Graphical Summary of Jerome Measurements For the Second Quarter 2022.

Introduction.

This report provides a graphical summary of the findings of deployments of the Council`s Jerome hydrogen sulphide monitoring instruments for the first quarter of 2022. Each graph shows concentration (ppb) plotted against time.

The Jeromes were deployed at selected properties, where they were left to continuously monitor ambient concentrations of hydrogen sulphide, taking a measurement every 10 minutes. The aim was to deploy the instruments at properties which would be downwind of Walleys Quarry, or at least in close proximity of the site, during the deployment period.

The findings of previous deployments are given within a previous reports ` Graphical Summary of Jerome Measurements From August 2021 Onwards` and `Graphical Summary of Jerome Measurements for the First Quarter 2022`.

The assessment criteria provided by the World Health Organisation, relating to annoyance and health impacts, and the relationship between hydrogen sulphide concentration and odour intensity are described below.

Assessment Criteria

With regards to health impacts, there is no statutory limit which relates to environmental exposure to hydrogen sulphide. However, the World Health Organisation has produced an air quality guideline for the avoidance of annoyance at 7 $\mu g/m^3$ averaged over 30mins, which approximates to 5 parts per billion (ppb) averaged over 30 minutes. This is equates to a distinct odour (perceived intensity score of 3) and is the threshold of recognition of hydrogen sulphide (i.e. the concentration at which 5O% of the population would recognise the odour as H2S).

The World Health Organisation has also produced an air quality guideline for the protection of health - 150 $\mu g/m^3$ averaged over 24 hours, which equates to 100ppb averaged over 24 hours. This is 100^{th} of the concentration identified as resulting in the onset of health impacts, namely eye irritation, which begin to occur at 10 parts per million (i.e. 10 000 ppb).

As described within the DEFRA publication `Odour Guidance for Local Authorities March 2010`, the characteristics of an odour affects the impact. Fairly regular exposure to some strong odours, even for short periods, can be both objectionable and offensive, such as in the case of hydrogen sulphide. Also, the concentration at which these odours become a statutory nuisance could be relatively low if they are persistent and frequent.

With regards to odour, by applying the Weber-Fechner Law, the perceived odour intensity (scored from 0 to 6) for hydrogen sulphide can be estimated from the measured concentration as described within the table below:

Odour Strength	Perceived Intensity	Approximate Concentration (ug/m3)	Approximate Concentration (ppb)
Extremely strong	6	148	99
Very strong	5	57	38

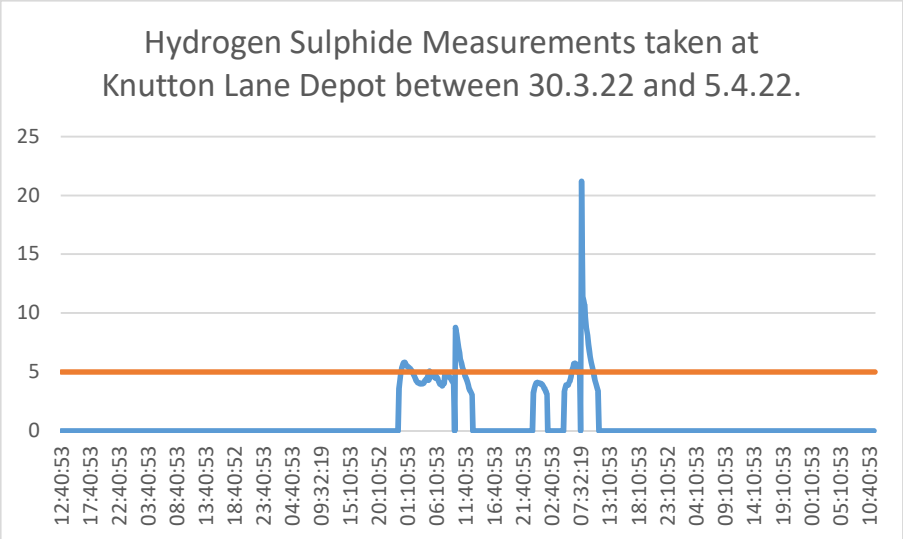
Strong	4	22	14
Distinct	3	7	5
Weak/faint	2	3	2
Very weak/very faint	1	0.7	0.5
Not perceptible/no odour	0	0	0

