



Docksway Disposal Site

Annual Environmental Review for Area 2 - 2022

On behalf of **Newport City Council**



Project Ref: 332510236/3510 | Rev: 00 | Date: February 2023

Registered Office: Buckingham Court Kingsmead Business Park, London Road, High Wycombe, Buckinghamshire, HP11 1JU
Office Address: Caversham Bridge House, Waterman Place, Reading, Berkshire RG1 8DN
T: +44 (0)118 950 0761 E: Reading.uk@stantec.com

Document Control Sheet

Project Name: Docksway Disposal Site

Project Ref: 332510236/3510

Report Title: Annual Environmental Review for Area 2 - 2022

Doc Ref: 332510236/3510/AEPR/AREA2/2022/Rev0

Date: February 2023

| | Name | Position | Signature | Date |
|--|---------------|------------------|-----------|----------|
| Prepared by: | Natasha Caton | Senior Engineer | NC | 28/02/23 |
| Reviewed by: | Kate Riley | Senior Associate | VKR | 28/02/23 |
| Approved by: | Kate Riley | Senior Associate | VKR | 28/02/23 |
| For and on behalf of Stantec UK Limited | | | | |

| Revision | Date | Description | Prepared | Reviewed | Approved |
|----------|--------|-------------|----------|----------|----------|
| 00 | Feb 23 | Issue | NC | VKR | VKR |
| | | | | | |

This report has been prepared by Stantec UK Limited ('Stantec') on behalf of its client to whom this report is addressed ('Client') in connection with the project described in this report and takes into account the Client's particular instructions and requirements. This report was prepared in accordance with the professional services appointment under which Stantec was appointed by its Client. This report is not intended for and should not be relied on by any third party (i.e. parties other than the Client). Stantec accepts no duty or responsibility (including in negligence) to any party other than the Client and disclaims all liability of any nature whatsoever to any such party in respect of this report.

Contents

| | | |
|-----------|---|-----------|
| 1 | Introduction | 1 |
| 1.1 | Background | 1 |
| 1.2 | Scope | 1 |
| 1.3 | Related Work..... | 1 |
| 2 | Surface Water Quality Monitoring | 2 |
| 2.1 | Current Monitoring Programme | 2 |
| 2.2 | Surface Water Hydrochemistry over the Preceding 12 Months | 2 |
| 2.3 | Review of Potential Risks and Further Monitoring | 6 |
| 3 | Groundwater Quality Monitoring | 7 |
| 3.1 | Monitoring Programme | 7 |
| 3.2 | Monitoring Locations and Compliance Levels..... | 7 |
| 3.3 | Groundwater Quality..... | 9 |
| 3.4 | Review of Potential Risks and Future Monitoring | 10 |
| 4 | Leachate Monitoring | 11 |
| 4.1 | Leachate Control Measures and Management System | 11 |
| 4.2 | Leachate Chemistry..... | 11 |
| 5 | External Landfill Gas Monitoring | 14 |
| 5.1 | Gas Monitoring Locations..... | 14 |
| 5.2 | Monitoring Requirements and Trigger Levels | 14 |
| 5.3 | External Landfill Gas Monitoring | 15 |
| 5.4 | Review of Risks and Future Monitoring..... | 16 |
| 6 | Landfill Gas Generation and Usage | 17 |
| 6.1 | Landfill Gas Utilisation Plant..... | 17 |
| 6.2 | Landfill Gas Extraction | 17 |
| 6.3 | Monitoring of Extracted Gas..... | 17 |
| 7 | Annual Production/Treatment and Performance Parameters | 18 |
| 7.1 | Annual Production/Treatment..... | 18 |
| 7.2 | Performance Parameters | 18 |
| 9 | References | 21 |
| 10 | Essential Guidance for Report Readers | 22 |

Figures

- Figure 1 Site Location Plan
Figure 2 Monitoring Point Location Plan

Tables

| | |
|---|----|
| Table 2-1 Details of Surface Water Locations Monitored during 2022 | 2 |
| Table 3-1 Groundwater Monitoring Well Locations | 7 |
| Table 3-2 Area 2 Groundwater Compliance Limits for Emissions to Groundwater..... | 8 |
| Table 4-1 Leachate Measurements at Cells 1,2,3 and 4 | 11 |
| Table 5-1 Area 2 Landfill Gas Monitoring Boreholes | 14 |
| Table 5-2 Gas Monitoring Borehole Specific Trigger Levels for Area 2..... | 15 |
| Table 7-1 Annual Production/Treatment Report by NCC and Infinis (Landfill Gas)..... | 18 |
| Table 7-2 Performance Parameters | 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 | NCC Topographical Survey and Cross Sections |

This page is intentionally blank

1 Introduction

1.1 Background

- 1.1.1 Docksway Disposal Site is located approximately 3km south of Newport city centre 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**.
- 1.1.2 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 Environmental Permit No. DP3733BK, Variation Number V005 (Jan 2022).
- 1.1.3 It is a requirement of the Environmental 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

- 1.2.1 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 2022 to December 2022. The data review and analysis are 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.
- 1.2.2 Guidance for readers of this report is given in **Section 10** of this report.

1.3 Related Work

- 1.3.1 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 in graphed format within this report as a series of Appendices for ease of reference.

2 Surface Water Quality Monitoring

2.1 Current Monitoring Programme

- 2.1.1 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 continues in accordance with the Environmental Permit for Area 2 (EPR/DP3733BK).
- 2.1.2 Since commencement of the monitoring, NCC has undertaken monthly surface water monitoring and has reported these results to NRW generally 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) are presented in the Monitoring Plan for Area 1, (PBA, 2011)^[1], in relation to surface water, and also the Monitoring Plan for Area 2: Landfill Extension, (PBA, 2005)^[2].
- 2.1.3 Sampling locations SW_25 and SW_26 are the subject of individual discharge consents and will continue to be monitored and assessed in accordance with those consents, whilst all other locations will continue to be monitored and assessed in accordance with the Environmental Permit.
- 2.1.4 It should be noted that sampling point C3_Asb was established at the start of 2017 and is specific to Cell 3a.
- 2.1.5 A total of six 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 2022

| Position Monitored | Location |
|--------------------|--|
| SW_1A | Ebbw Upstream |
| 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 |

Note: SW02 and SW07 were not sampled during 2022 due to unsafe access and SW11 was not sampled as there is no requirement.

2.2 Surface Water Hydrochemistry over the Preceding 12 Months

Compliance Limits

- 2.2.1 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 within the consents.

2.2.2 Sampling location C3_Asb has compliance limit values which are set out in the Environmental Permit (EPR/DP3733BK).

2.2.3 Notwithstanding the surface water discharge consents, surface water compliance limits are not generally required by NRW for the site as part of the Environmental Permit, and consequently none have been set, except for surface water sampling point C3_Asb. Therefore, comments on the surface water hydrochemistry with respect to compliance limits are only presented in this report where applicable. The data and any temporal trends in the data are presented and commented upon for those positions without compliance limits.

SW_25

2.2.4 In the last 12 months, SW_25 has been sampled four times (January, February, March and November 2022) and was recorded as dry on each of the other monthly monitoring visits.

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

- On all the occasions that SW_25 was sampled in 2022 the concentration of Ammoniacal Nitrogen was below the discharge consent limit of 30mg/l, and adverse trends have not been identified in the longer-term data.
- The discharge consent limit of 40mg/l for Biological Oxygen Demand (BOD) was not exceeded during 2022 for SW_25, and the longer-term data does not indicate any developing adverse trends.
- The samples from SW_25 recorded pH values between 7.9 and 8.3 in 2022, which is within the acceptable range of between 6 and 9 set in the discharge consent and is similar to previously recorded pH values.
- The concentration of Total Suspended Solids (TSS) was recorded below the discharge consent limit of 60mg/l during all samples taken in 2022. The concentrations are similar to those previously seen at this monitoring location and adverse trends have not been identified in the longer-term data.
- There is no limit value for Chloride in the discharge consent for SW_25, however concentrations in 2021 appeared to indicate a slowly increasing trend. The Chloride concentrations recorded in the four monitoring rounds in 2022 have been variable ranging from 64.4mg/l to 274mg/l which is the highest concentration recorded since 2009.

2.2.6 There is currently no evidence to suggest that there are any detrimental temporal trends with regard to surface water quality at this location with reference to the parameters tested. The concentrations of Chloride recorded, have been higher in the last two years than the previous twenty years, and this will continue to be monitored throughout 2023.

SW_26

2.2.7 Surface water monitoring point SW_26 was included in the monitoring programme for Area 1 at the start of 2013. In the last 12 months, SW_26 has been sampled three times (February, March and November 2022) and was recorded as dry on each of the other monthly monitoring visits.

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

- There is no limit value for Ammoniacal Nitrogen in the discharge consent for SW_26. However, concentrations recorded in 2022 have generally been slightly higher than

those recorded in 2021 but are similar to those seen in previous years with no significant adverse trends being identified.

- The results of the TSS testing undertaken on the samples obtained from SW_26 during 2022 recorded concentrations between the method detection limit (MDL) of <2mg/l, and 33.2mg/l which are all below the discharge consent limit of 60mg/l.
- During 2022, the pH values recorded at SW_26 were within the acceptable range of between 6 and 9, in accordance with the discharge consent.

2.2.9 There is currently no indication that there are any detrimental temporal trends with regard to surface water quality at this location with reference to the parameters tested and data reviewed.

C3_Asb

2.2.10 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.

2.2.11 During 2022, samples were taken from this location on twelve occasions and submitted to the laboratory for identification of the presence of asbestos fibres and other hydrochemistry parameters. The laboratory did not identify the presence of asbestos fibres on any of the twelve samples they received from C3_Asb. The hydrochemistry parameters are commented on below alongside other testing locations.

Commentary on Other Surface Water Monitoring Locations

Ammoniacal Nitrogen

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

2.2.13 SW_1A was sampled on twelve occasions during 2022. Concentrations of Ammoniacal Nitrogen in SW_1A have been recorded below the MDL (0.2mg/l) in the last 12 months with one exception in September when a concentration slightly above the MDL of 0.252 mg/l was recorded. This is consistent with the longer-term dataset.

2.2.14 SW_23 was sampled ten times during 2022 and the Ammoniacal Nitrogen concentrations have shown a generally steady increase across 2022 from 7.05mg/l in February peaking at 158mg/l in September, which is the highest concentration recorded since 2006. The October monitoring did however show a significant decrease in the recorded concentration, to 18.8mg/l.

2.2.15 Ammoniacal Nitrogen within C3_ASB was recorded on twelve occasions with concentrations generally below 2mg/l and within the range of the concentrations previously detected at this location. The exception to this was the December monitoring round where a concentration of 8.23mg/l was identified; however, this is still within the range of the overall data set.

2.2.16 The remaining surface water monitoring location, SW_24, shows a generally uniform trend since commencement of monitoring, with concentrations predominantly below 1mg/l. The concentrations of Ammoniacal Nitrogen recorded in the twelve samples obtained from SW_24 in 2022 were generally below the limit of detection (<0.2mg/l) with the exception of the samples taken in July and September which returned concentrations of 0.323mg/l and 0.247mg/l respectively.

Biochemical and Chemical Oxygen Demand

- 2.2.17 **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.
- 2.2.18 The majority of locations appear to be displaying a generally uniform trend in BOD concentrations with the majority of results recorded at concentrations below 10mg/l. The exception is SW_23 in September where a concentration of 12.1mg/l was recorded.
- 2.2.19 In general, COD concentrations appear to be relatively consistent at all monitoring locations during 2022 with results generally below 150mg/l. The exception to this is SW_23 where a COD concentration of 408mg/l was recorded in September, although the concentration had significantly reduced by the subsequent monitoring round.

Chloride

- 2.2.20 **Appendix 1-4** presents the 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 and in the longer term, with concentrations at most locations predominantly below 100mg/l.
- 2.2.21 The exceptions to this are SW_1A where a concentration of 1960mg/l was recorded in September, however the recorded concentrations had reduced significantly in the next monitoring rounds. Concentrations of Chloride continued to fluctuate from month to month in SW_23 during 2022 (from about 48.2mg/l up to 2610mg/l). These concentrations are within the overall dataset but generally higher than recent years.
- 2.2.22 Concentrations of Chloride at C3_Asb have also continued to fluctuate in 2022 between 249mg/l and 353mg/l, and the long-term data is showing a generally increasing trend in Chloride concentration at this location.

pH

- 2.2.23 **Appendix 1-5** presents the results of pH monitoring of surface water since 2003 at each of the current 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 10 years.

Electrical Conductivity

- 2.2.24 **Appendix 1-6** presents Electrical Conductivity (EC) readings in each of the surface water monitoring locations since 2003. The data indicates a generally stable trend of Electrical Conductivity, with readings generally below 5mS/cm at all monitoring locations in the last 12 months. The exceptions to this are at SW_1A with a reading of 5.9mS/cm in September and at SW_23 where readings were above 5mS/cm from July to September ranging from 6.73mS/cm to 7.38mS/cm. However, these are within the range of the overall datasets.

Total Suspended Solids

- 2.2.25 **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 any developing trends for TSS.

Dissolved Oxygen

- 2.2.26 **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 12mg/l, and this is consistent with the overall dataset with no indication of developing trends.

2.3 Review of Potential Risks and Further Monitoring

- 2.3.1 The environmental data obtained for January to December 2022 for surface water locations does not indicate any significant adverse trends developing in surface water quality, with reference to the parameters tested, 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 – 2021 ^[4].
- 2.3.2 The data does indicate some variability in the recorded concentrations of Chloride particularly over the last couple of years where increasingly higher concentrations have been recorded. However, the concentrations recorded in this period are within the overall dataset and are not currently considered to be indicative of a significant decrease in surface water quality.
- 2.3.3 In the surface water dataset for 2022, there is some indication that an unspecified event has affected the water quality at SW23 in September 2022. However, subsequent data indicates that this was a short-term event that did not continue into subsequent monitoring rounds.

3 Groundwater Quality Monitoring

3.1 Monitoring Programme

- 3.1.1 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.
- 3.1.2 Details of the monitoring methodology and protocols for the site (including the frequency of testing and the range of chemical testing suites used) are presented in the Monitoring Plan for Area 2: Landfill Extension, (PBA, 2005) ^[2].
- 3.1.3 The locations of the boreholes used in the current monitoring and sampling programme are indicated on **Figure 2**.
- 3.1.4 Interim groundwater quality reports have previously been provided to NRW on a quarterly basis (in accordance with the Environmental Permit Conditions 3.6.1 and 3.6.2).

3.2 Monitoring Locations and Compliance Levels

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

Table 3-1 Groundwater Monitoring Well Locations

| Monitoring Well | 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 |

- 3.2.2 The current control levels and compliance limits for Area 2 groundwater monitoring wells are reproduced in Table 3.2. It is noted that in relation to Benzene, Naphthalene, Xylene and Arsenic, only compliance limits have been set (in accordance with EA guidance), with other determinands having both control levels and compliance levels set.

Table 3-2 Area 2 Groundwater Compliance Limits for Emissions to Groundwater

| Monitoring Well | Benzene | Naphthalene | Xylene | Arsenic |
|-----------------|------------------|------------------|------------------|------------------|
| | Compliance Limit | Compliance Limit | Compliance Limit | Compliance Limit |
| | 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

- 3.3.1 **Appendices 2-1 to 2-5** present the recorded concentrations of Ammoniacal Nitrogen for the Area 2 groundwater monitoring locations.
- 3.3.2 Ammoniacal Nitrogen concentrations in the majority of monitoring wells have been relatively consistent in the last 12 months and also in the longer term and there have generally been no exceedances of the compliance limits for Ammoniacal Nitrogen in 2022. The limited exceptions to this are described below.
- 3.3.3 The first exception is at GW12_33 which has previously shown variable concentrations in 2021. Although concentrations recorded in the first two monitoring rounds in 2022 were below the compliance limits, the September and December concentrations of 19.7mg/l and 35.6mg/l respectively, are both above the Compliance Limit (18mg/l). However, the concentrations recorded as exceedances are lower than the concentrations recorded during the summer in 2021 at this location.
- 3.3.4 At GW06_37, the concentrations of Ammoniacal Nitrogen recorded in 2022 have all exceeded the compliance limits and are similar to concentrations recorded in 2019 and 2020 when a trend of increasing concentrations had been emerging. The concentrations recorded in 2021 at this location were all below the compliance limits.
- 3.3.5 All other monitoring locations remained below the compliance limits throughout the monitoring period with no indication of adverse trends developing.

Arsenic

- 3.3.6 **Appendices 2-6 to 2-15** present the recorded Arsenic concentrations for the current Area 2 groundwater monitoring locations. Arsenic concentrations were generally below the Compliance Limits during 2022 with no distinct adverse trends developing. The exception to this was GW06_37 where concentrations have been slowly increasing over 2022, and in December 2022 the concentration was recorded at 61.7ug/l, marginally above the Compliance Limit of 60ug/l. However, this is within the range of the overall dataset.

Benzene, Naphthalene and o-Xylene

- 3.3.7 **Appendices 2-16 to 2-23** present the results of Benzene, Naphthalene and o-Xylene concentrations.
- 3.3.8 Benzene, Naphthalene and o-Xylene 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 MDL.
- 3.3.9 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

- 3.3.10 **Appendices 2-24 and 2-25** present the results of Extractable Petroleum Hydrocarbons (EPH) concentrations. Concentrations of EPH have generally been recorded below 500µg/l in all of the monitoring wells in Area 2 during 2022.
- 3.3.11 The exceptions to this were:

- GW12_33 on one monitoring occasion with a concentration of 674ug/l (December).
- GW03_09 on one monitoring occasion with a concentration of 696ug/l (September).
- GW07_40 on one monitoring occasion with a concentration of 1040ug/l (September).
- GW09_32 on one monitoring occasion with a concentration of 816ug/l (September).
- GW06_34 on one monitoring occasion with a concentration of 3070ug/l (December) and this is the highest concentration ever recorded at this location.

3.3.12 There are, however, no compliance limits for EPH, and the concentrations are generally within the range of the overall data sets.

Nickel and Potassium

3.3.13 **Appendices 2-26 to 2-37** present the results of Nickel and Potassium concentrations in the monitoring wells.

3.3.14 Nickel and Potassium concentrations at the majority of the compliance wells have generally remained consistent throughout the 12-month monitoring period, with no recorded Compliance Limit exceedances.

3.3.15 The exceptions to this were Nickel at GW09_31 and Potassium in GW06_14A. GW09_31 recorded a Nickel concentration of 10.5µg/l in June 2022, which marginally exceeds the compliance limit of 10µg/l. During the following monitoring rounds the Nickel concentration recorded in GW09_31 returned below the Compliance Limits. GW06_14A recorded Potassium concentrations exceeding the Compliance Limit of 180mg/l on one monitoring occasion (September) with a concentration of 199mg/l, which is the highest concentration ever encountered at this location. During the following monitoring rounds the Potassium concentration returned below the Compliance limits.

3.4 Review of Potential Risks and Future Monitoring

3.4.1 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 - 2021^[4].

3.4.2 During 2022, 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. There is an indication of a rising trend in Ammoniacal Nitrogen concentrations in GW06_37 and this will be reviewed during 2023.

4 Leachate Monitoring

4.1 Leachate Control Measures and Management System

4.1.1 In accordance with Condition 2.7.1 of the Environmental Permit, leachate levels should be recorded monthly. However, there have been occasions when access to the monitoring locations has not been possible. As such, for this period of reporting, leachate levels have been monitored at five locations in Cell 1, two locations in Cell 2, two locations in Cell 3, and two locations within Cell 4. Leachate samples have been recovered for analytical testing (similarly when access permits) on a quarterly basis at LF08_07 located within Cell 1, C2C within Cell 2, C3B within Cell 3 and C4B within Cell 4.

4.1.2 Leachate generated in Area 2 is pumped directly to tankers and removed off site for disposal.

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

| Monitoring Round in 2021 | Leachate Head Level above base of cell (m) | | | | | | | | | | | |
|--------------------------|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | 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) | C3A (Cell 3) | C3B (Cell 3) | C4B (Cell 4) | C4A (Cell 4) |
| January | 1.61 | n/a | 1.62 | 1.53 | 1.25 | 2.00 | n/a | 3.58 | 1.18 | 3.00 | 1.50 | 2.00 |
| February | 0.66 | n/a | 1.45 | 1.59 | 0.35 | 1.56 | n/a | 3.16 | 0.53 | 3.02 | 2.46 | 3.06 |
| March | 1.17 | n/a | 1.66 | 1.88 | 1.33 | 1.94 | n/a | 3.50 | 0.74 | 3.15 | 2.39 | 3.16 |
| April | 1.79 | n/a | 1.41 | 1.58 | 1.47 | 2.77 | n/a | 3.37 | 0.96 | 3.59 | 2.35 | 3.68 |
| May | 1.97 | 2.79 | 1.56 | 1.42 | 1.74 | 3.08 | n/a | 3.08 | 0.37 | 3.00 | 1.73 | n/a |
| June | 2.25 | 3.37 | 1.38 | 1.52 | 1.94 | 1.98 | n/a | 2.26 | n/a | 1.96 | 1.20 | 2.64 |
| July | 1.57 | 3.63 | 1.38 | 1.28 | 1.27 | 2.12 | n/a | 3.55 | n/a | 2.55 | 0.93 | 2.65 |
| August | 1.81 | 3.44 | 1.50 | 1.26 | 1.49 | 2.30 | n/a | 2.41 | n/a | 2.82 | n/a | 2.90 |
| September | 1.99 | 3.51 | 1.60 | n/a | 1.71 | 2.54 | n/a | 3.01 | n/a | n/a | 1.14 | 2.86 |
| October | 2.19 | 4.31 | 1.70 | n/a | 1.88 | 2.20 | n/a | 3.91 | 1.90 | 3.63 | 1.12 | 2.95 |
| November | 2.37 | 3.50 | 1.97 | n/a | 2.06 | 2.69 | n/a | 3.74 | 2.83 | 3.95 | 1.69 | 3.07 |
| December | 2.37 | 3.21 | 1.92 | n/a | 1.98 | 2.34 | n/a | 3.52 | 1.95 | 3.90 | 1.32 | 2.58 |

Leachate removed from Area 2 during 2022 = 18,044,920kg

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

N/A indicates the location was not accessible

4.2 Leachate Chemistry

4.2.1 The frequency of leachate sampling required by the Environmental Permit is quarterly. In 2022, samples were obtained from Cell 1, Cell 2, Cell 3 and Cell 4 on four occasions (March, June, September and December). Throughout the whole monitoring period, samples were taken from C2C rather than C2B within Cell 2 as C2B could not be sampled due to a possible obstruction/defect.

Ammoniacal Nitrogen

4.2.2 **Appendix 3-1** presents the results of Ammoniacal Nitrogen concentrations. The Ammoniacal Nitrogen concentrations recorded in Area 2 leachate during 2022 are as follows:

- Cell 1 between 556mg/l and 724mg/l.
- Cell 2 between 1630mg/l and 1740mg/l.
- Cell 3 between 267mg/l and 1100mg/l.
- Cell 4 between 268mg/l and 613mg/l.

4.2.3 The results for each cell do not appear to show any distinct trend, although there are limited datasets for Cells 3B and 4 due to them being relatively new cells.

Arsenic

4.2.4 **Appendix 3-2** presents the results of Arsenic concentrations over time in leachate in Area 2, and the concentrations recorded in 2022 are as follows:

- Cell 1 between 17.3ug/l and 20.8ug/l.
- Cell 2 between 23ug/l and 32.9ug/l.
- Cell 3 between 2.28ug/l and 33.4ug/l
- Cell 4 between 6.59ug/l and 174ug/l

4.2.5 The results for Cells 1 and 2 are within the range of the overall datasets for these locations. The datasets for Cells 3 and 4 are limited, however the results for Cell 4 indicate a single elevated concentration of Arsenic in December compared to previous monitoring. During 2020 and 2021 there was an increasing trend developing within Cell 3, but this has not continued during 2022 with recorded concentrations significantly lower in 2022 than the previous 2 years.

Benzene

4.2.6 **Appendix 3-3** presents the results of Benzene concentrations in leachate from Area 2 and the concentrations recorded during 2022 are as follows;

- Cell 1, between 4.62ug/l and 5.98ug/l.
- Cell 2, between 2.64ug/l and 8.19ug/l.
- Cell 3, between 2.7ug/l and 3.33ug/l.
- Cell 4, between 1.26ug/l and 2.46ug/l.

4.2.8 The Benzene results for all cells do not appear to indicate any distinct trends.

Naphthalene

4.2.7 **Appendix 3-4** present the results of Naphthalene concentrations in leachate from Area 2.

4.2.8 Naphthalene concentrations in Cell 1 leachate have been recorded below the MDL during all monitoring rounds since 2013.

- 4.2.9 Concentrations of Naphthalene in Cell 2 were recorded between 1.96ug/l and 3560ug/l (September), which is the highest concentration ever recorded at this location and represents a significant spike above 'normal' levels. The concentration returned to normal levels in the following monitoring round, and it is considered that the spike seen during September may be erroneous.
- 4.2.10 Naphthalene concentrations in Cell 3 recorded concentrations between the MDL and 1.27ug/l. The Naphthalene concentrations in Cell 4 were recorded below the MDL during all monitoring rounds.

o-Xylene and EPH

- 4.2.11 **Appendices 3-5 and 3-6** present the results of o-Xylene and EPH concentrations.
- 4.2.12 Concentrations of o-Xylene in Cell 1 leachate have been recorded between 1.21ug/l and 2.21ug/l and in the Cell 2 leachate between 4.42ug/l and 5.93ug/l in 2022, which is within the range of the overall datasets. The concentrations of o-Xylene in C3B were recorded between 4.09ug/l and 5.19ug/l, and between 2.33ug/l and 4.42ug/l in Cell 4 in 2022.
- 4.2.13 Concentrations of EPH in Cell 1 were recorded between 706ug/l and 1060ug/l, and in Cell 2 were recorded between 2260ug/l and 3450ug/l which are within the range of the overall datasets.
- 4.2.14 Concentrations of EPH in Cell 3 were recorded between 915ug/l and 5930ug/l, and in Cell 4 were recorded between 1760ug/l and 2450ug/l.
- 4.2.15 There are no distinct trends of either o-Xylene or EPH in any of the Cells.

Nickel and Potassium

- 4.2.16 **Appendices 3-7 and 3-8** present the results of Nickel and Potassium concentrations since commencement of monitoring.
- 4.2.17 During 2022, Nickel concentrations in Cell 1 were recorded between 70.7ug/l and 93.6ug/l and in Cell 2 were recorded between 142ug/l and 170ug/l. These concentrations are within the overall range of the datasets with no indication of any adverse trends developing. Nickel concentrations within Cell 3 were recorded between 27.6ug/l and 110ug/l, and in Cell 4 were recorded between 46.5ug/l and 146ug/l.
- 4.2.18 The Potassium concentrations recorded in Cell 1 during 2022 were between 274mg/l and 345mg/l, and in Cell 2 were recorded between 738mg/l and 812mg/l. These concentrations are within the range of the overall datasets. Potassium concentrations within Cell 3 were recorded between 94.7mg/l and 404mg/l, and in Cell 4 were recorded between 200mg/l and 356mg/l.
- 4.2.19 There are no distinct trends of either Nickel or Potassium in any of the Cells.

Review of Potential Risks and Future Monitoring

- 4.2.1 The environmental monitoring data for LF08_07, C2C, C3B and C4B indicates that the leachate chemistry has been variable throughout the 12-month monitoring period in all four Cells, although generally the concentrations are within the range of the overall dataset for each of the parameters.
- 4.2.2 The data is not indicative of a significant change in the leachate quality in Area 2 during 2022.
- 4.2.3 The data indicates that during 2022 there have been exceedances of the permitted leachate levels (being greater than 2m above the base) in all Cells in Area 2.

5 External Landfill Gas Monitoring

5.1 Gas Monitoring Locations

5.1.1 There are currently thirteen 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**.

Table 5-1 Area 2 Landfill Gas Monitoring Boreholes

| Gas Monitoring Borehole | 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 | - |
| GP18_18B | 331028 | 184798 | Converted to interceptor well |
| GP18_18C | 331032 | 184795 | Destroyed by site activity in 2021. |
| 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 | - |

5.1.2 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

5.2.1 Landfill gas monitoring has generally been undertaken on a quarterly basis with reports being produced for NRW quarterly in accordance with Condition 3.6.1 (d) of the Environmental Permit.

5.2.2 Trigger Levels for all the Area 2 wells have previously been submitted to and accepted by NRW.

5.2.3 Well-specific trigger levels for landfill gas as set out in the Environmental Permit are presented in Table 5.2 below. There are no trigger levels for carbon dioxide or methane in GP06_25 or for carbon dioxide in GP05_20 and GP05_21 – in accordance with NRW requirements.

Table 5-2 Gas Monitoring Borehole Specific Trigger Levels for Area 2

| Gas Monitoring Borehole | 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_25 | n/a | n/a |

5.3 External Landfill Gas Monitoring

Methane

- 5.3.1 **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.
- 5.3.2 **Appendix 4-1** indicates that the majority of the Area 2 wells did not typically detect Methane above the trigger level of 1% during 2022, with the exceptions of GP05_17 and GP05_05. At GP05_17, Methane was recorded above the 1% trigger level in June, recording a concentration of 2.4%. However, subsequent monitoring at this location recorded the methane concentration below the 1% trigger level. The concentration of methane in GP05_17 has fluctuated since early 2019. At GP05_05 Methane was recorded at a concentration of 1.2% in December.
- 5.3.3 **Appendix 4-2** presents the Methane concentrations in GP06_24 (now destroyed) and GP06_25, constructed on the Area 2 side of the in-ground barrier installed between Area 1 and Area 2.
- 5.3.4 GP06_25 was monitored on four occasions during 2022. The Methane concentrations were recorded between 4.4% and 22.5%, which are within the overall range for the dataset. The methane concentrations at this location have fluctuated significantly since the start of 2012 however, the concentrations recorded in 2022 do not support a previously identified rising trend in methane concentrations at this location.
- 5.3.5 **Appendix 4-3** presents the methane concentrations at GP09_18 and three surrounding monitoring wells GP18_18A, GP18_18B and GP18_18C, however GP18_18B and GP18_18C have been destroyed due to site activity.
- 5.3.6 Following a period of significant variability and significantly elevated concentrations of methane at this location since 2017, the remaining monitoring boreholes are now recording significantly lower and consistent concentrations of methane than compared to the previous 5 years.

- 5.3.7 In 2022, GP09_18 recorded methane concentrations of between about 0.1%v/v and 1%v/v, and GP18_18A recorded methane concentrations of between 0.1%v/v and 0.3%v/v .
- 5.3.8 Treason for the elevated and fluctuating methane concentrations at this location in the previous 5 years are unknown.
- 5.3.9 **Appendix 4-4** indicates that concentrations of Methane in GP05_20 and GP05_21 were generally recorded below the 1.5% trigger level during 2022. The exception to this was in GP05_20 in September when a Methane concentration of 9.5%v/v was recorded, however this is within the range of the overall dataset.

Carbon Dioxide

- 5.3.10 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**.
- 5.3.11 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 level during 2022 and there is no indication of adverse trends developing at this time.

5.4 Review of Risks and Future Monitoring

- 5.4.1 The only monitoring location (excluding destroyed wells) that has consistently recorded significant Methane concentrations is GP06_25, since 2012. This well has however recorded methane concentrations significantly lower in 2022 than previous years and will continue to be monitored by NCC.
- 5.4.2 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 Environmental Permit.

6 Landfill Gas Generation and Usage

6.1 Landfill Gas Utilisation Plant

- 6.1.1 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 1500m³/hr flare. Information from Infinis Energy indicates that the plant capacity was reduced in January 2014, with a 330kW Jenbacher (208) engine removed as a result of a reduction in gas availability at the site.
- 6.1.2 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**.
- 6.1.3 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

- 6.2.1 In 2022, the total production of energy from the Landfill Gas Utilisation Plant was 4038MWh with a site efficiency of 34.5%. In 2021 by comparison, the total production of energy was 3442MWh with a site efficiency of 33.4%. The total energy produced, and efficiency has increased slightly from 2021 to 2022.
- 6.2.2 Engine downtime in 2022 was 405 hours, compared to 431 in 2021 which represents a decrease in engine downtime. Engine operation time in 2022 was 4038 hours which is an increase from the 3442 hours in 2021.
- 6.2.3 The flare operated in 2022 during periods when the engine was not operational. The flare was operating for 277 hours during 2022 based on the availability of the engine, compared to 375 hours in 2021. This is a decrease from 2021.
- 6.2.4 Environmental Performance Indicators, provided by Infinis Energy, indicate that there has been a decrease in Carbon Monoxide emissions in 2022 (4.1kg/MWh) compared to 2021 (13.6kg/MWh), and total Oxides of Nitrogen emissions also decreased in the same period (1.6kg/MWh in 2022, compared to 7.0kg/MWh in 2021).
- 6.2.5 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

- 6.3.1 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.
- 6.3.2 Flare monitoring is only required if the flare is in operation greater than 10% of the time. Infinis have indicated that the flare was not subject to emissions testing in 2022 as the flare did not exceed the 10% trigger level (in the preceding 12-month period).
- 6.3.3 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 Report by NCC and Infinis (Landfill Gas)

| | |
|--|-------------------------------------|
| Leachate: | kg/year |
| Disposed of off-site (Area 2) (kg) | 18,044,920 |
| 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 | 85,622 |
| Combustion in gas engines | 2.582.566 |
| Other methods of gas utilisation | None |

7.2 Performance Parameters

Table 7-2 Performance Parameters

| Parameter | Frequency of Assessment | Annual Total | Unit |
|---|-------------------------|--------------|--------------------|
| Potable Water Use | Annually | 3299 | Cubic metres |
| Energy Used (including for leachate treatment, excluding electricity generated) | Annually | 202,869 | kWh of electricity |
| Non Potable Water Use | Annually | 0 | Cubic metres |

7.3 Topographic Surveys

- 7.3.1 The surface of Area 2 of Docksway Disposal Site was surveyed during January 2023 and the results of the survey are presented in **Appendix 6**.
- 7.3.2 It has been calculated by NCC that 102,046m³ of waste was placed in the non-hazardous Cells in Area 2 (12 month period December 2021 to December 2022), which is an increase from 2021 when 92,557m³ of waste was placed.
- 7.3.3 It has also been calculated by NCC that a total of 14,615m³ of SNRHW was placed in Cell 3A (12 month period December 2021 to December 2022), which is an increase from 2021 when 9,879m³ was placed.
- 7.3.4 As of December 2022, the cumulative waste volume deposited in Area 2 (excluding Cell 3A) was 1,363,925m³, and in Cell 3A was 95,985m³.

