PASCO COUNTY FLORIDA
OPEN SPACES. VIBRANT PLACES.

July 15, 2026

Mr. Nate Senn, Environmental Administrator
Florida Department of Environmental Protection – Siting Section

Re: Request for Amendment to Authorize One-Time Pilot Test of WTE Bottom Ash as a Kiln Feed Ingredient

Mr. Senn,

The Pasco County Solid Waste and Resource Recovery Department has continued to partner with the University of Florida (UF), and CEMEX Construction Materials, Florida, LLC (CEMEX), to explore the use of Waste-to-Energy (WTE) combustion ash as a kiln feed ingredient in cement production. We thank you for the Department's assistance last year in approving a one-time authorization to utilize approximately 1,000 tons of ash as an ingredient in the CEMEX kiln located in Brooksville. The results of last year's trial were successful, with no adverse effects being observed either on kiln operation or on the quality of the cement produced. Accordingly, Pasco County and CEMEX would like to conduct another trial utilizing approximately 4,000 tons of ash with the intent of allowing UF researchers to collect data in support of the development of a Beneficial Use Demonstration for submittal to the Department. The scope of the proposed work is outlined below:

Approximately 10,000 tons of WTE ash from the Pasco County Resource Recovery Facility (RRF) has been stockpiled and aged on site of the existing ash monofill at the Pasco County RRF (14230 Hays Rd, Spring Hill, FL 34610). The ash will be processed on the monofil with advanced screening and metal recovery equipment in compliance with the existing, approved Landfill Operations Plan. The equipment will produce an aggregate that is generally metal-free and has the size segregation properties desired by CEMEX (> 4 mm, < 50 mm). The recovered metal will be sold on the scrap metal market (just as the metal that is currently recovered in the Ash Processing Building is), and the reject ash (< 4 mm, > 50 mm) will be worked back into the monofil. Approximately 2,000 tons of the usable aggregate will be used in the Beneficial Use Demonstration.

Long-term use of the ash as an ingredient in the CEMEX kiln requires more ash than the Pasco County RRF can generate on a short-term basis. As such, it is desirable to augment the daily ash production with landfilled ash. To evaluate the potential for such a scenario, Pasco County intends to excavate approximately 3,000 tons of legacy ash from the A1 cell of the monofil that was placed between 1991

and 1996. This excavated ash will be processed with the same equipment described above resulting in approximately 2,000 tons of additionally generated aggregate for use and evaluation in the CEMEX kiln. **Attachment A** to this correspondence is a Temporary Supplemental Landfill Operations Procedure describing the activities that will be undertaken to preserve the integrity of the existing environmental protection measures such as the landfill cover, drainage, bottom liner, leachate collection, and stormwater controls.

Following transportation to the CEMEX site, the ash/aggregate will be stored in a permitted, covered storage area prior to being introduced to the kiln as a raw ingredient. This trial will involve incorporating multiple replacement percentages of WTE ash, with a maximum of approximately 10% by mass of traditional materials. We expect this trial to last up to three weeks, and it may extend into a fourth. Care will be taken to minimize the amount of time between the delivery of the ash to CEMEX and its incorporation into cement production. Representatives from CEMEX have also been in contact with the FDEP Air Permitting Division to notify them of this trial. Because the finer fraction of the ash (< 4 mm) will have been removed by the processing equipment, fugitive ash emissions are not expected to create a concern, but will nonetheless be controlled as already required by Specific Condition C.1 of Title V Permit No. 1010056-015-AV. All transportation from Pasco County to CEMEX will be in tarped vehicles.

Clinker and cement products created during this trial will be extensively tested for their physical and environmental performance in reference to a control cement product containing no WTE ash, as described in the Sampling and Testing plan prepared by the University of Florida and included as **Attachment B** to this correspondence. Following completion of the Testing and Sampling Plan, the UF research team will prepare a Beneficial Use Demonstration request for the approval of recycling and reuse of the above referenced ash materials under the provisions of Section 403.7045(5), Florida Statutes (F.S.).

We see the successful execution of this trial and the data generated from it as critical to advancing WTE ash reuse in Florida. UF has previously performed similar trials with Miami-Dade County, and with Argos Cement. A report summarizing results was provided to the Department for the Miami project; this report indicated no increased direct exposure or leaching risk associated with WTE Bottom Ash incorporated into cement production.

To date, we have engaged in limited informal discussion with the Department regarding the execution of this project. Accordingly, we are writing this memo to formally notify the Department of our efforts and to request permission to execute this trial as described above. UF researchers will be the technical lead on this project. Pasco County and UF are happy to provide any additional details requested by the Department in reference to this project.

Thank you for your attention to the topic of WTE ash reuse in Pasco County. We look forward to discussing any concerns or needs with the Department in order secure formal permission to execute this trial. Should you have any questions concerning this submittal, please contact Mr. Jason Gorrie at (813) 220-0653.

Sincerely,

Kevin Pliska Digitally signed by Kevin Pliska
Date: 2026.07.16 12:47:51 -04'00'

Kevin Pliska,
Solid Waste Director

ATTACHMENT A

Temporary Supplemental Landfill Operations Procedure

SUPPLEMENTAL LANDFILL OPERATIONS PLAN PROCUDURE
Temporary Relocation of Ash From Disposal Cell A1 to Disposal Cell A4

Background

In 2014, the FDEP authorized the conditional use of ash generated by the PCRRF as a road construction material (roadbase, asphalt aggregate, and concrete aggregate). A subsequent amendment to the authorization in 2019 authorized the use of ash in multi-use paths and beneath structures (building slabs). Since receiving approval, the County has utilized the ash in a number of roadways and structures on the campus of the Resource Recovery Facility. A handful of projects beyond the confines of the Resource Recovery Facility have been explored but were eventually removed from consideration out of concern for violating the conditions of the FDEP approval.

In 2024, an opportunity to utilize ash as a cement kiln feed ingredient in a CEMEX kiln located in Brooksville was identified. Throughout the first quarter of 2025, the County processed approximately 5,000 tons of ash as currently authorized by Sections 6.5 (Engineered Aggregate Processing) and 15.0 (Ash Monofill Ferrous and Non-Ferrous Metals Processing). The resultant aggregate was transported to CEMEX for a week-long kiln trial through the authority of Amendment Request No. AM25-307 to the Pasco County Conditions of Certification associated with Power Plant Certification No. PA87-23.

Given the positive results of the 2025 kiln trial, Pasco County and CEMEX plan to conduct a 2nd kiln trial utilizing legacy ash excavated from disposal cell A1. The purpose of this Supplemental Procedure is to describe the activities that will be undertaken to preserve the integrity of the existing environmental protection measures such as the landfill cover, drainage, bottom liner, leachate collection, and stormwater controls.

Waste Disturbance

In order to conduct a meaningful kiln trial, CEMEX anticipates a need for approximately 500 tons of ash. The ash must be processed to remove residual metal and to generate the appropriate size fraction needed by the kiln. The metals recovery process described in Section 15 of the current Landfill Operations Plan will be temporarily augmented through the use of an advanced metal recovery system operated on a temporary basis by Blue Phoenix USA, Inc. to process approximately 3,000[1] tons of ash excavated from disposal Cell A1.

Figure 1 depicts the approximate area of disposal cell A1 that will be used to excavate the ash. The area has been intentionally selected to create no impact to existing landfill sideslopes and to provide ample buffer from the leachate collection and liner system. The existing temporary cover will be removed and the ash will be excavated with 3:1 sideslopes. The 1,500 ft^2 excavation area will generate approximately 2,800 yd^3 of ash. **Figure 2** depicts the haul route for moving the excavated ash to the Blue Phoenix processing activity.

[1] The size gradation required by CEMEX necessitates the processing of 3,000 tons to generate 500 tons of usable aggregate.

Leachate Control

The location and geometry of the excavation area will not cause or contribute to any leachate leakage from the landfill. The existing temporary rain cover will remain in place for the remainder of the A1 disposal cell, thus limiting rainwater contact with ash to the excavated area only. Further, the temporary cover will only be removed where active excavation is taking place. Any leachate generated will drain to the existing leachate collection system and be managed as described in the Landfill Operations Plan. Protective measures will be undertaken to protect the remaining cover from the excavation and hauling vehicles. Lastly, Paco County will utilize an existing on-demand contract with Comanco to restore the temporary rain cover as excavation progresses.

Stormwater Control

The location and geometry of the excavation area will not cause or contribute to any uncontrolled stormwater. No existing stormwater swales or structures will be impacted and no additional impervious area will be generated.

Landfill Gas Control

The location and geometry of the excavation area will not cause or contribute to any landfill gas releases from the landfill. No putrescible waste has ever been placed in disposal cell A1.

