



memorandum

TO Christchurch City Council FROM [REDACTED]
DATE 09/03/2023
RE Living Earth Odour Monitoring: 1st February 2023 to 12th February 2023 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 of 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 of the period between the 1st February 2023 and the 12th February 2023.

2.0 Summary of Methodology

Odour scouting is undertaken by PDP odour scouts. To ensure consistency between scouts, PDP undertakes 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, these are 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, and P are located in the residential zone around Bayswater Reserve. Sites E, L, and O are located roughly along the residential-industrial boundary. In assessments, Sites E and O are used to represent the closest (to the LE Site) downwind edge of the residential zone. Site L is located in the general industrial zone - Site D is used as the closest (to the LE Site) downwind residential monitoring point in this area.



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 are offensive or objectionable. The FIDOL factors are:

- ∴ Frequency;
- ∴ Intensity;
- ∴ Duration;
- ∴ Offensiveness/Character¹; 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.

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.

¹ "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)

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:

- ∴ 2nd February 2023;
- ∴ 3rd February 2023;
- ∴ 7th February 2023;
- ∴ 9th February 2023;
- ∴ 10th February 2023; and,
- ∴ 12th February 2023.

3.1 2nd February 2023

██████████ was the PDP odour scout. The scout was present from 07:35 to 10:05, for approximately two and a half hours. The temperature was 20 °C with windspeeds ranging from 1.6 m/s to 6.0 m/s as a 10-minute average. The wind was variable, predominately coming from an ENE direction, but shifting between NE and ESE (as a 10-minute average) during the scout. The scout started and finished at Site A. Broadly, the scout worked upwind towards the site, first through the residential zone, then the industrial zone. Additional observations were taken at the residential zone at the start and end of the scout. The odour scout route (yellow dashed line) and key scouting locations are shown in **Figure 2**.



Figure 2: 2nd February 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: 2 nd February Odour Scouting Summary		
Site	Time	Observations
A	07:38	Weak (2) compost odour present upon arrival. Disappeared shortly after arrival.
C	07:41	FIDOL assessment completed. No odour was present 68% of the time. Very weak (1) odours of an indeterminate character were present 15% of the time. Weak (2) compost odour was present 12% of the time. Weak (2) floral odour with a positive hedonic tone was present 5% of the time. Odour assessed as not offensive or objectionable.
B	07:53	No odour detected in reserve. Short duration weak (2) compost odour detected when leaving reserve.
D	07:55	FIDOL assessment completed. No odour was present 61% of the time. Very weak (1) odours of an indeterminate character were present 3% of the time. Weak (2) compost odour was present 25% of the time. Weak (2) marine odour with a positive hedonic tone was detected 5% of the time. Distinct (3) compost odour was present 1% of the time. Odour assessed as not acutely offensive or objectionable during 10-minute observation. Odour was likely offensive or objectionable over the course of the afternoon, this is discussed further in Section 3.1.1.
O	08:07	No odour detected.
P	08:17	Short duration weak (2) sweet odour detected (not compost/biofilter).
E	08:19	No odour detected.
L	08:21	No odour detected.
Tanya St (L to K)	08:25	Weak (2) compost detected for approx. 30s.
K	08:28	FIDOL assessment completed. No odour was present 32% of the time. Very weak (1) odours of an indeterminate character were present 28% of the time. Weak (2) compost odour was present 18% of the time. Weak (2) rubbish odour was present 8% of the time. Distinct (3) compost odour was present 13% of the time. Odour assessed as not offensive or objectionable.
J	08:41	No odour detected.
I	08:44	Dusty smell, no compost odour detected.
N	08:46	FIDOL assessment completed. No odour was present 62% of the time. Very weak (1) odours of an indeterminate character were present 30% of the time. Weak (2) compost odour was present 3% of the time. Weak (2) solvent odour with a negative hedonic tone was present 5% of the time. Odour assessed as not offensive or objectionable.

Table 1: 2nd February Odour Scouting Summary

Site	Time	Observations
H	08:59	Weak (2) compost and weak (2) solvent/rubber odours detected. Variable as wind was swirling.
G	09:03	Weak (2) to distinct (3) compost odour detected.
F	09:05	FIDOL assessment completed. No odour was present 15% of the time. Very weak (1) odours of an indeterminate character were present 28% of the time. Weak (2) compost odour was present 33% of the time. Distinct (3) compost odour was present 23% of the time. Odour assessed as not offensive or objectionable.
E	09:19	FIDOL assessment completed. No odour was present 58% of the time. Very weak (1) odours of an indeterminate character were present 5% of the time. Weak (2) compost odour was present 17% of the time. A weak (2) burnt odour with a negative hedonic tone was present 3% of the time. A weak (2) sweet odour with a positive hedonic tone was present 10% of the time. Distinct (3) compost odour was present 7% of the time. Odour assessed as not acutely offensive or objectionable during 10-minute observation. Odour was likely offensive or objectionable over the course of the afternoon, this is discussed further in Section 3.1.2.
P	09:33	FIDOL assessment completed. No odour was present 47% of the time. Very weak (1) odours of an indeterminate character were present 17% of the time. Weak (2) compost odour was present 30% of the time. A weak (2) floral odour with a positive hedonic tone was present 5% of the time. Distinct (3) compost odour was present 2% of the time. Odour assessed as not acutely offensive or objectionable during 10-minute observation. Odour was likely offensive or objectionable over the course of the afternoon, this is discussed further in Section 3.1.3.
D	09:46	Stood at Site D again (not a full 10-minute) assessment. Intermittent weak (2) to distinct (3) compost odour was detected, similar to previous observations at Site P.
B		No odour detected.
C	09:50	FIDOL assessment completed. No odour was present 92% of the time. Weak (2) floral odour detected 8% of the time. Odour assessed as not offensive or objectionable.
A	10:03	No odour detected.

Odour levels were varied across the course of the scout. Distinct (3) compost odours in the residential zone were detected at Sites D, E and P. Distinct (3) compost odours were not detected at Sites O, B or A.

The character of the compost odour matched PDP’s experience with the odour generated by the outdoor material, namely the unscreened compost, oversize stockpiles and screened fines. The odour did not match PDP’s experience with the odour from the processing hall or associated biofilter.

The detailed assessment of the results for Sites D, E and P are provided below.

3.1.1 2nd February 2023 – Site D – FIDOL

Odours detected during the 10-minute assessment at Site D are summarised below in Figure 3.

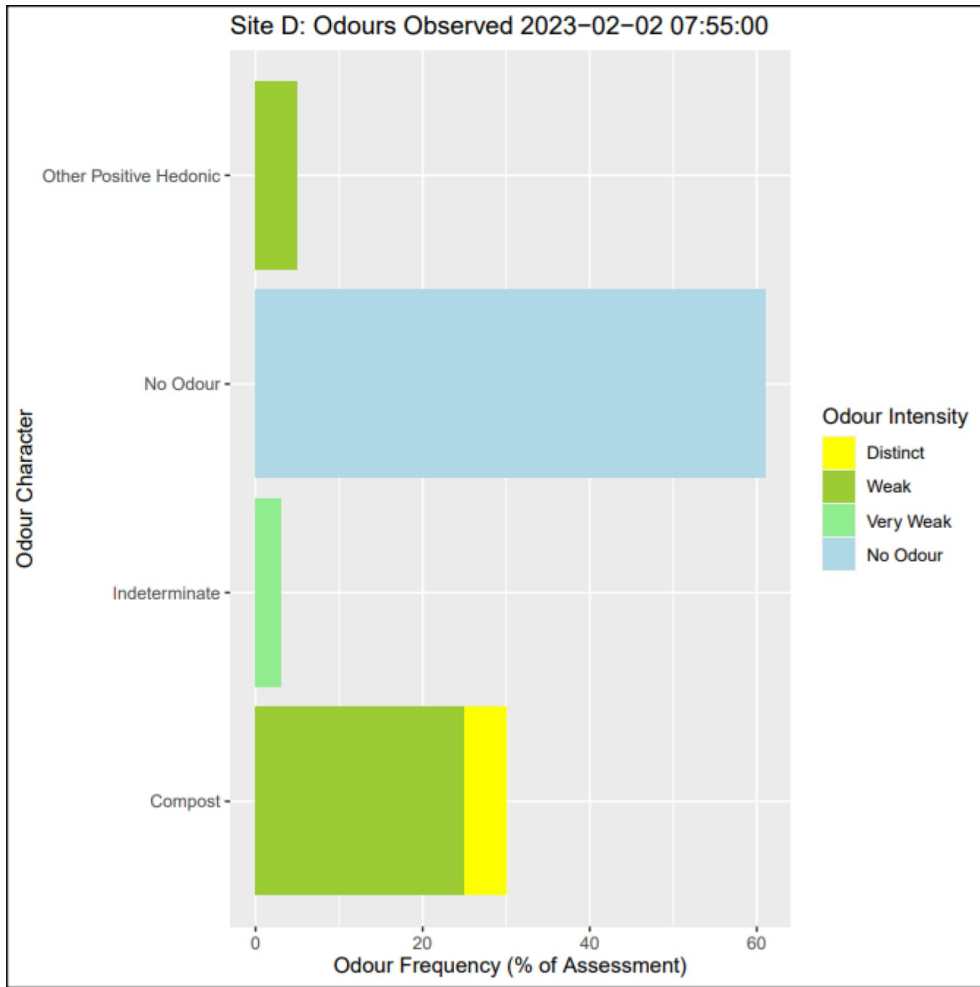


Figure 3: Site D Odours Observed, 02/02/2023 07:55

Site D, on Woburn Street is in the residential zone, close to the border with the industrial zone.

The weak (2) odour with a positive hedonic tone had a marine character.

Typically, intermittent distinct (3) or continuous weak (2) odours of a negative hedonic tone (such as compost) would be considered offensive or objectionable in a residential zone.

The odour observed at Site D (Woburn Street) was an intermittent weak (2) odour, not continuous. Three observations (30 seconds in 10 minutes) of distinct (3) compost odour do not establish an intermittent odour. In isolation, PDP does not consider this to meet the threshold of offensive or objectionable odour.

An assessment of the longer-term odour exposure on the day is provided in Section 3.1.4.

3.1.2 2nd February 2023 – Site E - FIDOL

Odours detected during the 10-minute assessment at Site E are summarised below in Figure 4.

