October 9, 2024

Luke LeMond
Site Manager
Solid Waste Program
State of Washington Dept. of Ecology
Central Regional Office
1250 West Alder St.
Union Gap, WA 98903-0009

Re: DTG Yakima – Agreed Order No. DE 21624 – Monthly Progress Letter – September

Dear Mr. LeMond:

In accordance with Section 7.3 of Agreed Order (AO) No. DE 21624, the following is a description of the actions taken during September 2024 to implement the requirements of this AO.

Activities:
On-site activities included weekly gas probe and every other week ambient monitoring. The once per month regulatory review meeting was also held on September 19, 2024 to assess conditions and the data. The data summary through September 2024 from Landfill Fire Control, Inc. (LFCI) is attached.

In response to Ecology's August 23, 2024 letter, DTG held a review meeting with Ecology on September 12, 2024 to discuss DTG's response and potential additional investigations and interim actions. The DTG response timeline was extended to October 15, 2024.

DTG surveyed the MTCA area on September 10, 2024 to capture baseline topography for suppressive cover thickness and settlement monitoring.

Parametrix agreed to a revised upper prediction limit approach and submitted the Q1 groundwater monitoring report on September 19, 2024.

Parametrix performed quarterly landfill gas monitoring on September 9, 2024.

Deviations from Plans (if any):
None.

Deviations Description from the Scope of Work and Schedule:
None.

All Data Received or Collected:
Ambient and gas probe data for gases and temperature were emailed, separately, to Ecology weekly after measurements were taken. Gas probe data was entered into the tracking spreadsheets and assessed by LFCI. The summary of the data has been included as an attachment.

The Q1 groundwater report and Q3 landfill gas monitoring report were submitted to Ecology.

Deliverables for the Upcoming Month:
Deliverables will include:

- Responses to Ecology comments to the Draft Limited RI Work Plan
- Weekly ambient and gas probe data
- October Progress Report
- Q2 groundwater report

Please contact me to discuss any of the above items.

Respectfully,

Ian Sutton
Director of Engineering
DTG Recycle
isutton@dtgrecycle.com

Enclosures: LFCI Data Update – July 2024

cc: mbrady@parametrix.com
steven.newchurch@co.yakima.wa.us

October 1st, 2024 LFCIPRJ-2023-001

Mr. Ian Sutton, Director of Engineering
DTG Recycle
P.O. Box 14302 Mill Creek, WA 98082

By email: isutton@dtgrecycle.com

Re: Monthly Data Assessment Report DTG Yakima Landfill Fire Incident – September 2024

Dear Mr. Sutton,

LFCI has prepared a monthly review and update of gas and temperature monitoring data that is being collected at the DTG Recycle Landfill Fire in Yakima, Washington. The update includes maps showing the spatial distribution of temperature, carbon monoxide, and oxygen within the monitoring area and presents the data collected, highlighting trends and interpreting the results.

Considering the available data, the oxygen suppression appears to be working, but the fire suppression response is slow on account of low biological activity within the landfill. Nevertheless, the highest observed temperatures at GP-3 continue to decline at a steady rate. Temperatures continue to decline throughout the hotspot area. Without additional intervention, normal background temperatures of about 122 F would be attained in roughly 2 years at current cooling rates.

The landfill gas composition data is also indicating that the subsurface smolder is becoming less and less active with CO, H2, VOC's and H2S all trending downward. There is a recent uptick in VOC's at T-3, possibly on account of increasing barometric pressure which is adding additional air incursion into the landfill. As other wells that increased have now dropped to previous low levels, LFCI expects the same response in T-3, but will continue to closely monitor to ensure this.

Plotting of the temperature data in plan view clearly shows that the area affected by fire has markedly decreased over time. Based on the available data, LFCI believes that a small smolder continues to be active in close proximity to GP-3, and that the rate of combustion of the smolder is steadily decreasing, however slowly. Due to the drop in temperature and few wells recording high temperatures, LFCI has changed the color coding of the spatial maps to better represent the activity within the landfill cell.

Based on this, LFCI recommends that monitoring continue on a weekly basis until it can be shown that CO levels in all locations have decreased to below 200ppm, once corrected for cross sensitivity effects. At that time, monitoring can be decreased for prevention purposes. Given the slow rate of response, additional intervention should be considered at this time. Given the geometry of the landfill, overhaul is not a viable option. Therefore, focused injection grouting on the known hot spot area around T-1 is recommended.

A thermal infrared survey was recommended in advance of any further work to assess if the underground fire is leaving a surface thermal indication. The thermal scan identified anomalies that appear to be about 15 degrees F higher than background. Detailed mapping of those thermal anomalies is recommended to help spatially target further investigation efforts.

We trust that this report provides the information you require, and should you need anything else please don't hesitate to contact the undersigned.

Sincerely,

LANDFILL FIRE CONTROL INC.

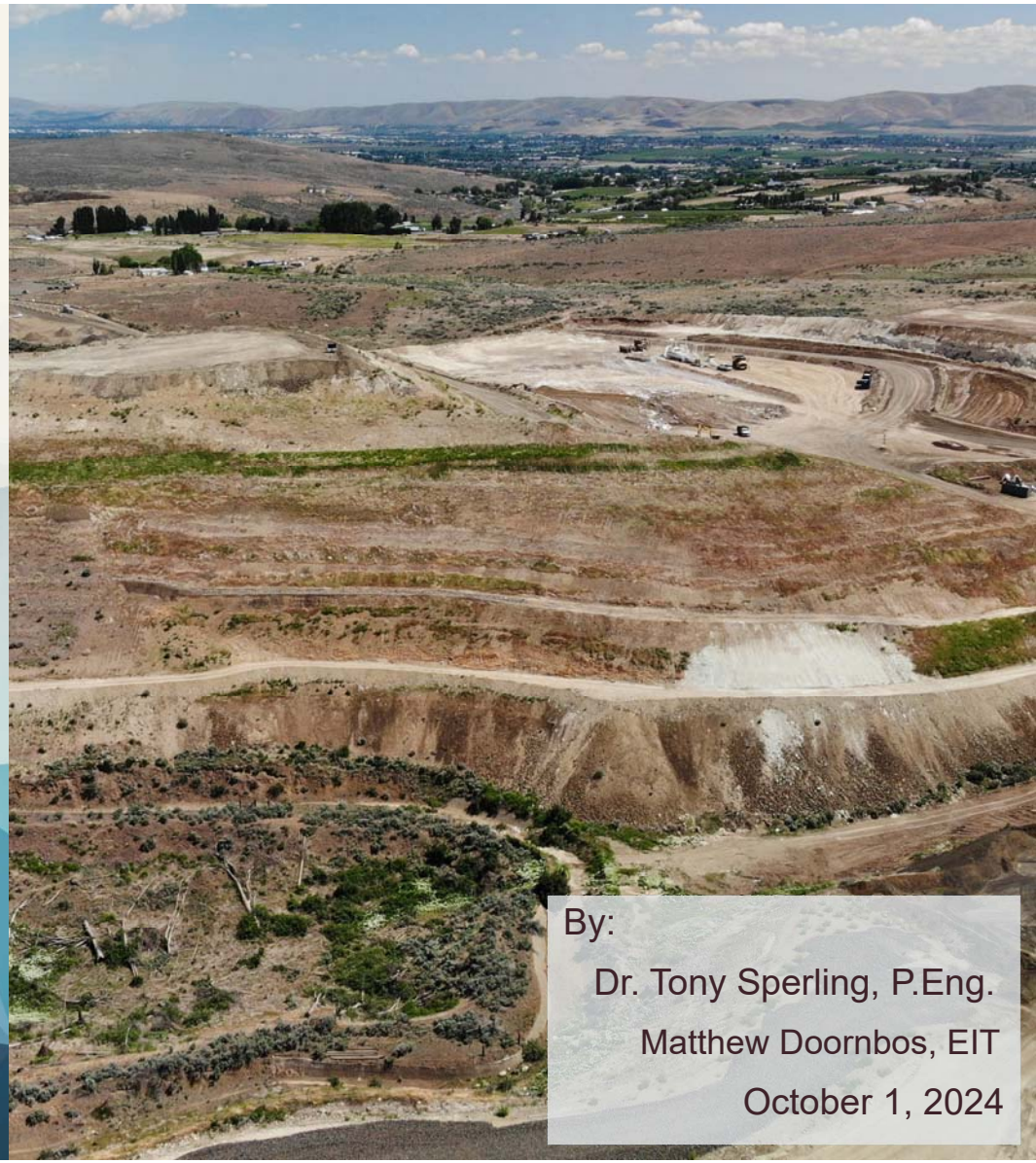
Dr. Tony Sperling, P.Eng.
President

October 1, 2024

DTG LPL LANDFILL FIRE INVESTIGATIONS AND MITIGATION

Monthly Monitoring Data Review

September 2024



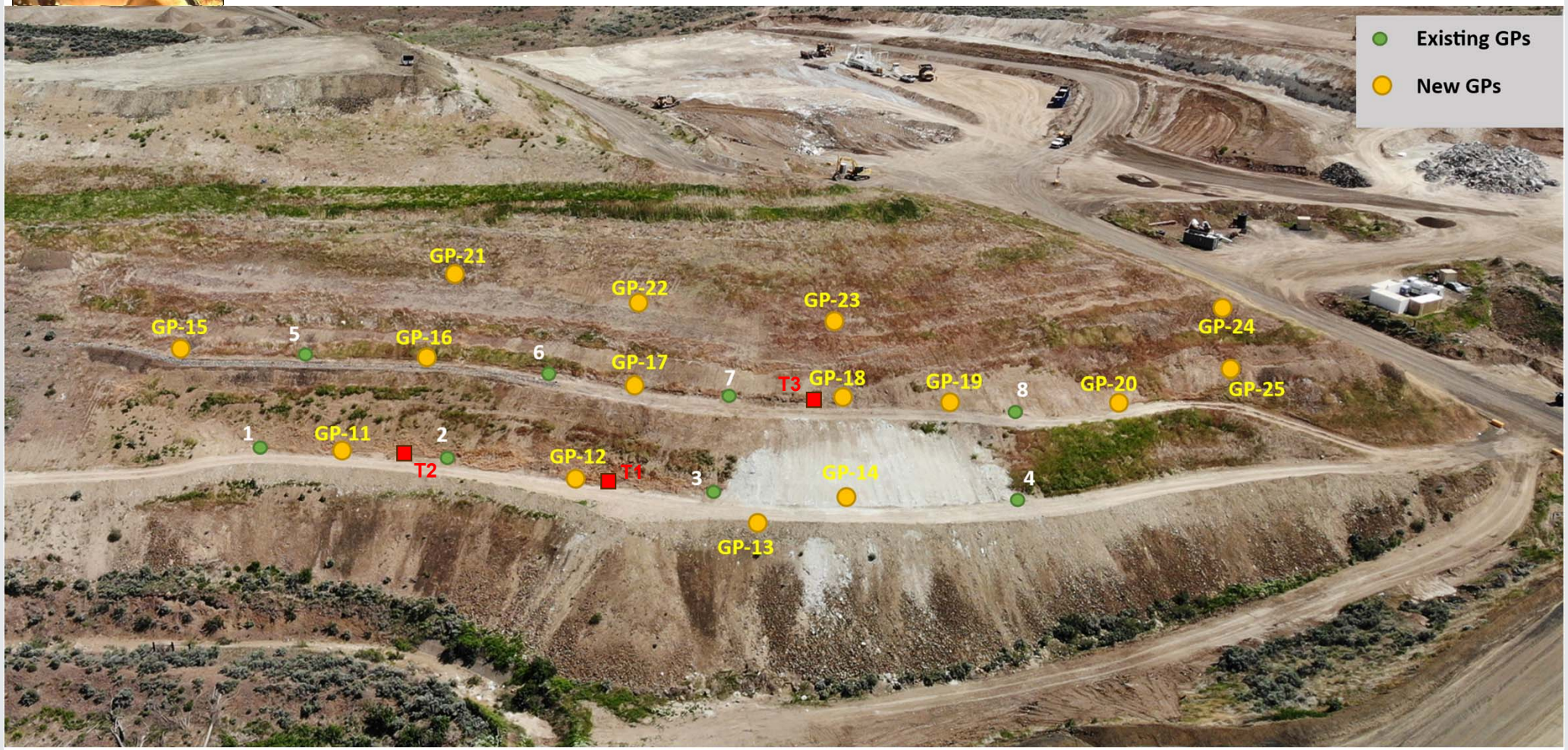
By:

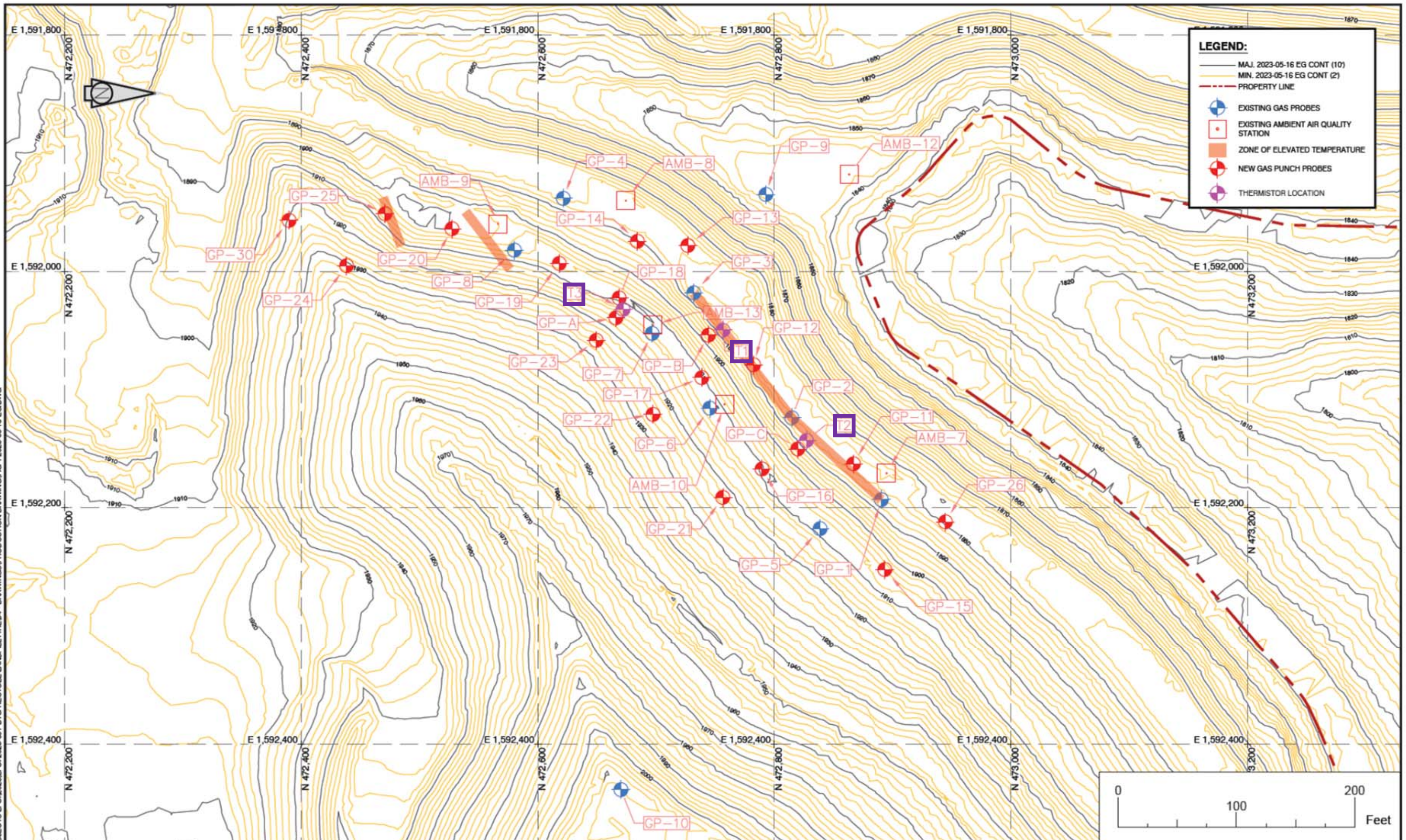
Dr. Tony Sperling, P.Eng.

Matthew Doornbos, EIT

October 1, 2024

Contents


LANDFILLFIRE.com
Existing GPs
New GPs
GP-21
GP-22
GP-23
GP-15
5
GP-16
6
GP-17
7
T3
GP-18
GP-19
8
GP-20
GP-24
GP-25
1
GP-11
2
T2
GP-12
T1
3
GP-14
4
GP-13



PDF GENERATED by: Eduardo Kugler Pamplona \ 10/5/2023 6:02 AM
X:\LANDFILL\FIRECONTROL\PROJECTS LFC\2023\LFCI-2023-001 DTG RECYCLE LANDFILL FIRE\04 - DRAWINGS\PRODUCTION DRAWING\FIG 1 2023-05-16 EG.DWG

SPERLING HANSEN ASSOCIATES

Landfill Services Group
- Landfill Siting
- Design & Operations Plans
- Landfill Closure
- Environmental Monitoring

#8 - 1225 Keith Road East
North Vancouver, B.C. V7J 1J3
Phone: (604) 986-7723

SEAL

No.	DATE	REVISIONS	DRAWN	CHK'D	APP'D

CLIENT:

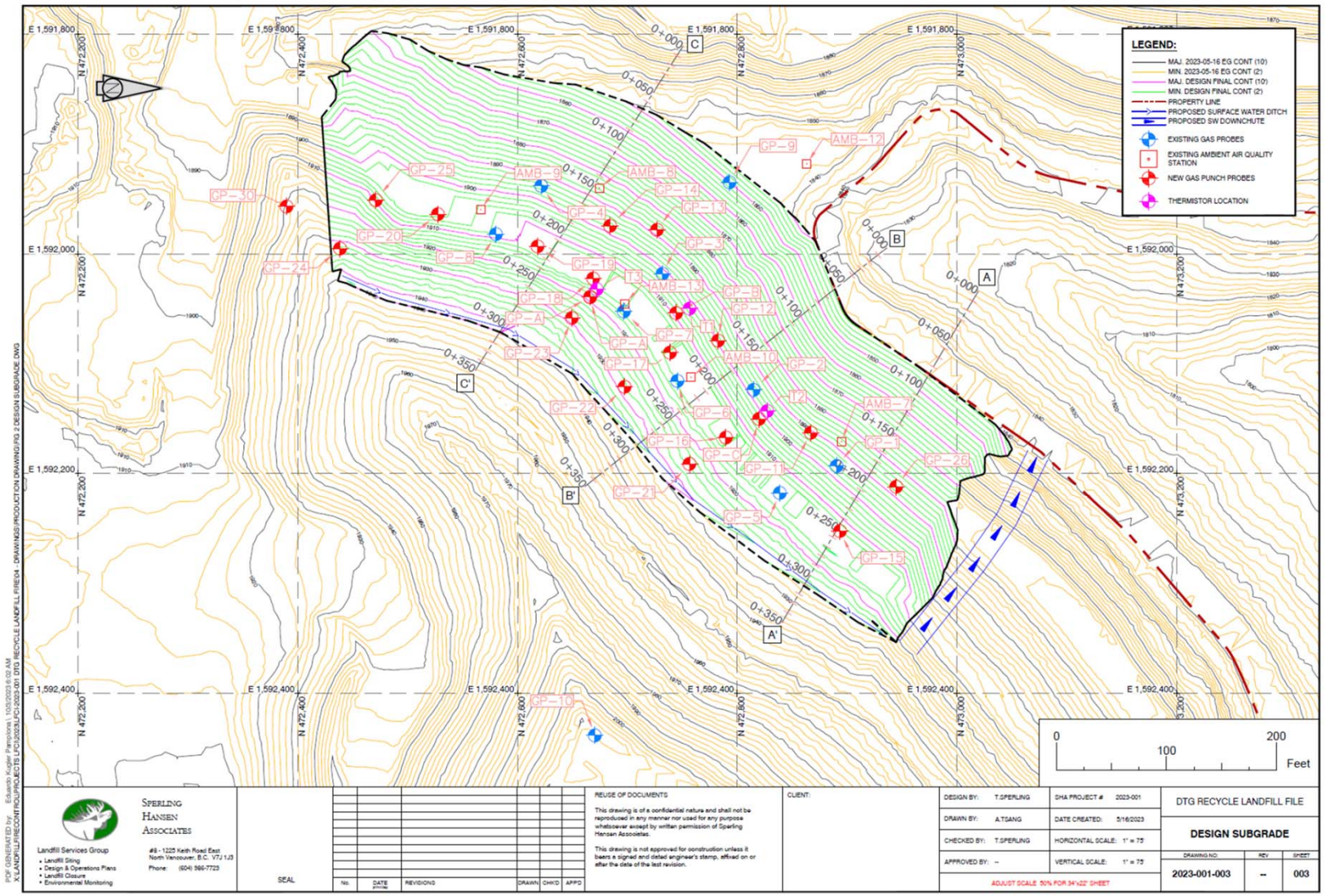
DESIGN BY:	T.SPERLING	SHA PROJECT #	2023-001
DRAWN BY:	A.TSANG	DATE CREATED:	5/16/2023
CHECKED BY:	T.SPERLING	HORIZONTAL SCALE:	1" = 75'
APPROVED BY:	--	VERTICAL SCALE:	1" = 75'

ADJUST SCALE 50% FOR 34"x22" SHEET

DTG RECYCLE LANDFILL FILE

EXISTING TOPOGRAPHY 2023-05-16

DRAWING NO:	REV	SHEET
2023-001-001	--	001



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X:\LANDFILL\RECONTROL\PROJECTS UPC\2023\UPC\2023-001 DTG RECYCLE LANDFILL R\RE04 - DRAWINGS\PRODUCTION DRAWING\FIG 2 DESIGN SUBGRADE.DWG

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No.	DATE yy/mm/dd	REVISIONS	DRAWN	CHK'D	APP'D

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DRAWN BY:	A.TSANG	DATE CREATED:	5/16/2023
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ADJUST SCALE 50% FOR 34"x22" SHEET

DTG RECYCLE LANDFILL FILE

DESIGN SUBGRADE

DRAWING NO.	REV	SHEET
2023-001-003	--	003

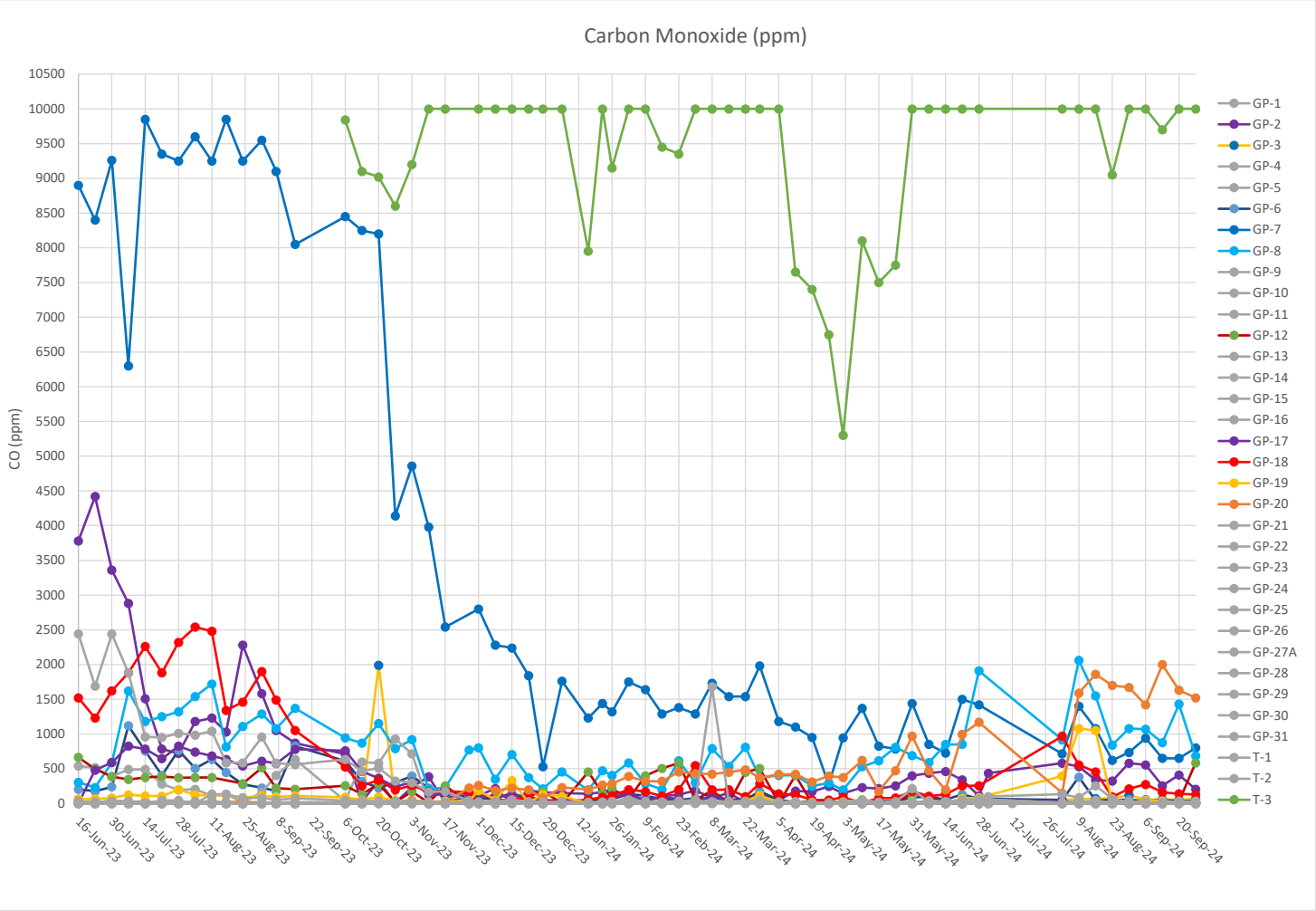
Carbon Monoxide

August continued to show high CO concentrations at T-3 with levels fluctuating around 10,000 ppm.

