CTEH® CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH, LLC

Arkema Facility - Harvey Response

Crosby, TX

Arkema Inc.

September 3, 2017

Project #109489 Summary

9866025

1.0 Introduction

As a result of flooding events related to Hurricane Harvey, the Arkema facility located in Crosby, TX suffered a loss of power and failure on refrigeration of manufacturing process. The loss of temperature control resulted in degradation and heating of organic peroxides, with the potential of creating a fire. As a precautionary measure, local authorities established a 1.5-mile radius evacuation zone around the facility.

On August 31, 2017, the Center for Toxicology and Environmental Health, LLC (CTEH®) was contacted by Arkema Inc. (Arkema) to initiate air monitoring and sampling around the community areas outside of the evacuation zone perimeter. This submittal summarizes the results of real-time air monitoring conducted by CTEH® personnel from 06:00 on September 2, 2017 to 06:00 on September 3, 2017. A map of the site location is provided in **Attachment A**.

2.0 Real-time Air Monitoring

All real-time air monitoring instrumentation was calibrated per the manufacturer's recommendations prior to air monitoring. Handheld, real-time air monitoring was conducted for benzene, cumene, and volatile organic compounds (VOCs) using RAE Systems and Gastec instruments. Additionally, combustion byproducts potentially associated with fire smoke, such as particulate matter ($PM_{2.5}$), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2) were assessed. **Table 1** summarizes the data for all real-time air monitoring readings recorded in Crosby, TX from 06:00 on September 2, 2017 through 06:00 on September 3, 2017. Maps of real-time air monitoring locations are provided as **Attachment B**.

Table 1 Real-time Handheld Air Monitoring Readings
06:00 September 2, 2017 – 06:00 September 3, 2017

Analyte	Instrument	Number of Readings	Number of Detections	Range of Detections*
Benzene	UltraRAE	47	0	< 0.025 ppm
Cumene	Gastec Tube 122L	2	0	< 2.0 ppm
NO_2	MultiRAE Plus	68	0	< 0.1 ppm
$PM_{2.5}$	AM510	142	142	0.022 - 0.13 mg/m^3
	Dusttrak	58	58	0.017 - 0.12 mg/m^3
SO_2	MultiRAE Plus	81	0	< 0.1 ppm
VOCs	MultiRAE Plus	211	5	0.6 - 1.4 ppm

*If detections were not observed, the instrument detection limit is listed in this column.

3.0 Analytical Air Sampling

To supplement real-time air monitoring, CTEH® deployed areas along the perimeter of the evacuated area within the community. Evacuated canister (Minican™) samplers were regulated to collect air evenly over a 24-hr period. Analytical air samples will be submitted to SGS Galson Laboratories, an AIHA-accredited laboratory, for analysis using EPA Method TO-15. A map highlighting the analytical air sampling locations is provided as **Attachment C**. Analytical Air Sampling Results will be reported upon receipt from the laboratory.

