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## Docksway Disposal Site

### Annual Environmental Review for Area 2 - 2018

On behalf of **Newport City Council**



Project Ref: 14739/3541 | Rev: 00 | Date: February 2019

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## Contents

<b>1</b>	<b>Introduction .....</b>	<b>1</b>
1.2	Scope .....	1
1.3	Related Work.....	1
<b>2</b>	<b>Surface Water Quality Monitoring .....</b>	<b>2</b>
2.1	Current Monitoring Programme .....	2
2.2	Surface Water Hydrochemistry over the Preceding 12 Months .....	2
2.3	Review of Potential Risks and Future Monitoring .....	5
<b>3</b>	<b>Groundwater Quality Monitoring .....</b>	<b>6</b>
3.1	Monitoring Programme .....	6
3.2	Monitoring Locations and Compliance Levels.....	6
3.3	Groundwater Quality.....	8
3.4	Review of Potential Risks and Future Monitoring .....	9
<b>4</b>	<b>Leachate Monitoring .....</b>	<b>10</b>
4.1	Leachate Control Measures and Management System .....	10
4.1	Leachate Measurements .....	10
4.2	Leachate Chemistry.....	11
<b>5</b>	<b>External Landfill Gas Monitoring.....</b>	<b>13</b>
5.1	Gas Monitoring Locations.....	13
5.3	External Landfill Gas Monitoring .....	14
<b>6</b>	<b>Landfill Gas Generation and Usage .....</b>	<b>17</b>
6.1	Landfill Gas Utilisation Plant.....	17
6.2	Landfill Gas Extraction .....	17
6.3	Monitoring of Extracted Gas.....	17
<b>7</b>	<b>Annual Production / Treatment and Performance Parameters .....</b>	<b>18</b>
7.1	Annual Production/Treatment.....	18
7.2	Performance Parameters .....	18
7.3	Topographic Surveys.....	18
<b>8</b>	<b>Conclusions.....</b>	<b>19</b>
8.1	Assessment of Environmental Performance Trends.....	19
8.2	Future Monitoring Requirements.....	19
<b>9</b>	<b>References .....</b>	<b>20</b>

## Figures

Figure 1	Site Location Plan
Figure 2	Monitoring Point Location Plan

## Tables

Table 2-1 Details of Surface Water Locations Monitored During 2018.....	2
Table 3-1 Groundwater Monitoring Locations .....	6
Table 3-2 Accepted Area 2 Groundwater PPC Permit Compliance Limits for Emissions to Groundwater .....	7
Table 4-1 Leachate Measurements at Cells 1, 2 and 3 .....	10
Table 5-1 Area 2 Landfill Gas Monitoring Boreholes .....	13
Table 5-2 Well Specific Trigger Levels for Landfill Gas Monitoring for Area 2.....	14
Table 7-1 Annual Production/Treatment reported by NCC and Infinis (Landfill Gas) .....	18

## Appendices

Appendix 1	Surface Water Chemistry Graphs
Appendix 2	Groundwater Chemistry Graphs
Appendix 3	Leachate Chemistry Graphs
Appendix 4	Gas Concentrations Graphs
Appendix 5	Infinis Annual Report
Appendix 6	Drawing No. 1476/Ph2/AEPR

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# 1 Introduction

## 1.1 Background

Docksway Disposal Site is located approximately 3km south of Newport City Centre, Gwent, and is centred on National Grid Reference ST 305 853. The site is operated by Newport City Council, referred to hereafter as NCC. The location of the site is shown on **Figure 1**.

The site is approximately split into a northern part (Area 1) and a southern part (Area 2):

- Area 1 is an unlined ('dilute and disperse') landfill that was operated under Waste Management Licence (WML) number EAWML30058 and is now closed, and in the aftercare phase; and
- Area 2 is an engineered containment landfill that is active and operated under Pollution Prevention Control (PPC) Permit No. DP3733BK, Variation Number V004 (July 2016).

It is a requirement of the PPC Permit for Area 2 (Conditions 4.2.1 and 4.2.2) that an Environmental Review report is provided to Natural Resources Wales (NRW) on an annual basis in order to provide a review of data collected in relation to the environmental performance of the site.

## 1.2 Scope

This document reviews the data produced by various environmental monitoring programmes and management systems and provides an analysis of any trends in the data over the preceding 12-month period of January 2018 to December 2018. The data review and analysis is used to provide an appraisal of the potential environmental risks associated with Area 2 of the site. This document includes the following:

- Review and analysis of the Area 2 environmental monitoring results collated over the past 12 months.
- Comments on temporal trends observed in the longer term monitoring data collected.
- A review of the potential risks to sensitive environmental receptors.
- Energy consumption at the site and annual production/treatment.
- Comparison of the current topographical survey and the previous topographical survey and assessment of the settlement behaviour together with volumetric difference.
- Calculation of the remaining capacity.

Guidance for readers of this report is given in **Section 10** of this report.

## 1.3 Related Work

The environmental data commented on in this report has been issued to NRW previously in the form of monthly or quarterly interim environmental monitoring reports but is provided within this report as a series of Appendices for ease of reference.

## 2 Surface Water Quality Monitoring

### 2.1 Current Monitoring Programme

A surface water monitoring programme commenced at Docksway Disposal Site in September 2003, in accordance with the requirements of Condition 62 of the Area 1 WML and continue in accordance with the PPC Permit for Area 2 (EPR/DP3733BK). Since commencement of monitoring, NCC has undertaken monthly surface water monitoring and has reported these results to NRW on a monthly basis. Details of the monitoring methodology and protocols for the site (including the frequency of testing and the range of chemical testing suites used) were presented in the Monitoring Plan for Area 1, dated 2011<sup>[1]</sup>, which was accepted by NRW, and also the Monitoring Plan for Area 2: Landfill Extension, dated 2005<sup>[2]</sup>, which have previously been accepted by NRW

Sampling locations SW\_25 and SW\_26 are the subject of individual discharge consents and will continue to be monitored in accordance with those consents, whilst all other locations will continue to be monitored in accordance with the Environmental Permit. It is noted that sampling point C3\_Asb was established at the start of 2017 and is specific to Cell 3a.

A total of seven monitoring locations have been used for assessing the surface water quality over the past 12 months, the locations of which are shown on **Figure 2**, and details are tabulated below:

**Table 2-1 Details of Surface Water Locations Monitored During 2018**

Position Monitored	Location
SW_1A	Ebbw Upstream
SW_11	North Pond
SW_23	Discharge to Maes Glas Pill from Docks Drain Outfall (Disused Culvert)
SW_24	Oxbow Lake Position 1
SW_25	Surface Water Management System Discharge Point. Subject to a discharge consent.
SW_26	Area 2 Surface Water. Subject to a discharge consent.
C3_Asb	Cell 3 Settling Lagoon

### 2.2 Surface Water Hydrochemistry over the Preceding 12 Months

#### Compliance Limits

Surface water compliance limits are not generally required by NRW for the site, and consequently none have been set, except for surface water sampling points SW\_25, SW\_26 and C3\_Asb. Therefore, comments on the surface water hydrochemistry with respect to compliance limits are not presented in this report. Instead, only the data and any temporal trends in the data are presented and commented upon for those positions without compliance limits.

Surface water sampling points SW\_25 and SW\_26, are subject to discharge consents (Consent Number AN0394301 and AN0401301 respectively) and have compliance limit values as set by NRW.

Sampling location C3\_Asb has compliance limit values which are set out in the PPC Permit (EPR/DP3733BK).

## SW\_25

In the last 12 months, SW\_25 has been sampled once (December 2018) and was recorded as dry on each of the other monthly monitoring visits.

The following provides commentary on the laboratory test results compared to the consented compliance limit values:

- On the occasion that SW\_25 was sampled, the concentration of Ammoniacal Nitrogen, of 2.26 mg/l, was significantly below the discharge consent limit (30mg/l). The concentrations of Ammoniacal Nitrogen recorded in SW\_25 appear to show an overall gradual decrease since commencement of monitoring in 2004.
- The discharge limit (40mg/l) for Biological Oxygen Demand (BOD) was not exceeded during the monitoring event in 2018 for SW\_25 which recorded a concentration below the limit of detection.
- The recorded pH value was within the required limits of between 6 and 9, measured at 7.94.
- The recorded concentration of Total Suspended Solids (TSS) was below the discharge consent limit (60mg/l) during the monitoring visit. The recorded TSS concentration is less than the concentrations recorded during 2017 at below 5mg/l.

There is currently no evidence to suggest that there are any detrimental temporal trends with regard to surface water quality at this location.

## SW\_26

Surface water monitoring point SW\_26 was included in the monitoring programme for Area 1 at the start of 2013 and has been sampled on eighteen out of seventy-two occasions since commencement (being recorded as dry on each other occasion).

During 2018, SW\_26 was sampled on one occasion (December), and on the remaining monitoring visits was recorded as dry.

The following provides commentary on the laboratory test results compared to the consented limit values:

- There is no limit for Ammoniacal Nitrogen in the discharge consent for SW\_26. However, although the concentration recorded in 2018, at 15mg/l, is higher than recorded during 2017, it is within the general range recorded at this location.
- The result of the TSS testing undertaken on the sample obtained from SW\_26 during 2018 recorded a concentration of 2.75mg/l which is significantly below the discharge consent limit for TSS (60mg/l) at this location.
- During 2018, the pH value recorded (7.83) was within the required limits of between 6 and 9, in accordance with the discharge consent.

There is currently no evidence to suggest that there are any detrimental temporal trends with regard to surface water quality at this location.

## C3\_Asb

Surface water monitoring point C3\_Asb is the settling lagoon for surface water from the Stable Non-Reactive Hazardous Waste (SNRHW) cell. A specific testing requirement for this location is for the

presence of asbestos fibres. During 2018 samples were taken from this location on 11 occasions and subsequently tested for asbestos fibres on 10 occasions.

The laboratory did not identify the presence of asbestos fibres in the samples on any occasion.

It is noted that in addition to testing for the presence of asbestos fibres other surface water hydrochemistry parameters are tested for. These are commented on below alongside other testing locations.

## Commentary on other Surface Water Monitoring Locations

### Ammoniacal Nitrogen

**Appendix 1-1** presents the results of Ammoniacal Nitrogen concentrations since 2003 at each of the surface water monitoring locations.

It can be seen that Ammoniacal Nitrogen concentrations in SW\_1A have mostly been recorded below the method detection limit (MDL) for the laboratory (0.2mg/l) in the last 12 months. This is consistent with the longer-term dataset.

SW\_11 was sampled once during 2018, in November as part of the annual screen. The Ammoniacal Nitrogen concentration was recorded at 0.7mg/l which is the highest concentration recorded in the last six years but it's within the overall range recorded at this location.

In SW\_23 the Ammoniacal Nitrogen concentrations have been relatively consistent over the last 5 to 6 years, continuing a general gradual decrease in concentrations since 2003, below 50mg/l in the last 6 years, and generally below 25mg/l in the last 24 months.

The remaining surface water monitoring point (SW\_24) shows a generally consistent trend since commencement of monitoring, with concentrations predominantly below 1mg/l.

### Biochemical and Chemical Oxygen Demand

**Appendices 1-2** and **1-3** present Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) concentrations since 2003 at each of the surface water monitoring locations.

All locations appear to be displaying a generally stable trend in BOD concentrations with the majority of results recorded at concentrations below 10mg/l in the last 6 years. The exception to this is C3\_Asb where the BOD concentration has ranged between 2.13mg/l and 26.3mg/l during 2018. The concentration of 26.3mg/l was recorded in C3\_Asb in May 2018, however the subsequent sampling visit in June 2018 recorded a significantly lower concentration of 5.34mg/l.

In general, COD concentrations appeared to be relatively stable at most monitoring locations during 2018 with results generally below or around 100mg/l. The exception to this is C3\_Asb which recorded a concentration of 183mg/l in April 2018. This concentration reduced to 124mg/l in May 2018 and subsequently reduced further to within the range of concentrations previously recorded between August 2018 and December 2018.

### Dissolved Oxygen and Chloride

**Appendix 1-8** presents the Dissolved Oxygen (DO) concentrations recorded at the surface water monitoring locations in the last 12 months. The concentrations have generally been between about 5mg/l and 11mg/l, and this is consistent with the overall dataset.

**Appendix 1-4** presents Chloride concentrations at each of the surface water monitoring locations since 2003. The data indicates that most surface water monitoring locations are showing a generally stable trend of Chloride concentrations over the last 12 months with concentrations at most locations

predominantly below 100mg/l. The exceptions to this are SW\_23 where concentrations of Chloride have fluctuated significantly from month to month (from about 50mg/l up to 670mg/l), as they have done since monitoring commenced, and C3\_Asb where concentrations have fluctuated between about 50mg/l and 300mg/l.

### pH and Electrical Conductivity

**Appendix 1-5** presents the results of pH monitoring of surface water since 2003 at each of the current Area 1 surface water monitoring locations. In the past 12 months the majority of the pH readings have generally been recorded between about pH 7.5 and pH 8.5, which is within the normal range for all of the monitoring locations in the last 5 years.

**Appendix 1-6** presents Electrical Conductivity (EC) readings in each of the surface water monitoring locations since 2003. The data indicates a stable trend of Electrical Conductivity readings, below 5mS/cm at all monitoring locations in the last 12 months. This is within the range of the overall dataset.

### Total Suspended Solids

**Appendix 1-7** presents the concentrations of Total Suspended Solids (TSS) at SW\_25 since 2007, SW\_26 since 2013, and C3\_Asb since 2017. The data does not currently indicate trends of increasing concentrations of TSS.

## 2.3 Review of Potential Risks and Future Monitoring

The environmental data obtained for January to December 2018 for surface water does not indicate any significant adverse trends developing in surface water quality, and over the last 12 months does not indicate any significant decrease in surface water quality since the previous Annual Environmental Review for Area 2 - 2017<sup>[4]</sup>.

## 3 Groundwater Quality Monitoring

### 3.1 Monitoring Programme

A groundwater monitoring/sampling programme commenced at Docksway Disposal Site in September 2003 to monitor groundwater quality within the underlying River Terrace Gravel deposits present beneath the site.

Details of the monitoring methodology and protocols for the site (including the frequency of testing and the range of chemical testing suites used) were presented in the Monitoring Plan for Area 2: Landfill Extension, dated 2005<sup>[2]</sup>, which was accepted by the Environment Agency (now NRW) at that time.

The locations of the boreholes used in the current monitoring and sampling programme are indicated on **Figure 2**.

Interim groundwater quality reports have previously been provided to NRW on a quarterly basis (in accordance with the PPC Permit Conditions 3.6.1 and 3.6.2) providing both factual data and interpretive comments where appropriate.

### 3.2 Monitoring Locations and Compliance Levels

There are fourteen monitoring wells across Area 2, and the compliance limits for each are presented in Table 3-1 below.

**Table 3-1 Groundwater Monitoring Locations**

Monitoring Location	Easting	Northing
GW07_40	331007	185204
GW12_30	331089	185194
GW09_31	331165	185095
GW03_09	331166	184999
GW09_32	331118	184919
GW12_33	331055	184834
GW06_34	331015	184732
GW09_35	330904	184755
GW06_36	330811	184777
GW06_37	330715	184801
GW06_13	330602	184887
GW12_38	330705	184986
GW06_14a	330829	185098
GW06_39	330932	185137

Control levels and Compliance limits for eight of the compliance monitoring wells were proposed as part of the four-yearly review of the Hydrogeological Risk Assessment (HRA) for Area 2 produced in December 2010<sup>[3]</sup> and accepted by NRW in August 2013. In addition, Control and Compliance limits for

the three 'GW09' compliance wells (31, 32, and 35) were proposed in September 2013, and following amendment were subsequently accepted by NRW.

The compliance limits for GW12\_30, GW12\_33 and GW12\_38 were proposed in the previous Annual Environmental Review for Area 2 - 2017<sup>[4]</sup>, and in the absence of any correspondence from NRW are considered to have been accepted.

The current control and compliance levels are reproduced in Table 3.2. It is noted that in relation to Benzene, Naphthalene, Xylene and Arsenic, only Compliance levels have been set, with other determinands having both control and compliance levels set.

**Table 3-2 Accepted Area 2 Groundwater PPC Permit Compliance Limits for Emissions to Groundwater**

Monitoring Well	Benzene	Naphthalene	Xylene	Arsenic
	Compliance	Compliance	Compliance	Compliance
	ug/l	ug/l	ug/l	ug/l
GW03_09	2	5	3	35
GW06_13	2	5	3	50
GW06_14a	2	5	3	25
GW06_34	2	5	3	65
GW06_36	2	5	3	30
GW06_37	2	5	3	60
GW06_39	2	5	3	50
GW07_40	2	5	3	35
GW09_31	13	5	3	80
GW09_32	3	5	3	30
GW09_35	2	5	3	50
GW12_30	1	1	1	160
GW12_33	1	1	1	560
GW12_38	1	1	1	26

Monitoring Well	Nickel		Potassium		Ammoniacal Nitrogen	
	Control Level	Compliance Limit	Control Level	Compliance Limit	Control Level	Compliance Limit
	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l
GW03_09	8	10	160	180	30	35
GW06_13	12	14	100	110	30	35
GW06_14a	12	14	160	180	53	60
GW06_34	12	14	310	350	30	35
GW06_36	8	10	100	110	20	23
GW06_37	8	10	100	110	30	35
GW06_39	26.4	30	100	110	20	23
GW07_40	8	10	39.6	45	20	23
GW09_31	8	10	100	110	50	50
GW09_32	8	10	160	180	50	50
GW09_35	8	10	100	110	30	35
GW12_30	25	30	35	40	10	12
GW12_33	5	6	50	55	15	18
GW12_38	25	30	65	70	10	12

### 3.3 Groundwater Quality

#### Ammoniacal Nitrogen

Appendices 2-1 to 2-5 present the recorded concentrations of Ammoniacal Nitrogen for the Area 2 groundwater monitoring locations. Ammoniacal Nitrogen concentrations in all monitoring wells have been relatively consistent in the last 12 months and also in the longer term.

There have generally been no exceedances of the Compliance Limits for Ammoniacal Nitrogen in 2018, except for two marginal exceedances at GW06\_37 in October and December. The recorded concentrations were 35.3mg/l and 39.7mg/l respectively (Compliance Limit 35mg/l), with the concentration recorded in December being the highest concentration ever recorded at this location. The fluctuating concentrations at GW06\_37 are consistent with the data recorded at this location in the last 5 years. At GW06\_39 the concentration of 20.5mg/l recorded in December marginally exceeded the control level but was below the compliance limit.

All other monitoring locations remained below the compliance limits throughout the monitoring period.

#### Arsenic

Appendices 2-6 to 2-15 present the recorded Arsenic concentrations for the current Area 2 groundwater monitoring locations. There were no exceedances of the Compliance Limits for Arsenic in the Area 2 groundwater monitoring wells during 2018, and no distinct adverse trends are apparent.

#### Benzene, Naphthalene and o-Xylene

Appendices 2-16 to 2-23 present the results of Benzene, Naphthalene and o-Xylene concentrations.

Benzene concentrations in all Area 2 compliance wells have been consistent in the last 12 months, with no exceedances of the compliance limits and no concentrations recorded above the method detection limit (MDL).

All current Area 2 groundwater monitoring locations are showing stable trends of Naphthalene and o-Xylene concentrations at or below the MDL.

It should be noted that the laboratory MDL has changed a number of times since 2004 for Benzene, Naphthalene and o-Xylene which gives a false impression that some of the results have occasionally exceeded the compliance limit, because the compliance limit tracks the MDL.

### Extractable Petroleum Hydrocarbons

**Appendices 2-24** and **2-25** present the results of Extractable Petroleum Hydrocarbons (EPH) concentrations. Concentrations of EPH have generally been recorded below 400µg/l in all of the monitoring wells in Area 2 during 2018, with the exception of GW12\_38 in March and June where the concentrations recorded were 579ug/l and 533ug/l respectively. There are no compliance limits required for EPH.

### Nickel and Potassium

**Appendices 2-26** to **2-38** present the results of Nickel and Potassium concentrations in the monitoring wells.

Nickel and Potassium concentrations at the majority of the compliance wells have remained stable throughout the 12-month monitoring period, with no recorded compliance limit exceedances, with the exception of Nickel at GW09\_32 and GW12\_33 in March where the concentrations recorded were 22.4µg/l, and 7.6µg/l respectively. However, during the following monitoring round in June 2018, the Nickel concentrations at GW09\_32 and GW12\_33 had returned to below the control level.

## 3.4 Review of Potential Risks and Future Monitoring

The environmental data obtained for the groundwater monitoring wells in Area 2 indicates that in general the River Terrace Gravel groundwater chemistry is in a stable condition and that there is therefore no significant deterioration in water quality since the previous Annual Environmental Review for Area 2 - 2017<sup>[4]</sup>.

During 2018, a small number of intermittent exceedances of compliance limits were recorded in some monitoring wells, however, these are not generally considered to represent a significant risk to the groundwater quality because they are not consistently exceeding the compliance limits at the current time.

## 4 Leachate Monitoring

### 4.1 Leachate Control Measures and Management System

In accordance with Condition 2.7.1 of the PPC Permit, leachate levels should be recorded monthly. However there have been occasions where either access to the monitoring locations has not been possible or a monitoring round has been missed. As such for this period of reporting leachate levels have been monitored at five locations in Cell 1, three locations in Cell 2, and one location in Cell 3B, with samples recovered for analytical testing (similarly when access permits) on a quarterly basis at LF08\_07 located within Cell 1 of Area 2, C2B within Cell 2 of Area 2, and C3B within Cell 3 of Area 2. Leachate generated in Area 2 is pumped directly to tankers and removed off site for disposal.

### 4.1 Leachate Measurements

Leachate head levels from Cell 1 at LF08\_07, C1A, C1B, C1D, C1E; from Cell 2 at C2A, C2B, C2C; and from Cell 3B are scheduled to be recorded on a monthly basis at the site. In accordance with Schedule 3, Table S3.1 of the PPC Permit, leachate head levels should not exceed 2m above the base of any cell. Where this has occurred the records in table 4-1, below, are indicated in bold text.

Total leachate tonnage removed from Area 2 and associated leachate head levels in all cells, recorded over the last 12 months, are presented in Table 4.1.

Table 4-1 Leachate Measurements at Cells 1, 2 and 3

Monitoring Round	Leachate Head Level above base of cell (m)									Leachate Removed (tonnes)
	LF08_07 (Cell 1)	C1A (Cell 1)	C1B (Cell 1)	C1D (Cell 1)	C1E (Cell 1)	C2A (Cell 2)	C2B (Cell 2)	C2C (Cell 2)	C3B (Cell 3)	
January 2018	<b>2.69</b>	N/A	<b>2.42</b>	1.61	<b>7.46</b>	<b>2.78</b>	<b>3.24</b>	N/A	N/M	11,648
February 2018	<b>2.54</b>	<b>4.04</b>	<b>2.42</b>	1.51	N/A	<b>2.23</b>	<b>2.64</b>	<b>3.01</b>	N/M	
March 2018	<b>2.24</b>	N/A	<b>2.42</b>	1.61	1.46	<b>2.03</b>	<b>2.94</b>	<b>3.06</b>	N/M	
April 2018	<b>2.34</b>	N/A	1.92	1.21	1.51	<b>2.33</b>	<b>3.34</b>	<b>3.21</b>	N/M	
May 2018	<b>2.29</b>	N/A	1.82	1.21	1.56	1.88	<b>3.14</b>	<b>2.76</b>	<b>2.10</b>	
June 2018	1.99	N/A	1.52	1.01	1.52	1.08	<b>2.54</b>	<b>2.56</b>	N/A	
July 2018	<b>2.04</b>	N/A	1.12	1.11	1.26	0.98	<b>2.24</b>	1.86	1.77	
August 2018	<b>2.19</b>	N/A	1.42	1.51	1.46	1.38	<b>2.74</b>	<b>3.06</b>	1.90	
September 2018	Not Measured									
October 2018	<b>2.19</b>	N/A	1.22	1.51	1.16	1.18	<b>2.34</b>	N/A	N/A	
November 2018	<b>2.49</b>	N/A	1.32	1.31	N/A	1.48	<b>2.64</b>	N/A	N/A	
December 2018	<b>2.59</b>	N/A	1.35	1.51	1.91	1.38	<b>2.54</b>	<b>2.71</b>	N/A	

**Bold** text indicates leachate head levels above the permitted leachate head level (2m).

N/A indicates the location was not accessible

N/M indicates the location was not monitored

## 4.2 Leachate Chemistry

The leachate wells in Cells 1 and 2 have been connected to the gas abstraction system and therefore there is currently no access for sampling leachate directly from the leachate wells (LF08\_07 and C2B respectively). Leachate samples have however been obtained from the closest side risers and submitted for laboratory analysis. For consistency with historical data, these have been referred to as LF08\_07 and C2B throughout this Section.

As described above, samples have been obtained from locations associated with LF08\_07 (Cell 1), C2B (Cell 2) and C3B (Cell 3). Therefore, the information below relates only to these locations.

Cell 2 wells were not monitored during 2015 due to access restrictions, and therefore the data for C2B was incomplete for that year.

The PPC Permit requirement for frequency of leachate sampling is quarterly. In 2018, samples were obtained from Cell 1 on two occasions in March and June respectively, once from LF08\_07 and once from LF Cell\_1\_C (closest side riser) when LF08\_07 could not be accessed. Samples were taken from Cell 2 on three occasions in March, June and November 2018, and one sample was also taken from Cell 3 (LF\_C3B) in June.

### Ammoniacal Nitrogen

**Appendix 3-1** presents the results of Ammoniacal Nitrogen concentrations. The Ammoniacal Nitrogen concentration recorded at LF08\_07 in March 2018 was 1040mg/l, which is within the general range of the dataset. LF Cell\_1\_C was sampled in November instead of LF08\_07 due to access, and the concentration recorded was 1150mg/l.

Ammoniacal Nitrogen concentrations of between 1210mg/l and 1320mg/l were recorded in C2B between March and November 2018. These results are within the typical range of the dataset.

An Ammoniacal Nitrogen Concentration of 450mg/l was recorded in LF\_C3B in June 2018. This is the first and only result for this location.

### Arsenic

**Appendix 3-2** presents the results of Arsenic concentrations over time in leachate in Area 2. Arsenic in C2B was recorded at concentrations between 49.8µg/l and 67.5µg/l, and at LF08\_07 Arsenic concentrations between <0.5µg/l and 20.8µg/l were recorded. These concentrations are within the range established during previous monitoring with no distinct trends apparent.

The leachate sample from LF\_C3B recorded a concentration of 26.8µg/l in June 2018, and this was the first and only result for this location.

### Benzene and Naphthalene

**Appendices 3-3** and **3-4** present the results of Benzene and Naphthalene concentrations in leachate from Cell 1 (LF08\_07, LF Cell\_1\_C), Cell 2 (C2B) and LF\_C3B (Cell 3).

Benzene was recorded at a concentration in LF08\_07 of 2.31ug/l in March 2018 and a concentration of 6.09µg/l in November in LF Cell\_1\_C. In C2B the Benzene concentrations recorded were between 4.39ug/l and 7.35ug/l in 2018. These concentrations are within the typical range of the datasets.

In LF\_C3B the Benzene concentration was recorded as being below the MDL in June 2018.

Naphthalene concentrations in LF08\_07 leachate have been recorded below the MDL during all monitoring rounds since 2013. Concentrations of Naphthalene were also below the MDL in LF Cell\_1\_C and LF\_C3B in 2018.

The leachate from C2B recorded a concentration in June 2018 of 2.91µg/l which subsequently reduced to below the MDL in November. The concentrations recorded are within the range established at this location.

## o-Xylene and EPH

**Appendices 3-5 and 3-6** present the results of o-Xylene and EPH concentrations in the Area 2 leachate.

Concentrations of o-Xylene in C2B leachate have been recorded between 10µg/l and 3.06µg/l in 2018, which is within the normal range of concentrations typically recorded at this location. The concentrations of o-Xylene recorded in LF08\_07 and in LF\_C3B were below the MDL during 2018.

At LF08\_07 the concentration of EPH recorded in March 2018 was 1,100ug/l, and this is within the range of the overall dataset.

LF Cell\_1\_C recorded a concentration of 1200µg/l in November 2018. Concentrations of EPH in C2B during 2018 were recorded between 1620ug/l and 1760ug/l, within the typical range of the overall dataset, and below the concentrations recorded in 2017. In June 2018, LF\_C3B recorded a concentration of 1440µg/l.

## Nickel and Potassium

**Appendices 3-7 and 3-8** present the results of Nickel and Potassium concentrations at LF08\_07 (Cell 1), Cell 2 (C2B) and Cell 3 (LF\_C3B) since commencement of monitoring.

During 2018, Nickel concentrations in C2B were recorded between 167ug/l and 197ug/l, which are within the overall dataset range. At LF08\_07 the Nickel concentration recorded in March 2018 was below the MDL, and within LF Cell\_1\_C the concentration of Nickel in June 2018 was recorded at 142µg/l. LF\_C3B recorded a concentration of 35.6µg/l in June 2018.

The Potassium concentration recorded in LF08\_07 in March 2018 was below the MDL, within is the lowest concentration ever recorded at this monitoring location. LF Cell\_1\_C recorded a Potassium concentration of 546mg/l in November 2018 which is within the typical range for LF08\_07/Cell 1. At C2B the concentrations recorded were between about 470mg/l and 693mg/l, which is within the typical range of the dataset. LF\_C3B recorded a concentration of 200mg/l in June 2018.

## 4.3 Review of Potential Risks and Future Monitoring

The environmental monitoring data for LF08\_07 and C2B indicates that the leachate chemistry has been variable throughout the 12-month monitoring period in both Cells 1 and 2, although generally the data is within the typical range for each of the parameters.

There is currently insufficient data for Cell 3 to determine whether there are any trends developing, however the results to date for all parameters are within the typical ranges identified over the longer term for Cells 1 and 2.

The data is not indicative of a significant change in the leachate quality in 2018.

The data indicates that during 2018 there have been exceedances of the permitted leachate levels (being greater than 2m above the base) in all cells in Area 2, and that there have been times when the leachate levels have not been measured in accordance with the PPC Permit.

Whilst it is recognised that access constraints have not permitted access to all positions, there have also been occasions when the monitoring has been missed. Newport City Council (NCC) have now employed a dedicated monitoring technician from the start of 2019, and therefore it is anticipated that ongoing monitoring will be undertaken in accordance with the frequencies set out within the PPC Permit for the site going forwards.

## 5 External Landfill Gas Monitoring

### 5.1 Gas Monitoring Locations

There are currently fifteen purpose drilled gas monitoring boreholes available around the perimeter of Area 2. The locations of the boreholes are shown on **Figure 2** and coordinates of the gas monitoring boreholes are shown within Table 5.1. These include, three new monitoring wells installed since the previous 2017 annual report and the loss of one monitoring well which has been destroyed since the previous annual report. See commentary below in Table 5-1.

**Table 5-1 Area 2 Landfill Gas Monitoring Boreholes**

Monitoring Point	Easting	Northing	Comments
GP03_06	331150	185227	-
GP06_08a	331830	185104	-
GP05_14	331172	185144	-
GP05_15	331187	185055	-
GP05_16	331153	184977	-
GP05_17	331091	184884	-
GP09_18	331033	184804	-
GP18_18A	331035	184805	New well – installed April 2018
GP18_18B	331028	184798	New well – installed April 2018
GP18_18C	331032	184795	New well – installed April 2018
GP05_20	330676	184817	-
GP05_21	330602	184887	-
GP05_22	330649	184963	-
GP12_23	330781	185028	-
GP06_24	330973	185165	Well destroyed
GP06_25	331060	185236	-

These boreholes all have their response zones situated in the shallow strata (the Alluvial Deposits and the Made Ground above, where it is present). Monitoring started at many of these boreholes before the commencement of landfilling in Cell 1 to enable comparison of the historical (baseline) soil gas regime around the perimeter of the site with the regime once waste disposal operations had commenced.

### 5.2 Monitoring Requirements and Trigger Levels

Landfill gas monitoring has generally been undertaken on a quarterly basis with reports being produced for NRW quarterly in accordance with Condition 3.1.7 of the PPC Permit.

Trigger Levels for all the Area 2 wells have previously been submitted to and accepted by NRW. The exceptions to this are the new monitoring wells GP18\_18, A, B and C that surround and are in close proximity to GP09\_18. The trigger levels for these new monitoring wells are the same as for GP09\_18.

Well-specific trigger levels for landfill gas as set out in the PPC Permit are presented in Table 5.2 below. There are no trigger levels for carbon dioxide or methane in GP06\_24 and GP06\_25 or for carbon dioxide in GP05\_20 and GP05\_21 – in accordance with NRW (formerly EA) requirements.

Table 5-2 Well Specific Trigger Levels for Landfill Gas Monitoring for Area 2

Well	Methane (%Volume)	Carbon Dioxide (%Volume)
GP03_06	1.0	6.1
GP06_08A	1.0	2.4
GP05_14	1.0	2.2
GP05_15	1.0	10.4
GP05_16	1.0	7.7
GP05_17	1.0	13.5
GP09_18, GP18_18A, GP18_18B & GP18_18C	1.0	19.0
GP05_20	1.5	n/a
GP05_21	1.5	n/a
GP05_22	1.0	8.3
GP06_24	n/a	n/a
GP06_25	n/a	n/a

### 5.3 External Landfill Gas Monitoring

#### Methane

Appendices 4-1, 4-2, 4-3 and 4-4 present the results of Methane concentrations in the Area 2 gas monitoring wells since commencement of monitoring.

Appendix 4-1 indicates that the majority of the Area 2 wells did not typically detect Methane above the trigger level of 1% during 2018. The exception to this is GP05\_16, where Methane was recorded above the 1% trigger level during December 2018, with a recorded concentration of 7.7%, being the highest recorded at this location. This location will be closely monitored in 2019.

Appendix 4-2 presents the Methane concentrations in GP06\_24 and GP06\_25, constructed on the Area 2 side of the in-ground barrier installed between Area 1 and Area 2. Methane concentrations have typically fluctuated significantly in GP06\_24 since mid-2008 and in GP06\_25 since the start of 2012.

GP06\_24 was only monitored on one occasion in 2018 due to the well subsequently being destroyed due to site activity. The Methane concentration recorded during this visit (March 2018) was 4.6%v/v, and this is within the general range of the dataset Methane in GP06\_24 has been recorded at significantly lower concentrations since mid-2017.

GP06\_25 was monitored four times during 2018 (quarterly - March, June, September and December). On the four visits the Methane concentrations were recorded in the range 32.4%v/v to 75.1%v/v which, with the exception of December 2018 are within the overall range for the dataset. The concentration (75.1%v/v) recorded at this location in December 2018 is the highest ever concentration being recorded at this location.

Appendix 4-3 presents the methane concentrations at GP09\_18 and three surrounding monitoring wells GP18\_18A, GP18\_18B and GP18\_18C. In late 2016 the methane (and carbon dioxide) concentrations at GP09\_18 started to rise significantly and therefore the three additional monitoring wells were installed

in 2018 at locations surrounding the original monitoring location. The new monitoring wells have been included as part of the monitoring programme for Area 2 since June 2018.

In 2018, GP09\_18 has recorded methane concentrations of between about 16%v/v and 45%v/v. In comparison, GP18\_18A was monitored on one occasion (September) and recorded a methane concentration of 9.7%v/v. GP18\_18B was monitored on three occasions (June, September and December) and recorded methane concentrations between 16%v/v and 81%v/v. GP18\_18C was also monitored on three occasions and recorded methane concentrations between 32%v/v and 89%v/v.

At the current time the reason for the elevated methane concentrations at this location are unknown, and there are no current obvious trends in the data from the new surrounding wells. The data from the next closest monitoring well, GP05\_17 to the north, does not indicate elevated methane concentrations.

In agreement with the NCC, it is proposed to obtain bulk samples of the gas from GP09\_18 and submit this to the laboratory for analysis, to facilitate a potential determination of the gas type, nature and origin. This will be reported in due course.

**Appendix 4-4** indicates that concentrations of Methane in GP05\_20 and GP05\_21 were recorded below the 1% trigger level throughout 2018.

## Carbon Dioxide

Carbon Dioxide concentrations have generally varied with time since the commencement of the landfill gas monitoring programme in the perimeter monitoring wells within Area 2. Graphs indicating the Carbon Dioxide concentrations recorded over time and showing well specific trigger levels are presented in **Appendices 4-5 to 4-16**.

In all of the monitoring wells where trigger levels have been set, the Carbon Dioxide concentrations have all been recorded below the well-specific trigger levels during 2018.

Carbon Dioxide within GP03\_06 has been recorded at lower concentrations throughout 2018, compared with concentrations observed in the previous five years.

In GP09\_18 the concentrations of carbon dioxide started rising significantly in late 2016, the same as for methane (see above). However, at the current time the trigger level for carbon dioxide at this location has not been exceeded.

At the remaining locations, the carbon dioxide concentrations recorded during 2018 are generally within the typical range for the datasets and are not indicating that any adverse trends are developing,

## 5.4 Review of Risks and Future Monitoring

The data for GP09\_18 indicates that there has continued to be elevated methane concentrations present at this location during 2018. Three further monitoring wells were installed surrounding GP09\_18 during 2018 and elevated concentrations of methane have also been observed within these new locations.

With the exception of GP09\_18 (discussed above), the only monitoring locations that have consistently recorded significant Methane concentrations are GP06\_24 since 2006 and GP06\_25 since 2012. These wells are located some considerable distance away from the part of the Area 2 site that has to date been used for waste disposal. The elevated Methane concentrations recorded at GP06\_24 were present at the time that the in-ground gas barrier was constructed (separating the Area 1 and Area 2 sites) and may therefore represent background concentrations, or natural gas in the Alluvium. However, this monitoring well has been destroyed by site activities during 2018, and therefore no further data can be collected at this location. It is not currently known why Methane concentrations in GP06\_25 started fluctuating in 2012, or why the highest concentration was recorded at this location in December 2018, however this will continue to be closely monitored and reported to NRW during 2019.

Landfill gas will continue to be monitored on a quarterly basis and gas conditions will continue to be reported to NRW on a quarterly basis in accordance with the PPC Permit.

## 6 Landfill Gas Generation and Usage

### 6.1 Landfill Gas Utilisation Plant

Docksway Disposal Site has a Landfill Gas Utilisation Plant servicing both Area 1 and Area 2 landfills. It currently comprises one 1MW Jenbacher (320) engine together with one 1500m<sup>3</sup>/hr flare.

Infinis Energy are currently responsible for the general running and routine maintenance of the gas plant and has provided information to assist in the compilation of this section of the report. The Infinis annual report is presented as **Appendix 5**.

Monitoring of the plant performance and volumes of gas extracted from the gas utilisation plant has been undertaken on a regular basis since 2005 by Novera/Infinis, and the data collected over the last 12 months has been reported directly to NRW by Infinis.

### 6.2 Landfill Gas Extraction

In 2018, the total production of energy from the Landfill Gas Utilisation Plant was 5938MWh with a site efficiency of 33%. In 2017 by comparison, the total production of energy was about 7443MWh with a site efficiency of 33.5%. The total energy produced and efficiency has decreased slightly from 2017 to 2018.

Engine downtime hours in 2018 were 773, compared to 699 in 2017 which represents a marginal increase in engine downtime from 2017 (7.7% compared to 7.9%). Engine operation time in 2018 was 7987 hours which is a marginal reduction from the 8072 hours in 2017.

The flare operated in 2018 during periods when the engine was not operational. The flare was operating for 778 hours during 2018 based on the availability of the engine, compared to 667 hours in 2017. This is a slight increase from 2017.

Environmental Performance Indicators, provided by Infinis Energy, indicate that there has been a slight increase in Carbon Monoxide emissions in 2018 compared to 2017, and total Oxides of Nitrogen emissions increased slightly in the same period. Emissions data critically depends on a number of factors including run hours of engines and availability of landfill gas to them, and whilst they are presented as EPI they should be treated with caution. The Annual Report provided by Infinis is presented in **Appendix 5**.

### 6.3 Monitoring of Extracted Gas

The PPC Permit (LP3135SB) for the gas installation at the site requires that 'emissions to air from the engine stacks, fugitive emissions, and odour are monitored and reported annually'. This data is collated and presented directly to NRW by Infinis Energy.

Flare monitoring is only required if the flare is in operation greater than 10% of the time, in accordance with Condition 58 of the WML. Infinis have indicated that the flare was not subject to emissions testing in 2018 due the operation time being <10%.

Monitoring and reporting will continue by Infinis in accordance with the PPC Permit.

## 7 Annual Production / Treatment and Performance Parameters

### 7.1 Annual Production/Treatment

Table 7-1 Annual Production/Treatment reported by NCC and Infinis (Landfill Gas)

Leachate:	Tonnes/year
Disposed of off-site (Area 2)	11,648
Disposed of to any onsite effluent treatment plant	None
Re-circulated into the waste mass	None
Surface water and/or groundwater:	Cubic metres/year
Disposed of off site	N/A
Disposed of to any onsite effluent treatment plant	None
Landfill Gas: (Whole site)	Normalised cubic metres/year
Combustion in flares	342,557
Combustion in gas engines	3,516,712
Other methods of gas utilisation	None

### 7.2 Performance Parameters

Parameter	Frequency of Assessment	Annual Total	Unit
Potable Water Use	Annually	1,558	Cubic metres
Energy Used (including for leachate treatment, Excluding electricity generated)	Annually	195,120	kWh of electricity
Non Potable Water Use	Annually	0	Cubic metres

### 7.3 Topographic Surveys

The topographical surface of Area 2 of Docksway Disposal Site was surveyed during January 2018 and the results of the survey are presented in **Appendix 6**.

It has been calculated by NCC that 90,947 m<sup>3</sup> of waste was placed in Cells 2 and 3B in 2018 (December 2017 to October 2018), and this is an increase from 2017 when 77,494 m<sup>3</sup> of waste was placed (in Cell 2 only). It has also been calculated by NCC that a total of 17,717 m<sup>3</sup> of SNRHW was placed in Cell 3A during 2018 (December 2017 to October 2018), an increase from 13,426 m<sup>3</sup> in 2017. As of October 2018, the cumulative waste volume deposited in Area 2 (excluding Cell 3A) was 1,005,268m<sup>3</sup>, and in Cell 3A was 31,143m<sup>3</sup>.

The maximum elevation of Area 2 was 32m (Cell 1) Above Ordnance Datum (mAOD) as of October 2018.

The cross sections provided indicate that the slope angles of the permanent waste slopes are in accordance with permitted slope angles (no greater than 1:4).

## 8 Conclusions

### 8.1 Assessment of Environmental Performance Trends

This document reviews the environmental data from the last 12 months and also provides an indication of data trends both over the last 12 months and since the various monitoring programmes commenced.