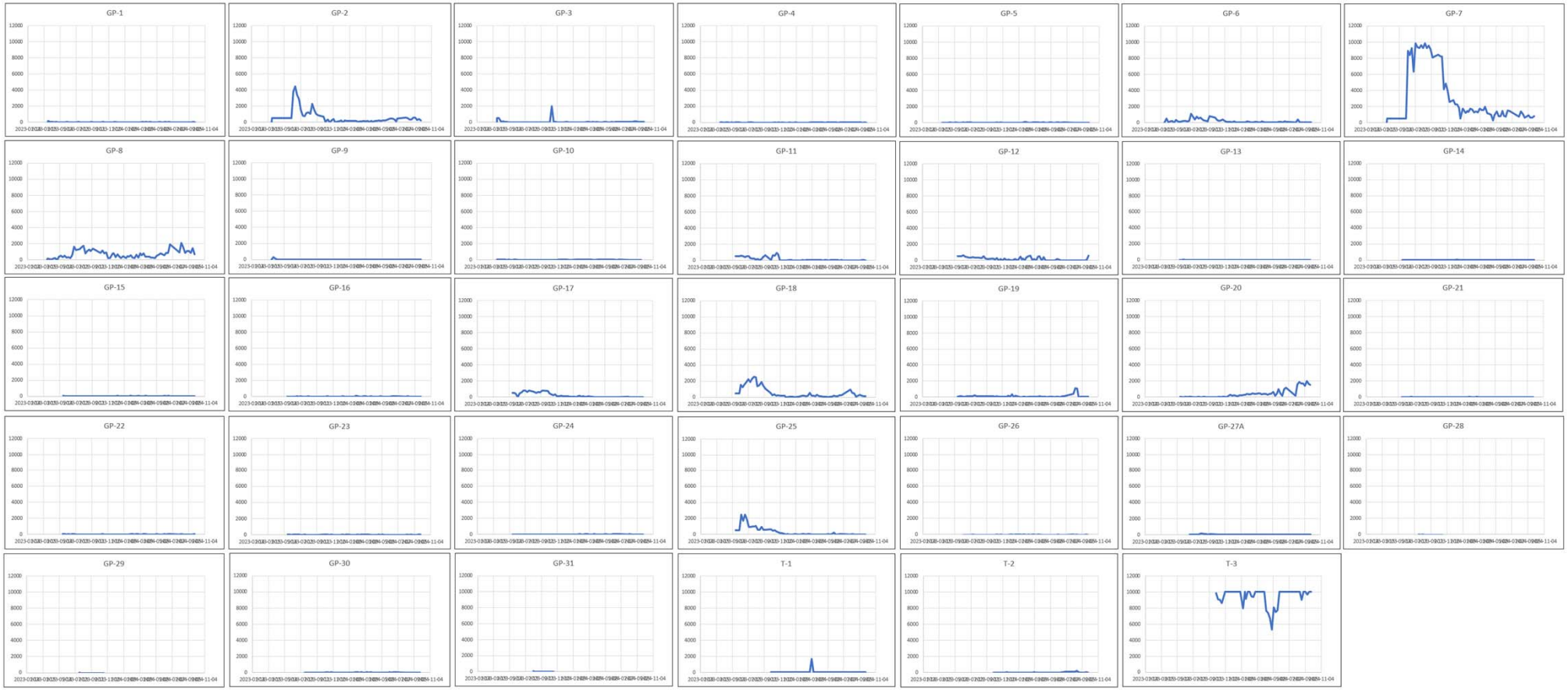
Some of the lower concentration wells have been measured above 1500ppm again, particularly GP-20 which is associated with the southern smolder zone. LFCI to monitor closely.

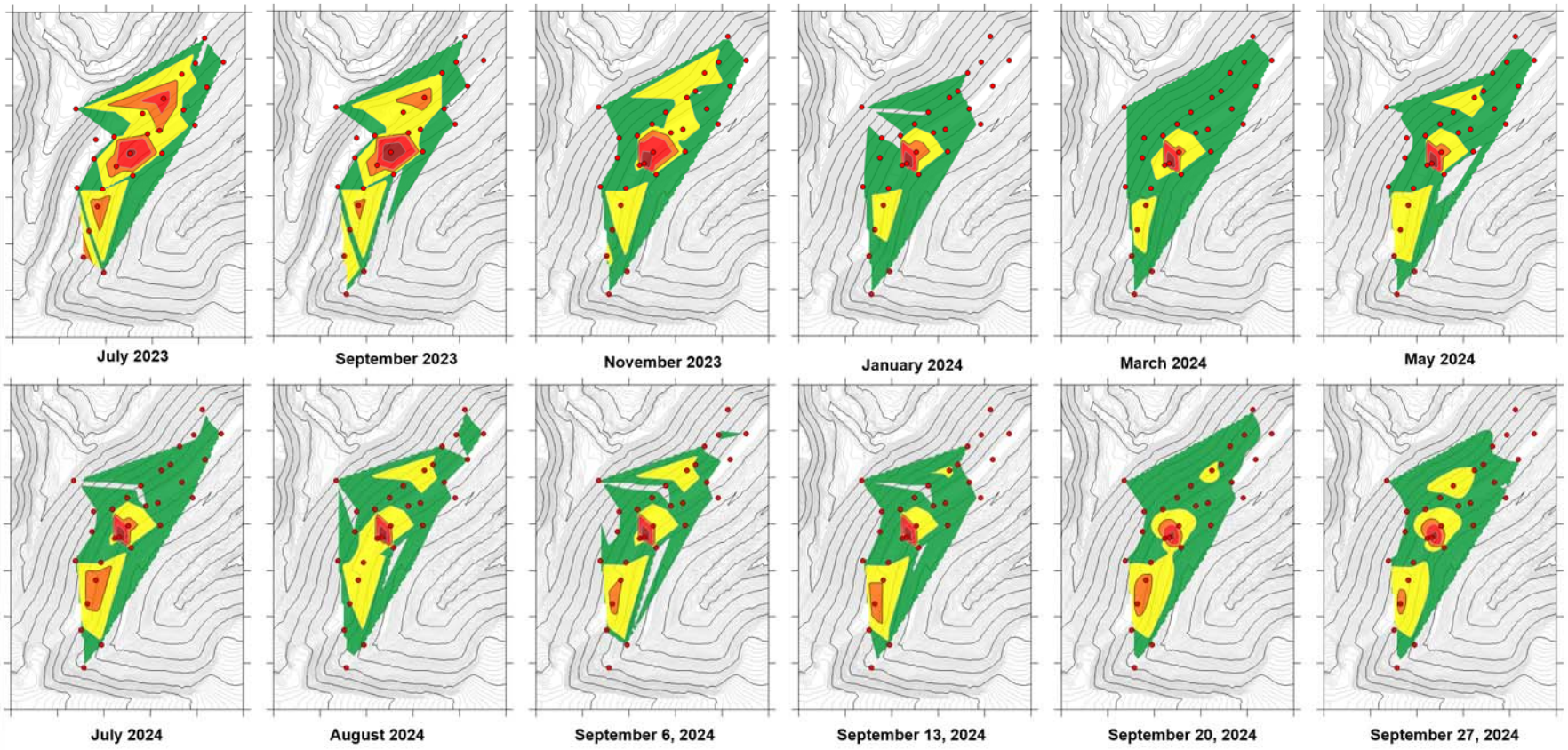
As mentioned previously, additional instrumentation around the southern smolder zone is recommended.

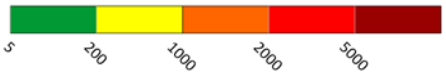
An infra-red scan before sunrise was recommended to determine if active fire areas can be delineated. The infrared identified some venting locations.



CO Levels by Individual Wells







- Data taken from first monitoring event of each month unless noted otherwise
- Data was linearly interpolated between data points
- Datapoints (probe locations) represented in red
- CO levels are measured in ppm
- Ground contours are of existing ground at beginning of project, with design contours added for after addition of fill

No.	DATE yr/m/day	REVISIONS	DRAWN	CHK'D	APP'D
1	2024/10/01	ISSUED FOR REVIEW	MD	TS	TS

DESIGN BY:	T. SPERLING
DRAWN BY:	M. DOORNBOS
DATE CREATED:	2024/10/01
SHA PROJECT #	LFCI-2023-001

DTG RECYCLE LANDFILL FIRE

MONTHLY MONITORING SUMMARY SPATIAL MAPS - CO

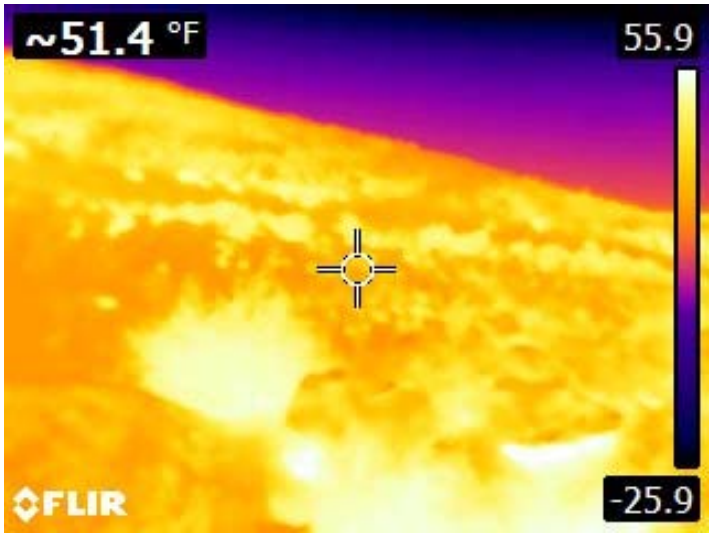
DRAWING NO.	REV	SHEET
LFCI-2023-001-09-CO	1	1

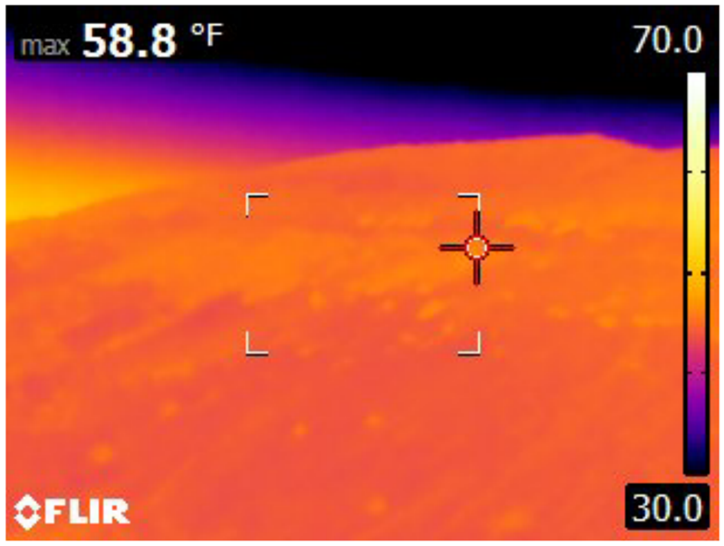
Hand held Infrared Monitoring

Two rounds of hand held FLIR imaging were conducted on 2024/09/17 and 2024/10/01. Both sets of imaging identified thermal anomalies.

In the Sept. 17 round of monitoring, the camera was not set to auto detect the hottest pixel in the image. On repeating the survey on October 17th, it can be seen that the hottest zones where smolder is venting are about 15 deg. F warmer (eg. 58.8 F yellow white vs. background of about 45 deg F (orange).

