



memorandum

TO Christchurch City Council FROM [REDACTED]
DATE 17 May 2024
RE Living Earth Odour Monitoring: 1st April 2024 to 30th April 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 1st April 2024 and the 30th April 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 fifth 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:

- ∴ 3rd April 2024;
- ∴ 4th April 2024;
- ∴ 11th April 2024;
- ∴ 17th April 2024;
- ∴ 23rd April 2024;
- ∴ 24th April 2024;
- ∴ 29th April 2024; and
- ∴ 30th April 2024.

3.1 3rd April 2024

██████ was the PDP odour scout. The scout was present for approximately 40 minutes. The weather was overcast, with an average temperature of 17°C, and easterly to east-southeasterly winds ranging from 5.5 to 6.1 m/s as a 10-minute average. The scout started and ended near Site O, walking the boundary of the residential area, before walking a loop within the industrial area. 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 2**.



Figure 2: 3rd April 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: 3rd April 2024 - Odour Scouting Summary

Site	Time	Observations
O	13:04	Intermittent weak (2) solvent odour detected.
Q	13:07	Intermittent very weak (1) odours of an indeterminate character detected.
O	13:10	Intermittent weak (2) solvent odour detected.
D	13:13	Very intermittent weak (2) solvent odour detected.
E	13:17	Intermittent very weak (1) odours of an indeterminate character to weak (2) marine and grassy odour detected.
F	13:21	No odour (0) to very weak (1) odours of an indeterminate character detected.
G	13:24	No odour (0) to very weak (1) odours of an indeterminate character detected.
H	13:26	No odour (0) to very weak (1) odours of an indeterminate character detected.
H to M		Continuous weak (2) rubbish odour detected.
H	13:27	No odour (0) to very weak (1) odours of an indeterminate character detected.
I	13:30	Continuous weak (2) compost odour detected.
J	13:34	No odour (0) detected.
J to K		Weak (2) grease trap/rancid odour detected.
K	13:39	Weak (2) grease trap/rancid odour detected.
L	13:44	No odour (0) detected.

Compost odour was detected in the industrial area at Site I. No compost odour was detected in the residential area. The odour was assessed to be neither offensive nor objectionable.

The source of the grease trap odour was not identified. It was not observed further downwind at Site Q in the residential area.

3.2 4th April 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 east-southeasterly to westerly winds ranging from 0.7 to 3.8 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: 4th April 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: 4th April 2024 - Odour Scouting Summary

Site	Time	Observations
O	9:13	No odour (0) detected.
D	9:13	No odour (0) detected.
E	9:19	No odour (0) detected.
F	9:21	No odour (0) to intermittent weak (2) solvent odour detected.
G	9:25	No odour (0) detected.
H	9:26	Intermittent weak (2) food odour from Caltex detected.
G	9:28	No odour (0) detected.
F	9:30	Intermittent weak (1) solvent odour detected.
E	9:33	No odour (0) detected.
D	9:36	No odour (0) detected.

No compost odour was detected in the residential or industrial areas. Although north-easterly winds were forecast, when the scout arrived in the area, the winds ranged from east-southeasterly to westerly, and as a result the scout was not downwind of the LE site.

3.3 11th April 2024

[REDACTED] was the PDP odour scout. The scout was present for approximately 15 minutes. The weather was clear, with an average temperature of 18°C, and north-easterly winds ranging from 7.7 to 8.1 m/s as a 10-minute average. The scout started and ended at 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 4**.



Figure 4: 11th April 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: 11th April 2024 - Odour Scouting Summary

Site	Time	Observations
E	10:05	No odour (0) detected.
F	10:08	No odour (0) detected.
G	10:11	No odour (0) detected.
H	10:12	No odour (0) detected.
G	10:14	No odour (0) detected.
F	10:17	No odour (0) detected.
E	10:19	No odour (0) detected.

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

3.4 17th April 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 east-northeasterly winds ranging from 4.7 to 5.3 m/s as a 10-minute average. The scout started and ended near 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: 17th April 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: 17th April 2024 - Odour Scouting Summary

Site	Time	Observations
O	15:22	No odour (0) detected.
O to D		Very intermittent weak (2) solvent odour detected.
D	15:25	Very intermittent weak (2) rubber/tyre odour detected.
E	15:29	Intermittent weak (2) marine odour detected.
F	15:31	No odour (0) detected.
G	15:33	No odour (0) detected.
G to H		Intermittent weak (2) rubbish odour detected.
H	15:35	Weak (2) rubbish odour detected.
G	15:37	No odour (0) detected.
F	15:40	No odour (0) detected.
E	15:42	No odour (0) detected.
P	15:45	Intermittent weak (2) solvent odour detected.
D	15:47	No odour (0) detected.

