CTEH® CENTER FOR TOXICOLOGY AND ENVIRONMENTAL HEALTH, LLC

Arkema Facility - Harvey Response

Crosby, TX

Arkema Inc.

September 2, 2017

Project #109489 Summary

7019366

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 1, 2017 to 06:00 on September 2, 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, atmosphere flammability (lower explosive limit - LEL), 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 1, 2017 through 06:00 on September 2, 2017. Maps of real-time air monitoring locations are provided as **Attachment B**.

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

Analyte	Instrument	Number of Readings	Number of Detections	Range of Detections*
Benzene	UltraRAE	31	0	< 0.025 ppm
	Gastec Tube 121L	7	0	< 0.05 ppm
CO	MultiRAE Plus	40	0	< 1.0 ppm
Cumene	Gastec Tube 122L	2	0	< 50 ppm
LEL	MultiRAE Plus	2	0	< 1.0 %
NO_2	MultiRAE Plus	14	0	< 0.1 ppm
	Gastec Tube 9L	1	0	< 0.1 ppm
$PM_{2.5}$	AM510	170	170	0.013 - 0.065 mg/m^3
	Dusttrak	68	68	0.012 - 0.112 mg/m^3
SO_2	MultiRAE Plus	54	0	< 0.1 ppm
VOCs	MultiRAE Plus	229	0	< 0.1 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.