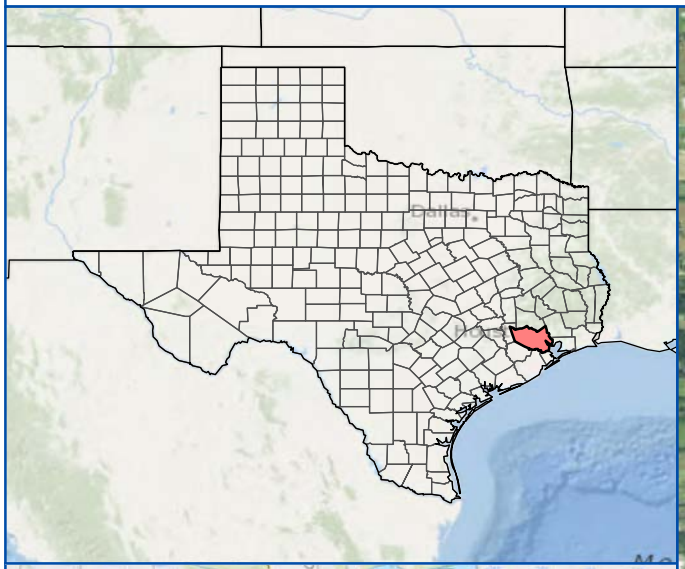
Attachment A

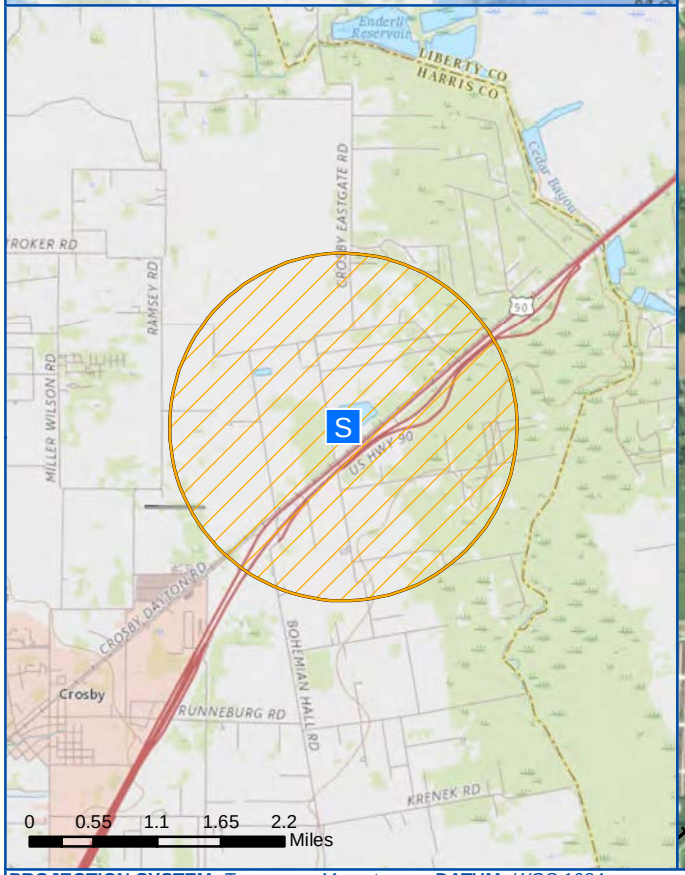
Site Location Map

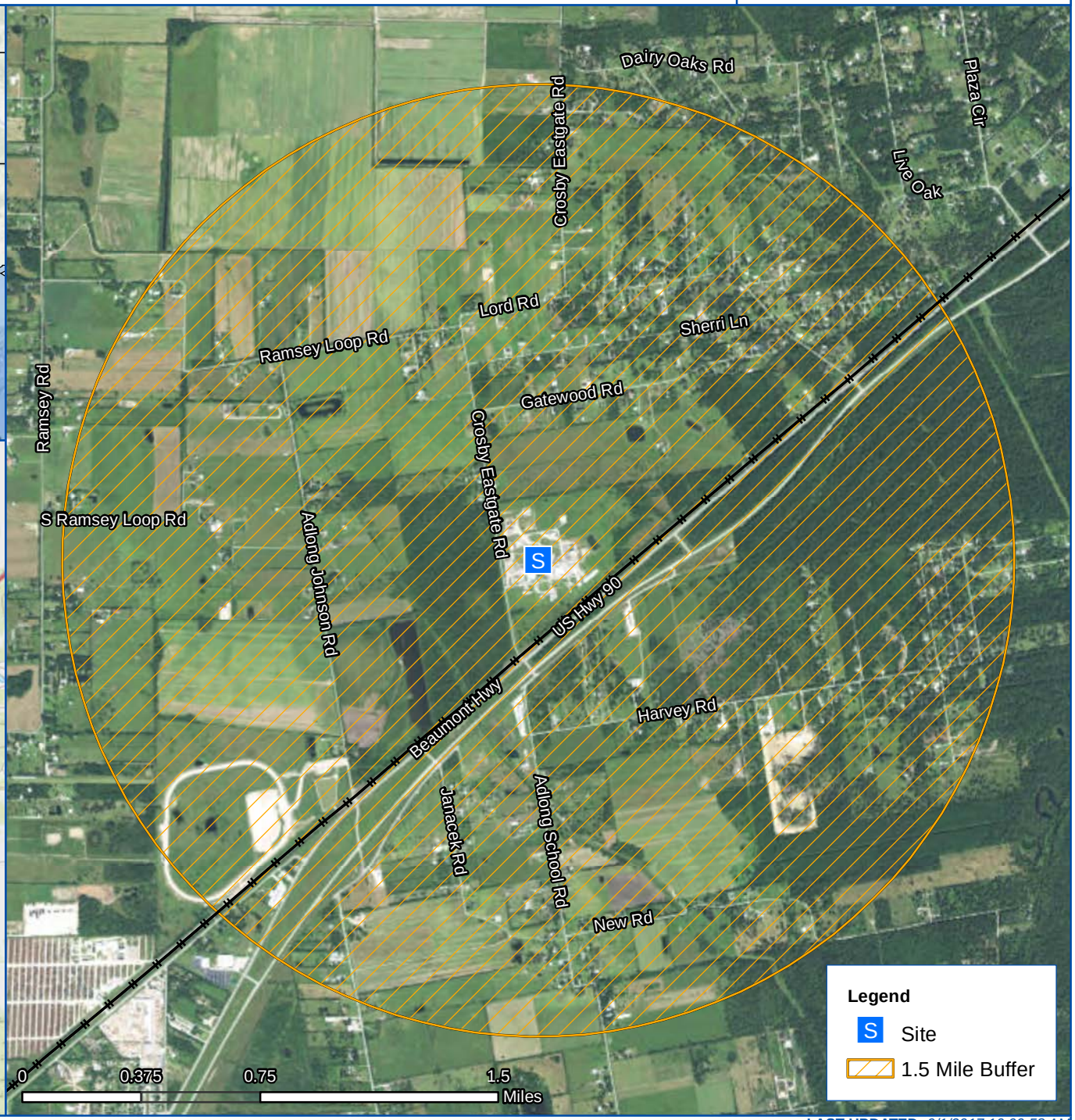
Harvey Response

Site Location

Project: 109458
Client: Arkema
City: Crosby, TX
County: Harris







PROJECTION SYSTEM: *Transverse Mercator* **DATUM:** *WGS 1984* **LAST UPDATED:** *9/1/2017 10:00:58 AM*

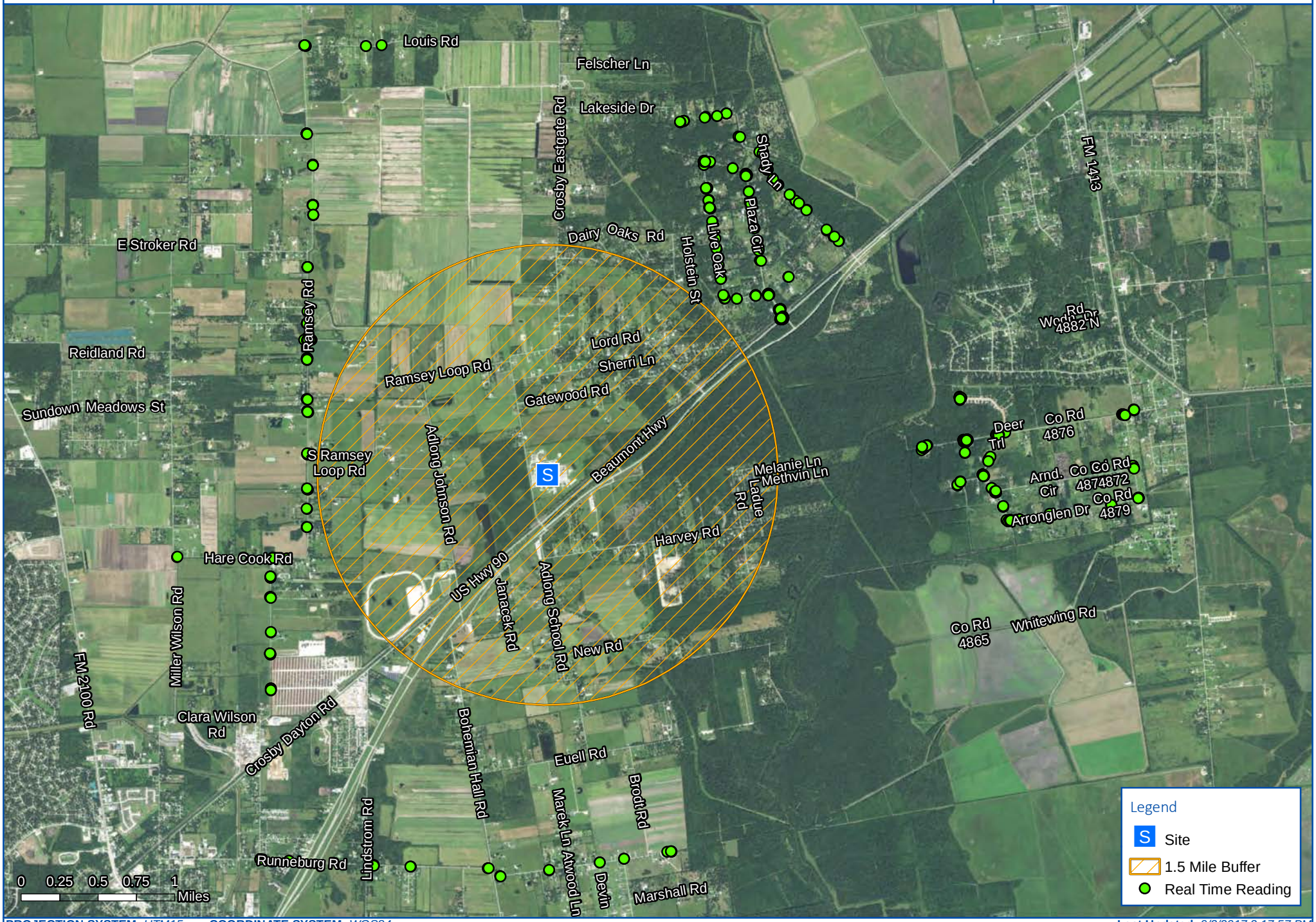
Attachment B

Handheld Real-time Air Monitoring Locations

Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 2, 2017 to 06:00 September 3, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris



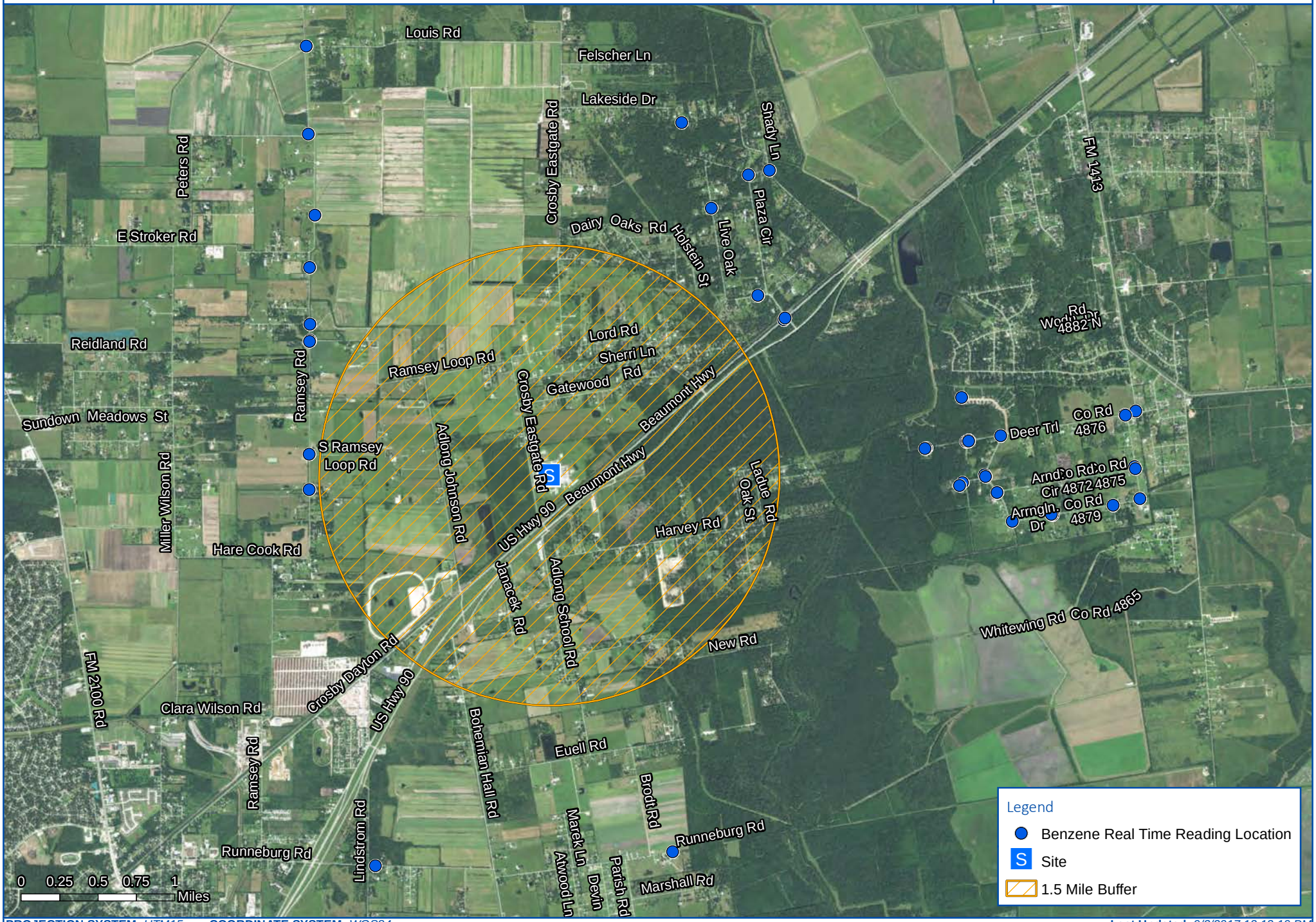
PROJECTION SYSTEM: *UTM15* **COORDINATE SYSTEM:** *WGS84*

Last Updated: *9/3/2017 2:17:57 PM*

Benzene Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 2, 2017 to 06:00 September 3, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

