TMP INSTALLATIONS

BRIDGETON LANDFILL

PREPARED FOR:

BRIDGETON LANDFILL, LLC

Prepared by

P.J. Carey & Associates, P.C.

Sugar Hill, Georgia

9/13/2012

TABLE OF CONTENTS

1.1 INTRODUCTION 1
1.2 PROPOSED LOCATIONS 1
1.3 PROPOSED DEVICES 1
1.4 INSTALLATION 2
1.5 SCHEDULE 2

FIGURES (APPEAR AT THE END OF THE REPORT)

FIGURE 1 – TMP LOCATION PLAN
FIGURE 2 – TMP DETAIL
FIGURES 3 THROUGH 10– GAS WELL TEMPERATURE GRAPHS WITH TIME

1.1 INTRODUCTION

This report has been prepared to address the requirements of installation of temperature monitoring devices in the waste as per the July 23 letter from MDNR. The proposed temperature monitoring system has been developed based on a site visit and review of available data, along with discussion with site personnel. The locations of the proposed devices are depicted in Figure 1. Discussion of the choice of locations and description of the monitoring equipment and installation procedures are provided below. The proposed methods of installation and equipment are based on temperature monitoring at landfills experiencing elevated temperatures.

1.2 PROPOSED LOCATIONS

The intent of the proposed temperature monitoring system is to provide subsurface measurement of the waste temperatures along the narrow portion of the landfill, between the north and south portions of the landfill, and within an area to the south, where the gas well temperatures are currently not greater than 170 deg F and typically less than 150 deg F. The area to the south of the narrow point has not exhibited significant temperature rises in the gas wells in the past months (see attached graphs of temperature versus time) and provides a location where the rate of advance of elevated temperatures toward the north to be assessed by both gas and in waste measurement.

The information gained from rate temperature advance to the north will allow estimation of when, in the event northern migration of the temperature front continues, temperatures would be projected to reach limits that are critical to proposed actions. At present areas to the north of the narrow point are, as reflected in gas well temperatures, all below 130 deg F. While point temperatures in the waste below grade are likely slightly higher, the well head temperatures have, at other sites, been found to be excellent indicators where heat generating reactions not related to biological decomposition of waste are occurring. Therefore, it is recommended that additional TMP locations in the north area would not be installed at this time, given the action(s) proposed to be taken are currently undefined but understood to be addressed in a future submittal to the MDNR. The location of potential future TMPs is dependent on the type of action contemplated. The time to implement actions, set back requirements from elevated temperatures and other action specific considerations along with the rate the elevated temperatures are moving north will govern the location of trigger systems needed.

A total of nine thermocouple strings with a thermocouple every 20 vertical feet are proposed at the locations shown in Figure 1.

1.3 PROPOSED DEVICES

The measuring devices proposed are type T thermocouples of the type successfully used under similar circumstances for this purpose. Thermocouples were found to have longer in ground lifetimes than thermistors. The thermocouples will consist of 20 gauge type T wire with Teflon coating. The junctions will be pre formed by the supplier and wires cut to length prior to delivery. Wires will be inserted into an abrasion resistant sheath with each junction at the prescribed depth prior to installing sheath in a bore hole. A fiberglass rod or other rigid solid bar will be used to stand the assembly in the hole while the casings are extracted. The entire assembly will be grouted in place with a cement bentonite grout. A typical arrangement is shown in Figure 2. Each wire will be labeled with a crimped on numbered band to identify

it. Upon completion of the installation, the leads will be attached to a readout terminal box with each lead numbered the same as the crimped on band.

1.4 INSTALLATION

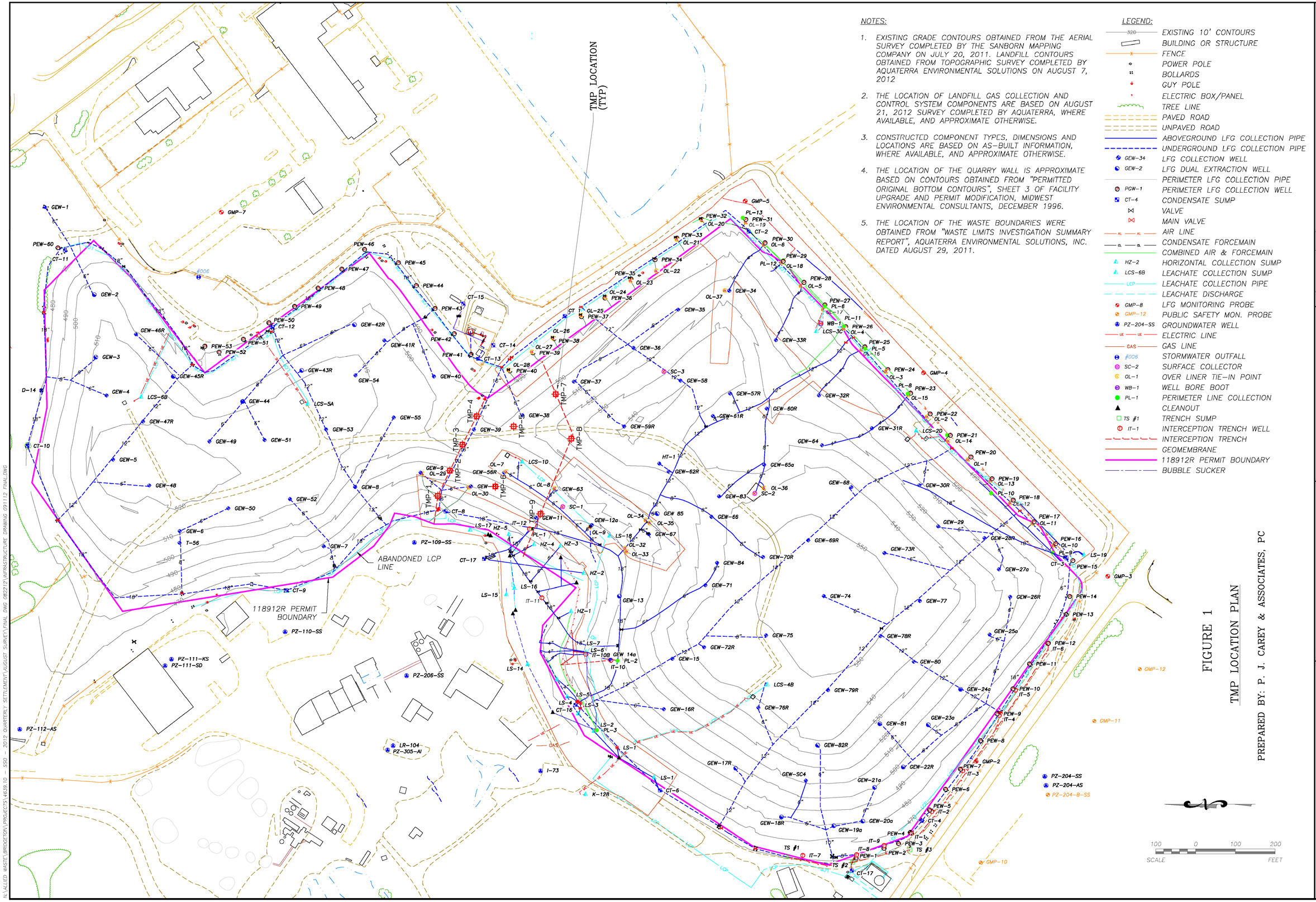
Borings, with minimum diameter of 6 inches will be drilled using roto-sonic drilling techniques. Borings will be advanced to the bottom of the landfill but not to depths exceeding 285 feet should the landfill bottom not be encountered. Sampling will be performed, as opposed to lost point insertion, allowing viewing of the waste samples. Once the bottom of the landfill is encountered, the string of thermal couples and protective sheath will be placed inside the drill casing. Cement bentonite grout will be introduced into the top of the casing and the casing withdrawn while keeping the casing full of grout. When the casing is fully extracted the wires will be cleaned and connected to a terminal box as described previously.