Surface water monitoring indicates generally stable trends since the previous Environmental Performance Review, with no evidence of significant adverse trends developing. On the one occasion that SW26 was monitored in 2018, the recorded parameters were within the discharge consent limits. On the one occasion that SW25 was monitored in 2018, the recorded parameters were within the discharge consent limits. On the basis of the data available, it is considered that there has been no significant deterioration of the surface water quality in the last 12 months.

Data from the groundwater monitoring wells in Area 2 indicate generally stable trends in the groundwater chemistry since the previous Environmental Performance Review. A small number of intermittent exceedances of compliance limits were recorded in some monitoring wells, however, these are not generally considered to represent a significant risk to the groundwater quality because they are not consistently exceeding the compliance limits at the current time. On the basis of the data available, it is considered that there has been no significant deterioration of the groundwater quality in the last 12 months.

The data indicates that during 2018 there have been exceedances of the permitted leachate levels (of 2m above the base) in all cells in Area 2, and that there have been times when the leachate levels have not been measured in accordance with the PPC Permit. Newport City Council (NCC) have employed a dedicated monitoring technician from the start of 2019, and therefore it is anticipated that ongoing monitoring will be undertaken in accordance with the PPC Permit for the site going forwards.

Samples could not always be recovered from the leachate wells in Area 2 during 2018 and therefore samples of leachate were obtained from side risers closest to the monitoring wells when necessary, when access allows, the long-term sampling locations are; LF08\_07 in Cell 1 and C2B in Cell 2. A sample was also obtained from Cell 3 (LF\_C3B).

The environmental monitoring data for LF08\_07 and C2B indicates that the leachate chemistry has been variable throughout the 12-month monitoring period in both Cells 1 and 2, although generally the data is within the typical range for each of the parameters. There is currently insufficient data for Cell 3 to determine whether there are any trends developing, however the results to date for all parameters are within the typical ranges identified over the longer term for Cells 1 and 2. The data is not indicative of a significant change in the leachate quality in 2018.

External landfill gas concentrations at Area 2 are predominantly indicating generally stable trends in methane and carbon dioxide, although concentrations of methane and carbon dioxide continue to be elevated in GP09\_18 and continue to be high in GP06\_24 and GP06\_25, In agreement with NCC, samples of the bulk gases at GP09\_18 will be obtained and submitted to the laboratory for analysis, to facilitate a potential determination of the gas type, nature and origin. This will be reported in due course. GP06\_24 has been destroyed and therefore will not be part of the ongoing monitoring programme at the site. GP06\_25 will continue to be closely monitored and reported to NRW.

### 8.2 Future Monitoring Requirements

It is intended that the Docksway Disposal Site Area 2 monitoring programmes shall continue in line with the PPC Permit requirements (and as approved by NRW), providing data which will enable the ongoing assessment of the environmental performance of the site and the provision of environmental performance reports on an annual basis.

## 9 References

- [1] PBA (2011) Docksway Disposal Site, Newport. 2011 Monitoring Plan for Area 1. Peter Brett Associates, August 2011.
- [2] PBA (2004). Docksway Disposal Site, Newport. Monitoring Plan for Area 2: Landfill Extension. Peter Brett Associates LLP report reference 14739/010B/CBH. October 2004.
- [3] PBA (2010) Docksway Disposal Site, Newport. Review of the Hydrogeological Risk Assessment for Area 2. Peter Brett Associates, December 2010.
- [4] PBA (2017) Docksway Disposal Site, Annual Environmental Review for Area 2 - 2017. Peter Brett Associates, April 2018.

## Guidance for Readers of the Report

This report has been prepared within an agreed timeframe and to an agreed budget that will necessarily apply some constraints on its content and usage. The remarks below are presented to assist the reader in understanding the context of this report and any general limitations or constraints. If there are any specific limitations and constraints they are described in the report text.

- 1 The opinions and recommendations expressed in this report are based on statute, guidance, and appropriate practice current at the date of its preparation. Peter Brett Associates LLP (PBA) does not accept any liability whatsoever for the consequences of any future legislative changes or the release of subsequent guidance documentation, etc. Such changes may render some of the opinions and advice in this report inappropriate or incorrect and we will be pleased to advise if any report requires revision due to changing circumstances, especially those over one year old. Following delivery of any report PBA has no obligation to advise the Client or any other party of such changes or their repercussions.
- 2 Some of the conclusions in this report may be based on third party data. No guarantee can be given for the accuracy or completeness of any of the third party data used.
- 3 The conclusions and recommendations made in this report and the opinions expressed are based on the information reviewed and/or the ground conditions encountered in exploratory holes and the results of any field or laboratory testing undertaken. There may be ground conditions at the site that have not been disclosed by the information reviewed or by the investigative work undertaken. Such undisclosed conditions cannot be taken into account in any analysis and reporting.
- 4 It should be noted that groundwater levels, groundwater chemistry, surface water levels, surface water chemistry, soil gas concentrations and soil gas flow rates can vary due to seasonal, climatic, tidal and manmade effects.
- 5 This report has been written for the sole use of the Client stated at the front of the report. This report shall not be relied upon or transferred to any other party without the express written authorisation of PBA. Any such party relies upon the report at its own risk.
- 6 The interpretation carried out in this report is based on scientific and engineering appraisal carried out by suitably experienced and qualified technical consultants based on the scope of our engagement. We have not taken into account the perceptions of, for example, banks, insurers, other funders, lay people, etc., unless the report has been prepared specifically for that purpose. Advice from other specialists may be required such as the legal, planning and architecture professions, whether specifically recommended in our report or not.
- 7 Public or legal consultations or enquiries, or consultation with any Regulatory Bodies (such as Natural Resources Wales, Natural England or Local Authority) have taken place only as part of this work where specifically stated.

## Figures



Site Grid Reference: ST 309 852

Client  
**NEWPORT CITY COUNCIL**

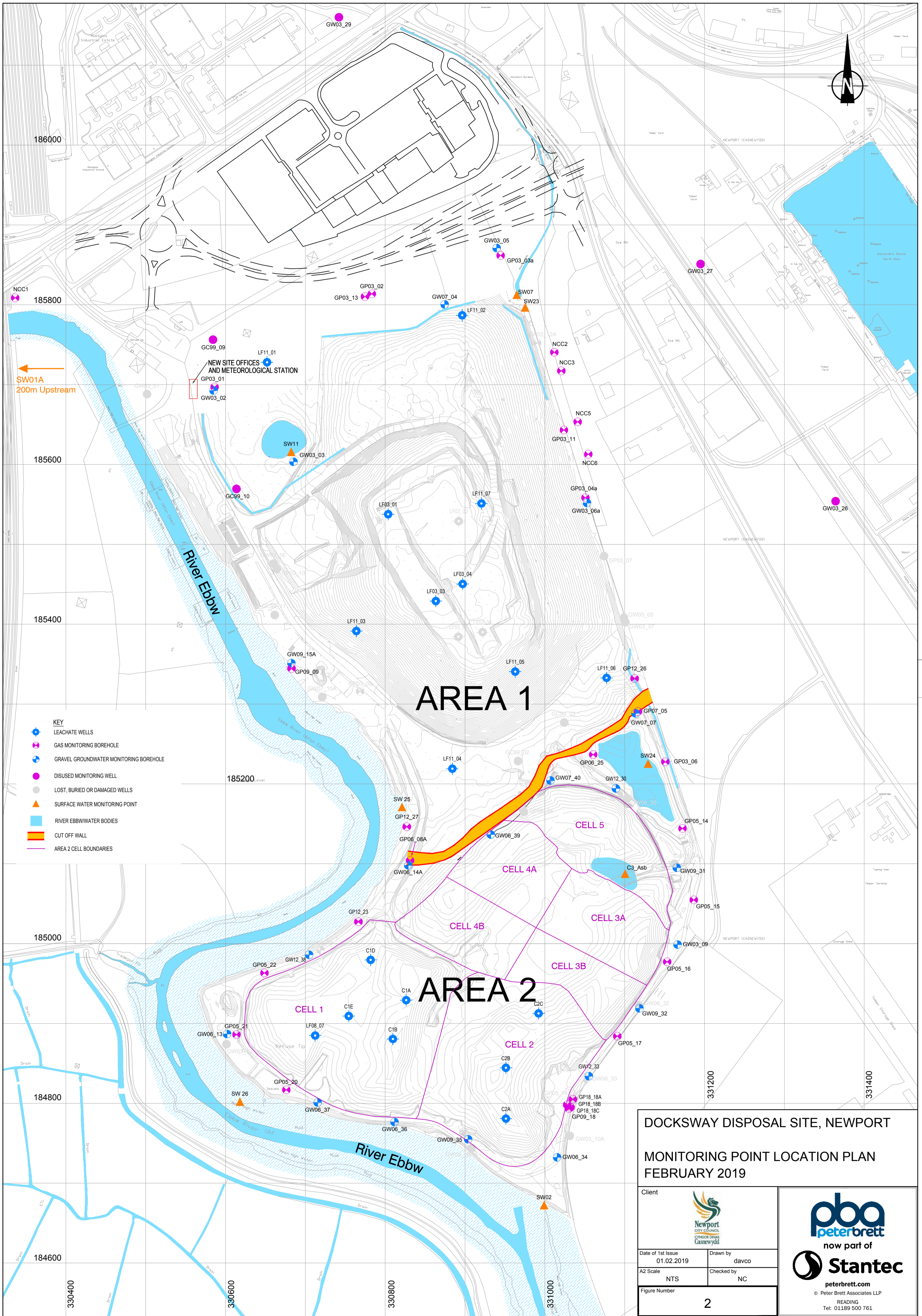
Contains Ordnance Survey data © Crown copyright and database right 2014.

**DOCKSWAY DISPOSAL SITE  
 NEWPORT**

**SITE LOCATION PLAN**


Date	01.04.2015
A4 Scale	1:50 000
Drawn by	davco
Checked by	VKR
Revision	0

FIGURE 1



- KEY**
- LEACHATE WELLS
  - GAS MONITORING BOREHOLE
  - GRAVEL GROUNDWATER MONITORING BOREHOLE
  - DISUSED MONITORING WELL
  - LOST, BURIED OR DAMAGED WELLS
  - ▲ SURFACE WATER MONITORING POINT
  - RIVER EBBWATER BODIES
  - CUT OFF WALL
  - AREA 2 CELL BOUNDARIES

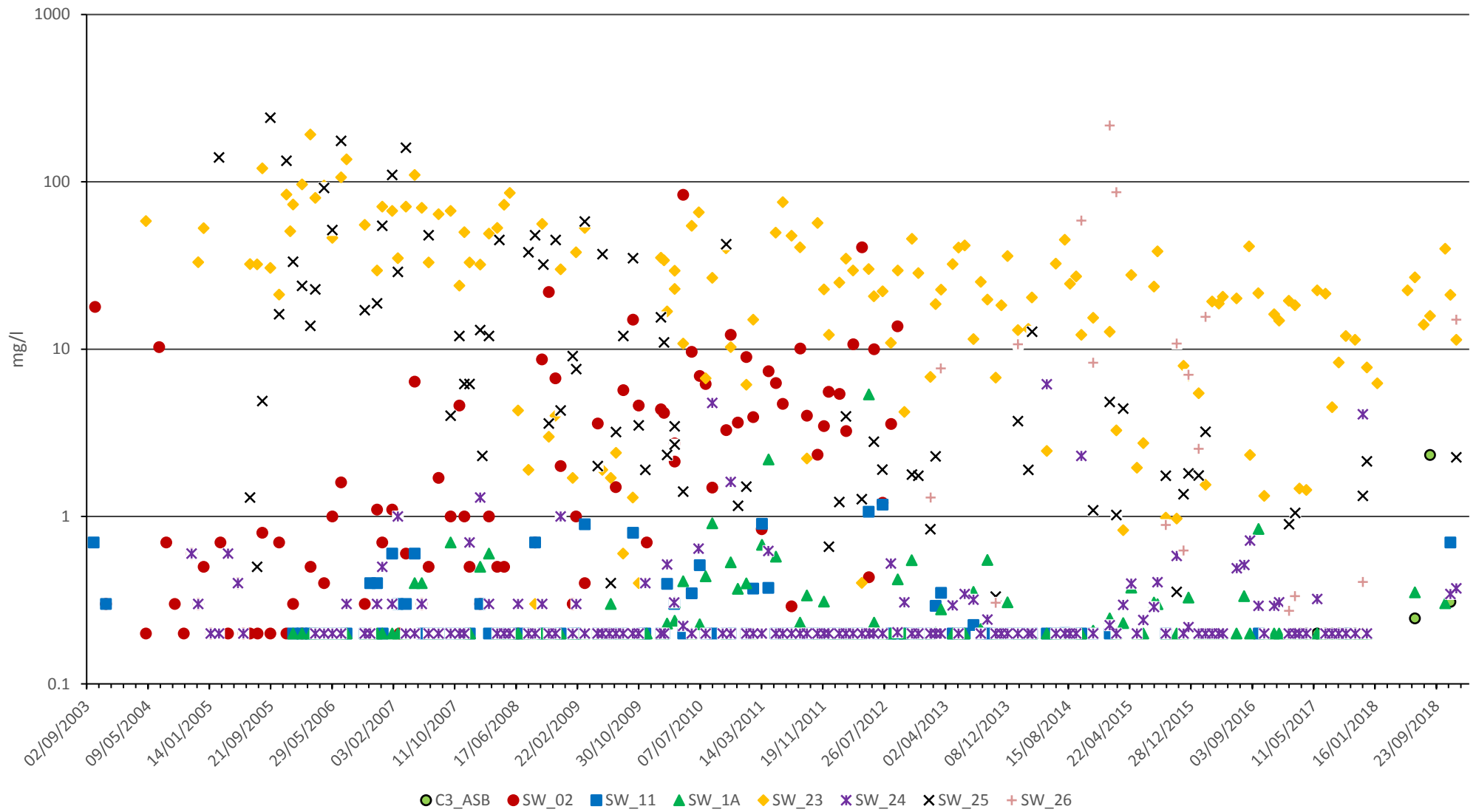
**DOCKSWAY DISPOSAL SITE, NEWPORT**  
**MONITORING POINT LOCATION PLAN**  
**FEBRUARY 2019**

Client		 Newport City Council CYMRU DDEUS CASNEWYDD	
Date of 1st Issue	01.02.2019	Drawn by	davco
A2 Scale	NTS	Checked by	NC
Figure Number	2		


  
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## Appendix 1 Surface Water Chemistry Graphs



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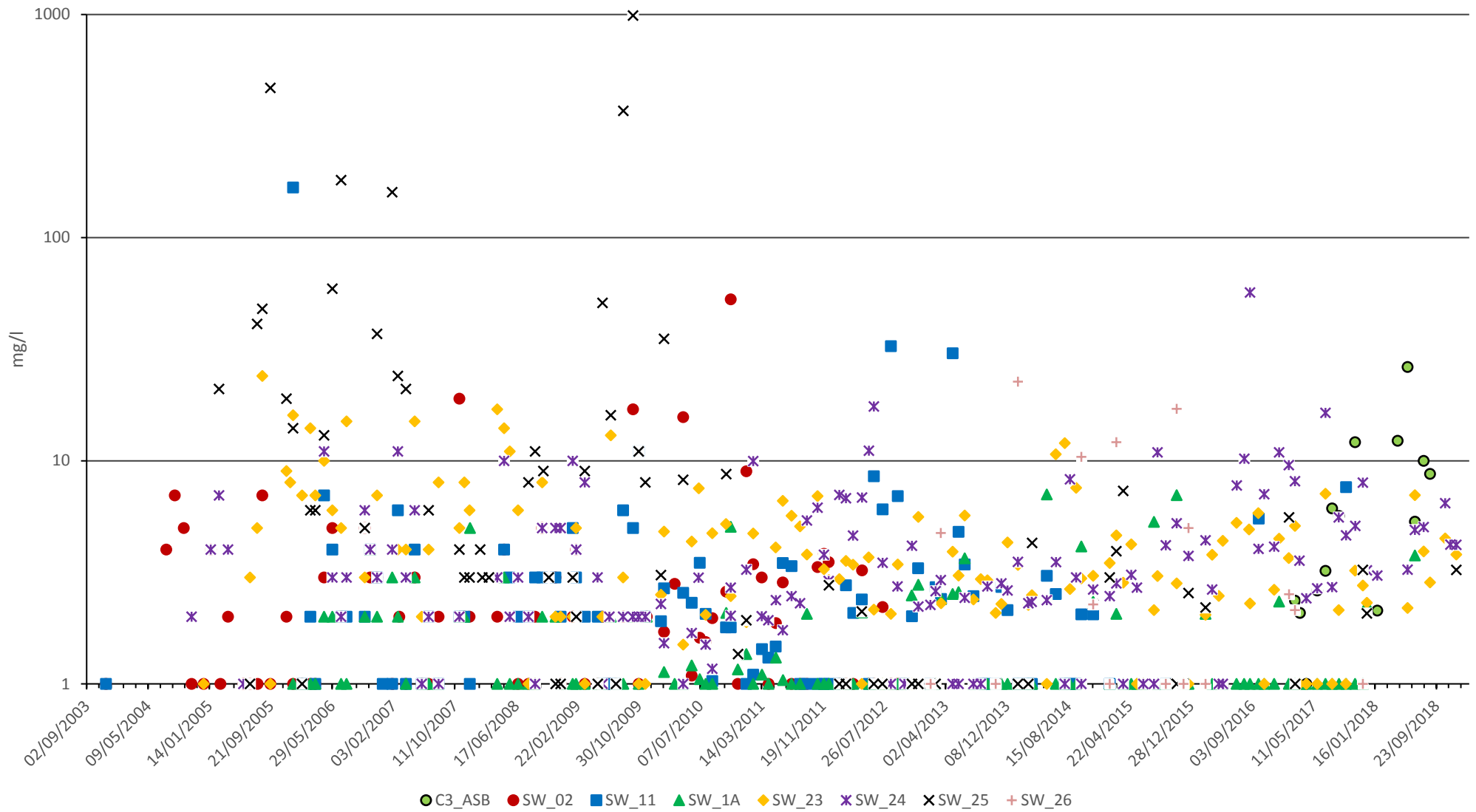
**Dockway Disposal Site**

**Ammonical Nitrogen in Surface Water**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix	<b>1/1</b>
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**Newport City Council**

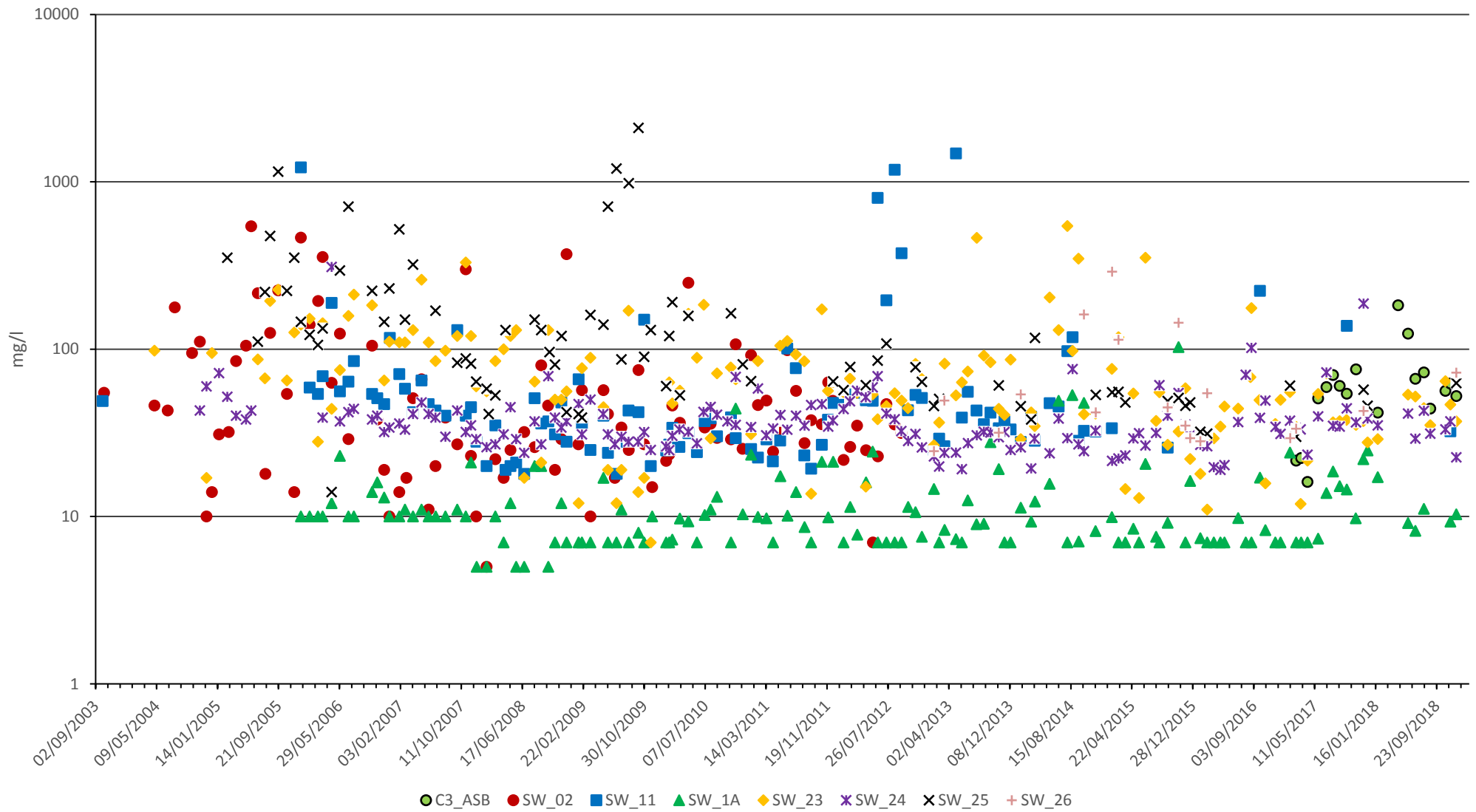
**Dockway Disposal Site**

**Biochemical Oxygen Demand in Surface Water**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix	<b>1-2</b>
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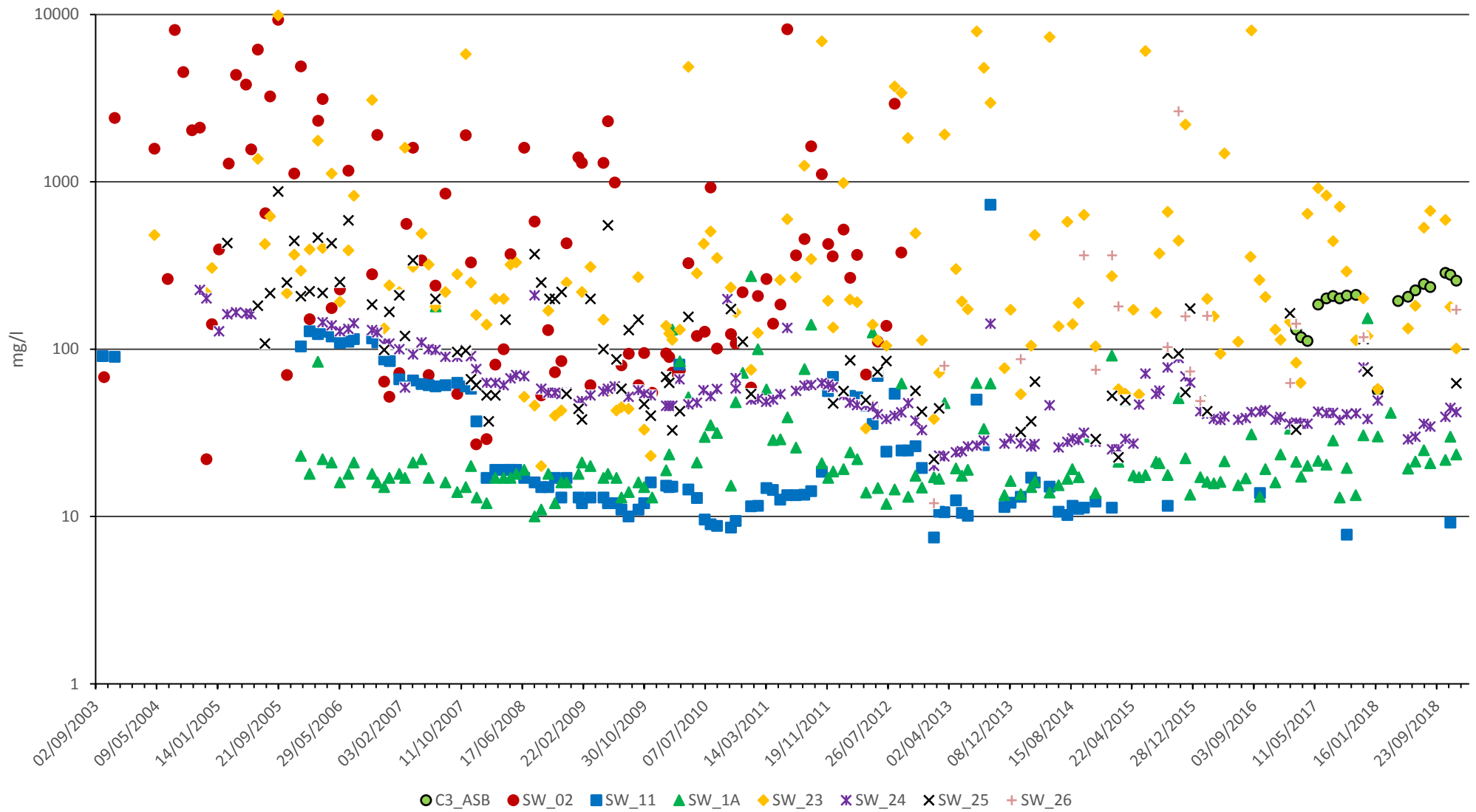
**Docksway Disposal Site**

**Chemical Oxygen Demand in Surface Water**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix	<b>1-3</b>
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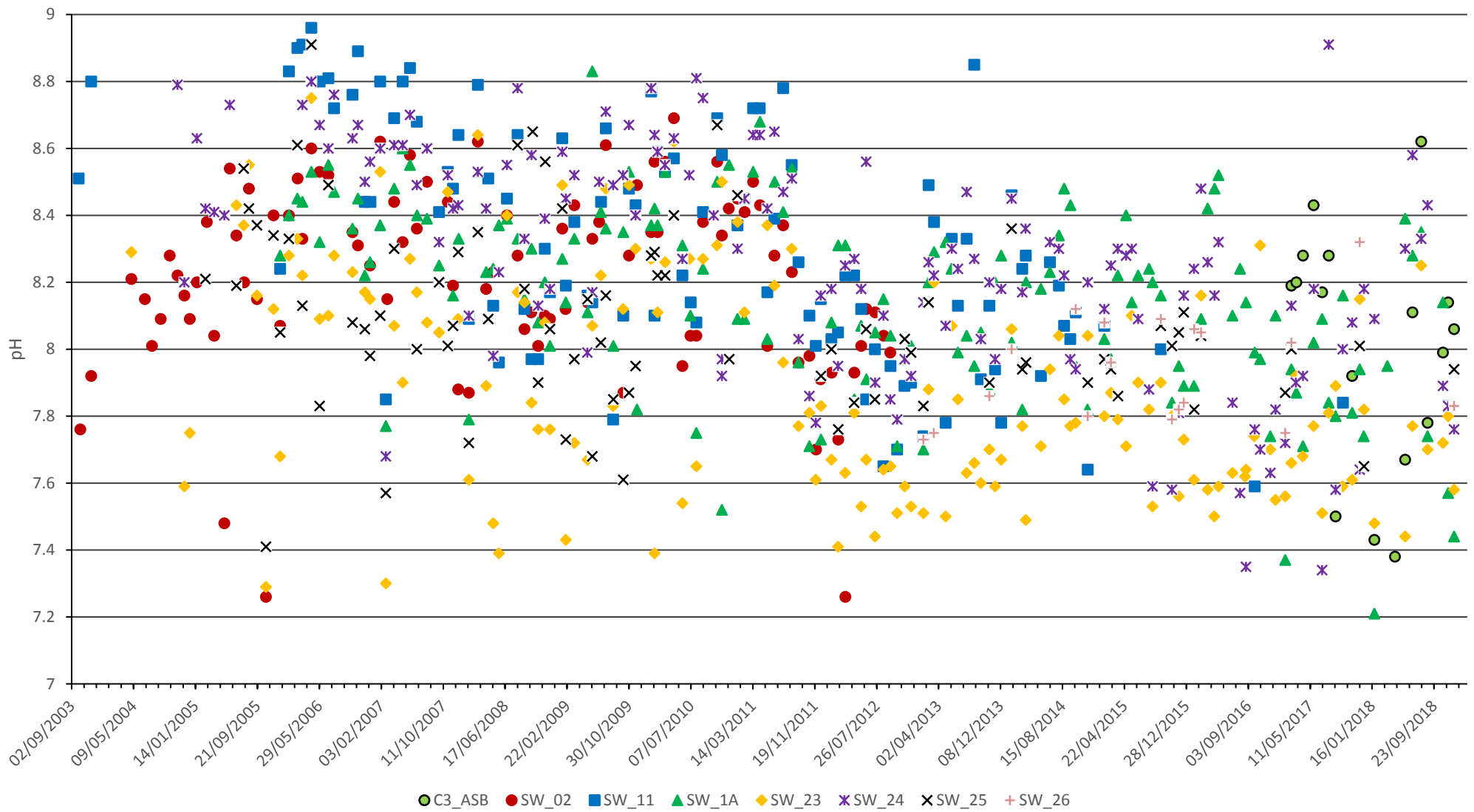
Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

**Docksway Disposal Site**

**Chloride in Surface Water**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix	<b>1-4</b>
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**Newport City Council**

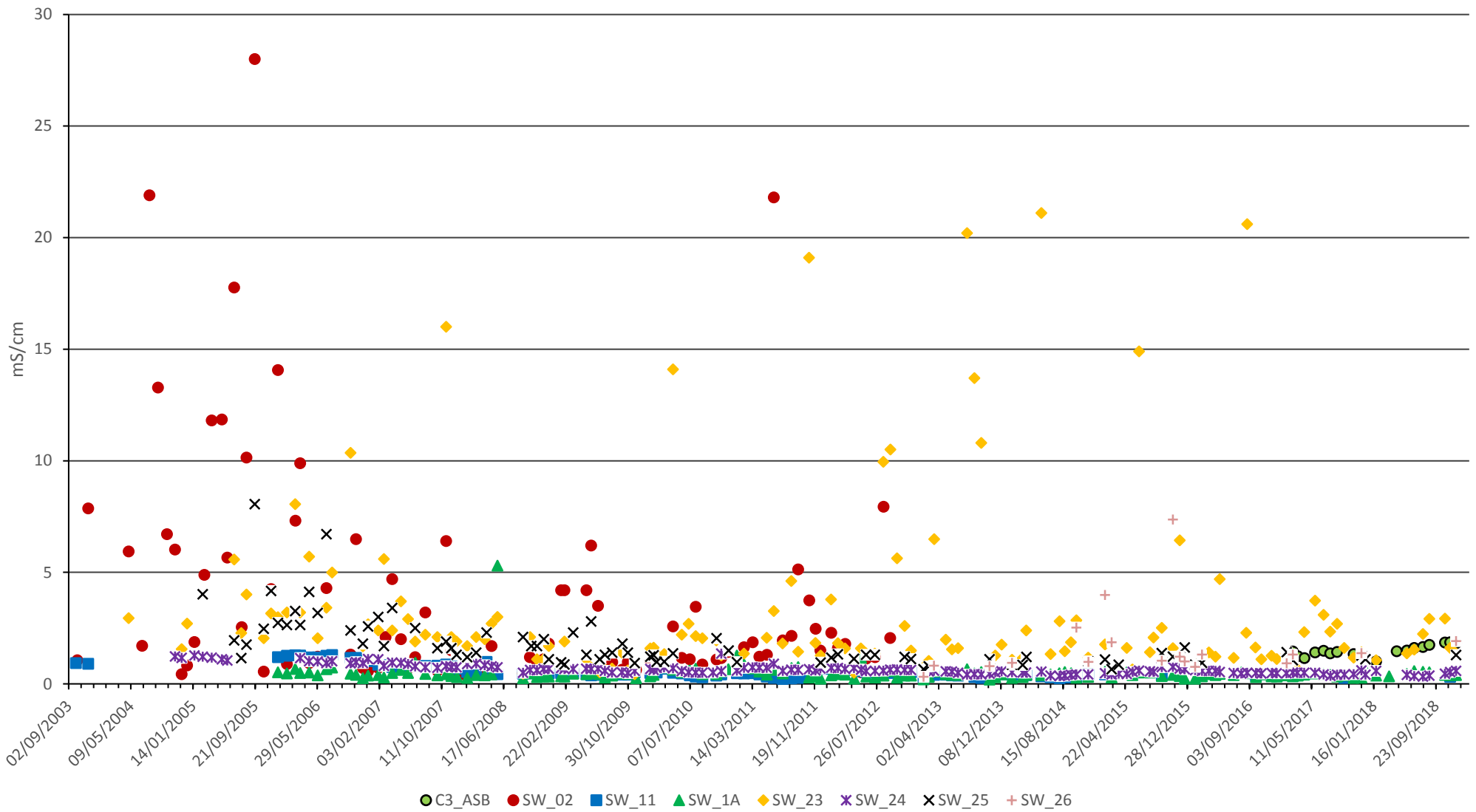
**Docksway Disposal Site**

**pH in Surface Water**

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 Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix	<b>1-5</b>
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● C3\_ASB ● SW\_02 ■ SW\_11 ▲ SW\_1A ◆ SW\_23 ✖ SW\_24 ✖ SW\_25 + SW\_26



Client  
**Newport City Council**

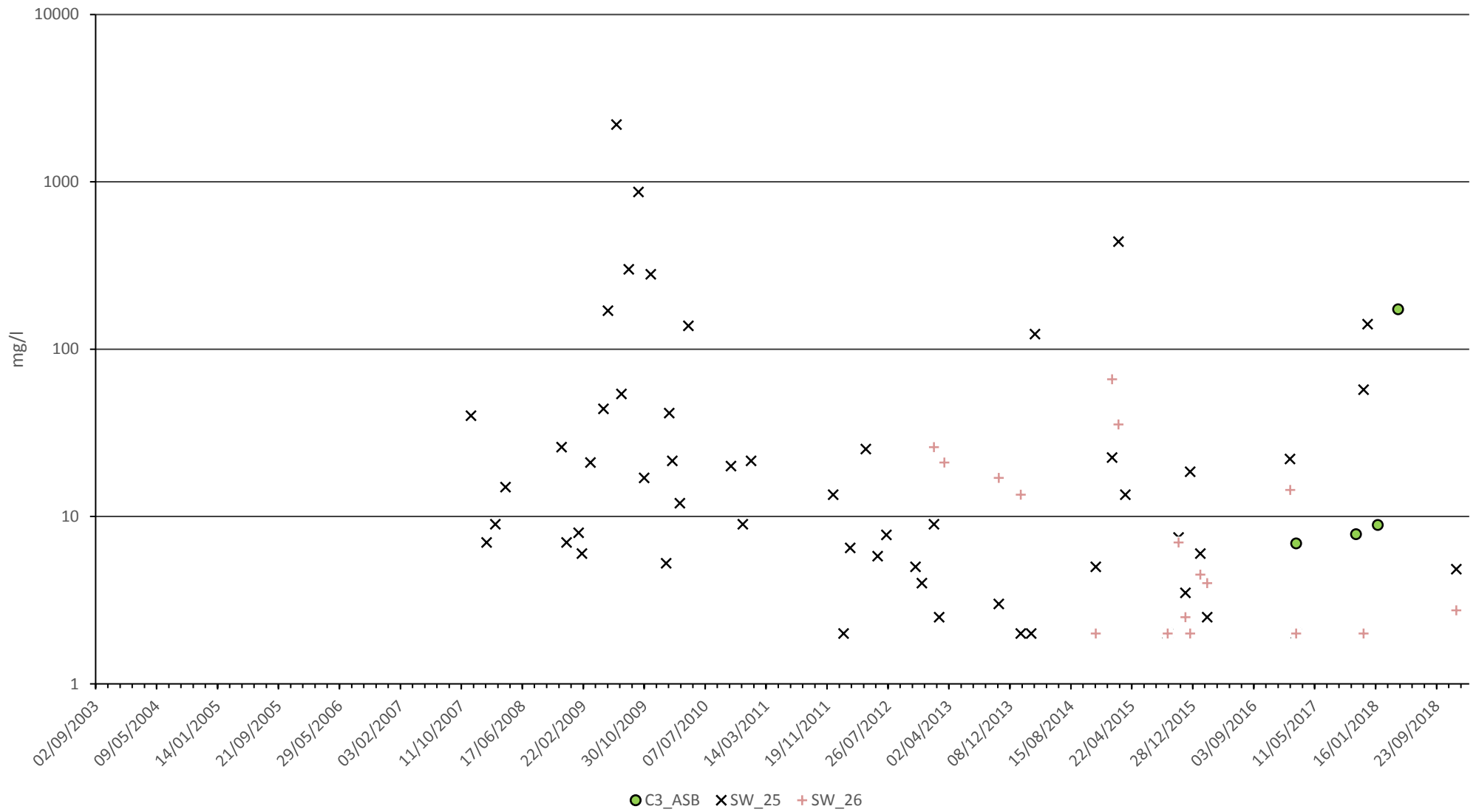
**Dockway Disposal Site**

**Electrical Conductivity in Surface Water**

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Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix	<b>1-5</b>
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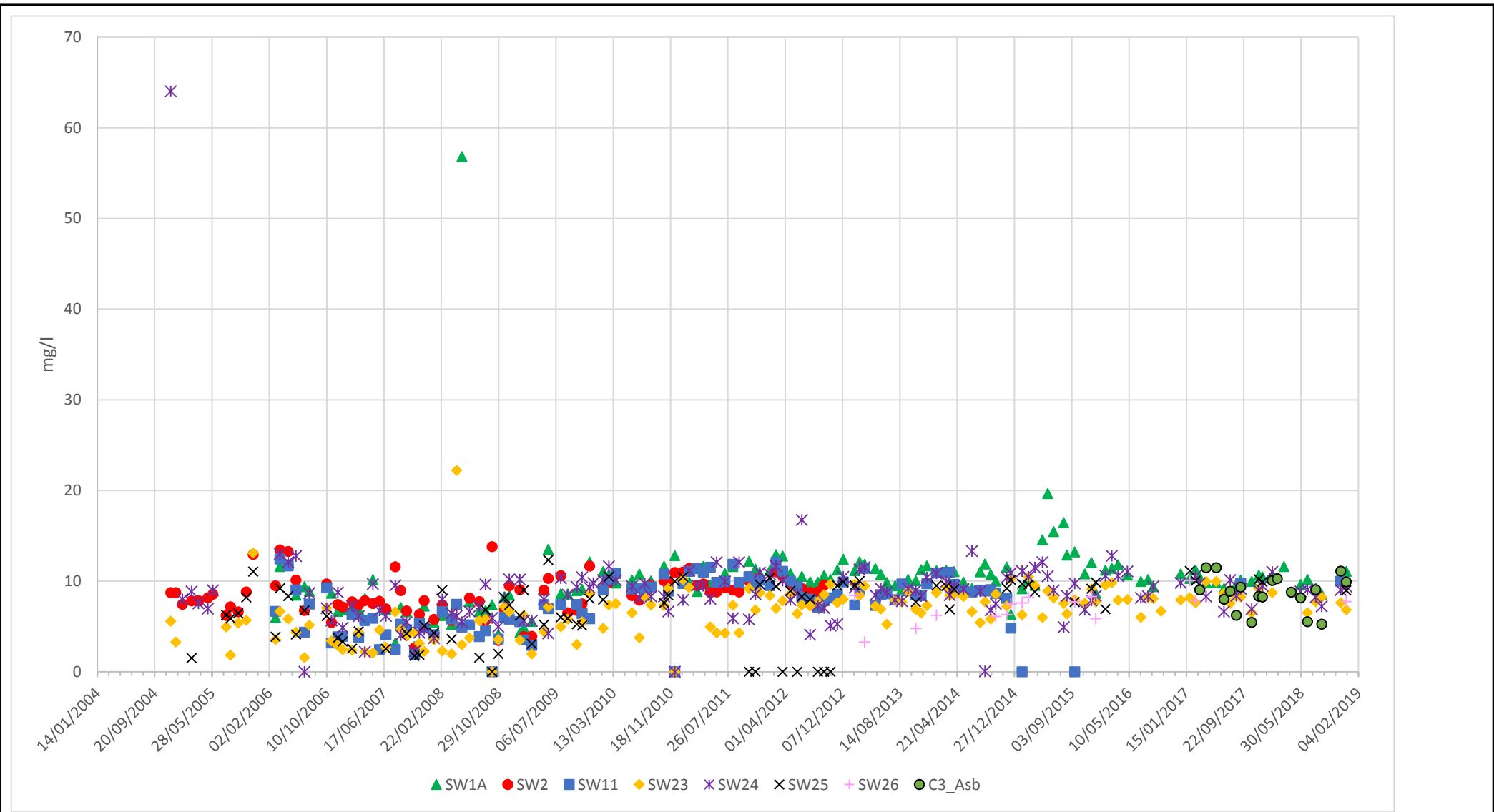
**Dockway Disposal Site**

