<6.9	ug/kg	19.9	6.9	1	03/13/15 08:18	03/13/15 13:32	56-55-3	
Benzo(a)pyrene	<7.1	ug/kg	19.9	7.1	1	03/13/15 08:18	03/13/15 13:32	50-32-8	
Benzo(b)fluoranthene	<9.9	ug/kg	19.9	9.9	1	03/13/15 08:18	03/13/15 13:32	205-99-2	
Benzo(g,h,i)perylene	<7.6	ug/kg	19.9	7.6	1	03/13/15 08:18	03/13/15 13:32	191-24-2	
Benzo(k)fluoranthene	<11.0	ug/kg	19.9	11.0	1	03/13/15 08:18	03/13/15 13:32	207-08-9	
Chrysene	<9.2	ug/kg	19.9	9.2	1	03/13/15 08:18	03/13/15 13:32	218-01-9	
Dibenz(a,h)anthracene	<7.3	ug/kg	19.9	7.3	1	03/13/15 08:18	03/13/15 13:32	53-70-3	
Fluoranthene	<9.9	ug/kg	19.9	9.9	1	03/13/15 08:18	03/13/15 13:32	206-44-0	
Fluorene	<9.9	ug/kg	19.9	9.9	1	03/13/15 08:18	03/13/15 13:32	86-73-7	L2
Indeno(1,2,3-cd)pyrene	<7.5	ug/kg	19.9	7.5	1	03/13/15 08:18	03/13/15 13:32	193-39-5	
1-Methylnaphthalene	<9.9	ug/kg	19.9	9.9	1	03/13/15 08:18	03/13/15 13:32	90-12-0	
2-Methylnaphthalene	<9.9	ug/kg	19.9	9.9	1	03/13/15 08:18	03/13/15 13:32	91-57-6	
Naphthalene	<9.9	ug/kg	19.9	9.9	1	03/13/15 08:18	03/13/15 13:32	91-20-3	
Phenanthrene	<9.9	ug/kg	19.9	9.9	1	03/13/15 08:18	03/13/15 13:32	85-01-8	
Pyrene	<9.9	ug/kg	19.9	9.9	1	03/13/15 08:18	03/13/15 13:32	129-00-0	
<b>Surrogates</b>									
2-Fluorobiphenyl (S)	49	%	39-130		1	03/13/15 08:18	03/13/15 13:32	321-60-8	
Terphenyl-d14 (S)	38	%	37-130		1	03/13/15 08:18	03/13/15 13:32	1718-51-0	
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Benzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	71-43-2	W
Bromobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	108-86-1	W
Bromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	74-97-5	W
Bromodichloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	75-27-4	W
Bromoform	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	75-25-2	L2,W
Bromomethane	<69.9	ug/kg	250	69.9	1	03/13/15 07:30	03/13/15 15:51	74-83-9	W
n-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	104-51-8	W
sec-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	135-98-8	W
tert-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	98-06-6	W
Carbon tetrachloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	56-23-5	W

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-5 S5 Lab ID: 40111561010 Collected: 03/11/15 11:10 Received: 03/12/15 08:30 Matrix: Solid  
Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Chlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	108-90-7	W
Chloroethane	<67.0	ug/kg	250	67.0	1	03/13/15 07:30	03/13/15 15:51	75-00-3	W
Chloroform	<46.4	ug/kg	250	46.4	1	03/13/15 07:30	03/13/15 15:51	67-66-3	W
Chloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	74-87-3	W
2-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	95-49-8	W
4-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	106-43-4	W
1,2-Dibromo-3-chloropropane	<91.2	ug/kg	250	91.2	1	03/13/15 07:30	03/13/15 15:51	96-12-8	W
Dibromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	124-48-1	W
1,2-Dibromoethane (EDB)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	106-93-4	W
Dibromomethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	74-95-3	W
1,2-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	95-50-1	W
1,3-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	541-73-1	W
1,4-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	106-46-7	W
Dichlorodifluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	75-71-8	W
1,1-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	75-34-3	W
1,2-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	107-06-2	W
1,1-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	75-35-4	W
cis-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	156-59-2	W
trans-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	156-60-5	W
1,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	78-87-5	W
1,3-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	142-28-9	W
2,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	594-20-7	W
1,1-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	563-58-6	W
cis-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	10061-01-5	W
trans-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	10061-02-6	W
Diisopropyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	108-20-3	W
Ethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	100-41-4	W
Hexachloro-1,3-butadiene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	87-68-3	W
Isopropylbenzene (Cumene)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	98-82-8	W
p-Isopropyltoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	99-87-6	W
Methylene Chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	75-09-2	W
Methyl-tert-butyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	1634-04-4	W
Naphthalene	<40.0	ug/kg	250	40.0	1	03/13/15 07:30	03/13/15 15:51	91-20-3	W
n-Propylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	103-65-1	W
Styrene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	100-42-5	W
1,1,1,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	630-20-6	W
1,1,1,2,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	79-34-5	W
Tetrachloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	127-18-4	W
Toluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	108-88-3	W
1,2,3-Trichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	87-61-6	W
1,2,4-Trichlorobenzene	<47.6	ug/kg	250	47.6	1	03/13/15 07:30	03/13/15 15:51	120-82-1	W
1,1,1-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	71-55-6	W
1,1,2-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	79-00-5	W
Trichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	79-01-6	W
Trichlorofluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	75-69-4	W

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-5 S5 Lab ID: 40111561010 Collected: 03/11/15 11:10 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>		Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
1,2,3-Trichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	96-18-4	W
1,2,4-Trimethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	95-63-6	W
1,3,5-Trimethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	108-67-8	W
Vinyl chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 15:51	75-01-4	W
Xylene (Total)	<75.0	ug/kg	180	75.0	1	03/13/15 07:30	03/13/15 15:51	1330-20-7	W
<b>Surrogates</b>									
Dibromofluoromethane (S)	91	%	37-152		1	03/13/15 07:30	03/13/15 15:51	1868-53-7	
Toluene-d8 (S)	96	%	38-154		1	03/13/15 07:30	03/13/15 15:51	2037-26-5	
4-Bromofluorobenzene (S)	84	%	39-139		1	03/13/15 07:30	03/13/15 15:51	460-00-4	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87							
Percent Moisture	16.1	%	0.10	0.10	1		03/16/15 15:01		

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

**Sample: GP-5 S3**      **Lab ID: 40111561011**      Collected: 03/11/15 11:00      Received: 03/12/15 08:30      Matrix: Solid  
*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b> Analytical Method: EPA 6010      Preparation Method: EPA 3050									
Arsenic	4.1	mg/kg	2.6	0.84	1	03/16/15 07:20	03/17/15 20:17	7440-38-2	
Barium	86.5	mg/kg	0.66	0.16	1	03/16/15 07:20	03/17/15 20:17	7440-39-3	
Cadmium	0.24J	mg/kg	0.66	0.087	1	03/16/15 07:20	03/17/15 20:17	7440-43-9	
Chromium	22.6	mg/kg	0.66	0.25	1	03/16/15 07:20	03/17/15 20:17	7440-47-3	
Lead	14.7	mg/kg	1.3	0.57	1	03/16/15 07:20	03/17/15 20:17	7439-92-1	
Selenium	<1.0	mg/kg	2.6	1.0	1	03/16/15 07:20	03/17/15 20:17	7782-49-2	
Silver	0.48J	mg/kg	1.3	0.37	1	03/16/15 07:20	03/17/15 20:17	7440-22-4	
<b>7471 Mercury</b> Analytical Method: EPA 7471      Preparation Method: EPA 7471									
Mercury	0.060	mg/kg	0.0078	0.0039	1	03/13/15 12:05	03/16/15 15:36	7439-97-6	
<b>8270 MSSV PAH by SIM</b> Analytical Method: EPA 8270 by SIM      Preparation Method: EPA 3546									
Acenaphthene	<11.3	ug/kg	22.6	11.3	1	03/13/15 08:18	03/13/15 15:50	83-32-9	
Acenaphthylene	<10.1	ug/kg	22.6	10.1	1	03/13/15 08:18	03/13/15 15:50	208-96-8	
Anthracene	<11.7	ug/kg	22.6	11.7	1	03/13/15 08:18	03/13/15 15:50	120-12-7	
Benzo(a)anthracene	16.4J	ug/kg	22.6	7.8	1	03/13/15 08:18	03/13/15 15:50	56-55-3	
Benzo(a)pyrene	17.9J	ug/kg	22.6	8.1	1	03/13/15 08:18	03/13/15 15:50	50-32-8	
Benzo(b)fluoranthene	21.7J	ug/kg	22.6	11.3	1	03/13/15 08:18	03/13/15 15:50	205-99-2	
Benzo(g,h,i)perylene	12.4J	ug/kg	22.6	8.6	1	03/13/15 08:18	03/13/15 15:50	191-24-2	
Benzo(k)fluoranthene	19.2J	ug/kg	22.6	12.5	1	03/13/15 08:18	03/13/15 15:50	207-08-9	
Chrysene	25.6	ug/kg	22.6	10.4	1	03/13/15 08:18	03/13/15 15:50	218-01-9	
Dibenz(a,h)anthracene	<8.3	ug/kg	22.6	8.3	1	03/13/15 08:18	03/13/15 15:50	53-70-3	
Fluoranthene	39.2	ug/kg	22.6	11.3	1	03/13/15 08:18	03/13/15 15:50	206-44-0	
Fluorene	<11.3	ug/kg	22.6	11.3	1	03/13/15 08:18	03/13/15 15:50	86-73-7	L2
Indeno(1,2,3-cd)pyrene	8.7J	ug/kg	22.6	8.6	1	03/13/15 08:18	03/13/15 15:50	193-39-5	
1-Methylnaphthalene	<11.3	ug/kg	22.6	11.3	1	03/13/15 08:18	03/13/15 15:50	90-12-0	
2-Methylnaphthalene	<11.3	ug/kg	22.6	11.3	1	03/13/15 08:18	03/13/15 15:50	91-57-6	
Naphthalene	<11.3	ug/kg	22.6	11.3	1	03/13/15 08:18	03/13/15 15:50	91-20-3	
Phenanthrene	20.0J	ug/kg	22.6	11.3	1	03/13/15 08:18	03/13/15 15:50	85-01-8	
Pyrene	34.9	ug/kg	22.6	11.3	1	03/13/15 08:18	03/13/15 15:50	129-00-0	
<b>Surrogates</b>									
2-Fluorobiphenyl (S)	58	%	39-130		1	03/13/15 08:18	03/13/15 15:50	321-60-8	
Terphenyl-d14 (S)	68	%	37-130		1	03/13/15 08:18	03/13/15 15:50	1718-51-0	
<b>8260 MSV Med Level Normal List</b> Analytical Method: EPA 8260      Preparation Method: EPA 5035/5030B									
Benzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	71-43-2	W
Bromobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	108-86-1	W
Bromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	74-97-5	W
Bromodichloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	75-27-4	W
Bromoform	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	75-25-2	L2,W
Bromomethane	<69.9	ug/kg	250	69.9	1	03/13/15 07:30	03/13/15 16:14	74-83-9	W
n-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	104-51-8	W
sec-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	135-98-8	W
tert-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	98-06-6	W
Carbon tetrachloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	56-23-5	W

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-5 S3 Lab ID: 40111561011 Collected: 03/11/15 11:00 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Chlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	108-90-7	W
Chloroethane	<67.0	ug/kg	250	67.0	1	03/13/15 07:30	03/13/15 16:14	75-00-3	W
Chloroform	<46.4	ug/kg	250	46.4	1	03/13/15 07:30	03/13/15 16:14	67-66-3	W
Chloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	74-87-3	W
2-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	95-49-8	W
4-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	106-43-4	W
1,2-Dibromo-3-chloropropane	<91.2	ug/kg	250	91.2	1	03/13/15 07:30	03/13/15 16:14	96-12-8	W
Dibromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	124-48-1	W
1,2-Dibromoethane (EDB)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	106-93-4	W
Dibromomethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	74-95-3	W
1,2-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	95-50-1	W
1,3-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	541-73-1	W
1,4-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	106-46-7	W
Dichlorodifluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	75-71-8	W
1,1-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	75-34-3	W
1,2-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	107-06-2	W
1,1-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	75-35-4	W
cis-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	156-59-2	W
trans-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	156-60-5	W
1,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	78-87-5	W
1,3-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	142-28-9	W
2,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	594-20-7	W
1,1-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	563-58-6	W
cis-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	10061-01-5	W
trans-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	10061-02-6	W
Diisopropyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	108-20-3	W
Ethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	100-41-4	W
Hexachloro-1,3-butadiene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	87-68-3	W
Isopropylbenzene (Cumene)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	98-82-8	W
p-Isopropyltoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	99-87-6	W
Methylene Chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	75-09-2	W
Methyl-tert-butyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	1634-04-4	W
Naphthalene	<40.0	ug/kg	250	40.0	1	03/13/15 07:30	03/13/15 16:14	91-20-3	W
n-Propylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	103-65-1	W
Styrene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	100-42-5	W
1,1,1,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	630-20-6	W
1,1,1,2,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	79-34-5	W
Tetrachloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	127-18-4	W
Toluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	108-88-3	W
1,2,3-Trichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	87-61-6	W
1,2,4-Trichlorobenzene	<47.6	ug/kg	250	47.6	1	03/13/15 07:30	03/13/15 16:14	120-82-1	W
1,1,1-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	71-55-6	W
1,1,2-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	79-00-5	W
Trichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	79-01-6	W
Trichlorofluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	75-69-4	W

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-5 S3 Lab ID: 40111561011 Collected: 03/11/15 11:00 Received: 03/12/15 08:30 Matrix: Solid  
Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>		Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
1,2,3-Trichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	96-18-4	W
1,2,4-Trimethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	95-63-6	W
1,3,5-Trimethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	108-67-8	W
Vinyl chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:14	75-01-4	W
Xylene (Total)	<75.0	ug/kg	180	75.0	1	03/13/15 07:30	03/13/15 16:14	1330-20-7	W
<b>Surrogates</b>									
Dibromofluoromethane (S)	96	%	37-152		1	03/13/15 07:30	03/13/15 16:14	1868-53-7	
Toluene-d8 (S)	103	%	38-154		1	03/13/15 07:30	03/13/15 16:14	2037-26-5	
4-Bromofluorobenzene (S)	87	%	39-139		1	03/13/15 07:30	03/13/15 16:14	460-00-4	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87							
Percent Moisture	26.1	%	0.10	0.10	1		03/16/15 15:01		

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-8 S2 Lab ID: 40111561012 Collected: 03/11/15 13:30 Received: 03/12/15 08:30 Matrix: Solid  
Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>									
Analytical Method: EPA 6010 Preparation Method: EPA 3050									
Arsenic	8.3	mg/kg	2.3	0.72	1	03/16/15 07:20	03/17/15 20:19	7440-38-2	
Barium	118	mg/kg	0.56	0.13	1	03/16/15 07:20	03/17/15 20:19	7440-39-3	
Cadmium	2.0	mg/kg	0.56	0.074	1	03/16/15 07:20	03/17/15 20:19	7440-43-9	
Chromium	13.1	mg/kg	0.56	0.22	1	03/16/15 07:20	03/17/15 20:19	7440-47-3	
Lead	395	mg/kg	1.1	0.48	1	03/16/15 07:20	03/17/15 20:19	7439-92-1	
Selenium	<0.87	mg/kg	2.3	0.87	1	03/16/15 07:20	03/17/15 20:19	7782-49-2	
Silver	0.60J	mg/kg	1.1	0.31	1	03/16/15 07:20	03/17/15 20:19	7440-22-4	
<b>7471 Mercury</b>									
Analytical Method: EPA 7471 Preparation Method: EPA 7471									
Mercury	0.29	mg/kg	0.0062	0.0031	1	03/13/15 12:05	03/16/15 15:38	7439-97-6	
<b>8270 MSSV PAH by SIM</b>									
Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546									
Acenaphthene	<9.6	ug/kg	19.3	9.6	1	03/13/15 08:18	03/13/15 16:07	83-32-9	
Acenaphthylene	94.2	ug/kg	19.3	8.6	1	03/13/15 08:18	03/13/15 16:07	208-96-8	
Anthracene	115	ug/kg	19.3	10	1	03/13/15 08:18	03/13/15 16:07	120-12-7	
Benzo(a)anthracene	356	ug/kg	19.3	6.7	1	03/13/15 08:18	03/13/15 16:07	56-55-3	
Benzo(a)pyrene	436	ug/kg	19.3	6.9	1	03/13/15 08:18	03/13/15 16:07	50-32-8	
Benzo(b)fluoranthene	570	ug/kg	19.3	9.6	1	03/13/15 08:18	03/13/15 16:07	205-99-2	
Benzo(g,h,i)perylene	319	ug/kg	19.3	7.3	1	03/13/15 08:18	03/13/15 16:07	191-24-2	
Benzo(k)fluoranthene	430	ug/kg	19.3	10.7	1	03/13/15 08:18	03/13/15 16:07	207-08-9	
Chrysene	435	ug/kg	19.3	8.9	1	03/13/15 08:18	03/13/15 16:07	218-01-9	
Dibenz(a,h)anthracene	111	ug/kg	19.3	7.1	1	03/13/15 08:18	03/13/15 16:07	53-70-3	
Fluoranthene	529	ug/kg	19.3	9.6	1	03/13/15 08:18	03/13/15 16:07	206-44-0	
Fluorene	10.0J	ug/kg	19.3	9.6	1	03/13/15 08:18	03/13/15 16:07	86-73-7	L2
Indeno(1,2,3-cd)pyrene	298	ug/kg	19.3	7.3	1	03/13/15 08:18	03/13/15 16:07	193-39-5	
1-Methylnaphthalene	47.8	ug/kg	19.3	9.6	1	03/13/15 08:18	03/13/15 16:07	90-12-0	
2-Methylnaphthalene	92.5	ug/kg	19.3	9.6	1	03/13/15 08:18	03/13/15 16:07	91-57-6	
Naphthalene	254	ug/kg	19.3	9.6	1	03/13/15 08:18	03/13/15 16:07	91-20-3	
Phenanthrene	187	ug/kg	19.3	9.6	1	03/13/15 08:18	03/13/15 16:07	85-01-8	
Pyrene	586	ug/kg	19.3	9.6	1	03/13/15 08:18	03/13/15 16:07	129-00-0	
<b>Surrogates</b>									
2-Fluorobiphenyl (S)	52	%	39-130		1	03/13/15 08:18	03/13/15 16:07	321-60-8	
Terphenyl-d14 (S)	58	%	37-130		1	03/13/15 08:18	03/13/15 16:07	1718-51-0	
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Benzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	71-43-2	W
Bromobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	108-86-1	W
Bromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	74-97-5	W
Bromodichloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	75-27-4	W
Bromoform	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	75-25-2	L2,W
Bromomethane	<69.9	ug/kg	250	69.9	1	03/13/15 07:30	03/13/15 16:36	74-83-9	W
n-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	104-51-8	W
sec-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	135-98-8	W
tert-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	98-06-6	W
Carbon tetrachloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	56-23-5	W

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-8 S2 Lab ID: 40111561012 Collected: 03/11/15 13:30 Received: 03/12/15 08:30 Matrix: Solid  
Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Chlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	108-90-7	W
Chloroethane	<67.0	ug/kg	250	67.0	1	03/13/15 07:30	03/13/15 16:36	75-00-3	W
Chloroform	<46.4	ug/kg	250	46.4	1	03/13/15 07:30	03/13/15 16:36	67-66-3	W
Chloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	74-87-3	W
2-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	95-49-8	W
4-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	106-43-4	W
1,2-Dibromo-3-chloropropane	<91.2	ug/kg	250	91.2	1	03/13/15 07:30	03/13/15 16:36	96-12-8	W
Dibromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	124-48-1	W
1,2-Dibromoethane (EDB)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	106-93-4	W
Dibromomethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	74-95-3	W
1,2-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	95-50-1	W
1,3-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	541-73-1	W
1,4-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	106-46-7	W
Dichlorodifluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	75-71-8	W
1,1-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	75-34-3	W
1,2-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	107-06-2	W
1,1-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	75-35-4	W
cis-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	156-59-2	W
trans-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	156-60-5	W
1,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	78-87-5	W
1,3-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	142-28-9	W
2,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	594-20-7	W
1,1-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	563-58-6	W
cis-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	10061-01-5	W
trans-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	10061-02-6	W
Diisopropyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	108-20-3	W
Ethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	100-41-4	W
Hexachloro-1,3-butadiene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	87-68-3	W
Isopropylbenzene (Cumene)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	98-82-8	W
p-Isopropyltoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	99-87-6	W
Methylene Chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	75-09-2	W
Methyl-tert-butyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	1634-04-4	W
Naphthalene	106J	ug/kg	289	46.3	1	03/13/15 07:30	03/13/15 16:36	91-20-3	
n-Propylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	103-65-1	W
Styrene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	100-42-5	W
1,1,1,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	630-20-6	W
1,1,2,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	79-34-5	W
Tetrachloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	127-18-4	W
Toluene	169	ug/kg	69.4	28.9	1	03/13/15 07:30	03/13/15 16:36	108-88-3	
1,2,3-Trichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	87-61-6	W
1,2,4-Trichlorobenzene	<47.6	ug/kg	250	47.6	1	03/13/15 07:30	03/13/15 16:36	120-82-1	W
1,1,1-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	71-55-6	W
1,1,2-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	79-00-5	W
Trichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	79-01-6	W
Trichlorofluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	75-69-4	W

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-8 S2 Lab ID: 40111561012 Collected: 03/11/15 13:30 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>		Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
1,2,3-Trichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	96-18-4	W
1,2,4-Trimethylbenzene	77.2	ug/kg	69.4	28.9	1	03/13/15 07:30	03/13/15 16:36	95-63-6	
1,3,5-Trimethylbenzene	36.4J	ug/kg	69.4	28.9	1	03/13/15 07:30	03/13/15 16:36	108-67-8	
Vinyl chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:36	75-01-4	W
Xylene (Total)	248	ug/kg	208	86.8	1	03/13/15 07:30	03/13/15 16:36	1330-20-7	
<b>Surrogates</b>									
Dibromofluoromethane (S)	103	%	37-152		1	03/13/15 07:30	03/13/15 16:36	1868-53-7	
Toluene-d8 (S)	107	%	38-154		1	03/13/15 07:30	03/13/15 16:36	2037-26-5	
4-Bromofluorobenzene (S)	95	%	39-139		1	03/13/15 07:30	03/13/15 16:36	460-00-4	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87							
Percent Moisture	13.6	%	0.10	0.10	1		03/16/15 15:01		

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: **GP-8 S3** Lab ID: **40111561013** Collected: 03/11/15 13:30 Received: 03/12/15 08:30 Matrix: Solid  
Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>									
Analytical Method: EPA 6010 Preparation Method: EPA 3050									
Arsenic	2.6	mg/kg	2.3	0.73	1	03/16/15 07:20	03/17/15 20:22	7440-38-2	
Barium	87.4	mg/kg	0.57	0.14	1	03/16/15 07:20	03/17/15 20:22	7440-39-3	
Cadmium	<0.075	mg/kg	0.57	0.075	1	03/16/15 07:20	03/17/15 20:22	7440-43-9	
Chromium	22.2	mg/kg	0.57	0.22	1	03/16/15 07:20	03/17/15 20:22	7440-47-3	
Lead	7.5	mg/kg	1.1	0.49	1	03/16/15 07:20	03/17/15 20:22	7439-92-1	
Selenium	<0.88	mg/kg	2.3	0.88	1	03/16/15 07:20	03/17/15 20:22	7782-49-2	
Silver	<0.32	mg/kg	1.1	0.32	1	03/16/15 07:20	03/17/15 20:22	7440-22-4	
<b>7471 Mercury</b>									
Analytical Method: EPA 7471 Preparation Method: EPA 7471									
Mercury	0.021	mg/kg	0.0064	0.0032	1	03/13/15 12:05	03/16/15 15:40	7439-97-6	
<b>8270 MSSV PAH by SIM</b>									
Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546									
Acenaphthene	<10.5	ug/kg	21.0	10.5	1	03/13/15 08:18	03/13/15 13:49	83-32-9	
Acenaphthylene	<9.4	ug/kg	21.0	9.4	1	03/13/15 08:18	03/13/15 13:49	208-96-8	
Anthracene	<10.9	ug/kg	21.0	10.9	1	03/13/15 08:18	03/13/15 13:49	120-12-7	
Benzo(a)anthracene	<7.3	ug/kg	21.0	7.3	1	03/13/15 08:18	03/13/15 13:49	56-55-3	
Benzo(a)pyrene	<7.5	ug/kg	21.0	7.5	1	03/13/15 08:18	03/13/15 13:49	50-32-8	
Benzo(b)fluoranthene	<10.5	ug/kg	21.0	10.5	1	03/13/15 08:18	03/13/15 13:49	205-99-2	
Benzo(g,h,i)perylene	<8.0	ug/kg	21.0	8.0	1	03/13/15 08:18	03/13/15 13:49	191-24-2	
Benzo(k)fluoranthene	<11.6	ug/kg	21.0	11.6	1	03/13/15 08:18	03/13/15 13:49	207-08-9	
Chrysene	<9.7	ug/kg	21.0	9.7	1	03/13/15 08:18	03/13/15 13:49	218-01-9	
Dibenz(a,h)anthracene	<7.7	ug/kg	21.0	7.7	1	03/13/15 08:18	03/13/15 13:49	53-70-3	
Fluoranthene	<10.5	ug/kg	21.0	10.5	1	03/13/15 08:18	03/13/15 13:49	206-44-0	
Fluorene	<10.5	ug/kg	21.0	10.5	1	03/13/15 08:18	03/13/15 13:49	86-73-7	L2
Indeno(1,2,3-cd)pyrene	<8.0	ug/kg	21.0	8.0	1	03/13/15 08:18	03/13/15 13:49	193-39-5	
1-Methylnaphthalene	<10.5	ug/kg	21.0	10.5	1	03/13/15 08:18	03/13/15 13:49	90-12-0	
2-Methylnaphthalene	<10.5	ug/kg	21.0	10.5	1	03/13/15 08:18	03/13/15 13:49	91-57-6	
Naphthalene	<10.5	ug/kg	21.0	10.5	1	03/13/15 08:18	03/13/15 13:49	91-20-3	
Phenanthrene	<10.5	ug/kg	21.0	10.5	1	03/13/15 08:18	03/13/15 13:49	85-01-8	
Pyrene	<10.5	ug/kg	21.0	10.5	1	03/13/15 08:18	03/13/15 13:49	129-00-0	
<b>Surrogates</b>									
2-Fluorobiphenyl (S)	64	%	39-130		1	03/13/15 08:18	03/13/15 13:49	321-60-8	
Terphenyl-d14 (S)	76	%	37-130		1	03/13/15 08:18	03/13/15 13:49	1718-51-0	
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Benzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	71-43-2	W
Bromobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	108-86-1	W
Bromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	74-97-5	W
Bromodichloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	75-27-4	W
Bromoform	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	75-25-2	L2,W
Bromomethane	<69.9	ug/kg	250	69.9	1	03/13/15 07:30	03/13/15 16:59	74-83-9	W
n-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	104-51-8	W
sec-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	135-98-8	W
tert-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	98-06-6	W
Carbon tetrachloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	56-23-5	W

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-8 S3 Lab ID: 40111561013 Collected: 03/11/15 13:30 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Chlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	108-90-7	W
Chloroethane	<67.0	ug/kg	250	67.0	1	03/13/15 07:30	03/13/15 16:59	75-00-3	W
Chloroform	<46.4	ug/kg	250	46.4	1	03/13/15 07:30	03/13/15 16:59	67-66-3	W
Chloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	74-87-3	W
2-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	95-49-8	W
4-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	106-43-4	W
1,2-Dibromo-3-chloropropane	<91.2	ug/kg	250	91.2	1	03/13/15 07:30	03/13/15 16:59	96-12-8	W
Dibromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	124-48-1	W
1,2-Dibromoethane (EDB)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	106-93-4	W
Dibromomethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	74-95-3	W
1,2-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	95-50-1	W
1,3-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	541-73-1	W
1,4-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	106-46-7	W
Dichlorodifluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	75-71-8	W
1,1-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	75-34-3	W
1,2-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	107-06-2	W
1,1-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	75-35-4	W
cis-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	156-59-2	W
trans-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	156-60-5	W
1,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	78-87-5	W
1,3-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	142-28-9	W
2,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	594-20-7	W
1,1-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	563-58-6	W
cis-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	10061-01-5	W
trans-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	10061-02-6	W
Diisopropyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	108-20-3	W
Ethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	100-41-4	W
Hexachloro-1,3-butadiene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	87-68-3	W
Isopropylbenzene (Cumene)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	98-82-8	W
p-Isopropyltoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	99-87-6	W
Methylene Chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	75-09-2	W
Methyl-tert-butyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	1634-04-4	W
Naphthalene	<40.0	ug/kg	250	40.0	1	03/13/15 07:30	03/13/15 16:59	91-20-3	W
n-Propylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	103-65-1	W
Styrene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	100-42-5	W
1,1,1,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	630-20-6	W
1,1,2,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	79-34-5	W
Tetrachloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	127-18-4	W
Toluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	108-88-3	W
1,2,3-Trichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	87-61-6	W
1,2,4-Trichlorobenzene	<47.6	ug/kg	250	47.6	1	03/13/15 07:30	03/13/15 16:59	120-82-1	W
1,1,1-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	71-55-6	W
1,1,2-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	79-00-5	W
Trichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	79-01-6	W
Trichlorofluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	75-69-4	W

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-8 S3 Lab ID: 40111561013 Collected: 03/11/15 13:30 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>		Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
1,2,3-Trichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	96-18-4	W
1,2,4-Trimethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	95-63-6	W
1,3,5-Trimethylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	108-67-8	W
Vinyl chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 16:59	75-01-4	W
Xylene (Total)	<75.0	ug/kg	180	75.0	1	03/13/15 07:30	03/13/15 16:59	1330-20-7	W
<b>Surrogates</b>									
Dibromofluoromethane (S)	110	%	37-152		1	03/13/15 07:30	03/13/15 16:59	1868-53-7	
Toluene-d8 (S)	121	%	38-154		1	03/13/15 07:30	03/13/15 16:59	2037-26-5	
4-Bromofluorobenzene (S)	111	%	39-139		1	03/13/15 07:30	03/13/15 16:59	460-00-4	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87							
Percent Moisture	20.7	%	0.10	0.10	1		03/16/15 15:01		

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-7 S1 Lab ID: 40111561014 Collected: 03/11/15 13:15 Received: 03/12/15 08:30 Matrix: Solid  
Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b> Analytical Method: EPA 6010 Preparation Method: EPA 3050									
Arsenic	10.6	mg/kg	2.2	0.71	1	03/16/15 07:20	03/17/15 20:24	7440-38-2	
Barium	81.6	mg/kg	0.56	0.13	1	03/16/15 07:20	03/17/15 20:24	7440-39-3	
Cadmium	1.2	mg/kg	0.56	0.074	1	03/16/15 07:20	03/17/15 20:24	7440-43-9	
Chromium	14.4	mg/kg	0.56	0.22	1	03/16/15 07:20	03/17/15 20:24	7440-47-3	
Lead	248	mg/kg	1.1	0.48	1	03/16/15 07:20	03/17/15 20:24	7439-92-1	
Selenium	<0.86	mg/kg	2.2	0.86	1	03/16/15 07:20	03/17/15 20:24	7782-49-2	
Silver	0.47J	mg/kg	1.1	0.31	1	03/16/15 07:20	03/17/15 20:24	7440-22-4	
<b>7471 Mercury</b> Analytical Method: EPA 7471 Preparation Method: EPA 7471									
Mercury	0.064	mg/kg	0.0080	0.0040	1	03/13/15 12:05	03/16/15 15:43	7439-97-6	
<b>8270 MSSV PAH by SIM</b> Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546									
Acenaphthene	<40.2	ug/kg	80.4	40.2	4	03/13/15 08:18	03/13/15 16:42	83-32-9	
Acenaphthylene	489	ug/kg	80.4	36.0	4	03/13/15 08:18	03/13/15 16:42	208-96-8	
Anthracene	324	ug/kg	80.4	41.7	4	03/13/15 08:18	03/13/15 16:42	120-12-7	
Benzo(a)anthracene	844	ug/kg	80.4	27.9	4	03/13/15 08:18	03/13/15 16:42	56-55-3	
Benzo(a)pyrene	1000	ug/kg	80.4	28.8	4	03/13/15 08:18	03/13/15 16:42	50-32-8	
Benzo(b)fluoranthene	859	ug/kg	80.4	40.2	4	03/13/15 08:18	03/13/15 16:42	205-99-2	
Benzo(g,h,i)perylene	540	ug/kg	80.4	30.6	4	03/13/15 08:18	03/13/15 16:42	191-24-2	
Benzo(k)fluoranthene	947	ug/kg	80.4	44.5	4	03/13/15 08:18	03/13/15 16:42	207-08-9	
Chrysene	824	ug/kg	80.4	37.2	4	03/13/15 08:18	03/13/15 16:42	218-01-9	
Dibenz(a,h)anthracene	181	ug/kg	80.4	29.5	4	03/13/15 08:18	03/13/15 16:42	53-70-3	
Fluoranthene	1260	ug/kg	80.4	40.2	4	03/13/15 08:18	03/13/15 16:42	206-44-0	
Fluorene	<40.2	ug/kg	80.4	40.2	4	03/13/15 08:18	03/13/15 16:42	86-73-7	L2
Indeno(1,2,3-cd)pyrene	523	ug/kg	80.4	30.6	4	03/13/15 08:18	03/13/15 16:42	193-39-5	
1-Methylnaphthalene	212	ug/kg	80.4	40.2	4	03/13/15 08:18	03/13/15 16:42	90-12-0	
2-Methylnaphthalene	409	ug/kg	80.4	40.2	4	03/13/15 08:18	03/13/15 16:42	91-57-6	
Naphthalene	538	ug/kg	80.4	40.2	4	03/13/15 08:18	03/13/15 16:42	91-20-3	
Phenanthrene	587	ug/kg	80.4	40.2	4	03/13/15 08:18	03/13/15 16:42	85-01-8	
Pyrene	1330	ug/kg	80.4	40.2	4	03/13/15 08:18	03/13/15 16:42	129-00-0	
<b>Surrogates</b>									
2-Fluorobiphenyl (S)	42	%	39-130		4	03/13/15 08:18	03/13/15 16:42	321-60-8	
Terphenyl-d14 (S)	51	%	37-130		4	03/13/15 08:18	03/13/15 16:42	1718-51-0	
<b>8260 MSV Med Level Normal List</b> Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Benzene	65.5J	ug/kg	72.4	30.2	1	03/13/15 07:30	03/13/15 17:22	71-43-2	
Bromobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	108-86-1	W
Bromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	74-97-5	W
Bromodichloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	75-27-4	W
Bromoform	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	75-25-2	L2,W
Bromomethane	<69.9	ug/kg	250	69.9	1	03/13/15 07:30	03/13/15 17:22	74-83-9	W
n-Butylbenzene	71.4J	ug/kg	72.4	30.2	1	03/13/15 07:30	03/13/15 17:22	104-51-8	
sec-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	135-98-8	W
tert-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	98-06-6	W
Carbon tetrachloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	56-23-5	W

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: **GP-7 S1** Lab ID: **40111561014** Collected: 03/11/15 13:15 Received: 03/12/15 08:30 Matrix: Solid  
Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Chlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	108-90-7	W
Chloroethane	<67.0	ug/kg	250	67.0	1	03/13/15 07:30	03/13/15 17:22	75-00-3	W
Chloroform	<46.4	ug/kg	250	46.4	1	03/13/15 07:30	03/13/15 17:22	67-66-3	W
Chloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	74-87-3	W
2-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	95-49-8	W
4-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	106-43-4	W
1,2-Dibromo-3-chloropropane	<91.2	ug/kg	250	91.2	1	03/13/15 07:30	03/13/15 17:22	96-12-8	W
Dibromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	124-48-1	W
1,2-Dibromoethane (EDB)	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	106-93-4	W
Dibromomethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	74-95-3	W
1,2-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	95-50-1	W
1,3-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	541-73-1	W
1,4-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	106-46-7	W
Dichlorodifluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	75-71-8	W
1,1-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	75-34-3	W
1,2-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	107-06-2	W
1,1-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	75-35-4	W
cis-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	156-59-2	W
trans-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	156-60-5	W
1,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	78-87-5	W
1,3-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	142-28-9	W
2,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	594-20-7	W
1,1-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	563-58-6	W
cis-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	10061-01-5	W
trans-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	10061-02-6	W
Diisopropyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	108-20-3	W
Ethylbenzene	126	ug/kg	72.4	30.2	1	03/13/15 07:30	03/13/15 17:22	100-41-4	
Hexachloro-1,3-butadiene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	87-68-3	W
Isopropylbenzene (Cumene)	32.2J	ug/kg	72.4	30.2	1	03/13/15 07:30	03/13/15 17:22	98-82-8	
p-Isopropyltoluene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	99-87-6	W
Methylene Chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	75-09-2	W
Methyl-tert-butyl ether	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	1634-04-4	W
Naphthalene	259J	ug/kg	302	48.3	1	03/13/15 07:30	03/13/15 17:22	91-20-3	
n-Propylbenzene	71.6J	ug/kg	72.4	30.2	1	03/13/15 07:30	03/13/15 17:22	103-65-1	
Styrene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	100-42-5	W
1,1,1,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	630-20-6	W
1,1,1,2,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	79-34-5	W
Tetrachloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	127-18-4	W
Toluene	354	ug/kg	72.4	30.2	1	03/13/15 07:30	03/13/15 17:22	108-88-3	
1,2,3-Trichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	87-61-6	W
1,2,4-Trichlorobenzene	<47.6	ug/kg	250	47.6	1	03/13/15 07:30	03/13/15 17:22	120-82-1	W
1,1,1-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	71-55-6	W
1,1,2-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	79-00-5	W
Trichloroethene	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	79-01-6	W
Trichlorofluoromethane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	75-69-4	W

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## ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY

Pace Project No.: 40111561

Sample: GP-7 S1 Lab ID: 40111561014 Collected: 03/11/15 13:15 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>		Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
1,2,3-Trichloropropane	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	96-18-4	W
1,2,4-Trimethylbenzene	397	ug/kg	72.4	30.2	1	03/13/15 07:30	03/13/15 17:22	95-63-6	
1,3,5-Trimethylbenzene	165	ug/kg	72.4	30.2	1	03/13/15 07:30	03/13/15 17:22	108-67-8	
Vinyl chloride	<25.0	ug/kg	60.0	25.0	1	03/13/15 07:30	03/13/15 17:22	75-01-4	W
Xylene (Total)	776	ug/kg	217	90.5	1	03/13/15 07:30	03/13/15 17:22	1330-20-7	
<b>Surrogates</b>									
Dibromofluoromethane (S)	102	%	37-152		1	03/13/15 07:30	03/13/15 17:22	1868-53-7	
Toluene-d8 (S)	105	%	38-154		1	03/13/15 07:30	03/13/15 17:22	2037-26-5	
4-Bromofluorobenzene (S)	96	%	39-139		1	03/13/15 07:30	03/13/15 17:22	460-00-4	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87							
Percent Moisture	17.1	%	0.10	0.10	1		03/16/15 15:01		

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY

Pace Project No.: 40111561

Sample: GP-5 Lab ID: 40111561015 Collected: 03/11/15 00:00 Received: 03/12/15 08:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV</b>									
Analytical Method: EPA 8260									
Benzene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	71-43-2	
Bromobenzene	<0.23	ug/L	1.0	0.23	1		03/13/15 15:16	108-86-1	
Bromochloromethane	<0.34	ug/L	1.0	0.34	1		03/13/15 15:16	74-97-5	
Bromodichloromethane	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	75-27-4	
Bromoform	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	75-25-2	
Bromomethane	<2.4	ug/L	5.0	2.4	1		03/13/15 15:16	74-83-9	
n-Butylbenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	104-51-8	
sec-Butylbenzene	<2.2	ug/L	5.0	2.2	1		03/13/15 15:16	135-98-8	
tert-Butylbenzene	<0.18	ug/L	1.0	0.18	1		03/13/15 15:16	98-06-6	
Carbon tetrachloride	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	56-23-5	
Chlorobenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	108-90-7	
Chloroethane	<0.37	ug/L	1.0	0.37	1		03/13/15 15:16	75-00-3	
Chloroform	<2.5	ug/L	5.0	2.5	1		03/13/15 15:16	67-66-3	
Chloromethane	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	74-87-3	
2-Chlorotoluene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	95-49-8	
4-Chlorotoluene	<0.21	ug/L	1.0	0.21	1		03/13/15 15:16	106-43-4	
1,2-Dibromo-3-chloropropane	<2.2	ug/L	5.0	2.2	1		03/13/15 15:16	96-12-8	
Dibromochloromethane	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	124-48-1	
1,2-Dibromoethane (EDB)	<0.18	ug/L	1.0	0.18	1		03/13/15 15:16	106-93-4	
Dibromomethane	<0.43	ug/L	1.0	0.43	1		03/13/15 15:16	74-95-3	
1,2-Dichlorobenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	95-50-1	
1,3-Dichlorobenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	541-73-1	
1,4-Dichlorobenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	106-46-7	
Dichlorodifluoromethane	<0.22	ug/L	1.0	0.22	1		03/13/15 15:16	75-71-8	
1,1-Dichloroethane	<0.24	ug/L	1.0	0.24	1		03/13/15 15:16	75-34-3	
1,2-Dichloroethane	<0.17	ug/L	1.0	0.17	1		03/13/15 15:16	107-06-2	
1,1-Dichloroethene	<0.41	ug/L	1.0	0.41	1		03/13/15 15:16	75-35-4	
cis-1,2-Dichloroethene	<0.26	ug/L	1.0	0.26	1		03/13/15 15:16	156-59-2	
trans-1,2-Dichloroethene	<0.26	ug/L	1.0	0.26	1		03/13/15 15:16	156-60-5	
1,2-Dichloropropane	<0.23	ug/L	1.0	0.23	1		03/13/15 15:16	78-87-5	
1,3-Dichloropropane	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	142-28-9	
2,2-Dichloropropane	<0.48	ug/L	1.0	0.48	1		03/13/15 15:16	594-20-7	
1,1-Dichloropropene	<0.44	ug/L	1.0	0.44	1		03/13/15 15:16	563-58-6	
cis-1,3-Dichloropropene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	10061-01-5	
trans-1,3-Dichloropropene	<0.23	ug/L	1.0	0.23	1		03/13/15 15:16	10061-02-6	
Diisopropyl ether	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	108-20-3	
Ethylbenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	100-41-4	
Hexachloro-1,3-butadiene	<2.1	ug/L	5.0	2.1	1		03/13/15 15:16	87-68-3	
Isopropylbenzene (Cumene)	<0.14	ug/L	1.0	0.14	1		03/13/15 15:16	98-82-8	
p-Isopropyltoluene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	99-87-6	
Methylene Chloride	<0.23	ug/L	1.0	0.23	1		03/13/15 15:16	75-09-2	
Methyl-tert-butyl ether	<0.17	ug/L	1.0	0.17	1		03/13/15 15:16	1634-04-4	
Naphthalene	<2.5	ug/L	5.0	2.5	1		03/13/15 15:16	91-20-3	
n-Propylbenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	103-65-1	
Styrene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	100-42-5	
1,1,1,2-Tetrachloroethane	<0.18	ug/L	1.0	0.18	1		03/13/15 15:16	630-20-6	

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY

Pace Project No.: 40111561

Sample: GP-5 Lab ID: 40111561015 Collected: 03/11/15 00:00 Received: 03/12/15 08:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV</b>									
Analytical Method: EPA 8260									
1,1,2,2-Tetrachloroethane	<0.25	ug/L	1.0	0.25	1		03/13/15 15:16	79-34-5	
Tetrachloroethene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	127-18-4	
Toluene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	108-88-3	
1,2,3-Trichlorobenzene	<2.1	ug/L	5.0	2.1	1		03/13/15 15:16	87-61-6	
1,2,4-Trichlorobenzene	<2.2	ug/L	5.0	2.2	1		03/13/15 15:16	120-82-1	
1,1,1-Trichloroethane	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	71-55-6	
1,1,2-Trichloroethane	<0.20	ug/L	1.0	0.20	1		03/13/15 15:16	79-00-5	
Trichloroethene	<0.33	ug/L	1.0	0.33	1		03/13/15 15:16	79-01-6	
Trichlorofluoromethane	<0.18	ug/L	1.0	0.18	1		03/13/15 15:16	75-69-4	
1,2,3-Trichloropropane	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	96-18-4	
1,2,4-Trimethylbenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	95-63-6	
1,3,5-Trimethylbenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:16	108-67-8	
Vinyl chloride	<0.18	ug/L	1.0	0.18	1		03/13/15 15:16	75-01-4	
Xylene (Total)	<1.5	ug/L	3.0	1.5	1		03/13/15 15:16	1330-20-7	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	94	%	70-130		1		03/13/15 15:16	460-00-4	
Dibromofluoromethane (S)	120	%	70-130		1		03/13/15 15:16	1868-53-7	
Toluene-d8 (S)	91	%	70-130		1		03/13/15 15:16	2037-26-5	

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: **GP-6 S2** Lab ID: **40111561016** Collected: 03/11/15 14:00 Received: 03/12/15 08:30 Matrix: Solid  
Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b> Analytical Method: EPA 6010 Preparation Method: EPA 3050									
Arsenic	23.7	mg/kg	2.8	0.88	1	03/16/15 07:20	03/17/15 20:26	7440-38-2	
Barium	1920	mg/kg	0.69	0.17	1	03/16/15 07:20	03/17/15 20:26	7440-39-3	
Cadmium	1.1	mg/kg	0.69	0.092	1	03/16/15 07:20	03/17/15 20:26	7440-43-9	
Chromium	69.7	mg/kg	0.69	0.27	1	03/16/15 07:20	03/17/15 20:26	7440-47-3	
Lead	835	mg/kg	1.4	0.60	1	03/16/15 07:20	03/17/15 20:26	7439-92-1	
Selenium	<1.1	mg/kg	2.8	1.1	1	03/16/15 07:20	03/17/15 20:26	7782-49-2	
Silver	0.83J	mg/kg	1.4	0.39	1	03/16/15 07:20	03/17/15 20:26	7440-22-4	
<b>7471 Mercury</b> Analytical Method: EPA 7471 Preparation Method: EPA 7471									
Mercury	0.36	mg/kg	0.0094	0.0047	1	03/13/15 12:05	03/16/15 15:45	7439-97-6	
<b>8270 MSSV PAH by SIM</b> Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546									
Acenaphthene	<66.6	ug/kg	133	66.6	5	03/13/15 08:18	03/13/15 16:59	83-32-9	
Acenaphthylene	1240	ug/kg	133	59.6	5	03/13/15 08:18	03/13/15 16:59	208-96-8	
Anthracene	859	ug/kg	133	69.0	5	03/13/15 08:18	03/13/15 16:59	120-12-7	
Benzo(a)anthracene	1360	ug/kg	133	46.2	5	03/13/15 08:18	03/13/15 16:59	56-55-3	
Benzo(a)pyrene	1930	ug/kg	133	47.6	5	03/13/15 08:18	03/13/15 16:59	50-32-8	
Benzo(b)fluoranthene	1520	ug/kg	133	66.6	5	03/13/15 08:18	03/13/15 16:59	205-99-2	
Benzo(g,h,i)perylene	1120	ug/kg	133	50.7	5	03/13/15 08:18	03/13/15 16:59	191-24-2	
Benzo(k)fluoranthene	1390	ug/kg	133	73.7	5	03/13/15 08:18	03/13/15 16:59	207-08-9	
Chrysene	1680	ug/kg	133	61.6	5	03/13/15 08:18	03/13/15 16:59	218-01-9	
Dibenz(a,h)anthracene	338	ug/kg	133	48.8	5	03/13/15 08:18	03/13/15 16:59	53-70-3	
Fluoranthene	1820	ug/kg	133	66.6	5	03/13/15 08:18	03/13/15 16:59	206-44-0	
Fluorene	103J	ug/kg	133	66.6	5	03/13/15 08:18	03/13/15 16:59	86-73-7	L2
Indeno(1,2,3-cd)pyrene	993	ug/kg	133	50.6	5	03/13/15 08:18	03/13/15 16:59	193-39-5	
1-Methylnaphthalene	340	ug/kg	133	66.6	5	03/13/15 08:18	03/13/15 16:59	90-12-0	
2-Methylnaphthalene	605	ug/kg	133	66.6	5	03/13/15 08:18	03/13/15 16:59	91-57-6	
Naphthalene	1590	ug/kg	133	66.6	5	03/13/15 08:18	03/13/15 16:59	91-20-3	
Phenanthrene	701	ug/kg	133	66.6	5	03/13/15 08:18	03/13/15 16:59	85-01-8	
Pyrene	2110	ug/kg	133	66.6	5	03/13/15 08:18	03/13/15 16:59	129-00-0	
<b>Surrogates</b>									
2-Fluorobiphenyl (S)	46	%	39-130		5	03/13/15 08:18	03/13/15 16:59	321-60-8	
Terphenyl-d14 (S)	51	%	37-130		5	03/13/15 08:18	03/13/15 16:59	1718-51-0	
<b>8260 MSV Med Level Normal List</b> Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Benzene	178	ug/kg	95.9	39.9	1	03/16/15 07:50	03/16/15 11:50	71-43-2	
Bromobenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	108-86-1	W
Bromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	74-97-5	W
Bromodichloromethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	75-27-4	W
Bromoform	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	75-25-2	W
Bromomethane	<69.9	ug/kg	250	69.9	1	03/16/15 07:50	03/16/15 11:50	74-83-9	W
n-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	104-51-8	W
sec-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	135-98-8	W
tert-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	98-06-6	W
Carbon tetrachloride	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	56-23-5	W