Cuttings from the boring program will placed in a dumpster and disposed offsite and at a permitted facility.

1.5 SCHEDULE

Two drilling companies, both of whom had drilled in similar or worse conditions at the Countywide site, have indicated that a two week lead time plus some time to fabricate a safety shield for the drill rig (approximately 1 week) would be needed prior to commencement of installation. This would correspond with the approximate 3 week lead time in getting the thermocouple strings fabricated and assembled at the site. Installation time is likely to be approximately 12 work days. Therefore the approximate completion date is the end of the week of October 26, 2012, allowing for some time for concurrence with the plan from the MDNR.

FIGURES



NOTES:

1. EXISTING GRADE CONTOURS OBTAINED FROM THE AERIAL SURVEY COMPLETED BY THE SANBORN MAPPING COMPANY ON JULY 20, 2011. LANDFILL CONTOURS OBTAINED FROM TOPOGRAPHIC SURVEY COMPLETED BY AQUATERRA ENVIRONMENTAL SOLUTIONS ON AUGUST 7, 2012
2. THE LOCATION OF LANDFILL GAS COLLECTION AND CONTROL SYSTEM COMPONENTS ARE BASED ON AUGUST 21, 2012 SURVEY COMPLETED BY AQUATERRA, WHERE AVAILABLE, AND APPROXIMATE OTHERWISE.
3. CONSTRUCTED COMPONENT TYPES, DIMENSIONS AND LOCATIONS ARE BASED ON AS-BUILT INFORMATION, WHERE AVAILABLE, AND APPROXIMATE OTHERWISE.
4. THE LOCATION OF THE QUARRY WALL IS APPROXIMATE BASED ON CONTOURS OBTAINED FROM "PERMITTED ORIGINAL BOTTOM CONTOURS", SHEET 3 OF FACILITY UPGRADE AND PERMIT MODIFICATION, MIDWEST ENVIRONMENTAL CONSULTANTS, DECEMBER 1996.
5. THE LOCATION OF THE WASTE BOUNDARIES WERE OBTAINED FROM "WASTE LIMITS INVESTIGATION SUMMARY REPORT", AQUATERRA ENVIRONMENTAL SOLUTIONS, INC. DATED AUGUST 29, 2011.

LEGEND:

- EXISTING 10' CONTOURS
- BUILDING OR STRUCTURE
- FENCE
- POWER POLE
- BOLLARDS
- GUY POLE
- ELECTRIC BOX/PANEL
- TREE LINE
- PAVED ROAD
- UNPAVED ROAD
- ABOVEGROUND LFG COLLECTION PIPE
- UNDERGROUND LFG COLLECTION PIPE
- GEW-34 LFG COLLECTION WELL
- GEW-2 LFG DUAL EXTRACTION WELL
- PERIMETER LFG COLLECTION PIPE
- PGW-1 PERIMETER LFG COLLECTION WELL
- CT-4 CONDENSATE SUMP
- VALVE
- MAIN VALVE
- AIR LINE
- CONDENSATE FORCEMAIN
- COMBINED AIR & FORCEMAIN
- HZ-2 HORIZONTAL COLLECTION SUMP
- LCS-6B LEACHATE COLLECTION SUMP
- LCP LEACHATE COLLECTION PIPE
- LEACHATE DISCHARGE
- GMP-8 LFG MONITORING PROBE
- GMP-12 PUBLIC SAFETY MON. PROBE
- PZ-204-SS GROUNDWATER WELL
- ELECTRIC LINE
- GAS LINE
- #006 STORMWATER OUTFALL
- SC-2 SURFACE COLLECTOR
- OL-1 OVER LINER TIE-IN POINT
- WB-1 WELL BORE BOOT
- PL-1 PERIMETER LINE COLLECTION
- CLEANOUT
- TS #1 TRENCH SUMP
- IT-1 INTERCEPTION TRENCH WELL
- INTERCEPTION TRENCH
- GEOMEMBRANE
- 118912R PERMIT BOUNDARY
- BUBBLE SUCKER