**Total Suspended Solids in Surface Water**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix	<b>1-7</b>
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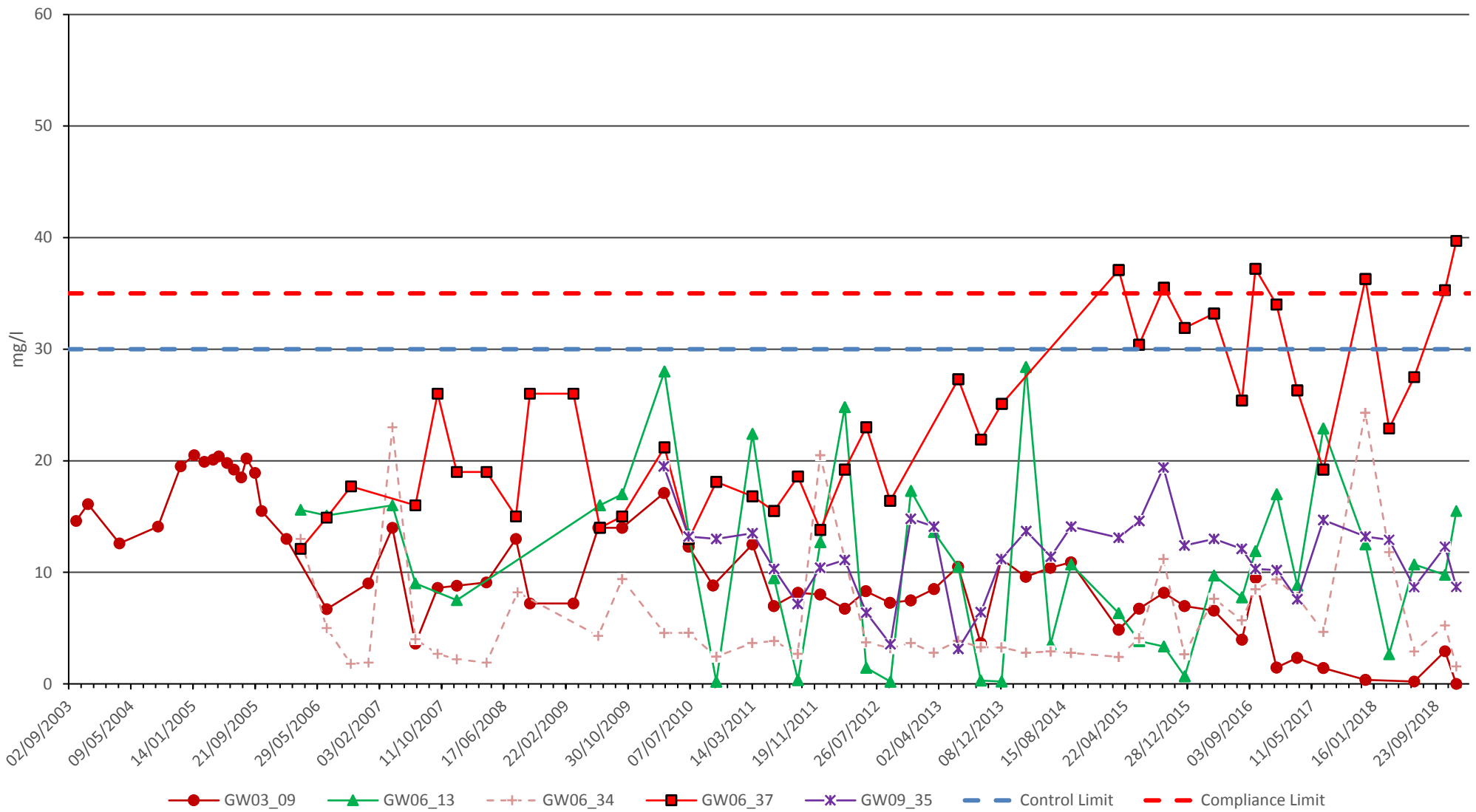
Client  
**Newport City Council**

**Docksway Disposal Site**

**Dissolved Oxygen in Surface Water**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR
<b>Appendix</b>	<b>1-8</b>

## Appendix 2 Groundwater Chemistry Graphs



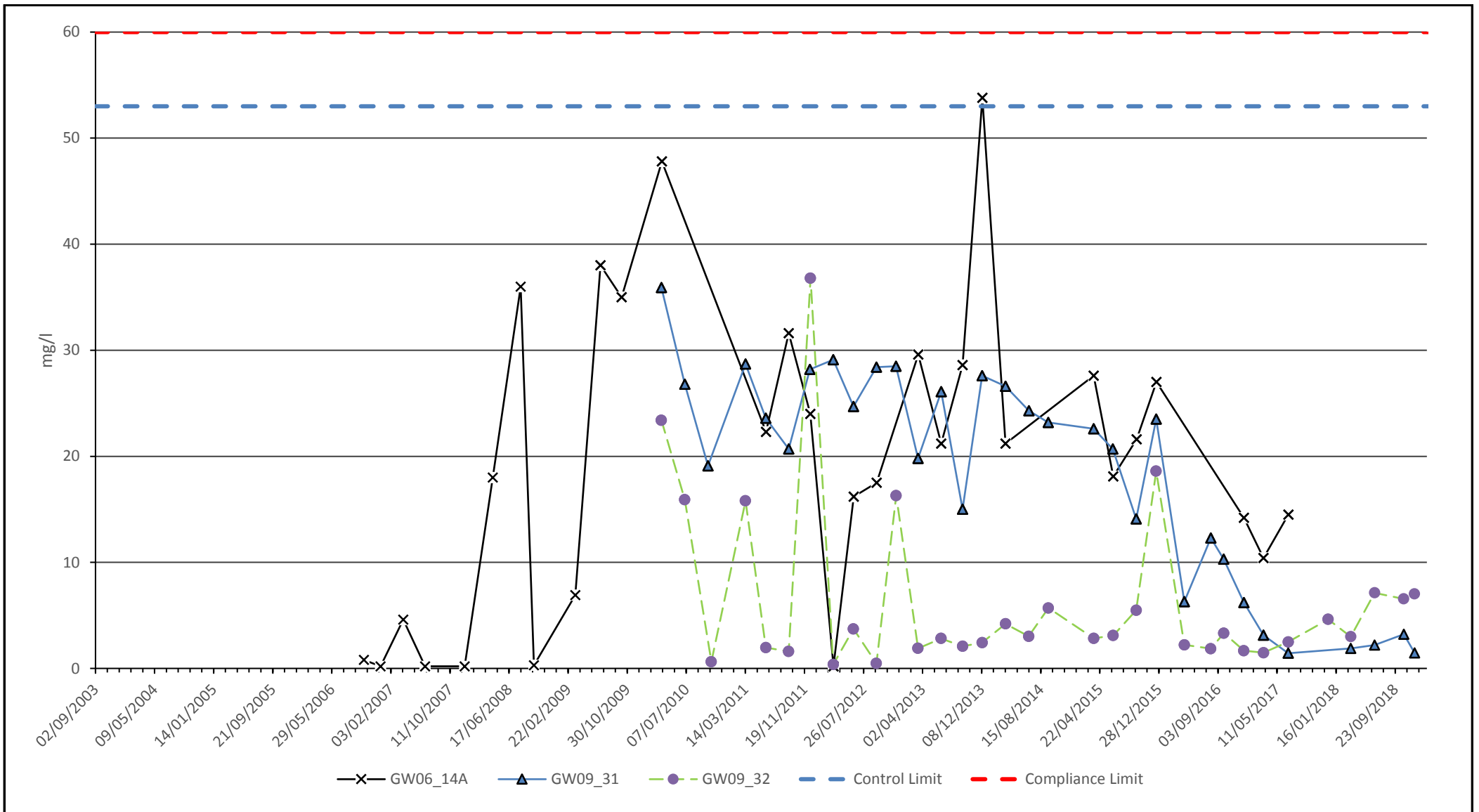
Client  
**Newport City Council**

**Docksway Disposal Site**

**Ammoniacal Nitrogen in Groundwater**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix  
**2-1**



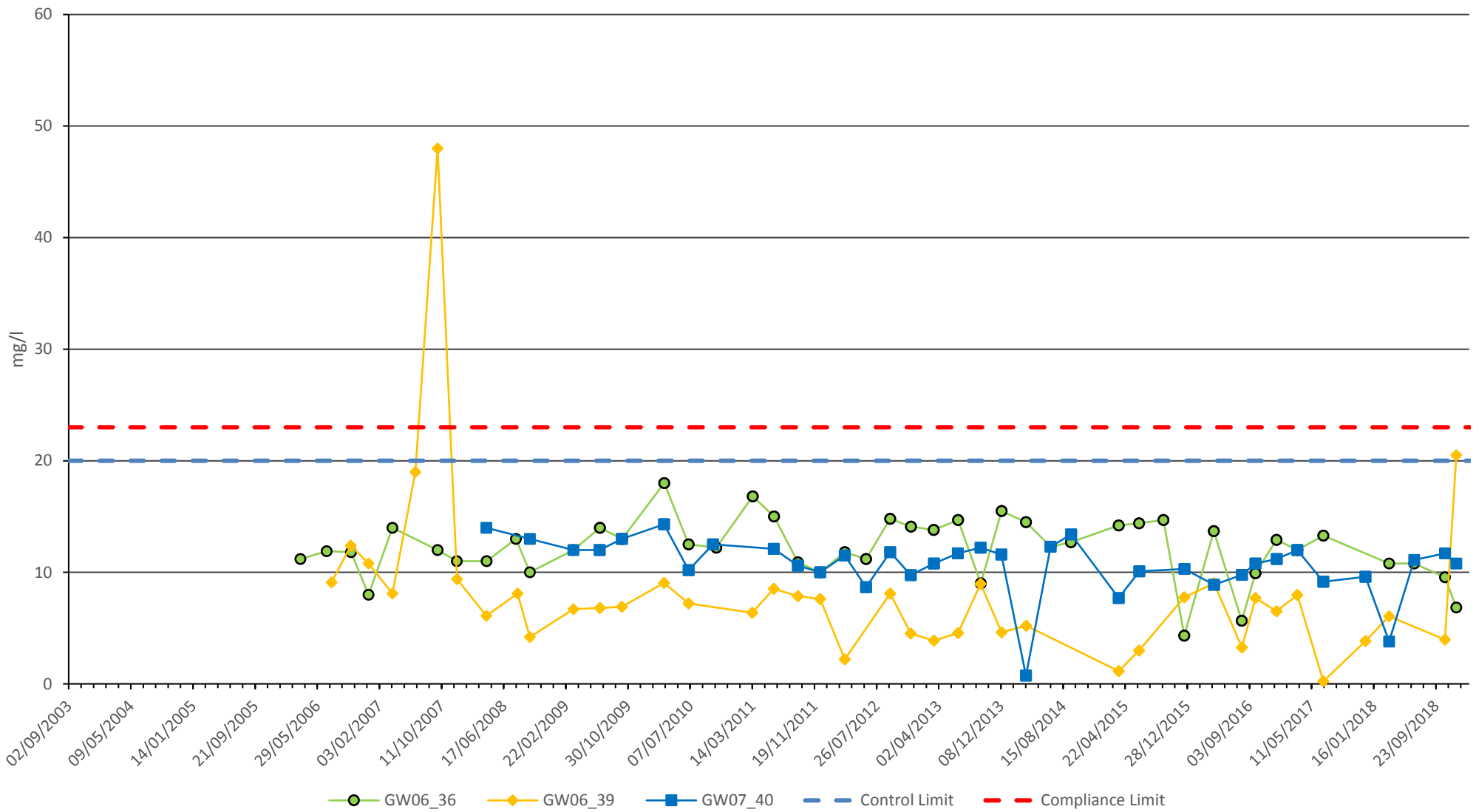
Client  
**Newport City Council**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

**Docksway Disposal Site**

**Ammoniacal Nitrogen in Groundwater**

Date	January 2019
A4 Scale	nts
Drawn	WW
Checked	VKR
Appendix	<b>2-2</b>



Client  
**Newport City Council**

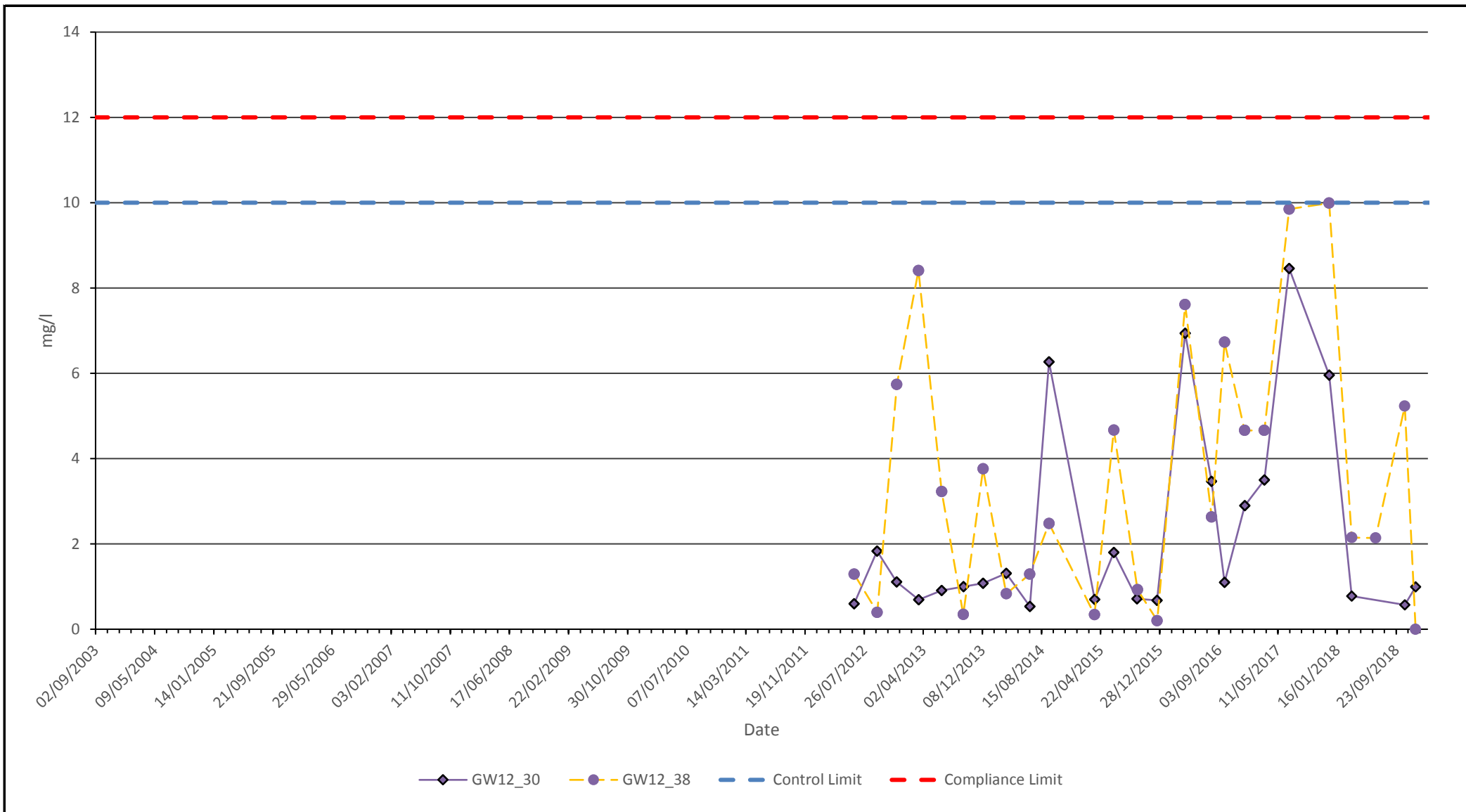
**Docksway Disposal Site**

**Ammoniacal Nitrogen in Groundwater**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	WW
Checked	VKR

Appendix	<b>2-3</b>
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Client

**Newport City Council**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
Tel 0118 950 0761 Fax 0118 959 7499

**Docksway Disposal Site**

**Ammoniacal Nitrogen in Groundwater**

Date January 2019

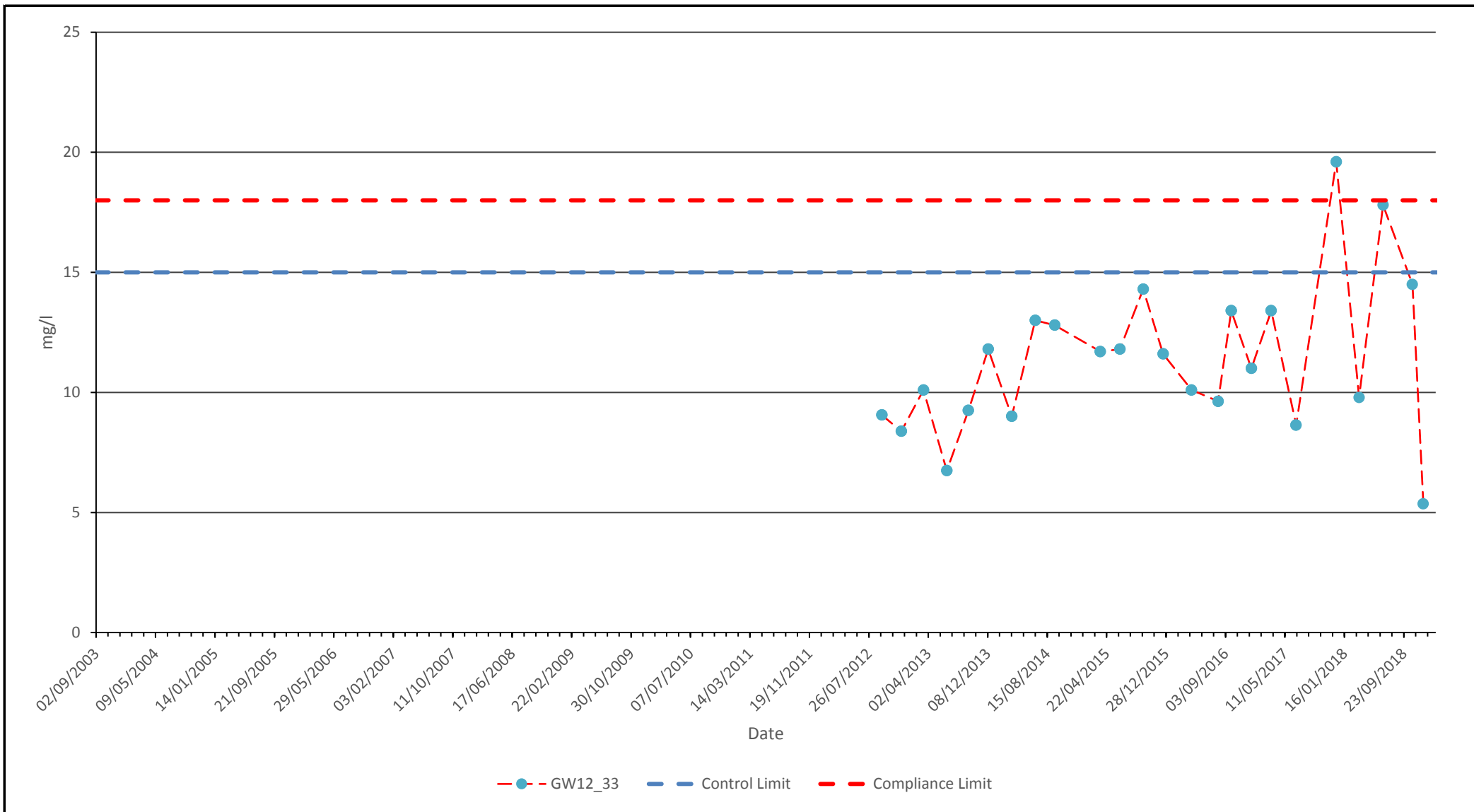
A4 Scale nts

Drawn NC

Checked VKR

Appendix

**2-4**



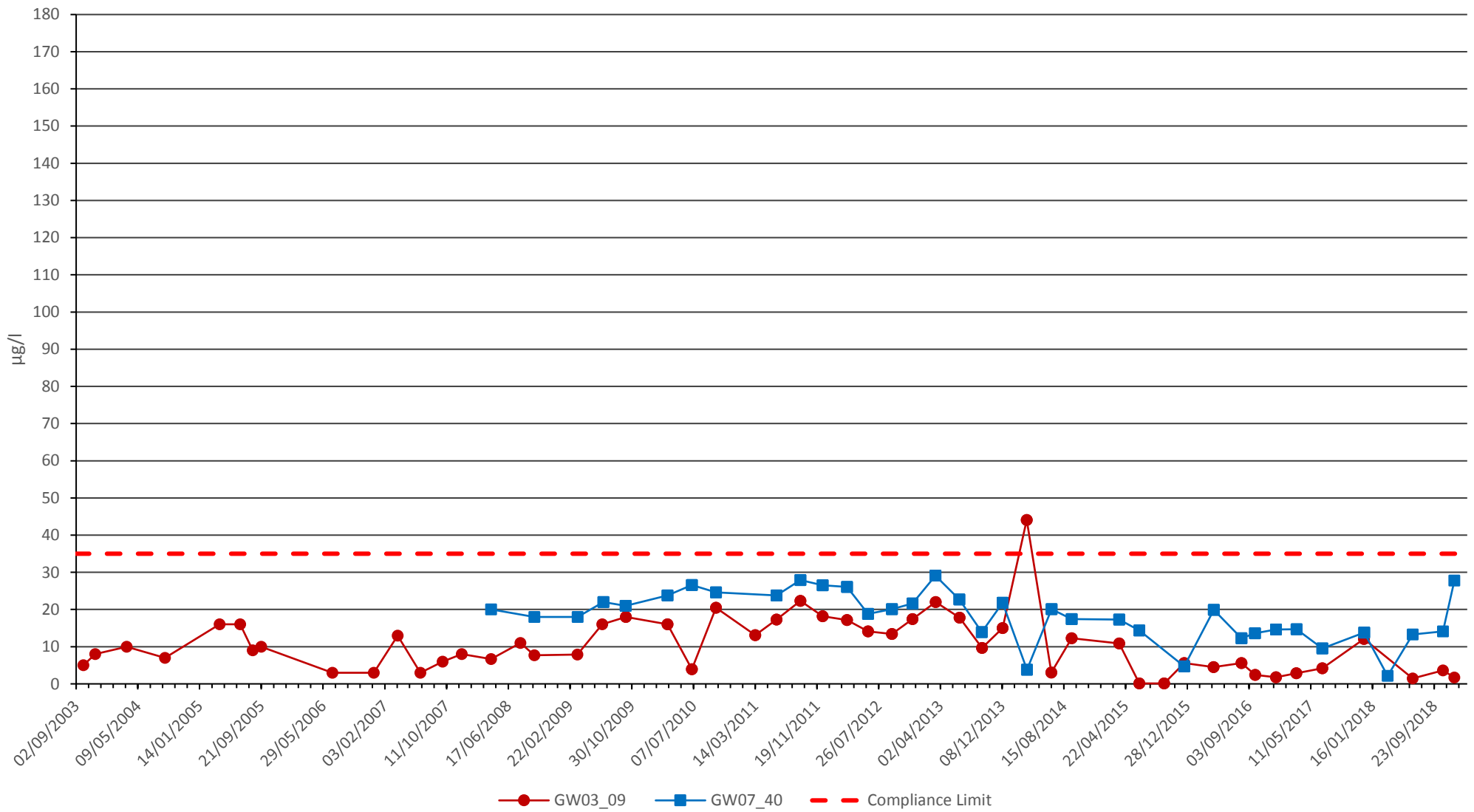

Client  
**Newport City Council**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
Tel 0118 950 0761 Fax 0118 959 7499

**Docksway Disposal Site**

**Ammoniacal Nitrogen in Groundwater**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR
Appendix	<b>2-5</b>



Client  
**Newport City Council**

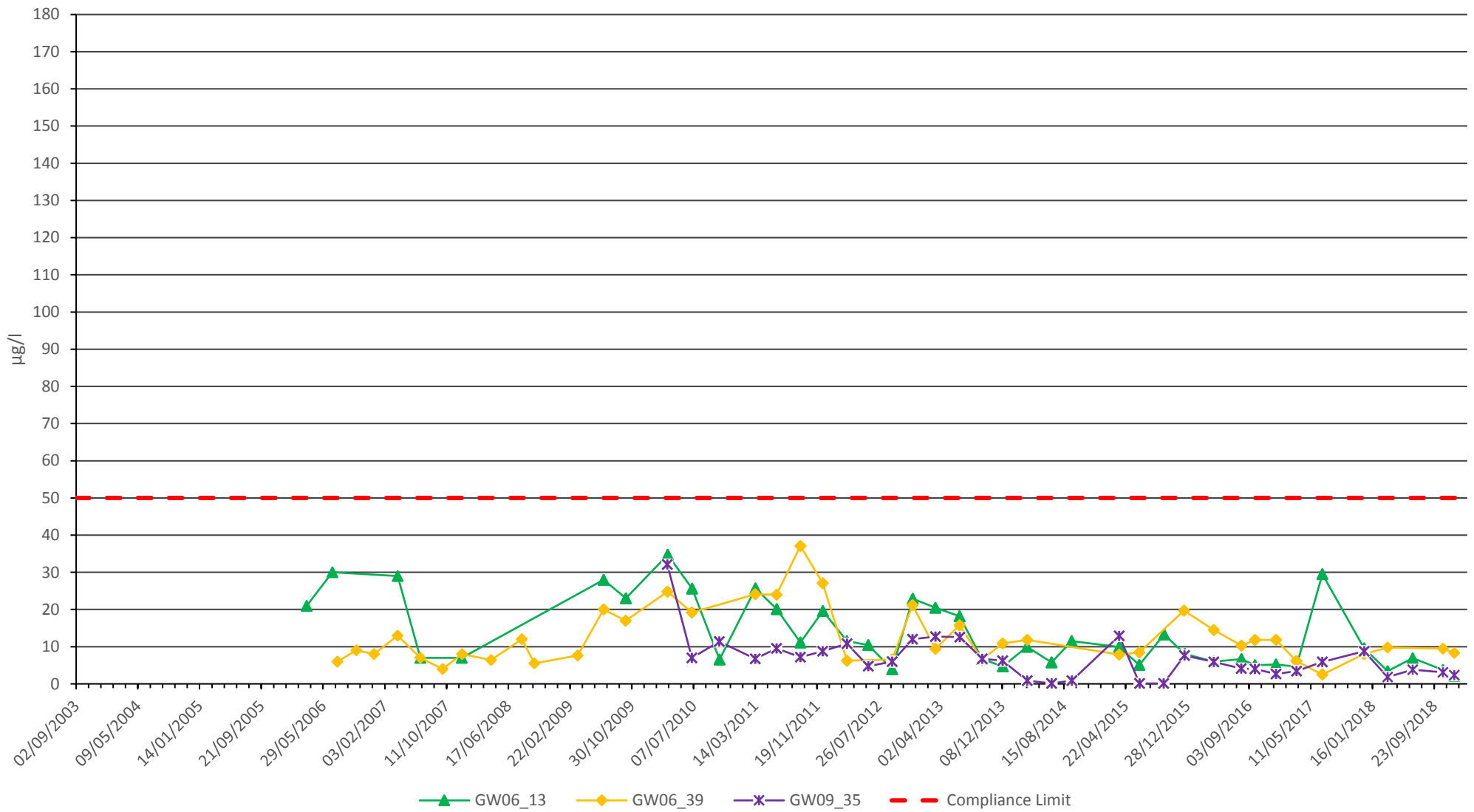
Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

**Docksway Disposal Site**

**Arsenic in Groundwater**

Date	January 2019
A4 Scale	nts
Drawn	WW
Checked	VKR

Appendix	<b>2-6</b>
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Client

**Newport City Council**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
Tel 0118 950 0761 Fax 0118 959 7499

**Docksway Disposal Site**

**in Groundwater**

Date January 2019

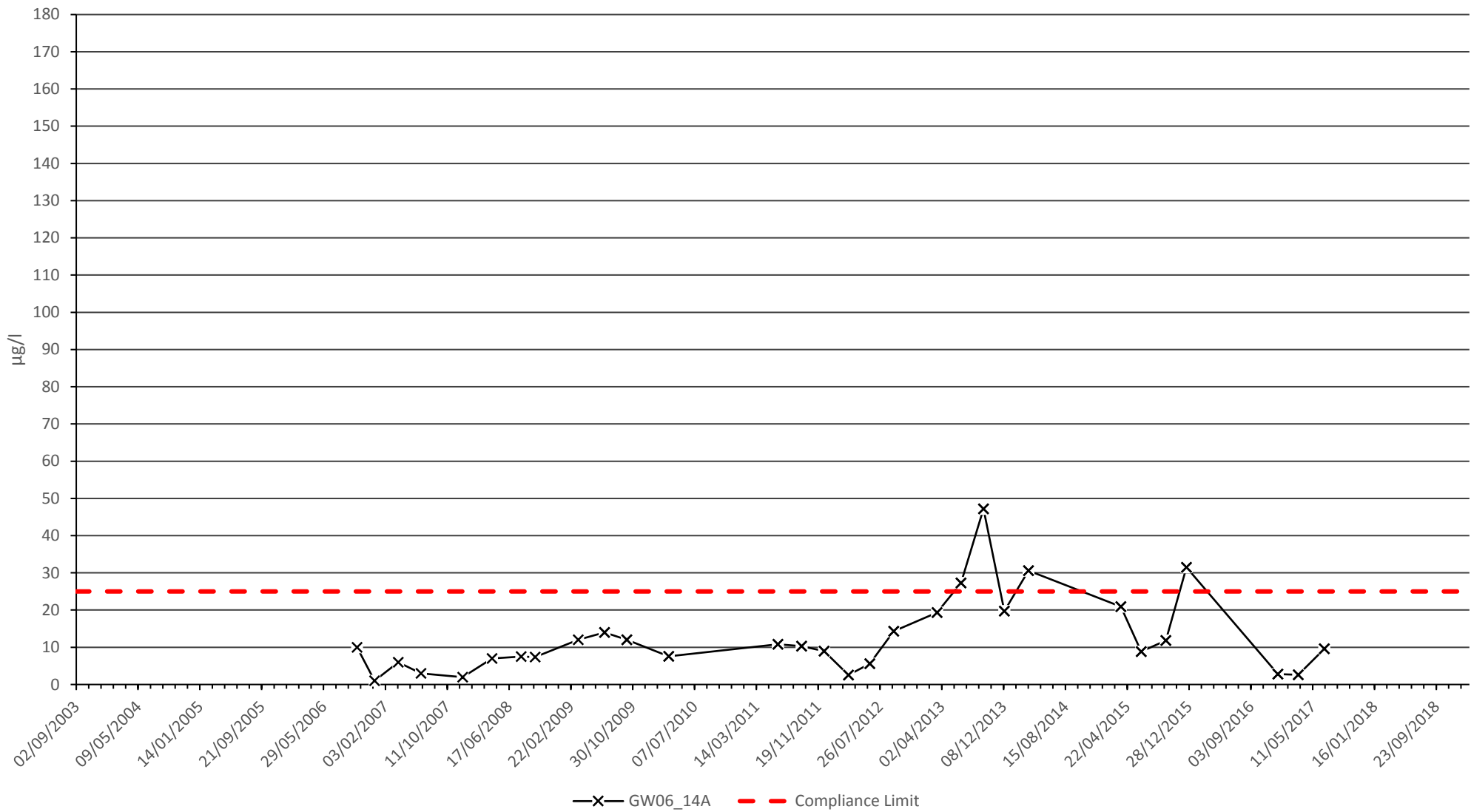
A4 Scale nts

Drawn WW

Checked VKR

Appendix

**2-7**



Client  
**Newport City Council**

**Docksway Disposal Site**

**Arsenic in Groundwater**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
Tel 0118 950 0761 Fax 0118 959 7499

Date January 2019

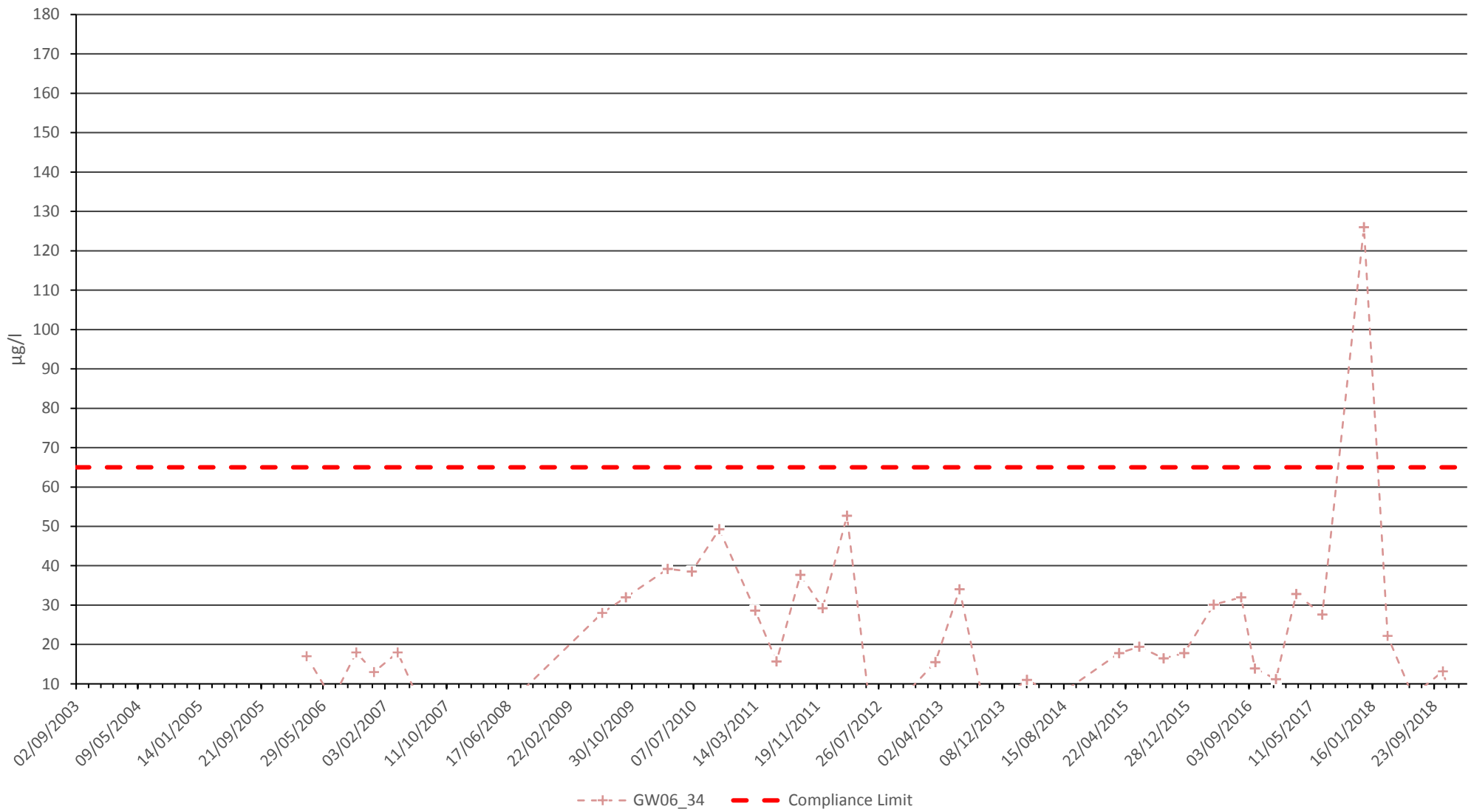
A4 Scale nts

Drawn WW

Checked VKR

Appendix

**2-8**



Client  
**Newport City Council**

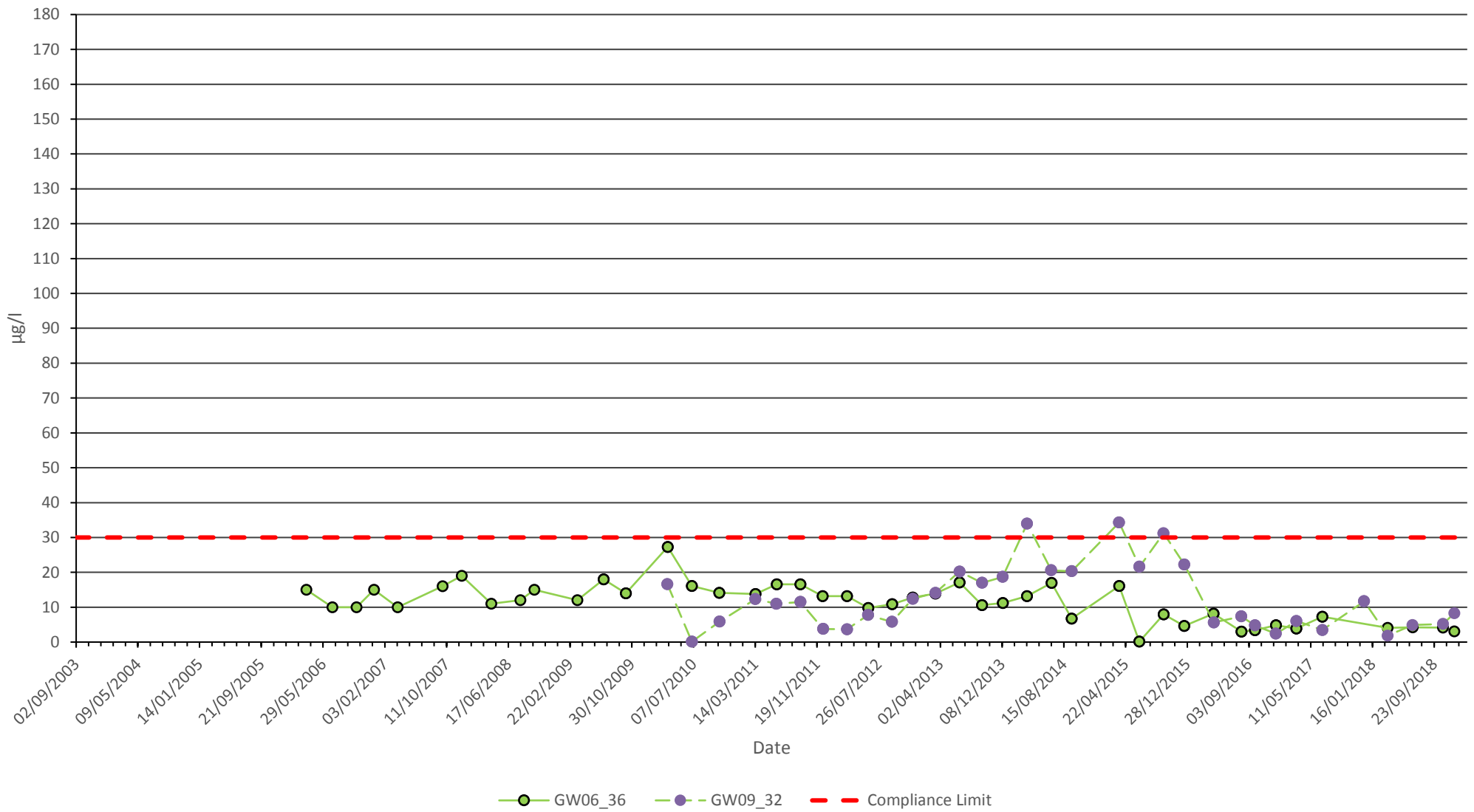
**Docksway Disposal Site**

**Arsenic in Groundwater**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	WW
Checked	VKR

Appendix	<b>2-9</b>
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Client  
**Newport City Council**

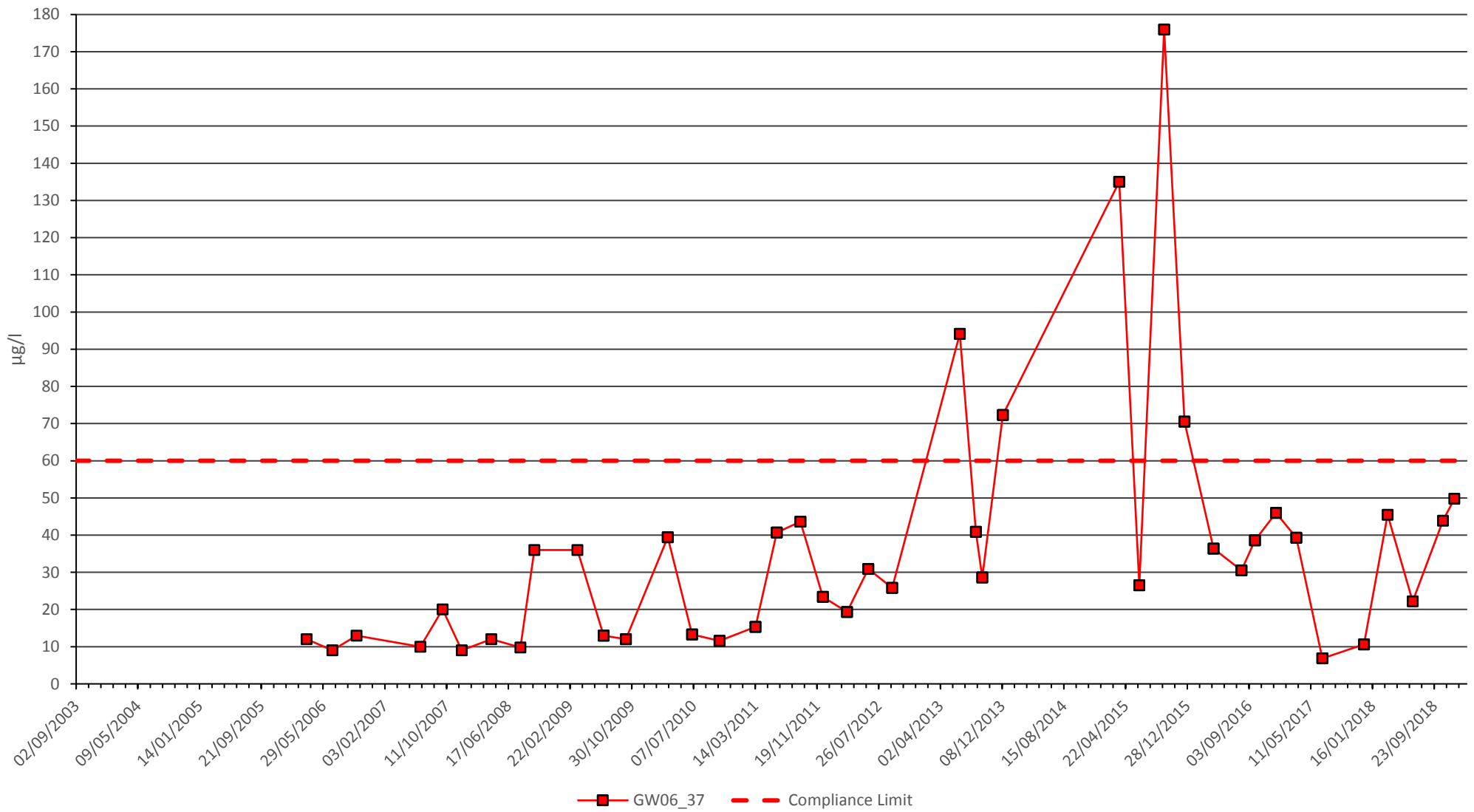
**Docksway Disposal Site**

**Arsenic in Groundwater**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	WW
Checked	VKR

Appendix	<b>2-10</b>
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Client  
**Newport City Council**