- 7.3.5 The maximum elevation of Area 2 was around 31m (Cells 1 and 2) Above Ordnance Datum (mAOD) as of December 2022. The greatest level change was an increase of about 7m in Cell 4B.
- 7.3.6 The cross sections provided indicate that slope angles of the external waste slopes are in accordance with the permitted slope angles (no greater than 1:4).

8 Conclusions

8.1 Assessment of Environmental Performance Trends

- 8.1.1 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.
- 8.1.2 Surface water monitoring indicates generally stable trends since the previous Environmental Performance Review, with no evidence of significant adverse trends developing. On the four occasions that SW25 was monitored in 2022, the recorded parameters were within the discharge consent limits. On the three occasions that SW26 was monitored in 2022, the recorded parameters were within the discharge consent limits.
- 8.1.3 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 and there is no indication of adverse trends developing.
- 8.1.4 The data indicates that during 2022 there have been intermittent exceedances of the permitted leachate levels (of 2m above the base) in Cells 1, 2,3 and 4 in Area 2. Leachate extraction continues at the site in order to address leachate heads at the site, and as such a total of 18,044,920kg of leachate was removed during 2022 for offsite treatment and disposal.
- 8.1.5 The environmental monitoring data for LF08_07, C2B and C2C, C3B and C4B indicates that the leachate chemistry has been variable throughout the 12-month monitoring period in all four Cells, although generally the data is within the typical range for each of the parameters and is not indicative of a significant change in the leachate quality in 2022.
- 8.1.6 External landfill gas concentrations at Area 2 are predominantly indicating generally stable trends in methane and carbon dioxide.

8.2 Future Monitoring Requirements

- 8.2.1 It is intended that the Docksway Disposal Site Area 2 monitoring programmes shall continue in line with the Environmental 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.

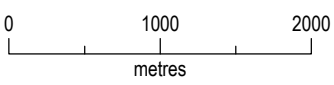
9 References

- [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] Stantec (2021) Docksway Disposal Site, Annual Environmental Review for Area 2 - 2021. Stantec, February 2022.

10 Essential Guidance for Report Readers

- 1) 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.
- 2) The opinions and recommendations expressed in this report are based on statute, guidance, and best practice current at the time of its publication. Stantec UK Ltd (Stantec) 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 the report should be returned to us and reassessed if required for re-use after one year from date of publication. Following delivery of the report, Stantec has no obligation to advise the Client or any other party of such changes or their repercussions.
- 3) 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.
- 4) Historical maps and aerial photographs provide a “snapshot” in time about conditions or activities at the site and cannot be relied upon as indicators of any events or activities that may have taken place at other times. It is possible for developments to have occurred between surveys that are not shown or for the map record to have been censored for military security.
- 5) The absence of cavity records in the Stantec natural and mining cavities (non-coal) databases is not considered as conclusive as to the absence of these features and we do not warranty that the data is complete or error free.
- 6) 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 considered in any analysis and reporting.
- 7) It should be noted that this report is a land condition assessment and does not purport to be an ecological, flood risk or archaeological survey and additional specific surveys may be required.
- 8) The identification of invasive and/or noxious plants such as Japanese Knotweed is outside the remit of our appointment.
- 9) This report has been written for the sole use of the Client stated at the front of the report in relation to a specific development or scheme. The conclusions and recommendations presented herein are only relevant to the scheme or the phase of project under consideration. This report shall not be relied upon or transferred to any other party without the expressed written authorisation of Stantec. Any such party relies upon the report at its own risk.
- 10) 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 considered 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.
- 11) Public or legal consultations or enquiries, or consultation with any Regulatory Bodies (such as the Environment Agency, Natural England or Local Authority) have taken place only as part of this work where specifically stated.

Figures



Site Grid Ref: ST 309 852

**DOCKSWAY DISPOSAL SITE
NEWPORT**

SITE LOCATION PLAN

Client
**NEWPORT CITY
COUNCIL**



Date of 1st Issue
20.01.2020

Drawn by
davco

A4 Scale
1:50 000

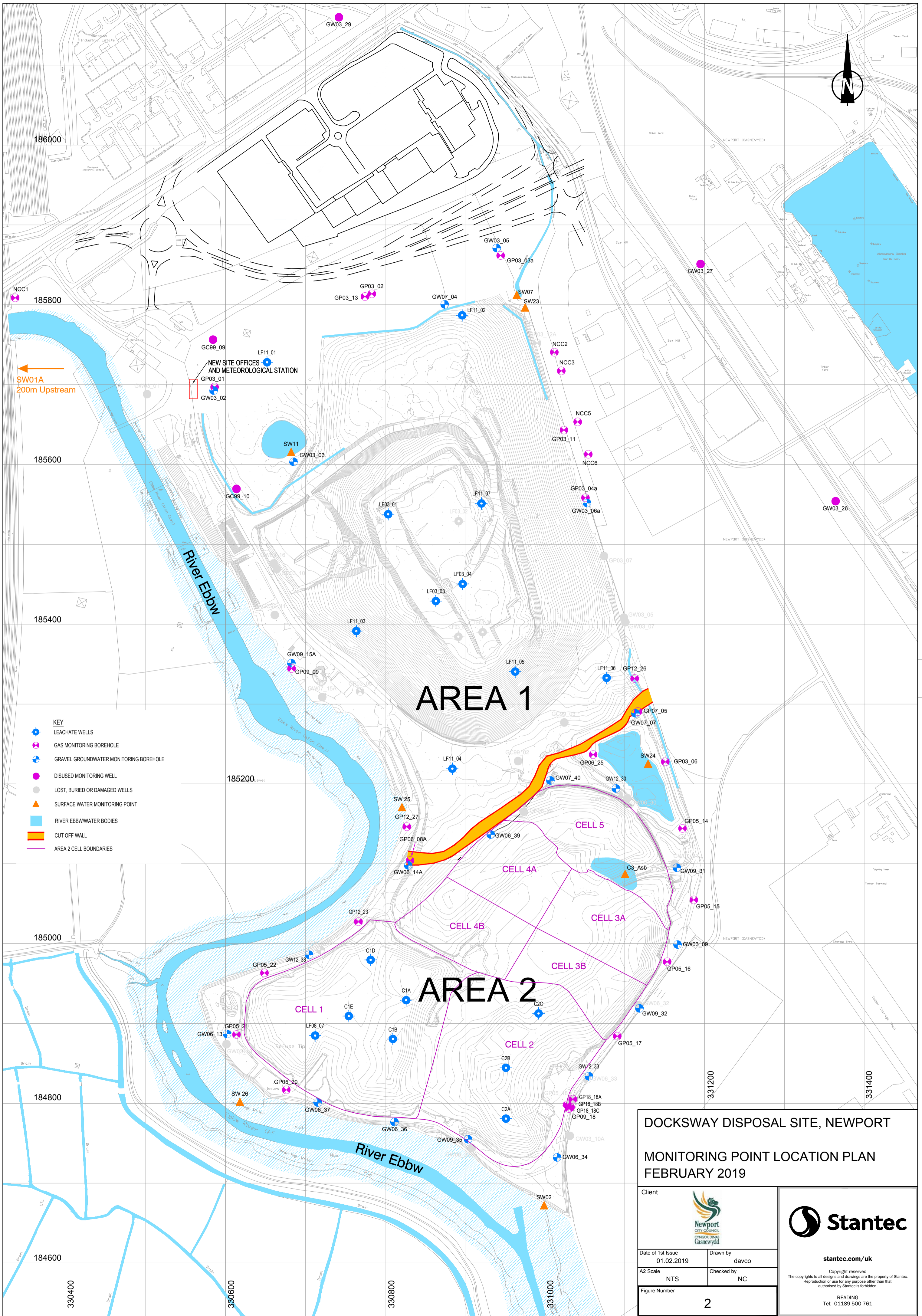
Checked by
NC

Figure Number
1

stantec.com/uk
Copyright reserved
The copyrights to all designs and drawings are the property of Stantec.
Reproduction or use for any purpose other than that
authorised by Stantec is forbidden.


READING
Tel: 01189 500 761

Contains Ordnance Survey data © Crown copyright and database right 2018



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

DOCKSWAY DISPOSAL SITE, NEWPORT
MONITORING POINT LOCATION PLAN
FEBRUARY 2019

| | | |
|-------------------|------------|--|
| Client | |  Newport CITY COUNCIL CYMRU DDWYF CASNEWYDD |
| Date of 1st Issue | Drawn by | |
| A2 Scale | Checked by | |
| Figure Number | | |
| | | 2 |

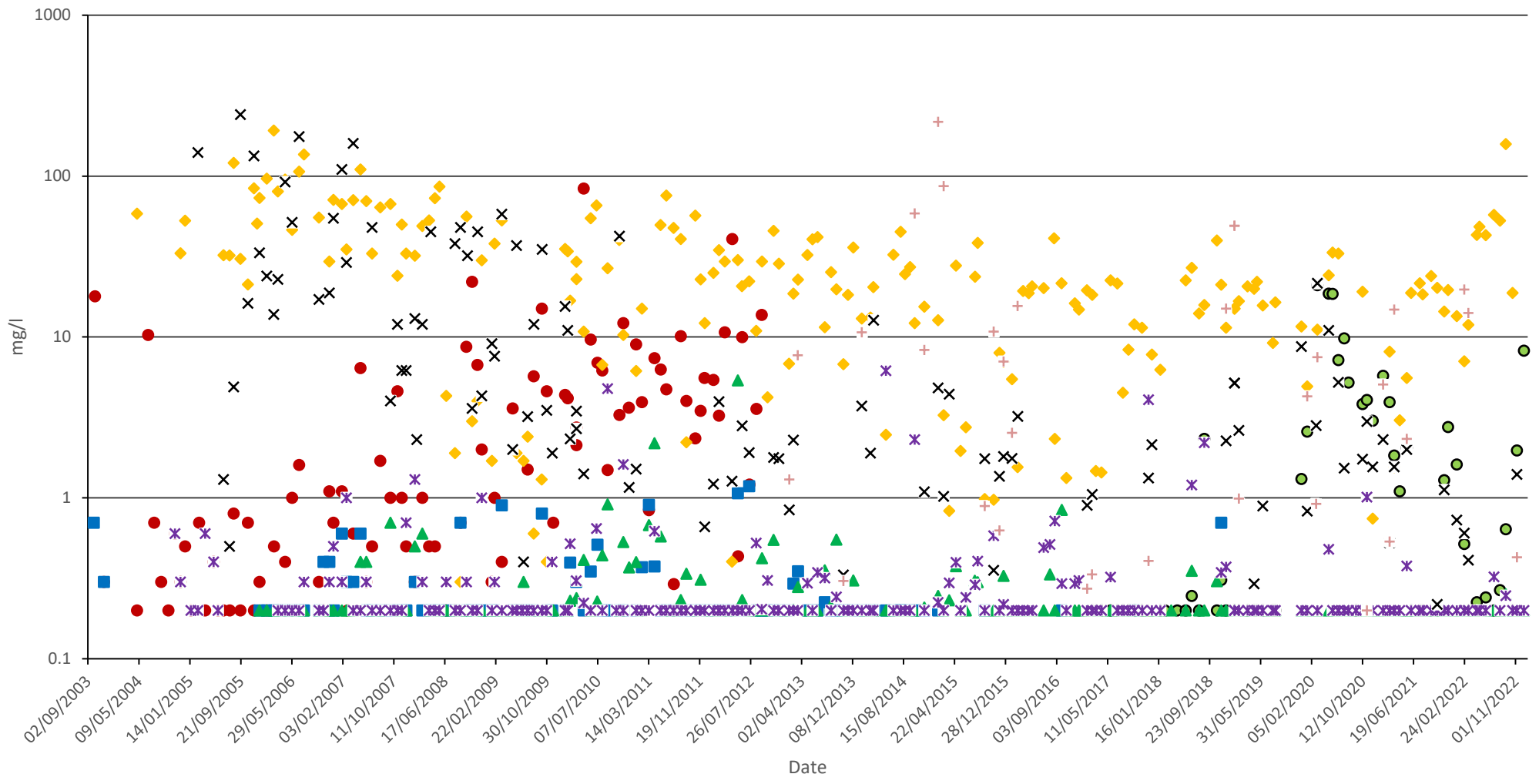


stantec.com/uk

Copyright reserved
 The copyrights to all designs and drawings are the property of Stantec.
 Reproduction or use for any purpose other than that
 authorized by Stantec is forbidden.

READING
 Tel: 01189 500 761

Appendix 1 Surface Water Chemistry Graphs



● C3_ASB ● SW_02 ■ SW_11 ▲ SW_1A ◆ SW_23 * SW_24 × SW_25 + SW_26

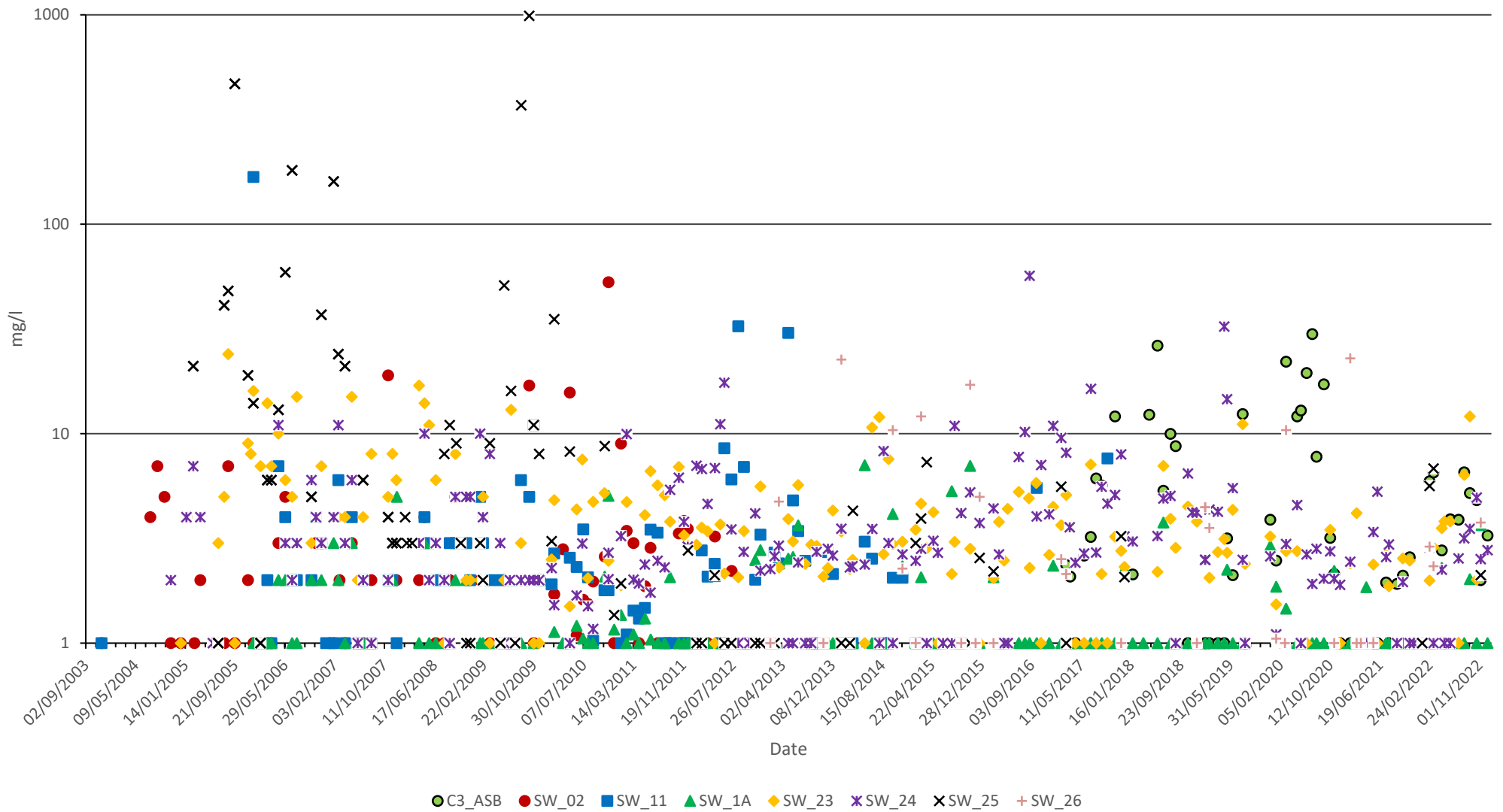


Stantec
stantec.com/uk
© Stantec UK Limited

Client
Newport City Council

Docksway Disposal Site
Ammoniacal Nitrogen in Surface Water

| | |
|-----------------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |
| Appendix | 1-1 |

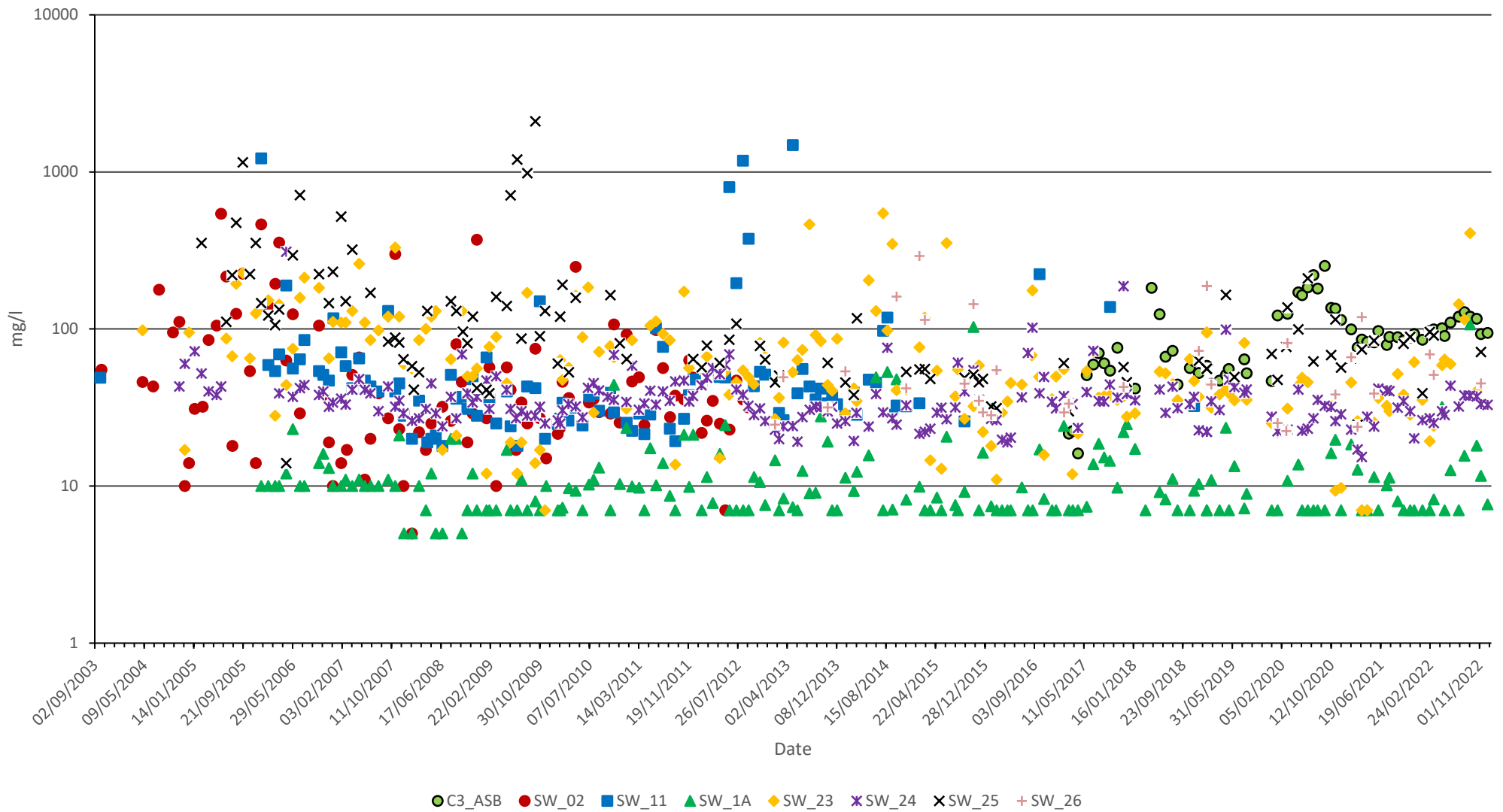



Stantec
stantec.com/uk
© Stantec UK Limited

Client
Newport City Council

Docksway Disposal Site
Biochemical Oxygen Demand in Surface Water

| | |
|-----------------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |
| Appendix | 1-2 |