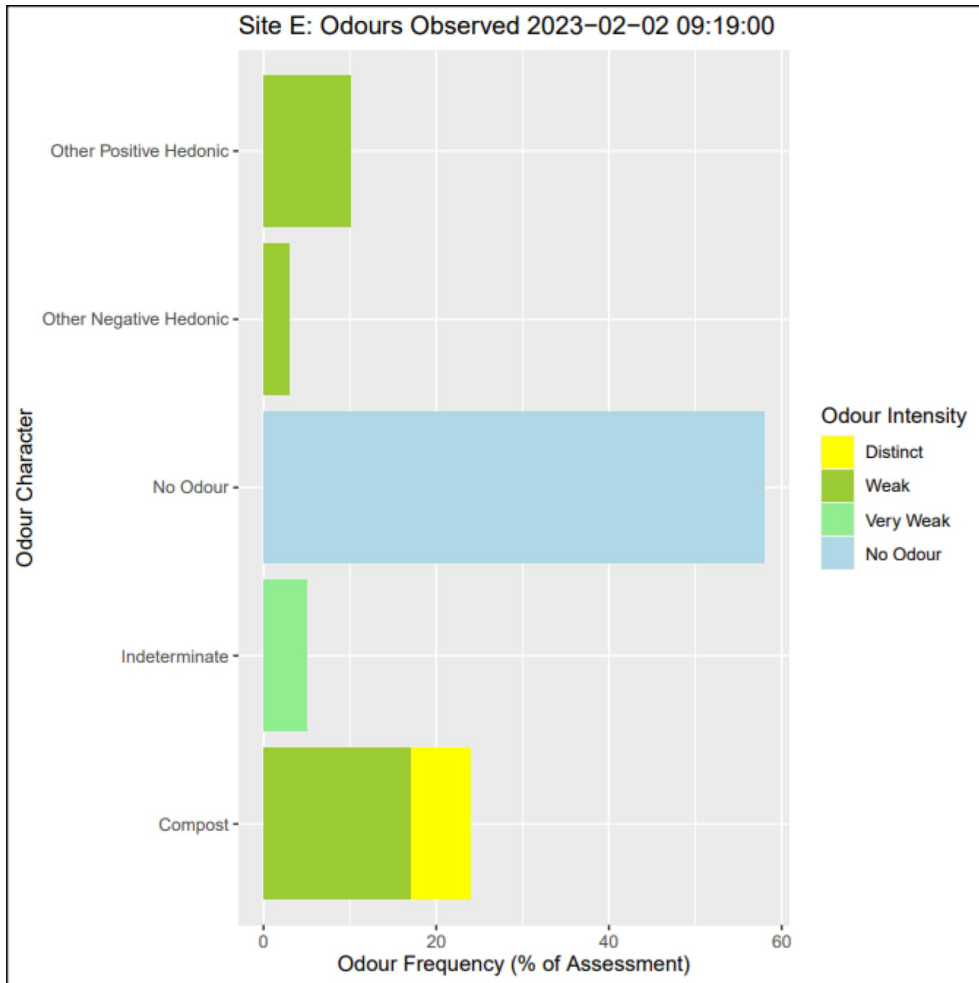


Figure 4: Site E Odours Observed, 02/02/2023 09:19

Site E, on the corner of Dyers Road and Maces Road, represents the border between the industrial and residential zones. The closest residence is 60 metres to the south-west.

The weak (2) odour with a negative hedonic tone had a burnt character. The weak (2) odour with a positive hedonic tone had a sweet character, distinct from compost or biofilter odours.

Typically, intermittent distinct (3) or continuous weak (2) odours of a negative hedonic tone (such as compost) would be considered offensive or objectionable in a residential zone.

Four observations (40 seconds in 10 minutes) of distinct (3) compost odour do not establish an intermittent odour. In isolation, PDP does not consider this to meet the threshold of offensive or objectionable odour.

An assessment of the longer-term odour exposure on the day is provided in Section 3.1.4.

3.1.3 2nd February 2023 – Site P – FIDOL

Odours detected during the 10-minute assessment at Site P are summarised below in Figure 5.

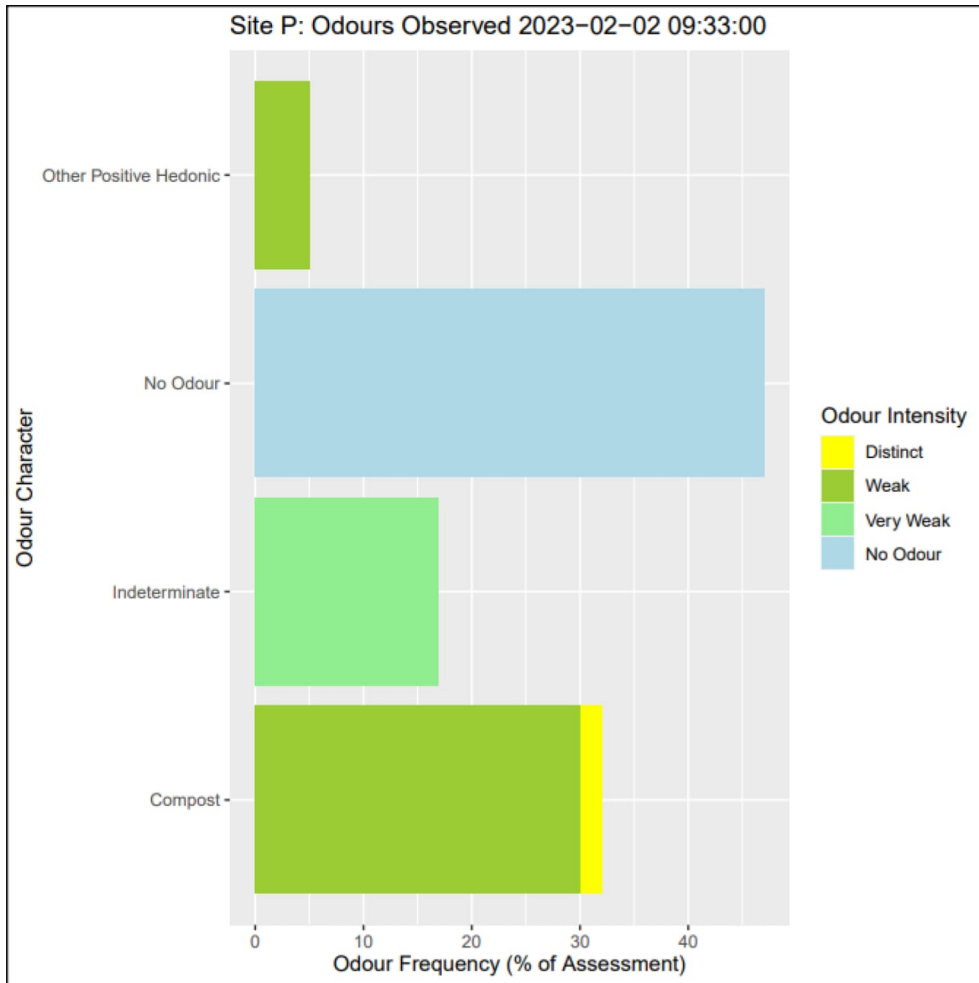


Figure 5: Site P Odours Observed, 02/02/2023 09:33

Site P, on Bayswater Crescent is in the residential zone.

The weak (2) odour with a positive hedonic tone had a floral character.

Typically, intermittent distinct (3) or continuous weak (2) odours of a negative hedonic tone (such as compost) would be considered offensive or objectionable in a residential zone.

The odour observed at Site D (Woburn Street) was an intermittent weak (2) odour, not continuous. A single observation (10 seconds in 10 minutes) of distinct (3) compost odour does not establish an intermittent odour. In isolation, PDP does not consider this to meet the threshold of offensive or objectionable odour.

An assessment of the longer-term odour exposure on the day is provided in Section 3.1.4.

3.1.4 Longer Durations of Odour Exposure on the 2nd February 2023

In isolation, the short duration and infrequent (i.e., observed for less than 1 minute in 10 minutes) distinct (3) odours observed at Sites E, P and D, are not considered acutely offensive or objectionable. This level of odour however could become offensive or objectionable if it occurred over a longer timeframe:

- ∴ During the 20-minute period prior to the Site D FIDOL assessment, the scout detected no distinct odours while walking through the residential area (although the area travelled was at a greater downwind distance than Site D).
- ∴ After the Site D assessment, there was a further 20-minute window where the scout was walking through the residential area from Site D to Site K via Sites O, P, E and L (which are at a comparable downwind distance as Site D) in which no distinct (3) compost odours were noted. This implies that distinct (3) odours were highly infrequent during the first period of the scout.
- ∴ On the return leg of the scout, distinct (3) odour was detected during the 10-minute FIDOL assessments at Sites E and P. A spot observation of distinct (3) odour was also made at Site D at this time. This indicates that distinct (3) compost odours were occurring consistently in an intermittent manner over an approximately 30-minute period.
- ∴ During the following 15 minutes, the scout returned to their vehicle, visiting Sites B and A and making a full 10-minute FIDOL assessment at Site C. No distinct odours were detected during this section of the scout.

The residential area around Sites D, E and P consistently experienced intermittent distinct (3) compost odours as observed by PDP odour scout between 9:19 and 9:46. The wind direction during the scout predominately coming from an ENE direction, shifting between NE and ESE. After the scout finished, NE conditions largely persisted, shifting towards NNE into the afternoon/evening. Windspeeds after the scout finished continued to fluctuate (between 2 m/s and 7 m/s); this is similar to the conditions experienced by the scout when onsite. It is therefore likely that intermittent, distinct (3) compost odours were present in the residential area (around Sites D, E and P) over the day. PDP considers that, on the balance of the evidence, this odour was offensive or objectionable.

There is no evidence that the residential areas south of Sites P and D experienced intermittent distinct (3) or continuous weak (2) compost odours on the 2nd February. Therefore, PDP does not consider those areas would have experienced an offensive or objectionable odour on this day.

3.2 3rd February 2023

██████████ was the PDP odour scout. The scout was present for approximately forty minutes. The temperature was 27 °C with windspeeds ranging from 3.7 m/s to 3.8 m/s as a 10-minute average from an ESE direction. The scout started and finished at Site L. Broadly, the scout worked from the residential zone towards the site, until the plume was encountered. The odour scout route (orange dots) and key scouting locations are shown in **Figure 6**.



Figure 6: 3rd February 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: 3rd February Odour Scouting Summary

Site	Time	Observations
L to E	16:17	No odour detected.
E to F		No odour detected.
F	16:24	FIDOL assessment completed. No odour was present 93% of the time. Very weak (1) odours of an indeterminate character were present 7% of the time. Odour assessed as not offensive or objectionable.
F to H		Intermittent compost odours, ranging from no odour (0) to distinct (3) observed.
H	16:31	FIDOL assessment completed. A constant compost odour was present, weak (2) 7% of the time and distinct (3) 97% of the time. Odour assessed as not offensive or objectionable.
H to F		Intermittent compost odours, ranging from no odour (0) to distinct (3) observed.
F to E		No odour detected.
E to L		No odour detected.