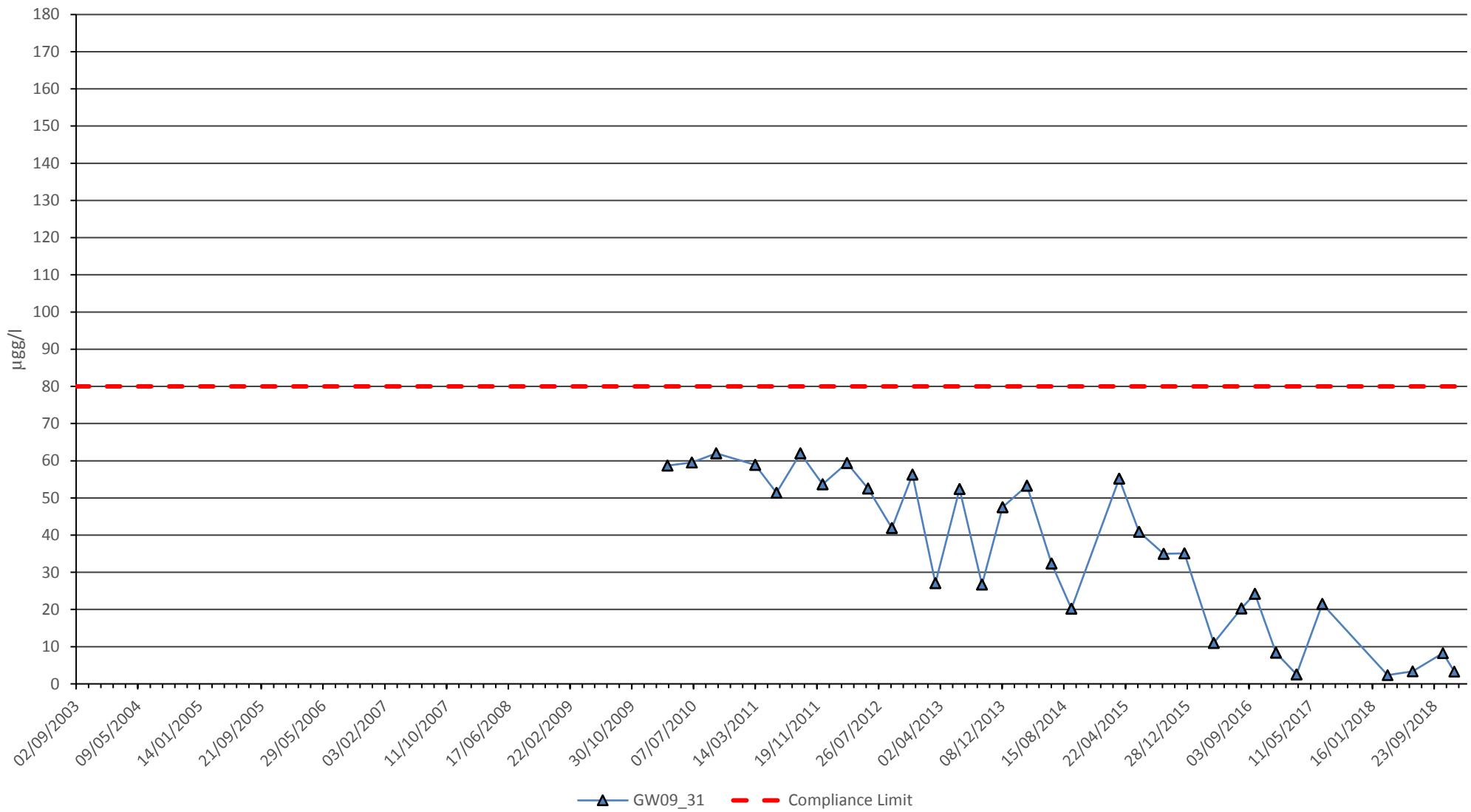
Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

**Docksway Disposal Site**

**Arsenic in Groundwater**

Date	January 2019
A4 Scale	nts
Drawn	WW
Checked	VKR

Appendix  
**2-11**



Client  
**Newport City Council**

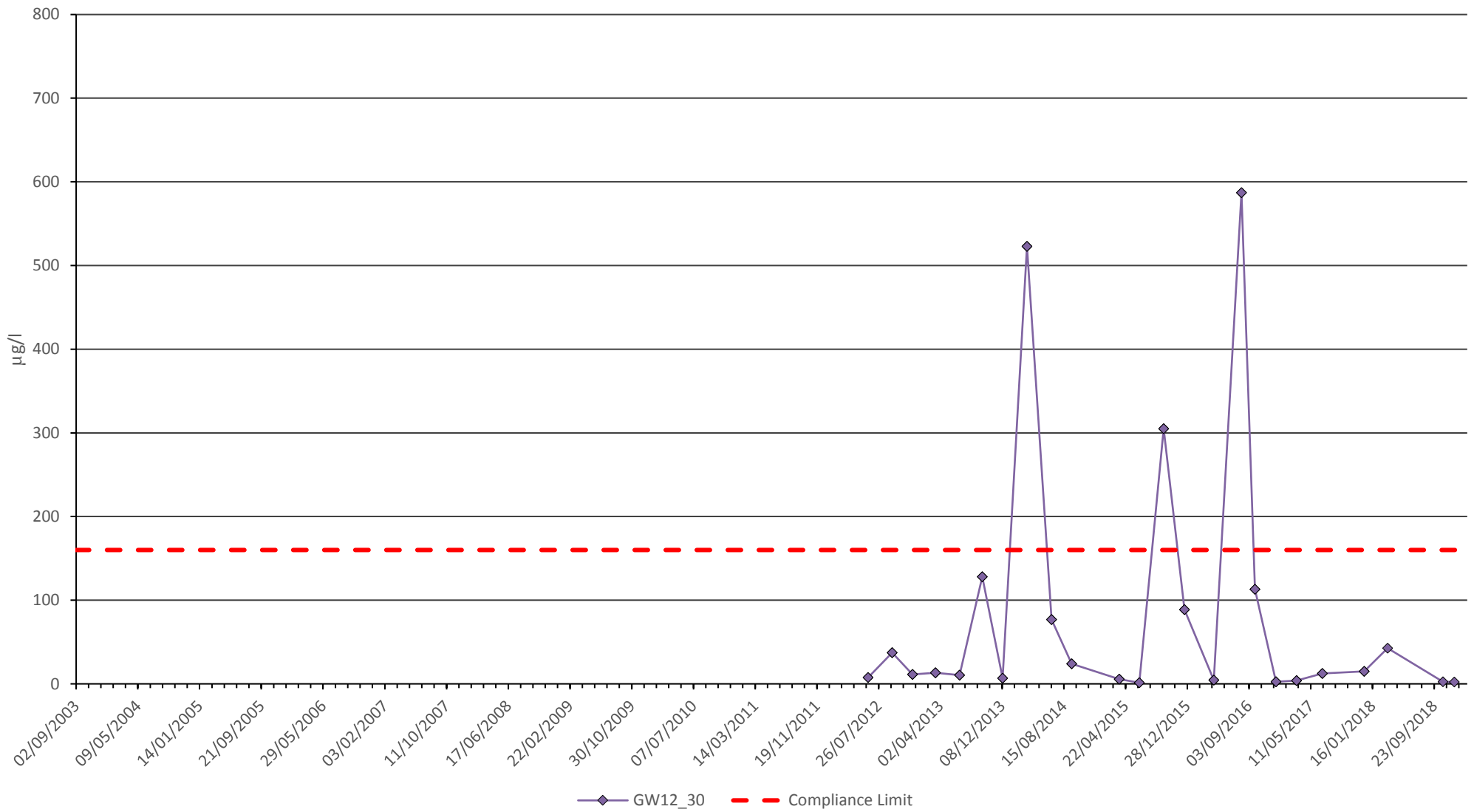
Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

**Docksway Disposal Site**

**Arsenic in Groundwater**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix	<b>2-12</b>
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Client  
**Newport City Council**

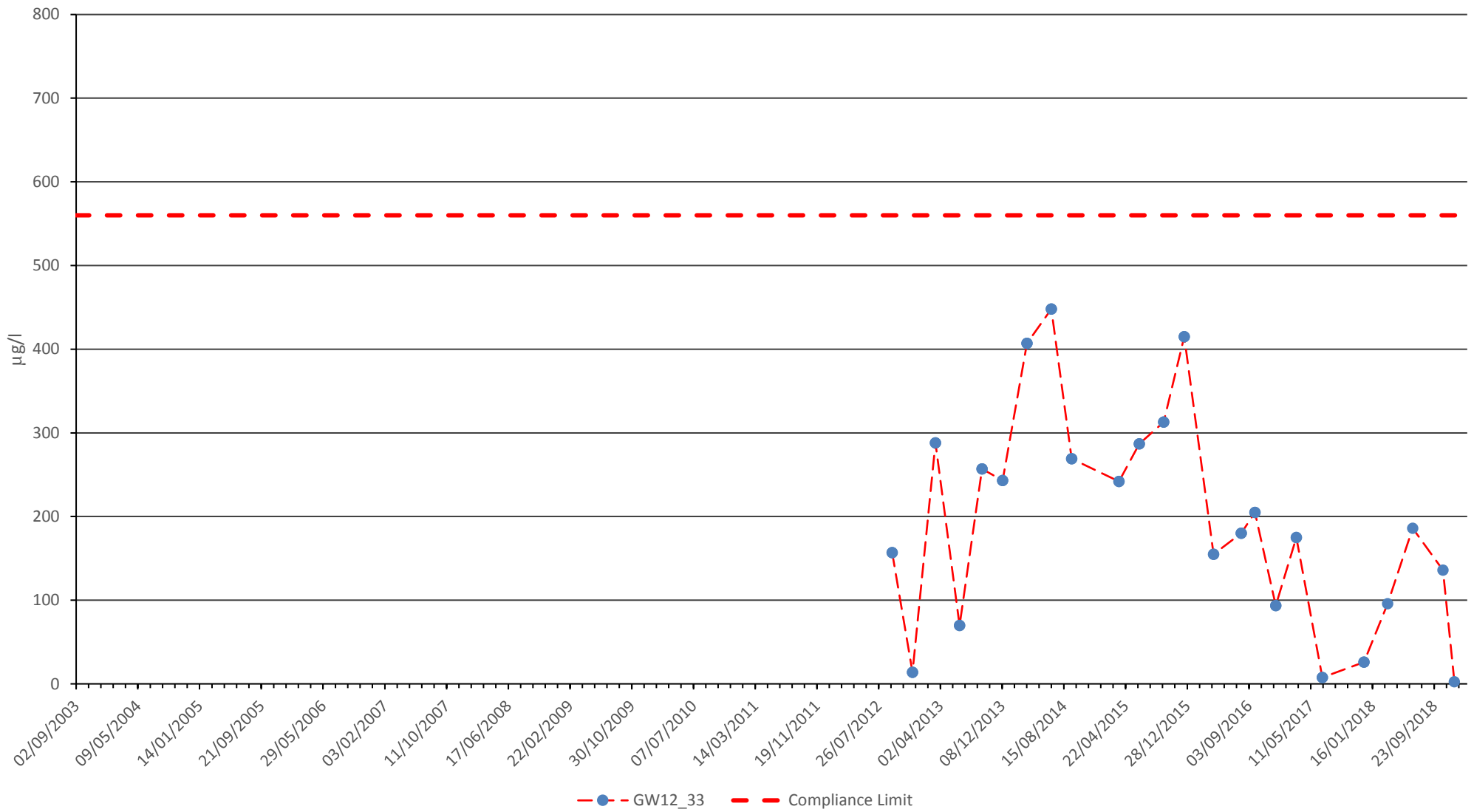
**Docksway Disposal Site**

**Arsenic in Groundwater**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

**Appendix**  
**2-13**



Client  
**Newport City Council**

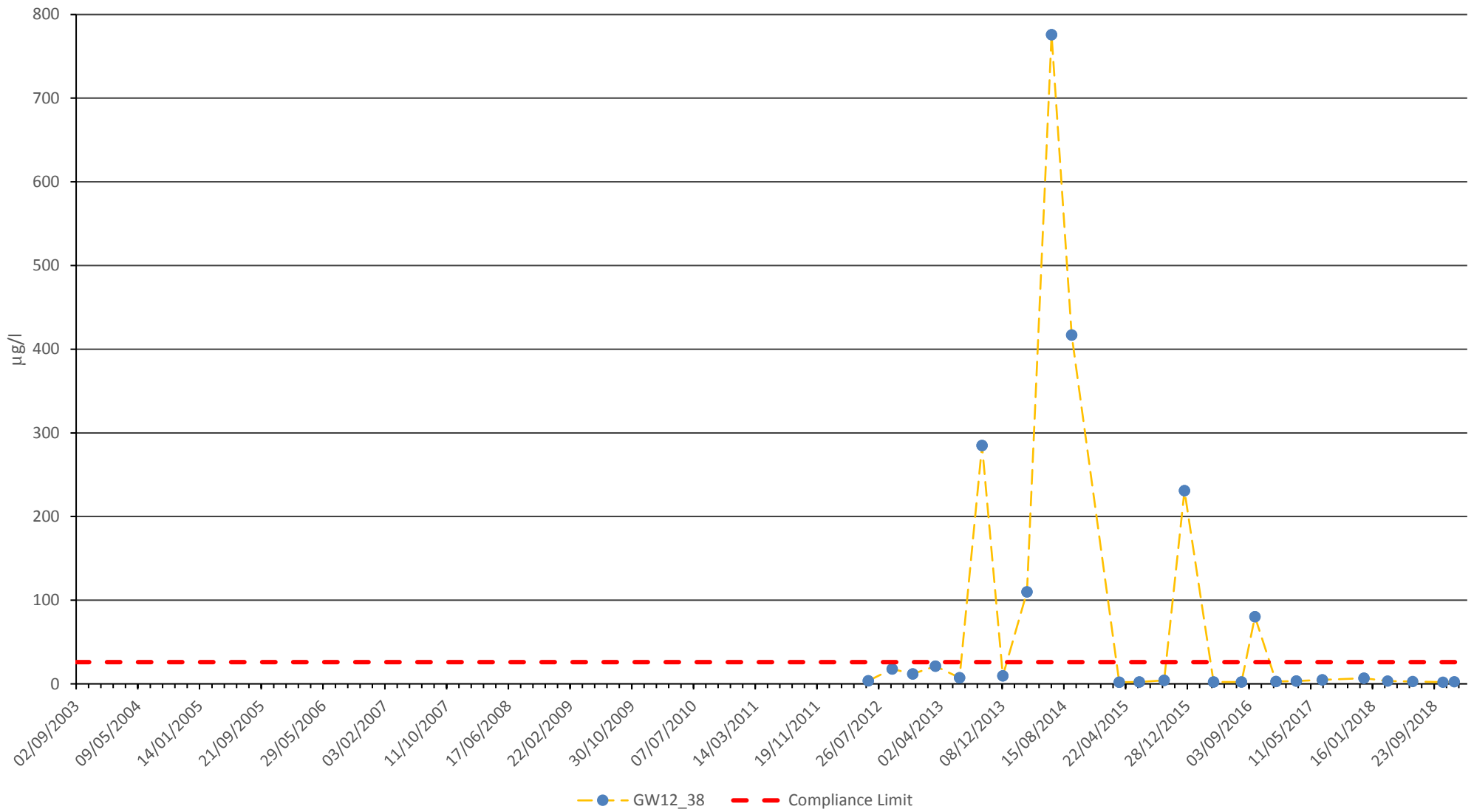
**Docksway Disposal Site**

**Arsenic in Groundwater**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

**Appendix**  
**2-14**



Client  
**Newport City Council**

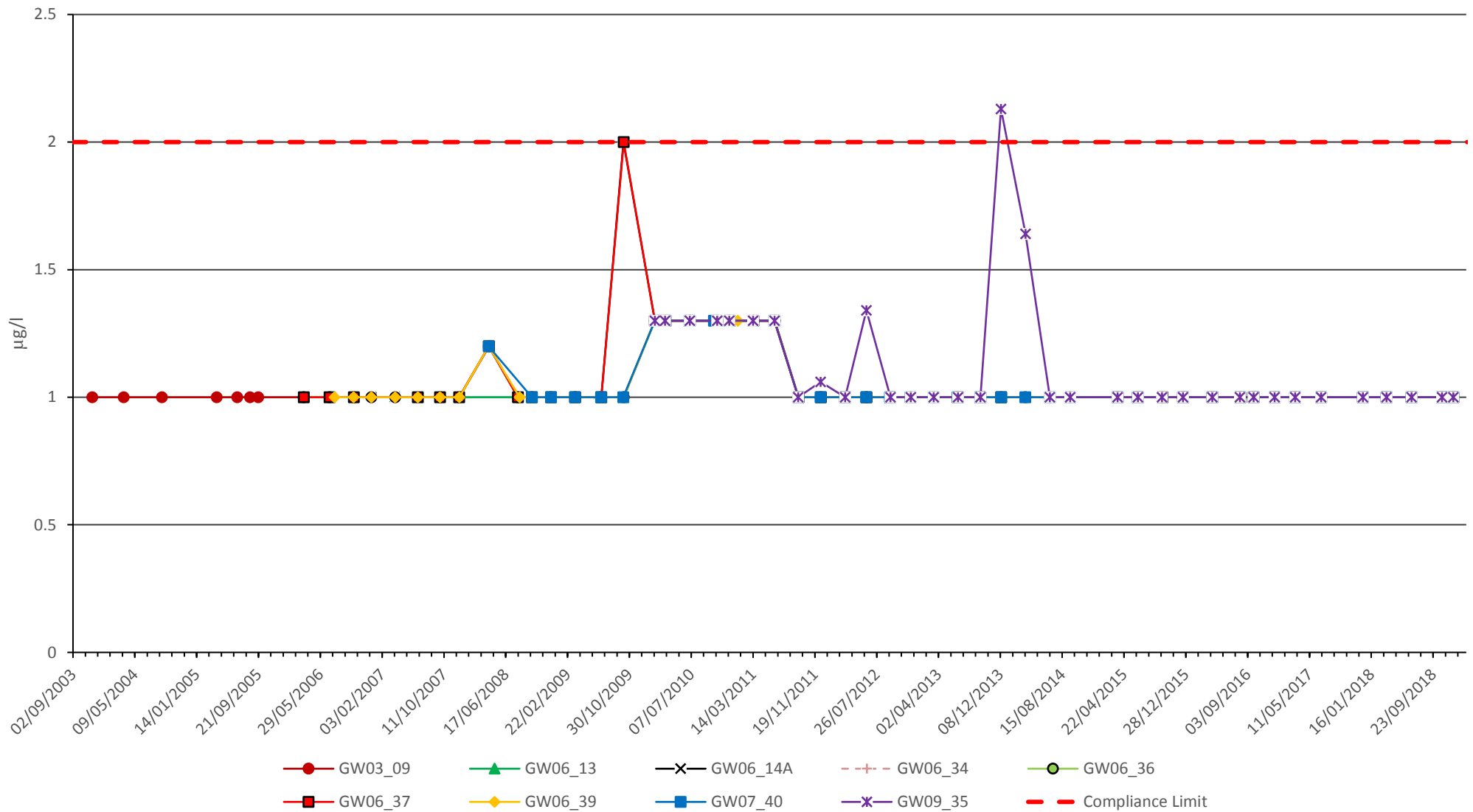
**Docksway Disposal Site**

**Arsenic in Groundwater**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

**Appendix**  
**2-15**



Client  
**Newport City Council**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
Tel 0118 950 0761 Fax 0118 959 7499

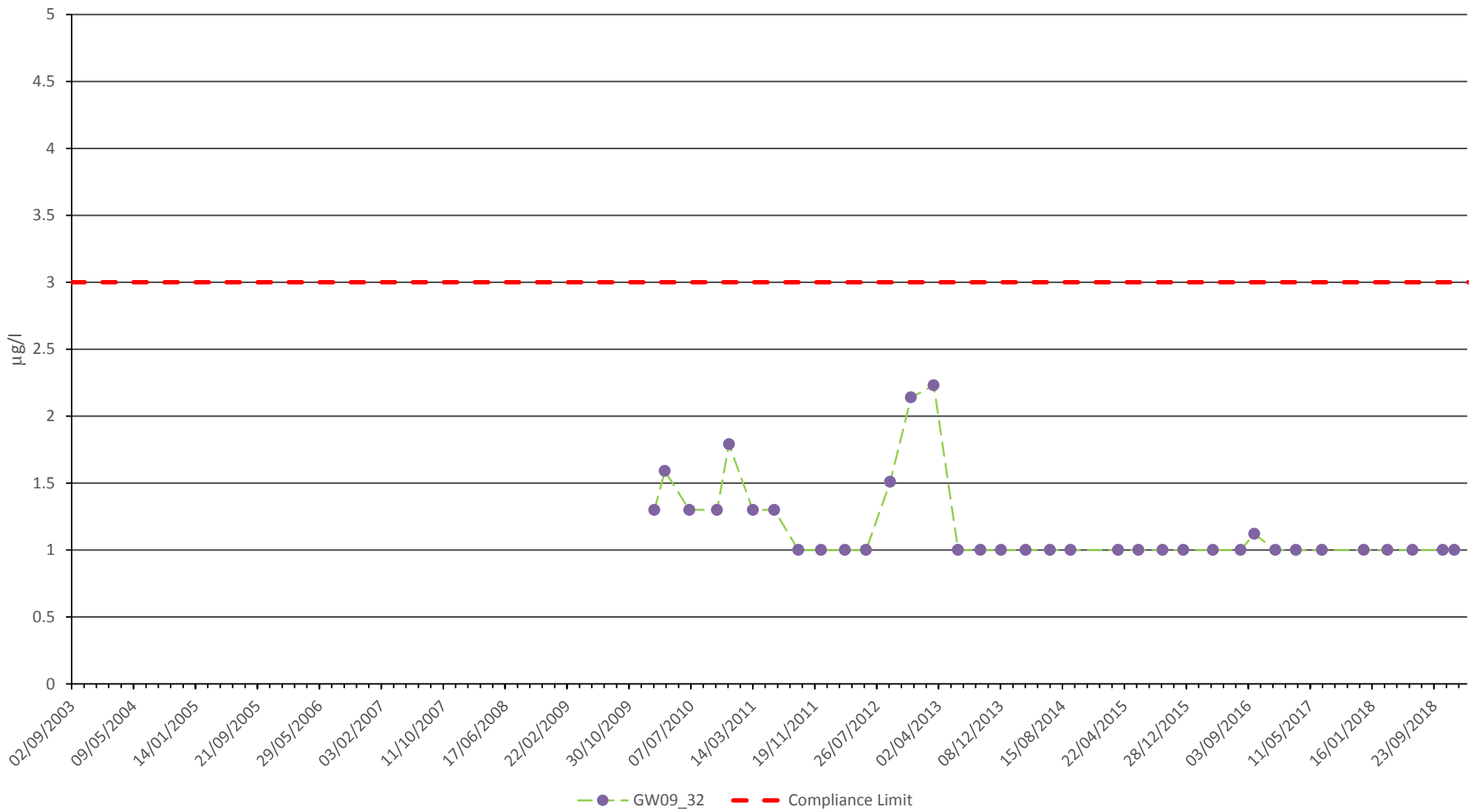
**Docksway Disposal Site**

**Benzene in Groundwater**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

**Appendix**  
**2-16**





Client

**Newport City Council**

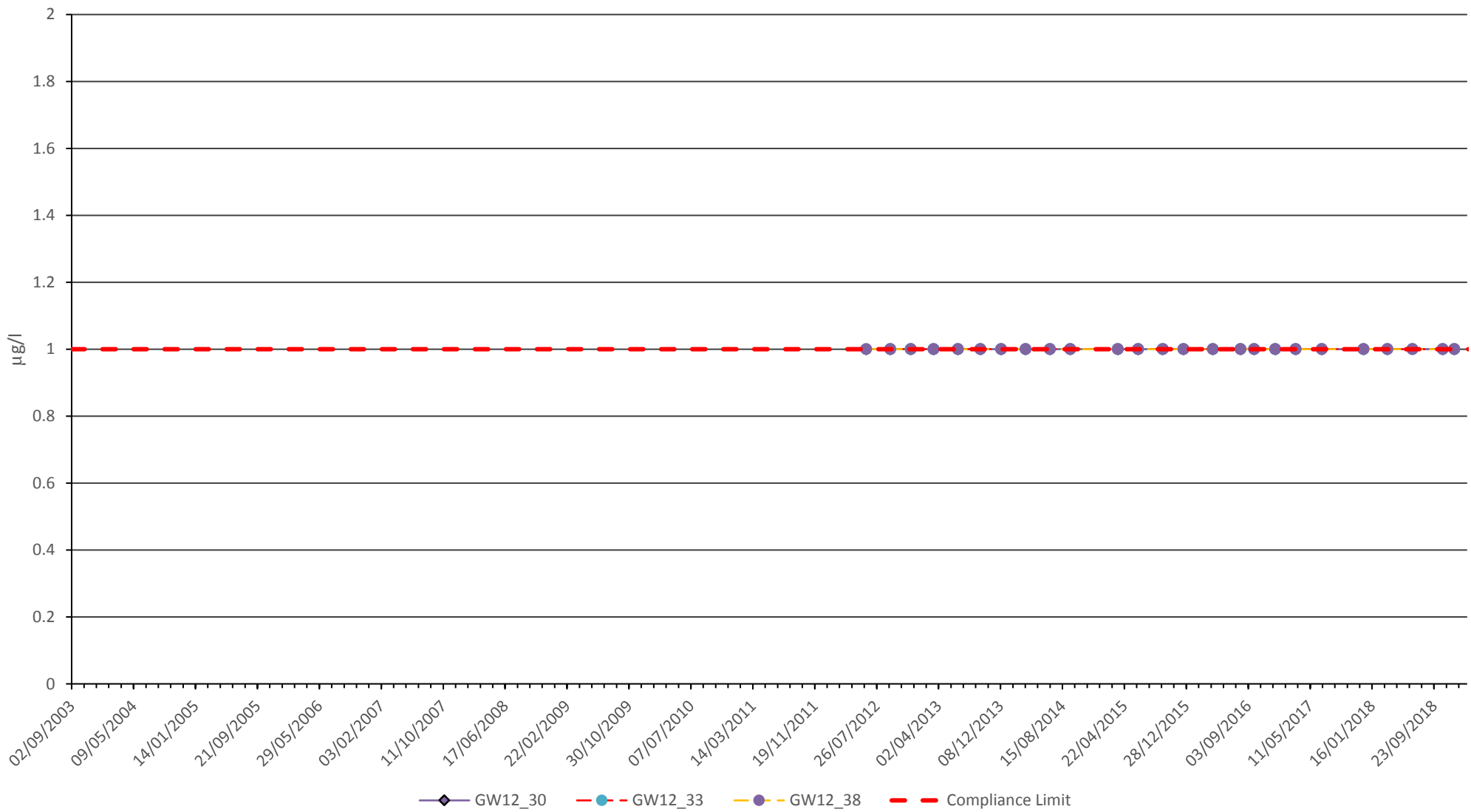
Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
Tel 0118 950 0761 Fax 0118 959 7499

**Docksway Disposal Site**

**Benzene in Groundwater**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

<b>Appendix</b>	<b>2-18</b>
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Client  
**Newport City Council**

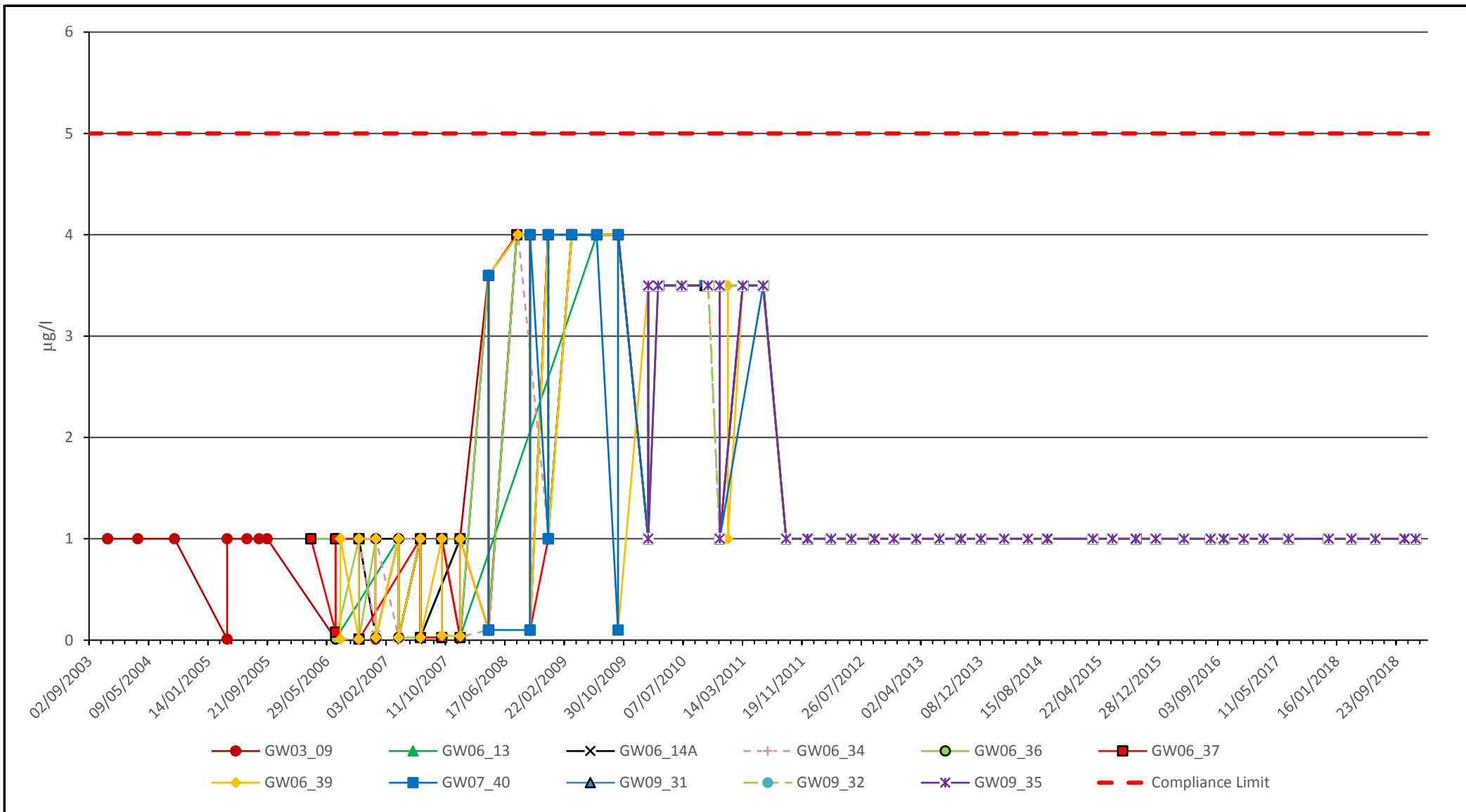
Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
Tel 0118 950 0761 Fax 0118 959 7499

**Docksway Disposal Site**

**Benzene in Groundwater**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

<b>Appendix</b>
<b>2-19</b>



Client

**Newport City Council**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
Tel 0118 950 0761 Fax 0118 959 7499

**Docksway Disposal Site**

**Naphthalene in Groundwater**

Date January 2019

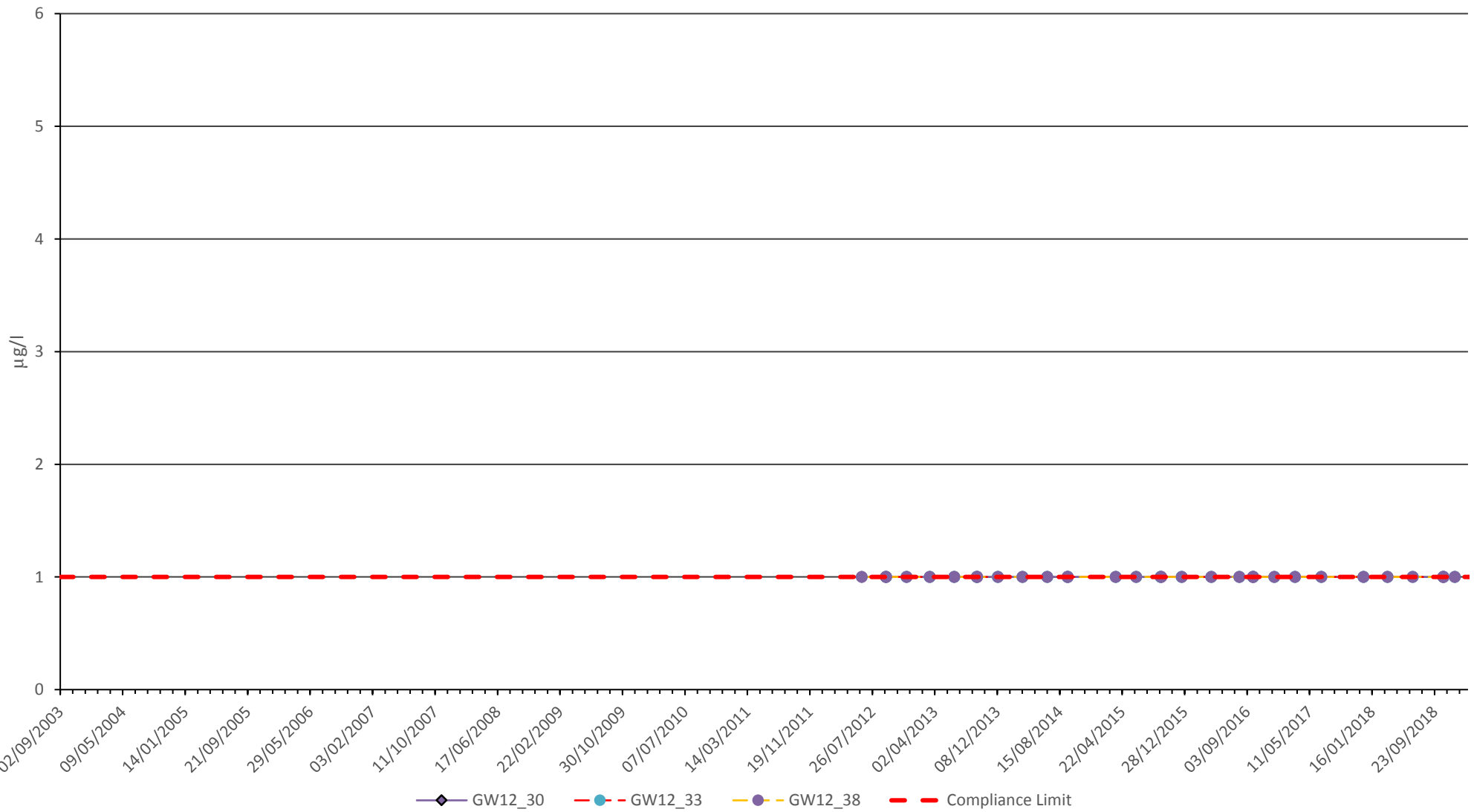
A4 Scale nts

Drawn NC

Checked VKR

Appendix

**2-20**



Client  
**Newport City Council**

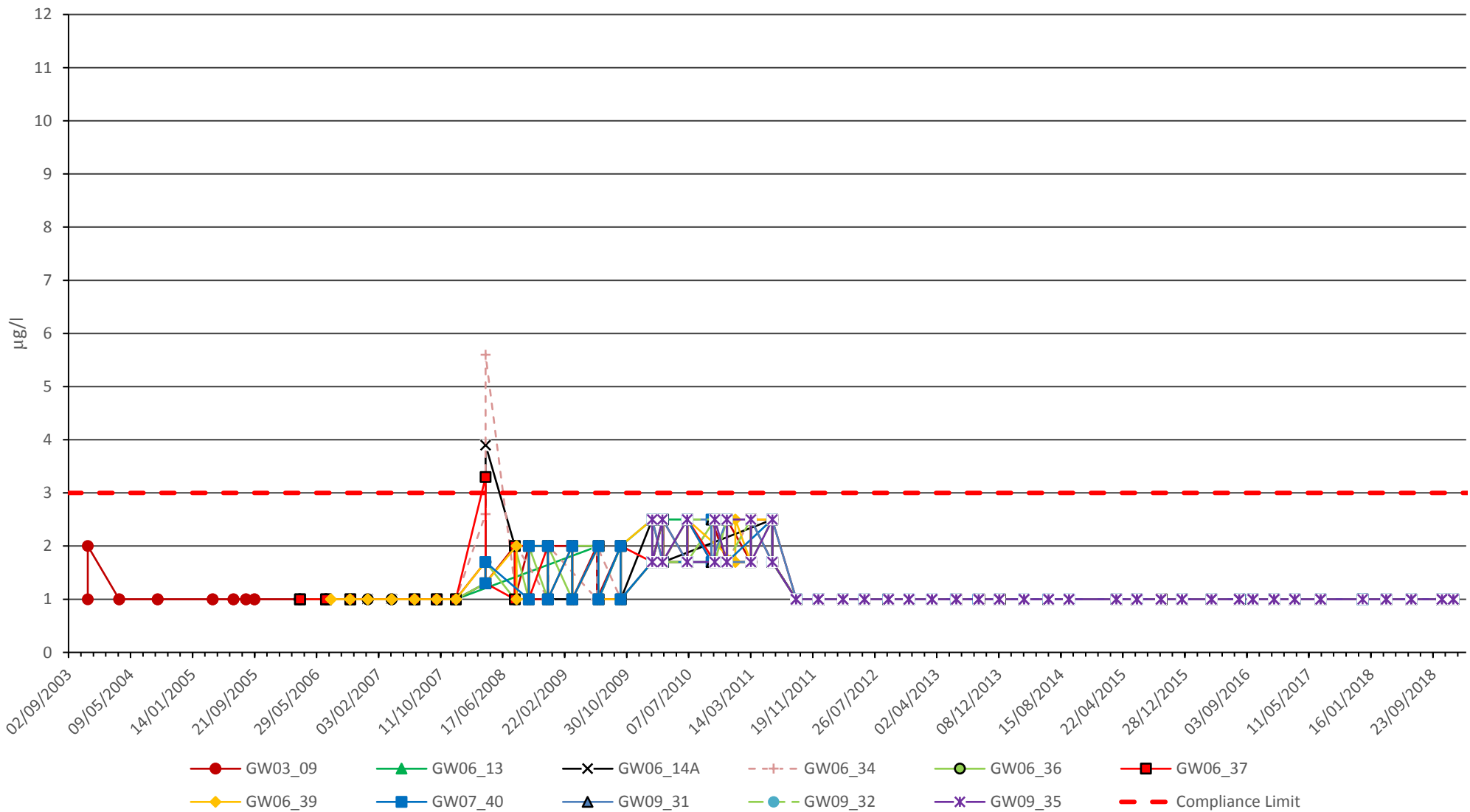
**Docksway Disposal Site**

**Napthalene in Groundwater**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

**Appendix**  
**2-21**



Client  
**Newport City Council**

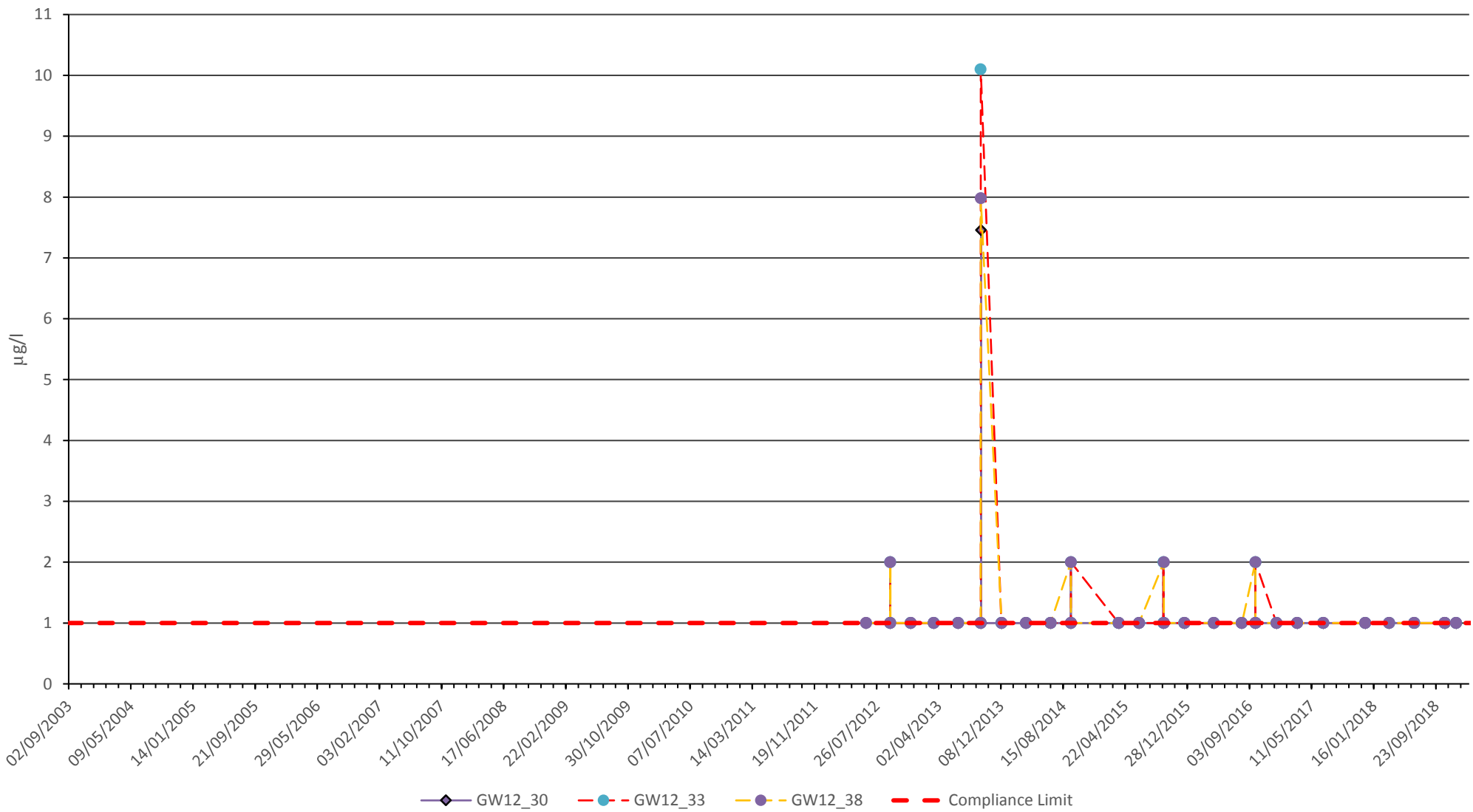
Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

**Docksway Disposal Site**

**Xylene in Groundwater**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix	<b>2-22</b>
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Client