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-6 S2 Lab ID: 40111561016 Collected: 03/11/15 14:00 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Chlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	108-90-7	W
Chloroethane	<67.0	ug/kg	250	67.0	1	03/16/15 07:50	03/16/15 11:50	75-00-3	W
Chloroform	<46.4	ug/kg	250	46.4	1	03/16/15 07:50	03/16/15 11:50	67-66-3	W
Chloromethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	74-87-3	W
2-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	95-49-8	W
4-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	106-43-4	W
1,2-Dibromo-3-chloropropane	<91.2	ug/kg	250	91.2	1	03/16/15 07:50	03/16/15 11:50	96-12-8	W
Dibromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	124-48-1	W
1,2-Dibromoethane (EDB)	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	106-93-4	W
Dibromomethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	74-95-3	W
1,2-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	95-50-1	W
1,3-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	541-73-1	W
1,4-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	106-46-7	W
Dichlorodifluoromethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	75-71-8	W
1,1-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	75-34-3	W
1,2-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	107-06-2	W
1,1-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	75-35-4	W
cis-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	156-59-2	W
trans-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	156-60-5	W
1,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	78-87-5	W
1,3-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	142-28-9	W
2,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	594-20-7	W
1,1-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	563-58-6	W
cis-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	10061-01-5	W
trans-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	10061-02-6	W
Diisopropyl ether	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	108-20-3	W
Ethylbenzene	81.8J	ug/kg	95.9	39.9	1	03/16/15 07:50	03/16/15 11:50	100-41-4	W
Hexachloro-1,3-butadiene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	87-68-3	W
Isopropylbenzene (Cumene)	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	98-82-8	W
p-Isopropyltoluene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	99-87-6	W
Methylene Chloride	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	75-09-2	W
Methyl-tert-butyl ether	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	1634-04-4	W
Naphthalene	2090	ug/kg	399	64.0	1	03/16/15 07:50	03/16/15 11:50	91-20-3	W
n-Propylbenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	103-65-1	W
Styrene	72.7J	ug/kg	95.9	39.9	1	03/16/15 07:50	03/16/15 11:50	100-42-5	W
1,1,1,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	630-20-6	W
1,1,2,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	79-34-5	W
Tetrachloroethene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	127-18-4	W
Toluene	324	ug/kg	95.9	39.9	1	03/16/15 07:50	03/16/15 11:50	108-88-3	W
1,2,3-Trichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	87-61-6	W
1,2,4-Trichlorobenzene	<47.6	ug/kg	250	47.6	1	03/16/15 07:50	03/16/15 11:50	120-82-1	W
1,1,1-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	71-55-6	W
1,1,2-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	79-00-5	W
Trichloroethene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	79-01-6	W
Trichlorofluoromethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	75-69-4	W

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: **GP-6 S2** Lab ID: **40111561016** Collected: 03/11/15 14:00 Received: 03/12/15 08:30 Matrix: Solid  
*Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.*

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>		Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
1,2,3-Trichloropropane	<b>&lt;25.0</b>	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	96-18-4	W
1,2,4-Trimethylbenzene	<b>190</b>	ug/kg	95.9	39.9	1	03/16/15 07:50	03/16/15 11:50	95-63-6	
1,3,5-Trimethylbenzene	<b>78.4J</b>	ug/kg	95.9	39.9	1	03/16/15 07:50	03/16/15 11:50	108-67-8	
Vinyl chloride	<b>&lt;25.0</b>	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 11:50	75-01-4	W
Xylene (Total)	<b>404</b>	ug/kg	288	120	1	03/16/15 07:50	03/16/15 11:50	1330-20-7	
<b>Surrogates</b>									
Dibromofluoromethane (S)	85	%	49-157		1	03/16/15 07:50	03/16/15 11:50	1868-53-7	
Toluene-d8 (S)	85	%	61-148		1	03/16/15 07:50	03/16/15 11:50	2037-26-5	
4-Bromofluorobenzene (S)	75	%	53-134		1	03/16/15 07:50	03/16/15 11:50	460-00-4	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87							
Percent Moisture	<b>37.4</b>	%	0.10	0.10	1		03/16/15 15:01		

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-9 S1 Lab ID: 40111561017 Collected: 03/11/15 14:30 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>									
Analytical Method: EPA 6010 Preparation Method: EPA 3050									
Arsenic	5.1	mg/kg	2.0	0.65	1	03/16/15 07:20	03/17/15 20:33	7440-38-2	
Barium	61.5	mg/kg	0.51	0.12	1	03/16/15 07:20	03/17/15 20:33	7440-39-3	
Cadmium	0.34J	mg/kg	0.51	0.067	1	03/16/15 07:20	03/17/15 20:33	7440-43-9	
Chromium	11.5	mg/kg	0.51	0.20	1	03/16/15 07:20	03/17/15 20:33	7440-47-3	
Lead	59.8	mg/kg	1.0	0.44	1	03/16/15 07:20	03/17/15 20:33	7439-92-1	
Selenium	<0.78	mg/kg	2.0	0.78	1	03/16/15 07:20	03/17/15 20:33	7782-49-2	
Silver	0.57J	mg/kg	1.0	0.28	1	03/16/15 07:20	03/17/15 20:33	7440-22-4	
<b>7471 Mercury</b>									
Analytical Method: EPA 7471 Preparation Method: EPA 7471									
Mercury	0.23	mg/kg	0.0073	0.0037	1	03/13/15 12:05	03/16/15 15:47	7439-97-6	
<b>8270 MSSV PAH by SIM</b>									
Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546									
Acenaphthene	20.1J	ug/kg	37.4	18.7	2	03/13/15 08:18	03/13/15 17:16	83-32-9	
Acenaphthylene	186	ug/kg	37.4	16.7	2	03/13/15 08:18	03/13/15 17:16	208-96-8	
Anthracene	162	ug/kg	37.4	19.4	2	03/13/15 08:18	03/13/15 17:16	120-12-7	
Benzo(a)anthracene	502	ug/kg	37.4	13.0	2	03/13/15 08:18	03/13/15 17:16	56-55-3	
Benzo(a)pyrene	624	ug/kg	37.4	13.4	2	03/13/15 08:18	03/13/15 17:16	50-32-8	
Benzo(b)fluoranthene	524	ug/kg	37.4	18.7	2	03/13/15 08:18	03/13/15 17:16	205-99-2	
Benzo(g,h,i)perylene	281	ug/kg	37.4	14.2	2	03/13/15 08:18	03/13/15 17:16	191-24-2	
Benzo(k)fluoranthene	558	ug/kg	37.4	20.7	2	03/13/15 08:18	03/13/15 17:16	207-08-9	
Chrysene	550	ug/kg	37.4	17.3	2	03/13/15 08:18	03/13/15 17:16	218-01-9	
Dibenz(a,h)anthracene	102	ug/kg	37.4	13.7	2	03/13/15 08:18	03/13/15 17:16	53-70-3	
Fluoranthene	731	ug/kg	37.4	18.7	2	03/13/15 08:18	03/13/15 17:16	206-44-0	
Fluorene	24.6J	ug/kg	37.4	18.7	2	03/13/15 08:18	03/13/15 17:16	86-73-7	L2
Indeno(1,2,3-cd)pyrene	289	ug/kg	37.4	14.2	2	03/13/15 08:18	03/13/15 17:16	193-39-5	
1-Methylnaphthalene	63.4	ug/kg	37.4	18.7	2	03/13/15 08:18	03/13/15 17:16	90-12-0	
2-Methylnaphthalene	114	ug/kg	37.4	18.7	2	03/13/15 08:18	03/13/15 17:16	91-57-6	
Naphthalene	129	ug/kg	37.4	18.7	2	03/13/15 08:18	03/13/15 17:16	91-20-3	
Phenanthrene	314	ug/kg	37.4	18.7	2	03/13/15 08:18	03/13/15 17:16	85-01-8	
Pyrene	902	ug/kg	37.4	18.7	2	03/13/15 08:18	03/13/15 17:16	129-00-0	
<b>Surrogates</b>									
2-Fluorobiphenyl (S)	57	%	39-130		2	03/13/15 08:18	03/13/15 17:16	321-60-8	
Terphenyl-d14 (S)	69	%	37-130		2	03/13/15 08:18	03/13/15 17:16	1718-51-0	
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Benzene	28.5J	ug/kg	67.3	28.1	1	03/16/15 07:50	03/16/15 12:12	71-43-2	
Bromobenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	108-86-1	W
Bromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	74-97-5	W
Bromodichloromethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	75-27-4	W
Bromoform	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	75-25-2	W
Bromomethane	<69.9	ug/kg	250	69.9	1	03/16/15 07:50	03/16/15 12:12	74-83-9	W
n-Butylbenzene	37.0J	ug/kg	67.3	28.1	1	03/16/15 07:50	03/16/15 12:12	104-51-8	
sec-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	135-98-8	W
tert-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	98-06-6	W
Carbon tetrachloride	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	56-23-5	W

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-9 S1 Lab ID: 40111561017 Collected: 03/11/15 14:30 Received: 03/12/15 08:30 Matrix: Solid  
Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Chlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	108-90-7	W
Chloroethane	<67.0	ug/kg	250	67.0	1	03/16/15 07:50	03/16/15 12:12	75-00-3	W
Chloroform	<46.4	ug/kg	250	46.4	1	03/16/15 07:50	03/16/15 12:12	67-66-3	W
Chloromethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	74-87-3	W
2-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	95-49-8	W
4-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	106-43-4	W
1,2-Dibromo-3-chloropropane	<91.2	ug/kg	250	91.2	1	03/16/15 07:50	03/16/15 12:12	96-12-8	W
Dibromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	124-48-1	W
1,2-Dibromoethane (EDB)	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	106-93-4	W
Dibromomethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	74-95-3	W
1,2-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	95-50-1	W
1,3-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	541-73-1	W
1,4-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	106-46-7	W
Dichlorodifluoromethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	75-71-8	W
1,1-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	75-34-3	W
1,2-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	107-06-2	W
1,1-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	75-35-4	W
cis-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	156-59-2	W
trans-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	156-60-5	W
1,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	78-87-5	W
1,3-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	142-28-9	W
2,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	594-20-7	W
1,1-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	563-58-6	W
cis-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	10061-01-5	W
trans-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	10061-02-6	W
Diisopropyl ether	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	108-20-3	W
Ethylbenzene	62.1J	ug/kg	67.3	28.1	1	03/16/15 07:50	03/16/15 12:12	100-41-4	
Hexachloro-1,3-butadiene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	87-68-3	W
Isopropylbenzene (Cumene)	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	98-82-8	W
p-Isopropyltoluene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	99-87-6	W
Methylene Chloride	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	75-09-2	W
Methyl-tert-butyl ether	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	1634-04-4	W
Naphthalene	180J	ug/kg	281	44.9	1	03/16/15 07:50	03/16/15 12:12	91-20-3	
n-Propylbenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	103-65-1	W
Styrene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	100-42-5	W
1,1,1,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	630-20-6	W
1,1,1,2,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	79-34-5	W
Tetrachloroethene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	127-18-4	W
Toluene	155	ug/kg	67.3	28.1	1	03/16/15 07:50	03/16/15 12:12	108-88-3	
1,2,3-Trichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	87-61-6	W
1,2,4-Trichlorobenzene	<47.6	ug/kg	250	47.6	1	03/16/15 07:50	03/16/15 12:12	120-82-1	W
1,1,1-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	71-55-6	W
1,1,2-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	79-00-5	W
Trichloroethene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	79-01-6	W
Trichlorofluoromethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	75-69-4	W

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-9 S1 Lab ID: 40111561017 Collected: 03/11/15 14:30 Received: 03/12/15 08:30 Matrix: Solid  
Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>		Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
1,2,3-Trichloropropane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	96-18-4	W
1,2,4-Trimethylbenzene	156	ug/kg	67.3	28.1	1	03/16/15 07:50	03/16/15 12:12	95-63-6	
1,3,5-Trimethylbenzene	58.1J	ug/kg	67.3	28.1	1	03/16/15 07:50	03/16/15 12:12	108-67-8	
Vinyl chloride	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:12	75-01-4	W
Xylene (Total)	392	ug/kg	202	84.2	1	03/16/15 07:50	03/16/15 12:12	1330-20-7	
<b>Surrogates</b>									
Dibromofluoromethane (S)	110	%	49-157		1	03/16/15 07:50	03/16/15 12:12	1868-53-7	
Toluene-d8 (S)	110	%	61-148		1	03/16/15 07:50	03/16/15 12:12	2037-26-5	
4-Bromofluorobenzene (S)	100	%	53-134		1	03/16/15 07:50	03/16/15 12:12	460-00-4	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87							
Percent Moisture	10.9	%	0.10	0.10	1		03/16/15 15:02		

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-10 S2 Lab ID: 40111561018 Collected: 03/11/15 15:00 Received: 03/12/15 08:30 Matrix: Solid  
Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b>									
Analytical Method: EPA 6010 Preparation Method: EPA 3050									
Arsenic	9.5	mg/kg	2.4	0.78	1	03/16/15 07:20	03/17/15 20:35	7440-38-2	
Barium	126	mg/kg	0.61	0.15	1	03/16/15 07:20	03/17/15 20:35	7440-39-3	
Cadmium	0.45J	mg/kg	0.61	0.081	1	03/16/15 07:20	03/17/15 20:35	7440-43-9	
Chromium	14.2	mg/kg	0.61	0.24	1	03/16/15 07:20	03/17/15 20:35	7440-47-3	
Lead	457	mg/kg	1.2	0.53	1	03/16/15 07:20	03/17/15 20:35	7439-92-1	
Selenium	<0.94	mg/kg	2.4	0.94	1	03/16/15 07:20	03/17/15 20:35	7782-49-2	
Silver	0.69J	mg/kg	1.2	0.34	1	03/16/15 07:20	03/17/15 20:35	7440-22-4	
<b>7471 Mercury</b>									
Analytical Method: EPA 7471 Preparation Method: EPA 7471									
Mercury	0.24	mg/kg	0.0074	0.0037	1	03/13/15 12:05	03/16/15 15:54	7439-97-6	
<b>8270 MSSV PAH by SIM</b>									
Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546									
Acenaphthene	<429	ug/kg	858	429	40	03/16/15 09:25	03/20/15 11:03	83-32-9	
Acenaphthylene	1650	ug/kg	858	384	40	03/16/15 09:25	03/20/15 11:03	208-96-8	
Anthracene	4110	ug/kg	858	445	40	03/16/15 09:25	03/20/15 11:03	120-12-7	
Benzo(a)anthracene	12100	ug/kg	858	297	40	03/16/15 09:25	03/20/15 11:03	56-55-3	
Benzo(a)pyrene	15300	ug/kg	858	307	40	03/16/15 09:25	03/20/15 11:03	50-32-8	
Benzo(b)fluoranthene	13300	ug/kg	858	429	40	03/16/15 09:25	03/20/15 11:03	205-99-2	
Benzo(g,h,i)perylene	13700	ug/kg	858	327	40	03/16/15 09:25	03/20/15 11:03	191-24-2	
Benzo(k)fluoranthene	13300	ug/kg	858	475	40	03/16/15 09:25	03/20/15 11:03	207-08-9	
Chrysene	13900	ug/kg	858	397	40	03/16/15 09:25	03/20/15 11:03	218-01-9	
Dibenz(a,h)anthracene	4050	ug/kg	858	315	40	03/16/15 09:25	03/20/15 11:03	53-70-3	
Fluoranthene	18800	ug/kg	858	429	40	03/16/15 09:25	03/20/15 11:03	206-44-0	
Fluorene	449J	ug/kg	858	429	40	03/16/15 09:25	03/20/15 11:03	86-73-7	
Indeno(1,2,3-cd)pyrene	11300	ug/kg	858	326	40	03/16/15 09:25	03/20/15 11:03	193-39-5	
1-Methylnaphthalene	<429	ug/kg	858	429	40	03/16/15 09:25	03/20/15 11:03	90-12-0	
2-Methylnaphthalene	<429	ug/kg	858	429	40	03/16/15 09:25	03/20/15 11:03	91-57-6	
Naphthalene	895	ug/kg	858	429	40	03/16/15 09:25	03/20/15 11:03	91-20-3	
Phenanthrene	7230	ug/kg	858	429	40	03/16/15 09:25	03/20/15 11:03	85-01-8	
Pyrene	16100	ug/kg	858	429	40	03/16/15 09:25	03/20/15 11:03	129-00-0	
<b>Surrogates</b>									
2-Fluorobiphenyl (S)	69	%	39-130		40	03/16/15 09:25	03/20/15 11:03	321-60-8	
Terphenyl-d14 (S)	71	%	37-130		40	03/16/15 09:25	03/20/15 11:03	1718-51-0	
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Benzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	71-43-2	W
Bromobenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	108-86-1	W
Bromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	74-97-5	W
Bromodichloromethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	75-27-4	W
Bromoform	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	75-25-2	W
Bromomethane	<69.9	ug/kg	250	69.9	1	03/16/15 07:50	03/16/15 12:35	74-83-9	W
n-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	104-51-8	W
sec-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	135-98-8	W
tert-Butylbenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	98-06-6	W
Carbon tetrachloride	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	56-23-5	W

### REPORT OF LABORATORY ANALYSIS

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-10 S2 Lab ID: 40111561018 Collected: 03/11/15 15:00 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b> Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Chlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	108-90-7	W
Chloroethane	<67.0	ug/kg	250	67.0	1	03/16/15 07:50	03/16/15 12:35	75-00-3	W
Chloroform	<46.4	ug/kg	250	46.4	1	03/16/15 07:50	03/16/15 12:35	67-66-3	W
Chloromethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	74-87-3	W
2-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	95-49-8	W
4-Chlorotoluene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	106-43-4	W
1,2-Dibromo-3-chloropropane	<91.2	ug/kg	250	91.2	1	03/16/15 07:50	03/16/15 12:35	96-12-8	W
Dibromochloromethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	124-48-1	W
1,2-Dibromoethane (EDB)	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	106-93-4	W
Dibromomethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	74-95-3	W
1,2-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	95-50-1	W
1,3-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	541-73-1	W
1,4-Dichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	106-46-7	W
Dichlorodifluoromethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	75-71-8	W
1,1-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	75-34-3	W
1,2-Dichloroethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	107-06-2	W
1,1-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	75-35-4	W
cis-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	156-59-2	W
trans-1,2-Dichloroethene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	156-60-5	W
1,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	78-87-5	W
1,3-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	142-28-9	W
2,2-Dichloropropane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	594-20-7	W
1,1-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	563-58-6	W
cis-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	10061-01-5	W
trans-1,3-Dichloropropene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	10061-02-6	W
Diisopropyl ether	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	108-20-3	W
Ethylbenzene	40.8J	ug/kg	77.2	32.2	1	03/16/15 07:50	03/16/15 12:35	100-41-4	
Hexachloro-1,3-butadiene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	87-68-3	W
Isopropylbenzene (Cumene)	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	98-82-8	W
p-Isopropyltoluene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	99-87-6	W
Methylene Chloride	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	75-09-2	W
Methyl-tert-butyl ether	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	1634-04-4	W
Naphthalene	341	ug/kg	322	51.5	1	03/16/15 07:50	03/16/15 12:35	91-20-3	
n-Propylbenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	103-65-1	W
Styrene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	100-42-5	W
1,1,1,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	630-20-6	W
1,1,2,2-Tetrachloroethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	79-34-5	W
Tetrachloroethene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	127-18-4	W
Toluene	160	ug/kg	77.2	32.2	1	03/16/15 07:50	03/16/15 12:35	108-88-3	
1,2,3-Trichlorobenzene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	87-61-6	W
1,2,4-Trichlorobenzene	<47.6	ug/kg	250	47.6	1	03/16/15 07:50	03/16/15 12:35	120-82-1	W
1,1,1-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	71-55-6	W
1,1,2-Trichloroethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	79-00-5	W
Trichloroethene	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	79-01-6	W
Trichlorofluoromethane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	75-69-4	W

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-10 S2 Lab ID: 40111561018 Collected: 03/11/15 15:00 Received: 03/12/15 08:30 Matrix: Solid  
Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>		Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
1,2,3-Trichloropropane	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	96-18-4	W
1,2,4-Trimethylbenzene	106	ug/kg	77.2	32.2	1	03/16/15 07:50	03/16/15 12:35	95-63-6	
1,3,5-Trimethylbenzene	66.4J	ug/kg	77.2	32.2	1	03/16/15 07:50	03/16/15 12:35	108-67-8	
Vinyl chloride	<25.0	ug/kg	60.0	25.0	1	03/16/15 07:50	03/16/15 12:35	75-01-4	W
Xylene (Total)	297	ug/kg	232	96.5	1	03/16/15 07:50	03/16/15 12:35	1330-20-7	
<b>Surrogates</b>									
Dibromofluoromethane (S)	89	%	49-157		1	03/16/15 07:50	03/16/15 12:35	1868-53-7	
Toluene-d8 (S)	94	%	61-148		1	03/16/15 07:50	03/16/15 12:35	2037-26-5	
4-Bromofluorobenzene (S)	88	%	53-134		1	03/16/15 07:50	03/16/15 12:35	460-00-4	
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87							
Percent Moisture	22.3	%	0.10	0.10	1		03/16/15 15:02		

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## ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-10 S4 Lab ID: 40111561019 Collected: 03/11/15 15:00 Received: 03/12/15 08:30 Matrix: Solid  
Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>6010 MET ICP</b> Analytical Method: EPA 6010 Preparation Method: EPA 3050									
Arsenic	3.6	mg/kg	2.1	0.66	1	03/16/15 07:20	03/17/15 20:37	7440-38-2	
Barium	59.3	mg/kg	0.52	0.12	1	03/16/15 07:20	03/17/15 20:37	7440-39-3	
Cadmium	0.081J	mg/kg	0.52	0.069	1	03/16/15 07:20	03/17/15 20:37	7440-43-9	
Chromium	14.5	mg/kg	0.52	0.20	1	03/16/15 07:20	03/17/15 20:37	7440-47-3	
Lead	6.5	mg/kg	1.0	0.45	1	03/16/15 07:20	03/17/15 20:37	7439-92-1	
Selenium	<0.80	mg/kg	2.1	0.80	1	03/16/15 07:20	03/17/15 20:37	7782-49-2	
Silver	0.36J	mg/kg	1.0	0.29	1	03/16/15 07:20	03/17/15 20:37	7440-22-4	
<b>7471 Mercury</b> Analytical Method: EPA 7471 Preparation Method: EPA 7471									
Mercury	0.011	mg/kg	0.0067	0.0033	1	03/13/15 12:05	03/16/15 15:57	7439-97-6	
<b>8270 MSSV PAH by SIM</b> Analytical Method: EPA 8270 by SIM Preparation Method: EPA 3546									
Acenaphthene	<102	ug/kg	203	102	10	03/16/15 09:25	03/20/15 12:46	83-32-9	
Acenaphthylene	<90.9	ug/kg	203	90.9	10	03/16/15 09:25	03/20/15 12:46	208-96-8	
Anthracene	<105	ug/kg	203	105	10	03/16/15 09:25	03/20/15 12:46	120-12-7	
Benzo(a)anthracene	<70.5	ug/kg	203	70.5	10	03/16/15 09:25	03/20/15 12:46	56-55-3	
Benzo(a)pyrene	<72.7	ug/kg	203	72.7	10	03/16/15 09:25	03/20/15 12:46	50-32-8	
Benzo(b)fluoranthene	<102	ug/kg	203	102	10	03/16/15 09:25	03/20/15 12:46	205-99-2	
Benzo(g,h,i)perylene	<77.4	ug/kg	203	77.4	10	03/16/15 09:25	03/20/15 12:46	191-24-2	
Benzo(k)fluoranthene	<112	ug/kg	203	112	10	03/16/15 09:25	03/20/15 12:46	207-08-9	
Chrysene	<94.0	ug/kg	203	94.0	10	03/16/15 09:25	03/20/15 12:46	218-01-9	
Dibenz(a,h)anthracene	<74.6	ug/kg	203	74.6	10	03/16/15 09:25	03/20/15 12:46	53-70-3	
Fluoranthene	<102	ug/kg	203	102	10	03/16/15 09:25	03/20/15 12:46	206-44-0	
Fluorene	<102	ug/kg	203	102	10	03/16/15 09:25	03/20/15 12:46	86-73-7	
Indeno(1,2,3-cd)pyrene	<77.2	ug/kg	203	77.2	10	03/16/15 09:25	03/20/15 12:46	193-39-5	
1-Methylnaphthalene	953	ug/kg	203	102	10	03/16/15 09:25	03/20/15 12:46	90-12-0	
2-Methylnaphthalene	3090	ug/kg	203	102	10	03/16/15 09:25	03/20/15 12:46	91-57-6	
Naphthalene	5720	ug/kg	203	102	10	03/16/15 09:25	03/20/15 12:46	91-20-3	
Phenanthrene	<102	ug/kg	203	102	10	03/16/15 09:25	03/20/15 12:46	85-01-8	
Pyrene	128J	ug/kg	203	102	10	03/16/15 09:25	03/20/15 12:46	129-00-0	
<b>Surrogates</b>									
2-Fluorobiphenyl (S)	72	%	39-130		10	03/16/15 09:25	03/20/15 12:46	321-60-8	
Terphenyl-d14 (S)	71	%	37-130		10	03/16/15 09:25	03/20/15 12:46	1718-51-0	
<b>8260 MSV Med Level Normal List</b> Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Benzene	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	71-43-2	W
Bromobenzene	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	108-86-1	W
Bromochloromethane	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	74-97-5	W
Bromodichloromethane	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	75-27-4	W
Bromoform	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	75-25-2	W
Bromomethane	<1400	ug/kg	5000	1400	20	03/16/15 07:50	03/16/15 19:46	74-83-9	W
n-Butylbenzene	3800	ug/kg	1460	610	20	03/16/15 07:50	03/16/15 19:46	104-51-8	
sec-Butylbenzene	1700	ug/kg	1460	610	20	03/16/15 07:50	03/16/15 19:46	135-98-8	
tert-Butylbenzene	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	98-06-6	W
Carbon tetrachloride	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	56-23-5	W

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: **GP-10 S4** Lab ID: **40111561019** Collected: 03/11/15 15:00 Received: 03/12/15 08:30 Matrix: Solid

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

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>									
Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B									
Chlorobenzene	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	108-90-7	W
Chloroethane	<1340	ug/kg	5000	1340	20	03/16/15 07:50	03/16/15 19:46	75-00-3	W
Chloroform	<929	ug/kg	5000	929	20	03/16/15 07:50	03/16/15 19:46	67-66-3	W
Chloromethane	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	74-87-3	W
2-Chlorotoluene	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	95-49-8	W
4-Chlorotoluene	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	106-43-4	W
1,2-Dibromo-3-chloropropane	<1820	ug/kg	5000	1820	20	03/16/15 07:50	03/16/15 19:46	96-12-8	W
Dibromochloromethane	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	124-48-1	W
1,2-Dibromoethane (EDB)	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	106-93-4	W
Dibromomethane	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	74-95-3	W
1,2-Dichlorobenzene	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	95-50-1	W
1,3-Dichlorobenzene	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	541-73-1	W
1,4-Dichlorobenzene	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	106-46-7	W
Dichlorodifluoromethane	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	75-71-8	W
1,1-Dichloroethane	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	75-34-3	W
1,2-Dichloroethane	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	107-06-2	W
1,1-Dichloroethene	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	75-35-4	W
cis-1,2-Dichloroethene	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	156-59-2	W
trans-1,2-Dichloroethene	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	156-60-5	W
1,2-Dichloropropane	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	78-87-5	W
1,3-Dichloropropane	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	142-28-9	W
2,2-Dichloropropane	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	594-20-7	W
1,1-Dichloropropene	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	563-58-6	W
cis-1,3-Dichloropropene	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	10061-01-5	W
trans-1,3-Dichloropropene	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	10061-02-6	W
Diisopropyl ether	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	108-20-3	W
Ethylbenzene	9820	ug/kg	1460	610	20	03/16/15 07:50	03/16/15 19:46	100-41-4	
Hexachloro-1,3-butadiene	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	87-68-3	W
Isopropylbenzene (Cumene)	3860	ug/kg	1460	610	20	03/16/15 07:50	03/16/15 19:46	98-82-8	
p-Isopropyltoluene	3760	ug/kg	1460	610	20	03/16/15 07:50	03/16/15 19:46	99-87-6	
Methylene Chloride	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	75-09-2	W
Methyl-tert-butyl ether	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	1634-04-4	W
Naphthalene	18800	ug/kg	6100	977	20	03/16/15 07:50	03/16/15 19:46	91-20-3	
n-Propylbenzene	6550	ug/kg	1460	610	20	03/16/15 07:50	03/16/15 19:46	103-65-1	
Styrene	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	100-42-5	W
1,1,1,2-Tetrachloroethane	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	630-20-6	W
1,1,1,2,2-Tetrachloroethane	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	79-34-5	W
Tetrachloroethene	661J	ug/kg	1460	610	20	03/16/15 07:50	03/16/15 19:46	127-18-4	
Toluene	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	108-88-3	W
1,2,3-Trichlorobenzene	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	87-61-6	W
1,2,4-Trichlorobenzene	<951	ug/kg	5000	951	20	03/16/15 07:50	03/16/15 19:46	120-82-1	W
1,1,1-Trichloroethane	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	71-55-6	W
1,1,2-Trichloroethane	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	79-00-5	W
Trichloroethene	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	79-01-6	W
Trichlorofluoromethane	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	75-69-4	W

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-10 S4 Lab ID: 40111561019 Collected: 03/11/15 15:00 Received: 03/12/15 08:30 Matrix: Solid  
Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV Med Level Normal List</b>		Analytical Method: EPA 8260 Preparation Method: EPA 5035/5030B							
1,2,3-Trichloropropane	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	96-18-4	W
1,2,4-Trimethylbenzene	43100	ug/kg	1460	610	20	03/16/15 07:50	03/16/15 19:46	95-63-6	
1,3,5-Trimethylbenzene	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	108-67-8	W
Vinyl chloride	<500	ug/kg	1200	500	20	03/16/15 07:50	03/16/15 19:46	75-01-4	W
Xylene (Total)	11500	ug/kg	4390	1830	20	03/16/15 07:50	03/16/15 19:46	1330-20-7	
<b>Surrogates</b>									
Dibromofluoromethane (S)	0	%	49-157		20	03/16/15 07:50	03/16/15 19:46	1868-53-7	D3,S4
Toluene-d8 (S)	0	%	61-148		20	03/16/15 07:50	03/16/15 19:46	2037-26-5	S4
4-Bromofluorobenzene (S)	0	%	53-134		20	03/16/15 07:50	03/16/15 19:46	460-00-4	S4
<b>Percent Moisture</b>		Analytical Method: ASTM D2974-87							
Percent Moisture	18.0	%	0.10	0.10	1		03/16/15 15:02		

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-10 Lab ID: 40111561020 Collected: 03/11/15 15:00 Received: 03/12/15 08:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV</b>									
Analytical Method: EPA 8260									
Benzene	174	ug/L	20.0	10.0	20		03/13/15 18:29	71-43-2	
Bromobenzene	<4.6	ug/L	20.0	4.6	20		03/13/15 18:29	108-86-1	
Bromochloromethane	<6.8	ug/L	20.0	6.8	20		03/13/15 18:29	74-97-5	
Bromodichloromethane	<10.0	ug/L	20.0	10.0	20		03/13/15 18:29	75-27-4	
Bromoform	<10.0	ug/L	20.0	10.0	20		03/13/15 18:29	75-25-2	
Bromomethane	<48.7	ug/L	100	48.7	20		03/13/15 18:29	74-83-9	
n-Butylbenzene	106	ug/L	20.0	10.0	20		03/13/15 18:29	104-51-8	
sec-Butylbenzene	47.6J	ug/L	100	43.7	20		03/13/15 18:29	135-98-8	
tert-Butylbenzene	<3.6	ug/L	20.0	3.6	20		03/13/15 18:29	98-06-6	
Carbon tetrachloride	<10.0	ug/L	20.0	10.0	20		03/13/15 18:29	56-23-5	
Chlorobenzene	<10.0	ug/L	20.0	10.0	20		03/13/15 18:29	108-90-7	
Chloroethane	8.7J	ug/L	20.0	7.5	20		03/13/15 18:29	75-00-3	
Chloroform	<50.0	ug/L	100	50.0	20		03/13/15 18:29	67-66-3	
Chloromethane	<10.0	ug/L	20.0	10.0	20		03/13/15 18:29	74-87-3	
2-Chlorotoluene	<10.0	ug/L	20.0	10.0	20		03/13/15 18:29	95-49-8	
4-Chlorotoluene	<4.3	ug/L	20.0	4.3	20		03/13/15 18:29	106-43-4	
1,2-Dibromo-3-chloropropane	<43.3	ug/L	100	43.3	20		03/13/15 18:29	96-12-8	
Dibromochloromethane	<10.0	ug/L	20.0	10.0	20		03/13/15 18:29	124-48-1	
1,2-Dibromoethane (EDB)	<3.6	ug/L	20.0	3.6	20		03/13/15 18:29	106-93-4	
Dibromomethane	<8.5	ug/L	20.0	8.5	20		03/13/15 18:29	74-95-3	
1,2-Dichlorobenzene	<10.0	ug/L	20.0	10.0	20		03/13/15 18:29	95-50-1	
1,3-Dichlorobenzene	<10.0	ug/L	20.0	10.0	20		03/13/15 18:29	541-73-1	
1,4-Dichlorobenzene	<10.0	ug/L	20.0	10.0	20		03/13/15 18:29	106-46-7	
Dichlorodifluoromethane	<4.5	ug/L	20.0	4.5	20		03/13/15 18:29	75-71-8	
1,1-Dichloroethane	<4.8	ug/L	20.0	4.8	20		03/13/15 18:29	75-34-3	
1,2-Dichloroethane	<3.4	ug/L	20.0	3.4	20		03/13/15 18:29	107-06-2	
1,1-Dichloroethene	<8.2	ug/L	20.0	8.2	20		03/13/15 18:29	75-35-4	
cis-1,2-Dichloroethene	<5.1	ug/L	20.0	5.1	20		03/13/15 18:29	156-59-2	
trans-1,2-Dichloroethene	<5.1	ug/L	20.0	5.1	20		03/13/15 18:29	156-60-5	
1,2-Dichloropropane	<4.7	ug/L	20.0	4.7	20		03/13/15 18:29	78-87-5	
1,3-Dichloropropane	<10.0	ug/L	20.0	10.0	20		03/13/15 18:29	142-28-9	
2,2-Dichloropropane	<9.7	ug/L	20.0	9.7	20		03/13/15 18:29	594-20-7	
1,1-Dichloropropene	<8.8	ug/L	20.0	8.8	20		03/13/15 18:29	563-58-6	
cis-1,3-Dichloropropene	<10.0	ug/L	20.0	10.0	20		03/13/15 18:29	10061-01-5	
trans-1,3-Dichloropropene	<4.6	ug/L	20.0	4.6	20		03/13/15 18:29	10061-02-6	
Diisopropyl ether	<10.0	ug/L	20.0	10.0	20		03/13/15 18:29	108-20-3	
Ethylbenzene	1380	ug/L	20.0	10.0	20		03/13/15 18:29	100-41-4	
Hexachloro-1,3-butadiene	<42.1	ug/L	100	42.1	20		03/13/15 18:29	87-68-3	
Isopropylbenzene (Cumene)	199	ug/L	20.0	2.9	20		03/13/15 18:29	98-82-8	
p-Isopropyltoluene	<10.0	ug/L	20.0	10.0	20		03/13/15 18:29	99-87-6	
Methylene Chloride	<4.7	ug/L	20.0	4.7	20		03/13/15 18:29	75-09-2	
Methyl-tert-butyl ether	<3.5	ug/L	20.0	3.5	20		03/13/15 18:29	1634-04-4	
Naphthalene	1530	ug/L	100	50.0	20		03/13/15 18:29	91-20-3	
n-Propylbenzene	326	ug/L	20.0	10.0	20		03/13/15 18:29	103-65-1	
Styrene	<10.0	ug/L	20.0	10.0	20		03/13/15 18:29	100-42-5	
1,1,1,2-Tetrachloroethane	<3.6	ug/L	20.0	3.6	20		03/13/15 18:29	630-20-6	

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY

Pace Project No.: 40111561

Sample: GP-10      Lab ID: 40111561020      Collected: 03/11/15 15:00      Received: 03/12/15 08:30      Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV</b>									
Analytical Method: EPA 8260									
1,1,2,2-Tetrachloroethane	<5.0	ug/L	20.0	5.0	20		03/13/15 18:29	79-34-5	
Tetrachloroethene	<10.0	ug/L	20.0	10.0	20		03/13/15 18:29	127-18-4	
Toluene	147	ug/L	20.0	10.0	20		03/13/15 18:29	108-88-3	
1,2,3-Trichlorobenzene	<42.7	ug/L	100	42.7	20		03/13/15 18:29	87-61-6	
1,2,4-Trichlorobenzene	<44.2	ug/L	100	44.2	20		03/13/15 18:29	120-82-1	
1,1,1-Trichloroethane	<10.0	ug/L	20.0	10.0	20		03/13/15 18:29	71-55-6	
1,1,2-Trichloroethane	<3.9	ug/L	20.0	3.9	20		03/13/15 18:29	79-00-5	
Trichloroethene	<6.6	ug/L	20.0	6.6	20		03/13/15 18:29	79-01-6	
Trichlorofluoromethane	<3.7	ug/L	20.0	3.7	20		03/13/15 18:29	75-69-4	
1,2,3-Trichloropropane	<10.0	ug/L	20.0	10.0	20		03/13/15 18:29	96-18-4	
1,2,4-Trimethylbenzene	2130	ug/L	20.0	10.0	20		03/13/15 18:29	95-63-6	
1,3,5-Trimethylbenzene	<10.0	ug/L	20.0	10.0	20		03/13/15 18:29	108-67-8	
Vinyl chloride	<3.5	ug/L	20.0	3.5	20		03/13/15 18:29	75-01-4	
Xylene (Total)	1740	ug/L	60.0	30.0	20		03/13/15 18:29	1330-20-7	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	99	%	70-130		20		03/13/15 18:29	460-00-4	HS
Dibromofluoromethane (S)	99	%	70-130		20		03/13/15 18:29	1868-53-7	
Toluene-d8 (S)	96	%	70-130		20		03/13/15 18:29	2037-26-5	

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## ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-3      Lab ID: 40111561021      Collected: 03/11/15 00:00      Received: 03/12/15 08:30      Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV</b>									
Analytical Method: EPA 8260									
Benzene	<0.50	ug/L	1.0	0.50	1		03/13/15 18:07	71-43-2	
Bromobenzene	<0.23	ug/L	1.0	0.23	1		03/13/15 18:07	108-86-1	
Bromochloromethane	<0.34	ug/L	1.0	0.34	1		03/13/15 18:07	74-97-5	
Bromodichloromethane	<0.50	ug/L	1.0	0.50	1		03/13/15 18:07	75-27-4	
Bromoform	<0.50	ug/L	1.0	0.50	1		03/13/15 18:07	75-25-2	
Bromomethane	<2.4	ug/L	5.0	2.4	1		03/13/15 18:07	74-83-9	
n-Butylbenzene	5.0	ug/L	1.0	0.50	1		03/13/15 18:07	104-51-8	
sec-Butylbenzene	8.9	ug/L	5.0	2.2	1		03/13/15 18:07	135-98-8	
tert-Butylbenzene	0.53J	ug/L	1.0	0.18	1		03/13/15 18:07	98-06-6	
Carbon tetrachloride	<0.50	ug/L	1.0	0.50	1		03/13/15 18:07	56-23-5	
Chlorobenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 18:07	108-90-7	
Chloroethane	<0.37	ug/L	1.0	0.37	1		03/13/15 18:07	75-00-3	
Chloroform	<2.5	ug/L	5.0	2.5	1		03/13/15 18:07	67-66-3	
Chloromethane	<0.50	ug/L	1.0	0.50	1		03/13/15 18:07	74-87-3	
2-Chlorotoluene	<0.50	ug/L	1.0	0.50	1		03/13/15 18:07	95-49-8	
4-Chlorotoluene	<0.21	ug/L	1.0	0.21	1		03/13/15 18:07	106-43-4	
1,2-Dibromo-3-chloropropane	<2.2	ug/L	5.0	2.2	1		03/13/15 18:07	96-12-8	
Dibromochloromethane	<0.50	ug/L	1.0	0.50	1		03/13/15 18:07	124-48-1	
1,2-Dibromoethane (EDB)	<0.18	ug/L	1.0	0.18	1		03/13/15 18:07	106-93-4	
Dibromomethane	<0.43	ug/L	1.0	0.43	1		03/13/15 18:07	74-95-3	
1,2-Dichlorobenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 18:07	95-50-1	
1,3-Dichlorobenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 18:07	541-73-1	
1,4-Dichlorobenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 18:07	106-46-7	
Dichlorodifluoromethane	<0.22	ug/L	1.0	0.22	1		03/13/15 18:07	75-71-8	
1,1-Dichloroethane	<0.24	ug/L	1.0	0.24	1		03/13/15 18:07	75-34-3	
1,2-Dichloroethane	<0.17	ug/L	1.0	0.17	1		03/13/15 18:07	107-06-2	
1,1-Dichloroethene	<0.41	ug/L	1.0	0.41	1		03/13/15 18:07	75-35-4	
cis-1,2-Dichloroethene	<0.26	ug/L	1.0	0.26	1		03/13/15 18:07	156-59-2	
trans-1,2-Dichloroethene	<0.26	ug/L	1.0	0.26	1		03/13/15 18:07	156-60-5	
1,2-Dichloropropane	<0.23	ug/L	1.0	0.23	1		03/13/15 18:07	78-87-5	
1,3-Dichloropropane	<0.50	ug/L	1.0	0.50	1		03/13/15 18:07	142-28-9	
2,2-Dichloropropane	<0.48	ug/L	1.0	0.48	1		03/13/15 18:07	594-20-7	
1,1-Dichloropropene	<0.44	ug/L	1.0	0.44	1		03/13/15 18:07	563-58-6	
cis-1,3-Dichloropropene	<0.50	ug/L	1.0	0.50	1		03/13/15 18:07	10061-01-5	
trans-1,3-Dichloropropene	<0.23	ug/L	1.0	0.23	1		03/13/15 18:07	10061-02-6	
Diisopropyl ether	<0.50	ug/L	1.0	0.50	1		03/13/15 18:07	108-20-3	
Ethylbenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 18:07	100-41-4	
Hexachloro-1,3-butadiene	<2.1	ug/L	5.0	2.1	1		03/13/15 18:07	87-68-3	
Isopropylbenzene (Cumene)	3.2	ug/L	1.0	0.14	1		03/13/15 18:07	98-82-8	
p-Isopropyltoluene	<0.50	ug/L	1.0	0.50	1		03/13/15 18:07	99-87-6	
Methylene Chloride	<0.23	ug/L	1.0	0.23	1		03/13/15 18:07	75-09-2	
Methyl-tert-butyl ether	<0.17	ug/L	1.0	0.17	1		03/13/15 18:07	1634-04-4	
Naphthalene	<2.5	ug/L	5.0	2.5	1		03/13/15 18:07	91-20-3	
n-Propylbenzene	8.5	ug/L	1.0	0.50	1		03/13/15 18:07	103-65-1	
Styrene	<0.50	ug/L	1.0	0.50	1		03/13/15 18:07	100-42-5	
1,1,1,2-Tetrachloroethane	<0.18	ug/L	1.0	0.18	1		03/13/15 18:07	630-20-6	

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-3 Lab ID: 40111561021 Collected: 03/11/15 00:00 Received: 03/12/15 08:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV</b>		Analytical Method: EPA 8260							
1,1,2,2-Tetrachloroethane	<0.25	ug/L	1.0	0.25	1		03/13/15 18:07	79-34-5	
Tetrachloroethene	<0.50	ug/L	1.0	0.50	1		03/13/15 18:07	127-18-4	
Toluene	1.0	ug/L	1.0	0.50	1		03/13/15 18:07	108-88-3	
1,2,3-Trichlorobenzene	<2.1	ug/L	5.0	2.1	1		03/13/15 18:07	87-61-6	
1,2,4-Trichlorobenzene	<2.2	ug/L	5.0	2.2	1		03/13/15 18:07	120-82-1	
1,1,1-Trichloroethane	<0.50	ug/L	1.0	0.50	1		03/13/15 18:07	71-55-6	
1,1,2-Trichloroethane	<0.20	ug/L	1.0	0.20	1		03/13/15 18:07	79-00-5	
Trichloroethene	<0.33	ug/L	1.0	0.33	1		03/13/15 18:07	79-01-6	
Trichlorofluoromethane	<0.18	ug/L	1.0	0.18	1		03/13/15 18:07	75-69-4	
1,2,3-Trichloropropane	<0.50	ug/L	1.0	0.50	1		03/13/15 18:07	96-18-4	
1,2,4-Trimethylbenzene	0.74J	ug/L	1.0	0.50	1		03/13/15 18:07	95-63-6	
1,3,5-Trimethylbenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 18:07	108-67-8	
Vinyl chloride	<0.18	ug/L	1.0	0.18	1		03/13/15 18:07	75-01-4	
Xylene (Total)	<1.5	ug/L	3.0	1.5	1		03/13/15 18:07	1330-20-7	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	99	%	70-130		1		03/13/15 18:07	460-00-4	HS
Dibromofluoromethane (S)	104	%	70-130		1		03/13/15 18:07	1868-53-7	
Toluene-d8 (S)	96	%	70-130		1		03/13/15 18:07	2037-26-5	