FIGURE 1
TMP LOCATION PLAN
PREPARED BY: P. J. CAREY & ASSOCIATES, PC

REV	DATE	DESCRIPTION
R6	5BY	-
R5	5BY	-
R4	4BY	-
R3	3BY	-
R2	2BY	-
R1	1BY	-

AQUATERRA
ENVIRONMENTAL SOLUTIONS, INC.
7311 W. 130th St., Ste. 100
Overland Park, Kansas 66213

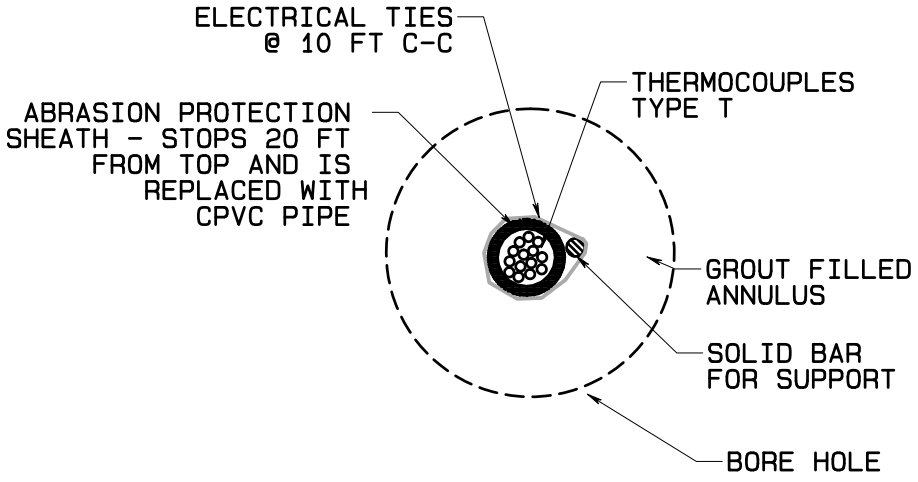
CLIENT: BRIDGETON LANDFILL, LLC
BRIDGETON LANDFILL
BRIDGETON, MISSOURI

DRAWN BY: JWB | DESIGNED BY: JWB | PROJECT MGR: MAB | DATE: 9/11/12
ELECTRONIC FILE NAME: G:\PROJECTS\639.10 - SSO - 2012 QUARTERLY SETTLEMENT\AUGUST SURVEY\FINAL DWG 082212\INFRASTRUCTURE DRAWING 091112 FINAL.DWG

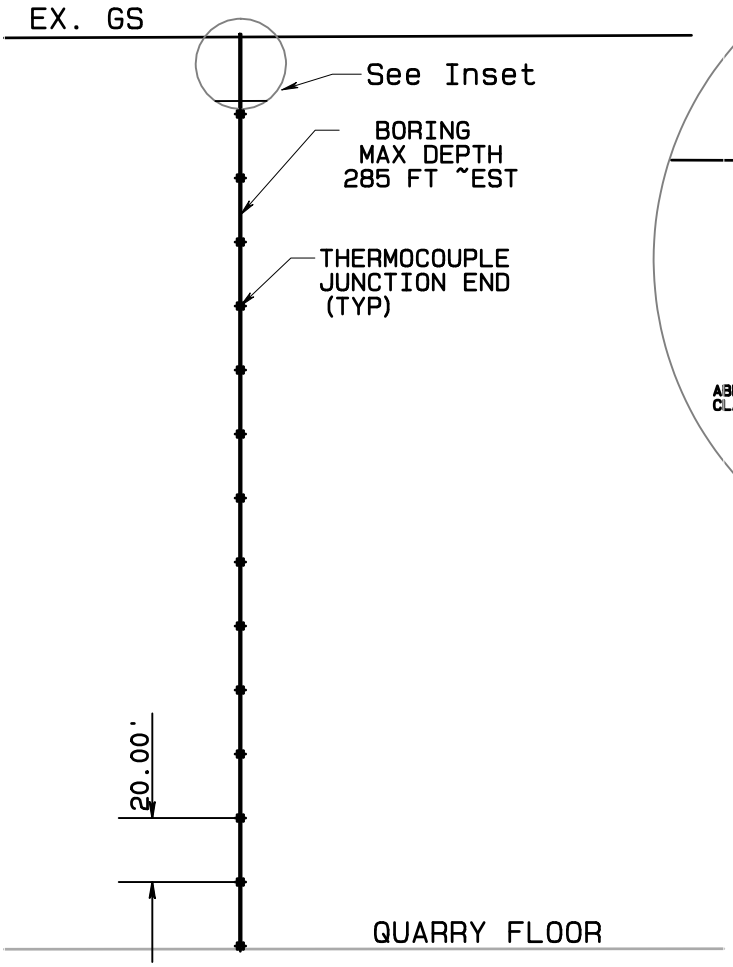
SITE LAYOUT
BRIDGETON INFRASTRUCTURE

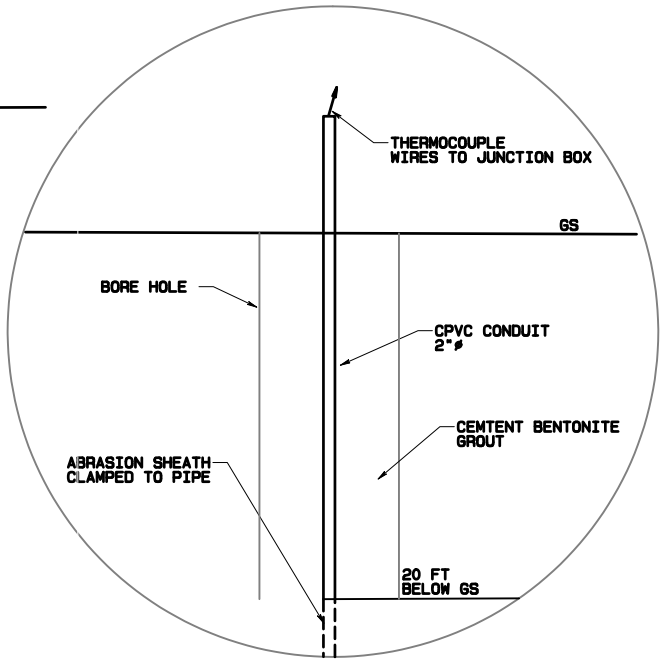
REV.: 0 | DRAWING NUMBER: 1 | PROJECT NUMBER: 4639.10 | SHT: 1 OF 3