**Newport City Council**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
Tel 0118 950 0761 Fax 0118 959 7499

**Docksway Disposal Site**

**Xylene in Groundwater**

Date January 2019

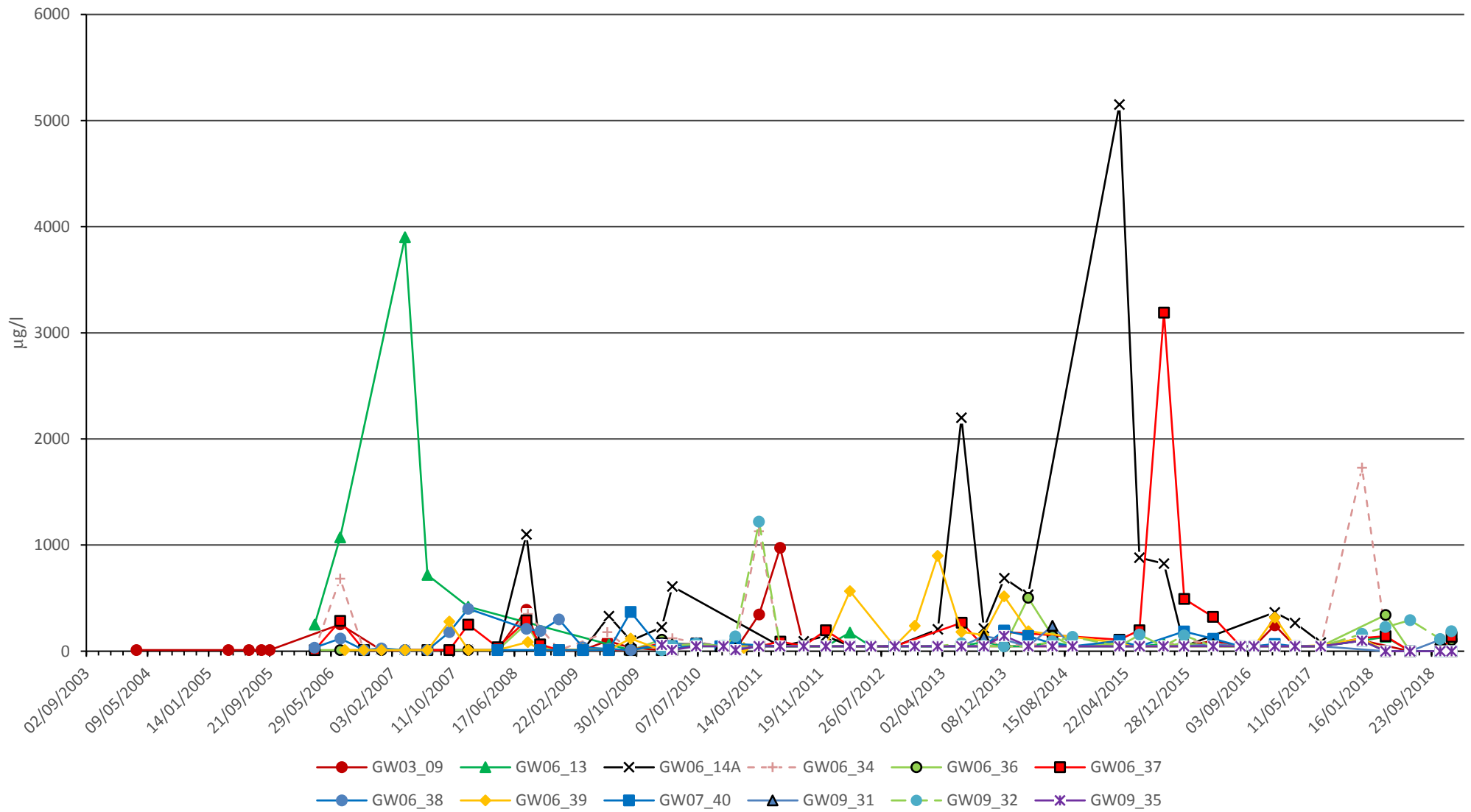
A4 Scale nts

Drawn NC

Checked VKR

Appendix

**2-23**



Client  
**Newport City Council**

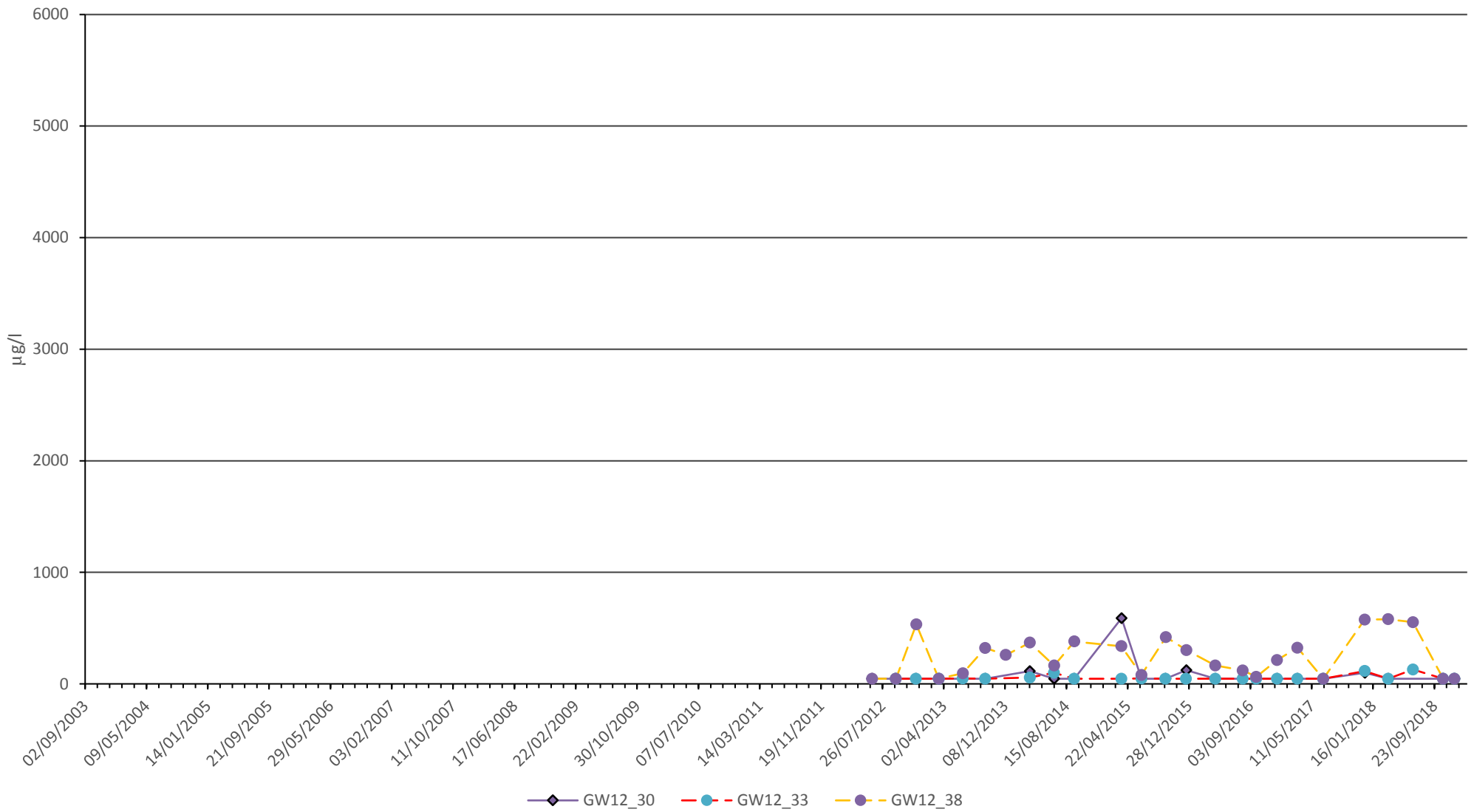
**Docksway Disposal Site**

**EPH in Groundwater**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix  
**2-24**



Client  
**Newport City Council**

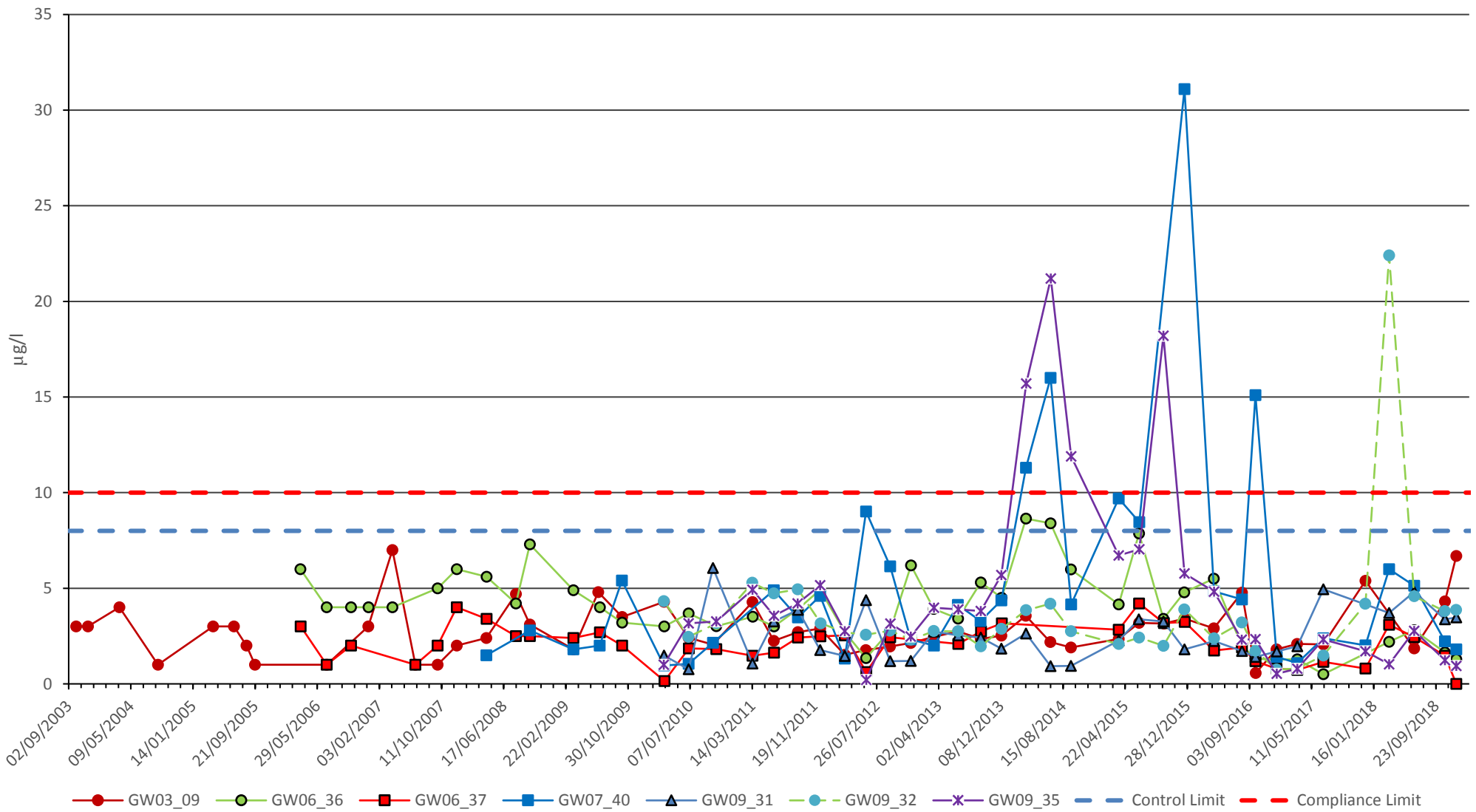
**Docksway Disposal Site**

**EPH in Groundwater**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

**Appendix**  
**2-25**



Client  
**Newport City Council**

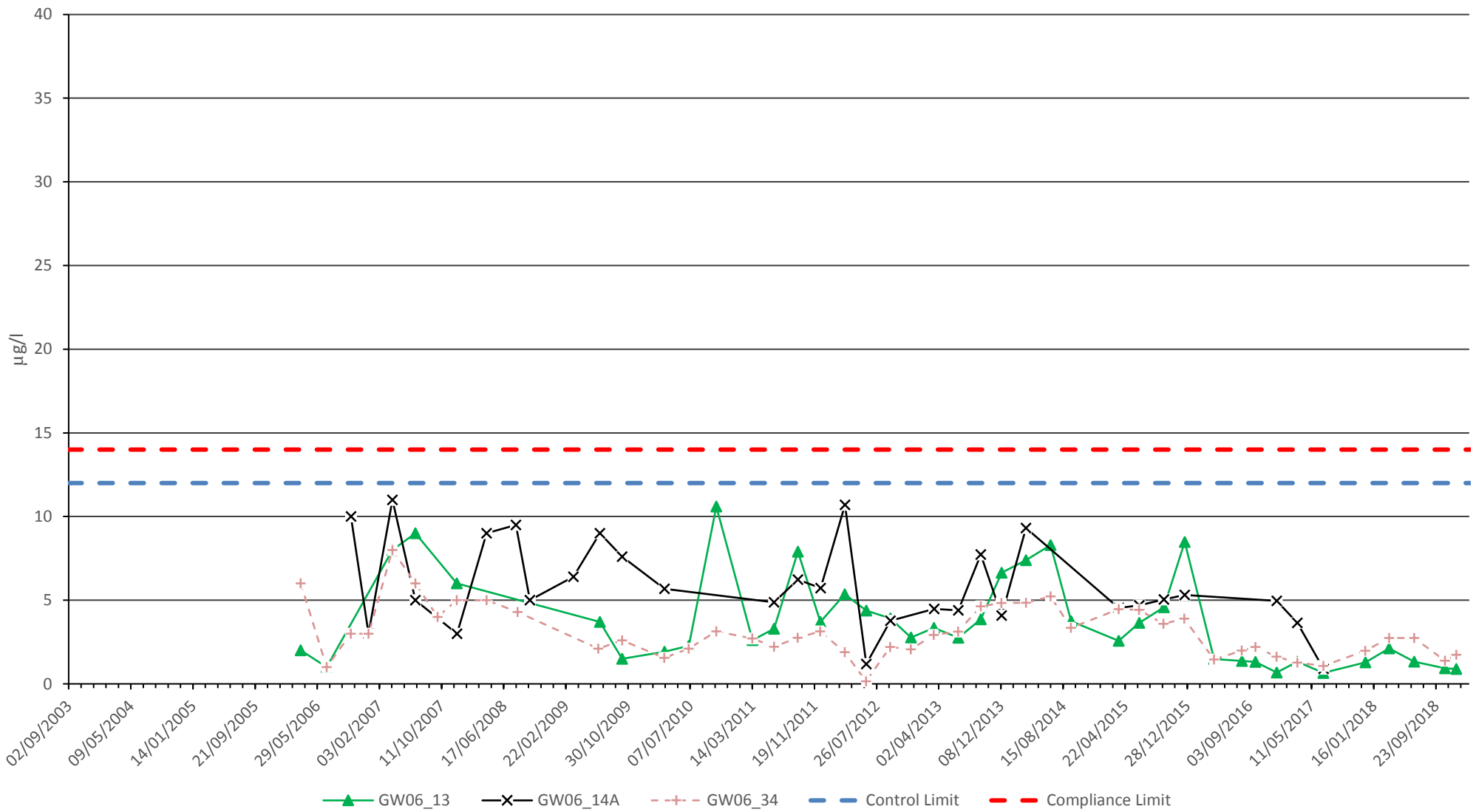
**Docksway Disposal Site**

**Nickel in Groundwater**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

**Appendix**  
**2-26**



Client  
**Newport City Council**

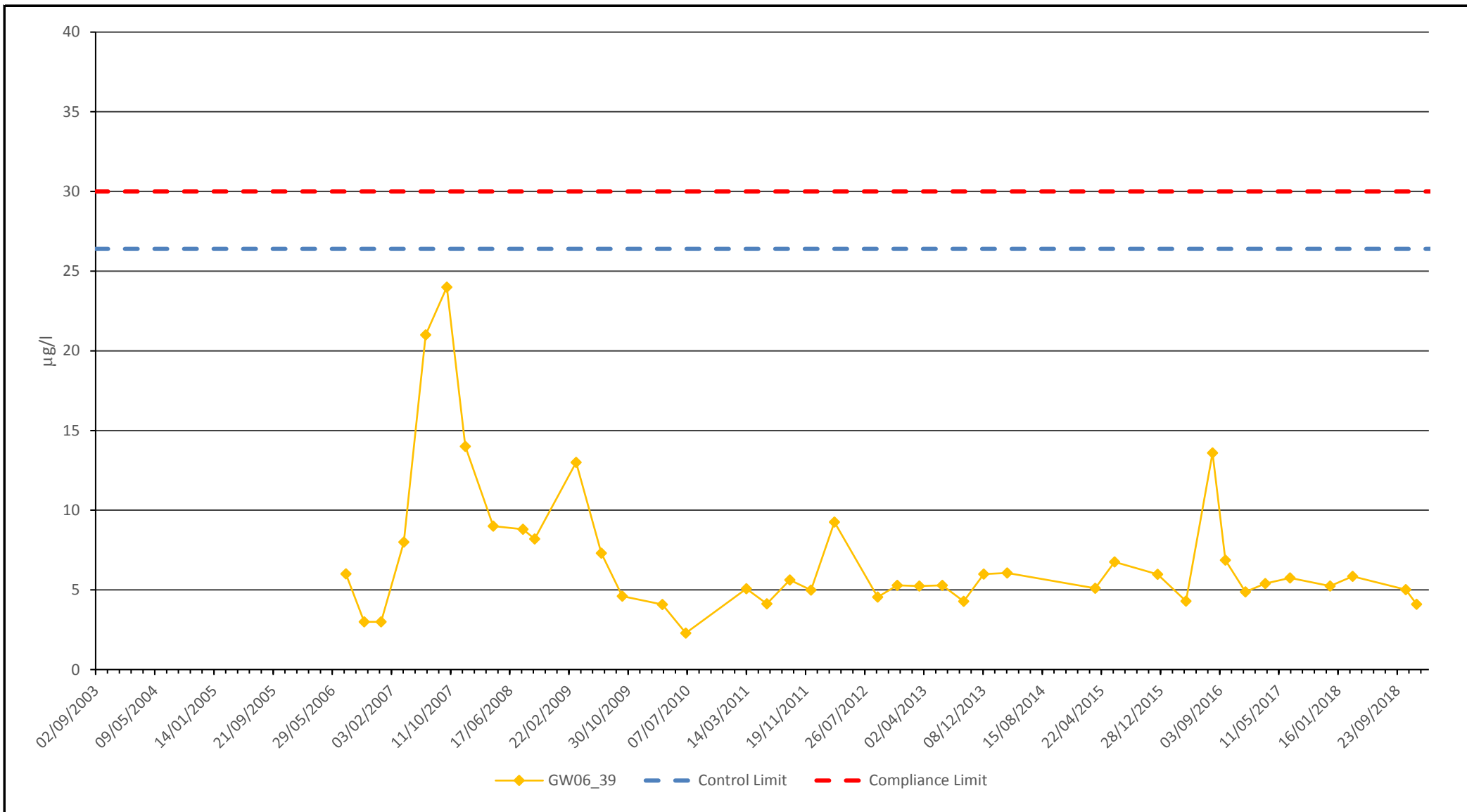
**Docksway Disposal Site**

**Nickel in Groundwater**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix  
**2-27**



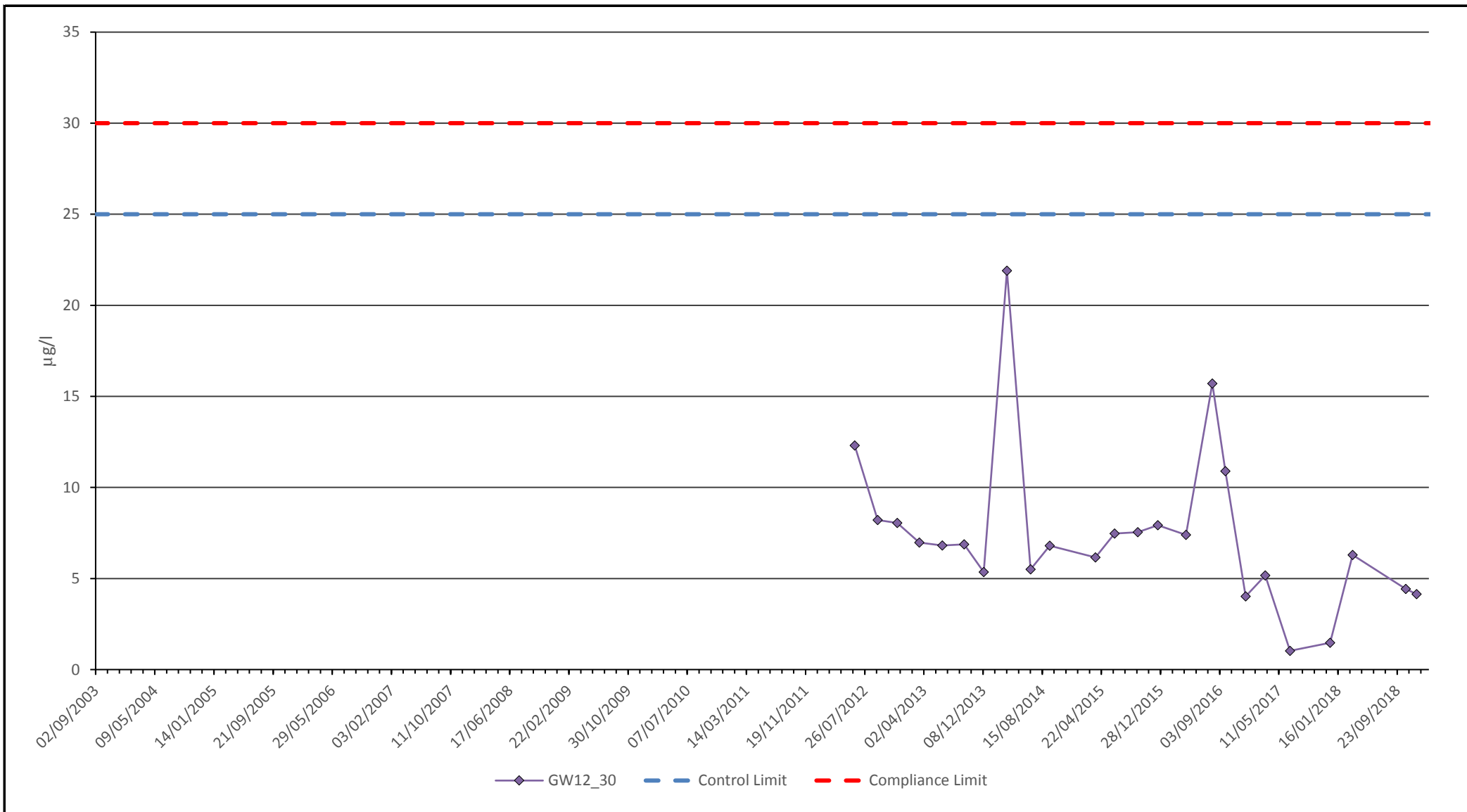

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
Tel 0118 950 0761 Fax 0118 959 7499

Client  
**Newport City Council**

**Docksway Disposal Site**

**Nickel in Groundwater**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR
Appendix	<b>2-28</b>



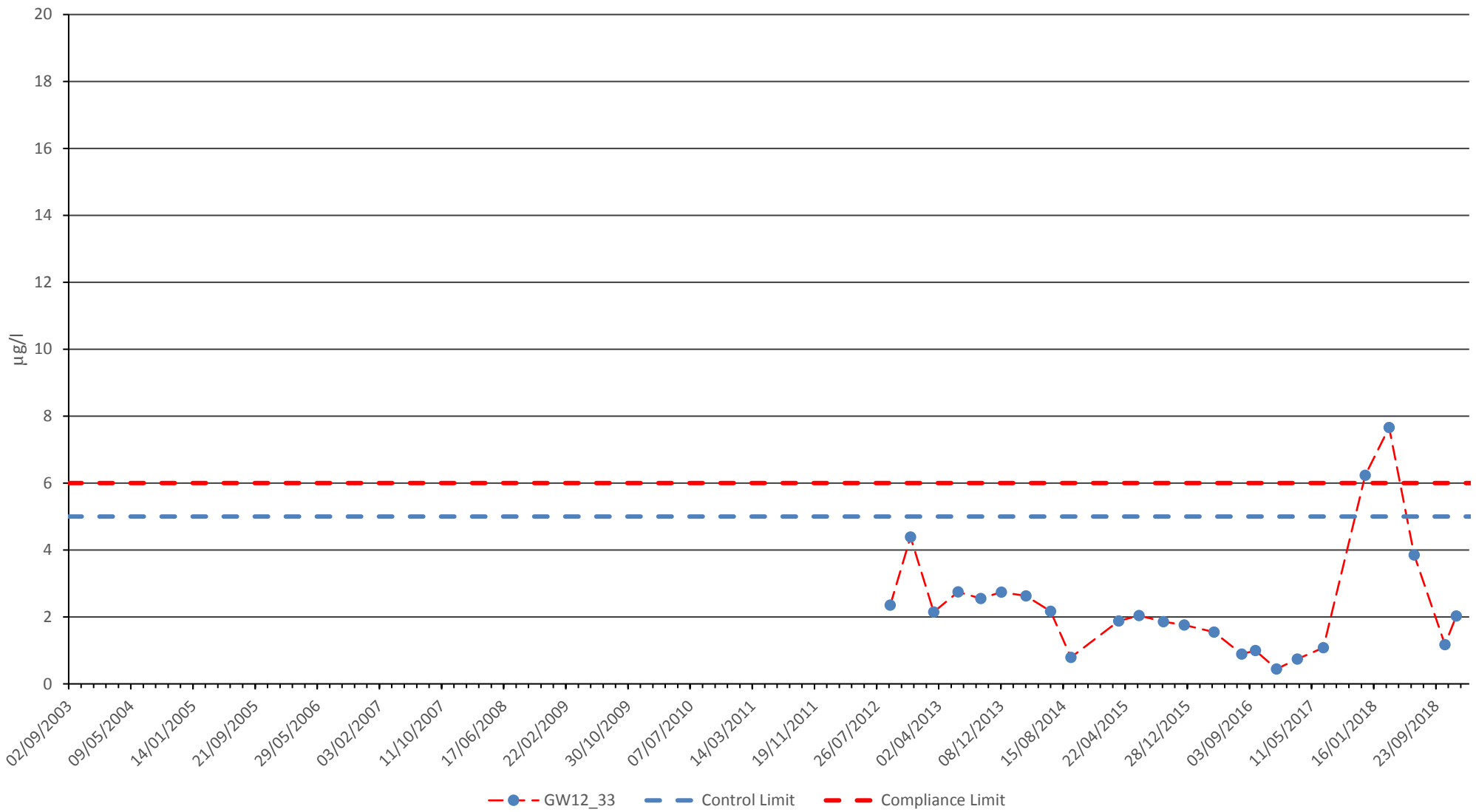

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
Tel 0118 950 0761 Fax 0118 959 7499

Client  
**Newport City Council**

**Docksway Disposal Site**

**Nickel in Groundwater**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR
<b>Appendix</b>	<b>2-29</b>



Client

**Newport City Council**

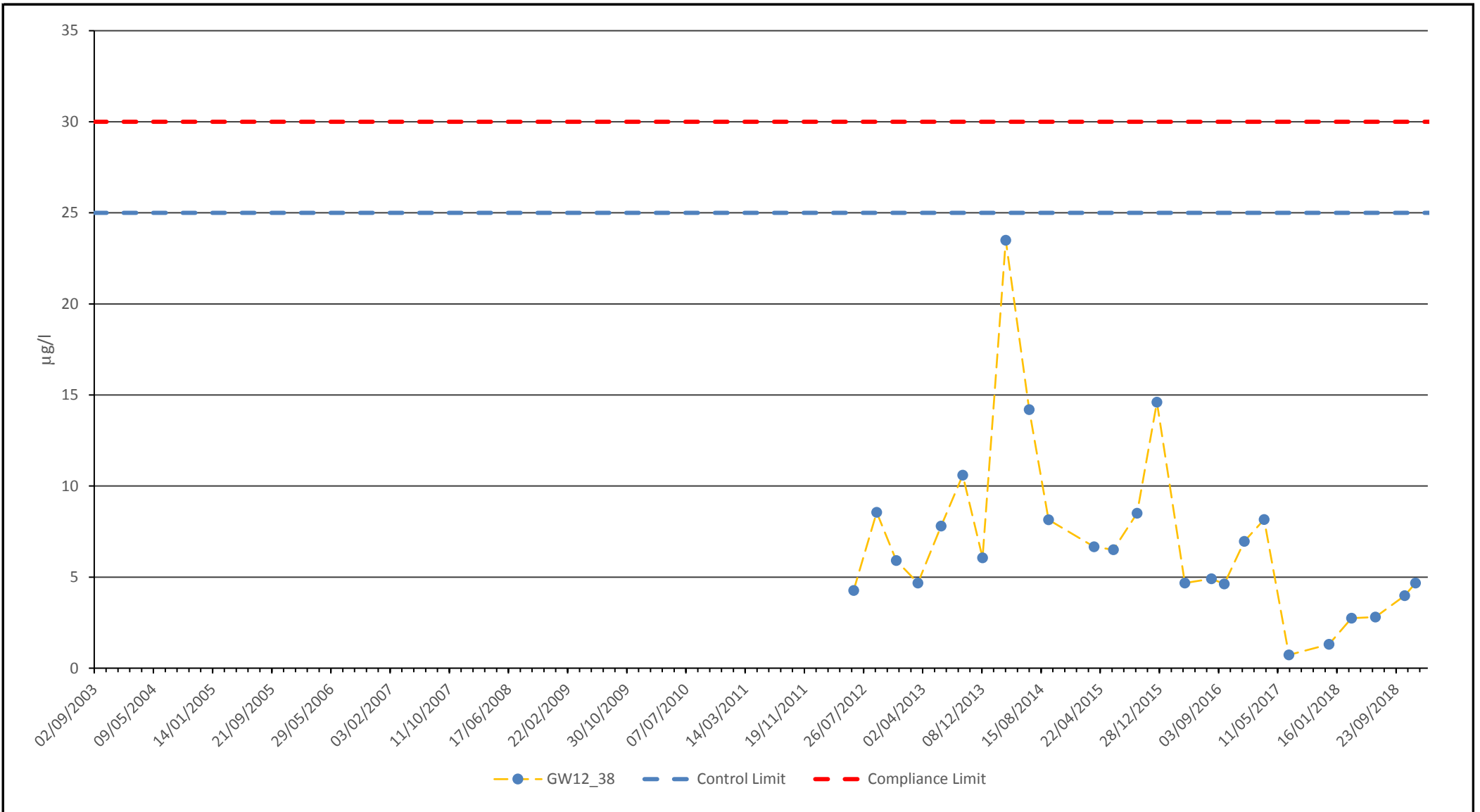
Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
Tel 0118 950 0761 Fax 0118 959 7499

**Docksway Disposal Site**

**Nickel in Groundwater**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

<b>Appendix</b>	<b>2-30</b>
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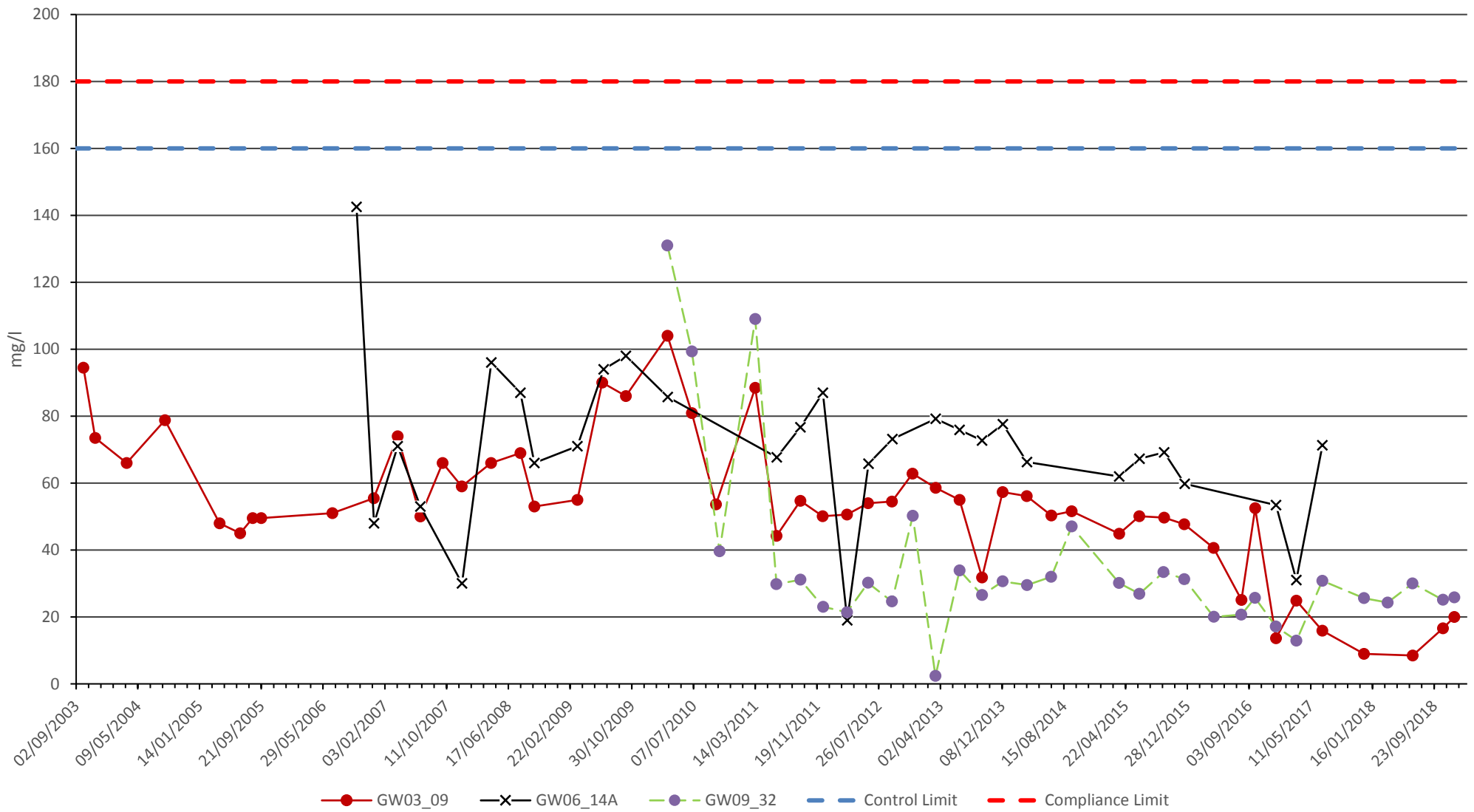


Client  
**Newport City Council**  
 Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

**Docksway Disposal Site**

**Nickel in Groundwater**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR
<b>Appendix</b>	<b>2-31</b>



Client  
**Newport City Council**

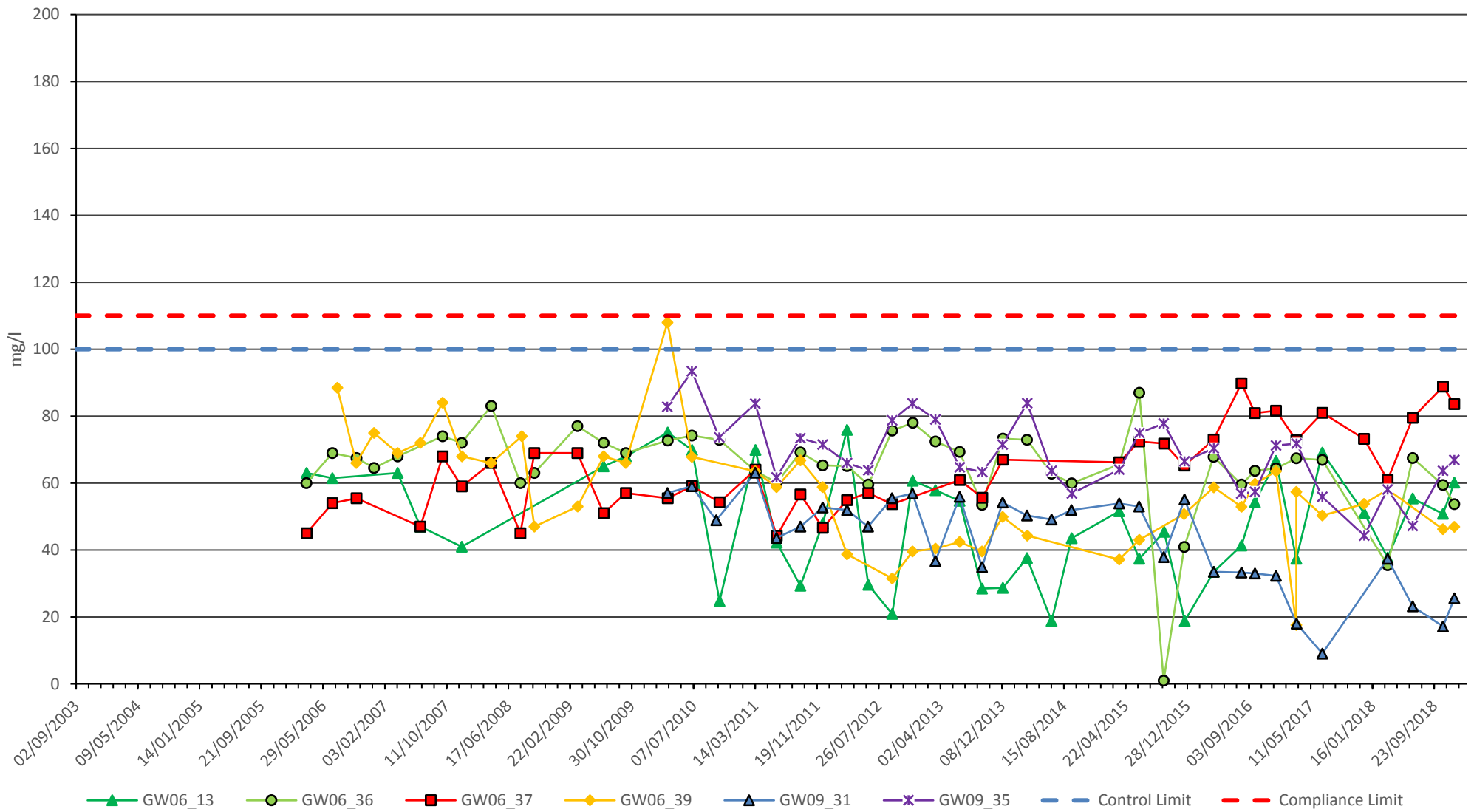
Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
Tel 0118 950 0761 Fax 0118 959 7499

**Docksway Disposal Site**

**Potassium in Groundwater**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

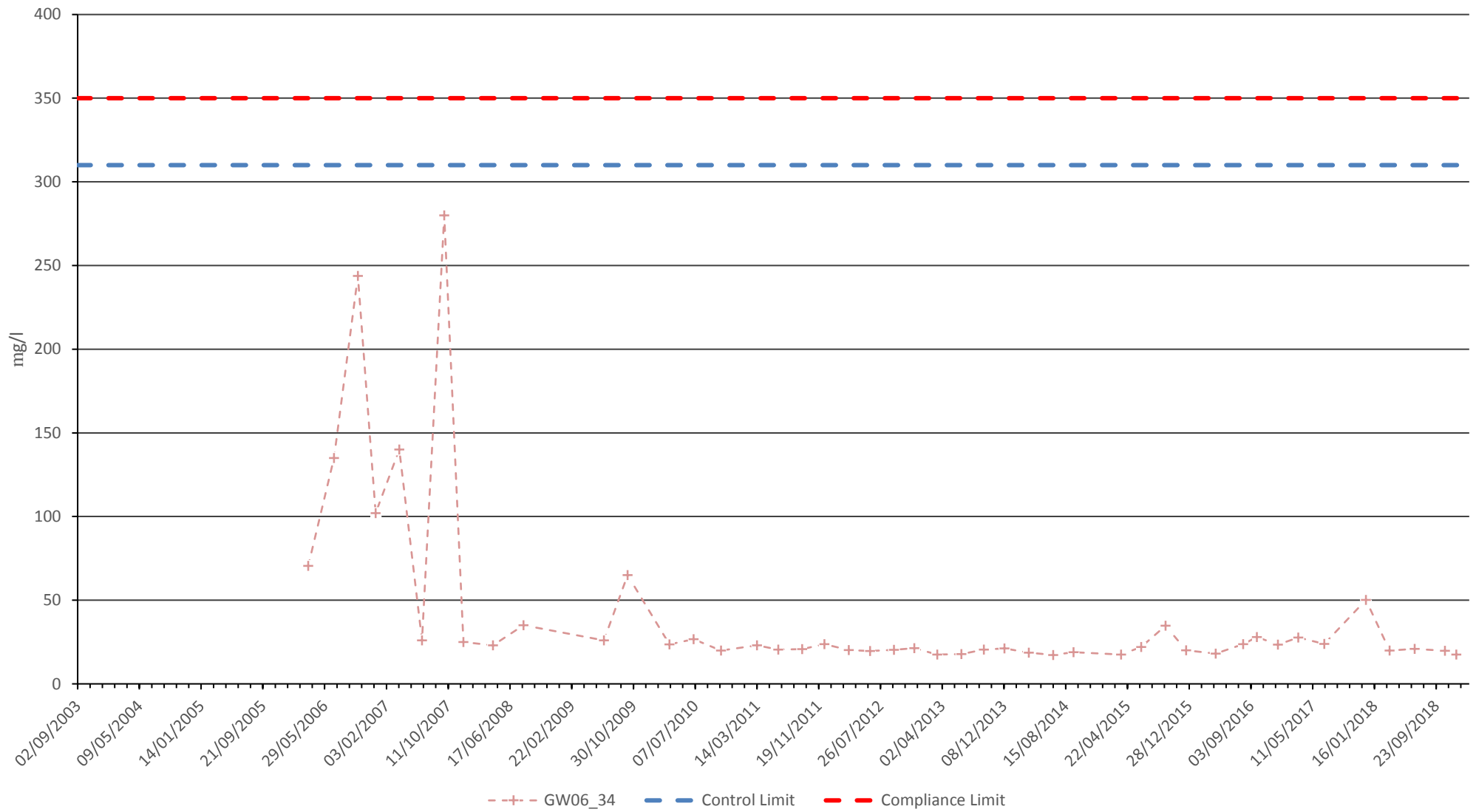
Appendix  
**2-32**




**Client**  
**Newport City Council**  
 Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

**Docksway Disposal Site**  
  
**Potassium in Groundwater**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR
<b>Appendix</b>	<b>2-33</b>



Client

**Newport City Council**

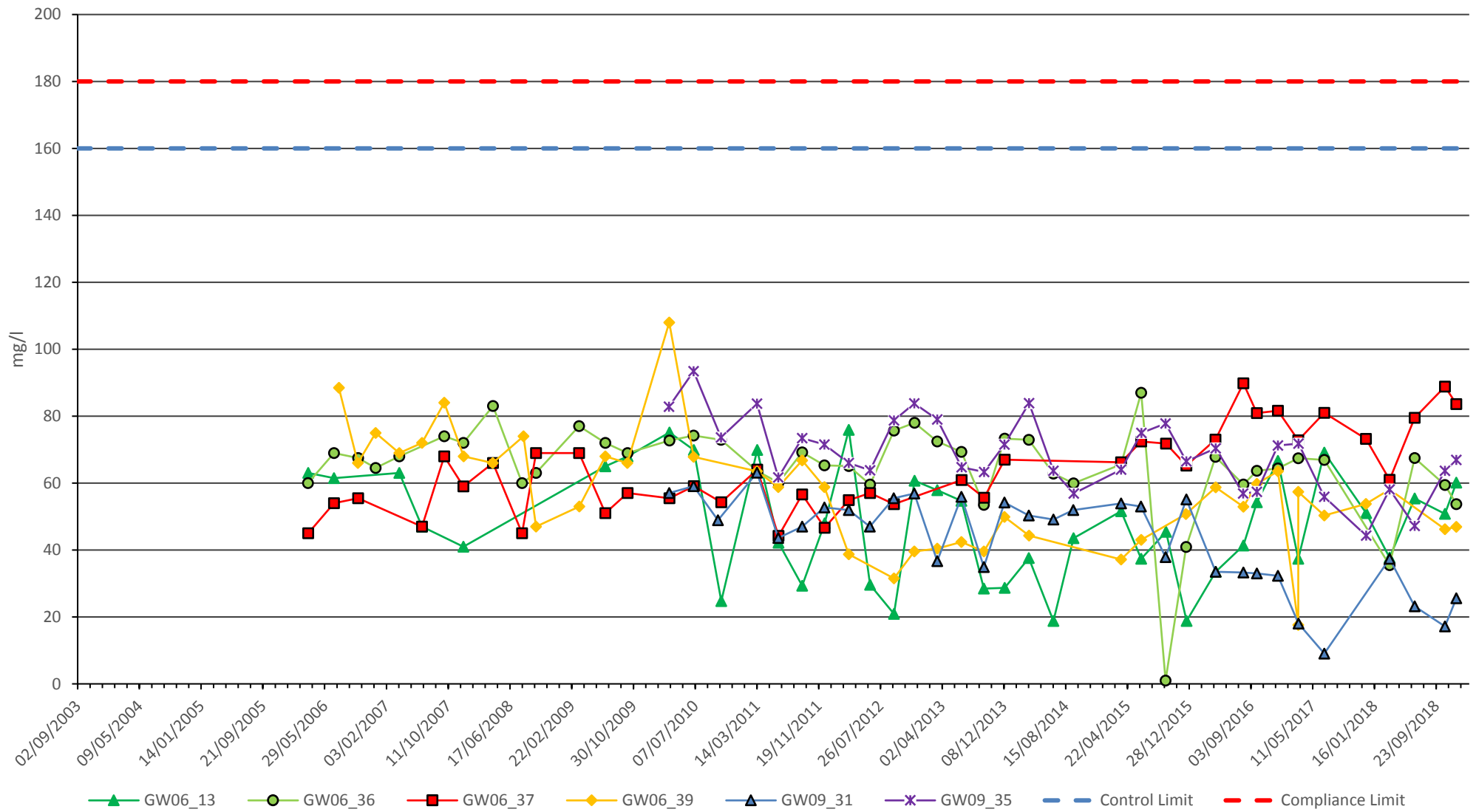
Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
Tel 0118 950 0761 Fax 0118 959 7499