Following up to precisely locate the vents by close up sensing is recommended.





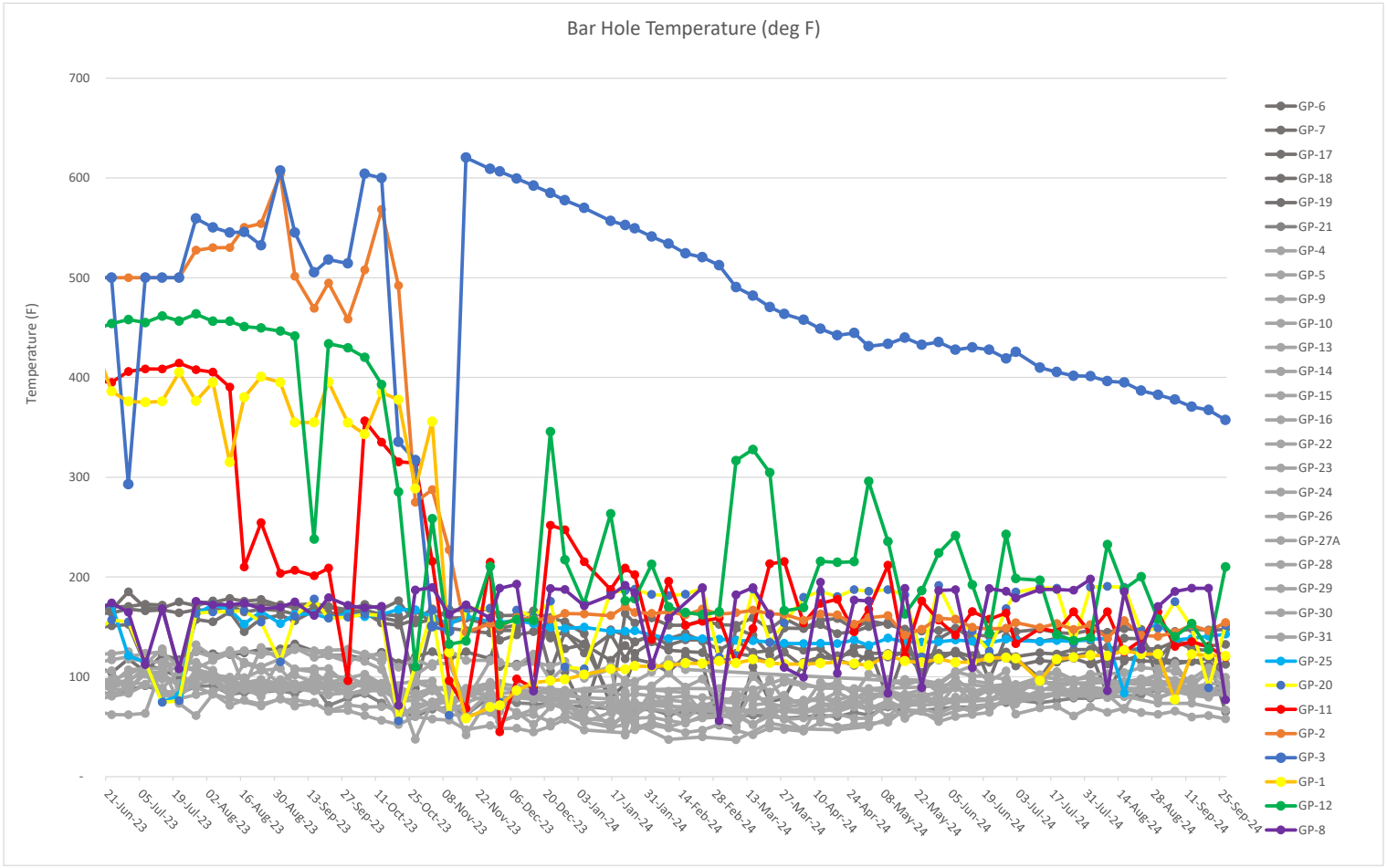
Temperature (F)

Temperature has continued to decrease in GP-3, down 25F through September to 357F. The linear cooling trend continues.

This matches with higher temperatures in T-1 at 30' below ground, currently around 296F.

All other wells have remained low, with some variability possibly caused by atmospheric pressure swings.

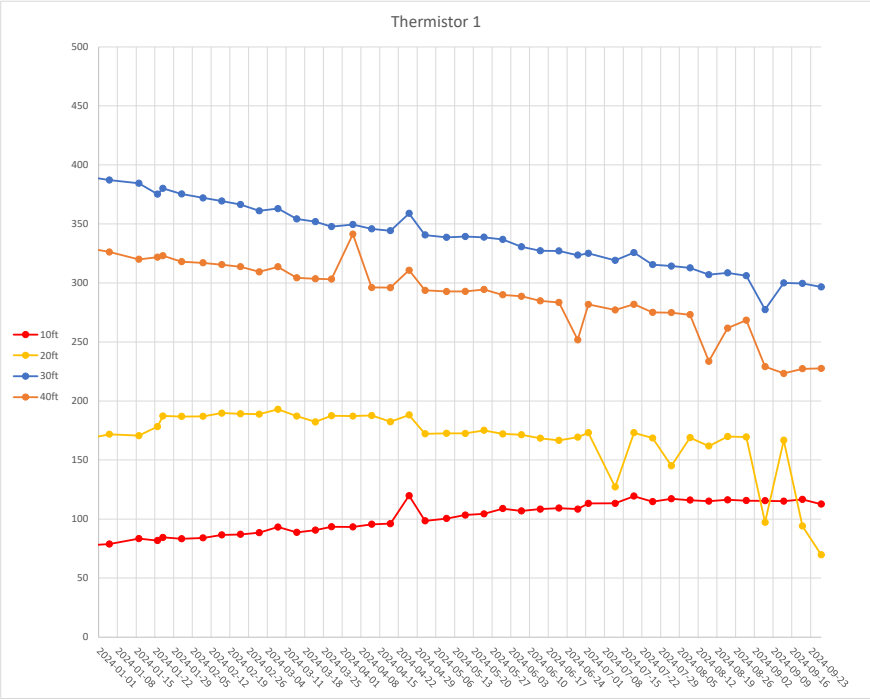
GP-12 (green) seems to be especially susceptible to atmospheric pressure.

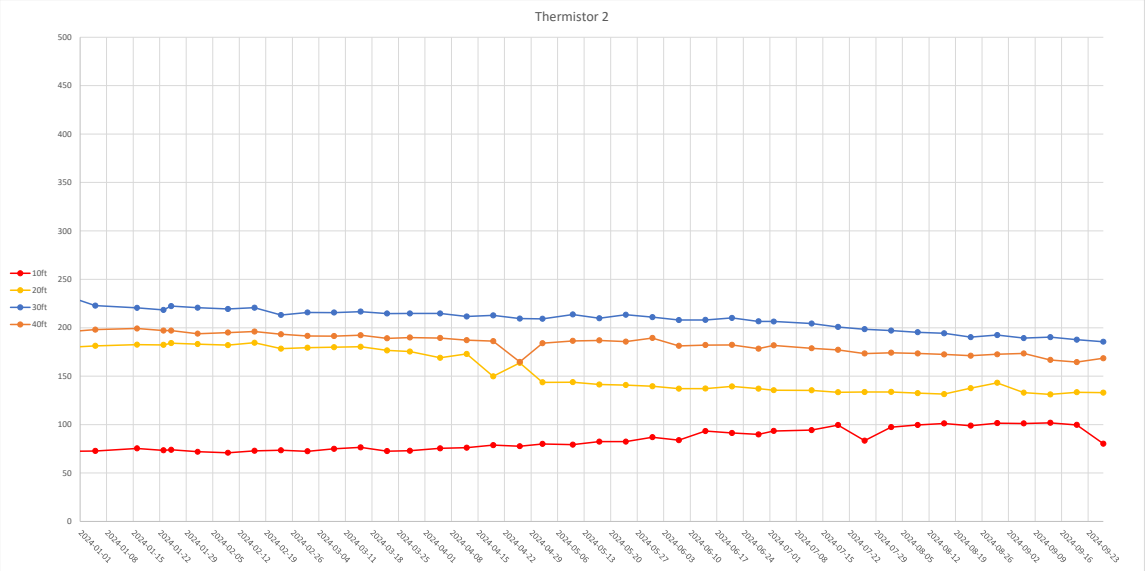


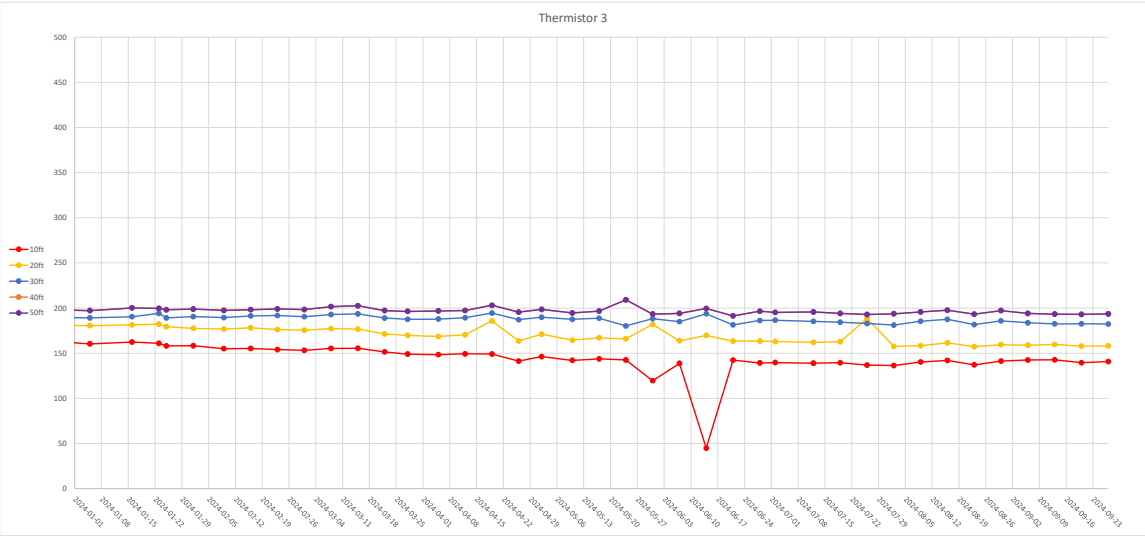
Thermistor Temperatures

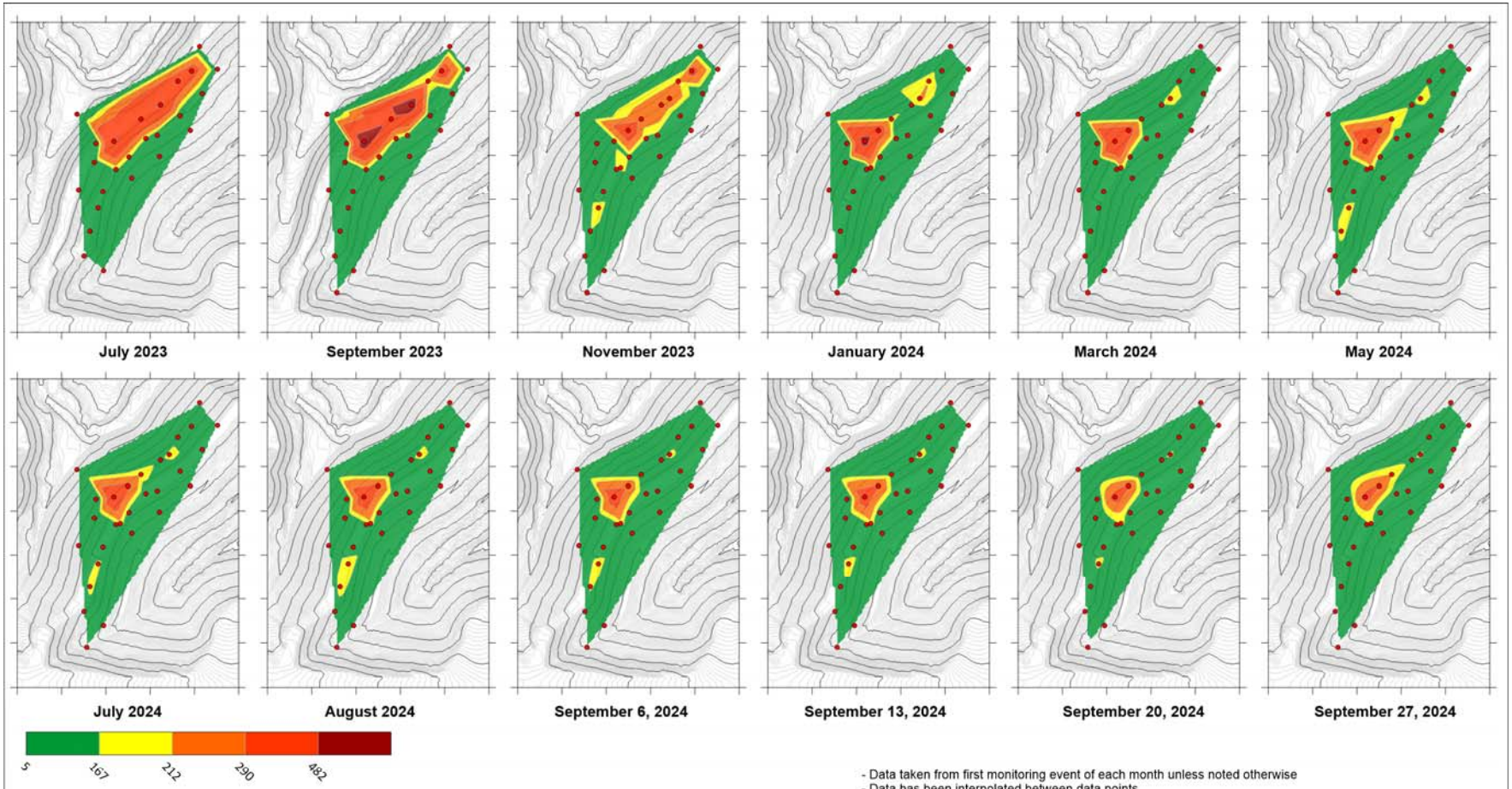
Thermistor temperatures mostly stable, with levelling trend continuing. Will keep a close eye on T-1 to ensure no major changes. Noted that the deeper measurement of 20ft below surface is cooler than measurements at 10ft depth.