N:\ALLIED WASTE\BRIDGETON\PROJECTS\4639.10 - SSO - 2012 QUARTERLY SETTLEMENT\AUGUST SURVEY\FINAL DWG 082212\INFRASTRUCTURE DRAWING 091112 FINAL.DWG



TMP
SECTION VIEW
1"= 4"





INSET

FIGURE 2
TMP INSTALLATION

BRIDGETON LANDFILL
TEMPERATURE MONITORING

DESIGNED BY	P.J.C	CHECKED BY	
DRAWN BY	P.J.C	DATE	9/13/2012
SCALE: AS SHOWN	Drawing No. DRAWING	SHEET No. FIGURE 2	Revision No. 0

P. J. Carey & Associates, P.C.

Project Desc.: Path: N:\Bridgeton\Bridgeton Temp.prn Plot Date/Time: Thu Sep 13,2012 / 16:06:57

Site: Bridgeton Landfill / Gem ID: BRIEW12A / Name: GEW-12A
Jun 6, 2012 - Sep 6, 2012

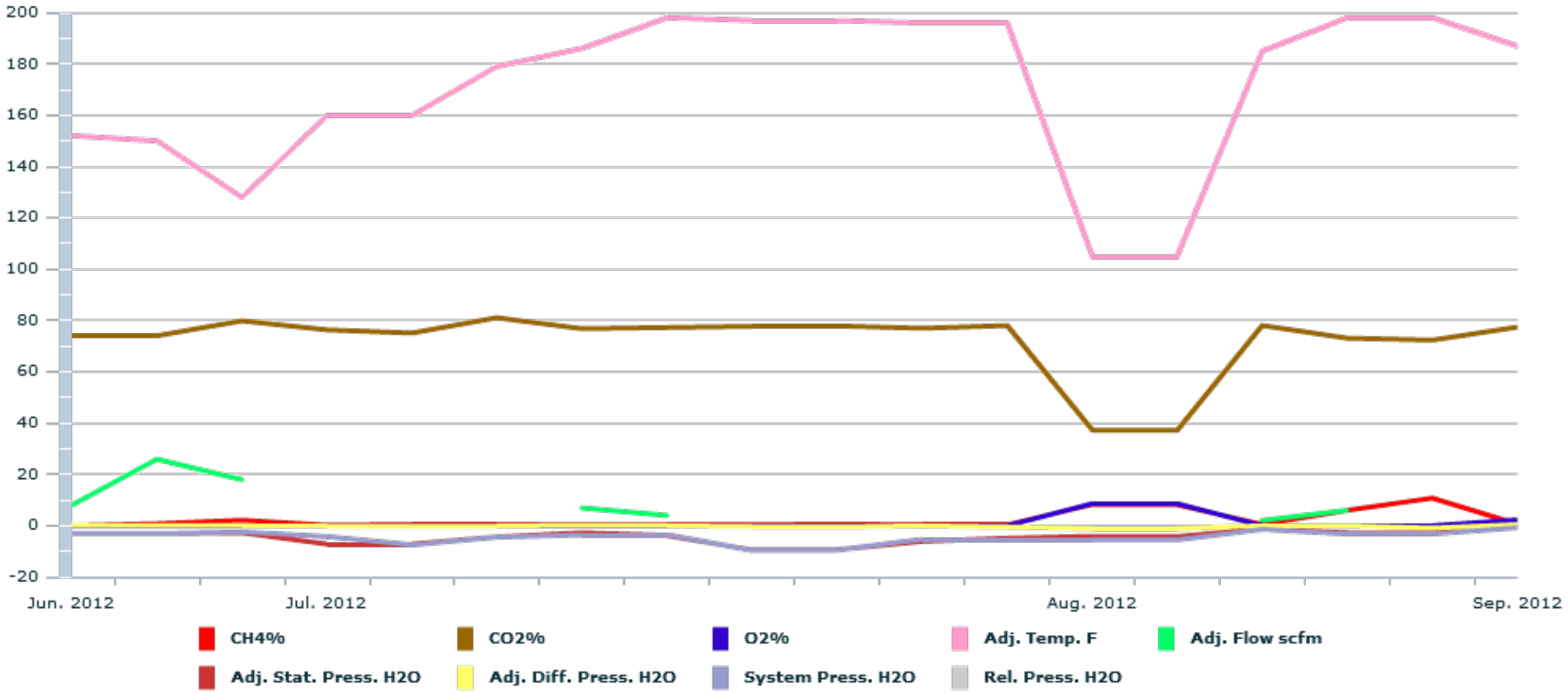


FIGURE 3

Site: Bridgeton Landfill / Gem ID: BRIGEW35 / Name: GEW-35
Jun 5, 2012 - Sep 5, 2012