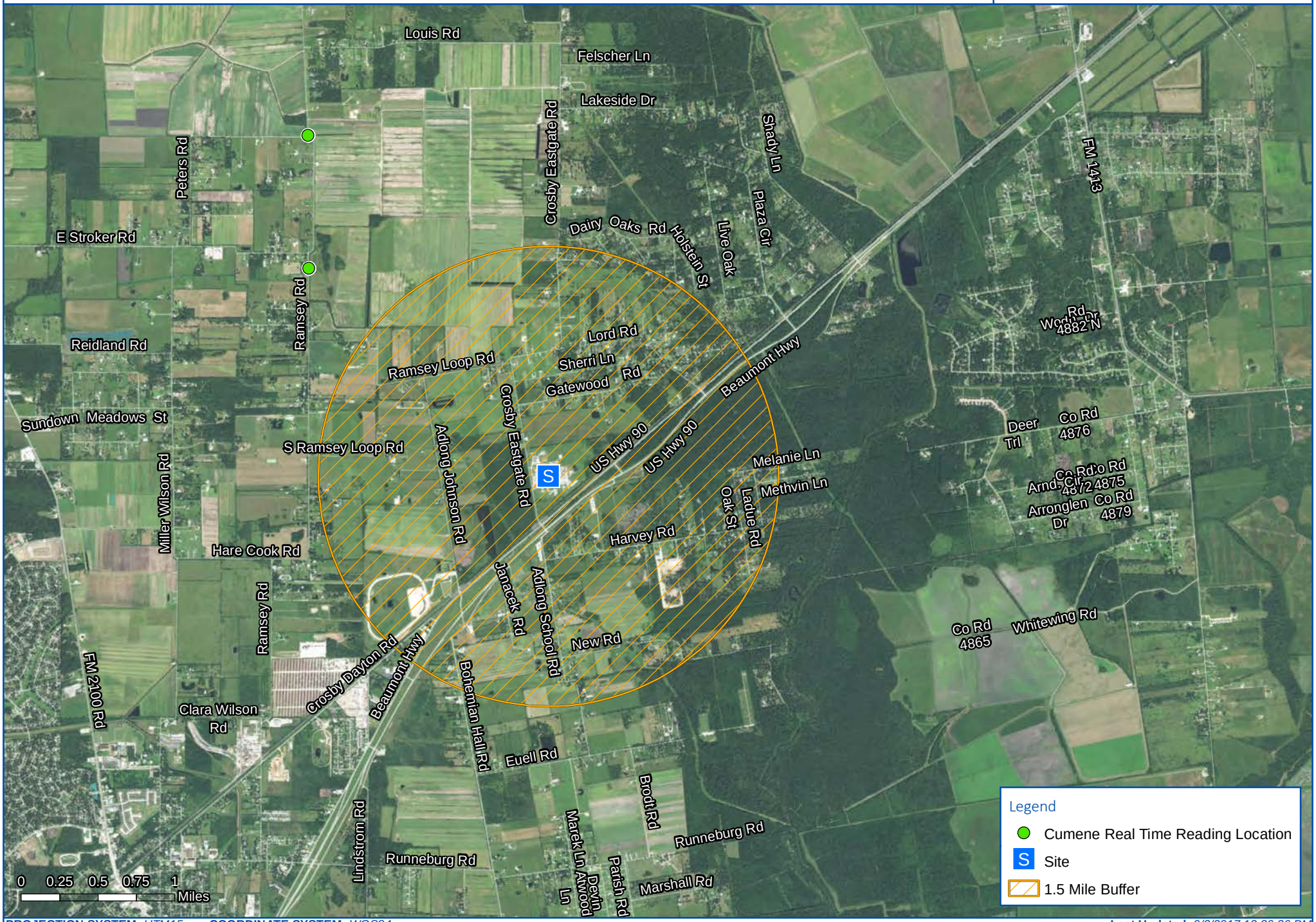


PROJECTION SYSTEM: *UTM15* **COORDINATE SYSTEM:** *WGS84* **Last Updated:** *9/3/2017 12:12:19 PM*

Cumene Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 2, 2017 to 06:00 September 3, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

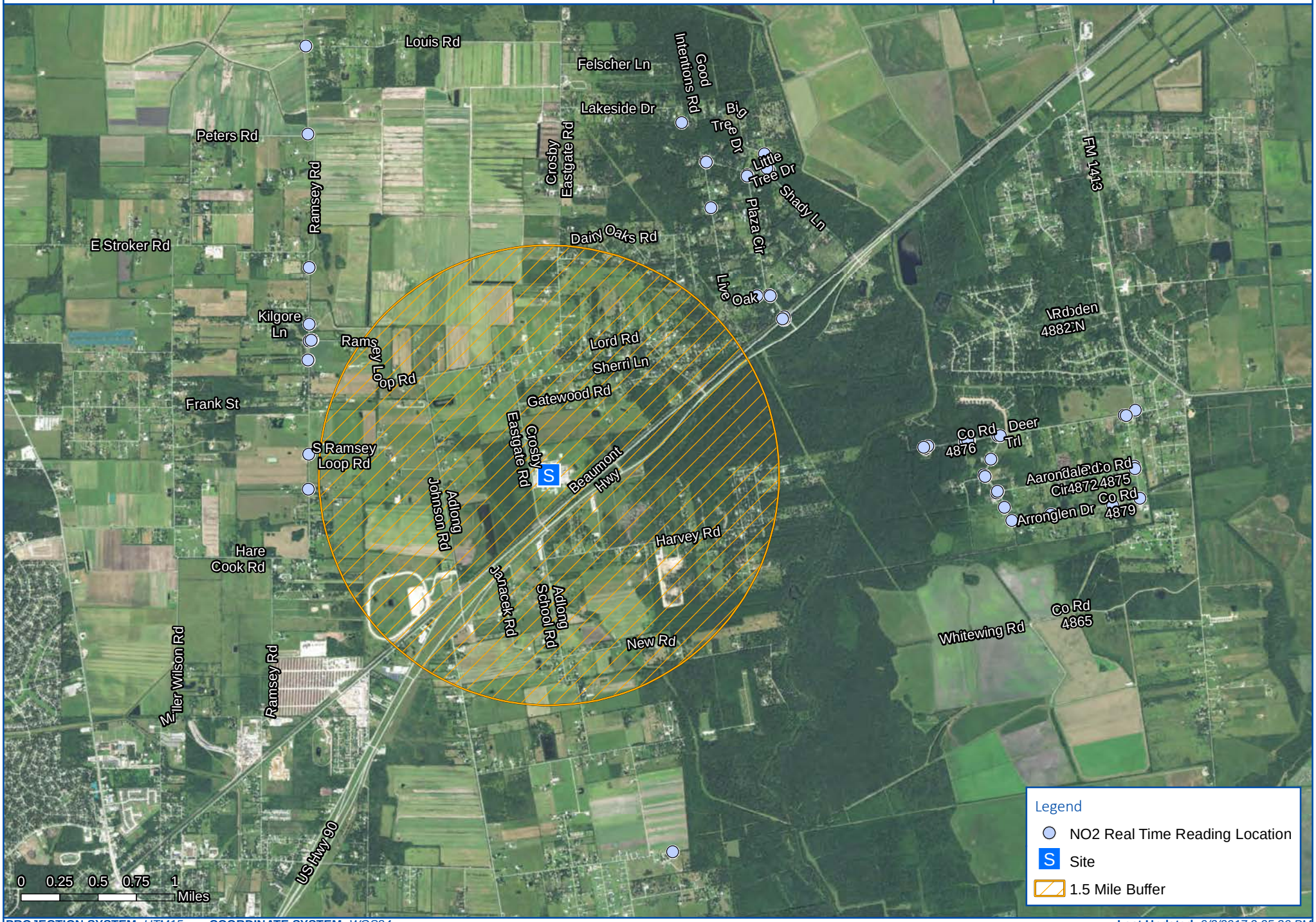


PROJECTION SYSTEM: *UTM15* **COORDINATE SYSTEM:** *WGS84* **Last Updated:** *9/3/2017 12:36:36 PM*

Nitrogen Dioxide Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 2, 2017 to 06:00 September 3, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