Consistent compost odours were detected close to the LE site. Compost odours were not detected along Maces Rd at the residential/industrial boundary. This is likely due to the ESE wind direction. No sulphur odours from the estuary (due to decomposing sea lettuce) were detected in the ESE conditions.

Site H is within the heavy industrial zone. Odours that would be meet the threshold of offensive or objectionable odour in a residential zone will not necessarily be offensive or objectionable in the industrial area.

The character of the compost odour matched PDP's experience with the odour generated by the outdoor material, namely the unscreened compost, oversize stockpiles and screened fines. The odour did not match PDP's experience with the odour from the processing hall or associated biofilter.

3.3 7th February 2023

[REDACTED] were present as PDP odour scouts. The scouts were present from 09:30 to 11:00, for approximately one and a half hours. The temperature was 21 °C with windspeeds ranging from 4.8 m/s to 5.2 m/s as a 10-minute average. The wind was predominately coming from an ENE direction. The scouts started and finished at Site D. Broadly, the scouts walked through the residential zone along Bayswater Crescent then looped through the industrial zone to locate the odour plume. At Site L, the scouts took alternate routes through the residential zone to Seaside Gardens (via Site O and Site B) before finishing. The odour scout route (blue dots) and key scouting locations are shown in **Figure 7**. The yellow dots show the alternate route of the second scout through the residential zone.



Figure 7: 7th February 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: 7th February Odour Scouting Summary

Site	Time	Observations
D	09:30	No odour detected.
P	09:32	No odour detected.
E		No odour detected.
F		No odour detected.
F to G	09:39	First detection of weak (2) compost odour.

Table 3: 7th February Odour Scouting Summary

Site	Time	Observations
G	09:42	<p>FIDOL assessment completed. No odour was present 38% of the time. Very weak (1) odours of an indeterminate character were present 27% of the time. Weak (2) compost odour was present 27% of the time. Weak (2) rubbish odour was present 3% of the time. Distinct (3) compost odour was present 6% of the time.</p> <p>Odour assessed as not offensive or objectionable.</p>
H	09:53	<p>Odour more frequent than at Site G, some intermittent strong (4) compost odours detected.</p>
I	09:57	<p>Intermittent weak (2) compost odour and weak (2) solvent odour detected.</p>
N	09:59	<p>FIDOL assessment completed. No odour was present 24% of the time. Very weak (1) odours of an indeterminate character were present 13% of the time. Weak (2) compost odour was present 53% of the time. A weak (2) solvent odour with a negative hedonic tone was present 2% of the time. Distinct (3) compost odour was present 8% of the time.</p> <p>Odour assessed as not offensive or objectionable.</p>
J	10:14	<p>No odour detected.</p>
K	10:19	<p>FIDOL assessment completed. No odour was present 30% of the time. Very weak (1) odours of an indeterminate character were present 10% of the time. Weak (2) compost odour was present 59% of the time. Distinct (3) compost odour was present 1% of the time (a single observation).</p> <p>Odour assessed as not offensive or objectionable.</p>
L	10:34	<p>Intermittent weak (2) solvent odour detected. No compost odour detected.</p>
D	10:37	<p>FIDOL assessment completed. No odour was present 93% of the time. Weak (2) marine (positive hedonic tone) odour was present 2% of the time. A weak (2) odour of burnt diesel with a negative hedonic tone was present 5% of the time. No compost odour was detected during assessment.</p> <p>Odour assessed as not offensive or objectionable.</p>
B	10:48	<p>Weak (2) grass odour (positive hedonic tone) detected. No compost odour detected.</p>
C	10:50	<p>No compost odour detected, however green bins were kerbside for collection and a weak (2) organic odour from them was detectable.</p>
Alternate Scout Route		
O	10:38	<p>Alternate route taken by second odour scout to cover more residential zone.</p> <p>FIDOL assessment completed. No odour was present 31% of the time. Weak (2) marine (estuary) odour was present 58% of the time. Weak (2) compost odour was present 12% of the time.</p> <p>Odour assessed as not offensive or objectionable.</p>

Table 3: 7th February Odour Scouting Summary

Site	Time	Observations
C	10:50	No compost odour detected, however green bins were kerbside for collection and a weak (2) organic odour from them was detectable.

The ENE wind direction appears to have resulted in a plume centreline approximately through Sites H, N, K, and O. By Site O, compost odours were intermittently weak (2) and not considered offensive or objectionable in a residential zone.

The character of the compost odour matched PDP’s experience with the odour generated by the outdoor material, namely the unscreened compost, oversize stockpiles and screened fines. The odour did not match PDP’s experience with the odour from the processing hall or associated biofilter.

Estuary odours detected in the residential area were positive hedonic tone marine (salty) odours, not negative hedonic tone sulphur odours that can arise from sea lettuce decomposition.

3.4 9th February 2023

██████████ was the PDP odour scout. The scout was present for approximately one hour. The temperature was 18 °C with windspeeds ranging from 5.7 m/s to 6.1 m/s as a 10-minute average from an E to ENE direction. The scout started and finished at Bromley Road. Broadly, the scout worked along the industrial/residential boundary before looping through the industrial zone until the plume was encountered. The odour scout route (green dots) and key scouting locations are shown in **Figure 8**.



Figure 8: 9th February 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: 9 th February Odour Scouting Summary		
Site	Time	Observations
Bromley Rd to O	11:34	No odour detected.
O to L		No odour detected.
L to K		No odour detected.
K to J		No odour detected.
J to H		No odour detected.
H to G		Intermittent weak (2) compost odours detected.

Table 4: 9 th February Odour Scouting Summary		
Site	Time	Observations
G	12:04	FIDOL assessment completed. No odour was present 73% of the time. Very weak (1) odours of an indeterminate character were present 20% of the time. Weak (2) compost odour was present 7% of the time. Odour assessed as not offensive or objectionable.
G to F		Intermittent compost odours, ranging from no odour (0) to distinct (3) observed.
F	12:12	FIDOL assessment completed. No odour was present for 2% of the time. Very weak (1) odours of an indeterminate character were present for 10% of the time. Weak (2) compost odour was present 72% of the time. Distinct (3) compost odour was present 17% of the time. Odour assessed as not offensive or objectionable.
F to E		Intermittent compost odours, ranging from no odour (0) to distinct (3) observed.
E to L		No compost odour detected. Paint odour present near Ferry Paint and Panel.
L	12:25	FIDOL assessment completed. No odour was present for 95% of the time. Very weak (1) odours of an indeterminate character were present for 2% of the time. Weak (2) compost odour was present 3% of the time. Odour assessed as not offensive or objectionable.
L to Bromley Rd		No odour detected.

Compost odours were detected close to the LE site. Compost odours were not detected along Maces Rd at the residential /industrial boundary (with the exception of 3% weak odours at Site L). This is likely due to the E wind direction. No sulphur odours from the estuary (due to decomposing sea lettuce) were detected in the E conditions.

The character of the compost odour matched PDP's experience with the odour generated by the outdoor material, namely the unscreened compost, oversize stockpiles and screened fines. The odour did not match PDP's experience with the odour from the processing hall or associated biofilter.

3.5 10th February 2023

██████████ was the PDP odour scout. The scout was present for approximately one hour. The temperature was 12 °C with windspeeds ranging from 8.8 m/s to 9.1 m/s as a 10-minute average from a NE direction. The scout started and finished at Site L (Newton Street). Broadly, the scout walked a loop through the residential zone before walking in the industrial zone up Dyers Rd towards the site/odour source. The odour scout route (light blue dots) and key scouting locations are shown in **Figure 9**.

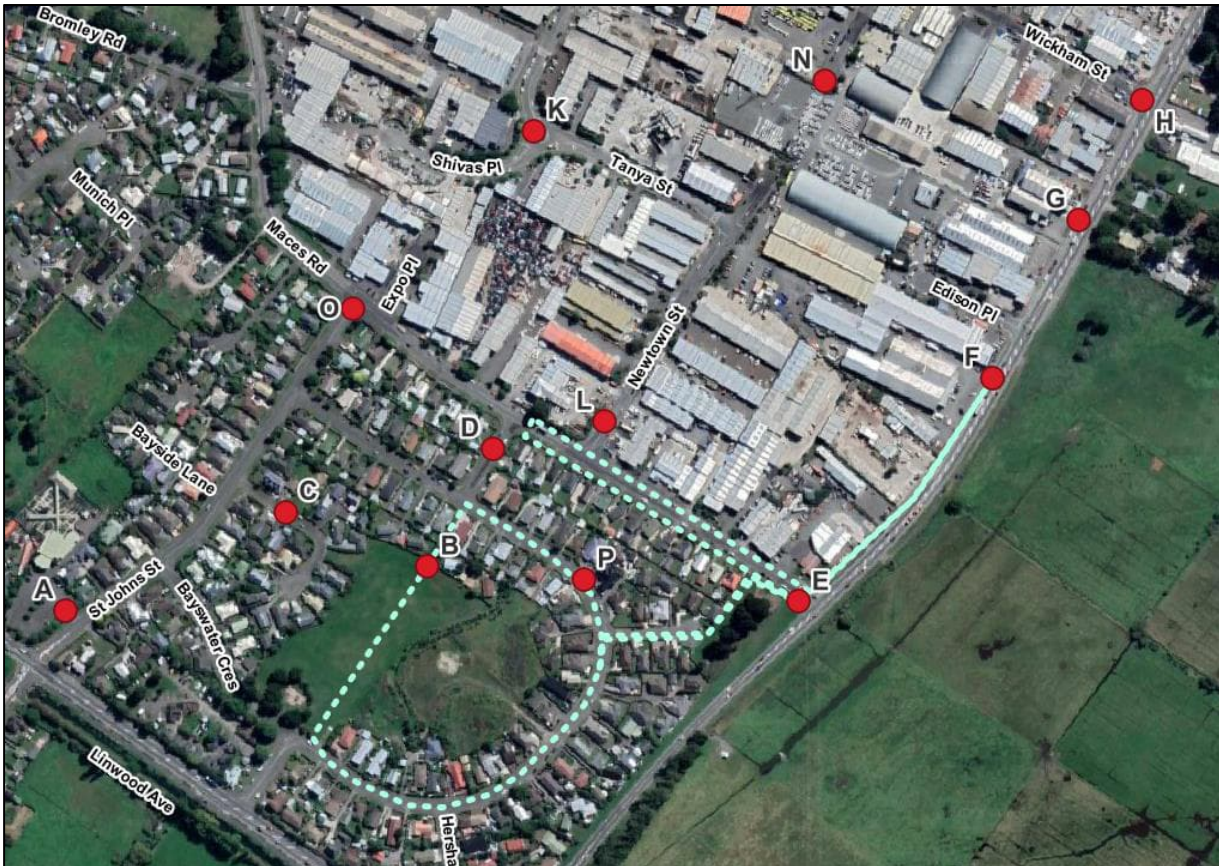


Figure 9: 10th February Odour Scout Route

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: 10 th February Odour Scouting Summary		
Site	Time	Observations
L to E		No odour detected along initial section of Macas Rd; compost odour encountered near Site E.
E	15:23	FIDOL assessment completed. No odour was present for 10% of the time. Very weak (1) odours of an indeterminate character were present for 17% of the time. Weak (2) compost odour was present 63% of the time. Distinct (3) compost odour was present 10% of the time. Odour assessed as being offensive or objectionable if in a residential area, results are discussed further in Section 3.5.1.