Rate of thermal decrease is very slow, 50 degrees every 4 months. We project about 2 years to get to desired baseline levels around 122F without additional suppression.









- Data taken from first monitoring event of each month unless noted otherwise
- Data has been interpolated between data points
- Datapoints (probe locations) represented in red
- Temperatures are measured in Degrees F
- Ground contours are of existing ground at beginning of project, with design contours added for after addition of fill

No.	DATE yr/m/day	REVISIONS	DRAWN	CHK'D	APP'D
1	2024/10/01	ISSUED FOR REVIEW	MD	TS	TS

DESIGN BY:	T. SPERLING
DRAWN BY:	M. DOORNBOS
DATE CREATED:	2024/10/01
SHA PROJECT #	LFCI-2023-001

DTG RECYCLE LANDFILL FIRE

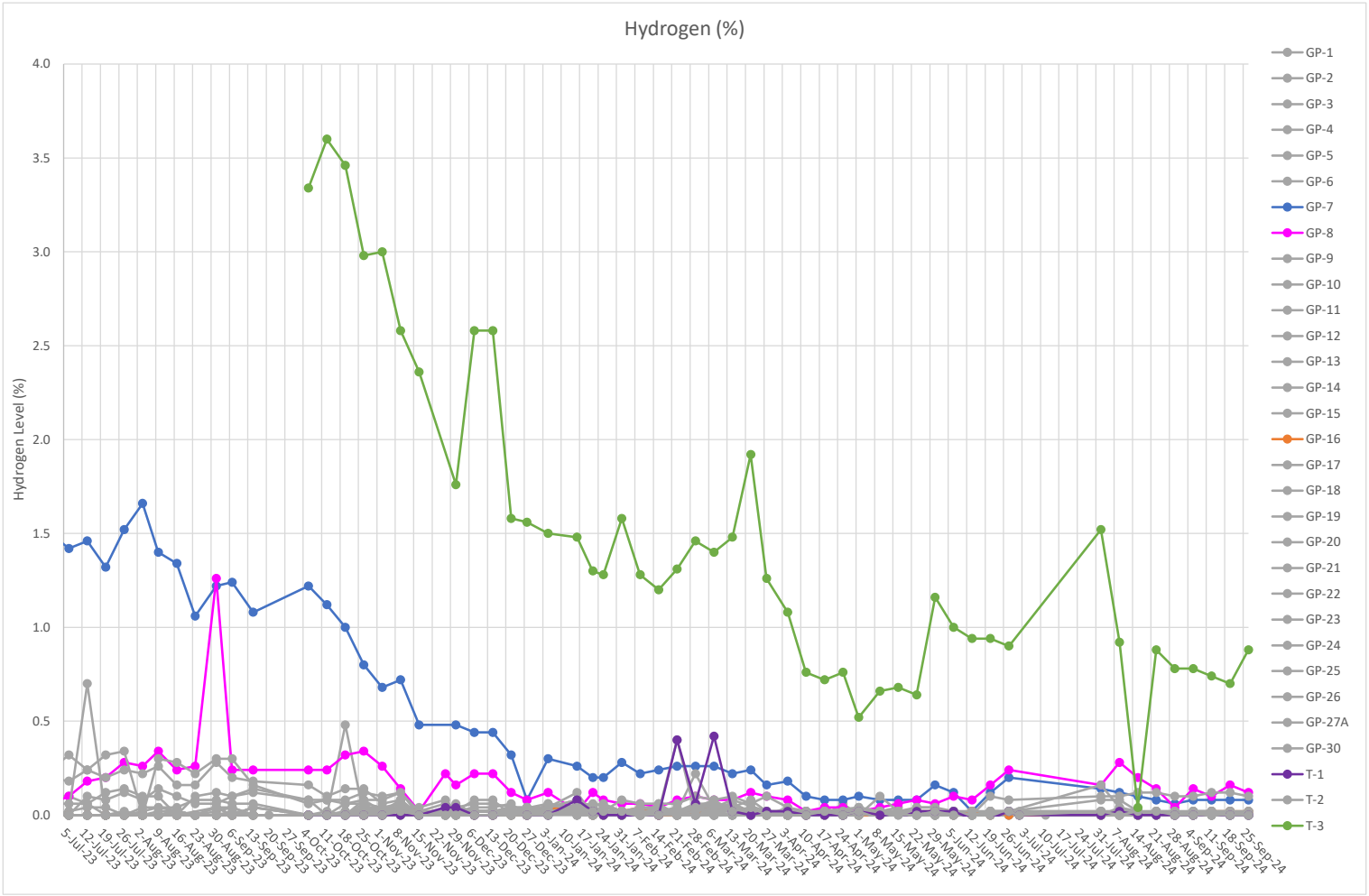
MONTHLY MONITORING SUMMARY SPATIAL MAPS - TEMPERATURE

DRAWING NO.	REV	SHEET
LFCI-2023-001-09-TEMP	1	1

Hydrogen

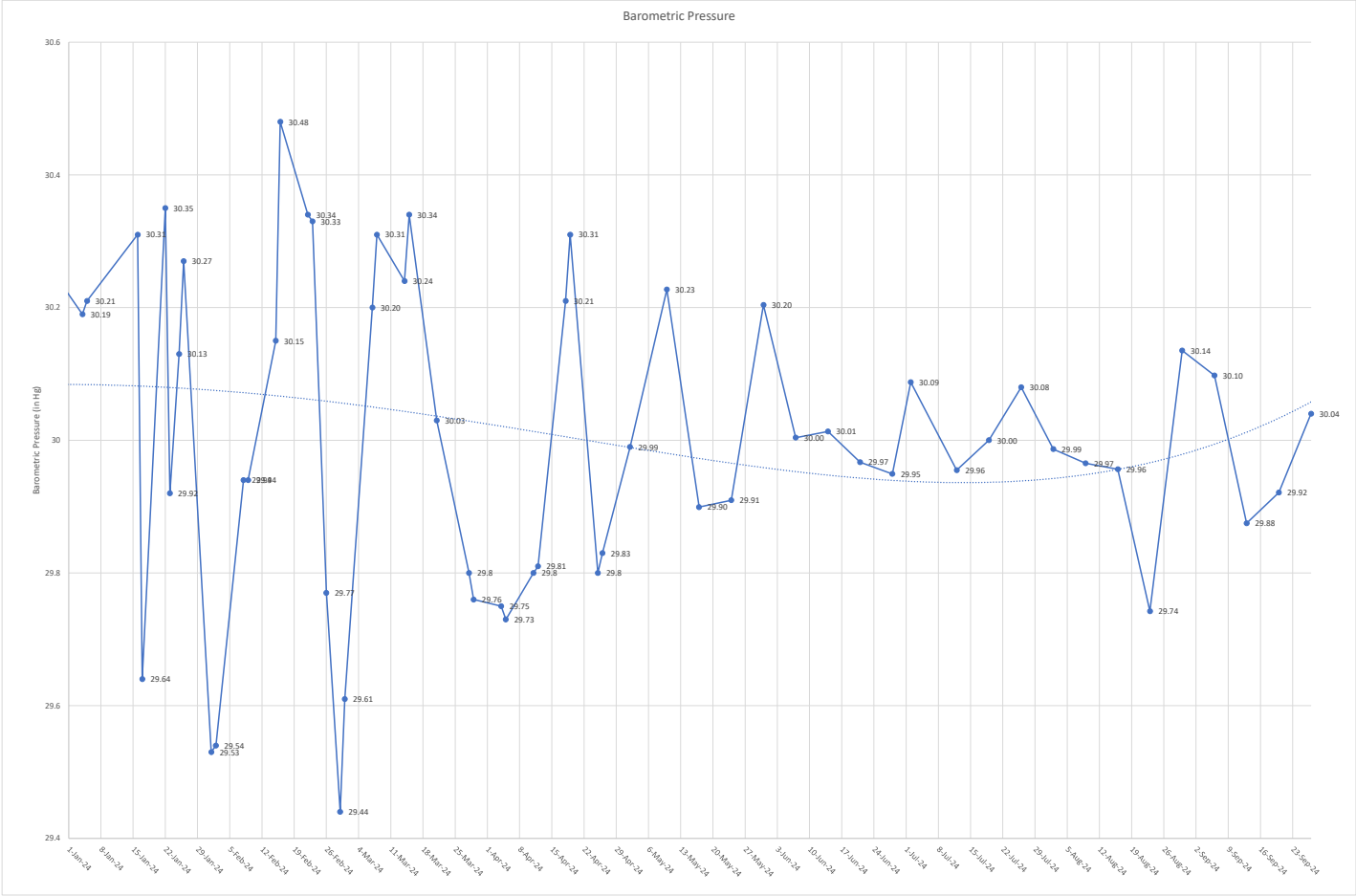
Hydrogen has remained stable around 0.8% in T-3 since mid August.

Hydrogen remains very low in all other wells. Production of H_2 is often observed with smoldering waste. LFCI believes that the level of H_2 dropping indicates that the fire is less active.



Barometric Pressure

The site observed large swings in the barometric pressure over the last two weeks. This has caused spikes in some datasets.