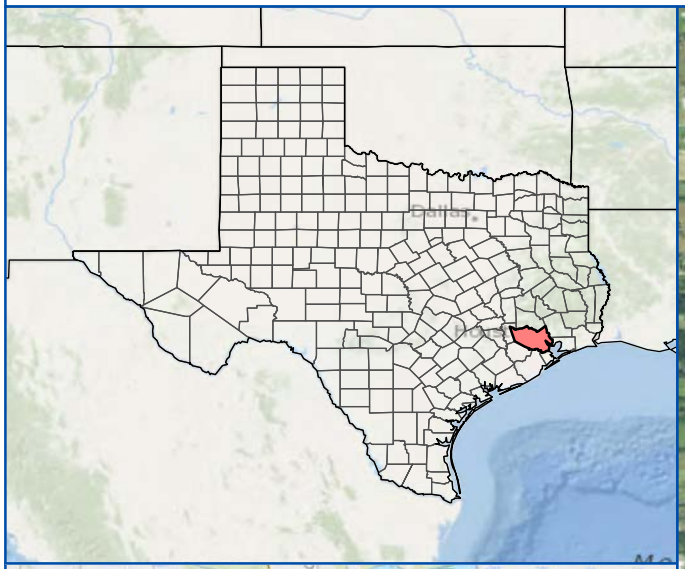
Attachment A

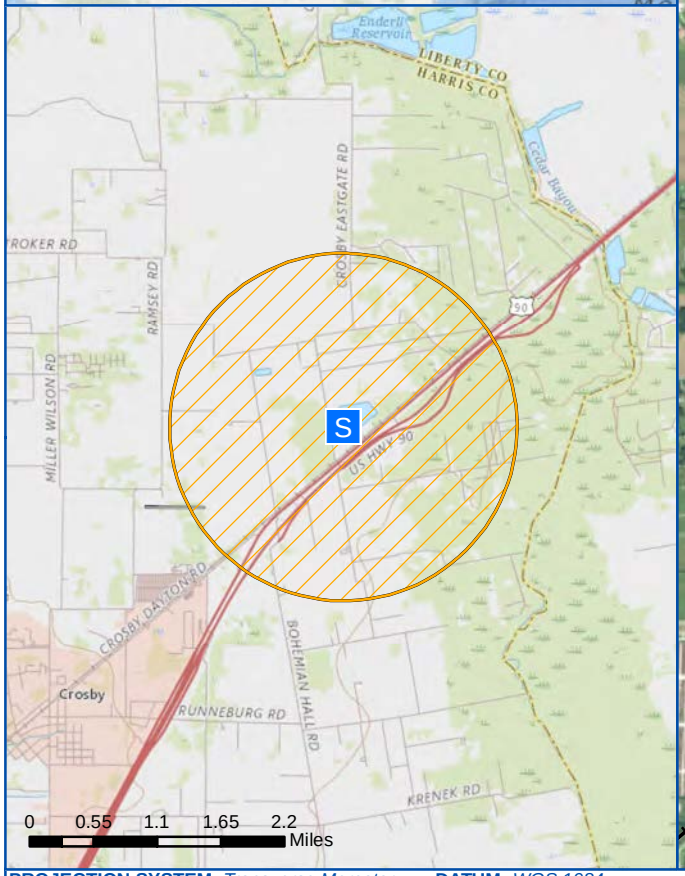
Site Location Map

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*

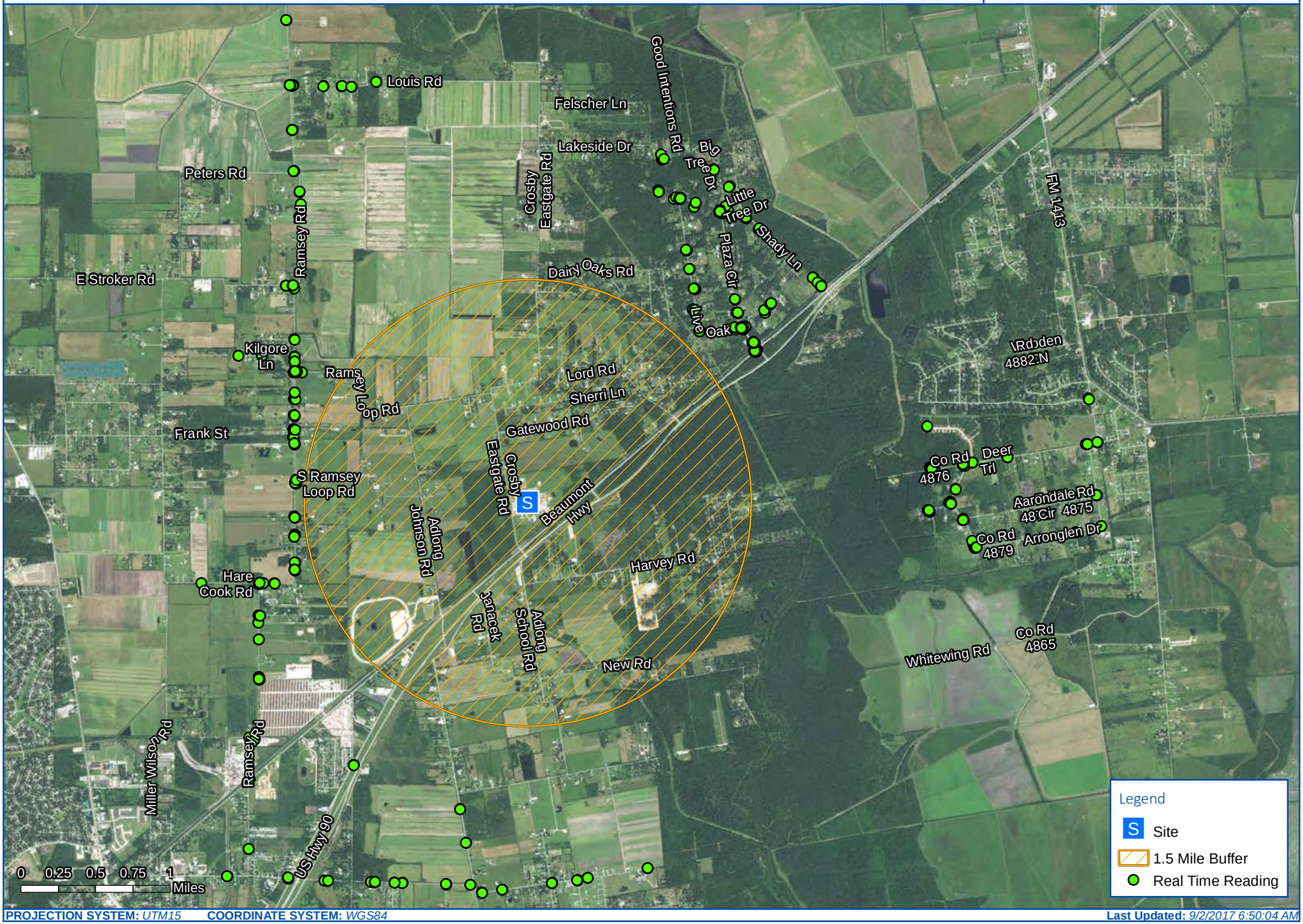
Attachment B

Handheld Real-time Air Monitoring Locations

Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 1, 2017 to 06:00 September 2, 2017

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

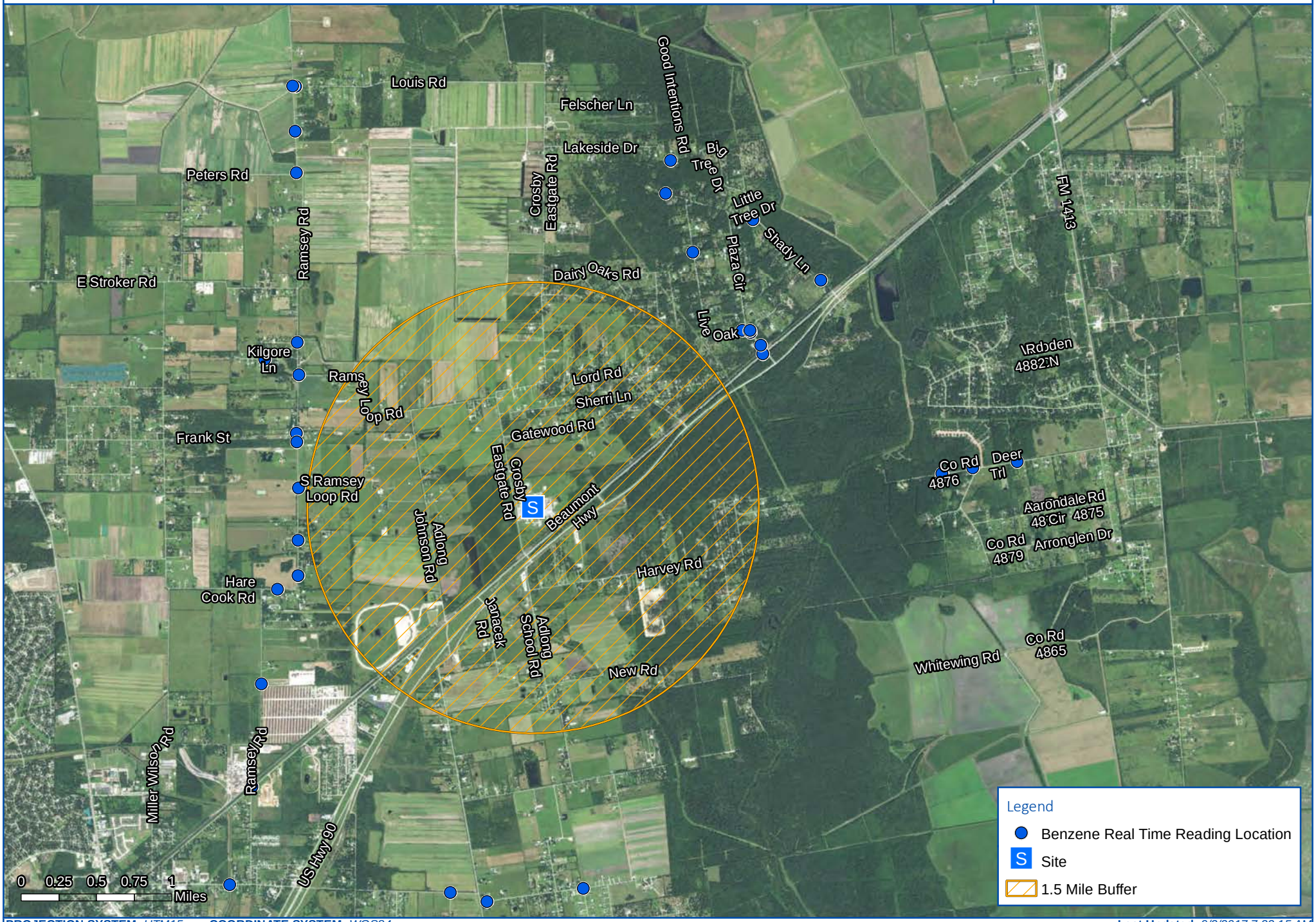


PROJECTION SYSTEM: *UTM15* **COORDINATE SYSTEM:** *WGS84* **Last Updated:** *9/2/2017 6:50:04 AM*

Benzene Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 1, 2017 to 06:00 September 2, 2017