Table 5: 10 th February Odour Scouting Summary		
Site	Time	Observations
E to B		Walked clockwise around Bayswater Crescent. No compost odour detected.
B to P		No odour detected.
P	15:47	FIDOL assessment completed. No odour was present 43% of the time. Very weak (1) odours of an indeterminate character were present 23% of the time. Weak (2) compost odour was present 33% of the time. Odour assessed as not offensive or objectionable, results are discussed further in Section 3.5.1.
P to E		Intermittent compost odours, ranging from no odour (0) to weak (2) observed.
E to F		Intermittent compost odours, ranging from no odour (0) to distinct (3) observed.
F	16:01	FIDOL assessment completed. No odour was present for 5% of the time. Very weak (1) odours of an indeterminate character were present for 13% of the time. Weak (2) compost odour was present 45% of the time. Distinct (3) compost odour was present 37% of the time. Odour assessed as not offensive or objectionable, results are discussed further in Section 3.5.1.
F to E		Intermittent compost odours, ranging from no odour (0) to distinct (3) observed.
E to L		No compost odour detected near Site L; compost odour encountered near Site E.

The character of the compost odour matched PDP’s experience with the odour generated by the outdoor material, namely the unscreened compost, oversize stockpiles and screened fines. The odour did not match PDP’s experience with the odour from the processing hall or associated biofilter.

The detailed assessment, which considers the results for Sites F, E and P, is provided in Section 3.5.1.

3.5.1 10th February - Sites F, E and P - FIDOL

The three FIDOL assessments undertaken on the 10th February (Sites F, E and P) occur in a line downwind of the site.

Site F is in the industrial zone. Odours detected during the 10-minute assessment at Site F are summarised below in **Figure 9**.

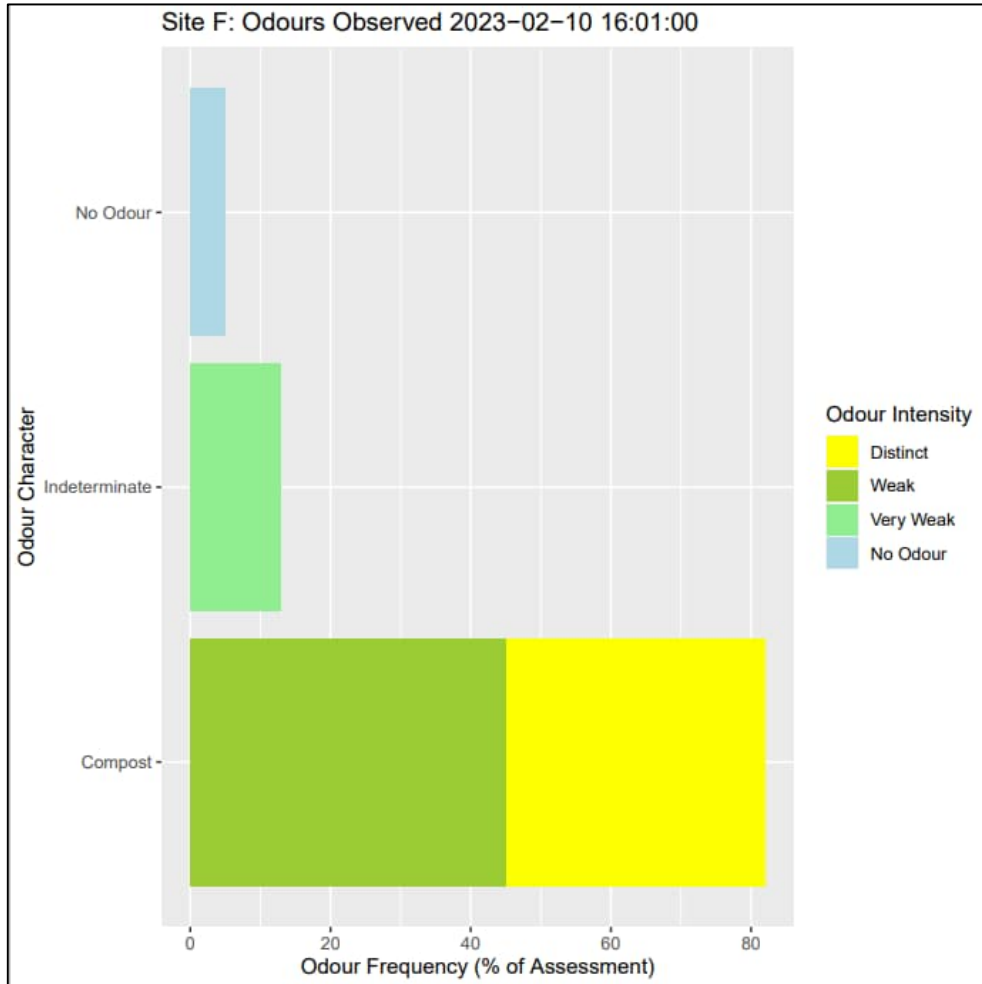


Figure 10: Site F Odours Observed, 10/02/2023 16:01

Site E, on the corner of Dyers Road and Maces Road, represents the border between the industrial and residential zones. The closest residence is 60 metres to the south-west. Odours detected during the 10-minute assessment at Site E are summarised below in **Figure 11**.

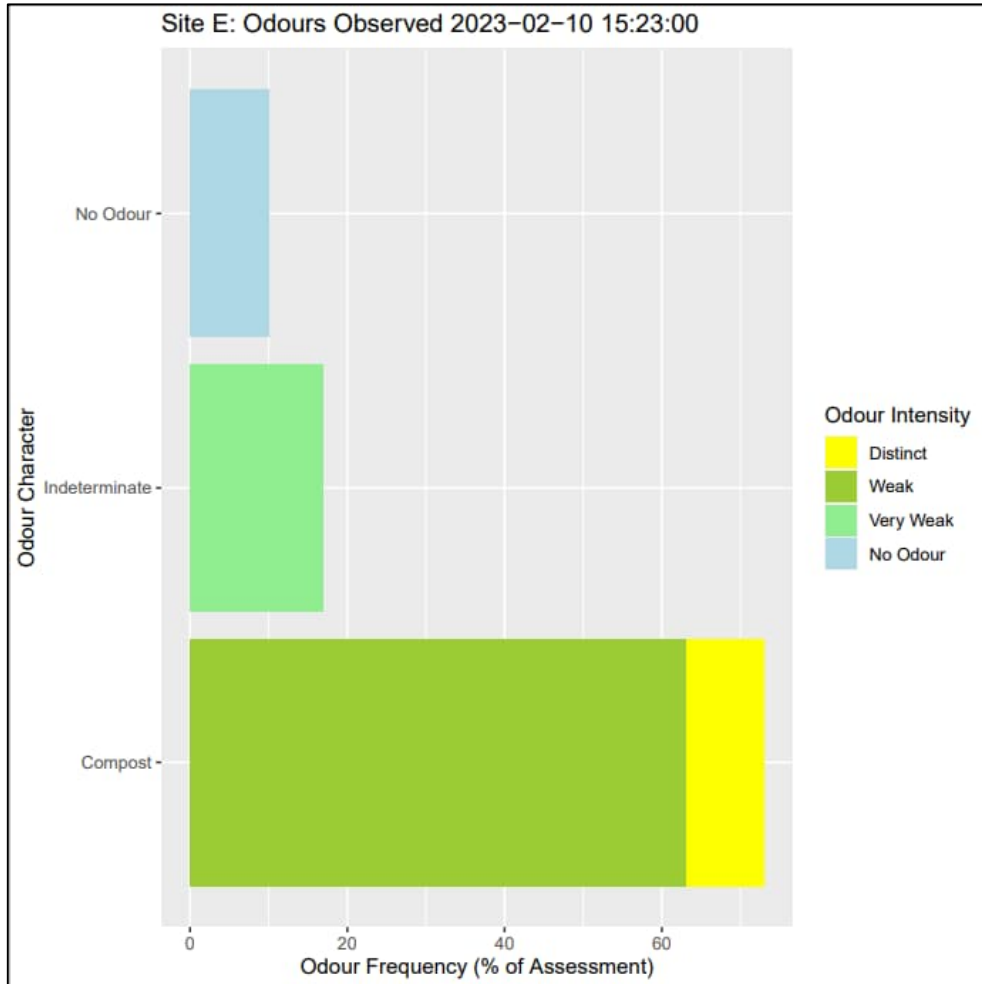


Figure 11: Site E Odours Observed, 10/02/2023 15:23

Site P is in the residential zone. Odours detected during the 10-minute assessment at Site P are summarised below in **Figure 12**.