**Docksway Disposal Site**

**Potassium in Groundwater**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix	<b>2-34</b>
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Client  
**Newport City Council**

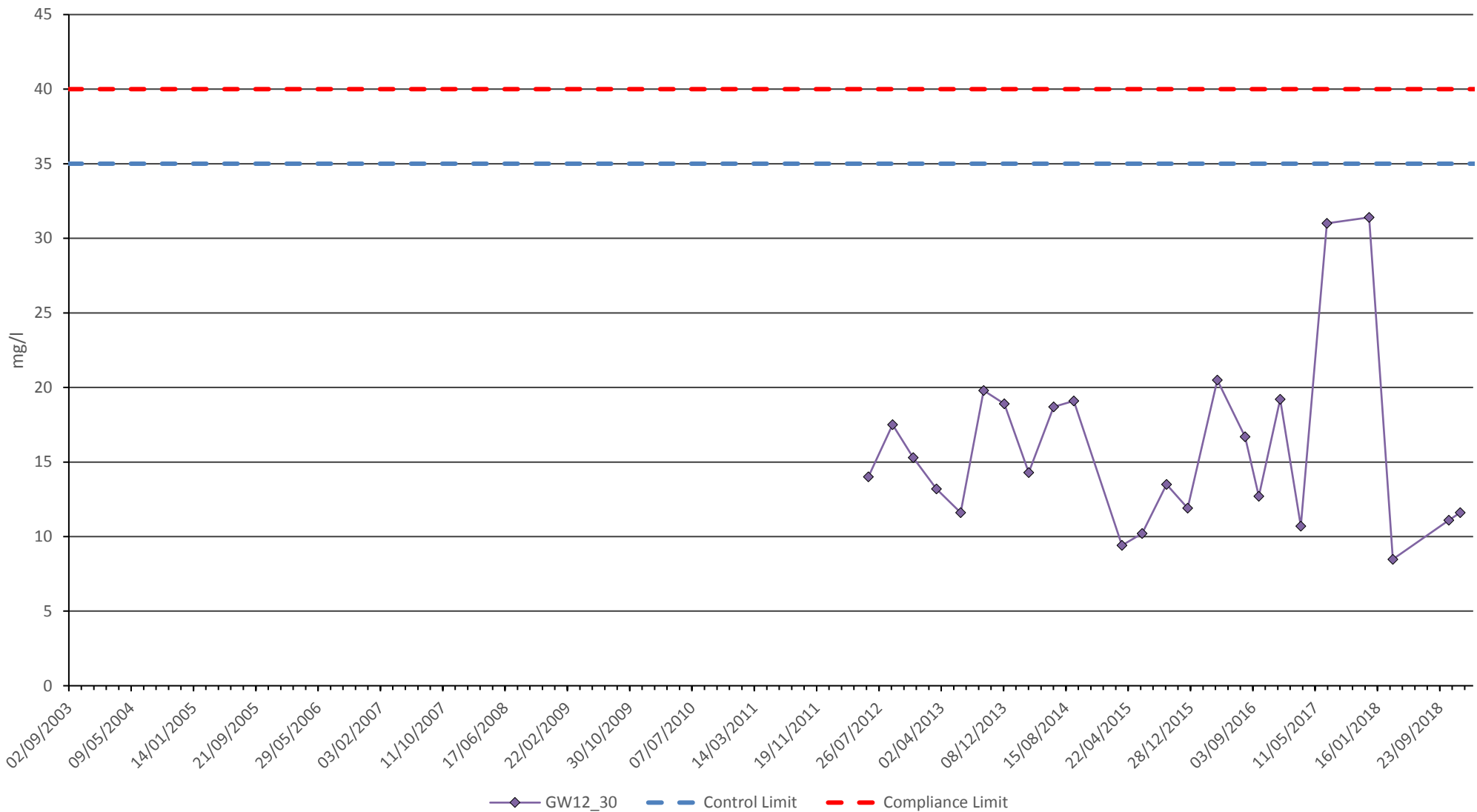
**Docksway Disposal Site**

**Potassium in Groundwater**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

**Appendix**  
2-35

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499



Client  
**Newport City Council**

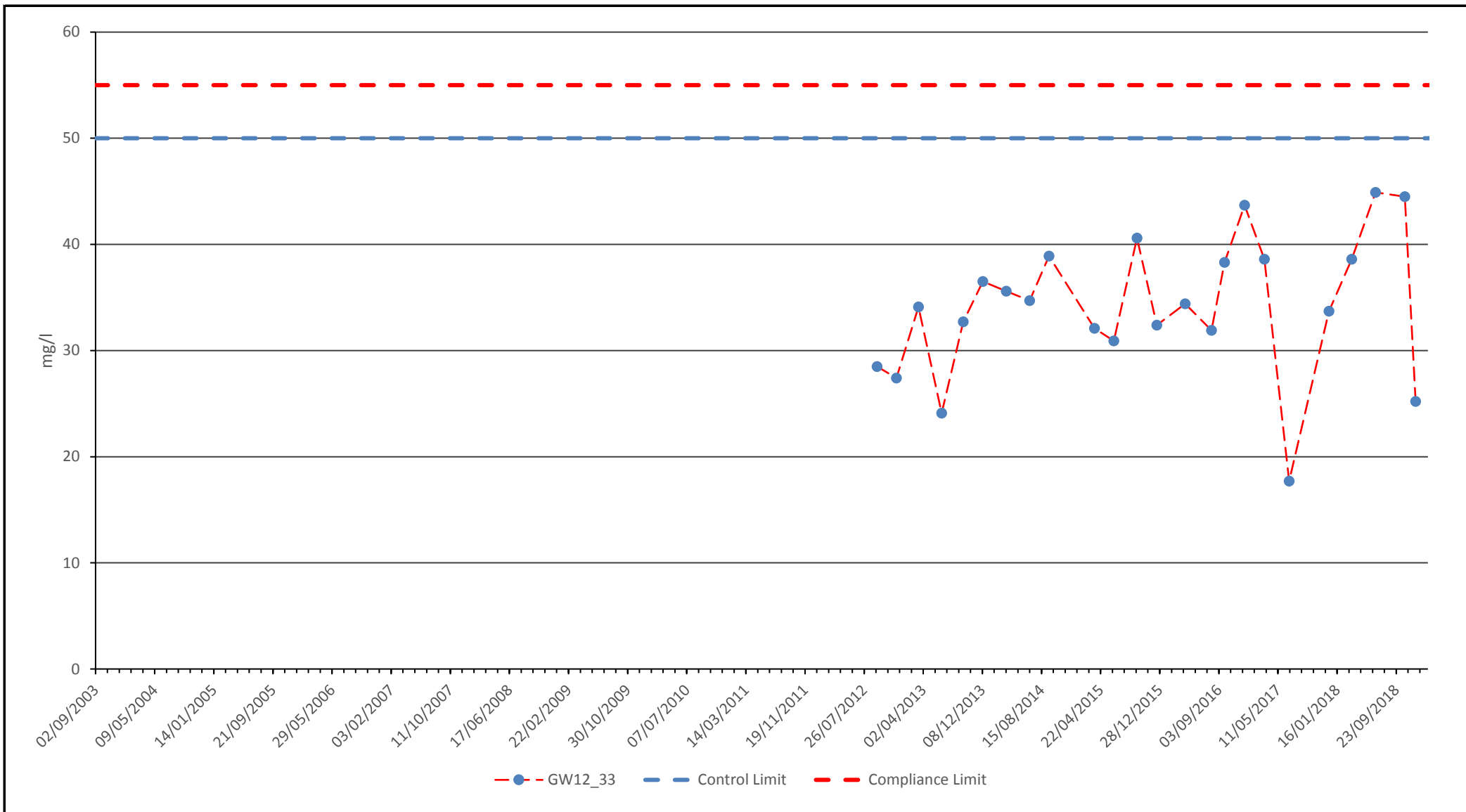
**Docksway Disposal Site**

**Potassium in Groundwater**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

**Appendix**  
**2-36**



Client

**Newport City Council**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
Tel 0118 950 0761 Fax 0118 959 7499

**Docksway Disposal Site**

**Potassium in Groundwater**

Date January 2019

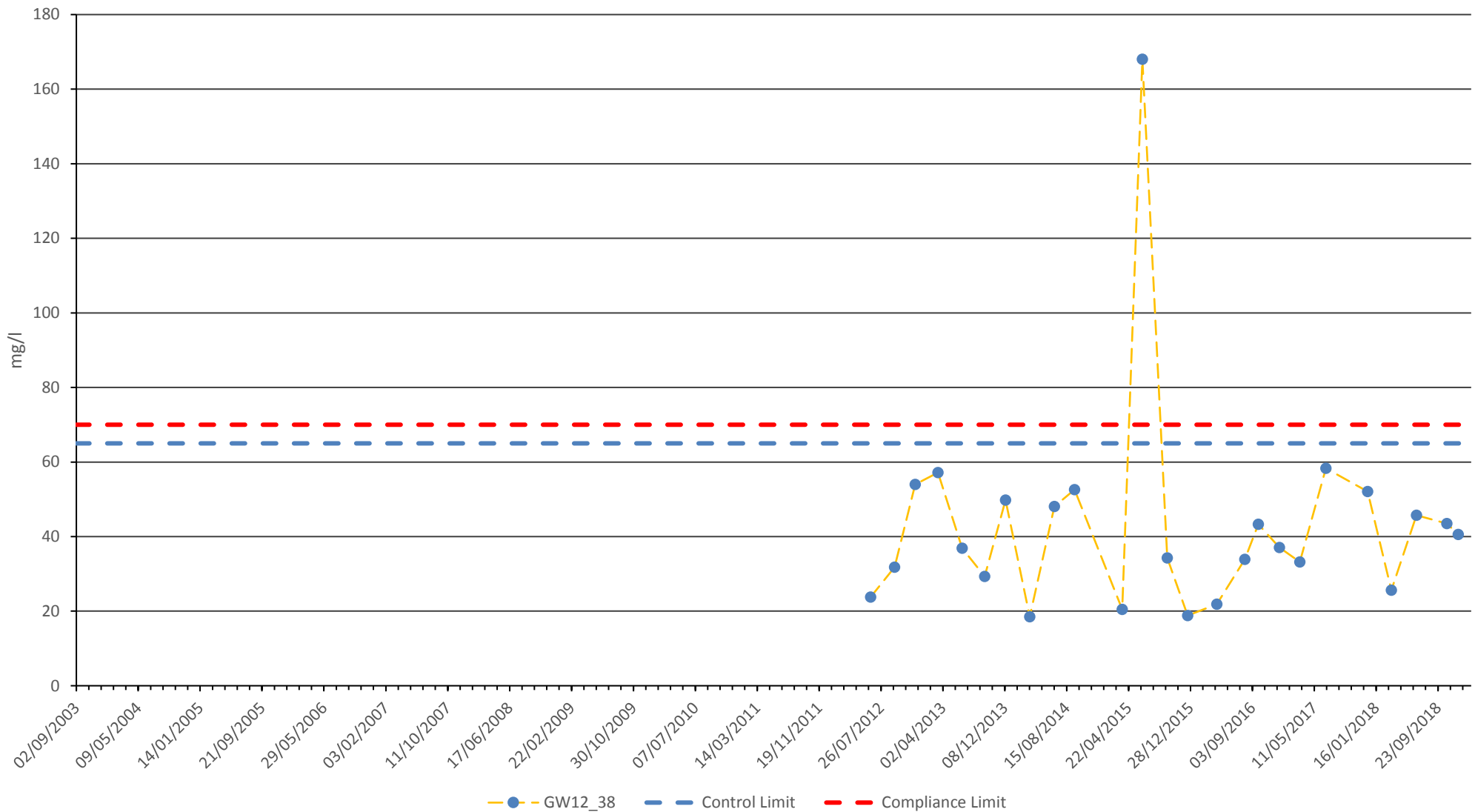
A4 Scale nts

Drawn NC

Checked VKR

Appendix

**2-37**



Client  
**Newport City Council**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

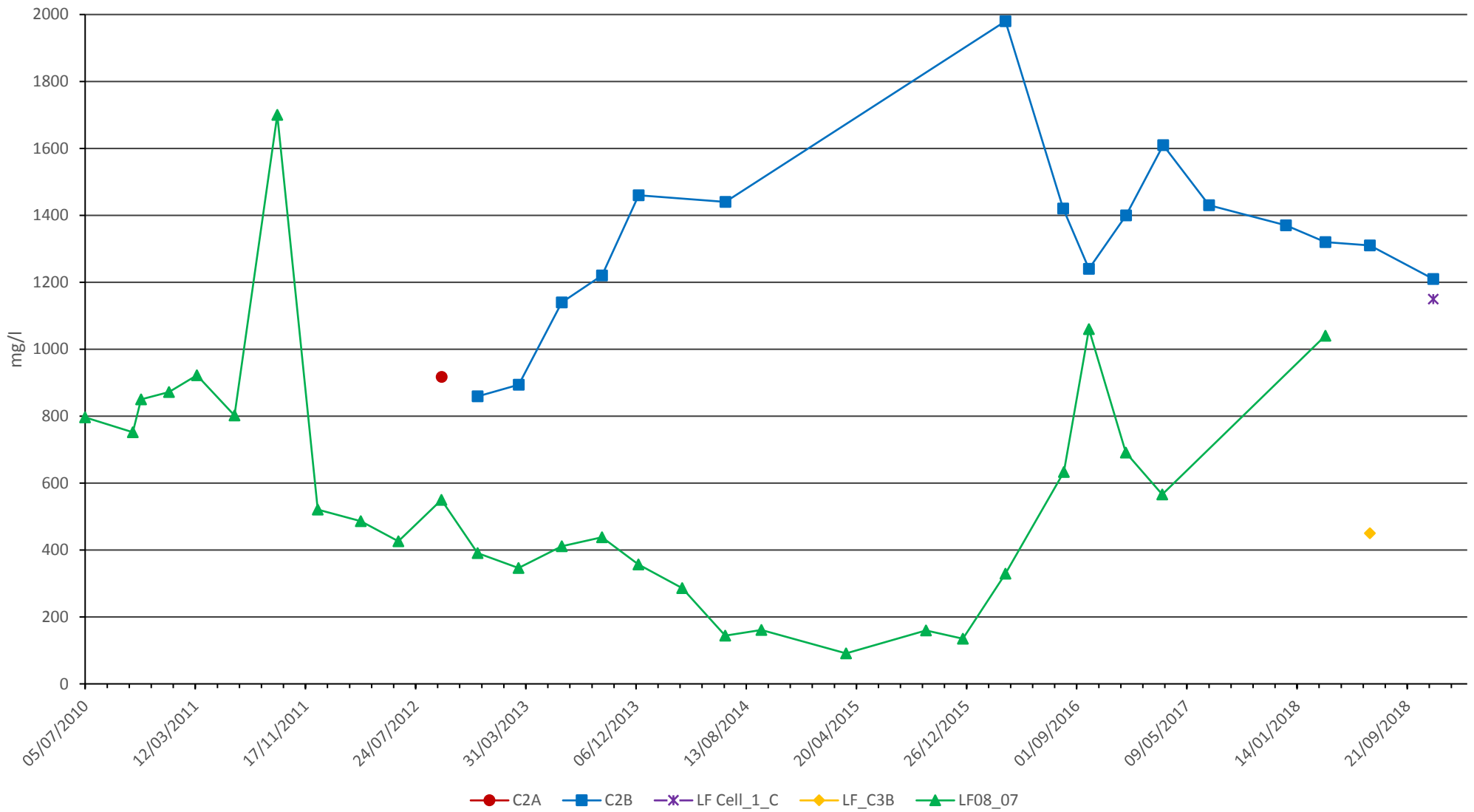
**Docksway Disposal Site**

**Potassium in Groundwater**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

<b>Appendix</b>	<b>2-38</b>
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## Appendix 3 Leachate Chemistry Graphs



Client  
**Newport City Council**

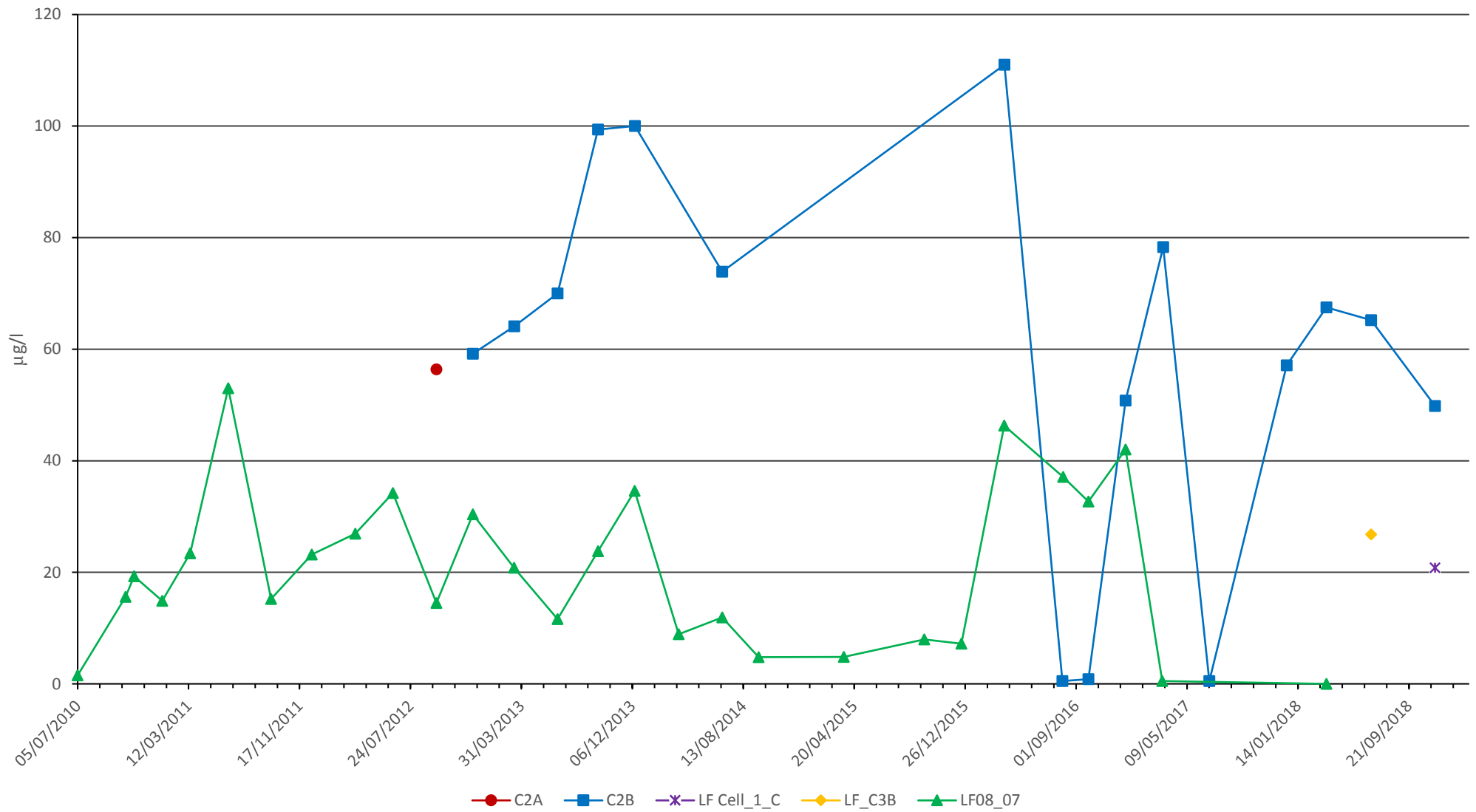
**Docksway Disposal Site**

**Ammoniacal Nitrogen in Leachate**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix	<b>3-1</b>
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Client  
**Newport City Council**

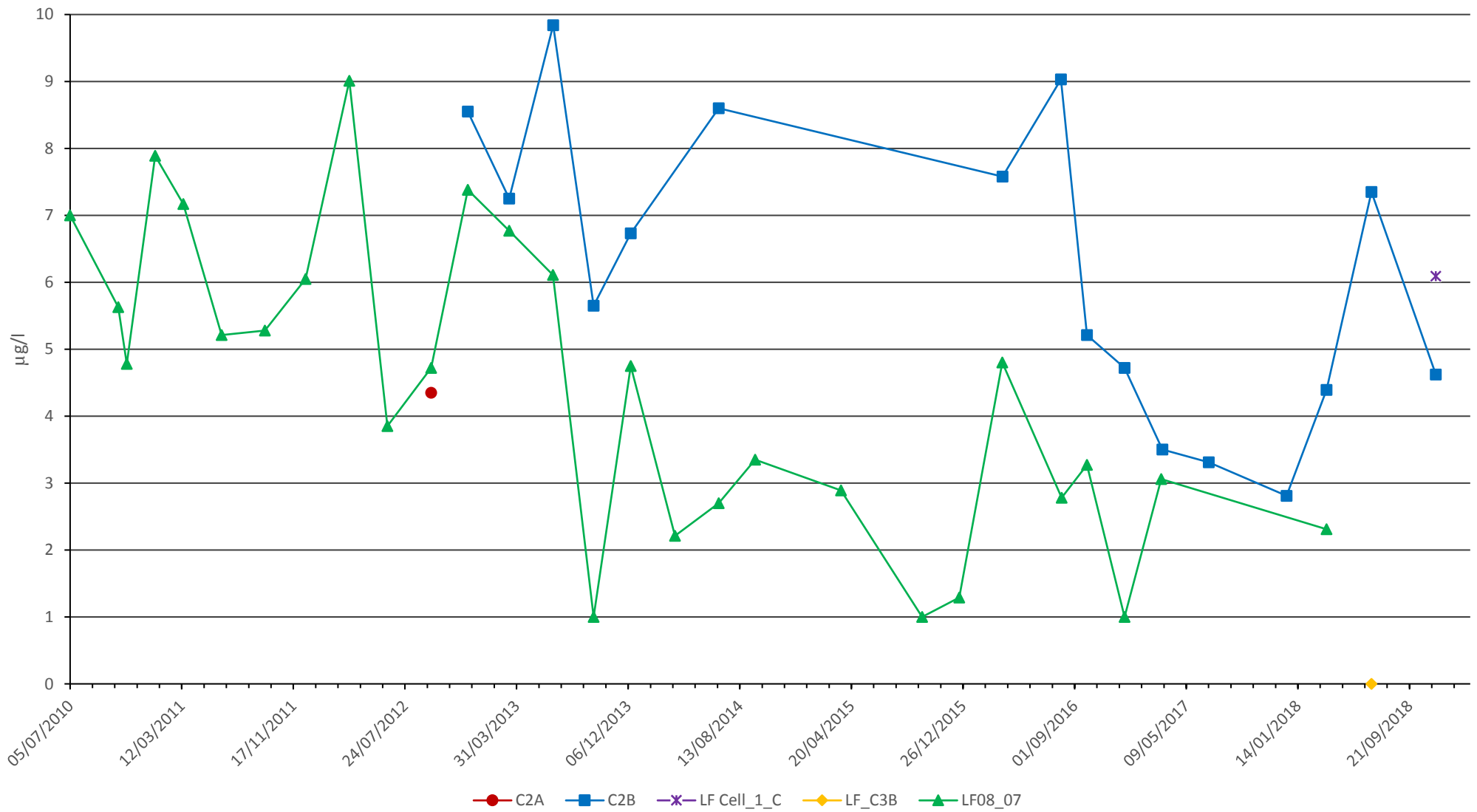
**Docksway Disposal Site**

**Arsenic in Leachate**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix	<b>3-2</b>
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Client  
**Newport City Council**

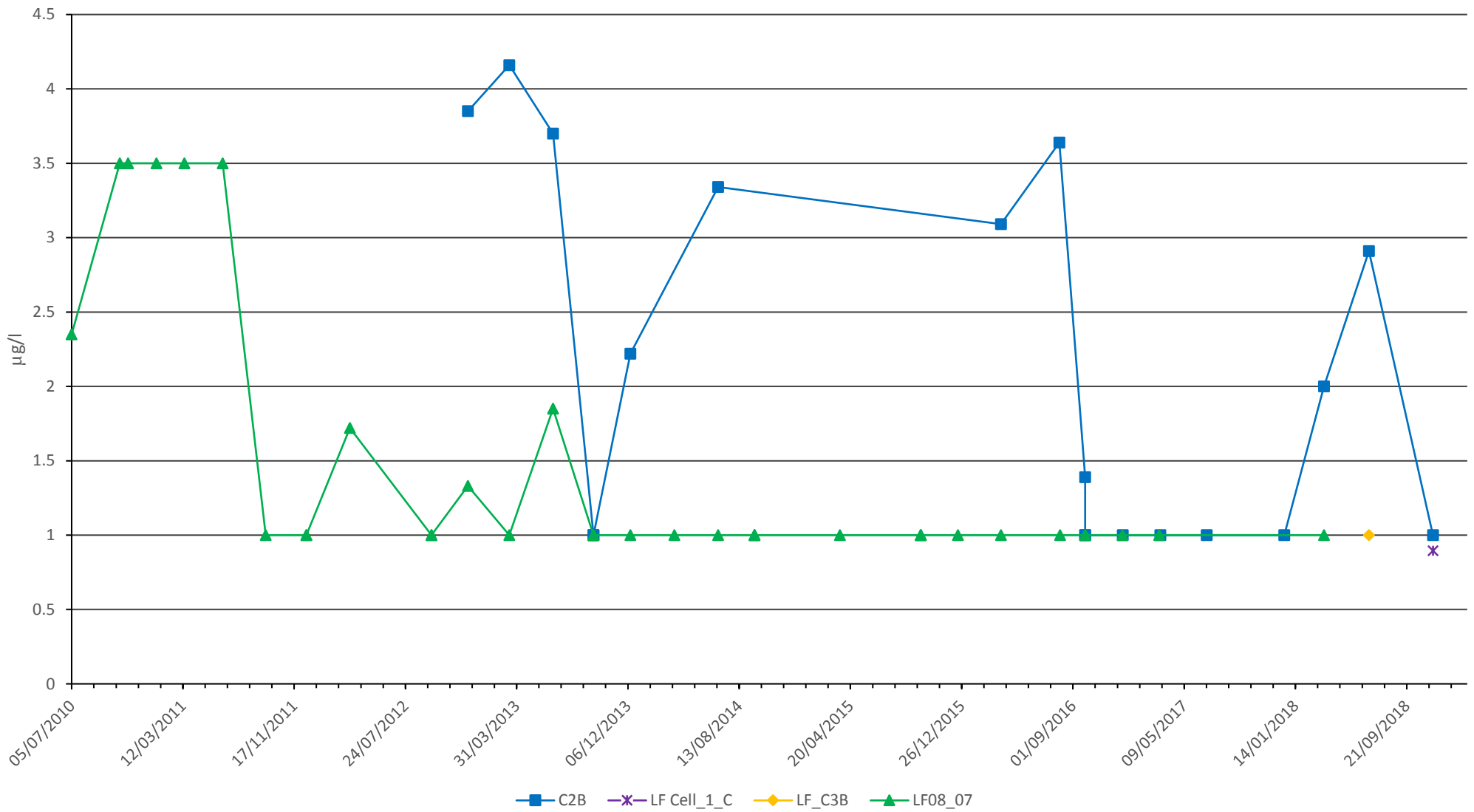
**Docksway Disposal Site**

**Benzene in Leachate**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix	<b>3-3</b>
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Client  
**Newport City Council**

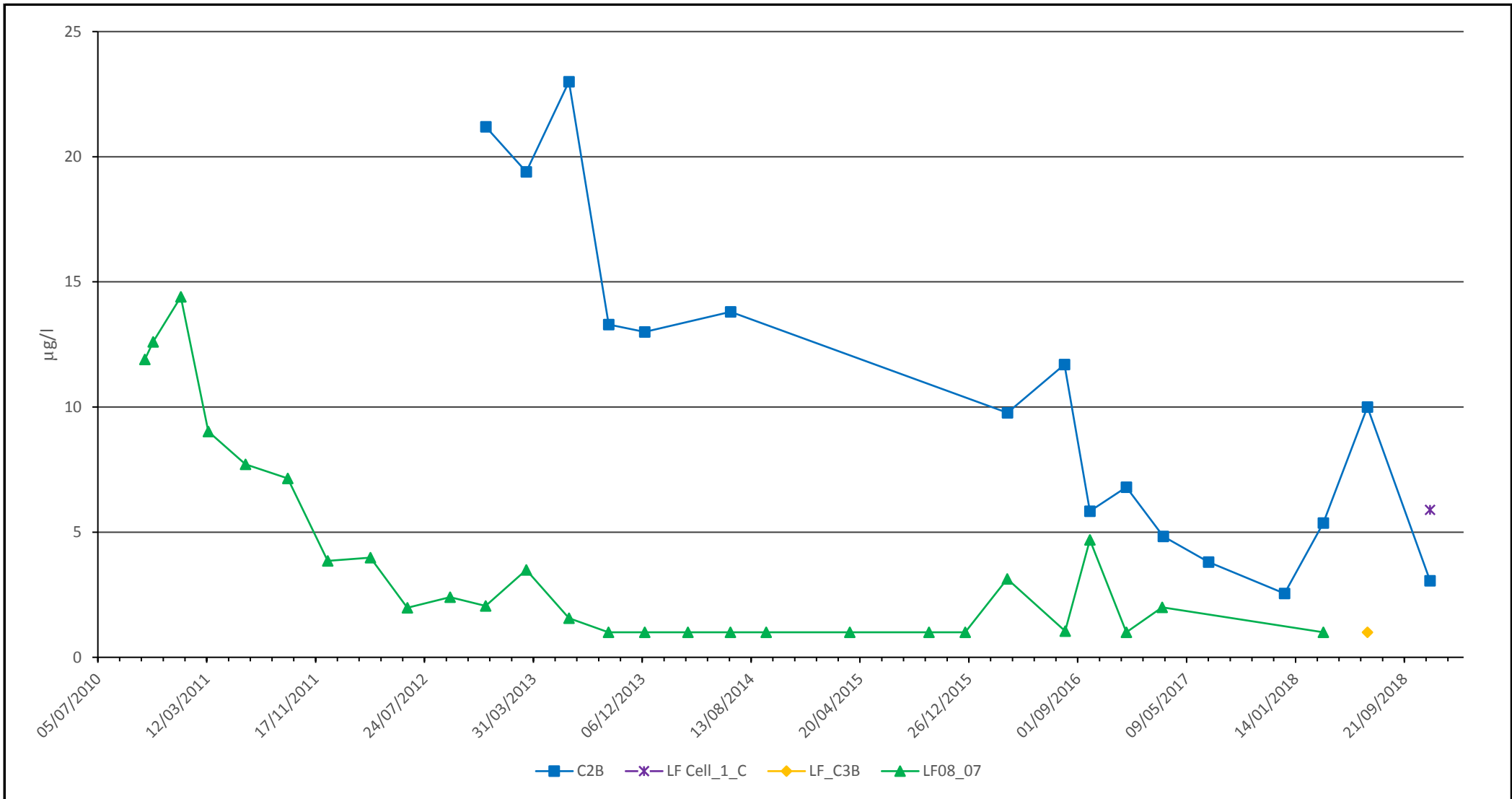
Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

**Docksway Disposal Site**

**Naphthalene in Leachate**

Date	February 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix	<b>3-4</b>
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Client  
**Newport City Council**

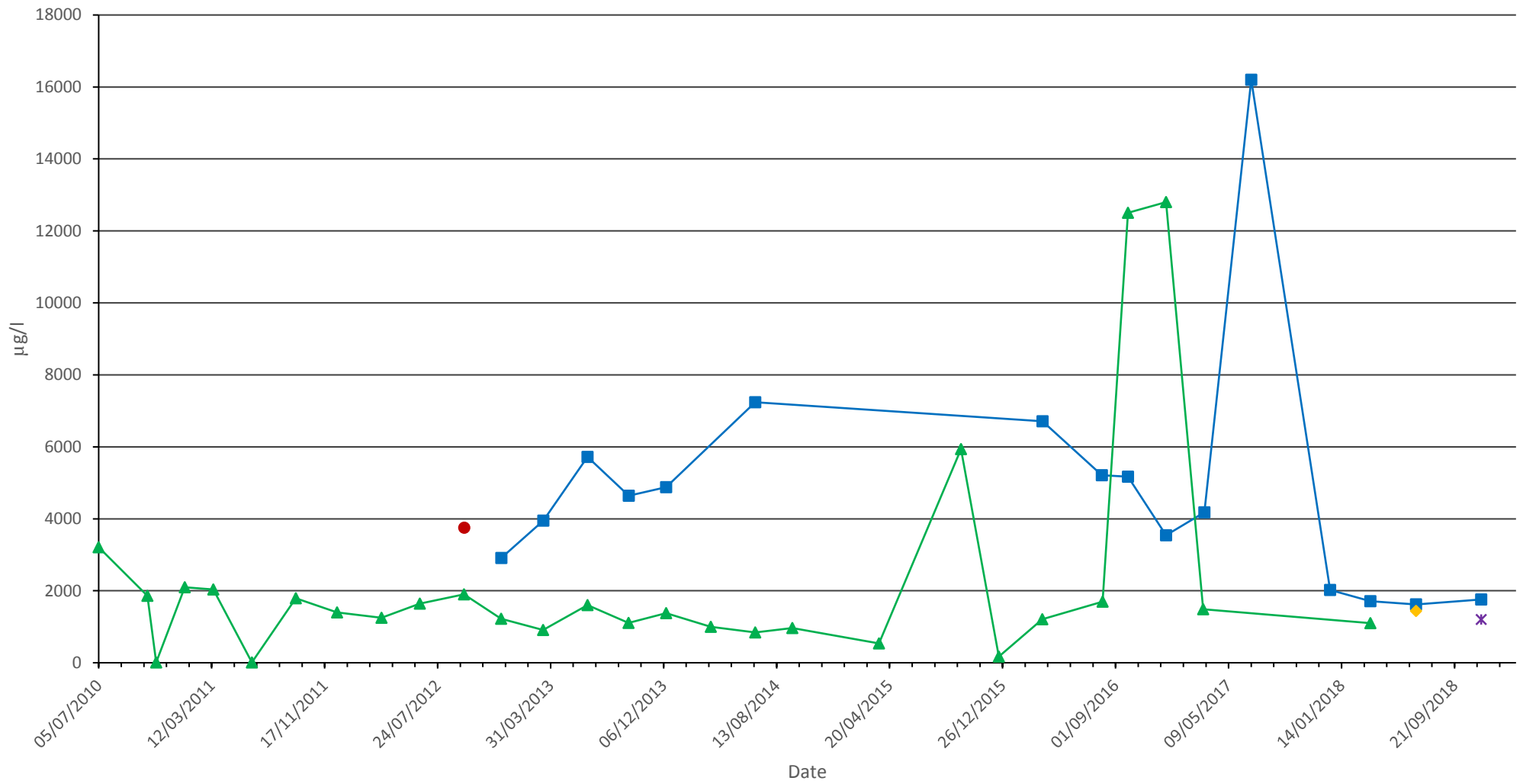
**Docksway Disposal Site**

**O-Xylene in Leachate**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

**Appendix**  
**3-5**



● C2A   
 ■ C2B   
 ✱ LF Cell\_1\_C   
 ◆ LF\_C3B   
 ▲ LF08\_07



Client  
**Newport City Council**

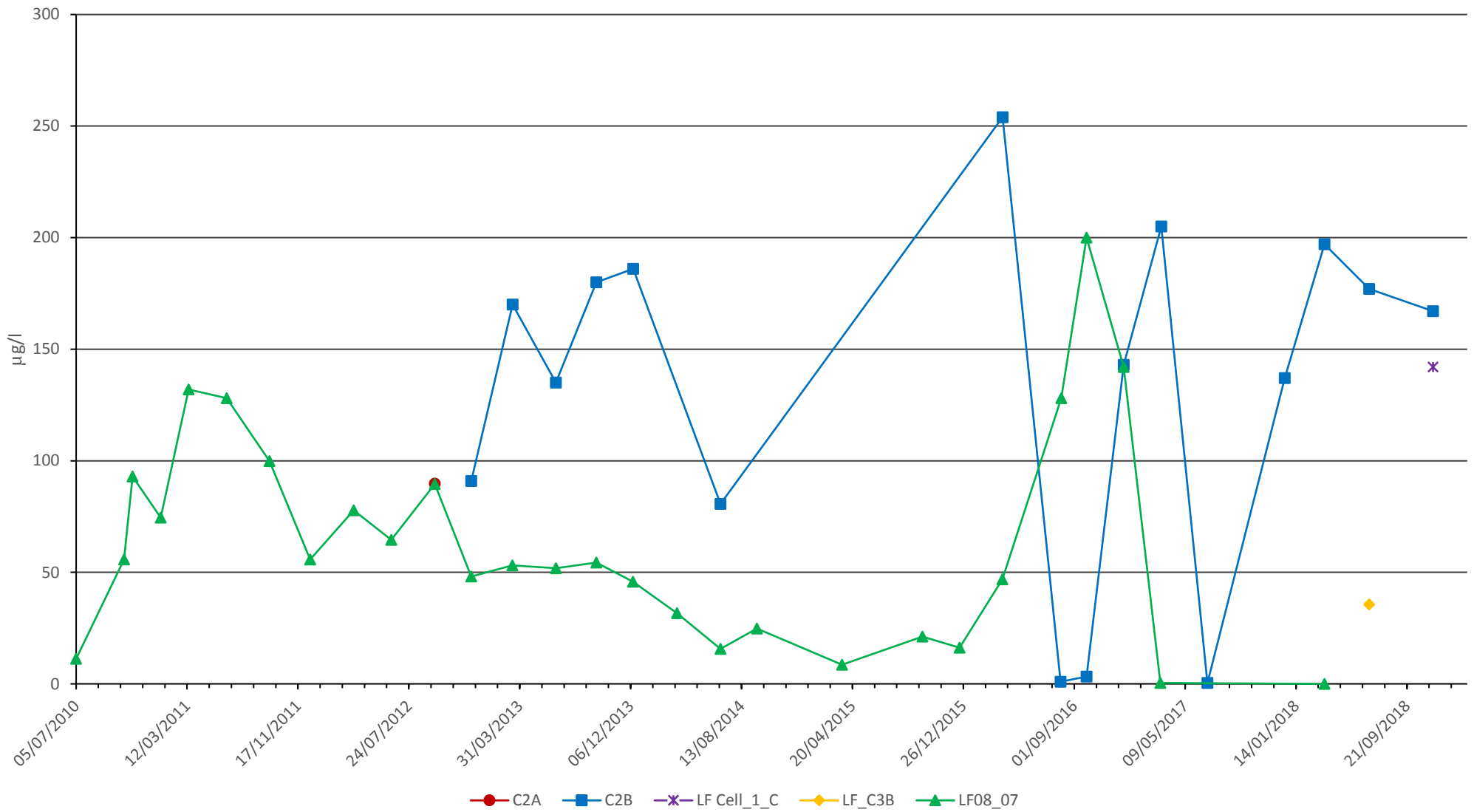
**Docksway Disposal Site**

**EPH in Leachate**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix	<b>3-6</b>
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Client  
**Newport City Council**

