Gavin Newsom
California Governor

Yana Garcia
Secretary for Environmental Protection

California Environmental Protection Agency

Zoe Heller
CalRecycle Director

Department of
Resources Recycling and Recovery

November 25, 2024 Via Email:kgork@ph.lacounty.gov

Karen Gork
Chief Environmental Health Specialist
Los Angeles County Department of Public Health
5050 Commerce Drive
Baldwin Park, California 91706

Subject: Chiquita Canyon Landfill (19-AA-0052) Technical Review – Forward Looking Infrared (FLIR) Aerial Survey

Dear Ms. Gork:

CalRecycle staff is providing this letter in response to your November 13, 2024, request for technical assistance in reviewing the Forward Looking Infrared (FLIR) aerial survey dated October 1, 2024.

The following comments are provided to the Los Angeles County Department of Public Health [Local Enforcement Agency (LEA)] as assistance to support the program in carrying out its responsibilities on permitted disposal sites. The final determination as to the comments to be provided to the responsible party is within the sole purview of the LEA, acting within the parameters of its discretion, in accordance with its vested authority under its certification as defined in Title 14, California Code of Regulations (14 CCR), Division 7, 27 CCR, Division 2, Subdivision 1 (Section 20005 et seq.), and Division 30 of the Public Resources Code.

Discussion

FLIR surveys are a tool for assessing Subsurface Elevated Temperature (SET) Events. Operators should use both FLIR and Light Detection and Ranging (LiDAR) surveys when assessing the magnitude and intensity of SET Events. FLIR surveys use a thermal imaging camera that detects heat signatures by sensing infrared radiation. In

contrast, LiDAR is a technology that uses laser pulses to measure distances and create topographic surveys.

A FLIR survey is critical to protecting landfill workers' and emergency responders' health and safety. FLIR surveys are a tool for assessing and establishing surface temperatures. A FLIR survey alone cannot detect leachate outbreaks, fissures, gas releases, or collapsed areas under geomembrane covers. Using other landfill data, site observations, and field FLIR surveys, one can analyze the cause of the elevated temperatures. The FLIR survey with field verification can clearly show elevated temperatures at individual gas wells and collection systems. Multiple FLIR surveys collected over time can assist in determining if a reaction is increasing in magnitude and/or intensity.

As with all assessment methods, FLIR surveys will detect heat sources that may or may not be significant. As identified by the submittal, the FLIR survey showed the flare area at the southeast corner of the survey. This area was red on the FLIR map indicating a high-heat area. One can compare other observations with additional evaluation and site background data. FLIR surveys can also provide false positive heat signatures. Typically, the false positives can be due to the specific time of day that the survey was conducted, solar heating, ambient temperature, soil/waste type, cover material, the presence of moisture, and the presence of glass, metal, or gravel. Each anomaly must be field evaluated using a handheld FLIR camera, landfill data, site observations, or intrusive methods such as adding additional temperature probes, excavation, or cutting through the geomembrane to visually inspect an area.

Analysis of FLIR Data

The FLIR survey showed thirteen areas where the temperature exceeded 68 degrees Fahrenheit (F). CalRecycle staff outlined the approximate geomembrane limits on the FLIR map in Figure 1 and added five areas of concern marked A to E. The FLIR survey revealed surface temperatures are most intense at the following locations:

- Along the western slope;
- In the north around gas wells CV-2429, CV-2435, and CV-2340;
- A small area of concern identified as 17; and
- The area to the north at gas wells CV-2301, CV-2459, CV-2468, and CV-2469.

The last two areas are outside CCL’s claimed reaction zone.

FLIR Survey Recommendations

The LEA should consider the following recommendations:

The submitted report did not include the typical temperature data found in other FLIR reports (e.g., GPS coordinates and quantitative thermal data) that CalRecycle staff observed on Sniffer’s website (https://www.snifferrobotics.com/post/the-sniffer-team-

demonstrates-their-capabilities-in-the-caribbean). Only a narrative describing the range of temperatures observed was provided. As shown on the sniffer base map dated October 1, 2024, the FLIR survey detected a thermal reflectance of 257 F to -1 F. Future submittals should include actual reported FLIR GPS coordinates and quantitative thermal data in future submittals. CalRecycle staff acknowledges these temperatures may or may not be accurate, but it is essential to report the temperature so they can be tracked over time.

For each submittal, including the most recently submitted FLIR survey, the CCL should investigate and discuss the likely cause of the high temperatures for each identified area of interest. The discussion should also include a photograph of the area with the highest detected thermal data. For example, the CCL disclosed that some or all of the shading picked up in the western perimeter are identified as cracks under the geosynthetic cap from the heat discoloring/staining the top of the liner. An evaluation should be conducted to determine the cause and ensure the heat signatures are not expanding or increasing in intensity.