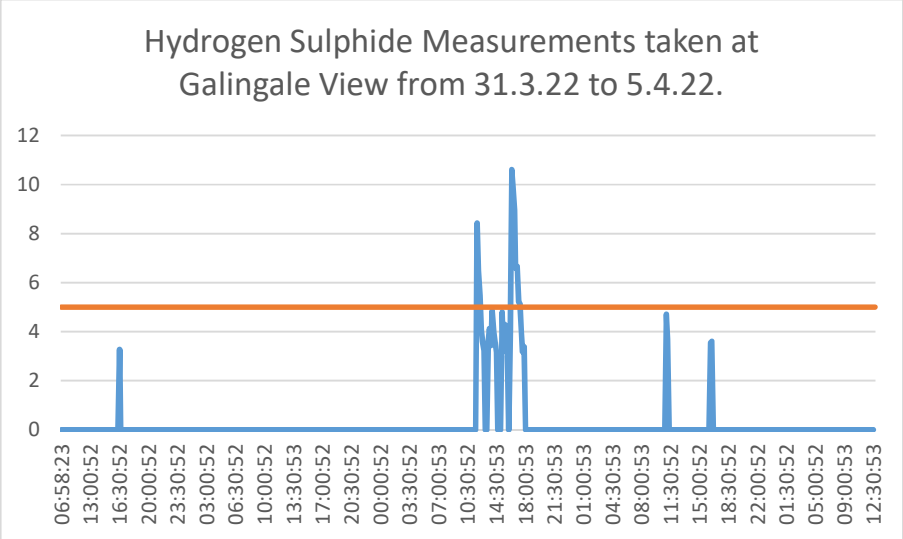
Note: The exact conversion between ppm and µg/m^3 is proportional to temperature and atmospheric pressure.

The limit of detection of the Jerome J605 is 3ppb. Any measurement below this value would be reported as 0. This does not necessarily mean that odour or gases associated with the landfill were absent, it can only be said that hydrogen sulphide concentration was below 3ppb at the time of measurement.

Deployments to Properties.

A graphical representation of each deployment of the instruments is given below.




Hydrogen Sulphide Measurements taken at Galingale View from 31.3.22 to 5.4.22.
12
10
8
6
4
2
0
06:58:23
13:00:52
16:30:52
20:00:52
23:30:52
03:00:52
06:30:52
10:00:52
13:30:53
17:00:52
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00:00:52
03:30:52
07:00:53
10:30:52
14:30:53
18:00:53
21:30:53
01:00:53
04:30:53
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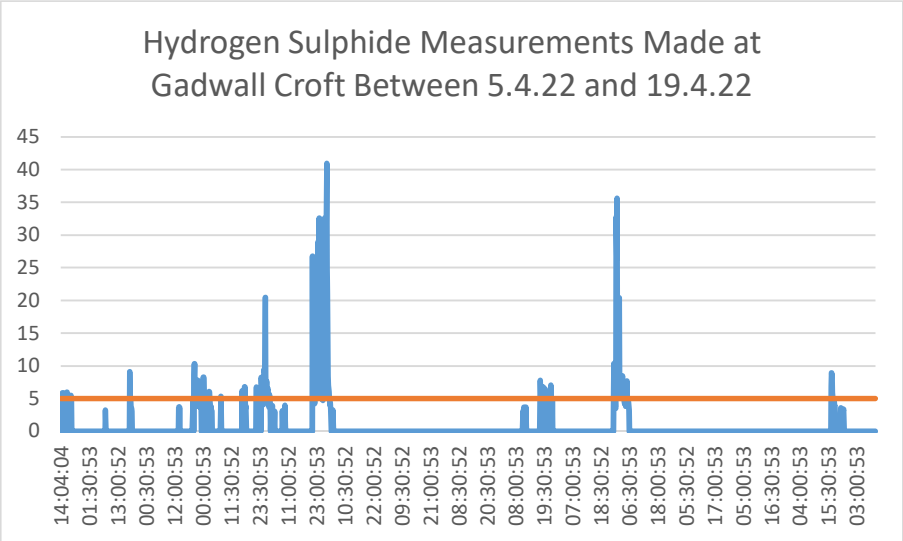
01:30:52
05:00:52
09:00:53
12:30:53