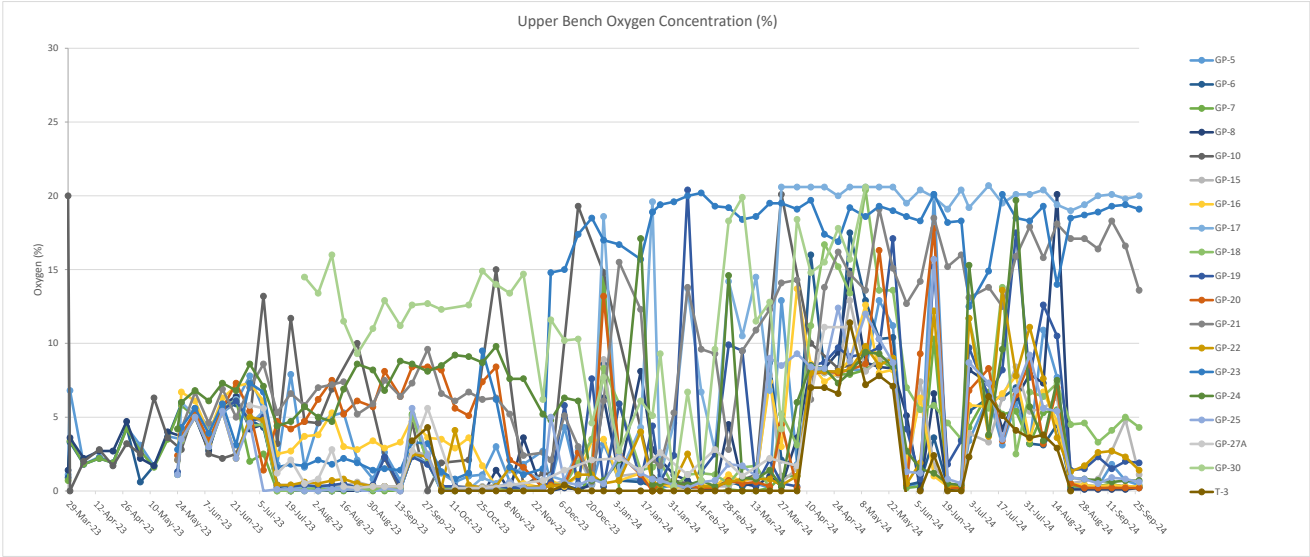


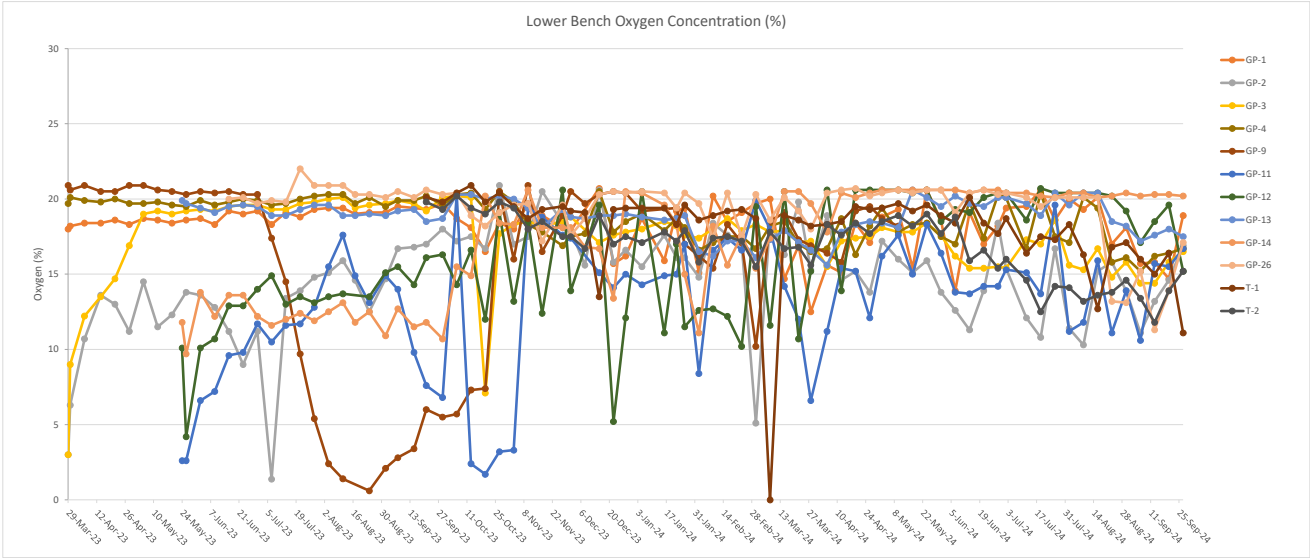
Oxygen

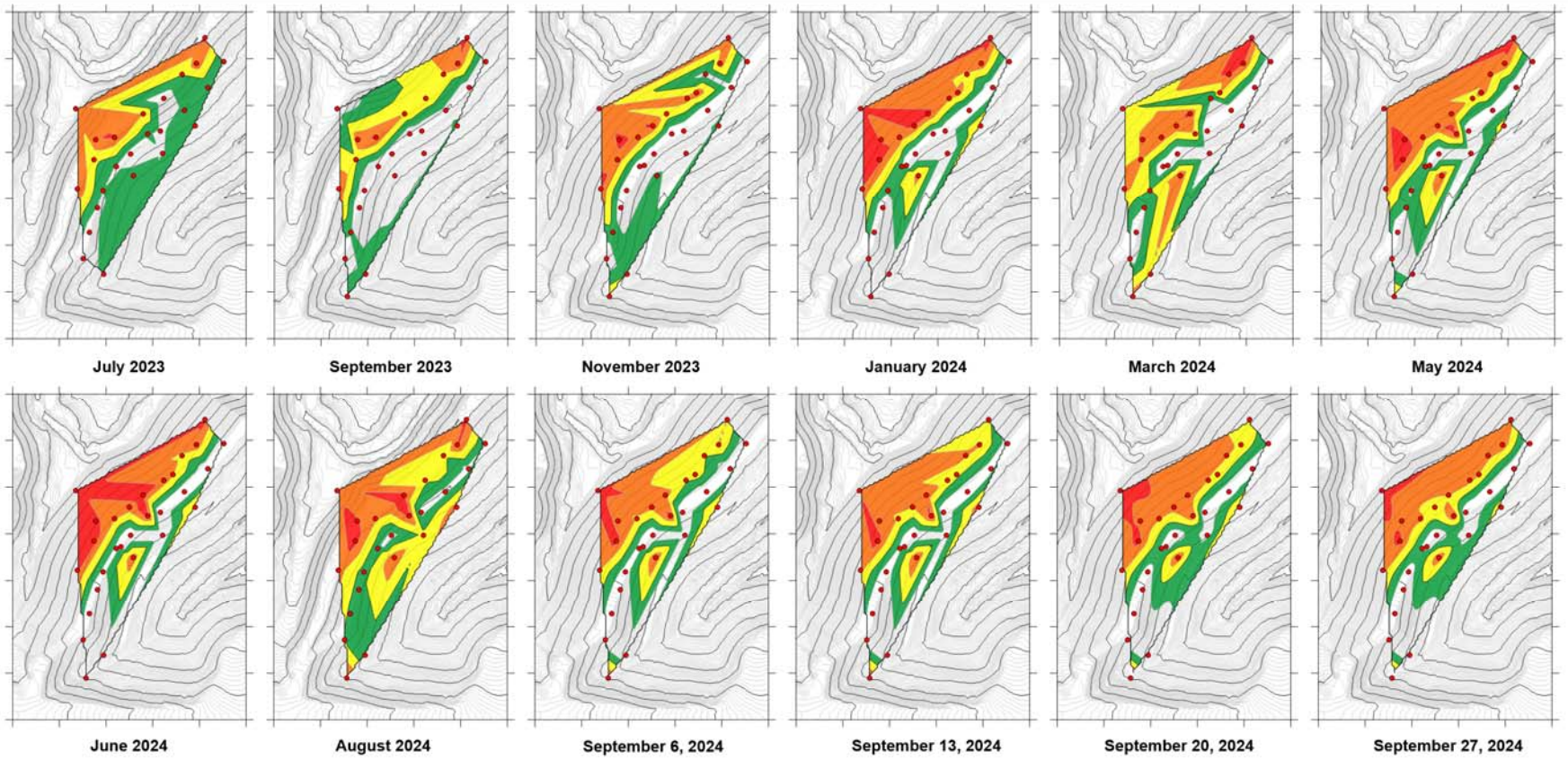
The oldest portion of the landfill is likely relatively inert and biologically inactive, producing very little methane. As a result, the pore space is full of atmospheric air.

Some GPs likely susceptible to swings in pressure – LFCI believes this is causing the spikes. This theory fits with the large pressure swings over the last two weeks of data in August.

Noted that higher levels of oxygen in GP-9 (>20%) are causing the spatial maps to be somewhat skewed.







- Data taken from first monitoring event of each month
- Data was linearly interpolated between data points
- Datapoints (probe locations) represented in red
- O2 levels are measured in % composition
- Ground contours are of existing ground at beginning of project, with design contours added for after addition of fill

No.	DATE yr/m/day	REVISIONS	DRAWN	CHK'D	APP'D
1	2024/10/01	ISSUED FOR REVIEW	MD	TS	TS

DESIGN BY:	T. SPERLING
DRAWN BY:	M. DOORNBOS
DATE CREATED:	2024/10/01
SHA PROJECT #	LFCI-2023-001

DTG RECYCLE LANDFILL FIRE

MONTHLY MONITORING SUMMARY SPATIAL MAPS - O2

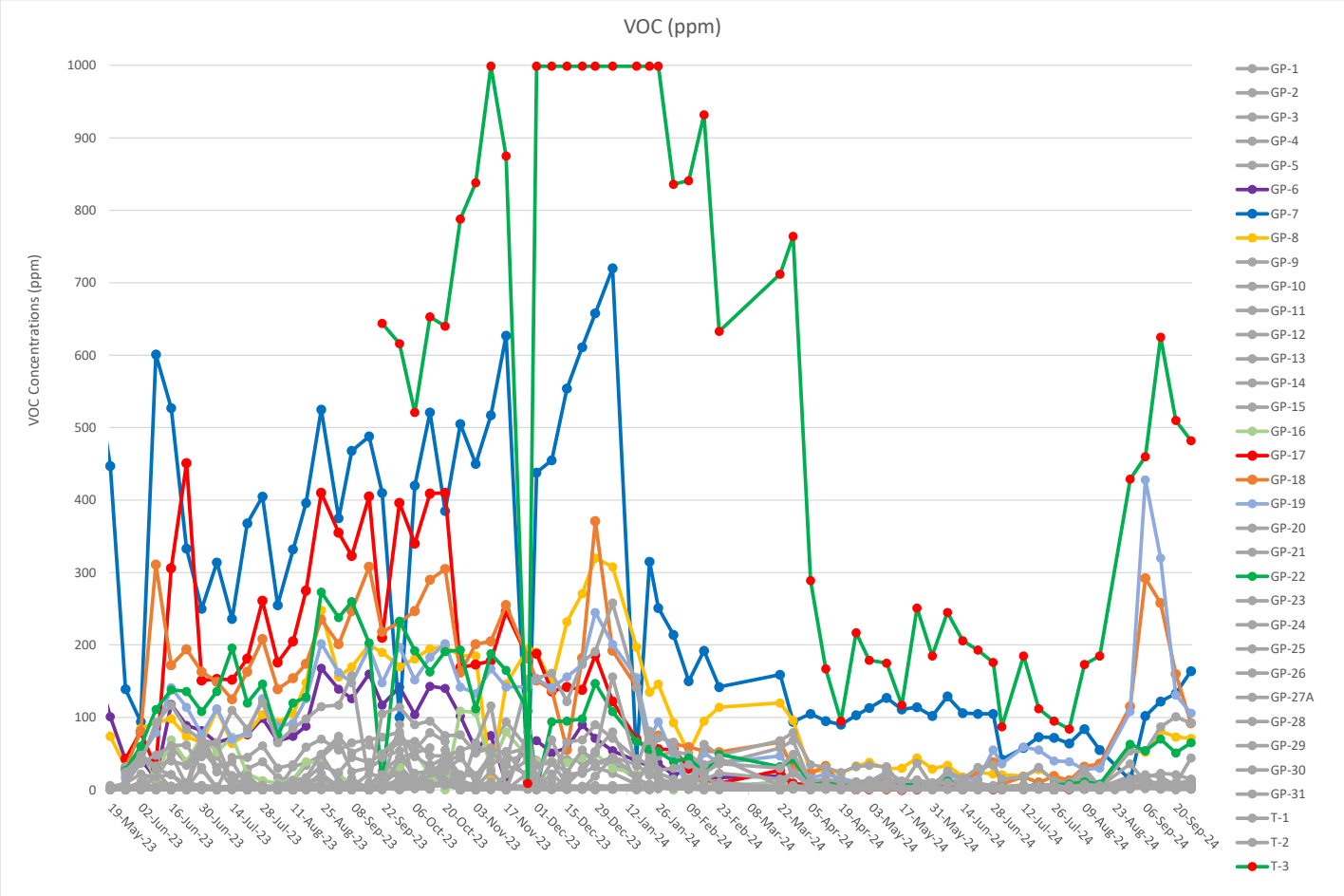
DRAWING NO.	REV	SHEET
LFCI-2023-001-09-O2	1	1

Volatile Organic Compounds

Increase seen in August has now decreased somewhat. Overall, levels continue to drop.

VOC's in T-3 shot up in mid August, 2024 but are again declining.

LFCI is monitoring closely to ensure any negative trends are caught early.

