



memorandum

TO Christchurch City Council FROM [REDACTED]
DATE 2 April 2024
RE Living Earth Odour Monitoring: 3rd February 2024 to 1st March 2024 Summary

1.0 Background

Living Earth Limited (Living Earth) operates an organics processing plant and composting facility located at 40 Metro Place, Bromley, Christchurch (the LE Site). Living Earth's air discharges are subject to the conditions attached to air discharge consent CRC080301.1 ("the consent") from Canterbury Regional Council (CRC) to discharge contaminants (odour and dust) to air.

Specifically, Condition 27 of the consent states that:

"The discharges to air shall not cause odour or dust which is offensive or objectionable beyond the boundary of the site on which this consent is exercised."

While Living Earth operates the composting facility, Christchurch City Council (CCC) holds the consent.

Pattle Delamore Partners Limited (PDP) has been providing assistance to CCC and Living Earth regarding the assessment and management of odour effects from the site. This has included regular odour scouting. The objectives of the odour scouting are to:

- ∴ Correlate the intensity and characters of observed odour (where possible) to:
 - Odour sources in the Bromley area.
 - Specific activities and/or sources on the LE Site.
 - Meteorological conditions.
 - Time of day.
- ∴ Undertake FIDOL assessments to determine if offensive or objectionable odours are present beyond the site boundary.
- ∴ Corroborate the content of community (i.e., Smelt-It) complaints.

This letter provides a summary of PDP's observations of off-site odour scouting for the period between the 3rd of February and the 1st of March 2024. The stockpiles of the outdoor material, namely the unscreened compost, oversize stockpiles and screened fines were largely cleared from the site by the 12th of January 2024. As such, this report is the third which covers observations of the site under the short-term operational plan¹.

¹ <https://newsline.ccc.govt.nz/news/story/organics-processing-will-move-out-of-bromley>

2.0 Summary of Methodology

Odour observations are made by PDP odour scouts. To ensure consistency between scouts, PDP ensures the following:

1. Scouts periodically undertake parallel odour assessments with each other in the field.
2. Scouts periodically visit the LE Site and familiarise themselves with the character of the odour from the various onsite sources.
3. Scouts undergo nose calibration via direct dilution olfactometry according to the requirements of AS/NZS 4323.3:2001 Section 9.7.2.

During an assessment, scouts walk at a comfortable pace through the area downwind of the LE Site, making note of odours detected. PDP has defined a series of observation points in the area where the scout makes more detailed observations, shown in **Figure 1**. The exact route and observation points visited in an assessment depend on the meteorological conditions (wind speed and direction) and the odour (if any) detected by the scout on the route.

Sites H and M are immediately downwind of the site, located along Dyers Road with sites G and F. Sites I, J, K, and N are located in the heavy industrial zone. Sites A, C, B, D, P, and R are located in the residential zone around Bayswater Reserve. Sites E, L, O, and Q are located roughly along the residential-industrial boundary. In assessments, Sites E, O, D and Q are in the residential zone, while Site L is in the general industrial zone.



Figure 1: Odour Observation Locations

In key areas where odour is detected, or at known sensitive areas, a full 10-minute odour observation is taken. Where 10-minute observations are taken at a site, a FIDOL assessment is completed by the scout and a determination made as to whether the odour is offensive or objectionable.

Determinations made are necessarily the opinion of the odour scout at that time to the conditions they encounter. They are based upon observations in the field but may also include consideration of wider factors such as meteorological conditions and patterns of site activity when considering the potential for offensive or objectionable odour over longer time periods.

Each scout makes their determination with reference to other determinations made, both within PDP, and more widely amongst the air quality profession.

Summaries for each odour scout are included in Section 3.0. Detailed analysis of specific observations is included, where necessary. Results of all 10-minute odour observations, summarised by observation location, are appended to this memorandum.

This memorandum presents the results of the odour scouting undertaken. This report does not analyse odour trends across time.