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-2 Lab ID: 40111561022 Collected: 03/11/15 00:00 Received: 03/12/15 08:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV</b>									
Analytical Method: EPA 8260									
Benzene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:38	71-43-2	
Bromobenzene	<0.23	ug/L	1.0	0.23	1		03/13/15 15:38	108-86-1	
Bromochloromethane	<0.34	ug/L	1.0	0.34	1		03/13/15 15:38	74-97-5	
Bromodichloromethane	<0.50	ug/L	1.0	0.50	1		03/13/15 15:38	75-27-4	
Bromoform	<0.50	ug/L	1.0	0.50	1		03/13/15 15:38	75-25-2	
Bromomethane	<2.4	ug/L	5.0	2.4	1		03/13/15 15:38	74-83-9	
n-Butylbenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:38	104-51-8	
sec-Butylbenzene	<2.2	ug/L	5.0	2.2	1		03/13/15 15:38	135-98-8	
tert-Butylbenzene	<0.18	ug/L	1.0	0.18	1		03/13/15 15:38	98-06-6	
Carbon tetrachloride	<0.50	ug/L	1.0	0.50	1		03/13/15 15:38	56-23-5	
Chlorobenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:38	108-90-7	
Chloroethane	<0.37	ug/L	1.0	0.37	1		03/13/15 15:38	75-00-3	
Chloroform	<2.5	ug/L	5.0	2.5	1		03/13/15 15:38	67-66-3	
Chloromethane	<0.50	ug/L	1.0	0.50	1		03/13/15 15:38	74-87-3	
2-Chlorotoluene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:38	95-49-8	
4-Chlorotoluene	<0.21	ug/L	1.0	0.21	1		03/13/15 15:38	106-43-4	
1,2-Dibromo-3-chloropropane	<2.2	ug/L	5.0	2.2	1		03/13/15 15:38	96-12-8	
Dibromochloromethane	<0.50	ug/L	1.0	0.50	1		03/13/15 15:38	124-48-1	
1,2-Dibromoethane (EDB)	<0.18	ug/L	1.0	0.18	1		03/13/15 15:38	106-93-4	
Dibromomethane	<0.43	ug/L	1.0	0.43	1		03/13/15 15:38	74-95-3	
1,2-Dichlorobenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:38	95-50-1	
1,3-Dichlorobenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:38	541-73-1	
1,4-Dichlorobenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:38	106-46-7	
Dichlorodifluoromethane	<0.22	ug/L	1.0	0.22	1		03/13/15 15:38	75-71-8	
1,1-Dichloroethane	<0.24	ug/L	1.0	0.24	1		03/13/15 15:38	75-34-3	
1,2-Dichloroethane	<0.17	ug/L	1.0	0.17	1		03/13/15 15:38	107-06-2	
1,1-Dichloroethene	<0.41	ug/L	1.0	0.41	1		03/13/15 15:38	75-35-4	
cis-1,2-Dichloroethene	<0.26	ug/L	1.0	0.26	1		03/13/15 15:38	156-59-2	
trans-1,2-Dichloroethene	<0.26	ug/L	1.0	0.26	1		03/13/15 15:38	156-60-5	
1,2-Dichloropropane	<0.23	ug/L	1.0	0.23	1		03/13/15 15:38	78-87-5	
1,3-Dichloropropane	<0.50	ug/L	1.0	0.50	1		03/13/15 15:38	142-28-9	
2,2-Dichloropropane	<0.48	ug/L	1.0	0.48	1		03/13/15 15:38	594-20-7	
1,1-Dichloropropene	<0.44	ug/L	1.0	0.44	1		03/13/15 15:38	563-58-6	
cis-1,3-Dichloropropene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:38	10061-01-5	
trans-1,3-Dichloropropene	<0.23	ug/L	1.0	0.23	1		03/13/15 15:38	10061-02-6	
Diisopropyl ether	<0.50	ug/L	1.0	0.50	1		03/13/15 15:38	108-20-3	
Ethylbenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:38	100-41-4	
Hexachloro-1,3-butadiene	<2.1	ug/L	5.0	2.1	1		03/13/15 15:38	87-68-3	
Isopropylbenzene (Cumene)	<0.14	ug/L	1.0	0.14	1		03/13/15 15:38	98-82-8	
p-Isopropyltoluene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:38	99-87-6	
Methylene Chloride	<0.23	ug/L	1.0	0.23	1		03/13/15 15:38	75-09-2	
Methyl-tert-butyl ether	<0.17	ug/L	1.0	0.17	1		03/13/15 15:38	1634-04-4	
Naphthalene	<2.5	ug/L	5.0	2.5	1		03/13/15 15:38	91-20-3	
n-Propylbenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:38	103-65-1	
Styrene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:38	100-42-5	
1,1,1,2-Tetrachloroethane	<0.18	ug/L	1.0	0.18	1		03/13/15 15:38	630-20-6	

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-2 Lab ID: 40111561022 Collected: 03/11/15 00:00 Received: 03/12/15 08:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV</b>		Analytical Method: EPA 8260							
1,1,2,2-Tetrachloroethane	<0.25	ug/L	1.0	0.25	1		03/13/15 15:38	79-34-5	
Tetrachloroethene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:38	127-18-4	
Toluene	0.57J	ug/L	1.0	0.50	1		03/13/15 15:38	108-88-3	
1,2,3-Trichlorobenzene	<2.1	ug/L	5.0	2.1	1		03/13/15 15:38	87-61-6	
1,2,4-Trichlorobenzene	<2.2	ug/L	5.0	2.2	1		03/13/15 15:38	120-82-1	
1,1,1-Trichloroethane	<0.50	ug/L	1.0	0.50	1		03/13/15 15:38	71-55-6	
1,1,2-Trichloroethane	<0.20	ug/L	1.0	0.20	1		03/13/15 15:38	79-00-5	
Trichloroethene	<0.33	ug/L	1.0	0.33	1		03/13/15 15:38	79-01-6	
Trichlorofluoromethane	<0.18	ug/L	1.0	0.18	1		03/13/15 15:38	75-69-4	
1,2,3-Trichloropropane	<0.50	ug/L	1.0	0.50	1		03/13/15 15:38	96-18-4	
1,2,4-Trimethylbenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:38	95-63-6	
1,3,5-Trimethylbenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 15:38	108-67-8	
Vinyl chloride	<0.18	ug/L	1.0	0.18	1		03/13/15 15:38	75-01-4	
Xylene (Total)	<1.5	ug/L	3.0	1.5	1		03/13/15 15:38	1330-20-7	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	93	%	70-130		1		03/13/15 15:38	460-00-4	
Dibromofluoromethane (S)	123	%	70-130		1		03/13/15 15:38	1868-53-7	
Toluene-d8 (S)	87	%	70-130		1		03/13/15 15:38	2037-26-5	

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Sample: GP-8 Lab ID: 40111561023 Collected: 03/11/15 00:00 Received: 03/12/15 08:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV</b>									
Analytical Method: EPA 8260									
Benzene	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	71-43-2	
Bromobenzene	<0.23	ug/L	1.0	0.23	1		03/13/15 16:01	108-86-1	
Bromochloromethane	<0.34	ug/L	1.0	0.34	1		03/13/15 16:01	74-97-5	
Bromodichloromethane	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	75-27-4	
Bromoform	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	75-25-2	
Bromomethane	<2.4	ug/L	5.0	2.4	1		03/13/15 16:01	74-83-9	
n-Butylbenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	104-51-8	
sec-Butylbenzene	<2.2	ug/L	5.0	2.2	1		03/13/15 16:01	135-98-8	
tert-Butylbenzene	<0.18	ug/L	1.0	0.18	1		03/13/15 16:01	98-06-6	
Carbon tetrachloride	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	56-23-5	
Chlorobenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	108-90-7	
Chloroethane	<0.37	ug/L	1.0	0.37	1		03/13/15 16:01	75-00-3	
Chloroform	<2.5	ug/L	5.0	2.5	1		03/13/15 16:01	67-66-3	
Chloromethane	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	74-87-3	
2-Chlorotoluene	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	95-49-8	
4-Chlorotoluene	<0.21	ug/L	1.0	0.21	1		03/13/15 16:01	106-43-4	
1,2-Dibromo-3-chloropropane	<2.2	ug/L	5.0	2.2	1		03/13/15 16:01	96-12-8	
Dibromochloromethane	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	124-48-1	
1,2-Dibromoethane (EDB)	<0.18	ug/L	1.0	0.18	1		03/13/15 16:01	106-93-4	
Dibromomethane	<0.43	ug/L	1.0	0.43	1		03/13/15 16:01	74-95-3	
1,2-Dichlorobenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	95-50-1	
1,3-Dichlorobenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	541-73-1	
1,4-Dichlorobenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	106-46-7	
Dichlorodifluoromethane	<0.22	ug/L	1.0	0.22	1		03/13/15 16:01	75-71-8	
1,1-Dichloroethane	<0.24	ug/L	1.0	0.24	1		03/13/15 16:01	75-34-3	
1,2-Dichloroethane	<0.17	ug/L	1.0	0.17	1		03/13/15 16:01	107-06-2	
1,1-Dichloroethene	<0.41	ug/L	1.0	0.41	1		03/13/15 16:01	75-35-4	
cis-1,2-Dichloroethene	<0.26	ug/L	1.0	0.26	1		03/13/15 16:01	156-59-2	
trans-1,2-Dichloroethene	<0.26	ug/L	1.0	0.26	1		03/13/15 16:01	156-60-5	
1,2-Dichloropropane	<0.23	ug/L	1.0	0.23	1		03/13/15 16:01	78-87-5	
1,3-Dichloropropane	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	142-28-9	
2,2-Dichloropropane	<0.48	ug/L	1.0	0.48	1		03/13/15 16:01	594-20-7	
1,1-Dichloropropene	<0.44	ug/L	1.0	0.44	1		03/13/15 16:01	563-58-6	
cis-1,3-Dichloropropene	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	10061-01-5	
trans-1,3-Dichloropropene	<0.23	ug/L	1.0	0.23	1		03/13/15 16:01	10061-02-6	
Diisopropyl ether	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	108-20-3	
Ethylbenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	100-41-4	
Hexachloro-1,3-butadiene	<2.1	ug/L	5.0	2.1	1		03/13/15 16:01	87-68-3	
Isopropylbenzene (Cumene)	0.17J	ug/L	1.0	0.14	1		03/13/15 16:01	98-82-8	
p-Isopropyltoluene	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	99-87-6	
Methylene Chloride	<0.23	ug/L	1.0	0.23	1		03/13/15 16:01	75-09-2	
Methyl-tert-butyl ether	<0.17	ug/L	1.0	0.17	1		03/13/15 16:01	1634-04-4	
Naphthalene	<2.5	ug/L	5.0	2.5	1		03/13/15 16:01	91-20-3	
n-Propylbenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	103-65-1	
Styrene	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	100-42-5	
1,1,1,2-Tetrachloroethane	<0.18	ug/L	1.0	0.18	1		03/13/15 16:01	630-20-6	

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### ANALYTICAL RESULTS

Project: 25215045 MADISON WATER UTILITY

Pace Project No.: 40111561

Sample: GP-8 Lab ID: 40111561023 Collected: 03/11/15 00:00 Received: 03/12/15 08:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
<b>8260 MSV</b>									
Analytical Method: EPA 8260									
1,1,2,2-Tetrachloroethane	<0.25	ug/L	1.0	0.25	1		03/13/15 16:01	79-34-5	
Tetrachloroethene	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	127-18-4	
Toluene	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	108-88-3	
1,2,3-Trichlorobenzene	<2.1	ug/L	5.0	2.1	1		03/13/15 16:01	87-61-6	
1,2,4-Trichlorobenzene	<2.2	ug/L	5.0	2.2	1		03/13/15 16:01	120-82-1	
1,1,1-Trichloroethane	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	71-55-6	
1,1,2-Trichloroethane	<0.20	ug/L	1.0	0.20	1		03/13/15 16:01	79-00-5	
Trichloroethene	<0.33	ug/L	1.0	0.33	1		03/13/15 16:01	79-01-6	
Trichlorofluoromethane	<0.18	ug/L	1.0	0.18	1		03/13/15 16:01	75-69-4	
1,2,3-Trichloropropane	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	96-18-4	
1,2,4-Trimethylbenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	95-63-6	
1,3,5-Trimethylbenzene	<0.50	ug/L	1.0	0.50	1		03/13/15 16:01	108-67-8	
Vinyl chloride	<0.18	ug/L	1.0	0.18	1		03/13/15 16:01	75-01-4	
Xylene (Total)	<1.5	ug/L	3.0	1.5	1		03/13/15 16:01	1330-20-7	
<b>Surrogates</b>									
4-Bromofluorobenzene (S)	97	%	70-130		1		03/13/15 16:01	460-00-4	
Dibromofluoromethane (S)	114	%	70-130		1		03/13/15 16:01	1868-53-7	
Toluene-d8 (S)	93	%	70-130		1		03/13/15 16:01	2037-26-5	

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**QUALITY CONTROL DATA**

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

QC Batch: MERP/4798 Analysis Method: EPA 7471  
QC Batch Method: EPA 7471 Analysis Description: 7471 Mercury  
Associated Lab Samples: 40111561001, 40111561002, 40111561003, 40111561004, 40111561005, 40111561006, 40111561007, 40111561008, 40111561009, 40111561010, 40111561011, 40111561012, 40111561013, 40111561014, 40111561016, 40111561017, 40111561018, 40111561019

METHOD BLANK: 1127143 Matrix: Solid  
Associated Lab Samples: 40111561001, 40111561002, 40111561003, 40111561004, 40111561005, 40111561006, 40111561007, 40111561008, 40111561009, 40111561010, 40111561011, 40111561012, 40111561013, 40111561014, 40111561016, 40111561017, 40111561018, 40111561019

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Mercury	mg/kg	<0.0033	0.0067	03/16/15 14:59	

LABORATORY CONTROL SAMPLE: 1127144

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Mercury	mg/kg	.17	0.18	106	85-115	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1127145 1127146

Parameter	Units	40111561001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	Max RPD	Qual
Mercury	mg/kg	0.22	.2	.2	0.25	0.25	16	16	85-115	0	20	M0

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**REPORT OF LABORATORY ANALYSIS**

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### QUALITY CONTROL DATA

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

QC Batch: MPRP/11578 Analysis Method: EPA 6010  
QC Batch Method: EPA 3050 Analysis Description: 6010 MET  
Associated Lab Samples: 40111561001, 40111561002, 40111561003, 40111561004, 40111561005, 40111561006, 40111561007, 40111561008, 40111561009, 40111561010, 40111561011, 40111561012, 40111561013, 40111561014, 40111561016, 40111561017, 40111561018, 40111561019

METHOD BLANK: 1127438 Matrix: Solid  
Associated Lab Samples: 40111561001, 40111561002, 40111561003, 40111561004, 40111561005, 40111561006, 40111561007, 40111561008, 40111561009, 40111561010, 40111561011, 40111561012, 40111561013, 40111561014, 40111561016, 40111561017, 40111561018, 40111561019

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Arsenic	mg/kg	<0.64	2.0	03/17/15 19:27	
Barium	mg/kg	<0.12	0.50	03/17/15 19:27	
Cadmium	mg/kg	<0.066	0.50	03/17/15 19:27	
Chromium	mg/kg	<0.19	0.50	03/17/15 19:27	
Lead	mg/kg	<0.43	1.0	03/17/15 19:27	
Selenium	mg/kg	<0.77	2.0	03/17/15 19:27	
Silver	mg/kg	<0.28	1.0	03/17/15 19:27	

LABORATORY CONTROL SAMPLE: 1127439

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Arsenic	mg/kg	50	49.3	99	80-120	
Barium	mg/kg	50	50.0	100	80-120	
Cadmium	mg/kg	50	49.9	100	80-120	
Chromium	mg/kg	50	50.4	101	80-120	
Lead	mg/kg	50	50.5	101	80-120	
Selenium	mg/kg	50	48.4	97	80-120	
Silver	mg/kg	25	24.2	97	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1127440 1127441

Parameter	Units	MS		MSD		MS		MSD		% Rec Limits	RPD	Max RPD	Qual
		40111479014 Result	Spike Conc.	Spike Conc.	MS Result	MSD Result	% Rec	% Rec					
Arsenic	mg/kg	3.5	58.5	58.5	54.5	54.4	87	87	75-125	0	20		
Barium	mg/kg	73.8	58.5	58.5	127	128	91	93	75-125	1	20		
Cadmium	mg/kg	<0.077	58.5	58.5	54.1	54.2	92	93	75-125	0	20		
Chromium	mg/kg	28.2	58.5	58.5	83.6	83.6	95	95	75-125	0	20		
Lead	mg/kg	7.3	58.5	58.5	58.7	58.1	88	87	75-125	1	20		
Selenium	mg/kg	<0.90	58.5	58.5	50.8	50.3	87	86	75-125	1	20		
Silver	mg/kg	0.55J	29.3	29.3	26.9	27.1	90	91	75-125	1	20		

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### QUALITY CONTROL DATA

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

QC Batch: MSV/27740 Analysis Method: EPA 8260  
QC Batch Method: EPA 5035/5030B Analysis Description: 8260 MSV Med Level Normal List  
Associated Lab Samples: 40111561001, 40111561002, 40111561003, 40111561004, 40111561005, 40111561006, 40111561007,  
40111561008, 40111561009, 40111561010, 40111561011, 40111561012, 40111561013, 40111561014

METHOD BLANK: 1127163 Matrix: Solid  
Associated Lab Samples: 40111561001, 40111561002, 40111561003, 40111561004, 40111561005, 40111561006, 40111561007,  
40111561008, 40111561009, 40111561010, 40111561011, 40111561012, 40111561013, 40111561014

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	<13.7	50.0	03/13/15 09:27	
1,1,1-Trichloroethane	ug/kg	<14.4	50.0	03/13/15 09:27	
1,1,2,2-Tetrachloroethane	ug/kg	<17.5	50.0	03/13/15 09:27	
1,1,2-Trichloroethane	ug/kg	<20.2	50.0	03/13/15 09:27	
1,1-Dichloroethane	ug/kg	<17.6	50.0	03/13/15 09:27	
1,1-Dichloroethene	ug/kg	<17.6	50.0	03/13/15 09:27	
1,1-Dichloropropene	ug/kg	<14.0	50.0	03/13/15 09:27	
1,2,3-Trichlorobenzene	ug/kg	<17.0	50.0	03/13/15 09:27	
1,2,3-Trichloropropane	ug/kg	<22.3	50.0	03/13/15 09:27	
1,2,4-Trichlorobenzene	ug/kg	<47.6	250	03/13/15 09:27	
1,2,4-Trimethylbenzene	ug/kg	<12.2	50.0	03/13/15 09:27	
1,2-Dibromo-3-chloropropane	ug/kg	<91.2	250	03/13/15 09:27	
1,2-Dibromoethane (EDB)	ug/kg	<14.7	50.0	03/13/15 09:27	
1,2-Dichlorobenzene	ug/kg	<16.2	50.0	03/13/15 09:27	
1,2-Dichloroethane	ug/kg	<15.0	50.0	03/13/15 09:27	
1,2-Dichloropropane	ug/kg	<16.8	50.0	03/13/15 09:27	
1,3,5-Trimethylbenzene	ug/kg	<14.5	50.0	03/13/15 09:27	
1,3-Dichlorobenzene	ug/kg	<13.2	50.0	03/13/15 09:27	
1,3-Dichloropropane	ug/kg	<12.0	50.0	03/13/15 09:27	
1,4-Dichlorobenzene	ug/kg	<15.9	50.0	03/13/15 09:27	
2,2-Dichloropropane	ug/kg	<12.6	50.0	03/13/15 09:27	
2-Chlorotoluene	ug/kg	<15.8	50.0	03/13/15 09:27	
4-Chlorotoluene	ug/kg	<13.0	50.0	03/13/15 09:27	
Benzene	ug/kg	<9.2	20.0	03/13/15 09:27	
Bromobenzene	ug/kg	<20.6	50.0	03/13/15 09:27	
Bromochloromethane	ug/kg	<21.4	50.0	03/13/15 09:27	
Bromodichloromethane	ug/kg	<9.8	50.0	03/13/15 09:27	
Bromoform	ug/kg	<19.8	50.0	03/13/15 09:27	
Bromomethane	ug/kg	<69.9	250	03/13/15 09:27	
Carbon tetrachloride	ug/kg	<12.1	50.0	03/13/15 09:27	
Chlorobenzene	ug/kg	<14.8	50.0	03/13/15 09:27	
Chloroethane	ug/kg	<67.0	250	03/13/15 09:27	
Chloroform	ug/kg	<46.4	250	03/13/15 09:27	
Chloromethane	ug/kg	<20.4	50.0	03/13/15 09:27	
cis-1,2-Dichloroethene	ug/kg	<16.6	50.0	03/13/15 09:27	
cis-1,3-Dichloropropene	ug/kg	<16.6	50.0	03/13/15 09:27	
Dibromochloromethane	ug/kg	<17.9	50.0	03/13/15 09:27	
Dibromomethane	ug/kg	<19.3	50.0	03/13/15 09:27	
Dichlorodifluoromethane	ug/kg	<12.3	50.0	03/13/15 09:27	
Diisopropyl ether	ug/kg	<17.7	50.0	03/13/15 09:27	

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### QUALITY CONTROL DATA

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

METHOD BLANK: 1127163

Matrix: Solid

Associated Lab Samples: 40111561001, 40111561002, 40111561003, 40111561004, 40111561005, 40111561006, 40111561007, 40111561008, 40111561009, 40111561010, 40111561011, 40111561012, 40111561013, 40111561014

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Ethylbenzene	ug/kg	<12.4	50.0	03/13/15 09:27	
Hexachloro-1,3-butadiene	ug/kg	<24.5	50.0	03/13/15 09:27	
Isopropylbenzene (Cumene)	ug/kg	<12.6	50.0	03/13/15 09:27	
Methyl-tert-butyl ether	ug/kg	<12.7	50.0	03/13/15 09:27	
Methylene Chloride	ug/kg	<16.2	50.0	03/13/15 09:27	
n-Butylbenzene	ug/kg	<10.5	50.0	03/13/15 09:27	
n-Propylbenzene	ug/kg	<11.6	50.0	03/13/15 09:27	
Naphthalene	ug/kg	<40.0	250	03/13/15 09:27	
p-Isopropyltoluene	ug/kg	<12.0	50.0	03/13/15 09:27	
sec-Butylbenzene	ug/kg	<11.9	50.0	03/13/15 09:27	
Styrene	ug/kg	<9.0	50.0	03/13/15 09:27	
tert-Butylbenzene	ug/kg	<9.5	50.0	03/13/15 09:27	
Tetrachloroethene	ug/kg	<12.9	50.0	03/13/15 09:27	
Toluene	ug/kg	<11.2	50.0	03/13/15 09:27	
trans-1,2-Dichloroethene	ug/kg	<16.5	50.0	03/13/15 09:27	
trans-1,3-Dichloropropene	ug/kg	<14.4	50.0	03/13/15 09:27	
Trichloroethene	ug/kg	<23.6	50.0	03/13/15 09:27	
Trichlorofluoromethane	ug/kg	<24.7	50.0	03/13/15 09:27	
Vinyl chloride	ug/kg	<21.1	50.0	03/13/15 09:27	
Xylene (Total)	ug/kg	<48.4	150	03/13/15 09:27	
4-Bromofluorobenzene (S)	%	93	39-139	03/13/15 09:27	
Dibromofluoromethane (S)	%	98	37-152	03/13/15 09:27	
Toluene-d8 (S)	%	104	38-154	03/13/15 09:27	

LABORATORY CONTROL SAMPLE & LCSD: 1127164

1127165

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,1,1-Trichloroethane	ug/kg	2500	2020	2230	81	89	70-130	10	20	
1,1,2,2-Tetrachloroethane	ug/kg	2500	2270	2310	91	93	70-130	2	20	
1,1,2-Trichloroethane	ug/kg	2500	2330	2380	93	95	70-130	2	20	
1,1-Dichloroethane	ug/kg	2500	2300	2490	92	99	70-130	8	20	
1,1-Dichloroethene	ug/kg	2500	2270	2440	91	97	70-130	7	20	
1,2,4-Trichlorobenzene	ug/kg	2500	2200	2360	88	95	70-130	7	20	
1,2-Dibromo-3-chloropropane	ug/kg	2500	1690	1860	68	75	50-150	10	20	
1,2-Dibromoethane (EDB)	ug/kg	2500	2270	2400	91	96	70-130	6	20	
1,2-Dichlorobenzene	ug/kg	2500	2380	2470	95	99	70-130	4	20	
1,2-Dichloroethane	ug/kg	2500	2170	2340	87	94	70-141	8	20	
1,2-Dichloropropane	ug/kg	2500	2370	2520	95	101	70-130	6	20	
1,3-Dichlorobenzene	ug/kg	2500	2340	2500	94	100	70-130	7	20	
1,4-Dichlorobenzene	ug/kg	2500	2370	2460	95	98	70-130	4	20	
Benzene	ug/kg	2500	2280	2450	91	98	70-130	7	20	
Bromodichloromethane	ug/kg	2500	2040	2120	82	85	70-130	4	20	
Bromoform	ug/kg	2500	1670	1770	67	71	70-130	6	20	LO

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### QUALITY CONTROL DATA

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Parameter	Units	1127164		1127165			% Rec Limits	RPD	Max RPD	Qualifiers
		Spike Conc.	LCS Result	LCS Result	LCS % Rec	LCS % Rec				
Bromomethane	ug/kg	2500	2330	2480	93	99	34-173	6	20	
Carbon tetrachloride	ug/kg	2500	2150	2310	86	93	70-130	7	20	
Chlorobenzene	ug/kg	2500	2440	2540	98	102	70-130	4	20	
Chloroethane	ug/kg	2500	2410	2590	97	103	44-173	7	20	
Chloroform	ug/kg	2500	2200	2370	88	95	70-130	7	20	
Chloromethane	ug/kg	2500	2530	2640	101	105	43-130	4	20	
cis-1,2-Dichloroethene	ug/kg	2500	2210	2470	88	99	70-130	11	20	
cis-1,3-Dichloropropene	ug/kg	2500	2000	2140	80	86	70-130	7	20	
Dibromochloromethane	ug/kg	2500	2080	2150	83	86	70-130	3	20	
Dichlorodifluoromethane	ug/kg	2500	2240	2360	90	94	10-150	5	20	
Ethylbenzene	ug/kg	2500	2360	2450	95	98	70-130	4	20	
Isopropylbenzene (Cumene)	ug/kg	2500	2360	2500	94	100	70-130	6	20	
Methyl-tert-butyl ether	ug/kg	2500	2090	2190	83	88	65-131	5	20	
Methylene Chloride	ug/kg	2500	2210	2390	88	96	64-143	8	20	
Styrene	ug/kg	2500	2390	2530	95	101	70-130	6	20	
Tetrachloroethene	ug/kg	2500	2500	2550	100	102	70-130	2	20	
Toluene	ug/kg	2500	2440	2530	98	101	70-130	3	20	
trans-1,2-Dichloroethene	ug/kg	2500	2120	2320	85	93	70-130	9	20	
trans-1,3-Dichloropropene	ug/kg	2500	1890	1980	75	79	70-130	5	20	
Trichloroethene	ug/kg	2500	2300	2410	92	96	70-130	5	20	
Trichlorofluoromethane	ug/kg	2500	2230	2500	89	100	50-150	11	20	
Vinyl chloride	ug/kg	2500	2630	2700	105	108	57-130	3	20	
Xylene (Total)	ug/kg	7500	7230	7620	96	102	70-130	5	20	
4-Bromofluorobenzene (S)	%				93	95	39-139			
Dibromofluoromethane (S)	%				104	108	37-152			
Toluene-d8 (S)	%				104	106	38-154			

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### QUALITY CONTROL DATA

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

QC Batch: MSV/27755 Analysis Method: EPA 8260  
QC Batch Method: EPA 5035/5030B Analysis Description: 8260 MSV Med Level Normal List  
Associated Lab Samples: 40111561016, 40111561017, 40111561018, 40111561019

METHOD BLANK: 1128148 Matrix: Solid  
Associated Lab Samples: 40111561016, 40111561017, 40111561018, 40111561019

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/kg	<13.7	50.0	03/16/15 09:57	
1,1,1-Trichloroethane	ug/kg	<14.4	50.0	03/16/15 09:57	
1,1,2,2-Tetrachloroethane	ug/kg	<17.5	50.0	03/16/15 09:57	
1,1,2-Trichloroethane	ug/kg	<20.2	50.0	03/16/15 09:57	
1,1-Dichloroethane	ug/kg	<17.6	50.0	03/16/15 09:57	
1,1-Dichloroethene	ug/kg	<17.6	50.0	03/16/15 09:57	
1,1-Dichloropropene	ug/kg	<14.0	50.0	03/16/15 09:57	
1,2,3-Trichlorobenzene	ug/kg	29.6J	50.0	03/16/15 09:57	
1,2,3-Trichloropropane	ug/kg	<22.3	50.0	03/16/15 09:57	
1,2,4-Trichlorobenzene	ug/kg	<47.6	250	03/16/15 09:57	
1,2,4-Trimethylbenzene	ug/kg	<12.2	50.0	03/16/15 09:57	
1,2-Dibromo-3-chloropropane	ug/kg	<91.2	250	03/16/15 09:57	
1,2-Dibromoethane (EDB)	ug/kg	<14.7	50.0	03/16/15 09:57	
1,2-Dichlorobenzene	ug/kg	<16.2	50.0	03/16/15 09:57	
1,2-Dichloroethane	ug/kg	<15.0	50.0	03/16/15 09:57	
1,2-Dichloropropane	ug/kg	<16.8	50.0	03/16/15 09:57	
1,3,5-Trimethylbenzene	ug/kg	<14.5	50.0	03/16/15 09:57	
1,3-Dichlorobenzene	ug/kg	<13.2	50.0	03/16/15 09:57	
1,3-Dichloropropane	ug/kg	<12.0	50.0	03/16/15 09:57	
1,4-Dichlorobenzene	ug/kg	<15.9	50.0	03/16/15 09:57	
2,2-Dichloropropane	ug/kg	<12.6	50.0	03/16/15 09:57	
2-Chlorotoluene	ug/kg	<15.8	50.0	03/16/15 09:57	
4-Chlorotoluene	ug/kg	<13.0	50.0	03/16/15 09:57	
Benzene	ug/kg	<9.2	20.0	03/16/15 09:57	
Bromobenzene	ug/kg	<20.6	50.0	03/16/15 09:57	
Bromochloromethane	ug/kg	<21.4	50.0	03/16/15 09:57	
Bromodichloromethane	ug/kg	<9.8	50.0	03/16/15 09:57	
Bromoform	ug/kg	<19.8	50.0	03/16/15 09:57	
Bromomethane	ug/kg	<69.9	250	03/16/15 09:57	
Carbon tetrachloride	ug/kg	<12.1	50.0	03/16/15 09:57	
Chlorobenzene	ug/kg	<14.8	50.0	03/16/15 09:57	
Chloroethane	ug/kg	<67.0	250	03/16/15 09:57	
Chloroform	ug/kg	<46.4	250	03/16/15 09:57	
Chloromethane	ug/kg	<20.4	50.0	03/16/15 09:57	
cis-1,2-Dichloroethene	ug/kg	<16.6	50.0	03/16/15 09:57	
cis-1,3-Dichloropropene	ug/kg	<16.6	50.0	03/16/15 09:57	
Dibromochloromethane	ug/kg	<17.9	50.0	03/16/15 09:57	
Dibromomethane	ug/kg	<19.3	50.0	03/16/15 09:57	
Dichlorodifluoromethane	ug/kg	<12.3	50.0	03/16/15 09:57	
Diisopropyl ether	ug/kg	<17.7	50.0	03/16/15 09:57	
Ethylbenzene	ug/kg	<12.4	50.0	03/16/15 09:57	

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### QUALITY CONTROL DATA

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

METHOD BLANK: 1128148 Matrix: Solid  
Associated Lab Samples: 40111561016, 40111561017, 40111561018, 40111561019

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Hexachloro-1,3-butadiene	ug/kg	<24.5	50.0	03/16/15 09:57	
Isopropylbenzene (Cumene)	ug/kg	<12.6	50.0	03/16/15 09:57	
Methyl-tert-butyl ether	ug/kg	<12.7	50.0	03/16/15 09:57	
Methylene Chloride	ug/kg	<16.2	50.0	03/16/15 09:57	
n-Butylbenzene	ug/kg	14.5J	50.0	03/16/15 09:57	
n-Propylbenzene	ug/kg	<11.6	50.0	03/16/15 09:57	
Naphthalene	ug/kg	<40.0	250	03/16/15 09:57	
p-Isopropyltoluene	ug/kg	<12.0	50.0	03/16/15 09:57	
sec-Butylbenzene	ug/kg	<11.9	50.0	03/16/15 09:57	
Styrene	ug/kg	<9.0	50.0	03/16/15 09:57	
tert-Butylbenzene	ug/kg	<9.5	50.0	03/16/15 09:57	
Tetrachloroethene	ug/kg	<12.9	50.0	03/16/15 09:57	
Toluene	ug/kg	<11.2	50.0	03/16/15 09:57	
trans-1,2-Dichloroethene	ug/kg	<16.5	50.0	03/16/15 09:57	
trans-1,3-Dichloropropene	ug/kg	<14.4	50.0	03/16/15 09:57	
Trichloroethene	ug/kg	<23.6	50.0	03/16/15 09:57	
Trichlorofluoromethane	ug/kg	<24.7	50.0	03/16/15 09:57	
Vinyl chloride	ug/kg	<21.1	50.0	03/16/15 09:57	
Xylene (Total)	ug/kg	<48.4	150	03/16/15 09:57	
4-Bromofluorobenzene (S)	%	94	53-134	03/16/15 09:57	
Dibromofluoromethane (S)	%	101	49-157	03/16/15 09:57	
Toluene-d8 (S)	%	104	61-148	03/16/15 09:57	

LABORATORY CONTROL SAMPLE & LCSD: 1128149

1128150

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,1,1-Trichloroethane	ug/kg	2500	2190	2100	87	84	70-130	4	20	
1,1,2,2-Tetrachloroethane	ug/kg	2500	2340	2260	94	90	70-130	4	20	
1,1,2-Trichloroethane	ug/kg	2500	2430	2370	97	95	70-130	3	20	
1,1-Dichloroethane	ug/kg	2500	2350	2350	94	94	70-130	0	20	
1,1-Dichloroethene	ug/kg	2500	2270	2330	91	93	70-132	3	20	
1,2,4-Trichlorobenzene	ug/kg	2500	2170	2320	87	93	70-130	7	20	
1,2-Dibromo-3-chloropropane	ug/kg	2500	1960	1960	78	78	45-150	0	20	
1,2-Dibromoethane (EDB)	ug/kg	2500	2360	2320	94	93	70-130	1	20	
1,2-Dichlorobenzene	ug/kg	2500	2350	2410	94	96	70-130	2	20	
1,2-Dichloroethane	ug/kg	2500	2300	2250	92	90	70-134	2	20	
1,2-Dichloropropane	ug/kg	2500	2470	2440	99	98	70-130	1	20	
1,3-Dichlorobenzene	ug/kg	2500	2370	2430	95	97	70-130	2	20	
1,4-Dichlorobenzene	ug/kg	2500	2380	2430	95	97	70-130	2	20	
Benzene	ug/kg	2500	2330	2320	93	93	70-130	0	20	
Bromodichloromethane	ug/kg	2500	2170	2130	87	85	70-130	1	20	
Bromoform	ug/kg	2500	1850	1820	74	73	48-130	2	20	
Bromomethane	ug/kg	2500	2240	2230	90	89	70-169	1	20	
Carbon tetrachloride	ug/kg	2500	2290	2250	92	90	67-130	2	20	

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### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Parameter	Units	1128149		1128150			% Rec Limits	RPD	Max RPD	Qualifiers
		Spike Conc.	LCS Result	LCS Result	LCSD Result	% Rec				
Chlorobenzene	ug/kg	2500	2480	2450	99	98	70-130	1	20	
Chloroethane	ug/kg	2500	2350	2350	94	94	70-191	0	20	
Chloroform	ug/kg	2500	2230	2260	89	90	70-130	1	20	
Chloromethane	ug/kg	2500	2440	2420	98	97	52-132	1	20	
cis-1,2-Dichloroethene	ug/kg	2500	2250	2270	90	91	70-130	1	20	
cis-1,3-Dichloropropene	ug/kg	2500	2180	2130	87	85	70-130	2	20	
Dibromochloromethane	ug/kg	2500	2170	2140	87	86	65-130	1	20	
Dichlorodifluoromethane	ug/kg	2500	2150	2050	86	82	12-150	5	20	
Ethylbenzene	ug/kg	2500	2350	2370	94	95	70-130	1	20	
Isopropylbenzene (Cumene)	ug/kg	2500	2380	2400	95	96	70-130	1	20	
Methyl-tert-butyl ether	ug/kg	2500	2320	2100	93	84	70-130	10	20	
Methylene Chloride	ug/kg	2500	2250	2240	90	90	70-131	1	20	
Styrene	ug/kg	2500	2420	2370	97	95	70-130	2	20	
Tetrachloroethene	ug/kg	2500	2490	2500	100	100	70-130	0	20	
Toluene	ug/kg	2500	2480	2440	99	98	70-130	2	20	
trans-1,2-Dichloroethene	ug/kg	2500	2180	2190	87	87	69-130	0	20	
trans-1,3-Dichloropropene	ug/kg	2500	2080	1990	83	80	65-130	5	20	
Trichloroethene	ug/kg	2500	2330	2320	93	93	70-130	0	20	
Trichlorofluoromethane	ug/kg	2500	2320	2200	93	88	50-150	5	20	
Vinyl chloride	ug/kg	2500	2520	2590	101	104	67-134	3	20	
Xylene (Total)	ug/kg	7500	7370	7320	98	98	70-130	1	20	
4-Bromofluorobenzene (S)	%				94	95	53-134			
Dibromofluoromethane (S)	%				100	102	49-157			
Toluene-d8 (S)	%				105	103	61-148			

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### QUALITY CONTROL DATA

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

QC Batch: MSV/27717 Analysis Method: EPA 8260  
QC Batch Method: EPA 8260 Analysis Description: 8260 MSV  
Associated Lab Samples: 40111561015, 40111561020, 40111561021, 40111561022, 40111561023

METHOD BLANK: 1126650 Matrix: Water  
Associated Lab Samples: 40111561015, 40111561020, 40111561021, 40111561022, 40111561023

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1,1,1,2-Tetrachloroethane	ug/L	<0.18	1.0	03/13/15 07:47	
1,1,1-Trichloroethane	ug/L	<0.50	1.0	03/13/15 07:47	
1,1,2,2-Tetrachloroethane	ug/L	<0.25	1.0	03/13/15 07:47	
1,1,2-Trichloroethane	ug/L	<0.20	1.0	03/13/15 07:47	
1,1-Dichloroethane	ug/L	<0.24	1.0	03/13/15 07:47	
1,1-Dichloroethene	ug/L	<0.41	1.0	03/13/15 07:47	
1,1-Dichloropropene	ug/L	<0.44	1.0	03/13/15 07:47	
1,2,3-Trichlorobenzene	ug/L	<2.1	5.0	03/13/15 07:47	
1,2,3-Trichloropropane	ug/L	<0.50	1.0	03/13/15 07:47	
1,2,4-Trichlorobenzene	ug/L	<2.2	5.0	03/13/15 07:47	
1,2,4-Trimethylbenzene	ug/L	<0.50	1.0	03/13/15 07:47	
1,2-Dibromo-3-chloropropane	ug/L	<2.2	5.0	03/13/15 07:47	
1,2-Dibromoethane (EDB)	ug/L	<0.18	1.0	03/13/15 07:47	
1,2-Dichlorobenzene	ug/L	<0.50	1.0	03/13/15 07:47	
1,2-Dichloroethane	ug/L	<0.17	1.0	03/13/15 07:47	
1,2-Dichloropropane	ug/L	<0.23	1.0	03/13/15 07:47	
1,3,5-Trimethylbenzene	ug/L	<0.50	1.0	03/13/15 07:47	
1,3-Dichlorobenzene	ug/L	<0.50	1.0	03/13/15 07:47	
1,3-Dichloropropane	ug/L	<0.50	1.0	03/13/15 07:47	
1,4-Dichlorobenzene	ug/L	<0.50	1.0	03/13/15 07:47	
2,2-Dichloropropane	ug/L	<0.48	1.0	03/13/15 07:47	
2-Chlorotoluene	ug/L	<0.50	1.0	03/13/15 07:47	
4-Chlorotoluene	ug/L	<0.21	1.0	03/13/15 07:47	
Benzene	ug/L	<0.50	1.0	03/13/15 07:47	
Bromobenzene	ug/L	<0.23	1.0	03/13/15 07:47	
Bromochloromethane	ug/L	<0.34	1.0	03/13/15 07:47	
Bromodichloromethane	ug/L	<0.50	1.0	03/13/15 07:47	
Bromoform	ug/L	<0.50	1.0	03/13/15 07:47	
Bromomethane	ug/L	<2.4	5.0	03/13/15 07:47	
Carbon tetrachloride	ug/L	<0.50	1.0	03/13/15 07:47	
Chlorobenzene	ug/L	<0.50	1.0	03/13/15 07:47	
Chloroethane	ug/L	<0.37	1.0	03/13/15 07:47	
Chloroform	ug/L	<2.5	5.0	03/13/15 07:47	
Chloromethane	ug/L	<0.50	1.0	03/13/15 07:47	
cis-1,2-Dichloroethene	ug/L	<0.26	1.0	03/13/15 07:47	
cis-1,3-Dichloropropene	ug/L	<0.50	1.0	03/13/15 07:47	
Dibromochloromethane	ug/L	<0.50	1.0	03/13/15 07:47	
Dibromomethane	ug/L	<0.43	1.0	03/13/15 07:47	
Dichlorodifluoromethane	ug/L	<0.22	1.0	03/13/15 07:47	
Diisopropyl ether	ug/L	<0.50	1.0	03/13/15 07:47	
Ethylbenzene	ug/L	<0.50	1.0	03/13/15 07:47	

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### QUALITY CONTROL DATA

Project: 25215045 MADISON WATER UTILITY

Pace Project No.: 40111561

METHOD BLANK: 1126650

Matrix: Water

Associated Lab Samples: 40111561015, 40111561020, 40111561021, 40111561022, 40111561023

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Hexachloro-1,3-butadiene	ug/L	<2.1	5.0	03/13/15 07:47	
Isopropylbenzene (Cumene)	ug/L	<0.14	1.0	03/13/15 07:47	
Methyl-tert-butyl ether	ug/L	<0.17	1.0	03/13/15 07:47	
Methylene Chloride	ug/L	<0.23	1.0	03/13/15 07:47	
n-Butylbenzene	ug/L	<0.50	1.0	03/13/15 07:47	
n-Propylbenzene	ug/L	<0.50	1.0	03/13/15 07:47	
Naphthalene	ug/L	<2.5	5.0	03/13/15 07:47	
p-Isopropyltoluene	ug/L	<0.50	1.0	03/13/15 07:47	
sec-Butylbenzene	ug/L	<2.2	5.0	03/13/15 07:47	
Styrene	ug/L	<0.50	1.0	03/13/15 07:47	
tert-Butylbenzene	ug/L	<0.18	1.0	03/13/15 07:47	
Tetrachloroethene	ug/L	<0.50	1.0	03/13/15 07:47	
Toluene	ug/L	<0.50	1.0	03/13/15 07:47	
trans-1,2-Dichloroethene	ug/L	<0.26	1.0	03/13/15 07:47	
trans-1,3-Dichloropropene	ug/L	<0.23	1.0	03/13/15 07:47	
Trichloroethene	ug/L	<0.33	1.0	03/13/15 07:47	
Trichlorofluoromethane	ug/L	<0.18	1.0	03/13/15 07:47	
Vinyl chloride	ug/L	<0.18	1.0	03/13/15 07:47	
Xylene (Total)	ug/L	<1.5	3.0	03/13/15 07:47	
4-Bromofluorobenzene (S)	%	94	70-130	03/13/15 07:47	
Dibromofluoromethane (S)	%	117	70-130	03/13/15 07:47	
Toluene-d8 (S)	%	91	70-130	03/13/15 07:47	

LABORATORY CONTROL SAMPLE & LCSD: 1126651

1126652

Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
1,1,1-Trichloroethane	ug/L	50	56.8	57.6	114	115	70-130	1	20	
1,1,1,2-Tetrachloroethane	ug/L	50	52.5	55.0	105	110	70-130	5	20	
1,1,2-Trichloroethane	ug/L	50	51.3	50.9	103	102	70-130	1	20	
1,1-Dichloroethane	ug/L	50	57.6	58.1	115	116	70-130	1	20	
1,1-Dichloroethene	ug/L	50	49.2	51.2	98	102	70-130	4	20	
1,2,4-Trichlorobenzene	ug/L	50	45.0	47.8	90	96	70-130	6	20	
1,2-Dibromo-3-chloropropane	ug/L	50	44.3	44.7	89	89	50-150	1	20	
1,2-Dibromoethane (EDB)	ug/L	50	49.8	50.2	100	100	70-130	1	20	
1,2-Dichlorobenzene	ug/L	50	50.5	52.6	101	105	70-130	4	20	
1,2-Dichloroethane	ug/L	50	57.4	57.5	115	115	70-131	0	20	
1,2-Dichloropropane	ug/L	50	57.1	57.2	114	114	70-130	0	20	
1,3-Dichlorobenzene	ug/L	50	51.4	53.2	103	106	70-130	3	20	
1,4-Dichlorobenzene	ug/L	50	51.3	53.2	103	106	70-130	4	20	
Benzene	ug/L	50	57.5	57.3	115	115	70-130	0	20	
Bromodichloromethane	ug/L	50	59.9	60.3	120	121	70-130	1	20	
Bromoform	ug/L	50	42.4	41.8	85	84	68-130	1	20	
Bromomethane	ug/L	50	43.8	49.3	88	99	38-137	12	20	
Carbon tetrachloride	ug/L	50	57.6	59.0	115	118	70-130	2	20	

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### QUALITY CONTROL DATA

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

LABORATORY CONTROL SAMPLE & LCSD: 1126651			1126652							
Parameter	Units	Spike Conc.	LCS Result	LCSD Result	LCS % Rec	LCSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Chlorobenzene	ug/L	50	54.1	54.1	108	108	70-130	0	20	
Chloroethane	ug/L	50	51.9	51.9	104	104	70-136	0	20	
Chloroform	ug/L	50	59.1	59.2	118	118	70-130	0	20	
Chloromethane	ug/L	50	56.9	55.0	114	110	48-144	3	20	
cis-1,2-Dichloroethene	ug/L	50	52.7	53.0	105	106	70-130	1	20	
cis-1,3-Dichloropropene	ug/L	50	46.2	47.1	92	94	70-130	2	20	
Dibromochloromethane	ug/L	50	47.3	47.0	95	94	70-130	1	20	
Dichlorodifluoromethane	ug/L	50	53.9	52.5	108	105	33-157	3	20	
Ethylbenzene	ug/L	50	57.9	57.8	116	116	70-132	0	20	
Isopropylbenzene (Cumene)	ug/L	50	58.5	58.8	117	118	70-130	1	20	
Methyl-tert-butyl ether	ug/L	50	48.6	49.3	97	99	48-141	1	20	
Methylene Chloride	ug/L	50	48.4	48.7	97	97	70-130	1	20	
Styrene	ug/L	50	50.8	51.6	102	103	70-130	2	20	
Tetrachloroethene	ug/L	50	53.0	52.8	106	106	70-130	0	20	
Toluene	ug/L	50	56.4	55.7	113	111	70-130	1	20	
trans-1,2-Dichloroethene	ug/L	50	58.7	58.3	117	117	70-130	1	20	
trans-1,3-Dichloropropene	ug/L	50	41.6	41.2	83	82	70-130	1	20	
Trichloroethene	ug/L	50	58.9	59.8	118	120	70-130	1	20	
Trichlorofluoromethane	ug/L	50	49.5	50.1	99	100	50-150	1	20	
Vinyl chloride	ug/L	50	53.1	52.8	106	106	65-142	1	20	
Xylene (Total)	ug/L	150	167	167	111	112	70-132	0	20	
4-Bromofluorobenzene (S)	%				102	101	70-130			
Dibromofluoromethane (S)	%				103	103	70-130			
Toluene-d8 (S)	%				97	95	70-130			