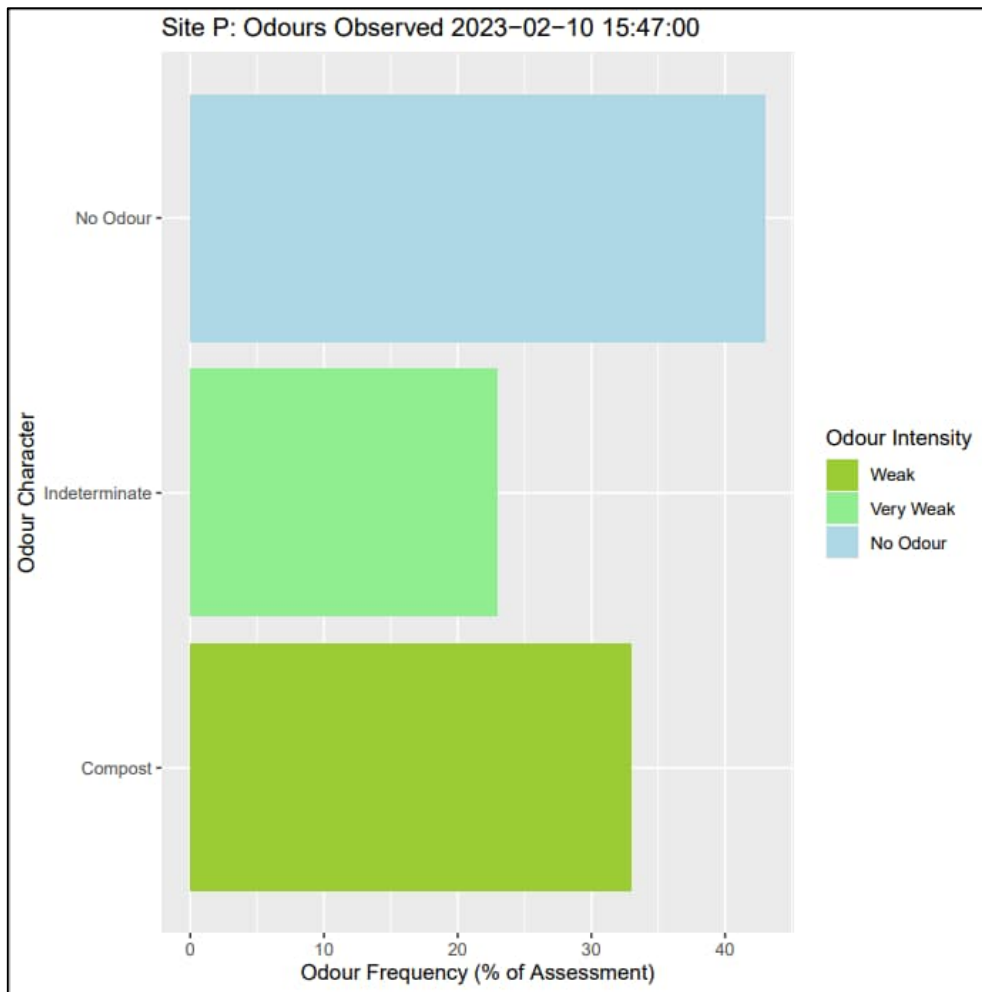


Figure 12: Site P Odours Observed, 10/02/2023 15:47

Compost odours recognised in the three assessments are summarised below:

- ∴ Site F - odour was recognised weakly (2) 45% of the time and distinctly (3) 37% of the time (82% total).
- ∴ Site E - odour was recognised weakly (2) 63% of the time and distinctly (3) 10% of the time. (73% total).
- ∴ Site P - odour was recognised weakly (2) 33% of the time with no distinct (3) odour detected (33% total).

The monitoring shows a clear trend of decreasing odour intensity with downwind distance from the site.

Typically, intermittent distinct (3) or continuous weak (2) odours of a negative hedonic tone (such as compost) would be considered offensive or objectionable in a residential zone.

PDP would consider the odour at Site E, experienced over any significant period of time in a residential zone to be offensive or objectionable. PDP would not consider the same level of odour to be offensive or objectionable in an industrial zone.

Wind directions at the site were consistently NE over the course of the day (09:00 to 17:00). Later in the day (after 17:00), the wind gradually shifted to an ENE direction. Windspeeds remained in the 8 m/s to

10 m/s range over the same period. It is therefore likely that the odour conditions observed during the scout were generally representative of the conditions in the area at other times on the same day.

Considering these factors, PDP considers the odour:

- ∴ At Site F was not offensive or objectionable.
- ∴ At Site E was offensive or objectionable for a residential zone; and,
- ∴ At Site P in the residential zone was not offensive or objectionable.

Accordingly, we consider that the odour was offensive or objectionable in a small section of the residential area. The section of the residential zone where offensive or objectionable odours were present was likely limited to the area upwind of Site P, towards Site E.

Compost odours were not noted near Site L, nor along Bayswater Crescent south of Site P. This further supports the conclusion that the intermittent distinct (3) and high frequency weak (2) compost odours observed at Site E were likely limited to a small section of the residential area.

3.6 12th February 2023

██████████ was the PDP odour scout. The scout was present for approximately forty minutes in the area. The temperature was 20 °C with windspeeds ranging from 6.8 m/s to 7.4 m/s as a 10-minute average from an ENE direction. The scout started at Site E and finished at Site G. Broadly, the scout completed a loop through the residential zone before walking the industrial zone up Dyers Rd towards the site/odour source. The odour scout route (light blue dots) and key scouting locations are shown in Figure 13.



Figure 13: 12th February 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: 12th February Odour Scouting Summary

Site	Time	Observations
E	16:52	FIDOL assessment completed. No odour was detected after approx. seven minutes. Odour assessed as not offensive or objectionable.
D	16:58	FIDOL assessment completed. No odour was present 58% of the time. Very weak (1) odours of an indeterminate character were present 23% of the time. Weak (2) compost odour was present 18% of the time. Odour assessed as not offensive or objectionable.

Table 6: 12th February Odour Scouting Summary

Site	Time	Observations
C	17:09	FIDOL assessment completed. No odour was present 82% of the time. Very weak (1) odours of an indeterminate character were present 8% of the time. Weak (2) compost odour was present 10% of the time. Odour assessed as not offensive or objectionable.
O		No odour detected.
O to E		Intermittent compost odours, ranging from no odour (0) to weak (2) observed.
G	17:17	FIDOL assessment completed. Weak (2) compost odour was present 2% of the time. Distinct (3) compost odour was present 95% of the time. Distinct (3) rubbish odour was present 3% of the time. Odour assessed as not offensive or objectionable.

Intermittent weak (2) compost odours were present in the residential area. PDP does not consider this to constitute an offensive or objectionable odour on the day.

The character of the compost odour matched PDP’s experience with the odour generated by the outdoor material, namely the unscreened compost, oversize stockpiles and screened fines. The odour did not match PDP’s experience with the odour from the processing hall or associated biofilter.

4.0 Summary

PDP undertook odour scouting on six occasions between the 1st February 2023 and the 12th February 2023. Plots of the raw results from each 10-minute assessment, summarised by monitoring location are appended to this memorandum.

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:

∴ 2nd February 2023:

On the balance of the available evidence, PDP considers the odour was likely to have been offensive or objectionable in the residential area around Sites D, E and P over the course of the afternoon. PDP does not consider the residential areas south of Sites P and D to have experienced an offensive or objectionable odour.

∴ 3rd February 2023:

No odour detected along the boundary of the residential and industrial zones. PDP does not consider the odour detected in the industrial zone was offensive or objectionable.

∴ 7th February 2023:

PDP does not consider the odour detected during the scout was offensive or objectionable.

∴ 9th February 2023:

No odour detected along the boundary of the residential and industrial zones. PDP does not consider the odour detected in the industrial zone was offensive or objectionable.

∴ 10th February 2023:

PDP considers the odour observed at the Maces Rd/Dyers Rd intersection (Site E) was offensive or objectionable for a residential zone and would have been experienced in a small part of the residential zone. Odour observations at Site P (and further south and west) in the residential zone indicate the extent of offensive or objectionable odours in the residential zone was likely limited to the residences close to Site E.

∴ 12th February 2023:

Intermittent, weak (2) compost odours were present in sections of the residential area during the scout. PDP does not consider this to constitute an offensive or objectionable odour.

The character of the compost odour matched PDP's experience with the odour generated by the outdoor material, namely the unscreened compost, oversize stockpiles and screened fines. The odour did not match PDP's experience with the odour from the processing hall or associated biofilter.

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.

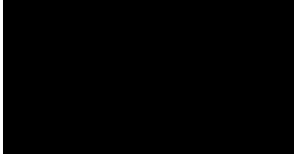
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Prepared by