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



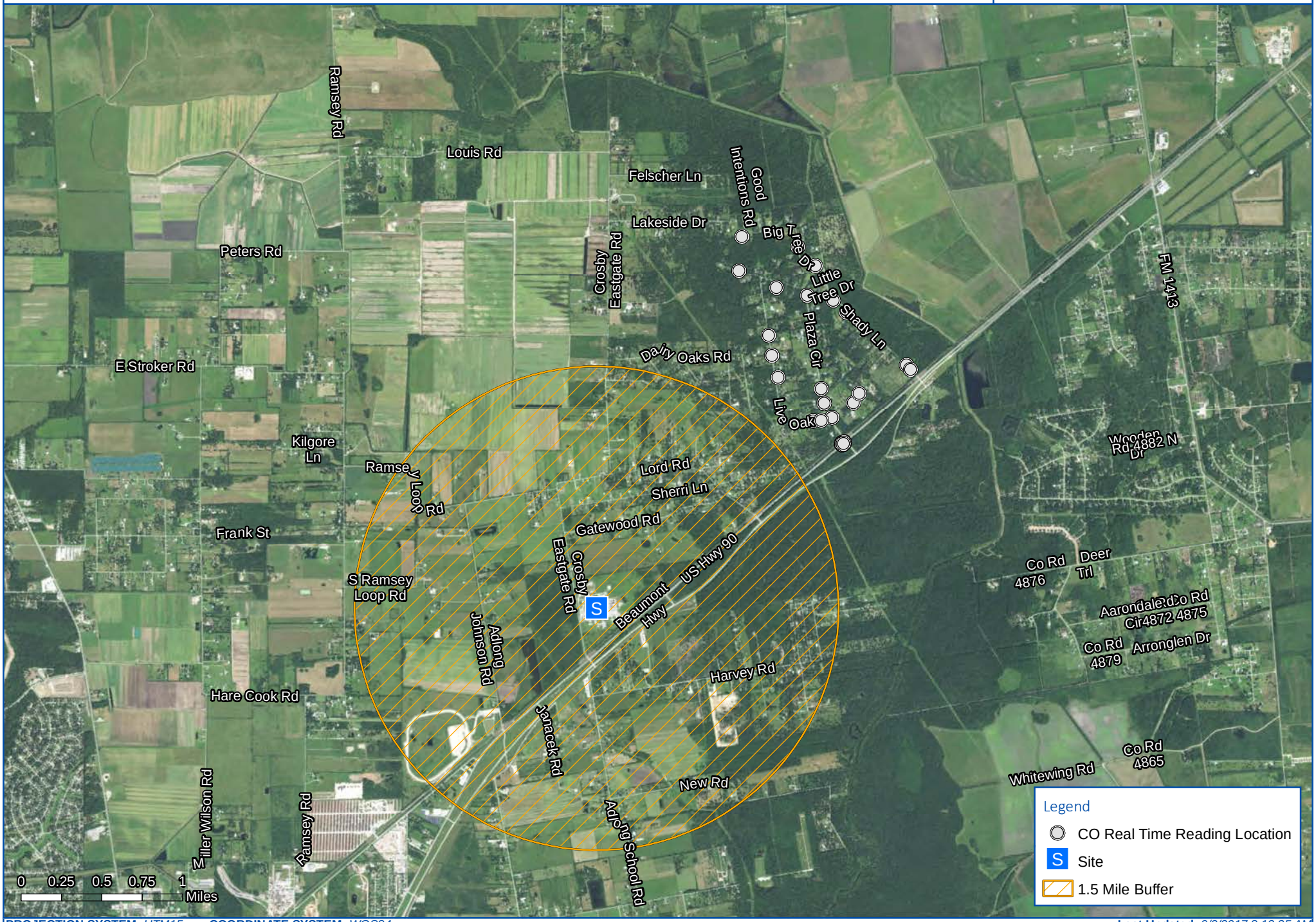
PROJECTION SYSTEM: *UTM15* **COORDINATE SYSTEM:** *WGS84*

Last Updated: *9/2/2017 7:22:15 AM*

Carbon Monoxide Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 1, 2017 to 06:00 September 2, 2017

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



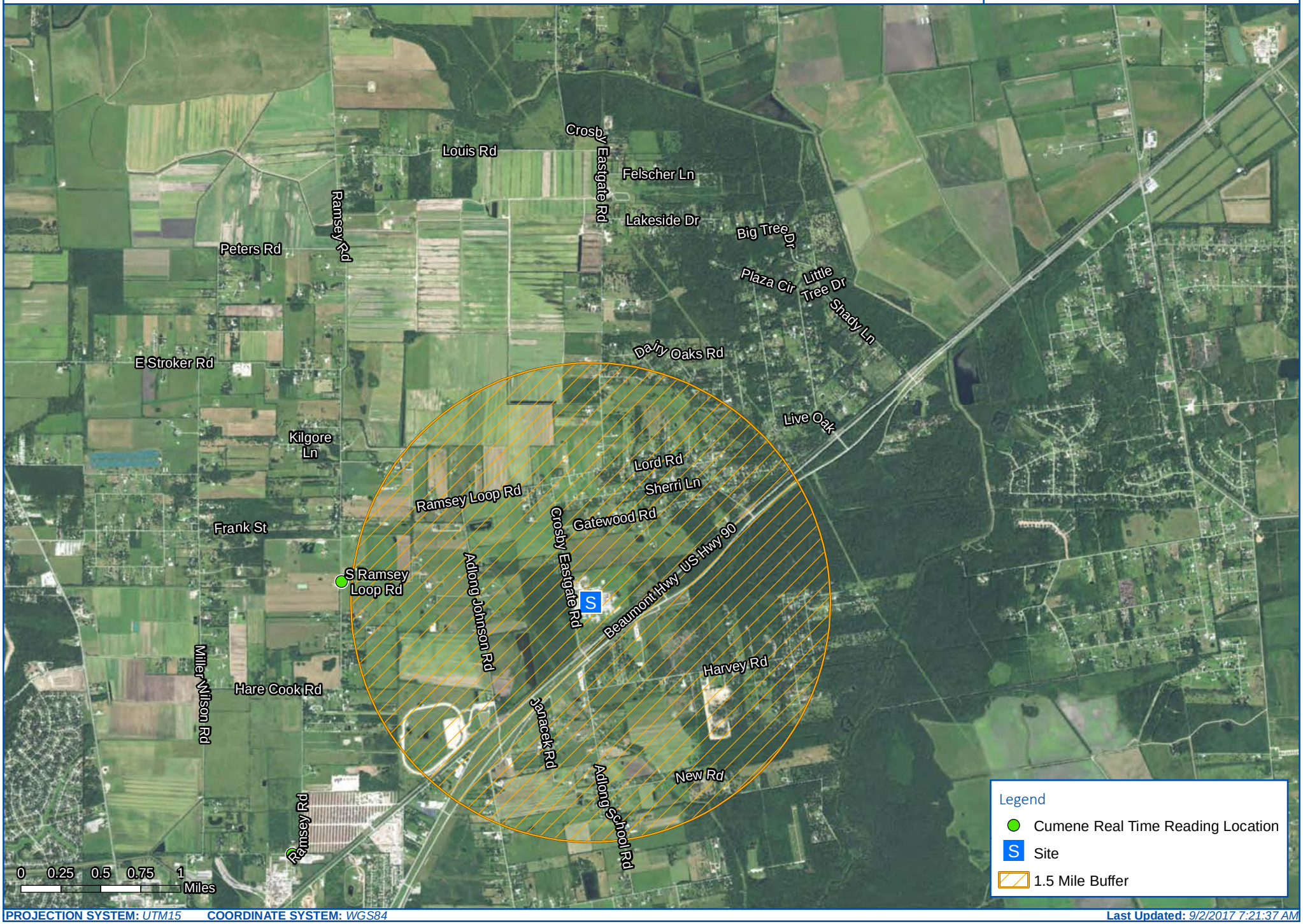
PROJECTION SYSTEM: *UTM15* **COORDINATE SYSTEM:** *WGS84*