Staff recommends that a background and/or field FLIR survey be conducted at Area E between Points 19 and 21, as shown in Figure 1, to determine the cause of the elevated surface temperature. The thermal signature is concerning but could be an additional flare, portable generator, geysering wells, or other thermal signature unrelated to the reaction.

All FLIR submittals should include online access to sniffer's Geospatial Portal to view the ArcGIS map and all FLIR temperature data. The GIS file should include separate layers for the gas control system wells and geomembrane cover.

CalRecycle staff recommends that the LEA require the CCL to collect four additional FLIR surveys in December 2024, February 2025, April 2025, and June 2025 and analyze the cause(s) of high temperatures in areas identified. Once the four additional FLIR surveys are completed and do not show an increase in intensity or expansion, the CCL may consider submitting them quarterly.

All FLIR surveys should be kept on-site and provided to local emergency responders to identify the elevated temperature zones and their maximum temperatures.

LiDAR Map Recommendations

Lastly, some confusion still exists about submitting the LiDAR Maps for settlement. CalRecycle staff recommends that CCL submit iso-settlement maps for the reaction area based on LiDAR Maps that CCL has produced from July 2022 to the present date. These iso-settlement maps and analyses should be submitted monthly moving forward.

If you have comments or questions, please call (916) 341-6356 or email Todd.Thalhamer@Calrecycle.ca.gov.

Sincerely,



Todd Thalhamer, P.E.
Senior Waste Management Engineer
Engineering Support Branch

Cc Via Email:

Shikari Nakagawa-Ota, Los Angeles County Department of Public Health (sota@ph.lacounty.gov)

Jeff Lindberg California Air Recourses Board (jeff.lindberg@arb.ca.gov)

Vanessa Aguila, California Air Resources Board (vanessa.aguila@arb.ca.gov)

Terrence Mann, South Coast Air Quality Management District (tmann@aqmd.gov)

Larry Israel, South Coast Air Quality Management District (lisrael@aqmd.gov)

Jenny Newman, Los Angeles Regional Water Quality Control Board (Jenny.Newman@waterboards.ca.gov)

Douglas Cross, Los Angeles Regional Water Quality Control Board

(dcross@waterboards.ca.gov)

Katherine Butler, Department of Toxic Substances Control (Katherine.Butler@dtsc.ca.gov)

Joel Jones, United States Environmental Protection Agency (jones.joel@epa.gov)

