Quarterly Report 2021-Q1

APRIL 2021

Odor Task Force

THE CITY OF Kalamazoo

Executive Summary

Per City of Kalamazoo Commission action taken September 2020, the Odor Task Force presents this Quarterly Report for the first quarter, 2021. The members of the Odor Task Force continue to work collaboratively to develop solutions to community concerns with odors generated within the control of the members. Odor Task Force meetings have been scheduled for approximately every six weeks, or two per quarter. The meetings are now scheduled on an adjusting basis to accommodate the dynamic schedules of the members.

Quarter one of 2021 also saw the departure of Rich Townley, Graphic Packaging International, Inc., and a founding member of the Odor Task Force. Rich has played a key role in the collaboration between Graphic Packaging International, Inc. and the Kalamazoo Water Reclamation Plant. Rich steps down from his role as a member to pursue an increased focus on Project Bronco. He leaves in his place Tom Olstad, Kalamazoo Mill Manager.

Q1 Accomplishments

- KWRP expanded the Envirosuite sensor network with the addition a three community monitoring locations in January 2021.
- All deployed sensors were updated to the current model in January 2021.
- The City Manager's Office approved a 1-year Pilot with SmartCover for the deployment of their H2Scents real time sanitary sewer H2S monitoring.
- Online odor complaint form refined prior to deployment with the inclusion of sanitary sewer network on the form.
- The Envirosuite system now has year over year datasets for comparison and evaluation.

HISTORY

Formally originated in 2018, the Odor Task Force (OTF) is a technical workgroup of members from Graphic Packaging International, Inc., community committees, local and State agencies, elected officials, and the City of Kalamazoo. The primary goal of the OTF is to provide a collaborative forum to discuss the community's concerns with and potential mitigation efforts regarding industrial odors emitted from the City of Kalamazoo Water Reclamation Plant (KWRP) and Graphic Packaging International, Inc. (GPI) as both industrial facilities have the potential to emit odors of differing compounds and of differing concentrations. Odors emitted to or generated within a community falls under the regulatory jurisdiction of the Michigan Department of Environment, Great Lakes, and Environment (EGLE) Air Quality Division.

CITY OF KALAMAZOO PRIOR ACCOMPLISHMENTS

Investments have been made completing projects leading up to the origination of the OTF. Various investments in treatment processes operations of increased byproduct hauling offsite and point source chemical treatments have been piloted with some implemented as part of the current odor mitigation efforts. The City has continued its investment in capital improvement projects specifically targeted at odor emission mitigation. Currently under construction, is the construction of four carbon scrubbers to treat odors at the source of generation, one of which is currently operational. In addition, the KWRP implemented the EnviroSuite odor management with e-Nose monitoring technology for the real-time monitoring, historic investigation and forecasting of the fugitive odor transmission of those generated at the KWRP. In the pursuit of continuous odor source identification and mitigation opportunities, the KWRP commissioned J&H to conduct an initial study to identify additional point sources of odors within City owned infrastructure followed by a detailed odor analytical report also conducted by J&H. Pilot trials of various chemical treatments to mitigate emitted odors has also been conducted with varying degrees of success. These are only a few of the prior accomplishments and investment commissioned and completed by the City.

CITY OF KALAMAZOO CURRENT QUARTER ACCOMPLISHMENTS

The first quarter of 2021 has brought several milestone accomplishments in the mitigation of emitted odors from the KWRP. The KWRP expanded the Envirosuite sensor network with the addition a three community monitoring locations; The Northside Association; Krom / Prouty Park; and Rockwell Park. The three additional sensors came online January 20th 2021. The Rockwell Park sensor experienced early technical difficulties which were rectified February 13th 2021. At Envirosuite's recommendation, all deployed sensors were updated to the current model in January 2021. The City Manager's Office approved a 1-year Pilot with SmartCover for the deployment of their H2Scents real time sanitary sewer H2S monitoring. The community online odor complaint form has received additional refinement prior to deployment with the inclusion of sanitary sewer network on the form. With the end of the first quarter 2021, the Envirosuite system now has year over year datasets for comparison and evaluation. The focus of the first quarter of 2021 was on actional data obtainment and data source diversification.

CITY OF KALAMAZOO UPCOMING ANTICIPATED ACCOMPLISHMENTS

The KWRP has several investments underway, proposed, and in the planning phases to aid in the identification and mitigation of odors emitted from the KWRP and City owned sanitary sewer collections system. The remaining three process point source carbon scrubbers are expected to undergo startup and begin beneficial use of two in Q2 2021 with the final unit in Q3 2021. The biofilter treatment technology request for proposal is anticipated to be posted early Q2 2021. Continued management and monitoring of hauling offsite of process byproducts along with the monitoring and source investigation utilizing the EnviroSuite system. The deployment of the SmartCover H2Scents Pilot is anticipated to be conducted early Q2 2021. Chemical treatment of the KWRP's dewatered solids and screens will begin again in the start of Q2 2021 along with a Pilot chemical treatment of our vactor truck spoils in early Q2 2021. The KWRP is in the scoping phase of determining if studies are necessary to determine if odors are being generated and emitted into the community from

additional sanitary sewer interceptors owned by the City. The inclusion of an additional three community monitoring locations is also in the scoping phase to determine potential value added data set locations which fit into the goals of the program. The community online odor complaint form is anticipated for a go live deployment mid quarter two 2021.

Michigan Department of Health and Human Services (MDHHS), in partnership with Michigan Department of Environment, Great Lakes, and Energy (EGLE) and Environment Protection Agency (EPA), intend to perform air sampling within the community. The agencies will utilize the Agency for Toxic Substances and Disease Registry (ATSDR) for technical assistance. A community townhall meeting, coordinated by the above partnership, is anticipated but not yet scheduled.

GRAPHIC PACKAGING INTERNATIONAL, INC UPDATE

Thomas J. Olstad
Kalamazoo Board Mill
Resident Mill Manager
Phone: 269-383-5215
Email: tom.olstad@graphicpkg.com

Date: March 11, 2021

RE: 2021 1st Quarter Odor Management Update

As required in Resolution No. 20-50, provision 3, Graphic Packaging International, LLCs ("Graphic Packaging") is providing our 1st quarter 2021 Odor Management Update to the Kalamazoo City Administration for submission to the City of Kalamazoo Commissioners. This report covers the period of December, 2020 through February, 2021

Included in this update are the minutes (Graphic Packaging portion) of the recent Odor Task Force meeting, current status of the Nuisance Minimization Plan for Odors (NMP) submitted to the Michigan Department of Environment, Great Lakes, and Energy (EGLE) late December, recent chemical treatments to optimize the clarifier and wastewater treatment plant, and the Envirosuite system update.

Odor Task Force Meeting & Minutes

Meeting held February 11, 2021:

Graphic Packaging International - Projects Overview - Currently on target for an April startup on their new expanded recycle plant. The new K2 paper machine projected startup is for the beginning of Quarter 4. They have all their new buildings enclosed now, and they're at 55 degrees inside, to facilitate proper temperature for construction activities indoors, during the coldest part of the year.

GPI Envirosuite Update - The GPI Envirosuite system currently has 10 units in service. They have received 6 more new units for installation in new locations, these 6 units will require commissioning support from Envirosuite personnel to upgrade the firmware to the proper version. Also working through battery upgrade with Envirosuite to resolve low solar battery charging issues. GPI is waiting on Envirosuite personnel availability at this time (about a 2 week wait, perhaps).

GPI Odor Management System - Started their new O2 system about 2 weeks ago. Have worked the bugs out of it and learned about it, and it's becoming a reliable system now. They are learning the interaction of both systems, the peroxide system, and the oxygen system, and both systems will be used and will enhance each other, and be backup for each other, to a certain extent.

GPI Nuisance Minimization Plan for Odors (NMP) - GPI submitted the NMP to EGLE in December. They have received feedback from EGLE, and have a meeting scheduled later this month to review the questions and recommendations.

Next meeting is Thursday, March 25 at 9:30am.

Nuisance Minimization Plan for Odors (NMP)

Graphic Packaging submitted the draft NMP to EGLE late December 2020. EGLE responded back to Graphic Packaging late in January 2021 with several questions regarding details of the draft NMP. Graphic Packaging and EGLE personnel met on Thursday, February 25 for review of the initial set of

questions posed by EGLE. Further communication on the status and implementation of the NMP will be shared as both parties work through the details.

Clarifier and Wastewater Treatment Plant Status

Graphic Packaging continues to optimize process chemistry to further reduce the potential for nuisance odors. The mill recently started an Oxygen Injection System to increase the dissolved oxygen levels in the wastewater clarifier. The impact of this new system, in conjunction with the addition of Hydrogen Peroxide to the Wastewater Treatment Plant, is proving to be an overall improvement to managing the potential for odors from the mill wastewater treatment plant. The mill continues to optimize the system with promising results to date.

Envirosuite Monitoring System

Graphic Packaging installed the Envirosuite hydrogen sulfide (H2S) monitoring system in September 2020. After working through the initial startup and commissioning phase, the system has been on line now for several months providing data to measure ambient H2S levels at ten (10) exterior locations throughout the mill site. To gain additional information, the mill recently purchased six (6) additional monitors to increase the overall monitor total to sixteen (16). These additional six (6) units are being installed and commissioned in March.

As outlined in the 2020 4th Quarter Odor Management Update submitted December 11, 2020, Graphic Packaging will continue to:

- Provide quarterly reports to the City of Kalamazoo summarizing our odor mitigation efforts.
- Continue to work with the community's Odor Task Force.
- Continue to remove sludge from the concrete pad along Paterson Street five to six days per week. Historically this was performed two or three days per week. This has reduced the potential for composting odors.
- Continue to add chemical treatments to the clarifier to reduce the potential for odor.
- Continue to use the Envirosuite monitoring network installed in September 2020 to monitor H2S ambient air concentrations at various locations.
- Continue to work with consultants to finalize the operational practices to minimize odors from GPI's operations.

Appendix A

interoffice memo

Date: 02-15-2021

To: Jim Cornell, Wastewater Division Manager

From: Mike Buzzo, Treatment Control Supervisor

RE: Notes from the February 11, 2021 Odor Task Force Meeting at 8:00 AM.

Introductions/Attendees: **John Curran,** Chief of Staff for **Senator Sean McCann**; **Monica Brothers**, from Michigan EGLE; **Rich Townley, Donald Krug, Tom Olstad, and Gregg Lanternier,** from Graphics Packaging; **Aaron Davenport** and **Alexis Kontorousis** from Jones and Henry Engineers; and **Jim Cornell, Ryan Stoughton, Ron Janssen, Steve Helmer, and Mike Buzzo,** from the City of Kalamazoo. (13 total attendees). My apologies if I missed anyone.

The WebEx meeting began at 8:00 AM.

Graphics Packaging International- Projects Overview- Currently on target for an April startup on their new expanded recycle plant. The new K2 paper machine projected startup is for the beginning of Quarter 4. They have all their new buildings enclosed now, and they're at 55 degrees inside, to facilitate proper temperature for construction activities indoors, during the coldest part of the year.

GPI Envirosuite Update- The GPI Envirosuite system currently has 10 units in service. They have received 6 more new units for installation in new locations, these 6 units will require commissioning support from Envirosuite personnel to upgrade the firmware to the proper version. Also working through battery upgrade with Envirosuite to resolve low solar battery charging issues. GPI is waiting on Envirosuite personnel availability at this time (about a 2 week wait, perhaps).

GPI Odor Management System- Started their new O_2 system about 2 weeks ago. Have worked the bugs out of it and learned about it, and it's becoming a reliable system now. They are learning the interaction of both systems, the peroxide system, and the oxygen system, and both systems will be used and will enhance each other, and be backup for each other, to a certain extent.

GPI Nuisance Minimization Plan for Odors- GPI submitted the plan to EGLE in December. They have received feedback from EGLE, and have a meeting scheduled later this month to review the questions and recommendations.

City of Kalamazoo- Biofilter Progress Status- Regulatory update – Received Joint Permit Pre-Application Site Investigation Letter. Based on the field investigation and proposed Project Scope, no Part 303 of the NREPA permit will be required, no Part 301 Inland Lakes and Streams permit required, and no Part 31 Water Resources Protection of NREPA permit required. We are getting closer to the

point that actual construction can begin, pending a few other developments. Monica Brothers asked about what locations will be treated by the biofilter. There are 5 or 6 interceptor sewer pipes into the plant on which the biofilter will pull intake air from and pass that air through the biofilter to treat the odors. There are limits on how far and where the air will be pulled from, and that will be assessed and addressed at a later date, after the system is installed and operating.

City of Kalamazoo Carbon Scrubbers Update- Installing the fiberglass ductwork in indoor areas. The outdoor ductwork will have to wait until warmer temperatures in the spring. The primary settling area will probably be the first up in the spring, followed by all the other units.

City of Kalamazoo- Community air sampling study- Further testing will be done by others, MDHHS, EGLE, and EPA will be doing additional testing, partnering with ATSDR (Agency for Toxic Substances & Disease Registry) for technical assistance, and there is planning underway for a townhall meeting at some point in the future regarding test results.

City of Kalamazoo- EnviroSuite System- Working out some issues with the new units recently installed (three of them). Working towards providing public access to the system by April, perhaps, once that can be set up properly, and any bugs addressed.

City of Kalamazoo- Real Time Sewer H_2S Monitoring- "Smart Covers" 1-year pilot program will be used to test for H_2S in the collection system at 5 locations where samples were taken in the fall of 2020. This will provide us a baseline level before, and then after, the biofilter startup. This plan was submitted to city leadership for approval last week.

The meeting ended at approximately 8:40 AM.

Thank you,
Mike Buzzo.

Appendix B

Odor Task Force Meeting Minutes - March 25, 2021, 9:30 AM.

Date: 03-26-2021

To: Jim Cornell, Wastewater Division Manager

From: Mike Buzzo, Treatment Control Supervisor

RE: Notes from the March 25, 2021 Odor Task Force Meeting at 9:30 AM.

Introductions/Attendees: **Rich Townley, Donald Krug, Tom Olstad, and Gregg Lanternier,** from Graphics Packaging; **Aaron Davenport** and **Alexis Kontorousis** from Jones and Henry Engineers; **Monica Brothers**, from the Michigan Dept. of EGLE; **Annie Brown**, West Michigan Regional Coordinator for Senator Gary Peters Office; **Aaron Wright**, Environmental Concerns Committee; and **Jim Cornell, Ryan Stoughton, Ron Janssen, Steve Helmer, and Mike Buzzo,** from the City of Kalamazoo. (14 total attendees). My apologies if I missed anyone.

The WebEx meeting began at 9:32 AM.

Graphics Packaging International- Projects Overview- Tom Olstad gave us an update on the status of construction projects underway at GPI. They are still on target for an early May startup on their new expanded recycle fiber plant. The new K2 paper machine projected startup is for the beginning of Q4 2021. They are progressing well toward that goal, and expect to be on-time. Rich Townley explained that this project is a huge one, requiring 600 shipping containers, primarily from Finland, where the manufacturer of the paper machine is located. They have about 80 more shipping containers yet to receive and install on the project, having completed over 500 of them so far.

GPI Envirosuite Update- Tom Olstad gave an update on the GPI Envirosuite H_2S detection system. They now have 16 units in their system, with their 6 newest units being commissioned right now. Gregg Lanternier added that personnel from Envirosuite were onsite at GPI on Tuesday and Wednesday of this week to resolve firmware and battery charging issues on the 6 new units, and to get them commissioned and working well.

GPI Odor Management Systems- Tom discussed the two odor management systems installed at GPI. They have both systems, the peroxide injection system, and the oxygen injection system, fine-tuned and running well now.

City of Kalamazoo- EnviroSuite Update- Ryan Stoughton pointed out that the Envirosuite Sensors only detect and measure hydrogen sulfide (H_2S) gas. He said there may have been a little confusion on that point, but that the sensors only measure and quantify the H_2S. There may be a slight "bleed over" of some other compounds, but not to any appreciable amount, and other compounds are not specifically measured or quantified. Jim Cornell added that the City of Kalamazoo now has 12 Envirosuite sensors

in its system, 6 within the KWRP property, and 6 out in the community. We initially had 3 community sensors, and added 3 additional community sensors in Q1 2021. The City is looking to expand the system even more by adding an additional 3-6 sensors. The city has been operating the Envirosuite system now since September of 2019, so we are starting to get a good baseline of data to compare and evaluate as time goes on.

City of Kalamazoo- Biofilter Progress Status- A Request for Proposals is due to go out to equipment vendors in Q2. This is the system that will pull foul air out of multiple sewer interceptor pipes and treat that air for odors.

City of Kalamazoo Carbon Scrubbers Update- The outdoor ductwork that warmer weather will allow for the fiberglass work to proceed. The first scrubber unit in service Q4 2020, two more are being completed Q2 2021, and the fourth one should be done by end Q3 2021. That would complete all four of the planned carbon scrubber units in this project.

City of Kalamazoo- Chemical and Biological Odor Control Pilot Projects- Steve Helmer gave an update on chemical and biological treatment projects currently being used. In April, we will start treating trucks once again, as we had been doing last year. Remedia will be here in early April to help us make improvements to our systems for treating truckloads and various tubs in the plant. We have also been using biological additives from KML to help remove scum buildups and odors in the plant. All of these efforts seem to be working well and producing results. We are ordering a portable chemical sprayer and tank so that we will be able to treat other areas of our plant, such as the Vactor spoils area, and the hauled waste receiving area.

Community air sampling study- EGLE is coordinating the details. Monica Brothers said that they would be installing 2 units along Riverview Drive in mid-April, once the site permissions are worked out. These will be continuous H2S monitoring units, very similar to the Envirosuite units in use by the City and GPI.

City of Kalamazoo- Real Time Sewer H_2S Monitoring- "Smart Cover H2Scents" a 1-year pilot program will be used to test for H_2S in the collection system at 6 sewer locations where samples were taken in the Q3 2020. This will provide us a baseline level before, and then after, the biofilter startup. This pilot has been approved and will begin Q2 2021. Jim Cornell added that we do quarterly "data dumps" on the Envirosuite data, and will should be able to do the same with the Smart Sewers H_2S data as we begin to receive it. We are also working to integrate our sewer complaint forms with our data systems and sewer mapping, etc., and are hoping to have that all working properly by May.

Survey to determine future meeting dates and times- Ryan will do another Survey Monkey survey to determine future meeting dates, times, and frequency that work best for everyone.

The meeting ended at approximately 10:10 AM.

Thank you,
Mike Buzzo.

Appendix C

STATE OF MICHIGAN
DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY
KALAMAZOO DISTRICT OFFICE

GRETCHEN WHITMER
GOVERNOR

LIESL EICHLER CLARK
DIRECTOR

February 4, 2021

Mr. Ryan Stoughton
1415 N Harrison Street
Kalamazoo, Michigan 49007

Dear Mr. Stoughton:

SUBJECT: Preapplication Meeting
Department of Environment, Great Lakes, and Energy (EGLE)
Submission Number HP3-1F89-7XBDW

This letter is a follow-up to our October 12, 2020*, on-site* preapplication meeting regarding the proposed project at the Kalamazoo Wastewater Treatment Plant (WWTP) in the City of Kalamazoo, Kalamazoo County. The purpose of a preapplication meeting is to provide you with information that will clarify the permit process, answer preliminary questions about your specific project in order to avoid delays at a later date, and to determine, if possible, the need for wetland or inland lakes and streams permits.

During this meeting, we reviewed the need to obtain a permit under Part 301, Inland Lakes and Streams; and Part 303, Wetlands Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA). The review was based on discussion of the proposed project, a review of the proposed area and potential modifications to the project discussed during our meeting.

The purpose of the meeting was to review the proposed location of a new biofiltration system to treat odorous air. The biofilter will be located on the south east corner of the existing WWTP property, west of the Kalamazoo River.

Based on the information provided with the preapplication meeting request, and our review of the proposed project area and limits of earth change, EGLE's Water Resources Division (WRD) has determined that a permit is NOT required under Part 303 of the NREPA for the project as proposed. No wetlands were identified within the project area.

Unless the project will involve any work directly in the water or on bottomlands of the Kalamazoo River, a Part 301 permit will not be required either. It is our understanding that no work regulated under Part 301 is proposed at this time.

If the work is outside of the 1.0% annual chance (100-year) floodplain you would not need a permit for this project under the Floodplain Regulatory Authority found in Part 31, Water Resources Protection, of NREPA. We do not regulate development in the 500-year floodplain. For regulatory purposes please use the floodplain elevation of XS-H shown on the attachment for the site of the proposed construction.

This determination is based on the enclosed project plans. Provided that the proposed project and location are not altered, this determination is binding on EGLE for a period of two years from the date of this meeting.

We appreciated the opportunity to meet with you and provide feedback on the project. If you should have follow-up questions, please contact me at 269-569-3609; HaroldsonD@michigan.gov; or EGLE, WRD, Kalamazoo District Office, 7953 Adobe Road, Kalamazoo, Michigan 49009-5025.

Sincerely,

Derek Haroldson
Water Resources Division

DH: SE

Enclosure
cc: Mr. Aaron Davenport, Jones & Henry
Mr. John Bayha, EGLE

City of Kalamazoo GIS

If elec. is fed from new LC

connect to existing nat gas stub @ valve, installed 2019

If elec. is fed from Tert. Sand MCC 18

Stub and cap nat gas service

Proposed 480V AC @ ??? amps

Proposed 2" Nat Gas 5.4 PSI

Possibly remove & blind flange abandoned flow meter.

Proposed Plant Water Service

Proposed City Water Tap & Service w/ Meter, coordinate w/ CoK Water Division

Forklift Access

Realigned / expanded parking lot

BioScrubber Media Bed(s)

BioScrubber Equipment Building

Realign fence as needed. Remove tree as needed.

Connect ducting to this chamber

Remove abandoned sampler shed.

Current elec. feeder to Diversion Chamber 1 is from MCC PP-1 in Pilot Plant.

Disconnect feeder from MCC PP-1 and connect it MCC BioScrubber Equipment Building (MCC-??)

Media Bed contained within a concrete containment structure. Top of Concrete 3'-0" above 100 yr flood elevation.

Media Bed shall be automatically misted and chemical treated to assure proper media moisture content and microorganism nutrient load. Media Bed shall be covered with an exhaust stack for monitoring of discharge air quality and quantity.

Real-time sensors shall provide automation control and operational & maintenance alerts of system.

Static pressure sensors shall be provided to transmit readings across the following items: Mist Eliminator, Fan, and Media Bed.

Equipment building Top of Concrete foundation perimeter wall 3'-0" above 100 yr flood elevation.

Equipment building shall be equipped with an OH crane capable of lifting fan(s) and IBC chemical totes for placement on secondary containment.

Mist and grease eliminator shall be housed inside Equipment Building.

All drains shall route back to headworks.

Power feeder from LC-1 & LC-10 replacement LC currently in design for Contract 75 to a new MCC located inside BioScrubber Equipment Building.
OR
Power feeder from MCC located in Tertiary Sand Filter MCC. (Much of the load fed from this MCC is going away).

Process Control Communication via radio to onsite radio tower.

Initial design for 12 ACH's of piping connected to chamber. Sampling and analysis will probably need to be conducted to determine any other odor compound presence and levels; Ammonia, mercaptains,

Legend

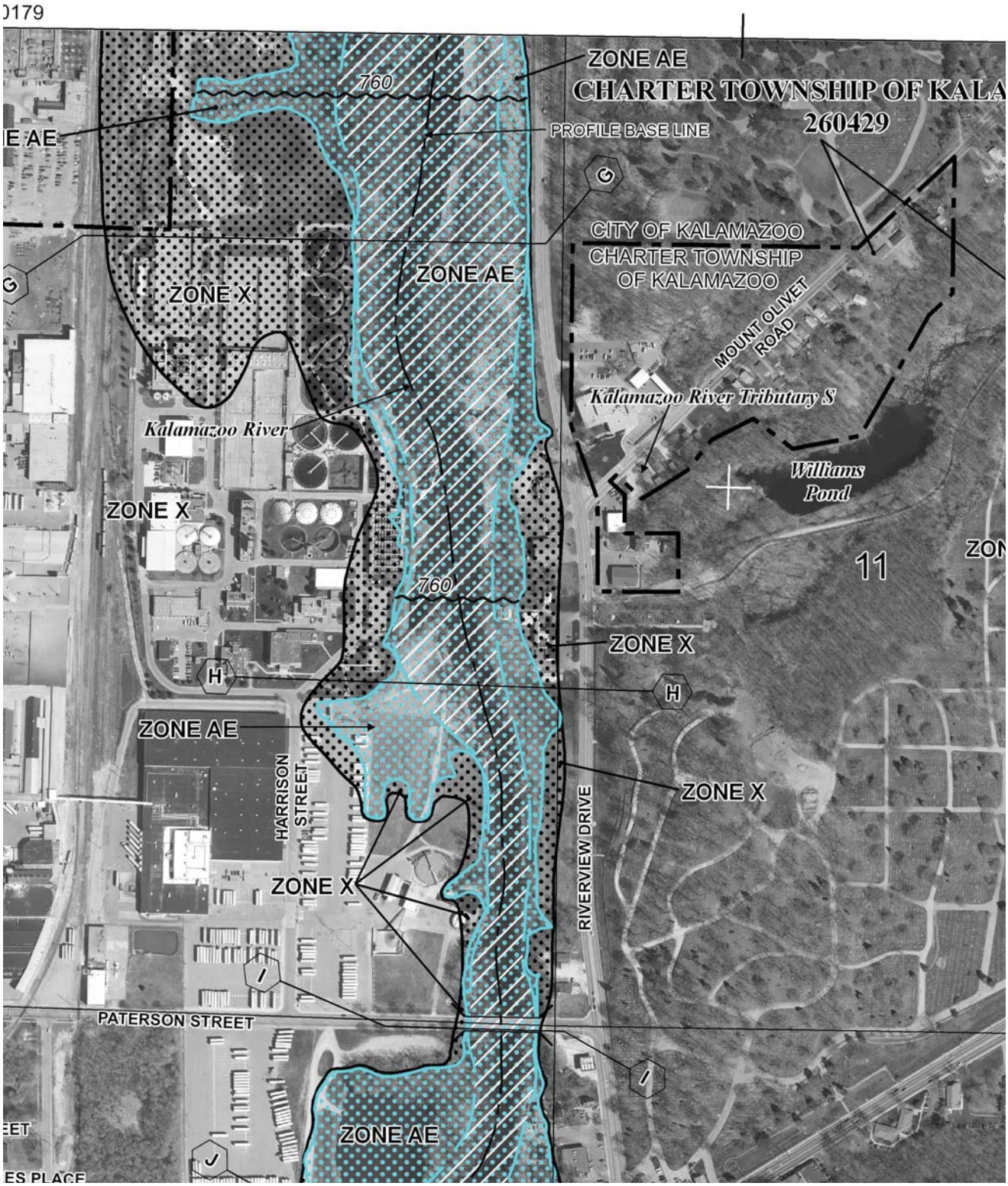
- Street Names - City
- Parcels
- Floodway

1: 1,128

0.0 0 0.02 0.0 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere

THE CITY OF Kalamazoo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PATERSON STREET
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ZONE AE
J
ES PLACE

FLOOD INSURANCE STUDY

KALAMAZOO COUNTY, MICHIGAN

(ALL JURISDICTIONS)

Community Name	Community Number
* Alamo, Township of	261387
Augusta, Village of	260312
Brady, Township of	261388
Charleston, Township of	260426
Climax, Township of	261389
* Climax, Village of	261385
Comstock, Charter Township of	260427
Cooper, Charter Township of	260428
Galesburg, City of	260576
Kalamazoo, City of	260315
Kalamazoo, Charter Township of	260429
Oshtemo, Charter Township of	260736
Parchment, City of	260319
* Pavilion, Township of	260907
Portage, City of	260577
Prairie Ronde, Township of	261392
Richland, Township of	260885
* Richland, Village of	261015
Ross, Township of	260624
Schoolcraft, Township of	261394
* Schoolcraft, Village of	261386
Texas, Charter Township of	261395
Vicksburg, Village of	260578
* Wakeshma, Township of	261396

Kalamazoo County

* NO SPECIAL FLOOD HAZARD AREAS IDENTIFIED

February 17, 2010

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
26077CV000A

channel and overbank conditions remain essentially the same as ascertained during this study.