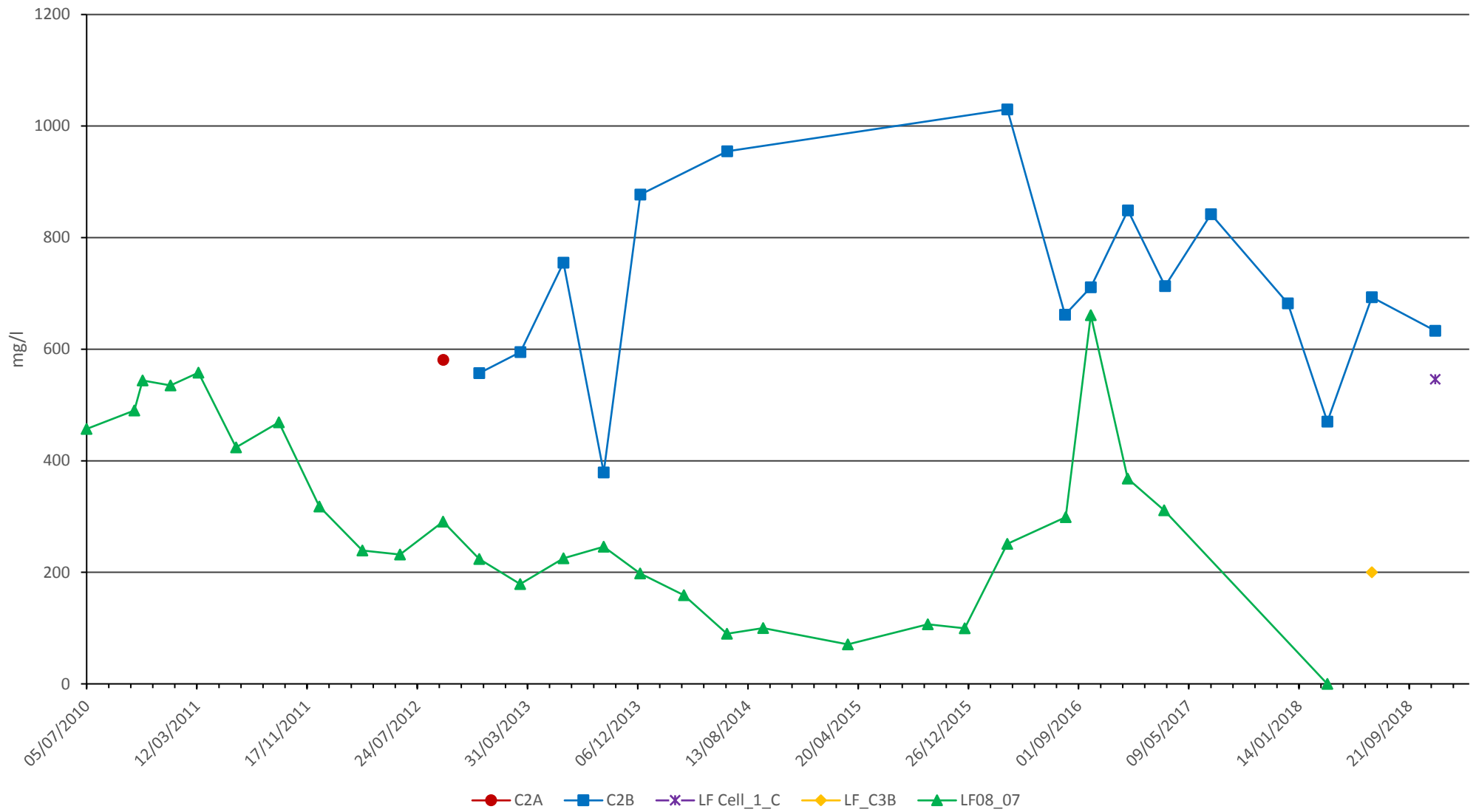
**Docksway Disposal Site**

**Nickel in Leachate**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

**Appendix**  
**3-7**



Client  
**Newport City Council**

**Docksway Disposal Site**

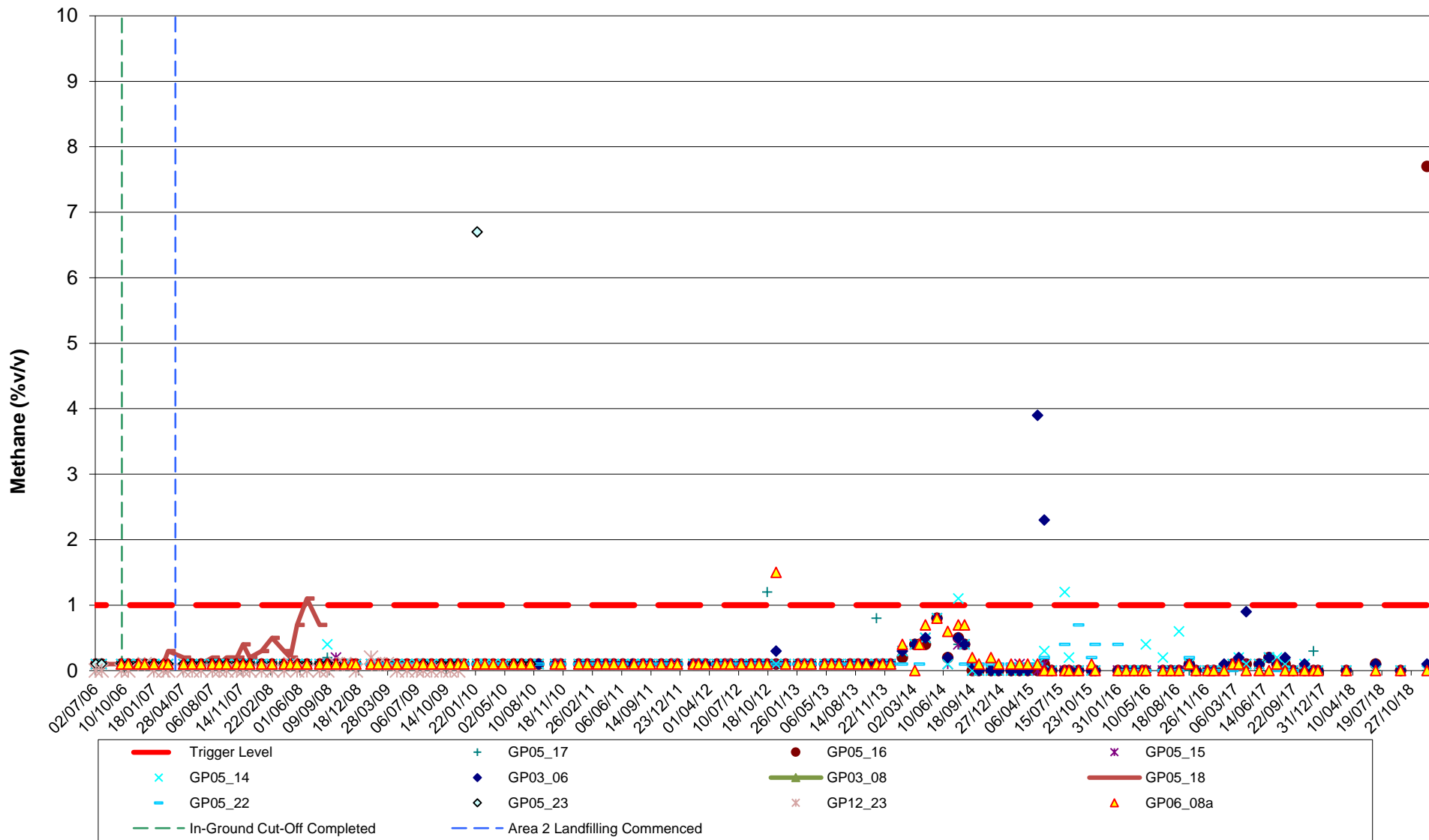
**Potassium in Leachate**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix	<b>3-8</b>
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## Appendix 4 Gas Concentrations Graphs



Client  
**Newport City Council**

**Docksway Disposal Site**

**Methane Concentrations in Area 2 Gas Monitoring Wells  
 (Excluding GP05\_20, GP05\_21, GP06\_24, GP06\_25, GP09\_18)**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

Date January 2019

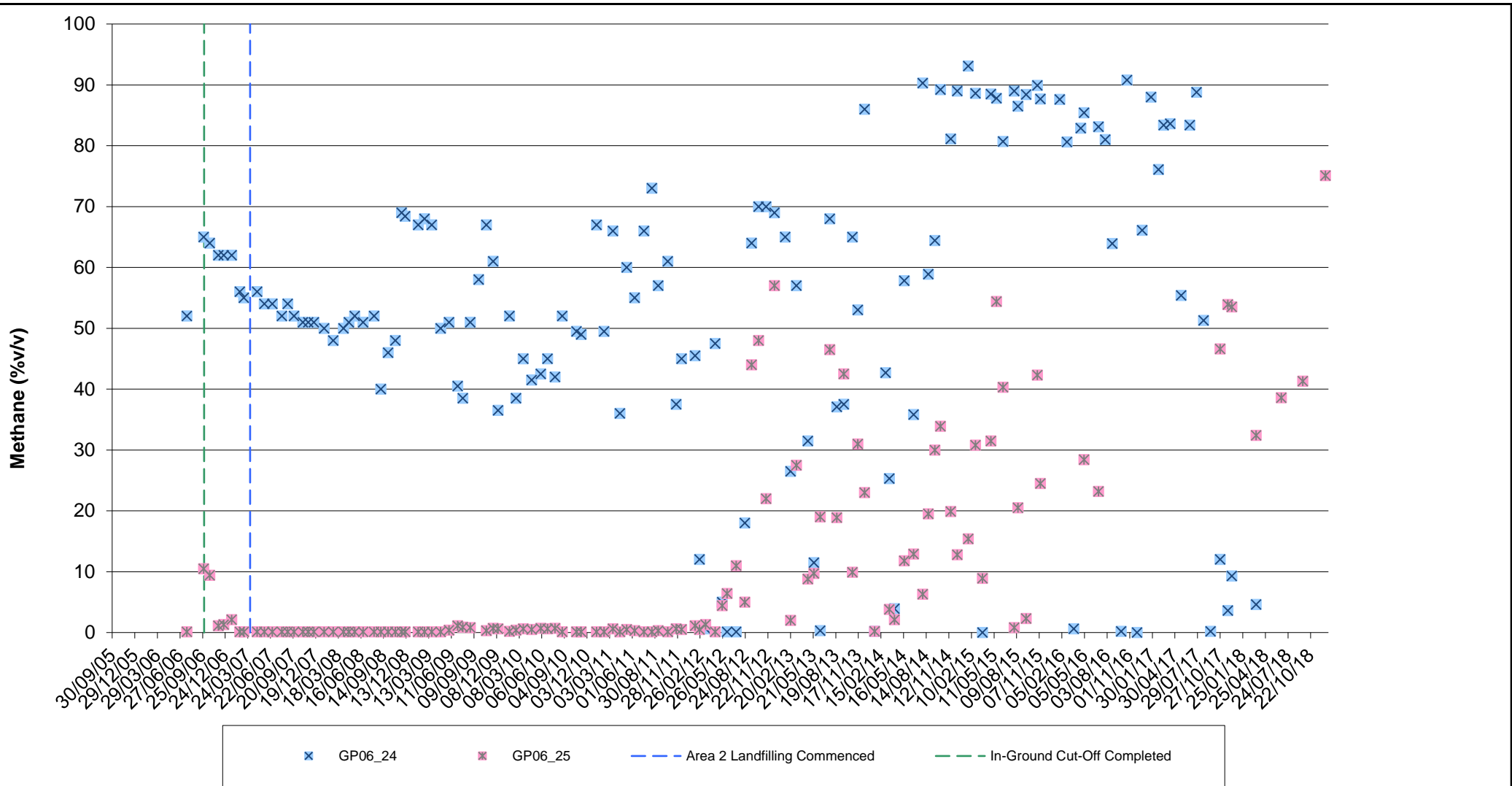
A4 Scale nts

Drawn NC

Checked VKR

Appendix

**4-1**



Client

**Newport City Council**

**Docksway Disposal Site**

**Recorded Methane Concentrations for GP06\_24 and GP06\_25**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN

Tel 0118 950 0761 Fax 0118 959 7499

Date January 2019

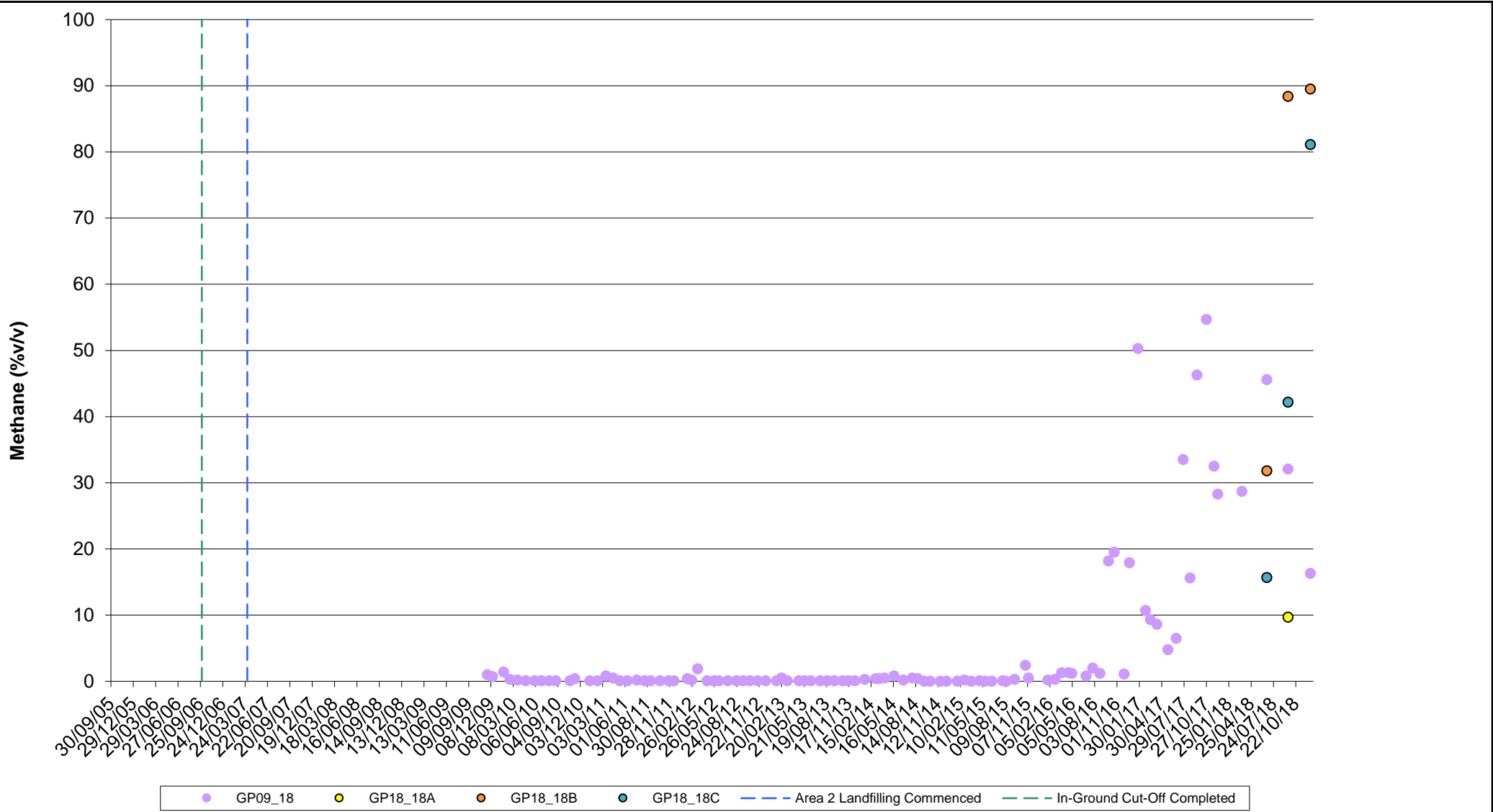
A4 Scale nts

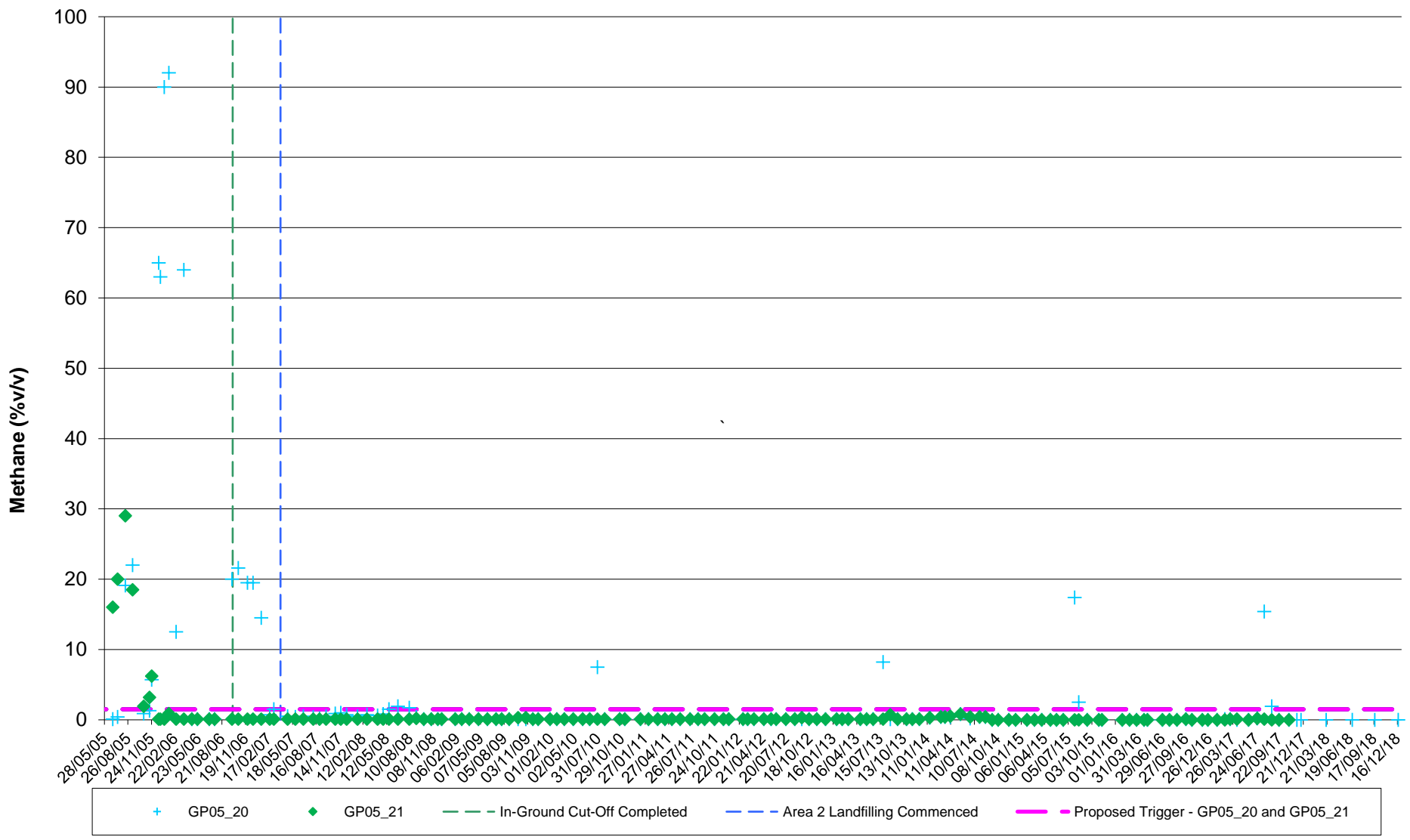
Drawn NC

Checked VKR

Appendix

**4-2**





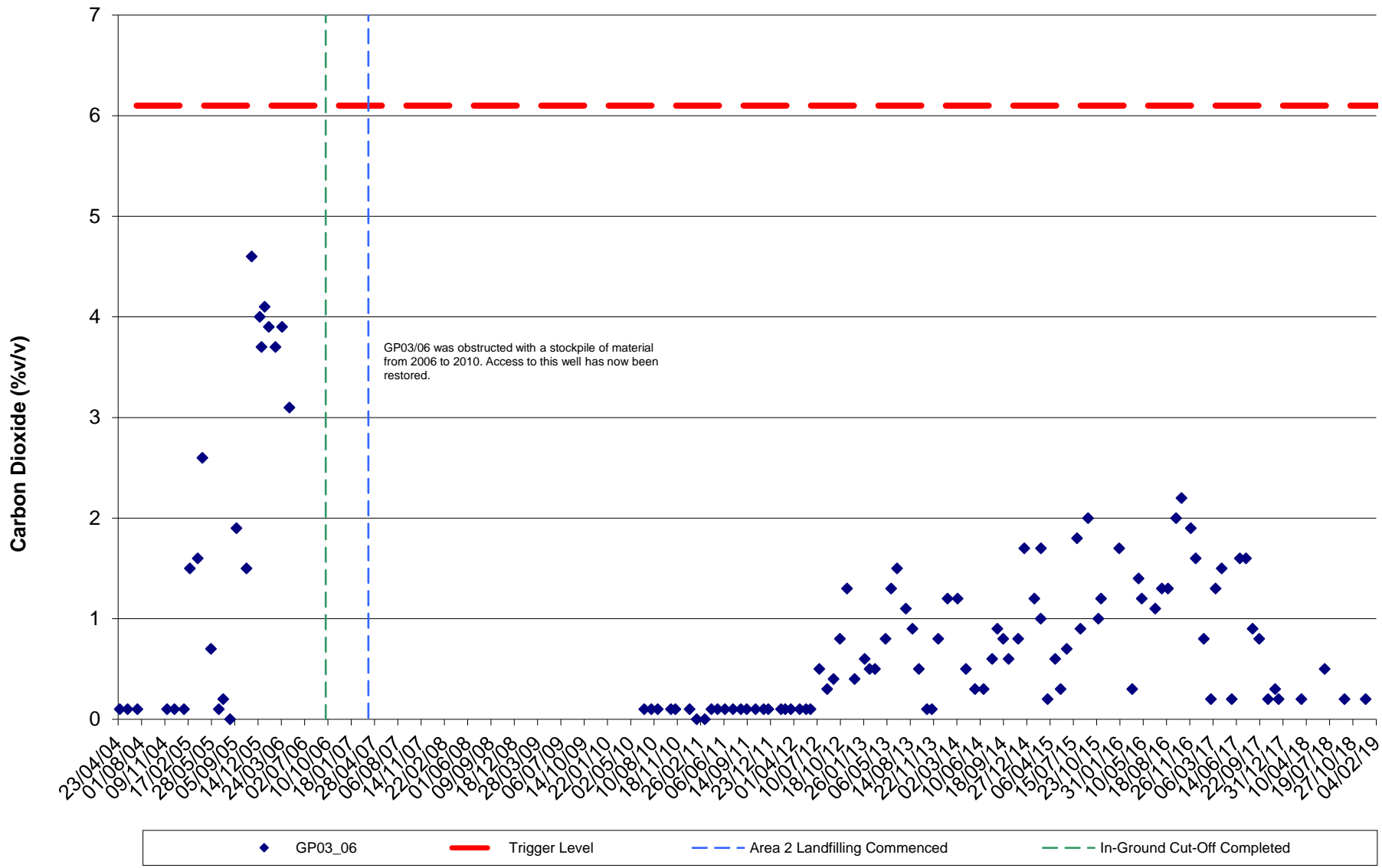
Client  
**Newport City Council**

**Docksway Disposal Site**

**Recorded Methane Concentrations in GP05\_20 and GP05\_21**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix  
**4-4**



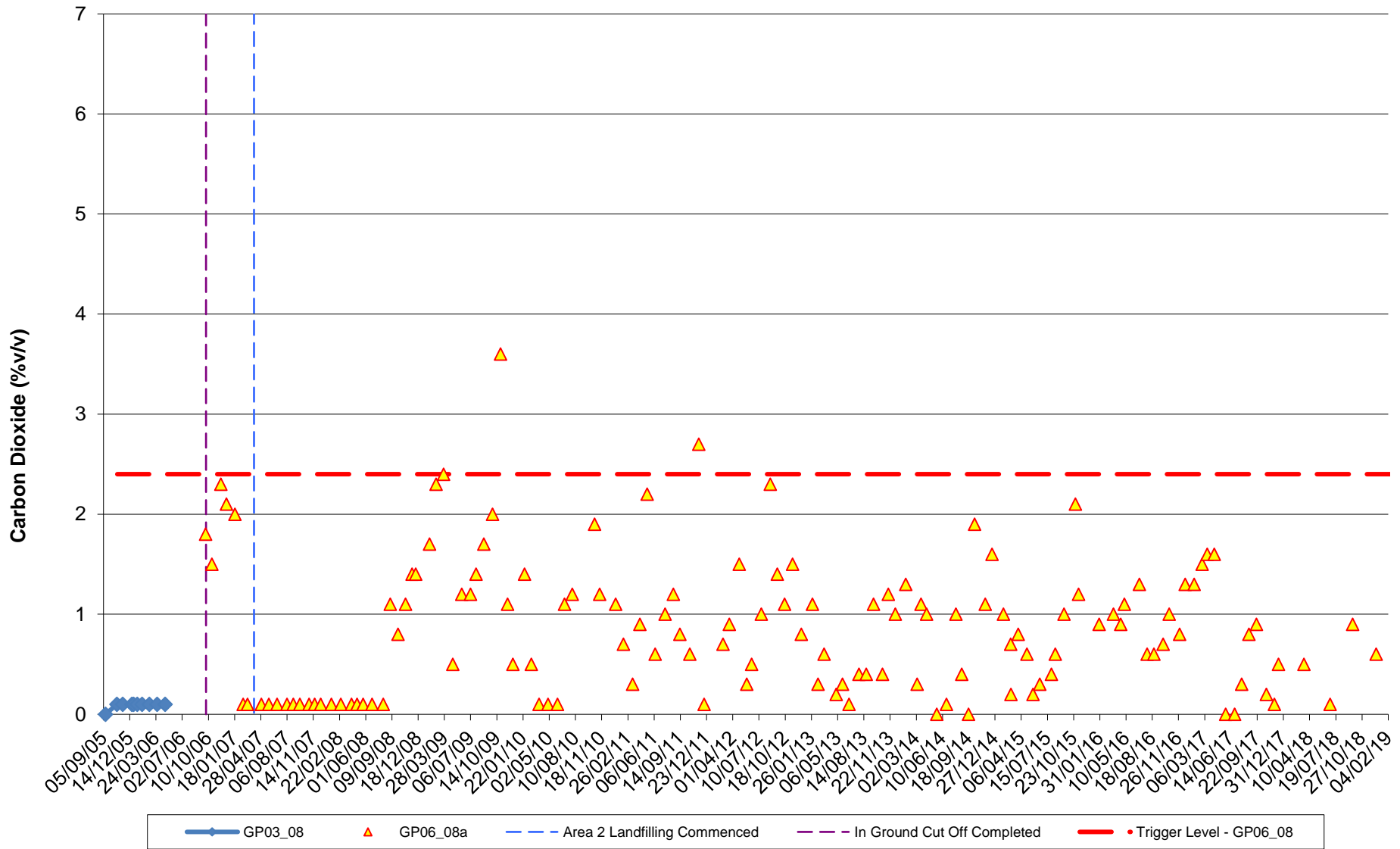
Client  
**Newport City Council**

**Docksway Disposal Site**

**Recorded Carbon Dioxide Concentrations in GP03\_06**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix  
**4-5**



Client  
**Newport City Council**

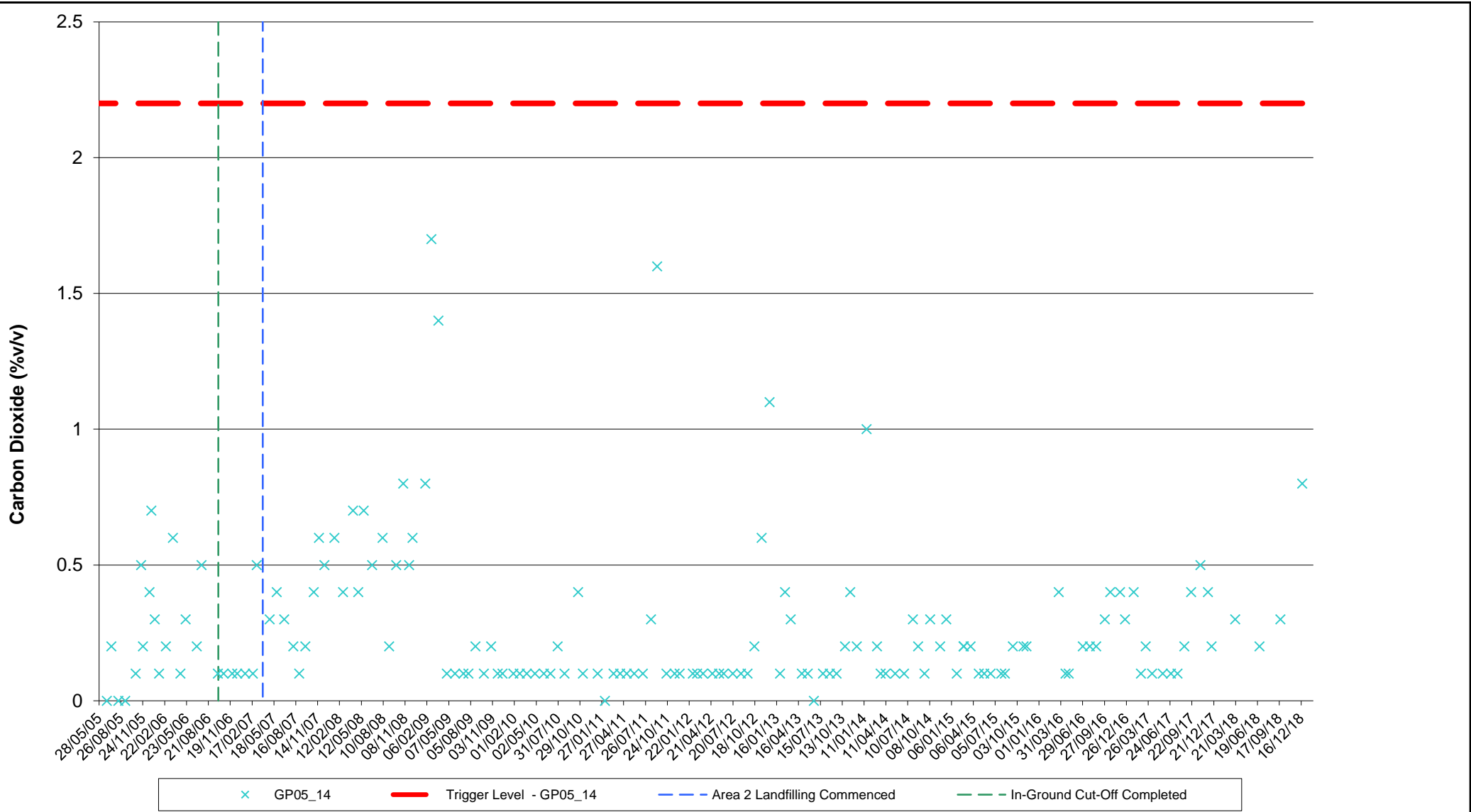
**Docksway Disposal Site**

**Recorded Carbon Dioxide Concentrations in GP06\_08a**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix	<b>4-6</b>
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Client  
**Newport City Council**

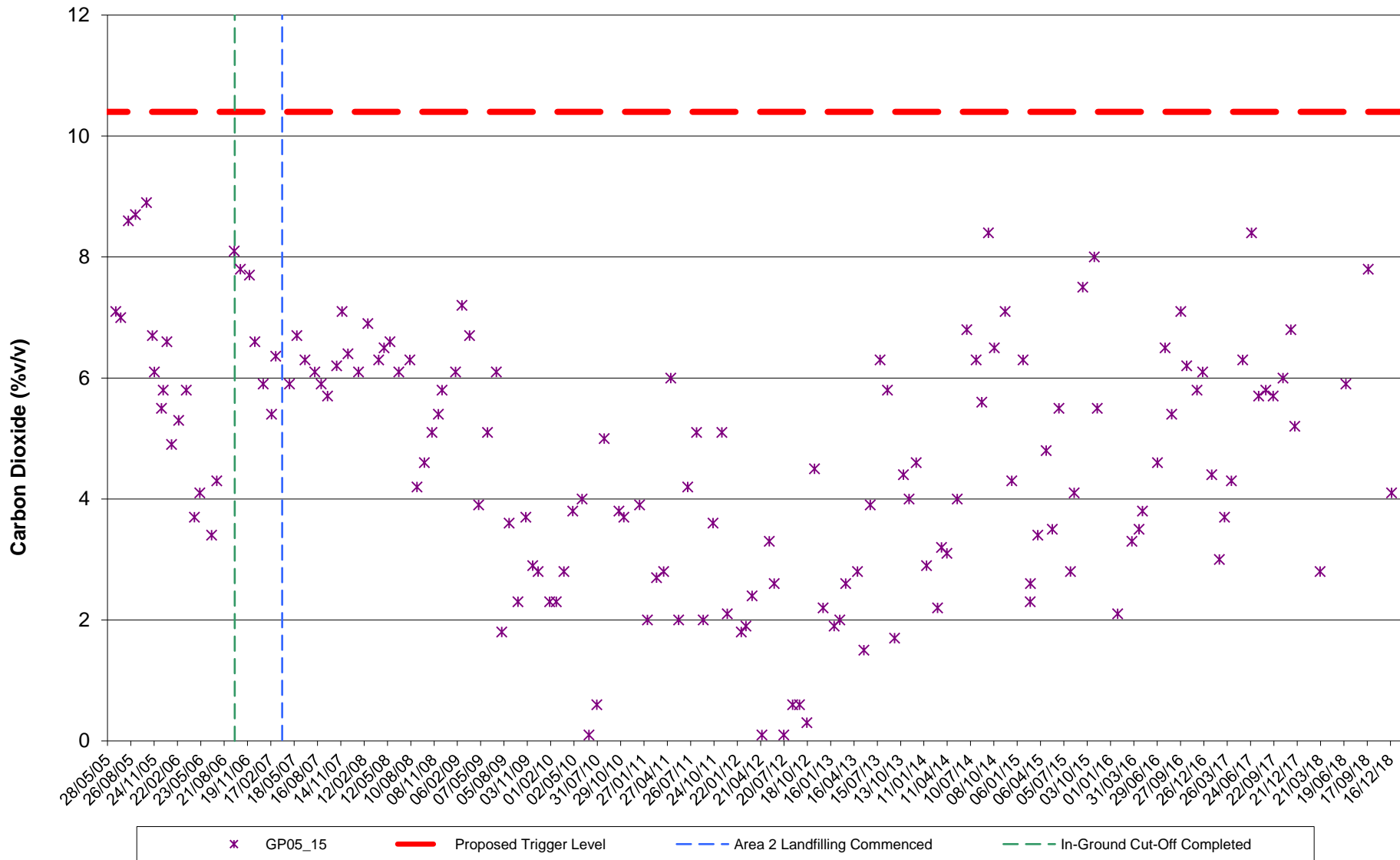
**Docksway Disposal Site**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

**Recorded Carbon Dioxide Concentrations in GP05\_14**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix  
**4-7**



Client  
**Newport City Council**

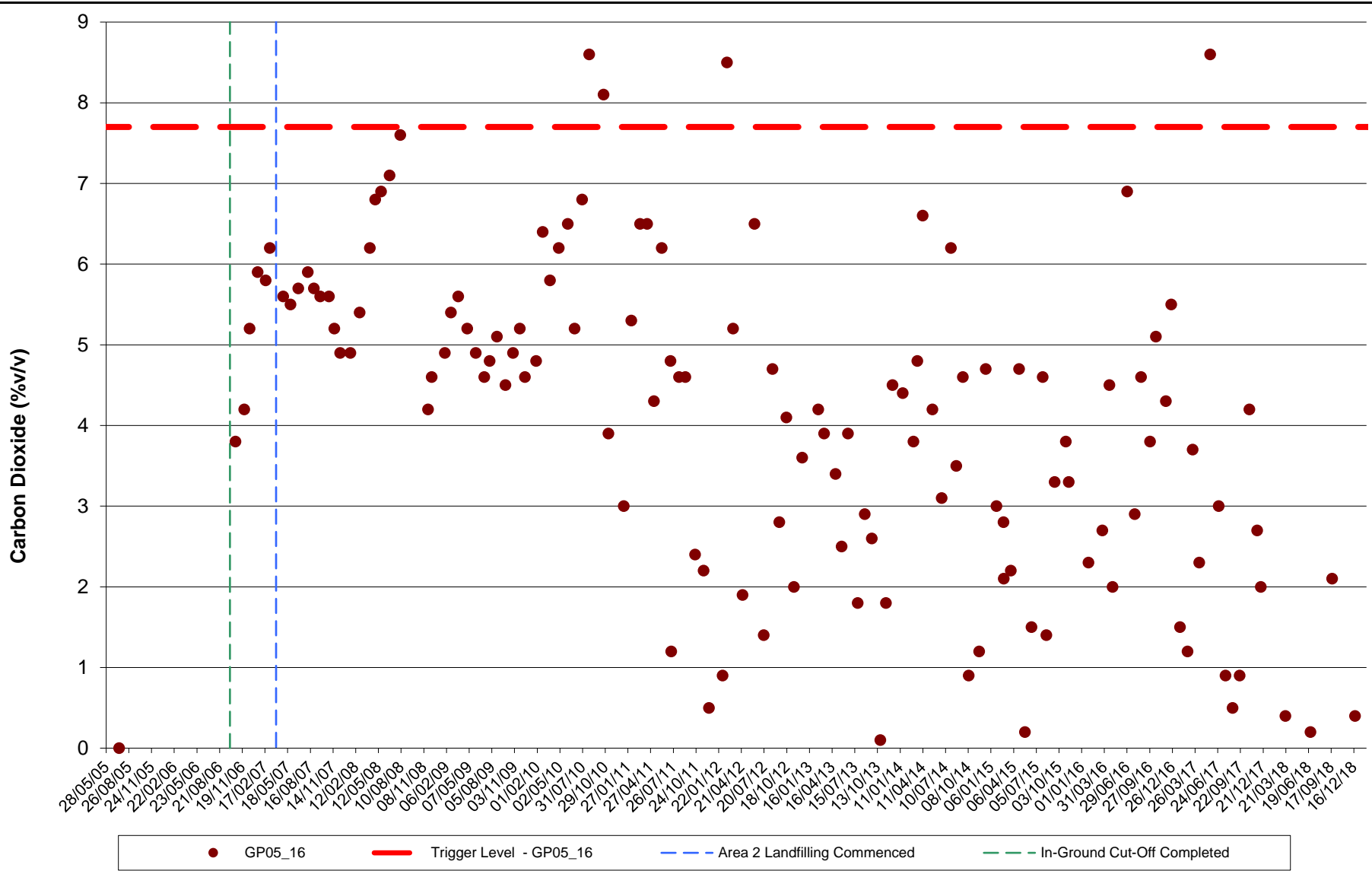
**Docksway Disposal Site**

**Recorded Carbon Dioxide Concentrations in GP05\_15**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix	<b>4-8</b>
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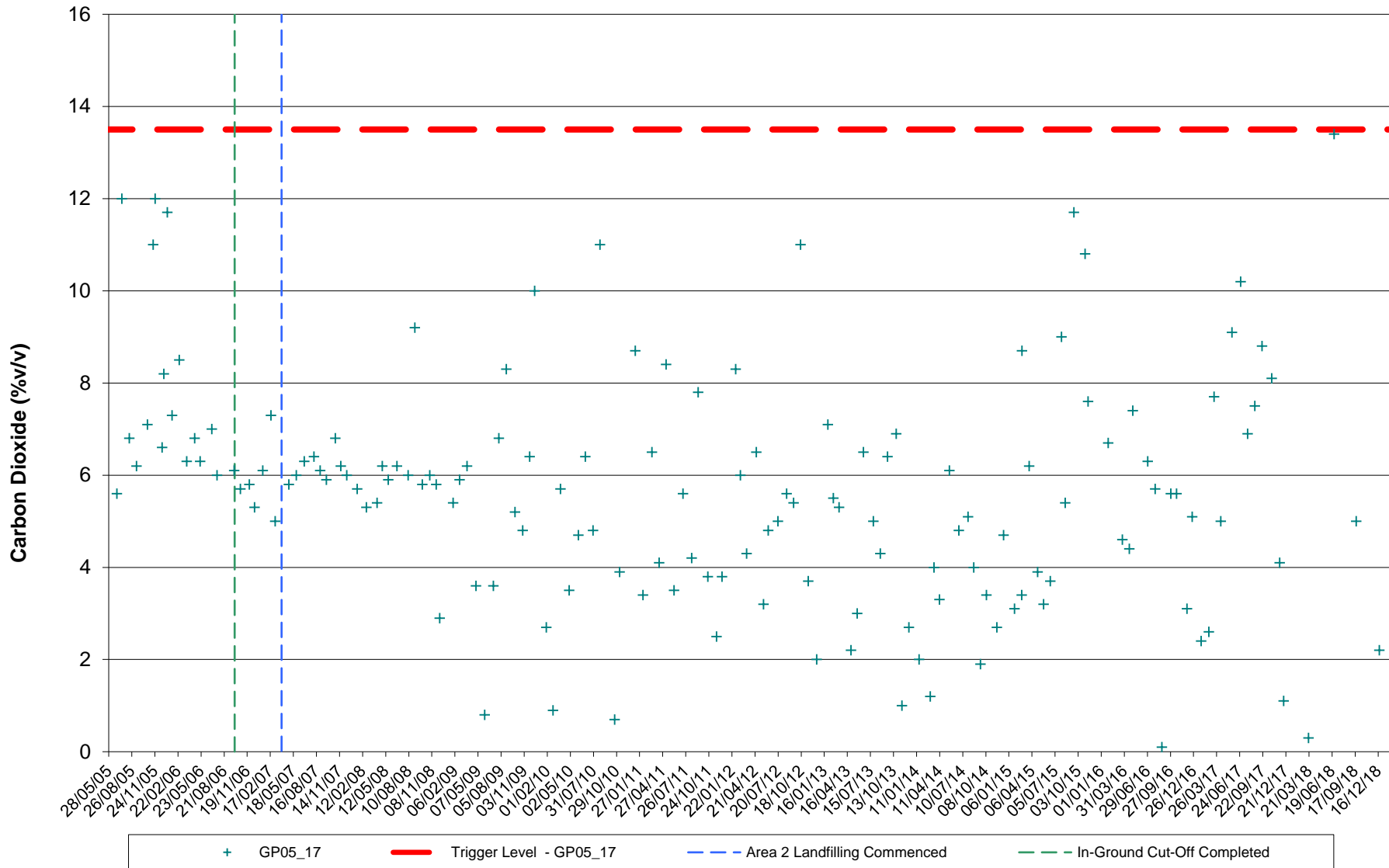
Client  
**Newport City Council**