Dust Control

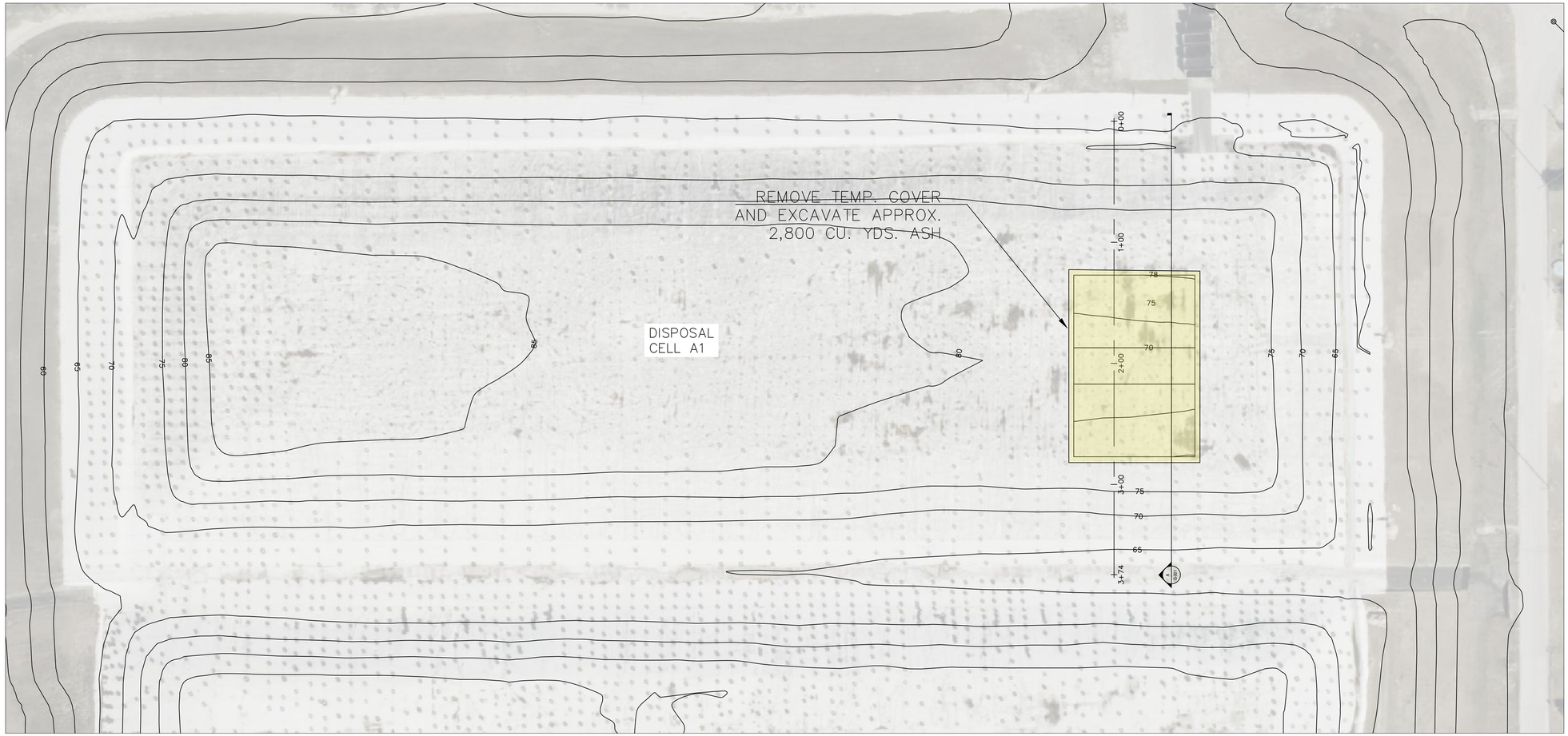
Given the hydrophilic nature of the ash, as well past experience with handling ash, it is not anticipated that the excavation activity will generate dusting conditions. Nonetheless, if dusting is encountered, water sprays will be deployed to prevent migration of fugitive ash.

Waste Characterization

Multiple hazardous waste determinations have been conducted on the ash placed in all four disposal cells, including A1, throughout the life of the landfill. All determinations have concluded that the ash is a non-hazardous waste. To verify the validity of the previous determinations, a sample of the legacy ash in the A1 disposal cell was obtained, subjected to TCLP extraction, and sampled for RCRA metals. The results of this sampling event are included as **Attachment A** to the Supplemental Procedure.

Restoration of Excavated Area

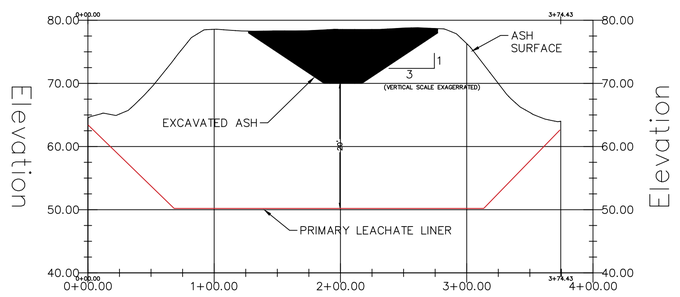
Once the excavated ash has been processed by Blue Phoenix, the fraction that is not sent to the CEMEX kiln will be hauled back to A1 and used to refill the excavation area. The combination of metal recovery, export of aggregate to CEMEX, and increased density of the reject ash is anticipated to result in approximately 1,680 yd^3 to be returned to the excavated area. An additional 1,120 yd^3 of “fresh ash” will be added to the returned ash so as to re-establish the current contours of A1 and to maintain a uniform elevation of 78’ NGVD for the A1 disposal cell. Comanco will restore the rain cover and the normal fill sequence described in the Landfill Operations Plan will resume.



NOTES:

ASH ELEVATIONS
RECORDED BY D.C.
JOHNSON & ASSOCIATES,
JANUARY 2026

BOTTOM LINER ELEVATION
FROM CDM RECORD
DRAWINGS, FEBRUARY 1991



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SECTION
SCALE:

No.	Issue	Drawn	Approved	Date

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JMG Engineering, Inc.
3825 Henderson Blvd., Suite 605
Tampa, FL 33629
T 813 605 0706

Drawn		Designer	
Drafting Check		Design Check	
Project Manager	**J. GORRIE**	Date	
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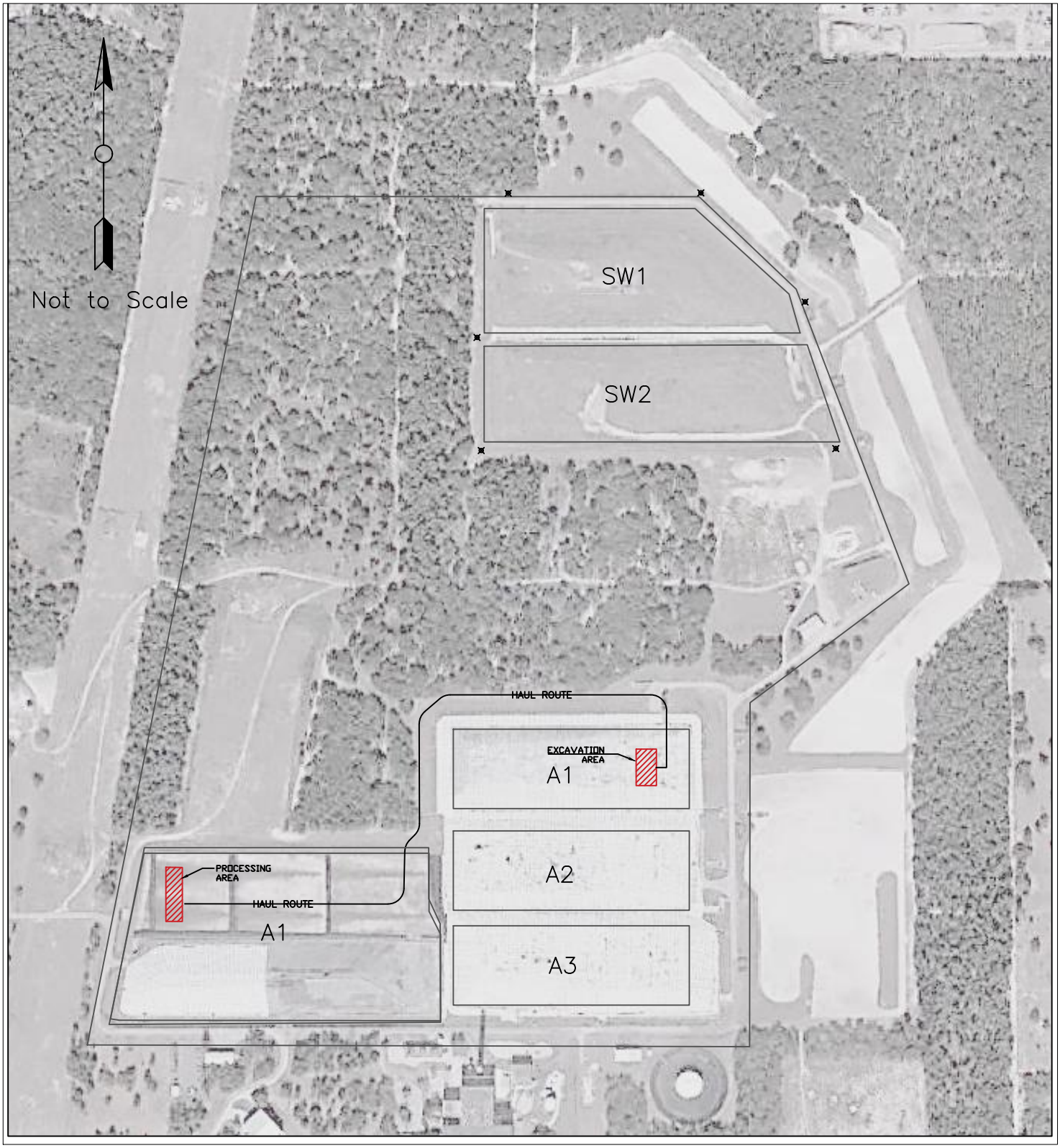
Client **PASCO COUNTY PUBLIC INFRASTRUCTURE**
Project **CEMENT KILN FEED FIELD TRIAL**
Title
Project No. **7107**
Original Size **ANSI D**
Sheet No.
Sheet of