2.1 FIDOL Analysis

As per Ministry for the Environment's Good Practice Guide for Assessing and Managing Odour (MfE GPG), odours were assessed against the FIDOL factors to determine if they were offensive or objectionable. The FIDOL factors are:

- ∴ Frequency;
- ∴ Intensity;
- ∴ Duration;
- ∴ Offensiveness/Character²; and
- ∴ Location.

Odour intensity is reported on a scale of (0-6) as per the MfE's GPG Odour. PDP applies the following descriptions to each odour intensity to ensure consistency between scouts:

0. No Odour: No odour.
1. Very Weak: Odour detectable but character not recognisable.
2. Weak: Odour detectable and barely recognisable.
3. Distinct: Odour readily recognisable.
4. Strong: Odour is strong but not causing discomfort to assessor.
5. Very Strong: The odour causes some discomfort; assessor can remain in area but will consider leaving/altering breathing patterns.
6. Extremely Strong: The odour causes assessor to feel nauseous or compelled to leave the area.

² "It is preferable to refer to the character of an odour, rather than its 'offensiveness' to avoid confusion between the inherent characteristics of an odour (i.e., whether it is pleasant or unpleasant) and whether there is an 'objectionable or offensive' effect occurring as a result of exposure to odour." (MfE GPG Odour)

When determining whether odour is having an offensive or objectionable effect, odour scouts make their determination with respect to the FIDOL factors. No regulatory standard exists for the specific combination of FIDOL factors that do or do not constitute an offensive or objectionable odour. However, as a broad litmus test when making determinations at the Living Earth site, PDP scouts consider intermittently distinct (3) or continuous weak (2) odours of a negative hedonic tone (such as compost) to be offensive or objectionable in a residential zone.

Within a heavy industrial zone, there is a lower expectation of amenity as it pertains to odour.

Based on PDP's understanding, this approach is generally consistent with that used by other air quality professionals.

3.0 Results Summary

Result summaries for each odour scout are reported below. Results of all 10-minute odour observations, summarised by observation location, are appended to this memorandum.

Scouts were present in the Bromley area on the:

- ∴ 5th of February 2024;
- ∴ 12th of February 2024;
- ∴ 15th of February 2024;
- ∴ 21st of February 2024;
- ∴ 22nd of February 2024;
- ∴ 26th of February 2024; and
- ∴ 1st of March 2024.

3.2 5th February 2024

[REDACTED] was the PDP odour scout. The scout was present for approximately 30 minutes. The weather was clear, with an average temperature of 24°C, and east-south-easterly winds ranging from 6.6 to 7.2 m/s as a 10-minute average. The scout started near Site Q, and then walked along Maces and Dyers Road toward the LE Site, before returning through the industrial area. The objective was to identify any odour from the LE Site that could be moving towards the residential areas. The odour scout route (yellow dots) and key scouting locations are shown in **Figure 2**.



Figure 2: 5th February 2024 - Odour Scout Route

Results from the odour scout are shown below. Entries within **Table 1** that are highlighted blue denote locations within a residential zone and purple denotes locations within an industrial zone.

Table 1: 5 th February 2024 - Odour Scouting Summary		
Site	Time	Observations
Q	13:35	No odour (0) detected.
O	13:40	No odour (0) detected.
D	13:40	No odour (0) detected.
E	13:43	No odour (0) detected.
F	13:45	No odour (0) detected.
G	13:49	No odour (0) detected.

Table 1: 5th February 2024 - Odour Scouting Summary

Site	Time	Observations
H	13:50	No odour (0) detected.
I	13:53	No odour (0) to intermittent very weak (1) odours of an indeterminate character detected.
J	13:56	No odour (0) detected.
Q	14:03	No odour (0) detected.

No compost odour was detected in the residential or industrial areas. Although the wind direction was forecast to be north-easterly, data from the Bromley EWS indicates the wind was east-south-easterly. As a result, the residential area was not downwind of the LE Site.

3.3 12th February 2024

██████████ was the PDP odour scout. The scout was present for approximately 30 minutes. The weather was clear, with an average temperature of 18°C, and easterly winds ranging from 5.5 to 5.7 m/s as a 10-minute average. The scout started at Site O, and then walked along Maces and Dyers Road toward the LE Site, before returning to Site O. The objective was to undertake odour monitoring in the area downwind of the LE Site. The odour scout route (yellow dots) and key scouting locations are shown in **Figure 3**.