Last Updated: *9/2/2017 8:12:35 AM*

Cumene Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 1, 2017 to 06:00 September 2, 2017

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



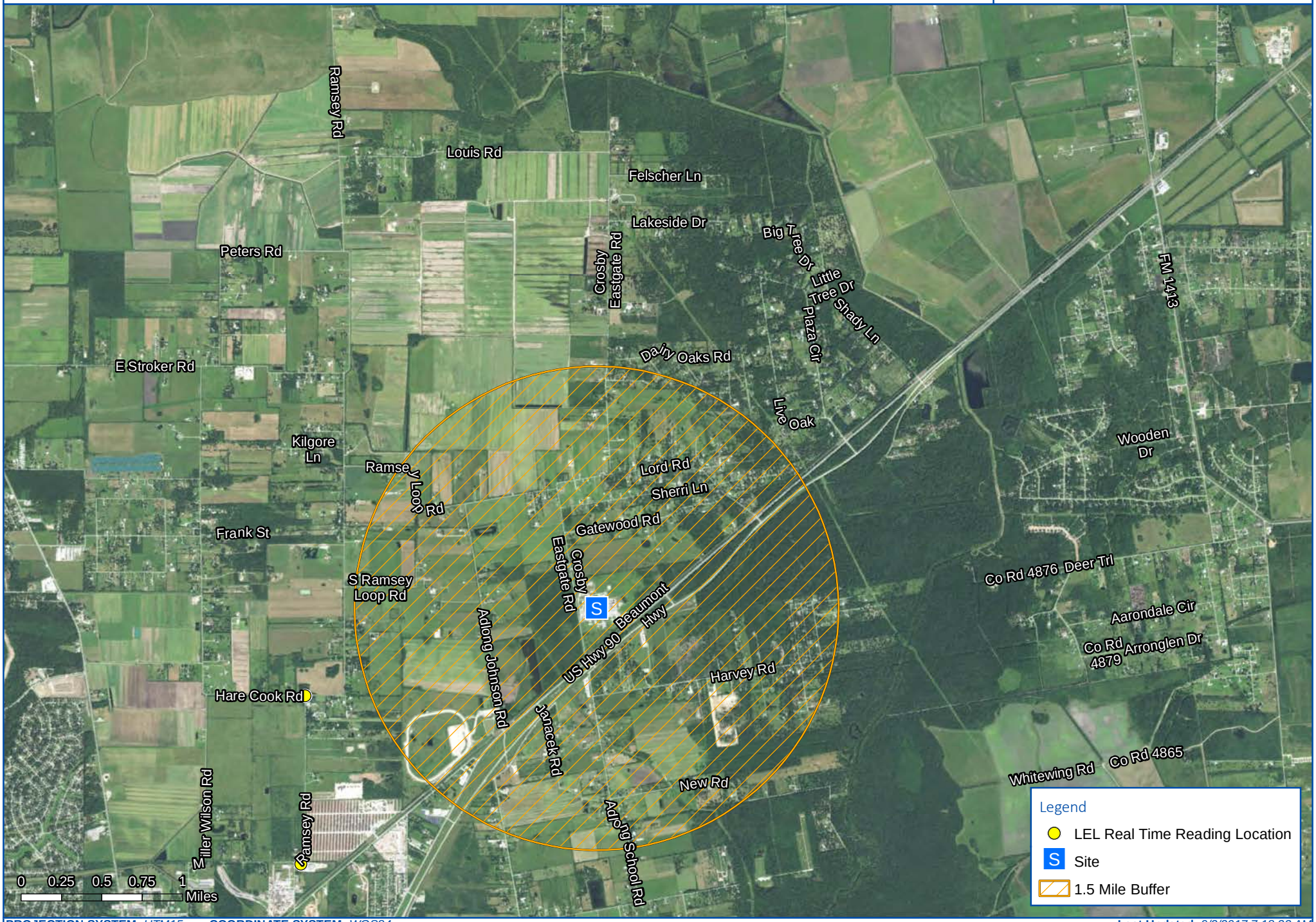
PROJECTION SYSTEM: *UTM15* **COORDINATE SYSTEM:** *WGS84*

Last Updated: *9/2/2017 7:21:37 AM*

LEL Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 1, 2017 to 06:00 September 2, 2017