Plotted By: Jason Gorrie
Filename: D:\OneDrive - JMG Engineering\Pasco\Ash Reuse Phase II (TO 3-26)\JMG Working File.dwg



Note: THIS FIGURE IS NOT TO SCALE AND THE LOCATIONS OF SOME ITEMS HAVE BEEN EXAGGERATED FOR CLARITY

JMG ENGINEERING INC

SITE PLAN

FIGURE 2

APPENDIX A

Waste Characterization Results

eurofins | Environment Testing

ANALYTICAL REPORT

PREPARED FOR

Attn: Jason Gorrie
JMG Engineering Inc
238 E Davis Blvd
Suite 206
Tampa, Florida 33606

Generated 2/5/2025 1:40:49 PM Revision 1

JOB DESCRIPTION

Total and TCLP Metals

JOB NUMBER

660-140609-1

Eurofins Tampa
6712 Benjamin Road
Suite 100
Tampa FL 33634

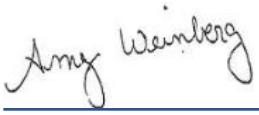
See page two for job notes and contact information.

Job Notes

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

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Southeast, LLC Project Manager.

Authorization



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Revision 1

Authorized for release by
Amy Weinberg, Project Manager II
amy.weinberg@et.eurofinsus.com
(813)885-7427

Table of Contents

Sample Summary

Client: JMG Engineering Inc
Project/Site: Total and TCLP Metals

Job ID: 660-140609-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
660-140609-1	001-TCLP Metals	Solid	01/28/25 08:00	01/29/25 12:15
660-140609-2	002-Total Metals	Solid	01/28/25 08:00	01/29/25 12:15

Job Narrative
660-140609-1

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

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

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

Receipt
The samples were received on 1/29/2025 12:15 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 3.6°C.

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

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

Definitions/Glossary

Client: JMG Engineering Inc
Project/Site: Total and TCLP Metals

Job ID: 660-140609-1

Qualifiers

Metals

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.
U	Indicates that the compound was analyzed for but not detected.

Glossary

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

Detection Summary

Client: JMG Engineering Inc
Project/Site: Total and TCLP Metals

Job ID: 660-140609-1

Client Sample ID: 001-TCLP Metals — Lab Sample ID: 660-140609-1

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Antimony	0.058		0.040	0.019	mg/L	1		6010D	TCLP
Copper	0.075		0.010	0.0023	mg/L	1		6010D	TCLP
Zinc	0.15		0.020	0.0040	mg/L	1		6010D	TCLP

Client Sample ID: 002-Total Metals — Lab Sample ID: 660-140609-2

Analyte	Result	Qualifier	PQL	MDL	Unit	Dil Fac	D	Method	Prep Type
Antimony	21000		940	230	mg/Kg	100	☼	6010D	Total/NA
Beryllium	0.38		0.23	0.14	mg/Kg	1	☼	6010D	Total/NA
Nickel	66		0.59	0.21	mg/Kg	1	☼	6010D	Total/NA
Copper	3800		59	30	mg/Kg	100	☼	6010D	Total/NA
Zinc	4100		290	150	mg/Kg	100	☼	6010D	Total/NA
Manganese	680		2.3	0.73	mg/Kg	1	☼	6010D	Total/NA
Cobalt	45		0.59	0.17	mg/Kg	1	☼	6010D	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: 001-TCLP Metals

Lab Sample ID: 660-140609-1
Date Collected: 01/28/25 08:00
Matrix: Solid
Date Received: 01/29/25 12:15

Method: SW846 6010D - Metals (ICP) - TCLP

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**0.058**		0.040	0.019	mg/L		01/31/25 11:20	01/31/25 16:26	1
Beryllium	0.0023	U	0.010	0.0023	mg/L		01/31/25 11:20	01/31/25 16:26	1
Thallium	0.0061	U	0.040	0.0061	mg/L		01/31/25 11:20	01/31/25 16:26	1
Nickel	0.0050	U	0.010	0.0050	mg/L		01/31/25 11:20	01/31/25 16:26	1
Copper	**0.075**		0.010	0.0023	mg/L		01/31/25 11:20	01/31/25 16:26	1
Zinc	**0.15**		0.020	0.0040	mg/L		01/31/25 11:20	01/31/25 16:26	1
Manganese	0.0084	U	0.010	0.0084	mg/L		01/31/25 11:20	01/31/25 16:26	1
Cobalt	0.0048	U	0.010	0.0048	mg/L		01/31/25 11:20	01/31/25 16:26	1

Method: SW846 7470A - Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	U	0.00040	0.00020	mg/L		01/30/25 13:59	01/31/25 15:20	1

Client Sample ID: 002-Total Metals

Lab Sample ID: 660-140609-2
Date Collected: 01/28/25 08:00
Matrix: Solid
Date Received: 01/29/25 12:15
Percent Solids: 85.3

Method: SW846 6010D - Metals (ICP)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	**21000**		940	230	mg/Kg	☼	02/03/25 12:06	02/04/25 11:46	100
Beryllium	**0.38**		0.23	0.14	mg/Kg	☼	02/03/25 12:06	02/03/25 20:02	1
Thallium	1.5	U	2.3	1.5	mg/Kg	☼	02/03/25 12:06	02/03/25 20:02	1
Nickel	**66**		0.59	0.21	mg/Kg	☼	02/03/25 12:06	02/03/25 20:02	1
Copper	**3800**		59	30	mg/Kg	☼	02/03/25 12:06	02/04/25 11:46	100
Zinc	**4100**		290	150	mg/Kg	☼	02/03/25 12:06	02/04/25 11:46	100
Manganese	**680**		2.3	0.73	mg/Kg	☼	02/03/25 12:06	02/03/25 20:02	1
Cobalt	**45**		0.59	0.17	mg/Kg	☼	02/03/25 12:06	02/03/25 20:02	1

Method: SW846 7471B - Mercury (CVAA)

Analyte	Result	Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.023	U	0.045	0.023	mg/Kg	☼	01/30/25 14:15	01/31/25 16:55	1

Method: 6010D - Metals (ICP)

Lab Sample ID: MB 670-134638/3-A
Matrix: Solid
Analysis Batch: 134813

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 134638

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	2.0	U	8.0	2.0	mg/Kg		02/03/25 12:06	02/03/25 19:03	1
Beryllium	0.12	U	0.20	0.12	mg/Kg		02/03/25 12:06	02/03/25 19:03	1
Thallium	1.3	U	2.0	1.3	mg/Kg		02/03/25 12:06	02/03/25 19:03	1
Nickel	0.220	I	0.50	0.18	mg/Kg		02/03/25 12:06	02/03/25 19:03	1
Copper	0.25	U	0.50	0.25	mg/Kg		02/03/25 12:06	02/03/25 19:03	1
Zinc	1.3	U	2.5	1.3	mg/Kg		02/03/25 12:06	02/03/25 19:03	1
Manganese	0.62	U	2.0	0.62	mg/Kg		02/03/25 12:06	02/03/25 19:03	1
Cobalt	0.15	U	0.50	0.15	mg/Kg		02/03/25 12:06	02/03/25 19:03	1