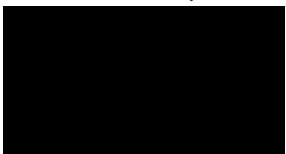
Senior Environmental Engineer

Prepared by



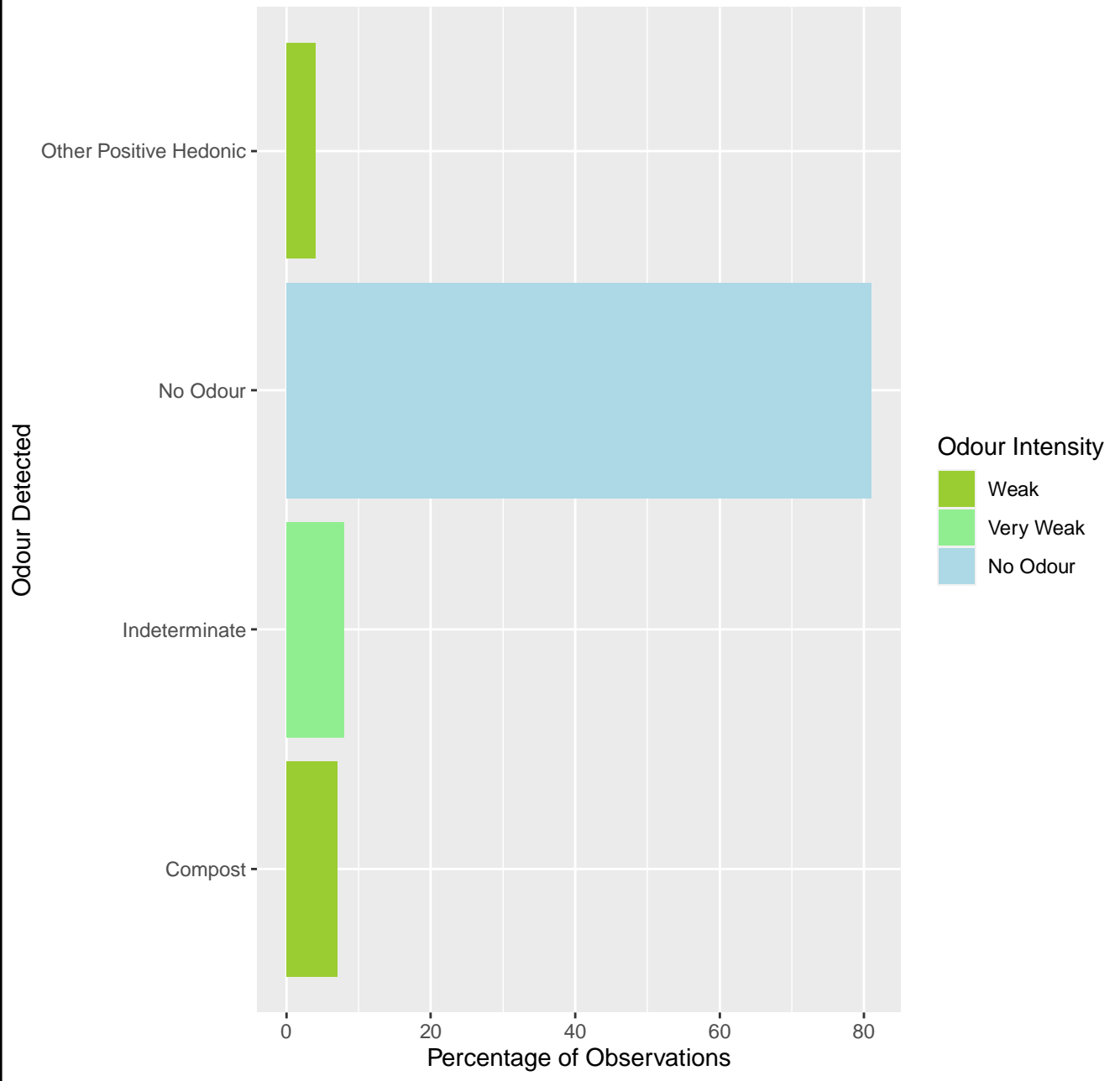
Air Quality Engineer

Reviewed by



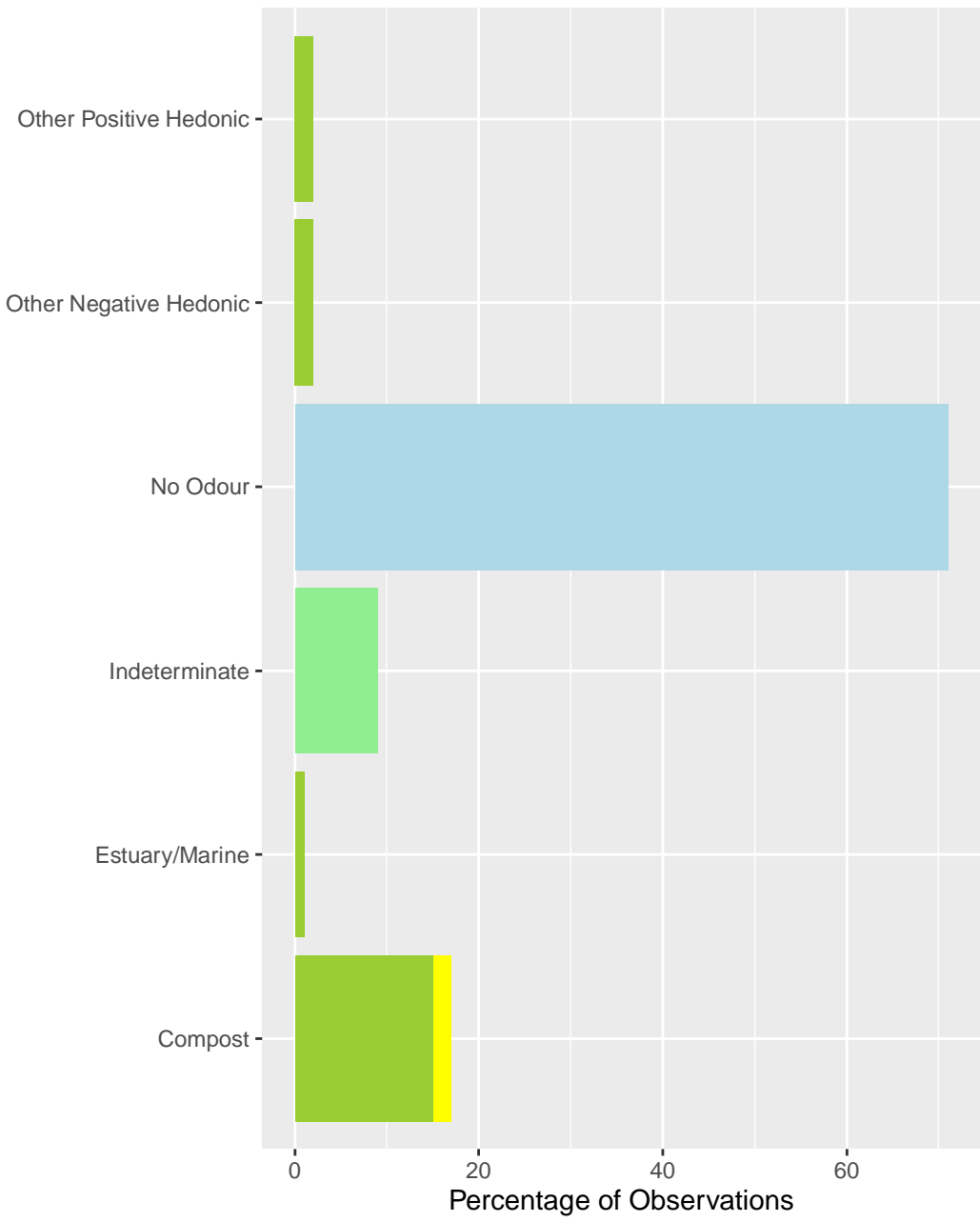
Technical Director

Site C : Summary of Odours Detected at Site



Site D : Summary of Odours Detected at Site

Odour Detected



Odour Intensity

- Distinct
- Weak
- Very Weak