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



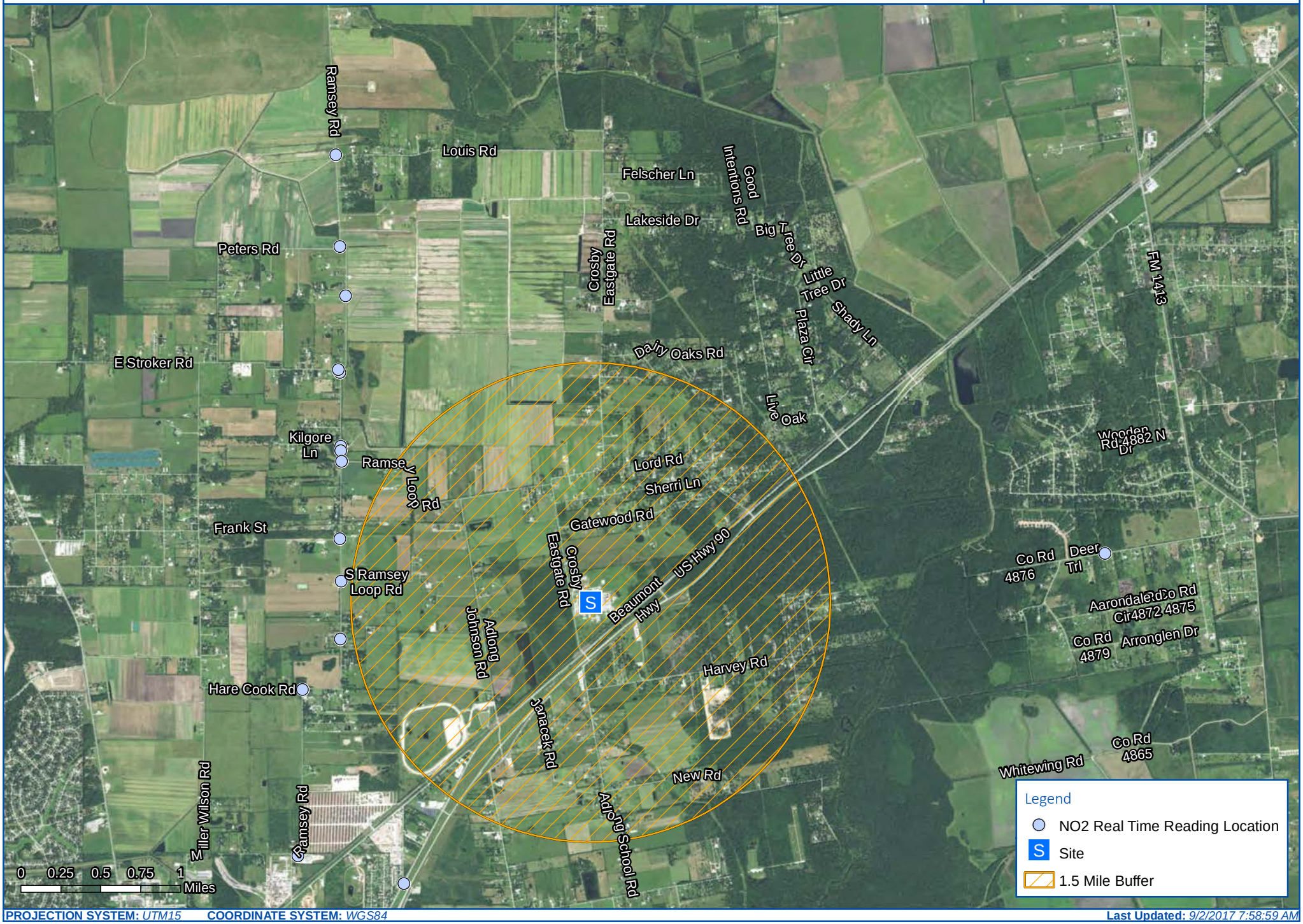
PROJECTION SYSTEM: *UTM15* **COORDINATE SYSTEM:** *WGS84*

Last Updated: *9/2/2017 7:18:33 AM*

Nitrogen Dioxide Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 1, 2017 to 06:00 September 2, 2017