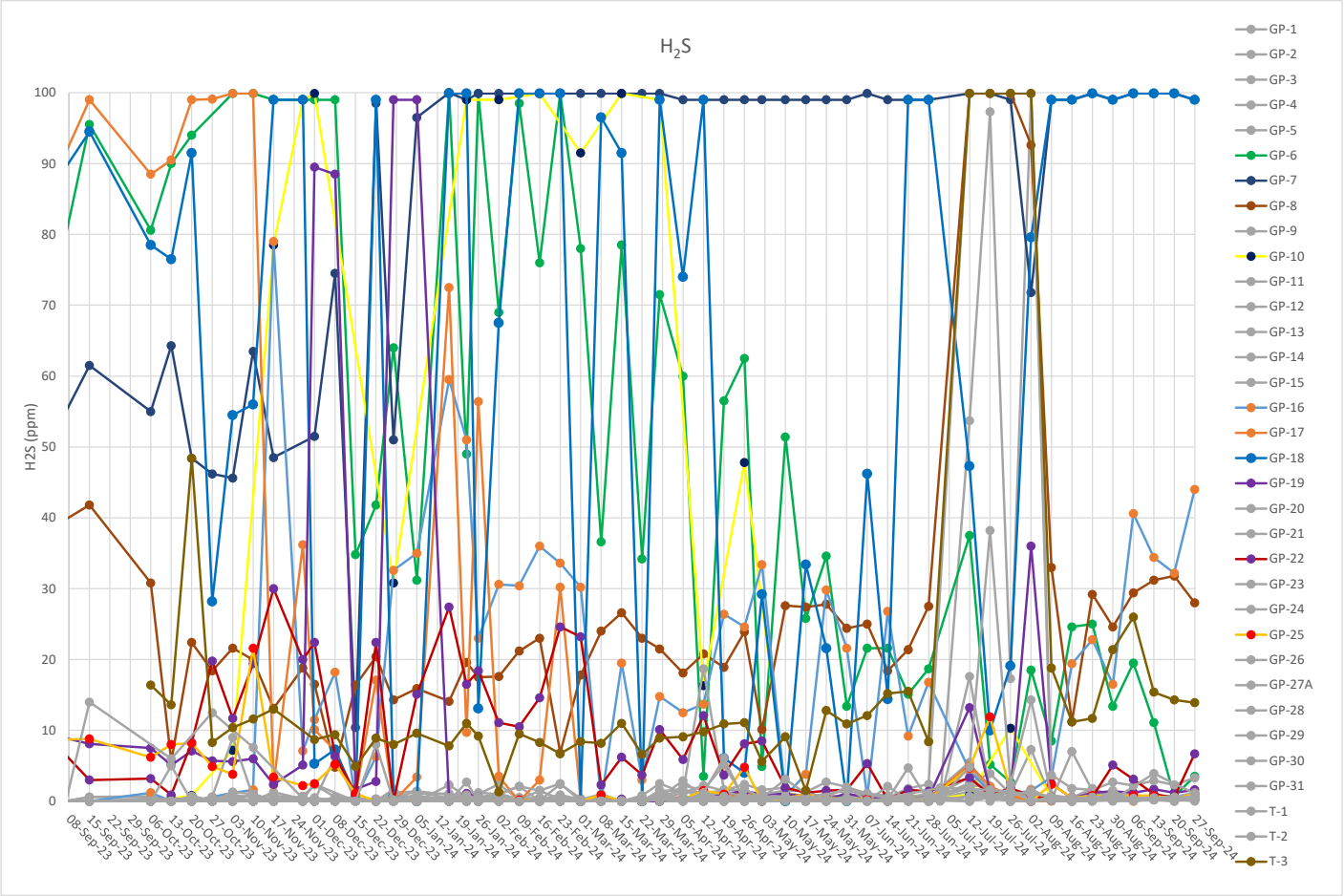


Hydrogen Sulfide

H_2S data continues to be noisy, likely affected by atmospheric pressure fluctuation. Only one well (GP-18) was measured as notably high during last week's monitoring event.

GP-18 is in the area that LFCI believes gases are venting.

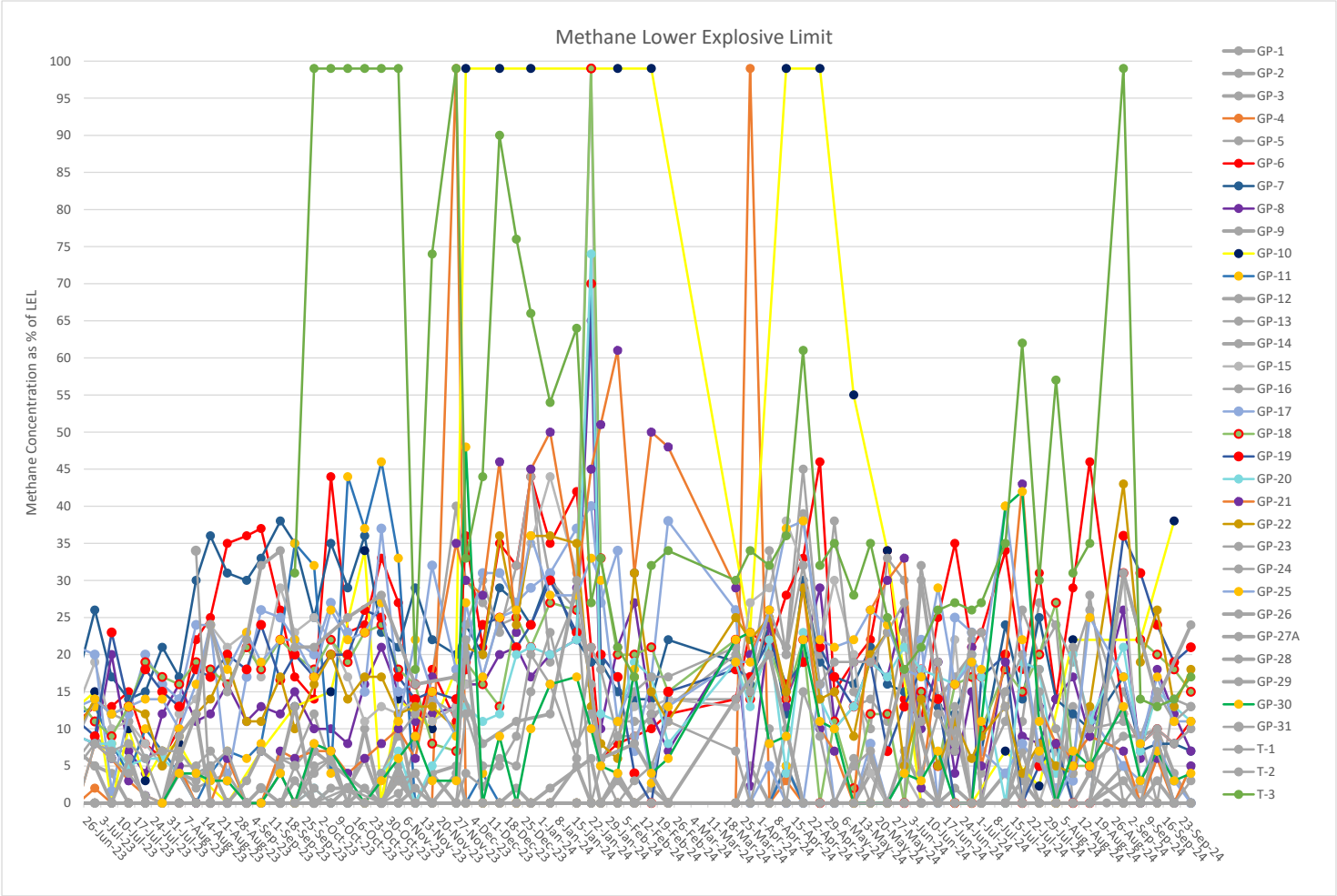
As mentioned previously, it is possible that the H_2S sensor is being impacted by CO cross interference.



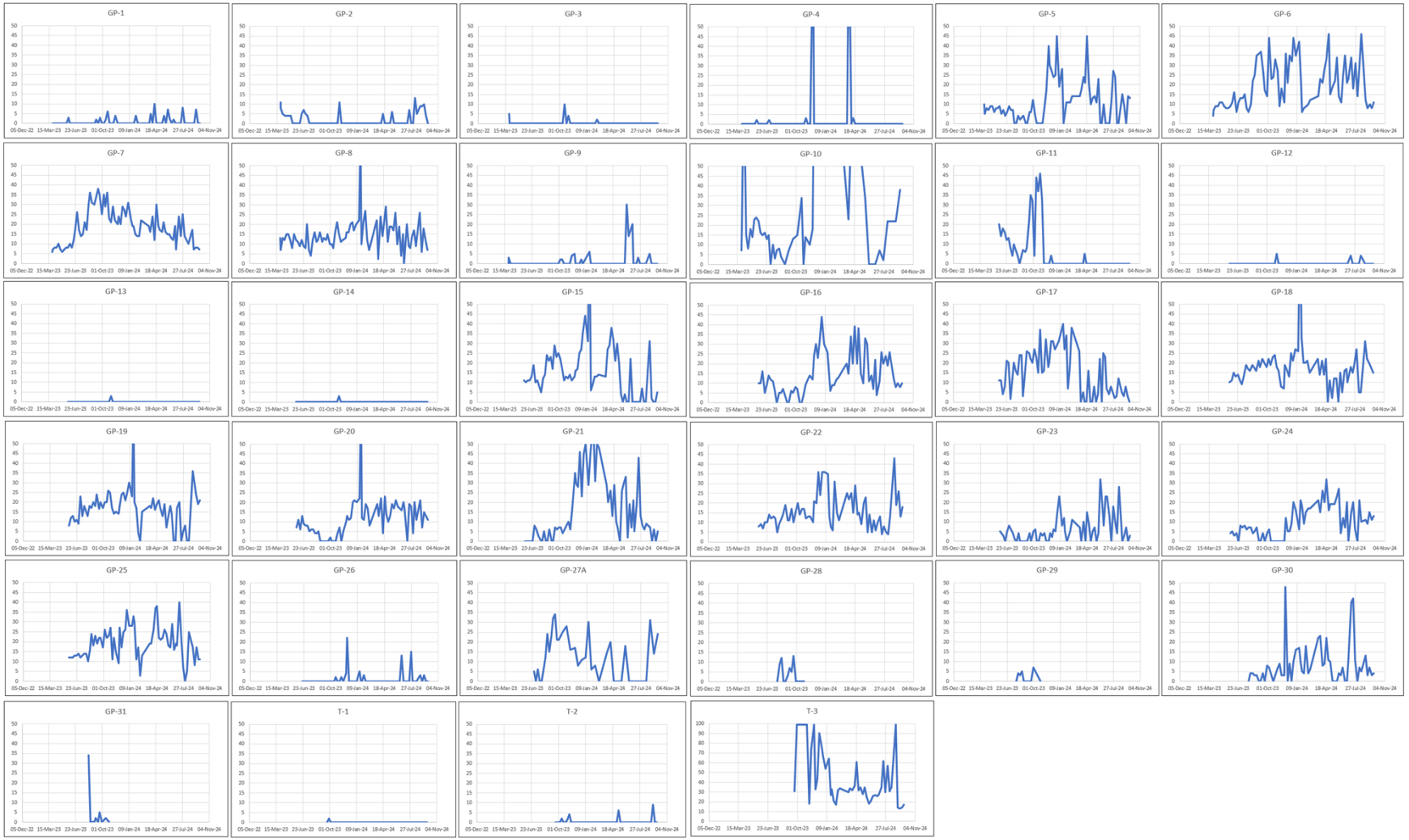
Lower Explosive Limit

Many data points fluctuating wildly – methane composition is a better indicator of levels within the landfill.

Large increase in LEL over last couple weeks. LFCI suspects that this is linked to the large pressure swings.