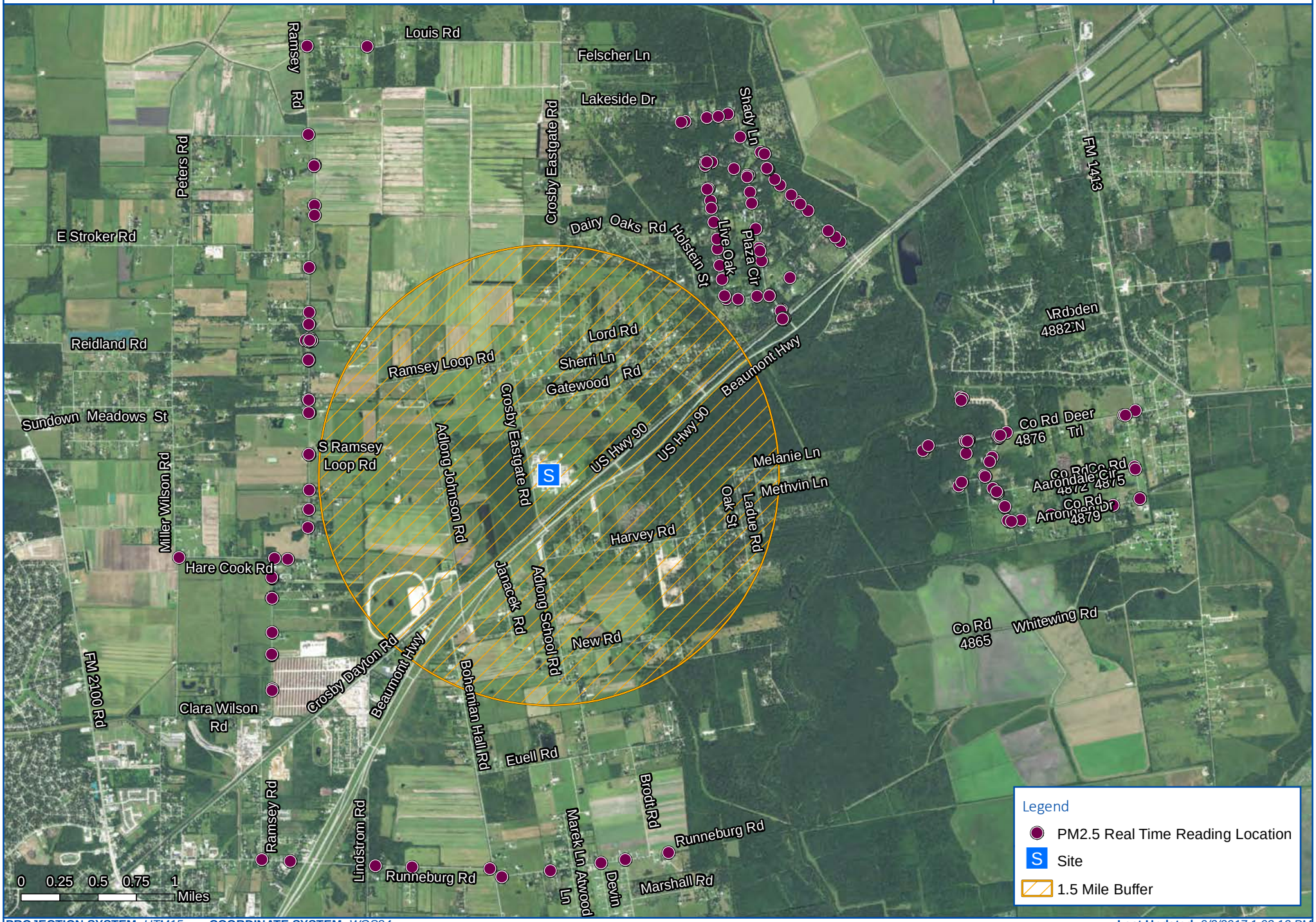


PROJECTION SYSTEM: *UTM15* **COORDINATE SYSTEM:** *WGS84* **Last Updated:** *9/3/2017 2:25:30 PM*

PM2.5 Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 2, 2017 to 06:00 September 3, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris

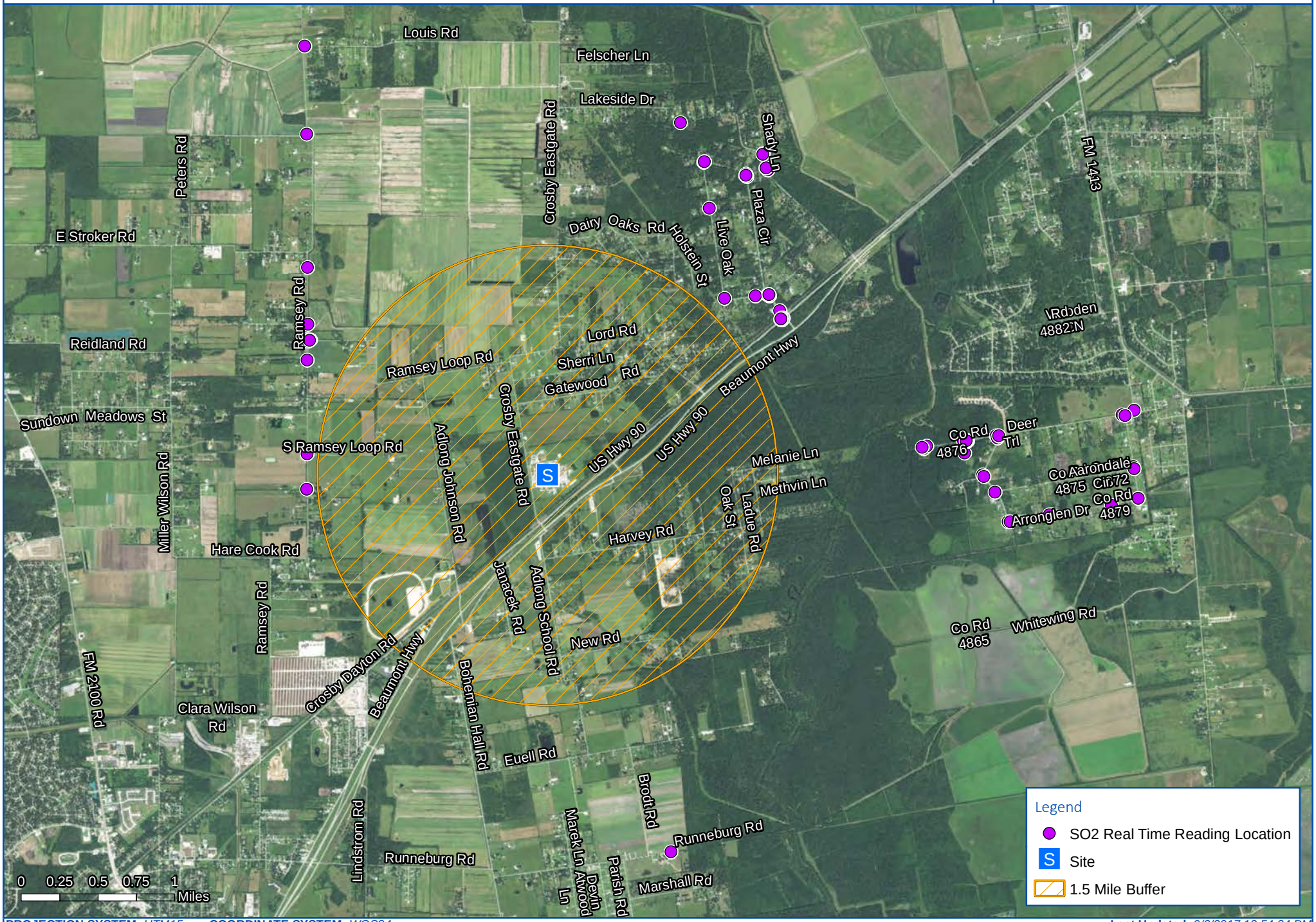


PROJECTION SYSTEM: *UTM15* **COORDINATE SYSTEM:** *WGS84* **Last Updated:** *9/3/2017 1:03:12 PM*

Sulfur Dioxide Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 2, 2017 to 06:00 September 3, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris