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1126946			1126947									
Parameter	Units	40111541001 Result	MS	MSD	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	Max RPD	RPD	Qual
			Spike Conc.	Spike Conc.								
1,1,1-Trichloroethane	ug/L	<0.50	50	50	56.8	57.2	114	114	70-130	1	20	
1,1,2,2-Tetrachloroethane	ug/L	<0.25	50	50	55.0	54.2	110	108	70-130	1	20	
1,1,2-Trichloroethane	ug/L	<0.20	50	50	52.2	50.0	104	100	70-130	4	20	
1,1-Dichloroethane	ug/L	<0.24	50	50	57.3	56.5	115	113	70-134	1	20	
1,1-Dichloroethene	ug/L	<0.41	50	50	49.9	49.9	100	100	70-139	0	20	
1,2,4-Trichlorobenzene	ug/L	<2.2	50	50	48.9	48.7	98	97	70-130	0	20	
1,2-Dibromo-3-chloropropane	ug/L	<2.2	50	50	46.8	46.1	94	92	50-150	2	20	
1,2-Dibromoethane (EDB)	ug/L	<0.18	50	50	50.1	50.1	100	100	70-130	0	20	
1,2-Dichlorobenzene	ug/L	<0.50	50	50	52.1	51.5	104	103	70-130	1	20	
1,2-Dichloroethane	ug/L	<0.17	50	50	56.4	56.6	113	113	70-132	0	20	
1,2-Dichloropropane	ug/L	<0.23	50	50	56.6	55.9	113	112	70-130	1	20	
1,3-Dichlorobenzene	ug/L	<0.50	50	50	52.8	52.8	106	106	70-130	0	20	
1,4-Dichlorobenzene	ug/L	<0.50	50	50	51.2	50.9	102	102	70-130	1	20	
Benzene	ug/L	3.6	50	50	60.4	61.2	114	115	70-130	1	20	
Bromodichloromethane	ug/L	<0.50	50	50	58.9	58.0	118	116	70-132	2	20	

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### QUALITY CONTROL DATA

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Parameter	Units	1126946		1126947		MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		40111541001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result								
Bromoform	ug/L	<0.50	50	50	42.4	40.6	85	81	68-130	4	20		
Bromomethane	ug/L	<2.4	50	50	47.1	47.2	94	94	38-141	0	20		
Carbon tetrachloride	ug/L	<0.50	50	50	57.4	57.4	115	115	70-130	0	20		
Chlorobenzene	ug/L	<0.50	50	50	53.0	52.4	106	105	70-130	1	20		
Chloroethane	ug/L	<0.37	50	50	50.9	51.1	102	102	66-152	0	20		
Chloroform	ug/L	<2.5	50	50	58.1	58.7	116	117	70-130	1	20		
Chloromethane	ug/L	<0.50	50	50	53.3	52.1	107	104	44-151	2	20		
cis-1,2-Dichloroethene	ug/L	52.4	50	50	102	102	99	100	70-130	0	20		
cis-1,3-Dichloropropene	ug/L	<0.50	50	50	46.9	45.2	94	90	70-130	4	20		
Dibromochloromethane	ug/L	<0.50	50	50	47.9	45.9	96	92	70-130	4	20		
Dichlorodifluoromethane	ug/L	<0.22	50	50	50.8	50.4	102	101	29-160	1	20		
Ethylbenzene	ug/L	8.5	50	50	67.7	66.5	118	116	70-132	2	20		
Isopropylbenzene (Cumene)	ug/L	0.74J	50	50	59.2	58.3	117	115	70-130	2	20		
Methyl-tert-butyl ether	ug/L	<0.17	50	50	49.5	51.0	99	102	48-143	3	20		
Methylene Chloride	ug/L	<0.23	50	50	47.9	48.4	96	97	70-130	1	20		
Styrene	ug/L	<0.50	50	50	48.6	44.5	97	89	70-130	9	20		
Tetrachloroethene	ug/L	3.5	50	50	55.8	55.4	105	104	70-130	1	20		
Toluene	ug/L	23.1	50	50	79.8	77.6	113	109	70-130	3	20		
trans-1,2-Dichloroethene	ug/L	1.3	50	50	58.6	59.5	114	116	70-132	1	20		
trans-1,3-Dichloropropene	ug/L	<0.23	50	50	43.1	40.3	86	81	70-130	7	20		
Trichloroethene	ug/L	1.2	50	50	58.9	58.2	115	114	70-130	1	20		
Trichlorofluoromethane	ug/L	<0.18	50	50	49.0	49.7	98	99	50-153	1	20		
Vinyl chloride	ug/L	8.4	50	50	59.7	61.3	103	106	60-155	3	20		
Xylene (Total)	ug/L	56.2	150	150	227	219	114	108	70-132	4	20		
4-Bromofluorobenzene (S)	%						102	101	70-130				
Dibromofluoromethane (S)	%						103	106	70-130				
Toluene-d8 (S)	%						96	95	70-130				

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### QUALITY CONTROL DATA

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

QC Batch: OEXT/26002 Analysis Method: EPA 8270 by SIM  
QC Batch Method: EPA 3546 Analysis Description: 8270/3546 MSSV PAH by SIM  
Associated Lab Samples: 40111561001, 40111561002, 40111561003, 40111561004, 40111561005, 40111561006, 40111561007, 40111561008, 40111561009, 40111561010, 40111561011, 40111561012, 40111561013, 40111561014, 40111561016, 40111561017

METHOD BLANK: 1126983 Matrix: Solid  
Associated Lab Samples: 40111561001, 40111561002, 40111561003, 40111561004, 40111561005, 40111561006, 40111561007, 40111561008, 40111561009, 40111561010, 40111561011, 40111561012, 40111561013, 40111561014, 40111561016, 40111561017

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1-Methylnaphthalene	ug/kg	<8.3	16.7	03/13/15 10:39	
2-Methylnaphthalene	ug/kg	<8.3	16.7	03/13/15 10:39	
Acenaphthene	ug/kg	<8.3	16.7	03/13/15 10:39	
Acenaphthylene	ug/kg	<7.5	16.7	03/13/15 10:39	
Anthracene	ug/kg	<8.6	16.7	03/13/15 10:39	
Benzo(a)anthracene	ug/kg	<5.8	16.7	03/13/15 10:39	
Benzo(a)pyrene	ug/kg	<6.0	16.7	03/13/15 10:39	
Benzo(b)fluoranthene	ug/kg	<8.3	16.7	03/13/15 10:39	
Benzo(g,h,i)perylene	ug/kg	<6.3	16.7	03/13/15 10:39	
Benzo(k)fluoranthene	ug/kg	<9.2	16.7	03/13/15 10:39	
Chrysene	ug/kg	<7.7	16.7	03/13/15 10:39	
Dibenz(a,h)anthracene	ug/kg	<6.1	16.7	03/13/15 10:39	
Fluoranthene	ug/kg	<8.3	16.7	03/13/15 10:39	
Fluorene	ug/kg	<8.3	16.7	03/13/15 10:39	
Indeno(1,2,3-cd)pyrene	ug/kg	<6.3	16.7	03/13/15 10:39	
Naphthalene	ug/kg	<8.3	16.7	03/13/15 10:39	
Phenanthrene	ug/kg	<8.3	16.7	03/13/15 10:39	
Pyrene	ug/kg	<8.3	16.7	03/13/15 10:39	
2-Fluorobiphenyl (S)	%	74	39-130	03/13/15 10:39	
Terphenyl-d14 (S)	%	94	37-130	03/13/15 10:39	

LABORATORY CONTROL SAMPLE: 1126984

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1-Methylnaphthalene	ug/kg	333	252	76	53-130	
2-Methylnaphthalene	ug/kg	333	235	70	52-130	
Acenaphthene	ug/kg	333	254	76	54-130	
Acenaphthylene	ug/kg	333	256	77	55-130	
Anthracene	ug/kg	333	295	89	64-130	
Benzo(a)anthracene	ug/kg	333	253	76	50-130	
Benzo(a)pyrene	ug/kg	333	231	69	46-130	
Benzo(b)fluoranthene	ug/kg	333	280	84	43-130	
Benzo(g,h,i)perylene	ug/kg	333	225	68	48-130	
Benzo(k)fluoranthene	ug/kg	333	255	77	55-130	
Chrysene	ug/kg	333	307	92	62-130	
Dibenz(a,h)anthracene	ug/kg	333	210	63	49-130	

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### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

LABORATORY CONTROL SAMPLE: 1126984

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoranthene	ug/kg	333	286	86	57-130	
Fluorene	ug/kg	333	170	51	57-130	LO
Indeno(1,2,3-cd)pyrene	ug/kg	333	228	68	50-130	
Naphthalene	ug/kg	333	231	69	48-130	
Phenanthrene	ug/kg	333	244	73	51-130	
Pyrene	ug/kg	333	288	86	55-130	
2-Fluorobiphenyl (S)	%			72	39-130	
Terphenyl-d14 (S)	%			93	37-130	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1126985 1126986

Parameter	Units	MS		MSD		MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
		40111479012 Result	Spike Conc.	Spike Conc.	Result						
1-Methylnaphthalene	ug/kg	<9.6	382	382	250	286	65	75	50-130	13	30
2-Methylnaphthalene	ug/kg	<9.6	382	382	232	273	61	71	44-130	16	32
Acenaphthene	ug/kg	<9.6	382	382	250	291	65	76	46-130	15	26
Acenaphthylene	ug/kg	<8.6	382	382	250	296	65	77	49-130	17	23
Anthracene	ug/kg	<9.9	382	382	274	341	72	89	52-130	22	28
Benzo(a)anthracene	ug/kg	<6.6	382	382	226	279	59	73	34-130	21	36
Benzo(a)pyrene	ug/kg	<6.8	382	382	217	267	57	70	34-130	21	40
Benzo(b)fluoranthene	ug/kg	<9.6	382	382	227	292	59	76	22-130	25	40
Benzo(g,h,i)perylene	ug/kg	<7.3	382	382	191	231	50	60	24-130	19	35
Benzo(k)fluoranthene	ug/kg	<10.6	382	382	259	311	68	81	41-130	18	37
Chrysene	ug/kg	<8.8	382	382	292	349	76	91	49-130	18	33
Dibenz(a,h)anthracene	ug/kg	<7.0	382	382	175	214	46	56	27-130	20	31
Fluoranthene	ug/kg	<9.6	382	382	258	317	68	83	34-130	20	37
Fluorene	ug/kg	<9.6	382	382	145	182	38	48	45-130	22	25 MO
Indeno(1,2,3-cd)pyrene	ug/kg	<7.3	382	382	189	234	50	61	30-130	21	34
Naphthalene	ug/kg	<9.6	382	382	247	285	64	75	38-130	14	30
Phenanthrene	ug/kg	<9.6	382	382	230	277	60	72	38-130	19	34
Pyrene	ug/kg	<9.6	382	382	264	321	69	84	35-130	19	35
2-Fluorobiphenyl (S)	%						54	64	39-130		
Terphenyl-d14 (S)	%						66	80	37-130		

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### QUALITY CONTROL DATA

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

QC Batch: OEXT/26009 Analysis Method: EPA 8270 by SIM  
QC Batch Method: EPA 3546 Analysis Description: 8270/3546 MSSV PAH by SIM  
Associated Lab Samples: 40111561018, 40111561019

METHOD BLANK: 1128100 Matrix: Solid  
Associated Lab Samples: 40111561018, 40111561019

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
1-Methylnaphthalene	ug/kg	<8.3	16.7	03/20/15 10:28	
2-Methylnaphthalene	ug/kg	<8.3	16.7	03/20/15 10:28	
Acenaphthene	ug/kg	<8.3	16.7	03/20/15 10:28	
Acenaphthylene	ug/kg	<7.5	16.7	03/20/15 10:28	
Anthracene	ug/kg	<8.6	16.7	03/20/15 10:28	
Benzo(a)anthracene	ug/kg	<5.8	16.7	03/20/15 10:28	
Benzo(a)pyrene	ug/kg	<6.0	16.7	03/20/15 10:28	
Benzo(b)fluoranthene	ug/kg	<8.3	16.7	03/20/15 10:28	
Benzo(g,h,i)perylene	ug/kg	<6.3	16.7	03/20/15 10:28	
Benzo(k)fluoranthene	ug/kg	<9.2	16.7	03/20/15 10:28	
Chrysene	ug/kg	<7.7	16.7	03/20/15 10:28	
Dibenz(a,h)anthracene	ug/kg	<6.1	16.7	03/20/15 10:28	
Fluoranthene	ug/kg	<8.3	16.7	03/20/15 10:28	
Fluorene	ug/kg	<8.3	16.7	03/20/15 10:28	
Indeno(1,2,3-cd)pyrene	ug/kg	<6.3	16.7	03/20/15 10:28	
Naphthalene	ug/kg	<8.3	16.7	03/20/15 10:28	
Phenanthrene	ug/kg	<8.3	16.7	03/20/15 10:28	
Pyrene	ug/kg	<8.3	16.7	03/20/15 10:28	
2-Fluorobiphenyl (S)	%	73	39-130	03/20/15 10:28	
Terphenyl-d14 (S)	%	81	37-130	03/20/15 10:28	

LABORATORY CONTROL SAMPLE: 1128101

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
1-Methylnaphthalene	ug/kg	333	245	74	53-130	
2-Methylnaphthalene	ug/kg	333	237	71	52-130	
Acenaphthene	ug/kg	333	249	75	54-130	
Acenaphthylene	ug/kg	333	247	74	55-130	
Anthracene	ug/kg	333	264	79	64-130	
Benzo(a)anthracene	ug/kg	333	248	74	50-130	
Benzo(a)pyrene	ug/kg	333	258	78	46-130	
Benzo(b)fluoranthene	ug/kg	333	270	81	43-130	
Benzo(g,h,i)perylene	ug/kg	333	243	73	48-130	
Benzo(k)fluoranthene	ug/kg	333	247	74	55-130	
Chrysene	ug/kg	333	252	75	62-130	
Dibenz(a,h)anthracene	ug/kg	333	259	78	49-130	
Fluoranthene	ug/kg	333	250	75	57-130	
Fluorene	ug/kg	333	245	73	57-130	
Indeno(1,2,3-cd)pyrene	ug/kg	333	260	78	50-130	
Naphthalene	ug/kg	333	232	70	48-130	

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**QUALITY CONTROL DATA**

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

LABORATORY CONTROL SAMPLE: 1128101

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Phenanthrene	ug/kg	333	255	77	51-130	
Pyrene	ug/kg	333	245	73	55-130	
2-Fluorobiphenyl (S)	%			68	39-130	
Terphenyl-d14 (S)	%			71	37-130	

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**QUALITY CONTROL DATA**

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

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QC Batch: PMST/10964                      Analysis Method: ASTM D2974-87  
QC Batch Method: ASTM D2974-87                      Analysis Description: Dry Weight/Percent Moisture  
Associated Lab Samples: 40111561009

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SAMPLE DUPLICATE: 1128275

Parameter	Units	40111733001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	10.5	10.3	1	10	

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**QUALITY CONTROL DATA**

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

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QC Batch:	PMST/10966	Analysis Method:	ASTM D2974-87
QC Batch Method:	ASTM D2974-87	Analysis Description:	Dry Weight/Percent Moisture
Associated Lab Samples:	40111561010, 40111561011, 40111561012, 40111561013, 40111561014, 40111561016, 40111561017, 40111561018, 40111561019		

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SAMPLE DUPLICATE: 1128294

Parameter	Units	40111593004 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	4.6	4.5	1	10	

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## QUALIFIERS

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

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### 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 LOD.

J - Estimated concentration at or above the LOD and below the LOQ.

LOD - Limit of Detection adjusted for dilution factor and percent moisture.

LOQ - Limit of Quantitation adjusted for dilution factor and percent moisture.

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 at or above the adjusted LOD.

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-G Pace Analytical Services - Green Bay

### BATCH QUALIFIERS

Batch: MSSV/7706

[IP] Benzo(b)fluoranthene and benzo(k)fluoranthene were in the check standard but did not meet the resolution criteria in SW846 Method 8270C. Whereas sample results included are reported as individual isomers, the lab and the customer must recognize them as an isomeric pair.

Batch: MSV/27742

[M5] A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

Batch: MSV/27761

[M5] A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

### ANALYTE QUALIFIERS

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

HS Results are from sample aliquot taken from VOA vial with headspace (air bubble greater than 6 mm diameter).

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

L2 Analyte recovery in the laboratory control sample (LCS) was below QC limits. Results may be biased low.

M0 Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.

S4 Surrogate recovery not evaluated against control limits due to sample dilution.

W Non-detect results are reported on a wet weight basis.

## REPORT OF LABORATORY ANALYSIS

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**QUALITY CONTROL DATA CROSS REFERENCE TABLE**

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40111561001	GP-1 S2	EPA 3050	MPRP/11578	EPA 6010	ICP/10286
40111561002	GP-2 S2	EPA 3050	MPRP/11578	EPA 6010	ICP/10286
40111561003	GP-2 S4	EPA 3050	MPRP/11578	EPA 6010	ICP/10286
40111561004	GP-3 S1	EPA 3050	MPRP/11578	EPA 6010	ICP/10286
40111561005	GP-3 S4	EPA 3050	MPRP/11578	EPA 6010	ICP/10286
40111561006	GP-3 S5	EPA 3050	MPRP/11578	EPA 6010	ICP/10286
40111561007	GP-4 S1	EPA 3050	MPRP/11578	EPA 6010	ICP/10286
40111561008	GP-4 S4	EPA 3050	MPRP/11578	EPA 6010	ICP/10286
40111561009	GP-5 S1	EPA 3050	MPRP/11578	EPA 6010	ICP/10286
40111561010	GP-5 S5	EPA 3050	MPRP/11578	EPA 6010	ICP/10286
40111561011	GP-5 S3	EPA 3050	MPRP/11578	EPA 6010	ICP/10286
40111561012	GP-8 S2	EPA 3050	MPRP/11578	EPA 6010	ICP/10286
40111561013	GP-8 S3	EPA 3050	MPRP/11578	EPA 6010	ICP/10286
40111561014	GP-7 S1	EPA 3050	MPRP/11578	EPA 6010	ICP/10286
40111561016	GP-6 S2	EPA 3050	MPRP/11578	EPA 6010	ICP/10286
40111561017	GP-9 S1	EPA 3050	MPRP/11578	EPA 6010	ICP/10286
40111561018	GP-10 S2	EPA 3050	MPRP/11578	EPA 6010	ICP/10286
40111561019	GP-10 S4	EPA 3050	MPRP/11578	EPA 6010	ICP/10286
40111561001	GP-1 S2	EPA 7471	MERP/4798	EPA 7471	MERC/6502
40111561002	GP-2 S2	EPA 7471	MERP/4798	EPA 7471	MERC/6502
40111561003	GP-2 S4	EPA 7471	MERP/4798	EPA 7471	MERC/6502
40111561004	GP-3 S1	EPA 7471	MERP/4798	EPA 7471	MERC/6502
40111561005	GP-3 S4	EPA 7471	MERP/4798	EPA 7471	MERC/6502
40111561006	GP-3 S5	EPA 7471	MERP/4798	EPA 7471	MERC/6502
40111561007	GP-4 S1	EPA 7471	MERP/4798	EPA 7471	MERC/6502
40111561008	GP-4 S4	EPA 7471	MERP/4798	EPA 7471	MERC/6502
40111561009	GP-5 S1	EPA 7471	MERP/4798	EPA 7471	MERC/6502
40111561010	GP-5 S5	EPA 7471	MERP/4798	EPA 7471	MERC/6502
40111561011	GP-5 S3	EPA 7471	MERP/4798	EPA 7471	MERC/6502
40111561012	GP-8 S2	EPA 7471	MERP/4798	EPA 7471	MERC/6502
40111561013	GP-8 S3	EPA 7471	MERP/4798	EPA 7471	MERC/6502
40111561014	GP-7 S1	EPA 7471	MERP/4798	EPA 7471	MERC/6502
40111561016	GP-6 S2	EPA 7471	MERP/4798	EPA 7471	MERC/6502
40111561017	GP-9 S1	EPA 7471	MERP/4798	EPA 7471	MERC/6502
40111561018	GP-10 S2	EPA 7471	MERP/4798	EPA 7471	MERC/6502
40111561019	GP-10 S4	EPA 7471	MERP/4798	EPA 7471	MERC/6502
40111561001	GP-1 S2	EPA 3546	OEXT/26002	EPA 8270 by SIM	MSSV/7706
40111561002	GP-2 S2	EPA 3546	OEXT/26002	EPA 8270 by SIM	MSSV/7706
40111561003	GP-2 S4	EPA 3546	OEXT/26002	EPA 8270 by SIM	MSSV/7706
40111561004	GP-3 S1	EPA 3546	OEXT/26002	EPA 8270 by SIM	MSSV/7706
40111561005	GP-3 S4	EPA 3546	OEXT/26002	EPA 8270 by SIM	MSSV/7706
40111561006	GP-3 S5	EPA 3546	OEXT/26002	EPA 8270 by SIM	MSSV/7706
40111561007	GP-4 S1	EPA 3546	OEXT/26002	EPA 8270 by SIM	MSSV/7706
40111561008	GP-4 S4	EPA 3546	OEXT/26002	EPA 8270 by SIM	MSSV/7706
40111561009	GP-5 S1	EPA 3546	OEXT/26002	EPA 8270 by SIM	MSSV/7706
40111561010	GP-5 S5	EPA 3546	OEXT/26002	EPA 8270 by SIM	MSSV/7706
40111561011	GP-5 S3	EPA 3546	OEXT/26002	EPA 8270 by SIM	MSSV/7706
40111561012	GP-8 S2	EPA 3546	OEXT/26002	EPA 8270 by SIM	MSSV/7706

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### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40111561013	GP-8 S3	EPA 3546	OEXT/26002	EPA 8270 by SIM	MSSV/7706
40111561014	GP-7 S1	EPA 3546	OEXT/26002	EPA 8270 by SIM	MSSV/7706
40111561016	GP-6 S2	EPA 3546	OEXT/26002	EPA 8270 by SIM	MSSV/7706
40111561017	GP-9 S1	EPA 3546	OEXT/26002	EPA 8270 by SIM	MSSV/7706
40111561018	GP-10 S2	EPA 3546	OEXT/26009	EPA 8270 by SIM	MSSV/7709
40111561019	GP-10 S4	EPA 3546	OEXT/26009	EPA 8270 by SIM	MSSV/7709
40111561001	GP-1 S2	EPA 5035/5030B	MSV/27740	EPA 8260	MSV/27742
40111561002	GP-2 S2	EPA 5035/5030B	MSV/27740	EPA 8260	MSV/27742
40111561003	GP-2 S4	EPA 5035/5030B	MSV/27740	EPA 8260	MSV/27742
40111561004	GP-3 S1	EPA 5035/5030B	MSV/27740	EPA 8260	MSV/27742
40111561005	GP-3 S4	EPA 5035/5030B	MSV/27740	EPA 8260	MSV/27742
40111561006	GP-3 S5	EPA 5035/5030B	MSV/27740	EPA 8260	MSV/27742
40111561007	GP-4 S1	EPA 5035/5030B	MSV/27740	EPA 8260	MSV/27742
40111561008	GP-4 S4	EPA 5035/5030B	MSV/27740	EPA 8260	MSV/27742
40111561009	GP-5 S1	EPA 5035/5030B	MSV/27740	EPA 8260	MSV/27742
40111561010	GP-5 S5	EPA 5035/5030B	MSV/27740	EPA 8260	MSV/27742
40111561011	GP-5 S3	EPA 5035/5030B	MSV/27740	EPA 8260	MSV/27742
40111561012	GP-8 S2	EPA 5035/5030B	MSV/27740	EPA 8260	MSV/27742
40111561013	GP-8 S3	EPA 5035/5030B	MSV/27740	EPA 8260	MSV/27742
40111561014	GP-7 S1	EPA 5035/5030B	MSV/27740	EPA 8260	MSV/27742
40111561016	GP-6 S2	EPA 5035/5030B	MSV/27755	EPA 8260	MSV/27761
40111561017	GP-9 S1	EPA 5035/5030B	MSV/27755	EPA 8260	MSV/27761
40111561018	GP-10 S2	EPA 5035/5030B	MSV/27755	EPA 8260	MSV/27761
40111561019	GP-10 S4	EPA 5035/5030B	MSV/27755	EPA 8260	MSV/27761
40111561015	GP-5	EPA 8260	MSV/27717		
40111561020	GP-10	EPA 8260	MSV/27717		
40111561021	GP-3	EPA 8260	MSV/27717		
40111561022	GP-2	EPA 8260	MSV/27717		
40111561023	GP-8	EPA 8260	MSV/27717		
40111561001	GP-1 S2	ASTM D2974-87	PMST/10963		
40111561002	GP-2 S2	ASTM D2974-87	PMST/10963		
40111561003	GP-2 S4	ASTM D2974-87	PMST/10963		
40111561004	GP-3 S1	ASTM D2974-87	PMST/10963		
40111561005	GP-3 S4	ASTM D2974-87	PMST/10963		
40111561006	GP-3 S5	ASTM D2974-87	PMST/10963		
40111561007	GP-4 S1	ASTM D2974-87	PMST/10963		
40111561008	GP-4 S4	ASTM D2974-87	PMST/10963		
40111561009	GP-5 S1	ASTM D2974-87	PMST/10964		
40111561010	GP-5 S5	ASTM D2974-87	PMST/10966		
40111561011	GP-5 S3	ASTM D2974-87	PMST/10966		
40111561012	GP-8 S2	ASTM D2974-87	PMST/10966		
40111561013	GP-8 S3	ASTM D2974-87	PMST/10966		
40111561014	GP-7 S1	ASTM D2974-87	PMST/10966		
40111561016	GP-6 S2	ASTM D2974-87	PMST/10966		
40111561017	GP-9 S1	ASTM D2974-87	PMST/10966		

### REPORT OF LABORATORY ANALYSIS

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### QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 25215045 MADISON WATER UTILITY  
Pace Project No.: 40111561

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40111561018	GP-10 S2	ASTM D2974-87	PMST/10966		
40111561019	GP-10 S4	ASTM D2974-87	PMST/10966		

### REPORT OF LABORATORY ANALYSIS

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Sample Condition Upon Receipt

Pace Analytical Services, Inc.  
1241 Bellevue Street, Suite 9  
Green Bay, WI 54302



Client Name: SCS Engineers

Project #

WO#: **40111561**

Courier:  Fed Ex  UPS  Client  Pace Other: CS Logistics

Tracking #: NA



Custody Seal on Cooler/Box Present:  yes  no Seals intact:  yes  no

Custody Seal on Samples Present:  yes  no Seals intact:  yes  no

Packing Material:  Bubble Wrap  Bubble Bags  None  Other

Thermometer Used NA Type of Ice:  Wet  Blue  Dry  None  Samples on ice, cooling process has begun

Cooler Temperature Uncorr: R6E 1Corr:            Biological Tissue is Frozen:  yes  no

Temp Blank Present:  yes  no

Person examining contents:  
Date: 3/12/15  
Initials: MG

Temp should be above freezing to 6°C for all sample except Biota.  
Frozen Biota Samples should be received ≤ 0°C.

Comments:

Chain of Custody Present:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	1.
Chain of Custody Filled Out:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	2.
Chain of Custody Relinquished:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	3.
Sampler Name & Signature on COC:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	4.
Samples Arrived within Hold Time:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	5.
- VOA Samples frozen upon receipt	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Date/Time:
Short Hold Time Analysis (<72hr):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	6.
Rush Turn Around Time Requested:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	7.
Sufficient Volume:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	8. Did not receive volume for GP-4 on 3/12/15
Correct Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	9.
-Pace Containers Used:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
-Pace IR Containers Used:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
Containers Intact:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	10.
Filtered volume received for Dissolved tests	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	11. 010+011 times 11:05 017 I.D. is GP-9 82 R25 3/12/15
Sample Labels match COC:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	12. 007 1-4 only do not match COC time - time is 12:45 003 1-4 only time is 9:40 1-4 25 time is 10:15 009 1-4 only & 1-4 25 time is 11:00
-Includes date/time/ID/Analysis Matrix: <u>SW</u>		
All containers needing preservation have been checked. (Non-Compliance noted in 13.)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	13. <input type="checkbox"/> HNO3 <input type="checkbox"/> H2SO4 <input type="checkbox"/> NaOH <input type="checkbox"/> NaOH + ZnAct
All containers needing preservation are found to be in compliance with EPA recommendation. (HNO3, H2SO4 ≤2; NaOH+ZnAct ≥9, NaOH ≥12)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
exceptions: VOA, coliform, TOC, TOX, TOH, O&G, WIDROW, Phenolics, OTHER:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Initial when completed
		Lab Std #/ID of preservative
		Date/Time:
Headspace in VOA Vials (>6mm):	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	14. 000 + 021
Trip Blank Present:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	15.
Trip Blank Custody Seals Present	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution:  If checked, see attached form for additional comments

Person Contacted: 010 Date/Time:             
 Comments/ Resolution: 001 1-4 only time is 11:15, 011 1-4 only time is 11:15  
0015 no time or date, 016 time is 14:30, 0017 time is 14:45  
018 time is 15:10, 019 time is 15:10

Project Manager Review: MG 3/12/15 Date: 3/12/15  
MMH for DM

## **SECTION 003132 - GEOTECHNICAL DATA**

### **PART 1 - GENERAL**

#### **1.1 GEOTECHNICAL DATA**

- A. This Section with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information, but are not a warranty of existing conditions.
- B. Soil-boring data for Project, obtained by CGC, Inc., dated December 5, 2005, is available for viewing as appended to this Section.
- C. A geotechnical investigation report for Project, prepared by CGC, Inc., dated December 5, 2005, is available for viewing as appended to this Section.
- D. Related Requirements:
  - 1. Section 003126 "Existing Hazardous Material Information" for hazardous materials reports that are made available to bidders.

### **PART 2 - PRODUCTS (Not Used)**

### **PART 3 - EXECUTION (Not Used)**

**END OF SECTION 003132**

# CGC, Inc.

Construction • Geotechnical  
Consulting Engineering/Testing  
December 5, 2005  
C05459

Mr. Alan Larson, P.E.  
Madison Water Utility  
119 E. Olin Avenue  
Madison, WI 53713-1431

Re: Geotechnical Exploration Report  
Paterson Street Vehicle Maintenance Facility  
Madison, Wisconsin

Dear Mr. Larson:

Construction • Geotechnical Consultants, Inc. (CGC) has completed the subsurface exploration for the proposed addition to the vehicle maintenance building, as well as the future dry storage facility on the property across Paterson Street. The primary purpose of this exploration was to evaluate the subsurface conditions on the sites and to provide geotechnical recommendations regarding foundation, floor slab, below-grade wall and pavement design/construction. Two copies of this report are provided for your use, and two additional copies are being forwarded to the project architect, Mr. Chris Romney of Bray Associates (Bray) and the project structural engineer, Mr. Fred Groth of Graef Anhalt & Schloemer (GAS).

## PROJECT DESCRIPTION

We understand the project will consist of demolishing the 1918 wing of the existing building at 110 S. Paterson Street and building a new addition. The new vehicle maintenance building will be approximately 11,000 sq ft in area. The building is expected to be a combination of masonry load bearing wall and steel frame. The mezzanine and office areas will be precast plank. The typical roof will be steel bar joist and metal deck. A pit for a vehicle hoist will be constructed in one of the bays. We understand the pit may extend as deep as 9 ft below the slab and will be a reinforced concrete structure.

Typical column loads for spread footings will be 60 kips (dead) and 46 kips (live load) for a total load of 106 kips. Typical wall loads will be 5 kips per lineal foot (total).

We also understand that a temporary vehicle maintenance building will be constructed in a current storage yard behind the existing Water Utility Vehicle Storage Building located across the street on the east side of Paterson Street. The building will ultimately be converted for dry storage of materials and supplies but will temporarily serve as a vehicle maintenance facility during construction of the new facility at 110 S. Paterson Street. Column and wall loads were not provided but are expected to be comparable to those described above.

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Mr. Alan Larson, P.E.  
Madison Water Utility  
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## **SUBSURFACE EXPLORATION**

The subsurface conditions in the areas of proposed construction were explored by drilling six Standard Penetration Test (SPT) borings (Borings 1 through 7, excluding 6) to planned depths of 40 ft for the vehicle maintenance building addition and three SPT borings (Borings 8, 9 and 10) also to depths of 40 ft for the future dry storage building. Note that Boring 6 was deleted because its location was inaccessible due to overhead power lines. The boring locations were selected by Bray/GAS. The approximate boring locations are shown in plan on the soil boring location maps presented in Appendix B. Ground surface elevations at the boring locations were surveyed by the drillers and are referenced to a stormwater inlet rim near Boring 4 at EL 849.96 ft.

The soil borings were performed by Badger State Drilling (under subcontract to CGC) on November 15-17, 2005 using truck-mounted drill rigs equipped with hollow-stem augers and mud rotary drilling tools. Soil samples were obtained at the boring locations in accordance with SPT techniques (ASTM D1586). The specific procedures used for drilling and sampling are described in Appendix A.

Temporary water table wells were installed in two borings (B5 and B7) to obtain 48-hr water level readings. The water level observations are included at the bottom of the boring logs.

## **SURFACE CHARACTERISTICS**

The 110 S. Paterson site is occupied by the existing vehicle maintenance building, a portion of which is slated for demolition and replacement. The wing to be demolished is a one-story masonry building. The remainder of the site is paved parking area and drives. A fueling facility is located in the parking lot west of the addition and will remain after construction. We understand one or more releases of petroleum products have occurred on the site, and the site has been explored and monitored by another consultant for petroleum contaminants for a number of years.

The site of the future dry storage building is across Paterson Street to the east, behind the existing vehicle storage building. The area is a gravel-surfaced storage yard with various materials stored around the perimeter and two soil stockpiles in the center. Site grades at both locations are flat and are generally in the range of EL 850-851, based on boring elevations.

## **SITE CONDITIONS**

The subsurface profile revealed by the borings is fairly uniform and can be described by the following generalized strata, in descending order:



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Madison Water Utility  
December 5, 2005  
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- 8 to 12 in. of *asphalt* and/or *crushed stone* base course, except for Boring 7 which has topsoil at the surface; underlain by
- 4.5 to 7.5 ft of miscellaneous *fill* consisting of cinders, ash, coal, gravel, sand, clay and glass, with possible topsoil or peat pockets noted in a few locations; followed by
- 3.5 to 26.5 ft of medium stiff to stiff (typically) *lean clay*, with softer zones near the top of the layer and scattered very stiff zones elsewhere; followed by
- Medium to very dense *sand strata* with significant silt/clay content and varying percentages of gravel extending to the maximum depths explored.

Note that the fill is a non-engineered material with a significant proportion of waste material (cinders, ash, glass, etc.).

Groundwater was encountered in the boreholes during or shortly after drilling at depths ranging from about 10 to 24 ft below ground surface (bgs). However, the use of drilling mud to advance the holes has obscured the short-term water levels in the boreholes, and only the two-day readings in the two temporary water table wells (Borings 5 and 7) are considered reliable. These readings show the water table at about 10 to 11 ft bgs. Note also that Gannett Fleming, the environmental consultant at the site, has indicated on their Residual Groundwater Information Map that "the average depth to groundwater is approximately 4 to 5 ft below ground surface when the remediation system is not pumping groundwater." Gannett Fleming's statement puts the static water level at about EL 845.5 ft, or approximately the same elevation at Lake Monona and roughly 4 ft below Lake Mendota. In view of these observations, we estimate that the long-term static water table would be at about EL 846, or approximately 4 ft below grade. Fluctuations in the water table should be expected in response to seasonal variations in precipitation, infiltration, evapotranspiration, pumping rates from nearby wells, lake levels and other factors. Additional details on the soil and groundwater conditions can be found on the boring logs in Appendix B.

The drillers noted possible petroleum odors in most borings, and in some cases the odor was quite strong. We understand that the site has been studied in the past by Gannett Fleming. *However, because these new findings may impact the cost of disposal of soil removed from the site, we recommend additional environmental review be conducted.* Such a review is beyond our area of expertise and is not included in the scope of our work.

## **DISCUSSION AND RECOMMENDATIONS**

The presence of miscellaneous, non-engineered fill and soft zones in the underlying clay stratum pose significant problems in construction on both sites. However, the satisfactory performance of the existing buildings indicate that construction is feasible, provided the cost of dealing with

Mr. Alan Larson, P.E.  
Madison Water Utility  
December 5, 2005  
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possible environmental issues can be controlled. Our recommendations for site preparation, as well as foundation, floor slab, below-grade walls and pavement design/construction are presented in the following subsections. Additional information regarding the conclusions and recommendations presented in this report is discussed in Appendix C.

### **1. Site Preparation/Floor Slab Support**

As the initial step in preparing the 110 Paterson Street site for construction, the portion of the existing building slated for removal will be demolished. Building debris, including foundations and floor slabs, should be removed in its entirety from the site and properly disposed of. We next recommend that the existing pavement and any vegetation/ topsoil be stripped to a minimum of 5 to 10 ft beyond the proposed construction areas.

Once the building has been removed at 110 S. Paterson Street, site preparation for footings and floor slabs can proceed on both sites in about the same fashion, due to the similarity in soil conditions. As an overview, we recommend that the existing miscellaneous fill and upper zone of soft clay be removed below foundations and replaced with compacted sand and/or gravel fill. As the most positive means of reducing the risk of floor slab settlement, the fill and soft clay should be removed in their entirety below floor slab areas also. However, in view of the apparently satisfactory performance of the slabs in the existing building, we believe a partial undercut/replacement approach would be appropriate below floor slab areas, *provided a slight risk of settlement possibly leading to minor floor slab distress (i.e., cracking) is acceptable to the owner.*

Assuming partial undercutting/replacement is acceptable below floor slabs, we recommend the following steps be taken:

- The existing fill should be removed to a depth of 1.5 ft below the bottom of the floor slab.
- Excavated soils should be tested for possible environmental contaminants and disposed in a licensed solid waste landfill, if necessary.
- The fill soils and underlying soft clay zones should be removed below foundations, as described in more detail in the next section.
- Following footing construction, the fill soils to be left in place below floor slabs should be thoroughly compacted with a large (i.e., 10 ton) self-propelled vibratory sheepsfoot roller by making at least two passes in each direction.
- A 1-ft layer of breaker rock stone with fines should be placed and compacted in lifts until no further consolidation is evident.

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- Finally, a 6-in. layer of subfloor granular fill (e.g., a reasonably well graded sand with less than 5 percent passing the No. 200 sieve) should be placed as slab bedding material.

Additional recommendations on floor slab design and construction are included in a later section.

**2. Foundation Design**

It is our opinion that the proposed structures can be supported on conventional shallow spread foundations following removal of the miscellaneous fill/soft clay to an estimated depth of about 8 ft below grade.

Footing excavations should be performed with a smooth-edged backhoe bucket. We further recommend that a 6-in. layer of breaker rock be placed in the base of each footing excavation and rigorously compacted with a hoe-pak or large plate compactor into the bottom. The undercut areas should be restored with granular fill (i.e., sand and/or gravel with less than 25 percent passing the No. 200 sieve) and compacted to at least 95 percent of modified Proctor (ASTM D1557) dry density. For stress distribution purposes, the width of undercut excavations should be widened 1 ft for each foot of undercut. Subgrade observation by CGC is recommended to check the adequacy of bearing conditions and recommend additional remedial measures, if necessary. Note that clay soils exposed at the base of the excavation with pocket penetrometer readings of 0.75 tsf or less will also require undercutting.

Provided the foundations are installed in accordance with the preceding recommendations, the following parameters may be used for foundation design:

- Maximum allowable bearing pressure for footings resting on at least 3 ft of compacted fill following undercutting/replacement as described above: 3000 psf
- Minimum foundation widths:
  - Continuous wall footings: 18 in.
  - Column footings: 30 in.
- Minimum footing depths for frost protection: 4 ft

Provided the foundation design/construction recommendations discussed above are followed, we estimate that total and differential settlements should not exceed 1.0 and 0.5 in., respectively.

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Alternative methods of foundation and floor slab support may be considered should disposal costs of the fill to be removed from the site become excessive. These alternatives include helical piers and driven pipe piles. Recommendations for these options can be provided at a later date.

In our opinion, the average soil/rock properties in the upper 100 ft of the site (based on SPT N-values averaging between 15 and 50) can be characterized as a stiff soil profile. This characterization would place the site in Site Class D for seismic design according to the International Building Code (see Table 1615.1.1).

### 3. Floor Slabs

In our opinion, the floor slabs for the structures can be supported after partially undercutting and replacing the existing fill to 1.5 ft below the slab as described above and may be designed using a subgrade modulus of 100 pci. Prior to slab construction, the subgrades should be recompact to densify soils that may become disturbed or loosened during construction activities such that non-yielding conditions are developed. As mentioned previously, to serve as a capillary break, the final 6 in. of soil placed below the slab should consist of an imported well-graded sand or gravel with no more than 5 percent by weight passing the No. 200 U.S. standard sieve. To further minimize the potential for moisture migration, a plastic vapor barrier could also be utilized. Fill and drainage course material below the floor slab should be placed as described in the Site Preparation section of this report.

The floor slabs should be isolated from the building walls and columns with a compressible filler, and the design should include an adequate number of isolation and contraction joints.

### 4. Below-Grade Walls

We anticipate that the below-grade walls for the proposed hoist pit will be rigidly framed. Therefore, *at-rest* lateral earth pressures should be used during design. To minimize the buildup of such pressures, high-quality backfill should be placed within 4 to 6 ft of the walls. The granular backfill should be an imported, well-graded sand or gravel having no more than 12 percent passing the No. 200 U.S. standard sieve.

Current groundwater levels are about 10 to 11 ft below grade but may rise to within 4 ft of the ground surface with time. Two options are available for designing the pit walls and slab: (1) they can be designed as a watertight structure to resist the uplift forces due to a water level at EL 846 or (2) they can incorporate an underdrain system to artificially lower the water table on a permanent basis below the pit. The underdrain system would include a 12-in. thick layer of 3/4-in. clear stone below the base and against the pit walls up to EL 846 with a geotextile fabric (Mirafi 160N or equivalent) separating the stone from the native soils. The drainage layer should be connected to a sump with pumps to remove the infiltrating water. Depending on the sensitivity to water damage

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 Madison Water Utility  
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of the equipment in the pit, redundant/backup systems may be necessary, such as a duplicate pump and an emergency generator.

Before placing the pit wall backfill, the exterior walls should be damp-proofed with spray-applied or mopped-on rubber or bituminous sealer or a waterproof membrane applied if the pit is designed to be watertight. Compaction of backfill within 3 ft of the walls should be performed with lightweight equipment to avoid the development of excessive lateral earth pressures. The backfill should be compacted to a minimum of 93 percent modified Proctor following Appendix D guidelines. Lower level walls constructed in accordance with the above recommendations may be designed for an equivalent fluid pressure of 55 psf per ft of depth.

**5. Pavement Design**

We assume the parking lot/access drive pavement will be exposed to significant truck traffic (i.e., a medium to heavy traffic class). The pavement design will likely be controlled by the miscellaneous soils expected at subgrade elevation across some of the site. After stripping to subgrade elevations and prior to fill placement, the subgrade soils should be recompacted and proof-rolled as discussed in the Site Preparation section of this report. The pavement section tabulated below was selected assuming a CBR value of approximately 2 for the miscellaneous fill soils anticipated at subgrade elevation and a design life of 20 years.

**TABLE 1  
 RECOMMENDED PAVEMENT SECTIONS**

Material	Truck Drive Areas Thickness (in.)	DOT Specification <sup>1</sup>
Bituminous surface course	1.75	Section 460, Table 460-1, 12.5 mm
Bituminous binder course	2.25	Section 460, Table 460-1, 19.0 mm
Dense graded base course	6.0	Sections 301 and 305, 31.5 mm
3" Dense graded base course or breaker run	12.0	Sections 301 and 305, 75 mm or Section 311
<b>TOTAL THICKNESS</b>	<b>22.0</b>	

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Notes:

1. Wisconsin DOT *Standard Specifications for Highway and Structure Construction*, 2003 Edition, including supplemental specifications.
2. Compaction requirements:
  - Bituminous concrete: Refer to Section 460.3
  - Base course: Refer to Section 301.3.4.2, Standard Compaction
3. Mixture Type E-1 bituminous pavement is recommended; refer to Section 460, Table 460-2 of the *Standard Specifications*.

The pavement design assumes a stable non-yielding subgrade and a regular program of preventative maintenance. If there is a delay between subgrade preparation and placing the base course, the subgrade should be recompacted.

Pavement areas subjected to concentrated wheel loads (i.e., loading docks, dumpster pads, etc.) should be constructed of Portland cement concrete. The slab should be a minimum of 6-in. thick and should contain mesh reinforcement for crack control. A subgrade modulus of 100 pci may be used for design of rigid pavements founded on 12 in. of breaker rock over proof-rolled existing fill soils.

**6. Corrosion Potential**

Because of the presence of miscellaneous fill containing cinders, ash and similar refuse-type materials, we recommend that any metallic pipe or conduit used on the project be protected against corrosion or replaced with plastic materials.

**CONSTRUCTION CONSIDERATIONS**

Due to variations in weather, construction methods and other factors, specific construction problems are difficult to predict. Soil-related difficulties which could be encountered on the site are discussed below:

- Due to the potentially sensitive nature of some of the on-site surficial soils to construction traffic disturbance, we recommend that general site grading activities be completed during dry weather, if possible. Earthwork construction during the early spring or late fall could be complicated as a result of wet weather and freezing temperatures. Also, to the extent practical, construction traffic should be kept off prepared subgrades to minimize their disturbance.
- During cold weather, exposed subgrades should be protected from freezing before and after footing construction. Fill should never be placed while frozen.

Mr. Alan Larson, P.E.  
Madison Water Utility  
December 5, 2005  
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- Excavations extending greater than 4 ft in depth below the existing ground surface should be sloped or braced in accordance with current OSHA standards, if it is necessary for workers to enter the excavation.
- Based on observations made during the field investigation, groundwater infiltration into undercut excavations for foundations should be expected. Water accumulating at the base of the excavations as a result of precipitation or seepage should be quickly removed using pumps operating from filtered sump pits. The layer of breaker run stone recommended in the base of footing undercut excavations should assist with the dewatering effort.

#### **RECOMMENDED CONSTRUCTION MONITORING**

The quality of the foundation and floor slab subgrades will largely be determined by the level of care exercised during site development. To check that earthwork and foundation construction proceeds in accordance with our recommendations, the following operations should be monitored by CGC:

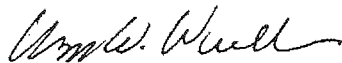
- Site stripping/subgrade proof-rolling within the construction areas;
- Fill placement and compaction;
- Foundation excavation and subgrade preparation; and
- Concrete placement.