Hydrogen Sulphide Measurements Made at Gadwall Croft Between 5.4.22 and 19.4.22
45
40
35
30
25
20
15
10
5
0
14:04:04
01:30:53
13:00:52
00:30:53
12:00:53
00:00:53
11:30:52
23:30:53
11:00:52
23:00:53
10:30:52
22:00:52
09:30:52
21:00:53
08:30:52
20:30:53
08:00:53
19:30:53
07:00:53
18:30:52
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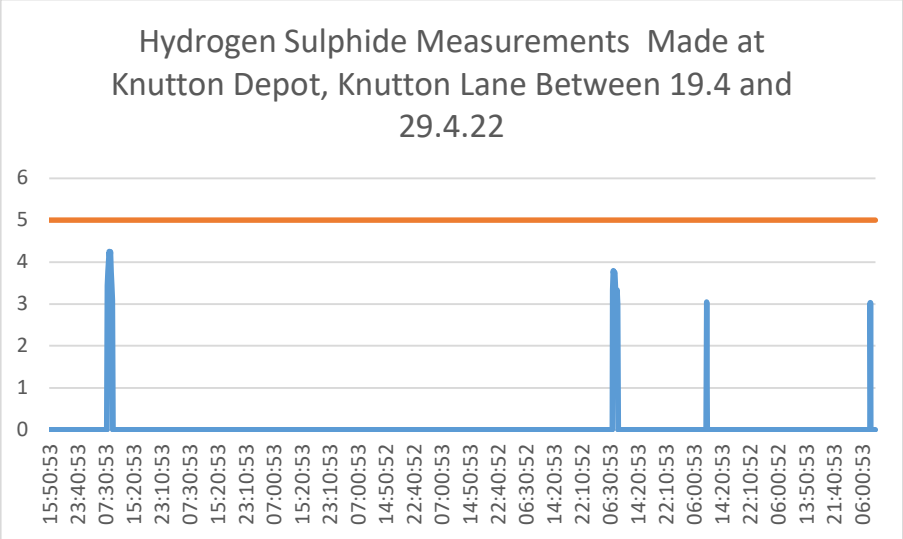
16:30:53
04:00:53
15:30:53
03:00:53


Hydrogen Sulphide Measurements Made at Knutton Depot, Knutton Lane Between 19.4 and 29.4.22
6
5
4
3
2
1
0
15:50:53
23:40:53
07:30:53
15:20:53
23:10:53
07:30:53
15:20:53
23:10:53
07:00:53
15:20:53
23:10:53
07:00:53
14:50:52
22:40:52
07:00:53
14:50:53
22:40:52
06:30:52
14:20:53
22:10:52
06:30:53
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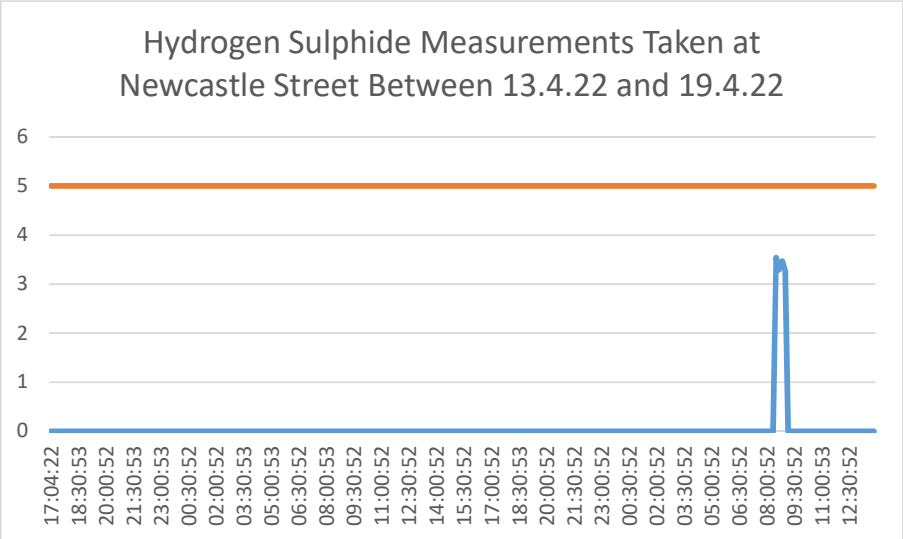
06:00:52
13:50:53
21:40:53
06:00:53