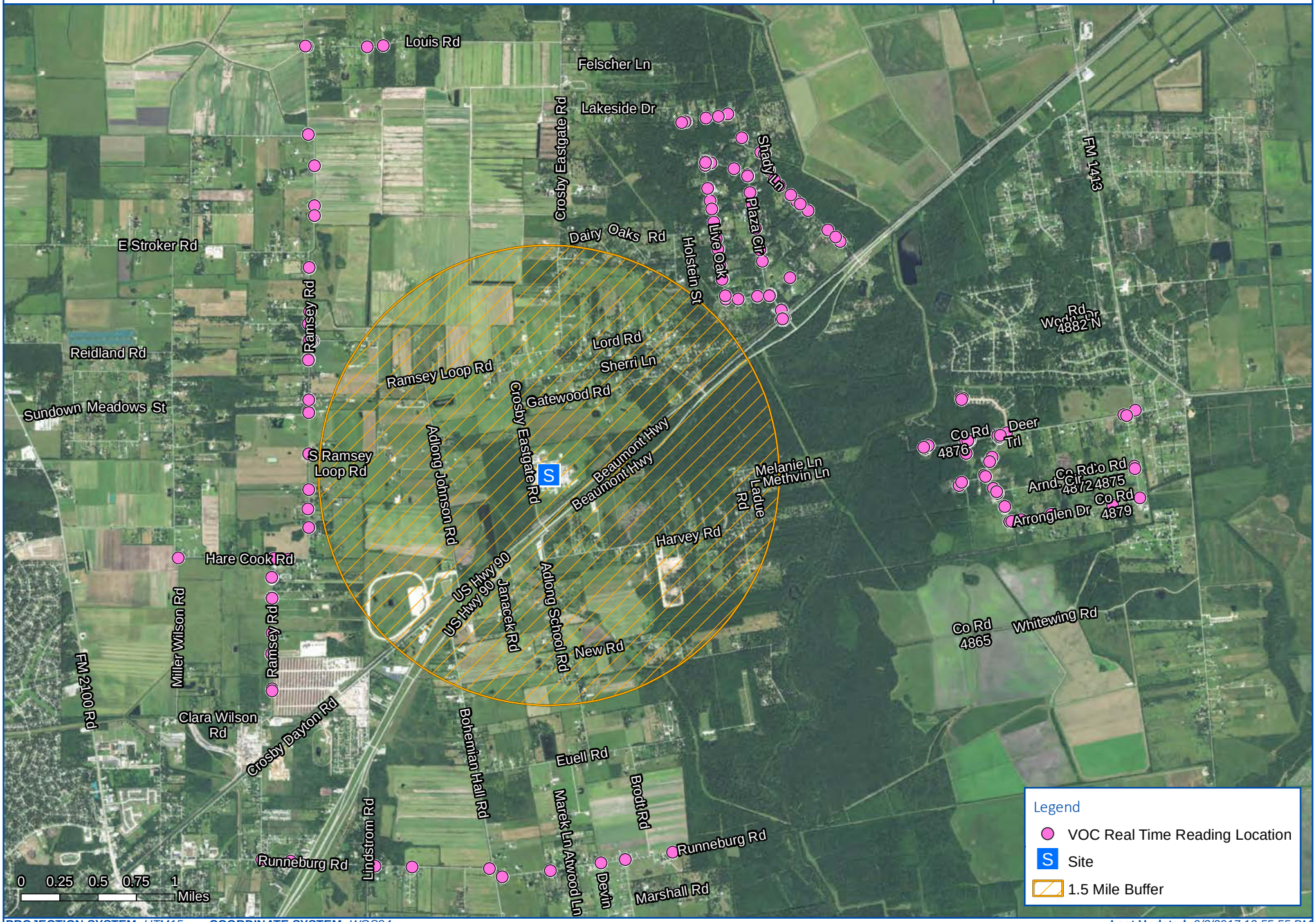
PROJECTION SYSTEM: *UTM15* **COORDINATE SYSTEM:** *WGS84*

Last Updated: *9/3/2017 12:54:34 PM*

VOC Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 2, 2017 to 06:00 September 3, 2017