stantec.com/uk
© Stantec UK Limited

Client

Newport City Council

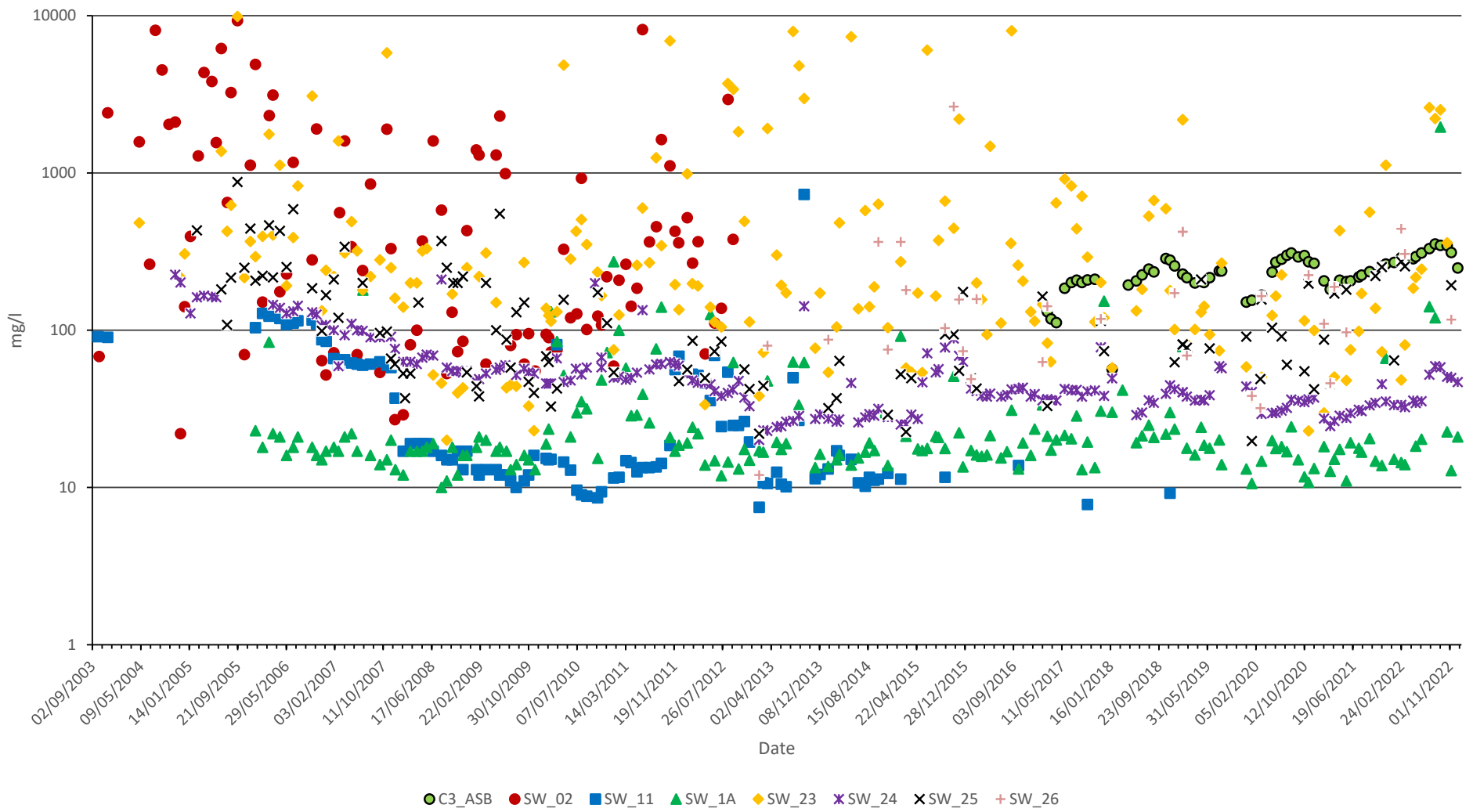
Dockway Disposal Site

Chemical Oxygen Demand in Surface Water

| | |
|----------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix

1-3



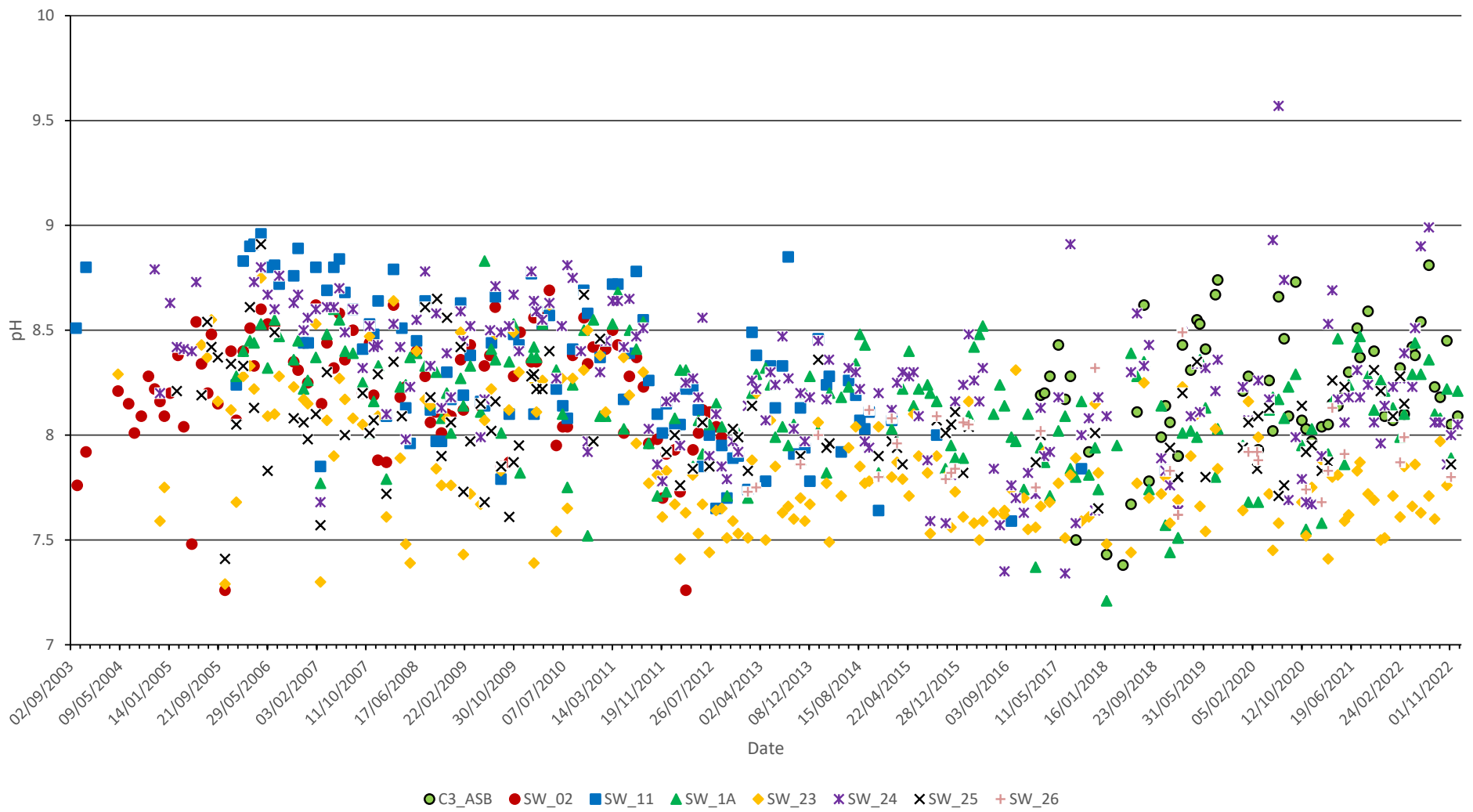
Client
Newport City Council

Docksway Disposal Site

Chloride in Surface Water

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
1-4



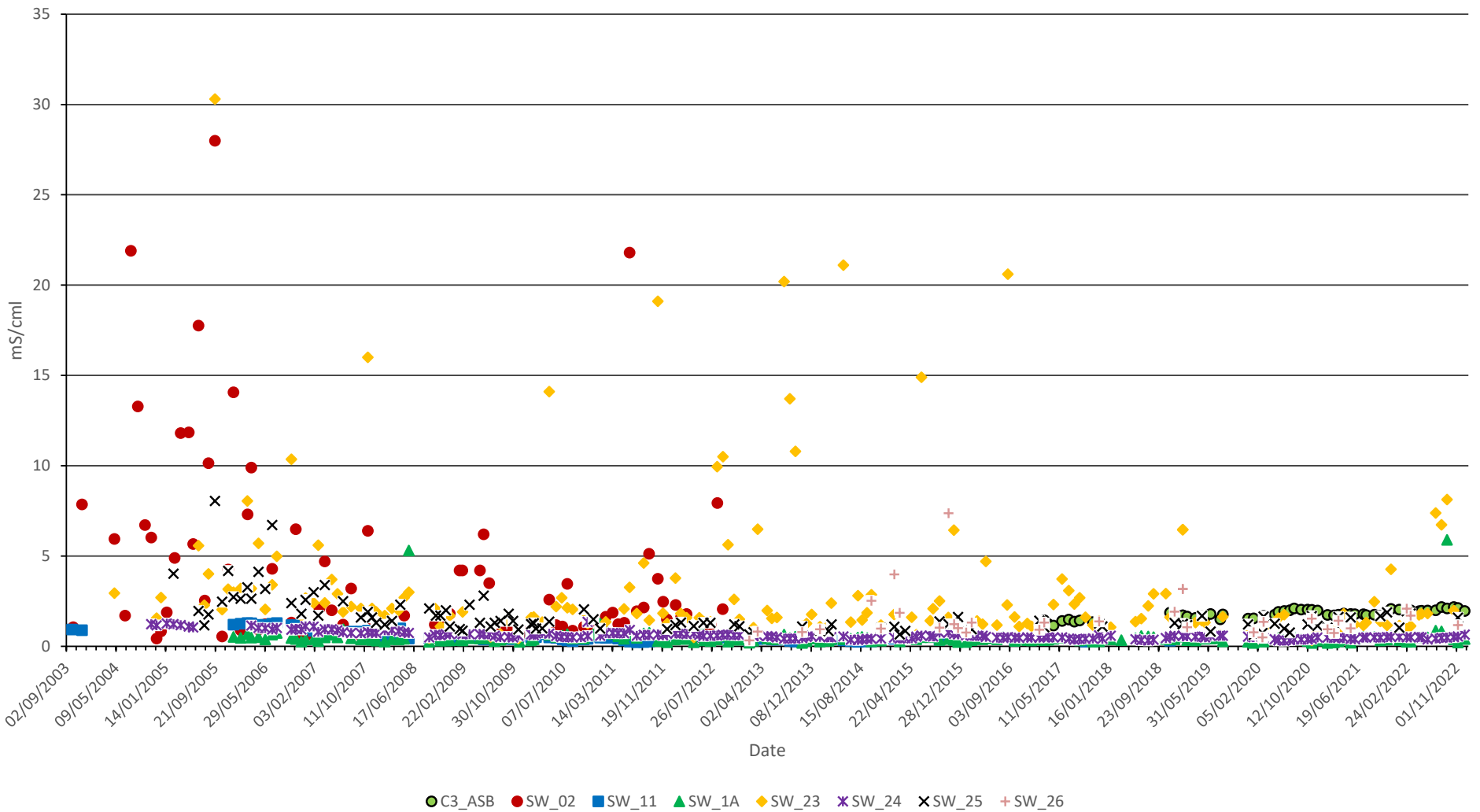
Client
Newport City Council

Docksway Disposal Site

pH in Surface Water

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
1-5



stantec.com/uk
© Stantec UK Limited

Client

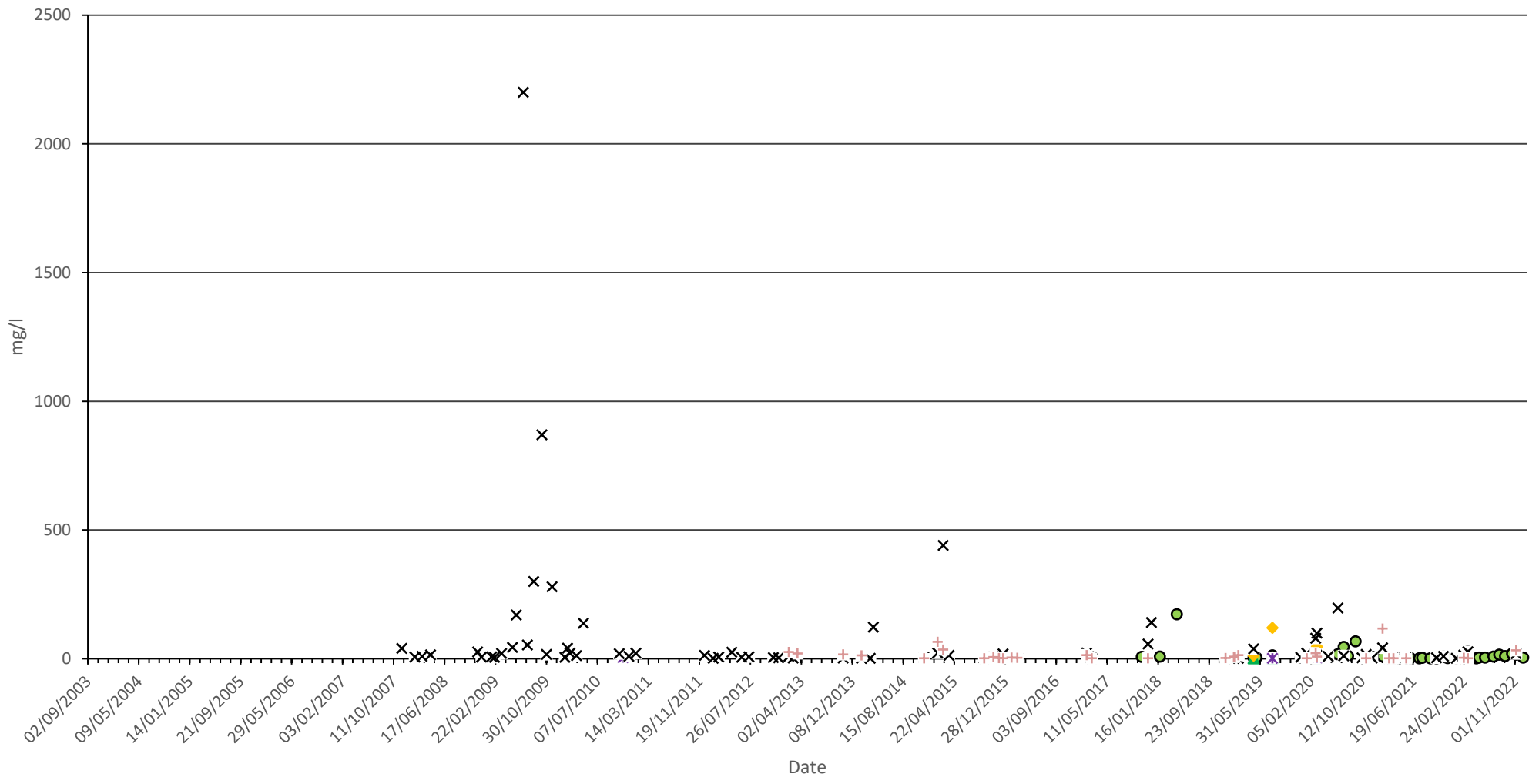
Newport City Council

Dockway Disposal Site

Electrical Conductivity in Surface Water

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
1-6



● C3_ASB ▲ SW_1A ◆ SW_23 ✖ SW_24 ✖ SW_25 + SW_26



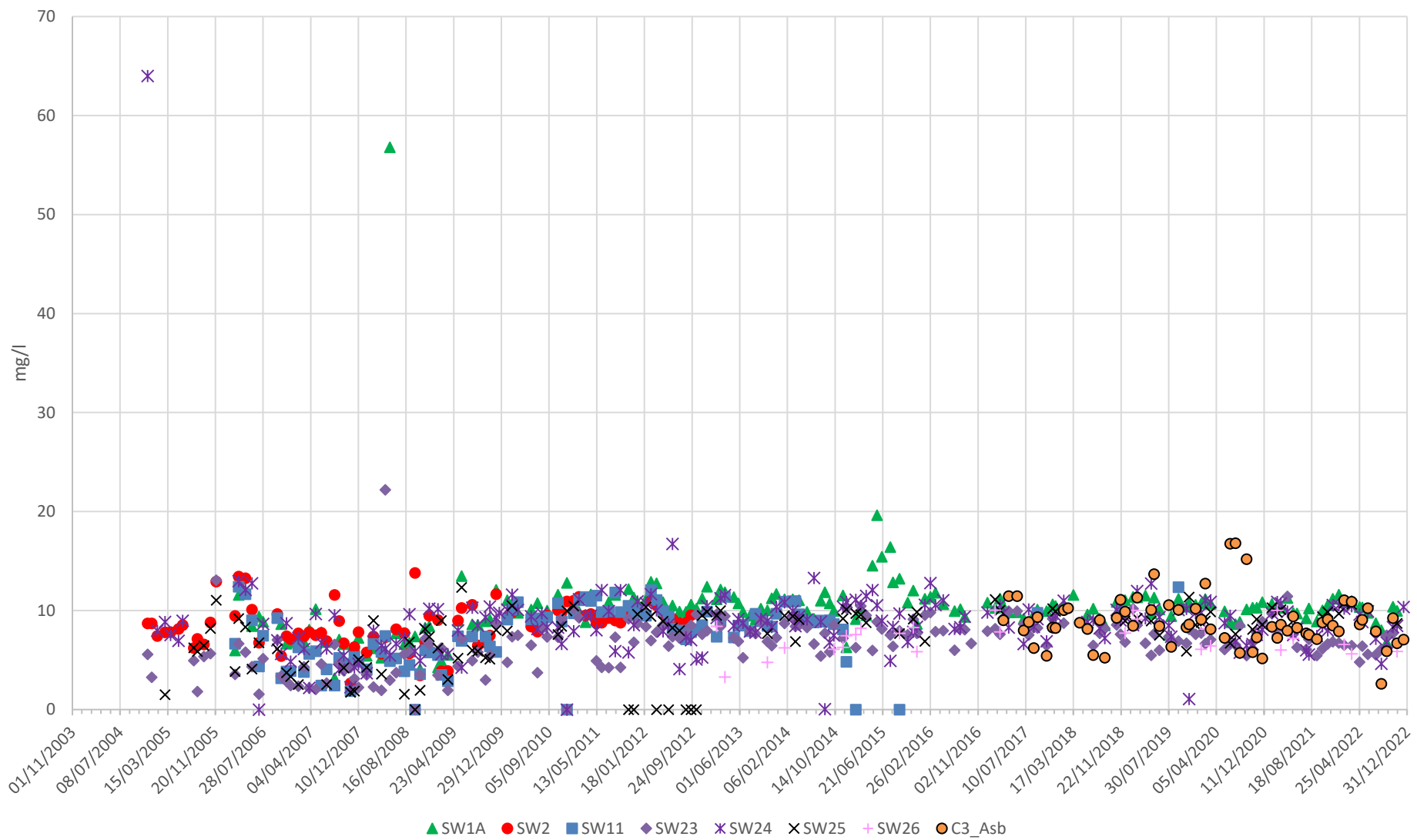
Stantec
stantec.com/uk
© Stantec UK Limited

Client
Newport City Council

Dockway Disposal Site

Total Suspended Solids in Surface Water

| | |
|-----------------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |
| Appendix | 1-6 |



▲ SW1A ● SW2 ■ SW11 ◆ SW23 ✖ SW24 ✖ SW25 + SW26 ● C3_Asb

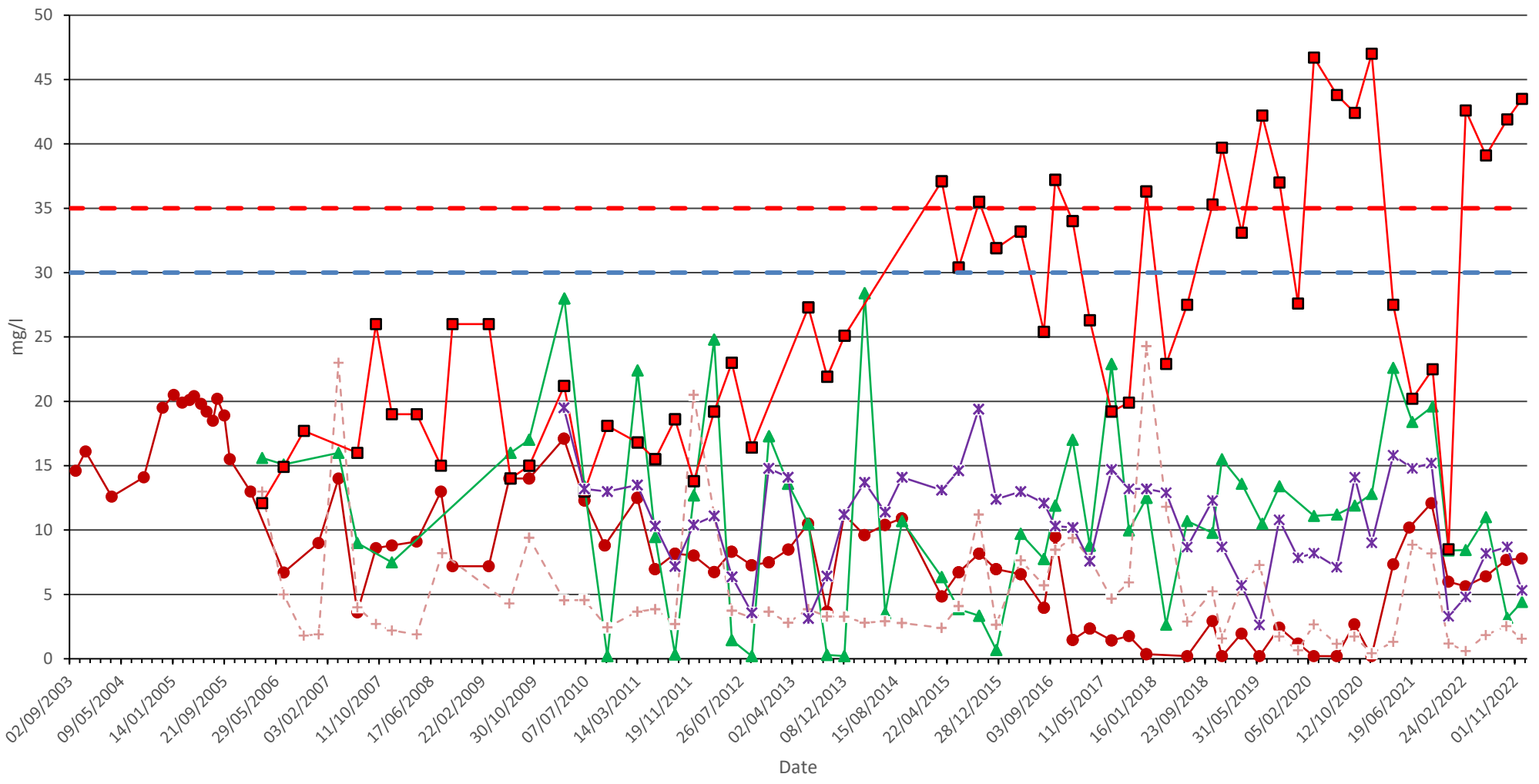


Client
Newport City Council

Docksway Disposal Site
Dissolved Oxygen in Surface Water

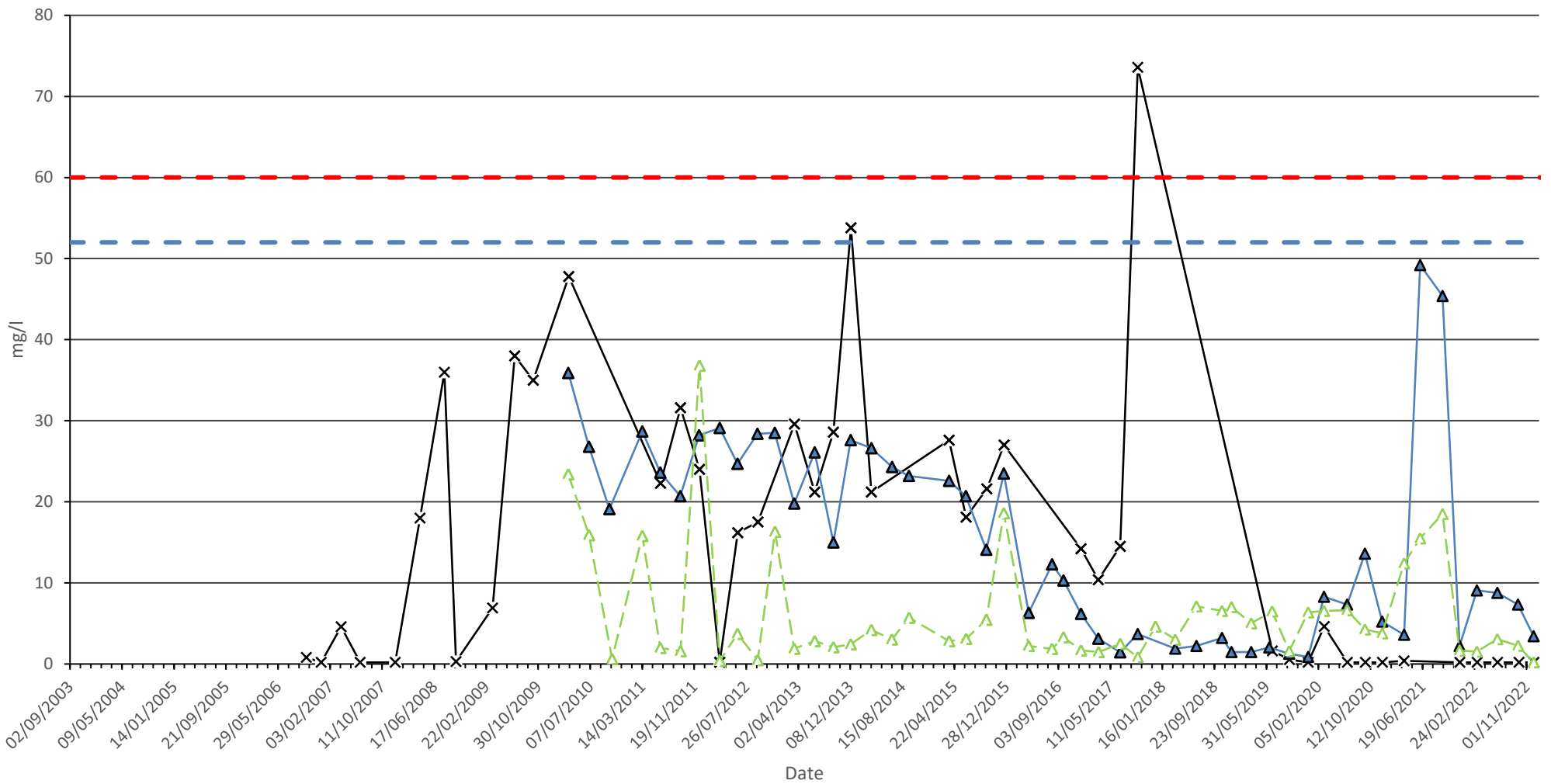
| | |
|-----------------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |
| Appendix | 1-8 |

Appendix 2 Groundwater Chemistry Graphs



● GW03_09
 ▲ GW06_13
 -+- GW06_34
 ■ GW06_37
 ✕ GW09_35
- - - Control Limit
- - - Compliance Limit

| | | | | | | | | | | | | | | | |
|---|--|---|--|------|---------------|----------|-----|-------|----|---------|----|-----------------|--|------------|--|
| <p>Stantec stantec.com/uk © Stantec UK Limited</p> | Client <p style="text-align: center; font-weight: bold; font-size: 1.2em;">Newport City Council</p> | <p style="font-weight: bold; font-size: 1.2em;">Docksway Disposal Site</p> <p style="font-weight: bold; font-size: 1.2em;">Ammoniacal Nitrogen in Groundwater</p> | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="padding: 2px;">Date</td><td style="padding: 2px;">February 2023</td></tr> <tr><td style="padding: 2px;">A4 Scale</td><td style="padding: 2px;">nts</td></tr> <tr><td style="padding: 2px;">Drawn</td><td style="padding: 2px;">JN</td></tr> <tr><td style="padding: 2px;">Checked</td><td style="padding: 2px;">NC</td></tr> <tr><td colspan="2" style="padding: 5px; text-align: center;">Appendix</td></tr> <tr><td colspan="2" style="padding: 5px; text-align: center; font-size: 1.5em;">2-1</td></tr> </table> | Date | February 2023 | A4 Scale | nts | Drawn | JN | Checked | NC | Appendix | | 2-1 | |
| | Date | February 2023 | | | | | | | | | | | | | |
| | A4 Scale | nts | | | | | | | | | | | | | |
| Drawn | JN | | | | | | | | | | | | | | |
| Checked | NC | | | | | | | | | | | | | | |
| Appendix | | | | | | | | | | | | | | | |
| 2-1 | | | | | | | | | | | | | | | |



—x— GW06_14A
 —▲— GW09_31
 —▲— GW09_32
 — — Control Limit
 — — Compliance Limit



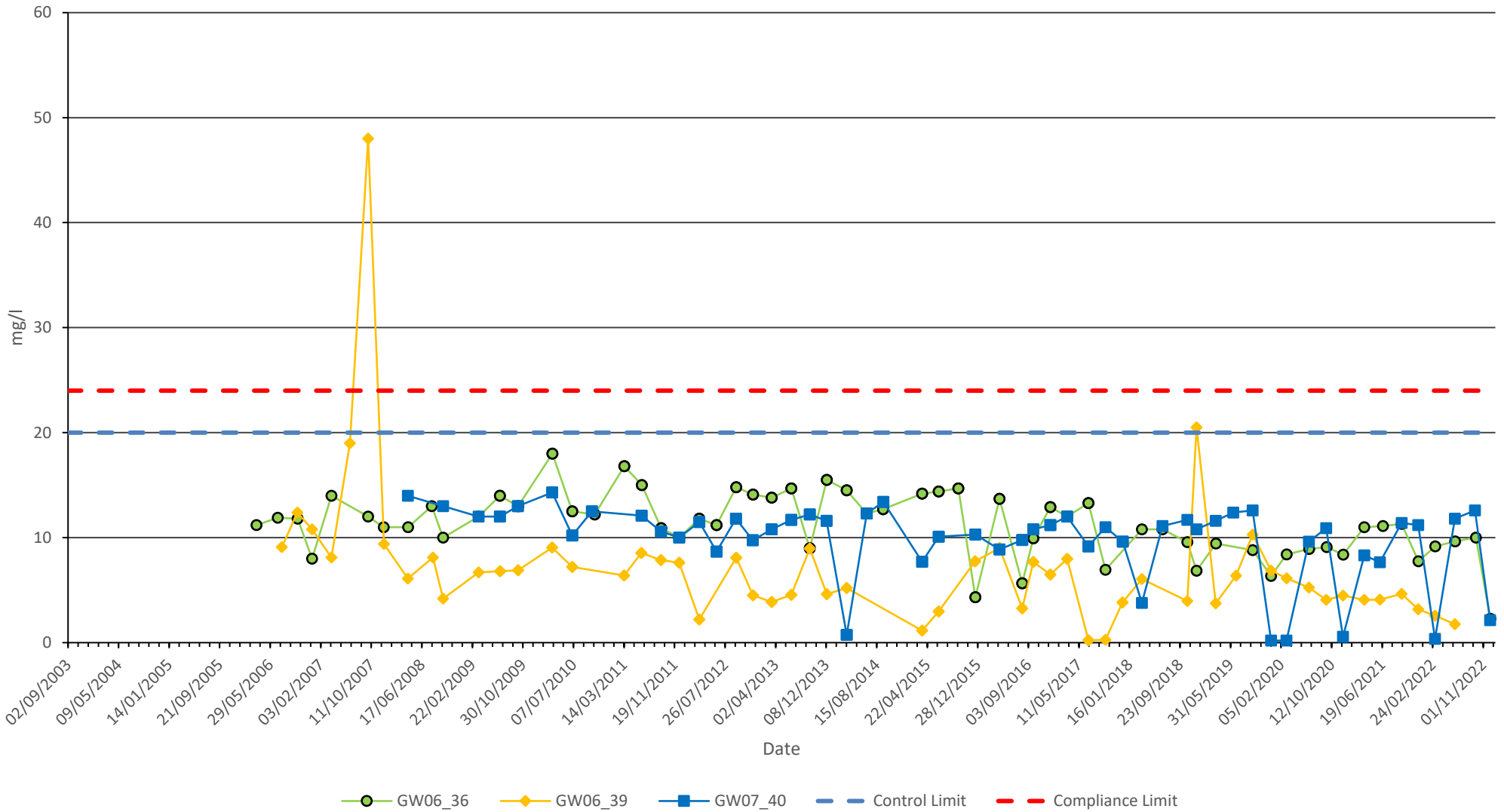
Stantec
stantec.com/uk
© Stantec UK Limited

Client
Newport City Council

Docksway Disposal Site

Ammoniacal Nitrogen in Groundwater

| | |
|-----------------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |
| Appendix | 2-2 |



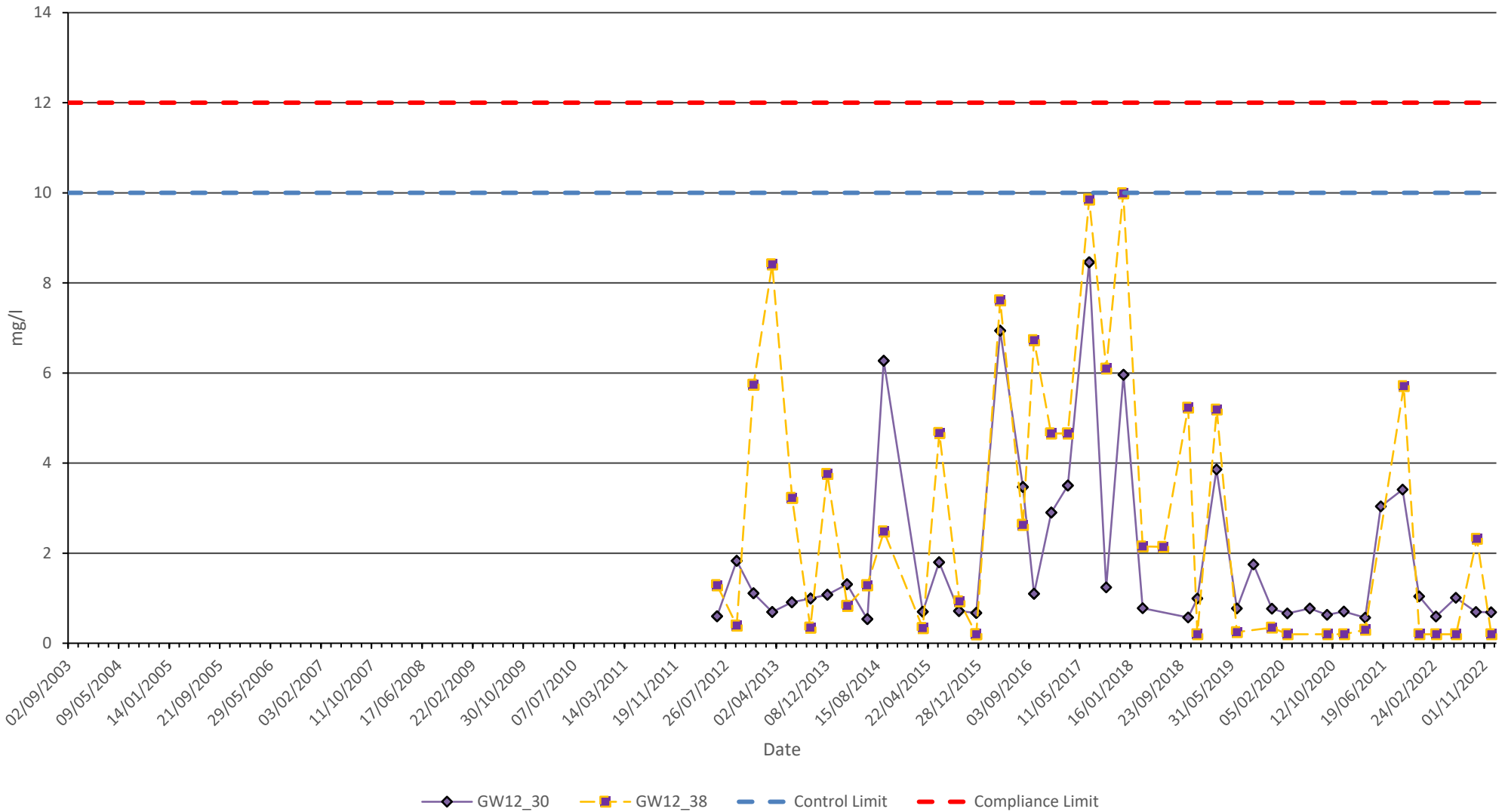
Client
Newport City Council

Docksway Disposal Site

Ammoniacal Nitrogen in Groundwater

| | |
|----------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-3

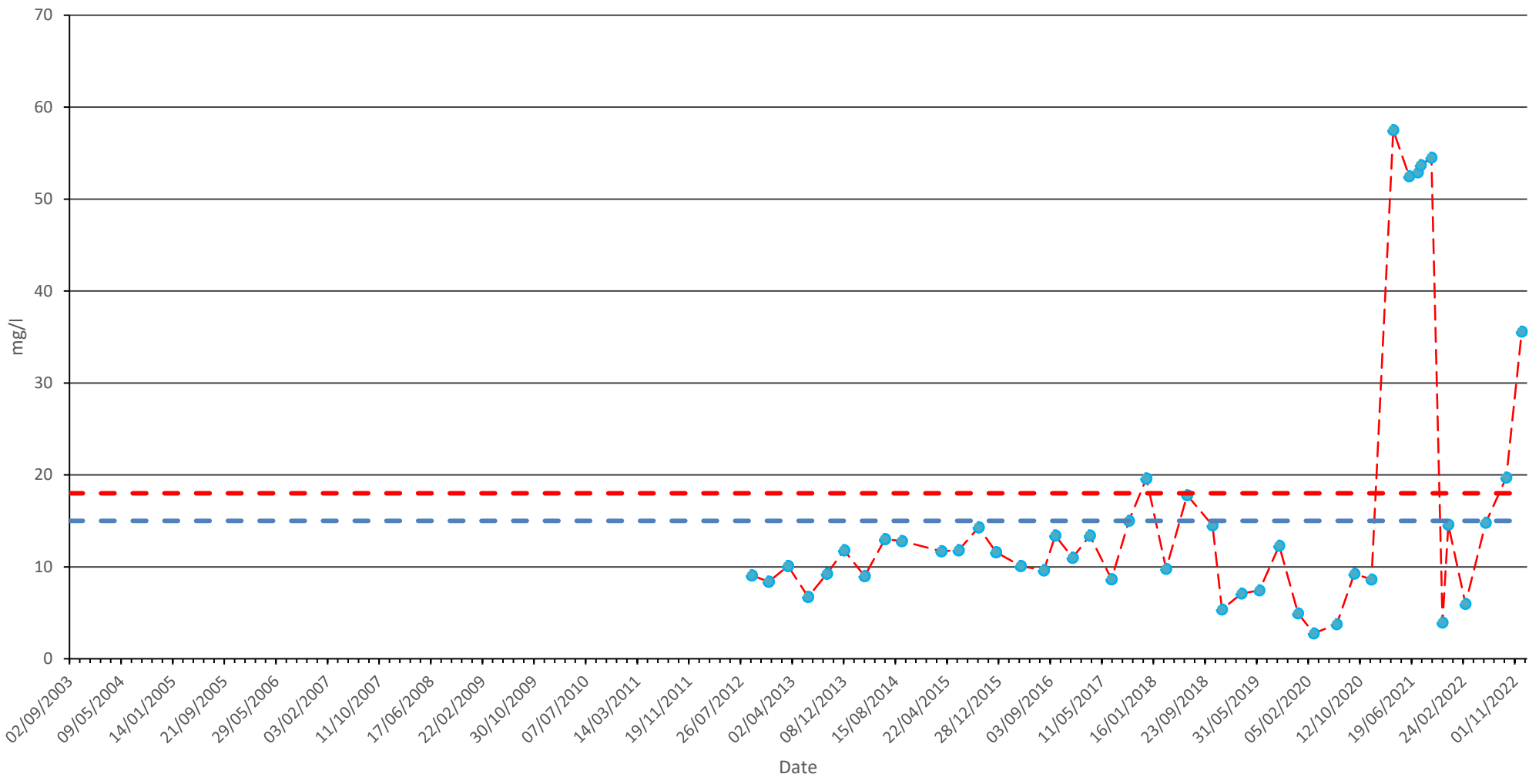



Stantec
stantec.com/uk
© Stantec UK Limited

Client
Newport City Council

Docksway Disposal Site
Ammoniacal Nitrogen in Groundwater

| | |
|-----------------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |
| Appendix | 2-4 |