Lab Sample ID: MB 670-134638/3-A
Matrix: Solid
Analysis Batch: 135041

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 134638

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	2.0	U	8.0	2.0	mg/Kg		02/03/25 12:06	02/04/25 12:35	1
Beryllium	0.12	U	0.20	0.12	mg/Kg		02/03/25 12:06	02/04/25 12:35	1
Thallium	1.3	U	2.0	1.3	mg/Kg		02/03/25 12:06	02/04/25 12:35	1
Nickel	0.18	U	0.50	0.18	mg/Kg		02/03/25 12:06	02/04/25 12:35	1
Copper	0.25	U	0.50	0.25	mg/Kg		02/03/25 12:06	02/04/25 12:35	1
Zinc	1.3	U	2.5	1.3	mg/Kg		02/03/25 12:06	02/04/25 12:35	1
Manganese	0.62	U	2.0	0.62	mg/Kg		02/03/25 12:06	02/04/25 12:35	1
Cobalt	0.15	U	0.50	0.15	mg/Kg		02/03/25 12:06	02/04/25 12:35	1

Lab Sample ID: LCS 670-134638/1-A
Matrix: Solid
Analysis Batch: 134813

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 134638

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	10.0	10.7		mg/Kg		107	80 - 120
Beryllium	10.0	11.2		mg/Kg		112	80 - 120
Thallium	10.0	10.7		mg/Kg		107	80 - 120
Nickel	10.0	10.8		mg/Kg		108	80 - 120
Copper	10.0	10.9		mg/Kg		109	80 - 120
Zinc	10.0	10.8		mg/Kg		108	80 - 120
Manganese	1010	1070		mg/Kg		106	80 - 120
Cobalt	10.0	10.8		mg/Kg		108	80 - 120

Lab Sample ID: LCSD 670-134638/2-A
Matrix: Solid
Analysis Batch: 134813

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 134638

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Antimony	10.0	10.3		mg/Kg		103	80 - 120	3	20
Beryllium	10.0	11.2		mg/Kg		112	80 - 120	0	20
Thallium	10.0	10.8		mg/Kg		108	80 - 120	2	20
Nickel	10.0	10.7		mg/Kg		107	80 - 120	1	20
Copper	10.0	10.8		mg/Kg		108	80 - 120	1	20
Zinc	10.0	10.7		mg/Kg		107	80 - 120	1	20
Manganese	1010	1080		mg/Kg		107	80 - 120	0	20

Method: 6010D - Metals (ICP) (Continued)

Lab Sample ID: LCSD 670-134638/2-A
Matrix: Solid
Analysis Batch: 134813

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 134638

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Cobalt			10.0	10.8		mg/Kg		108	80 - 120	0	20

Lab Sample ID: 660-140645-C-1-D MS
Matrix: Solid
Analysis Batch: 134813

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 134638

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	2.1	U J3	11.1	7.51	I J3	mg/Kg	☼	68	75 - 125
Beryllium	0.13	U	11.1	12.1		mg/Kg	☼	109	75 - 125
Thallium	1.4	U	11.1	11.3		mg/Kg	☼	101	75 - 125
Nickel	1.3		11.1	12.5		mg/Kg	☼	101	75 - 125
Copper	8.0		11.1	20.6		mg/Kg	☼	113	75 - 125
Zinc	33		11.1	46.4		mg/Kg	☼	116	75 - 125
Manganese	12		1120	1150		mg/Kg	☼	101	75 - 125
Cobalt	0.25	I	11.1	11.6		mg/Kg	☼	102	75 - 125

Lab Sample ID: 660-140645-C-1-E MSD
Matrix: Solid
Analysis Batch: 134813

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 134638

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Antimony	2.1	U J3	11.1	7.71	I J3	mg/Kg	☼	69	75 - 125	3	20
Beryllium	0.13	U	11.1	12.1		mg/Kg	☼	109	75 - 125	0	20
Thallium	1.4	U	11.1	11.2		mg/Kg	☼	101	75 - 125	0	20
Nickel	1.3		11.1	12.6		mg/Kg	☼	101	75 - 125	1	20
Copper	8.0		11.1	20.7		mg/Kg	☼	114	75 - 125	0	20
Zinc	33		11.1	46.3		mg/Kg	☼	116	75 - 125	0	20
Manganese	12		1120	1150		mg/Kg	☼	102	75 - 125	0	20
Cobalt	0.25	I	11.1	11.6		mg/Kg	☼	102	75 - 125	0	20

Lab Sample ID: MB 670-134415/3-A
Matrix: Solid
Analysis Batch: 134559

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 134415

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.017	U	0.036	0.017	mg/L		01/31/25 11:20	01/31/25 15:40	1
Beryllium	0.0021	U	0.0090	0.0021	mg/L		01/31/25 11:20	01/31/25 15:40	1
Thallium	0.0055	U	0.036	0.0055	mg/L		01/31/25 11:20	01/31/25 15:40	1
Nickel	0.0045	U	0.0090	0.0045	mg/L		01/31/25 11:20	01/31/25 15:40	1
Copper	0.00220	I	0.0090	0.0021	mg/L		01/31/25 11:20	01/31/25 15:40	1
Zinc	0.0036	U	0.018	0.0036	mg/L		01/31/25 11:20	01/31/25 15:40	1
Manganese	0.0076	U	0.0090	0.0076	mg/L		01/31/25 11:20	01/31/25 15:40	1
Cobalt	0.0043	U	0.0090	0.0043	mg/L		01/31/25 11:20	01/31/25 15:40	1

Lab Sample ID: LCS 670-134415/1-A
Matrix: Solid
Analysis Batch: 134559

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 134415

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony			0.100	0.103		mg/L		103	80 - 120

Method: 6010D - Metals (ICP) (Continued)

Lab Sample ID: LCS 670-134415/1-A
Matrix: Solid
Analysis Batch: 134559

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 134415

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Beryllium	0.100	0.105		mg/L		105	80 - 120
Thallium	0.100	0.103		mg/L		103	80 - 120
Nickel	0.100	0.0996		mg/L		100	80 - 120
Copper	0.100	0.104		mg/L		104	80 - 120
Zinc	0.100	0.104		mg/L		104	80 - 120
Manganese	10.1	10.3		mg/L		102	80 - 120
Cobalt	0.100	0.102		mg/L		102	80 - 120

Lab Sample ID: LCSD 670-134415/2-A
Matrix: Solid
Analysis Batch: 134559

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 134415

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Antimony	0.100	0.102		mg/L		102	80 - 120	1	20
Beryllium	0.100	0.105		mg/L		105	80 - 120	0	20
Thallium	0.100	0.0995		mg/L		100	80 - 120	3	20
Nickel	0.100	0.100		mg/L		100	80 - 120	1	20
Copper	0.100	0.104		mg/L		104	80 - 120	0	20
Zinc	0.100	0.105		mg/L		105	80 - 120	1	20
Manganese	10.1	10.4		mg/L		103	80 - 120	1	20
Cobalt	0.100	0.102		mg/L		102	80 - 120	0	20

Lab Sample ID: LB 670-134260/1-C
Matrix: Solid
Analysis Batch: 134559

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 134415

Analyte	LB Result	LB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.019	U	0.040	0.019	mg/L		01/31/25 11:20	01/31/25 16:14	1
Beryllium	0.0023	U	0.010	0.0023	mg/L		01/31/25 11:20	01/31/25 16:14	1
Thallium	0.0061	U	0.040	0.0061	mg/L		01/31/25 11:20	01/31/25 16:14	1
Nickel	0.0050	U	0.010	0.0050	mg/L		01/31/25 11:20	01/31/25 16:14	1
Copper	0.0023	U	0.010	0.0023	mg/L		01/31/25 11:20	01/31/25 16:14	1
Zinc	0.0040	U	0.020	0.0040	mg/L		01/31/25 11:20	01/31/25 16:14	1
Manganese	0.0084	U	0.010	0.0084	mg/L		01/31/25 11:20	01/31/25 16:14	1
Cobalt	0.0048	U	0.010	0.0048	mg/L		01/31/25 11:20	01/31/25 16:14	1

Lab Sample ID: LB 670-134262/1-C
Matrix: Solid
Analysis Batch: 134559

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 134415

Analyte	LB Result	LB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.019	U	0.040	0.019	mg/L		01/31/25 11:20	01/31/25 15:49	1
Beryllium	0.0023	U	0.010	0.0023	mg/L		01/31/25 11:20	01/31/25 15:49	1
Thallium	0.0061	U	0.040	0.0061	mg/L		01/31/25 11:20	01/31/25 15:49	1
Nickel	0.0050	U	0.010	0.0050	mg/L		01/31/25 11:20	01/31/25 15:49	1
Copper	0.0023	U	0.010	0.0023	mg/L		01/31/25 11:20	01/31/25 15:49	1
Zinc	0.0040	U	0.020	0.0040	mg/L		01/31/25 11:20	01/31/25 15:49	1
Manganese	0.0084	U	0.010	0.0084	mg/L		01/31/25 11:20	01/31/25 15:49	1
Cobalt	0.0048	U	0.010	0.0048	mg/L		01/31/25 11:20	01/31/25 15:49	1