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

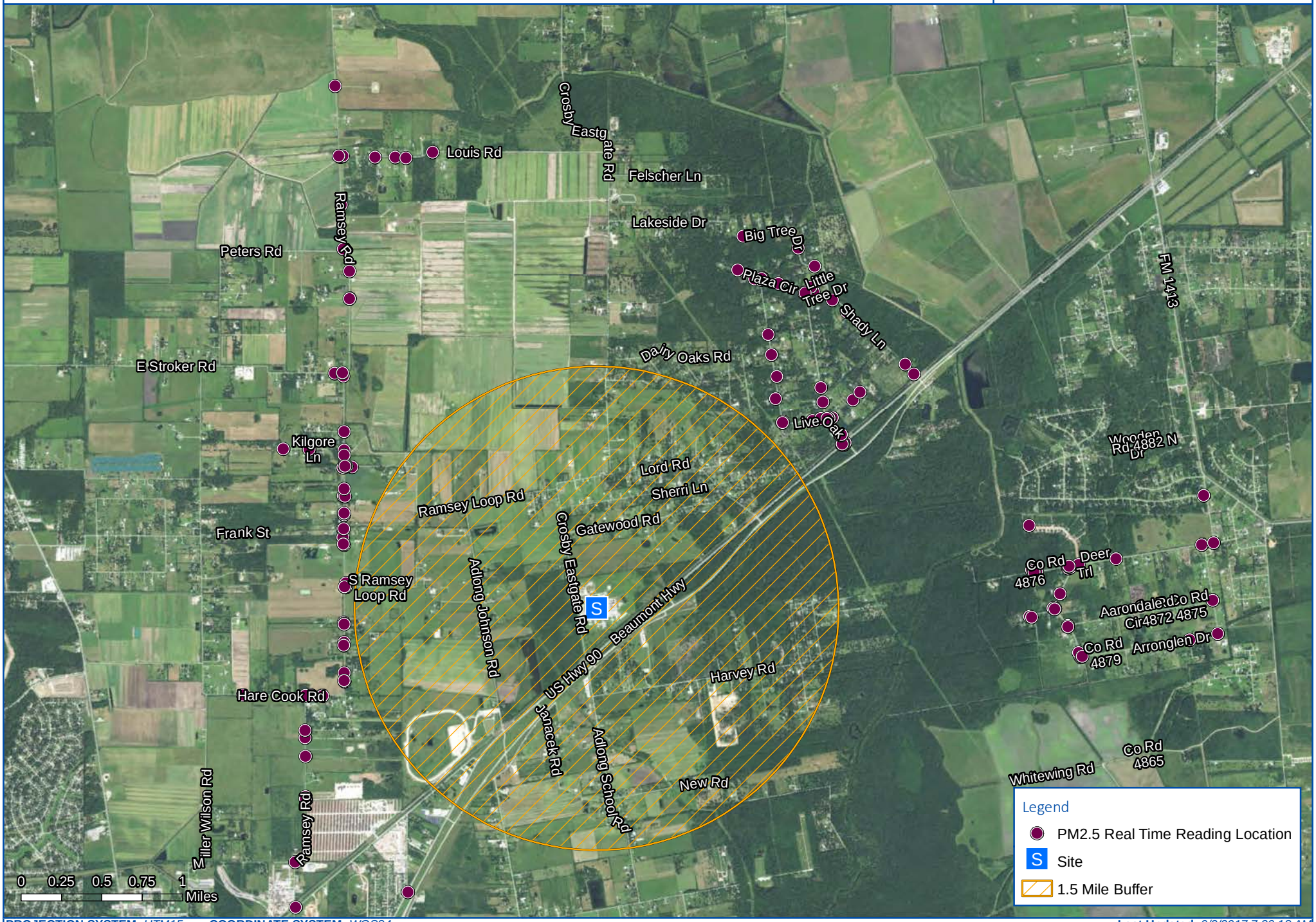


PROJECTION SYSTEM: *UTM15* **COORDINATE SYSTEM:** *WGS84* **Last Updated:** *9/2/2017 7:58:59 AM*

PM2.5 Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 1, 2017 to 06:00 September 2, 2017

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



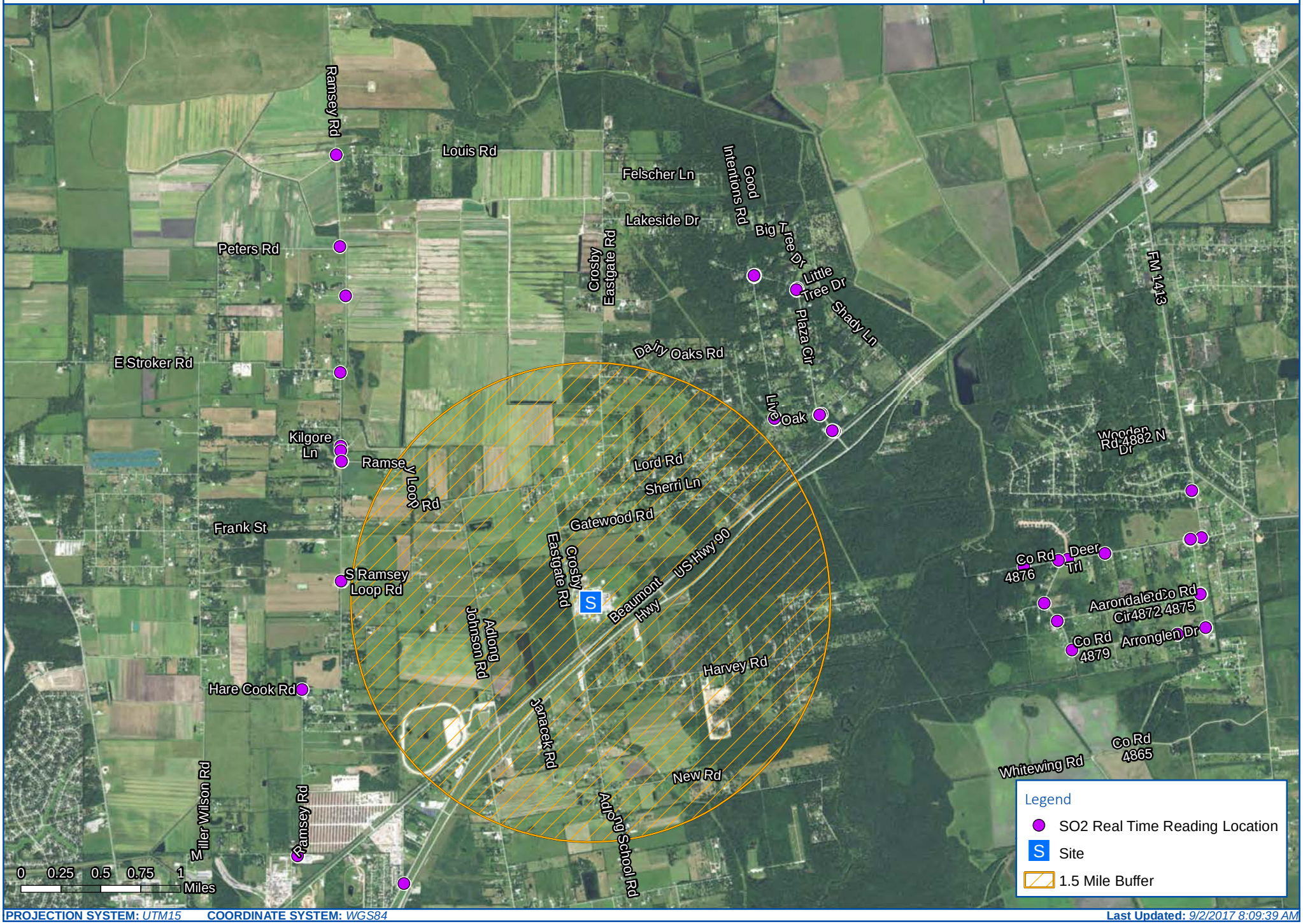
PROJECTION SYSTEM: *UTM15* **COORDINATE SYSTEM:** *WGS84*

Last Updated: *9/2/2017 7:30:18 AM*

Sulfur Dioxide Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 1, 2017 to 06:00 September 2, 2017