● GW12_33 - - Control Limit - - Compliance Limit



stantec.com/uk
© Stantec UK Limited

Client

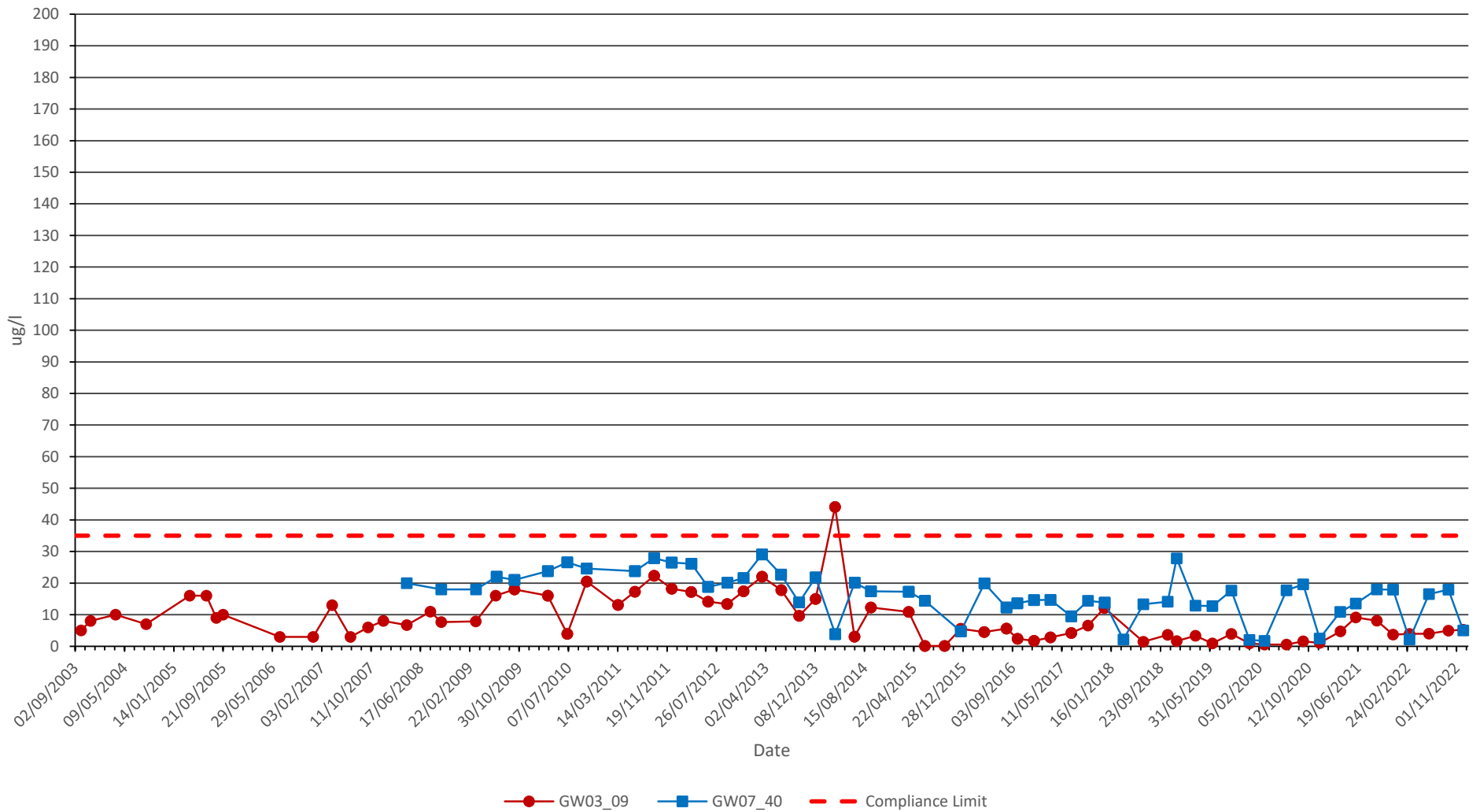
Newport City Council

Docksway Disposal Site

Ammoniacal Nitrogen in Groundwater

| | |
|----------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-5



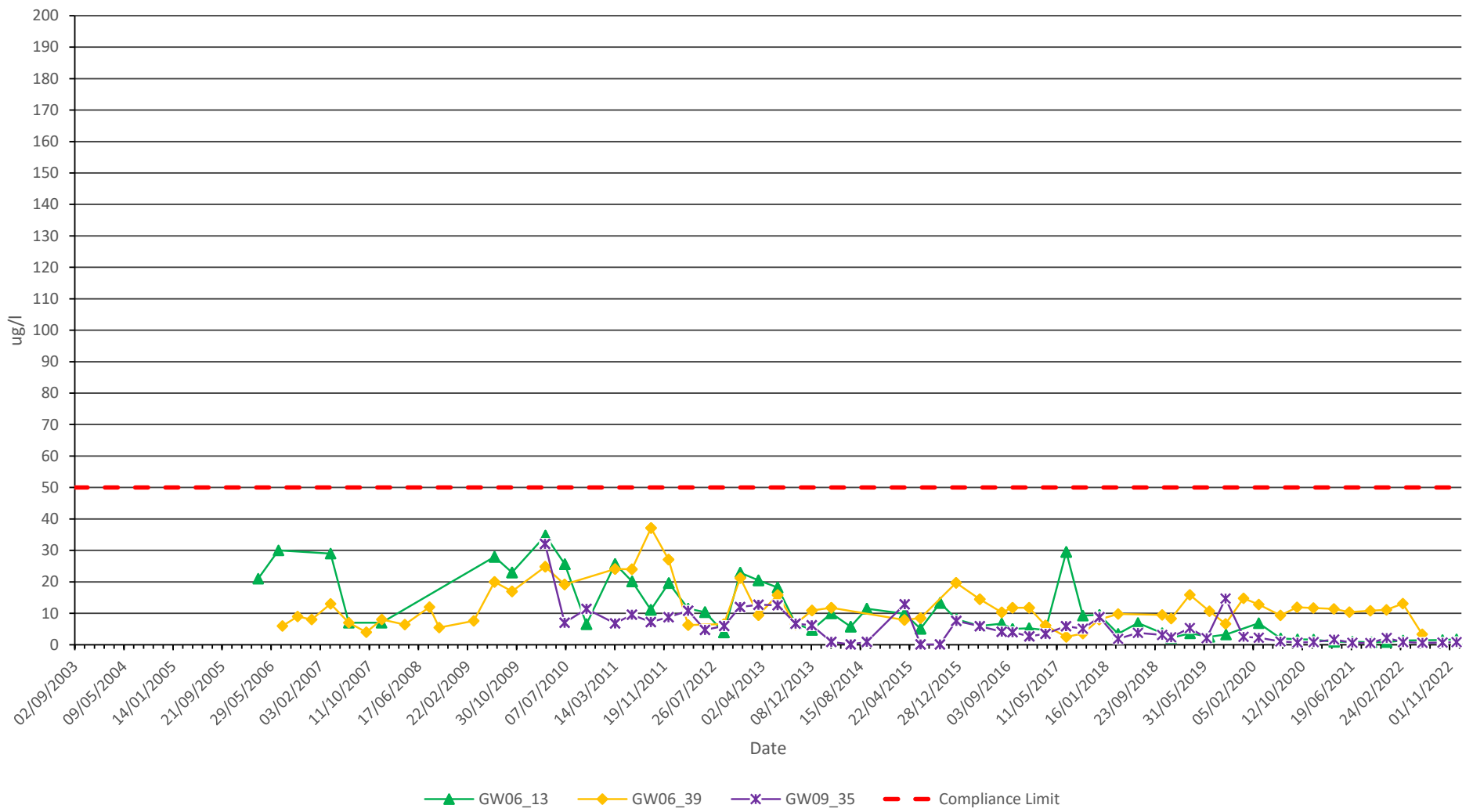
Client
Newport City Council

Docksway Disposal Site

Arsenic in Groundwater

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-6

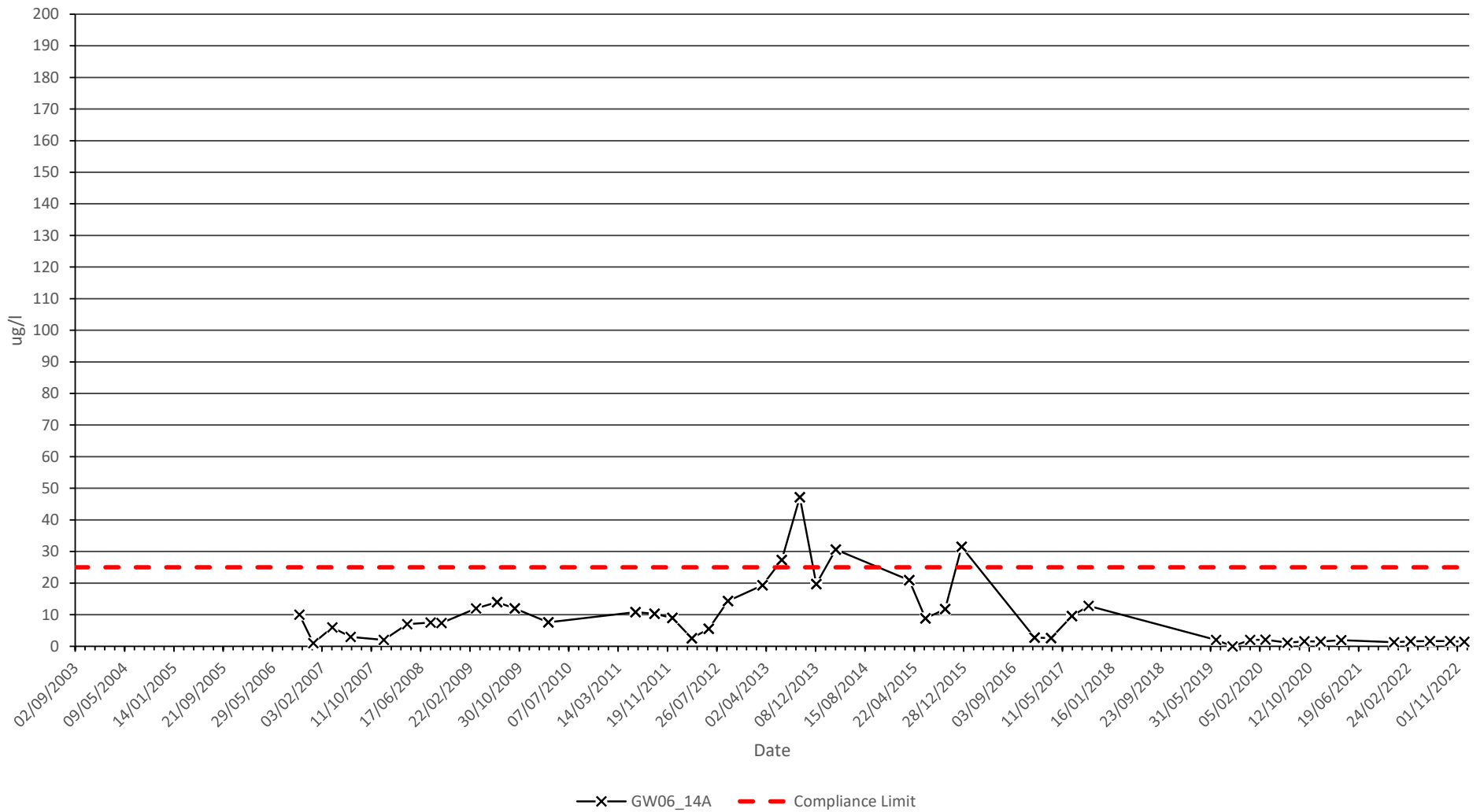


Client
Newport City Council

Docksway Disposal Site
Arsenic in Groundwater

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

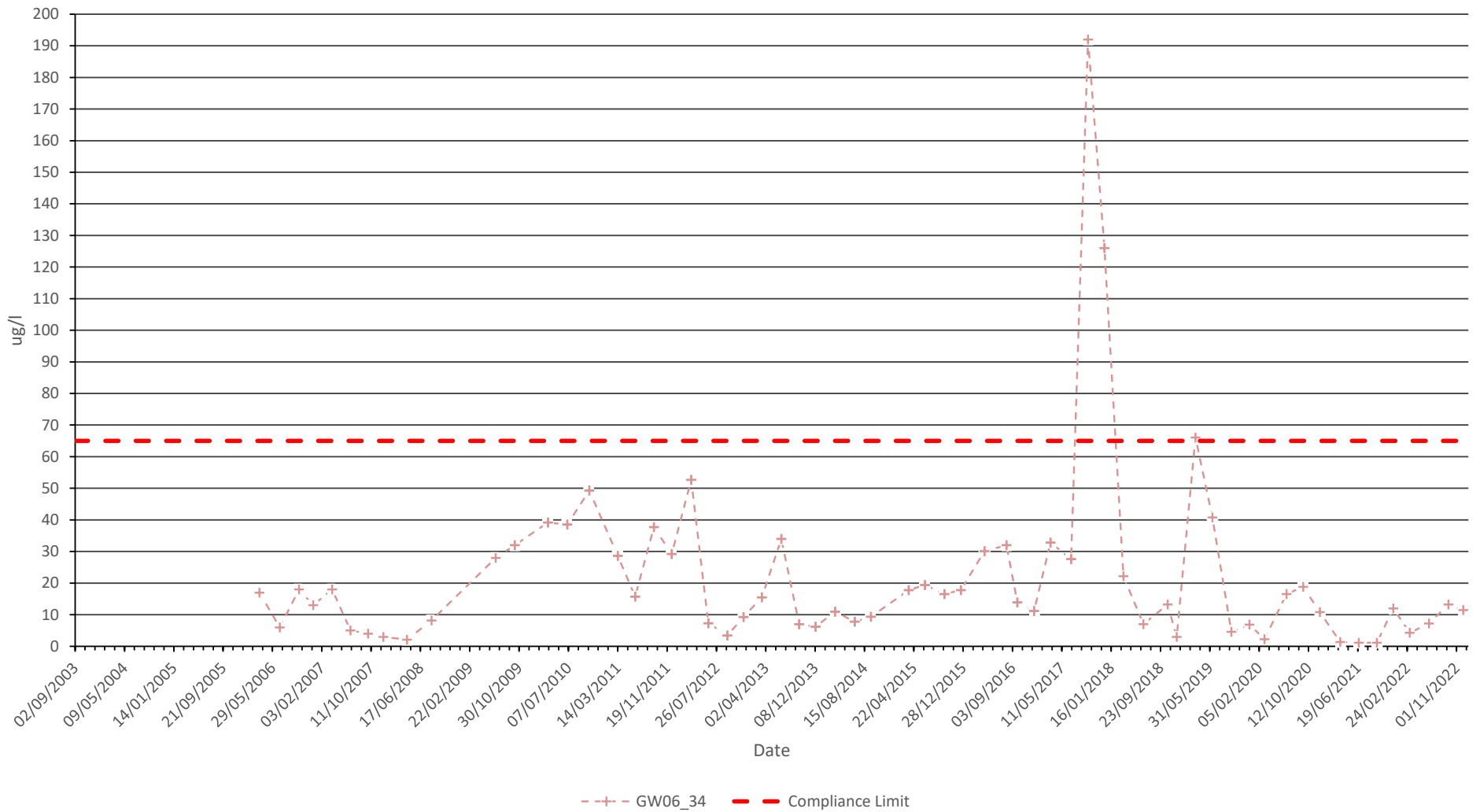
Appendix
2-7



Client
Newport City Council

Docksway Disposal Site
Arsenic in Groundwater

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |
| Appendix | 2-8 |

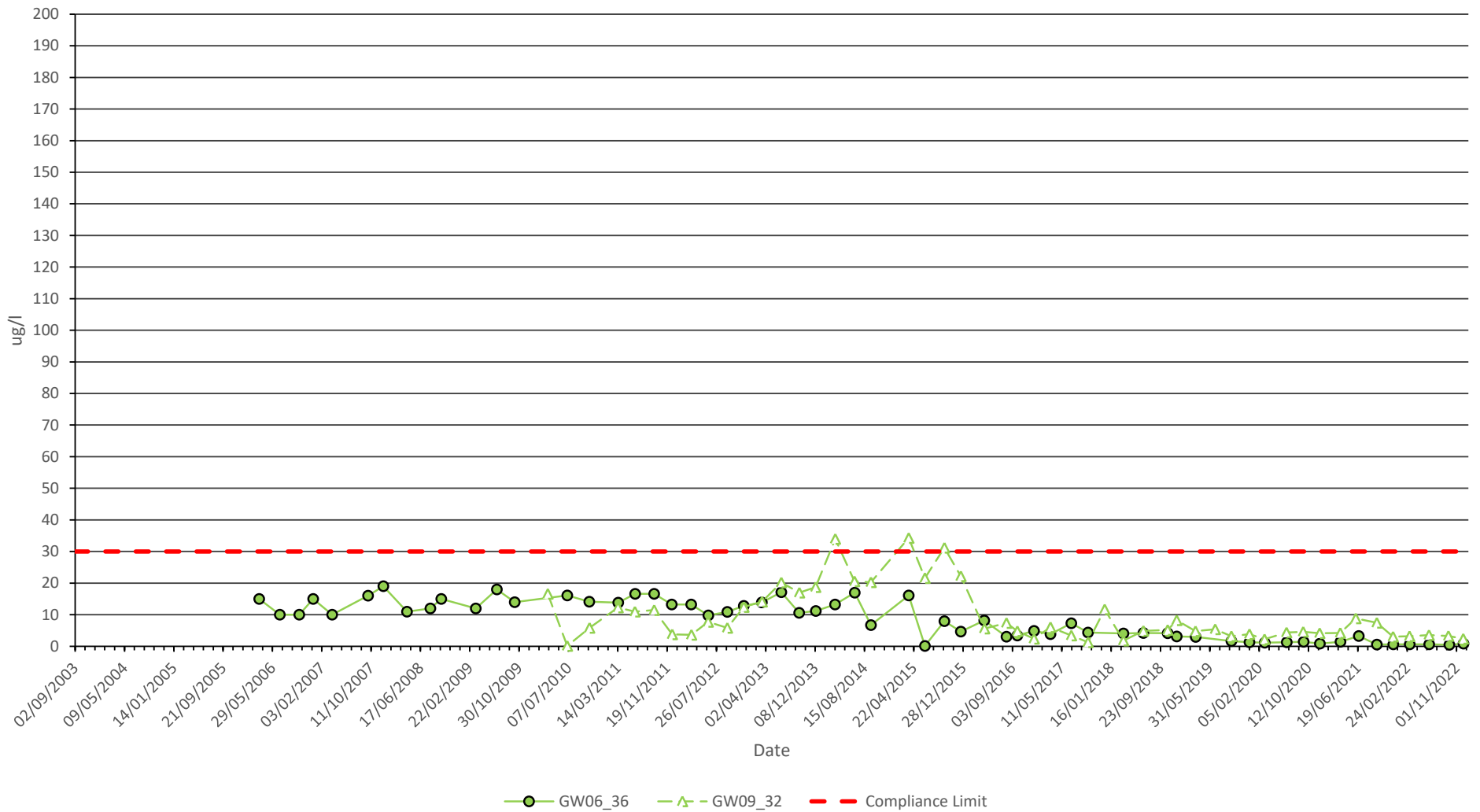


Client
Newport City Council

Docksway Disposal Site
Arsenic in Groundwater

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-9

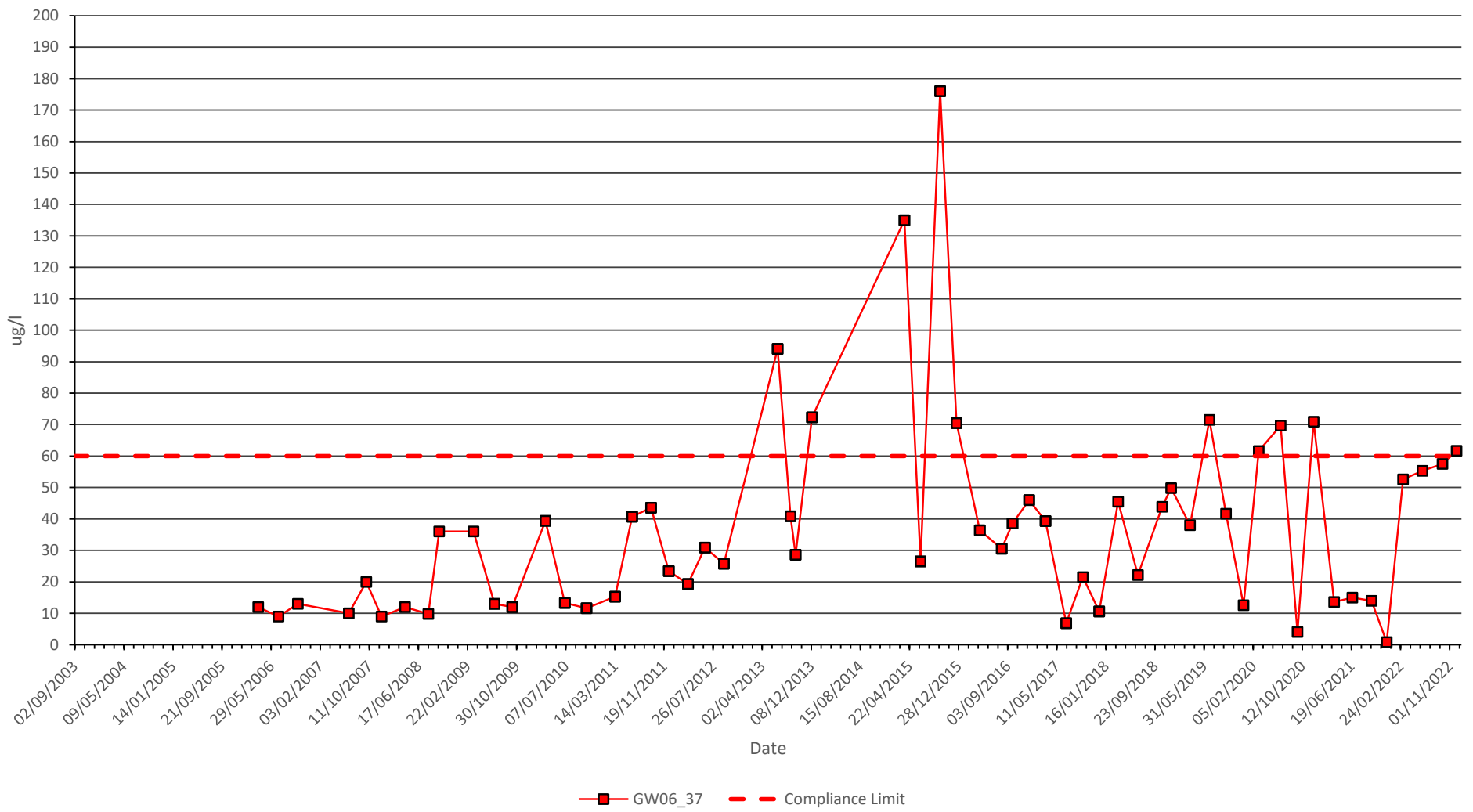


Client
Newport City Council

Docksway Disposal Site
Arsenic in Groundwater

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-10

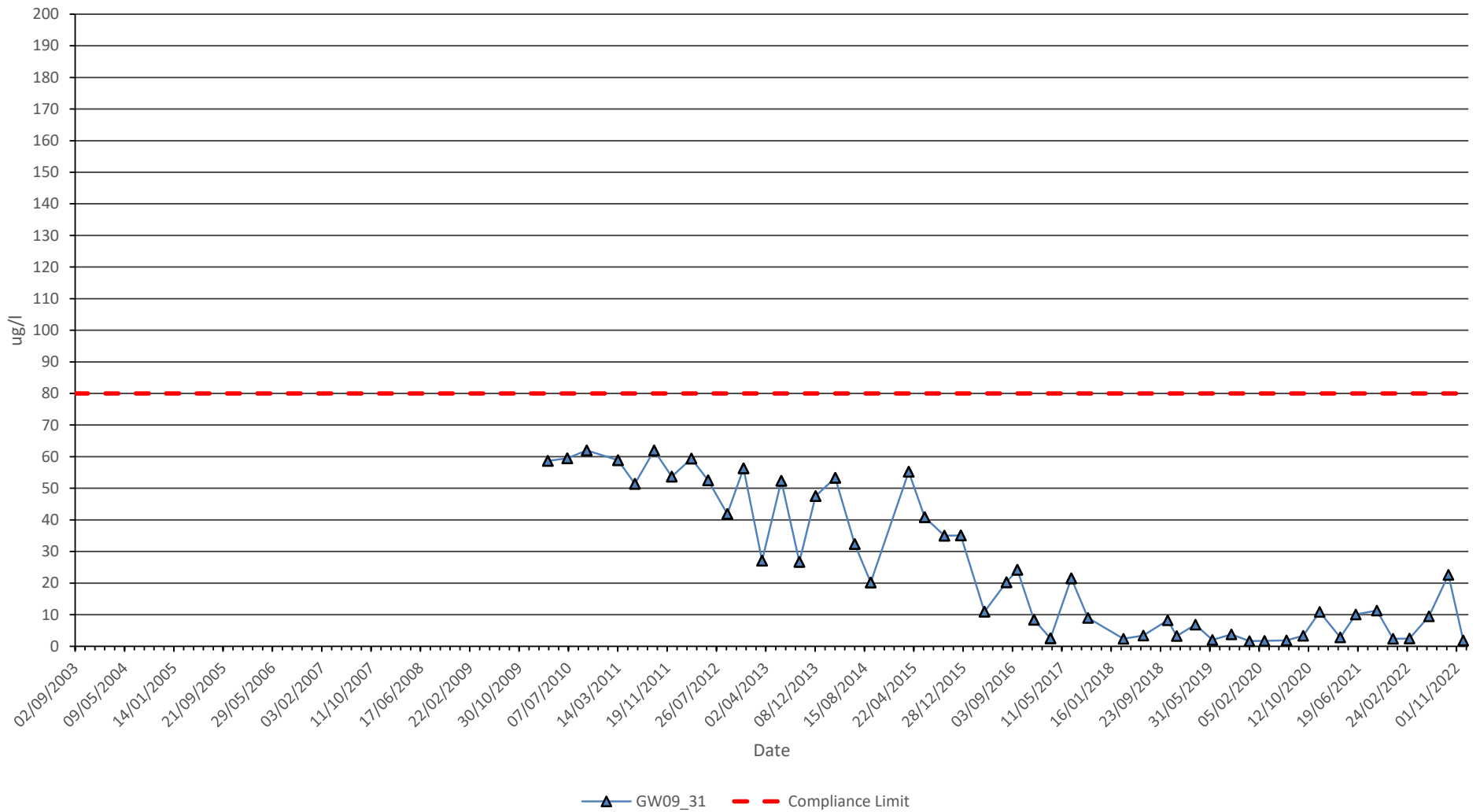


Client
Newport City Council

Docksway Disposal Site
Arsenic in Groundwater

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-11

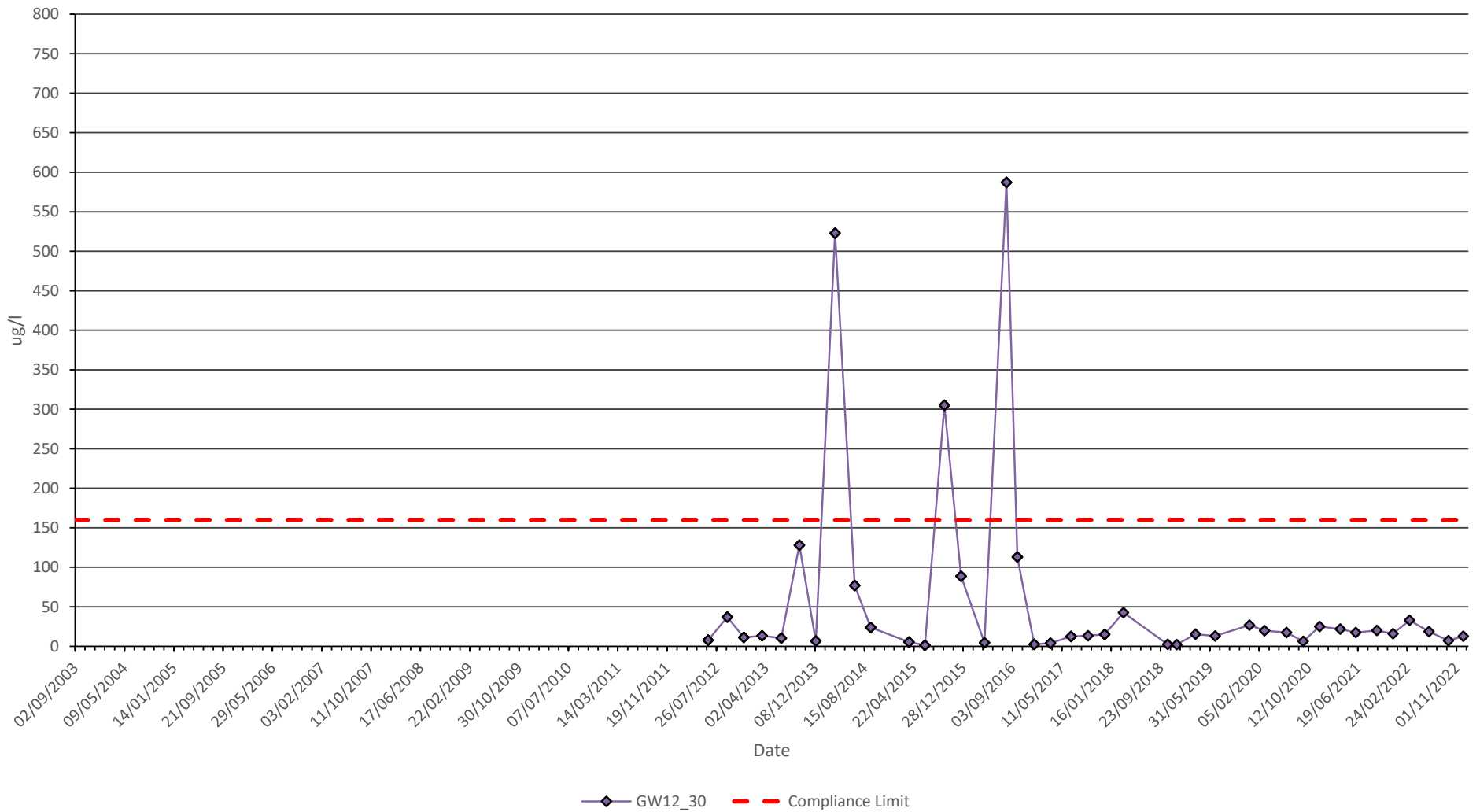


Client
Newport City Council

Docksway Disposal Site
Arsenic in Groundwater

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-12

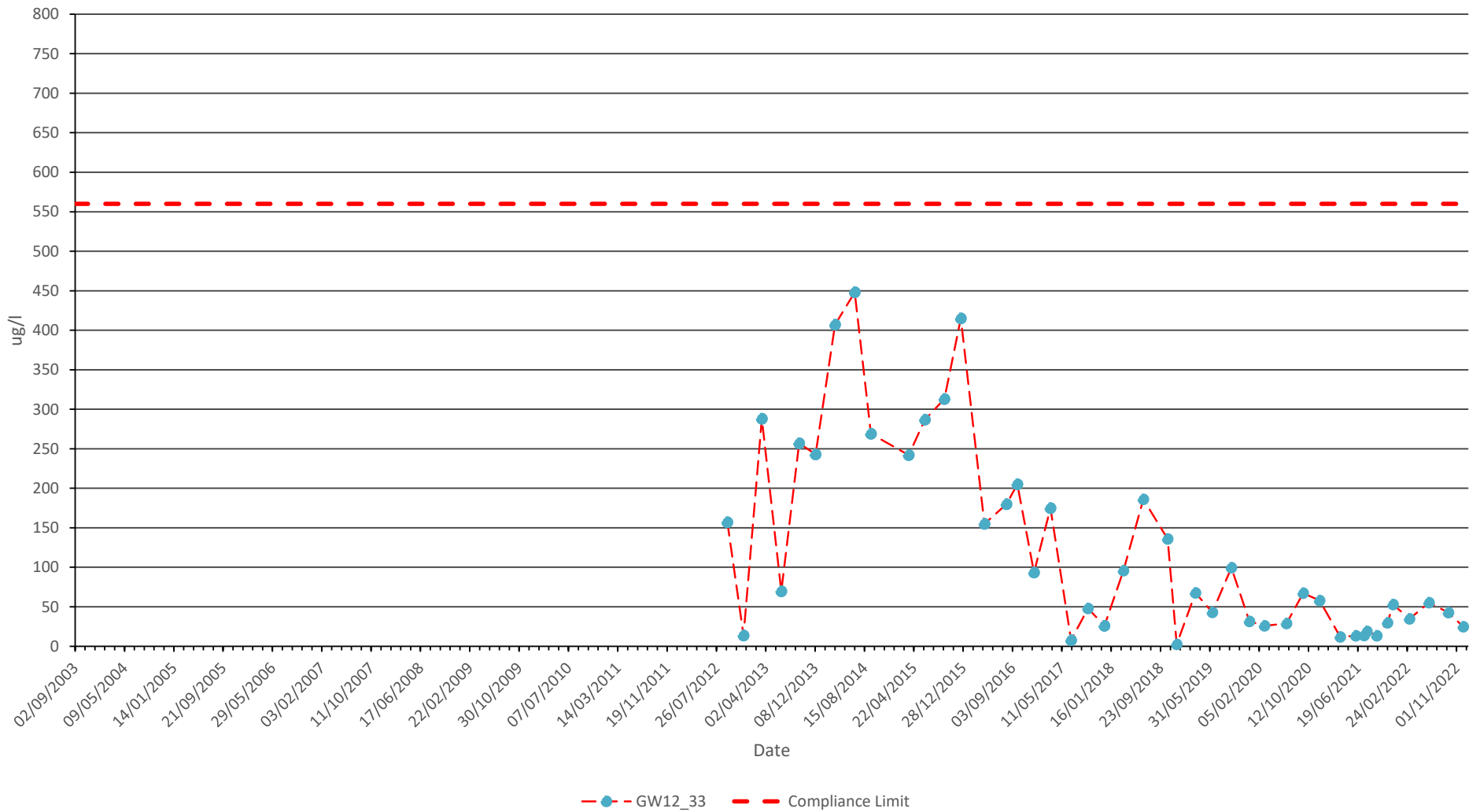



Client
Newport City Council

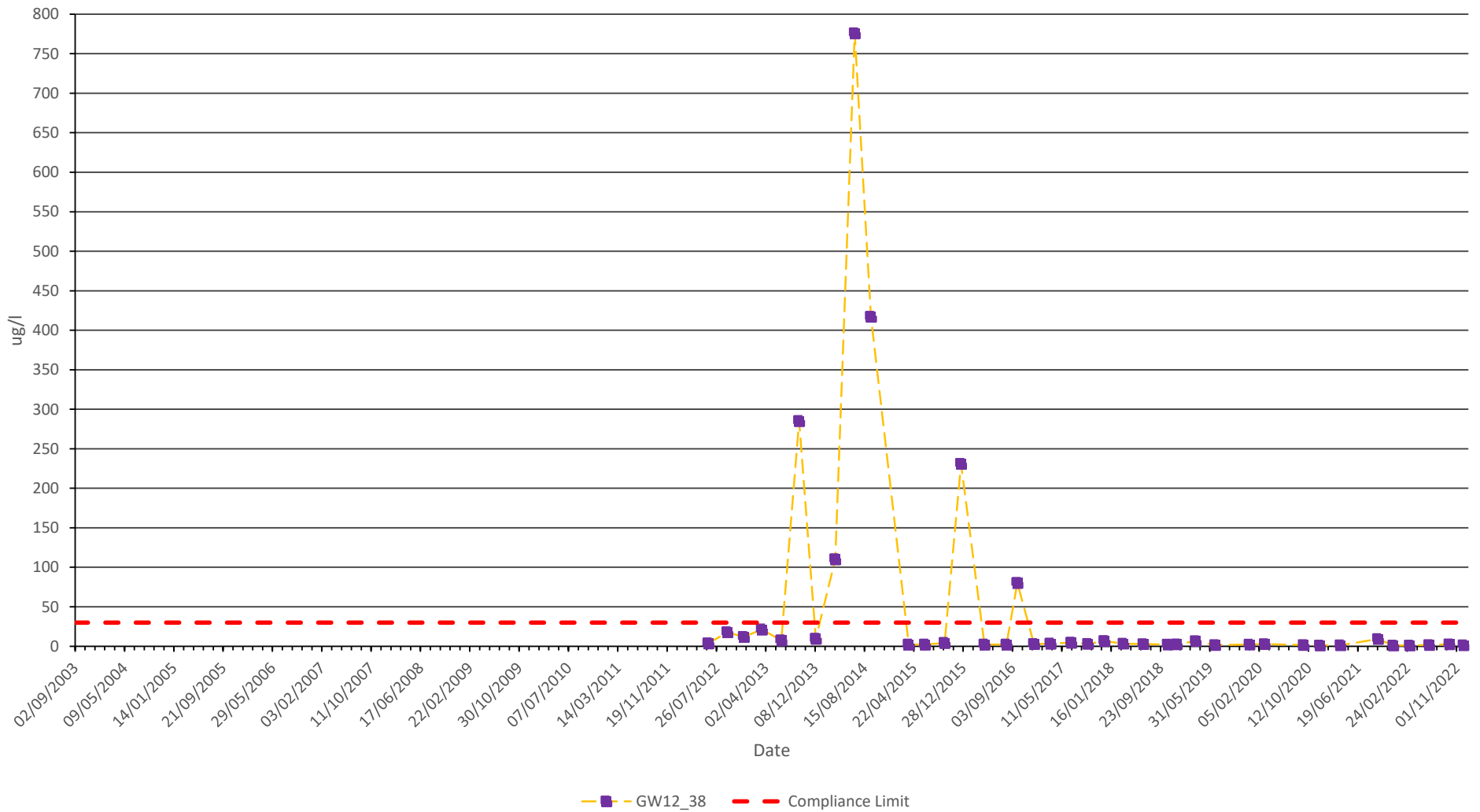
Docksway Disposal Site
Arsenic in Groundwater