Method: 6010D - Metals (ICP) (Continued)

Lab Sample ID: 400-269832-B-5-B MS
Matrix: Solid
Analysis Batch: 134559

Client Sample ID: Matrix Spike
Prep Type: TCLP
Prep Batch: 134415

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Antimony	0.019	U J3	0.111	0.0461	J3	mg/L		42	70 - 120
Beryllium	0.0023	U J3	0.111	0.0471	J3	mg/L		42	70 - 120
Thallium	0.0061	U J3	0.111	0.0433	J3	mg/L		39	70 - 120
Nickel	0.0050	U J3	0.111	0.0468	J3	mg/L		42	70 - 120
Copper	0.0058	I J3	0.111	0.0560	J3	mg/L		45	70 - 120
Zinc	0.082	J3	0.111	0.115	J3	mg/L		29	70 - 120
Manganese	0.70	J3	11.2	5.25	J3	mg/L		41	70 - 120
Cobalt	0.0048	U J3	0.111	0.0459	J3	mg/L		41	70 - 120

Lab Sample ID: 400-269832-B-5-C MSD
Matrix: Solid
Analysis Batch: 134559

Client Sample ID: Matrix Spike Duplicate
Prep Type: TCLP
Prep Batch: 134415

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Antimony	0.019	U J3	0.111	0.0583	J3	mg/L		53	70 - 120	23	20
Beryllium	0.0023	U J3	0.111	0.0613	J3	mg/L		55	70 - 120	26	20
Thallium	0.0061	U J3	0.111	0.0560	J3	mg/L		50	70 - 120	26	20
Nickel	0.0050	U J3	0.111	0.0611	J3	mg/L		55	70 - 120	27	20
Copper	0.0058	I J3	0.111	0.0724	J3	mg/L		60	70 - 120	26	20
Zinc	0.082	J3	0.111	0.147	J3	mg/L		59	70 - 120	25	20
Manganese	0.70	J3	11.2	6.77	J3	mg/L		54	70 - 120	25	20
Cobalt	0.0048	U J3	0.111	0.0596	J3	mg/L		54	70 - 120	26	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 670-134226/12-A
Matrix: Solid
Analysis Batch: 134489

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 134226

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	U	0.00040	0.00020	mg/L		01/30/25 13:59	01/31/25 14:41	1

Lab Sample ID: LCS 670-134226/10-A
Matrix: Solid
Analysis Batch: 134489

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 134226

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00500	0.00497		mg/L		99	85 - 115

Lab Sample ID: LCSD 670-134226/11-A
Matrix: Solid
Analysis Batch: 134489

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 134226

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	0.00500	0.00497		mg/L		99	85 - 115	0	20

Method: 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: 670-55861-A-1-D MS
Matrix: Solid
Analysis Batch: 134489

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 134226

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00020	U	0.00500	0.00536		mg/L		107	80 - 120

Lab Sample ID: 670-55861-A-1-E MSD
Matrix: Solid
Analysis Batch: 134489

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 134226

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	0.00020	U	0.00500	0.00506		mg/L		101	80 - 120	6	20

Lab Sample ID: LB 670-134260/1-B
Matrix: Solid
Analysis Batch: 134489

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 134226

Analyte	LB Result	LB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.00020	U	0.00040	0.00020	mg/L		01/30/25 13:59	01/31/25 15:11	1

Method: 7471B - Mercury (CVAA)

Lab Sample ID: MB 670-134228/12-A
Matrix: Solid
Analysis Batch: 134496

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 134228

Analyte	MB Result	MB Qualifier	PQL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.020	U	0.040	0.020	mg/Kg		01/30/25 14:15	01/31/25 16:33	1

Lab Sample ID: LCS 670-134228/10-A
Matrix: Solid
Analysis Batch: 134496

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 134228

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.400	0.394		mg/Kg		98	80 - 120

Lab Sample ID: LCSD 670-134228/11-A
Matrix: Solid
Analysis Batch: 134496

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 134228

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	0.400	0.334		mg/Kg		84	80 - 120	16	20

Lab Sample ID: 670-55857-E-1-A MS
Matrix: Solid
Analysis Batch: 134496

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 134228

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.030	U J3	0.607	0.446	J3	mg/Kg	☼	73	80 - 120

Method: 7471B - Mercury (CVAA) (Continued)

Lab Sample ID: 670-55857-E-1-B MSD
Matrix: Solid
Analysis Batch: 134496

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 134228

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	0.030	U J3	0.607	0.369	J3	mg/Kg	☼	61	80 - 120	19	20

QC Association Summary

Client: JMG Engineering Inc
Project/Site: Total and TCLP Metals

Job ID: 660-140609-1

Metals

Prep Batch: 134226

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-140609-1	001-TCLP Metals	TCLP	Solid	7470A	134260
LB 670-134260/1-B	Method Blank	TCLP	Solid	7470A	134260
MB 670-134226/12-A	Method Blank	Total/NA	Solid	7470A	
LCS 670-134226/10-A	Lab Control Sample	Total/NA	Solid	7470A	
LCSD 670-134226/11-A	Lab Control Sample Dup	Total/NA	Solid	7470A	
670-55861-A-1-D MS	Matrix Spike	Total/NA	Solid	7470A	
670-55861-A-1-E MSD	Matrix Spike Duplicate	Total/NA	Solid	7470A	

Prep Batch: 134228

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-140609-2	002-Total Metals	Total/NA	Solid	7471B	
MB 670-134228/12-A	Method Blank	Total/NA	Solid	7471B	
LCS 670-134228/10-A	Lab Control Sample	Total/NA	Solid	7471B	
LCSD 670-134228/11-A	Lab Control Sample Dup	Total/NA	Solid	7471B	
670-55857-E-1-A MS	Matrix Spike	Total/NA	Solid	7471B	
670-55857-E-1-B MSD	Matrix Spike Duplicate	Total/NA	Solid	7471B	

Leach Batch: 134260

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-140609-1	001-TCLP Metals	TCLP	Solid	1311	
LB 670-134260/1-B	Method Blank	TCLP	Solid	1311	
LB 670-134260/1-C	Method Blank	TCLP	Solid	1311	

Leach Batch: 134262

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LB 670-134262/1-C	Method Blank	TCLP	Solid	1311	
400-269832-B-5-B MS	Matrix Spike	TCLP	Solid	1311	
400-269832-B-5-C MSD	Matrix Spike Duplicate	TCLP	Solid	1311	

Prep Batch: 134415

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-140609-1	001-TCLP Metals	TCLP	Solid	3005A	134260
LB 670-134260/1-C	Method Blank	TCLP	Solid	3005A	134260
LB 670-134262/1-C	Method Blank	TCLP	Solid	3005A	134262
MB 670-134415/3-A	Method Blank	Total Recoverable	Solid	3005A	
LCS 670-134415/1-A	Lab Control Sample	Total Recoverable	Solid	3005A	
LCSD 670-134415/2-A	Lab Control Sample Dup	Total Recoverable	Solid	3005A	
400-269832-B-5-B MS	Matrix Spike	TCLP	Solid	3005A	134262
400-269832-B-5-C MSD	Matrix Spike Duplicate	TCLP	Solid	3005A	134262

Analysis Batch: 134489

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-140609-1	001-TCLP Metals	TCLP	Solid	7470A	134226
LB 670-134260/1-B	Method Blank	TCLP	Solid	7470A	134226
MB 670-134226/12-A	Method Blank	Total/NA	Solid	7470A	134226
LCS 670-134226/10-A	Lab Control Sample	Total/NA	Solid	7470A	134226
LCSD 670-134226/11-A	Lab Control Sample Dup	Total/NA	Solid	7470A	134226
670-55861-A-1-D MS	Matrix Spike	Total/NA	Solid	7470A	134226
670-55861-A-1-E MSD	Matrix Spike Duplicate	Total/NA	Solid	7470A	134226

QC Association Summary

Client: JMG Engineering Inc
Project/Site: Total and TCLP Metals

Job ID: 660-140609-1

Metals

Analysis Batch: 134496

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-140609-2	002-Total Metals	Total/NA	Solid	7471B	134228
MB 670-134228/12-A	Method Blank	Total/NA	Solid	7471B	134228
LCS 670-134228/10-A	Lab Control Sample	Total/NA	Solid	7471B	134228
LCSD 670-134228/11-A	Lab Control Sample Dup	Total/NA	Solid	7471B	134228
670-55857-E-1-A MS	Matrix Spike	Total/NA	Solid	7471B	134228
670-55857-E-1-B MSD	Matrix Spike Duplicate	Total/NA	Solid	7471B	134228