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

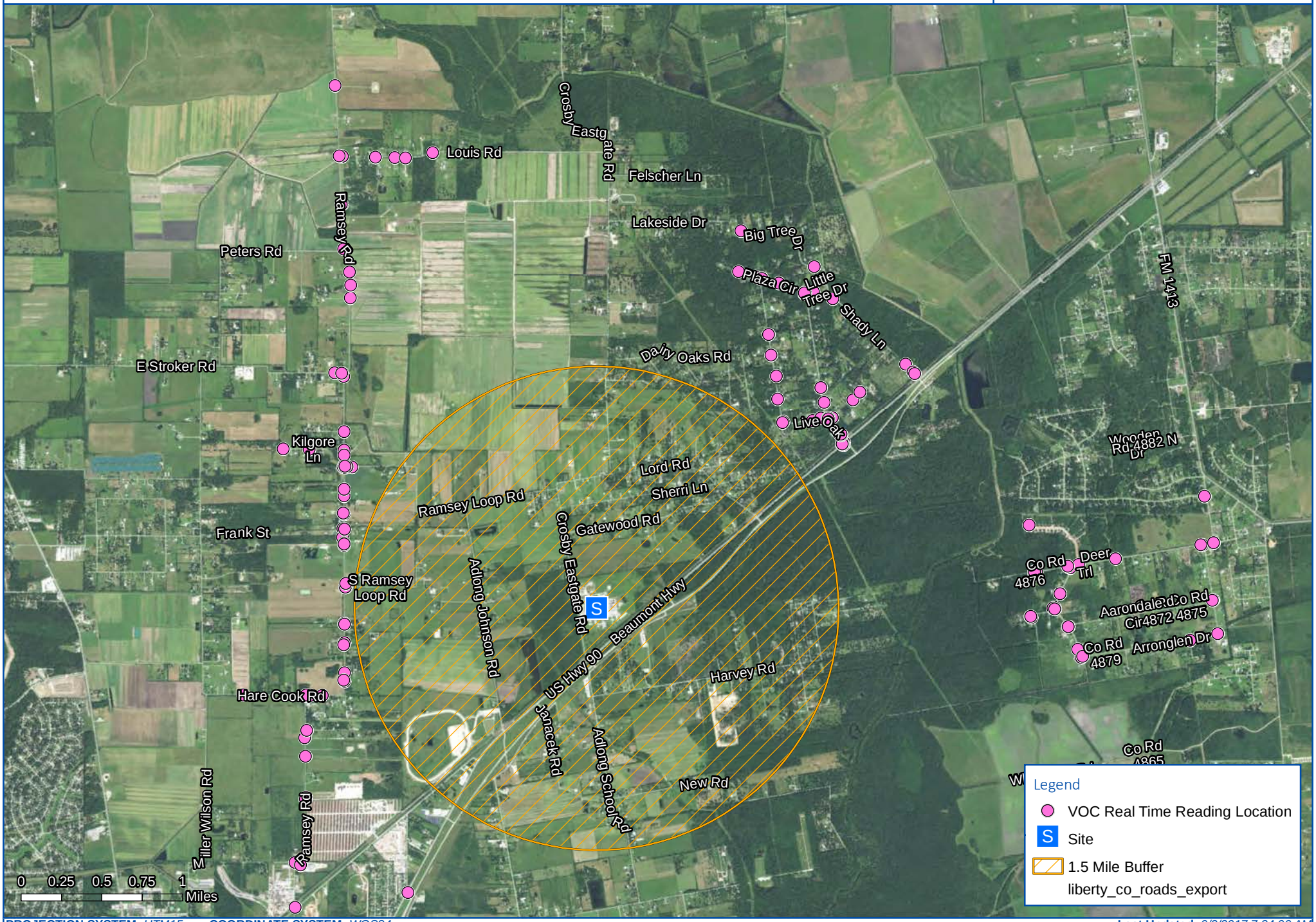


PROJECTION SYSTEM: *UTM15* **COORDINATE SYSTEM:** *WGS84* **Last Updated:** *9/2/2017 8:09:39 AM*

VOC Hand-held Real-time Reading Locations

Harvey Response - 06:00 September 1, 2017 to 06:00 September 2, 2017

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



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

Last Updated: *9/2/2017 7:34:00 AM*

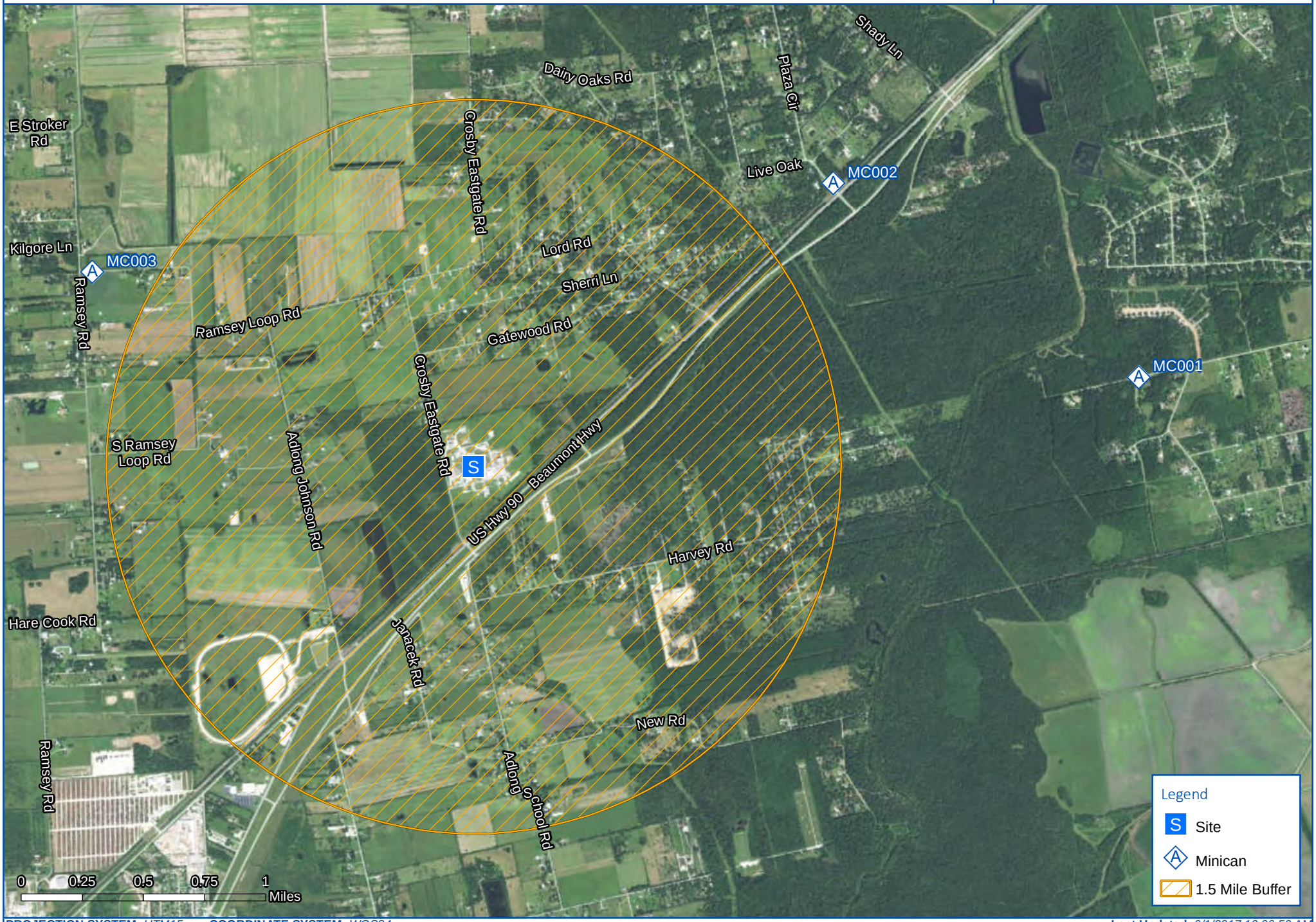
Attachment C

Map of Analytical Air Sampling Locations

Analytical Air Monitoring Station Locations

Harvey Response - August 31, 2017