#### **CLOSING REMARKS**

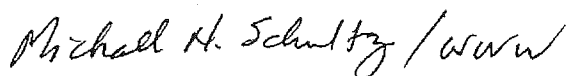
It has been a pleasure to serve you on this project. If you have any questions or need additional consultation, please contact us.

Sincerely,

**CGC, INC.**



William W. Wuellner, P.E.  
Senior Geotechnical Engineer



Michael N. Schultz, P.E.  
Principal/Consulting Professional

# **CGC, Inc.**

Mr. Alan Larson, P.E.  
Madison Water Utility  
December 5, 2005  
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Encl: Appendix A - Field Exploration  
Appendix B - Soil Boring Location Maps (2)  
Logs of Test Borings (9)  
Log of Test Boring-General Notes  
Unified Soil Classification System  
Appendix C - Document Qualifications  
Appendix D - Recommended Compacted Fill Specifications

cc: Mr. Chris Romney, Bray & Associates, Madison  
Mr. Fred Groth, Graef Anhalt Schloemer, Madison



**APPENDIX A**

**FIELD EXPLORATION**

## APPENDIX A

### FIELD EXPLORATION

Nine standard penetration test borings were drilled on November 15-17, 2005 at locations selected by Bray and GAS. The approximate locations of the borings are shown on the Boring Location Maps presented in Appendix B. The soil borings were drilled to depths of 40 ft by Badger State Drilling using truck-mounted drill rigs equipped with hollow-stem augers and mud rotary tooling. Ground surface elevations were surveyed by the drillers and are referenced to the inlet rim near Boring 4 at an elevation of 849.96 ft (USGS datum).

Soil samples were obtained at 2.5-ft intervals for a depth of 10 ft and at 5-ft intervals thereafter. The soil samples were obtained in general accordance with specifications for standard penetration testing, ASTM D 1586. The specific procedures used for drilling and sampling are described below.

1. Boring Procedures between Samples

The boring is extended downward, between samples, by a hollow-stem auger.

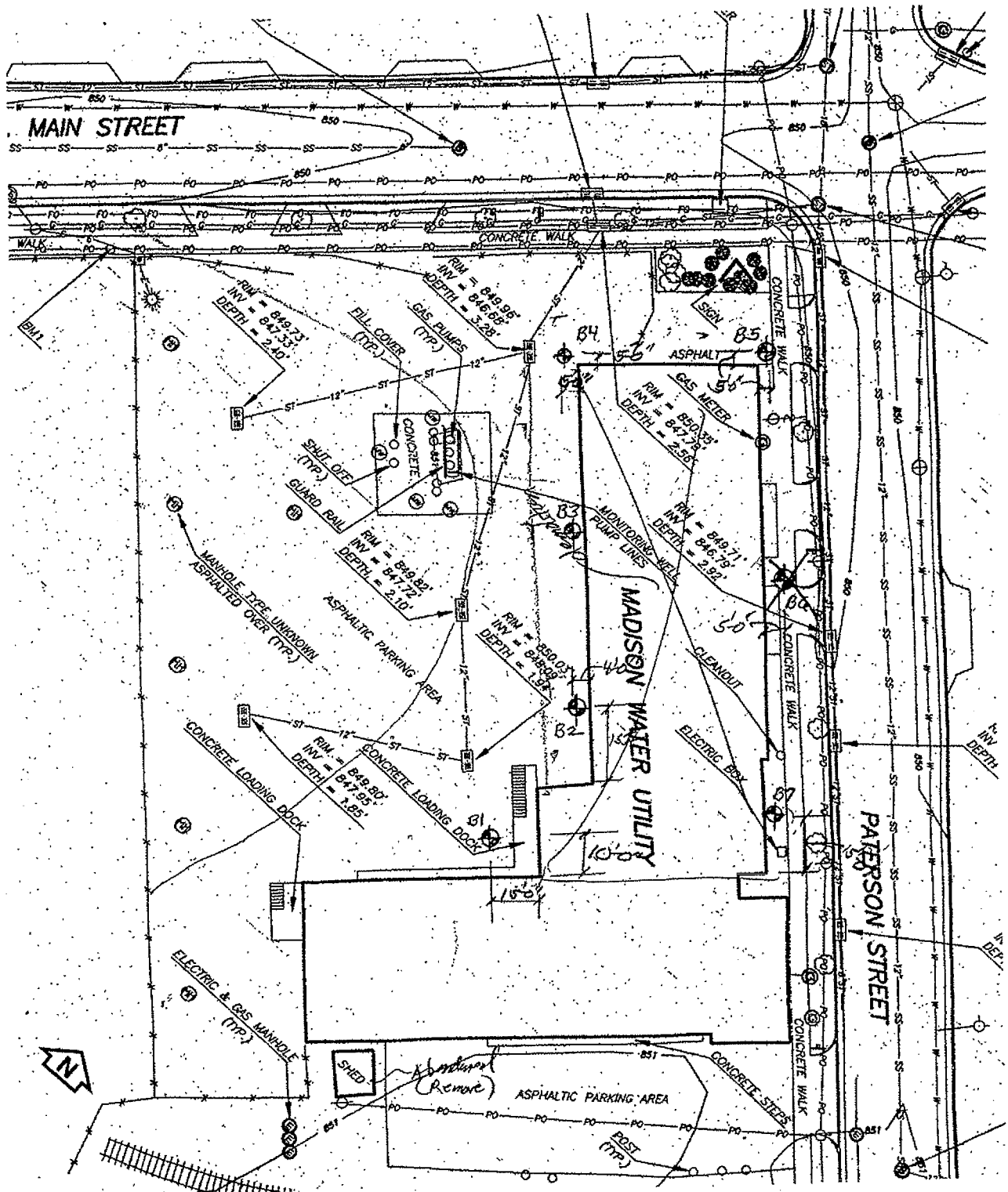
2. Standard Penetration Test and Split-Barrel Sampling of Soils  
(ASTM Designation: D 1586)

This method consists of driving a 2-inch outside diameter split barrel sampler using a 140-pound weight falling freely through a distance of 30 inches. The sampler is first seated 6 inches into the material to be sampled and then driven 12 inches. The number of blows required to drive the sampler the final 12 inches is recorded on the log of borings and is known as the Standard Penetration Resistance. Recovered samples are first classified as to texture by the driller.

During the field exploration, the driller visually classified the soil and prepared a field log. *Field screening of the samples for possible environmental contaminants was not conducted by the drillers, as environmental site assessment activities were not part of CGC's work scope.* Water level observations were made in each boring during and after drilling and are shown at the bottom of each boring log. Upon completion of drilling, the borings were backfilled with bentonite in accordance with WDNR regulations, and the soil samples were delivered to our laboratory for visual classification and laboratory testing. The soils were visually classified by a geotechnical engineer using the Unified Soil Classification System. The final logs prepared by the engineer and a description of the Unified Soil Classification System are presented in Appendix B.

**APPENDIX B**

**SOIL BORING LOCATION MAPS (2)  
LOGS OF TEST BORINGS (9)  
LOG OF TEST BORING - GENERAL NOTES  
UNIFIED SOIL CLASSIFICATION SYSTEM**



**Legend**  

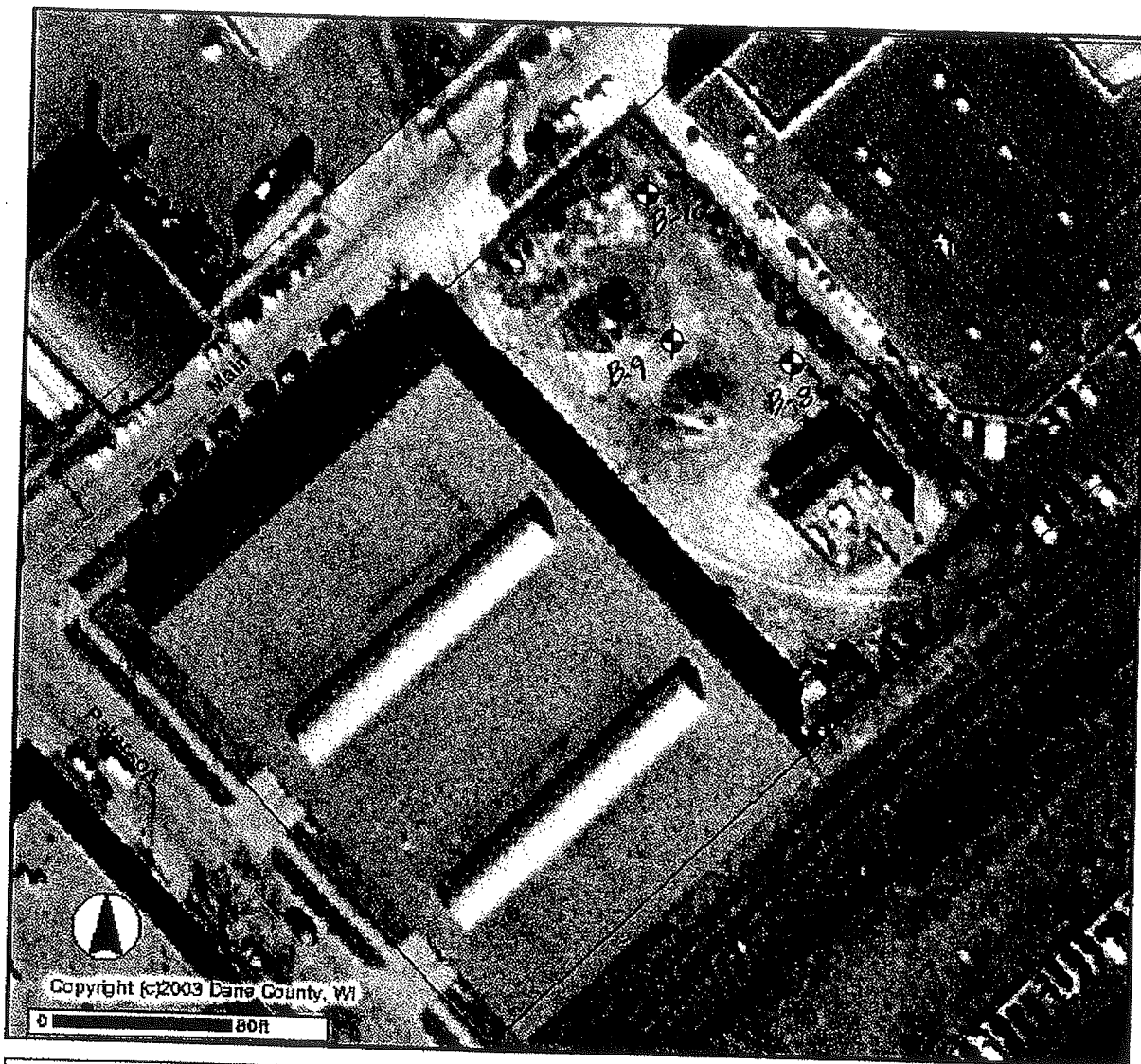
 Recent Soil Boring location and number

- Notes**
1. Borings were performed by Badger State Drilling in November 2005.
  2. Base map obtained from Rettler Corp. via GAS/Bray.
  3. Boring locations are approximate.

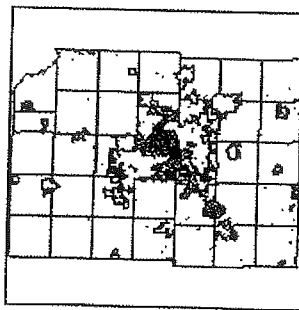
Date: 12/05	
Job No. C05459	

**SOIL BORING LOCATION MAP**  
 110 S. Paterson Street Vehicle  
 Maintenance Facility  
 Madison, Wisconsin

# Temp Veh Maint Fac



2004 Roads		Interstate		Plat Text
Local Roads		US Highways		Acreage Text
County Highways		On/Off Ramps		Hydrology (lines)
State Highways (cont)		Parcels		
		Ownership Boundaries		



## DCI Map

**DISCLAIMER**  
 This map was prepared using the Dane County DCI Map online geographic information system. All information is believed accurate but is NOT guaranteed to be without error. This map and its underlying data is intended to be used as a general index to land related information and is not intended for detailed, site-specific analysis. Dane County GIS datasets used to produce this map are copyrighted.

### Legend

Recent Soil Boring location and number

### Notes

1. Borings were performed by Badger State Drilling in November 2005.
2. Base map obtained from Dane County DCI Map.
3. Boring locations are approximate.

Date:  
12/05

Job No.  
C05459

**CGC, Inc.**

**SOIL BORING LOCATION MAP**  
 109 S. Paterson Street "Temp.  
 Vehicle Maintenance Facility"  
 Madison, Wisconsin



# LOG OF TEST BORING

Project Madison Water Utility Vehicle Storage Bldg.  
110 S. Paterson Street  
 Location Madison, Wisconsin

Boring No. 1  
 Surface Elevation (ft) 850.6  
 Job No. C05459  
 Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LI
					5" Asphalt/5" Base Course					
1	10	M	23		FILL: Black/Brown Cinders, Ash, Sand, Clay, Glass, Sand					
2	8	M	3							
3	10	M	3		Peat Seam near 6.5 ft	(0.75)				
4	12	M	6		Stiff, Gray Lean CLAY (CL) with Occasional Thin Sand and Silt Seams	(1.5)				
5	12	M	49		Medium to Very Dense, Brown Fine to Medium SAND, Some Silt and Gravel, Little Clay, Occasional Cobbles/Boulders (SM)					
6	12	M	64							
7	9	W	100							
			73"							
8	5	W	100		Probable Boulder at 29 ft					
			75"							
9	12	W	26							
10	12	W	40							
					End Boring at 40 ft					
					Borehole grouted with bentonite slurry Possible petroleum odor noted while drilling					

## WATER LEVEL OBSERVATIONS

## GENERAL NOTES

While Drilling  $\nabla$  24.0' Upon Completion of Drilling \_\_\_\_\_  
 Time After Drilling \_\_\_\_\_ 1/4 hr  
 Depth to Water \_\_\_\_\_ 20.0'  $\nabla$   
 Depth to Cave in \_\_\_\_\_ 25.0'

Start 11/15/05 End 11/15/05  
 Driller Badger Chief AP Rig B-59  
 Logger AP Editor WWW  
 Drill Method 4 1/4" HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



# LOG OF TEST BORING

Project Madison Water Utility Vehicle Storage Bldg.  
110 S. Paterson Street  
 Location Madison, Wisconsin

Boring No. 2  
 Surface Elevation (ft) 850.5  
 Job No. C05459  
 Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES					
No.	TYPE	Rec (in.)	Moist	N		Depth (ft)	qu (qa) (tsf)	W	LL	PL	LI
1		12	M	66	5	6" Asphalt/4" Base Course FILL: Black/Brown Cinders, Ash, Sand, Clay, Glass					
2		10	M	2							
3		12	M	5		Medium Stiff, Gray Lean CLAY (CL) with Rootlets	(0.75)				
4		12	M	6		Stiff to Very Stiff, Gray Lean CLAY (CL) with Occasional Thin Sand and Silt Seams	(1.5)				
5		12	M	28			(2.5)				
6		12	W	18		Medium to Very Dense, Brown Fine to Medium SAND, Some Silt and Gravel, Little Clay, Occasional Cobbles/Boulders (SM)					
7		10	W	80							
8		12	W	54							
9		12	W	100 /5"							
10		14	W	100 /2"							
End Boring at 40 ft											
Borehole grouted with bentonite slurry Possible petroleum odor noted while drilling											

## WATER LEVEL OBSERVATIONS

## GENERAL NOTES

While Drilling  16.0' Upon Completion of Drilling \_\_\_\_\_  
 Time After Drilling \_\_\_\_\_  
 Depth to Water \_\_\_\_\_  
 Depth to Cave in \_\_\_\_\_

Start 11/15/05 End 11/15/05  
 Driller Badger Chief Editor AP Rig B-59  
 Logger AP Editor WWW  
 Drill Method 4 1/4" HSA: 0-20'  
 DM/RB: 20-40'

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



## LOG OF TEST BORING

Project Madison Water Utility Vehicle Storage Bldg.  
110 S. Paterson Street  
 Location Madison, Wisconsin

Boring No. 3  
 Surface Elevation (ft) 850.7  
 Job No. C05459  
 Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES					
No.	TYPE	Rec (in.)	Moist	N		Depth (ft)	qu (qa) (tsf)	W	LL	PL	LI
1		10	M	58	5" Asphalt/5" Base Course FILL: Black/Brown/Gray Cinders, Coal, Sand, Gravel, Ash, Possible Peat Seam at Base  Medium Stiff, Dark Gray/Brown (Mottled) Lean CLAY (CL)  Stiff to Very Stiff, Gray Lean CLAY (CL) with Occasional Thin Sand and Silt Seams  Medium Dense to Very Dense, Brown Fine to Medium SAND, Some Silt and Gravel, Little Clay, Occasional Cobbles/Boulders (SM)						
2		12	M	10		(0.5)					
3		12	M	4		(0.75)					
4		12	M	12		(1.5)					
5		12	M	10		(2.25)					
6		12	W	13							
7		12	W	17							
8		12	W	107							
9		12	W	100 /4"							
10		2	W	100 /2"							
End Boring at 40 ft											
Borehole grouted with bentonite slurry Possible petroleum odor noted while drilling											

### WATER LEVEL OBSERVATIONS

### GENERAL NOTES

While Drilling  $\nabla$  18.5' Upon Completion of Drilling \_\_\_\_\_  
 Time After Drilling \_\_\_\_\_  
 Depth to Water \_\_\_\_\_  
 Depth to Cave in \_\_\_\_\_ 25.0'

Start 11/15/05 End 11/15/05  
 Driller Badger Chief AP Rig B-59  
 Logger AP Editor WWW  
 Drill Method 4 1/4" HSA: 0-10'  
 DM/RB: 10-40'

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.





# LOG OF TEST BORING

Project Madison Water Utility Vehicle Storage Bldg.  
110 S. Paterson Street  
 Location Madison, Wisconsin

Boring No. 4  
 Surface Elevation (ft) 850.4  
 Job No. C05459  
 Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N		Depth (ft)	qu (qa) (tsf)	W	LL	PL
1		2	M	12	6" Asphalt/4" Base Course					
2		12	M	11	FILL: Brown Fine to Coarse Sand, Some Gravel and Silt					
3		11	M	5	FILL: Black Ash, Peat, Topsoil					
4		12	M	5	Soft to Medium Stiff, Dark Gray/Gray (Mottled) Lean CLAY (CL)	(0.25-0.5)				
5		12	M	7	Medium Stiff to Stiff, Gray Lean CLAY (CL) with Occasional Thin Sand and Silt Seams	(0.75)				
6		12	W	13		(0.5-0.75)				
7		18	W	12		(2.0)				
8		12	W	75	Dense to Very Dense, Brown Fine to Medium SAND, Some Silt and Gravel, Little Clay, Occasional Cobbles/Boulders (SM)	(1.5)				
9		8	W	100 1/4"						
10		1	W	100 1/2"						
					End Boring at 40 ft					
					Borehole grouted with bentonite slurry Possible petroleum odor noted while drilling					

## WATER LEVEL OBSERVATIONS

## GENERAL NOTES

While Drilling  $\nabla$  18.0' Upon Completion of Drilling \_\_\_\_\_  
 Time After Drilling \_\_\_\_\_  
 Depth to Water \_\_\_\_\_  
 Depth to Cave in \_\_\_\_\_

Start 11/15/05 End 11/15/05  
 Driller Badger Chief AP Rig B-59  
 Logger AP Editor WWW  
 Drill Method 4 1/4" HSA: 0-10'  
 DM/RB: 10-40'

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



# LOG OF TEST BORING

Project **Madison Water Utility Vehicle Storage Bldg.**  
**110 S. Paterson Street**  
 Location **Madison, Wisconsin**

Boring No. **5**  
 Surface Elevation (ft) **850.3**  
 Job No. **C05459**  
 Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N		Depth (ft)	qu (qa) (tsf)	W	LL	PL
1		18	M	5	2" Asphalt Pavement/10" Silty Gravel FILL: Brown/Orange/Gray/Black Cinders, Ash, Sand, Gravel					
2		14	M	4						
3		18	M	0	Medium Stiff to Stiff, Gray Lean CLAY (CL)	(0.5)				
4		18	M	5			(1.5)			
5		18	M	5	Stiff, Gray/Brown Lean CLAY (CL) with Occasional Thin Sand and Silt Seams	(1.5)				
6		18	W	7			(1.5)			
7		18	W	7	Loose, Yellow Brown Fine SAND, Some Silt (SM)	(1.5)				
8		12	W	6						
9		10	W	50 /6"	Very Dense, Yellow- Brown/Brown Fine to Coarse GRAVEL, Some Sand and Silt (GM)					
10		5	W	50 /5"						
					Very Dense, Brown Fine to Medium SAND, Some Silt and Gravel, Little Clay, Occasional Cobbles/Boulders (SM)					
End Boring at 39 ft Temporary well set to 20' & pulled on 11/17 Borehole grouted with bentonite slurry Possible petroleum odor noted while drilling										

WATER LEVEL OBSERVATIONS	GENERAL NOTES
While Drilling $\nabla$ <u>13.5'</u> Upon Completion of Drilling <u>26.6'</u> Time After Drilling _____ <u>2 days</u> Depth to Water _____ <u>10.2'</u> $\nabla$ Depth to Cave in _____	Start <u>11/15/05</u> End <u>11/15/05</u> Driller <u>Badger</u> Chief <u>JHR</u> Rig <u>CME-55</u> Logger <u>JHR</u> Editor <u>WWW</u> Drill Method <u>2 1/4" HSA</u>
The stratification lines represent the approximate boundary between soil types and the transition may be gradual.	



# LOG OF TEST BORING

Project Madison Water Utility Vehicle Storage Bldg.  
110 S. Paterson Street  
 Location Madison, Wisconsin

Boring No. 7  
 Surface Elevation (ft) 849.8  
 Job No. C05459  
 Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	w	LL	PL	LI
1	14	M	16	0-5	Black Sandy Silt TOPSOIL FILL FILL: Brown/Orange/Gray/Black Cinders, Ash, Sand, Gravel					
2	16	M	9	5-10	Stiff, Brown/Gray (Slightly Mottled) Lean CLAY (CL)	(1.5)				
3	18	M	3	10-15		(1.5)				
4	18	M	4	15-20	Very Stiff, Gray Lean CLAY (CL) with Occasional Thin Sand and Silt Seams	(2.5)				
5	18	M	9	20-25		(1.5)				
6	18	M-W	43	25-30	Dense to Very Dense, Brown Fine to Medium SAND, Some Silt and Gravel, Little Clay, Occasional Cobbles/Boulders (SM)					
7	12	M	50 75"	30-35						
8	10	W	50 75"	35-40						
9	18	W	53	40-45						
10	18	W	87	45						
End Boring at 40 ft Temporary well set to 20' & pulled on 11/17 Borehole backfilled with bentonite chips										

WATER LEVEL OBSERVATIONS	GENERAL NOTES
While Drilling $\nabla$ <u>18.5'</u> Upon Completion of Drilling <u>31.7'</u> Time After Drilling _____ <u>2 days</u> Depth to Water _____ Depth to Cave in _____ $\nabla$ <u>11.1'</u>	Start <u>11/15/05</u> End <u>11/15/05</u> Driller <u>Badger</u> Chief <u>JHR</u> Rig <u>CME-55</u> Logger <u>JHR</u> Editor <u>WWW</u> Drill Method <u>2 1/4" HSA</u>
The stratification lines represent the approximate boundary between soil types and the transition may be gradual.	



## LOG OF TEST BORING

Project **Madison Water Utility Vehicle Storage Bldg.**  
**109 S. Paterson Street**  
 Location **Madison, Wisconsin**

Boring No. **8**  
 Surface Elevation (ft) **850.6**  
 Job No. **C05459**  
 Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES					
No.	Type	Rec (in.)	Moist	N		Depth (ft)	qu (qa) (tsf)	w	LL	PL	LI
1		12	M	79	0-5	8" GRAVEL FILL: Gray Fine to Coarse Sand, Some Gravel and silt					
2		12	M	7	5-7	FILL: Black/Brown Cinders, Ash, Sand, Clay, Glass Medium Stiff, Gray Silty CLAY, Little Sand (CL-ML) Stiff, Gray Lean CLAY (CL) with Occasional Thin Sand and Silt Seams					
3		12	M	7	7-8		(0.5)				
4		12	M	15	8-10						
5		12	W	16	10-15		(1.75)				
6		12	W	21	15-20	(2.0)					
7		12	W	23	20-25	(1.75)					
8		12	W	37	25-30	Dense to Very Dense, Brown Fine to Medium SAND, Some Silt and Gravel, Little Clay, Occasional Cobbles/Boulders (SM)					
9		10	W	87	30-35						
10		1	W	100 /1"	35-40	End Boring at 40 ft  Borehole grouted with bentonite slurry Possible petroleum odor noted while drilling					

### WATER LEVEL OBSERVATIONS

### GENERAL NOTES

While Drilling  $\nabla$  **11.0'**      Upon Completion of Drilling \_\_\_\_\_  
 Time After Drilling \_\_\_\_\_      **1/4 hr**  
 Depth to Water \_\_\_\_\_  
 Depth to Cave in \_\_\_\_\_ **25.0'**

Start **11/17/05** End **11/17/05**  
 Driller **Badger** Chief **AP** Rig **B-59**  
 Logger **AP** Editor **WWW**  
 Drill Method **4 1/4" HSA: 0-10'**  
**DM/RB: 10-40'**

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



# LOG OF TEST BORING

Project Madison Water Utility Vehicle Storage Bldg.  
109 S. Paterson Street  
 Location Madison, Wisconsin

Boring No. 9  
 Surface Elevation (ft) 850.5  
 Job No. C05459  
 Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N		Depth (ft)	qu (qa) (tsf)	W	LL	PL
1		12	M	71	8"± Crushed Stone Base Course FILL: Brown/Orange/Gray/Black Cinders, Ash, Sand, Gravel					
2		12	M	8						
3		12	M	11	Medium Stiff, Gray Silty CLAY, Little Sand (CL-ML)	(0.5)				
4		12	M	10		(0.5)				
5		12	W	14	Stiff to Very Stiff, Gray Lean CLAY (CL) with Occasional Thin Sand and Silt Seams	(1.5)				
6		12	W	33		(1.5)				
7		12	W	33	Dense to Very Dense, Brown Fine to Medium SAND, Some Silt and Gravel, Little Clay, Occasional Cobbles/Boulders (SM)	(2.75)				
8		6	W	30						
9		5	W	100 /5"	Numerous Cobbles/Boulders near 35 ft					
10		2	W	100 /2"						
					End Boring at 40 ft					
					Borehole backfilled with bentonite chips					

## WATER LEVEL OBSERVATIONS

## GENERAL NOTES

While Drilling ∇ 18.0' Upon Completion of Drilling \_\_\_\_\_  
 Time After Drilling \_\_\_\_\_  
 Depth to Water \_\_\_\_\_  
 Depth to Cave in \_\_\_\_\_

Start 11/17/05 End 11/17/05  
 Driller Badger Chief AP Rig B-59  
 Logger AP Editor WWW  
 Drill Method 4 1/4" HSA: 0-10'  
 DM/RB: 10-40'

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



# LOG OF TEST BORING

Project Madison Water Utility Vehicle Storage Bldg.  
109 S. Paterson Street  
 Location Madison, Wisconsin

Boring No. 10  
 Surface Elevation (ft) 850.6  
 Job No. C05459  
 Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N		Depth (ft)	qu (qa) (tsf)	W	LL	PL
1		12	M	30	4" Crushed Stone Base Course FILL: Brown/Orange/Gray/Black Cinders, Ash, Sand, Gravel					
2		12	M	7						
3		11	M	11	Medium Stiff, Gray Silty CLAY, Little Sand (CL-ML)	(0.5)				
4		15	M	9	Stiff, Gray Lean CLAY (CL) with Occasional Thin Sand and Silt Seams	(1.5)				
5		12	W	28		(1.5)				
6		12	W	22						
7		12	W	26	Medium Dense to Dense to Very Dense, Brown Fine to Medium SAND, Some Silt and Gravel, Little Clay, Occasional Cobbles/Boulders (SM)					
8		0	W	100 /0"	Large Boulder from 28 to 31.5 ft					
9		0	W	100 /0"						
10		0	W	100 /0"						
					End Boring at 40 ft					
					Borehole grouted with bentonite slurry					

### WATER LEVEL OBSERVATIONS

### GENERAL NOTES

While Drilling  10.0' Upon Completion of Drilling \_\_\_\_\_  
 Time After Drilling \_\_\_\_\_  
 Depth to Water \_\_\_\_\_  
 Depth to Cave in \_\_\_\_\_

Start 11/17/05 End 11/17/05  
 Driller Badger Chief AP Rig B-59  
 Logger AP Editor WWW  
 Drill Method 4 1/4" HSA: 0-10'  
 DM/RB: 10-40'

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

**CGC, Inc.**

**LOG OF TEST BORING**  
**General Notes**

**Descriptive Soil Classification**

GRAIN SIZE TERMINOLOGY

Soil Fraction	Particle Size	U.S. Standard Sieve Size
Boulders . . . . .	Larger than 12" . . . . .	Larger than 12"
Cobbles . . . . .	3" to 12" . . . . .	3" to 12"
Gravel: Coarse . . . . .	3/4" to 3" . . . . .	3/4" to 3"
Fine . . . . .	4.76 mm to 3/4" . . . . .	#4 to 3/4"
Sand: Coarse . . . . .	2.00 mm to 4.76 mm . . . . .	#10 to #4
Medium . . . . .	0.42 to mm to 2.00 mm . . . . .	#40 to #10
Fine . . . . .	0.074 mm to 0.42 mm . . . . .	#200 to #40
Silt . . . . .	0.005 mm to 0.074 mm . . . . .	Smaller than #200
Clay . . . . .	Smaller than 0.005 mm . . . . .	Smaller than #200

Plasticity characteristics differentiate between silt and clay.

GENERAL TERMINOLOGY

Physical Characteristics  
Color, moisture, grain shape, fineness, etc.  
Major Constituents  
Clay, silt, sand, gravel  
Structure  
Laminated, varved, fibrous, stratified, cemented, fissured, etc.  
Geologic Origin  
Glacial, alluvial, eolian, residual, etc.

RELATIVE DENSITY

Term	"N" Value
Very Loose . . . . .	0-4
Loose . . . . .	4-10
Medium Dense . . . . .	10-30
Dense . . . . .	30-50
Very Dense . . . . .	Over 50

RELATIVE PROPORTIONS OF OF COHESIONLESS SOILS

Proportional Term	Defining Range by Percentage of Weight
Trace . . . . .	0%-5%
Little . . . . .	5%-12%
Some . . . . .	12%-35%
And . . . . .	35%-50%

CONSISTENCY

Term	q <sub>u</sub> -tons/sq. ft.
Very Soft . . . . .	0.0 to 0.25
Soft . . . . .	0.25 to 0.50
Medium . . . . .	0.50 to 1.0
Stiff . . . . .	1.0 to 2.0
Very Stiff . . . . .	2.0 to 4.0
Hard . . . . .	Over 4.0

ORGANIC CONTENT BY COMBUSTION METHOD

Soil Description	Loss on Ignition
Non Organic . . . . .	Less than 4%
Organic Silt/Clay . . . . .	4-12%
Sedimentary Peat . . . . .	12-50%
Fibrous and Woody Peat . . . . .	More than 50%

PLASTICITY

Term	Plastic Index
None to Slight . . . . .	0-4
Slight . . . . .	5-7
Medium . . . . .	8-22
High to Very High . . . . .	Over 22

The penetration resistance, N, is the summation of the number of blows required to effect two successive 6" penetrations of the 2" split-barrel sampler. The sampler is driven with a 140 lb. weight falling 30" and is seated to a depth of 6" before commencing the standard penetration test.

**SYMBOLS**

DRILLING AND SAMPLING

- CS--Continuous Sampling
- RC--Rock Coring: Size AW, BW, NW, 2"W
- RQD--Rock Quality Designator
- RB--Rock Bit
- FT--Fish Tail
- DC--Drove Casing
- C--Casing: Size 2 1/2", NW, 4", HW
- CW--Clear Water
- DM--Drilling Mud
- HSA--Hollow Stem Auger
- FA--Flight Auger
- HA--Hand Auger
- COA--Clean-Out Auger
- SS--2" Diameter Split-Barrel Sample
- 2ST--2" Diameter Thin-Walled Tube Sample
- 3ST--3" Diameter Thin-Walled Tube Sample
- PT--3" Diameter Piston Tube Sample
- AS--Auger Sample
- WS--Wash Sample
- PTS--Peat Sample
- PS--Pitcher Sample
- NR--No Recovery
- S--Sounding
- PMT--Borehole Pressuremeter Test
- VS--Vane Shear Test
- WPT--Water Pressure Test

LABORATORY TESTS

- q<sub>a</sub>--Penetrometer Reading, tons/sq. ft.
- q<sub>u</sub>--Unconfined Strength, tons/sq. ft.
- W--Moisture Content, %
- LL--Liquid Limit, %
- PL--Plastic Limit, %
- SL--Shrinkage Limit, %
- LI--Loss on Ignition, %
- D--Dry Unit Weight, lbs/cu. ft.
- pH--Measure of Soil Alkalinity or Acidity
- FS--Free Swell, %

WATER LEVEL MEASUREMENT

- ▽ --Water Level at time shown
- NW--No Water Encountered
- WD--While Drilling
- BCR--Before Casing Removal
- ACR--After Casing Removal
- CW--Caved and Wet
- CM--Caved and Moist

Note: Water level measurements shown on the boring logs represent conditions at the time indicated and may not reflect static levels, especially in cohesive soils.

# UNIFIED SOIL CLASSIFICATION SYSTEM

## COARSE-GRAINED SOILS

(More than half of material is larger than No. 200 sieve size.)

<b>GRAVELS</b> More than half of coarse fraction larger than No. 4 sieve size	<b>Clean Gravels</b> (Little or no fines)	
	<b>GW</b>	Well-graded gravels, gravel-sand mixtures, little or no fines
	<b>GP</b>	Poorly graded gravels, gravel-sand mixtures, little or no fines
	<b>Gravels with Fines</b> (Appreciable amount of fines)	
	<b>GM<sub>u</sub><sup>d</sup></b>	Silty gravels, gravel-sand-silt mixtures
	<b>GC</b>	Clayey gravels, gravel-sand-clay mixtures.

<b>SANDS</b> More than half of coarse fraction smaller than No. 4 sieve size	<b>Clean Sands</b> (Little or no fines)	
	<b>SW</b>	Well-graded sands, gravelly sands, little or no fines
	<b>SP</b>	Poorly graded sands, gravelly sands, little or no fines
	<b>Sands with Fines</b> (Appreciable amount of fines)	
	<b>SM<sub>u</sub><sup>d</sup></b>	Silty sands, sand-silt mixtures
	<b>SC</b>	Clayey sands, sand-clay mixtures

## FINE-GRAINED SOILS

(More than half of material is smaller than No. 200 sieve.)

<b>SILTS AND CLAYS</b> Liquid limit less than 50%	<b>ML</b>	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
	<b>CL</b>	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	<b>OL</b>	Organic silts and organic silty clays of low plasticity

<b>SILTS AND CLAYS</b> Liquid limit greater than 50%	<b>MH</b>	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
	<b>CH</b>	Inorganic clays of high plasticity, fat clays
	<b>OH</b>	Organic clays of medium to high plasticity, organic silts

<b>HIGHLY ORGANIC SOILS</b>	<b>PT</b>	Peat and other highly organic soils
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## LABORATORY CLASSIFICATION CRITERIA

**GW**  $C_u = \frac{D_{60}}{D_{10}}$  greater than 4;  $C_c = \frac{(D_{30})^2}{D_{10}D_{60}}$  between 1 and 3

**GP** Not meeting all gradation requirements for GW

**GM** Atterberg limits below "A" line or P.I. less than 4

Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols

**GC** Atterberg limits above "A" line with P.I. greater than 7

**SW**  $C_u = \frac{D_{60}}{D_{10}}$  greater than 6;  $C_c = \frac{(D_{30})^2}{D_{10}D_{60}}$  between 1 and 3

**SP** Not meeting all gradation requirements for SW

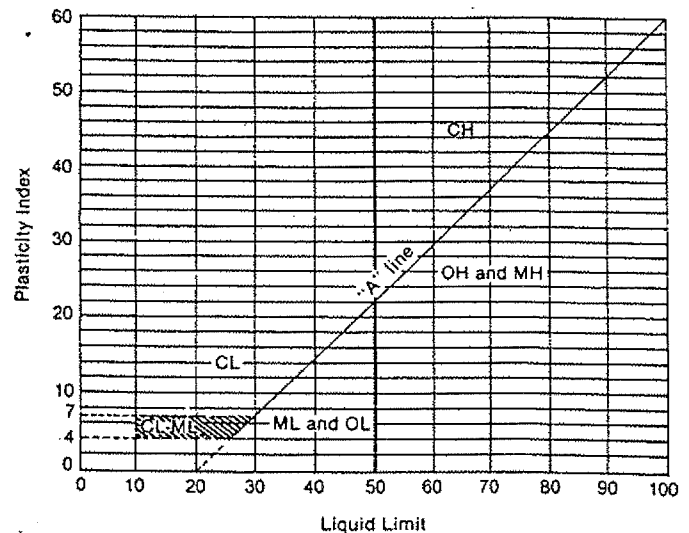
**SM** Atterberg limits below "A" line or P.I. less than 4

Limits plotting in hatched zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols.

**SC** Atterberg limits above "A" line with P.I. greater than 7

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:  
 Less than 5 per cent ..... GW, GP, SW, SP  
 More than 12 per cent ..... GM, GC, SM, SC  
 5 to 12 per cent ..... Borderline cases requiring dual symbols

## PLASTICITY CHART



For classification of fine-grained soils and fine fraction of coarse-grained soils.

Atterberg Limits plotting in hatched area are borderline classifications requiring use of dual symbols.

Equation of A-line:  $PI = 0.73 (LL - 20)$



**APPENDIX C**

**DOCUMENT QUALIFICATIONS**

## APPENDIX C

### DOCUMENT QUALIFICATIONS

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#### I. GENERAL RECOMMENDATIONS/LIMITATIONS

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CGC, Inc. should be provided the opportunity for a general review of the final design and specifications to confirm that earthwork and foundation requirements have been properly interpreted in the design and specifications. CGC should be retained to provide soil engineering services during excavation and subgrade preparation. This will allow us to observe that construction proceeds in compliance with the design concepts, specifications and recommendations, and also will allow design changes to be made in the event that subsurface conditions differ from those anticipated prior to the start of construction. CGC does not assume responsibility for compliance with the recommendations in this report unless we are retained to provide construction testing and observation services.

This report has been prepared in accordance with generally accepted soil and foundation engineering practices and no other warranties are expressed or implied. The opinions and recommendations submitted in this report are based on interpretation of the subsurface information revealed by the test borings indicated on the location plan. The report does not reflect potential variations in subsurface conditions between or beyond these borings. Therefore, variations in soil conditions can be expected between the boring locations and fluctuations of groundwater levels may occur with time. The nature and extent of the variations may not become evident until construction.

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#### II. IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL ENGINEERING REPORT

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Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. *No one except you* should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one - not even you -* should apply the report for any purpose or project except the one originally contemplated.

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

##### A GEOTECHNICAL ENGINEERING REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, *do not rely on a geotechnical engineering report* that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes - even minor ones - and request an assessment of their impact. *CGC cannot accept responsibility or liability for problems that occur because our reports do not consider developments of which we were not informed.*

##### SUBSURFACE CONDITIONS CAN CHANGE

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

##### MOST GEOTECHNICAL FINDINGS ARE PROFESSIONAL OPINIONS

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are

taken. Geotechnical engineers review field and laboratory data and then apply their professional judgement to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ - sometimes significantly - from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

#### **A REPORT'S RECOMMENDATIONS ARE NOT FINAL**

Do not over-rely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgement and opinion. Geotechnical engineers can finalize their recommendations only by observing actual subsurface conditions revealed during construction. *CGC cannot assume responsibility or liability for the report's recommendations if we do not perform construction observation.*

#### **A GEOTECHNICAL ENGINEERING REPORT IS SUBJECT TO MISINTERPRETATION**

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having CGC participate in prebid and preconstruction conferences, and by providing construction observation.

#### **DO NOT REDRAW THE ENGINEER'S LOGS**

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

#### **GIVE CONTRACTORS A COMPLETE REPORT AND GUIDANCE**

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited;

encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time to perform additional study.* Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

#### **READ RESPONSIBILITY PROVISIONS CLOSELY**

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce such risks, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineer's responsibilities begin and end, to help others recognize their own responsibilities and risks. Read these provisions closely. Ask questions. Your geotechnical engineer should respond fully and frankly.

#### **GEOENVIRONMENTAL CONCERNS ARE NOT COVERED**

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any *geoenvironmental* findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own *geoenvironmental* information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

#### **RELY ON YOUR GEOTECHNICAL ENGINEER FOR ADDITIONAL ASSISTANCE**

Membership in ASFE exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with CGC, a member of ASFE, for more information.

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ASFE  
8811 Colesville Road, Suite G 106  
Silver Spring, MD 20910

**APPENDIX D**

**RECOMMENDED COMPACTED FILL SPECIFICATIONS**

## APPENDIX D

### CGC, INC.

#### RECOMMENDED COMPACTED FILL SPECIFICATIONS

##### Fill Materials

Proposed fill shall contain no vegetation, roots, topsoil, peat, ash, wood or any other non-soil material which by decomposition might cause settlement. Also, fill shall never be placed while frozen or on frozen surfaces. Rock, stone or broken concrete greater than 6 in. in the largest dimension shall not be placed within 10 ft of the building area. Fill used greater than 10 ft beyond the building limits shall not contain rock, boulders or concrete pieces greater than a 2 sq ft area and shall not be placed within the final 2 ft of finish subgrade or in designated utility construction areas. The rock, boulders or concrete pieces should contain finer material to fill in void spaces between the larger material.

##### Placement Method

The approved fill shall be placed, spread and leveled in layers generally not exceeding 10 in. in thickness before compaction. The fill shall be placed at a moisture content capable of achieving the desired compaction level. For clay soils or granular soils containing an appreciable amount of cohesive fines, moisture conditioning will likely be required.

It is the Contractor's responsibility to provide all necessary compaction equipment and other grading equipment that may be required to attain the specified compaction. Hand-guided vibratory or tamping compactors will be required whenever fill is placed adjacent to walls, footings, columns or in confined areas.

##### Compaction Specifications

Maximum dry density and optimum moisture content of the fill soil shall be determined in accordance with modified Proctor methods (ASTM D1557). The recommended field compaction as a percentage of the maximum dry density is shown in Table 1.

**Table 1**  
**Compaction Guidelines**

Area	Percent Compaction <sup>+</sup>	
	Clay/Silt	Sand/Gravel
<u>Within 10 feet of building lines</u>		
● Footing bearing soils	93-95	95
● Under floors, steps and walks		
- Lightly loaded floor slab	90	90
- Heavily loaded floor slab & thicker fill zones	92	95
<u>Beyond 10 feet of building lines</u>		
● Under walks and pavements		
- Less than 2 ft below subgrade	92	95
- Greater than 2 ft below subgrade	90	90
● Landscaping	85	90

**NOTES:**

<sup>+</sup> Based on Modified Proctor (ASTM D 1557)

Testing Procedures

Representative samples of proposed fill shall be submitted to CGC, Inc. for optimum moisture-maximum density determination (ASTM D1557) prior to the start of fill placement. The sample size should be approximately 50 lb.

CGC, Inc. shall be retained to perform field density tests to determine the level of compaction being achieved in the fill. The tests shall generally be conducted on each lift at the beginning of fill placement and at a frequency mutually agreed upon by the project team for the remainder of the project.

## SECTION 011000 - SUMMARY

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Phased construction.
4. Work under separate contracts.
5. Purchase contracts.
6. Owner-furnished products.
7. Access to site.
8. Coordination with occupants.
9. Work restrictions.
10. Specification and drawing conventions.
11. Miscellaneous provisions.

- B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

#### 1.3 PROJECT INFORMATION

- A. Project Identification: Storm Water Management Improvements, 115 S. Paterson Street, Contract No. 7936.

1. Project Location: 115 S. Paterson Street, Madison, WI

- B. Owner: Madison Water Utility, City of Madison, 1600 Emil St, Madison, WI 53713

1. Owner's Representative: Al Larson.

- C. Architect: Mead & Hunt, Inc.

- D. Civil and Site Utilities: Mead & Hunt, Inc.

#### 1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:

1. Construction of a Storm Water Management system that includes a retention tank and piping additions and modifications and associated excavation and

removal and disposal of contaminated soils and addition of engineered fill. Coordination of work with existing onsite contractor will be required.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

C. Construction Duration: Excavation and new construction work shall commence within 7 days after Notice to Proceed (assumed to be August 15th, 2017) and be substantially complete and ready for use by October 15th, 2017.

1.5 WORK UNDER SEPARATE CONTRACTS

A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.

B. Preceding Work: Owner has awarded separate contract(s) for the following construction operations at Project site. Those operations are scheduled to be substantially complete before work under this Contract begins.

1. Material and Vehicle Storage Building Improvements: Underground utilities and site storm water (exclusive of this Contract for Storm Water Management Improvements) and Rain Water Recovery System.

C. Concurrent Work: Owner has awarded a separate contract for the following construction operations at Project site. Those operations will be conducted simultaneously with work under this Contract.

1. Material and Vehicle Storage Building Improvements: Construction of a Material Storage Building and Vehicle Storage Building Improvements, inclusive of site utilities, site improvements and paving.

1.6 OWNER-FURNISHED PRODUCTS

A. Owner will furnish products indicated. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products and making building services connections.

B. Owner-Furnished Products: Not applicable

1.7 ACCESS TO SITE

A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.

B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Limits: Confine construction operations to area identified on drawings.



2. Driveways, Walkways and Entrances: Keep driveways loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
  - a. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
  - b. Coordinate with contractor for the Material and Vehicle Storage Building Improvements for site access and equipment locations and to minimize disturbance to new construction in adjacent areas.
- C. Condition of New Material Storage Building and Site Improvements: Do not disturb new building and site construction previously completed, excepted as noted. Repair damage caused by construction operations immediately.

## 1.8 COORDINATION WITH OCCUPANTS

- A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.
  1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
  2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.
- B. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.
  1. Architect will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied prior to Owner acceptance of the completed Work.
  2. Obtain a Certificate of Occupancy from authorities having jurisdiction before limited Owner occupancy.
  3. Before limited Owner occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will operate and maintain mechanical and electrical systems serving occupied portions of Work.
  4. On occupancy, Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.