Analysis Batch: 134559

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-140609-1	001-TCLP Metals	TCLP	Solid	6010D	134415
LB 670-134260/1-C	Method Blank	TCLP	Solid	6010D	134415
LB 670-134262/1-C	Method Blank	TCLP	Solid	6010D	134415
MB 670-134415/3-A	Method Blank	Total Recoverable	Solid	6010D	134415
LCS 670-134415/1-A	Lab Control Sample	Total Recoverable	Solid	6010D	134415
LCSD 670-134415/2-A	Lab Control Sample Dup	Total Recoverable	Solid	6010D	134415
400-269832-B-5-B MS	Matrix Spike	TCLP	Solid	6010D	134415
400-269832-B-5-C MSD	Matrix Spike Duplicate	TCLP	Solid	6010D	134415

Prep Batch: 134638

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-140609-2	002-Total Metals	Total/NA	Solid	3051A	
MB 670-134638/3-A	Method Blank	Total/NA	Solid	3051A	
LCS 670-134638/1-A	Lab Control Sample	Total/NA	Solid	3051A	
LCSD 670-134638/2-A	Lab Control Sample Dup	Total/NA	Solid	3051A	
660-140645-C-1-D MS	Matrix Spike	Total/NA	Solid	3051A	
660-140645-C-1-E MSD	Matrix Spike Duplicate	Total/NA	Solid	3051A	

Analysis Batch: 134813

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-140609-2	002-Total Metals	Total/NA	Solid	6010D	134638
MB 670-134638/3-A	Method Blank	Total/NA	Solid	6010D	134638
LCS 670-134638/1-A	Lab Control Sample	Total/NA	Solid	6010D	134638
LCSD 670-134638/2-A	Lab Control Sample Dup	Total/NA	Solid	6010D	134638
660-140645-C-1-D MS	Matrix Spike	Total/NA	Solid	6010D	134638
660-140645-C-1-E MSD	Matrix Spike Duplicate	Total/NA	Solid	6010D	134638

Analysis Batch: 135041

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-140609-2	002-Total Metals	Total/NA	Solid	6010D	134638
MB 670-134638/3-A	Method Blank	Total/NA	Solid	6010D	134638

General Chemistry

Analysis Batch: 134175

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-140609-1	001-TCLP Metals	Total/NA	Solid	Moisture	
660-140632-A-16 DU	Duplicate	Total/NA	Solid	Moisture	

Analysis Batch: 134207

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-140609-2	002-Total Metals	Total/NA	Solid	Moisture	

General Chemistry (Continued)

Analysis Batch: 134207 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-140631-A-3 DU	Duplicate	Total/NA	Solid	Moisture	

Lab Chronicle

Client: JMG Engineering Inc
Project/Site: Total and TCLP Metals

Job ID: 660-140609-1

Client Sample ID: 001-TCLP Metals
Date Collected: 01/28/25 08:00
Date Received: 01/29/25 12:15

Lab Sample ID: 660-140609-1
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
TCLP	Leach	1311			134260	GL	EET ORL	01/30/25 16:29 - 01/31/25 08:29 [1]
TCLP	Prep	3005A			134415	JR	EET ORL	01/31/25 11:20
TCLP	Analysis	6010D		1	134559	AS	EET ORL	01/31/25 16:26
TCLP	Prep	7470A			134226	DP	EET ORL	01/30/25 13:59
TCLP	Leach	1311			134260	GL	EET ORL	01/30/25 16:29 - 01/31/25 08:29 [1]
TCLP	Analysis	7470A		1	134489	AS	EET ORL	01/31/25 15:20
Total/NA	Analysis	Moisture		1	134175	RB	EET ORL	01/30/25 09:17

Client Sample ID: 002-Total Metals
Date Collected: 01/28/25 08:00
Date Received: 01/29/25 12:15

Lab Sample ID: 660-140609-2
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	134207	RB	EET ORL	01/30/25 10:32

Client Sample ID: 002-Total Metals
Date Collected: 01/28/25 08:00
Date Received: 01/29/25 12:15

Lab Sample ID: 660-140609-2
Matrix: Solid
Percent Solids: 85.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3051A			134638	DP	EET ORL	02/03/25 12:06
Total/NA	Analysis	6010D		1	134813	AS	EET ORL	02/03/25 20:02
Total/NA	Prep	3051A			134638	DP	EET ORL	02/03/25 12:06
Total/NA	Analysis	6010D		100	135041	AS	EET ORL	02/04/25 11:46
Total/NA	Prep	7471B			134228	DP	EET ORL	01/30/25 14:15
Total/NA	Analysis	7471B		1	134496	AS	EET ORL	01/31/25 16:55

[1] This procedure uses a method stipulated length of time for the process. Both start and end times are displayed.

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Method Summary

Client: JMG Engineering Inc
Project/Site: Total and TCLP Metals

Job ID: 660-140609-1

Method	Method Description	Protocol	Laboratory
6010D	Metals (ICP)	SW846	EET ORL
7470A	Mercury (CVAA)	SW846	EET ORL
7471B	Mercury (CVAA)	SW846	EET ORL
Moisture	Percent Moisture	EPA	EET ORL
1311	TCLP Extraction	SW846	EET ORL
3005A	Preparation, Total Recoverable or Dissolved Metals	SW846	EET ORL
3051A	Preparation, Metals, Microwave Assisted	SW846	EET ORL
7470A	Preparation, Mercury	SW846	EET ORL
7471B	Preparation, Mercury	SW846	EET ORL

Protocol References:

EPA = US Environmental Protection Agency

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

Laboratory References:

EET ORL = Eurofins Orlando, 481 Newburyport Avenue, Altamonte Springs, FL 32701, TEL (407)339-5984

Accreditation/Certification Summary

Client: JMG Engineering Inc
Project/Site: Total and TCLP Metals

Job ID: 660-140609-1

Laboratory: Eurofins Orlando

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alabama	State	42800	06-30-25
Arkansas (DW)	State	FL00091	06-30-25
Florida	NELAP	E83018	06-30-25
Georgia (DW)	State	C055	07-01-25
Louisiana (DW)	State	LA039	12-31-24 *
Mississippi	State	MS00007	06-30-25
New Mexico	State	FL00091	07-02-25
North Carolina (DW)	State	12712	07-31-25
North Carolina (WW/SW)	State	699	12-31-25
Puerto Rico	State	FL00091	01-31-26
Tennessee	State	TN04930	06-30-25
Texas	NELAP	T104704571	02-28-25

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Eurofins Orlando
481 Newburyport Avenue
Altamonte Springs, FL 32701
Phone: 407-339-5984 Fax: 407-260-6110

Chain of Custody Record

eurofins | Environment Testing

Client Information	Sampler:	Lab PM: Weinberg, Amy	Carrier Tracking No(s):	COC No: 660-128936-40712.1
Client Contact: Jason Gorrie	Phone:	E-Mail: amy weinberg@et.eurofinsus.com	State of Origin:	Page: Page 1 of 1
Company: JMG Engineering Inc	PWSID:			Job #:
Address: 238 E Davis Blvd Suite 206	Due Date Requested:			
City: Tampa	TAT Requested (days):			
State, Zip: FL, 33606	Compliance Project: Δ Yes Δ No			
Phone:	PO #: Purchase Order not required			
Email: jason@jmg-eng.com	WO #:			
Project Name: Total and TCLP Metals	Project #: 66017114			
Site:	SSOW#:			

Analysis Requested

Preservation Codes: N None; Other

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010D, 7470A: see below	6010D, 7471B: Sb, Be, Co, Cu, Mn, Ni, Tl, V	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	N		
001 - TCLP Metals	1/28/25	08:00	C	Solid			✓			
002 - Total Metals	1/28/25	08:00	C	Solid				✓		

660-140609 Chain of Custody

Loc. 660
140609

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

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

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

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date: JAN 21 2025	Time: 1690	Method of Shipment: FedEx			
Relinquished by:	Date/Time: 1/29/2025 12:15	Company: JMG	Received by:	Date/Time: 1-29-25 1215	Company: ETPA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.	Cooler Temperature(s) °C and Other Remarks: 3.6°C IR09

Ver: 10/10/2024

Eurofins Tampa
6712 Benjamin Road Suite 100
Tampa, FL 33634
Phone: 813-885-7427 Fax: 813-885-7049