- No Odour

Site E : Summary of Odours Detected at Site

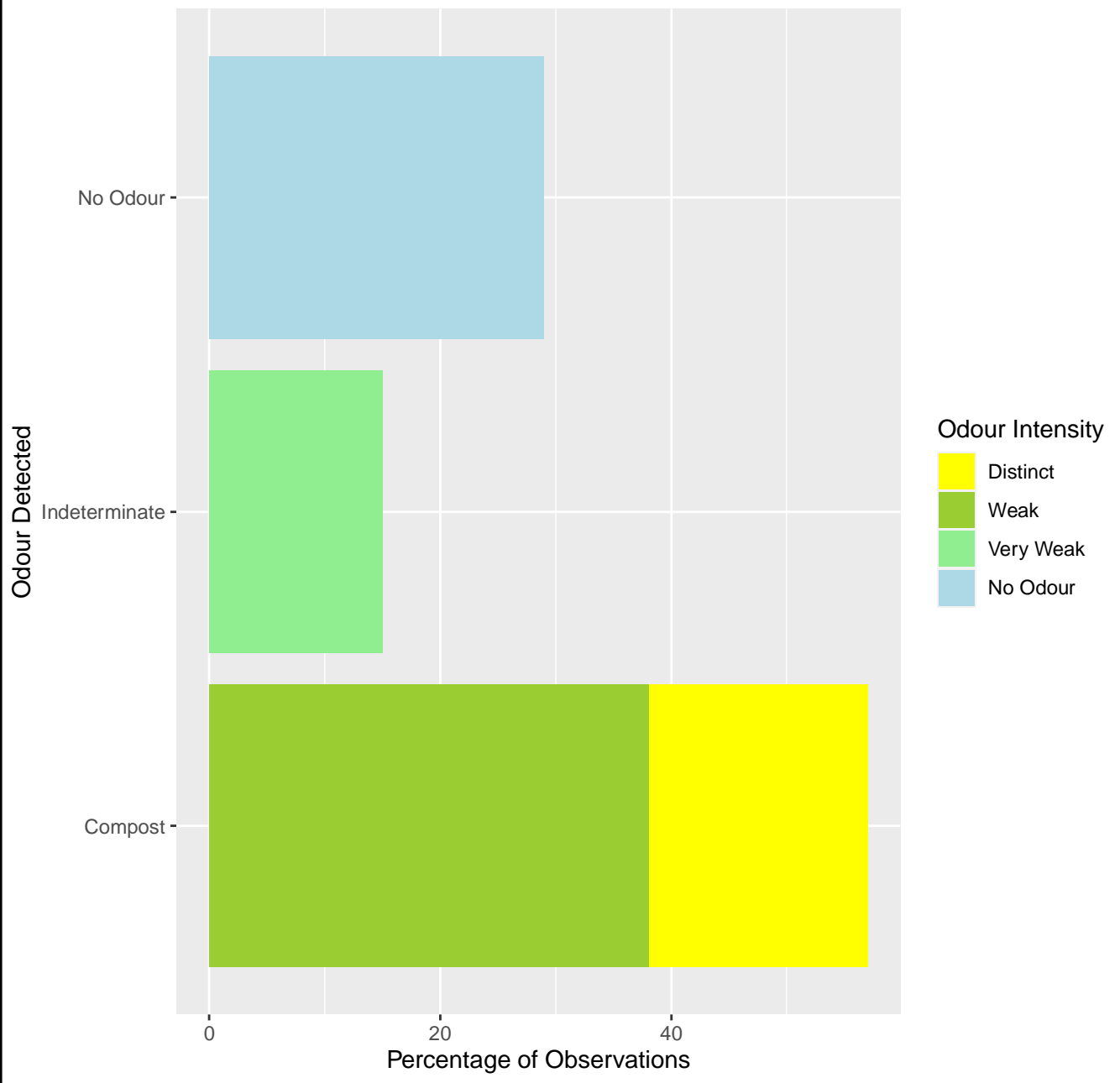
Odour Detected



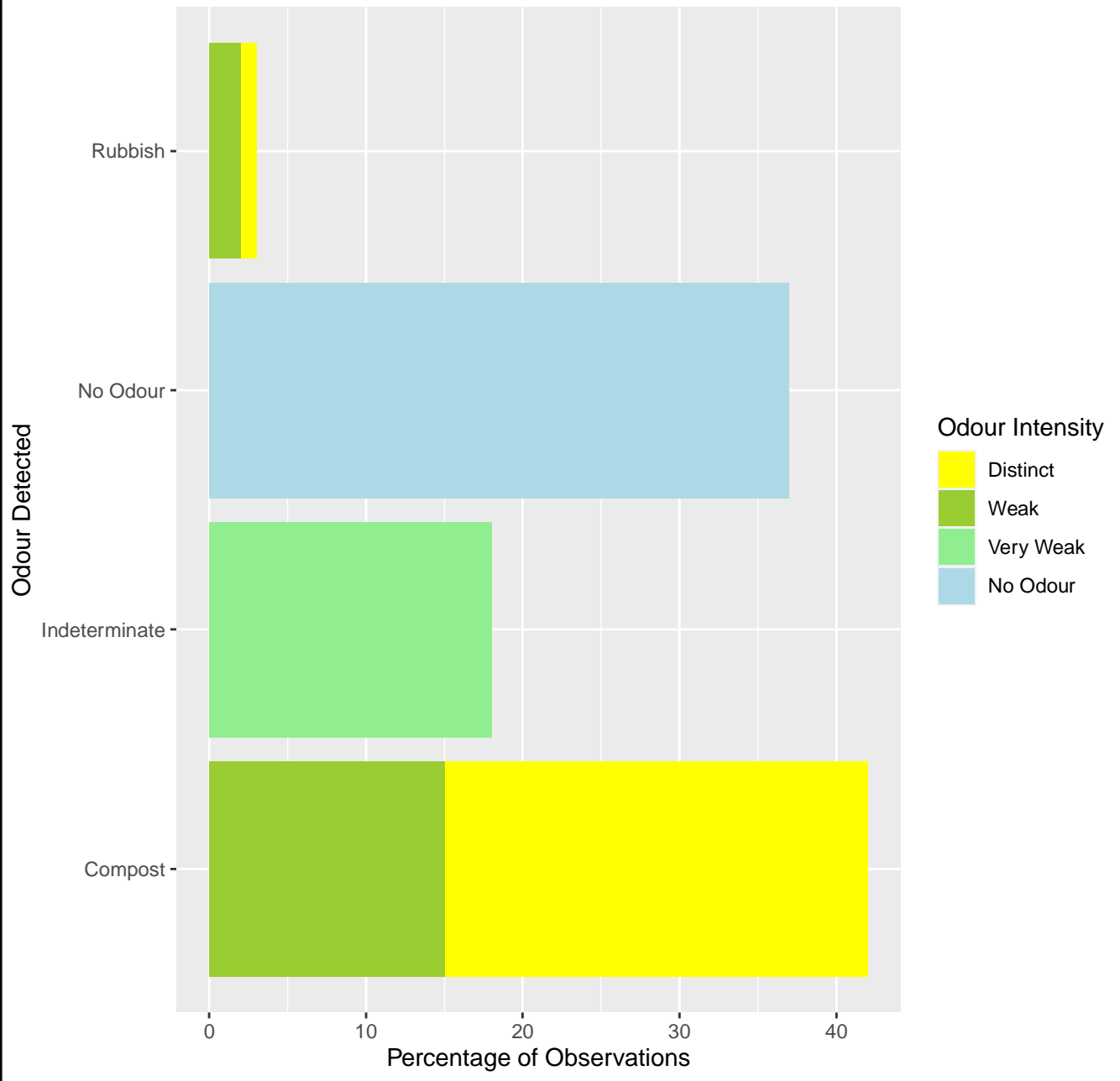
Odour Intensity

- Distinct
- Weak
- Very Weak
- No Odour

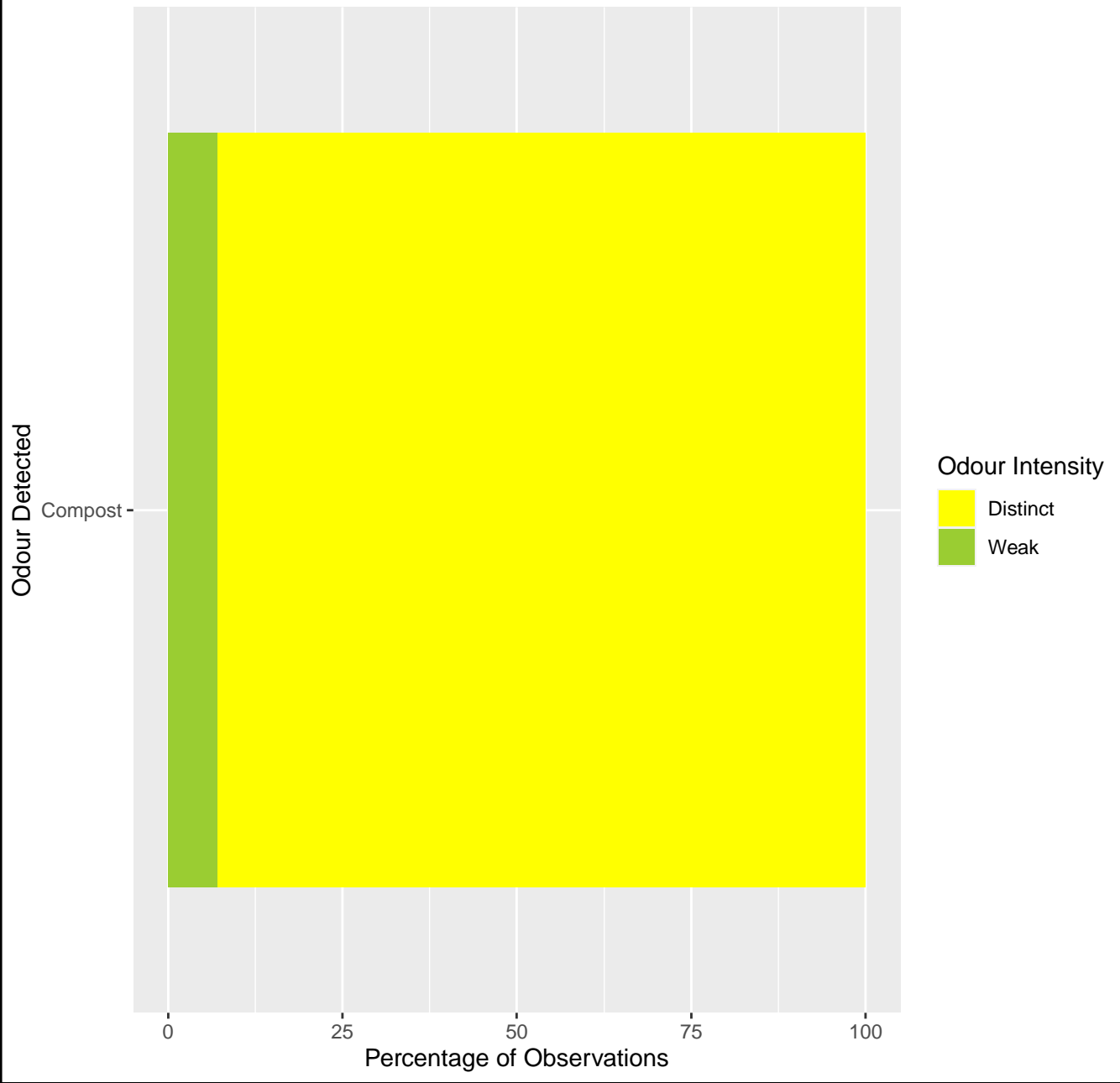
Site F : Summary of Odours Detected at Site



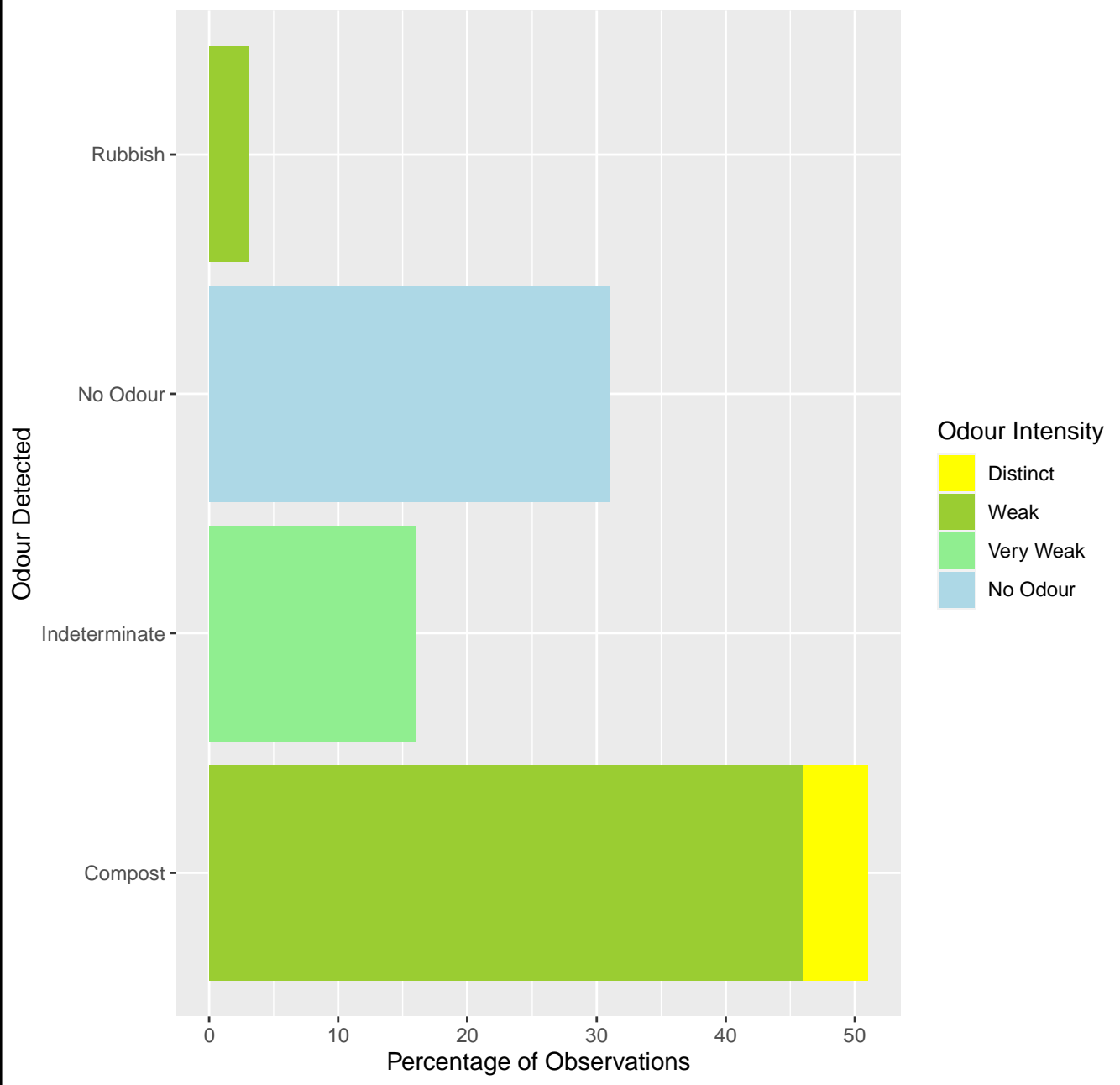
Site G : Summary of Odours Detected at Site