Flood profiles were drawn showing the computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals. In cases where two or more profiles are close together, due to limitations of the profile scale, only the higher profile has been shown.

Streams studied by approximate methods are listed in Section 1.2. Channel cross sections for these streams were based on elevation data obtained from USGS. In locations where no channel was defined by this elevation data, one was approximated using aerial photography. Manning's "n" values were based on aerial photography. Starting water-surface elevations were based on either known water-surface elevations or normal depths at the downstream end of each reach.

All elevations are referenced from NAVD88; elevation reference marks used in the study are shown on the maps.

3.3 Vertical Datum

All FIS reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum in use for newly created or revised FIS reports and FIRMs was the NGVD29. With the finalization of the NAVD88, many FIS reports and FIRMs are being prepared using NAVD88 as the referenced vertical datum.

Effective information for this countywide FIS report was converted from NGVD29 to NAVD88 based on data presented in Table 10. The average conversion of NGVD29 - 0.434 foot was applied to convert all effective Base Flood Elevations (BFEs). Structure and ground elevations in the community must, therefore, be referenced to NAVD88. It is important to note that adjacent communities in other counties not presented in this countywide FIS may be referenced to NGVD29. This may result in differences in BFEs across the corporate limits between communities.

For more information on NAVD88, see the FEMA publication entitled Converting the National Flood Insurance Program to the North American Vertical Datum of 1988 (Reference 35), or contact the Vertical Network Branch, National Geodetic Survey, Coast and Geodetic Survey, National Oceanic and Atmospheric Administration, Silver Spring, Maryland 20910 (http://www.ngs.noaa.gov).

FLOODING SOURCE		FLOODWAY				1-PERCENT-ANNUAL-CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	WIDTH REDUCED FROM PRIOR STUDY (FEET)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
KALAMAZOO RIVER									
A	0	677	4,092	1.8		755.3	755.3	755.4	0.1
B	850	1,172	5,457	1.4		755.5	755.5	755.6	0.1
C	2,860	599	2,386	3.1		756.0	756.0	756.1	0.1
D	4,391	304	2,509	3.0		757.0	757.0	757.1	0.1
E	7,188	259	2,640	2.8		758.7	758.7	758.8	0.1
F	8,200	207	1,851	4.0		759.1	759.1	759.2	0.1
G	10,855	610	2,547	2.9		759.7	759.7	759.8	0.1
H	12,455	325	2,200	3.4		760.1	760.1	760.2	0.1
I	13,650	251	2,595	2.8		760.5	760.5	760.6	0.1
J	14,600	407	2,763	2.7		760.7	760.7	760.8	0.1
K	15,443	191	1,903	3.9		761.1	761.1	761.2	0.1
L	15,993	377	2,596	2.8		761.3	761.3	761.4	0.1
M	16,643	254	2,300	3.2		761.5	761.5	761.6	0.1
N	17,122	181	2,237	3.3		762.3	762.3	762.4	0.1
O	18,707	180	2,039	3.4		762.7	762.7	762.8	0.1
P	20,157	525	3,505	2.0		763.0	763.0	763.1	0.1
Q	21,643	177	2,776	2.5		763.2	763.2	763.3	0.1
R	23,093	94	1,281	5.4		763.2	763.2	763.3	0.1
S	24,442	155	1,859	3.7		763.9	763.9	764.0	0.1
T	24,599	190	2,220	3.1		764.2	764.2	764.3	0.1
U	26,624	498	3,933	1.8		764.5	764.5	764.6	0.1
V	27,824	565	4,117	1.7		764.6	764.6	764.7	0.1
W	28,674	905	5,907	1.2		764.8	764.8	764.9	0.1
X	29,354	584	4,538	1.5		764.8	764.8	764.9	0.1
Y	31,054	252	2,109	3.3		765.1	765.1	765.2	0.1

[1]Feet above Township of Kalamazoo corporate limits

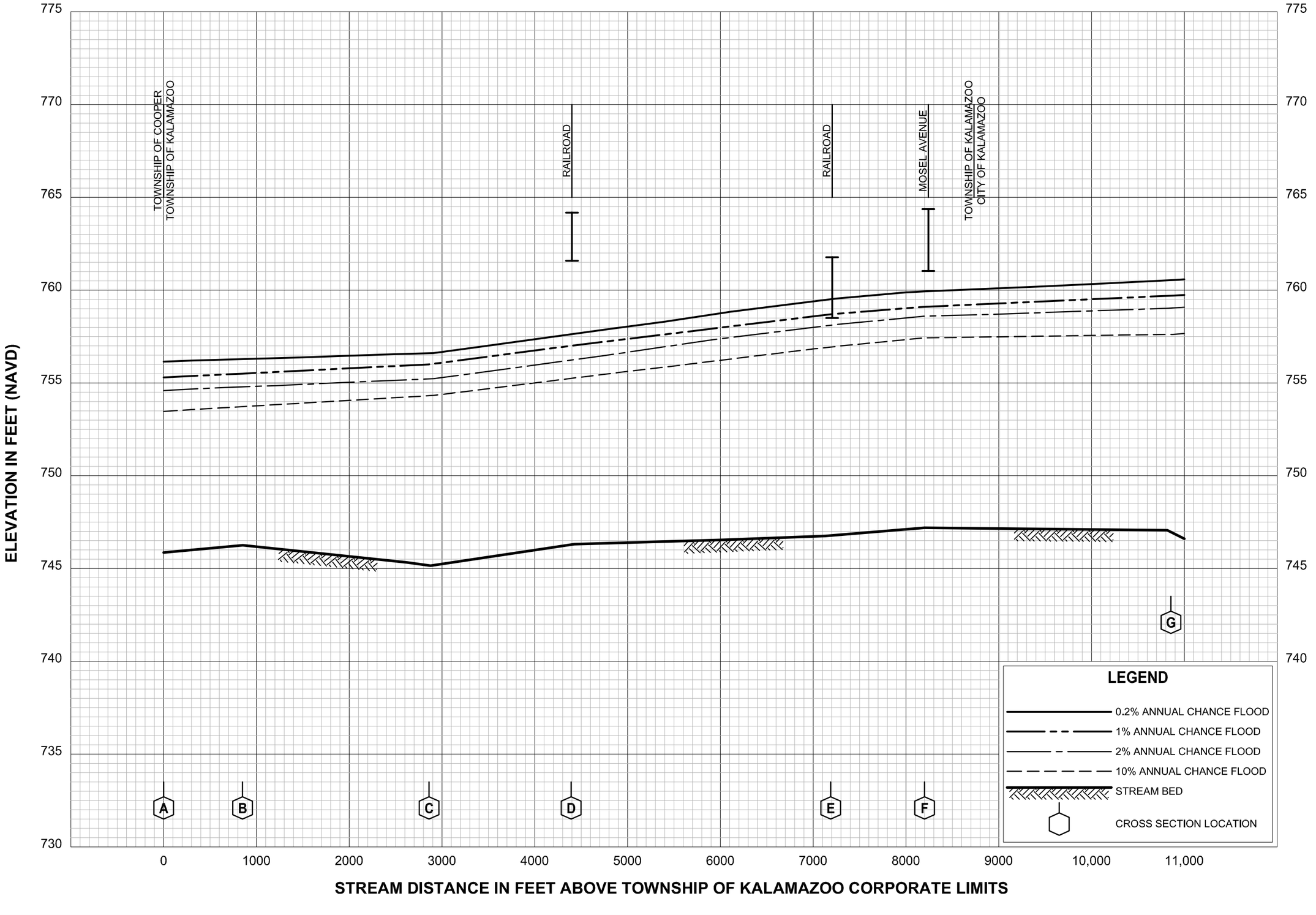
TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

KALAMAZOO COUNTY, MI
(ALL JURISDICTIONS)

FLOODWAY DATA

KALAMAZOO RIVER



FLOOD PROFILES

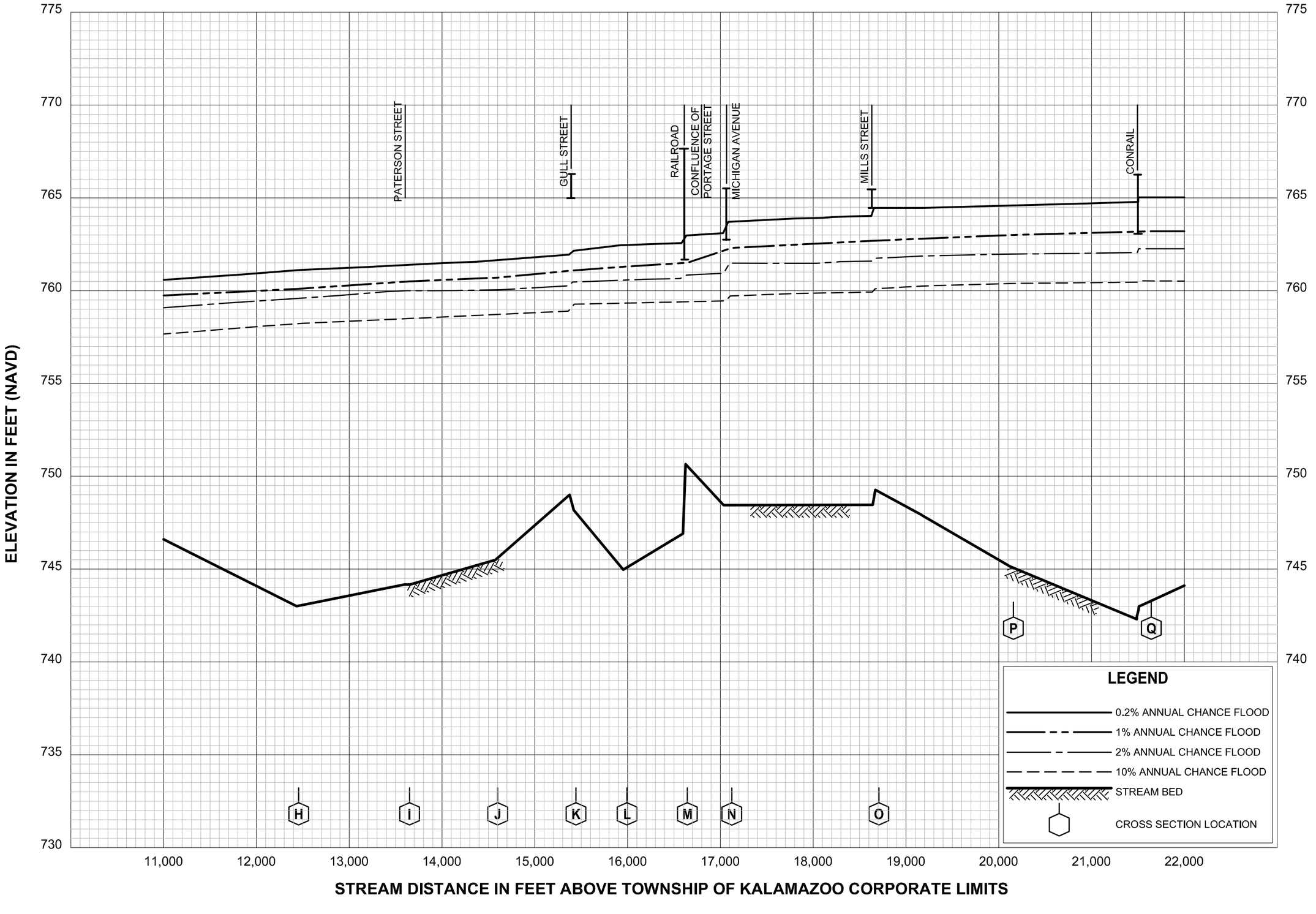
KALAMAZOO RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

KALAMAZOO COUNTY, MI

(ALL JURISDICTIONS)

26P



FLOOD PROFILES

KALAMAZOO RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

KALAMAZOO COUNTY, MI

(ALL JURISDICTIONS)


Harrison St
Kalamazoo River
Kalamazoo Township
Police Department
Harrison St
The Dog Dive
City of Kalamazoo -
Protect Your Water
Riverview Dr
Harrison St
Open Roads
Bike Program
Harrison St
Biofiltration project site
Sanitary sewer connection site
Harrison St
Kalamazoo River
Riverview Dr
Harrison St
E Paterson St
E Paterson St
E Paterson St

Appendix D

EGLE takes enforcement action against Graphic Packaging

Michigan Department of Environment, Great Lakes, and Energy sent this bulletin at 01/27/2021 12:00 PM EST

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EGLE takes enforcement action against Graphic Packaging

The Michigan Department of Environment, Great Lakes, and Energy (EGLE), Air Quality Division is taking escalated enforcement against Graphic Packaging. EGLE is restarting the enforcement action that began in July 2019 and had been suspended to allow Graphic Packaging to perform an Odor Investigation Study. The Odor Investigation Study has been completed.

The enforcement action will address the odor violations and a violation notice issued on November 20, 2020 for installing equipment before an air permit was approved.

The results of escalated enforcement can take time. The enforcement action will contain a monetary penalty, a compliance plan, and sometimes a Supplemental Environmental Project. The public will have an opportunity to view and submit comments before the enforcement action is finalized. Further information about the public's involvement will be provided at that time.

Information about this enforcement action and other air quality information related to Graphic Packaging, such as odor plans, current air permits and who to contact with questions or concerns can be found at Michigan.gov/EGLEGraphicPackaging.

EGLE COVID-19 RESPONSE:
For details on EGLE's work during the pandemic, visit our COVID-19 response webpage. Follow state actions and guidelines at Michigan.gov/Coronavirus.

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Appendix E

STATE OF MICHIGAN
MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
LANSING

GRETCHEN WHITMER
GOVERNOR

LIESL EICHLER CLARK
DIRECTOR

January 22, 2021

UPS NEXT DAY DELIVERY

ENFORCEMENT NOTICE

In the matter of:

Graphic Packaging International, LLC
1500 North Pitcher Street
Kalamazoo, Michigan 49007 SRN: B1678; Kalamazoo County

ATTENTION: Mr. Richard Townley

As you are aware in July 2019, the Michigan Department of Environment, Great Lakes, and Energy (EGLE), Air Quality Division (AQD) commenced an escalated enforcement action against Graphic Packaging International, LLC (GPI). After initial enforcement discussions it was determined the best path forward was to suspend enforcement negotiations while GPI designed and performed an Odor Investigation Study. The Odor Investigation Study has been completed and the final report was submitted to the AQD on November 3, 2020. Additionally, on December 30, 2020, GPI submitted an Odor Minimization Plan to the AQD describing how GPI will address areas of concern identified during the Odor Investigation Study.

The AQD is now providing GPI an opportunity to reengage to formally resolve the violations listed in the July 8, 2019 Enforcement Notice and the November 20, 2020 Violation Notice through the entry of a legally enforceable agreement that will include a compliance program and payment of an appropriate monetary penalty pursuant to Section 5528 of Part 55 of NREPA, MCL 324.5528. This will also act as an opportunity for the AQD to provide comments and questions the AQD has regarding the Odor Investigation Study and Odor Minimization Plan.

Please contact me at 517-275-0943, or by email at WolfJ2@Michigan.gov, no later than Tuesday, February 2, 2021, to schedule a meeting to discuss the resolution of this matter.

STATE OF MICHIGAN
MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

By:_____
Jason Wolf
Air Quality Division, Enforcement Unit

Date: January 22, 2021

cc: Mr. John Byl, Warner Norcross & Judd LLP
Ms. Sarah Marshall, U.S. EPA, Region 5
Mr. Neil Gordon, MDAG
Mr. Rex Lane, EGLE
Ms. Jenine Camilleri, EGLE

Appendix F

Odor Investigation Results
Graphic Packaging International, LLC's Recycled Paperboard Mill in Kalamazoo, MI

November, 2020

Prepared for:

Graphic Packaging International, LLC

Prepared by:

RK & ASSOCIATES, INC

RK & Associates, Inc.

2 South 631 Route 59
Suite B
Warrenville, Illinois 60555
Phone: 630-393-9000
Fax: 630-393-9111

1. INTRODUCTION

RK & Associates, Inc. (RKA) is retained to investigate and to evaluate potential odor impact in the nearby community of the Graphic Packaging International, LLC (GPI) recycled paperboard mill facility, located at 1500 North Pitcher Street in Kalamazoo, Michigan. An Odor Investigation Plan for determining this potential odor impact was submitted to, and subsequently approved by, the Michigan Department of Environment, Great Lakes and Energy (EGLE) on June 4, 2020 prior to initiating field investigation activities. Appendix A provides this approved Odor Investigation Plan.

The odor investigations included odor monitoring at 24 GPI property perimeter and nearby community locations (as approved by EGLE) which were conducted three times per week for a period of 60 days. These odor monitoring events included characterizing odors, measuring odor thresholds and taking hydrogen sulfide (H_2S) concentration measurements. In addition, RKA selected nine locations on site at the GPI facility to measure H_2S concentrations and collect air samples to be evaluated by an RKA odor panel and analyzed by RKA with an Olfactometer for odor threshold. RKA also reviewed meteorological data for evaluation of potential odor impact in the nearby community.

In the balance of this document, details of the investigation are presented including the procedures used, data results, and our findings.

2. INITIAL ODOR EVALUATION AND MONITORING LOCATION SELECTION

2.1 Initial Site Visit

RKA visited the GPI facility in Kalamazoo to evaluate its current odor status and conducted the following activities:

- Toured the facility to get familiar with the process and current operation, and to identify potential odor sources and identify locations to measure H_2S concentrations and collect air samples for subsequent evaluation
- Interviewed management personnel about daily operations, identified and inspected suspected odor sources, regulatory issues, and odor complaints
- Reviewed available history of odor complaints, frequency of odor complaints, location of complaints, and odor characteristics of the complaints, including publicly available information on complaints compiled by EGLE
- Reviewed predominant wind conditions and assessed correlation against historical odor complaints
- Toured the facility perimeter and neighboring communities to identify potential odor monitoring locations, and other potential odor sources, such as the adjoining City of Kalamazoo Water Reclamation Plant
- Selected odor monitoring locations along mill property line or appropriate mill perimeter locations. Selected odor monitoring locations located in the community in nearby

residential areas.

2.2 Monitoring Locations Selection

Five mill perimeter monitoring locations, P-1 through P-5, were selected along facility fence lines. Nineteen (19) community locations, C-1 through C-19, were identified in the nearby community. A map of monitoring locations is shown in Figure 1A and 1B (Figure 1B is a zoom version which shows further details of the selected locations).

Further review of initially selected locations showed that locations C-1 & C-2 were placed at the facility property line. Location C-6, which was initially placed at the intersection of E. Paterson St and Riverview Drive, was moved for safety reasons to the parking lot of Verburg Park, which is just across the GPI property line. These three locations were reclassified as perimeter locations for the analysis of the monitoring data.

3. ODOR MONITORING

RKA retained Fishbeck, Inc. (Fishbeck) to conduct the field odor monitoring activities. Fishbeck personnel were trained by RKA at the GPI mill on June 30, 2020.

Field odor monitoring was conducted by Fishbeck up to three times per week for a period of sixty days. Odor monitoring began July 9, 2020 and concluded on September 4, 2020 which resulted in odor monitoring being completed on a total of 26 days and yielding 624 total monitoring events. The day and time of the odor monitoring were randomly selected throughout the week, but during GPI's operating hours.

During each field odor monitoring day, Fishbeck completed the following activities at each of the 24 odor monitoring locations:

- Determine whether an odor characteristic (paper mill/process wastewater, municipal wastewater, mixed paper mill/process wastewater and municipal wastewater, or "other" can be detected by the individual (personal olfactory determination);
- Determine the number of air dilutions using a Scentometer field olfactometer until the odor characteristic could not be detected by the individual. The Scentometer allows for the odor threshold to be evaluated within six dilution to threshold (D/T) increments (Table 1);
- Measure the H_2S concentration using a Jerome 631-X analyzer;
- Record all measurements along with the date and time;
- Check Weather Underground KMIKALAM120 station data to verify and record wind direction and wind speed.

Recorded measurements of the odor characteristics, D/T intervals, H_2S concentrations, and wind directions and speeds are presented in Appendix B.

Table 1. Scentometer Standard Dilution To Threshold Increments

Dilutions to Odor Threshold (D/T) Interval	Description
<170	Odor D/T value is greater than 31 but less than 170
<31	Odor D/T value is greater than 15 but less than 31
< 15	Odor D/T value is greater than 7 but less than 15
< 7	Odor D/T value is greater than 4 but less than 7
< 4	Odor D/T value is greater than 2 but less than 4
< 2	Odor D/T value is greater than 0 but less than 2

Note: For example, D/T of <2 means that there is detectable odor in the ambient air but after the sample is diluted 2 times, odor is no longer detected; D/T of <4 means that there is detectable odor when the sample is diluted 2 times, but odor is no longer detected when the odor is diluted 4 times. Since the device has standard dilution quantities, no other dilution measurements between those quantities listed above are available (e.g., 3 dilutions).

4. ODOR MONITORING RESULTS

4.1 D/T Measurements for All Monitoring Locations

Table 1 presents a summary of Scentometer measurements collected during the 624 odor monitoring events conducted over 26 days at the 24 monitoring locations during the course of this odor investigation. No odors were detected during 433 of these monitoring events along with odors characterized as solely "Other" being detected during 68 monitoring events. Stated another way, during 80 percent (501 out of 624) of the odor monitoring events, no odor was identified relating to GPI's operations.

102 Scentometer monitoring events identified likely paper mill related odor and 12 monitoring events identified the municipal wastewater treatment plant related odor. The remaining nine monitoring events identified a mixed paper mill/municipal wastewater treatment plant related odor.

Table 2. Summary of Measurable Odor Threshold Values and Corresponding Odor Characteristic at all Monitoring Locations

Odor Threshold (D/T)	Odor Characteristic Frequency			
	Paper Mill	Municipal WW	Mixed	Other
<15	3	0	0	0
<7	2	0	0	2
<4	10	1	2	4
<2	87	11	7	62

4.2 D/T Odor Threshold Measurements at Community Locations

Monitoring results were separated between mill perimeter locations and community locations to better evaluate the odor impact if any on the neighboring communities. It is important to recognize the difference between mill perimeter and community locations because any well-run industrial facility will have some odors at its property boundary. This point is important in determining normal odor levels versus what could be odor nuisance levels.

Odor measurements at community locations, which are C-3 through C-6 and C-7 through C-19, are presented in Table 3. A total of 416 odor monitoring events were performed at community locations during the odor investigation. During 319 of these monitoring events no odor was identified and during 53 of these events the odor was characterized as "Other", or about 89.5% of the time there were no odors associated with GPI's operation in the community.

Of the remaining 44 monitoring events at community locations where an odor characterized as something besides "other", 38 monitoring events identified the "paper mill" odor characteristic, 3 events identified the "municipal wastewater" characteristic, and 3 events identified the "mixed" odor characteristic (includes both wastewater and paper mill).

Table 3. Summary of Measurable Odor Threshold Values and Odor Characteristics From 416 Events at Community Monitoring Locations

Odor Threshold (D/T)	Odor Characteristic Frequency			
	Paper Mill	Municipal WW	Mixed	Other
<15	0	0	0	0
<7	0	0	0	2
<4	4	0	0	4
<2	34	3	3	47

In terms of odor threshold levels measured during the investigation, in 319 out of 416 off-site measurements no odor was detected.; 87 out of 416 measurements determined a D/T less than

two,; eight measurements determined a D/T greater than two but less than four,; and two measurements (both not identified as having a "paper mill" characteristic) determined a D/T greater than four but less than seven.

We understand that the state of Michigan, unlike several other states, does not currently have an objective odor nuisance standard or require the Scentometer to measure the level of odors. Nevertheless, looking to the regulatory programs of other states and localities that do rely upon the Scentometer (or similar device) to measure odors helps put the current odor study data in context. See Table 4 below.

Thomas Mahin, in his paper *Measurement and Regulation of Odors in the USA*, references a study conducted for the California Air Resources Board that itself reviewed six published studies related to the recognizability, unpleasantness and annoyance associated with a variety of odors. The study found that for unpleasant odors the threshold of annoyance is about five times the threshold of detection. He also reports that the California's South Coast Air Quality Management District found that at 5 D/T people become aware of an odor and that at 5 to 10 D/T odors may be strong enough to trigger complaints.

During the odor investigation in the community there were four odor threshold measurements with D/T less than four and 34 measurements with D/T less than two associated with the likely paper mill odor characteristic. There were two measurements with D/T less than four and three measurements with D/T less than two identified as "mixed" (paper mill and municipal wastewater) odor characteristic. In RKA's professional opinion, these potential paper mill odor levels do not constitute an odor "nuisance" within the neighboring community.

Table 4. Odor "nuisance" standards by other states.