Hydrogen Sulphide Measurements Taken at Newcastle Street Between 13.4.22 and 19.4.22
6
5
4
3
2
1
0
17:04:22
18:30:53
20:00:52
21:30:53
23:00:53
00:30:52
02:00:52
03:30:53
05:00:53
06:30:52
08:00:53
09:30:52
11:00:52
12:30:52
14:00:52
15:30:52
17:00:52
18:30:53
20:00:52
21:30:52
23:00:52
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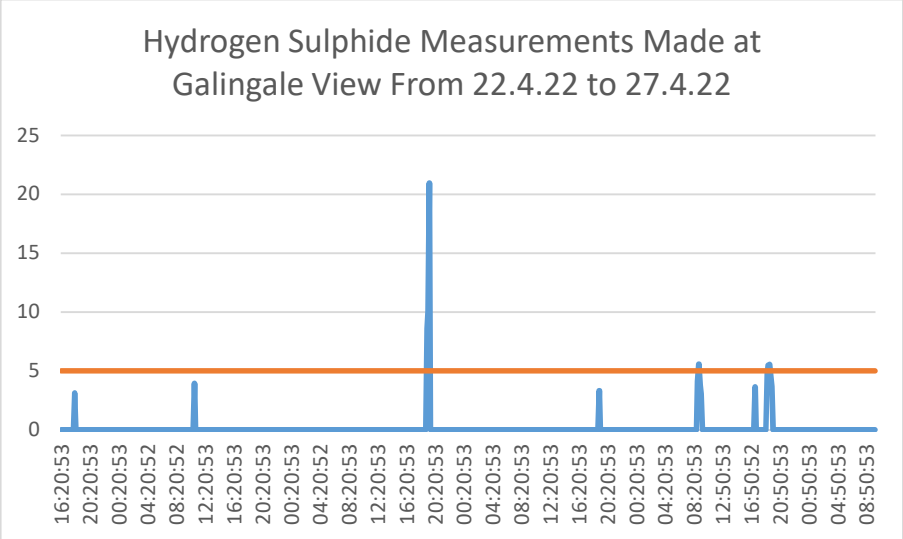
08:00:52
09:30:52
11:00:53
12:30:52


Hydrogen Sulphide Measurements Made at Galingale View From 22.4.22 to 27.4.22
25
20
15
10
5
0
16:20:53
20:20:53
00:20:53
04:20:52
08:20:52
12:20:53
16:20:53
20:20:53
00:20:53
04:20:52
08:20:53
12:20:53
16:20:53
20:20:53
00:20:53
04:20:53
08:20:53
12:20:53
16:20:53
20:20:53
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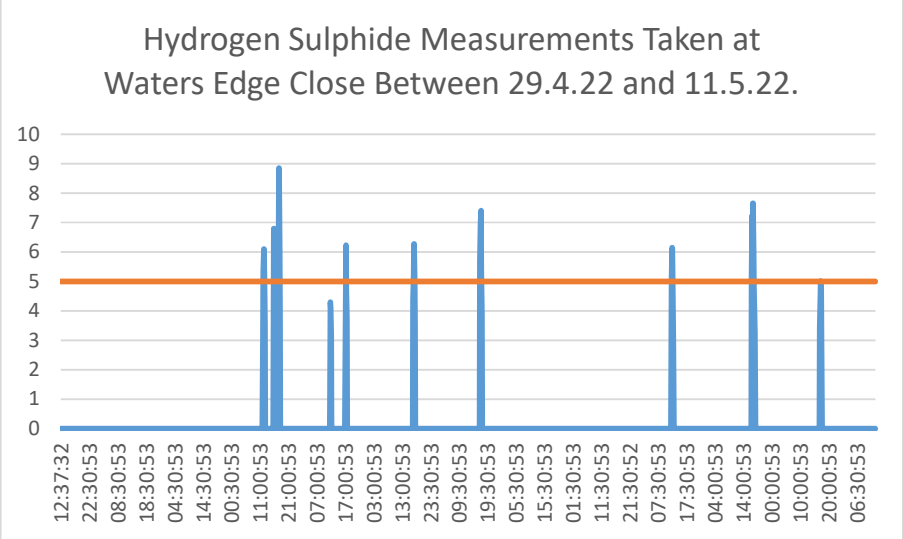
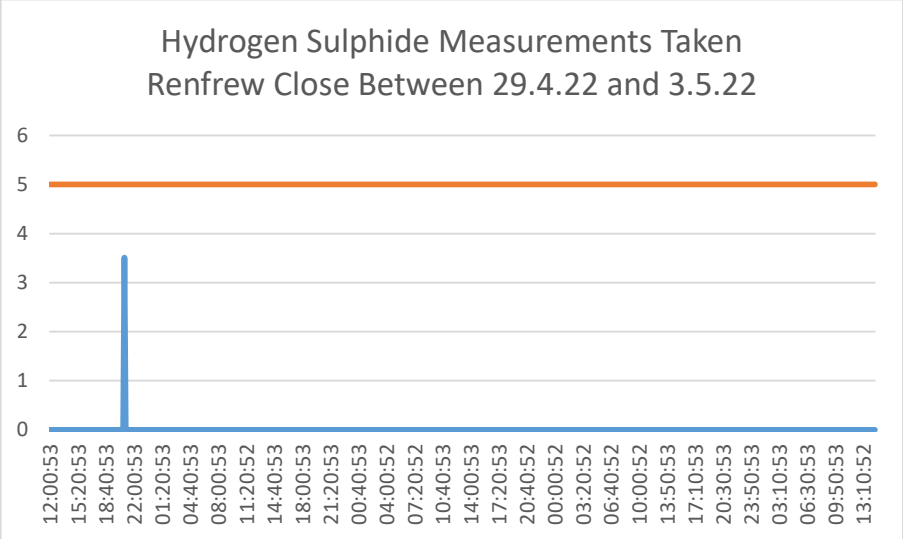
20:50:53
00:50:53
04:50:53
08:50:53