Figure 3: 12th February 2024 - Odour Scout Route

Results from the odour scout are shown below. Entries within **Table 2** that are highlighted blue denote locations within a residential zone and purple denotes locations within an industrial zone.

Table 2: 12th February 2024 - Odour Scouting Summary

Site	Time	Observations
O	14:38	No odour (0) detected.
D	14:42	No odour (0) detected.
E	14:45	No odour (0) detected
F	14:48	No odour (0) detected.
G	14:50	No odour (0) detected.
H	14:52	No odour (0) detected.

Table 2: 12th February 2024 - Odour Scouting Summary

Site	Time	Observations
G	14:54	No odour (0) detected.
F	14:56	No odour (0) detected.
E	14:58	No odour (0) detected.
D	15:02	No odour (0) detected.
O	15:05	No odour (0) detected.

No compost odour was detected in the residential or industrial areas.

3.2 15th February 2024

[REDACTED] was the PDP odour scout. The scout was present for approximately 45 minutes. The weather was clear, with an average temperature of 23°C, and east-south-easterly winds ranging from 2.2 to 3.2 m/s as a 10-minute average. The scout started at Site O, and then walked along Maces and Dyers Road toward the LE Site, before returning to Site O. The objective was to identify any odour from the LE Site that could be moving towards the residential areas. The odour scout route (yellow dots) and key scouting locations are shown in **Figure 4**.



Figure 4: 15th February 2024 - Odour Scout Route

Results from the odour scout are shown below. Entries within **Table 3** that are highlighted blue denote locations within a residential zone and purple denotes locations within an industrial zone.

Table 3: 15th February 2024 - Odour Scouting Summary

Site	Time	Observations
O	10:30	No odour (0) to very weak (1) odours of an indeterminate character detected.
D	10:33	No odour (0) detected.
E	10:36	No odour (0) detected.
F	10:39	No odour (0) detected.
G	10:41	No odour (0) detected.

Table 3: 15th February 2024 - Odour Scouting Summary

Site	Time	Observations
H	10:45	<p>FIDOL assessment completed.</p> <p>No odour (0) was detected 93% of the time. Very weak (1) odours of an indeterminate character were detected 2% of the time. Weak (2) solvent odours were detected 5% of the time.</p> <p>The odour was assessed to be neither offensive nor objectionable.</p>
G	11:01	No odour (0) detected.
F	11:04	No odour (0) detected.
E	11:06	No odour (0) detected.
D	11:10	No odour (0) to intermittent weak (2) solvent odour detected.
O	11:12	No odour (0) to intermittent weak (2) solvent odour detected.

No compost odour was detected in the residential or industrial areas.

3.4 21st February 2024

██████ was the PDP odour scout. The scout was present for approximately 30 minutes. The weather was clear, with an average temperature of 19°C, and northeasterly to east-north-easterly winds ranging from 4.7 to 5.3 m/s as a 10-minute average. The scout started at Site O, and then walked along Maces and Dyers Road toward the LE Site, before returning to Site O. The objective was to undertake odour monitoring in the area downwind of the LE Site. The odour scout route (yellow dots) and key scouting locations are shown in **Figure 5**.



Figure 5: 21st February 2024 - Odour Scout Route

Results from the odour scout are shown below. Entries within **Table 4** that are highlighted blue denote locations within a residential zone and purple denotes locations within an industrial zone.

Table 4: 21st February 2024 - Odour Scouting Summary

Site	Time	Observations
O	14:56	Intermittent very weak (1) odour of indeterminate character detected.
D	15:00	Intermittent very weak (1) odour of indeterminate character detected.
D to E		Intermittent weak (2) rubber odour detected.
E	15:02	No odour (0) detected
F	15:05	Very intermittent very weak (1) odour of indeterminate character detected.
G	15:10	No odour (0) detected.
G to H		Intermittent weak (2) sawdust odour detected.