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-13



| | | | | |
|--|-----------------------------|--|----------|--------------|
|  stantec.com/uk © Stantec UK Limited | Client | Docksway Disposal Site Arsenic in Groundwater | Date | January 2023 |
| | Newport City Council | | A4 Scale | nts |
| | | | Drawn | JN |
| | | | Checked | NC |
| | | | Appendix | 2-14 |



stantec.com/uk
© Stantec UK Limited

Client

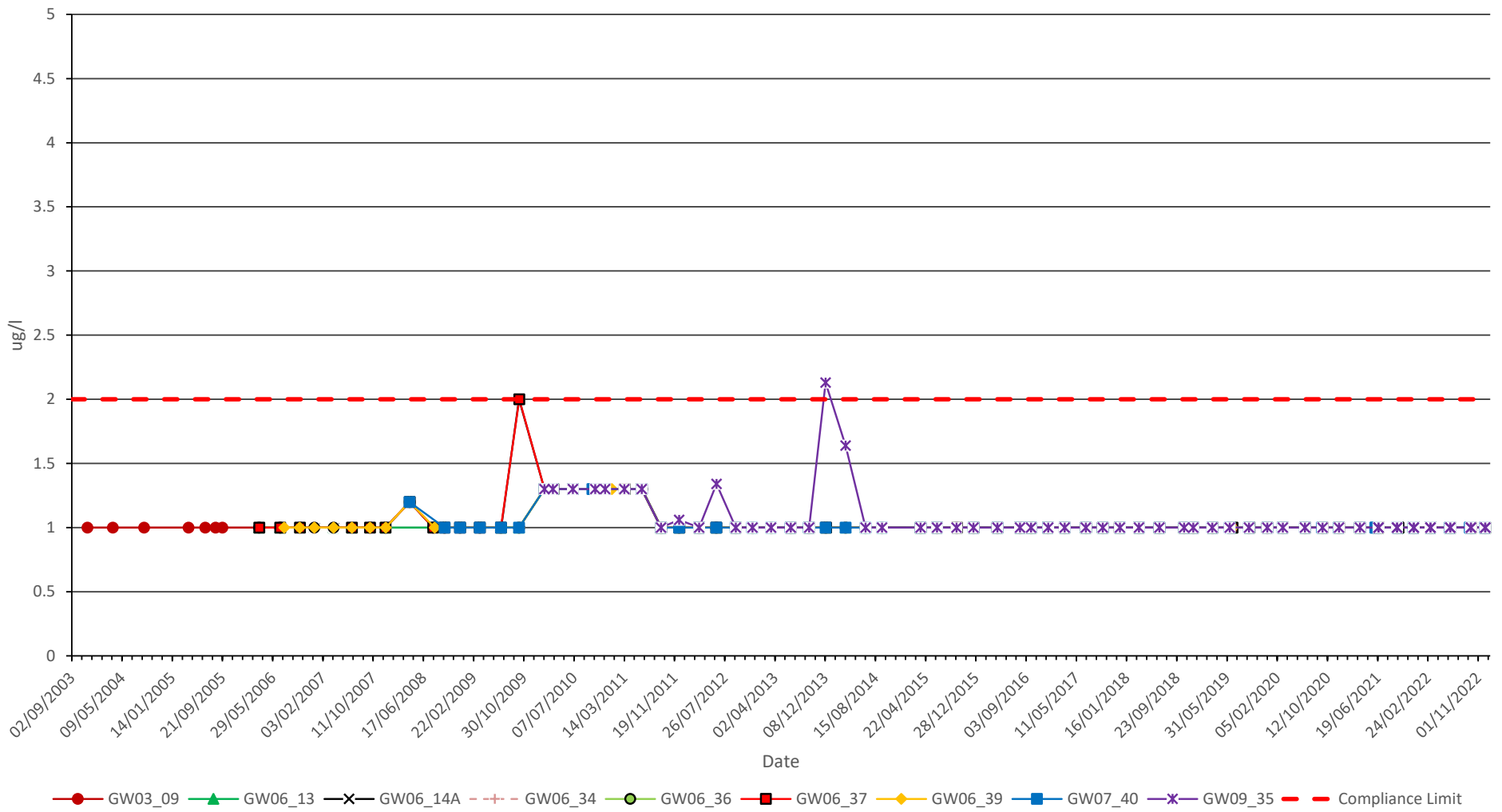
Newport City Council

Dockway Disposal Site

Arsenic in Groundwater

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-15



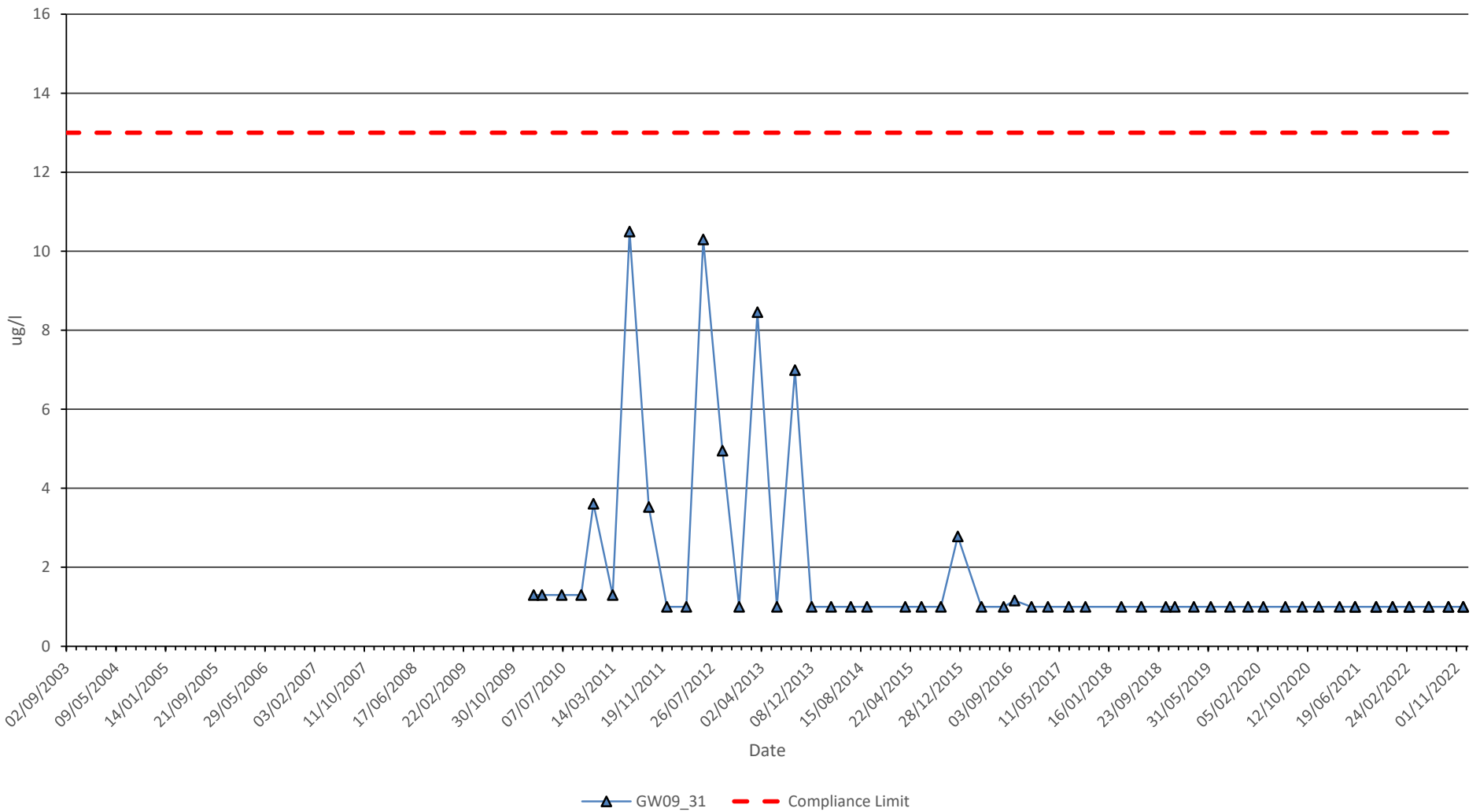
Client
Newport City Council

Docksway Disposal Site

Benzene in Groundwater

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-16

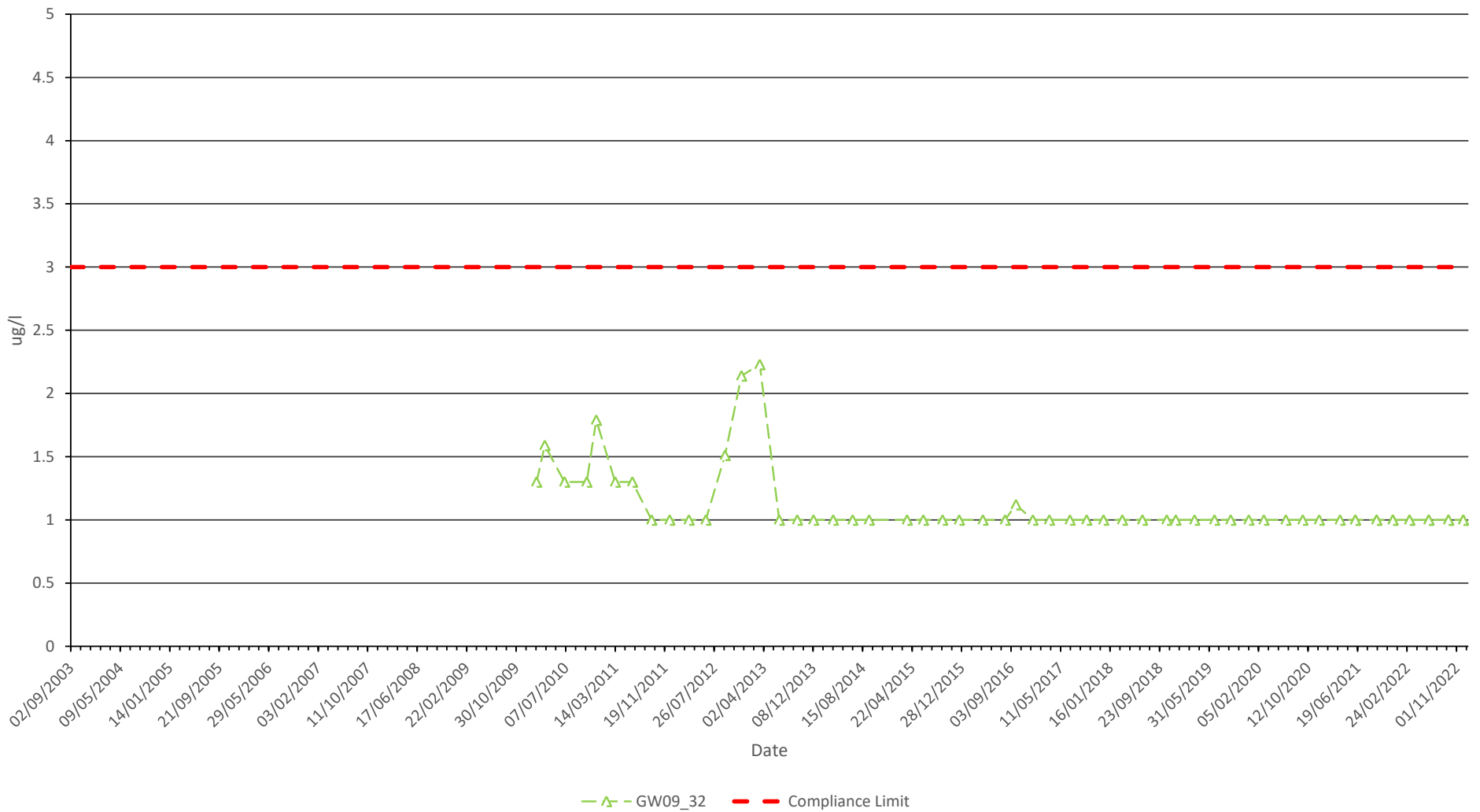


Client
Newport City Council

Docksway Disposal Site
Benzene in Groundwater

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-17

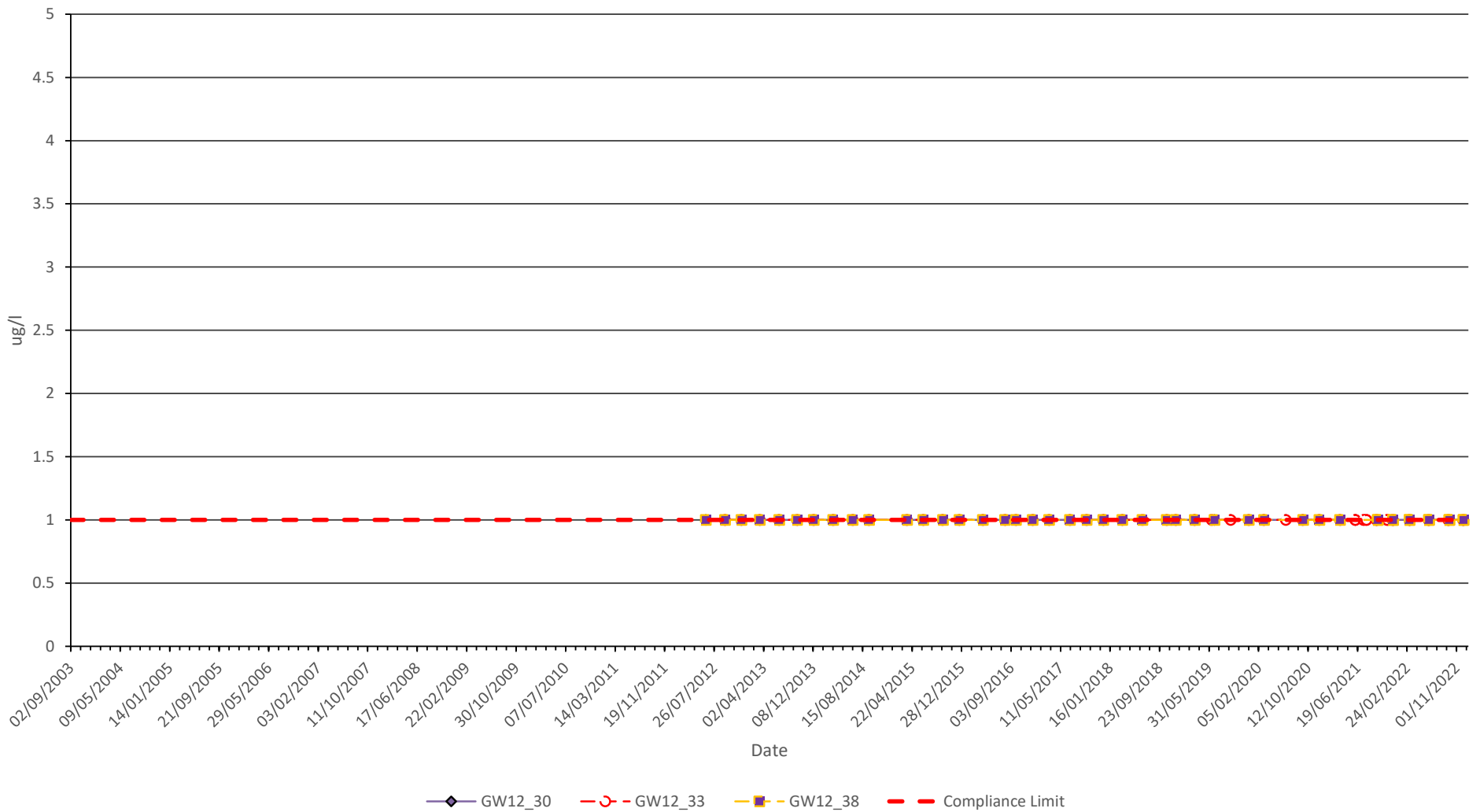


Client
Newport City Council

Docksway Disposal Site
Benzene in Groundwater

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-18



stantec.com/uk
© Stantec UK Limited

Client

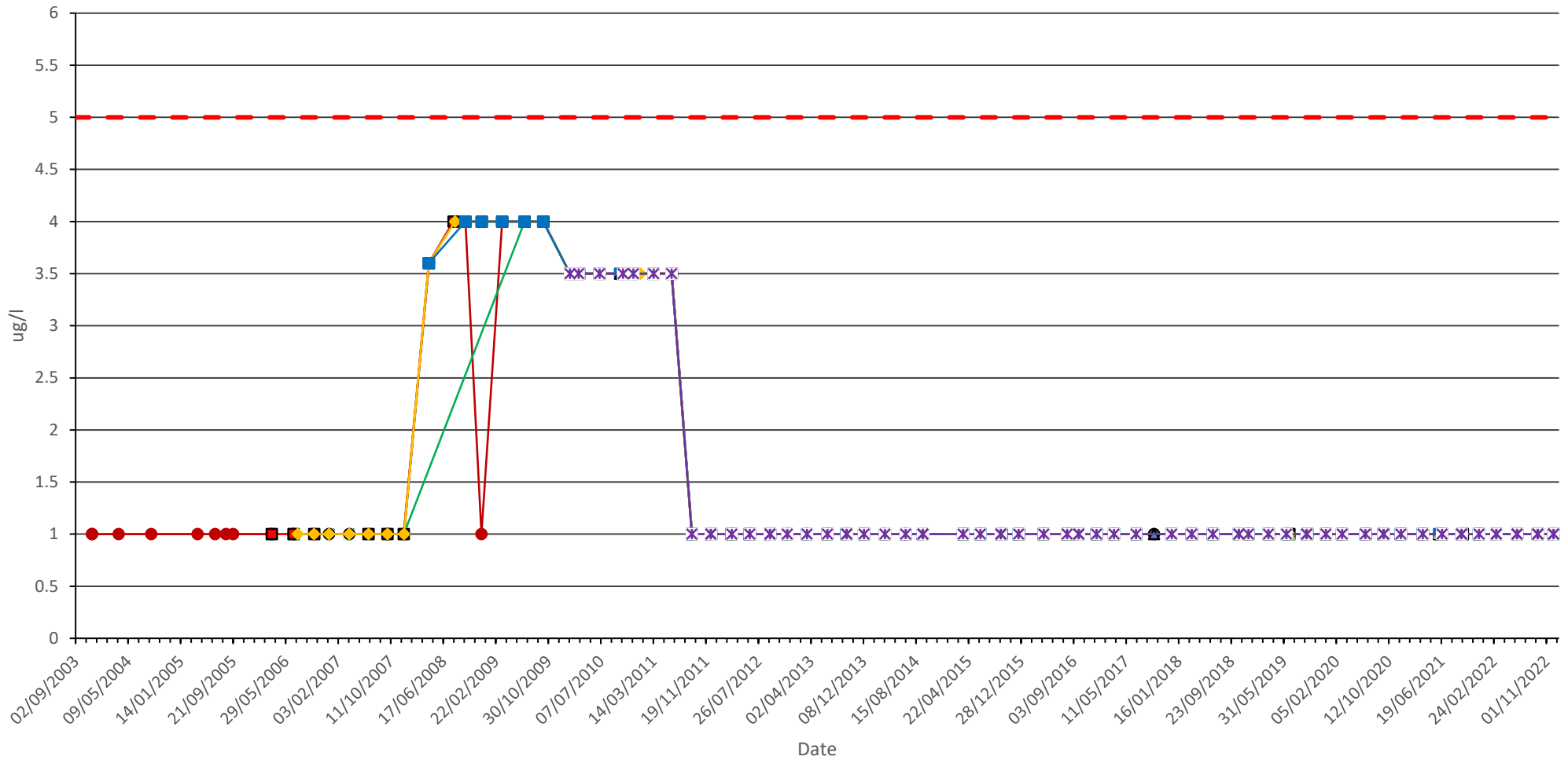
Newport City Council

Docksway Disposal Site

Benzene in Groundwater

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-19



● GW03_09 ▲ GW06_13 × GW06_14A -+ - GW06_34 ● GW06_36 ■ GW06_37
 ◆ GW06_39 ■ GW07_40 ▲ GW09_31 ▲ GW09_32 × GW09_35 - - - Compliance Limit



stantec.com/uk
© Stantec UK Limited

Client

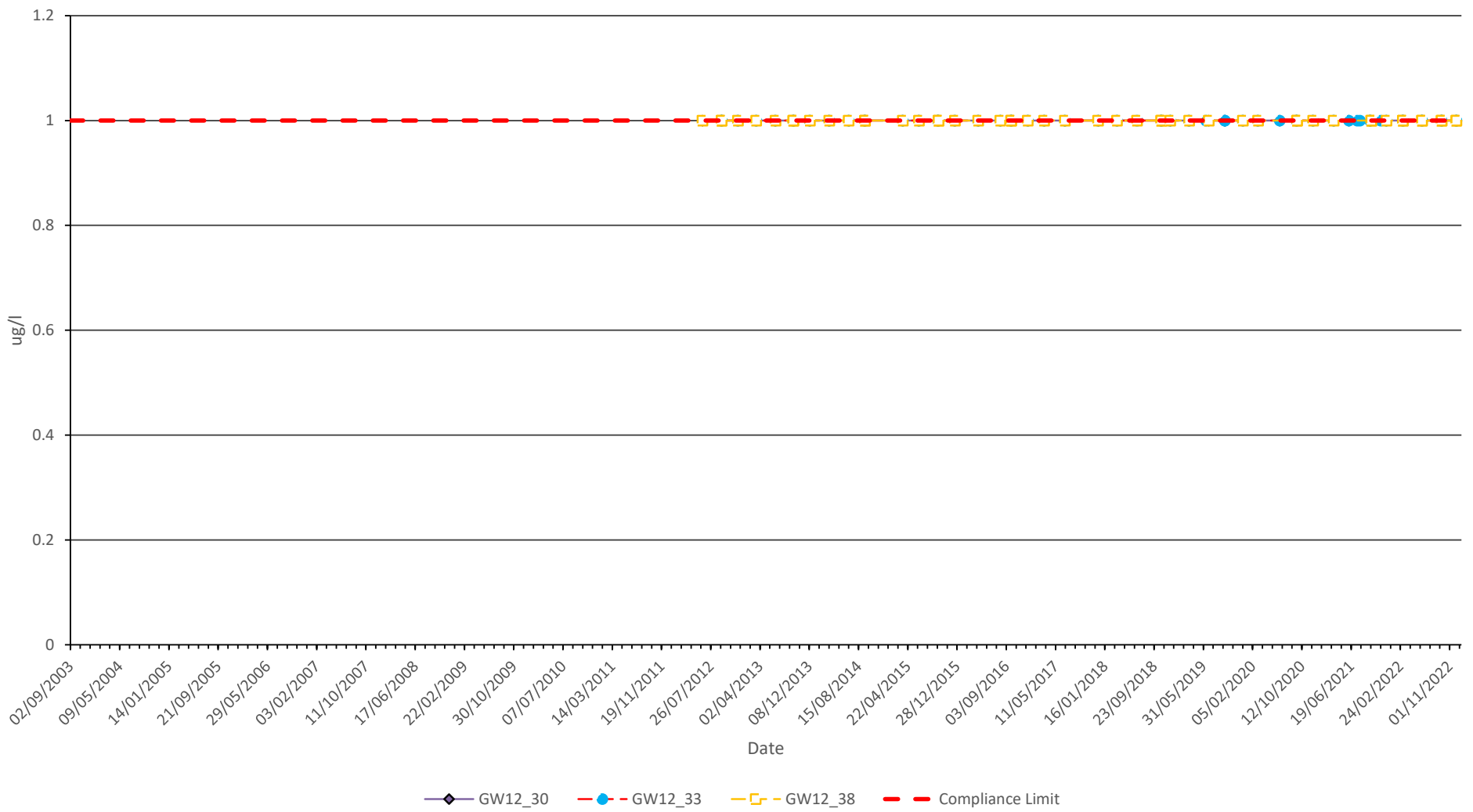
Newport City Council

Docksway Disposal Site

Naphthalene in Groundwater

| | |
|----------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-20

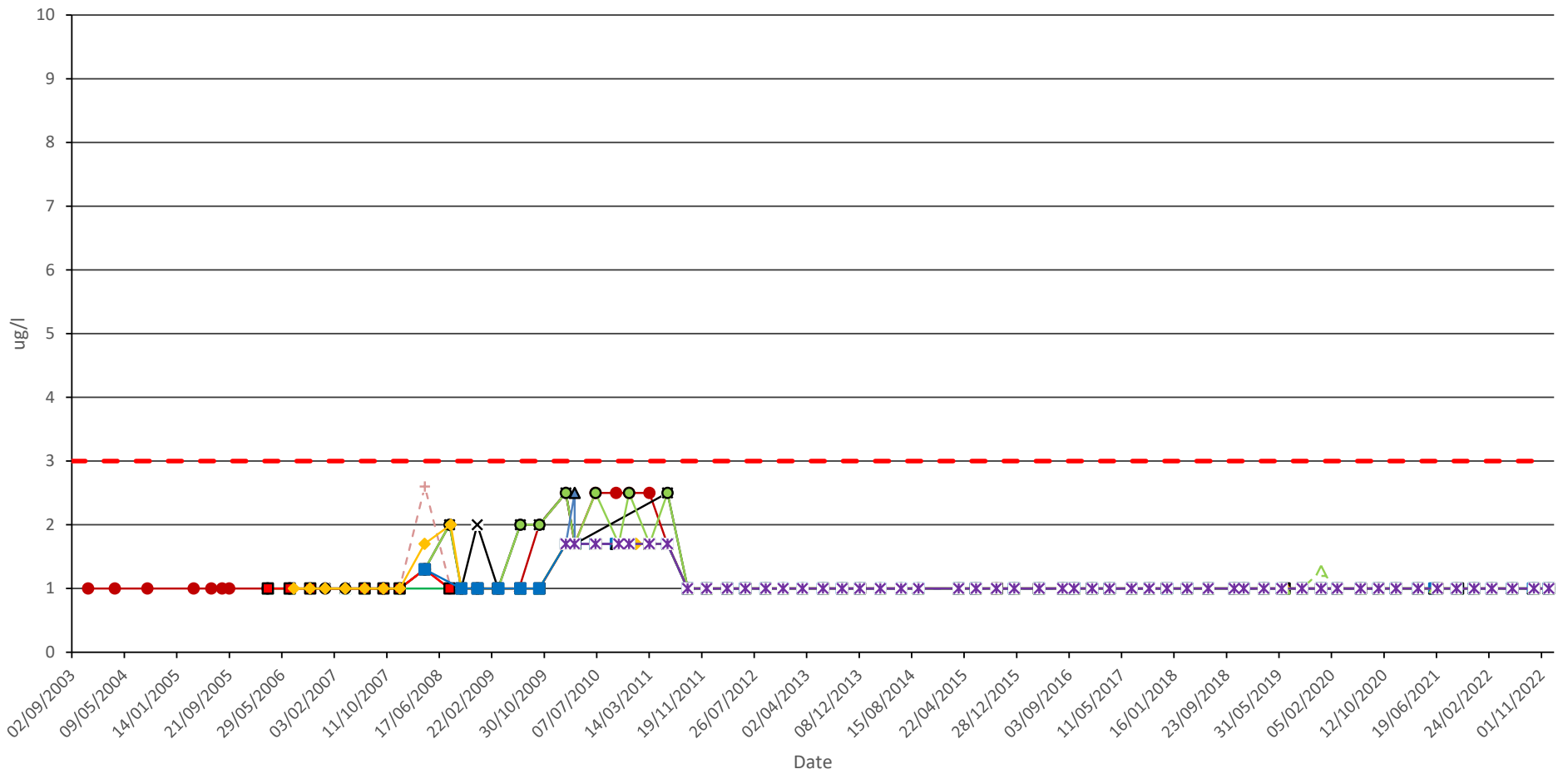


Client
Newport City Council

Docksway Disposal Site
Naphthalene in Groundwater

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-21



● GW03_09 ▲ GW06_13 × GW06_14A - - + - GW06_34 ● GW06_36 ■ GW06_37
 ◆ GW06_39 ■ GW07_40 ▲ GW09_31 ▲ GW09_32 × GW09_35 - - - Compliance Limit



stantec.com/uk
© Stantec UK Limited

Client

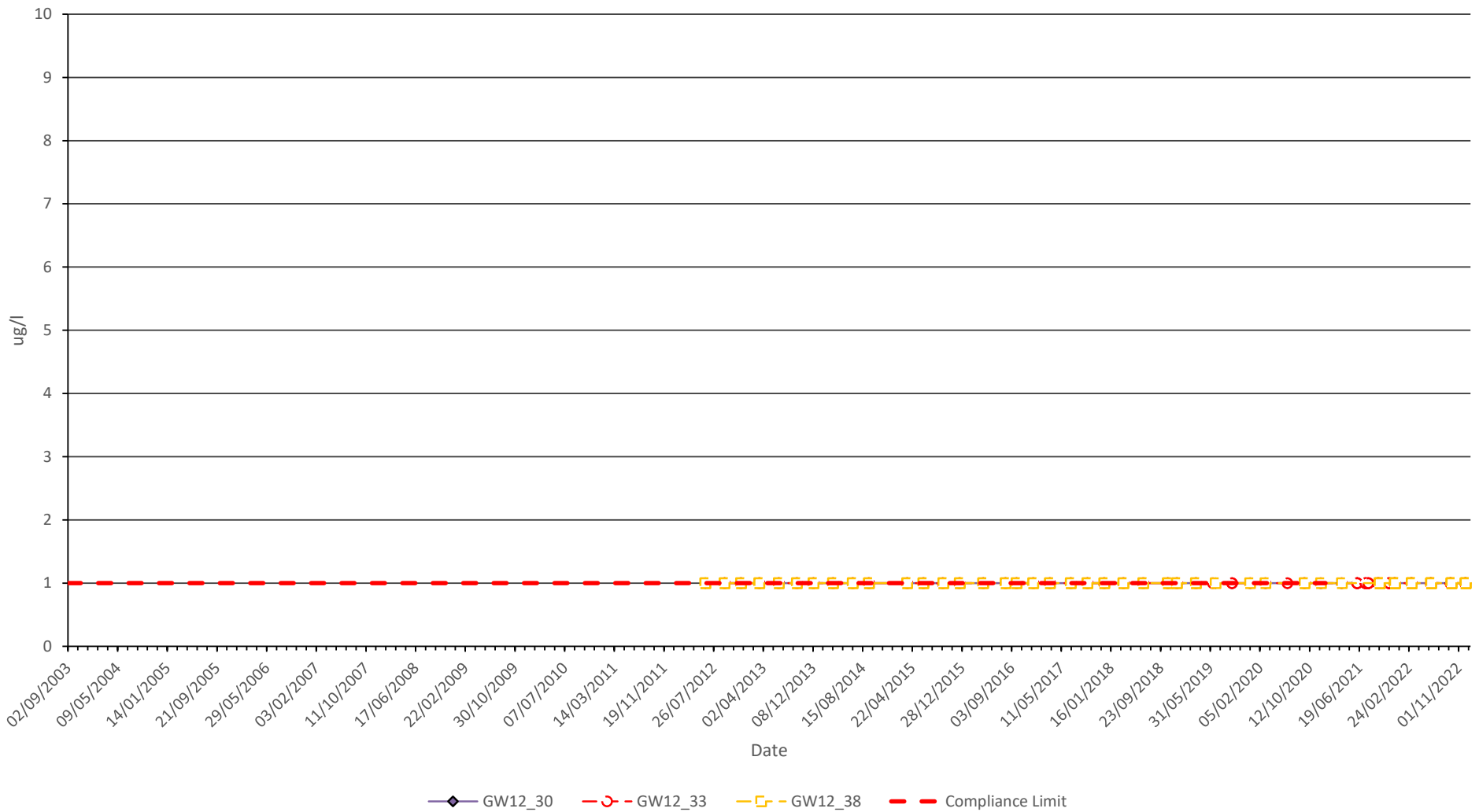
Newport City Council

Docksway Disposal Site

Xylene in Groundwater

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-22



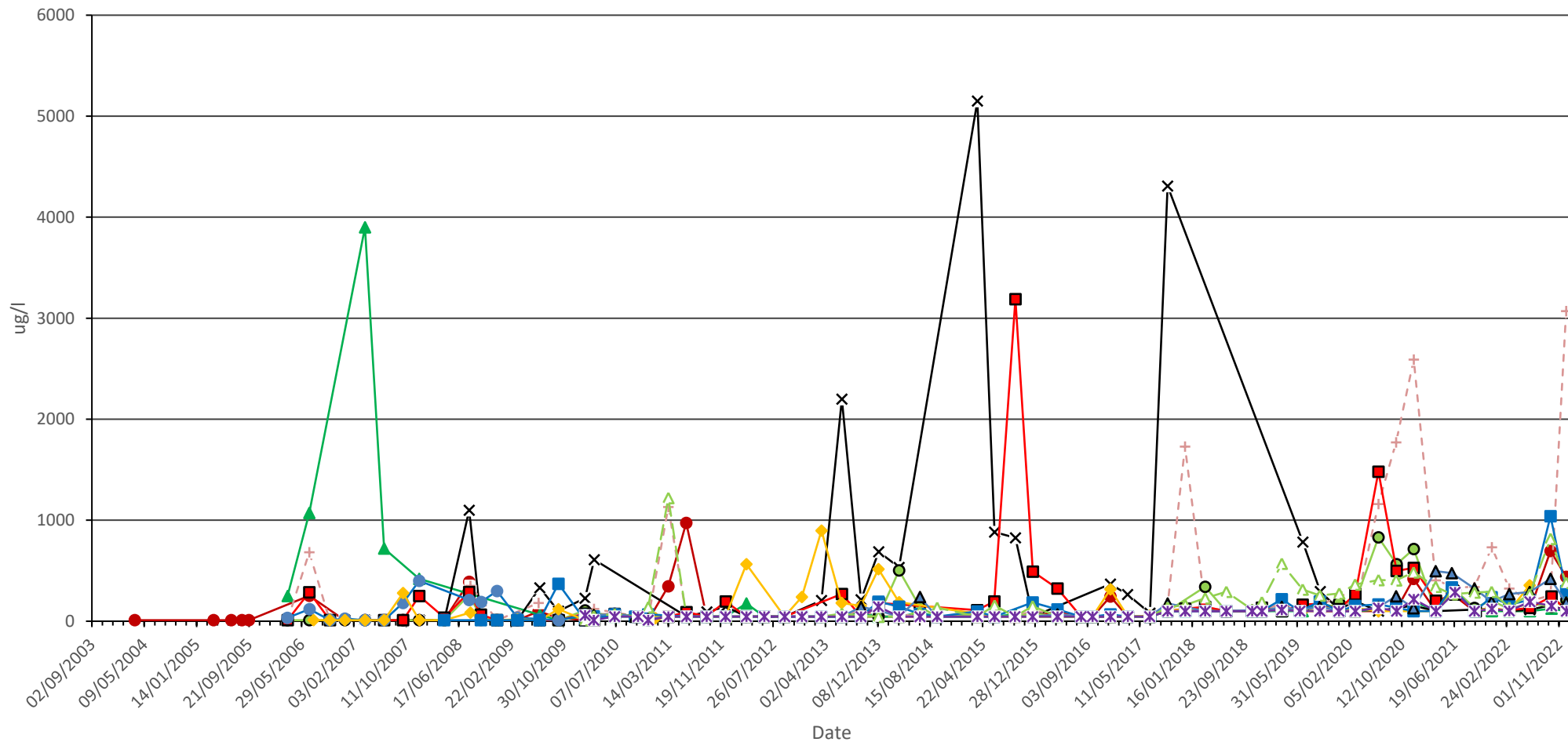
Client
Newport City Council

Docksway Disposal Site

Xylene in Groundwater

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-23



● GW03_09 ▲ GW06_13 × GW06_14A - - - GW06_34 ● GW06_36 ■ GW06_37
 ● GW06_38 ◆ GW06_39 ■ GW07_40 ▲ GW09_31 ▲ GW09_32 × GW09_35