Hydrogen Sulphide Measurements Taken at Waters Edge Close Between 29.4.22 and 11.5.22.
10
9
8
7
6
5
4
3
2
1
0
12:37:32
22:30:53
08:30:53
18:30:53
04:30:53
14:30:53
00:30:53
11:00:53
21:00:53
07:00:53
17:00:53
03:00:53
13:00:53
23:30:53
09:30:53
19:30:53
05:30:53
15:30:53
01:30:53
11:30:53
21:30:52
07:30:53
17:30:53
04:00:53
14:00:53
00:00:53
10:00:53
20:00:53
06:30:53


Hydrogen Sulphide Measurements Taken
Renfrew Close Between 29.4.22 and 3.5.22
6
5
4
3
2
1
0
12:00:53
15:20:53
18:40:53
22:00:53
01:20:53
04:40:53
08:00:53
11:20:52
14:40:53
18:00:53
21:20:53
00:40:53
04:00:52
07:20:52
10:40:53
14:00:53
17:20:53
20:40:52
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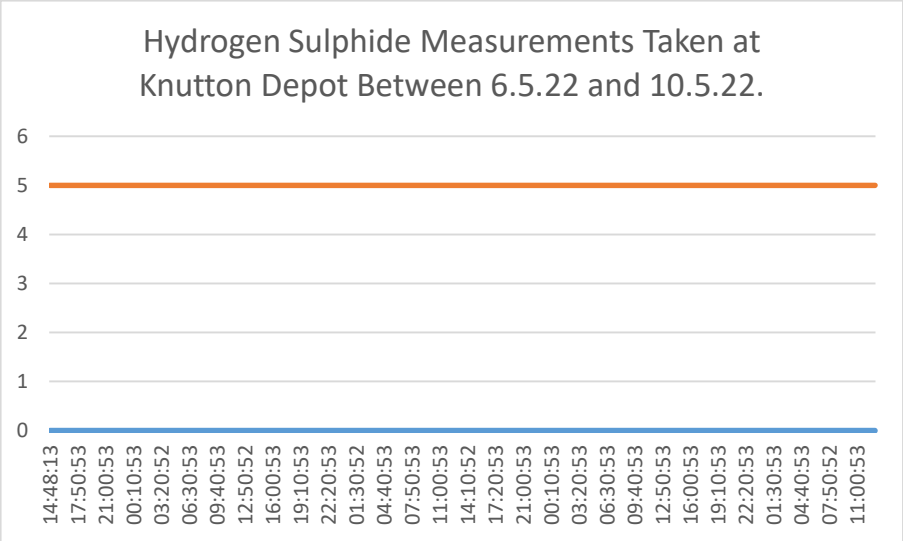
03:10:53
06:30:53
09:50:53
13:10:52


Hydrogen Sulphide Measurements Taken at
Knutton Depot Between 6.5.22 and 10.5.22.
6
5
4
3
2
1
0
14:48:13
17:50:53
21:00:53
00:10:53
03:20:52
06:30:53
09:40:53
12:50:52
16:00:53
19:10:53
22:20:53
01:30:52
04:40:53
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11:00:53
14:10:52
17:20:53
21:00:53
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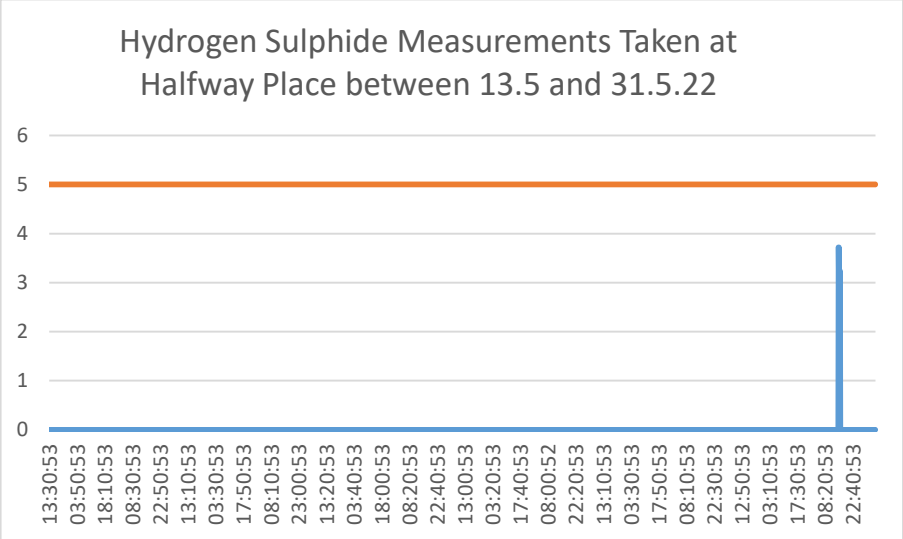
01:30:53
04:40:53
07:50:52
11:00:53