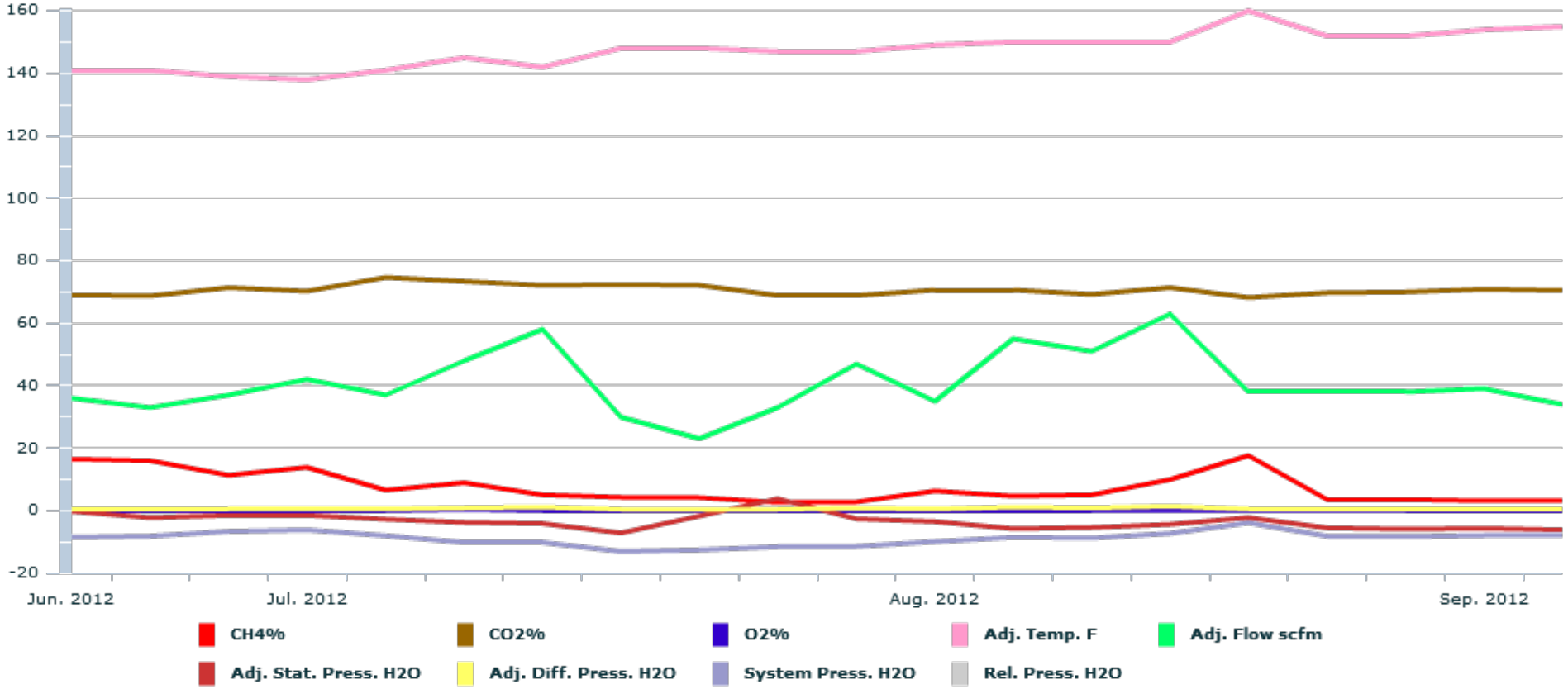


FIGURE 4

Site: Bridgeton Landfill / Gem ID: BRIGEW36 / Name: GEW-36
Jun 5, 2012 - Sep 5, 2012

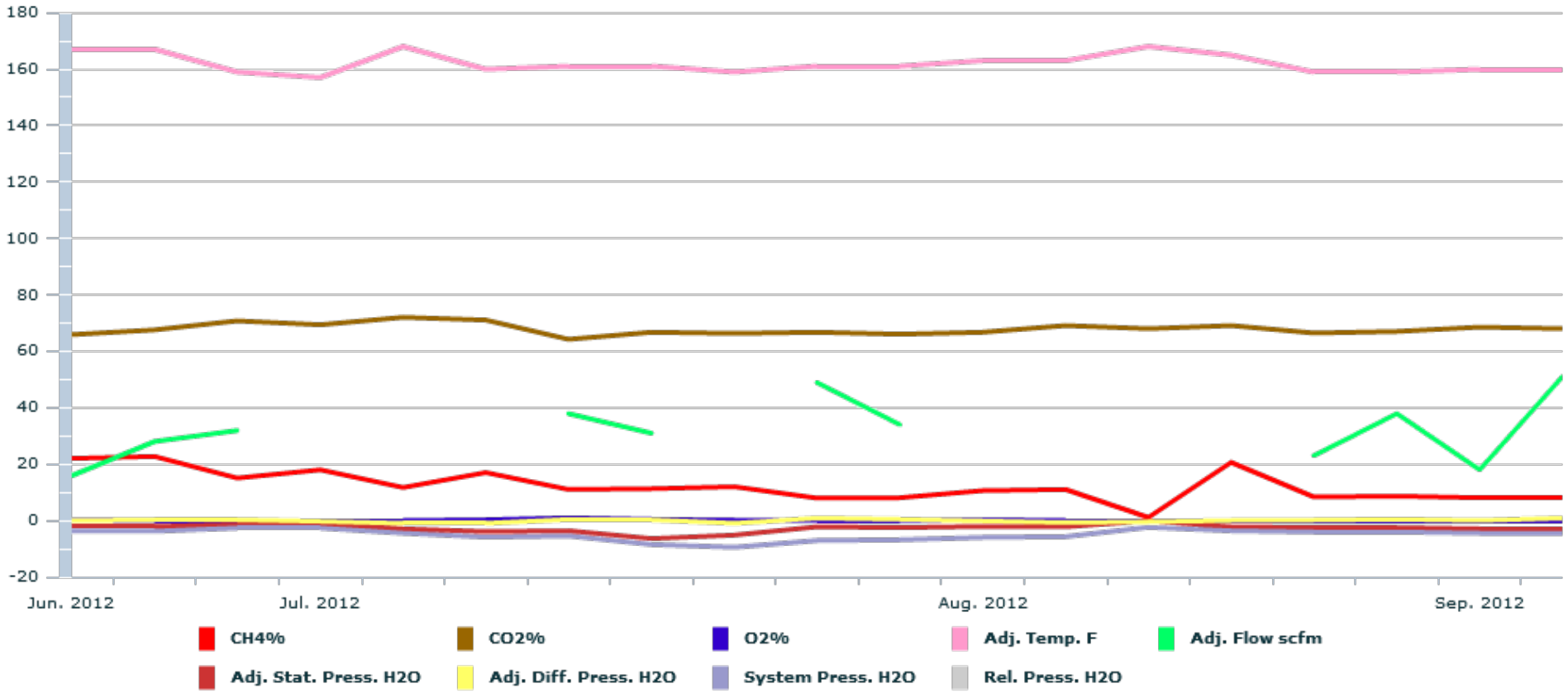


FIGURE 5

Site: Bridgeton Landfill / Gem ID: BRIGEW37 / Name: GEW-37
Jun 5, 2012 - Sep 5, 2012