## 1.9 WORK RESTRICTIONS

- A. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7 a.m. to 7 p.m., Monday through Friday, unless otherwise indicated.
1. Weekend Hours: Obtain Owner's written permission for weekend hour work.
  2. Early Morning Hours: Comply with City of Madison requirements on noise.
  3. Hours for Utility Shutdowns: Obtain Owner's written consent for all utility shutdowns.
  4. Work is not permitted on City of Madison Holidays: New Year's Day, Martin Luther King Day, Memorial Day, 4<sup>th</sup> of July, Labor Day, Thanksgiving, and Christmas Day.
- B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
1. Notify Owner not less than two days in advance of proposed utility interruptions.
  2. Obtain Owner's written permission before proceeding with utility interruptions.
- C. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
1. Notify Owner not less than two days in advance of proposed disruptive operations.
  2. Obtain Owner's written permission before proceeding with disruptive operations.
- D. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet of entrances, operable windows, or outdoor-air intakes.
- E. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

## 1.10 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
  2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION 011000**

## **SECTION 012200 - UNIT PRICES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for unit prices.

#### **1.3 DEFINITIONS**

- A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

#### **1.4 PROCEDURES**

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

### **PART 2 - PRODUCTS (Not Used)**

### **PART 3 - EXECUTION**

#### **3.1 SCHEDULE OF UNIT PRICES**

- A. General: Contaminated Soil Disposal shall consist of disposal of contaminated soil at an approved landfill according to specification section 003126 Existing Hazardous Material Information, for the Disposal of Contaminated Media, Memorandum, Materials Management Plan for Operations Facility Redevelopment and the Materials Management Plan for Vehicle and Material Storage Facility and Redevelopment (for the

Paint Shop) and specification section 312000 Earth Moving. It shall include all material, labor, equipment, taxes, and fees from the landfill for acceptance of the material, record keeping of the quantity, contractor acting as the manifest and providing the delivery tickets to the Architect/Owner for review prior to payment. Payment shall be made based on the actual tonnage accepted and recorded by the landfill. There is 1 profile of materials that require separate hauling to the landfill which are defined in the Materials Management Plans:

1. Unit Price 1: Class 1 Contaminated Soil, cost per ton based on 2,620 tons.
2. Unit Price 2: Backfill of over-excavated areas beyond base bid excavations. Backfill shall consist of drainage course and unit price based on 1,000 tons.

**END OF SECTION 012200**

## **SECTION 012500 - SUBSTITUTION PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for substitutions.

#### **1.3 DEFINITIONS**

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
  2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

#### **1.4 ACTION SUBMITTALS**

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Substitution Request Form: Use CSI Form 13.1A.
  2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
    - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
    - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
    - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
    - e. Samples, where applicable or requested.

- f. Certificates and qualification data, where applicable or requested.
  - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
  - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
  - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
  - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
  - k. Cost information, including a proposal of change, if any, in the Contract Sum.
  - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
  - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.

## 1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

## 1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

## **PART 2 - PRODUCTS**

### 2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
  - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
  - b. Substitution request is fully documented and properly submitted.
  - c. Requested substitution will not adversely affect Contractor's construction schedule.
  - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
  - e. Requested substitution is compatible with other portions of the Work.
  - f. Requested substitution has been coordinated with other portions of the Work.
  - g. Requested substitution provides specified warranty.
  - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not allowed unless otherwise indicated.

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION 012500**



## SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
1. General coordination procedures.
  2. Coordination drawings.
  3. Requests for Information (RFIs).
  4. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Requirements:
1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
  2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
  3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

#### 1.3 DEFINITIONS

- A. RFI: Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Use CSI Form 1.5A. Include the following information in tabular form:
1. Name, address, and telephone number of entity performing subcontract or supplying products.
  2. Number and title of related Specification Section(s) covered by subcontract.
  3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list

addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1. Post copies of list in project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

## 1.5 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Pre-installation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

C. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

## 1.6 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

- a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
- b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
- c. Indicate functional and spatial relationships of components of structural, civil and plumbing systems.
- d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
- e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
- f. Indicate required installation sequences.
- g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
2. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, slab depressions and similar items.
3. Plumbing Work: Show the following:
  - a. Sizes and bottom elevations of piping, including insulation, bracing, flanges, and support systems.
  - b. Dimensions of major components, such as valves, access doors, cleanouts.
4. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make changes as directed and resubmit.
5. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Section 013300 "Submittal Procedures."

1.7 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
1. Architect will return RFIs submitted to Architect by other entities controlled by Contractor with no response.

2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
  2. Project number.
  3. Date.
  4. Name of Contractor.
  5. Name of Architect.
  6. RFI number, numbered sequentially.
  7. RFI subject.
  8. Specification Section number and title and related paragraphs, as appropriate.
  9. Drawing number and detail references, as appropriate.
  10. Field dimensions and conditions, as appropriate.
  11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  12. Contractor's signature.
  13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
    - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: AIA Document G716 or equal.
1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Requests for approval of Contractor's means and methods.
    - d. Requests for coordination information already indicated in the Contract Documents.
    - e. Requests for adjustments in the Contract Time or the Contract Sum.
    - f. Requests for interpretation of Architect's actions on submittals.
    - g. Incomplete RFIs or inaccurately prepared RFIs.
  2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.
  3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal.

- a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log monthly. Use CSI Log Form 13.2B or equal.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.
1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

## 1.8 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
  2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
  3. Minutes: Contractor is responsible for conducting meeting and will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
1. Conduct the conference to review responsibilities and personnel assignments.
  2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Tentative construction schedule.
    - b. Phasing.
    - c. Critical work sequencing and long-lead items.
    - d. Designation of key personnel and their duties.
    - e. Lines of communications.
    - f. Procedures for processing field decisions and Change Orders.
    - g. Procedures for RFIs.
    - h. Procedures for testing and inspecting.
    - i. Procedures for processing Applications for Payment.

- j. Distribution of the Contract Documents.
- k. Submittal procedures.
- l. Preparation of record documents.
- m. Use of the premises and existing building.
- n. Work restrictions.
- o. Working hours.
- p. Owner's occupancy requirements.
- q. Responsibility for temporary facilities and controls.
- r. Procedures for moisture and mold control.
- s. Procedures for disruptions and shutdowns.
- t. Construction waste management and recycling.
- u. Parking availability.
- v. Office, work, and storage areas.
- w. Equipment deliveries and priorities.
- x. First aid.
- y. Security.
- z. Progress cleaning.

- 4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction.

- 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
- 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

- a. Contract Documents.
- b. Options.
- c. Related RFIs.
- d. Related Change Orders.
- e. Purchases.
- f. Deliveries.
- g. Submittals.
- h. Review of mockups.
- i. Possible conflicts.
- j. Compatibility requirements.
- k. Time schedules.
- l. Weather limitations.
- m. Manufacturer's written instructions.
- n. Warranty requirements.
- o. Compatibility of materials.
- p. Acceptability of substrates.
- q. Temporary facilities and controls.
- r. Space and access limitations.
- s. Regulations of authorities having jurisdiction.
- t. Testing and inspecting requirements.

- u. Installation procedures.
  - v. Coordination with other work.
  - w. Required performance results.
  - x. Protection of adjacent work.
  - y. Protection of construction and personnel.
3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
  4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
  5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
  2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
    - a. Preparation of record documents.
    - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
    - c. Submittal of written warranties.
    - d. Requirements for preparing operations and maintenance data.
    - e. Requirements for delivery of material samples, attic stock, and spare parts.
    - f. Requirements for demonstration and training.
    - g. Preparation of Contractor's punch list.
    - h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
    - i. Submittal procedures.
    - j. Owner's partial occupancy requirements.
    - k. Installation of Owner's furniture, fixtures, and equipment.
    - l. Responsibility for removing temporary facilities and controls.
  4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- E. Progress Meetings: Conduct progress meetings at monthly intervals or more frequently if requested by Owner.
1. Coordinate dates of meetings with preparation of payment requests.
  2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current

- progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
      - 1) Review schedule for next period.
    - b. Review present and future needs of each entity present, including the following:
      - 1) Interface requirements.
      - 2) Sequence of operations.
      - 3) Resolution of BIM component conflicts.
      - 4) Status of submittals.
      - 5) Status of sustainable design documentation.
      - 6) Deliveries.
      - 7) Off-site fabrication.
      - 8) Access.
      - 9) Site utilization.
      - 10) Temporary facilities and controls.
      - 11) Progress cleaning.
      - 12) Quality and work standards.
      - 13) Status of correction of deficient items.
      - 14) Field observations.
      - 15) Status of RFIs.
      - 16) Status of proposal requests.
      - 17) Pending changes.
      - 18) Status of Change Orders.
      - 19) Pending claims and disputes.
      - 20) Documentation of information for payment requests.
  4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
    - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

## **PART 2 - PRODUCTS (Not Used)**



**PART 3 - EXECUTION (Not Used)**

**END OF SECTION 013100**

## **SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Contractor's construction schedule.
2. Construction schedule updating reports.
3. Daily construction reports.
4. Material location reports.
5. Site condition reports.
6. Special reports.

- B. Related Requirements:

1. Section 013300 "Submittal Procedures" for submitting schedules and reports.

#### **1.3 DEFINITIONS**

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

- B. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum unless otherwise approved by Architect.

- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

- E. Event: The starting or ending point of an activity.

- F. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
  2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
  3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- G. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
1. Working electronic copy of schedule file, where indicated.
  2. PDF electronic file.
- B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
- C. Construction Schedule Updating Reports: Submit with Applications for Payment.

#### 1.5 QUALITY ASSURANCE

- A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Architect's request.

#### 1.6 COORDINATION

- A. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
1. Secure time commitments for performing critical elements of the Work from entities involved.
  2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

### **PART 2 - PRODUCTS**

#### 2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Final Completion.
1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

- B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
  2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
  3. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
  4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
  5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
  6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
  2. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
  3. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
  4. Work Restrictions: Show the effect of the following items on the schedule:
    - a. Coordination with existing construction.
    - b. Limitations of continued occupancies.
    - c. Uninterruptible services.
    - d. Partial occupancy before Substantial Completion.
    - e. Use of premises restrictions.
    - f. Provisions for future construction.
    - g. Seasonal variations.
    - h. Environmental control.
  5. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
    - a. Structural completion.
    - b. Temporary enclosure and space conditioning.
    - c. Permanent space enclosure.
    - d. Completion of mechanical installation.
    - e. Completion of electrical installation.
    - f. Substantial Completion.

- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion, and the following interim milestones:
1. Completion of Phase 1.
  2. Completion of Phase 2.
  3. Completion of Phase 3.
- E. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
1. Unresolved issues.
  2. Unanswered Requests for Information.
  3. Rejected or unreturned submittals.
  4. Notations on returned submittals.
  5. Pending modifications affecting the Work and Contract Time.
- F. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.
- G. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

## 2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. CPM Schedule: Prepare Contractor's construction schedule using a time-scaled CPM network analysis diagram for the Work.
1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 5 days after date established for the Notice to Proceed.
    - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.
  2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
  3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
  4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to coordinate with the Contract Time.

- C. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.
1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
    - a. Preparation and processing of submittals.
    - b. Mobilization and demobilization.
    - c. Purchase of materials.
    - d. Delivery.
    - e. Fabrication.
    - f. Utility interruptions.
    - g. Installation.
    - h. Work by Owner that may affect or be affected by Contractor's activities.
    - i. Testing.
    - j. Punch list and final completion.
    - k. Activities occurring following final completion.
  2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
  3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
  4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
    - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
- D. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.
- E. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
1. Contractor or subcontractor and the Work or activity.
  2. Description of activity.
  3. Main events of activity.
  4. Immediate preceding and succeeding activities.
  5. Early and late start dates.
  6. Early and late finish dates.
  7. Activity duration in workdays.
  8. Total float or slack time.
  9. Average size of workforce.
  10. Dollar value of activity (coordinated with the schedule of values).

- F. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed.
  2. Changes in early and late start dates.
  3. Changes in early and late finish dates.
  4. Changes in activity durations in workdays.
  5. Changes in the critical path.
  6. Changes in total float or slack time.
  7. Changes in the Contract Time.

### **PART 3 - EXECUTION**

#### **3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE**

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
  2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  3. As the Work progresses, indicate final completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
  2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

**END OF SECTION 013200**

## **SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for the following:
1. Preconstruction photographs.
  2. Periodic construction photographs.
  3. Final completion construction photographs.
- B. Related Requirements:
1. Section 013300 "Submittal Procedures" for submitting photographic documentation.
  2. Section 017700 "Closeout Procedures" for submitting photographic documentation as project record documents at Project closeout.
  3. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Digital Photographs: Submit image files within three days of taking photographs.
1. Digital Camera: Minimum sensor resolution of 8 megapixels.
  2. Format: Minimum 3200 by 2400 pixels, in unaltered original files, with same aspect ratio as the sensor, uncropped, date and time stamped, in folder named by date of photograph, accompanied by key plan file.
  3. Identification: Provide the following information with each image description in file metadata tag:
    - a. Name of Project.
    - b. Date photograph was taken.
    - c. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

#### **1.4 USAGE RIGHTS**

- A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

### **PART 2 - PRODUCTS**

#### **2.1 PHOTOGRAPHIC MEDIA**



- A. Digital Images: Provide images in JPG format, produced by a digital camera with minimum sensor size of 8 megapixels, and at an image resolution of not less than 3200 by 2400 pixels.

### **PART 3 - EXECUTION**

#### **3.1 CONSTRUCTION PHOTOGRAPHS**

- A. General: Take photographs using the maximum range of depth of field, and that are in focus, to clearly show the Work. Photographs with blurry or out-of-focus areas will not be accepted.
1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
1. Date and Time: Include date and time in file name for each image.
- C. Preconstruction Photographs: Before commencement of excavation, commencement of demolition, starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.
1. Flag excavation areas and construction limits before taking construction photographs.
  2. Take 20 photographs to show existing conditions adjacent to property before starting the Work.
  3. Take 20 photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
  4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
- D. Periodic Construction Photographs: Take 20 photographs weekly, with timing each month adjusted to coincide with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken. Include photographs of entire site from east, west, north and south vantage points. Provide at least 1 photo of each wall and ceiling condition prior to concealment documenting systems to be concealed by other finishes.
- E. Final Completion Construction Photographs: Take 20 photographs after date of Substantial Completion for submission as Project Record Documents. Architect will inform photographer of desired vantage points.

**END OF SECTION 013233**

## **SECTION 013300 - SUBMITTAL PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Requirements:
1. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
  2. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
  3. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
  4. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

#### **1.3 DEFINITIONS**

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."
- C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.
- D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

#### **1.4 ACTION SUBMITTALS**

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering,

manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Submit concurrently with the first complete submittal of Contractor's construction schedule.
  - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
3. Format: Arrange the following information in a tabular format:
  - a. Scheduled date for first submittal.
  - b. Specification Section number and title.
  - c. Submittal category: Action; informational.
  - d. Name of subcontractor.
  - e. Description of the Work covered.
  - f. Scheduled date for Architect's final release or approval.
  - g. Scheduled date of fabrication.
  - h. Scheduled dates for purchasing.
  - i. Scheduled dates for installation.
  - j. Activity or event number.

## 1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will be provided by Architect for Contractor's use in preparing submittals.
  1. Architect will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings.
    - a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
    - b. Digital Drawing Software Program: The Contract Drawings are available in AutoCAD Civil 3D.
    - c. Contractor shall execute a data licensing agreement in the form of Agreement form acceptable to Owner and Architect.
    - d. The following digital data files will be furnished for each appropriate discipline:
      - 1) Site Plans.
      - 2) Other drawings as requested by Contractor and agreed upon by Architect.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
  3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
  4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
  2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  3. Resubmittal Review: Allow 15 days for review of each resubmittal.
  4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
    - a. All Specification Sections are subject to sequential Owner review.
  5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
    - a. All Division 31 Sections.
    - b. All Division 33 Sections.
- D. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
  2. Name file with submittal number or other unique identifier, including revision identifier.
    - a. File name shall use the Specification Section number followed by a decimal point and then a sequential number (e.g., 061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 061000.01.A).

3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.
  4. Transmittal Form for Electronic Submittals: Use software-generated form from electronic project management software or electronic form acceptable to Owner, containing the following information:
    - a. Project name.
    - b. Date.
    - c. Name and address of Architect.
    - d. Name of Contractor.
    - e. Name of firm or entity that prepared submittal.
    - f. Names of subcontractor, manufacturer, and supplier.
    - g. Category and type of submittal.
    - h. Submittal purpose and description.
    - i. Specification Section number and title.
    - j. Specification paragraph number or drawing designation and generic name for each of multiple items.
    - k. Drawing number and detail references, as appropriate.
    - l. Location(s) where product is to be installed, as appropriate.
    - m. Related physical samples submitted directly.
    - n. Indication of full or partial submittal.
    - o. Transmittal number, numbered consecutively.
    - p. Submittal and transmittal distribution record.
    - q. Other necessary identification.
    - r. Remarks.
- E. Options: Identify options requiring selection by Architect.
- F. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
  1. Note date and content of previous submittal.
  2. Note date and content of revision in label or title block and clearly indicate extent of revision.
  3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

## **PART 2 - PRODUCTS**

### **2.1 SUBMITTAL PROCEDURES**

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Post electronic submittals as PDF electronic files directly to Project Web site specifically established for Project.
    - a. Architect will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
  2. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
    - a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
  2. Mark each copy of each submittal to show which products and options are applicable.
  3. Include the following information, as applicable:
    - a. Manufacturer's catalog cuts.
    - b. Manufacturer's product specifications.
    - c. Standard color charts.
    - d. Statement of compliance with specified referenced standards.
    - e. Testing by recognized testing agency.
    - f. Application of testing agency labels and seals.
    - g. Notation of coordination requirements.
    - h. Availability and delivery time information.
  4. For equipment, include the following in addition to the above, as applicable:
    - a. Wiring diagrams showing factory-installed wiring.
    - b. Printed performance curves.
    - c. Operational range diagrams.
    - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
  5. Submit Product Data before or concurrent with Samples.
  6. Submit Product Data in the following format:

- a. PDF electronic file.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless submittal based on Architect's digital data drawing files is otherwise permitted.
- 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Identification of products.
    - b. Schedules.
    - c. Compliance with specified standards.
    - d. Notation of coordination requirements.
    - e. Notation of dimensions established by field measurement.
    - f. Relationship and attachment to adjoining construction clearly indicated.
    - g. Seal and signature of professional engineer if specified.
  - 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
  - 3. Submit Shop Drawings in the following format:
    - a. PDF electronic file.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
- 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
  - 2. Identification: Attach label on unexposed side of Samples that includes the following:
    - a. Generic description of Sample.
    - b. Product name and name of manufacturer.
    - c. Sample source.
    - d. Number and title of applicable Specification Section.
    - e. Specification paragraph number and generic name of each item.
  - 3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
  - 4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
    - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.

- b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
  - 5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
    - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
  - 6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
    - a. Number of Samples: Submit 2 set of Samples. Architect will retain 1 Sample sets; remainder will be returned.
      - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
      - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
- 1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
  - 2. Manufacturer and product name, and model number if applicable.
  - 3. Number and name of room or space.
  - 4. Location within room or space.
  - 5. Submit product schedule in the following format:
    - a. PDF electronic file.
- F. Coordination Drawing Submittals: Comply with requirements specified in Section 013100 "Project Management and Coordination."
- G. Contractor's Construction Schedule: Comply with requirements specified in Section 013200 "Construction Progress Documentation."



- H. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 017700 "Closeout Procedures."
- I. Maintenance Data: Comply with requirements specified in Section 017823 "Operation and Maintenance Data."
- J. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- K. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- L. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- M. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- N. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- O. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- P. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- Q. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- R. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
  - 1. Name of evaluation organization.
  - 2. Date of evaluation.
  - 3. Time period when report is in effect.
  - 4. Product and manufacturers' names.
  - 5. Description of product.
  - 6. Test procedures and results.
  - 7. Limitations of use.

- S. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- T. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- U. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- V. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

## 2.2 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file and three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
  - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

## **PART 3 - EXECUTION**

### 3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.

- B. Project Closeout and Maintenance Material Submittals: See requirements in Section 017700 "Closeout Procedures."
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

### 3.2 ARCHITECT'S ACTION

- A. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will mark transmittal form for each submittal with an action.
- B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Submittals not required by the Contract Documents may be returned by the Architect without action.

**END OF SECTION 013300**

## **SECTION 014200 - REFERENCES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 DEFINITIONS**

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

#### **1.3 INDUSTRY STANDARDS**

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

#### 1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. AABC - Associated Air Balance Council; [www.aabc.com](http://www.aabc.com)
2. AAMA - American Architectural Manufacturers Association; [www.aamanet.org](http://www.aamanet.org).
3. AAPFCO - Association of American Plant Food Control Officials; [www.aapfc.org](http://www.aapfc.org).
4. AASHTO - American Association of State Highway and Transportation Officials; [www.transportation.org](http://www.transportation.org).
5. AATCC - American Association of Textile Chemists and Colorists; [www.aatcc.org](http://www.aatcc.org).
6. ABMA - American Bearing Manufacturers Association; [www.americanbearings.org](http://www.americanbearings.org).
7. ABMA - American Boiler Manufacturers Association; [www.abma.com](http://www.abma.com).
8. ACI - American Concrete Institute; (Formerly: ACI International); [www.abma.com](http://www.abma.com).
9. ACPA - American Concrete Pipe Association; [www.concrete-pipe.org](http://www.concrete-pipe.org).
10. AEIC - Association of Edison Illuminating Companies, Inc. (The); [www.aeic.org](http://www.aeic.org).
11. AF&PA - American Forest & Paper Association; [www.afandpa.org](http://www.afandpa.org).
12. AGA - American Gas Association; [www.aga.org](http://www.aga.org).
13. AHAM - Association of Home Appliance Manufacturers; [www.aham.org](http://www.aham.org).
14. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); [www.ahrinet.org](http://www.ahrinet.org).
15. AI - Asphalt Institute; [www.asphaltinstitute.org](http://www.asphaltinstitute.org).
16. AIA - American Institute of Architects (The); [www.aia.org](http://www.aia.org).
17. AISC - American Institute of Steel Construction; [www.aisc.org](http://www.aisc.org).
18. AISI - American Iron and Steel Institute; [www.steel.org](http://www.steel.org).
19. AITC - American Institute of Timber Construction; [www.aitc-glulam.org](http://www.aitc-glulam.org).
20. AMCA - Air Movement and Control Association International, Inc.; [www.amca.org](http://www.amca.org).
21. ANSI - American National Standards Institute; [www.ansi.org](http://www.ansi.org).
22. AOSA - Association of Official Seed Analysts, Inc.; [www.aosaseed.com](http://www.aosaseed.com).
23. APA - APA - The Engineered Wood Association; [www.apawood.org](http://www.apawood.org).
24. APA - Architectural Precast Association; [www.archprecast.org](http://www.archprecast.org).
25. API - American Petroleum Institute; [www.api.org](http://www.api.org).
26. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
27. ARI - American Refrigeration Institute; (See AHRI).
28. ARMA - Asphalt Roofing Manufacturers Association; [www.asphaltroofing.org](http://www.asphaltroofing.org).
29. ASCE - American Society of Civil Engineers; [www.asce.org](http://www.asce.org).

30. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
31. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; [www.ashrae.org](http://www.ashrae.org).
32. ASME - ASME International; (American Society of Mechanical Engineers); [www.asme.org](http://www.asme.org).
33. ASSE - American Society of Safety Engineers (The); [www.asse.org](http://www.asse.org).
34. ASSE - American Society of Sanitary Engineering; [www.asse-plumbing.org](http://www.asse-plumbing.org).
35. ASTM - ASTM International; [www.astm.org](http://www.astm.org).
36. ATIS - Alliance for Telecommunications Industry Solutions; [www.atis.org](http://www.atis.org).
37. AWEA - American Wind Energy Association; [www.awea.org](http://www.awea.org).
38. AWI - Architectural Woodwork Institute; [www.awinet.org](http://www.awinet.org).
39. AWMAC - Architectural Woodwork Manufacturers Association of Canada; [www.awmac.com](http://www.awmac.com).
40. AWPA - American Wood Protection Association; [www.awpa.com](http://www.awpa.com).
41. AWS - American Welding Society; [www.aws.org](http://www.aws.org).
42. AWWA - American Water Works Association; [www.awwa.org](http://www.awwa.org).
43. BHMA - Builders Hardware Manufacturers Association; [www.buildershardware.com](http://www.buildershardware.com).
44. BIA - Brick Industry Association (The); [www.gobrick.com](http://www.gobrick.com).
45. BICSI - BICSI, Inc.; [www.bicsi.org](http://www.bicsi.org).
46. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); [www.bifma.org](http://www.bifma.org).
47. BISSC - Baking Industry Sanitation Standards Committee; [www.bissc.org](http://www.bissc.org).
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); [www.bissc.org](http://www.bissc.org).
49. CDA - Copper Development Association; [www.copper.org](http://www.copper.org).
50. CEA - Canadian Electricity Association; [www.electricity.ca](http://www.electricity.ca).
51. CEA - Consumer Electronics Association; [www.ce.org](http://www.ce.org).
52. CFFA - Chemical Fabrics and Film Association, Inc.; [www.chemicalfabricsandfilm.com](http://www.chemicalfabricsandfilm.com).
53. CFSEI - Cold-Formed Steel Engineers Institute; [www.cfsei.org](http://www.cfsei.org).
54. CGA - Compressed Gas Association; [www.cganet.com](http://www.cganet.com).
55. CIMA - Cellulose Insulation Manufacturers Association; [www.cellulose.org](http://www.cellulose.org).
56. CISCA - Ceilings & Interior Systems Construction Association; [www.cisca.org](http://www.cisca.org).
57. CISPI - Cast Iron Soil Pipe Institute; [www.cispi.org](http://www.cispi.org).
58. CLFMI - Chain Link Fence Manufacturers Institute; [www.chainlinkinfo.org](http://www.chainlinkinfo.org).
59. CPA - Composite Panel Association; [www.pbmdf.com](http://www.pbmdf.com).
60. CRI - Carpet and Rug Institute (The); [www.carpet-rug.org](http://www.carpet-rug.org).
61. CRRC - Cool Roof Rating Council; [www.coolroofs.org](http://www.coolroofs.org).
62. CRSI - Concrete Reinforcing Steel Institute; [www.crsi.org](http://www.crsi.org).
63. CSA - Canadian Standards Association; [www.csa.ca](http://www.csa.ca).
64. CSA - CSA International; (Formerly: IAS - International Approval Services); [www.csa-international.org](http://www.csa-international.org).
65. CSI - Construction Specifications Institute (The); [www.csinet.org](http://www.csinet.org).
66. CSSB - Cedar Shake & Shingle Bureau; [www.cedarbureau.org](http://www.cedarbureau.org).
67. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); [www.cti.org](http://www.cti.org).
68. CWC - Composite Wood Council; (See CPA).
69. DASMA - Door and Access Systems Manufacturers Association; [www.dasma.com](http://www.dasma.com).

70. DHI - Door and Hardware Institute; [www.dhi.org](http://www.dhi.org).
71. ECA - Electronic Components Association; (See ECIA).
72. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
73. ECIA - Electronic Components Industry Association; [www.eciaonline.org](http://www.eciaonline.org).
74. EIA - Electronic Industries Alliance; (See TIA).
75. EIMA - EIFS Industry Members Association; [www.eima.com](http://www.eima.com).
76. EJMA - Expansion Joint Manufacturers Association, Inc.; [www.ejma.org](http://www.ejma.org).
77. ESD - ESD Association; (Electrostatic Discharge Association); [www.esda.org](http://www.esda.org).
78. ESTA - Entertainment Services and Technology Association; (See PLASA).
79. EVO - Efficiency Valuation Organization; [www.evo-world.org](http://www.evo-world.org).
80. FCI - Fluid Controls Institute; [www.fluidcontrolsinstitute.org](http://www.fluidcontrolsinstitute.org).
81. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); [www.fiba.com](http://www.fiba.com).
82. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); [www.fivb.org](http://www.fivb.org).
83. FM Approvals - FM Approvals LLC; [www.fmglobal.com](http://www.fmglobal.com).
84. FM Global - FM Global; (Formerly: FMG - FM Global); [www.fmglobal.com](http://www.fmglobal.com).
85. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; [www.floridarroof.com](http://www.floridarroof.com).
86. FSA - Fluid Sealing Association; [www.fluidsealing.com](http://www.fluidsealing.com).
87. FSC - Forest Stewardship Council U.S.; [www.fscus.org](http://www.fscus.org).
88. GA - Gypsum Association; [www.gypsum.org](http://www.gypsum.org).
89. GANA - Glass Association of North America; [www.glasswebsite.com](http://www.glasswebsite.com).
90. GS - Green Seal; [www.greenseal.org](http://www.greenseal.org).
91. HI - Hydraulic Institute; [www.pumps.org](http://www.pumps.org).
92. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
93. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
94. HPVA - Hardwood Plywood & Veneer Association; [www.hpva.org](http://www.hpva.org).
95. HPW - H. P. White Laboratory, Inc.; [www.hpwhite.com](http://www.hpwhite.com).
96. IAPSC - International Association of Professional Security Consultants; [www.iapsc.org](http://www.iapsc.org).
97. IAS - International Accreditation Service; [www.iasonline.org](http://www.iasonline.org).
98. IAS - International Approval Services; (See CSA).
99. ICBO - International Conference of Building Officials; (See ICC).
100. ICC - International Code Council; [www.iccsafe.org](http://www.iccsafe.org).
101. ICEA - Insulated Cable Engineers Association, Inc.; [www.icea.net](http://www.icea.net).
102. ICPA - International Cast Polymer Alliance; [www.icpa-hq.org](http://www.icpa-hq.org).
103. ICRI - International Concrete Repair Institute, Inc.; [www.icri.org](http://www.icri.org).
104. IEC - International Electrotechnical Commission; [www.iec.ch](http://www.iec.ch).
105. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); [www.ieee.org](http://www.ieee.org).
106. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); [www.ies.org](http://www.ies.org).
107. IESNA - Illuminating Engineering Society of North America; (See IES).
108. IEST - Institute of Environmental Sciences and Technology; [www.iest.org](http://www.iest.org).
109. IGMA - Insulating Glass Manufacturers Alliance; [www.igmaonline.org](http://www.igmaonline.org).
110. IGSHPA - International Ground Source Heat Pump Association; [www.igshpa.okstate.edu](http://www.igshpa.okstate.edu).
111. ILI - Indiana Limestone Institute of America, Inc.; [www.iliai.com](http://www.iliai.com).

112. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); [www.intertek.com](http://www.intertek.com).
113. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); [www.isa.org](http://www.isa.org).
114. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
115. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); [www.isfanow.org](http://www.isfanow.org).
116. ISO - International Organization for Standardization; [www.iso.org](http://www.iso.org).
117. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
118. ITU - International Telecommunication Union; [www.itu.int/home](http://www.itu.int/home).
119. KCMA - Kitchen Cabinet Manufacturers Association; [www.kcma.org](http://www.kcma.org).
120. LMA - Laminating Materials Association; (See CPA).
121. LPI - Lightning Protection Institute; [www.lightning.org](http://www.lightning.org).
122. MBMA - Metal Building Manufacturers Association; [www.mbma.com](http://www.mbma.com).
123. MCA - Metal Construction Association; [www.metalconstruction.org](http://www.metalconstruction.org).
124. MFMA - Maple Flooring Manufacturers Association, Inc.; [www.maplefloor.org](http://www.maplefloor.org).
125. MFMA - Metal Framing Manufacturers Association, Inc.; [www.metalframingmfg.org](http://www.metalframingmfg.org).
126. MHIA - Material Handling Industry of America; [www.mhia.org](http://www.mhia.org).
127. MIA - Marble Institute of America; [www.marble-institute.com](http://www.marble-institute.com).
128. MMPA - Moulding & Millwork Producers Association; [www.wmmpa.com](http://www.wmmpa.com).
129. MPI - Master Painters Institute; [www.paintinfo.com](http://www.paintinfo.com).
130. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; [www.mss-hq.org](http://www.mss-hq.org).
131. NAAMM - National Association of Architectural Metal Manufacturers; [www.naamm.org](http://www.naamm.org).
132. NACE - NACE International; (National Association of Corrosion Engineers International); [www.nace.org](http://www.nace.org).
133. NADCA - National Air Duct Cleaners Association; [www.nadca.com](http://www.nadca.com).
134. NAIMA - North American Insulation Manufacturers Association; [www.naima.org](http://www.naima.org).
135. NBGQA - National Building Granite Quarries Association, Inc.; [www.nbgqa.com](http://www.nbgqa.com).
136. NBI - New Buildings Institute; [www.newbuildings.org](http://www.newbuildings.org).
137. NCAA - National Collegiate Athletic Association (The); [www.ncaa.org](http://www.ncaa.org).
138. NCMA - National Concrete Masonry Association; [www.ncma.org](http://www.ncma.org).
139. NEBB - National Environmental Balancing Bureau; [www.nebb.org](http://www.nebb.org).
140. NECA - National Electrical Contractors Association; [www.necanet.org](http://www.necanet.org).
141. NeLMA - Northeastern Lumber Manufacturers Association; [www.nelma.org](http://www.nelma.org).
142. NEMA - National Electrical Manufacturers Association; [www.nema.org](http://www.nema.org).
143. NETA - InterNational Electrical Testing Association; [www.netaworld.org](http://www.netaworld.org).
144. NFHS - National Federation of State High School Associations; [www.nfhs.org](http://www.nfhs.org).
145. NFPA - National Fire Protection Association; [www.nfpa.org](http://www.nfpa.org).
146. NFPA - NFPA International; (See NFPA).
147. NFRC - National Fenestration Rating Council; [www.nfrc.org](http://www.nfrc.org).
148. NHLA - National Hardwood Lumber Association; [www.nhla.com](http://www.nhla.com).
149. NLGA - National Lumber Grades Authority; [www.nlga.org](http://www.nlga.org).
150. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
151. NOMMA - National Ornamental & Miscellaneous Metals Association; [www.nomma.org](http://www.nomma.org).
152. NRCA - National Roofing Contractors Association; [www.nrca.net](http://www.nrca.net).
153. NRMCA - National Ready Mixed Concrete Association; [www.nrmca.org](http://www.nrmca.org).
154. NSF - NSF International; [www.nsf.org](http://www.nsf.org).



155. NSPE - National Society of Professional Engineers; [www.nspe.org](http://www.nspe.org).
156. NSSGA - National Stone, Sand & Gravel Association; [www.nssga.org](http://www.nssga.org).
157. NTMA - National Terrazzo & Mosaic Association, Inc. (The); [www.ntma.com](http://www.ntma.com).
158. NWFA - National Wood Flooring Association; [www.nwfa.org](http://www.nwfa.org).
159. PCI - Precast/Prestressed Concrete Institute; [www.pci.org](http://www.pci.org).
160. PDI - Plumbing & Drainage Institute; [www.pdionline.org](http://www.pdionline.org).
161. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); [www.plasa.org](http://www.plasa.org).
162. RCSC - Research Council on Structural Connections; [www.boltcouncil.org](http://www.boltcouncil.org).
163. RFCI - Resilient Floor Covering Institute; [www.rfci.com](http://www.rfci.com).
164. RIS - Redwood Inspection Service; [www.redwoodinspection.com](http://www.redwoodinspection.com).
165. SAE - SAE International; [www.sae.org](http://www.sae.org).
166. SCTE - Society of Cable Telecommunications Engineers; [www.scte.org](http://www.scte.org).
167. SDI - Steel Deck Institute; [www.sdi.org](http://www.sdi.org).
168. SDI - Steel Door Institute; [www.steeldoor.org](http://www.steeldoor.org).
169. SEFA - Scientific Equipment and Furniture Association (The); [www.sefalabs.com](http://www.sefalabs.com).
170. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
171. SIA - Security Industry Association; [www.siaonline.org](http://www.siaonline.org).
172. SJI - Steel Joist Institute; [www.steeljoist.org](http://www.steeljoist.org).
173. SMA - Screen Manufacturers Association; [www.smainfo.org](http://www.smainfo.org).
174. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; [www.smacna.org](http://www.smacna.org).
175. SMPTE - Society of Motion Picture and Television Engineers; [www.smpte.org](http://www.smpte.org).
176. SPFA - Spray Polyurethane Foam Alliance; [www.sprayfoam.org](http://www.sprayfoam.org).
177. SPIB - Southern Pine Inspection Bureau; [www.spib.org](http://www.spib.org).
178. SPRI - Single Ply Roofing Industry; [www.spri.org](http://www.spri.org).
179. SRCC - Solar Rating & Certification Corporation; [www.solar-rating.org](http://www.solar-rating.org).
180. SSINA - Specialty Steel Industry of North America; [www.ssina.com](http://www.ssina.com).
181. SSPC - SSPC: The Society for Protective Coatings; [www.sspc.org](http://www.sspc.org).
182. STI - Steel Tank Institute; [www.steeltank.com](http://www.steeltank.com).
183. SWI - Steel Window Institute; [www.steelwindows.com](http://www.steelwindows.com).
184. SWPA - Submersible Wastewater Pump Association; [www.swpa.org](http://www.swpa.org).
185. TCA - Tilt-Up Concrete Association; [www.tilt-up.org](http://www.tilt-up.org).
186. TCNA - Tile Council of North America, Inc.; [www.tileusa.com](http://www.tileusa.com).
187. TEMA - Tubular Exchanger Manufacturers Association, Inc.; [www.tema.org](http://www.tema.org).
188. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); [www.tiaonline.org](http://www.tiaonline.org).
189. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
190. TMS - The Masonry Society; [www.masonrysociety.org](http://www.masonrysociety.org).
191. TPI - Truss Plate Institute; [www.tpinst.org](http://www.tpinst.org).
192. TPI - Turfgrass Producers International; [www.turfgrasssod.org](http://www.turfgrasssod.org).
193. TRI - Tile Roofing Institute; [www.tilerroofing.org](http://www.tilerroofing.org).
194. UL - Underwriters Laboratories Inc.; [www.ul.com](http://www.ul.com).
195. UNI - Uni-Bell PVC Pipe Association; [www.uni-bell.org](http://www.uni-bell.org).
196. USAV - USA Volleyball; [www.usavolleyball.org](http://www.usavolleyball.org).
197. USGBC - U.S. Green Building Council; [www.usgbc.org](http://www.usgbc.org).
198. USITT - United States Institute for Theatre Technology, Inc.; [www.usitt.org](http://www.usitt.org).

199. WASTEC - Waste Equipment Technology Association; [www.wastec.org](http://www.wastec.org).
200. WCLIB - West Coast Lumber Inspection Bureau; [www.wclib.org](http://www.wclib.org).
201. WCMA - Window Covering Manufacturers Association; [www.wcmanet.org](http://www.wcmanet.org).
202. WDMA - Window & Door Manufacturers Association; [www.wdma.com](http://www.wdma.com).
203. WI - Woodwork Institute; [www.wicnet.org](http://www.wicnet.org).
204. WSRCA - Western States Roofing Contractors Association; [www.wsrca.com](http://www.wsrca.com).
205. WWPA - Western Wood Products Association; [www.wwpa.org](http://www.wwpa.org).

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. DIN - Deutsches Institut fur Normung e.V.; [www.din.de](http://www.din.de).
2. IAPMO - International Association of Plumbing and Mechanical Officials; [www.iapmo.org](http://www.iapmo.org).
3. ICC - International Code Council; [www.iccsafe.org](http://www.iccsafe.org).
4. ICC-ES - ICC Evaluation Service, LLC; [www.icc-es.org](http://www.icc-es.org).

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION 014200**

## **SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
  - 1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.
  - 2. Section 312319 "Dewatering" for disposal of ground water at Project site.

#### **1.3 USE CHARGES**

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Architect, occupants of Project, testing agencies, and authorities having jurisdiction.
- B. Electric Power Service: Electrical power from Owner's existing service can be used for construction operations.
- C. Water from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- B. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.
  - 1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
  - 2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
  - 3. Indicate sequencing of work that requires water, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of products.

## 1.5    QUALITY ASSURANCE

- A.    Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B.    Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

## 1.6    PROJECT CONDITIONS

- A.    Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

## **PART 2 - PRODUCTS**

### 2.1    MATERIALS

- A.    Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts; minimum 2-3/8-inch-OD line posts and 2-7/8-inch-OD corner and pull posts, with 1-5/8-inch-OD top and bottom rails. Provide concrete bases for supporting posts.

### 2.2    TEMPORARY FACILITIES

- A.    Field Offices, At the discretion of the contractor, no area on the construction site will be available for this use. General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B.    Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
  - 1.    Store materials apart from site.

### 2.3    EQUIPMENT

- A.    Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

## **PART 3 - EXECUTION**

### 3.1    INSTALLATION, GENERAL

- A.    Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

### 3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
  - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
  - 1. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
- C. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- E. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
  - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
  - 2. Install lighting for Project identification sign.
- F. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line(s) for each field office.
  - 1. At each telephone, post a list of important telephone numbers.
    - a. Police and fire departments.
    - b. Ambulance service.
    - c. Contractor's home office.
    - d. Contractor's emergency after-hours telephone number.
    - e. Architect's office.
    - f. Engineers' offices.
    - g. Owner's office.
    - h. Principal subcontractors' field and home offices.
  - 2. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.

### 3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:

1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
  2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Temporary Use of Permanent Roads and Paved Areas: Locate temporary roads and paved areas in same location as permanent roads and paved areas. Construct and maintain temporary roads and paved areas adequate for construction operations. Extend temporary roads and paved areas, within construction limits indicated, as necessary for construction operations.
1. Coordinate elevations of temporary roads and paved areas with permanent roads and paved areas.
  2. Prepare subgrade and install subbase and base for temporary roads and paved areas according to Section 312000 "Earth Moving."
  3. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
- C. Traffic Controls: Comply with requirements of authorities having jurisdiction.
1. Protect existing site improvements to remain including curbs, pavement, and utilities.
  2. Maintain access for fire-fighting equipment and access to fire hydrants.
- D. Parking: No access to Owner's existing parking areas for construction personnel.
- E. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
  2. Remove snow and ice as required to minimize accumulations.
- F. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
1. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
  2. Maintain and touchup signs so they are legible at all times.
- G. Waste Disposal Facilities: Comply with requirements specified in Section 017419 "Construction Waste Management and Disposal."
- H. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

### 3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
  - 1. Comply with work restrictions specified in Section 011000 "Summary."
- C. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- D. Site Enclosure Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
  - 1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
- E. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
- F. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- G. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.
- H. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
  - 1. Prohibit smoking in construction areas.
  - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
  - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

### 3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
  - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Operate Project-identification-sign lighting daily from dusk until 12:00 midnight.
- D. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- E. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
  - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
  - 2. Remove temporary roads and paved areas not intended for or acceptable for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
  - 3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

**END OF SECTION 015000**



## SECTION 017300 - EXECUTION

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching
5. Starting and adjusting.
6. Protection of installed construction.

- B. Related Requirements:

1. Section 011000 "Summary" for limits on use of Project site.
2. Section 013300 "Submittal Procedures" for submitting surveys.
3. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

#### 1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For land surveyor.
- B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.
- C. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
1. Extent: Describe reason for and extent of each occurrence of cutting and patching.

2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
3. Products: List products to be used for patching and firms or entities that will perform patching work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
  - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

D. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

## 1.5 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
  1. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
  2. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
  3. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

## **PART 2 - PRODUCTS**

### 2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.

- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
1. Before construction, verify the location and invert elevation at points of connection of storm sewer, and water-service piping; underground electrical services, and other utilities.
  2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
  3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
1. Description of the Work.
  2. List of detrimental conditions, including substrates.
  3. List of unacceptable installation tolerances.
  4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

#### **3.2 PREPARATION**

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility

appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Section 013100 "Project Management and Coordination."

### 3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
  - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
  - 2. Establish limits on use of Project site.
  - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
  - 4. Inform installers of lines and levels to which they must comply.
  - 5. Check the location, level and plumb, of every major element as the Work progresses.
  - 6. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
  - 7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

### 3.4 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
  2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
  2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
  3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

### 3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
1. Make vertical work plumb and make horizontal work level.
  2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
  4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
  - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
  - 2. Allow for building movement, including thermal expansion and contraction.
  - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

### 3.6 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 011000 "Summary."

- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  2. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  3. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operation.
  4. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
  2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
    - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    - b. Restore damaged pipe covering to its original condition.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

### 3.7 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
  2. Pre-installation Conferences: Include Owner's construction personnel at pre-installation conferences covering portions of the Work that are to receive Owner's

work. Attend pre-installation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

### 3.8    PROGRESS CLEANING

- A.    General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
  - 1.    Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  - 2.    Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
  - 3.    Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    - a.    Use containers intended for holding waste materials of type to be stored.
- B.    Site: Maintain Project site free of waste materials and debris.
- C.    Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
  - 1.    Remove liquid spills promptly.
  - 2.    Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D.    Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E.    Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F.    Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G.    Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls" And Section 017419 "Construction Waste Management and Disposal."
- H.    During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I.    Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.



- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

### 3.9 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

### 3.10 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

**END OF SECTION 017300**

## **SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for the following:
  - 1. Salvaging nonhazardous demolition and construction waste.
  - 2. Recycling nonhazardous demolition and construction waste.
  - 3. Disposing of nonhazardous demolition and construction waste.

#### **1.3 DEFINITIONS**

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

#### **1.4 PERFORMANCE REQUIREMENTS**

- A. General: Achieve end-of-Project rates for salvage/recycling of 75 percent by weight of total non-hazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials.

#### **1.5 ACTION SUBMITTALS**

- A. Waste Management Plan: Submit plan within 7 days of date established for the Notice to Proceed.

## 1.6 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Use Form CWM-7 for construction waste and Form CWM-8 for demolition waste or similar. Include the following information:
1. Material category.
  2. Generation point of waste.
  3. Total quantity of waste in tons.
  4. Quantity of waste salvaged, both estimated and actual in tons.
  5. Quantity of waste recycled, both estimated and actual in tons.
  6. Total quantity of waste recovered (salvaged plus recycled) in tons.
  7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- G. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

## 1.7 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: Experienced firm, with a record of successful waste management coordination of projects with similar requirements.
- B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Waste Management Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:

1. Review and discuss waste management plan including responsibilities of waste management coordinator.
2. Review requirements for documenting quantities of each type of waste and its disposition.
3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
5. Review waste management requirements for each trade.

## 1.8 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of demolition site-clearing and construction waste generated by the Work. Use Form CWM-1 for construction waste and Form CWM-2 for demolition waste or similar. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Use Form CWM-3 for construction waste and Form CWM-4 for demolition waste or similar. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
  2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
  3. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
  4. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
  5. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

## **PART 2 - PRODUCTS (Not Used)**

## **PART 3 - EXECUTION**

### 3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
  - 1. Comply with operation, termination, and removal requirements in Section 015000 "Temporary Facilities and Controls."
- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
  - 1. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
  - 2. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

### 3.2 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
  - 1. Clean salvaged items.
  - 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
  - 3. Store items in a secure area until installation.
  - 4. Protect items from damage during transport and storage.
  - 5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- B. Salvaged Items for Sale and Donation: Not permitted on Project site.

### 3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives,

solvents, petroleum contamination, and other substances deleterious to the recycling process.

- D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
    - a. Inspect containers and bins for contamination and remove contaminated materials if found.
  2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
  4. Store components off the ground and protect from the weather.
  5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

#### 3.4 RECYCLING DEMOLITION WASTE

- A. Asphalt Paving Removal may be completed by grinding asphalt to maximum 1 ½" size for re-use on site or break up and transport to asphalt-recycling facility.
- B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
- C. Crush concrete to maximum 1-1/2-inch size. Crushed concrete may be used as satisfactory soil for fill or subbase.
- D. Metals: Separate metals by type.
1. Structural Steel: Stack members according to size, type of member, and length.
  2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- E. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- F. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.
- G. Metal Suspension System: Separate metal members including trim, and other metals from acoustical panels and tile and sort with other metals.
- H. Carpet: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.

1. Store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.
- I. Carpet Tile: Remove debris, trash, and adhesive.
    1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.
  - J. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.
  - K. Conduit: Reduce conduit to straight lengths and store by type and size.