State or Locality	Source of Standard	Determination Criteria
Colorado	5 CCR 1001-4: Odor Emission	7:1 D/T (2 samples over 1-hour period)
Connecticut	Sec. 22a-174-23: Control of Odors	(a) Nuisance standard; (b) 7:1 D/T (3 samples over 1-hour period); and (c) Ambient air limits for certain substances in Table 23-1 (e.g. Hydrogen sulfide: 0.0045 ppm (15-minute average))
Illinois	Section 9(a) of the Act and 35 IAC 245.121: Objectionable Odor Nuisance Determination	Nuisance standard. 8:1 D/T (Scentometer)
Kentucky	401 KAR 53:010: Ambient Air Quality Standards	7:1 D/T (Nasal Ranger/Scentometer)

State or Locality	Source of Standard	Determination Criteria
Missouri	10 CSR 10-6.165: Restriction of Emission of Odors	7:1 D/T (Nasal Ranger) (2 samples over 1-hour)
North Dakota	Section 33-15-16: Restriction of Odorous Air Contaminants	Objectionable odors prohibited. 7:1 D/T (Scentometer)
San Francisco Bay Area Air Quality District		5 D/T applied after at least 10 complaints within 90 days.[1]
State of Massachusetts	Draft policy and guidance for composting facilities	5 D/T
City of San Diego WWTP		5 D/T average over 5 minutes
City of Seattle WWTP		5 D/T average over 5 minutes

4.3 D/T Odor Threshold Measurements at Mill Perimeter Locations

Odor measurements at locations P-1 through P-5, C-1, C-2, and C-6 are shown in Table 5. A total of 208 measurements were performed at mill perimeter locations during the course of the odor investigation. Out of the 208 measurements, 63 measurements were characterized as paper mill odor, nine were characterized as municipal wastewater, and six were of mixed characterization.

In terms of odor threshold measurements events, 114 times during the 208 measurements no odor was detected. 16 measurements were identified with the "Other" odor characteristic and nine measurements identified the municipal wastewater characteristic. Therefore, during 69.7% of the measurement events there were no odors potentially associated with GPI's operations near the GPI property line.

There were three odor threshold measurements with D/T greater than 7 but less than 15 on-site, and all other detected odors thresholds were below a D/T of 7.

[1] Thomss Mahin, *Measurement and Regulation of Odors in the USA*, 64

Table 5. Odor Readings at Mill Perimeter Locations

Odor Threshold (D/T)	Odor Characteristic Frequency			
	Paper Mill	Municipal WW	Mixed	Other
<15	3	0	0	0
<7	2	0	0	0
<4	5	1	2	1
<2	53	8	4	15

4.4 H_2S Readings

Hydrogen sulfide concentrations were measured during the 624 odor monitoring events in the odor investigation period. A summary of the results is shown in Table 6. The highest measured H_2S concentration was 0.010 ppm on July 9, 2020 at location C-2, a mill perimeter location. As demonstrated in Table 6, there were mostly zero or extremely low H_2S concentrations.

Table 6. H_2S Reading Measured During Odor Surveys

H_2S Concentration Range (ppm)	Number of H_2S Readings
0	368
➢ 0 and ≤ 0.002	212
➢ 0.002 and ≤ 0.004	25
➢ 0.004- and ≤ 0.006	12
➢ 0.006 and ≤ 0.008	5
➢ 0.008 and ≤ 0.010	2
Total	**624**

5. OLFACTOMETRY ANALYSIS OF ODOR SAMPLES

RKA collected nine (9) ambient air samples on site at the GPI facility for olfactometry analysis. The samples were collected August 10 and 11, 2020 and were analyzed August 12, 2020 at the RKA Olfactometry lab. Samples were collected near potential facility odor sources as follows:

- K1 Operating Floor - Coating Kitchen
- K3 Dryer Mezzanine
- Stock Prep Building at News Pulper
- AES Building between Screens
- Clarifier (Downwind of Clarifier)

- Sludge Pile (Downwind of Sludge Pile)
- Sludge Drum Filter Outlet
- Parking Lot B (near discharge to WWTP)
- North of Stock Prep Building

A Jerome 631-X portable H2S analyzer was used to measure ambient H_2S levels during the sample collection. Samples were collected in 10-liter Tedlar bags, labeled, and transported with chain of custody to RKA's office in Warrenville, Illinois, for odor analysis.

Samples were analyzed using an Olfactometer to measure odor thresholds in accordance with ASTM Method E-679-11. Samples were also analyzed for odor characterization using relative intensity scale of 0 to 5 (faint to strong). For each sample, panelists were asked to characterize the odor in one of the "feels like" and "smells like" descriptors.

A detailed report describing sample collection, Olfactometry analysis and odor characterization is included in Appendix C. Table 7 includes a summary of the results. Results show that samples collected at the GPI process wastewater treatment plant, AES Building and Sludge Drum Filter Outlet, have the highest detection threshold levels, followed by samples collected in processing areas which include the K1 Coating Kitchen, K3 Dryer Mezzanine and Stock Prep Building near the news pulper. Samples collected near outdoor sources, Parking Lot B, North of Stock Prep Building, Sludge Pile, and Clarifier, have the lowest detection to threshold values.

Table 7. Summary of Olfactometry Analysis for odor samples collected from GPI facility.

Sample Description	Detection Threshold (ou/scf)	Recognition Threshold (ou/scf)	H_2S Reading (ppm)
Parking Lot B	4	3	0.004
N. of Stock Prep Bldg	3	3	0.003
Sludge Pile	4	3	0.002
Clarifier	41	15	0.033
K1 – Coating Kitchen	94	41	0.091
K3 Dryer Mezzanine	76	28	0.160
AES Building	210	99	0.560
Stock Prep Bldg Pulper	127	46	0.810
Sludge Drum Filter Outlet	294	177	0.510

6. CONCLUSIONS

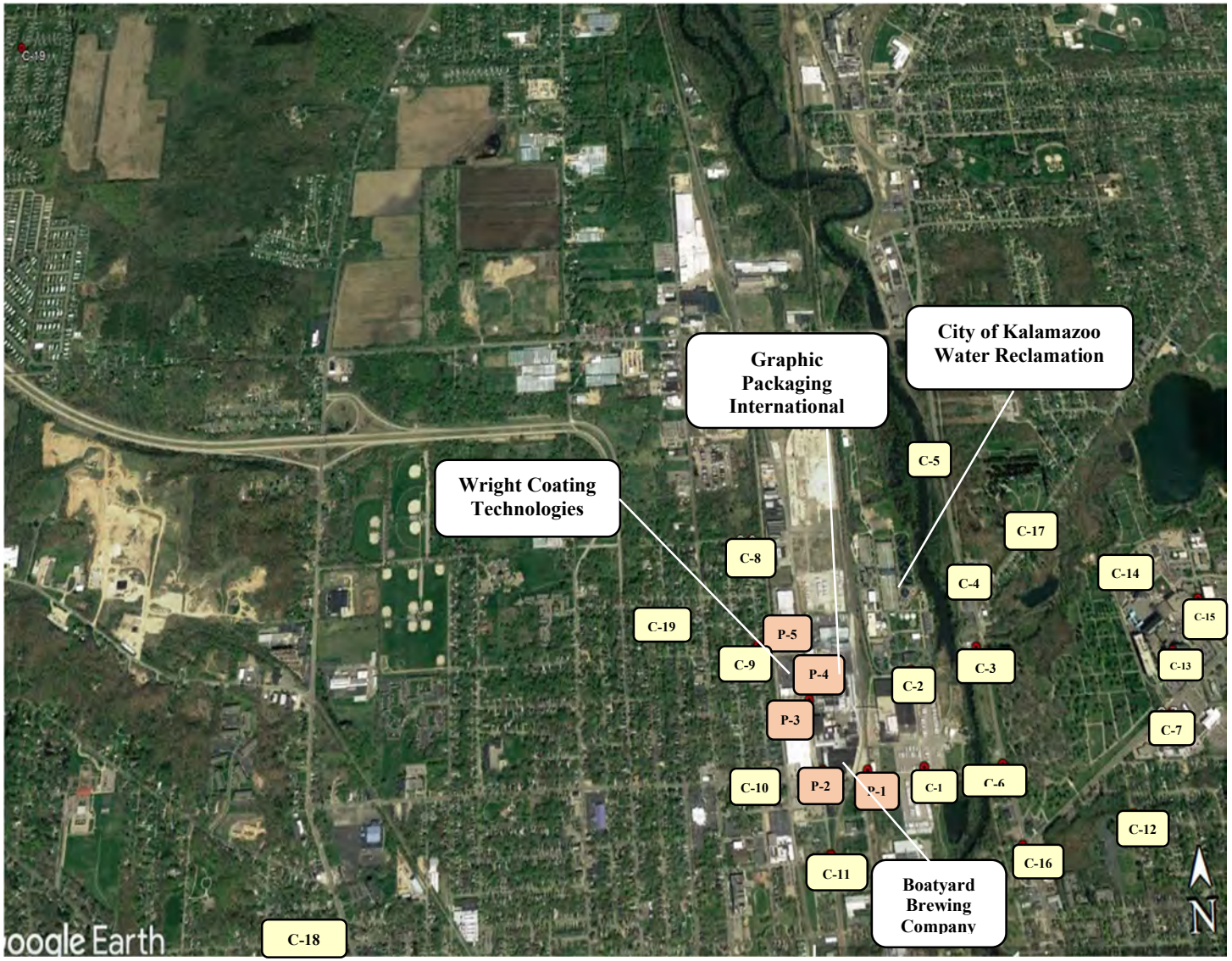
The Odor Investigation Study, as approved by Michigan EGLE, was conducted from July 9, 2020 through September 4, 2020. During the odor investigation, 624 odor and H_2S measurements were taken at all 24 mill perimeter and community locations. Based on the following factors derived from the course of the odor investigation study, in RKA's professional opinion, the odor levels associated with the mill's operations do not constitute an odor "nuisance" situation at the neighboring community:

1. Ninety percent (90%) of the odor measurements taken in the community locations either identified no odor or an odor associated with community types of odors (e.g., cut grass, asphalt/tar, wet mulch, flowers, burnt rubber, burnt plastic, mold/mildew, etc.);
2. The H_2S measured concentrations were extremely low, with the highest being 0.010 ppm;
3. Odor thresholds observed at mill perimeter locations were consistent with expected odors near an industrial facility; and.; and
4. Paper mill odor thresholds measured at community locations were mostly determined to have a D/T less than two and in only four instances had a D/T greater than or equal to two but less than four, with no measurements above four.

Odor Investigation Results
Graphic Packaging International, LLC's Recycled Paperboard Mill
in Kalamazoo, MI

November, 2020

FIGURES



N

RK No.	Location
	Perimeter
P-1	Paterson St & Walbridge St
P-2	Paterson St & Porter St
P-3	Graphic Packaging – Gate 2
P-4	Graphic Packaging – Gate 5
P-5	Graphic Packaging – Gate 6
C-1	Paterson St & Harrison St
C-2	Harrison St at WWT Plant gate
C-6	East side of Verburg Park Parking Lot
	Community
C-3	Kalamazoo River Watershed Council Parking Lot
C-4	Kalamazoo Township Parking Lot
C-5	Riverview Dr & Old Riverview Sav Rd
C-7	Kalamazoo County Juvenile Home Parking Lot
C-8	Dunkley St & Edwards St
C-9	Prouty St & Edwards St
C-10	Paterson S & Edwards St
C-11	Parsons St & Porter St
C-12	St. Mary Catholic Church Parking Lot
C-13	Borgress Medical Center Entrance Parking Lot
C-14	Neurosurgery of Kalamazoo Parking Lot
C-15	Borgress Medical Center at Lawrence Education Center Parking Lot
C-16	Gull Rd & Riverview Dr. at Walgreens Parking Lot
C-17	Front Entrance of Mt Olivet Cemetery
C-18	1248 Blakeslee Street
C-19	Union St. & E. Hopkins St.

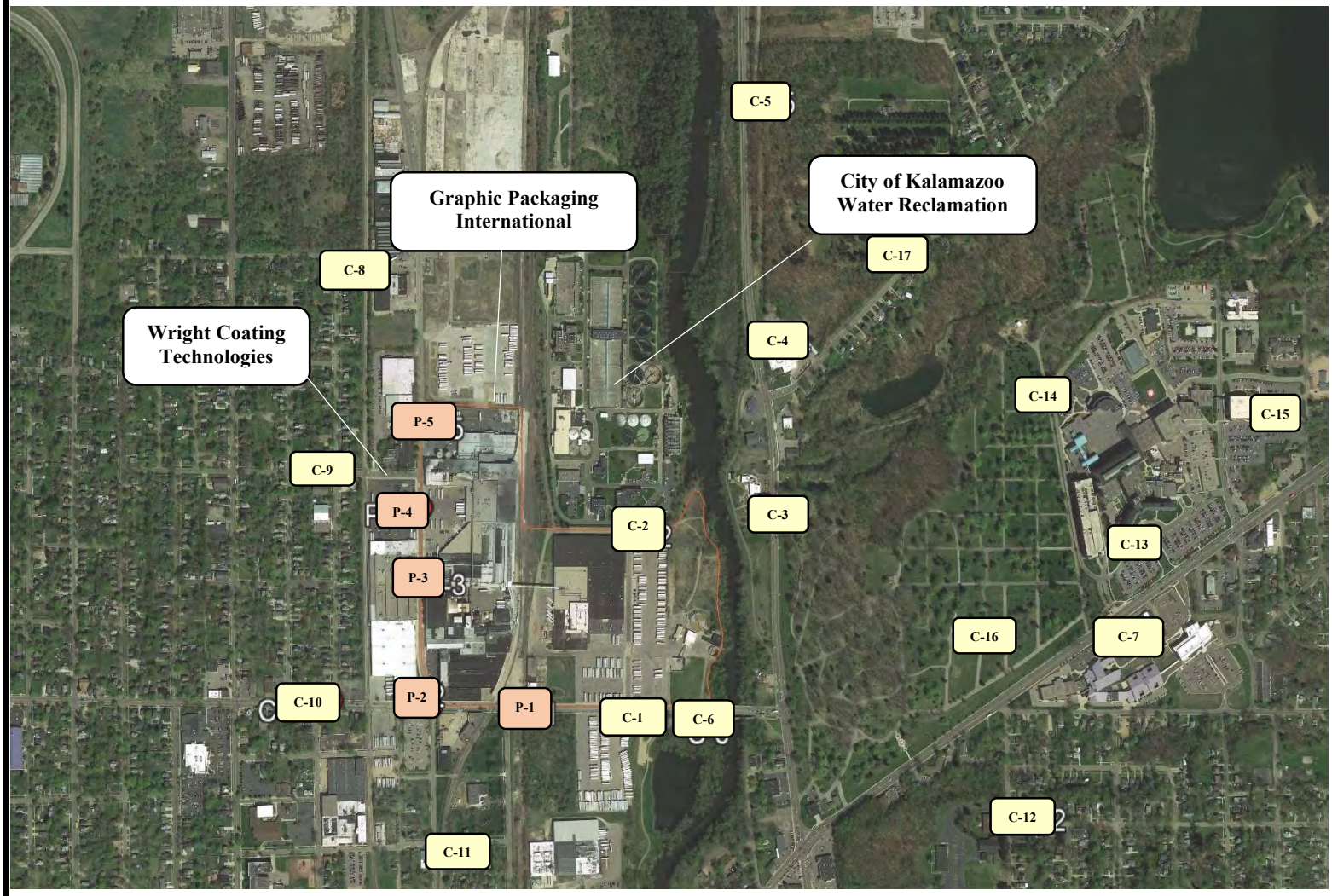
2S631 ROUTE 59, SUITE B
WARRENVILLE, IL 60555
630-393-9000
630-790-2966

COMMENTS: Perimeter and Community Odor Monitoring Location

Graphic Packaging International
Kalamazoo, MI

FIGURE 1A

DRAWN BY:	APPROVED BY:	PROJECT NUMBER:	DATE DRAWN:	REVISED DATE
SS	SR	R19444	01-16-2020	07-02-2020



N

RK No.	Location
	Perimeter
P-1	Paterson St & Walbridge St
P-2	Paterson St & Porter St
P-3	Graphic Packaging – Gate 2
P-4	Graphic Packaging – Gate 5
P-5	Graphic Packaging – Gate 6
C-1	Paterson St & Harrison St
C-2	Harrison St at WWT Plant gate
C-6	East side of Verburg Park Parking Lot
	Community
C-3	Kalamazoo River Watershed Council Parking Lot
C-4	Kalamazoo Township Parking Lot
C-5	Riverview Dr & Old Riverview Sav Rd
C-7	Kalamazoo County Juvenile Home Parking Lot
C-8	Dunkley St & Edwards St
C-9	Prouty St & Edwards St
C-10	Paterson S & Edwards St
C-11	Parsons St & Porter St
C-12	St. Mary Catholic Church Parking Lot
C-13	Borgress Medical Center Entrance Parking Lot
C-14	Neurosurgery of Kalamazoo Parking Lot
C-15	Borgress Medical Center at Lawrence Education Center Parking Lot
C-16	Gull Rd & Riverview Dr. at Walgreens Parking Lot
C-17	Front Entrance of Mt Olivet Cemetery
C-18	1248 Blakeslee Street
C-19	Union St. & E. Hopkins St.

2S631 ROUTE 59, SUITE B
WARRENVILLE, IL 60555
630-393-9000
630-790-2966

COMMENTS:
Perimeter and Community Odor Monitoring Location

Graphic Packaging International
Kalamazoo, MI

FIGURE
1B

DRAWN BY:	APPROVED BY:	PROJECT NUMBER:	DATE DRAWN:	REVISED DATE
SS	SR	R19444	01-16-2020	09-24-2020

Odor Investigation Results
Graphic Packaging International, LLC's Recycled Paperboard Mill
in Kalamazoo, MI

November, 2020

APPENDIX A

Odor Investigation Plan for Graphic Packaging International, LLC's Recycled Paperboard Mill in Kalamazoo, MI

July 6, 2020

Prepared for:

Graphic Packaging International, LLC

Prepared by:

RK & ASSOCIATES, INC

RK & Associates, Inc.

2 South 631 Route 59
Suite B
Warrenville, Illinois 60555
Phone: 630-393-9000
Fax: 630-393-9111

Odor Investigation Plan
Graphic Packaging Int'l – Kalamazoo, Michigan

INTRODUCTION

RK & Associates, Inc. (RKA) has been retained to evaluate the operations at the Graphic Packaging International, LLC (GPI) recycled paperboard mill, located at 1500 North Pitcher Street in Kalamazoo, Michigan, to investigate community odor levels. This investigation plan will also identify potential odor sources within GPI facility and any nearby other odor sources. In addition, this investigation will assist in the assessment of community odor levels compared to Michigan Rule 901 odor criteria.

Additionally, as part of the investigation, RKA will review historical odor complaint records in the area and evaluate those complaints against sources identified at the GPI mill and any other relevant neighboring operations.

1. ODOR STANDARDS

A. Michigan Administrative Code, Environment, Great Lakes, and Energy, Air Quality Division, Air Pollution Control

R 336.1901 Air contaminant or water vapor; prohibition.

Rule 901. Notwithstanding the provisions of any other rule, a person shall not cause or permit the emission of an air contaminant or water vapor in quantities that cause, alone or in reaction with other air contaminants, either of the following:

(a) Injurious effects to human health or safety, animal life, plant life of significant economic value, or property.

(b) Unreasonable interference with the comfortable enjoyment of life and property.

The Michigan Department of Environment, Great Lakes, and Energy (MEGLE), formerly Michigan Department of Environmental Quality (MDEQ), uses the following scale to identify objectionable odors:

Odor Intensity Odor Scale

0 – Non-Detect
1 – Just barely detectable
2 – Distinct and definite odor
3 – Distinct and definite objectionable odor
4 – Odor strong enough to cause a person to attempt to avoid it completely
5 – Odor so strong as to be overpowering and intolerable for any length of time

It is RKA's understanding that MEGLE considers anything at level 3 or above as a potential unreasonable interference with the comfortable enjoyment of life and property, depending on

the intensity and duration of the odor.

B. Objectionable odor using objective measurements at other states and localities.

RKA understands that the State of Michigan does not currently have an odor nuisance standard that requires a Scentometer or other analytical device to measure the level of odors. Nevertheless, looking to the regulatory programs of other states and localities that do rely upon the Scentometer or similar devices to measure odors helps put the GPI operations and other odor sources nearby in context:

State or Locality	Source of Standard	Determination Criteria
Colorado	5 CCR 1001-4: Odor Emission	7:1 Dilution to Threshold (D/T); (2 samples over 1-hour period)
Connecticut	Sec. 22a-174-23: Control of Odors	(a) Nuisance standard. (b) 7:1 D/T (3 samples over 1-hour period); and (c) Ambient air limits for certain substances in Table 23-1 (e.g. Hydrogen sulfide: 0.0045 ppm (15-minute average))
Illinois	Section 9(a) of the Act and 35 IAC 245.121: Objectionable Odor Nuisance Determination	Nuisance standard. 8:1 D/T (Scentometer)
Kentucky	401 KAR 53:010: Ambient Air Quality Standards	7:1 D/T (Nasal Ranger/Scentometer)
Missouri	10 CSR 10-6.165: Restriction of Emission of Odors	7:1 D/T (Nasal Ranger) (2 samples over 1-hour)
North Dakota	Section 33-15-16: Restriction of Odorous Air Contaminants	Objectionable odors prohibited. 7:1 D/T (Scentometer)
San Francisco Bay Area Air Quality District		5 D/T applied after at least 10 complaints within 90 days.1
State of Massachusetts	Draft policy and guidance for composting facilities	5 D/T
City of San Diego WWTP		5 D/T average over 5 minutes
City of Seattle, WWTP		5 D/T average over 5 minutes

[1] Thomas Mahin, *Measurement and Regulation of Odors in the USA*, 64

Thomas Mahin, in his paper Measurement and Regulation of Odors in the USA, references a study conducted for the California Air Resources Board that itself reviewed six published studies related to the recognizability, unpleasantness and annoyance associated with a variety of odors. The study found that for unpleasant odors, the threshold of annoyance is about five times the threshold of detection. He also reports that the California's South Coast Air Quality Management District found that at 5 D/T, people become aware of an odor and that at 5 to 10 D/T, odors may be strong enough to trigger complaints.

2. INITIAL ODOR EVALUATION

RKA visited the GPI facility in Kalamazoo to evaluate its current odor status and conducted the following activities:

- Toured the facility to get familiar with the process and current operation, and to identify potential odor sources
- Interviewed management personnel about daily operations, identified and inspected suspected odor sources, regulatory issues, and odor complaints
- Reviewed available history of odor complaints, frequency of odor complaints, location of complaints, and odor characteristics of the complaints, including publicly available information on complaints compiled by Michigan EGLE.
- Reviewed predominant wind conditions and assessed correlation against historical odor complaints
- Toured the facility perimeter and neighborhood areas to identify potential odor monitoring locations. Odor monitoring locations are selected along facility property line or appropriate perimeter locations. Odor monitoring locations are also located in the nearby residential areas.
- Additional monitoring locations are also located near other potential odor sources such as the City of Kalamazoo Water Reclamation facility, and Wright Coating Technologies.

3. ODOR MONITORING

RKA will either conduct, or arrange and oversee, odor monitoring activities which are planned to occur three (3) times per week for a period of sixty days (2 months). A Scentometer device, will be used to measure odor thresholds of various potential sources. The day and time of the odor monitoring will be selected randomly throughout the week, during facility operating hours. In addition to Scentometer readings, H_2S ambient air concentrations will be measured using a portable H_2S analyzer.

Scentometer and H_2S Readings at Selected Perimeter (fence line) Locations

Perimeter Scentometer readings will be taken at the selected perimeter locations along facility

fence lines. Five (5) perimeter locations, P-1 through P-5, were selected. A map of perimeter monitoring locations is shown in Figure 1A and 1B (Figure 1B is a zoom version which shows further details of locations).

Scentometer and H_2S Readings at Selected Community Locations

Community Scentometer readings will be taken at the selected community locations. Nineteen (19) community locations, C-1 through C-19 were identified. A map of community monitoring locations is shown on Figure 1A and Figure 1B.

Documenting Field Sampling Data

Odor readings taken with the Scentometer or other appropriate devices will be documented on the Perimeter and Community Log sheet included in Figure 2. If odor is present, the field operator will identify: 1, odor intensity as measured by Scentometer; and 2, odor character or the nature (such as chemical, rotten egg, or ethanol, etc.) of smell. Based on these measurements of odor intensity, odor character and wind direction, RKA trained field personnel will identify the source of the odor at a given location.

On-Site Meteorological Data

GPI will provide onsite meteorological data that includes time, wind speed, wind direction, temperature, humidity, barometric pressure, and rainfall related information. These data are used in the evaluation of potential off-site impacts from the facility and for investigating odor complaints.

Olfactometry Analysis of Potential Odor Sources from GPI Facility

RKA will collect up to 12 odor samples from potential odor sources from the GPI Facility in 10-liters Tedlar sample bags. The selected potential odor sources may include a clarifier, exhaust stacks and other selected odor sources located within the GPI Facility. A portable H_2S analyzer will be used to measure H_2S at the GPI sources selected to be sampled for odors. H_2S readings will be taken simultaneously with sample collection.

It is estimated that after about a month of field odor measurements, RKA will determine odor source locations within the GPI facility for collecting odor samples. In a month's time, RKS staff will have necessary community odor measurement levels to make an educated determination of potential odor sources within the facility.

The sample bags will then be taken to an onsite RKA Olfactometry lab for odor analysis to determine the odor threshold value and odor characterization using ASTM 679-11 and ASTM DATA Series DS 61.

a) Odor Threshold Value

Odor threshold value will be determined by performing triangular forced-choice odor analysis in accordance with ASTM 679-04, Standard Practice for Determination of Odor and Taste Thresholds by a Forced-Choice Ascending Concentration Series Method of Limits. Result will be reported in Odor Units.

b) Odor Characterization

Odor samples will also be analyzed for odor characterization using eight recognized odor descriptor categories for odor "smells like" and eight sensation descriptors for odor "feels like". Results will be plotted on a spider graph.

4. DATA ANALYSIS AND REPORTS

RKA will compile the data from the odor monitoring events that will include community and perimeter locations, Scentometer readings, odor character determination, daily meteorological data, and odor complaint data. This report will be updated after each monitoring event. Report template is shown on Figure 3.

RKA will evaluate the impact from the various odor sources at the GPI and neighboring operations against the odors measured at each monitoring location to determine the potential contribution against the Rule 901 criteria.

A final report will be issued in accordance with Michigan EGLE requirements within 60 days of last date of sampling.