stantec.com/uk
© Stantec UK Limited

Client

Newport City Council

Docksway Disposal Site

EPH in Groundwater

Date February 2023

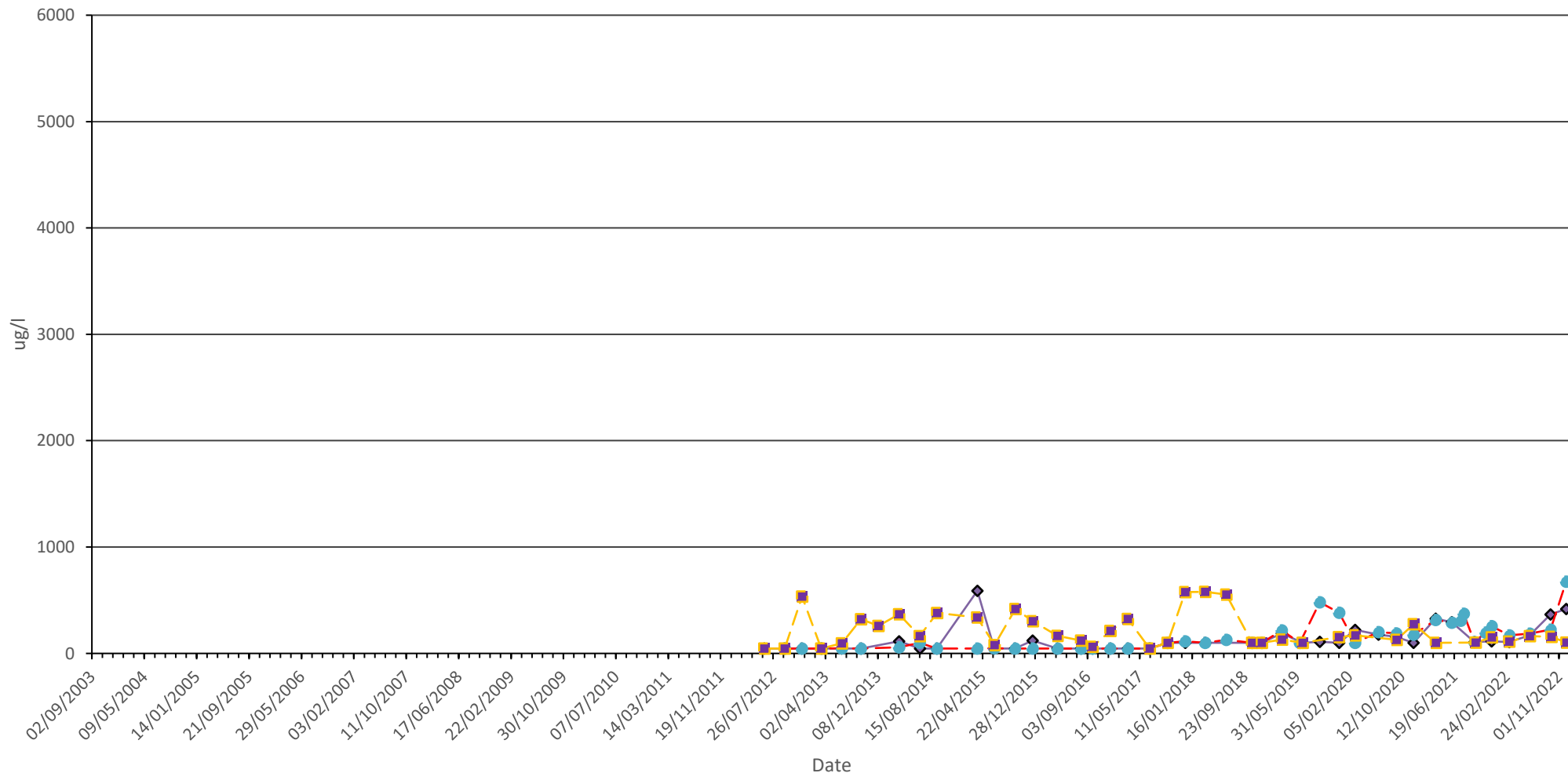
A4 Scale nts

Drawn JN

Checked NC

Appendix

2-24



◆ GW12_30 ● GW12_33 ■ GW12_38



stantec.com/uk
© Stantec UK Limited

Client

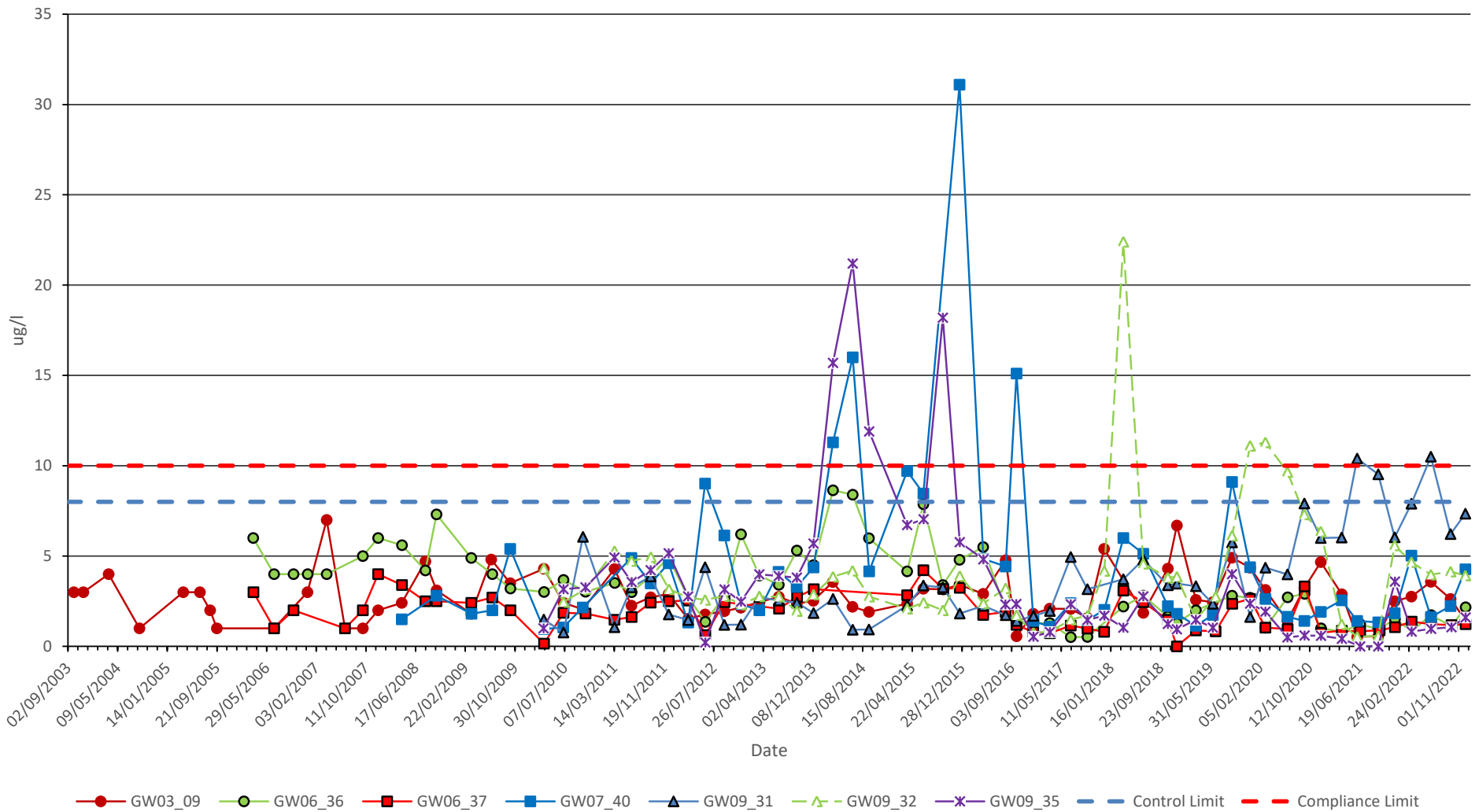
Newport City Council

Dockway Disposal Site

EPH in Groundwater

| | |
|----------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-25



stantec.com/uk
© Stantec UK Limited

Client

Newport City Council

Docksway Disposal Site

Nickel in Groundwater

Date January 2023

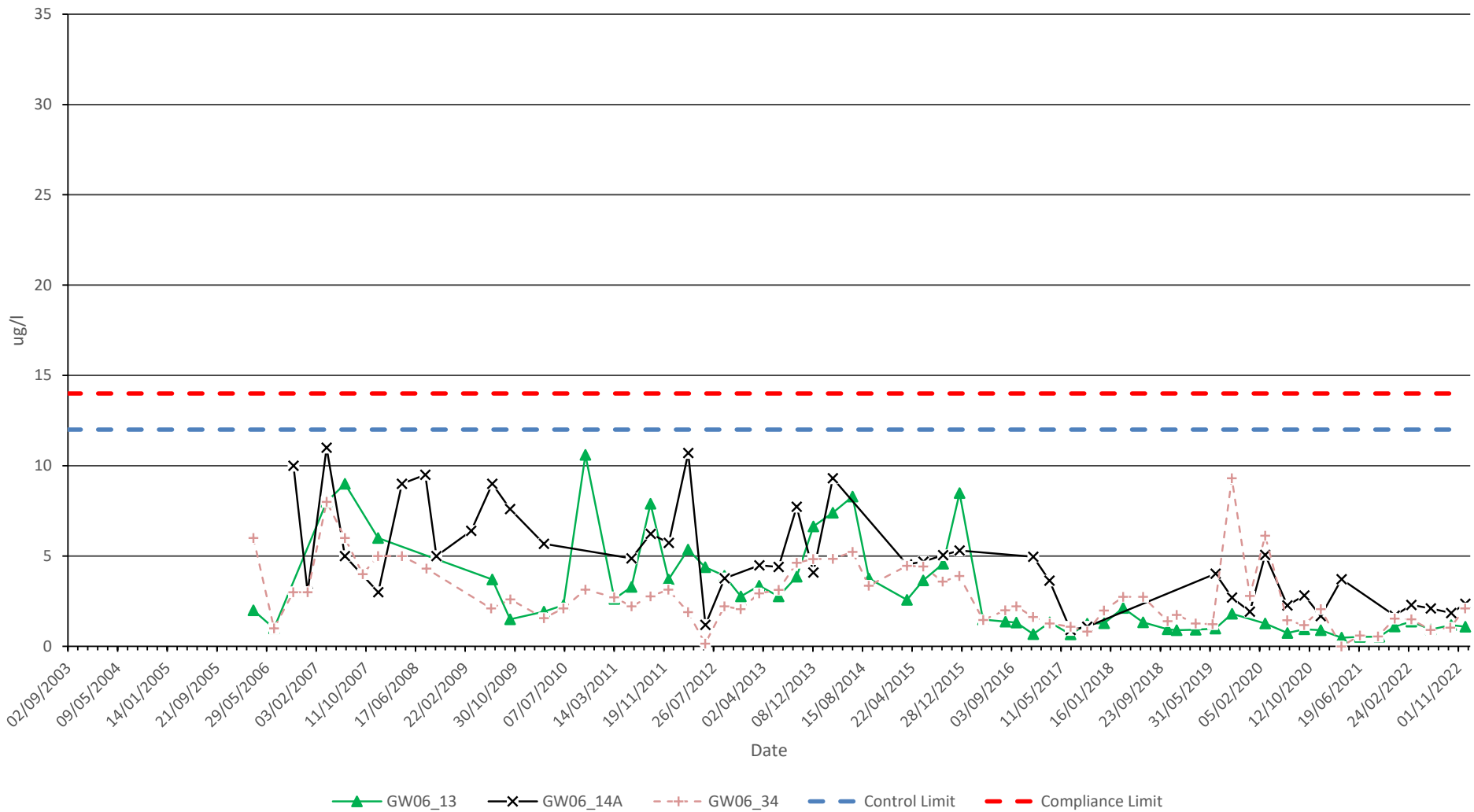
A4 Scale nts

Drawn JN

Checked NC

Appendix

2-26



stantec.com/uk
© Stantec UK Limited

Client

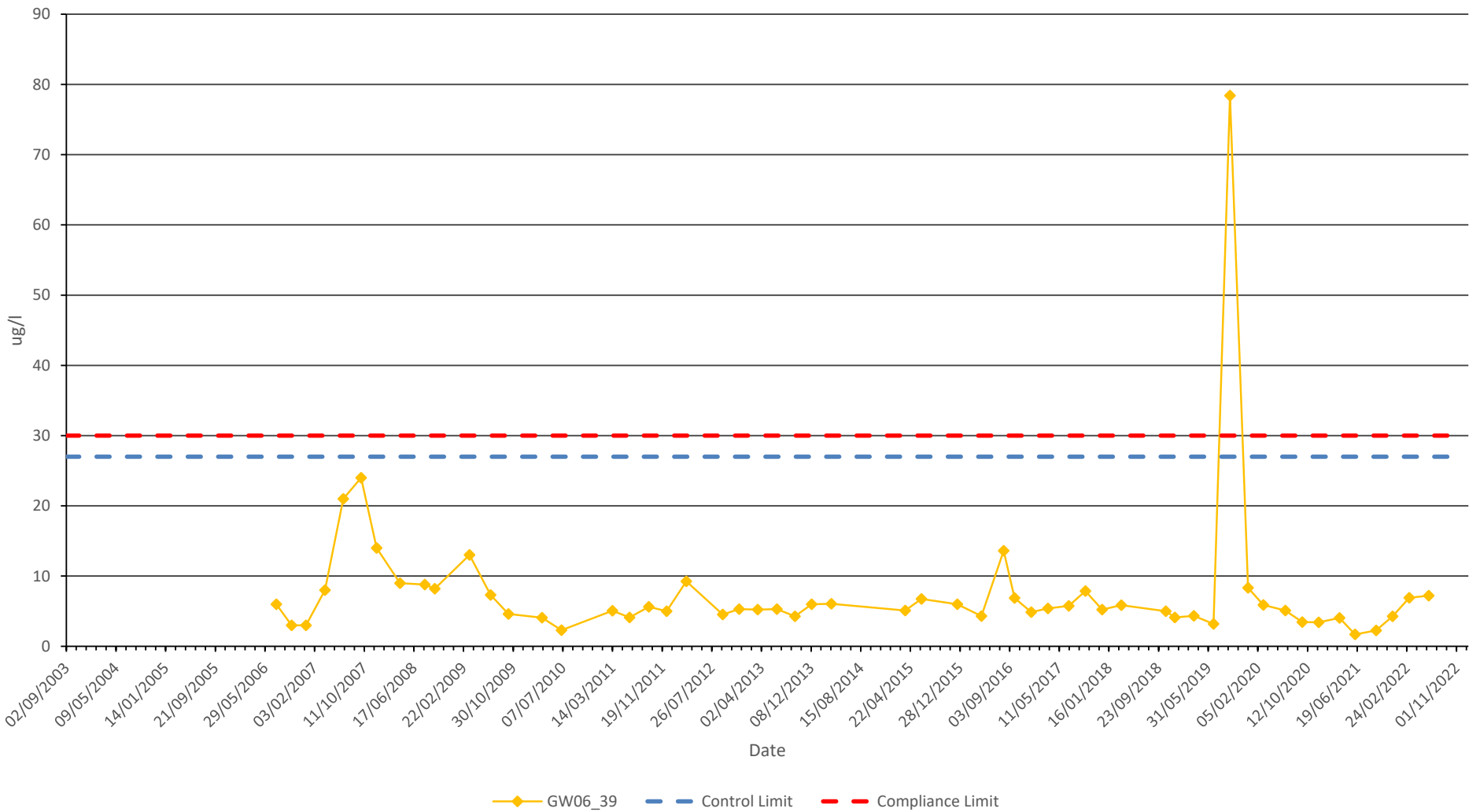
Newport City Council

Docksway Disposal Site

Nickel in Groundwater

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-27



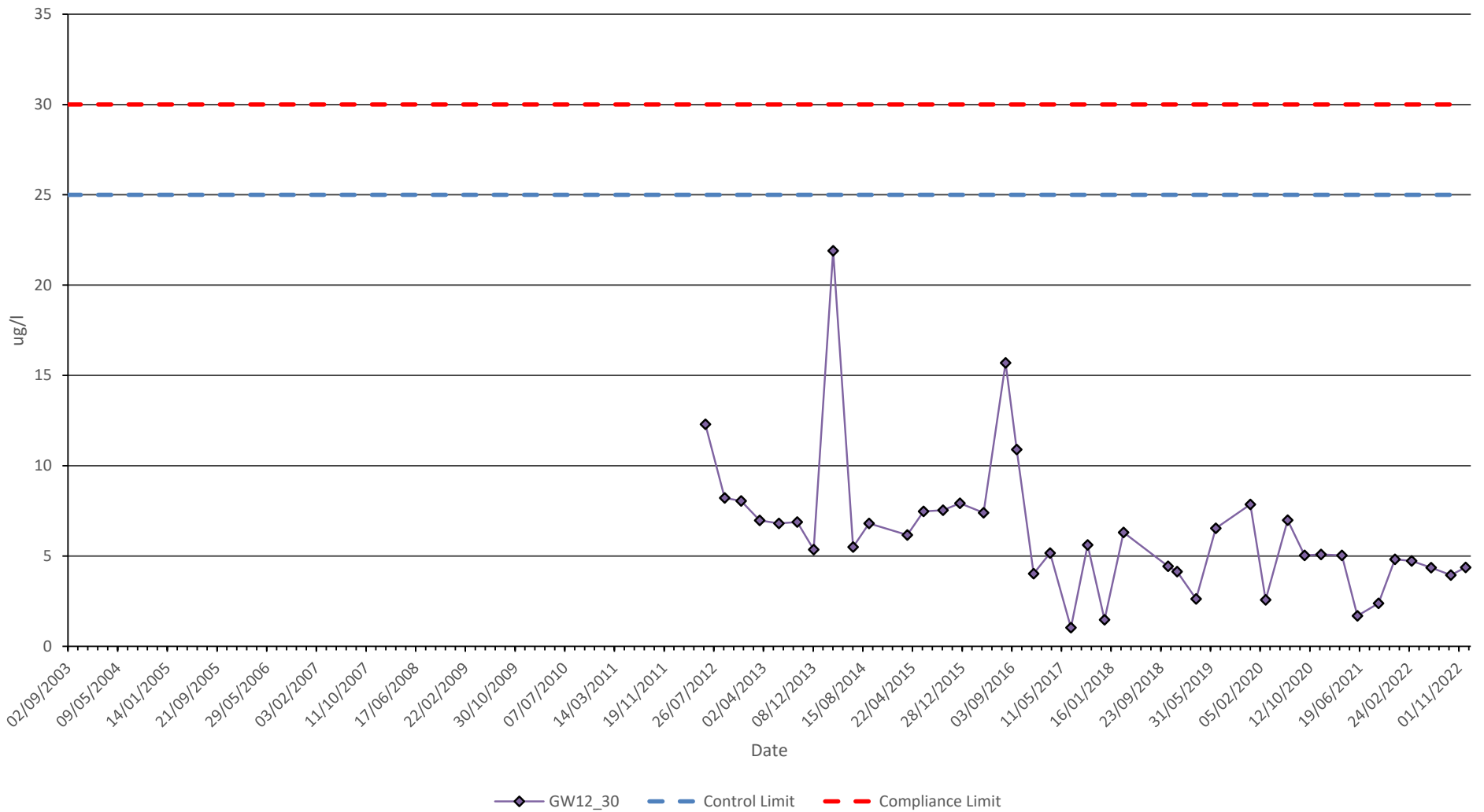
Client
Newport City Council

Docksway Disposal Site

Nickel in Groundwater

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-28



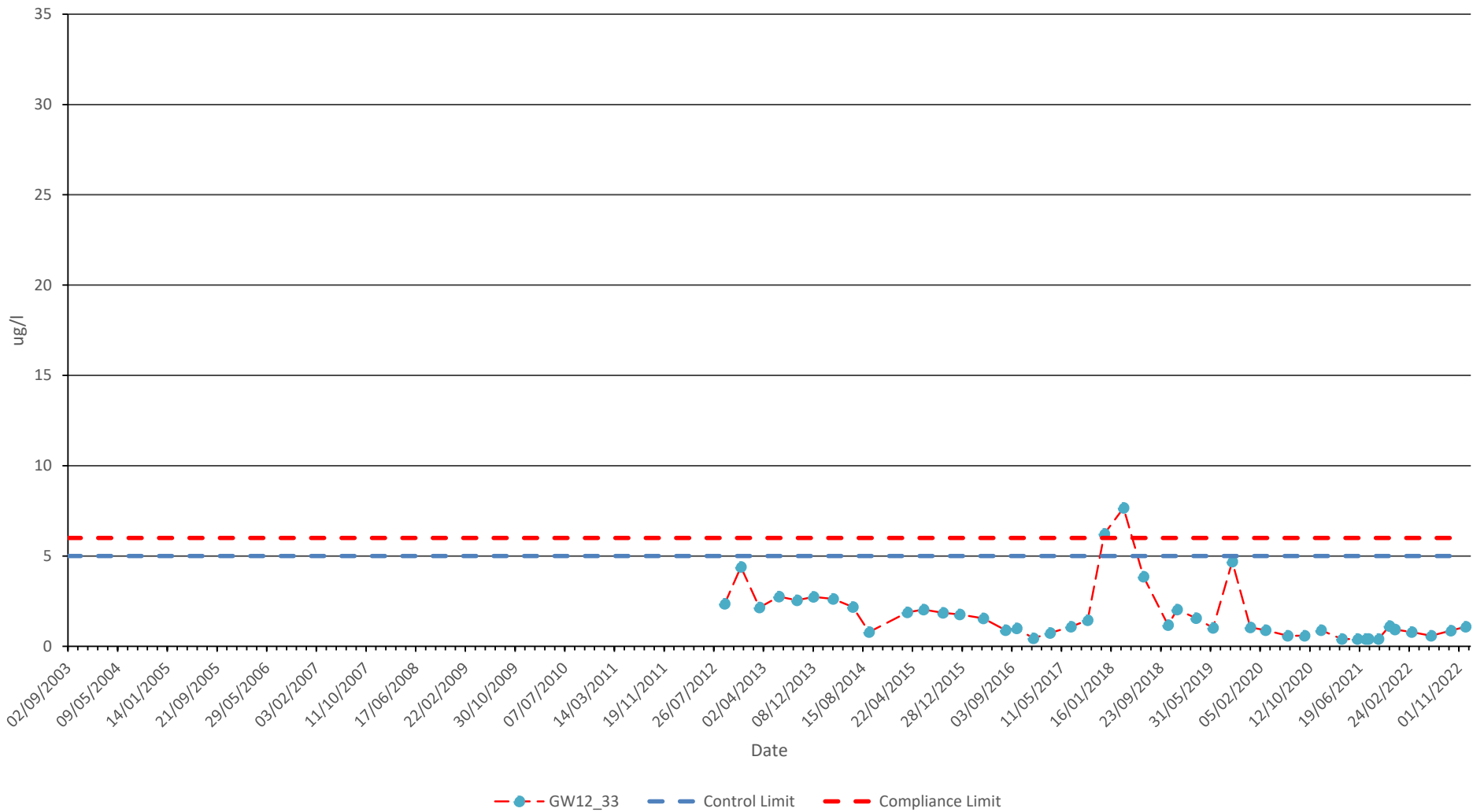
Client
Newport City Council

Docksway Disposal Site

Nickel in Groundwater

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-29



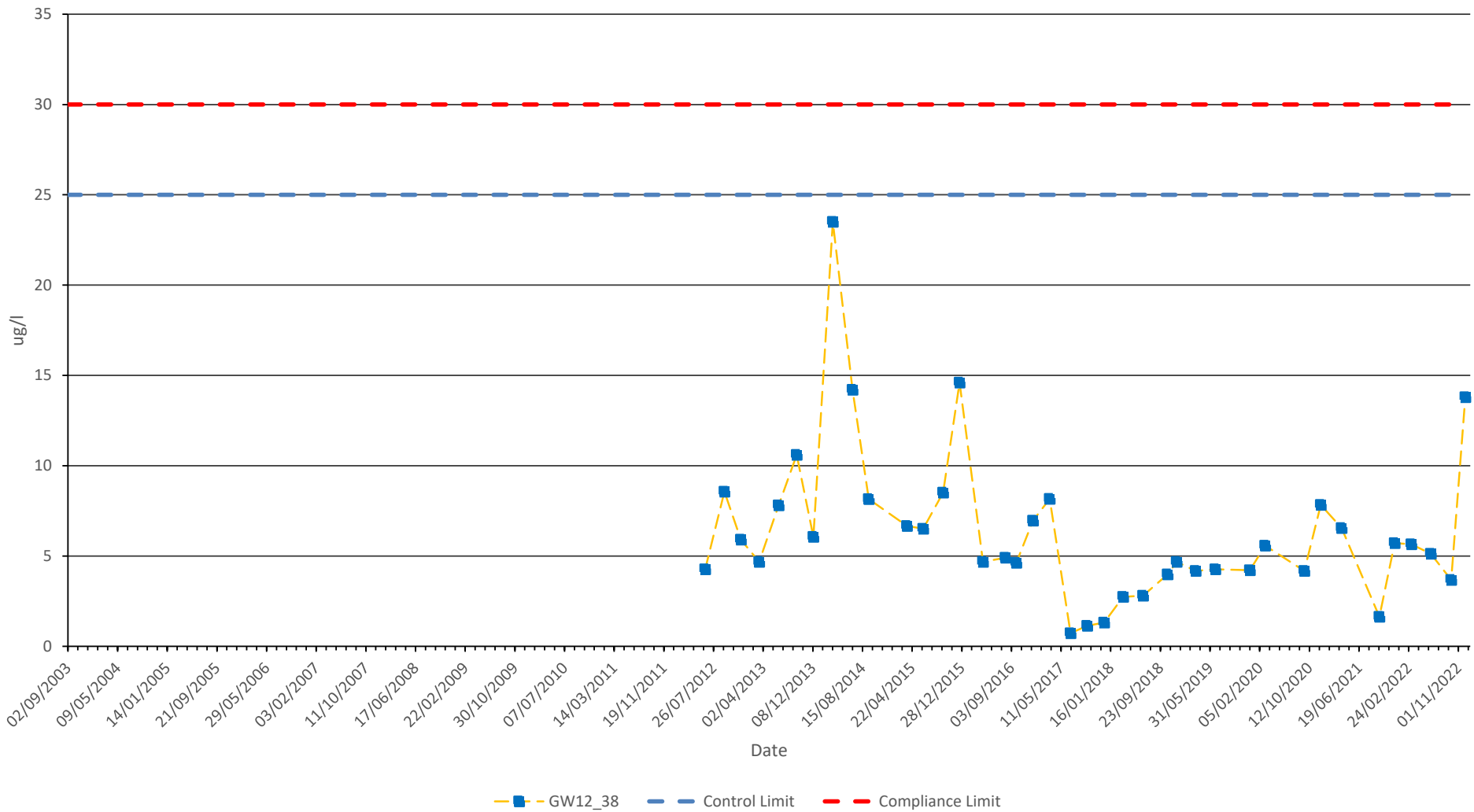
Client
Newport City Council

Docksway Disposal Site

Nickel in Groundwater

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-30



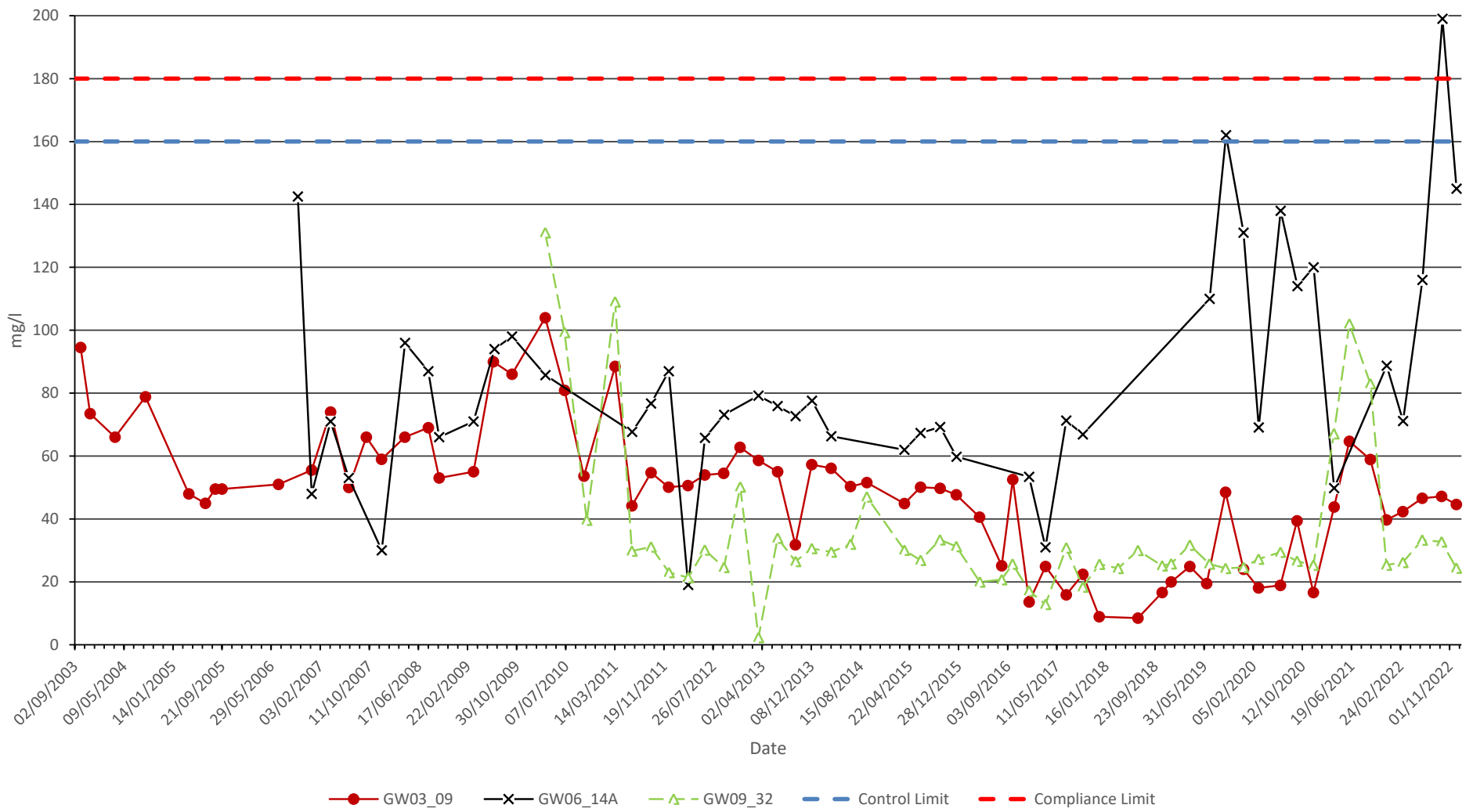
Client
Newport City Council

Dockway Disposal Site

Nickel in Groundwater

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-31

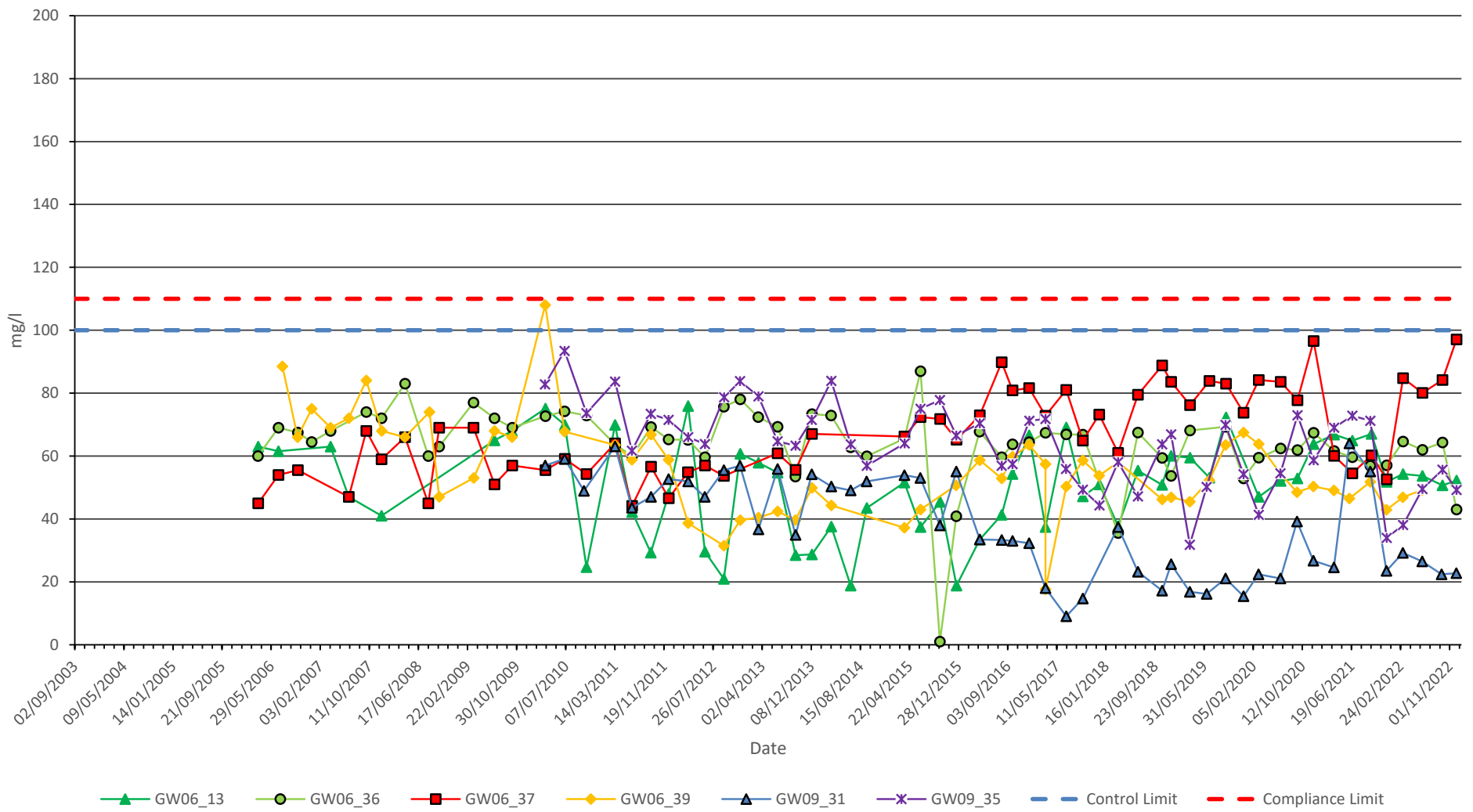


Client
Newport City Council

Docksway Disposal Site

Potassium in Groundwater

| | |
|-----------------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |
| Appendix | 2-32 |