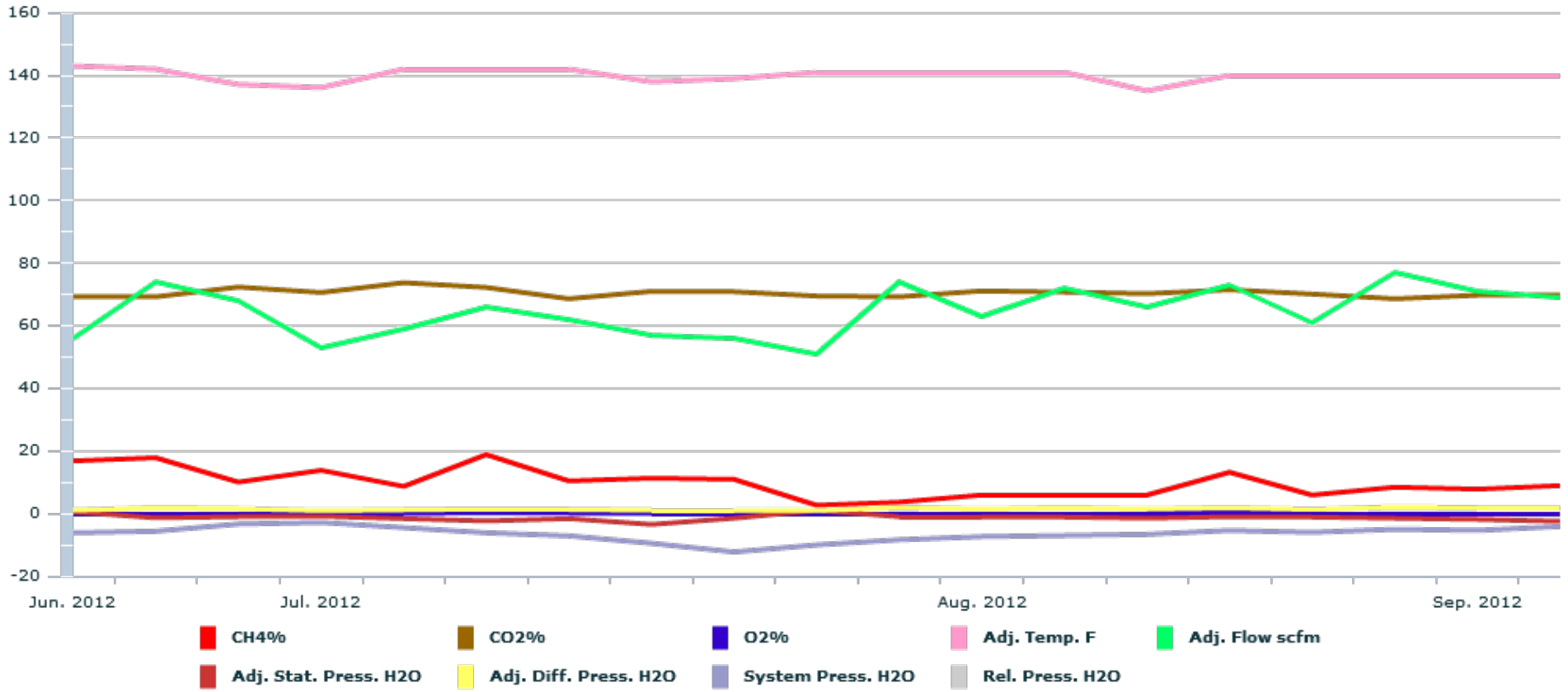


FIGURE 6

Site: Bridgeton Landfill / Gem ID: BRIGEW58 / Name: GEW-58
Jun 6, 2012 - Sep 6, 2012