Odor Investigation Plan for Graphic Packaging International, LLC's Recycled Paperboard Mill in Kalamazoo, MI

July 6, 2020

FIGURES

N

RK No.	Location
	Perimeter
P-1	Paterson St & Walbridge St
P-2	Paterson St & Porter St
P-3	Graphic Packaging – Gate 2
P-4	Graphic Packaging – Gate 5
P-5	Graphic Packaging – Gate 6
	Community
C-1	Paterson St & Harrison St
C-2	Harrison St at WWT Plant gate
C-3	Kalamazoo River Watershed Council Parking Lot
C-4	Kalamazoo Township Parking Lot
C-5	Riverview Dr & Old Riverview Sav Rd
C-6	East side of Verburg Park Parking Lot
C-7	Kalamazoo County Juvenile Home Parking Lot
C-8	Dunkley St & Edwards St
C-9	Prouty St & Edwards St
C-10	Paterson S & Edwards St
C-11	Parsons St & Porter St
C-12	St. Mary Catholic Church Parking Lot
C-13	Borgress Medical Center Entrance Parking Lot
C-14	Neurosurgery of Kalamazoo Parking Lot
C-15	Borgress Medical Center at Lawrence Educational Center Parking Lot
C-16	E Paterson St & Riverview Dr. at Walgreens Parking Lot
C-17	Front Entrance of Mt Olivet Cemetery
C-18	1248 Blakeslee Street
C-19	Union St & E. Hopkins St.

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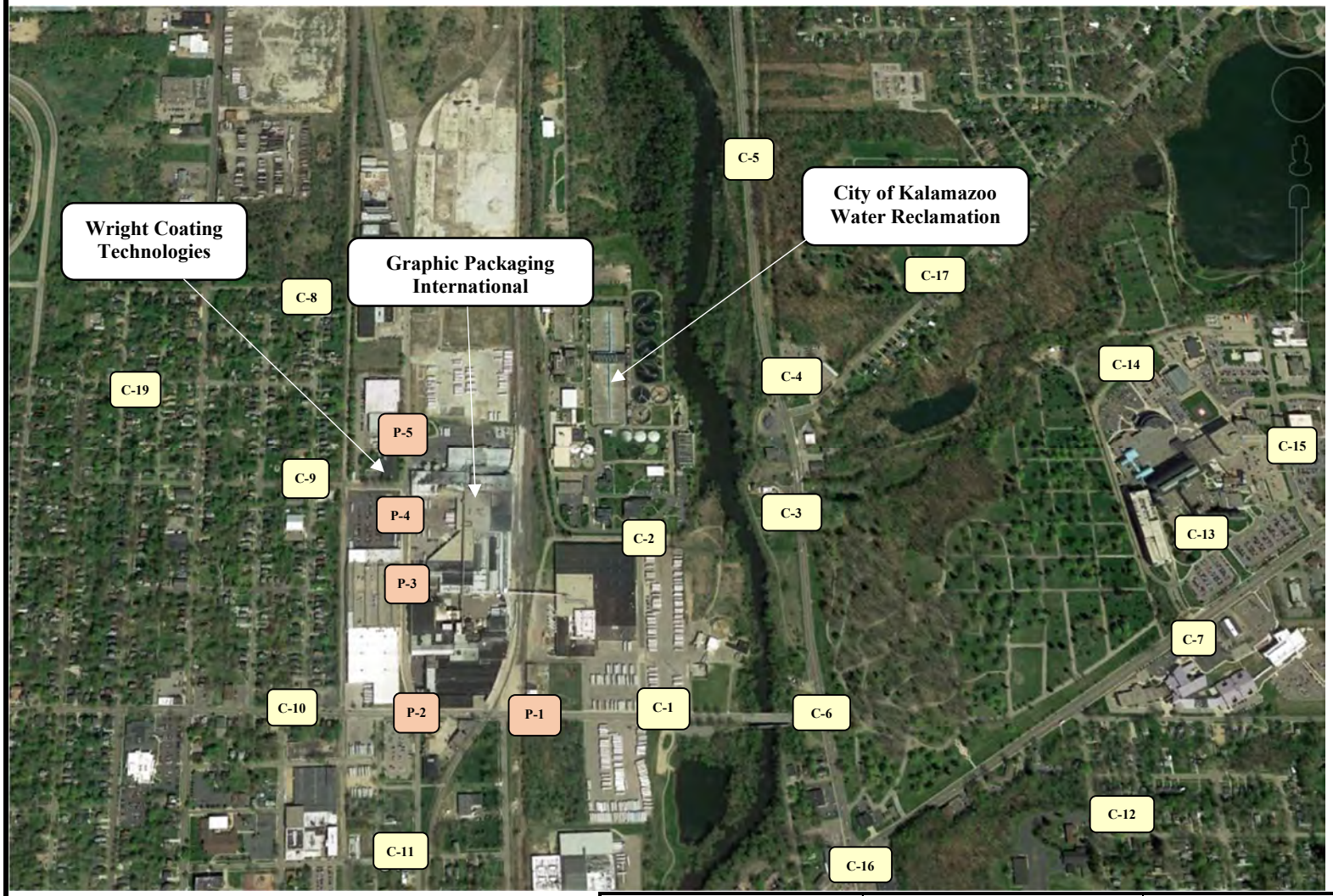
COMMENTS: Perimeter and Community Odor Monitoring Location

Graphic Packaging International
Kalamazoo, MI

FIGURE 1A

DRAWN BY:	APPROVED BY:	PROJECT NUMBER:	DATE DRAWN:	REVISED DATE
SS	SR	R19444	01-16-2020	07-06-2020



N

RK No.	Location
	Perimeter
P-1	Paterson St & Walbridge St
P-2	Paterson St & Porter St
P-3	Graphic Packaging – Gate 2
P-4	Graphic Packaging – Gate 5
P-5	Graphic Packaging – Gate 6
	Community
C-1	Paterson St & Harrison St
C-2	Harrison St at WWT Plant gate
C-3	Kalamazoo River Watershed Council Parking Lot
C-4	Kalamazoo Township Parking Lot
C-5	Riverview Dr & Old Riverview Sav Rd
C-6	East side of Verburg Park Parking Lot
C-7	Kalamazoo County Juvenile Home Parking Lot
C-8	Dunkley St & Edwards St
C-9	Prouty St & Edwards St
C-10	Paterson S & Edwards St
C-11	Parsons St & Porter St
C-12	St. Mary Catholic Church Parking Lot
C-13	Borgress Medical Center Entrance Parking Lot
C-14	Neurosurgery of Kalamazoo Parking Lot
C-15	Borgress Medical Center at Lawrence Educational Center Parking Lot
C-16	E Paterson St & Riverview Dr. at Walgreens Parking Lot
C-17	Front Entrance of Mt. Olivet Cemetery
C-18	1248 Blakeslee Street
C-19	Union St & E. Hopkins St.

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COMMENTS: Perimeter and Community Odor Monitoring Location

Graphic Packaging International
Kalamazoo, MI

FIGURE 1B

DRAWN BY:	APPROVED BY:	PROJECT NUMBER:	DATE DRAWN:	REVISED DATE
SS	SR	R19444	01-16-2020	07-06-2020

Figure 2

RK & Associates, Inc.

Graphic Packaging International
Scentometer Readings
Perimeter & Community Locations

Date _____ Field Person _____

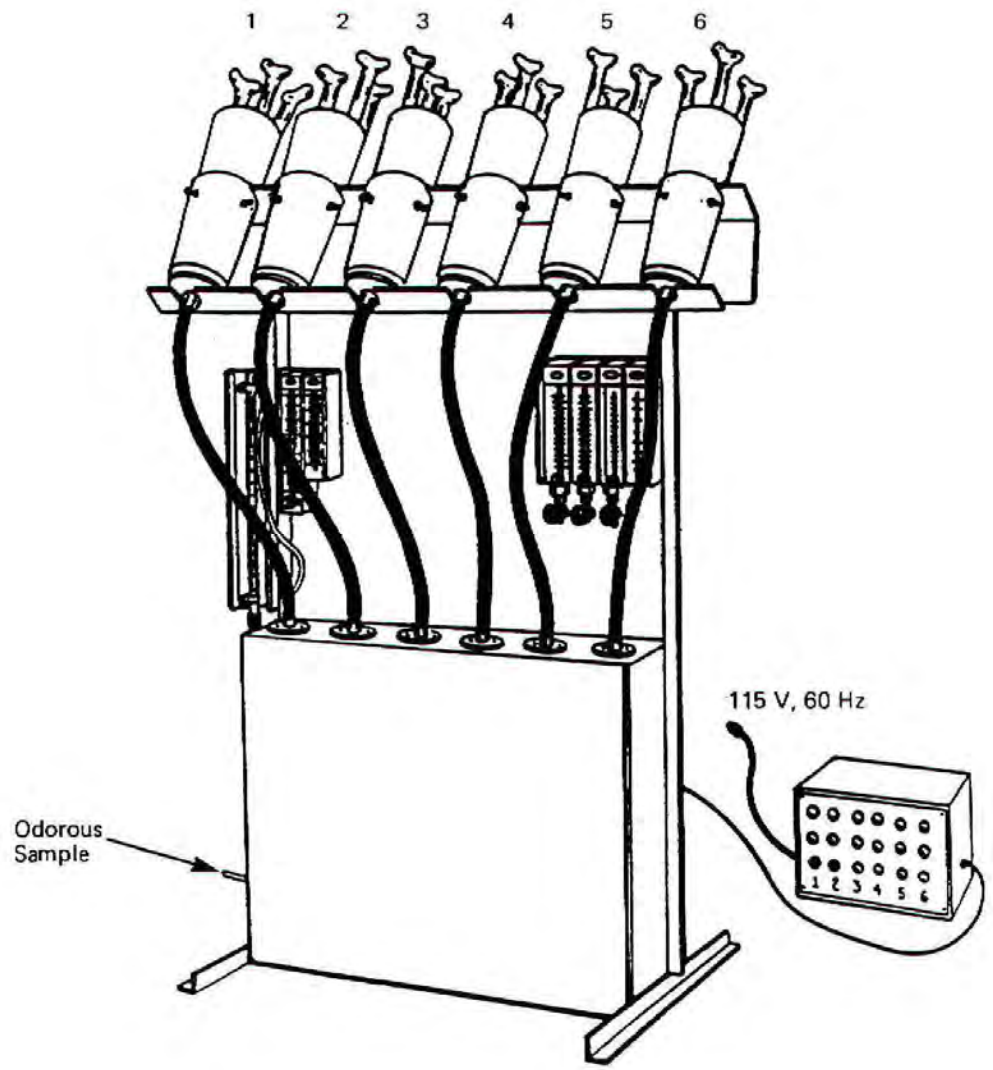
Locations		Wind Direction	Wind Speed	Scentometer Reading	H_2S Reading (ppm)	Time	Odor Description
Perimeter Locations	#						
Paterson St & Walbridge St	P-1						
Paterson St & Porter St	P-2						
Graphic Packaging – Gate 2	P-3						
Graphic Packaging – Gate 5	P-4						
Graphic Packaging – Gate 6	P-5						
Community Receptors	#						
Paterson St & Harrison St	C-1						
Harrison St at WWT Plant gate	C-2						
Kalamazoo River Watershed Council Parking Lot	C-3						
Kalamazoo Township Parking Lot	C-4						
Riverview Dr & Old Riverview Sav Rd	C-5						
East side of Verburg Park Parking Lot	C-6						
Kalamazoo County Juvenile Home Parking Lot	C-7						
Dunkley St & Edwards St	C-8						
Prouty St & Edwards St	C-9						
Paterson S & Edwards St	C-10						
Parsons St & Porter St	C-11						
St. Mary Catholic Church Parking Lot	C-12						
Borgress Medical Center Entrance Parking Lot	C-13						
Neurosurgery of Kalamazoo Parking Lot	C-14						
orgress Medical at Lawrence Educational Ctr Parking Lot	C-15						
E Paterson St & Riverview Dr at Walgreens Parking Lot	C-16						
Front Entrance of Mt. Olivet Cemetery	C-17						
1248 Blakeslee Street	C-18						
Union St & E. Hopkins St.	C-19						

Figure 3

RK & Associates, Inc.

Graphic Packaging International
Scentometer Readings
Perimeter & Community Locations

Odor Monitoring Event								Average
Wind Direction								
Odor Complaints								
Monitoring Time								
Downwind Scentometer Readings								
Perimeter Locations								
Paterson St & Walbridge St	P-1							
Paterson St & Porter St	P-2							
Graphic Packaging – Gate 2	P-3							
Graphic Packaging – Gate 5	P-4							
Graphic Packaging – Gate 6	P-5							
Community Locations								
Paterson St & Harrison St	C-1							
Harrison St at WWT Plant gate	C-2							
Kalamazoo River Watershed Council Parking Lot	C-3							
Kalamazoo Township Parking Lot	C-4							
Riverview Dr & Old Riverview Sav Rd	C-5							
East side of Verburg Park Parking Lot	C-6							
Kalamazoo County Juvenile Home Parking Lot	C-7							
Dunkley St & Edwards St	C-8							
Prouty St & Edwards St	C-9							
Paterson S & Edwards St	C-10							
Parsons St & Porter St	C-11							
St. Mary Catholic Church Parking Lot	C-12							
Borgress Medical Center Entrance Parking Lot	C-13							
Neurosurgery of Kalamazoo Parking Lot	C-14							
Borgress Medical at Lawrence Educational Ctr Parking Lot	C-15							
E Paterson St & Riverview Dr at Walgreens Parking Lot	C-16							
Front Entrance of Mt. Olivet Cemetery	C-17							
1248 Blakeslee Street	C-18							
Union St & E. Hopkins St.	C-19							
Upwind Scentometer Readings								
Perimeter Locations								
Paterson St & Walbridge St	P-1							
Paterson St & Porter St	P-2							
Graphic Packaging – Gate 2	P-3							
Graphic Packaging – Gate 5	P-4							
Graphic Packaging – Gate 6	P-5							
Community Locations								
Paterson St & Harrison St	C-1							
Harrison St at WWT Plant gate	C-2							
Kalamazoo River Watershed Council Parking Lot	C-3							
Kalamazoo Township Parking Lot	C-4							
Riverview Dr & Old Riverview Sav Rd	C-5							
East side of Verburg Park Parking Lot	C-6							
Kalamazoo County Juvenile Home Parking Lot	C-7							
Dunkley St & Edwards St	C-8							
Prouty St & Edwards St	C-9							
Paterson S & Edwards St	C-10							
Parsons St & Porter St	C-11							
St. Mary Catholic Church Parking Lot	C-13							
Borgress Medical Center Entrance Parking Lot	C-14							
Neurosurgery of Kalamazoo Parking Lot	C-15							
Borgress Medical at Lawrence Educational Ctr Parking Lot	C-16							
E Paterson St & Riverview Dr at Walgreens Parking Lot	C-17							
Front Entrance of Mt. Olivet Cemetery	C-18							
1248 Blakeslee Street	C-19							
Union St & E. Hopkins St.								



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COMMENTS:
Odor Management and Monitoring Plan – Graphic Packaging International

OLFACTOMETER

FIGURE
4

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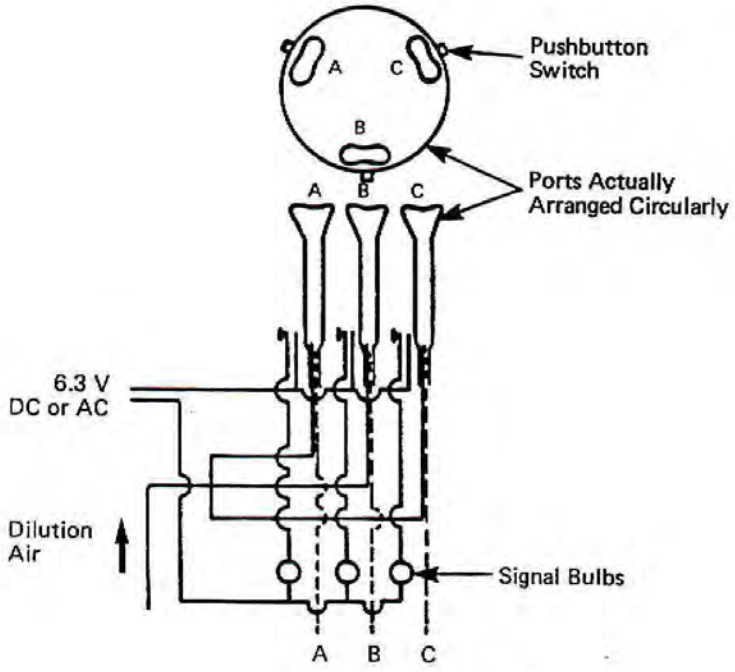

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COMMENTS:
Odor Management and Monitoring Plan – Graphic Packaging International

OLFACTOMETER DILUTION LEVEL

FIGURE
5

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Odor Investigation Results
Graphic Packaging International, LLC's Recycled Paperboard Mill
in Kalamazoo, MI

November, 2020

APPENDIX B

Graphic Packaging International
Scentometer Readings
Perimeter & Community Locations

Odor Monitoring Date		9-Jul-20		10-Jul-20		13-Jul-20		14-Jul-20		16-Jul-20		20-Jul-20		22-Jul-20		24-Jul-20		28-Jul-20		29-Jul-20		30-Jul-20		4-Aug-20		5-Aug-20		7-Aug-20		10-Aug-20		12-Aug-20		13-Aug-20		17-Aug-20		18-Aug-20		21-Aug-20		25-Aug-20		26-Aug-20		27-Aug-20		1-Sep-20		3-Sep-20		4-Sep-20		Average	
Monitoring Time		11:00 - 14:13		14:16-16:57		14:21-16:24		14:36-16:40		8:46-10:38		8:43-10:22		13:56-15:43		8:07-9:54		10:59-12:30		14:36-16:40		14:01-15:59		8:03-10:04		11:09-13:00		11:01-12:32		8:03-9:22		14:13-15:47		11:05-12:31		10:59-12:28		14:-08-15:53		11:05-12:34		8:15-9:37		8:05-9:28		8:10-9:27		11:04-12:27		11:04-12:28		8:02-9:29			
Wind Direction		SSW-SSE		NW-SW		NNW-NNE		WSW-ESE		N-NNW		N-W		S-SSW		N-ENE		WNW-SW		WSW-S		N-NE		NNW		WNW-WSW		NNE-SE		S-W		NW-SSE		N-NE		N-NW		NE-NW		WSW-NW		S-N		S-E		SW-WNW		NE-N		WSW-SSW		S-ENE			
Downwind Scentometer Readings																																																							
Perimeter Locations		D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm	D/T	H_2S ppm
Paterson St & Walbridge St	P-1	-	-	< 15	0.000	< 15	0.001	-	-	< 2	0.000	-	-	-	-	< 2	0.002	0	0.000	-	-	< 2	0.000	< 2	0.000	< 2	0.000	< 2	0.000	-	-	< 2	0.002	< 2	0.002	< 2	0.002	< 2	0.000	-	-	< 2	0.000	-	-	-	-	< 2	0.001	< 2	0.000	0	0.003	3.3	0.001
Paterson St & Porter St	P-2	-	-	0	0.000	< 4	0.001	-	-	< 2	0.000	-	-	-	-	0	0.002	-	-	-	-	< 2	0.001	< 2	0.000	-	-	< 2	0.002	-	-	< 2	0.002	< 2	0.006	-	-	-	-	-	-	-	-	-	-	-	-	0	0.001	-	-	-	-	1.6	0.002
Graphic Packaging – Gate 2	P-3	-	-	-	-	-	-	0	0.002	< 2	0.000	-	-	-	-	< 2	0.000	-	-	-	-	-	-	0	0.000	-	-	0	0.001	-	-	0	0.002	0	0.000	< 2	0.004	0	0.002	-	-	-	-	-	-	-	-	0	0.000	-	-	-	-	0.6	0.001
Graphic Packaging – Gate 5	P-4	-	-	-	-	-	-	0	0.001	< 2	0.000	-	-	-	-	< 2	0.003	-	-	-	-	-	-	< 2	0.000	-	-	< 4	0.004	-	-	-	-	< 4	0.005	< 2	0.000	< 2	0.003	-	-	< 2	0.000	-	-	-	-	0	0.001	-	-	-	-	2.0	0.002
Graphic Packaging – Gate 6	P-5	-	-	-	-	-	-	< 2	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 2	0.004	-	-	-	-	-	-	-	-	-	-	0	0.004	-	-	-	-	< 2	0.005	-	-	1.5	0.004
Paterson St & Harrison St	C-1	-	-	< 2	0.002	0	0.000	-	-	0	0.000	< 2	0.001	-	-	< 2	0.000	0	0.001	-	-	< 4	0.000	< 2	0.000	< 4	0.006	-	-	< 2	0.002	-	-	< 2	0.001	< 2	0.002	0	0.000	< 2	0.004	< 2	0.000	-	-	-	-	0	0.000	-	-	0	0.002	1.5	0.001
Harrison St at WWT Plant gate	C-2	< 7	0.010	-	-	-	-	0	0.001	-	-	< 4	0.002	< 2	0.000	-	-	< 2	0.008	< 2	0.004	-	-	-	-	< 2	0.002	-	-	-	-	< 2	0.002	-	-	< 2	0.000	< 2	0.001	< 2	0.004	< 2	0.002	0	0.002	< 2	0.003	< 2	0.001	< 2	0.004	< 2	0.003	2.2	0.003
East side of Verburg Park Parking Lot	C-6	-	-	< 4	0.001	< 15	0.001	-	-	< 2	0.000	0	0.000	0	0.000	-	-	0	0.001	-	-	-	-	< 2	0.001	< 2	0.002	-	-	-	-	-	-	-	-	0	0.001	< 7	0.001	< 2	0.001	< 2	0.000	-	-	-	-	< 2	0.001	-	-	0	0.002	2.7	0.001
Community Locations																																																							
Kalamazoo River Watershed Council Parking Lot	C-3	< 4	0.002	< 2	0.002	-	-	-	-	-	-	-	-	< 2	0.000	-	-	< 2	0.002	< 2	0.002	-	-	-	-	< 2	0.001	-	-	0	0.000	-	-	-	-	< 2	0.001	-	-	-	-	-	-	-	-	< 2	0.002	-	-	< 2	0.000	-	-	2.0	0.001
Kalamazoo Township Parking Lot	C-4	< 2	0.003	< 2	0.001	-	-	-	-	-	-	-	-	0	0.000	-	-	0	0.001	0	0.001	-	-	-	-	0	0.000	-	-	0	0.000	-	-	-	-	-	-	-	-	-	-	-	-	0	0.001	0	0.000	-	-	< 2	0.000	< 2	0.002	0.7	0.001
Riverview Dr & Old Riverview Sav Rd	C-5	< 2	0.002	-	-	-	-	< 2	0.001	-	-	-	-	0	0.000	-	-	-	-	0	0.001	-	-	-	-	-	-	-	-	0	0.000	-	-	-	-	-	-	-	-	-	-	-	-	0	0.001	-	-	-	-	0	0.001	< 2	0.003	0.8	0.001
Kalamazoo County Juvenile Home Parking Lot	C-7	-	-	0	0.000	-	-	-	-	-	-	0	0.000	-	-	-	-	< 2	0.001	0	0.000	-	-	-	-	0	0.000	-	-	< 2	0.001	-	-	-	-	-	-	-	-	0	0.000	-	-	-	-	0	0.000	0	0.000	-	-	-	-	0.4	0.000
Dunkley St & Edwards St	C-8	< 2	0.003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 2	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.0	0.003
Prouty St & Edwards St	C-9	< 2	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 2	0.002	-	-	0	0.001	0	0.000	-	-	-	-	-	-	-	-	0	0.002	-	-	-	-	-	-	-	-	0.8	0.001
Paterson S & Edwards St	C-10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0.000	-	-	-	-	< 4	0.000	-	-	-	-	< 2	0.001	-	-	0	0.001	0	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2	0.001
Parsons St & Porter St	C-11	-	-	-	-	< 4	0.002	-	-	-	-	-	-	-	-	0	0.000	-	-	-	-	< 2	0.000	< 2	0.000	-	-	< 2	0.000	-	-	0	0.001	0	0.000	-	-	< 4	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.8	0.001
St. Mary Catholic Church Parking Lot	C-12	-	-	< 2	0.001	-	-	-	-	-	-	< 2	0.000	-	-	-	-	< 2	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.5	0.000
Borgress Medical Center Entrance Parking Lot	C-13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0.000	0	0.000	-	-	-	-	< 2	0.000	-	-	< 2	0.000	-	-	-	-	-	-	-	-	0	0.000	-	-	-	-	-	-	-	-	-	-	-	-	0.8	0.000
Neurosurgery of Kalamazoo Parking Lot	C-14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 2	0.001	-	-	-	-	< 2	0.000	-	-	< 2	0.000	-	-	-	-	-	-	-	-	0	0.000	-	-	-	-	< 2	0.002	-	-	0	0.001	-	-	1.3	0.001
Borgress Medical at Lawrence Educational Ctr Parking Lot	C-15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 2	0.000	0	0.000	-	-	-	-	0	0.000	-	-	0	0.000	-	-	-	-	-	-	-	-	0	0.000	-	-	-	-	-	-	-	-	-	-	-	-	0.4	0.000
E Paterson St & Riverview Dr at Walgreens Parking Lot	C-16	-	-	< 2	0.002	-	-	-	-	-	-	< 2	0.001	-	-	-	-	-	-	-	-	-	-	< 2	0.000	-	-	-	-	-	-	-	-	-	-	0	0.000	-	-	-	-	< 2	0.000	-	-	-	-	0	0.003	-	-	0	0.001	1.1	0.001
Front Entrance of Mt. Olivet Cemetery	C-17	-	-	< 2	0.000	-	-	-	-	-	-	-	-	< 2	0.000	-	-	< 2	0.000	< 2	0.000	-	-	-	-	-	-	-	-	< 2	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0.000	-	-	0	0.002	< 2	0.003	1.5	0.001
1248 Blakeslee Street	C-18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0	0.000
Union St & E. Hopkins St.	C-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	< 2	0.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.0	0.002
Upwind Scentometer Readings																																																							
Perimeter Locations		D/T	H_2S ppm																																																				
Paterson St & Walbridge St	P-1	0	0.007	-	-	-	-	0	0.001	-	-	< 2	0.001	< 2	0.000	-	-	-	-	0	0.001	-	-	-	-	-	-	-	-	0	0.000	-	-	-	-	-	-	-	-	0	0.001	-	-	0	0.002	< 4	0.000	-	-	-	-	-	-	0.9	0.001
Paterson St & Porter St	P-2	< 2	0.009	-	-	-	-	0	0.002	-	-	0	0.000	0	0.000	-	-	0	0.000	0	0.000	-	-	-	-	0	0.000	-	-	0	0.000	-	-	-	-	0	0.000	0	0.001	0	0.000	0	0.000	< 2	0.002	0	0.000	-	-	0	0.000	0	0.003	0.3	0.001
Graphic Packaging – Gate 2	P-3	0	0.006	0	0.000	< 2	0.000	-	-	-	-	< 2	0.000	0	0.000	-	-	0	0.000	0	0.000	0	0.000	-	-	0	0.001	-	-	0	0.000	-	-	-	-	-	-	-	-	0	0.001	0	0.000	0	0.002	< 2	0.005	-	-	0	0.001	< 2	0.003	0.5	0.001
Graphic Packaging – Gate 5	P-4	< 2	0.006	< 2	0.000	0	0.000	-	-	-	-	0	0.000	0	0.000	-	-	< 2	0.000	0	0.000	0	0.005	-	-	0	0.000	-	-	0	0.000	0	0.002	-	-	-	-	-	-	0	0.000	-	-	0	0.002	0	0.000	-	-	0	0.000	0	0.000	0.4	0.001
Graphic Packaging – Gate 6	P-5	0	0.008	0	0.001	< 2	0.001	-	-	0	0.000	0	0.000	0	0.000	0	0.000	0	0.001	< 2	0.001	0	0.001	0	0.000	0	0.000	0	0.002	0	0.002	-	0.004	0	0.001	0	0.001	0	0.002	0	0.001	0	0.000	-	-	0	0.000	0	0.003	-	-	< 2	0.000	0.3	0.001
Paterson St & Harrison St	C-1	0	0.007	-	-	-	-	0	0.002	-	-	-	-	0	0.000	-	-	-	-	0	0.000	-	-	-	-	-	-	0	0.001	-	-	0	0.001	-	-	-	-	-	-	-	-	-	-	0	0.002	0	0.000	-	-	0	0.001	-	-	0.0	0.002
Harrison St at WWT Plant gate	C-2	-	-	< 4	0.002	< 2	0.001	-	-	0	0.000	-	-	-	-	0	0.000	-	-	-	-	< 2	0.000	< 2	0.000	-	-	0	0.000	0	0.000	-	-	0	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.1	0.000
East side of Verburg Park Parking Lot	C-6	< 2	0.005	-	-	-	-	0	0.000	-	-	-	-	-	-	< 2	0.002	-	-	0	0.001	0	0.000	-	-	-	-	< 2	0.001	0	0.000	0	0.002	< 2	0.002	-	-	-	-	-	-	-	-	0	0.002	0	0.000	-	-	0	0.001	-	-	0.7	0.001
Community Locations																																																							
Kalamazoo River Watershed Council Parking Lot	C-3	-	-	-	-	0	0.001	0	0.001	0	0.000	0	0.000	-	-	0	0.000	-	-	-	-	0	0.000	0	0.000	-	-	< 2	0.000	-	-	0	0.002	0	0.001	-	-	0	0.000	0	0.000	0	0.000	0	0.003	-	-	0	0.001	-	-	< 2	0.002	0.3	0.001
Kalamazoo Township Parking Lot	C-4	-	-	-	-	0	0.000	0	0.000	0	0.000	0	0.000	-	-	0	0.000	-	-	-	-	0	0.000	0	0.000	-	-	< 4	0.001	-	-	0	0.001	0	0.001	0	0.001	0	0.000	0	0.000	0	0.000	-	-	-	-	0	0.000	-	-	-	-	0.3	0.000
Riverview Dr & Old Riverview Sav Rd	C-5	-	-	< 2	0.000	0	0.000	-	-	0	0.000	0	0.000	-	-	0	0.000	0	0.002	-	-	0	0.000	0	0.000	0	0.000	< 2	0.001	-	-	0	0.002	0	0.000	0	0.000	0	0.001	0	0.000	< 4	0.000	-	-	< 2	0.000	0	0.001	-	-	-	-	0.6	0.000
Kalamazoo County Juvenile Home Parking Lot	C-7	< 2	0.002	-	-	0	0.000	< 2	0.000	0	0.000	-	-	0	0.000	0	0.000	-	-	-	-	0	0.000	0	0.000	-	-	0	0.000	-	-	0	0.001	0	0.001	0	0.000	0	0.000	-	-	0	0.000	0	0.003	-	-	-	-	0	0.001	0	0.002	0.2	0.001
Dunkley St & Edwards St	C-8	-	-	< 2	0.000	< 2	0.000	< 2	0.001	< 2	0.000	0	0.000	< 2	0.000	0	0.000	0	0.000	0	0.001	< 2	0.000	0	0.000	0	0.000	0	0.000	0	0.000	-	-	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	< 2	0.002	0	0.000	0	0.000	0	0.001	0	0.002	0.6	0.000
Prouty St & Edwards St	C-9	-	-	< 2	0.001	0	0.000	0	0.001	0	0.000	0	0.000	0	0.001	0	0.000	0	0.001	< 4	0.001	0	0.001	0	0.000	0	0.000	-	-	0	0.000	-	-	-	-	0	0.000	0	0.000	0	0.000	0	0.000	-	-	0	0.000	0	0.000	0	0.001	0	0.001	0.3	0.000
Paterson S & Edwards St	C-10	0	0.002	0	0.000	0	0.000	0	0.002	0	0.000	0	0.000	0	0.000	-	-	0	0.000	0	0.002	-	-	0	0.001	0	0.000	-	-	0	0.000	-	-	-	-	0	0.000	0	0.001	0	0.000	0	0.000	0	0.002	0	0.000	0	0.001	0	0.000	0	0.001	0.0	0.001
Parsons St & Porter St	C-11	< 2	0.002	0	0.000	-	-	0	0.001	0	0.000	0	0.000	0	0.000	-	-	0	0.000	0	0.001	-	-	-	-	0	0.000	-	-	0	0.000	-	-	-	-	0	0.000	-	-	0	0.000	0	0.000	0	0.002	0	0.000	0	0.000	0	0.000	0	0.001	0.1	0.000
St. Mary Catholic Church Parking Lot	C-12	< 2	0.006	-	-	0	0.001	0	0.001	< 2	0.000	-	-	0	0.000	0	0.000	-	-	0	0.001	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.001	0	0.000	< 2	0.000	-	-	0	0.000	< 2	0.000	0	0.003	0	0.000	0	0.001	0	0.001	0	0.002	0.4	0.001
Borgress Medical Center Entrance Parking Lot	C-13	0	0.002	0	0.001	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	-	-	-	-	0	0.000	0	0.000	-	-	0	0.001	-	-	0	0.000	0	0.000	0	0.000	0	0.000	-	-	0	0.000	0	0.002	0	0.000	0	0.000	0	0.001	0	0.001	0.0	0.000
Neurosurgery of Kalamazoo Parking Lot	C-14	< 2	0.002	< 2	0.000	0	0.001	0	0.000	0	0.000	0	0.000	< 2	0.000	0	0.000	0	0.000	-	-	0	0.000	0	0.000	-	-	0	0.000	-	-	0	0.001	0	0.001	0	0.000	0	0.001	-	-	0	0.000	0	0.002	-	-	0	0.000	-	-	0	0.002	0.3	0.001
Borgress Medical at Lawrence Educational Ctr Parking Lot	C-15	< 2	0.002	0	0.008	< 2	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	-	-	-	-	0	0.000	0	0.000	-	-	0	0.000	-	-	< 2	0.001	0	0.000	0	0.000	0	0.001	-	-	0	0.000	0	0.002	0	0.000	0	0.000	0	0.001	0	0.002	0.3	0.001
E Paterson St & Riverview Dr at Walgreens Parking Lot	C-16	0	0.005	-	-	0	0.000	0	0.001	0	0.000	-	-	0	0.000	0	0.000	0	0.000	0	0.001	0	0.001	-	-	0	0.000	0	0.002	0	0.000	0	0.002	0	0.006	-	-	0	0.001	0	0.000	-	-	0	0.003	0	0.000	-	-	0	0.001	-	-	0.0	0.001
Front Entrance of Mt. Olivet Cemetery	C-17	< 7	0.002	-	-	0	0.000	< 2	0.000	< 2	0.000	< 2	0.000	-	-	< 2	0.000	-	-	-	-	0	0.000	< 2	0.000	0	0.000	0	0.000	-	-	0	0.001	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.002	-	-	0	0.000	-	-	-	-	0.9	0.000
1248 Blakeslee Street	C-18	< 7	0.002	0	0.001	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	< 2	0.000	0	0.000	0	0.000	0	0.000	< 2	0.000	0	0.000	-	-	0	0.000	0	0.000	0	0.000	0	0.000	< 2	0.000	0	0.000	0	0.000	0	0	< 2	0	0.6	0.000
Union St & E. Hopkins St.	C-19	< 2	0.002	< 4	0.001	< 2	0.000	< 2	0.001	0	0.000	< 2	0.000	< 2	0.000	0	0.000	0	0.000	0	0.000	0	0.000	< 2	0.000	0	0.000	0	0.000	0	0.000	-	-	0	0.000	0	0.000	0	0.000	0	0.001	0	0.000	0	0.002	0	0.000	0	0.000	0	0.000	0	0.001	0.6	0.000