stantec.com/uk
© Stantec UK Limited

Client

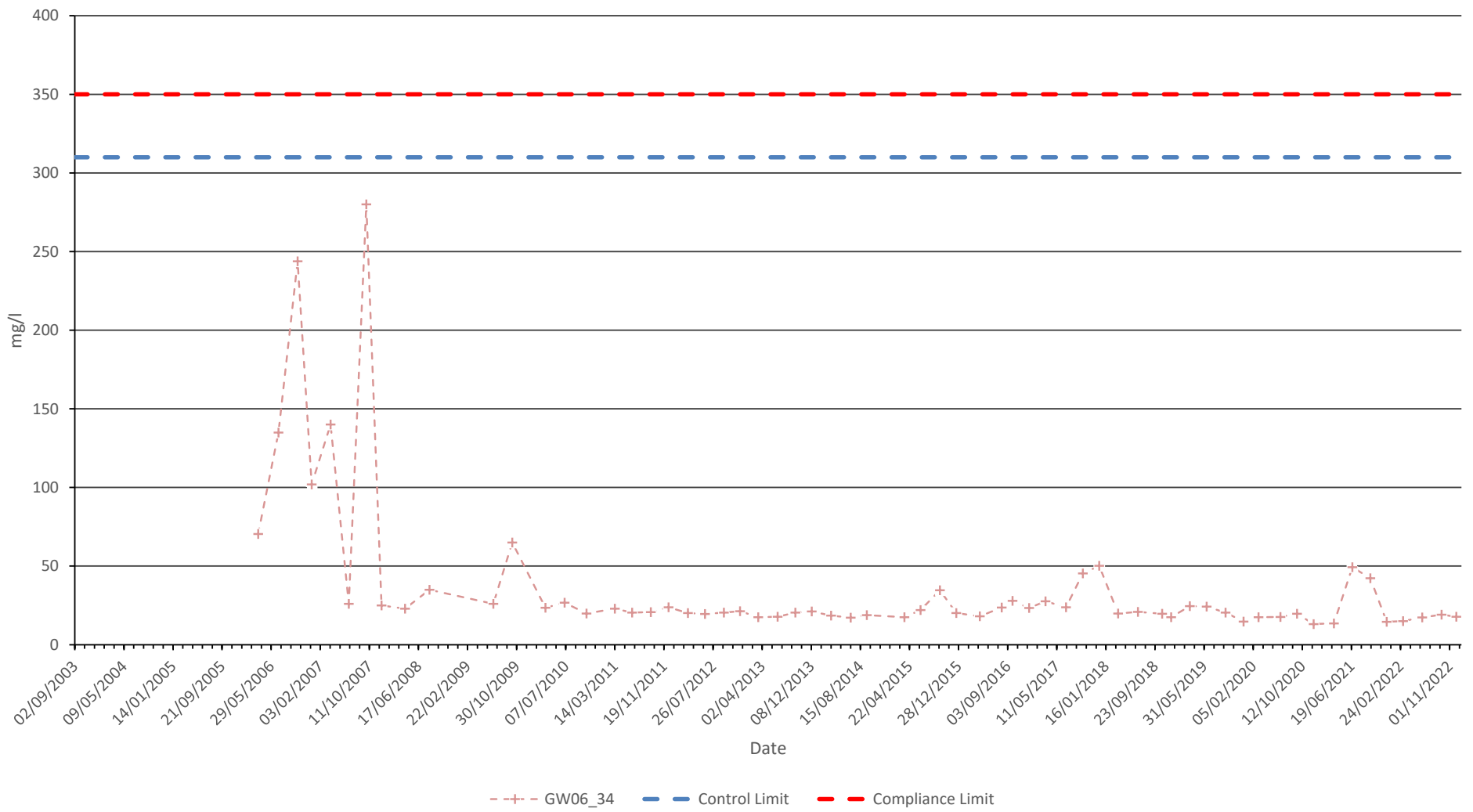
Newport City Council

Docksway Disposal Site

Potassium in Groundwater

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-33

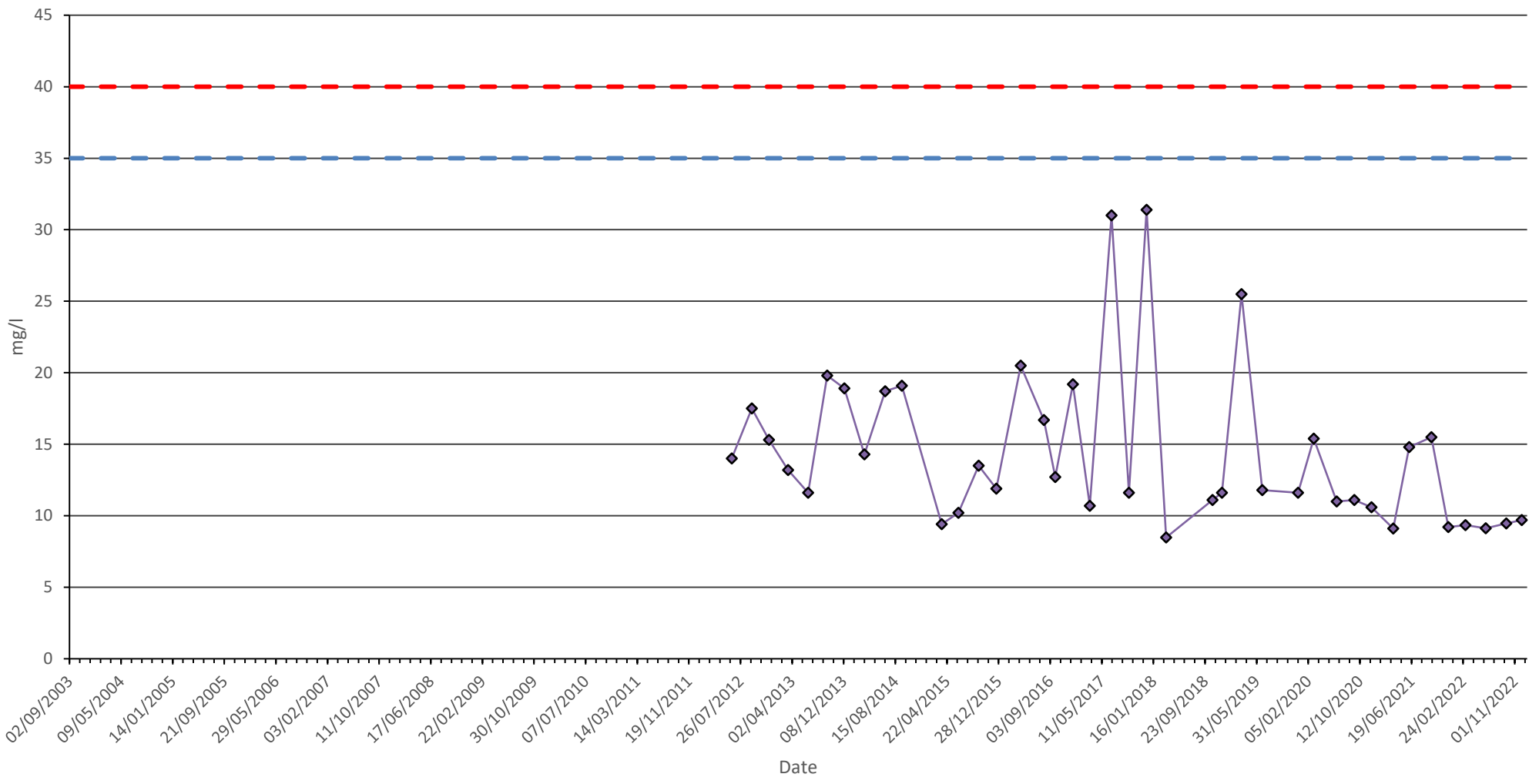


Client
Newport City Council

Docksway Disposal Site
Potassium in Groundwater

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
2-34



◆ GW12_30
 - - - Control Limit
 - - - Compliance Limit



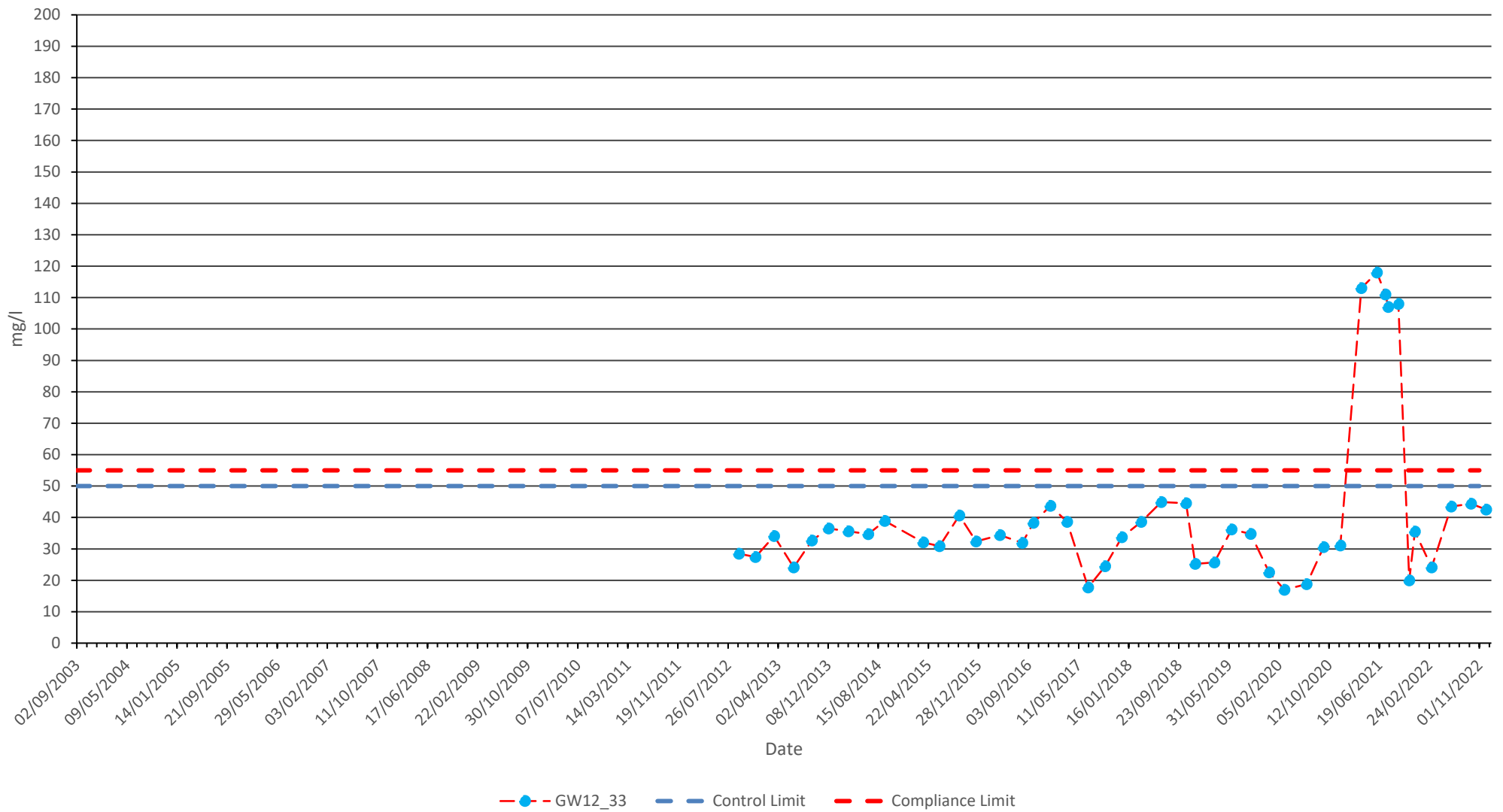
Stantec
 stantec.com/uk
 © Stantec UK Limited

Client
Newport City Council

Docksway Disposal Site

Potassium in Groundwater

| | |
|-----------------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |
| Appendix | 2-35 |

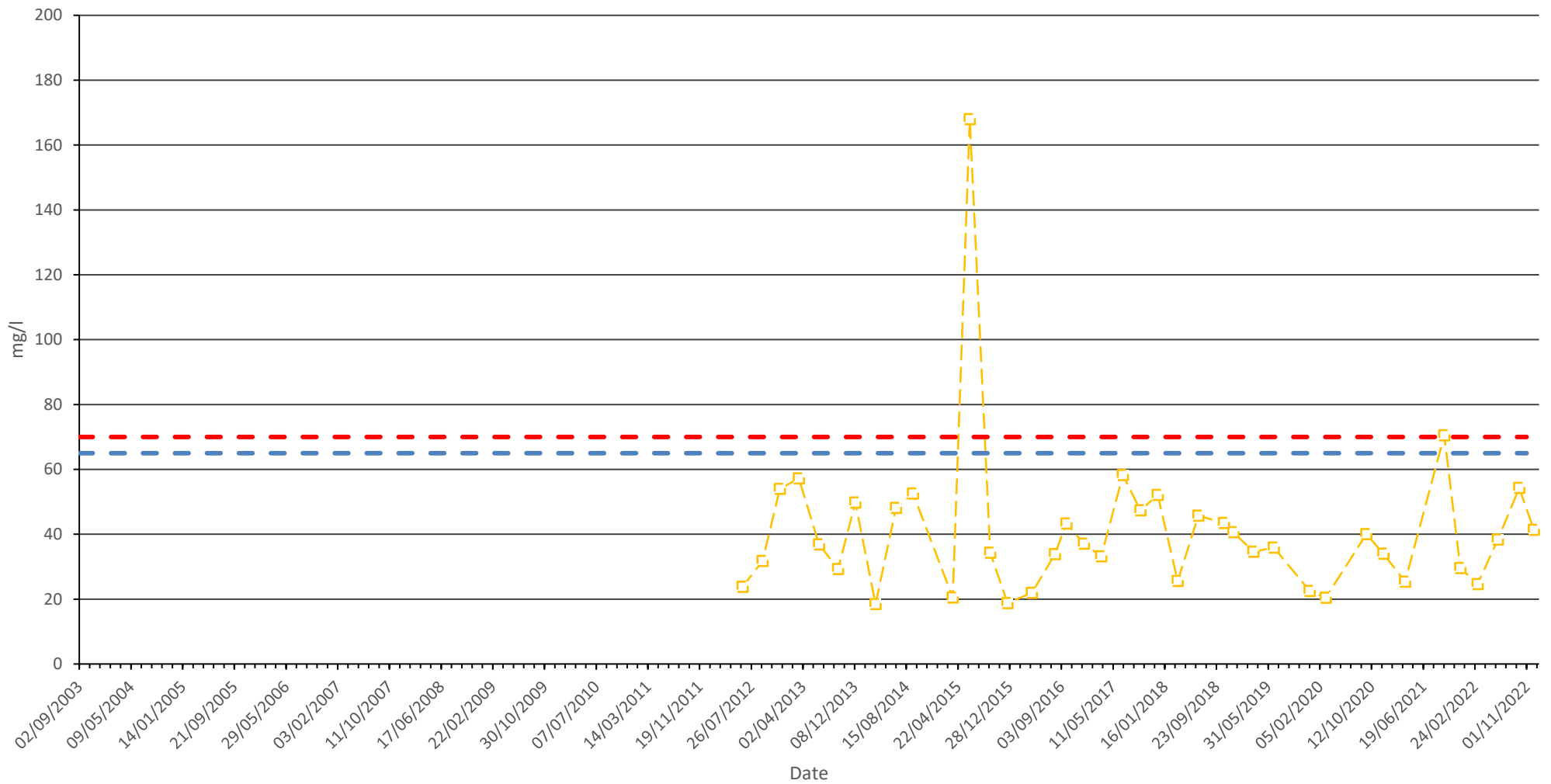



Stantec
stantec.com/uk
© Stantec UK Limited

Client
Newport City Council

Docksway Disposal Site
Potassium in Groundwater

| | |
|-----------------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |
| Appendix | 2-36 |



GW12_38 Control Limit Compliance Limit

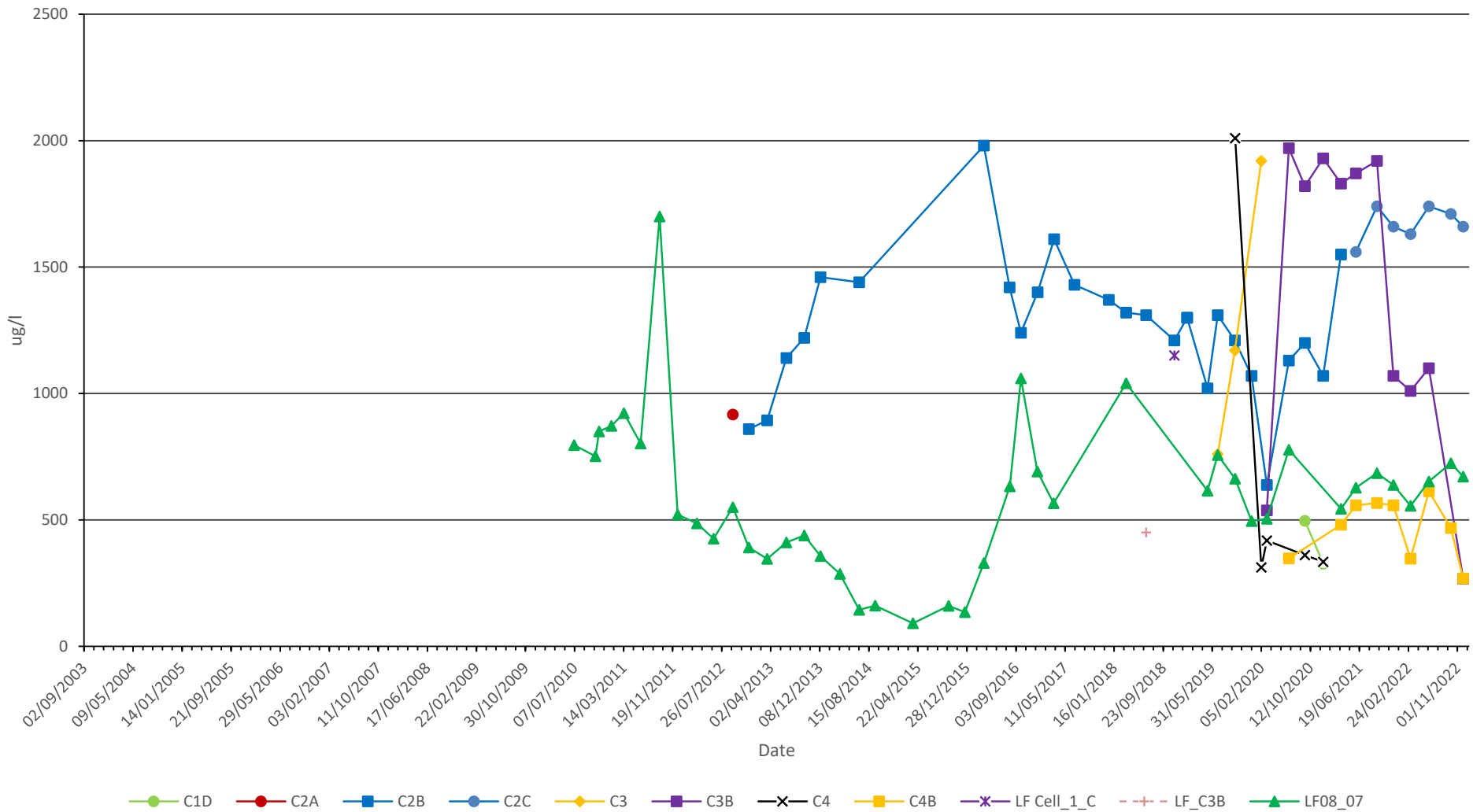
stantec.com/uk
© Stantec UK Limited

Client
Newport City Council

Docksway Disposal Site
Potassium in Groundwater

| | |
|-----------------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |
| Appendix | 2-37 |

Appendix 3 Leachate Chemistry Graphs



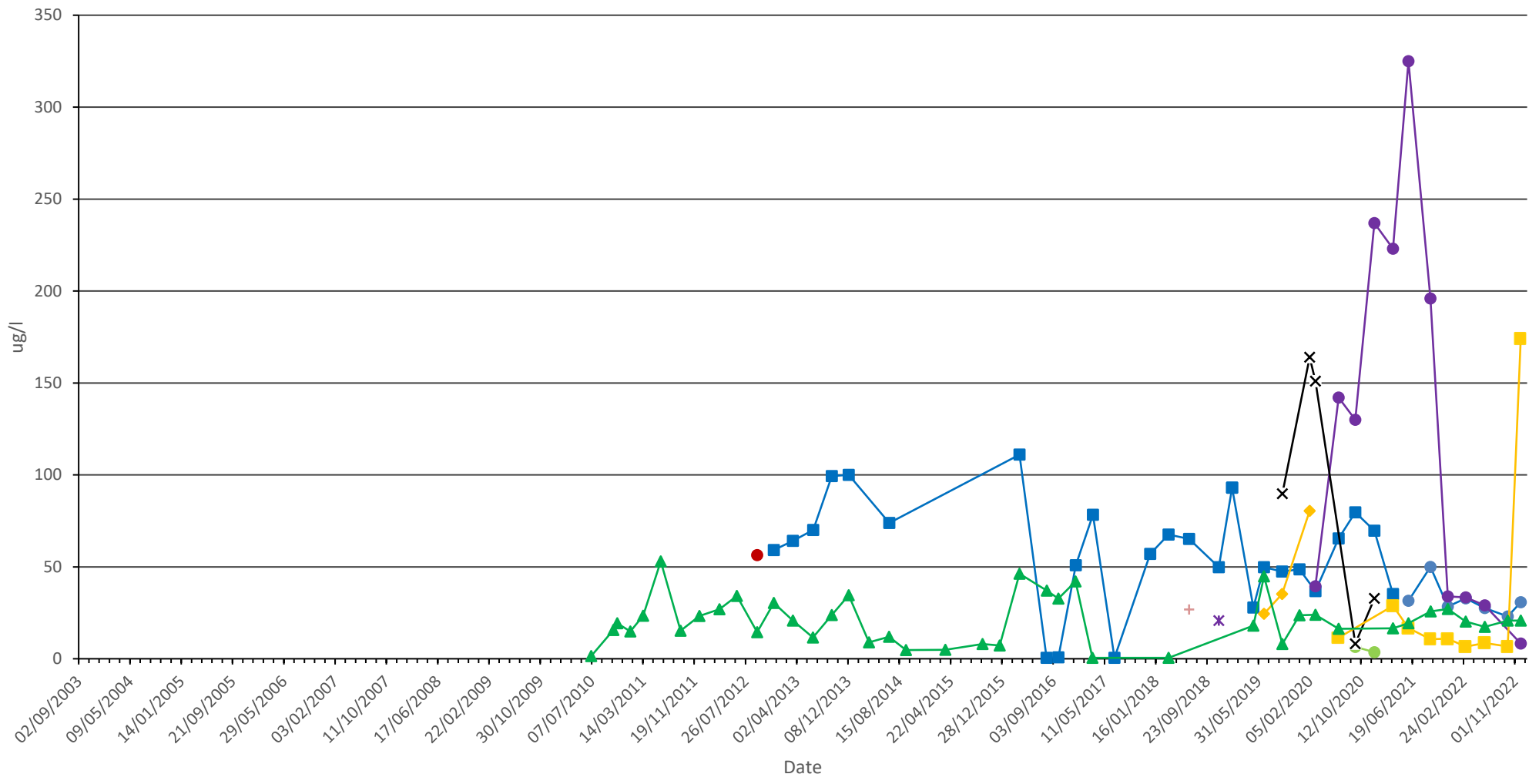
Client
Newport City Council

Docksway Disposal Site

Ammoniacal Nitrogen in Leachate

| | |
|----------|--------------|
| Date | January 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
3-1



● C1D
 ● C2A
 ■ C2B
 ● C2C
 ◆ C3
 ● C3B
 ✕ C4
 ■ C4B
 ✕ LF Cell_1_C
 + + + LF_C3B
 ▲ LF08_07



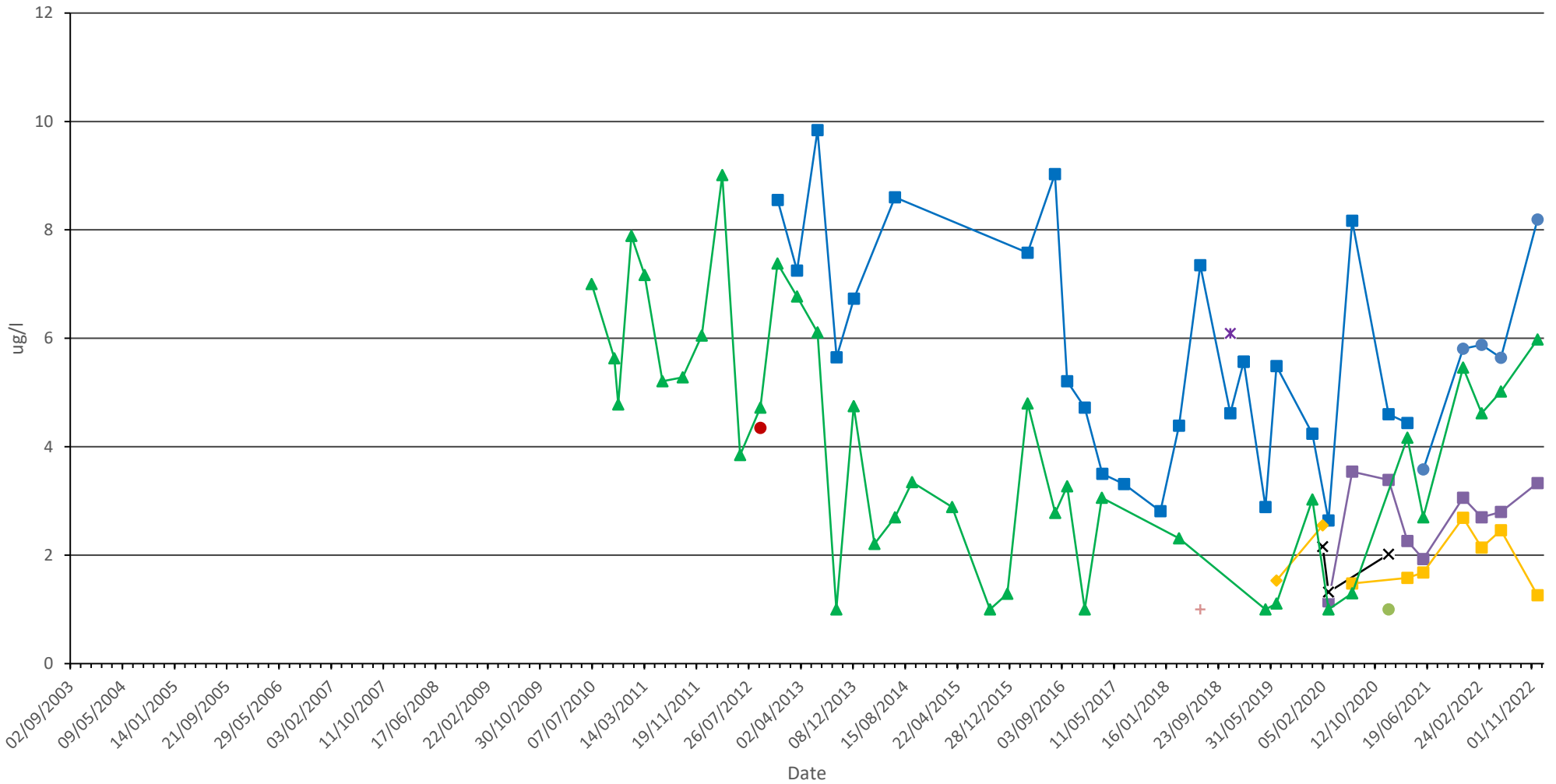
Stantec
 stantec.com/uk
 © Stantec UK Limited

Client
Newport City Council

Docksway Disposal Site

Arsenic in Leachate

| | |
|-----------------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |
| Appendix | 3-2 |



● C1D
 ● C2A
 ■ C2B
 ● C2C
 ◆ C3
 ■ C3B
 × C4
 ■ C4B
 × LF Cell_1_C
 + LF_C3B
 ▲ LF08_07



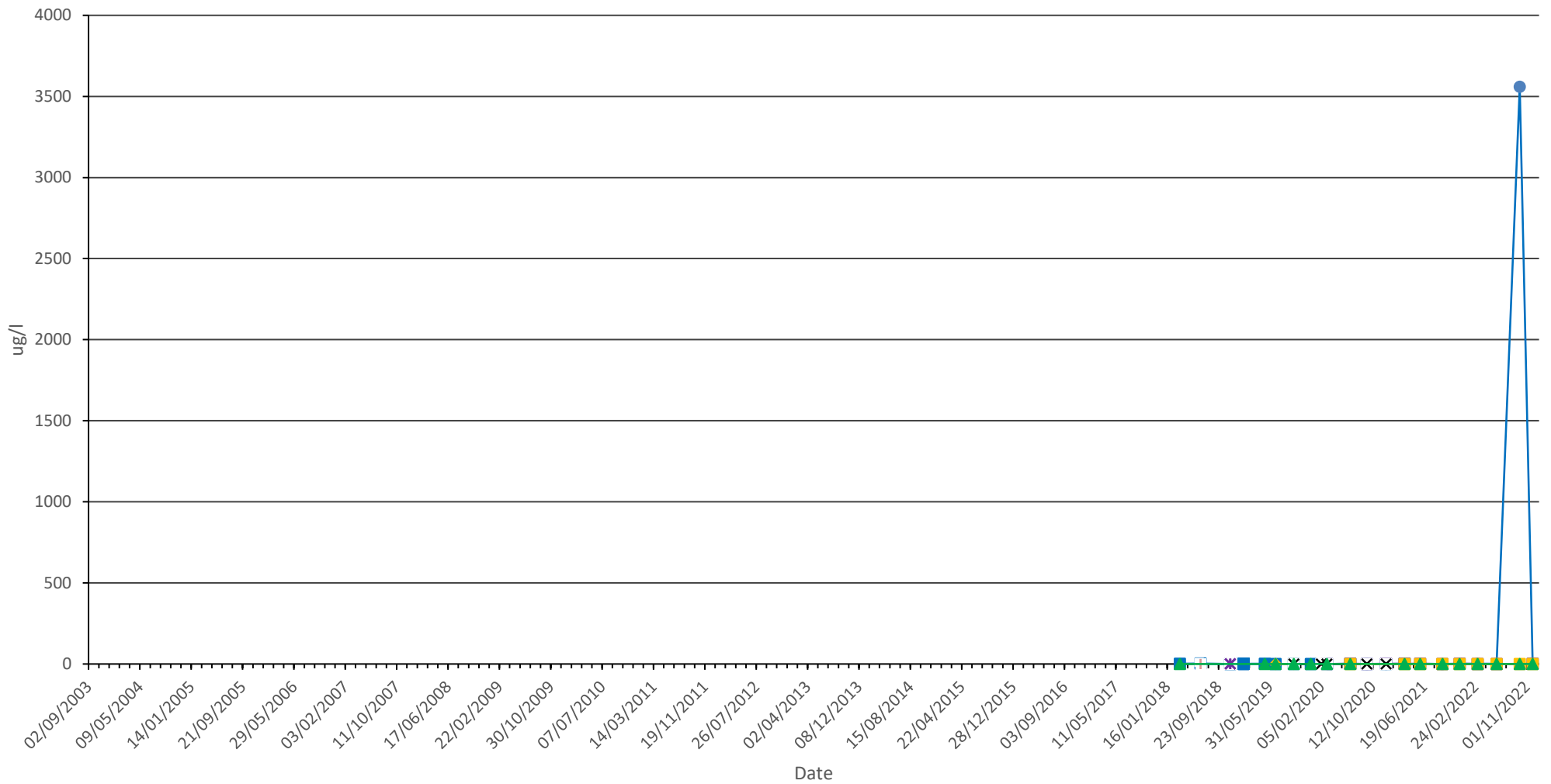
Stantec
 stantec.com/uk
 © Stantec UK Limited

Client
Newport City Council

Docksway Disposal Site

Benzene in Leachate

| | |
|-----------------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |
| Appendix | 3-3 |



● C1D
 ■ C2B
 ● C2C
 ◆ C3
 ■ C3B
 ✕ C4
 ■ C4B
 ✕ LF Cell_1_C
 - - - LF_C3B
 ▲ LF08_07



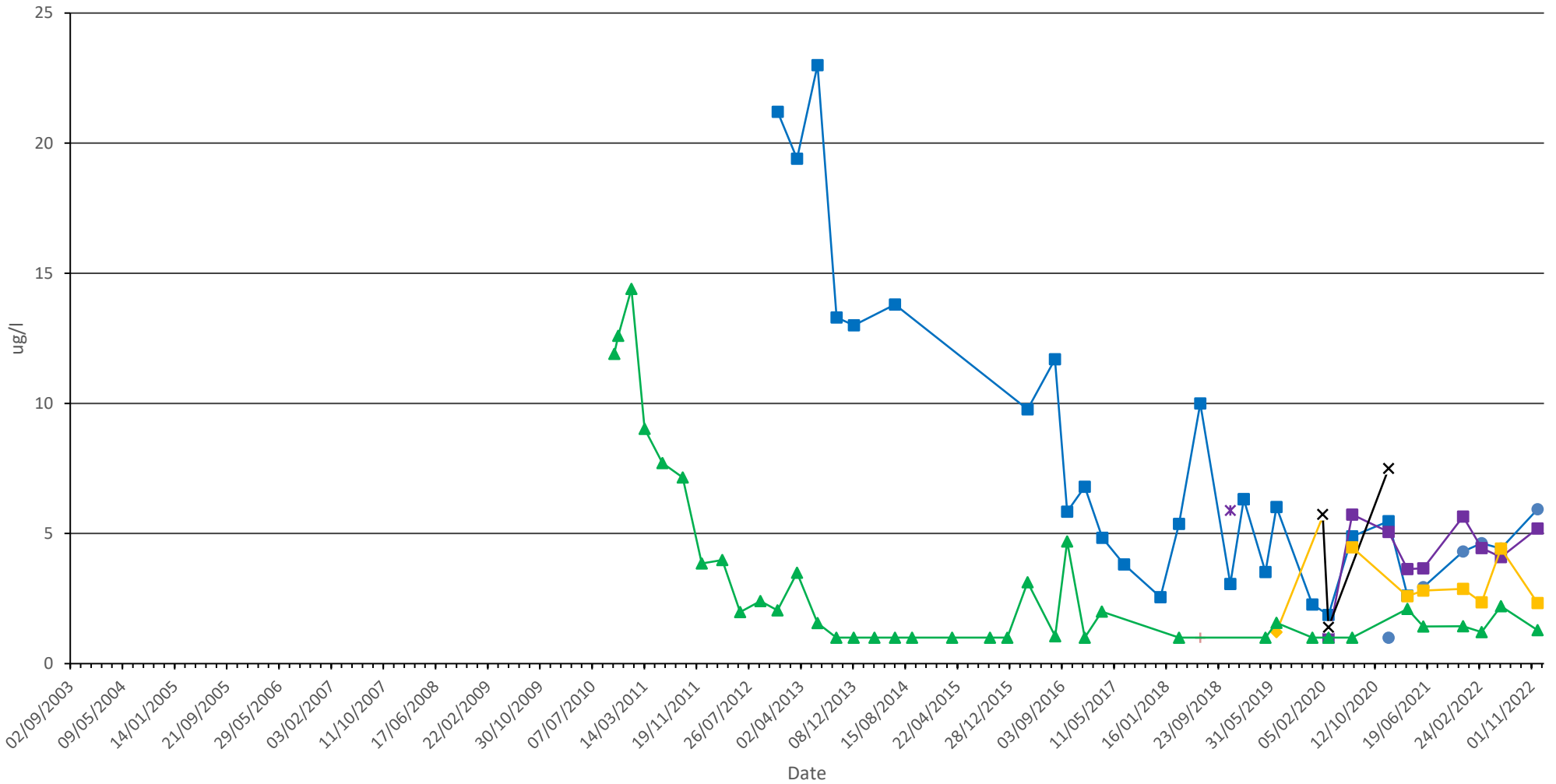
Stantec
 stantec.com/uk
 © Stantec UK Limited