### 3.5 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
  1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
  2. Polystyrene Packaging: Separate and bag materials.
  3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
  4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Wood Materials:
  1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
  2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
- C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

### 3.6 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
  1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
  2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

**END OF SECTION 017419**

## **SECTION 017700 - CLOSEOUT PROCEDURES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.
5. Repair of the Work.

- B. Related Requirements:

1. Section 013233 "Photographic Documentation" for submitting final completion construction photographic documentation.
2. Section 017300 "Execution" for progress cleaning of Project site.
3. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
4. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
5. Section 017900 "Demonstration and Training" for requirements for instructing Owner's personnel.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For cleaning agents.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

#### **1.4 CLOSEOUT SUBMITTALS**

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest control inspection.



## 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

## 1.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number where applicable.
5. Submit test/adjust/balance records.
6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
6. Advise Owner of changeover in heat and other utilities.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.

8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements, including touchup painting.
10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

#### 1.7 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
2. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

#### 1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

3. Include the following information at the top of each page:
  - a. Project name.
  - b. Date.
  - c. Name of Architect.
  - d. Name of Contractor.
  - e. Page number.
4. Submit list of incomplete items in the following format:
  - a. MS Excel electronic file. Architect will return annotated file.

### 1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
  1. Bind 2 copies of warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
  2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
  4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

## **PART 2 - PRODUCTS**

### 2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

## **PART 3 - EXECUTION**

### **3.1 FINAL CLEANING**

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
  - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Remove snow and ice to provide safe access to building.
    - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - h. Sweep concrete floors broom clean in unoccupied spaces.
    - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
    - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
    - k. Remove labels that are not permanent.
    - l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
    - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
    - n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

- o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
  - p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
  - q. Leave Project clean and ready for occupancy.
- C. Construction Waste Disposal: Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls" And Section 017419 "Construction Waste Management and Disposal."

### 3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
- 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
  - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
    - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
  - 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
  - 4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

**END OF SECTION 017700**

## **SECTION 017823 - OPERATION AND MAINTENANCE DATA**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Emergency manuals.
3. Operation manuals for systems, subsystems, and equipment.
4. Product maintenance manuals.
5. Systems and equipment maintenance manuals.

- B. Related Requirements:

1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

#### **1.3 DEFINITIONS**

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

- B. Subsystem: A portion of a system with characteristics similar to a system.

#### **1.4 CLOSEOUT SUBMITTALS**

- A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.

1. Architect will comment on whether content of operations and maintenance submittals are acceptable.
2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

- B. Format: Submit operations and maintenance manuals in the following format:

1. PDF electronic file. Assemble one manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.
  - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.

- b. Enable inserted reviewer comments on draft submittals.
- 2. 2 paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Architect will return two copies.
- C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are acceptable.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.
  - 1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.

## **PART 2 - PRODUCTS**

### **2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY**

- A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:
  - 1. List of documents.
  - 2. List of systems.
  - 3. List of equipment.
  - 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

## 2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
1. Title page.
  2. Table of contents.
  3. Manual contents.
- B. Title Page: Include the following information:
1. Subject matter included in manual.
  2. Name and address of Project.
  3. Name and address of Owner.
  4. Date of submittal.
  5. Name and contact information for Contractor.
  6. Name and contact information for Construction Manager.
  7. Name and contact information for Architect.
  8. Name and contact information for Commissioning Authority.
  9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
  10. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
  2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.



F. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
  - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
  - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, subject matter of contents. Indicate volume number for multiple-volume sets.
2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
  - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
  - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

### 2.3 EMERGENCY MANUALS

A. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.

7. System, subsystem, or equipment failure.
  8. Chemical release or spill.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable:
1. Instructions on stopping.
  2. Shutdown instructions for each type of emergency.
  3. Operating instructions for conditions outside normal operating limits.
  4. Required sequences for electric or electronic systems.
  5. Special operating instructions and procedures.

## 2.4 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
  2. Performance and design criteria if Contractor has delegated design responsibility.
  3. Operating standards.
  4. Operating procedures.
  5. Operating logs.
  6. Wiring diagrams.
  7. Control diagrams.
  8. Piped system diagrams.
  9. Precautions against improper use.
  10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
  2. Manufacturer's name.
  3. Equipment identification with serial number of each component.
  4. Equipment function.
  5. Operating characteristics.
  6. Limiting conditions.
  7. Performance curves.
  8. Engineering data and tests.
  9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
  2. Equipment or system break-in procedures.
  3. Routine and normal operating instructions.

4. Regulation and control procedures.
  5. Instructions on stopping.
  6. Normal shutdown instructions.
  7. Seasonal and weekend operating instructions.
  8. Required sequences for electric or electronic systems.
  9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

## 2.5 PRODUCT MAINTENANCE MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Product Information: Include the following, as applicable:
1. Product name and model number.
  2. Manufacturer's name.
  3. Color, pattern, and texture.
  4. Material and chemical composition.
  5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
1. Inspection procedures.
  2. Types of cleaning agents to be used and methods of cleaning.
  3. List of cleaning agents and methods of cleaning detrimental to product.
  4. Schedule for routine cleaning and maintenance.
  5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

## 2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
1. Standard maintenance instructions and bulletins.
  2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  3. Identification and nomenclature of parts and components.
  4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions.
  2. Troubleshooting guide.
  3. Precautions against improper maintenance.
  4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  5. Aligning, adjusting, and checking instructions.
  6. Demonstration and training video recording, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

## **PART 3 - EXECUTION**

### **3.1 MANUAL PREPARATION**

- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
  - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
  - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
  - 1. Do not use original project record documents as part of operation and maintenance manuals.
- F. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

**END OF SECTION 017823**

## **SECTION 017839 - PROJECT RECORD DOCUMENTS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section includes administrative and procedural requirements for project record documents, including the following:
1. Record Drawings.
  2. Record Specifications.
  3. Record Product Data.
  4. Miscellaneous record submittals.
- B. Related Requirements:
1. Section 017700 "Closeout Procedures" for general closeout procedures.
  2. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

#### **1.3 CLOSEOUT SUBMITTALS**

- A. Record Drawings: Comply with the following:
1. Number of Copies: Submit one set(s) of marked-up record prints.

### **PART 2 - PRODUCTS**

#### **2.1 RECORD DRAWINGS**

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Accurately record information in an acceptable drawing technique.
    - c. Record data as soon as possible after obtaining it.
    - d. Record and check the markup before enclosing concealed installations.

- e. Cross-reference record prints to corresponding archive photographic documentation.
2. Content: Types of items requiring marking include, but are not limited to, the following:
- a. Dimensional changes to Drawings.
  - b. Revisions to details shown on Drawings.
  - c. Depths of foundations below first floor.
  - d. Locations and depths of underground utilities.
  - e. Revisions to routing of piping and conduits.
  - f. Revisions to electrical circuitry.
  - g. Actual equipment locations.
  - h. Locations of concealed internal utilities.
  - i. Changes made by Change Order or Construction Change Directive.
  - j. Changes made following Architect's written orders.
  - k. Details not on the original Contract Drawings.
  - l. Field records for variable and concealed conditions.
  - m. Record information on the Work that is shown only schematically.
3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

## 2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
- 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  - 2. Note related Change Orders, record Product Data, and record Drawings where applicable.
- B. Format: Submit record Specifications as paper copy.

## 2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
- 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, record Specifications, and record Drawings where applicable.

B. Format: Submit record Product Data as annotated PDF electronic file.

1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

#### **2.4 MISCELLANEOUS RECORD SUBMITTALS**

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

B. Format: Submit miscellaneous record submittals as PDF electronic file or paper copy.

1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

### **PART 3 - EXECUTION**

#### **3.1 RECORDING AND MAINTENANCE**

A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.

B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

**END OF SECTION 017839**



## SECTION 017900 - DEMONSTRATION AND TRAINING

### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
1. Demonstration of operation of systems, subsystems, and equipment.
  2. Training in operation and maintenance of systems, subsystems, and equipment.
  3. Demonstration and training video recordings.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B. Qualification Data: For instructor.
- C. Attendance Record: For each training module, submit list of participants and length of instruction time.
- D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit two copies within seven days of end of each training module.
1. Identification: On each copy, provide an applied label with the following information:
    - a. Name of Project.
    - b. Name and address of videographer.
    - c. Name of Architect.
    - d. Name of Construction Manager.
    - e. Name of Contractor.
    - f. Date of video recording.

2. At completion of training, submit complete training manual(s) for Owner's use prepared and bound in format matching operation and maintenance manuals and in PDF electronic file format on compact disc.

## 1.5 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Videographer Qualifications: A professional videographer who is experienced photographing demonstration and training events similar to those required.
- C. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
  1. Inspect and discuss locations and other facilities required for instruction.
  2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
  3. Review required content of instruction.
  4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

## 1.6 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

## **PART 2 - PRODUCTS**

### 2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to

master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
  - a. System, subsystem, and equipment descriptions.
  - b. Performance and design criteria if Contractor is delegated design responsibility.
  - c. Operating standards.
  - d. Regulatory requirements.
  - e. Equipment function.
  - f. Operating characteristics.
  - g. Limiting conditions.
  - h. Performance curves.
  
2. Documentation: Review the following items in detail:
  - a. Emergency manuals.
  - b. Operations manuals.
  - c. Maintenance manuals.
  - d. Project record documents.
  - e. Identification systems.
  - f. Warranties and bonds.
  - g. Maintenance service agreements and similar continuing commitments.
  
3. Emergencies: Include the following, as applicable:
  - a. Instructions on meaning of warnings, trouble indications, and error messages.
  - b. Instructions on stopping.
  - c. Shutdown instructions for each type of emergency.
  - d. Operating instructions for conditions outside of normal operating limits.
  - e. Sequences for electric or electronic systems.
  - f. Special operating instructions and procedures.
  
4. Operations: Include the following, as applicable:
  - a. Startup procedures.
  - b. Equipment or system break-in procedures.
  - c. Routine and normal operating instructions.
  - d. Regulation and control procedures.
  - e. Control sequences.
  - f. Safety procedures.
  - g. Instructions on stopping.
  - h. Normal shutdown instructions.
  - i. Operating procedures for emergencies.
  - j. Operating procedures for system, subsystem, or equipment failure.
  - k. Seasonal and weekend operating instructions.
  - l. Required sequences for electric or electronic systems.
  - m. Special operating instructions and procedures.

5. Adjustments: Include the following:
  - a. Alignments.
  - b. Checking adjustments.
  - c. Noise and vibration adjustments.
  - d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
  - a. Diagnostic instructions.
  - b. Test and inspection procedures.
7. Maintenance: Include the following:
  - a. Inspection procedures.
  - b. Types of cleaning agents to be used and methods of cleaning.
  - c. List of cleaning agents and methods of cleaning detrimental to product.
  - d. Procedures for routine cleaning
  - e. Procedures for preventive maintenance.
  - f. Procedures for routine maintenance.
  - g. Instruction on use of special tools.
8. Repairs: Include the following:
  - a. Diagnosis instructions.
  - b. Repair instructions.
  - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - d. Instructions for identifying parts and components.
  - e. Review of spare parts needed for operation and maintenance.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."
- B. Set up instructional equipment at instruction location.

### **3.2 INSTRUCTION**

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
  2. Owner will furnish an instructor to describe Owner's operational philosophy.
  3. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
1. Schedule training with Owner with at least seven days' advance notice.
- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- E. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

### 3.3 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
1. At beginning of each training module, record each chart containing learning objective and lesson outline.
- B. Video: Provide minimum 640 x 480 video resolution converted to format file type acceptable to Owner, on electronic media.
1. Electronic Media: Read-only format compact disc acceptable to Owner, with commercial-grade graphic label.
  2. File Hierarchy: Organize folder structure and file locations according to project manual table of contents. Provide complete screen-based menu.
  3. File Names: Utilize file names based upon name of equipment generally described in video segment, as identified in Project specifications.
  4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the Equipment Demonstration and Training DVD that describes the following for each Contractor involved on the Project, arranged according to Project table of contents:
    - a. Name of Contractor/Installer.
    - b. Business address.
    - c. Business phone number.
    - d. Point of contact.
    - e. E-mail address.
- C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.

1. Film training session(s) in segments not to exceed 15 minutes.
  - a. Produce segments to present a single significant piece of equipment per segment.
  - b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
  - c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.
  
- D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.
  1. Furnish additional portable lighting as required.

**END OF SECTION 017900**

## SECTION 311100 - EROSION CONTROL

### **PART 1 - GENERAL**

#### 1.1 SUMMARY

A. This Section includes the following:

1. Inlet Protection
2. Sediment Log
3. Temporary Seeding
4. Tracking Pad

B. Provide temporary erosion control measures to prevent soil erosion and discharge of soil bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion and sedimentation-control Drawings and requirements of authorities having jurisdiction. The Contractor shall provide erosion and sediment control in accordance with the Erosion Control Plan for the project. If a plan is not available, the Contractor shall provide erosion control as necessary.

#### 1.2 PROJECT CONDITIONS

A. All erosion control devices specified in the plans must be installed before grading.

### **PART 2 - PRODUCTS**

#### 2.1 MATERIALS – GENERAL

A. Provide materials as required by governing agencies and on the approved site or erosion control plans.

#### 2.2 INLET PROTECTION FILTER

A. Install inlet protection filters as listed in the Wisconsin Department of Transportation (WisDOT) Erosion Control Product Acceptability List for Multi-Modal Applications.

#### 2.3 SEDIMENT LOG

A. Sediment log shall be a minimum of 12" in diameter and listed in the WisDOT Erosion Control Product Acceptability List for Multi-Modal Applications

#### 2.4 TEMPORARY SEEDING

A. Temporary Seed Mixture Components

<u>Lbs/1000 SF</u>	<u>Species</u>	<u>Min. % Purity</u>	<u>Min. % Germ.</u>
2	Oats	98	90
2.5	Rye	97	85

## 2.5 TRACKING PAD

- A. Maintain existing Tracking pads or create new pad prior to start of construction, as determined by Owner and Architect.

## **PART 3 - EXECUTION**

### 3.1 PROCEDURES AND MAINTENANCE

- A. Install silt fences and filter barriers at the beginning of the project.
- B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established. Measures shall be inspected on a weekly basis and after a precipitation event of 0.5 inches or greater in a 24 hour period. Document inspections and maintenance performed.
- D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal. Removal of measures shall be after the site is 80 % stabilized (or approved by local, county, or state erosion control agency).
- E. The Contractor shall install erosion control measures including but not limited to:
  - 1. Silt Fence
  - 2. Tracking Pad
  - 3. Sediment Log
  - 4. Temporary Seeding
- F. Minimize disturbed area. Stripping of vegetation, re-grading or other development shall be done in such a manner as to minimize erosion.
- G. Development plans shall preserve salient natural features, minimize land cuts and fills, and conform to the general topography so as to create the least erosion potential and to adequately contain the volume and velocity of surface water runoff.
- H. To the largest degree feasible, natural vegetation shall be retained, protected and supplemented. Disturbed areas and the duration of exposure thereof shall be kept to a practicable minimum and stabilized as quickly as practicable. Temporary vegetation and/or mulching shall be used to protect exposed critical areas during development.
- I. Permanent (final) vegetation and structural erosion control and drainage measures shall be installed as soon as practicable during development.
- J. Provisions shall be made to effectively accommodate the increased runoff caused by changed soil and surface conditions, both during and after development. Where necessary, the rate of surface water runoff shall be structurally retarded.
- K. Sediment in the runoff water shall be trapped until the disturbed area is stabilized by the use of debris or sediment basins, silt traps or similar measures.
- L. Locate stockpiles of soils away from waterways and wetlands.



1. Protect soil stockpiles with erosion mat, seed and mulch or cover with tarpaulins or burlap.
  2. All stockpiles shall have the base of the pile protected with sediment log around the base of the pile.
- M. All erosion and sedimentation devices shall be inspected and repaired in the following frequencies:
1. Weekly
  2. After each rainfall
  3. Daily during prolonged rainfall
- N. Sediment shall be removed after devices become one-third full.
- O. Repair all washouts.
- P. Maintain temporary erosion and sedimentation control structures until permanent soil erosion controls are completed and/or vegetation is established.
1. Repair damaged structures.
  2. Replace lost structures.
  3. Remove sediment on a regular basis.
  4. Refill eroded areas as required for grade stabilization.

### 3.2 EARTH STRUCTURES

- A. Maintain temporary erosion and sedimentation control structures until permanent soil erosion controls are completed and/or vegetation is established.
1. Repair damaged structures.
  2. Replace lost structures.
  3. Remove sediment on a regular basis.
  4. Refill eroded areas as required for grade stabilization.

### 3.3 ADJUST AND CLEAN

- A. Clean premises of all litter and debris created by work of this Section.

**END OF SECTION 311100**

## **SECTION 312000 - EARTH MOVING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:

1. Excavating and filling of the stormwater vault.

- B. Related Sections:

1. Section 003126 "Existing Hazardous Material Information" that describes handling and disposal of contaminated soils and testing for dewatering water for contamination and disposal.
2. Section 312319 "Dewatering"
3. Section 334923 "Underground Storm Water Vault."

#### **1.3 DEFINITIONS**

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

- B. Base Course: Aggregate layer placed between the subgrade and paving.

- C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.

- D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

- E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

- F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Owner's Representative. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by OWNER'S

REPRESENTATIVE. Unauthorized excavation, as well as remedial work directed by OWNER'S REPRESENTATIVE, shall be without additional compensation.

- G. Fill: Soil materials used to raise existing grades.
- H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- I. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- J. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.
- K. Sand: Clean, natural sand.

#### 1.4 SUBMITTALS

- A. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
  - 1. Classification according to ASTM D 2487 of each on-site and borrow soil material proposed for fill and backfill.
  - 2. Laboratory compaction curve according to ASTM D 698 for non-supporting sections and ASTM D 1557 for supporting sections for each on-site and borrow soil material proposed for fill and backfill.
- B. Field Quality Test Reports: From a qualified independent geotechnical engineering testing agency indicating subgrade, fill and backfill bearing capacities and degree of compaction.
- C. Contaminated soils and dewatering water disposal daily log, testing reports and quantity from receiving landfill. Dewatering water disposal shall be incidental.

#### 1.5 PRE-INSTALLATION MEETINGS

- A. Pre-installation Conference: Conduct pre-excavation conference at Project site.
  - 1. Review methods and procedures related to earthmoving, including, but not limited to, the following:
    - a. Personnel and equipment needed to make progress and avoid delays.
    - b. Coordination of Work with utility locator service.
    - c. Extent of trenching by hand or with air spade.
    - d. Field quality control.
    - e. Coordination of work to maintain access to building during construction.

## 1.6 FIELD CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations. Assure access to either north or south side of building at all times during construction.
1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Government and authorities having jurisdiction.
  2. Provide alternate routes around closed or obstructed traffic ways if required by Government or authorities having jurisdiction.
- B. Utility Locator Service: Notify Digger's Hotline for area where Project is located before beginning earth-moving operations.
- C. Do not commence earth-moving operations until inlet protection is installed.
- D. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted and then only after arranging to provide temporary utility services according to requirements indicated.
1. Notify Owner not less than two days in advance of proposed utility interruptions.
  2. Do not proceed with utility interruptions without Owner's written permission.
  3. Contact utility-locator service for area where Project is located before excavating.
- E. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active

## **PART 2 - PRODUCTS**

### 2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.
1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM C 294; with
1. 3/4-inch Mix: At least 95 percent passing a 3/4-inch sieve, 40-75 percent passing a 3/8-inch sieve, 25-60 percent passing a No. 4 sieve and not more than 8 percent passing a No. 200 sieve.

2. 3-inch Mix: 90-100 percent passing a 3-inch sieve, 60-85 percent passing a 1 ½-inch sieve, 40-65 percent passing a ¾-inch sieve, 14-40 percent passing a No. 4 sieve, 10-30 percent passing a No. 10 sieve and 2-12 percent passing a No. 200 sieve.
- E. Breaker Run: Crushed stone; predominantly 6-inches or less in one direction and not more than 8 percent passing a No. 200 sieve. The size of the material shall be predominantly 3-inches to 6-inches.
- F. Bedding Course or Clean Stone: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; except with 100 percent passing a ¾-inch sieve and not more than 8 percent passing a No. 200 sieve.
- G. Drainage Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940/D 2940M; except with 100 percent passing a ¾-inch sieve and not more than 5 percent passing a No. 200 sieve.
- H. Sand: Clean granular material meeting the requirement in Section 501.2.5.3.4 of the Wisconsin DOT Standard Specifications for Highway Construction.
- I. Geotextile Filter Fabric: Fabric shall meet the requirements of Section 645.2.4, Type DF, Schedule B or C of the Wisconsin DOT Standard Specifications for Highway Construction.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.
- B. Protect and maintain erosion and sedimentation controls during earth-moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

### **3.2 DEWATERING**

- A. See Section 312319 Dewatering.
- B. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- C. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

### 3.3 EXCAVATION, GENERAL

- A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

### 3.4 EXCAVATION IN CONTAMINATED SOILS AREAS

- A. Contaminated soils exist within the project extents and excavation areas. See Section 003126. On-site environmental consultant is required to determine the handling of the soil and dewatering water follows the "Material Management Plan".
- B. Contaminated soil removal beyond the limits of excavation is not required. Only soils that are excavated and are determined to be contaminated require special disposal unless the Material Management Plan states otherwise.

### 3.5 EXCAVATION FOR STRUCTURES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch (25 mm). If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

### 3.6 EXCAVATION FOR UTILITIES

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
  1. Excavation for Underground Tanks, Basins: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
  1. Clearance: 12 inches each side of pipe or conduit.
- C. Trench Bottoms: Excavate trenches 6 inches deeper than bottom of pipe elevation to allow for bedding course.

1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

### 3.7 SUBGRADE INSPECTION

- A. Notify OWNER'S REPRESENTATIVE when excavations have reached required subgrade.
- B. If OWNER'S REPRESENTATIVE determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. Proof-roll subgrade below pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
  1. Completely proof-roll subgrade in one direction. Limit vehicle speed to 3 mph (5 km/h).
  2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by OWNER'S REPRESENTATIVE, and replace with compacted backfill or fill as directed.
- D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
- E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by OWNER'S REPRESENTATIVE, without additional compensation.

### 3.8 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

### 3.9 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
  1. Construction below finish grade, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
  2. Removing concrete formwork.
  3. Removing trash and debris.
  4. Removing temporary shoring, bracing, and sheeting.
  5. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.

### 3.10 SOIL FILL

- A. Place and compact fill material in layers to required elevations as follows:
1. Under grass and planted areas, use satisfactory soil material.
  2. Under walks and pavements, use satisfactory soil material.
  3. Under steps and ramps, use engineered fill.
  4. Under building slabs, use engineered fill.
  5. Under footings and foundations, use engineered fill.
- B. Place soil fill on subgrades free of mud, frost, snow, or ice.

### 3.11 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
  2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

### 3.12 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D 1557:
1. Under structures, buildings, steps and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
  2. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
  3. For utility trenches, outside of supporting pavements, compact each layer of initial and final backfill soil material at 92 percent per ASTM D 698.

### 3.13 UTILITY TRENCH BACKFILL

- A. Place backfill that is free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.



- C. For conduit less than 30 inches below surface of pavements, provide 4-inch thick, concrete-base slab support. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway base course.
- D. Backfill utility trenches under future pavements with select backfill. All other trenches may be backfilled with satisfactory soil. Backfill to be compacted in 8 inch maximum lifts to a density of 95 percent compaction per ASTM D 1557.
- E. Place and compact initial backfill, free of particles larger than 1 inch in any dimension over the utility pipe or conduit.
  - 1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- F. Backfill voids with satisfactory soil while installing and removing shoring and bracing.
- G. Place and compact final backfill of satisfactory soil to final subgrade elevation.
- H. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

### 3.14 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
  - 1. Provide a smooth transition between adjacent existing grades and new grades.
  - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:
  - 1. Turf or Unpaved Areas: Plus or minus 1/2 inch.
  - 2. Pavements: Plus or minus 1/8 inch.

### 3.15 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:
  - 1. Install subdrainage geotextile on prepared subgrade according to manufacturer's written instructions, overlapping sides and ends.
  - 2. Place drainage course 6 inches (150 mm) or less in compacted thickness in a single layer.

3. Place drainage course that exceeds 6 inches (150 mm) in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches (150 mm) thick or less than 3 inches (75 mm) thick.
4. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

### 3.16 FIELD QUALITY CONTROL

- A. Special Inspections: Engage a qualified special inspector to perform the following special inspections:
1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
  2. Determine that fill material classification and maximum lift thickness comply with requirements.
  3. Determine, during placement and compaction that in-place density of compacted fill complies with requirements.
  4. Witness and approve proof roll of subgrade.
- B. Testing Agency: Contractor shall engage a qualified geotechnical engineering testing agency to perform tests and inspections.
- C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
- D. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2937, and ASTM D 6938, as applicable. Tests will be performed at the following locations and frequencies:
1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 400 sq. ft. or less of paved area or building slab but in no case fewer than three tests.
- E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

### 3.17 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
1. Scarify or remove and replace soil material to depth as directed by OWNER'S REPRESENTATIVE; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

### 3.18 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

**END OF SECTION 312000**

## **SECTION 312319 - DEWATERING**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes construction dewatering.

#### **1.2 REFERENCES**

- A. Wisconsin Administrative Code (WAC):
- B. Chapter NR 141 – Monitoring Well Construction
- C. Chapter NR 812 – Well Construction and Pump Installation
- D. Wisconsin Department of Natural Resources Technical Standards for Construction Site Erosion & Sediment Control (Technical Standards):  
<http://www.dnr.state.wi.us/org/water/wm/nps/stormwater/techstds.htm#Construction>

#### **1.3 RELATED SECTIONS**

- A. Section 003126 “Existing Hazardous Material Information” that describes handling and disposal of contaminated soils and testing for dewatering water for contamination and disposal.
- B. Section 312000 “Earth Moving.”
- C. Section 312319 “Dewatering.”
- D. Section 334923 “Underground Storm Water Vault.”

#### **1.4 ACTION SUBMITTALS**

- A. Shop Drawings: For dewatering system, prepared by or under the supervision of a qualified professional engineer.
  - 1. Include plans, elevations, sections, and details.
  - 2. The plan shall include the location of dewatering practices, staging of dewatering, where water will be pumped from, rate of pumping, details of sediment removal practice and polymer approval from WDNR (if polymer is used).
  - 3. For deep wells or well point systems, provide copies of the site assessment, system design computations for removal of groundwater, and design information for sediment removal practices. Include layouts of piezometers and flow-measuring devices for monitoring performance of dewatering system.
  - 4. For sump dewatering in trenches or excavations, provide copies of sediment removal practice selection and discharge design calculations or information.
  - 5. Provide copies of all permits required for dewatering.
  - 6. Provide copies of daily monitoring and testing logs for dewatering practices as described in the DNR Dewatering Technical Standard.
  - 7. Provide copies of all borehole abandonment forms.

- B. Permits.

### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer that has specialized in dewatering work.

### 1.6 FIELD CONDITIONS

- A. Project-Site Information: A geotechnical report has been prepared for this Project and is available for information only. The opinions expressed in this report are those of a geotechnical engineer and represent interpretations of subsoil conditions, tests, and results of analyses conducted by a geotechnical engineer. Owner is not responsible for interpretations or conclusions drawn from this data.

1. Make additional test borings and conduct other exploratory operations necessary for dewatering according to the performance requirements.
2. The geotechnical report is included elsewhere in Project Manual.

### 1.7 PERMITS

- A. Pay for and obtain all permits/approval required by state and federal regulations.

- B. Necessary permits/approval includes, but is not limited to

1. High capacity well approval under NR 812.09. Sump dewatering is not included in high capacity dewatering unless pumping rate is > 70 gallons per minute and is generally covered under the site erosion control permit. <http://dnr.wi.gov/topic/Wells/HighCapacity.html>
2. If groundwater dewatering, groundwater dewatering permit may be required. Coordinate with Materials Management Plan. Wastewater pit/trench dewatering permit (WI-0049344) contact Dave Brick (608-275-3321), wastewater specialist. This permit, fact sheet and request for coverage form at: <http://dnr.wi.gov/topic/wastewater/GeneralPermits.html>

- C. When installing by jetting methods, provide own water source. Do not use hydrants as water source without permission from Construction representative and/or local utility, as applicable. Obtain and pay for any required hydrant use and permits.

- D. Comply with erosion control permit. Inspect dewatering system daily for erosion issues and add erosion control as necessary.

### 1.8 SAFETY

- A. Prevent public access to dewatering system components.

- B. Abandon boreholes in accordance with applicable state and federal codes immediately following use.

- C. When pumping groundwater from contaminated soils area, follow Materials Management Plan.

## **PART 2 - PRODUCTS**

### **2.1 PERFORMANCE REQUIREMENTS**

- A. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.
1. Design dewatering system, including comprehensive engineering analysis by a qualified professional.
  2. Continuously monitor and maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, prevention of flooding in excavation, and prevention of damage to subgrades and permanent structures.
  3. Prevent surface water from entering excavations by grading, dikes, or other means.
  4. Accomplish dewatering without damaging existing buildings, structures, and site improvements adjacent to excavation.
  5. Remove dewatering system when no longer required for construction.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning dewatering. Comply with water and debris disposal regulations of authorities having jurisdiction.
- C. All deepwell and wellpoint dewatering equipment and well construction/abandonment materials shall meet the requirements of NR 141 and NR 812.
- D. Sump or trench dewatering shall use portable sediment removal devices and meet the requirements of DNR Technical Standard 1061. Portable sediment removal devices include but are not limited to: filter tanks, Type II Geotextile Bags with polymer addition and portable sand filters.
- E. Polymers used in dewatering to settle particles shall meet the DNR Technical Standard 1051 criteria and shall be approved by WDNR.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Comply with local, state and federal regulations.
- B. Dewatering from contaminated soil removal areas shall be in compliance with Section 003126 "Existing Hazardous Materials Information" and Materials Management Plan.
- C. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by dewatering operations.

1. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding site or surrounding area.
  2. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.
- D. Install dewatering system to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.
1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
- E. Provide temporary grading to facilitate dewatering and control of surface water.
- F. Protect and maintain temporary erosion and sedimentation controls during dewatering operations.
- G. When deep wells or well point systems are utilized, prepare a system design and obtain permits in accordance with NR 812.09 for high capacity wells as defined by NR 812.07(53). Design system to dewater site as necessary to complete construction, but minimize impact on local water table. Monitor water levels in wells adjacent to construction site. Adjust dewatering system configuration and operation as necessary if neighboring wells are adversely impacted. Do not adversely impact neighboring private wells.
- H. Coordinate dewatering with other contractors.

### 3.2 INSTALLATION

- A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.
1. Space well points or wells at intervals required to provide sufficient dewatering.
  2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.
- B. Place dewatering system into operation to lower water to specified levels before excavating below ground-water level.
- C. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.
- D. Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails.

### 3.3 OPERATION

- A. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.
- B. Operate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.
  - 1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
  - 2. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.
  - 3. Maintain piezometric water level a minimum of 24" below bottom of excavation.
- C. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others.
- D. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches below overlying construction.

### 3.4 FIELD QUALITY CONTROL

- A. Observation Wells: Provide observation wells or piezometers, take measurements, and maintain at least the minimum number indicated; additional observation wells may be required by authorities having jurisdiction.
  - 1. Observe and record daily elevation of ground water and piezometric water levels in observation wells.
  - 2. Repair or replace, within 24 hours, observation wells that become inactive, damaged, or destroyed. In areas where observation wells are not functioning properly, suspend construction activities until reliable observations can be made. Add or remove water from observation-well risers to demonstrate that observation wells are functioning properly.
  - 3. Fill observation wells, remove piezometers, and fill holes when dewatering is completed.
- B. Provide continual observation to ensure that subsurface soils are not being removed by the dewatering operation.
- C. Prepare reports of observations daily. Daily records shall be kept of:
  - 1. Discharge duration and rate
  - 2. Observed water table at time of dewatering
  - 3. Type and amount of polymer used
  - 4. Maintenance activities



**3.5**    **PROTECTION**

- A.    Protect and maintain dewatering system during dewatering operations.
- B.    Promptly repair damages to adjacent facilities caused by dewatering.
- C.    Remove dewatering system immediately after dewatering is complete in accordance with all state, local and federal regulations.

**END OF SECTION 312319**

## **SECTION 330500 - COMMON WORK RESULTS FOR UTILITIES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Piping joining materials.
  - 2. Transition fittings.
  - 3. Sleeves.
  - 4. Grout.
  - 5. Piped utility demolition.
  - 6. Piping system common requirements.
  - 7. Metal supports and anchorages.

#### **1.3 DEFINITIONS**

- A. Exposed Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions.
- B. Concealed Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- C. ABS: Acrylonitrile-butadiene-styrene plastic.
- D. CPVC: Chlorinated polyvinyl chloride plastic.
- E. PE: Polyethylene plastic.
- F. PVC: Polyvinyl chloride plastic.

#### **1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

#### **1.5 COORDINATION**

- A. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

- B. Coordinate size and location of concrete bases. Formwork, reinforcement, and concrete requirements are specified in Division 31.

## **PART 2 - PRODUCTS**

### **2.1 PIPING JOINING MATERIALS**

- A. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
1. ASME B16.21, nonmetallic, flat, asbestos free, 1/8-inch (3.2-mm) maximum thickness, unless otherwise indicated.
    - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
    - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
  2. AWWA C110, rubber, flat face, 1/8 inch (3.2 mm) thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- B. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- C. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- E. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.
- F. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- G. Solvent Cements for Joining Plastic Piping:
1. ABS Piping: ASTM D 2235.
  2. CPVC Piping: ASTM F 493.
  3. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
  4. PVC to ABS Piping Transition: ASTM D 3138.
- H. Fiberglass Pipe Adhesive: As furnished or recommended by pipe manufacturer.

### **2.2 TRANSITION FITTINGS**

- A. Transition Fittings, General: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.
- B. Transition Couplings NPS 1-1/2 (DN 40) and Smaller:

1. Underground Piping: Manufactured piping coupling or specified piping system fitting.
  2. Aboveground Piping: Specified piping system fitting.
- C. AWWA Transition Couplings NPS 2 (DN 50) and Larger:
1. Description: AWWA C219, metal sleeve-type coupling for underground pressure piping.
- D. Plastic-to-Metal Transition Fittings:
1. Description: One-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert, and one solvent-cement-joint or threaded end.
- E. Plastic-to-Metal Transition Unions:
1. Description: MSS SP-107, four-part union. Include threaded end, solvent-cement-joint or threaded plastic end, rubber O-ring, and union nut.
- F. Flexible Transition Couplings for Underground Nonpressure Drainage Piping:
1. Description: ASTM C 1173 with elastomeric sleeve, ends same size as piping to be joined, and corrosion-resistant metal band on each end.

### 2.3 SLEEVES

- A. Galvanized-Steel Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast-Iron Sleeves: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Molded PVC Sleeves: Permanent, with nailing flange for attaching to wooden forms.
- E. PVC Pipe Sleeves: ASTM D 1785, Schedule 40.
- F. Molded PE Sleeves: Reusable, PE, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.

### 2.4 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
1. Characteristics: Post hardening, volume adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
  2. Design Mix: 5000-psi, 28-day compressive strength.
  3. Packaging: Premixed and factory packaged.

## **PART 3 - EXECUTION**

### **3.1 PIPED UTILITY DEMOLITION**

- A. Disconnect, demolish, and remove piped utility systems, equipment, and components indicated to be removed.
  - 1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
  - 2. Piping to Be Abandoned in Place: Drain piping. Fill abandoned piping with flowable fill, and cap or plug piping with same or compatible piping material.
  - 3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
  - 4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make operational.
  - 5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
  
- B. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

### **3.2 PIPING INSTALLATION**

- A. Install piping according to the following requirements and utilities Sections specifying piping systems.
  
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on the Coordination Drawings.
  
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
  
- D. Install piping to permit valve servicing.
  
- E. Install piping at indicated slopes.
  
- F. Install piping free of sags and bends.
  
- G. Install fittings for changes in direction and branch connections.
  
- H. Select system components with pressure rating equal to or greater than system operating pressure.
  
- I. Sleeves are not required for core-drilled holes.

- J. Permanent sleeves are not required for holes formed by removable PE sleeves.
- K. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.
  - 1. Cut sleeves to length for mounting flush with both surfaces.
    - a. Exception: Extend sleeves installed in floors of equipment areas or other wet areas 2 inches above finished floor level.
  - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
    - a. Pipe Sleeves: For pipes smaller than NPS 6 (DN 150).
    - b. Steel Sheet Sleeves: For pipes NPS 6 (DN 150) and larger, penetrating gypsum-board partitions.
- L. Verify final equipment locations for roughing-in.
- M. Refer to equipment specifications in other Sections for roughing-in requirements.

### 3.3 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and utilities Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
  - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
  - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- E. Welded Joints: Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- F. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- G. Grooved Joints: Assemble joints with grooved-end pipe coupling with coupling housing, gasket, lubricant, and bolts according to coupling and fitting manufacturer's written instructions.
- H. Soldered Joints: Apply ASTM B 813 water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook,"

using lead-free solder alloy (0.20 percent maximum lead content) complying with ASTM B 32.

- I. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- J. Pressure-Sealed Joints: Assemble joints for plain-end copper tube and mechanical pressure seal fitting with proprietary crimping tool to according to fitting manufacturer's written instructions.
- K. Plastic Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
  - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
  - 2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 appendixes.
  - 3. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
  - 4. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
  - 5. PVC Nonpressure Piping: Join according to ASTM D 2855.
  - 6. PVC to ABS Nonpressure Transition Fittings: Join according to ASTM D 3138 Appendix.
- L. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.
- M. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D 3212.
- N. Plastic Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
  - 1. Plain-End PE Pipe and Fittings: Use butt fusion.
  - 2. Plain-End PE Pipe and Socket Fittings: Use socket fusion.
- O. Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

### 3.4 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
  - 1. Install unions, in piping NPS 2 (DN 50) and smaller, adjacent to each valve and at final connection to each piece of equipment.
  - 2. Install flanges, in piping NPS 2-1/2 (DN 65) and larger, adjacent to flanged valves and at final connection to each piece of equipment.
  - 3. Install dielectric fittings at connections of dissimilar metal pipes.

### 3.5 EQUIPMENT INSTALLATION

- A. Install equipment level and plumb, unless otherwise indicated.

- B. Install equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference with other installations. Extend grease fittings to an accessible location.
- C. Install equipment to allow right of way to piping systems installed at required slope.

**END OF SECTION 330500**



## **SECTION 334100 - STORM UTILITY DRAINAGE PIPING**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. Section Includes:

1. Pipe and fittings.
2. Catch Basins.
3. Manholes

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.

- B. Shop Drawings:

1. Stormwater catch basins and manholes. Include plans, elevations, sections, details, frames, covers, and grates.

#### **1.4 INFORMATIONAL SUBMITTALS**

- A. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from storm drainage system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.

- B. Product Certificates: For each type of cast-iron soil pipe and fitting, from manufacturer.

#### **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Do not store plastic manholes, pipe, and fittings in direct sunlight.

- B. Protect pipe, pipe fittings, and seals from dirt and damage.

- C. Handle stormwater inlets according to manufacturer's written rigging instructions.

#### **1.6 PROJECT CONDITIONS**

- A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of service.

## **PART 2 - PRODUCTS**

### **2.1 INLETS AND CATCH BASINS**

#### **A. Standard Precast Concrete Catch Basins and Inlets:**

1. Description: ASTM C 478 (ASTM C 478M), precast, reinforced concrete, of depth indicated, with provision for sealant joints.
2. Base Section: 6-inch (150-mm) minimum thickness for floor slab and 4-inch (102-mm) minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
3. Joint Sealant: ASTM C 990 (ASTM C 990M), bitumen or butyl rubber.
4. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and shape matching catch basin frame and grate. Include sealant recommended by ring manufacturer.
5. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.

#### **B. Designed Precast Concrete Catch Basins and Inlets: ASTM C 913, precast, reinforced concrete; designed according to ASTM C 890 for A-16 (ASSHTO HS20-44), heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for joint sealants.**

1. Joint Sealants: ASTM C 990 (ASTM C 990M), bitumen or butyl rubber.
2. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and shape matching catch basin frame and grate. Include sealant recommended by ring manufacturer.
3. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.

#### **C. Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for HS 20, structural loading.**

1. Size: 36" round grate opening – see detail on drawings.

### **2.2 MANHOLES**

#### **A. Standard Precast Concrete Manholes:**

1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
2. Diameter: 48 inches minimum unless otherwise indicated.
3. Ballast: Increase thickness of precast concrete sections or add concrete to base section as required to prevent flotation.
4. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated, and top of cone of size that matches grade rings.
5. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
6. Steps: ASTM A 615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into

sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.

7. Grade Rings: Reinforced-concrete rings, 6- to 9-inch (150- to 225-mm) total thickness, to match diameter of manhole frame and cover, and height as required to adjust manhole frame and cover to indicated elevation and slope.

### **PART 3 - EXECUTION**

#### **3.1 EARTHWORK**

- A. Excavation, trenching, and backfilling are specified in Section 312000 "Earth Moving."

#### **3.2 PIPING INSTALLATION**

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.
- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
- C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. Install gravity-flow, nonpressure drainage piping according to the following:
  1. Install piping pitched down in direction of flow.
  2. Install reinforced-concrete sewer piping according to ASTM C 1479 and ACPA's "Concrete Pipe Installation Manual."

#### **3.3 PIPE JOINT CONSTRUCTION**

- A. Join gravity-flow, nonpressure drainage piping according to the following:
  1. Join reinforced-concrete sewer piping according to ACPA's "Concrete Pipe Installation Manual" for rubber-gasketed joints.
  2. Join dissimilar pipe materials with nonpressure-type flexible couplings.

#### **3.4 CATCH BASIN AND INLET INSTALLATION**

- A. Construct catch basins to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

### 3.5 MANHOLE INSTALLATION

- A. General: Install manholes, complete with appurtenances and accessories indicated.
- B. Install precast concrete manhole sections with sealants according to ASTM C 891.
- C. Where specific manhole construction is not indicated, follow manhole manufacturer's written instructions.
- D. Set tops of frames and covers flush with finished surface of manholes that occur in pavements with a minimum of 4-inches of adjustment. Set tops 3 inches above finished surface elsewhere unless otherwise indicated.

### 3.6 CONNECTIONS

- A. Make connections to existing piping and underground manholes.
  - 1. Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

### 3.7 CLEANING

- A. Clean interior of piping of dirt and superfluous materials. Flush with water.

**END OF SECTION 334100**

## SECTION 334923 – UNDERGROUND STORM WATER VAULT

### **PART 1 - GENERAL**

#### 1.1 SECTION INCLUDES

- A. Precast concrete, modular, storm water detention vault.

#### 1.2 REFERENCES

- A. ACI 318 - Building Code Requirements for Structural Concrete.
- B. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
- C. ASTM C 857 - Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
- D. ASTM C 858 - Standard Specification for Underground Precast Concrete Utility Structures.
- E. ASTM C 891 - Standard Practice for Installation of Underground Precast Concrete Utility Structures.
- F. ASTM C 990 - Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.
- G. Related Sections:
  - 1. Section 003126 "Existing Hazardous Material Information" that describes handling and disposal of contaminated soils and testing for dewatering water for contamination and disposal.
  - 2. Section 312000 "Earth Moving"
  - 3. Section 312319 "Dewatering"

#### 1.3 DESIGN REQUIREMENTS

- A. Precast Concrete Modular Storm Water Detention shall comply with ASTM C 858 and shall have a concrete bottom to prevent infiltration.
- B. Underground concrete detention system shall fit the approved size, dimension, volume and calculations approved by the City of Madison.
  - 1. Size shall match both the dimensions and volume shown on the plans.
- C. Minimum Structural Design Loading: ASTM C 857.
  - 1. Total Cover:
    - a. Minimum: As indicated on the Drawings.
    - b. Maximum: As indicated on the Drawings.

2. Concrete chamber shall be designed for AASHTO HS-20 wheel load and applicable impact.
3. Minimum Soil Pressure:
  - a. StormTrap Single Trap Modules: 3,000 psf concrete pad
4. Vertical and lateral soil pressures shall be determined using:
  - a. Groundwater: Per Section 003132 "Geotechnical Data". Groundwater is likely to be encountered.

#### 1.4 PREINSTALLATION CONFERENCE

- A. A pre-installation conference is required prior to installation.

#### 1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions.
- B. If alternate manufacturer is submitted, revised approval from City of Madison is required and shall be provided by Contractor.
- C. Shop Drawings:
  1. Submit manufacturer's shop drawings, design, plans, elevations, sections, and details, indicating layout, dimensions, foundation, cover, loading requirements, cover requirements and joints.
  2. Indicate size and location of roof openings and inlet and outlet pipe openings.
  3. Indicate sealing of joints.
  4. Include liner layout and installation plans.
- D. Instructions from manufacturer on cover and vehicle weight restrictions over the top of the units during installation and compaction.
- E. Final inspection report.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery of Accessories: Deliver to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage of Accessories:
  1. Store in accordance with manufacturer's instructions.
  2. Store in clean, dry area, out of direct sunlight.
  3. Store between 40 and 90 degrees F.
- C. Handling: Protect materials during handling and installation to prevent damage.
- D. Follow manufacturer's instructions for storage and handling.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. StormTrap, LLC, 2495 West Bungalow Road, Morris, Illinois 60450. Phone (877) 867-6872. Fax (815) 416-1100. Website [www.stormtrap.com](http://www.stormtrap.com).
- B. Or Approved Alternate to match the material type, loading, cover, volume, dimensions, concrete bottom and oil water separator baffle wall as shown on the plans.
  - 1. Note: If alternate is specified, the submittal to the City of Madison and other permitting agencies to update the permits shall be the responsibility of the Contractor.

### 2.2 STORM WATER DETENTION (provided by StormTrap)

#### A. StormTrap Module Description:

- 1. Description: engineered, precast concrete, modular, storm water detention.
- 2. Module Type: SingleTrap
- 3. Size: As indicated on the Drawings.
- 4. Cover: HS-20 loading, minimum of 1' of cover, maximum of 2'.
  - a. Soil conditions shall be verified in the field by Contractor prior to installation.
  - b. Assumed conditions include:
    - 1) Groundwater is likely to be encountered. See soil boring report for specific data. The module layout shall assume groundwater at elevation 846 or roughly 4 feet below grade.
    - 2) Soil density assumed to be 135 pounds per cubic foot
    - 3) Contaminated soil removal is assumed to be included with excavation. Liner is required.
    - 4) Minimum soil pressure 3,000 pounds per square foot.
- 5. Concrete shall have a minimum compressive strength of 6,000 psi at 28 days.
- 6. Reinforcing Bars: ASTM A 615, Grade 60.
- 7. Cover for Reinforcing Bars: ACI 318.
- 8. Baffle Wall as indicated on drawings for oil and grease control.
- 9. Loading shall be for HS-20 loading with special instructions included for cover required during installation specific to construction vehicle traffic.
  - a. Construction vehicle traffic and cover restrictions shall be provided by manufacturer.
- 10. Designed to meet:
  - a. ACI 318 - Building Code Requirements for Structural Concrete.
  - b. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
  - c. ASTM C 857 - Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.

- d. ASTM C 858 - Standard Specification for Underground Precast Concrete Utility Structures.
- e. ASTM C 990 - Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.

### 2.3 CONCRETE PAD (provided by Contractor)

- A. Concrete pad shall be a reinforced concrete pad, design provided by the tank manufacturer with a minimum compressive strength of 4,000 psi at 28 days.

### 2.4 ACCESSORIES

#### A. Joint Tape:

- 1. ASTM C 990.
- 2. 7/8-inch diameter, preformed mastic joint sealer.
- 3. Approved by manufacturer.

#### B. Joint Wrap:

- 1. 8-inch wide sealant with protective release paper.
- 2. Approved by manufacturer.