Project: 109489
Client: Arkema
City: Crosby, TX
County: Harris



PROJECTION SYSTEM: *UTM15* **COORDINATE SYSTEM:** *WGS84*

Last Updated: *9/3/2017 12:55:55 PM*

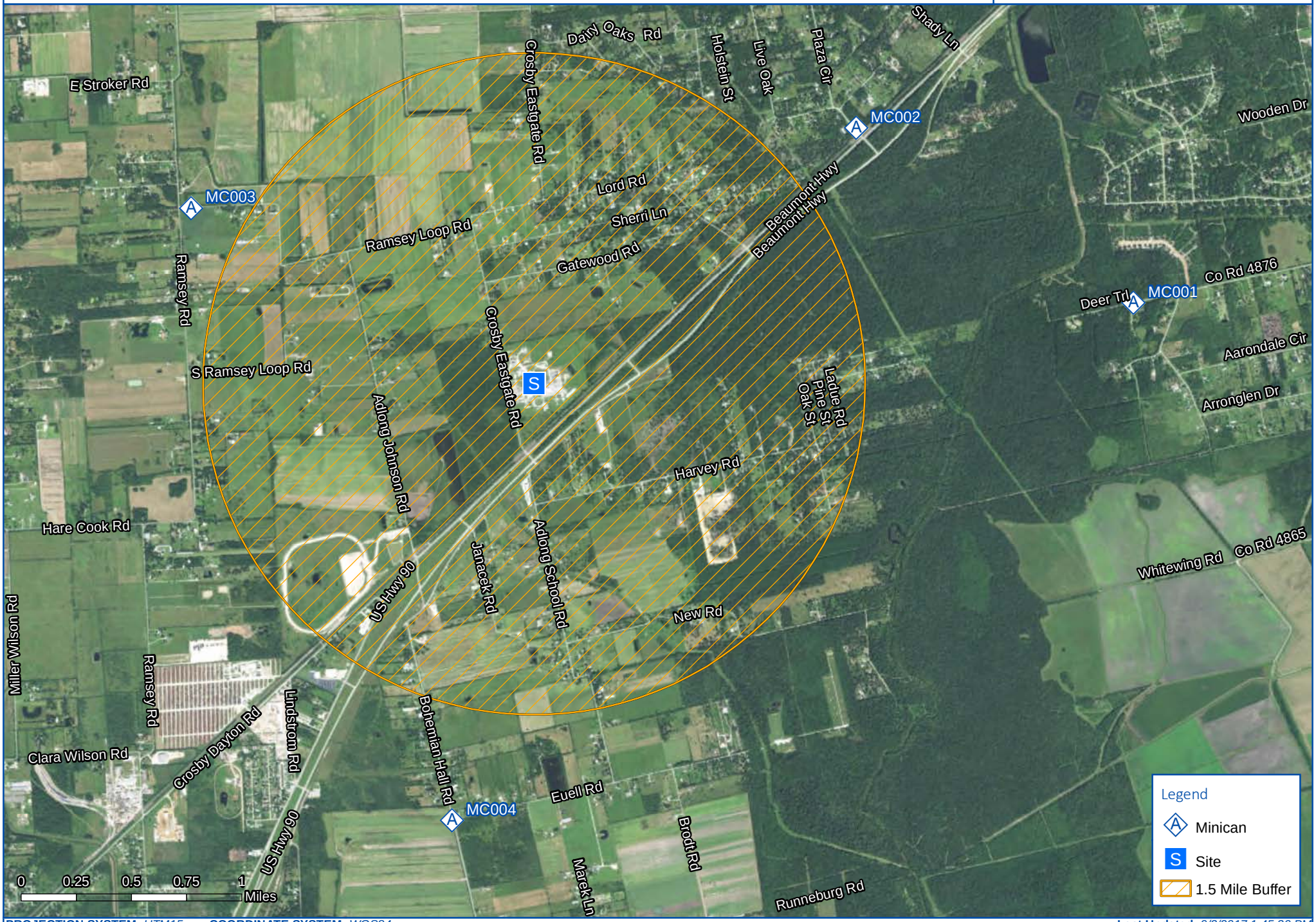
Attachment C

Map of Analytical Air Sampling Locations

Analytical Air Monitoring Station Locations as of September 3, 2017

Harvey Response

Project: 109458
Client: Arkema
City: Crosby, TX
County: Harris



PROJECTION SYSTEM: *UTM15* **COORDINATE SYSTEM:** *WGS84*

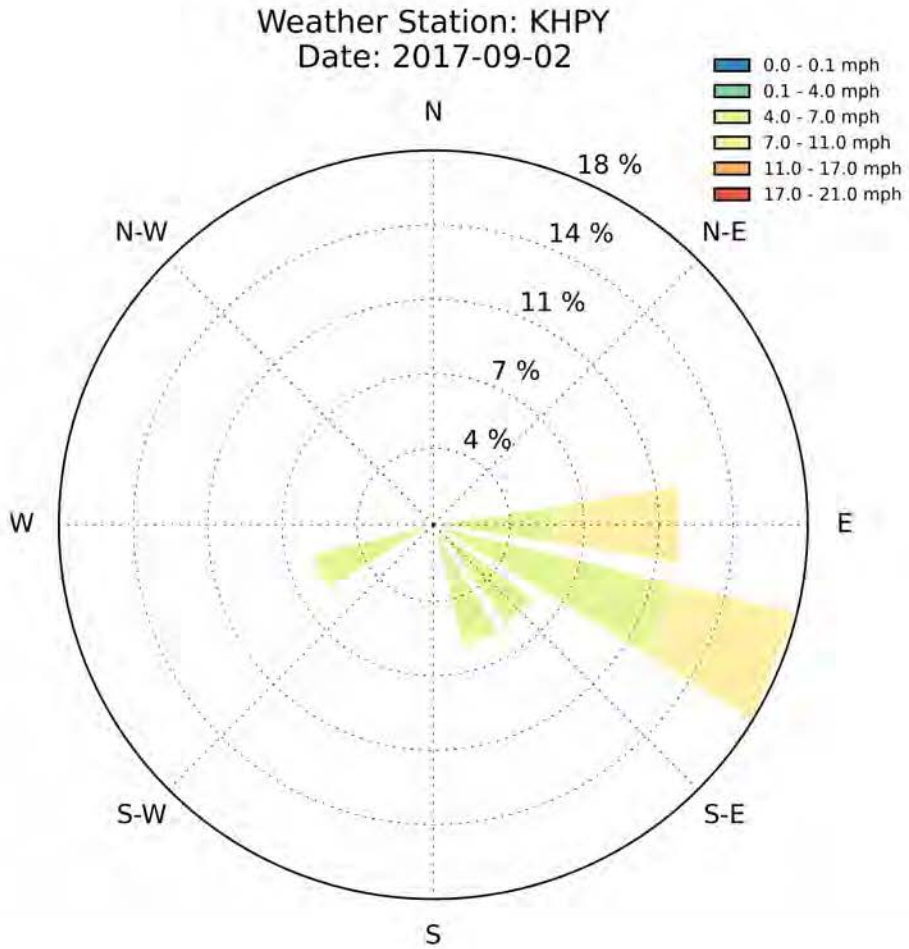
Last Updated: *9/3/2017 1:45:30 PM*

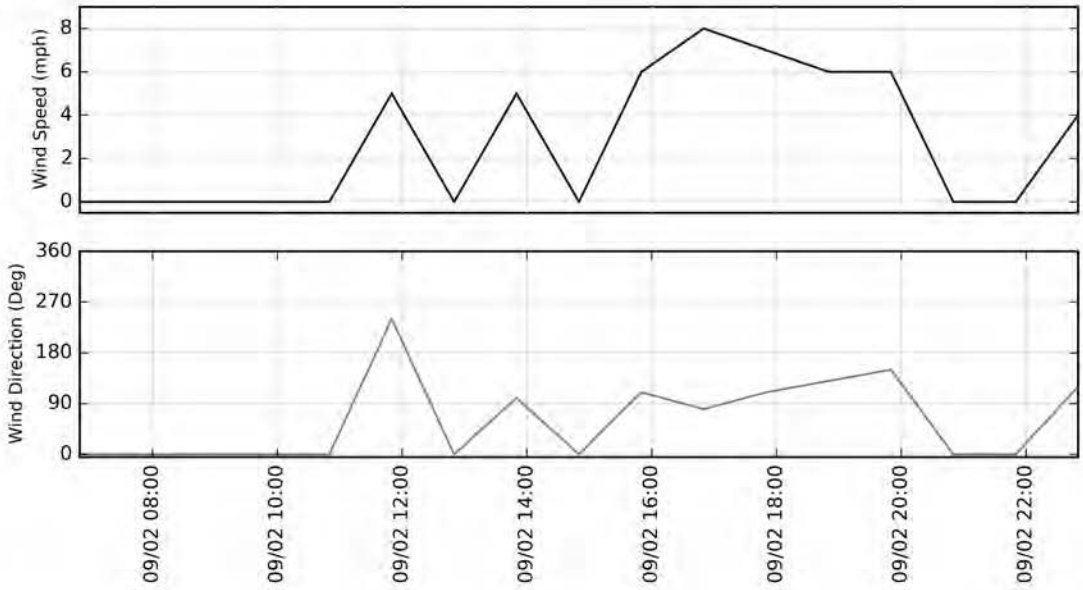
Attachment D

KHPY Windrose

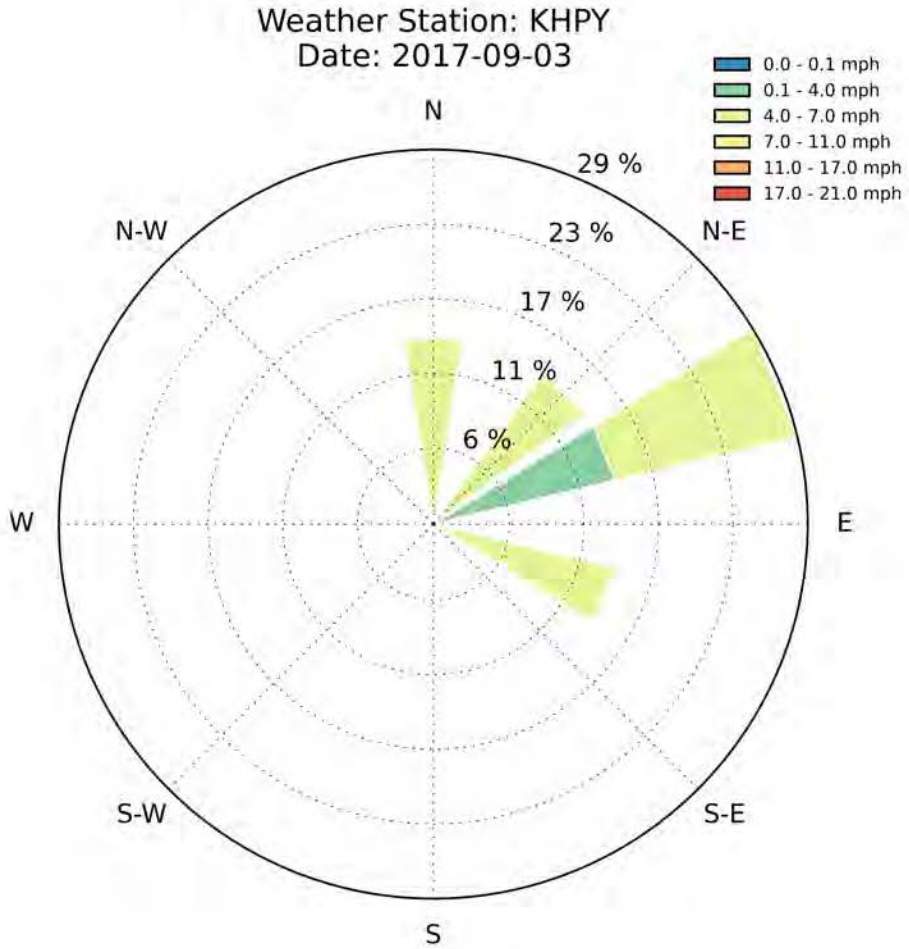
(Highland Park Airport - 12.5 miles SSE of Site)