Hydrogen Sulphide Measurements Taken at Halfway Place between 13.5 and 31.5.22
6
5
4
3
2
1
0
13:30:53
03:50:53
18:10:53
08:30:53
22:50:53
13:10:53
03:30:53
17:50:53
08:10:53
23:00:53
13:20:53
03:40:53
18:00:53
08:20:53
22:40:53
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17:40:53
08:00:52
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13:10:53
03:30:53
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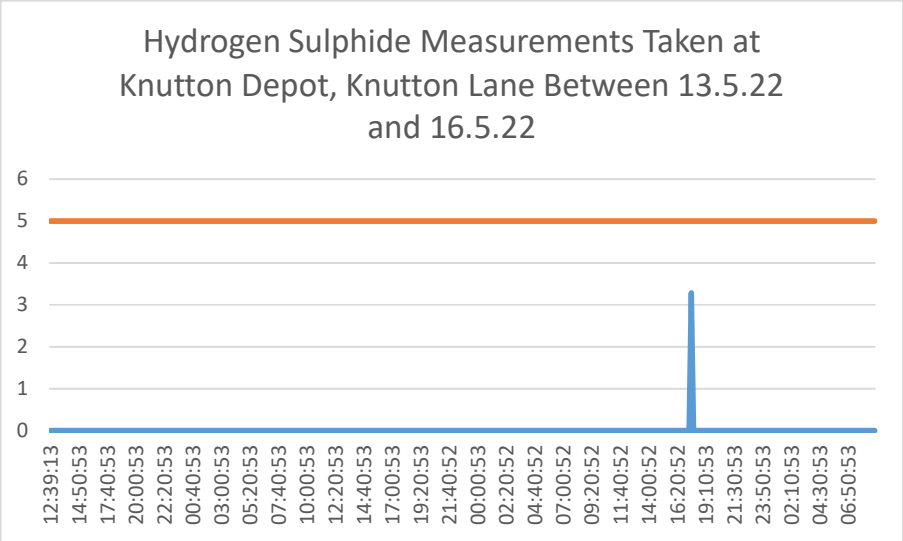
03:10:53
17:30:53
08:20:53
22:40:53