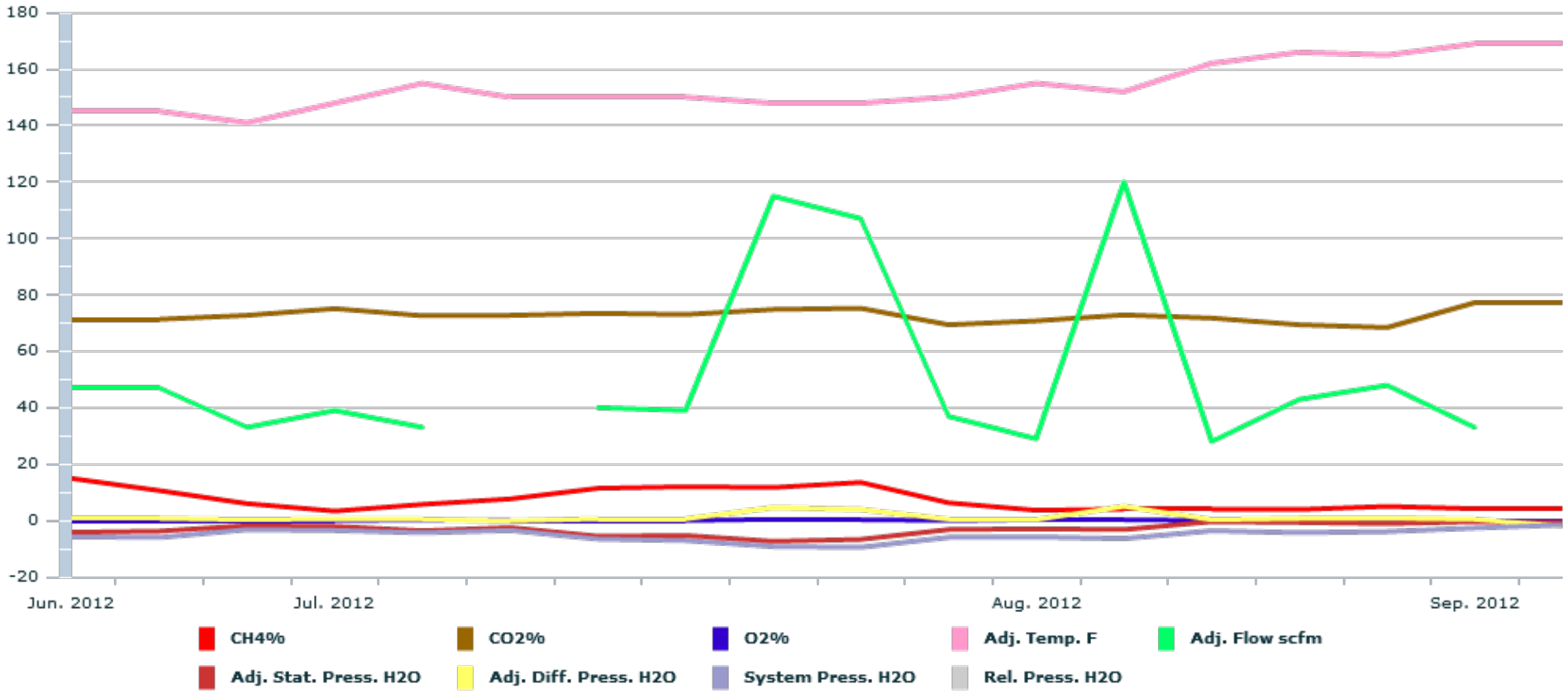


FIGURE 7

Site: Bridgeton Landfill / Gem ID: BRGEW62R / Name: GEW-62R
Jun 6, 2012 - Sep 6, 2012

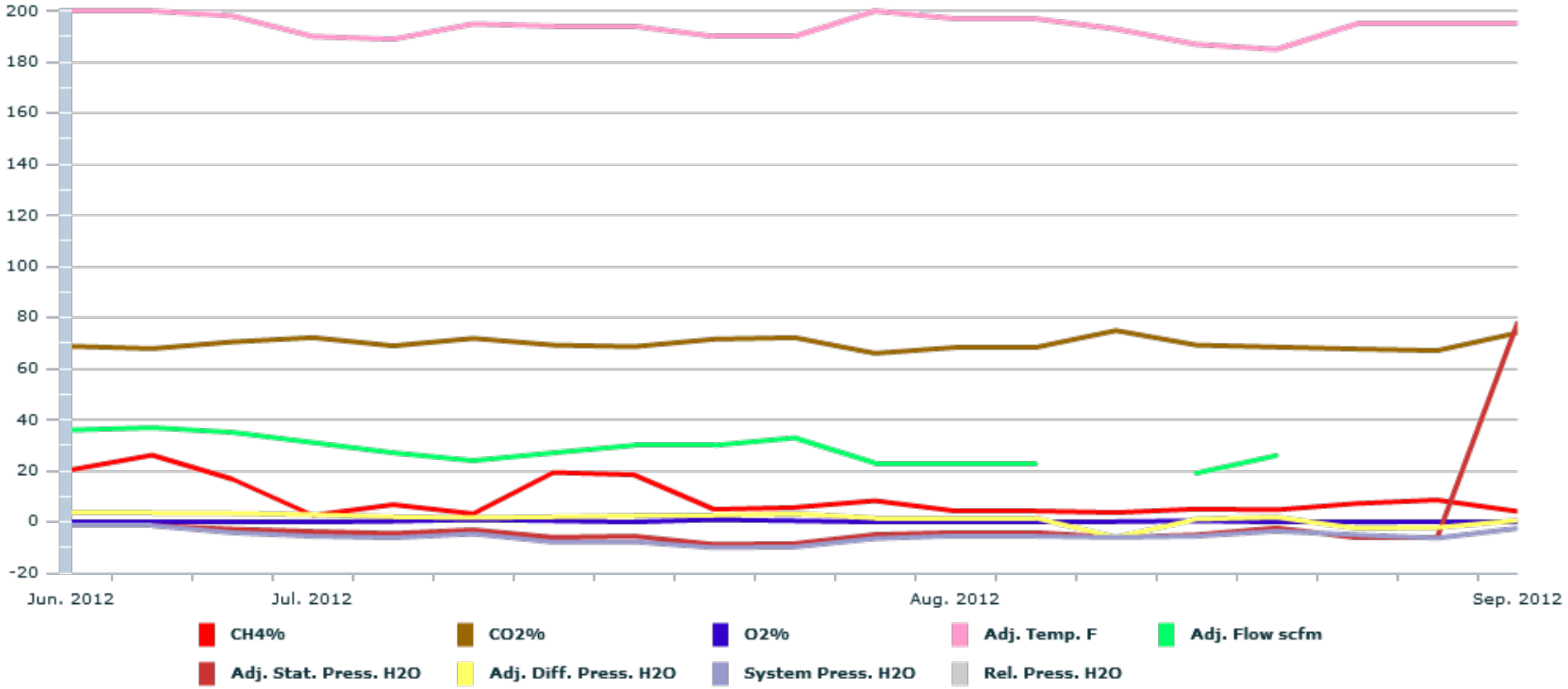


FIGURE 8

Site: Bridgeton Landfill / Gem ID: BRIGEW63 / Name: GEW-63
Jun 6, 2012 - Sep 6, 2012