No compost odour was detected in the residential or industrial areas. The rubbish odour from the EcoDrop was positively identified, indicating the scout passed through the zone where odour from LE could potentially be detected.

3.5 23rd April 2024

[REDACTED] was the PDP odour scout. The scout was present for approximately 40 minutes. The weather was clear, with an average temperature of 12 °C, and northeasterly to east-southeasterly winds ranging from 0.8 to 1.3 m/s as a 10-minute average. The scout started near Site C, before walking the boundary of the residential area and along Dyers Road towards the LE site, before returning to Site C. 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: 23rd April 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: 23rd April 2024 - Odour Scouting Summary

Site	Time	Observations
C	10:12	No odour (0) detected.
B	10:15	No odour (0) detected.
D	10:16	No odour (0) detected.
E	10:19	No odour (0) detected.
F	10:22	No odour (0) detected.
G	10:22	No odour (0) detected.
H	10:26	No odour (0) detected.
G	10:28	No odour (0) detected.
F	10:30	No odour (0) detected.
E	10:33	No odour (0) detected.
P	10:35	No odour (0) detected.
D	10:37	No odour (0) detected.
C	10:40	No odour (0) detected.

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

3.6 24th April 2024

[REDACTED] was the PDP odour scout. The scout was present for approximately 40 minutes. The weather was clear, with an average temperature of 18°C, and easterly to east-southeasterly winds ranging from 3.8 to 4.2 m/s as a 10-minute average. The scout started near Site C, before walking the boundary of the residential area and along Dyers Rd towards the LE site, before returning to Site C. 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: 24th April 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: 24th April 2024 - Odour Scouting Summary

Site	Time	Observations
C	14:27	No odour (0) detected.
B	14:29	No odour (0) detected.
D	14:30	No odour (0) detected.
E	14:34	No odour (0) to intermittent very weak (1) odours of an indeterminate character (possibly marine odour) detected.
F	14:37	No odour (0) to intermittent very weak (1) odours of an indeterminate character detected.
G	14:39	No odour (0) to very weak (1) odours of an indeterminate character detected.
H	14:42	No odour (0) detected.
H to M		No odour (0) to intermittent weak (2) rubbish odour detected.
M	14:45	Weak (2) rubbish odour detected.
H	14:47	No odour (0) detected.
G	14:49	No odour (0) detected.
F	14:53	No odour (0) detected.
E	14:55	No odour (0) detected.
P	14:58	No odour (0) detected.
D	14:59	No odour (0) to weak (2) solvent odour detected
C	15:02	No odour (0) detected.

No compost odour was detected in the residential or industrial areas. The rubbish odour from the EcoDrop was positively identified, indicating the scout passed through the zone where odour from LE could potentially be detected.

3.7 29th April 2024

[REDACTED] and Chris Hewlett were the PDP odour scouts. The scouts were present for approximately one hour. The weather was clear, with an average temperature of 15°C, and east-northeasterly winds ranging from 2.7 to 3.7 m/s as a 10-minute average. The scouts started near Site O, walking the boundary of the residential area, before walking a loop of the industrial area and 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 8**.



Figure 8: 29th April 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: 29 th April 2024 - Odour Scouting Summary		
Site	Time	Observations
O	13:19	No odour (0) to very intermittent weak (2) hydrocarbon odour (from new road seal) detected.
D	13:23	Intermittent very weak (1) odours of an indeterminate character to weak (2) solvent odour detected.
E	13:28	No odour (0) detected.
F	13:32	No odour (0) to intermittent weak (2) cattle manure odour detected.
G	13:34	No odour (0) detected.
H	13:37	No odour (0) to intermittent very weak (1) odours of an indeterminate character detected.
H to M		Continuous weak (2) rubbish odour detected near Site H. Then intermittent distinct (3) rubbish to continuous weak (2) rubbish odour detected. Then intermittent weak (2) green waste odour and weak (2) rubbish odour detected.
M	13:44	No odour (0) detected.
M to H		Intermittent distinct rubbish (3) odour and weak (2) rubbish odour detected.
H	13:49	No odour (0) detected.
H to I		Intermittent weak (2) rubbish odour detected.
I	13:52	<p>FIDOL assessment completed.</p> <p>No odour (0) was detected 42% of the time. Very weak (1) odours of an indeterminate character were detected 29% of the time. Weak (2) rubbish odour was detected 25% of the time. Weak (2) green waste odour was detected 2% of the time. Weak (2) solvent odour was detected 2% of the time.</p> <p>The odour was assessed to be neither offensive nor objectionable.</p>
J	14:07	No odour (0) detected.
J to K		Very intermittent weak (2) green waste odour detected.
K	14:12	Very weak (1) odours of an indeterminate character detected.
K to L		Very intermittent weak (2) green waste odour detected.
L	14:20	No odour (0) detected. Drop in windspeed detected.
Q	14:26	Intermittent weak (2) solvent odour detected. No rubbish or green waste odour detected.
Q to O		Intermittent very weak (1) odours of an indeterminate character detected.