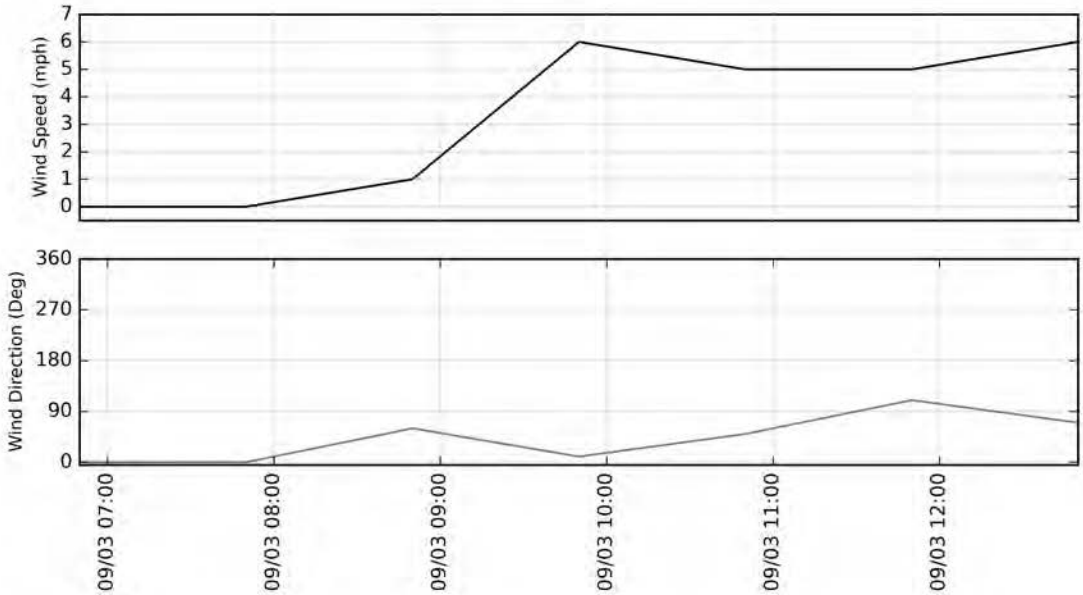
CTEH


Weather Station: KHPY
Date: 2017-09-02
0.0 - 0.1 mph
0.1 - 4.0 mph
4.0 - 7.0 mph
7.0 - 11.0 mph
11.0 - 17.0 mph
17.0 - 21.0 mph
N
N-E
E
S-E
S
S-W
W
N-W
18 %
14 %
11 %
7 %
4 %


Wind Speed (mph)
0
2
4
6
8
Wind Direction (Deg)
0
90
180
270
360
09/02 08:00
09/02 10:00
09/02 12:00
09/02 14:00
09/02 16:00
09/02 18:00
09/02 20:00
09/02 22:00

CTEH


Weather Station: KHPY
Date: 2017-09-03
0.0 - 0.1 mph
0.1 - 4.0 mph
4.0 - 7.0 mph
7.0 - 11.0 mph
11.0 - 17.0 mph
17.0 - 21.0 mph
N
N-E
E
S-E
S
S-W
W
N-W
29 %
23 %
17 %
11 %
6 %


Wind Speed (mph)
0
1
2
3
4
5
6
7
Wind Direction (Deg)
0
90
180
270
360
09/03 07:00
09/03 08:00
09/03 09:00
09/03 10:00
09/03 11:00
09/03 12:00