Table 4: 21st February 2024 - Odour Scouting Summary

Site	Time	Observations
H	15:13	Very intermittent weak (2) solvent odour detected.
H to M		Continuous weak (2) rubbish odour detected.
H	15:15	Intermittent weak (2) rubbish odour detected.
G	15:19	No odour (0) detected.
F	15:21	Intermittent very weak (1) indeterminate to weak (2) grass odour detected.
E	15:23	No odour (0) detected.
E to D		Intermittent weak (2) rubber and solvent odour detected.
D	15:26	No odour (0) detected.
O	15:29	No odour (0) detected.

No compost odour was detected in the residential or industrial areas. The positive detection of the rubbish odour from the EcoDrop indicates that the scout successfully passed downwind of the LE Site, detecting no odour.

3.6 22nd February 2024

██████████ was the PDP odour scout. The scout was present for approximately 20 minutes. The weather was clear, with an average temperature of 17°C, and east-north-easterly winds ranging from 6.6 to 7.0 m/s as a 10-minute average. The scout started at Site E, and then walked along Dyers Road toward the LE Site, before returning. The objective was to undertake odour monitoring in the area downwind of the LE Site. The odour scout route (yellow dots) and key scouting locations are shown in **Figure 6**.



Figure 6: 22nd February 2024 - Odour Scout Route

Results from the odour scout are shown below. Entries within **Table 5** that are highlighted blue denote locations within a residential zone and purple denotes locations within an industrial zone.

Table 5: 22 nd February 2024 - Odour Scouting Summary		
Site	Time	Observations
E	10:16	No odour (0) detected.
F	10:18	No odour (0) detected.
G	10:21	No odour (0) detected.
H	10:23	No odour (0) detected.
G	10:25	No odour (0) detected.
F	10:29	No odour (0) detected.
E	10:31	No odour (0) detected.

No compost odour was detected in the residential or industrial areas.

3.7 26th February 2024

██████████ was the PDP odour scout. The scout was present for approximately 30 minutes. The weather was overcast, with an average temperature of 20 °C, and easterly to east-north-easterly winds ranging from 6.8 to 7.4 m/s as a 10-minute average. The scout started at Site O, and then walked along Maces Road and Dyers Road toward the LE Site, before returning to Site O. The objective was to undertake odour monitoring in the area downwind of the LE Site. The odour scout route (yellow dots) and key scouting locations are shown in **Figure 7**.



Figure 7: 26th February 2024 - Odour Scout Route

Results from the odour scout are shown below. Entries within **Table 6** that are highlighted blue denote locations within a residential zone and purple denotes locations within an industrial zone.

Table 6: 26 th February 2024 - Odour Scouting Summary		
Site	Time	Observations
O	13:43	No odour (0) detected.
D	13:46	Weak (2) solvent odour detected.
E	13:50	No odour (0) detected
F	13:53	No odour (0) detected.
G	13:55	Intermittent weak (2) green waste odour with a neutral hedonic tone detected.
H	13:57	Very weak (1) indeterminate odour detected.

Table 6: 26th February 2024 - Odour Scouting Summary

Site	Time	Observations
G	13:59	No odour (0) detected.
F	14:02	Very weak (1) indeterminate odour detected.
E	14:04	No odour (0) detected.
D	14:07	Weak (2) solvent odour detected.
O	14:10	No odour (0) detected.

No compost odour was detected in the residential or industrial areas. The green waste odour detected at Site G had a character of fresh prunings/leaves. The Living Earth site has a stockpile of green waste, but other sites closer to the scout could also have been the source of this odour. The green waste odour had a neutral hedonic tone, distinct from the compost or biofilter odours at the LE Site.

3.8 1st March 2024

[REDACTED] was the PDP odour scout. The scout was present for approximately 20 minutes. The weather was clear, with an average temperature of 17°C, and easterly to east-north-easterly winds ranging from 5.7 to 5.1 m/s as a 10-minute average. The scout started at Site Q, and then drove to Site E. The scout then walked along Dyers Road toward the LE Site, before returning to Site E. The objective was to undertake odour monitoring in the area downwind of the LE Site. The odour scout route (yellow dots) and key scouting locations are shown in **Figure 8**.