Chain of Custody Record

eurofins | Environment Testing

Client Information (Sub Contract Lab)	Sampler: N/A	Lab PM: Weinberg, Amy	Carrier Tracking No(s): N/A	COC No: 660-146887.1
Client Contact: Shipping/Receiving	Phone: N/A	E-Mail: amy.weinberg@et.eurofinsus.com	State of Origin: Indiana	Page: Page 1 of 1
Company: Eurofins Environment Testing Southeast L		Accreditations Required (See note): NELAP - Florida		Job #: 660-140609-1
Address: 481 Newburyport Avenue, ,	Due Date Requested: 2/5/2025			
City: Altamonte Springs	TAT Requested (days): N/A			
State, Zip: FL, 32701				
Phone: 407-339-5984(Tel) 407-260-6110(Fax)	PO #: N/A			
Email: N/A	WO #: N/A			
Project Name: Total and TCLP Metals	Project #: 66017114			
Site: N/A	SSOW#: N/A			

Analysis Requested

Preservation Codes: -

Other: N/A

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	6010D/1311T_M (MOD) TCLP ICP Metals	7470A/1311T_Hg TCLP Mercury	Moisture	7471B/7471B_Prep Mercury	6010D/3051A (MOD) RCRA ICP Metals	Total Number of containers	Special Instructions/Note:
			Preservation Code:										
001-TCLP Metals (660-140609-1)	1/28/25	08:00 Eastern	G	Solid			X	X	X			1	
002-Total Metals (660-140609-2)	1/28/25	08:00 Eastern	G	Solid					X	X	X	1	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Southeast, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Southeast, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Southeast, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing Southeast, LLC.

Possible Hazard Identification *Unconfirmed*	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*** ☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

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

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	1-29-25 1445	ETPA	[signature]	1/30/25 8:00	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: 5.0/4.8

Login Sample Receipt Checklist

Client: JMG Engineering Inc

Job Number: 660-140609-1

Login Number: 140609
List Number: 1
Creator: Grohman, Tina

List Source: Eurofins Tampa

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

Login Sample Receipt Checklist

Client: JMG Engineering Inc

Job Number: 660-140609-1

Login Number: 140609
List Number: 2
Creator: Gemeinhardt, Alexandria

List Source: Eurofins Orlando
List Creation: 01/30/25 08:16 AM

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

ATTACHMENT B

Testing and Sampling Plan

Beneficial Use Determination of Pasco County Combustion Ash as a Cement Kiln Feed

Sampling and Testing Plan

May 2026

Introduction

Pasco County aims to evaluate the beneficial use of municipal solid waste incinerator (MSWI) ash from Pasco County Resource Recovery Facility (RRF) as an ingredient in the manufacture of portland cement. The University of Florida (UF) has historically evaluated the elemental composition of Pasco County MSWI ash. The presence of calcium, iron, silica, and alumina oxides make the ash suitable for use as an ingredient in portland cement manufacture, and a pilot-scale kiln trial is the next step in determining the real world feasibility of Pasco County ash reuse.

In collaboration with Cemex, approximately 2,000 tons of processed MSWI ash will be incorporated into the cement kiln, consisting of about 4% of the total kiln feed during a week-long testing period. This kiln trial will be repeated with another 2,000 tons of processed ash that has been mined from the Pasco County ash monofill. These two combined trials will last a total of about two weeks and utilize approximately 4,000 tons of MSWI ash from Pasco County RRF.

During the pilot-scale kiln process, UF researchers will collect representative samples of MSWI ash and the ash-amended cement products and perform a series of physical and environmental tests to assess the implications of reusing Pasco County ash as a cement kiln feed. Environmental testing such as total and leachable metals contents will determine the mobility of trace elements from the ash, cement, and cement products compared to control samples. Physical testing will determine the structural capacity of ash-amended cement products (concrete and mortar) compared to control specimens.

The goal of this project is to investigate the potential for reusing MSWI ash as an ingredient in cement manufacture at scale. Previous laboratory experiments justify the potential for ash reuse as a cement kiln feed, but limited pilot-scale studies have been performed to verify. This project will result in the direct diversion of 4,000 tons of MSWI ash from the Pasco County monofill, and will result in cost and resource savings for the Cemex Brooksville cement plant during the kiln trial.

Sampling and Testing Approach

1.0 MSWI ash from Pasco County

Two Pasco County MSWI ash streams will be assessed in the Cemex pilot project. The first stream will consist of 2,000 tons of fresh MSWI ash that is representative of the ash currently being produced at the Pasco County RRF. The second stream will consist of 2,000 tons of mined ash from the Pasco County monofill, representative of ash which was historically produced at the Pasco County RRF (estimated 1980s). Both of the ash streams ("fresh" and "mined") will be processed by Meldgaard to remove ferrous and non-ferrous metals, fines, and large ash particles. The final ash streams will consist of processed ash that is between 4 mm and 50 mm in size.

Representative subsamples of each ash stream will be collected during processing. A member of the UF team will work with Pasco County employees to collect one 5-gallon HDPE bucket full of processed ash five times throughout the 2,000-ton processing period. One bucket will be collected after every 400 tons of ash processed. The fifth bucket will be collected from the last 100 tons of ash being processed. This will result in five 5-gallon buckets of ash from each processed ash stream, collected at the specified processing intervals. This sampling procedure is summarized in Figure 1.

The grab samples will be transported to the UF labs for compositing and analysis. For each ash stream (consisting of five buckets), all material will be homogenized to produce a composite sample that is representative of the 2,000 tons of ash produced and processed at the Pasco County RRF. To homogenize each sample, the buckets will be dumped onto a clean plastic tarp and mixed using a clean shovel. Subsamples will be collected in clean plastic bags for laboratory analysis, and the resulting mixed sample will be returned to the 5-gallon buckets and will be referred to as the composite sample.

In order to determine the implications of using Pasco County MSWI ash as kiln feed replacement in cement manufacture, multiple tests will be performed on the ash subsamples. Leachable metals contents will be assessed using two leaching tests: the synthetic precipitation leaching procedure (SPLP, EPA Method 1311), and the toxicity characteristic leaching procedure (TCLP, EPA Method 1312). Both of these leaching tests will be performed on size-reduced ash subsamples at a liquid-to-solid ratio (LS) of 20. The purpose of the TCLP is to verify that the processed MSWI ash does not exhibit toxicity characteristics, and is a routine leaching test performed on MSWI ash. The SPLP simulates the effect of rainwater on the MSWI ash in a beneficial use scenario, and is a leaching test commonly employed in beneficial use determinations. The outcome of these two leaching tests will be compared to Florida groundwater cleanup target levels (GCTLs) and used as a baseline characterization of the raw MSWI ash before incorporation into cement manufacture.

The total environmentally available metal concentrations in the MSWI ash will be determined from each subsample following EPA Method 3050B *Acid Digestion of Sediments, Sludges, and*

Soils. This method consists of an acid digestion using sequential additions of nitric and hydrochloric acid, water, hydrogen peroxide, and heating and cooling steps. The resulting digestate will be filtered and analyzed via inductively coupled plasma-atomic emissions spectroscopy (ICP-AES). The results of this analysis will serve as a baseline characterization of the total metals contents in the MSWI ash before incorporation into cement manufacture. Finally, the mineral composition of the Pasco County ash will be determined using X-ray diffraction (XRD) to verify the suitability of utilizing the ash as a kiln feed replacement. A summary of the laboratory methods to be performed on each sample type is provided in Table 1.

2.0 MSWI ash-amended cement

For each kiln trial, the 2,000 tons of processed ash will be delivered to the Cemex Brooksville cement plant. The ash will be incorporated into the cement kiln at a replacement ratio of approximately 4%. It is expected to take about one week to incorporate all of the ash into the kiln feed, resulting in two weeks total for both kiln trials. Prior to the start of the kiln trial, a control cement sample will be collected from the Cemex Brooksville facility. This control cement sample will contain no MSWI ash addition, and will serve as a standard for comparison for physical and environmental test methods at the UF labs.

All cement ingredients will enter the cement kiln, and will exit the kiln as clinker. The clinker consists of solid modules of molten and solidified cement kiln ingredients that have not yet been powderized into cement. Clinker is typically stored in silos prior to final cement production. Following the brief storage process, clinker will be added to a ball mill along with gypsum, and powderized into cement. A representative subsample of cement will be collected once the process has stabilized and Cemex has confirmed that only ash-amended clinker is being used in the ball mill. This process will be repeated for both the fresh and mined ash-amended clinker, resulting in a representative sample of each cement type for subsequent testing at the UF labs.

The cement samples will be transported to the UF labs to undergo testing and analysis. Total environmentally available metals contents will be evaluated in the control cement, fresh ash-amended cement, and mined ash-amended cement. This procedure follows digestion by EPA Method 3050B and subsequent analysis by ICP-AES, as described in Section 1.0. In addition, XRD will be performed on all three cement types to verify the mineral composition of each cement.