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



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

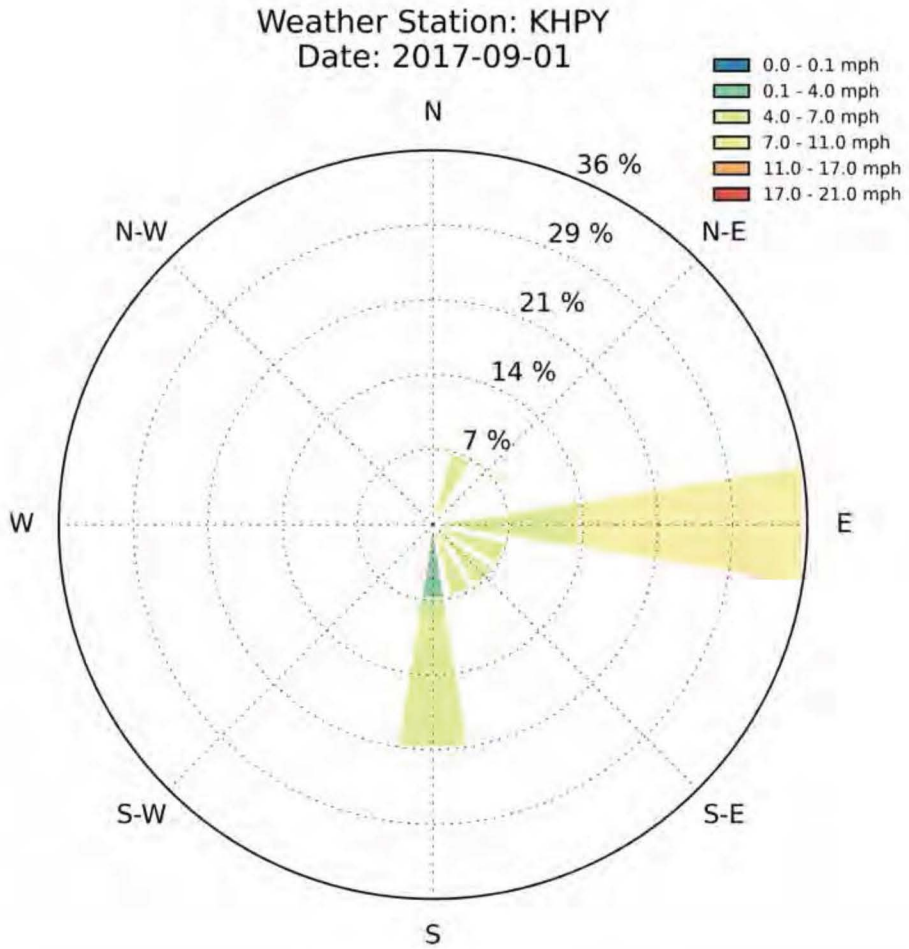
Last Updated: *9/1/2017 10:06:50 AM*

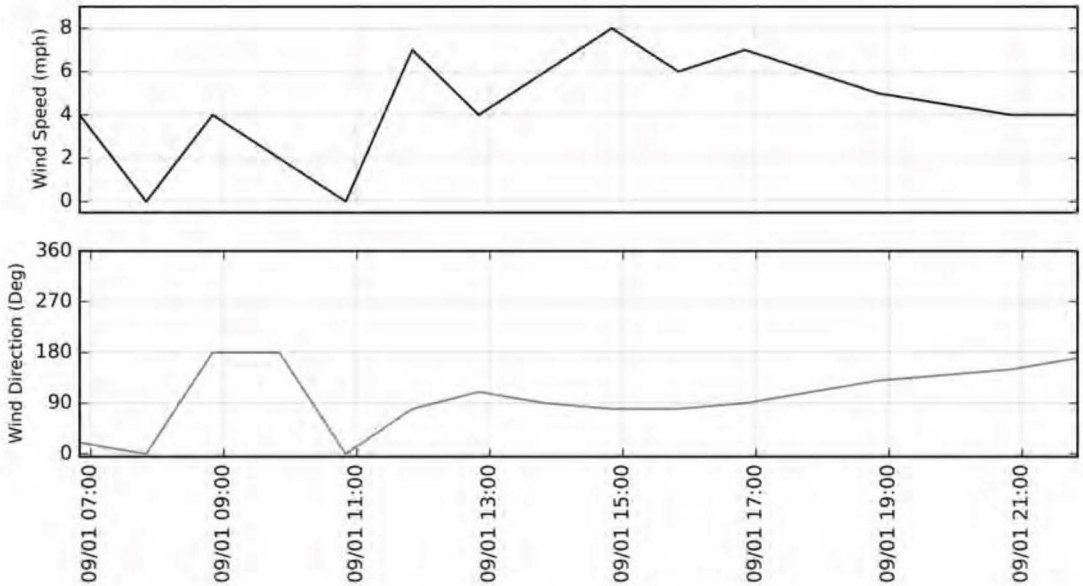
Attachment D

KHPY Windrose

(Highland Park Airport - 12.5 miles SSE of Site)

CTEH


Weather Station: KHPY
Date: 2017-09-01
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
36 %
29 %
21 %
14 %
7 %


Wind Speed (mph)
0
2
4
6
8
Wind Direction (Deg)
0
90
180
270
360
09/01 07:00
09/01 09:00
09/01 11:00
09/01 13:00
09/01 15:00
09/01 17:00
09/01 19:00
09/01 21:00

CTEH