LEL for individual GP

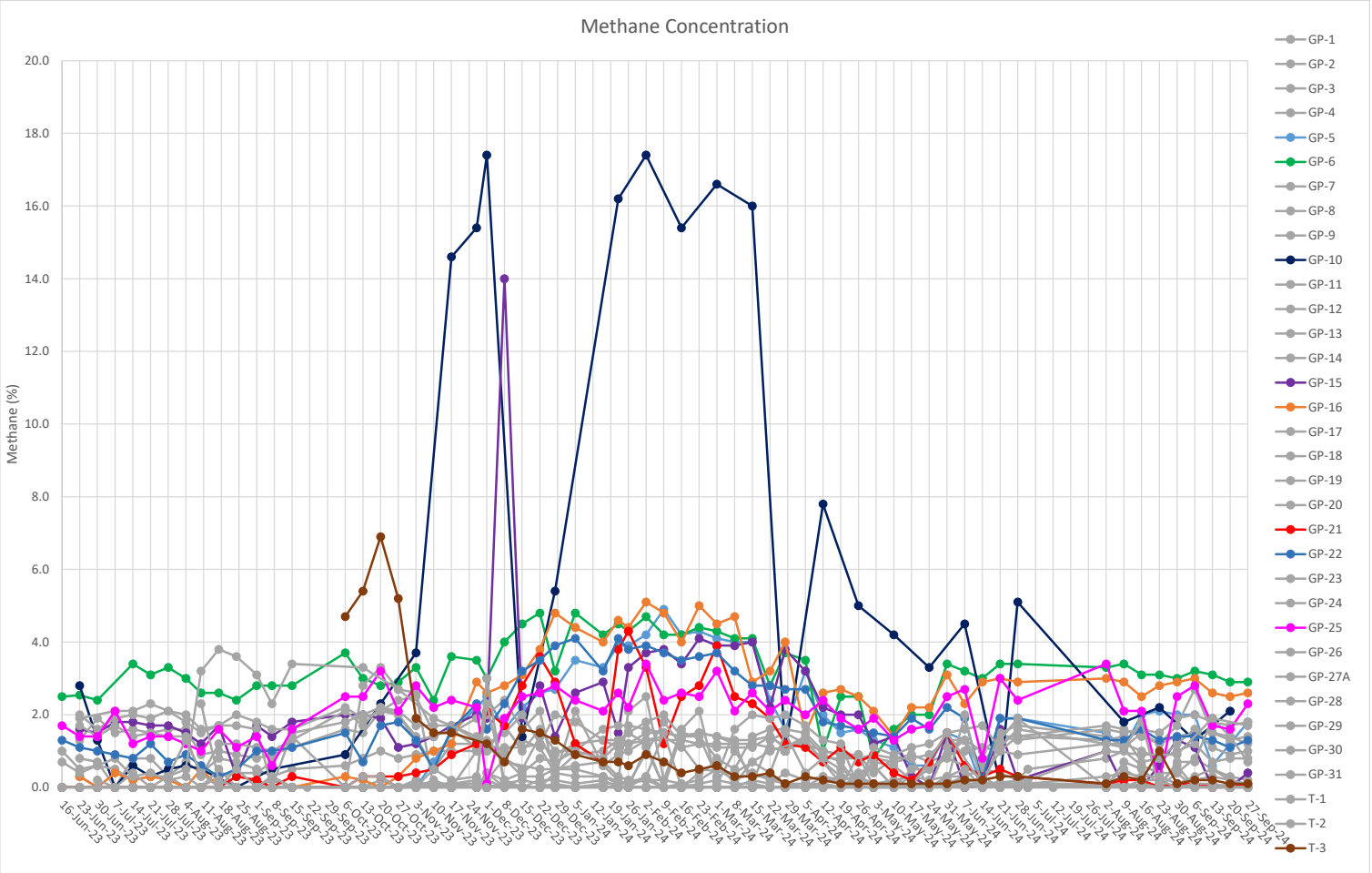


Methane

Draeger instrument has been recalibrated, showing similar levels to before calibration occurred.

Noted that GP-10 has been recorded as under 4% for the past month. Pressure swings have pushed atmospheric air back into the top of the landfill, displacing the concentrated landfill gas that is periodically detected on the landfill crest during periods of steady low atmospheric pressure.

LFCI to monitor.




LANDFILLFIRE.com
Existing GPs
New GPs
GP-21
GP-22
GP-23
GP-24
GP-15
GP-16
GP-17
GP-18
GP-19
GP-20
GP-25
GP-11
GP-12
GP-14
GP-13
T1
T2
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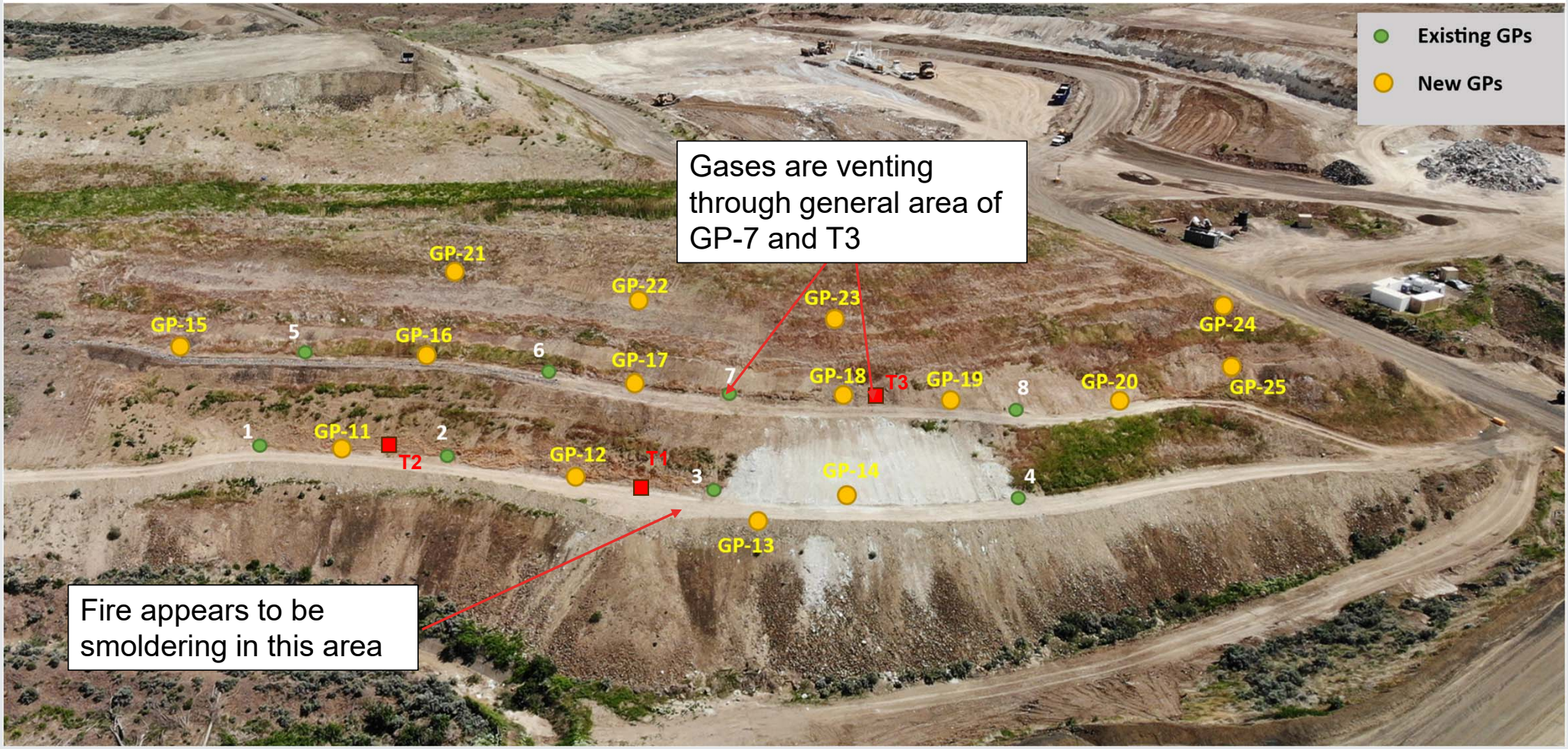
Fire Path


Existing GPs
New GPs
Gases are venting through general area of GP-7 and T3
Fire appears to be smoldering in this area
GP-21
GP-22
GP-23
GP-15
GP-16
GP-17
GP-18
GP-19
GP-20
GP-24
GP-25
GP-11
GP-12
GP-14
GP-13
T1
T2
T3
1
2
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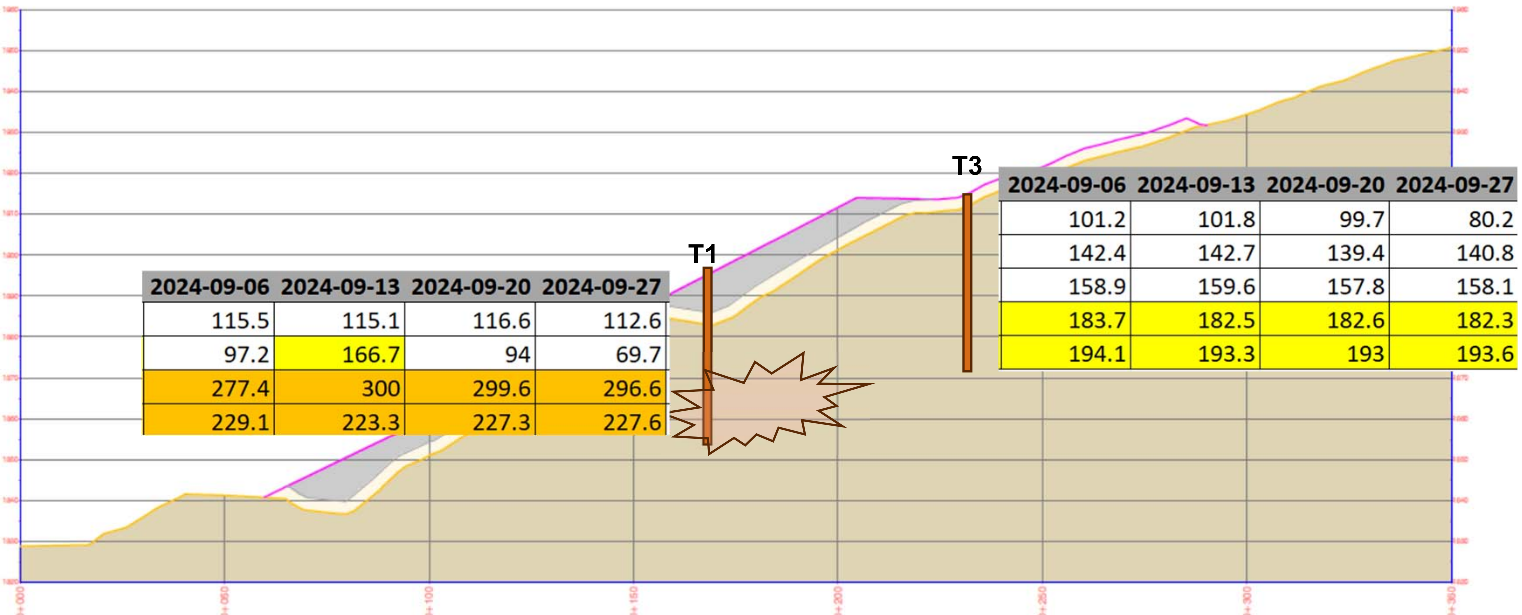
4
5
6
7
8

LEGEND:

- 2023-05-16 EG PROFILE
- DESIGN SUBGRADE PROFILE
- MINUS 1/2" SHOT ROCK
- 3' COMPACTED LOW PERMEABILITY SOIL
- EXISTING GROUND



T1

2024-09-06	2024-09-13	2024-09-20	2024-09-27
115.5	115.1	116.6	112.6
97.2	166.7	94	69.7
277.4	300	299.6	296.6
229.1	223.3	227.3	227.6

T3

2024-09-06	2024-09-13	2024-09-20	2024-09-27
101.2	101.8	99.7	80.2
142.4	142.7	139.4	140.8
158.9	159.6	157.8	158.1
183.7	182.5	182.6	182.3
194.1	193.3	193	193.6

SECTION B - B'

H - 1" : 25'
V - 1" : 25'

SPERLING HANSEN ASSOCIATES

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SEAL

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CLIENT:

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DRAWN BY: A.TSANG	DATE CREATED: 5/16/2023
CHECKED BY: T.SPERLING	HORIZONTAL SCALE: 1" = 25'
APPROVED BY: –	VERTICAL SCALE: 1" = 25'

ADJUST SCALE 50% FOR 34"x22" SHEET

DTG RECYCLE LANDFILL FILE

SECTION B-B'

DRAWING NO.	REV	SHEET
2023-001-005	–	005

Data Interpretation

LFCI believes that suppression efforts continue to work, but slowly. CO levels and temperatures have decreased dramatically since cover fill was placed and continue to slowly decrease.

In LFCI experience, CO has been best indicator of suppression at other landfill sites. CO levels in some wells have increased, but not significantly.

High O2 continues to fluctuate - this is likely due to large atmospheric pressure swings and pervious waste mass allowing entry of ambient air.

Temperature has dropped significantly all around, GP-3 continues to consistently fall.

LFCI believes that the waste is still smoldering underneath GP-3 and T-1 (elevated temperature) and a ‘chimney’ effect is occurring, causing higher CO and VOC’s in T-3 and GP-7. The large atmospheric pressure swing this week has likely caused some of the irregularities in the data, but LFCI will continue to monitor closely.

Increasing VOC concentrations at GP-8 and GP-20 suggest that there is increasing thermal activity in historic area of southern vents. Depth of smolder in that zone should be determined.