3.0 Concrete made using MSWI ash-amended cement

Sampling

Concrete specimens will be fabricated in the UF labs using each of the three cement types: the control cement, fresh ash-amended cement, and mined ash-amended cement. The specimens will

be made following an approved mix design and using ASTM-compliant fine and coarse aggregates. All three mix designs will use the same water-to-cement ratio, fine aggregate mass, and coarse aggregate mass, to ensure even comparison between the three types. Additionally, all raw ingredients used in the concrete will be analyzed for total metals following EPA Method 3050B and ICP-AES analysis.

The concrete cylinders will be tested for compressive strength following ASTM C39 *Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens*. Replicates of the concrete cylinders will be crushed after they are allowed to cure for 28 days, and will be processed for total and leachable metals contents. Leaching tests may include all or some of the US EPA leaching environmental assessment framework (LEAF) Methods (1313, 1315, 1316), and SPLP (Table 1).

Three batch leaching tests, as well as a monolith leaching procedure, will be performed on the ash-amended and control concrete specimens. EPA Method 1313 *Liquid-Solid Partitioning as a Function of Extract pH Using a Parallel Batch Extraction Procedure* will assess the influence of pH on element mobility across nine pre-determined pH points. Method 1316 *Liquid-Solid Partitioning as a Function of Liquid-to-Solid Ratio in Solid Materials Using a Parallel Batch Procedure* is another batch leaching procedure which assesses the influence of liquid-to-solid ratio on element mobility. Finally, the SPLP will be used to assess the impact of synthetic rainwater on the control and ash-amended concrete products.

The monolith leaching procedure, EPA Method 1315 *Mass Transfer Rates of Constituents in Monolithic or Compacted Granular Materials Using a Semi-Dynamic Tank Leaching Procedure*, will assess the constituent release from intact concrete specimens that are submerged in water. Again, this test method will be performed on both ash-amended concrete types and the control concrete. This test will provide the mass transfer rate of metals contained in a monolith (concrete cylinder) under diffusion-controlled release conditions, measured as a function of leaching time.

Mortar cubes will also be fabricated at the UF labs and tested for compressive strength following ASTM C109 *Standard Test Method for Compressive Strength of Hydraulic Cement Mortars*. This method allows for strength testing of a mortar matrix without the interference of coarse aggregates.

5.0 Beneficial Use Determination

The data acquired during the testing phases described above will be used to perform a beneficial use determination (BUD) of cement amended with Pasco County MSWI ash. UF researchers will evaluate the ash-amended cement and concrete compressive strength test results against the control results, and characterize total and leachable metal concentrations of each to determine whether any significant differences exist.

From a performance standpoint, the ash-amended cement must perform at least as well as typical cement in order to be beneficially reused as a cement kiln feed. Compressive strength of concrete and mortar specimens made with both ash-amended and control cements will be assessed to ensure comparable performance. XRD results of the cements will also be compared to investigate and ensure proper cement minerology.

Before the MSWI ash can be beneficially reused as a cement ingredient at scale, UF researchers will demonstrate that the proposed use will not cause groundwater or surface water contamination in concentrations above the Florida standards. This analysis will be a dual-step approach. First, the leachable metal concentrations from the ash-amended cement and concrete will be compared to that of the control cement and concrete. This comparison will be performed for each leaching test (SPLP, 1313, 1315, 1316). If there is an appreciable difference in leachable metals contents between the control and ash-amended products, then the leachable concentrations will be assessed against the Florida groundwater cleanup target levels (GCTLs) to ensure that the ash-amended products will not cause groundwater contamination above the target levels.

UF researchers will also demonstrate that the reuse of MSWI ash as a cement kiln feed poses no excess risk to human health compared to typical cement. Again, this analysis will consist of two steps. First, the total environmentally available metals concentrations will be measured in both the control and ash-amended products and compared to each other. If there is an appreciable difference in total metals contents between the control and ash-amended products, then the concentrations will be compared to regulatory thresholds, such as the Florida soil cleanup target levels (SCTLs). The goal with this analysis is to confirm that the reuse of MSWI ash in cement manufacture poses no *excess* risk to human health compared to typical cement manufacture.

Finally, the results of these analyses will be presented to the Department in a report prepared by the University of Florida. The report will serve as a beneficial use determination of Pasco County MSWI ash as an ingredient in the production of portland cement.

Tables and Figures

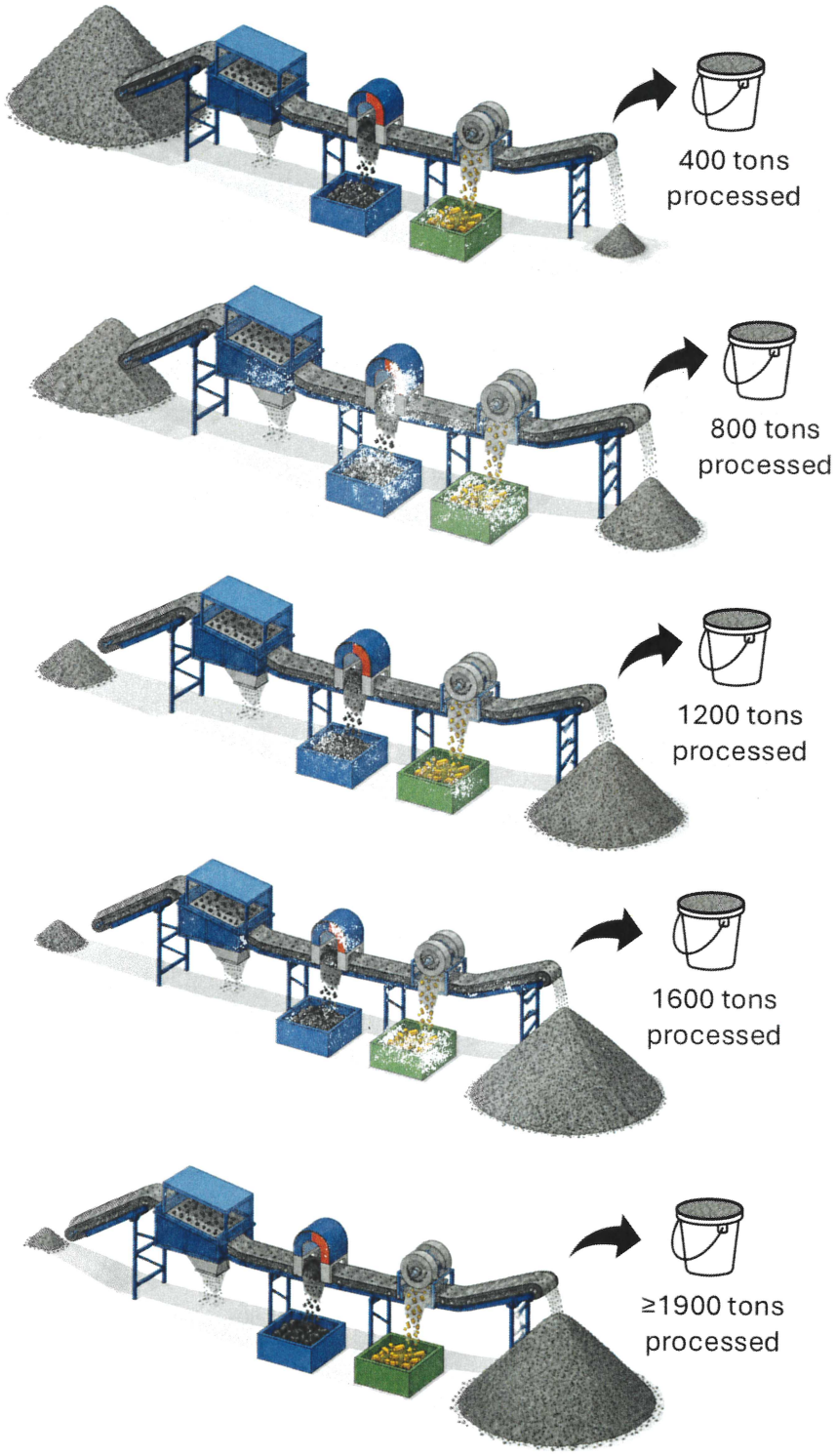

Figure 1. Sampling plan for processed ash. One 5-gallon HDPE bucket of processed ash will be collected after every 400 tons (approximately) of ash processed. This will be repeated for both the fresh and mined ash streams.

Table 1. Tests to be performed on each sample matrix

Test Method	**Sample Matrix**				
	Fresh MSWI ash	*Mined MSWI ash*	*Clinker**	*Cement**	*Concrete**
Total Metals Analysis	X	X	X	X	X
X-Ray Diffraction	X	X		X	
Method 1312: SPLP	X	X			X
Method 1313: Batch pH					X
Method 1315: Monolith					X
Method 1316: Batch LS					X

*Includes fresh MSWI ash-amended, mined MSWI ash-amended, and control