**Docksway Disposal Site**

**Recorded Carbon Dioxide Concentrations in GP05\_16**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

**Appendix**  
**4-9**



Client  
**Newport City Council**

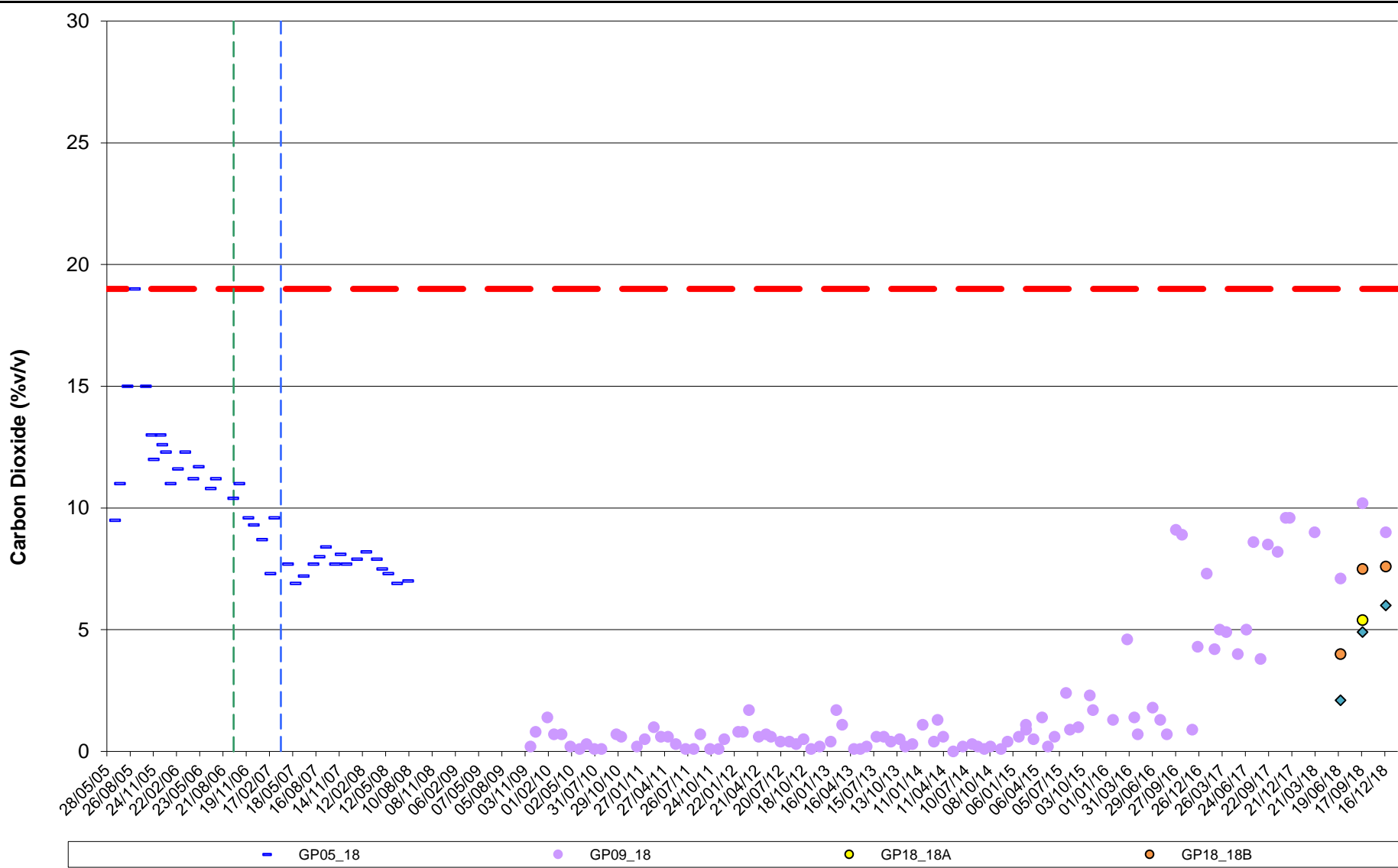
**Docksway Disposal Site**

**Recorded Carbon Dioxide Concentrations in GP05\_17**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix  
**4-10**



Client  
**Newport City Council**

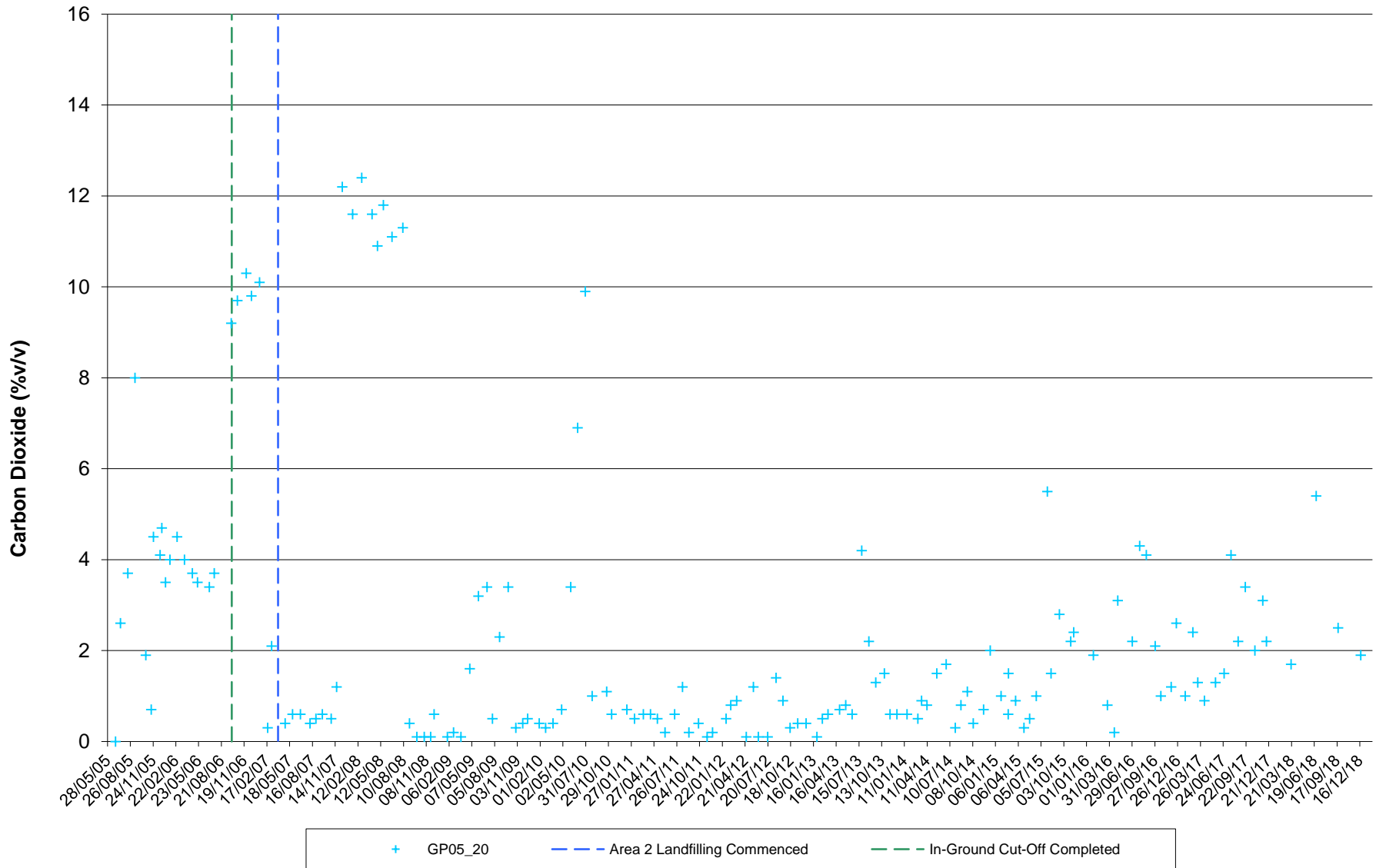
**Docksway Disposal Site**

**Recorded Carbon Dioxide Concentrations in GP05\_18, GP09\_18, GP18\_18A, GP18\_18B and GP18\_18C**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix	<b>4-11</b>
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Client  
**Newport City Council**

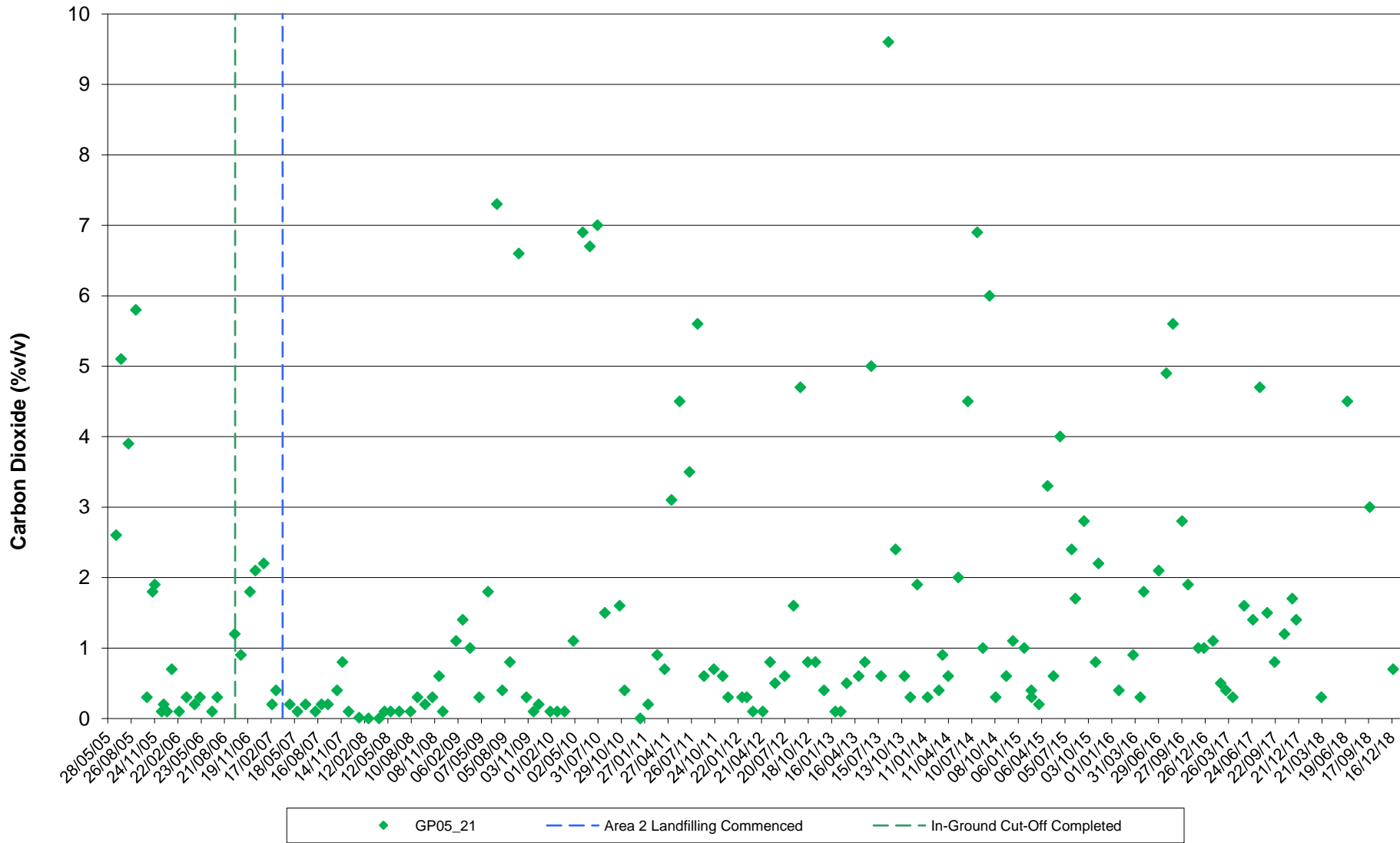
**Docksway Disposal Site**

**Recorded Carbon Dioxide Concentrations in GP05\_20**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix	<b>4-12</b>
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Client

**Newport City Council**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
Tel 0118 950 0761 Fax 0118 959 7499

**Dockway Disposal Site**

**Recorded Carbon Dioxide Concentrations in GP05\_21**

Date January 2019

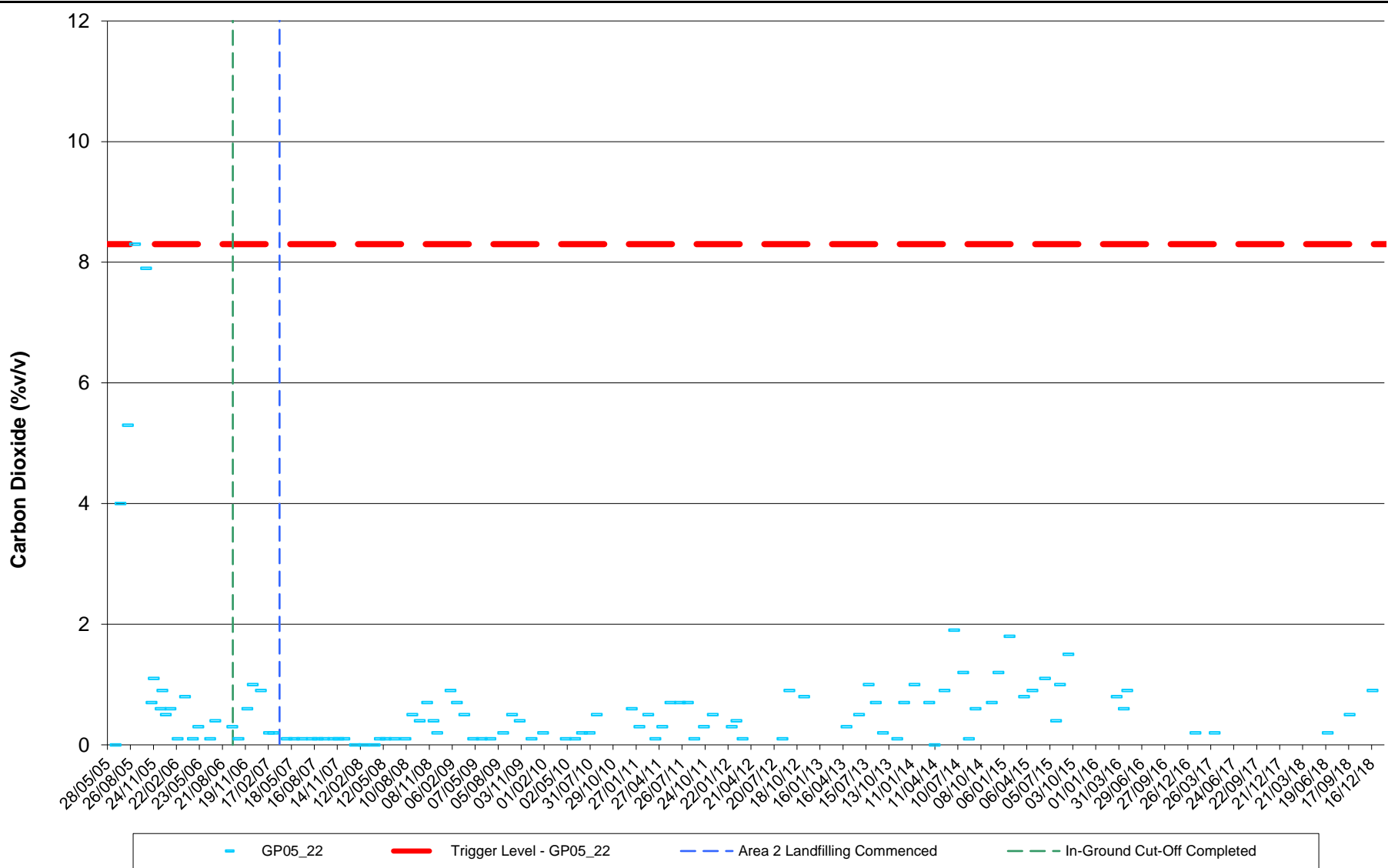
A4 Scale nts

Drawn NC

Checked VKR

Appendix

**4-13**



— GP05\_22     
 - - - Trigger Level - GP05\_22     
 - - - Area 2 Landfilling Commenced     
 - - - In-Ground Cut-Off Completed



Client  
**Newport City Council**

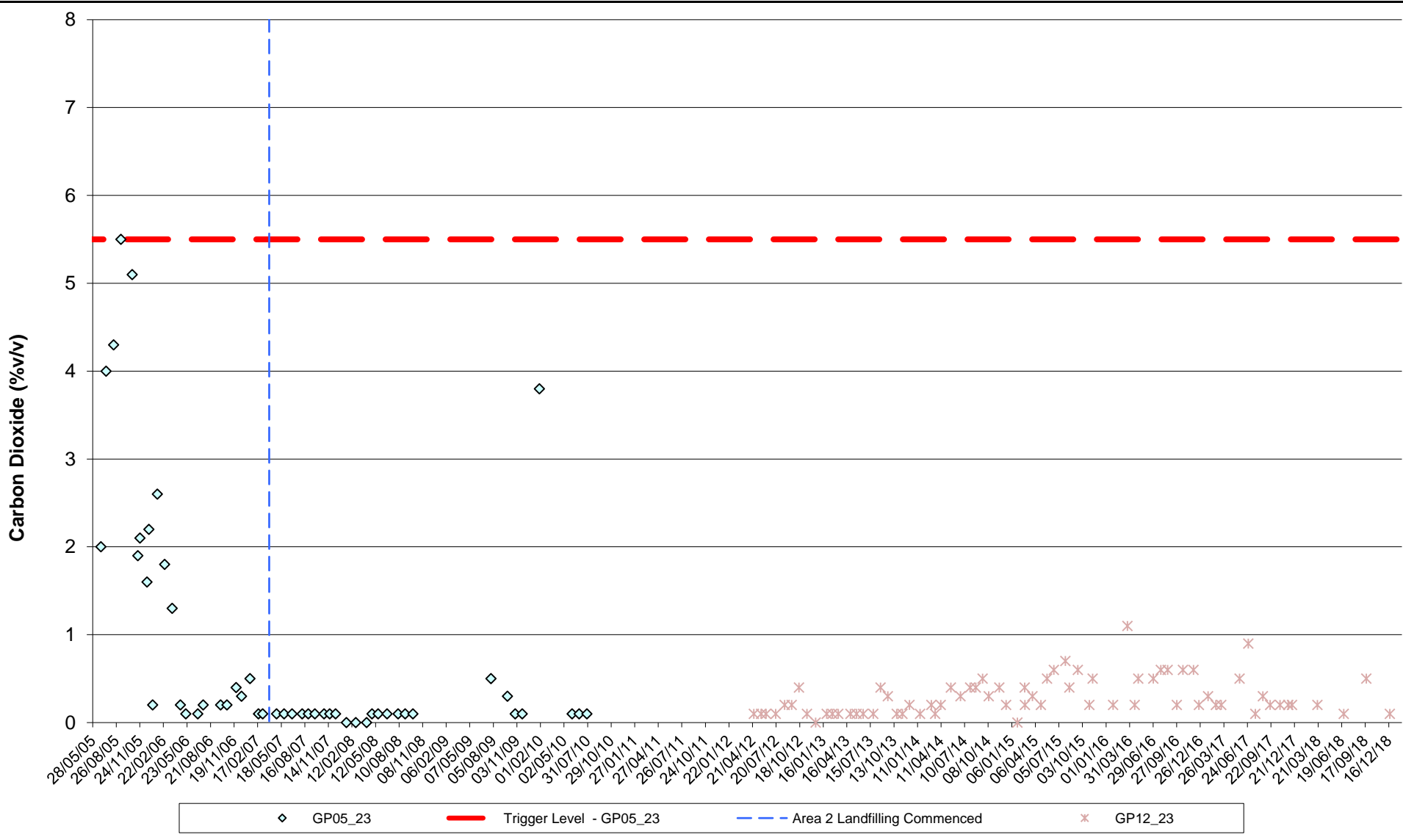
**Docksway Disposal Site**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

**Recorded Carbon Dioxide Concentrations in GP05\_22**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

**Appendix**  
4-14



Client  
**Newport City Council**

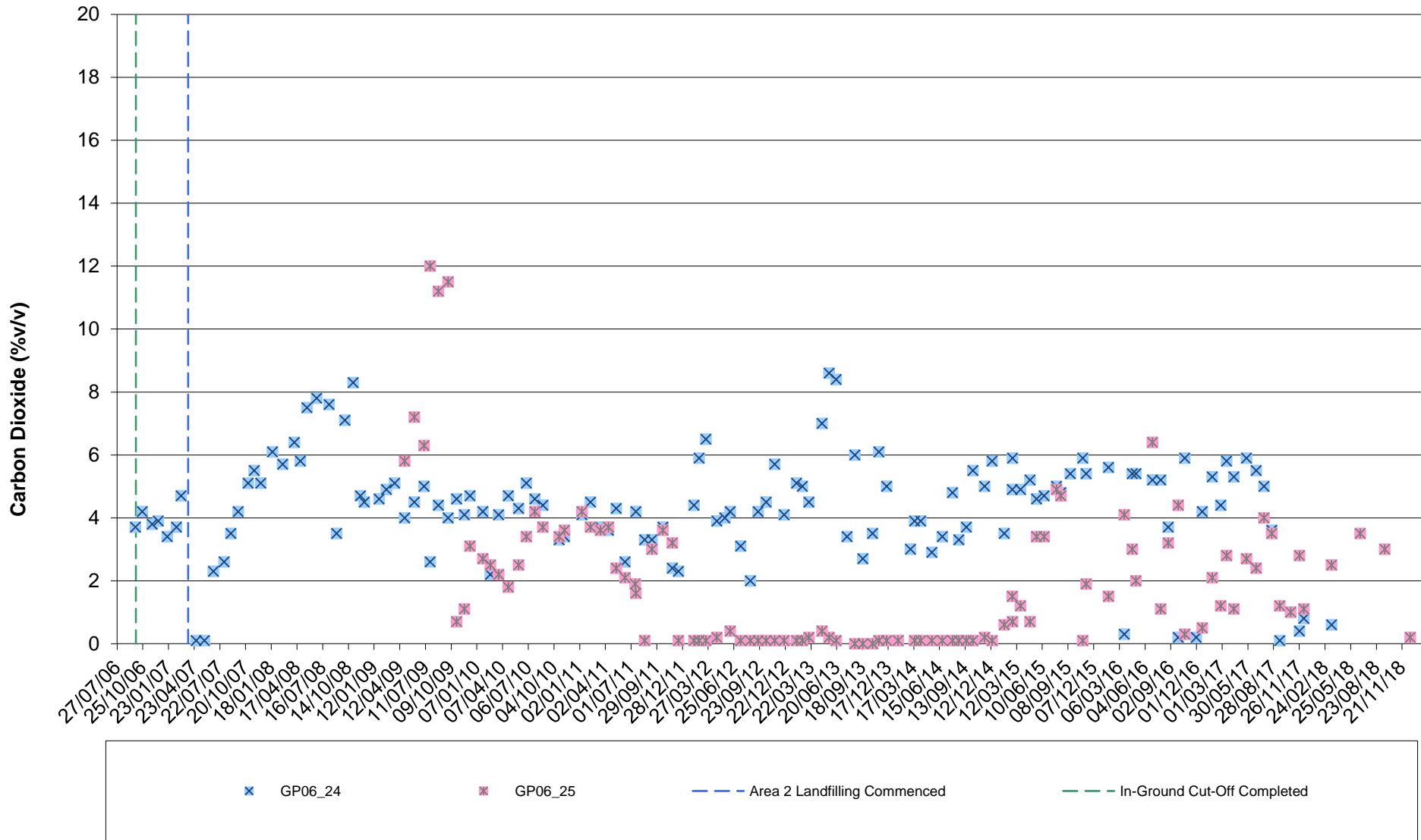
**Docksway Disposal Site**

**Recorded Carbon Dioxide Concentrations in GP05\_23 and GP12\_23**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix  
**4-15**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499



Client  
**Newport City Council**

Caversham Bridge House, Waterman Place, Reading, RG1 8DN  
 Tel 0118 950 0761 Fax 0118 959 7499

**Docksway Disposal Site**

**Recorded Carbon Dioxide Concentrations for GP06\_24 and GP06\_25**

Date	January 2019
A4 Scale	nts
Drawn	NC
Checked	VKR

Appendix  
**4-16**

## Appendix 5    Infnis Annual Report



Business Management System

Document No.:CAS 2.8  
Revision No.:2  
25/01/11

# Annual permit report

Installation	Docksway
Permit reference	LP3135SB
Reporting period	Jan - Dec 2018
Permit Operator	Novera Energy

Author: Kate Phillips

Date: 16/01/2019

Authorised to sign as representative of the Operator

<b>Fugitive Emissions Review</b>		<b>Reporting period:</b>	<b>Jan - Dec 2018</b>
<b>Installation Name:</b>		<b>Docksway Landfill gas utilisation plant</b>	<b>Permit reference</b>
			<b>LP3135SB</b>
<b>Substances Released/Potentially</b>	<b>Description of event and any contamination/decontamination of the site which has occurred</b>		
Landfill gas	Details of any notifiable events have been submitted to NRW in accordance with our notification procedure		
Spillages	No significant spillages, contamination or decontamination to report for this installation		

Raw Materials (& Water) Assessment Table							
Site: Docksway		Reporting period: Jan - Dec 2018			Permit Reference: LP3135SB		

Raw Materials	Application	Current Measures to Ensure Efficiency and Waste Minimisation	Annual Quantity Used	Fate of Material	Environmental Impact Potential	Reason Alternatives are Not Practicable	Details of Process Modifications which Could Result in Savings
Landfill gas	Fuel for engines to produce electricity	Kilowatt generation from volumes processed is maximised through effective operation, maintenance and servicing of plant	Variable depending on site conditions	Combustion	Potentially flammable, explosive, toxic, asphyxiant, ecotoxic, corrosive and odorous, greenhouse gas	N/A - Combustion of landfill gas essential for environmental control	N/A - environmental benefits to be gained from conversion of methane to CO2
Lubricating oils	To ensure efficiency of utilisation plant is maintained in accordance with manufacturer's instructions	Efficient use of lubricating oil is maximised through oil analysis to identify requirement for oil changes	Oil used is continually under review as part of the budgeting process	Reprocessing	Ecotoxic and odorous	Specification determined by engine manufacturer to ensure maximum performance and efficiency	Oil used is specialised for landfill gas fuel as recommended by the OEM. Oil change intervals are based on oil analysis therefore maximising efficiency and minimising use
Water	Coolant for engine block and domestic water supply	Cooling water is recirculated around the engines to maximise efficiency and minimise consumption	No water supply on site.	Treatment	Inert	N/A - Inert therefore best practicable environmental option	Re-use of water for coolant purposes ensures volumes used are as low as reasonably practicable. Cleaning practices assessed and minimal volumes used, cleaning practices are infrequent.
	Hygiene purposes	handwashing and (where available) toilet facilities		where installed toilet waste is removed from site and treated as sewerage	Inert	n/a	n/a
Glycol	Antifreeze for use in coolant water	Glycol is recirculated around the engines to maximise efficiency and minimise consumption	Glycol contained within enclosed-loop system is drained into a container for re-use. OEM* recommends change of glycol every 20,000 hours. Infnis policy is to change following natural depletion or contamination.	Reprocessing	Toxic, ecotoxic	Specification determined by engine manufacturer to ensure maximum performance and efficiency	Antifreeze mix is specific to engine type and pre-determined by the OEM*. Levels are topped-up following natural depletion or contamination
Battery Acid	In batteries used for engine start-up and to provide back-up power to ensure rapid restart following any loss of mains power supply	Battery use is essential minimised to the applications listed (see left)		Recycled	Corrosive	Portable electrical supply required for start-up	Minimal use of battery during start-up only therefore opportunity for savings is insignificant

\*OEM: Original Engine Manufacturer

## Waste Minimisation, Recovery and Disposal Assessment

<b>Installation Name:</b> Docksway Gas Utilisation Plant	<b>Permit Reference:</b> LP3135SB	<b>Reporting period:</b> Jan - Dec 2018
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Waste Stream	Application/Source	Current Measures to Ensure Efficiency and Waste Minimisation	Fate of Material	Reason Alternatives are Not Practicable	Details of Process Modifications which Could Result in Savings
Oil Filters (205ltr Drum)	Engine maintenance	Predetermined by manufacturers' recommendations to ensure efficiency	Reprocessing	Oil and filtration devices predetermined by manufacturers to ensure efficiency	Not applicable: oil filters changed at pre-determined life based on oil analysis and differential pressure
Oil Contaminated Rags & Absorbents (205ltr Drum)	Engine maintenance and housekeeping	Control measures in place to prevent spillage	Reprocessing	As above	No further modifications considered possible: Preventative maintenance and procedural practices minimise spillage and the requirement for oil absorbancy products
Waste Engine Oil (Bulk)	Engine maintenance	Efficient use of lubricating oil is maximised through oil analysis to identify requirement for oil changes	Reprocessing	As above	No further modifications considered possible: Oil used is specific to the landfill gas fuel in use and as recommended by the OEM*. Oil change intervals are based on oil analysis therefore maximising efficiency and minimising use
Batteries	Engine maintenance	Recharged	Recycled	Batteries essential for engine start-up and ensuring rapid restart	Batteries only replaced when they no longer hold a charge. Maintenance practices are in place to lengthen battery life
Fluorescent Tubes	Lighting	Replacement when faulty or damaged	Reprocessing	Alternatives not considered practicable due to warm-up time of energy saving bulbs	Tubes are only replaced when they have expired
General Waste	Packaging	Waste streams which can be reprocessed or recycled are identified and segregation facilities provided where appropriate	Disposal	Materials not segregated/ reprocessed are produced in small quantities only making alternatives not viable	Not applicable as a result of small quantities only being produced
Waste water/effluent	Welfare facilities	Facilities are maintained to ensure minimal water usage	Road tanker to treatment plant	Connection to mains sewer not practical - quantities produced are small.	Not applicable as a result of small quantities only being produced

\*Original Engine Manufacturer

### Annual Reporting of Other Performance Indicators

<b>Installation:</b>	Docksway Landfill Gas Utilisation Plant	<b>Permit Reference:</b> LP3135SB
<b>Parameter</b>	<b>Jan - Dec 2018</b>	<b>Units</b>
Flare operation hours	778	hrs
Gas engine downtime hours	773	hrs*
Gas engine operation hours	7987	hrs
Volume of landfill gas combusted	342,557	m3 (treated by flare)
	3,516,712	m3 (treated by engines)
	3,859,269	m3 (total treated by engines & flare)

#### Operator's Comments:

Please contact permit-compliance@infinis.com for any queries regarding the above

### Reporting of Performance Indicators (Form Ref: PI1)

<b>Installation:</b>	Docksway Landfill Gas Utilisation Plant	<b>Permit Reference:</b> LP3135SB
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#### Annual Production/Treatment (MWh)

<b>Total production of energy</b>	5938
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### Environmental Performance Indicators

Parameter	Annual Average Jan - Dec 2018	Units	Trends in Environmental Performance	
			2016	2017
Total oxides of nitrogen (expressed as NO2) emission	2.1	Kg/MWh	2.0	1.2
Total carbon monoxide emission	4.6	Kg/MWh	4.4	4.1
Total engine downtime (downtime hrs/available operation time in hrs)	8.8	%	7.7	8.8

Reporting period	Energy Imported (Primary Energy Usage) (MWh)	Parasitics (MWh)	Energy Exported (MWh)	Energy Used on Site (MWh)	Site Efficiency
Jan - Dec 2017	12	269	5669	281	33.0

\*site efficiency has been calculated as follows: ((Engine efficiency (%) x (gas to generation/total gas) x (power export / (power generation + imported power))).

<b>Installation:</b>	Docksway Landfill Gas Utilisation Plant	<b>Permit Reference:</b>	LP3135SB
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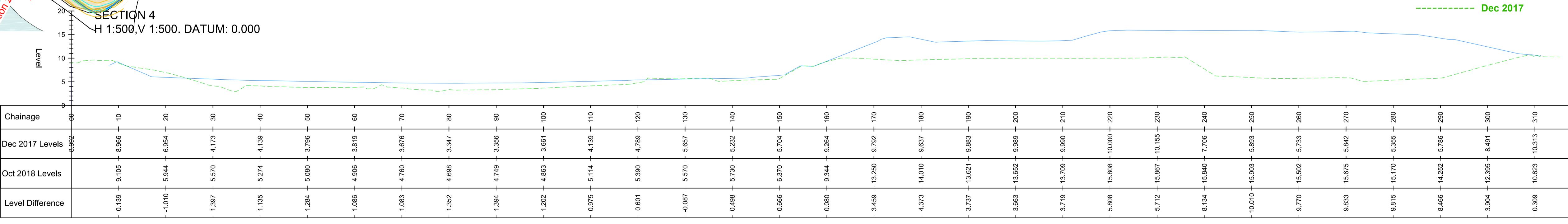
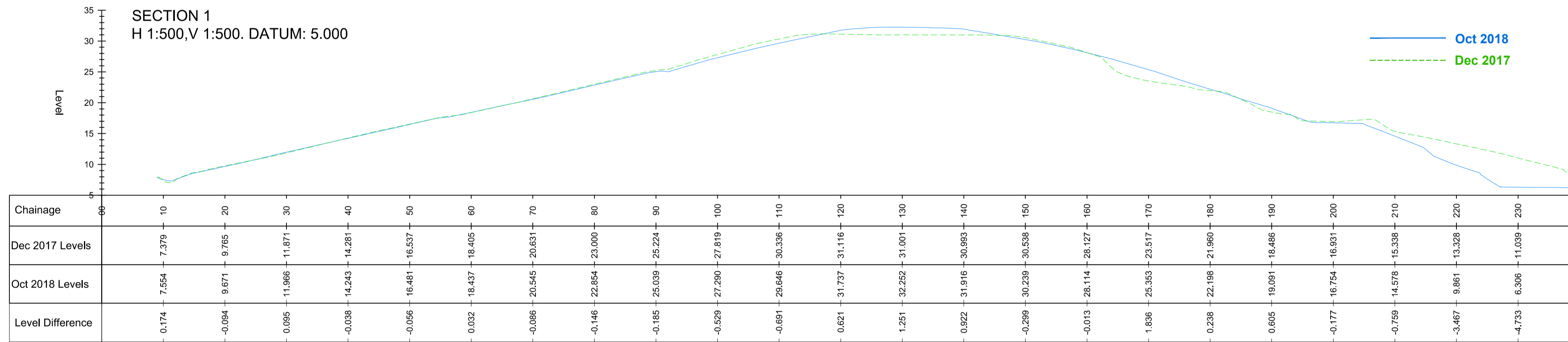
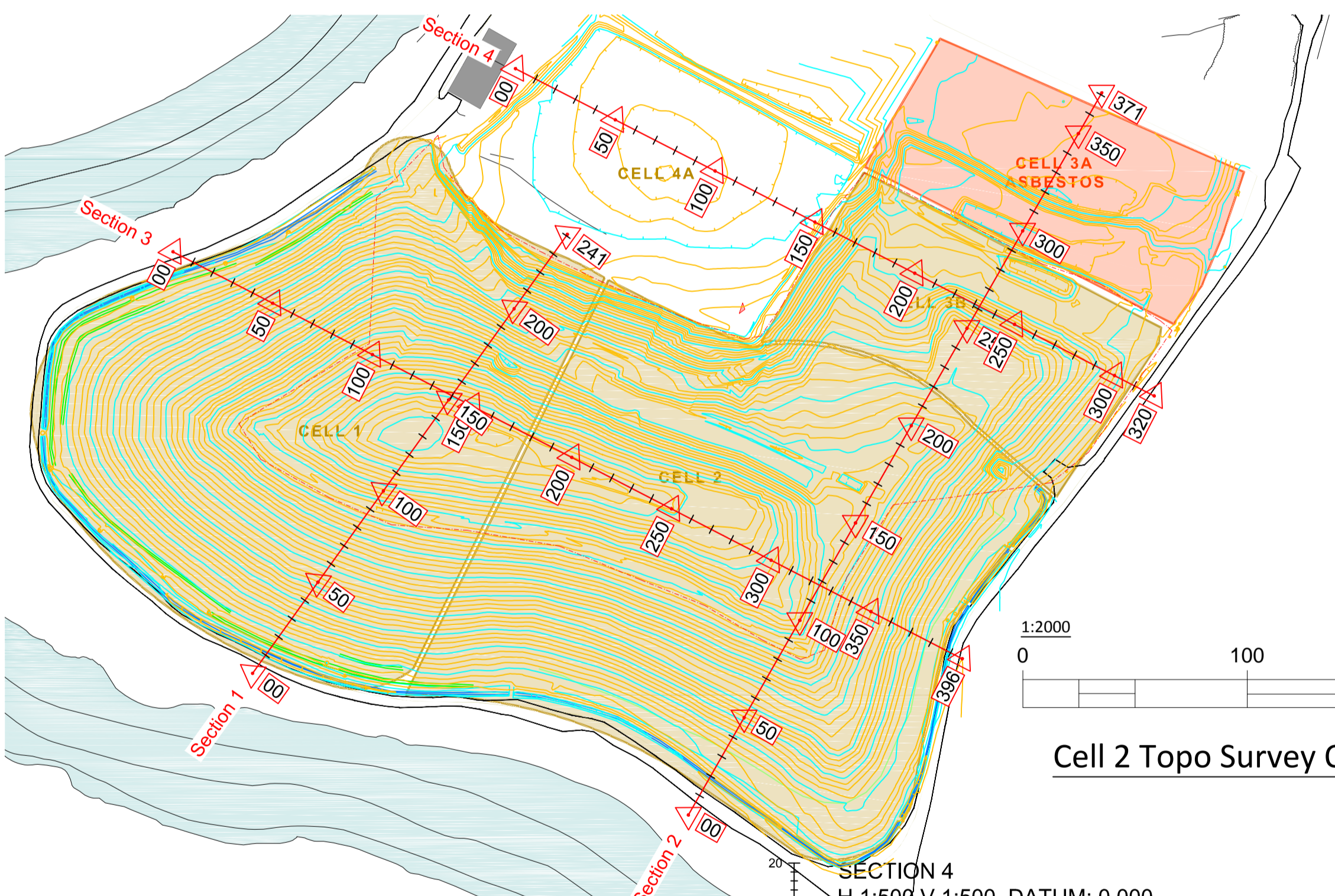
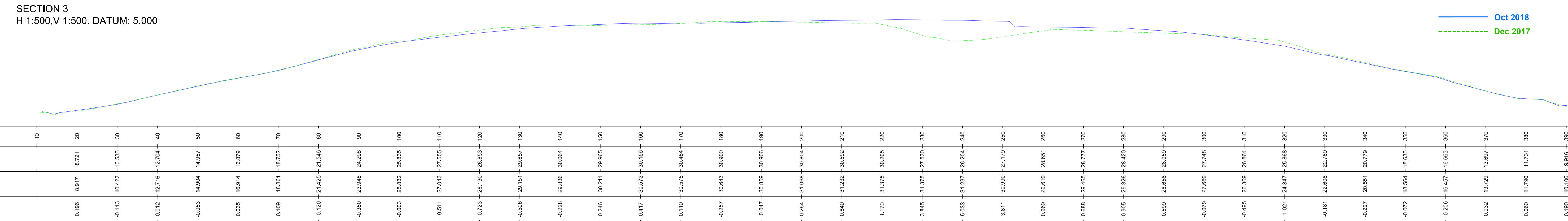
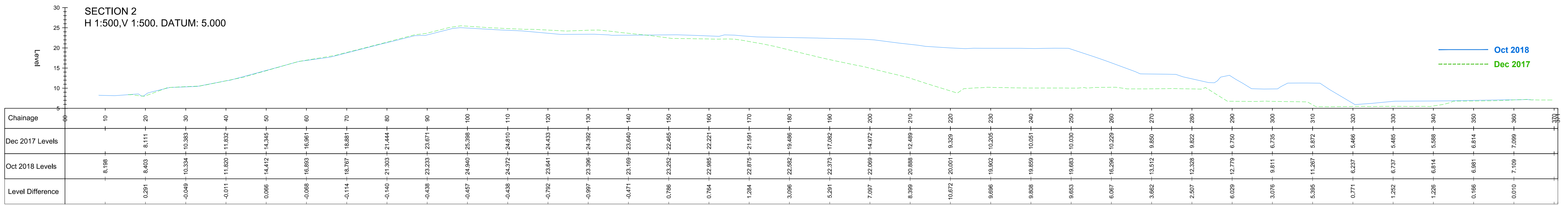
<b>Accident Management Plan Review</b>	<b>Jan - Dec 2018</b>
<b>Date of next review</b>	
Reviewed monthly following a review of notifiable events	

Permit requires that the accident management plan is reviewed at least every 2 years, or as soon as practicable after an accident (whichever is the earlier).

<b>Operator's comments:</b>
No accidents occurred during this period which would require amendment to the Accident Management Plan for this installation.

<b>Installation:</b> Docksway Landfill Gas Utilisation Plant	<b>Permit Reference:</b> LP3135SB
<b>Emissions to Air Reporting</b> Jan - Dec 2018	
<b>Report Submission Date</b>	04-Jun-18
<b>Submitted to</b>	David Willey

## **Appendix 6      Drawing No. 1476/Ph2/AEPR**



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**Docksway Waste Disposal Site**  
Waste Volume Summary 2018

Period	Input Volume (m <sup>3</sup> )	Cumulative Volume (m <sup>3</sup> )
Up to Jan 2017		914771
Dec 2018 - Oct 2018	90497	1005268
<b>Total Waste Deposited 2018</b>		<b>90497</b>

**Docksway Waste Disposal Site**  
Cell 3A Volume Summary (Asbestos)

Period	Input Volume (m <sup>3</sup> )	Cumulative Volume (m <sup>3</sup> )
Up to and including 2017	13426	
Dec 2017 - Oct 2018	17717	31143

Rev	Details	Dr	Ch	Ap	Date

**Streetscene**  
Andrew Morris CEng, MICE  
Head of Streetscene  
Newport City Council  
Civic Centre, Newport  
South Wales, NP20 4UR.  
Telephone: 01633 656656  
Email: streetscene@newport.gov.uk



Project  
Docksway Waste Disposal Site  
Cells 1 & 2 & 3 TOPO Survey Oct 2018  
(Ph2 Waste Levels Dec 2017 - Oct 2018)

File No. JNA1476	Status: For Consultation
Drawn By MDH	Checked By
Date Jan 19	Date
Approved By	Date
Scales 1:2000	
Drawing No. 1476 / Ph2 / AEPR 2018	