- Papermill/Porcess Wastewater
- Municipal Wastewater
- Mixed (Papermill Process WW and Municipal WW)
- Other (not papermill & wastewater related)

Odor Investigation Results
Graphic Packaging International, LLC's Recycled Paperboard Mill
in Kalamazoo, MI

November, 2020

APPENDIX C

Odor Sample Collection and Olfactometry Analysis for Graphic Packaging International, LLC's Recycled Paperboard Mill in Kalamazoo, MI

August 18, 2020

Prepared for:

Graphic Packaging International, LLC

Prepared by:

RK & ASSOCIATES, INC

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Suite B
Warrenville, Illinois 60555
Phone: 630-393-9000
Fax: 630-393-9111

RK & Associates, Inc.

1. INTRODUCTION

RK & Associates, Inc. (RKA) has been retained to investigate and evaluate odor levels at the Graphic Packaging International, LLC (GPI) recycled paperboard mill, located at 1500 North Pitcher Street in Kalamazoo, Michigan. An Odor Investigation Plan was developed for the GPI facility. The plan was approved by the Michigan Department of Environment, Great Lakes and Energy (MEGLE) on June 4, 2020.

The Odor Investigation Plan includes odor monitoring at selected locations along GPI property line and in nearby community, conducted three times a week, odor intensity being measured by Scentometer. The odor monitoring began on July 9, 2020. After about a month of field odor monitoring, the plan includes collecting samples inside the GPI facility for laboratory Olfactometry analysis using ASTM Method 679-11 and ASTM Data Series DS 61.

Sample were collected at the GPI facility for olfactometry analysis on August 10 & 11, 2020. Samples were analyzed at the RKA Olfactometry lab on August 12, 2020.

2. SAMPLE COLLECTION

RKA walked through the GPI facility on August 3, 2020 to identify sampling locations. GPI proposed sampling locations that could help with odor characterization of fugitive odor sources within the GPI facility. Nine (9) ambient air samples were collected as follows:

- K1 Operating Floor - Coating Kitchen
- K3 Dryer Mezzanine
- Stock Prep Building at News Pulper
- AES Building between Screens
- Clarifier (Downwind of Clarifier)
- Sludge Pile (Downwind of Sludge Pile)
- Sludge Drum Filter Outlet
- Parking Lot B (near discharge to WWTP)
- North of Stock Prep Building

A map of sampling locations and picture of each sampling spot are presented in Appendix A.

A Jerome J605 portable H_2S analyzer was used to measure ambient H_2S levels during sample collection. Samples were collected in 10-liter Tedlar bags, labeled, and transported to RKA Office for odor analysis. All samples were delivered in good condition.

3. SAMPLE ANALYSIS

Samples were analyzed for odor parameters as described below.

Odor Threshold: Samples were analyzed using an Olfactometer to measure odor thresholds of odorous samples in accordance with ASTM Method E-679-11 *Standard Practice for Determination of Odor and Taste Thresholds by a Forced-Choice Ascending Concentration Series Methods of Limits*. This method is performed using a group of odor panelists to smell various concentrations of an odorous sample diluted in odor free air to determine the number of dilutions required before the odor is no longer detected and the number of dilutions at which odor is recognizable. The responses of panelists are recorded and statically evaluated to determine the effective dilutions (ED) at which 50% of the panelists can no longer detect the presence of an odor. Dilution at which panelists can recognize odor is also reported.

Odor Characterization – "smells like" & "feels like": Samples were analyzed for odor characterization using relative intensity scale of 0 to 5 (faint to strong). For each sample panelists were asked to characterize the odor in one of the "feels like" and "smells like" descriptors.

Eight sensation descriptions of "feels like" were used: itching, tingling, warmth, burning, pungent, sharp, cool, and metallic.

Eight odor descriptor categories of "smells like" were used: vegetable, fruity, floral, medicinal, chemical, fishy, offensive, and earthy. Specific descriptors within each category are presented in Table 1.

Sample Sequence

The odor sample Chain of Custody was reviewed to rank the samples from the lowest to the highest odor level to determine the sequence of analysis to prevent a stronger odor from affecting a subsequent analysis of a weaker odor.

Table 1. Odor Descriptors

Vegetable	Fruity	Floral	Medicinal	Chemical	Fishy	Offensive	Earthy
Celery	Apple	Almond	Alcohol	Burnt Plastic	Amine	Flood	Ashes
Cucumber	Cherry	Cinnamon	Ammonia	Car Exhaust	Dead Fish	Burnt	Burnt Wood
Dill	Citrus	Coconut	Anesthetic	Cleaning fluid	Perm	Burnt Rubber	Chalk Like
Garlic	Cloves	Eucalyptus	Camphor	Coal	Solution	Decay	Coffee
Green pepper	Grapes	Fragrant	Chlorinous	Creosote		Fecal	Grain Silage
Nutty	Lemon	Herbal	Disinfectant	Diesel		Garbage	Grassy
Tomato	Maple	Lavender	Methanol	Gasoline		LF Leachate	Mold
Onion	Melon	Marigolds	Soapy	Grease		Manure	Mouse-like
	Minty	Perfumy	Vinegar	Foundry		Mercaptan	Mushroom
	Orange	Rose-like		Kerosene		Putrid	Musky
	Strawberry	Spicy		Molasses		Rancid	Musty
	Sweet	Vanilla		Mothball		Raw Meat	Peat-like
				Oil		Rotten Eggs	Pine
				Paint		Septic	Smokey
				Petroleum		Sewer	Stale
				Plastic		Sour	Swampy
				Resins		Spoiled Milk	Woody
				Solvent		Urine	Yeast
				Styrene		Vomit	
				Sulfur			
				Tar/Asphalt			
				Turpentine			
				Varnish			
				Vinegar			
				Vinyl			

4. ODOR ANALYSIS RESULTS

The measured odor detection thresholds ED_{50}, odor recognition threshold, and measured H_2S values are presented in Appendix B. Odor characterization for "smells like" and "feels like" spider graphs and histograms are shown in Appendix C.

If you have any questions or required any additional information, please do not hesitate to contact me at your convenience at 630-393-9000.

Respectfully submitted,
RK & Associates, Inc.

Darina Demirev
Project Engineer

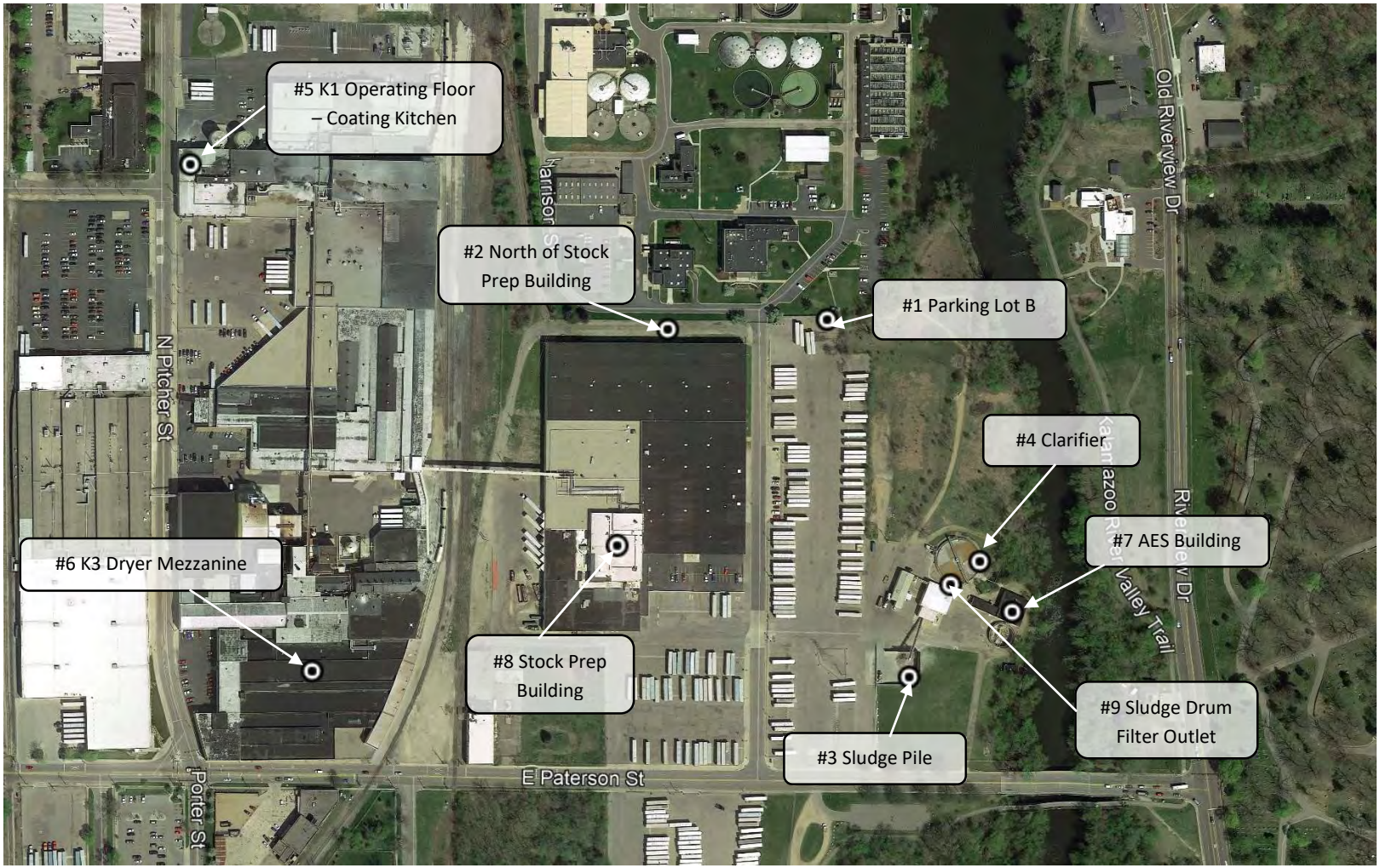
Attachments: Odor Panel Worksheets and Results

RK
& Associates, Inc.

Appendix A

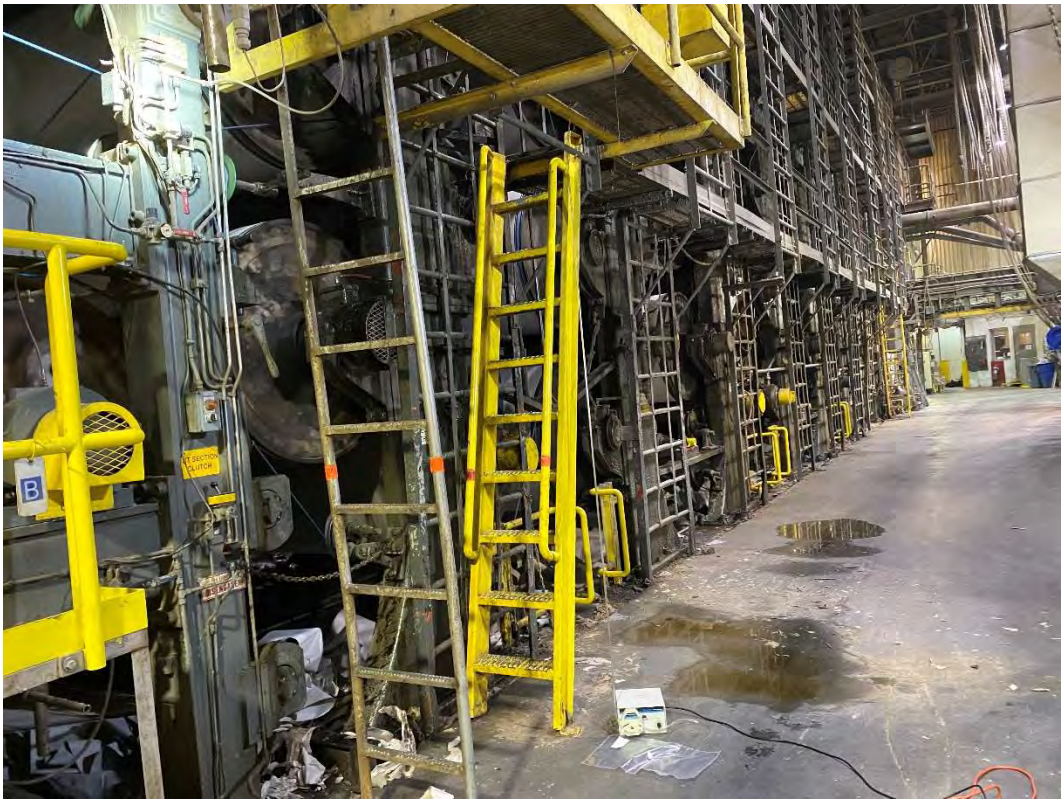
GPI Sampling Locations

Samples Collected August 10 & 11, 2020



RK & Associates, Inc. 2S631 ROUTE 59, SUITE B WARRENVILLE, IL 60555 630-393-9000 630-790-2966	COMMENTS: Sampling Locations		Graphic Packaging International Kalamazoo, MI		FIGURE 1
	DRAWN BY: DD	APPROVED BY: SR	PROJECT NUMBER: R19444	DATE DRAWN: 08-28-2020	REVISED DATE 01-18-2020

K1 Operationg Floor – Coating Kitchen



K3 Dryer Mezzanine

Stock Prep Building at News Pulper

AES Building between Screens

Clarifier (Downwind of Clarifier)

Sludge Pile (Downwind of Sludge Pile)

Sludge Drum Filter Outlet

Parking Lot B (near discharge to WWTP)

North of Stock Prep Building

RK
& Associates, Inc.

Appendix B

Odor Thresholds ED_{50} & Recognition Threshold

Odor Panel Results
Graphic Packaging International, LLC's

Analyzed on August 12, 2020

SUMMARY OF ODOR PANEL RESULTS

Client: **Graphic Packaging International** Date: **08/12/20**

Source: **Olfactometry Analysis**

Total No. of Samples: **9**

Sample No.	Sample Identification	Detection Threshold (ou/scf)	Recognition Threshold (ou/scf)	H_2S Reading (ppm)
1	Parking Lot B (near discharge to WWTP)	4	3	0.004
2	North of Stock Prep Building	3	3	0.003
3	Sludge Pile	4	3	0.002
4	Clarifier	41	15	0.033
5	K1 Operating Floor - Coating Kitchen	94	41	0.091
6	K3 Drayer Mezzanine	76	28	0.160
7	AES Building Between Screens	210	99	0.560
8	Stock Prep Building at News Pulper	127	46	0.810
9	Sludge Drum Filter Outlet	294	177	0.510
Detection Level		**3**	**3**	**0.001**

Suresh Relwani

signature

Suresh M. Relwani
Principal Engineer

12-Aug-20

date

2 South 631 Route 59 - Suite B
Warrenville, Illinois 60555

RK and Associates, Inc.

Phone: 630-393-9000
Fax: 630-393-9000

RK & Associates, Inc.