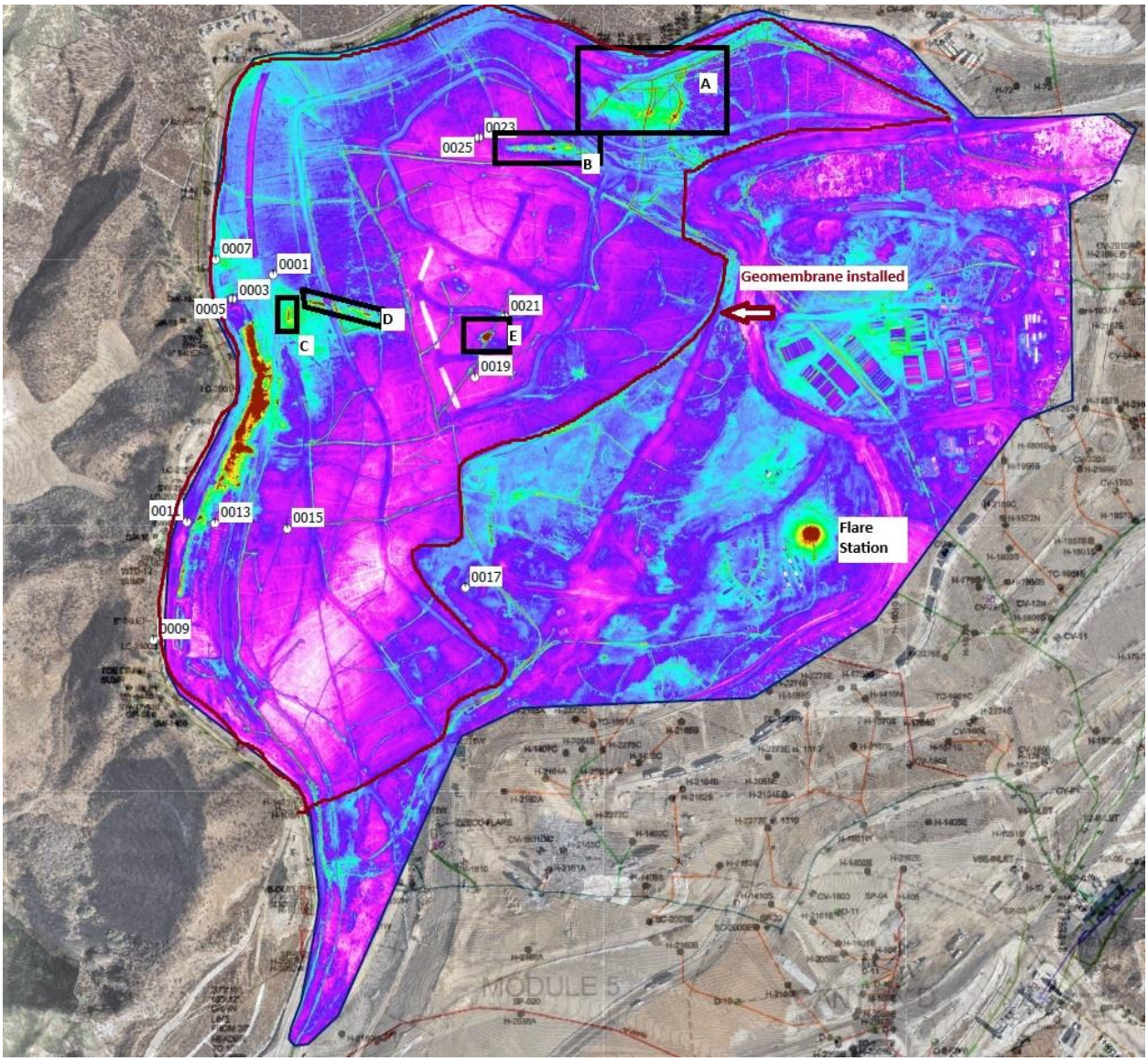


Figure 1. CCL FLIR survey on October 1, 2024, with added areas of concern (A to E) and an outline of the area covered by the geomembrane.

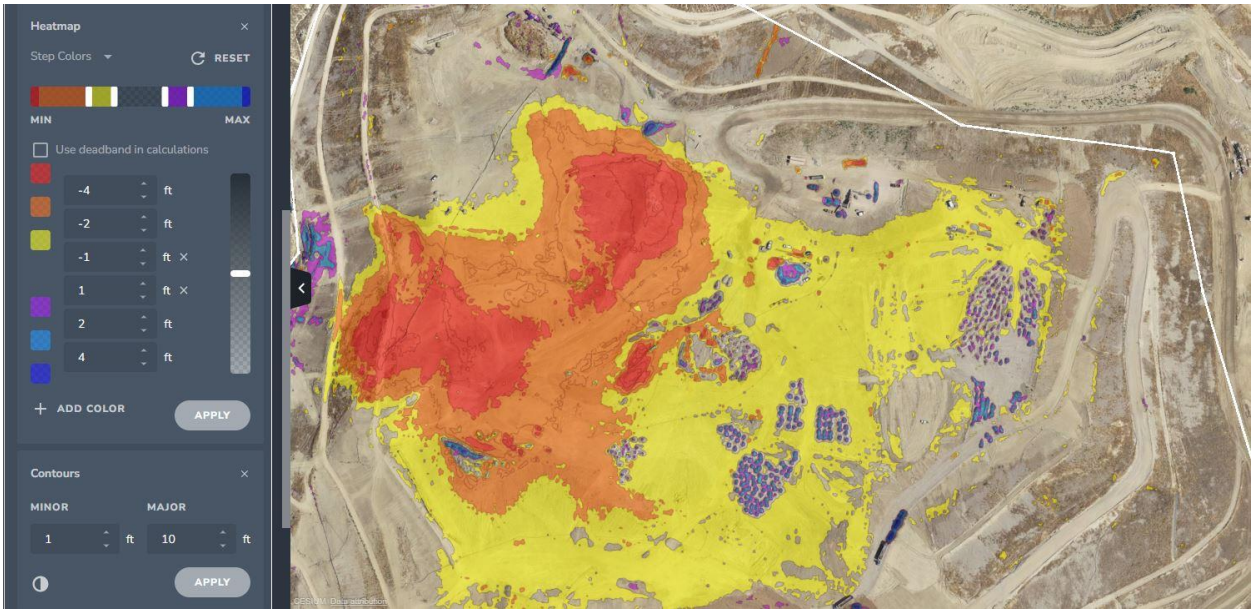


Figure 2. An example of a LiDAR iso-settlement map shows the intensity of settlement in the reaction area.