No compost odour was detected in the residential or industrial areas. The green waste odour detected had a character of fresh prunings, or leaves. The LE 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.

30th April 2024

██████████ was the PDP odour scout. The scout was present for approximately 50 minutes. The weather was clear, with an average temperature of 15°C, and northeasterly winds ranging from 1.7 to 2.1 m/s as a 10-minute average. The scout started near Site C, before walking the boundary of the residential area and towards the LE site, before walking a loop of the industrial area and returning to Site C. 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 9**.



Figure 9: 30th April 2024 - Odour Scout Route

Results from the odour scout are shown below. Entries within **Table 8** that are highlighted blue denote locations within a residential zone and purple denotes locations within an industrial zone.

Table 8: 30 th April 2024 - Odour Scouting Summary		
Site	Time	Observations
C	9:36	No odour (0) detected.
B	9:37	No odour (0) to weak (2) cut grass odour detected.
D	9:37	Continuous weak (2) solvent odour detected.
E	9:43	No odour (0) to intermittent very weak (1) odours of an indeterminate character detected.
E to F		Continuous very weak (1) odours of an indeterminate character detected.
F	9:46	No odour to very intermittent very weak (1) odours of an indeterminate character detected.
F to G		Distinct (3) burned rubber odour detected.
G	9:49	Continuous very weak (1) odours of an indeterminate character detected.
H	9:51	No odour (0) to intermittent very weak (1) odours of an indeterminate character detected.
H to M		Weak (2) rubbish odour to no odour (0) detected.
M	9:54	No odour (0) detected.
H	9:58	No odour (0) detected.
H to I		Intermittent weak (2) rubbish odour detected.
I	10:02	No odour (0) detected.
J	10:05	No odour (0) detected.
K	10:08	Continuous very weak (1) odours of an indeterminate character to intermittent weak (2) rubbish odour detected.
L	10:12	No odour (0) detected.
D	10:14	No odour (0) detected.
O	10:18	No odour (0) to intermittent very weak odours of an indeterminate character detected.
Q	10:20	No odour (0) detected.
O	10:22	No odour (0) detected.

No compost odour was detected in the residential or industrial areas. The rubbish odour from the EcoDrop was positively identified, indicating the scout passed through the zone where odour from LE could potentially be detected.

4.0 Summary

PDP undertook odour scouting on eight occasions between the 3rd of April 2024 and the 30th of April 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:

3rd April 2024

- ∴ Weak compost odour was detected in the industrial area at Site I. No compost odour was detected in the residential area. The odour was assessed to be neither offensive nor objectionable.

4th April 2024

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

11th April 2024

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

17th April 2024

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

23rd April 2024

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

24th April 2024

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

29th April 2024

- ∴ No compost odour was detected in the residential or industrial areas. The green waste odour detected had a character of fresh prunings, or leaves. The LE 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.

30th April 2024

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

The odour scouting during north-easterly wind conditions indicates that any odour produced at the LE Site is not generally migrating beyond the boundary of the site at the time of the scouting, with the following exceptions:

1. A single instance of weak (2) compost odour detected at Site I in the industrial area (neither offensive nor objectionable); and,
2. Occasional intermittent, weak (2) green waste odours observed on Dyers Rd in the industrial area (neither offensive nor objectionable).

No compost odours were found to have reached the residential area.

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.

This memorandum has been prepared by PDP on the specific instructions of Christchurch City Council for the limited purposes described in the memorandum. PDP accepts no liability if the memorandum is used for a different purpose or if it is used or relied on by any other person. Any such use or reliance will be solely at their own risk.

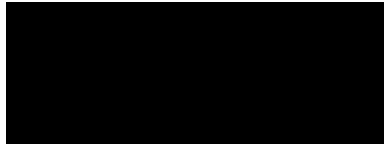
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Prepared by



Air Quality Engineer

Prepared by



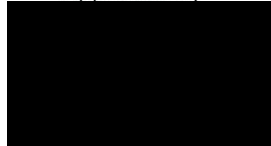
Air Quality Scientist

Reviewed by



Senior Environmental Engineer

Approved by



Group Director

Site I