ODOR SAMPLE
ED_{50} EVALUATION FORM

Client: **Graphic Packaging International** Date: **08/12/20**

Project: **Olfactometry Analysis**

Sample ID: **Parking Lot B (near discharge to WWTP)**

Sample Dilution: **NA**

Operator: **Jenny** Sample: **1** of **9**

Correct Choice	B

Attenuator Used	N
Sample Dil. Rate	

Panelist	Olfactometer Ports						
	1	2	3	4	5	6	>6
1121	T	T	C	C	B	T	B
1004	B	T	B	T	T	C	B
1002	B	T	C	B	B	T	B
1003	B	B	T	T	T	C	B
1074	T	T	B	B	C	C	B
1131	C	T	B	V	B	T	B
1132	C	T	B	B	T	B	
1130	T	T	C	C	C	B	

Log of ED_{50}:	0.61

ED_{50}:	4

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ODOR SAMPLE
ED_{50} EVALUATION FORM

Client: **Graphic Packaging International** Date: **08/12/20**

Project: **Olfactometry Analysis**

Sample ID: **North of Stock Prep Building**

Sample Dilution: **NA**

Operator: **Jenny** Sample: **2** of **9**

Correct Choice	B

Attenuator Used	N
Sample Dil. Rate	

Panelist	Olfactometer Ports						
	1	2	3	4	5	6	>6
1121	B	T	B	B	T	C	B
1004	T	C	C	B	T	T	B
1002	B	C	C	C	C	T	B
1003	C	C	T	B	T	C	B
1074	T	C	C	C	C	C	B
1131	C	B	C	B	T	T	B
1132	C	B	T	C	C	C	B
1130	B	C	C	C	C	T	B

Log of ED_{50}:	0.47

ED_{50}:	3

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ODOR SAMPLE
ED_{50} EVALUATION FORM

Client: **Graphic Packaging International** Date: **08/12/20**

Project: **Olfactometry Analysis**

Sample ID: **Sludge Pile**

Sample Dilution: **NA**

Operator: **Jenny** Sample: **3** of **9**

Correct Choice	B

Attenuator Used	N
Sample Dil. Rate	

Panelist	Olfactometer Ports						
	1	2	3	4	5	6	>6
1121	B	T	T	C	T	B	
1004	T	B	T	T	B	T	B
1002	B	C	B	C	C	T	B
1003	B	B	T	B	B	T	B
1074	C	B	T	T	C	T	B
1131	C	C	C	B	T	C	B
1132	T	C	B	B	T	C	B
1130	B	C	C	C	T	B	

Log of ED_{50}:	0.61

ED_{50}:	4

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ODOR SAMPLE
ED_{50} EVALUATION FORM

Client: **Graphic Packaging International** Date: **08/12/20**

Project: **Olfactometry Analysis**

Sample ID: **Clarifier**

Sample Dilution: **NA**

Operator: **Jenny** Sample: **4** of **9**

Correct Choice	B

Attenuator Used	N
Sample Dil. Rate	

	Olfactometer Ports						
Panelist	1	2	3	4	5	6	>6
1121	T	C	C	B	B	B	
1004	T	T	T	B	B	B	
1002	B	T	C	B	B	B	
1003	B	B	B	B	T	B	
1074	T	C	T	B	B	B	
1131	B	C	B	B	C	B	
1132	B	T	T	B	B	B	
1130	B	C	B	C	B	B	

Log of ED_{50}:	1.62

ED_{50}:	41

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ODOR SAMPLE
ED_{50} EVALUATION FORM

Client: **Graphic Packaging International** Date: **08/12/20**

Project: **Olfactometry Analysis**

Sample ID: **K1 Operating Floor - Coating Kitchen**

Sample Dilution: **NA**

Operator: **Jenny** Sample: **5** of **9**

Correct Choice	B

Attenuator Used	N
Sample Dil. Rate	

	Olfactometer Ports						
Panelist	1	2	3	4	5	6	>6
1121	B	T	C	**B**	B	B	
1004	B	T	T	**B**	B	B	
1002	B	C	**B**	B	B	B	
1003	T	C	T	**B**	B	B	
1074	T	C	**B**	B	B	B	
1131	B	C	T	C	**B**	B	
1132	T	**B**	B	B	B	B	
1130	T	B	C	T	**B**	B	

Log of ED_{50}:	1.97

ED_{50}:	94

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ODOR SAMPLE
ED_{50} EVALUATION FORM

Client: **Graphic Packaging International** Date: **08/12/20**

Project: **Olfactometry Analysis**

Sample ID: **K3 Drayer Mezzanine**

Sample Dilution: **NA**

Operator: **Jenny** Sample: **6** of **9**

Correct Choice	B

Attenuator Used	N
Sample Dil. Rate	

	Olfactometer Ports						
Panelist	1	2	3	4	5	6	>6
1121	T	C	C	B	B	B	
1004	C	C	B	B	B	B	
1002	T	C	C	B	B	B	
1003	C	T	B	B	B	B	
1074	B	B	T	B	B	B	
1131	T	C	B	T	B	B	
1132	B	C	C	B	B	B	
1130	B	T	B	T	B	B	

Log of ED_{50}:	1.88

ED_{50}:	76

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ODOR SAMPLE
ED_{50} EVALUATION FORM

Client: **Graphic Packaging International** Date: **08/12/20**

Project: **Olfactometry Analysis**

Sample ID: **AES Building Between Screens**

Sample Dilution: **NA**

Operator: **Jenny** Sample: **7** of **9**

Correct Choice	B

Attenuator Used	N
Sample Dil. Rate	

	Olfactometer Ports						
Panelist	1	2	3	4	5	6	>6
1121	T	C	B	B	B	B	
1004	T	B	T	B	B	B	
1002	T	C	B	B	B	B	
1003	T	T	B	B	B	B	
1074	T	B	B	B	B	B	
1131	T	B	B	B	B	B	
1132	T	B	B	B	B	B	
1130	T	T	C	B	B	B	

Log of ED_{50}:	2.32

ED_{50}:	210

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ODOR SAMPLE
ED_{50} EVALUATION FORM

Client: **Graphic Packaging International** Date: **08/12/20**

Project: **Olfactometry Analysis**

Sample ID: **Stock Prep Building at News Pulper**

Sample Dilution: **NA**

Operator: **Jenny** Sample: **8** of **9**

Correct Choice	B

Attenuator Used	N
Sample Dil. Rate	

	Olfactometer Ports						
Panelist	1	2	3	4	5	6	>6
1121	C	C	B	B	B	B	
1004	T	C	B	B	B	B	
1002	B	C	T	B	B	B	
1003	C	B	C	B	B	B	
1074	T	C	B	B	B	B	
1131	B	C	C	B	B	B	
1132	T	C	B	B	B	B	
1130	T	C	C	B	B	B	

Log of ED_{50}:	2.10

ED_{50}:	127

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ODOR SAMPLE
ED_{50} EVALUATION FORM

Client: **Graphic Packaging International** Date: **08/12/20**

Project: **Olfactometry Analysis**

Sample ID: **Sludge Drum Filter Outlet**

Sample Dilution: **NA**

Operator: **Jenny** Sample: **9** of **9**

Correct Choice	B

Attenuator Used	N
Sample Dil. Rate	

	Olfactometer Ports						
Panelist	1	2	3	4	5	6	>6
1121	C	B	B	B	B	B	
1004	T	C	B	B	B	B	
1002	B	C	B	B	B	B	
1003	B	C	B	B	B	B	
1074	B	T	B	B	B	B	
1131	T	B	B	B	B	B	
1132	T	B	B	B	B	B	
1130	C	B	B	B	B	B	

Log of ED_{50}:	2.47

ED_{50}:	294

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ODOR SAMPLE RECOGNITION THRESHOLD EVALUATION FORM

Client: **Graphic Packaging International** Date: **08/12/20**

Project: **Olfactometry Analysis**

Sample ID: **Parking Lot B (near discharge to WWTP)**

Sample Dilution: **NA**

Operator: **Jenny** Sample: **1** of **9**

Correct Choice	R

Attenuator Used	N
Sample Dil. Rate	

Panelist	Olfactometer Ports						
	1	2	3	4	5	6	>6
1121	NR	NR	NR	NR	NR	NR	R
1004	NR	NR	NR	NR	NR	NR	R
1002	NR	NR	NR	NR	NR	NR	R
1003	NR	NR	NR	NR	NR	NR	R
1074	NR	NR	NR	NR	NR	NR	R
1131	NR	NR	NR	NR	NR	NR	R
1132	NR	NR	NR	NR	NR	NR	R
1130	NR	NR	NR	NR	NR	NR	R

Log of ED_{50}:	0.47

ED_{50}:	3

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ODOR SAMPLE RECOGNITION THRESHOLD EVALUATION FORM

Client: **Graphic Packaging International** Date: **08/12/20**

Project: **Olfactometry Analysis**

Sample ID: **North of Stock Prep Building**

Sample Dilution: **NA**

Operator: **Jenny** Sample: **2** of **9**

Correct Choice	R

Attenuator Used	N
Sample Dil. Rate	

Panelist	Olfactometer Ports						
	1	2	3	4	5	6	>6
1121	NR	NR	NR	NR	NR	NR	R
1004	NR	NR	NR	NR	NR	NR	R
1002	NR	NR	NR	NR	NR	NR	R
1003	NR	NR	NR	NR	NR	NR	R
1074	NR	NR	NR	NR	NR	NR	R
1131	NR	NR	NR	NR	NR	NR	R
1132	NR	NR	NR	NR	NR	NR	R
1130	NR	NR	NR	NR	NR	NR	R

Log of ED_{50}:	0.47

ED_{50}:	3

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ODOR SAMPLE RECOGNITION THRESHOLD EVALUATION FORM

Client: **Graphic Packaging International** Date: **08/12/20**

Project: **Olfactometry Analysis**

Sample ID: **Sludge Pile**

Sample Dilution: **NA**

Operator: **Jenny** Sample: **3** of **9**

Correct Choice	R

Attenuator Used	N
Sample Dil. Rate	

Panelist	Olfactometer Ports						
	1	2	3	4	5	6	>6
1121	NR	NR	NR	NR	NR	NR	R
1004	NR	NR	NR	NR	NR	NR	R
1002	NR	NR	NR	NR	NR	NR	R
1003	NR	NR	NR	NR	NR	NR	R
1074	NR	NR	NR	NR	NR	NR	R
1131	NR	NR	NR	NR	NR	NR	R
1132	NR	NR	NR	NR	NR	NR	R
1130	NR	NR	NR	NR	NR	NR	R

Log of ED_{50}:	0.47

ED_{50}:	3

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ODOR SAMPLE RECOGNITION THRESHOLD EVALUATION FORM

Client: **Graphic Packaging International** Date: **08/12/20**

Project: **Olfactometry Analysis**

Sample ID: **Clarifier**

Sample Dilution: **NA**

Operator: **Jenny** Sample: **4** of **9**

Correct Choice	R

Attenuator Used	N
Sample Dil. Rate	

Panelist	Olfactometer Ports						
	1	2	3	4	5	6	>6
1121	NR	NR	NR	NR	R	R	
1004	NR	NR	NR	NR	R	R	
1002	NR	NR	NR	NR	R	R	
1003	NR	NR	NR	NR	NR	NR	R
1074	NR	NR	NR	NR	R	R	
1131	NR	NR	NR	NR	NR	R	
1132	NR	NR	NR	R	R	NR	
1130	NR	NR	NR	NR	NR	R	

Log of ED_{50}:	1.18

ED_{50}:	15

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ODOR SAMPLE
ED_{50} EVALUATION FORM

Client: **Graphic Packaging International** Date: **08/12/20**

Project: **Olfactometry Analysis**

Sample ID: **K1 Operating Floor - Coating Kitchen**

Sample Dilution: **NA**

Operator: **Jenny** Sample: **5** of **9**

Correct Choice	R

Attenuator Used	N
Sample Dil. Rate	

	Olfactometer Ports						
Panelist	1	2	3	4	5	6	>6
1121	NR	NR	NR	R	R	R	
1004	NR	NR	NR	R	R	R	
1002	NR	NR	NR	R	R	R	
1003	NR	NR	NR	NR	R	R	
1074	NR	NR	NR	R	R	R	
1131	NR	NR	NR	NR	NR	R	
1132	NR	NR	NR	R	R	R	
1130	NR	NR	NR	NR	NR	R	

Log of ED_{50}:	1.62

ED_{50}:	41

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ODOR SAMPLE
ED_{50} EVALUATION FORM

Client: **Graphic Packaging International** Date: **08/12/20**

Project: **Olfactometry Analysis**

Sample ID: **K3 Drayer Mezzanine**

Sample Dilution: **NA**

Operator: **Jenny** Sample: **6** of **9**

Correct Choice	R

Attenuator Used	N
Sample Dil. Rate	

Panelist	Olfactometer Ports						
	1	2	3	4	5	6	>6
1121	NR	NR	NR	R	R	R	
1004	NR	NR	NR	NR	R	R	
1002	NR	NR	NR	NR	R	R	
1003	NR	NR	NR	NR	NR	R	
1074	NR	NR	NR	NR	R	R	
1131	NR	NR	NR	NR	NR	R	
1132	NR	NR	NR	R	R	R	
1130	NR	NR	NR	NR	R	R	

Log of ED_{50}:	1.44

ED_{50}:	28

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ODOR SAMPLE
ED_{50} EVALUATION FORM

Client: **Graphic Packaging International** Date: **08/12/20**

Project: **Olfactometry Analysis**

Sample ID: **AES Building Between Screens**

Sample Dilution: **NA**

Operator: **Jenny** Sample: **7** of **9**

Correct Choice	R

Attenuator Used	N
Sample Dil. Rate	

Panelist	Olfactometer Ports						
	1	2	3	4	5	6	>6
1121	NR	NR	NR	R	R	R	
1004	NR	NR	NR	R	R	R	
1002	NR	NR	NR	R	R	R	
1003	NR	NR	NR	R	R	R	
1074	NR	NR	R	R	R	R	
1131	NR	NR	R	R	R	R	
1132	NR	NR	NR	R	R	R	
1130	NR	NR	NR	R	R	R	

Log of ED_{50}:	1.99

ED_{50}:	99

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ODOR SAMPLE
ED_{50} EVALUATION FORM

Client: **Graphic Packaging International** Date: **08/12/20**

Project: **Olfactometry Analysis**

Sample ID: **Stock Prep Building at News Pulper**

Sample Dilution: **NA**

Operator: **Jenny** Sample: **8** of **9**

Correct Choice	R

Attenuator Used	N
Sample Dil. Rate	

	Olfactometer Ports						
Panelist	1	2	3	4	5	6	>6
1121	NR	NR	NR	R	R	R	
1004	NR	NR	NR	R	R	R	
1002	NR	NR	NR	NR	R	R	
1003	NR	NR	NR	NR	NR	R	
1074	NR	NR	NR	R	R	R	
1131	NR	NR	NR	NR	R	R	
1132	NR	NR	NR	R	R	R	
1130	NR	NR	NR	R	R	R	

Log of ED_{50}:	1.67

ED_{50}:	46

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ODOR SAMPLE
ED_{50} EVALUATION FORM

Client: **Graphic Packaging International** Date: **08/12/20**

Project: **Olfactometry Analysis**

Sample ID: **Sludge Drum Filter Outlet**

Sample Dilution: **NA**

Operator: **Jenny** Sample: **9** of **9**

Correct Choice	R

Attenuator Used	N
Sample Dil. Rate	

Panelist	Olfactometer Ports						
	1	2	3	4	5	6	>6
1121	NR	NR	R	R	R	R	
1004	NR	NR	NR	R	R	R	
1002	NR	NR	R	R	R	R	
1003	NR	NR	R	R	R	R	
1074	NR	NR	NR	R	R	R	
1131	NR	NR	R	R	R	R	
1132	NR	R	R	R	R	R	
1130	NR	NR	R	R	R	R	

Log of ED_{50}:	2.25

ED_{50}:	177

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FLOW CALIBRATION FOR DYNAMIC TRIANGLE OLFACTOMETER
(all flows in cc/min)

Date: **08/12/20** Time: **11:00 AM** Temp: **74.0** °F

Client: **Graphic Packaging International** Operator: **Jenny**

Project: **Olfactometry Analysis**

Enter Flow Measurements Below When Using Attenuator		
Flow Through Carbon	By-Pass Flow	Sample Attenuation Factor

Port No.	Dilution Level No.	Odor Sample Flow (at port)	Dilution Air Flow (at port)	Direct Sample Dilution Factor	No Attenuator		Attenuator Data		
					Log of Dilution Factor	Avg. Log Dilution Factor	Attenuator Dilution Factor	Log Dilution Factor	Avg. Log Dilution Factor
	7								
						0.47			
6	6	82.3	501.0	7.09	0.85				
						1.03			
5	5	31.9	491.0	16.39	1.21				
						1.43			
4	4	11.5	496.0	44.13	1.64				
						1.89			
3	3	3.7	498.0	134.51	2.13				
						2.32			
2	2	1.6	502.0	320.75	2.51				
						2.62			
1	1	0.9	505.0	538.23	2.73				
						2.97			
	< 1								

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Appendix C

Odor Characterization

Odor Panel Results
Graphic Packaging International, LLC's

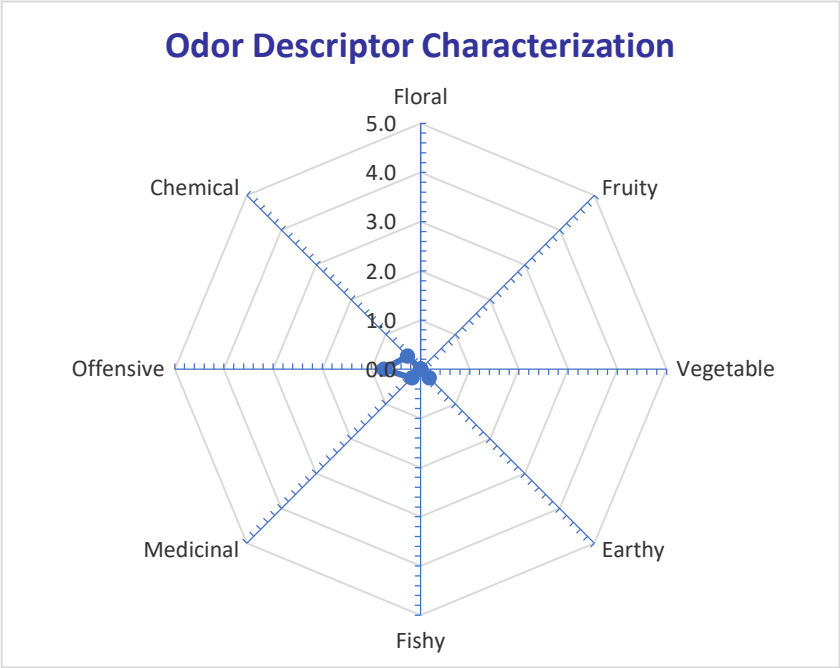
Analyzed on August 12, 2020

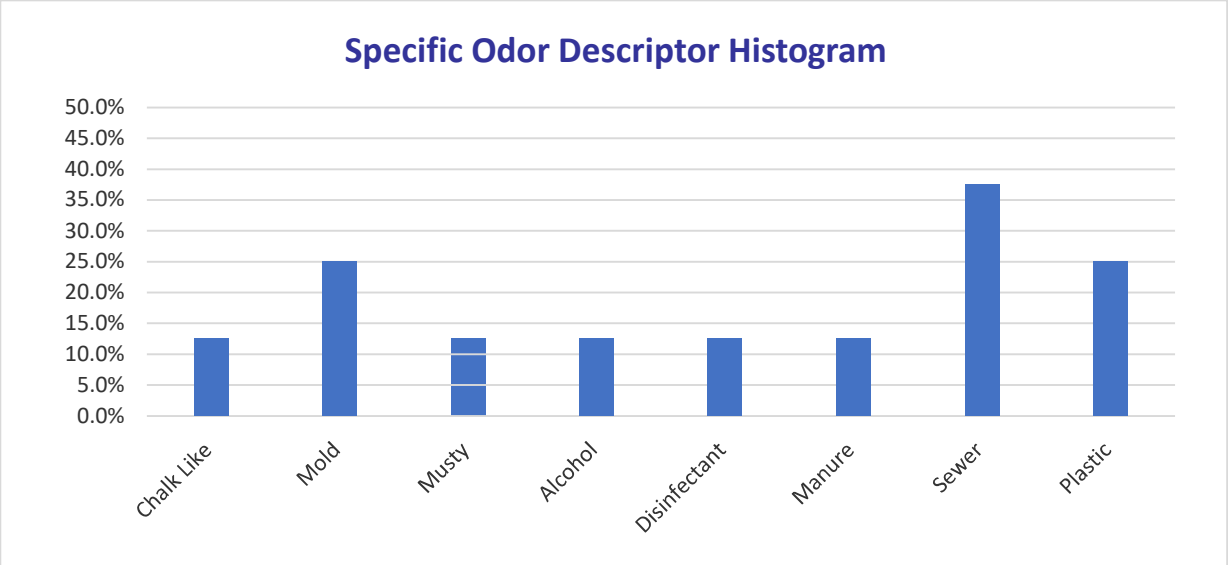
ODOR CHARACTERIZATION

Client: **Graphic Packaging International** Date: **08/12/20**

Sample ID: **Parking Lot B (near discharge to WWTP)**

Odor Descriptor Category	Odor Descriptor Intensity
Floral	0.0
Fruity	0.0
Vegetable	0.0
Earthy	0.3
Fishy	0.0
Medicinal	0.3
Offensive	0.8
Chemical	0.4



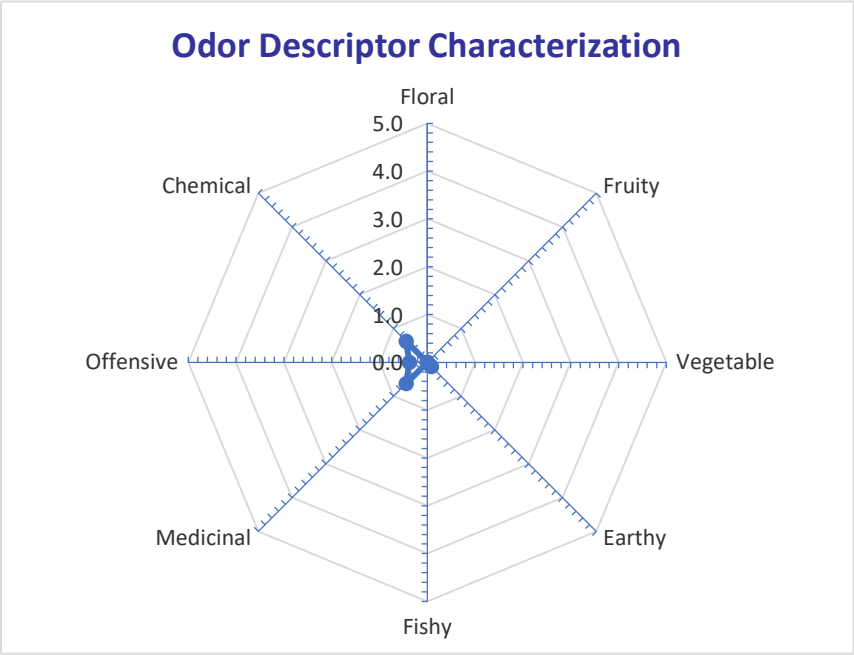


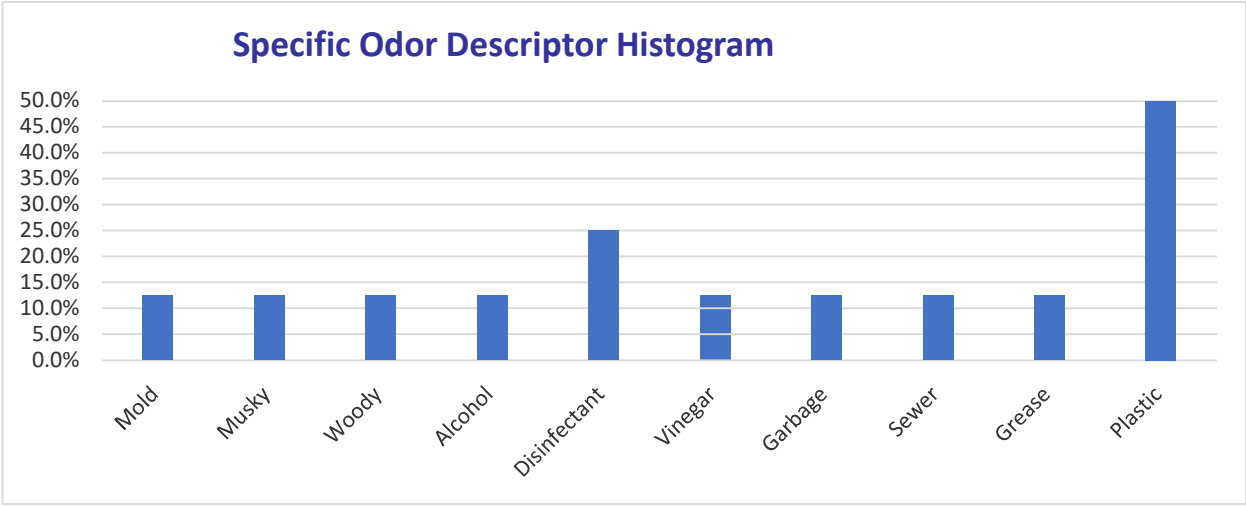
ODOR CHARACTERIZATION

Client: **Graphic Packaging International** Date: **08/12/20**

Sample ID: **North of Stock Prep Building**

Odor Descriptor Category	Odor Descriptor Intensity
Floral	0.0
Fruity	0.0
Vegetable	0.0
Earthy	0.1
Fishy	0.0
Medicinal	0.6
Offensive	0.4
Chemical	0.6



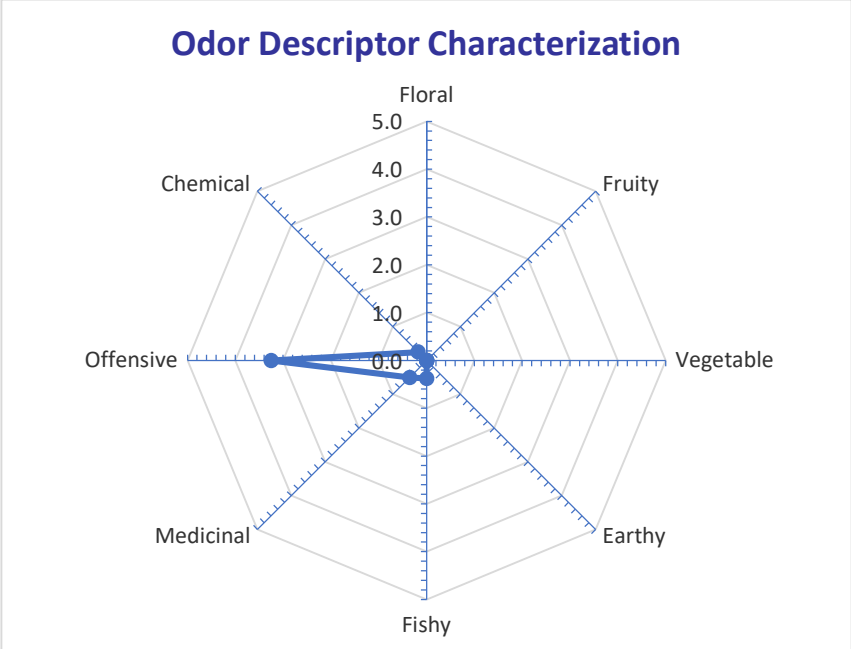


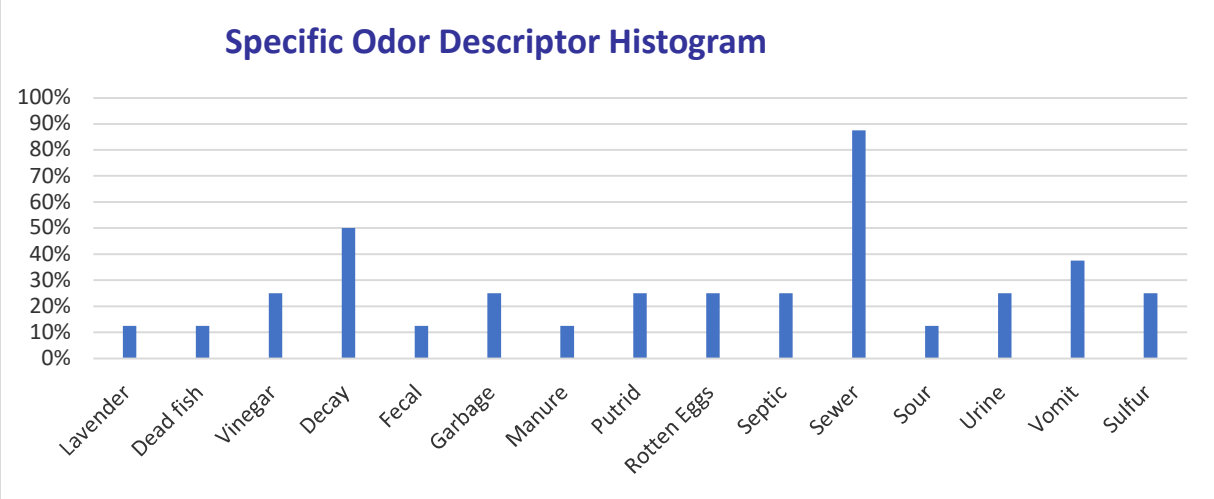
ODOR CHARACTERIZATION

Client: **Graphic Packaging International** Date: **08/12/20**

Sample ID: **Sludge Pile**

Odor Descriptor Category	Odor Descriptor Intensity
Floral	0.0
Fruity	0.0
Vegetable	0.0
Earthy	0.0
Fishy	0.4
Medicinal	0.5
Offensive	3.3
Chemical	0.3