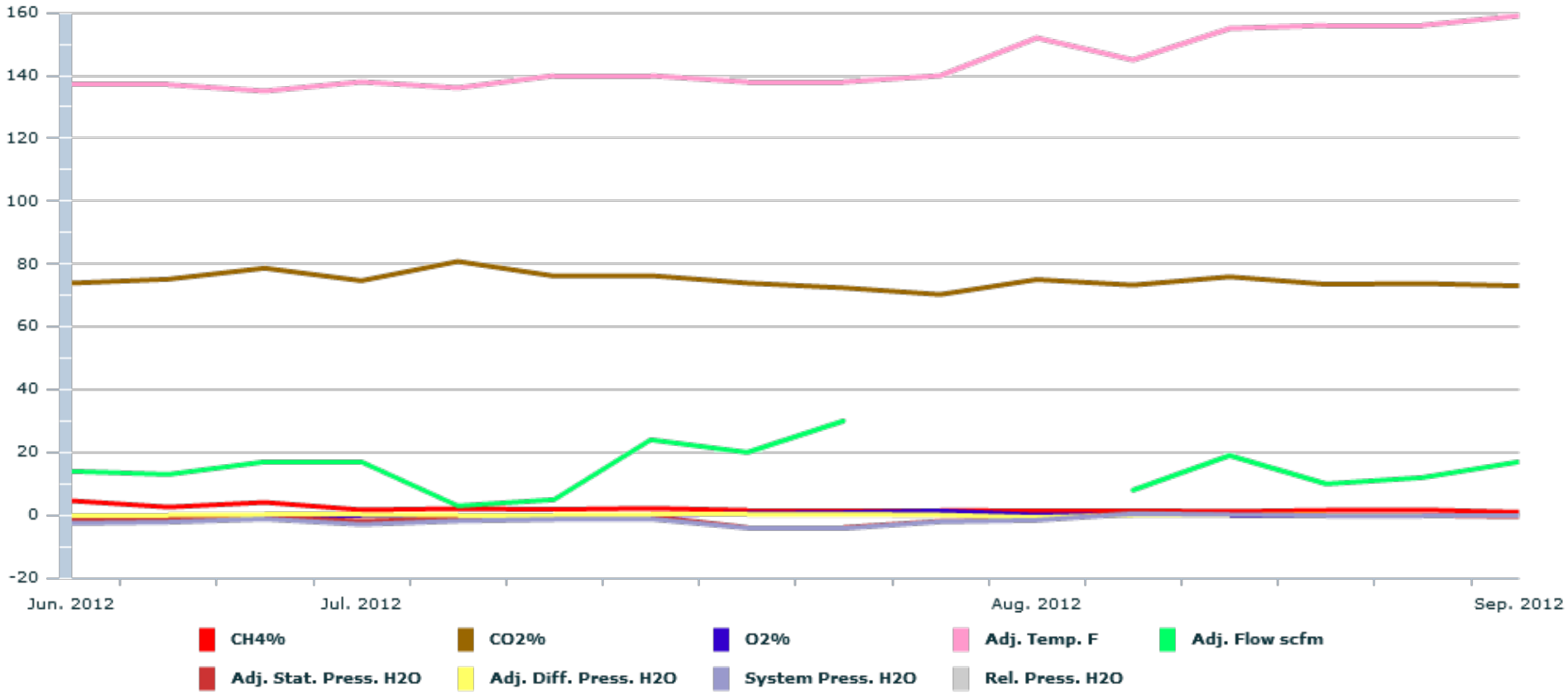


FIGURE 9

Site: Bridgeton Landfill / Gem ID: BRIGEW67 / Name: GEW-67
Jun 6, 2012 - Sep 6, 2012

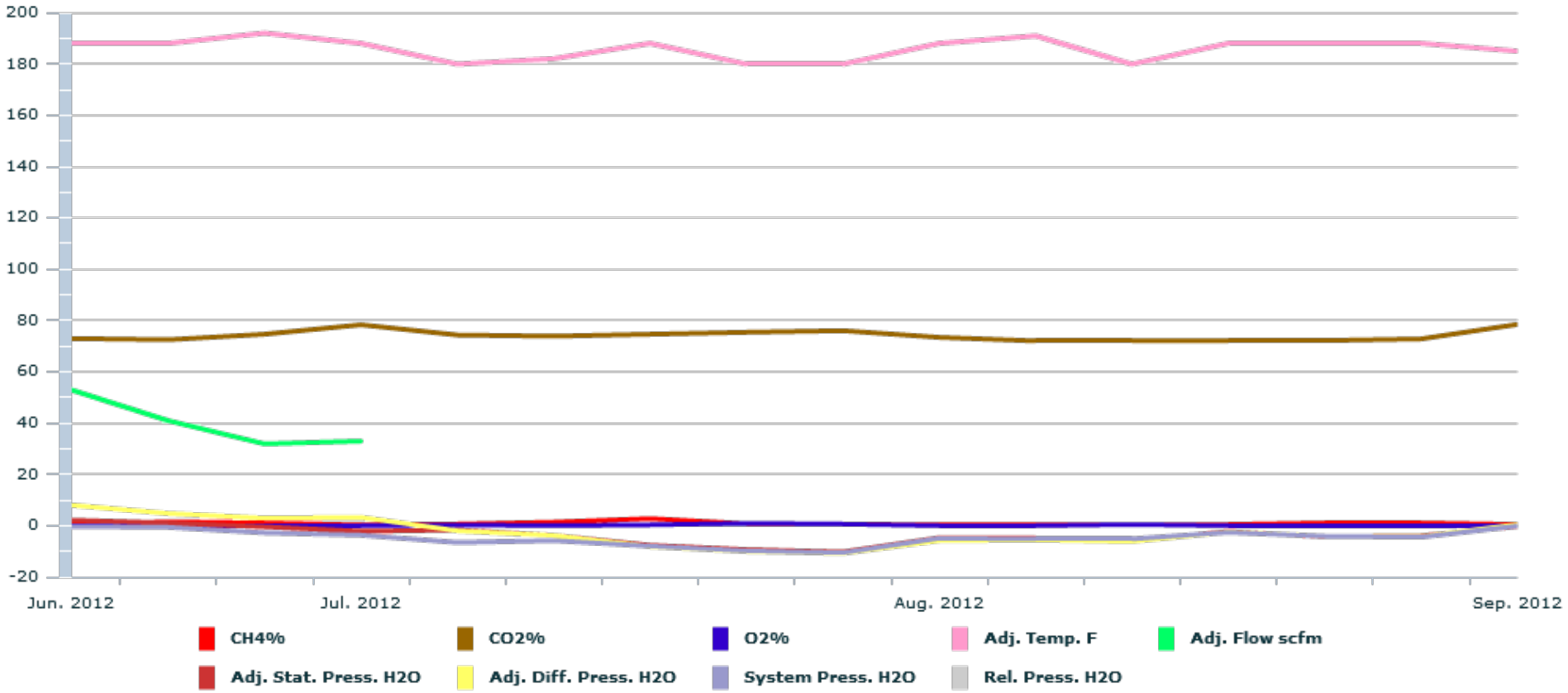


FIGURE 10