Figure 8: 1st March 2024 - Odour Scout Route

Results from the odour scout are shown below. Entries within **Table 7** that are highlighted blue denote locations within a residential zone and purple denotes locations within an industrial zone.

Table 7: 1st March 2024 - Odour Scouting Summary

Site	Time	Observations
Q	11:03	Very weak (1) odours of an indeterminate character to intermittent weak (2) solvent odour detected.
E	11:09	No odour (0) detected.
F	11:12	No odour (0) detected.
G	11:14	No odour (0) detected.

Table 7: 1st March 2024 - Odour Scouting Summary

Site	Time	Observations
H	11:16	Very weak (1) odours of an indeterminate character to intermittent weak (2) green waste odour detected.
G	11:17	No odour (0) detected.
F	11:21	No odour (0) detected.
E	11:23	No odour (0) detected.

No compost odour was detected in the residential or industrial areas. Intermittent weak green waste odour was detected at Site H, directly downwind of the LE Site. The green waste odour at Site H had a character of fresh prunings/leaves, different to that of the compost odour traditionally associated with the site. The Living Earth site has a stockpile of green waste, but other sites closer to the scout could also have been the source of this odour. The green waste odour had a neutral hedonic tone.

4.0 Summary

PDP undertook odour scouting on seven occasions between the 3rd of February 2024 and the 1st of March 2024.

Typically, PDP considers that intermittent distinct (3) or continuous weak (2) odours of a negative hedonic tone (such as compost) are offensive or objectionable in a residential zone.

Based on PDP's observations:

5th February 2024

- ∴ No compost odour was detected in the residential or industrial areas.

12th February 2024

- ∴ No compost odour was detected in the residential or industrial areas.

15th February 2024

- ∴ No compost odour was detected in the residential or industrial areas.

21st February 2024

- ∴ No compost odour was detected in the residential or industrial areas.

22nd February 2024

- ∴ No compost odour was detected in the residential or industrial areas.

26th February 2024

- ∴ No compost odour was detected in the residential or industrial areas. Green waste odour was detected at Site G. This may have originated from the Living Earth site or from gardening/pruning work at other sites upwind. The odour had a neutral hedonic tone and a character distinct to the compost and biofilter odours that have been previously associated with the LE site.

1st March 2024

- ∴ No compost odour was detected in the residential or industrial areas. Green waste odour was detected at Site H. This may have originated from the Living Earth site or from gardening/pruning work at other sites upwind. The odour had a neutral hedonic tone and a character distinct to the compost and biofilter odours that have been previously associated with the LE site.

The odour scouting during north-easterly wind conditions indicates that any odour produced at the site was not migrating beyond the boundary of the site at the time of the scouting.

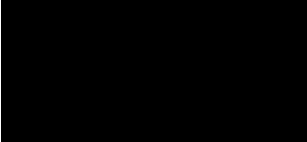
5.0 Limitations

This memorandum has been prepared by Pattle Delamore Partners Limited (PDP) on the basis of information provided by Christchurch City Council and Living Earth. PDP has not independently verified the provided information and has relied upon it being accurate and sufficient for use by PDP in preparing the memorandum. PDP accepts no responsibility for errors or omissions in, or the currency or sufficiency of, the provided information.

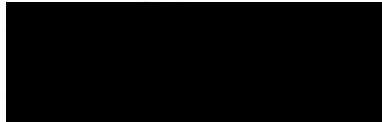
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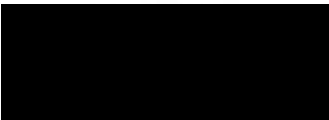


Air Quality Engineer



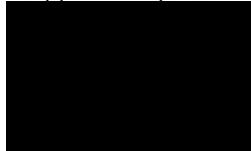
Air Quality Scientist

Reviewed by



Senior Environmental Engineer

Approved by



Group Director

Site H