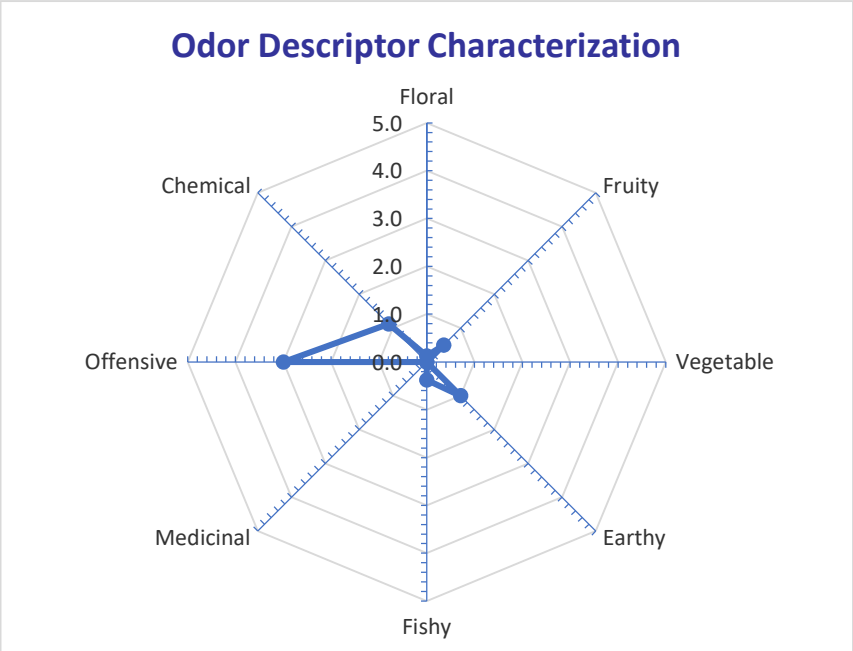


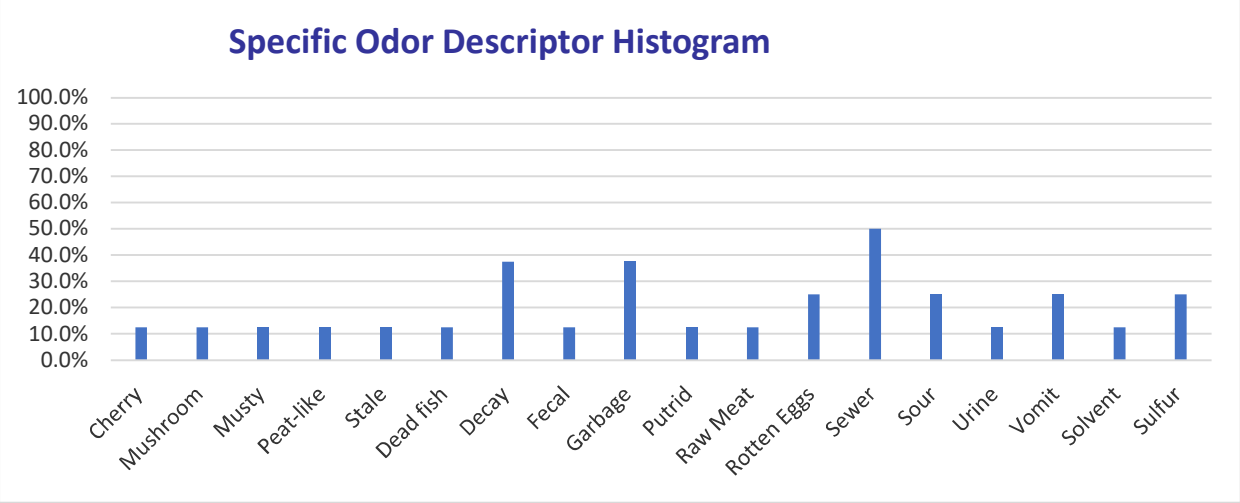
ODOR CHARACTERIZATION

Client: **Graphic Packaging International** Date: **08/12/20**

Sample ID: **Clarifier**

Odor Descriptor Category	Odor Descriptor Intensity
Floral	0.1
Fruity	0.5
Vegetable	0.0
Earthy	1.0
Fishy	0.4
Medicinal	0.0
Offensive	3.0
Chemical	1.1



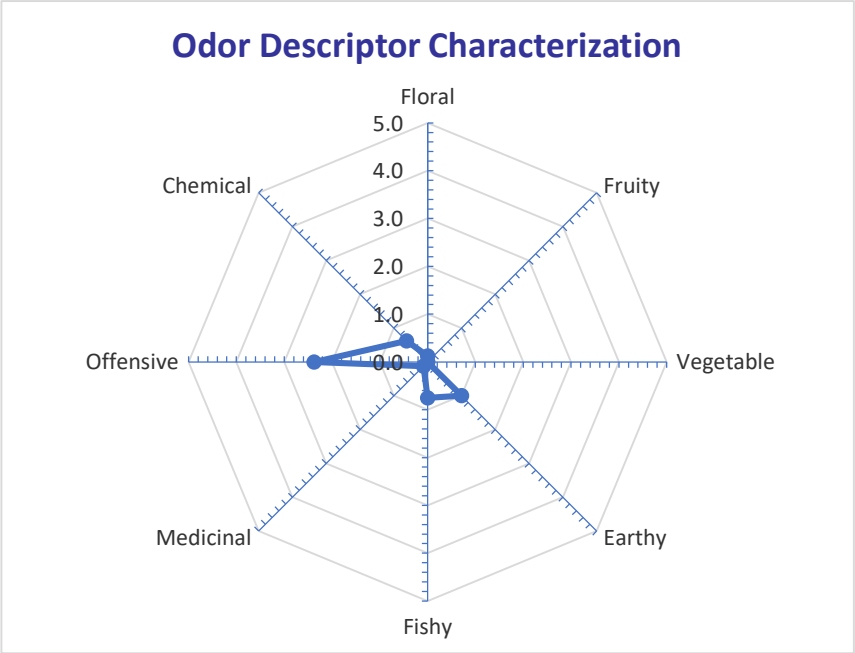


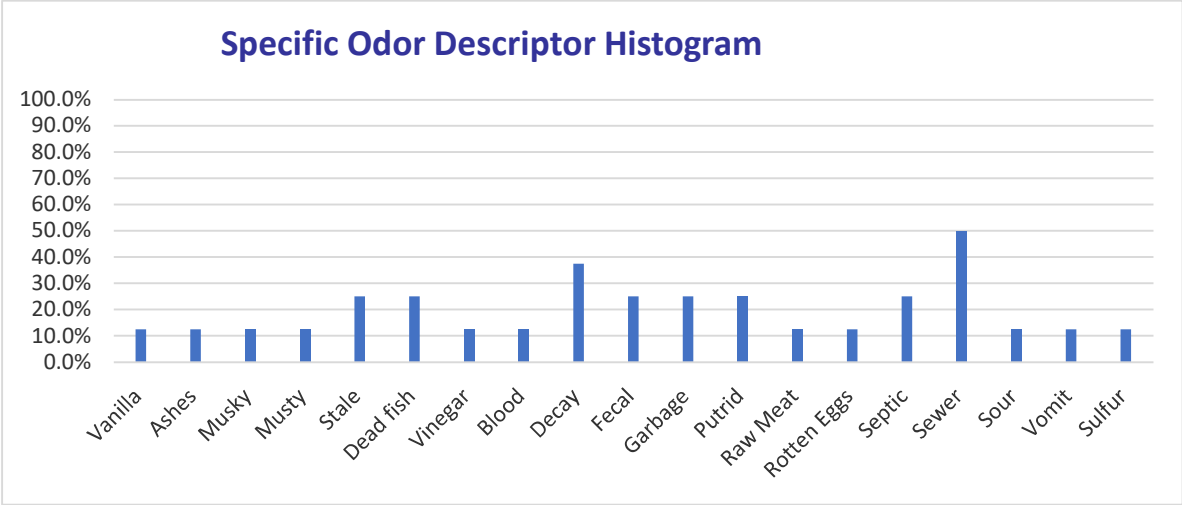
ODOR CHARACTERIZATION

Client: **Graphic Packaging International** Date: **08/12/20**

Sample ID: **K1 Operating Floor - Coating Kitchen**

Odor Descriptor Category	Odor Descriptor Intensity
Floral	0.1
Fruity	0.0
Vegetable	0.0
Earthy	1.0
Fishy	0.8
Medicinal	0.1
Offensive	2.4
Chemical	0.6



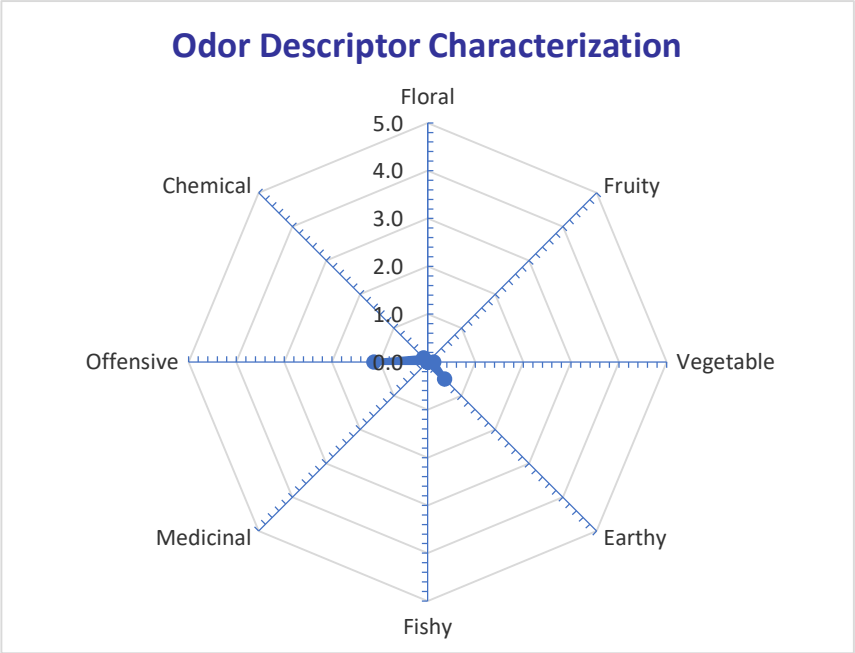


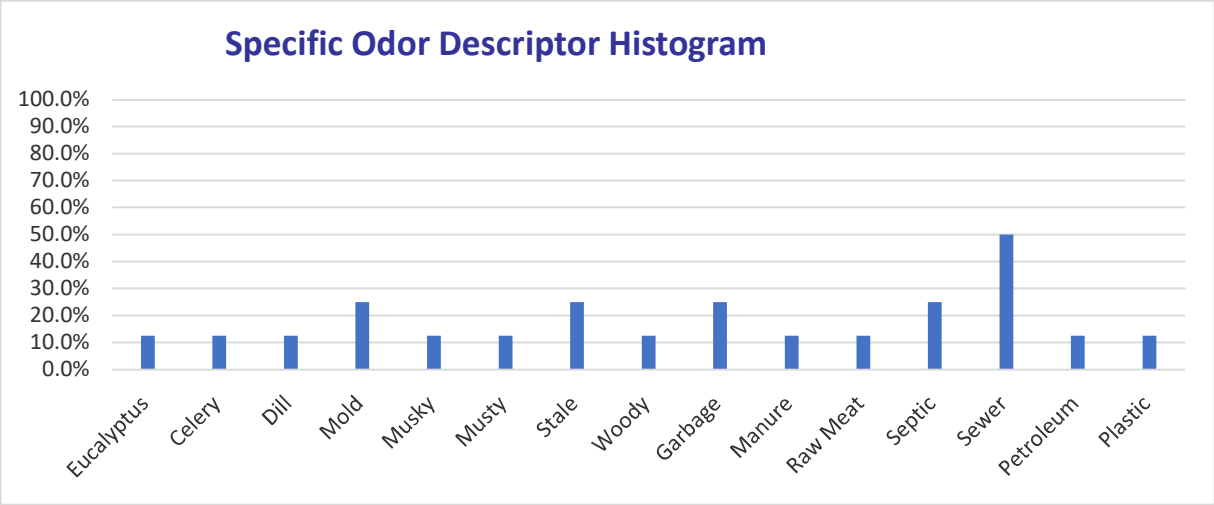
ODOR CHARACTERIZATION

Client: **Graphic Packaging International** Date: **#REF!**

Sample ID: **K3 Drayer Mezzanine**

Odor Descriptor Category	Odor Descriptor Intensity
Floral	0.0
Fruity	0.0
Vegetable	0.1
Earthy	0.5
Fishy	0.0
Medicinal	0.0
Offensive	1.1
Chemical	0.1



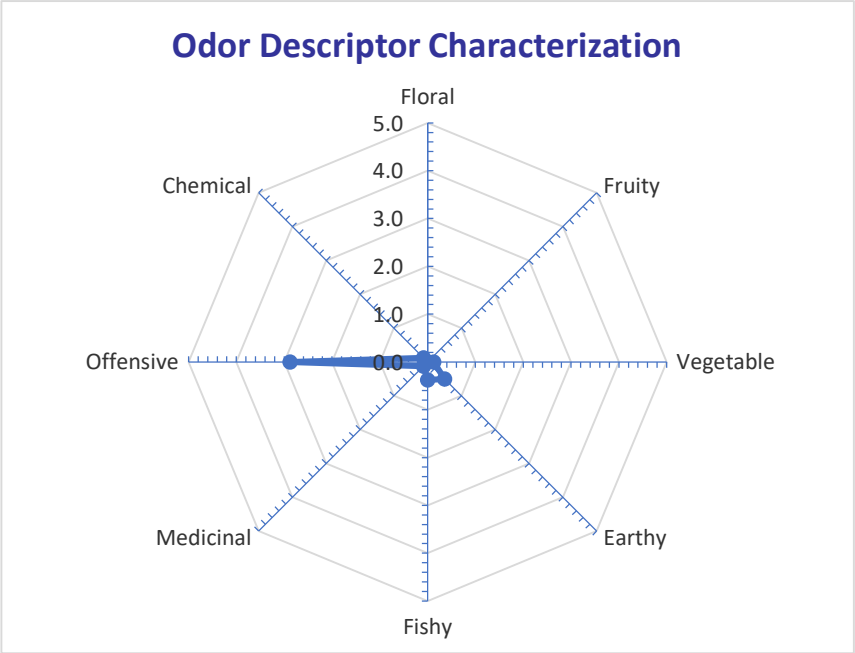


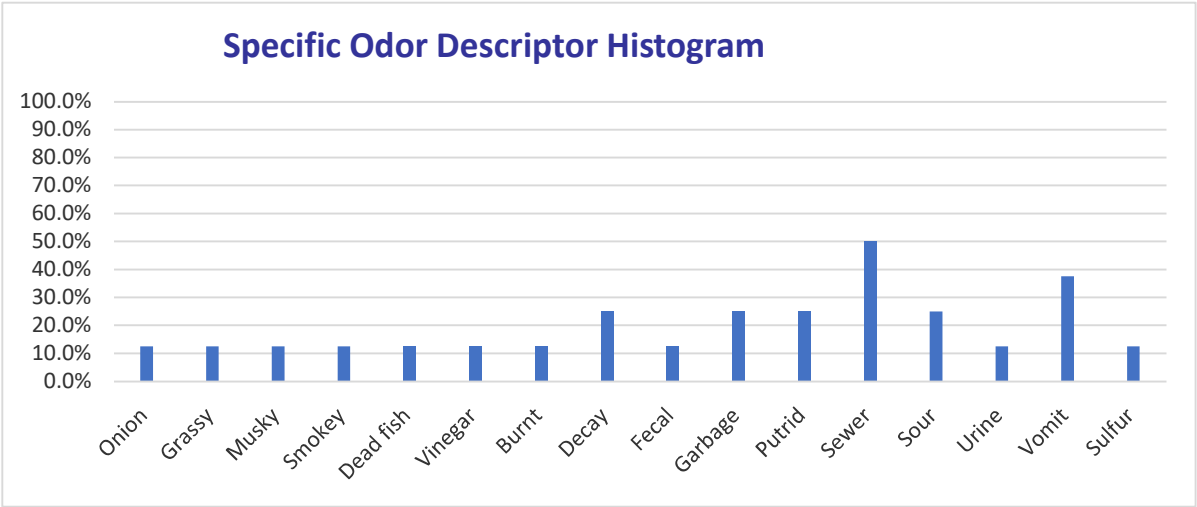
ODOR CHARACTERIZATION

Client: **Graphic Packaging International** Date: **08/12/20**

Sample ID: **AES Building Between Screens**

Odor Descriptor Category	Odor Descriptor Intensity
Floral	0.0
Fruity	0.0
Vegetable	0.1
Earthy	0.5
Fishy	0.4
Medicinal	0.1
Offensive	2.9
Chemical	0.1



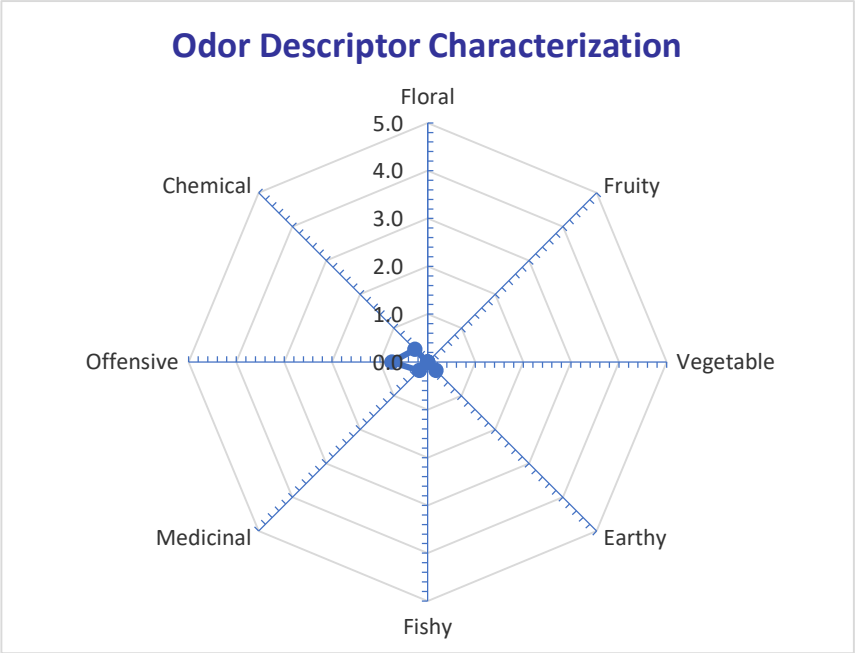


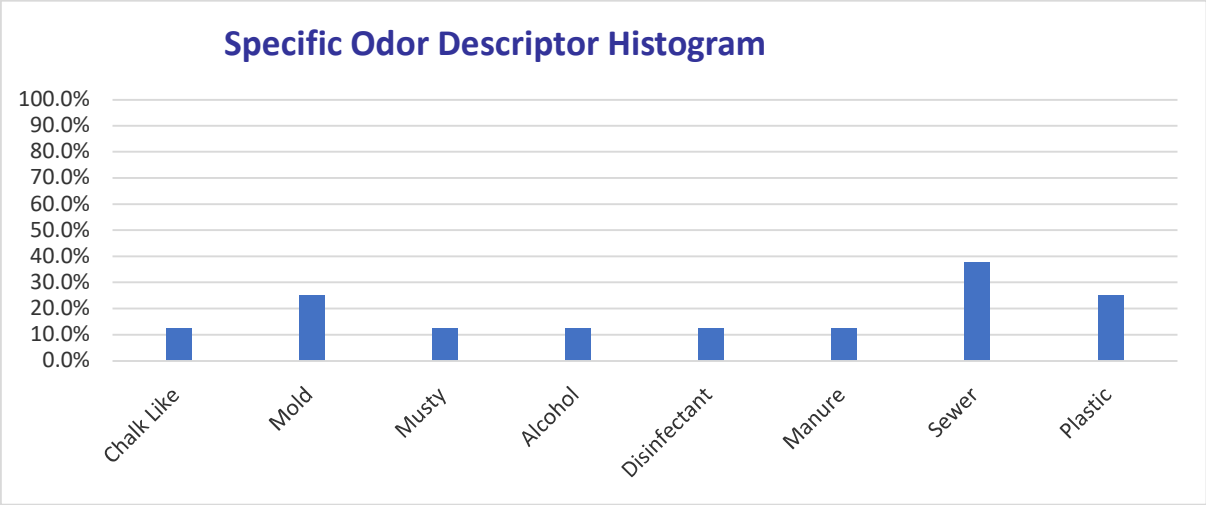
ODOR CHARACTERIZATION

Client: **Graphic Packaging International** Date: **08/12/20**

Sample ID: **Stock Prep Building at News Puler**

Odor Descriptor Category	Odor Descriptor Intensity
Floral	0.0
Fruity	0.0
Vegetable	0.0
Earthy	0.3
Fishy	0.0
Medicinal	0.3
Offensive	0.8
Chemical	0.4



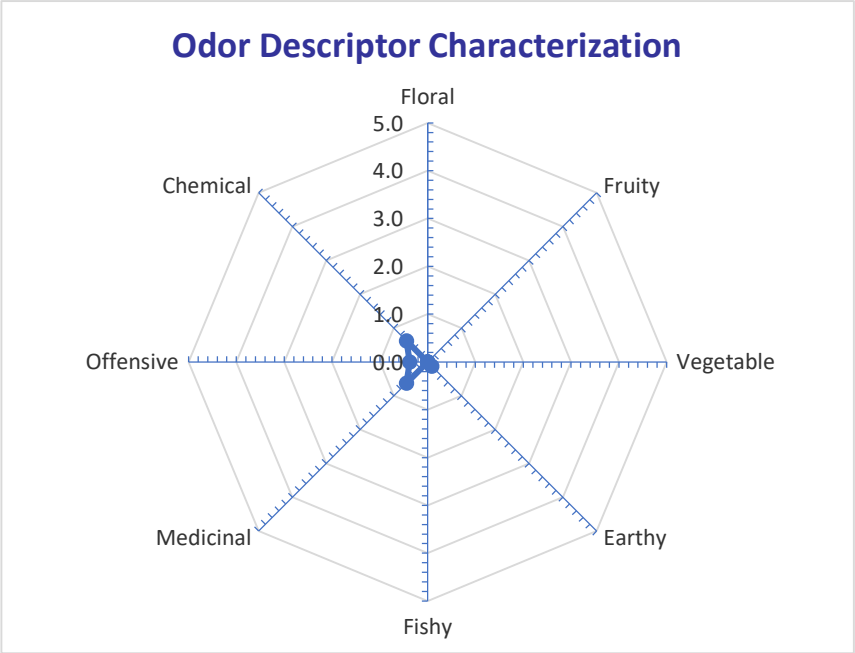


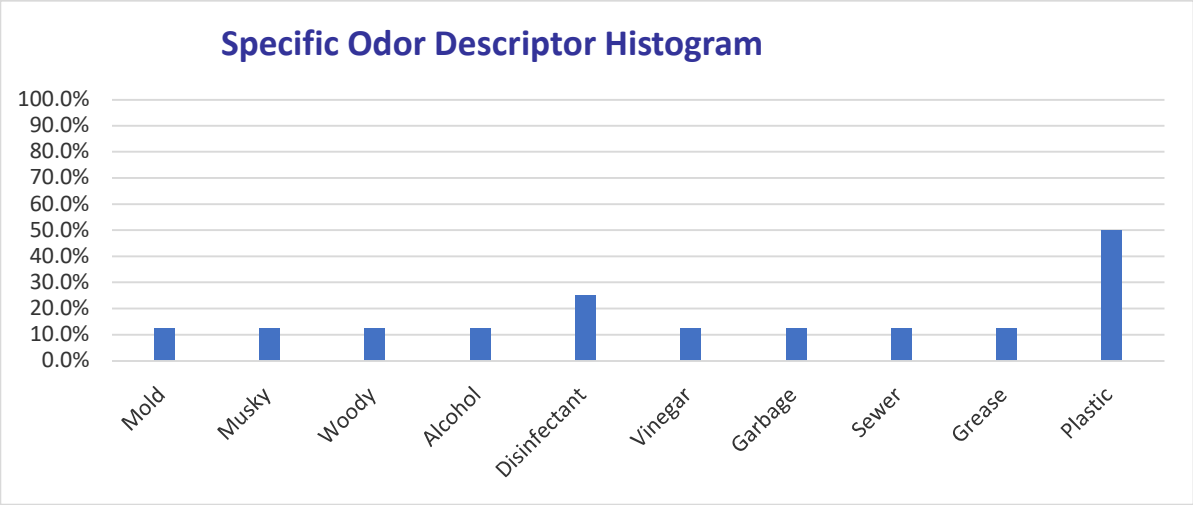
ODOR CHARACTERIZATION

Client: **Graphic Packaging International** Date: **08/12/20**

Sample ID: **Sludge Drum Filter Outlet**

Odor Descriptor Category	Odor Descriptor Intensity
Floral	0.0
Fruity	0.0
Vegetable	0.0
Earthy	0.1
Fishy	0.0
Medicinal	0.6
Offensive	0.4
Chemical	0.6





RK & Associates, Inc.

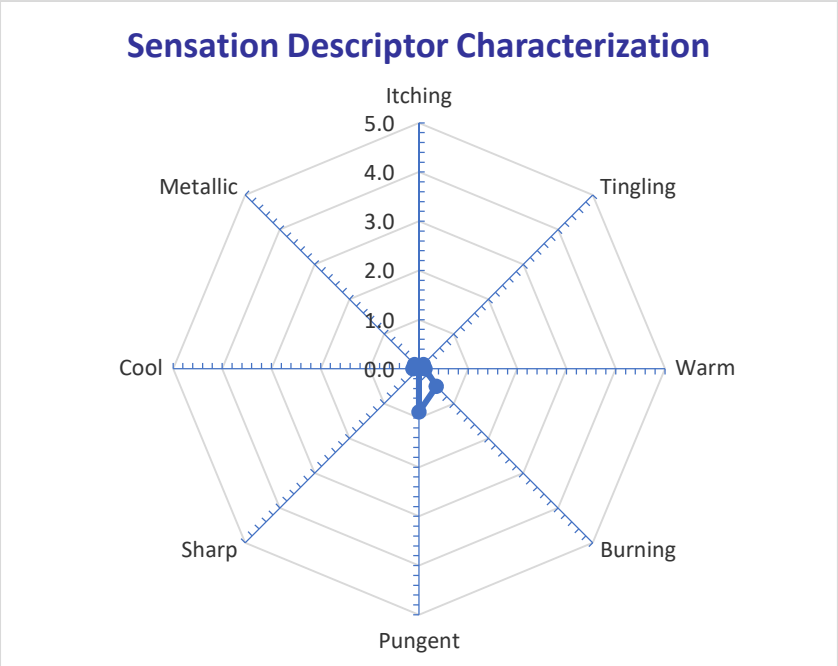
ODOR CHARACTERIZATION

Client: **MWRD** Date: **08/12/20**

Project: **Contract 19-101-11**

Sample ID: **Parking Lot B (near discharge to WWTP)**

Sensation Descriptor	Sensation Descriptor Intensity
Itching	0.0
Tingling	0.1
Warm	0.1
Burning	0.5
Pungent	0.9
Sharp	0.0
Cool	0.1
Metallic	0.1



RK & Associates, Inc.