#### C. Liner (provided by Contractor):

- 1. PPL Liner Type B per Wisconsin DNR Technical Standard 1001, Appendix D. BTL-40 mil liner or approved equal.
  - a. PPL Liner, 40 mils., minimum
  - b. PPL Liner one piece delivered to the site.
- 2. Include Non-Woven Geotextile Fabric, WisDOT Type SAS.
- 3. Include Pipe Boots for liner penetration that are water-tight and approved by liner manufacturer.

## **PART 3 - EXECUTION**

### 3.1 EXAMINATION

- A. Examine area to receive storm water detention modules. Notify Engineer if area is not acceptable. Do not begin installation until unacceptable conditions have been corrected.
- B. Verify in field before installation, dimensions and soil conditions, including groundwater and soil bearing capacity.

### 3.2 INSTALLATION

- A. Contractor shall install storm water detention vault in accordance with manufacturer's instructions and ASTM C 891.



- B. Install modules plumb, on line, and to proper elevation.
- C. Install modules with maximum space of 3/4 inch between adjacent modules. If the space exceeds 3/4", the modules shall be reset with appropriate adjustment made to line and grade to bring the space into compliance.
- D. Contractor shall place concrete pad on level, 6-inch pad of 3/4-inch bedding course stone that extends 2'-0" past outside of system as indicated on the Drawings.
- E. Contractor shall place modules on level, cast-in-place concrete foundation with a 1-foot overhang as indicated on the drawings. StormTrap shall provide an on-site representative for the installation.
- F. Joint Tape:
  - 1. Seal perimeter horizontal joint between modules with joint tape in accordance with ASTM C 891, 8.8 and 8.12.
  - 2. Prepare surfaces and install joint tape in accordance with manufacturer's instructions.
  - 3. 8" pre-formed, cold-applied, self-adhering elastomeric resin bonded to a woven highly puncture resistant polymer wrap. Integrated primer sealant as approved by the system manufacturer.
- G. Joint Wrap:
  - 1. Seal exterior joints between adjacent modules with joint wrap in accordance with ASTM C 891.
  - 2. Prepare surfaces and install joint wrap in accordance with manufacturer's instructions.
  - 3. The adhesive exterior joint wrap shall be installed according by:
    - a. Using a brush or wet cloth to thoroughly clean the outside surface at the point where the joint wrap is to be applied
    - b. A release paper protects the adhesive side of the joint wrap. Place the adhesive tape around the structure, removing the release paper as installed. Press the joint wrap firmly against the system module surface when applying.
- H. Liner: Contractor to provide liner and install according to manufacturer's instructions to cover all sides and bottom of the underground storm water vault with minimal seams. Seams shall be field welded and watertight. Liner shall be installed so that there is one layer of Geotextile, Type SAS on the bottom followed by the PPL liner and then one final layer of geotextile, Type SAS for a sandwich effect.
- I. Fill:
  - 1. Fill material shall be Bedding Course Stone.
  - 2. Deposit fill on both sides of modules at same time and to approximate same elevation.
  - 3. Prevent wedging action against structure by stepping or serrating slopes bounding or within area to be backfilled.

- 4. Do not disrupt or damage joint wrap from joints during backfilling.
- J. Excavation and fill shall be as specified in Section 31 00 00.
- K. Do not use storm water detention modules that are damaged, as determined by manufacturer.
- L. Final inspection shall be conducted by the manufacturer.

**END OF SECTION 334923**



# Madison Water Utility

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www.madisonwater.org • 119 East Olin Avenue • Madison, WI 53713-1431 • TEL 608-266-4651 • FAX 608.266.4644

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April 17, 2017

## NOTICE OF ADDENDUM

### ADDENDUM 1

### CONTRACT NO. 7936

Revise and amend the contract document(s) for the above project as stated in this addendum, otherwise, the original document shall remain in effect.

- Please see the attached documents for revisions to this contract.

Please acknowledge this addendum on page E1 of the contract documents and/or in Section E: Bidder's Acknowledgement on Bid Express.

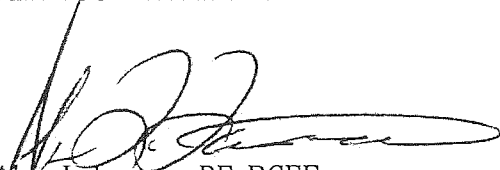
Electronic version of these documents can be found on the Bid Express web site at:

<http://www.bidexpress.com>

If you are unable to download plan revisions associated with the addendum, please contact the Engineering office at 608-266-4751 receive the material by another route.

Sincerely,

**MADISON WATER UTILITY**



Alan L. Larson, PE, BCEE  
Principal Engineer – Water



**Madison Water Utility,  
Storm Water Management  
Improvements,  
Bid Questions and Responses**



Project name: Stormwater Management Improvements

Project location: 115 S. Paterson St, Madison, WI

Mead & Hunt, Inc. Contact: Anne Anderson PE

Mead & Hunt Project Number: 3235300-131021.09

Mead & Hunt, Inc. phone: 608-443-0590

City of Madison Contract Number: 7936

Madison Project Number: 10442

Date: 4/12/17

**FOR DISTRIBUTION TO THE PLAN-HOLDERS FOR INFORMATIONAL PURPOSES:**

Questions:

- 1) Is it anticipated that all necessary dewatering will be discharged to the sanitary sewer? MMP states approval is needed for storm or sanitary, but contamination is concern for storm sewer – is there already a EC/Discharge permit that defines dewatering procedures for this site/project?

Response: Contractor is responsible for testing of the dewatering water to determine whether it is safe to discharge dewatering water to storm sewer. Sanitary sewer discharge requires a permit from the City of Madison and MMSD. Contractor is responsible for sanitary sewer discharge permits. Sump dewatering common to erosion control permits will be covered under the erosion control permit with the City of Madison. If dewatering exceeds the thresholds cited in the Dewatering specification section, additional permit may be required from the DNR. Contractor is also responsible to obtain a permit from Dane County Public Health for storm sewer discharge.

- 2) Does the City pay directly for the \$19/ton contaminated soil tipping fee or does the Contractor pay the landfill directly and include as part of bid item 2?

Response: The Contractor is responsible for all fees associated with removal, hauling and proper disposal of contaminated soils.

- 3) Bid Item 2 covers Class 1 contaminated soil – if Class 2 is discovered will that be paid under this item since specs handle both types essentially the same?

Response: Yes. Contractor may be asked to separate Class 1 versus Class II by visual evidence of non-native fill or native clay, respectively. The Owner will not be soliciting the services for field determination and classification of the contaminated soils. All excavated soil is considered contaminated and it is up to the Contractor to decide how they determine to sort the material. They can do it themselves or hire someone. If Contractors determine they would like to hire someone to help with the identification, they can do this.

- 4) Bid Item 3 is "Backfill of Over-Excavated Soils" – Could not find in specs what specifically this bid item covers?

Response: This bid item covers the additional material that would be required if unsuitable soils are encountered below structures and pavements beyond the base that is identified in the plans. Backfill material includes material cited in specifications.

Respectfully submitted,  
MEAD & HUNT, Inc.  
**Anne Anderson, PE**

**SECTION E: BIDDERS ACKNOWLEDGEMENT**

**MADISON WATER UTILITY  
STORM WATER MANAGEMENT IMPROVEMENTS  
115 S. PATERSON STREET  
CONTRACT NO. 7936**

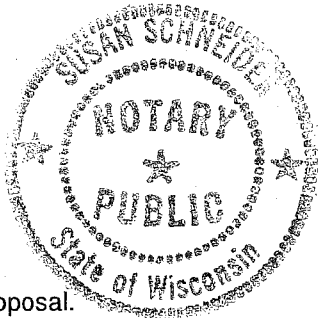
Bidder must state a Unit Price and Total Bid for each item. The Total Bid for each item must be the product of quantity, by Unit Price. The Grand Total must be the sum of the Total Bids for the various items. In case of multiplication errors or addition errors, the Grand Total with corrected multiplication and/or addition shall determine the Grand Total bid for each contract. The Unit Price and Total Bid must be entered numerically in the spaces provided. All words and numbers shall be written in ink.

1. The undersigned having familiarized himself/herself with the Contract documents, including Advertisement for Bids, Instructions to Bidders, Form of Proposal, City of Madison Standard Specifications for Public Works Construction - 2017 Edition thereto, Form of Agreement, Form of Bond, and Addenda issued and attached to the plans and specifications on file in the office of the City Engineer, hereby proposes to provide and furnish all the labor, materials, tools, and expendable equipment necessary to perform and complete in a workmanlike manner the specified construction on this project for the City of Madison; all in accordance with the plans and specifications as prepared by the City Engineer, including Addenda to the Contract Nos. 1 through \_\_\_\_\_ issued thereto, at the prices for said work as contained in this proposal. (Electronic bids submittals shall acknowledge addendum under Section E and shall not acknowledge here)
2. If awarded the Contract, we will initiate action within seven (7) days after notification or in accordance with the date specified in the contract to begin work and will proceed with diligence to bring the project to full completion within the number of work days allowed in the Contract or by the calendar date stated in the Contract.
3. The undersigned Bidder or Contractor certifies that he/she is not a party to any contract, combination in form of trust or otherwise, or conspiracy in restraint of trade or commerce or any other violation of the anti-trust laws of the State of Wisconsin or of the United States, with respect to this bid or contract or otherwise.
4. I hereby certify that I have met the Bid Bond Requirements as specified in Section 102.5. (IF BID BOND IS USED, IT SHALL BE SUBMITTED ON THE FORMS PROVIDED BY THE CITY. FAILURE TO DO SO MAY RESULT IN REJECTION OF THE BID).
5. I hereby certify that all statements herein are made on behalf of Miron Construction Co., Inc. (name of corporation, partnership, or person submitting bid) a corporation organized and existing under the laws of the State of Wisconsin a partnership consisting of \_\_\_\_\_; an individual trading as \_\_\_\_\_; of the City of \_\_\_\_\_ State of \_\_\_\_\_; that I have examined and carefully prepared this Proposal, from the plans and specifications and have checked the same in detail before submitting this Proposal; that I have fully authority to make such statements and submit this Proposal in (its, their) behalf; and that the said statements are true and correct.

David G. Voss, Jr.  
SIGNATURE  
David G. Voss, Jr. - President  
TITLE, IF ANY

Sworn and subscribed to before me this  
21st day of April, 2017  
Susan Schneider

(Notary Public or other officer authorized to administer oaths)  
My Commission Expires 6/8/18  
Bidders shall not add any conditions or qualifying statements to this Proposal.



## SECTION F: BEST VALUE CONTRACTING

### MADISON WATER UTILITY STORM WATER MANAGEMENT IMPROVEMENTS 115 S. PATERSON STREET CONTRACT NO. 7936

#### Best Value Contracting

1. The Contractor shall indicate the non-apprenticeable trades used on this contract.  

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2. Madison General Ordinance (M.G.O.), 33.07(7), does provide for some exemptions from the active apprentice requirement. Apprenticeable trades are those trades considered apprenticeable by the State of Wisconsin. Please check applicable box if you are seeking an exemption.
  - Contractor has a total skilled workforce of four or less individuals in all apprenticeable trades combined.
  - No available trade training program; The Contractor has been rejected by the only available trade training program, or there is no trade training program within 90 miles.
  - Contractor is not using an apprentice due to having a journey worker on layoff status, provided the journey worker was employed by the contractor in the past six months.
  - First-time Contractor on City of Madison Public Works contract requests a onetime exemption but intends to comply on all future contracts and is taking steps typical of a "good faith" effort.
  - Contractor has been in business less than one year.
  - Contractor doesn't have enough journeyman trade workers to qualify for a trade training program in that respective trade.
  - An exemption is granted in accordance with a time period of a "Documented Depression" as defined by the State of Wisconsin.
  
3. The Contractor shall indicate on the following section which apprenticeable trades are to be used on this contract. Compliance with active apprenticeship, to the extent required by M.G.O. 33.07(7), shall be satisfied by documentation from an applicable trade training body; an apprenticeship contract with the Wisconsin Department of Workforce Development or a similar agency in another state; or the U.S Department of Labor. This documentation is required prior to the Contractor beginning work on the project site.
  - The Contractor has reviewed the list and shall not use any apprenticeable trades on this project.

**LIST APPRENTICABLE TRADES** (check all that apply to your work to be performed on this contract)

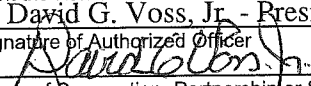
- BRICKLAYER
- CARPENTER
- CEMENT MASON / CONCRETE FINISHER
- CEMENT MASON (HEAVY HIGHWAY)
- CONSTRUCTION CRAFT LABORER
- DATA COMMUNICATION INSTALLER
- ELECTRICIAN
- ENVIRONMENTAL SYSTEMS TECHNICIAN / HVAC SERVICE TECH/HVAC INSTALL / SERVICE
- GLAZIER
- HEAVY EQUIPMENT OPERATOR / OPERATING ENGINEER
- INSULATION WORKER (HEAT & FROST)
- IRON WORKER
- IRON WORKER (ASSEMBLER, METAL BLDGS)
- PAINTER & DECORATOR
- PLASTERER
- PLUMBER
- RESIDENTIAL ELECTRICIAN
- ROOFER & WATER PROOFER
- SHEET METAL WORKER
- SPRINKLER FITTER
- STEAMFITTER
- STEAMFITTER (REFRIGERATION)
- STEAMFITTER (SERVICE)
- TAPER & FINISHER
- TELECOMMUNICATIONS (VOICE, DATA & VIDEO) INSTALLER-TECHNICIAN
- TILE SETTER



Madison Water Utility Storm Water Management Improvements  
Contract No. 7936

State of Wisconsin  
Department of Workforce Development  
Equal Rights Division  
Labor Standards Bureau

## Disclosure of Ownership

<p><b>Notice required under Section 15.04(1)(m), Wisconsin Statutes.</b> The statutory authority for the use of this form is prescribed in Sections 66.0903(12)(d) and 103.49(7)(d), Wisconsin Statutes. The use of this form is mandatory. The penalty for failing to complete this form is prescribed in Section 103.005(12), Wisconsin Statutes. Personal information you provide may be used for secondary purposes.</p>			
<p>(1) On the date a contractor submits a bid to or completes negotiations with a state agency or local governmental unit, on a project subject to Section 66.0903 or 103.49, Wisconsin Statutes, the contractor shall disclose to such state agency or local governmental unit the name of any "other construction business", which the contractor, or a shareholder, officer or partner of the contractor, owns or has owned within the preceding three (3) years.</p> <p>(2) The term "other construction business" means any business engaged in the erection, construction, remodeling, repairing, demolition, altering or painting and decorating of buildings, structures or facilities. It also means any business engaged in supplying mineral aggregate, or hauling excavated material or spoil as provided by Sections 66.0903(3), 103.49(2) and 103.50(2), Wisconsin Statutes.</p> <p>(3) This form must <b>ONLY</b> be filed, with the state agency or local governmental unit that will be awarding the contract, if <b>both (A) and (B) are met</b>.</p> <p>(A) The contractor, or a shareholder, officer or partner of the contractor:</p> <p style="margin-left: 20px;">(1) Owns at least a 25% interest in the "other construction business", indicated below, on the date the contractor submits a bid or completes negotiations.</p> <p style="margin-left: 20px;">(2) Or has owned at least a 25% interest in the "other construction business" at any time within the preceding three (3) years.</p> <p>(B) The Wisconsin Department of Workforce Development (DWD) has determined that the "other construction business" has failed to pay the prevailing wage rate or time and one-half the required hourly basic rate of pay, for hours worked in excess of the prevailing hours of labor, to any employee at any time within the preceding three (3) years.</p>			
<b>Other Construction Business</b>			
Not Applicable <input checked="" type="checkbox"/>			
Name of Business			
Street Address or P O Box	City	State	Zip Code
Name of Business			
Street Address or P O Box	City	State	Zip Code
Name of Business			
Street Address or P O Box	City	State	Zip Code
<p><b>I hereby state under penalty of perjury that the information, contained in this document, is true and accurate according to my knowledge and belief.</b></p>			
Print the Name of Authorized Officer David G. Voss, Jr. - President			
Signature of Authorized Officer 		Date Signed 4/21/17	
Name of Corporation, Partnership or Sole Proprietorship Miron Construction Co., Inc.			
Street Address or P O Box Neenah	City WI	State WI	Zip Code 54956

**If you have any questions call (608) 266-0028**

ERD-7777-E (R. 09/2003)

MADISON WATER UTILITY  
STORM WATER MANAGEMENT IMPROVEMENTS  
115 S. PATERSON STREET  
CONTRACT NO. 7936

Small Business Enterprise Compliance Report

This information may be submitted electronically through  
Bid Express or submitted with bid in sealed envelope.

Cover Sheet

Prime Bidder Information

Company: Miron Construction Co., Inc.  
Address: 1471 McMahan Dr., Neenah, WI 54956  
Telephone Number: 920-969-7000 Fax Number: 920-751-8150  
Contact Person/Title: David G. Voss, Jr. - President

Prime Bidder Certification

I, David G. Voss, Jr., President of  
Name Title  
Miron Construction Co., Inc. certify that the information  
Company

contained in this SBE Compliance Report is true and correct to the best of my knowledge and belief.

Susan Schneider  
Witness' Signature

4/21/17  
Date

David G. Voss, Jr.  
Bidder's Signature  
David G. Voss, Jr. - President



MADISON WATER UTILITY STORM WATER MANAGEMENT IMPROVEMENTS 115 S. PATERSON STREET  
CONTRACT NO. 7936  
DATE: 4/21/17

Miron Construction Co.,  
Inc.

Item	Quantity	Price	Extension
<b>Section B: Proposal Page</b>			
1.0 - Storm Water Management Improvements - LS	1.00	\$294,847.00	\$294,847.00
2.0 - Class I Contaminated Soil per Section 003126 Existing Hazardous Material Information and Section 312000 Earth Moving-Site - TONS	2620.00	\$31.81	\$83,342.20
3.0 - Backfill of Over-Excavated Soils - TONS	1000.00	\$18.51	\$18,510.00
<b>3 Items</b>	<b>Totals</b>		<b>\$396,699.20</b>

## SECTION G: BID BOND

KNOW ALL MEN BY THESE PRESENT, THAT Principal and Surety, as identified below, are held and firmly bound unto the City of Madison, (hereinafter referred to as the "Obligee"), in the sum of five per cent (5%) of the amount of the total bid or bids of the Principal herein accepted by the Obligee, for the payment of which the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

The conditions of this obligation are such that, whereas the Principal has submitted, to the City of Madison a certain bid, including the related alternate, and substitute bids attached hereto and hereby made a part hereof, to enter into a contract in writing for the construction of:

**MADISON WATER UTILITY  
STORM WATER MANAGEMENT IMPROVEMENTS  
115 S. PATERSON STREET  
CONTRACT NO. 7936**

Madison, Wisconsin.

1. If said bid is rejected by the Obligee, then this obligation shall be void.
2. If said bid is accepted by the Obligee and the Principal shall execute and deliver a contract in the form specified by the Obligee (properly completed in accordance with said bid) and shall furnish a bond for his/her faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said bid, then this obligation shall be void.

If said bid is accepted by the Obligee and the Principal shall fail to execute and deliver the contract and the performance and payment bond noted in 2. above executed by this Surety, or other Surety approved by the City of Madison, all within the time specified or any extension thereof, the Principal and Surety agree jointly and severally to forfeit to the Obligee as liquidated damages the sum mentioned above, it being understood that the liability of the Surety for any and all claims hereunder shall in no event exceed the sum of this obligation as stated, and it is further understood that the Principal and Surety reserve the right to recover from the Obligee that portion of the forfeited sum which exceed the actual liquidated damages incurred by the Obligee.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by an extension of the time within which the Obligee may accept such bid, and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, on the day and year set forth below.

Seal PRINCIPAL

MIRON CONSTRUCTION CO., INC.

Name of Principal

By

David G. Voss, Jr. - President  
Name and Title

4/21/17  
Date

Seal SURETY

FIDELITY AND DEPOSIT COMPANY OF MARYLAND

Name of Surety

By

Kelly Cody, Attorney-in-Fact  
Name and Title

4/21/17  
Date

This certifies that I have been duly licensed as an agent for the above company in Wisconsin under National Provider No. 7835807 for the year 2017, and appointed as attorney in fact with authority to execute this bid bond and the payment and performance bond referred to above, which power of attorney has not been revoked.

4/21/17  
Date

Aon Risk Services Central, Inc.

Kelly Cody

Agent Signature

111 N. Washington Street, Suite 300

Address

Green Bay, WI 54305-3004

City, State and Zip Code

800-437-0555

Telephone Number

#### NOTE TO SURETY & PRINCIPAL

The bid submitted which this bond guarantees shall be rejected if the following instrument is not attached to this bond:

Power of Attorney showing that the agent of Surety is currently authorized to execute bonds on behalf of the Surety, and in the amounts referenced above.

**ZURICH AMERICAN INSURANCE COMPANY  
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY  
FIDELITY AND DEPOSIT COMPANY OF MARYLAND  
POWER OF ATTORNEY**

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Maryland, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Maryland (herein collectively called the "Companies"), by **MICHAEL BOND, Vice President**, in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **Kelly CODY, Roxanne JENSEN, Trudy A. SZALEWSKI, Christopher H. KONDRICK, Brian KRAUSE and Christopher K. HOVDEN, all of Green Bay, Wisconsin, EACH** its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings**, and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND, this 23rd day of September, A.D. 2016.

ATTEST:

**ZURICH AMERICAN INSURANCE COMPANY  
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY  
FIDELITY AND DEPOSIT COMPANY OF MARYLAND**



*Eric D. Barnes*

By: \_\_\_\_\_

*Secretary  
Eric D. Barnes*

*Michael Bond*

*Vice President  
Michael Bond*

State of Maryland  
County of Baltimore

On this 23rd day of September, A.D. 2016, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **MICHAEL BOND, Vice President, and ERIC D. BARNES, Secretary**, of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, deposeth and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.

*Constance A. Dunn*



Constance A. Dunn, Notary Public  
My Commission Expires: July 9, 2019

EXTRACT FROM BY-LAWS OF THE COMPANIES

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify or revoke any such appointment or authority at any time."

CERTIFICATE

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed."

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this 21st day of April, 2012.



Gerald F. Haley

Gerald F. Haley, Vice President

TO REPORT A CLAIM WITH REGARD TO A SURETY BOND, PLEASE SUBMIT ALL REQUIRED INFORMATION TO:

Zurich American Insurance Co.  
Attn: Surety Claims  
1299 Zurich Way  
Schaumburg, IL 60196-1056



## SECTION H: AGREEMENT

THIS AGREEMENT made this 17<sup>th</sup> day of MAY in the year Two Thousand and Seventeen between MIRON CONSTRUCTION CO., INC. hereinafter called the Contractor, and the City of Madison, Wisconsin, hereinafter called the City.

WHEREAS, the Common Council of the said City of Madison under the provisions of a resolution adopted MAY 16, 2017, and by virtue of authority vested in the said Council, has awarded to the Contractor the work of performing certain construction.

NOW, THEREFORE, the Contractor and the City, for the consideration hereinafter named, agree as follows:

1. **Scope of Work.** The Contractor shall, perform the construction, execution and completion of the following listed complete work or improvement in full compliance with the Plans, Specifications, Standard Specifications, Supplemental Specifications, Special Provisions and contract; perform all items of work covered or stipulated in the proposal; perform all altered or extra work; and shall furnish, unless otherwise provided in the contract, all materials, implements, machinery, equipment, tools, supplies, transportation, and labor necessary to the prosecution and completion of the work or improvements:

**MADISON WATER UTILITY  
STORM WATER MANAGEMENT IMPROVEMENTS  
115 S. PATERSON STREET  
CONTRACT NO. 7936**

2. **Completion Date/Contract Time.** Construction work must begin within seven (7) calendar days after the date appearing on mailed written notice to do so shall have been sent to the Contractor and shall be carried on at a rate so as to secure full completion SEE SPECIAL PROVISIONS, the rate of progress and the time of completion being essential conditions of this Agreement.
3. **Contract Price.** The City shall pay to the Contractor at the times, in the manner and on the conditions set forth in said specifications, the sum of THREE HUNDRED NINETY-SIX THOUSAND SIX HUNDRED NINETY-NINE AND 20/100 (\$396,699.20) Dollars being the amount bid by such Contractor and which was awarded to him/her as provided by law.
4. **Affirmative Action.** In the performance of the services under this Agreement the Contractor agrees not to discriminate against any employee or applicant because of race, religion, marital status, age, color, sex, disability, national origin or ancestry, income level or source of income, arrest record or conviction record, less than honorable discharge, physical appearance, sexual orientation, gender identity, political beliefs, or student status. The Contractor further agrees not to discriminate against any subcontractor or person who offers to subcontract on this contract because of race, religion, color, age, disability, sex, sexual orientation, gender identity or national origin.

The Contractor agrees that within thirty (30) days after the effective date of this agreement, the Contractor will provide to the City Affirmative Action Division certain workforce utilization statistics, using a form to be furnished by the City.

If the contract is still in effect, or if the City enters into a new agreement with the Contractor, within one year after the date on which the form was required to be provided, the Contractor will provide updated workforce information using a second form, also to be furnished by the City. The second form will be submitted to the City Affirmative Action Division no later than one year after the date on which the first form was required to be provided.

The Contractor further agrees that, for at least twelve (12) months after the effective date of this contract, it will notify the City Affirmative Action Division of each of its job openings at facilities in Dane County for which applicants not already employees of the Contractor are to be considered.

The notice will include a job description, classification, qualifications and application procedures and deadlines. The Contractor agrees to interview and consider candidates referred by the Affirmative Action Division if the candidate meets the minimum qualification standards established by the Contractor, and if the referral is timely. A referral is timely if it is received by the Contractor on or before the date started in the notice.

#### Articles of Agreement

##### Article I

The Contractor shall take affirmative action in accordance with the provisions of this contract to insure that applicants are employed, and that employees are treated during employment without regard to race, religion, color, age, marital status, disability, sex, sexual orientation, gender identity or national origin and that the employer shall provide harassment free work environment for the realization of the potential of each employee. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation and selection for training including apprenticeship insofar as it is within the control of the Contractor. The Contractor agrees to post in conspicuous places available to employees and applicants notices to be provided by the City setting out the provisions of the nondiscrimination clauses in this contract.

##### Article II

The Contractor shall in all solicitations or advertisements for employees placed by or on behalf of the Contractors state that all qualified or qualifiable applicants will be employed without regard to race, religion, color, age, marital status, disability, sex, sexual orientation, gender identity or national origin.

##### Article III

The Contractor shall send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding a notice to be provided by the City advising the labor union or worker's representative of the Contractor's equal employment opportunity and affirmative action commitments. Such notices shall be posted in conspicuous places available to employees and applicants for employment.

##### Article V

The Contractor agrees that it will comply with all provisions of the Affirmative Action Ordinance of the City of Madison, including the contract compliance requirements. The Contractor agrees to submit the model affirmative action plan for public works contractors in a form approved by the Affirmative Action Division Manager.

##### Article VI

The Contractor will maintain records as required by Section 39.02(9)(f) of the Madison General Ordinances and will provide the City Affirmative Action Division with access to such records and to persons who have relevant and necessary information, as provided in Section 39.02(9)(f). The City agrees to keep all such records confidential, except to the extent that public inspection is required by law.

##### Article VII

In the event of the Contractor's or subcontractor's failure to comply with the Equal Employment Opportunity and Affirmative Action Provisions of this contract or Section 39.03 and 39.02 of the Madison General Ordinances, it is agreed that the City at its option may do any or all of the following:

1. Cancel, terminate or suspend this Contract in whole or in part.
2. Declare the Contractor ineligible for further City contracts until the Affirmative Action requirements are met.
3. Recover on behalf of the City from the prime Contractor 0.5 percent of the contract award price for each week that such party fails or refuses to comply, in the nature of liquidated damages, but not to exceed a total of five percent (5%) of the contract price, or five thousand dollars (\$5,000), whichever is less. Under public works contracts, if a subcontractor is in noncompliance, the City may recover liquidated damages from the prime Contractor in the manner described above. The preceding sentence shall not be construed to prohibit a prime Contractor from recovering the amount of such damage from the non-complying subcontractor.

#### Article VIII

The Contractor shall include the above provisions of this contract in every subcontract so that such provisions will be binding upon each subcontractor. The Contractor shall take such action with respect to any subcontractor as necessary to enforce such provisions, including sanctions provided for noncompliance.

#### Article IX

The Contractor shall allow the maximum feasible opportunity to small business enterprises to compete for any subcontracts entered into pursuant to this contract. (In federally funded contracts the terms "DBE, MBE and WBE" shall be substituted for the term "small business" in this Article.)

5. Substance Abuse Prevention Program Required. Prior to commencing work on the Contract, the Contractor, and any Subcontractor, shall have in place a written program for the prevention of substance abuse among its employees as required under Wis. Stat. Sec. 103.503.
6. **Contractor Hiring Practices.**

#### **Ban the Box - Arrest and Criminal Background Checks. (Sec. 39.08, MGO)**

This provision applies to all prime contractors on contracts entered into on or after January 1, 2016, and all subcontractors who are required to meet prequalification requirements under MGO 33.07(7)(I), MGO as of the first time they seek or renew pre-qualification status on or after January 1, 2016. The City will monitor compliance of subcontractors through the pre-qualification process.

- a. **Definitions.** For purposes of this section, "Arrest and Conviction Record" includes, but is not limited to, information indicating that a person has been questioned, apprehended, taken into custody or detention, held for investigation, arrested, charged with, indicted or tried for any felony, misdemeanor or other offense pursuant to any law enforcement or military authority.

"Conviction record" includes, but is not limited to, information indicating that a person has been convicted of a felony, misdemeanor or other offense, placed on probation, fined, imprisoned or paroled pursuant to any law enforcement or military authority.

"Background Check" means the process of checking an applicant's arrest and conviction record, through any means.

- b. **Requirements.** For the duration of this Contract, the Contractor shall:
  1. Remove from all job application forms any questions, check boxes, or other inquiries regarding an applicant's arrest and conviction record, as defined herein.

2. Refrain from asking an applicant in any manner about their arrest or conviction record until after conditional offer of employment is made to the applicant in question.
3. Refrain from conducting a formal or informal background check or making any other inquiry using any privately or publicly available means of obtaining the arrest or conviction record of an applicant until after a conditional offer of employment is made to the applicant in question.
4. Make information about this ordinance available to applicants and existing employees, and post notices in prominent locations at the workplace with information about the ordinance and complaint procedure using language provided by the City.
5. Comply with all other provisions of Sec. 39.08, MGO.

**c. Exemptions:** This section shall not apply when:

1. Hiring for a position where certain convictions or violations are a bar to employment in that position under applicable law, or
2. Hiring a position for which information about criminal or arrest record, or a background check is required by law to be performed at a time or in a manner that would otherwise be prohibited by this ordinance, including a licensed trade or profession where the licensing authority explicitly authorizes or requires the inquiry in question.

To be exempt, Contractor has the burden of demonstrating that there is an applicable law or regulation that requires the hiring practice in question, if so, the contractor is exempt from all of the requirements of this ordinance for the position(s) in question.

**MADISON WATER UTILITY  
STORM WATER MANAGEMENT IMPROVEMENTS  
115 S. PATERSON STREET  
CONTRACT NO. 7936**

IN WITNESS WHEREOF, the Contractor has hereunto set his/her hand and seal and the City has caused these presents to be sealed with its corporate seal and to be subscribed by its Mayor and City Clerk the day and year first above written.

Countersigned:

**MIRON CONSTRUCTION CO., INC.**

<p><u>Christy Young</u> <u>5/16/17</u> Witness Date</p> <p><u>Maureen K. Mayer</u> <u>5.16.17</u> Witness Date</p>	<p>Company Name _____</p> <p><u>David G. Voss, Jr.</u> <u>5/16/17</u> President Date</p> <p><u>Dean J. Basten</u> <u>5/15/17</u> Secretary Date</p>
--	---

CITY OF MADISON, WISCONSIN

Provisions have been made to pay the liability that will accrue under this contract.

Approved as to form:

<p><u>[Signature]</u> Finance Director</p> <p>Signed this <u>27th</u> day of <u>June</u> 20<u>17</u></p> <p><u>[Signature]</u> Witness</p> <p><u>[Signature]</u> Witness</p>	<p><u>[Signature]</u> City Attorney</p> <p><u>[Signature]</u> <u>27 June 2017</u> Mayor Date</p> <p><u>Maibeth Witzel-Bell</u> <u>5-22-2017</u> City Clerk Date</p>
--	---

SECTION 1: PAYMENT AND PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that we MIRON CONSTRUCTION CO., INC. as principal, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND Company of Schaumburg, IL as surety, are held and firmly bound unto the City of Madison, Wisconsin, in the sum of THREE HUNDRED NINETY-SIX THOUSAND SIX HUNDRED NINETY-NINE AND 20/100 (\$396,699.20) Dollars, lawful money of the United States, for the payment of which sum to the City of Madison, we hereby bind ourselves and our respective executors and administrators firmly by these presents.

The condition of this Bond is such that if the above bounden shall on his/her part fully and faithfully perform all of the terms of the Contract entered into between him/herself and the City of Madison for the construction of:

MADISON WATER UTILITY  
STORM WATER MANAGEMENT IMPROVEMENTS  
115 S. PATERSON STREET

Madison, Wisconsin.

CONTRACT NO. 7936 (City of Madison - Storm Water Management, Miron Project #170670; Contract No. 7936)

in Madison, Wisconsin, and shall pay all claims for labor performed and material furnished in the prosecution of said work, and save the City harmless from all claims for damages because of negligence in the prosecution of said work, and shall save harmless the said City from all claims for compensation (under Chapter 102, Wisconsin Statutes) of employees and employees of subcontractor, then this Bond is to be void, otherwise of full force, virtue and effect.

Signed and sealed this 17th day of May, 2017

Countersigned:

Christy Young  
Witness

MIRON CONSTRUCTION CO., INC.

Company Name (Principal)

David G. Voss, Jr.  
President David G. Voss, Jr. Seal

Dean J. Basten  
Secretary Dean J. Basten

Approved as to form:

[Signature]  
City Attorney

FIDELITY AND DEPOSIT COMPANY OF MARYLAND

Surety Seal

Salary Employee  Commission

By [Signature]  
Attorney-in-Fact Kelly Cody

This certifies that I have been duly licensed as an agent for the above company in Wisconsin under National Producer Number 7835807 for the year 2017 and appointed as attorney-in-fact with authority to execute this payment and performance bond which power of attorney has not been revoked.

5/17/17  
Date

[Signature]  
Agent Signature Kelly Cody

**ZURICH AMERICAN INSURANCE COMPANY  
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY  
FIDELITY AND DEPOSIT COMPANY OF MARYLAND  
POWER OF ATTORNEY**

KNOW ALL MEN BY THESE PRESENTS: That the ZURICH AMERICAN INSURANCE COMPANY, a corporation of the State of New York, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, a corporation of the State of Maryland, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND a corporation of the State of Maryland (herein collectively called the "Companies"), by **MICHAEL BOND, Vice President**, in pursuance of authority granted by Article V, Section 8, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, do hereby nominate, constitute, and appoint **Kelly CODY, Roxanne JENSEN, Trudy A. SZALEWSKI, Christopher H. KONDRICK, Brian KRAUSE and Christopher K. HOVDEN, all of Green Bay, Wisconsin, EACH** its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings**, and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the ZURICH AMERICAN INSURANCE COMPANY at its office in New York, New York., the regularly elected officers of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at its office in Owings Mills, Maryland., and the regularly elected officers of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at its office in Owings Mills, Maryland., in their own proper persons.

The said Vice President does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article V, Section 8, of the By-Laws of said Companies, and is now in force.

IN WITNESS WHEREOF, the said Vice-President has hereunto subscribed his/her names and affixed the Corporate Seals of the said **ZURICH AMERICAN INSURANCE COMPANY, COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and FIDELITY AND DEPOSIT COMPANY OF MARYLAND**, this 23rd day of September, A.D. 2016.

**ATTEST:**

**ZURICH AMERICAN INSURANCE COMPANY  
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY  
FIDELITY AND DEPOSIT COMPANY OF MARYLAND**



By: *Eric D. Barnes*  
*Secretary*  
*Eric D. Barnes*

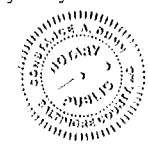
*Michael Bond*  
*Vice President*  
*Michael Bond*

State of Maryland  
County of Baltimore

On this 23rd day of September, A.D. 2016, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, **MICHAEL BOND, Vice President, and ERIC D. BARNES, Secretary**, of the Companies, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and acknowledged the execution of same, and being by me duly sworn, depose and saith, that he/she is the said officer of the Company aforesaid, and that the seals affixed to the preceding instrument are the Corporate Seals of said Companies, and that the said Corporate Seals and the signature as such officer were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.

*Constance A. Dunn*



Constance A. Dunn, Notary Public  
My Commission Expires: July 9, 2019

**EXTRACT FROM BY-LAWS OF THE COMPANIES**

"Article V, Section 8, Attorneys-in-Fact. The Chief Executive Officer, the President, or any Executive Vice President or Vice President may, by written instrument under the attested corporate seal, appoint attorneys-in-fact with authority to execute bonds, policies, recognizances, stipulations, undertakings, or other like instruments on behalf of the Company, and may authorize any officer or any such attorney-in-fact to affix the corporate seal thereto; and may with or without cause modify or revoke any such appointment or authority at any time."

**CERTIFICATE**

I, the undersigned, Vice President of the ZURICH AMERICAN INSURANCE COMPANY, the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, and the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that Article V, Section 8, of the By-Laws of the Companies is still in force.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the ZURICH AMERICAN INSURANCE COMPANY at a meeting duly called and held on the 15th day of December 1998.

RESOLVED: "That the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the Seal of the Company may be affixed by facsimile on any Power of Attorney...Any such Power or any certificate thereof bearing such facsimile signature and seal shall be valid and binding on the Company."

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY at a meeting duly called and held on the 5th day of May, 1994, and the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seals of the said Companies, this 17th day of May, 2017.



*Gerald F. Haley*

Gerald F. Haley, Vice President

**TO REPORT A CLAIM WITH REGARD TO A SURETY BOND, PLEASE SUBMIT ALL REQUIRED INFORMATION TO:**

Zurich American Insurance Co.  
Attn: Surety Claims  
1299 Zurich Way  
Schaumburg, IL 60196-1056



Mead  
& Hunt



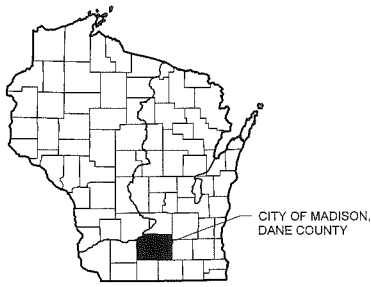
# Utility Sent

**Mead & Hunt**  
 Mead & Hunt, Inc.  
 2440 Deming Way  
 Middleton, WI 53562  
 phone: 608-273-6380  
 meadhunt.com

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**STATE MAP:**



STATE OF WISCONSIN

**VICINITY MAP:**



**City of Madison Water Utility**  
**Storm Water Management Improvements**  
 Contract No. 7936, Project No. 10442  
 Madison, Wisconsin

ISSUED

MAH NO.: 3235300-131021.02  
 DATE: March 24, 2017  
 DESIGNED BY: ACA  
 DRAWN BY: ACA  
 CHECKED BY: RCL

DO NOT SCALE DRAWINGS

SHEET CONTENTS  
 COVER SHEET

SHEET NO.:

**G-001**

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## City of Madison Water Utility Storm Water Management Improvements

Contract No. 7936, Project No. 10442  
Madison, Wisconsin

ISSUED

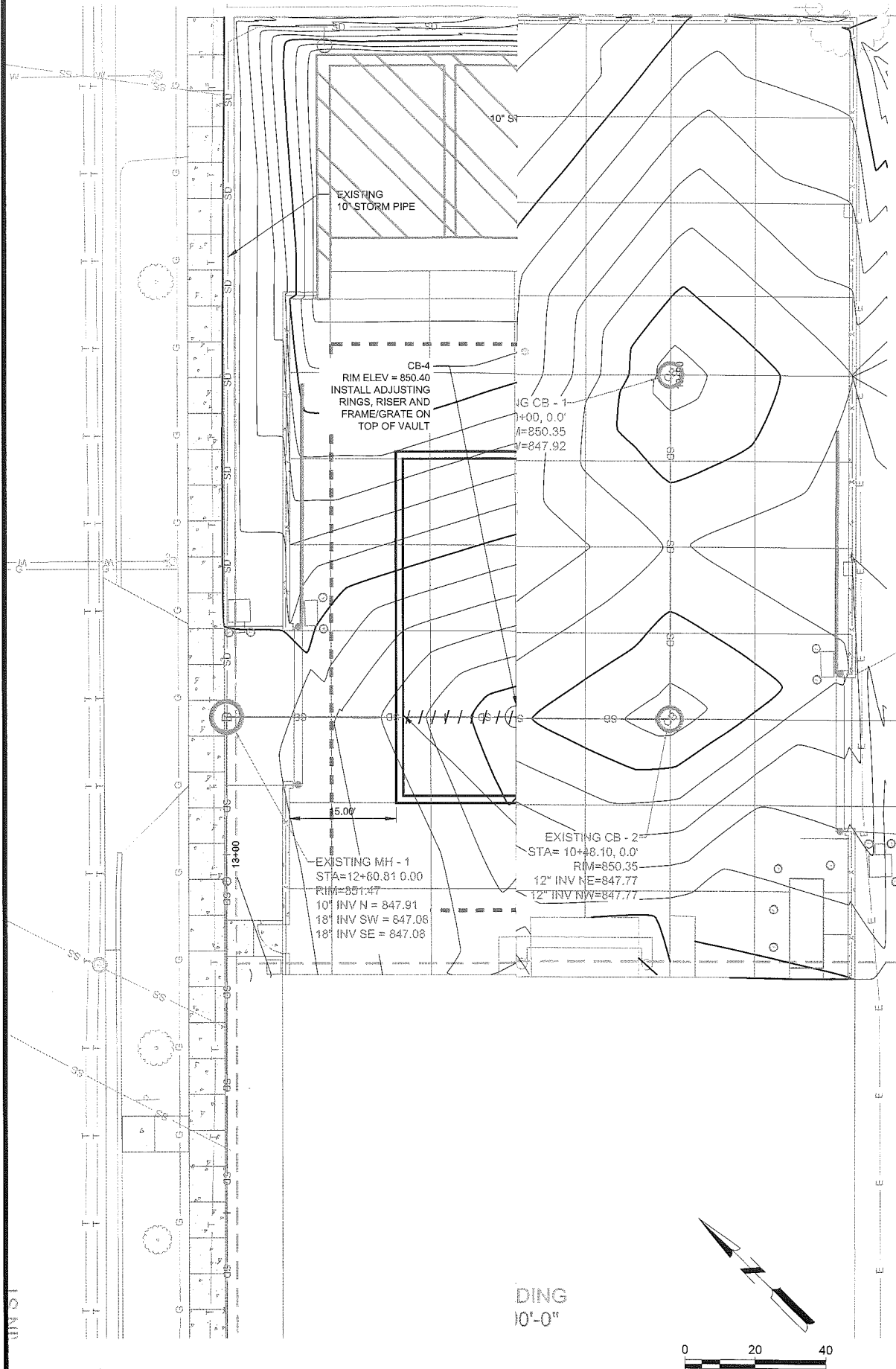
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DATE: March 24, 2017  
DESIGNED BY: ACA  
DRAWN BY: ACA  
CHECKED BY: RL  
DO NOT SCALE DRAWINGS

SHEET CONTENTS  
SITE UTILITY PLAN

SHEET NO.

# C-141

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City of Madison Water Utility  
Storm Water Management Improvements  
Contract No. 7936, Project No. 10442  
Madison, Wisconsin

ISSUED

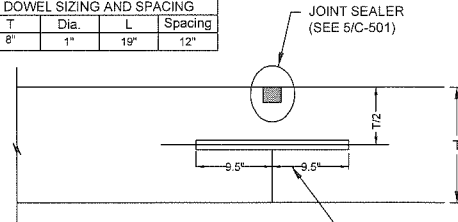
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DATE: March 24, 2017  
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CHECKED BY: RL  
DO NOT SCALE DRAWINGS

SHEET CONTENTS  
DETAILS

SHEET NO.

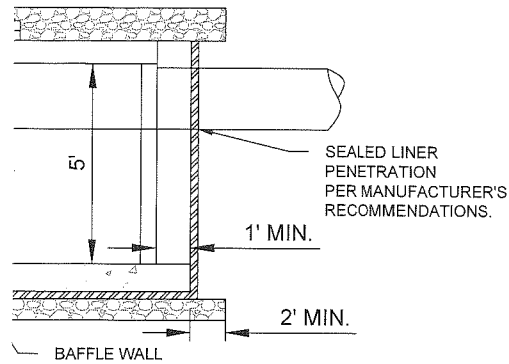
## C-501

DOWEL SIZING AND SPACING			
T	Dia.	L	Spacing
6"	1"	19"	12"



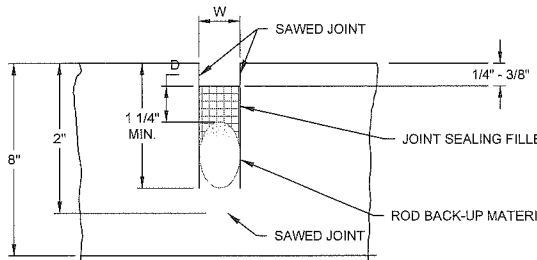
EPOXY-COATED & OILED SMOOTH STEEL DOWELS, LENGTH, SIZE AND SPACING SPECIFIED IN TABLE, DOWEL BOTH WAYS. (NOTE: PAINTED AND OILED CAN SUBSTITUTE FOR EPOXY COATED AND OILED.)

NOTE:  
T=THICKNESS OF CONCRETE PAVEMENT.



### 6 TYPICAL CONTRACTION JOINT DETAIL

NOT TO SCALE

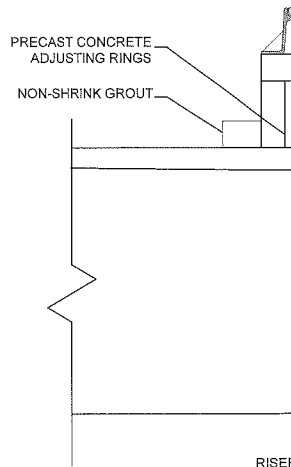


- NOTES:
- SEALANT RESERVOIR SIZED TO PROVIDE PROPOSED SHAPE FACTOR W/D AS RECOMMENDED BY THE SEALANT MANUFACTURER FOR OPTIMUM PERFORMANCE.
  - ROD BACKUP MATERIAL SHALL BE COMPATIBLE WITH THE TYPE OF SEALANT USED AND SIZED TO PROVIDE THE ADEQUATE SHAPE FACTOR.

### 5 TYPICAL CONTRACTION JOINT MATERIAL D

NOT TO SCALE

MANHOLE CASTING NF R-1524 OR R-1550 WITH TYPE B NON ROCKING LID. NF 1653A CAN BE SUBSTITUTED FOR A FLATTOP STRUCTURE. FOR CATCH BASIN, REUSE EXISTING CASTING.



ASTM C-478-95a  
ASTM D-4101-95b  
AASHTO M-199  
ASTM A-615



### 4 STAIR DETAIL

NOT TO SCALE

### 3 RIS

NOT TO SCALE