Hydrogen Sulphide Measurements Taken at Knutton Depot, Knutton Lane Between 13.5.22 and 16.5.22
6
5
4
3
2
1
0
12:39:13
14:50:53
17:40:53
20:00:53
22:20:53
00:40:53
03:00:53
05:20:53
07:40:53
10:00:53
12:20:53
14:40:53
17:00:53
19:20:53
21:40:52
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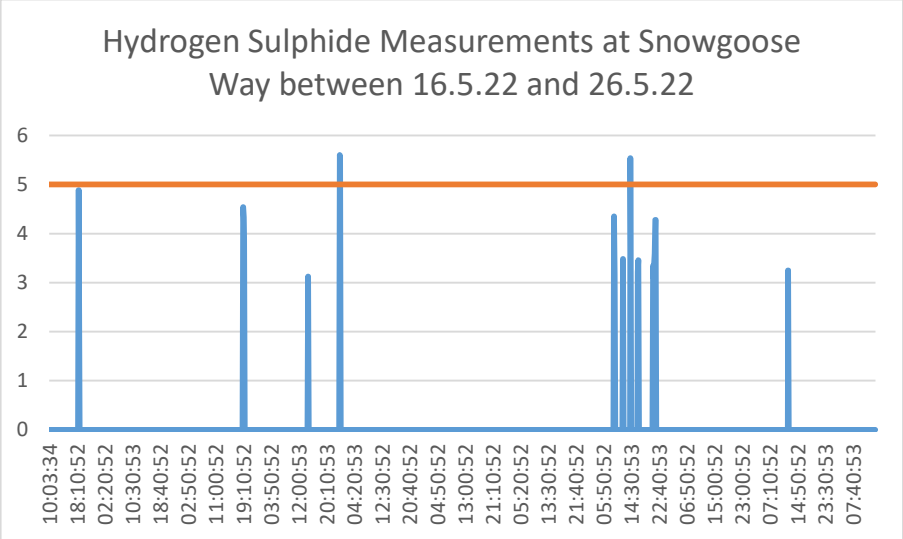
Hydrogen Sulphide Measurements at Snowgoose Way between 16.5.22 and 26.5.22
6
5
4
3
2
1
0
10:03:34
18:10:52
02:20:52
10:30:53
18:40:52
02:50:52
11:00:52
19:10:52
03:50:52
12:00:53
20:10:53
04:20:53
12:30:52
20:40:52
04:50:52
13:00:52
21:10:52
05:20:52
13:30:52
21:40:52
05:50:52
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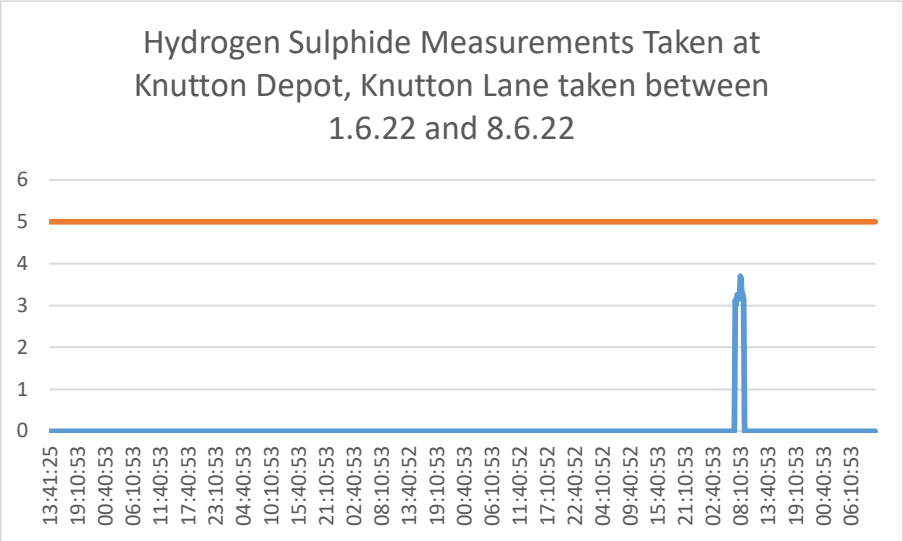
15:00:52
23:00:52
07:10:52
14:50:52
23:30:53
07:40:53


Hydrogen Sulphide Measurements Taken at Knutton Depot, Knutton Lane taken between 1.6.22 and 8.6.22
6
5
4
3
2
1
0
13:41:25
19:10:53
00:40:53
06:10:53
11:40:53
17:40:53
23:10:53
04:40:53
10:10:53
15:40:53
21:10:53
02:40:53
08:10:53
13:40:52
19:10:53
00:40:53
06:10:53
11:40:52
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22:40:52
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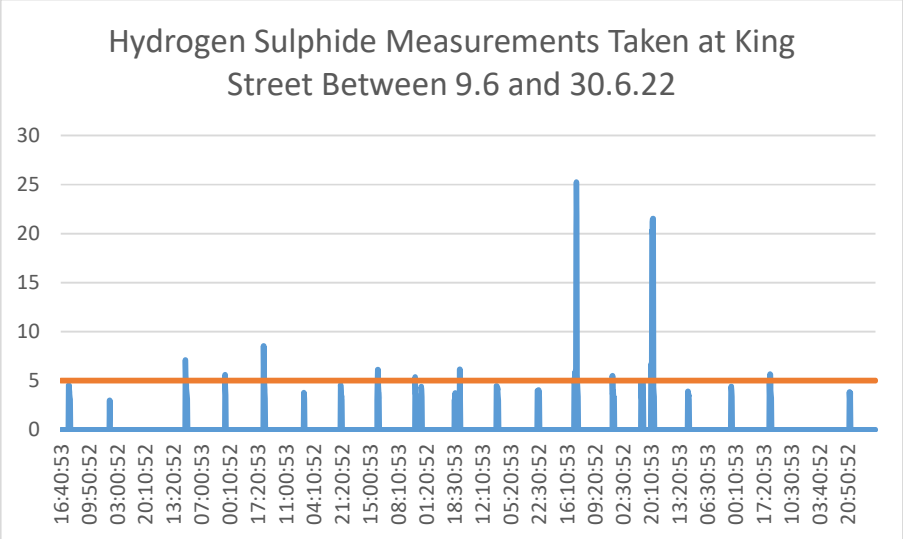
00:40:53
06:10:53