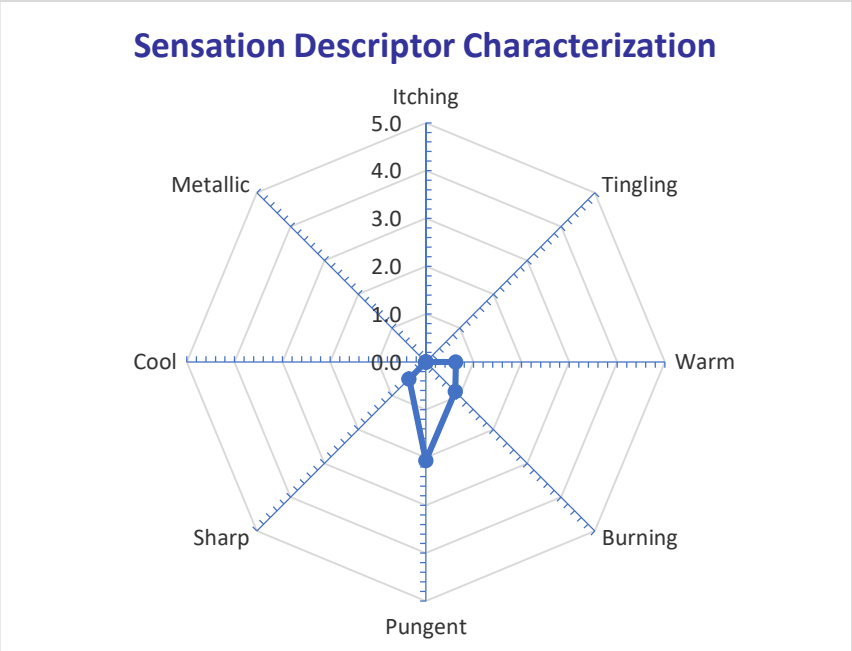
ODOR CHARACTERIZATION

Client: **MWRD** Date: **08/12/20**

Project: **Contract 19-101-11**

Sample ID: **North of Stock Prep Building**

Sensation Descriptor	Sensation Descriptor Intensity
Itching	0.0
Tingling	0.0
Warm	0.6
Burning	0.9
Pungent	2.1
Sharp	0.5
Cool	0.0
Metallic	0.0



RK & Associates, Inc.

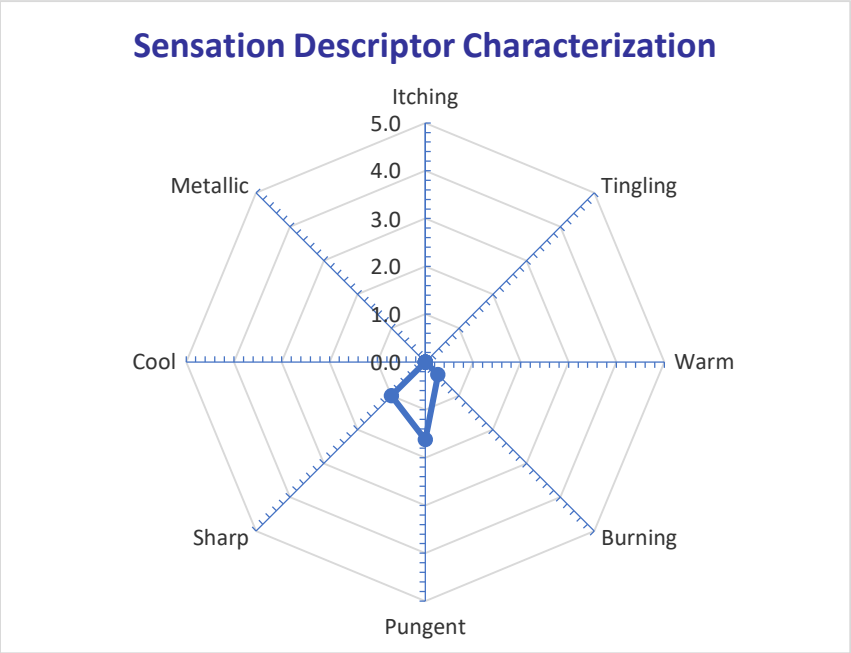
ODOR CHARACTERIZATION

Client: **MWRD** Date: **08/12/20**

Project: **Contract 19-101-11**

Sample ID: **Sludge Pile**

Sensation Descriptor	Sensation Descriptor Intensity
Itching	0.0
Tingling	0.0
Warm	0.0
Burning	0.4
Pungent	1.6
Sharp	1.0
Cool	0.0
Metallic	0.0



RK & Associates, Inc.

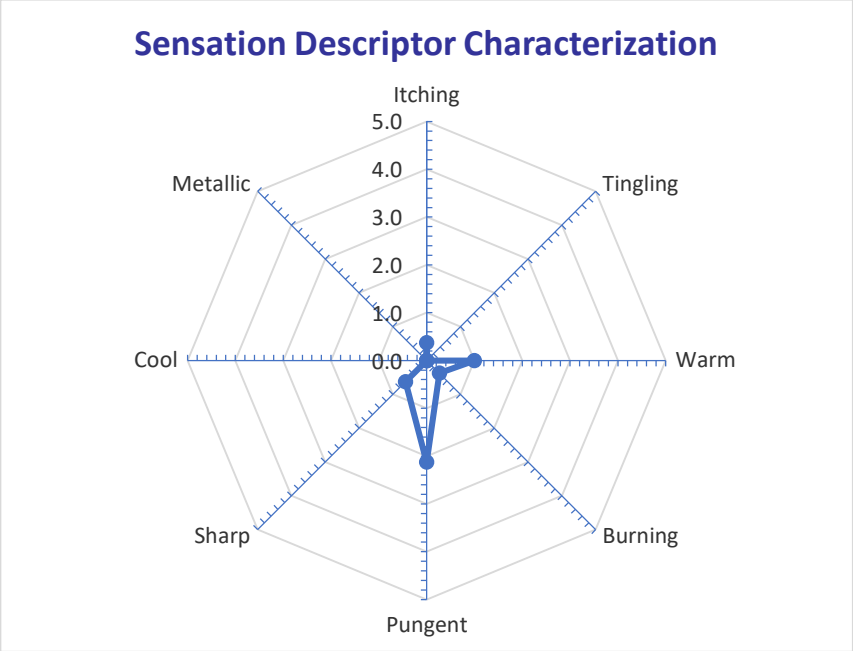
ODOR CHARACTERIZATION

Client: **MWRD** Date: **08/12/20**

Project: **Contract 19-101-11**

Sample ID: **Clarifier**

Sensation Descriptor	Sensation Descriptor Intensity
Itching	0.4
Tingling	0.0
Warm	1.0
Burning	0.4
Pungent	2.1
Sharp	0.6
Cool	0.0
Metallic	0.0



RK & Associates, Inc.

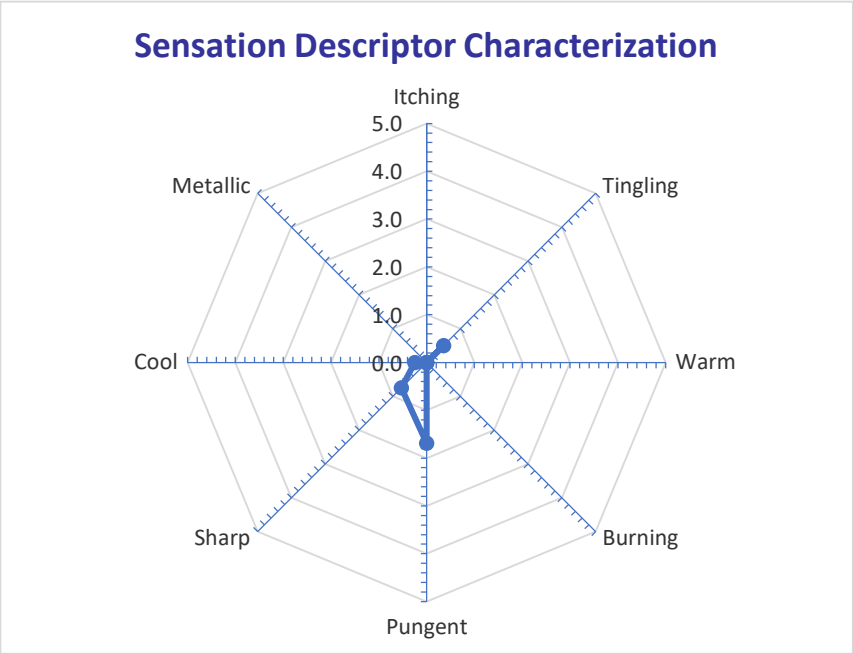
ODOR CHARACTERIZATION

Client: **MWRD** Date: **08/12/20**

Project: **Contract 19-101-11**

Sample ID: **K1 Operating Floor - Coating Kitchen**

Sensation Descriptor	Sensation Descriptor Intensity
Itching	0.0
Tingling	0.5
Warm	0.0
Burning	0.0
Pungent	1.7
Sharp	0.8
Cool	0.3
Metallic	0.0



RK & Associates, Inc.

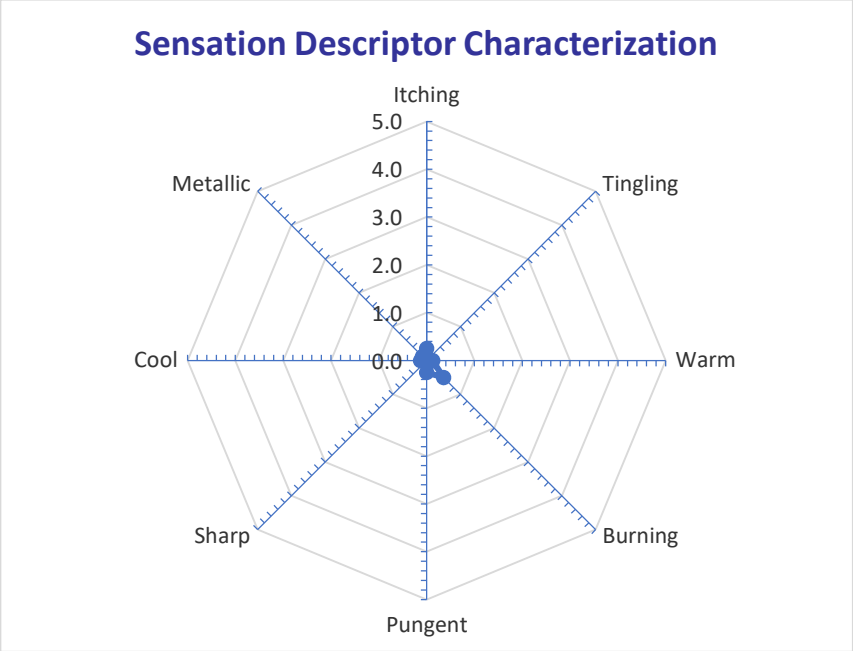
ODOR CHARACTERIZATION

Client: **MWRD** Date: **08/12/20**

Project: **Contract 19-101-11**

Sample ID: **K3 Drayer Mezzanine**

Sensation Descriptor	Sensation Descriptor Intensity
Itching	0.3
Tingling	0.0
Warm	0.1
Burning	0.5
Pungent	0.3
Sharp	0.0
Cool	0.1
Metallic	0.1



RK & Associates, Inc.

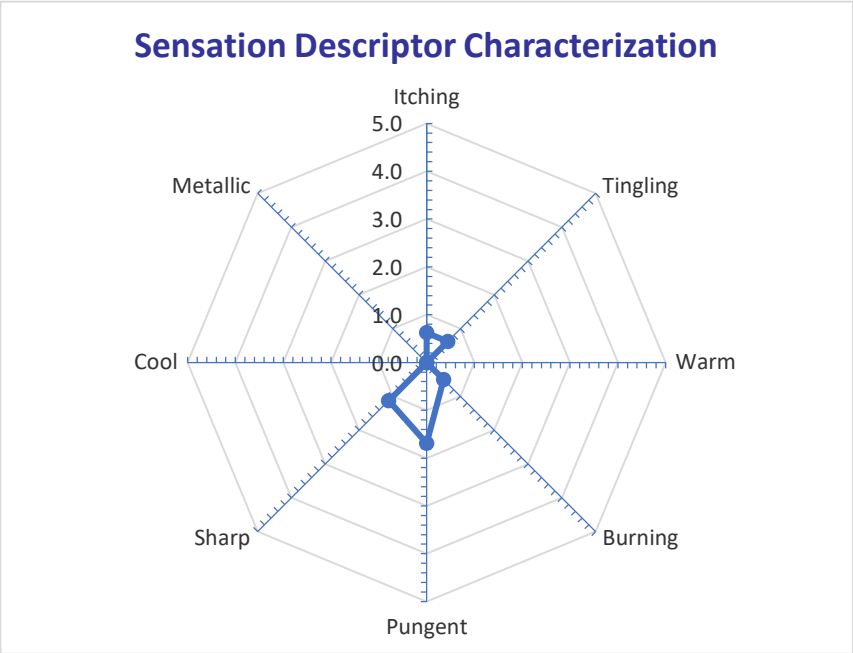
ODOR CHARACTERIZATION

Client: **MWRD** Date: **08/12/20**

Project: **Contract 19-101-11**

Sample ID: **AES Building Between Screens**

Sensation Descriptor	Sensation Descriptor Intensity
Itching	0.6
Tingling	0.6
Warm	0.0
Burning	0.5
Pungent	1.7
Sharp	1.1
Cool	0.0
Metallic	0.0



RK & Associates, Inc.

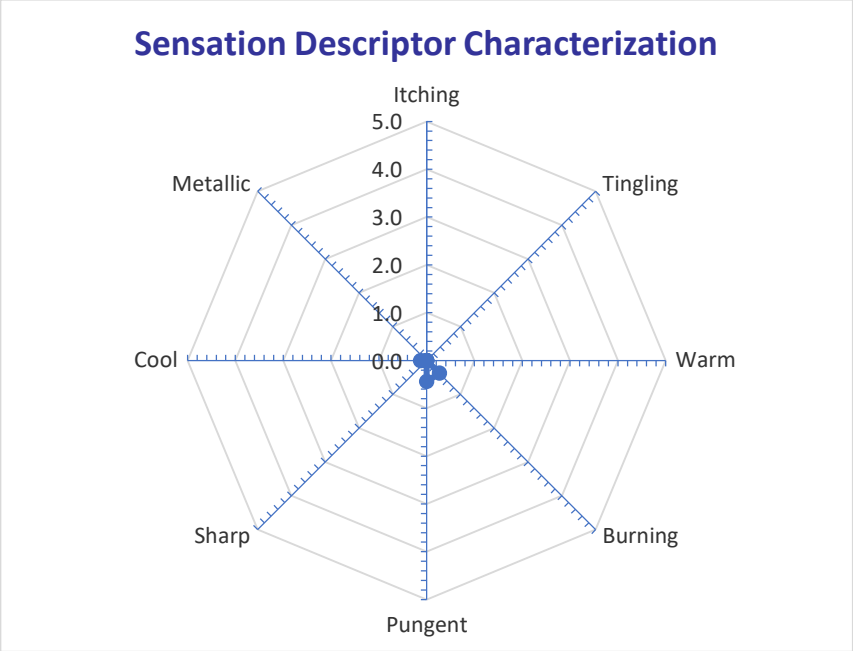
ODOR CHARACTERIZATION

Client: **MWRD** Date: **08/12/20**

Project: **Contract 19-101-11**

Sample ID: **Stock Prep Building at News Puler**

Sensation Descriptor	Sensation Descriptor Intensity
Itching	0.0
Tingling	0.0
Warm	0.0
Burning	0.4
Pungent	0.4
Sharp	0.0
Cool	0.1
Metallic	0.0



RK & Associates, Inc.

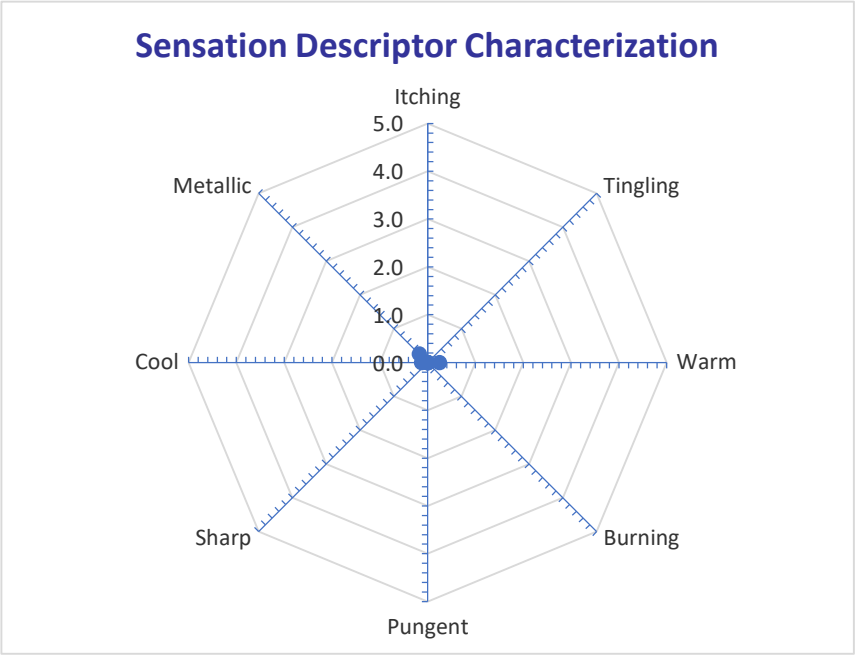
ODOR CHARACTERIZATION

Client: **MWRD** Date: **08/12/20**

Project: **Contract 19-101-11**

Sample ID: **Sludge Drum Filter Outlet**

Sensation Descriptor	Sensation Descriptor Intensity
Itching	0.0
Tingling	0.0
Warm	0.3
Burning	0.0
Pungent	0.0
Sharp	0.0
Cool	0.1
Metallic	0.3



Appendix G

STATE OF MICHIGAN
DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY
KALAMAZOO DISTRICT OFFICE

GRETCHEN WHITMER
GOVERNOR

LIESL EICHLER CLARK
DIRECTOR

November 20, 2020

Mr. Thomas Olstad
Graphic Packaging International, LLC
1500 North Pitcher Street
Kalamazoo, Michigan 49007

SRN: B1678, Kalamazoo County

Dear Mr. Olstad:

VIOLATION NOTICE

On November 17, 2020, the Department of Environment, Great Lakes, and Energy (EGLE), Air Quality Division (AQD), conducted a site investigation of Graphic Packaging International, LLC's new construction site located at 1500 North Pitcher Street, Kalamazoo, Michigan. The purpose of this site investigation was to determine the facility's compliance with the requirements of the federal Clean Air Act; Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451); the Air Pollution Control Rules; and the conditions of Renewable Operating Permit (ROP) number MI-ROP-B1678-2015;

During the site investigation, staff observed the following:

Process Description	Rule/Permit Condition Violated	Comments
Unpermitted Construction of New Boilers	R 336.1201 (Rule 201), and R 336.2802(3) (Rule 1802, Subrule 3)	Facility began actual construction of footings and foundation for two new boilers without a Permit to Install.

During this site investigation, it was noted that Graphic Packaging had begun actual construction at this facility for two new boilers without first obtaining a Permit to Install. It was observed that the foundation and footings for these two new boilers were present at the time of the investigation. The AQD staff advised the facility on November 10, 2020, that this is a violation of Rule 201 and Rule 1802 of the administrative rules promulgated under Act 451. This letter is attached. Pursuant to Rule 1801(e), "'begin actual construction', *means, in general, initiation of physical on-site construction activities on an emissions unit which are of a permanent nature. Such activities include, but are not limited to, installation of building supports and foundations, laying of underground pipework, and construction of permanent storage structures*".

Please initiate actions necessary to correct the cited violation and submit a written response to this Violation Notice by December 11, 2020 (which coincides with 21 calendar days from the date of this letter). The written response should include: the dates the violation occurred; an explanation of the causes and duration of the violation; whether the violation is ongoing; a summary of the actions that have been taken and are proposed to be taken to correct the violation and the dates by which these actions will take place; and what steps are being taken to prevent a reoccurrence.

Please submit the written response to EGLE, AQD, Kalamazoo District, at 7953 Adobe Road, Kalamazoo, Michigan 49009 and submit a copy to Ms. Jenine Camilleri, Enforcement Unit Supervisor at EGLE, AQD, P.O. Box 30260, Lansing, Michigan 48909-7760.

If Graphic Packaging International, LLC believes the above observations or statements are inaccurate or do not constitute violations of the applicable legal requirements cited, please provide appropriate factual information to explain your position.

Thank you for your attention to resolving the violation cited above and for the cooperation that was extended to us during our site investigation of the facility. If you have any questions regarding the violation or the actions necessary to bring this facility into compliance, please contact me at the number listed below.

Sincerely,

Monica Brothers

Monica Brothers
Senior Environmental Quality Analyst
Air Quality Division
269-312-2535

Attachment

cc:
Ms. Mary Ann Dolehanty, EGLE
Dr. Eduardo Olaguer, EGLE
Ms. Jenine Camilleri, EGLE
Mr. Christopher Ethridge, EGLE
Mr. Rex Lane, EGLE

Appendix H

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

Supplemental Environmental Projects

Contact: Jenine Camilleri, 517-643-2612
Agency: Environment, Great Lakes, and Energy

When the AQD enters into an enforcement action with a facility, the action typically results in a legally binding agreement between the State of Michigan and the facility which contains a monetary penalty, a compliance plan, and sometimes a Supplemental Environmental Project (SEP). An SEP is an environmentally beneficial project that is not required by state or federal law, but an alleged violator agrees to undertake as part of a settlement of an enforcement action. SEPs are projects that go beyond what is legally required to return to compliance with applicable state and federal laws.

Properly developed and administered SEPs have the potential to secure significant improvements in environmental quality and public health for Michigan citizens and can promote an atmosphere of cooperation between the alleged violator and the affected community benefiting from the projects. In lieu of payment of a portion of the monetary fines, an alleged violator may propose a SEP as part of the settlement. Although a settlement may include a SEP, monetary fines are a necessary and important part of any settlement.

Example SEPs

An SEP can take various forms and the facility involved in the enforcement action will develop the SEP. AQD will review and approve the SEP before it is implemented by the facility. An SEP must meet one or more of the following categories:

- pollution prevention and reduction
- environmental restoration and protection
- public health
- environmental assessments and awareness
- climate change mitigation and preparedness
- emergency planning and preparedness

A few examples are included below with the SEP categories met by conducting the project. More historical Air Quality SEP Summaries have also been included.

Environmental Restoration and Protection Project in Detroit

The city of Detroit will spend $89,200 as part of a settlement on a vegetative buffer at Clark Park.

The project will reduce the transport of particulate matter emissions from vehicles on I-75 to the adjacent park.
Trees will be planted, and the city will conduct two years of maintenance on the trees including fertilizing, weeding, mulching, and watering.

Pollution Prevention and Reduction Project in Albion

Knauf Insulation spent $103,000 as part of a settlement on street lighting replacement.

This project included recycling and proper disposal of the existing lights and replacing them with more energy efficient LED lights. This will result in a reduction in overall electrical demand, therefore reducing emissions associated with electricity generation.

Public Health Project in Dearborn

AK Steel spent $337,000 as part of a settlement on an active air filtration project at Salina Intermediate and Elementary Schools.

This project improved indoor air quality by removing more particles, gaseous odors, and volatile organic compounds than the schools' previous passive filters.

Community Input

EGLE encourages community input on SEPs from the local community that may have been adversely affected by the alleged violations. Soliciting community input during the SEP development process can better address the needs of the affected community, promote environmental justice, produce better community understanding of the resolution of the alleged violations, and foster partnership with the community members.

Seeking community input early in the SEP development process is beneficial for developing a SEP that addresses the needs and concerns of the affected community and environment. Both EGLE staff and the alleged violator can seek community input on SEP ideas collaboratively. The extent of community input and participation in the SEP development process will vary with each settlement.

More SEP Information

- Michigan SEP Policy
- Air Quality SEP Summaries
- USEPA SEP Information
- Should my Company Consider an SEP? *(Coming Soon)*
- Opportunities for Community Engagement *(Coming Soon)*
- Enforcement information not found on-line may be obtained through submission of a Freedom of Information Act (FOIA) request.
- For more information about a Source's compliance status and/or general questions related to a source, please contact the appropriate district office by county.

Appendix I

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

AIR

- News & Info
- Laws and Rules
- Compliance
- Emissions
- Permits
- Monitoring
- SIP & Attainment

EGLE / AIR / NEWS & INFO

Graphic Packaging International, LLC

Graphic Packaging International, LLC (Graphic Packaging) is located at 1421 N. Pitcher Street, in Kalamazoo. Graphic Packaging produces paper-based packaging for a variety of products including cups, cartons, boxes, and other food containers. The company produces the paper material as well as folding and labeling the products.

Industrial processes at the facility are subject to state and federal air quality rules and regulations, as well as various waste and water regulations.

Background Information

- Air Inspection, Compliance & Enforcement Documents

What Is EGLE Doing?

- Frequently Asked Questions (FAQs)

Contact Us

Health-Based Questions

- MDHHS: 800-MI-TOXIC or 800-648-6942

- Past Emissions Information
- Press Release: EGLE Approves Changes to Graphic Packaging Air Permit to Install (PTI)
- Odor Investigation Plan
- Odor Investigation Report (November 3, 2020)
- Permit to Install (PTI) Final Decisions
- Recording of Public Hearing (October 15, 2020)

Environmental Concerns

- Environmental Assistance Center: 800-662-9278 or EGLE-Assist@Michigan.gov
- EGLE District Office: 269-567-3500