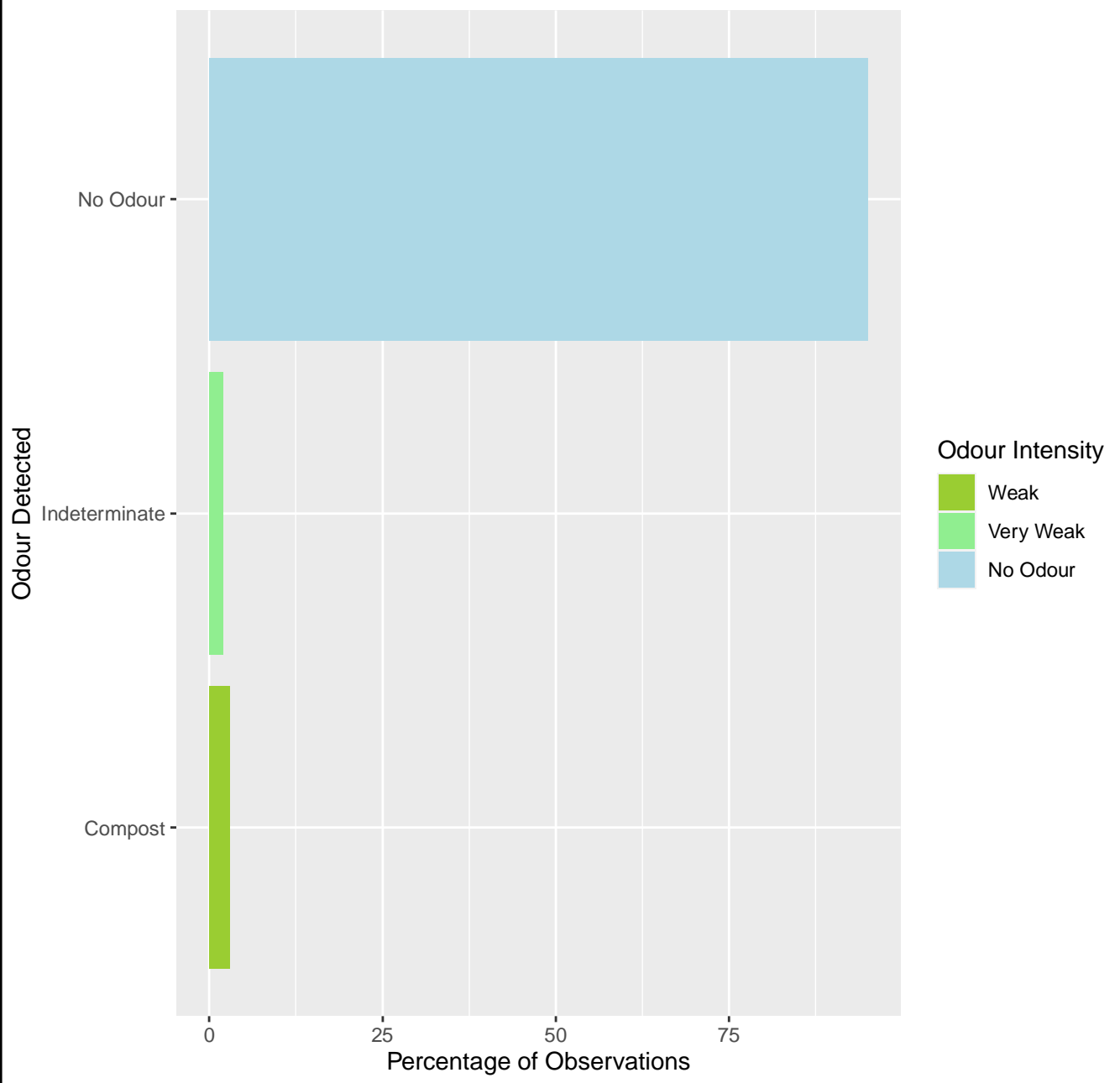
Site H : Summary of Odours Detected at Site



Site K : Summary of Odours Detected at Site



Site L : Summary of Odours Detected at Site



Site N : Summary of Odours Detected at Site

Odour Detected

Other Negative Hedonic

No Odour

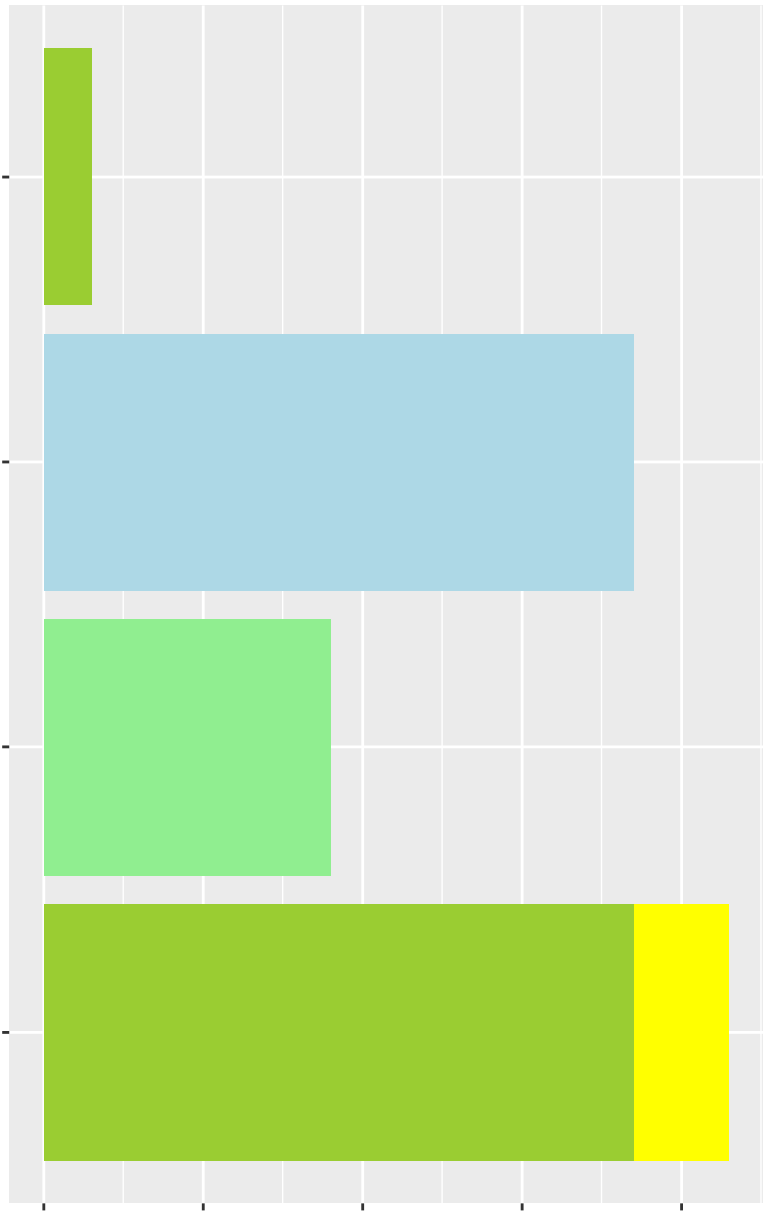
Indeterminate

Compost

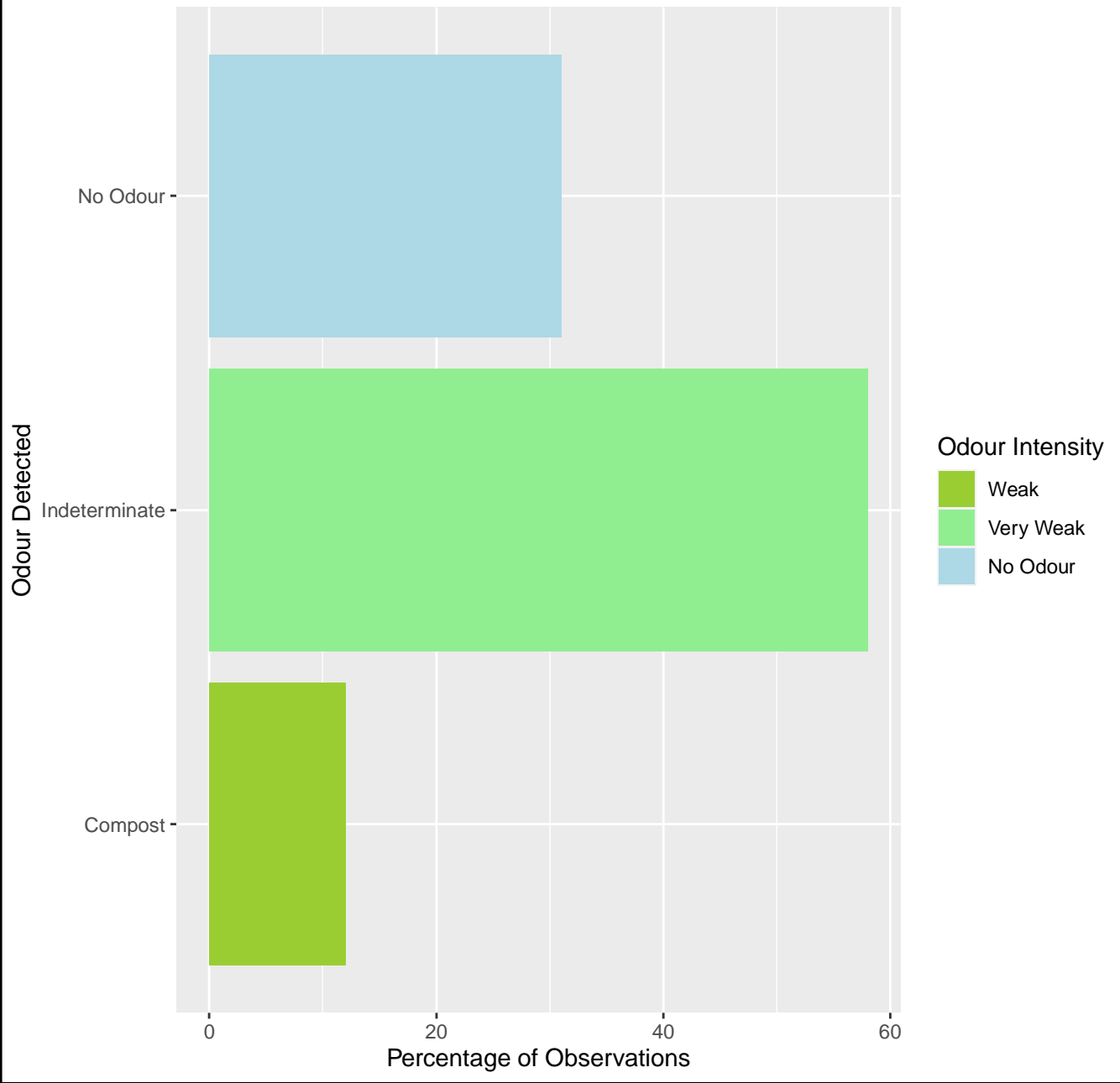
Odour Intensity

- Distinct
- Weak
- Very Weak
- No Odour

Percentage of Observations



Site O : Summary of Odours Detected at Site



Site P : Summary of Odours Detected at Site