Hydrogen Sulphide Measurements Taken at King Street Between 9.6 and 30.6.22
30
25
20
15
10
5
0
16:40:53
09:50:52
03:00:52
20:10:52
13:20:52
07:00:53
00:10:52
17:20:53
11:00:53
04:10:52
21:20:52
15:00:53
08:10:53
01:20:52
18:30:53
12:10:53
05:20:53
22:30:52
16:10:53
09:20:52
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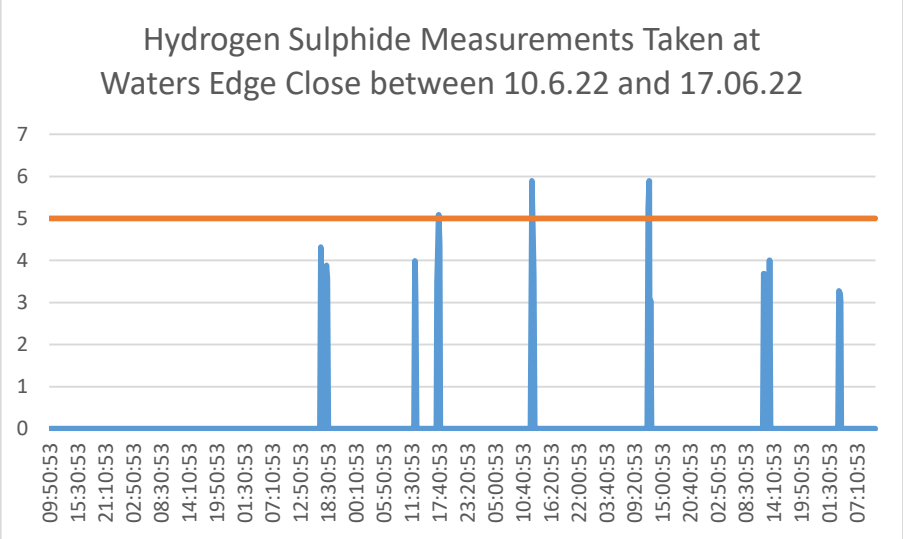
17:20:53
10:30:53
03:40:52
20:50:52


Hydrogen Sulphide Measurements Taken at Waters Edge Close between 10.6.22 and 17.06.22
7
6
5
4
3
2
1
0
09:50:53
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16:20:53
22:00:53
03:40:53
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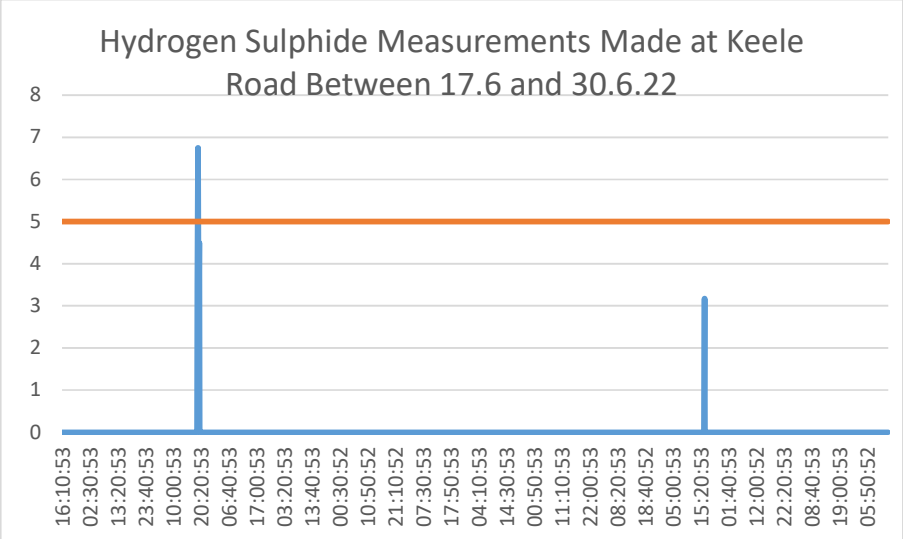
07:10:53



Summary of Deployments.

There were a total of 16 deployments during the second quarter of 2022.

Fifteen of the measurement series reported concentrations above 0ppb and exceedance of the World Health Organisation air quality guideline for the avoidance of annoyance at 7 µg/m^3 (5ppb) averaged over 30mins was indicated within six of these. One, of the sixteen sets of measurements, reported no measurements above 0ppb (although it should be noted that any measurement below 3ppb would be reported as 0).

No measurements exceeded the World Health Organisation air quality guideline for the protection of health - 150 µg/m^3 (100ppb) averaged over 24 hours.