Client
Newport City Council

Docksway Disposal Site

Napthalene in Leachate

| | |
|-----------------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |
| Appendix | 3-4 |



● C1D
 ● C2A
 ■ C2B
 ● C2C
 ◆ C3
 ■ C3B
 x C4
 ■ C4B
 x LF Cell_1_C
 - - + - LF_C3B
 ▲ LF08_07



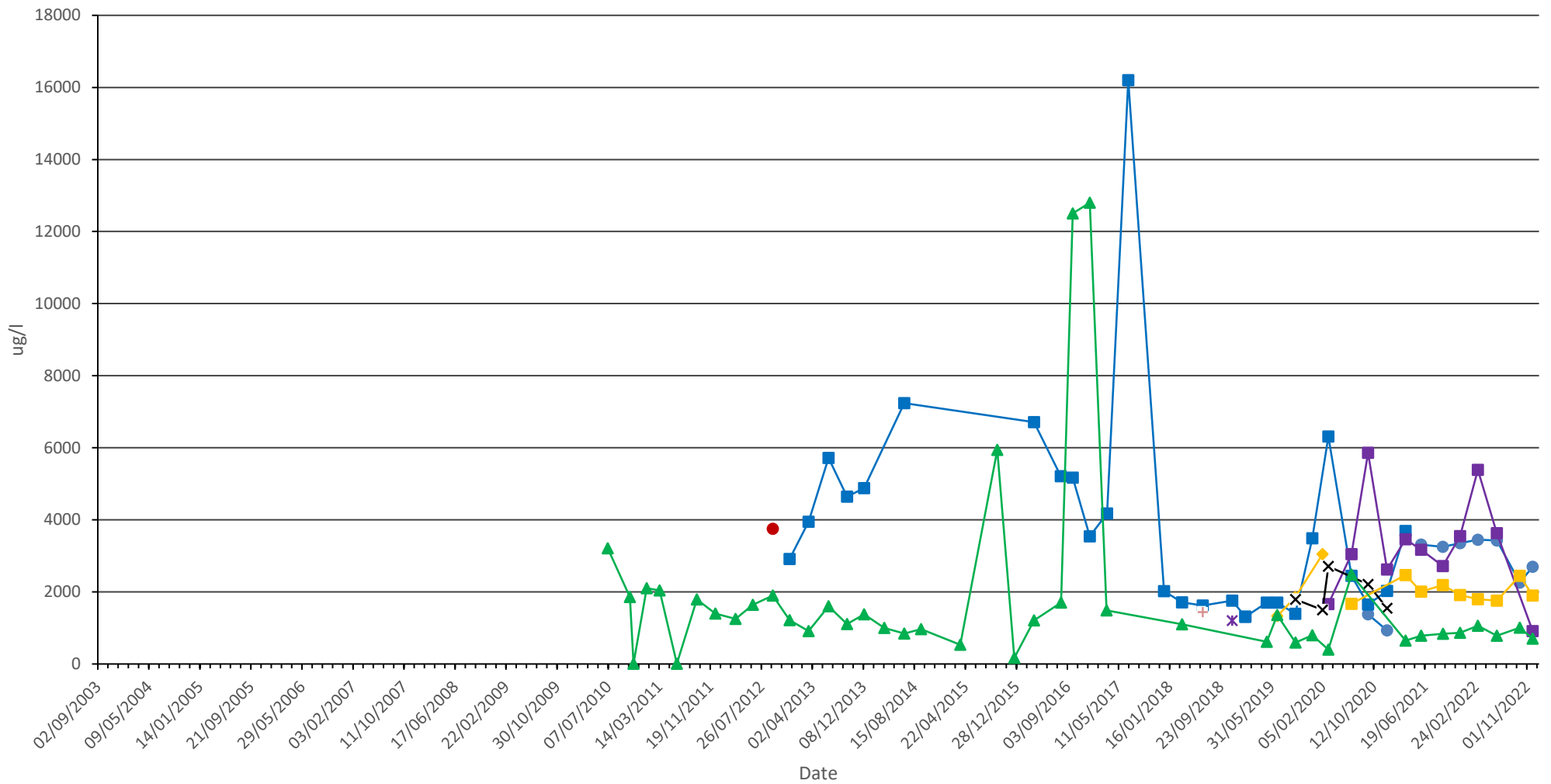
Stantec
 stantec.com/uk
 © Stantec UK Limited

Client
Newport City Council

Docksway Disposal Site

o-Xylene in Leachate

| | |
|-----------------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |
| Appendix | |
| 3-5 | |



● C1D
 ● C2A
 ■ C2B
 ● C2C
 ◆ C3
 ■ C3B
 × C4
 ■ C4B
 × LF Cell_1_C
 - - + - LF_C3B
 ▲ LF08_07



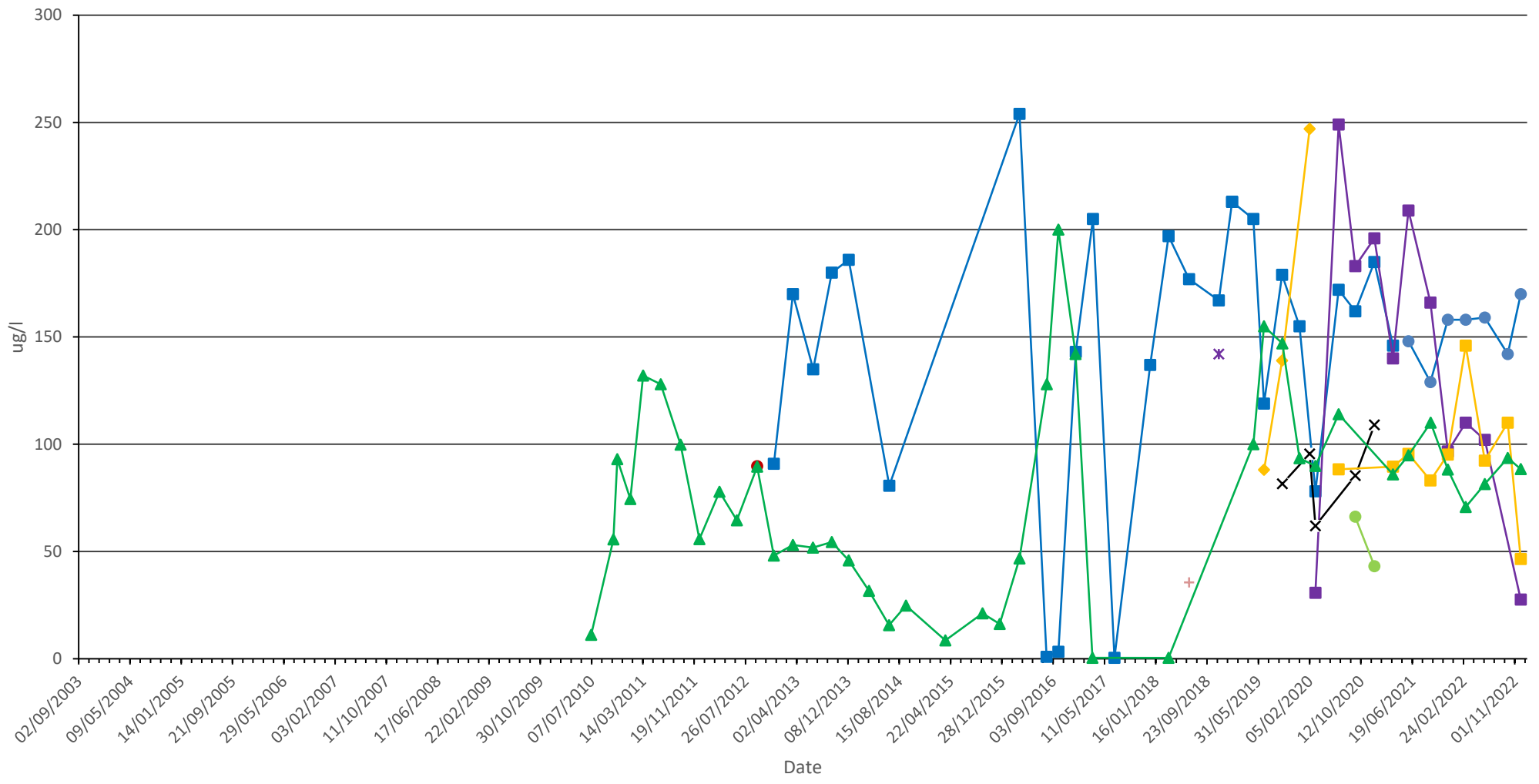
Stantec
 stantec.com/uk
 © Stantec UK Limited

Client
Newport City Council

Docksway Disposal Site

EPH in Leachate

| | |
|-----------------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |
| Appendix | 3-6 |



● C1D
 ● C2A
 ■ C2B
 ● C2C
 ◆ C3
 ■ C3B
 ✕ C4
 ■ C4B
 ✕ LF Cell_1_C
 + + + LF_C3B
 ▲ LF08_07



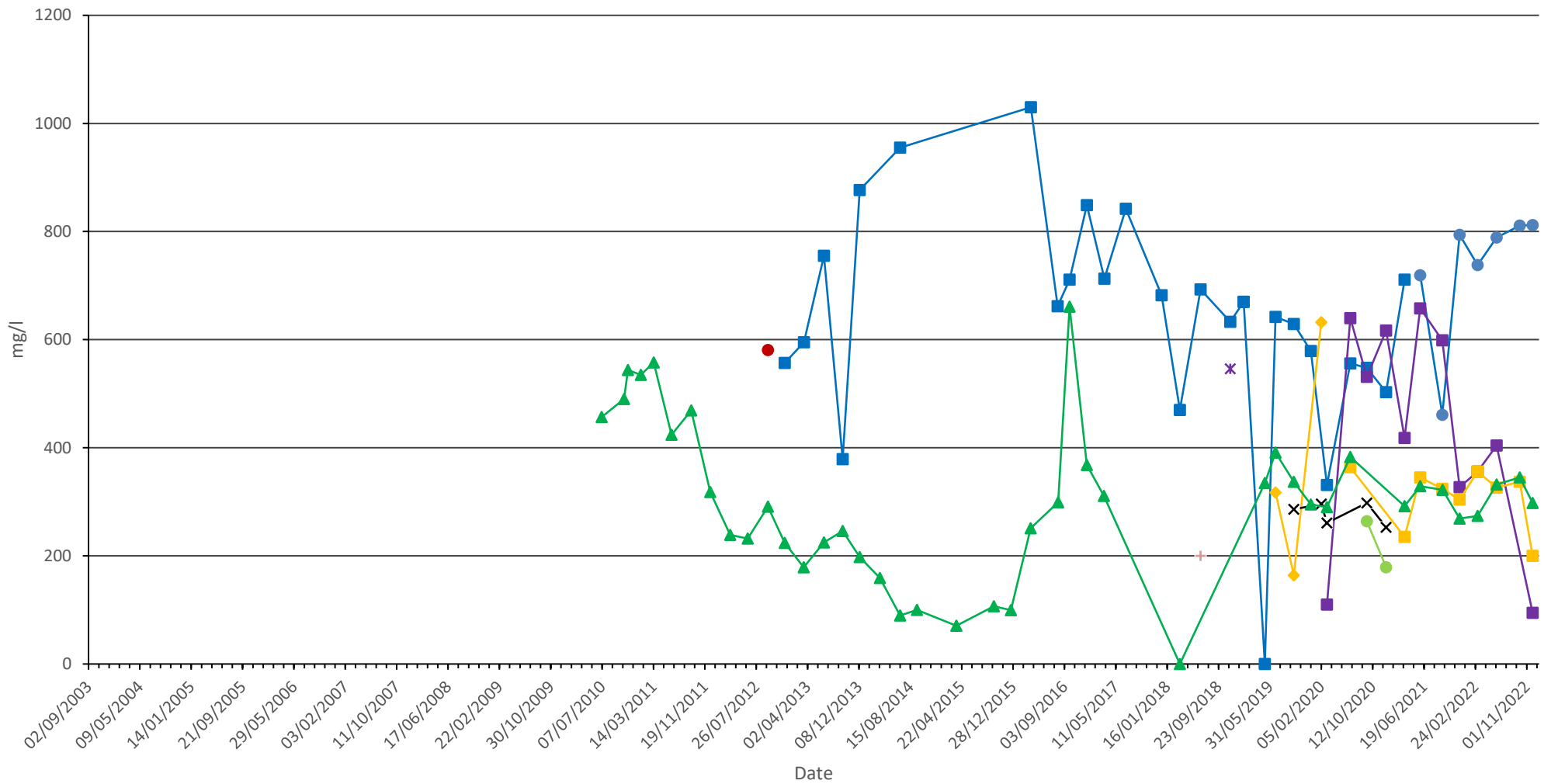
Stantec
stantec.com/uk
© Stantec UK Limited

Client
Newport City Council

Docksway Disposal Site

Nickel in Leachate

| | |
|-----------------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |
| Appendix | 3-7 |



● C1D
 ● C2A
 ■ C2B
 ● C2C
 ◆ C3
 ■ C3B
 ✕ C4
 ■ C4B
 ✕ LF Cell_1_C
 - - + - LF_C3B
 ▲ LF08_07



Client
Newport City Council

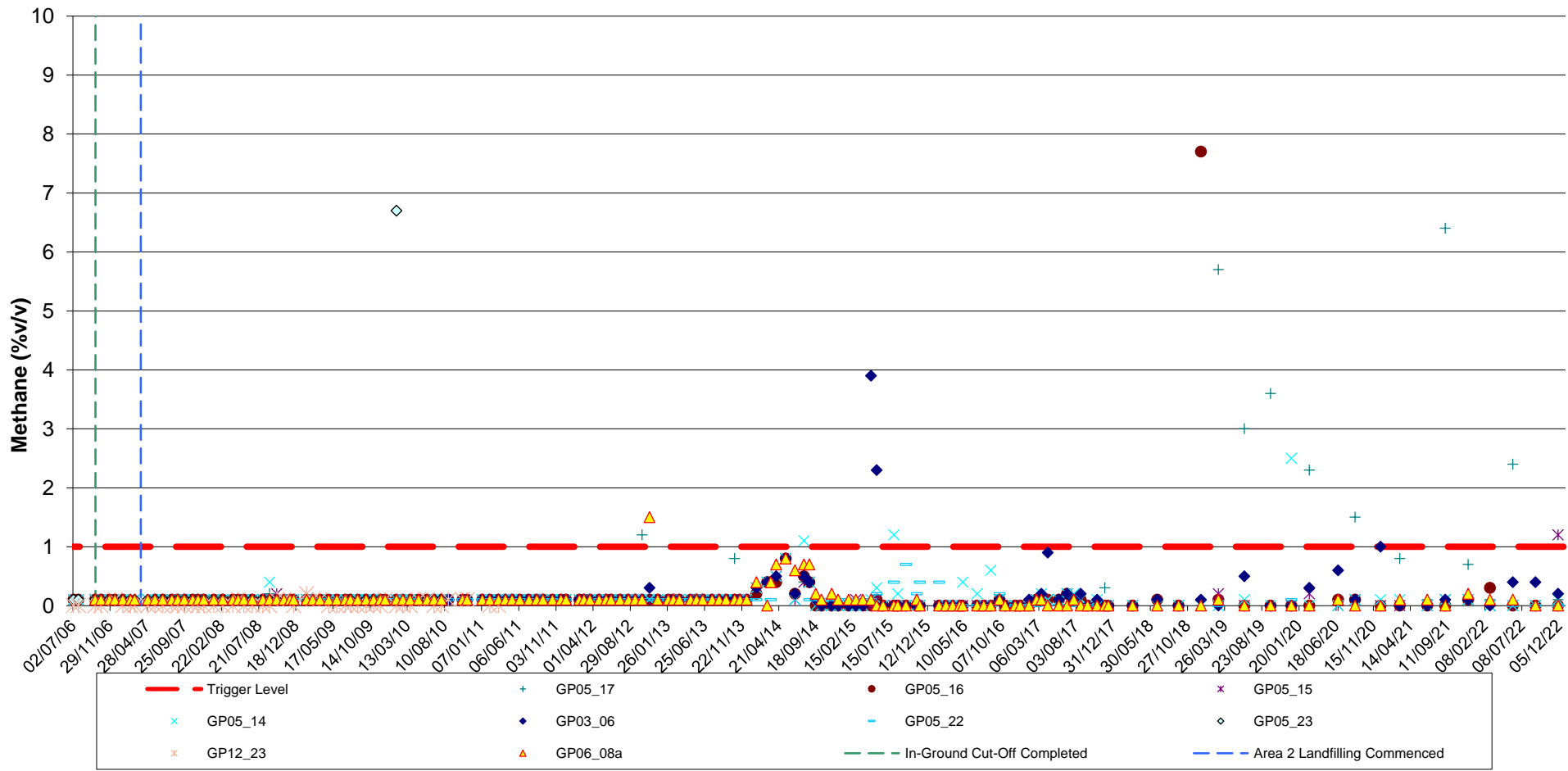
Docksway Disposal Site

Potassium in Leachate

| | |
|----------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | JN |
| Checked | NC |

Appendix
3-8

Appendix 4 Gas Concentrations Graphs

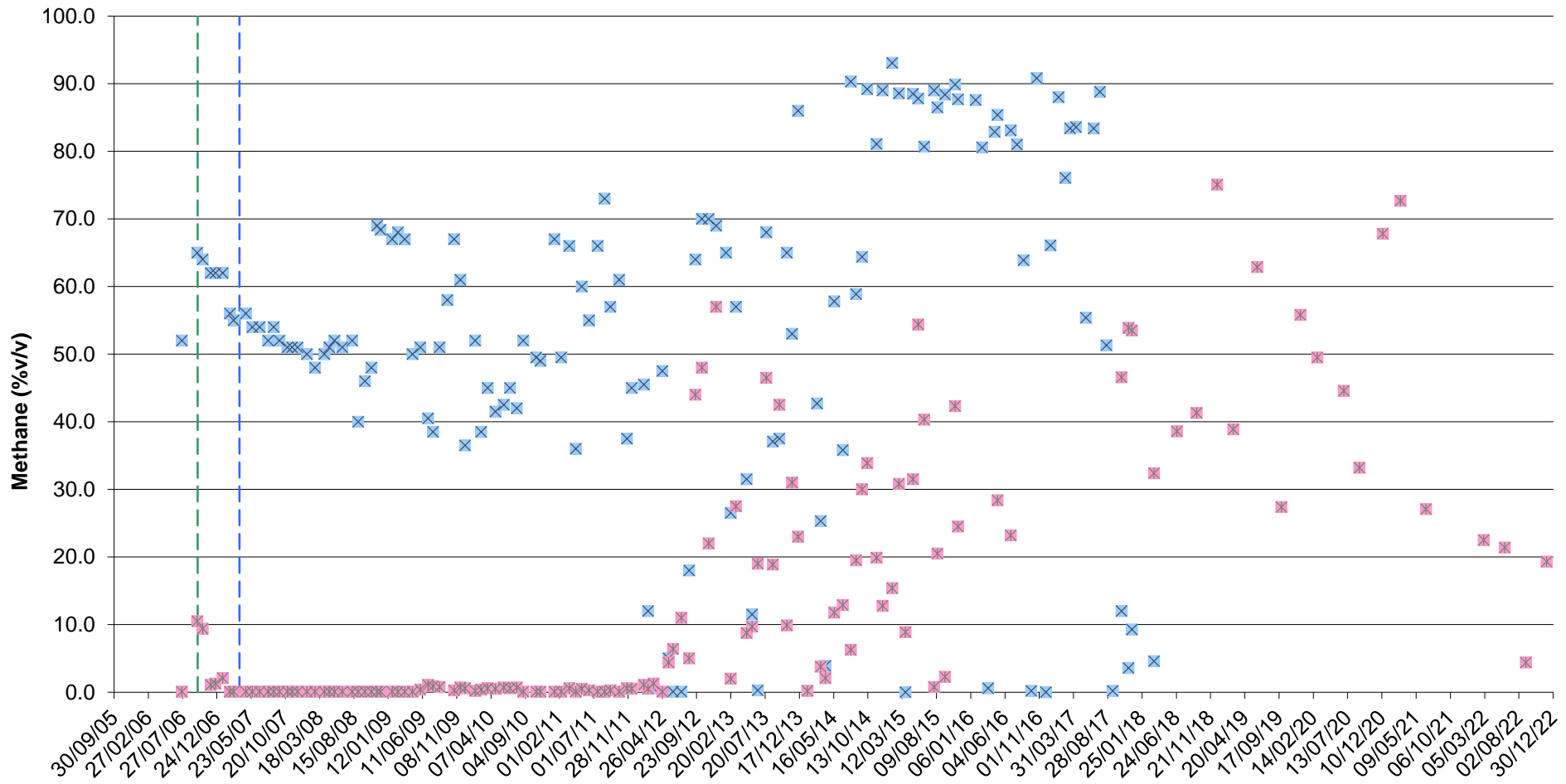


Client
Newport City Council

Docksway Disposal Site

**Methane Concentrations in Area 2 Gas Monitoring Wells
(Excluding GP05_20, GP05_21, GP06_24, GP06_25, GP09_18)**

| | |
|----------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | NC |
| Checked | VKR |
| Appendix | 4-1 |



x GP06_24
 x GP06_25
 - - - Area 2 Landfilling Commenced
 - - - In-Ground Cut-Off Completed



stantec.com/uk
© Stantec UK Limited

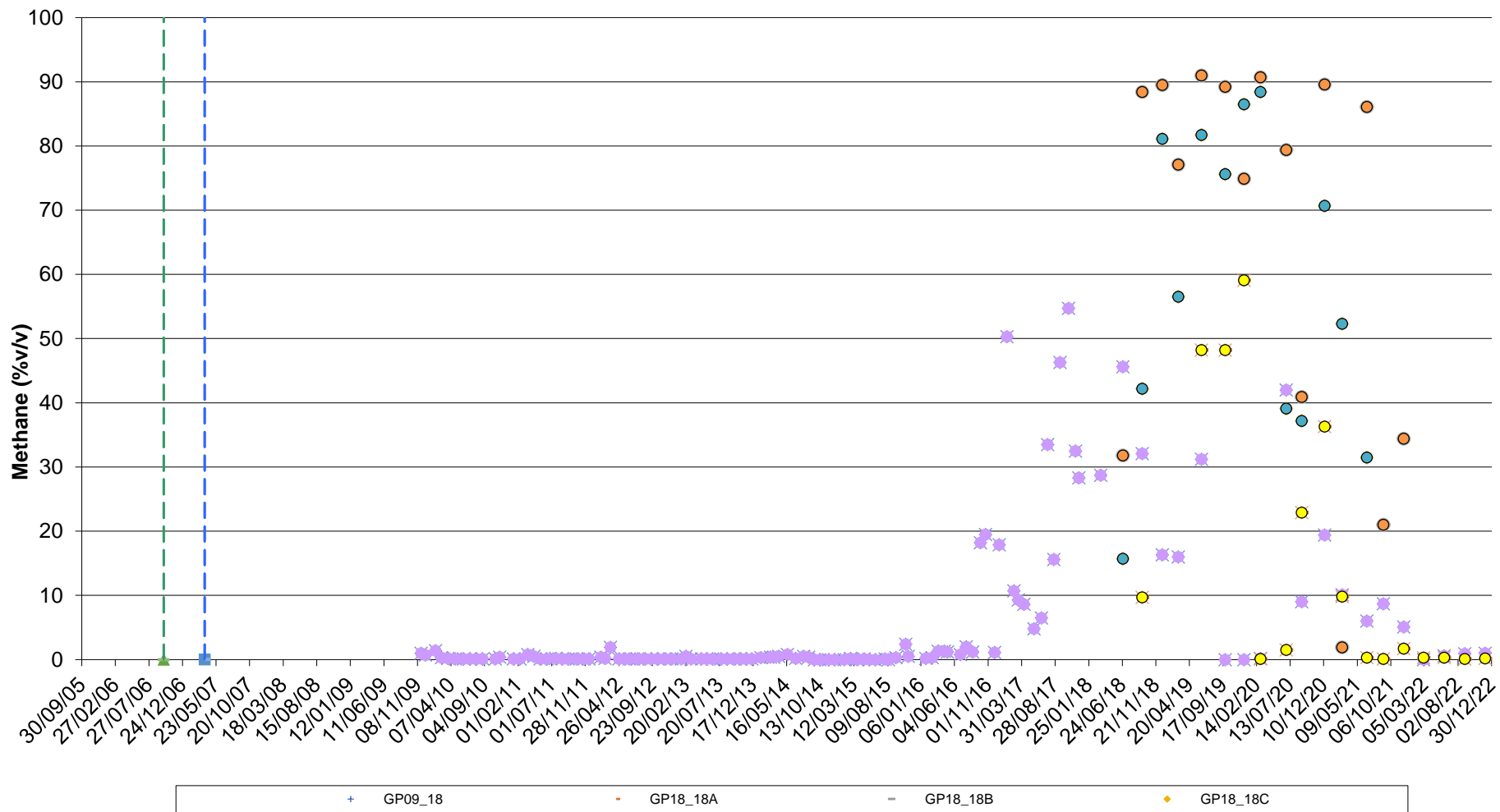
Newport City Council

Docksway Disposal Site

Recorded Methane Concentrations for GP06_24 and GP06_25

| | |
|----------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | NC |
| Checked | VKR |

| | |
|----------|------------|
| Appendix | 4-2 |
|----------|------------|

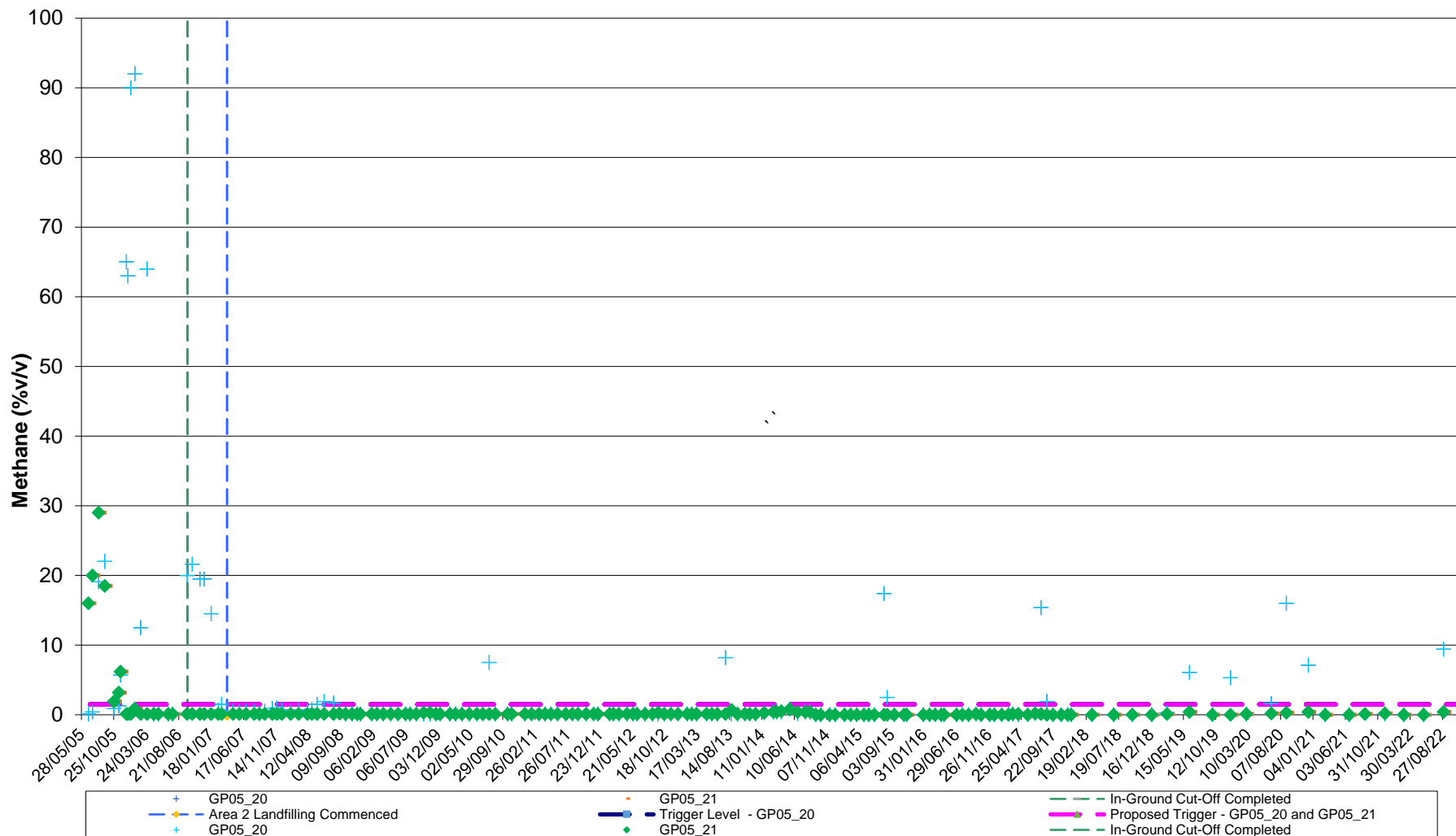


Client
Newport City Council

Docksway Disposal Site

Recorded Methane Concentrations for GP09_18, GP18_18A, GP18_18B and GP18_18C

| | |
|----------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | FBI |
| Checked | NC |
| Appendix | 4-3 |

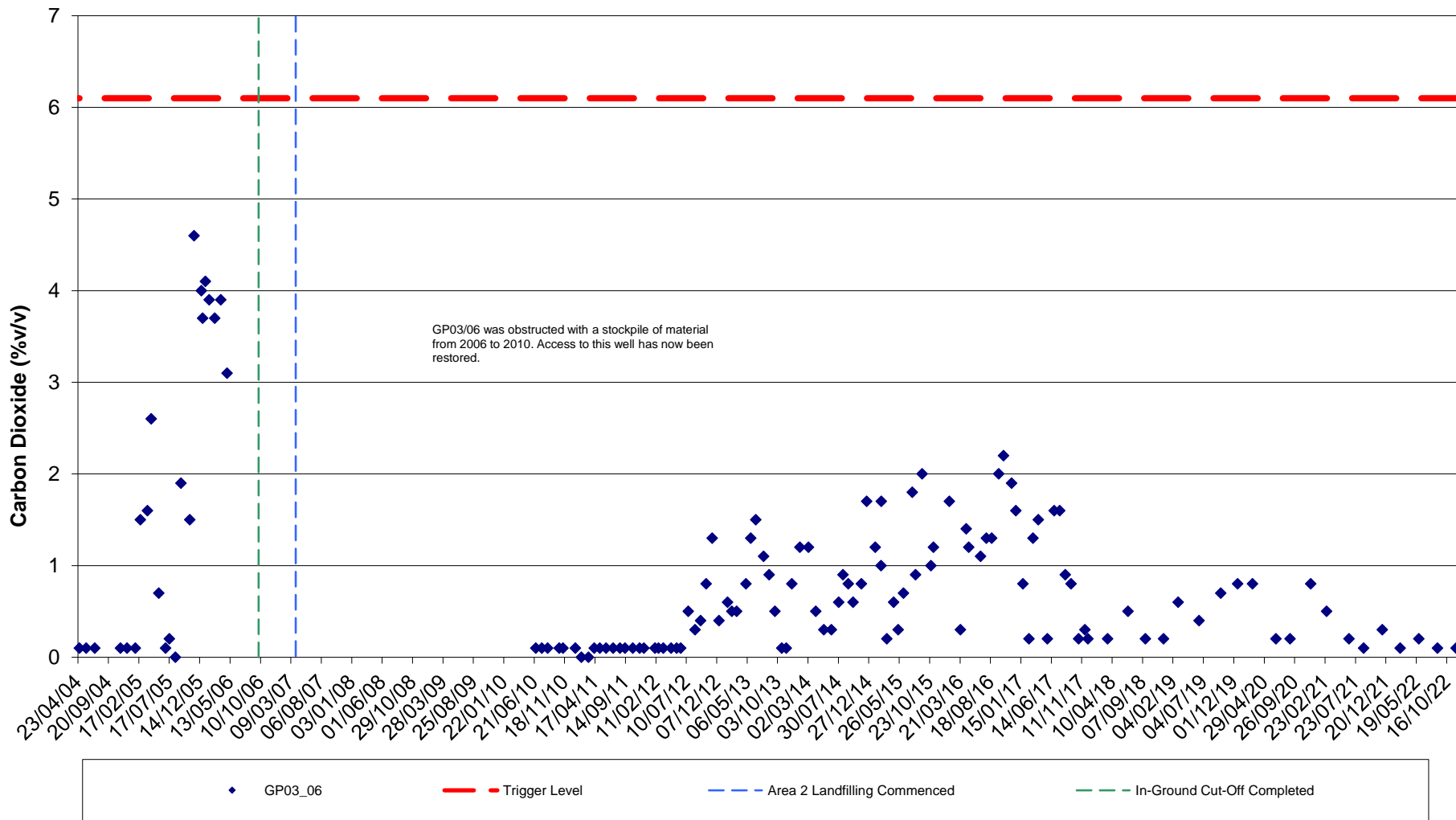


Client
Newport City Council

Docksway Disposal Site

Recorded Methane Concentrations in GP05_20 and GP05_21

| | |
|----------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | FBI |
| Checked | NC |
| Appendix | 4-4 |

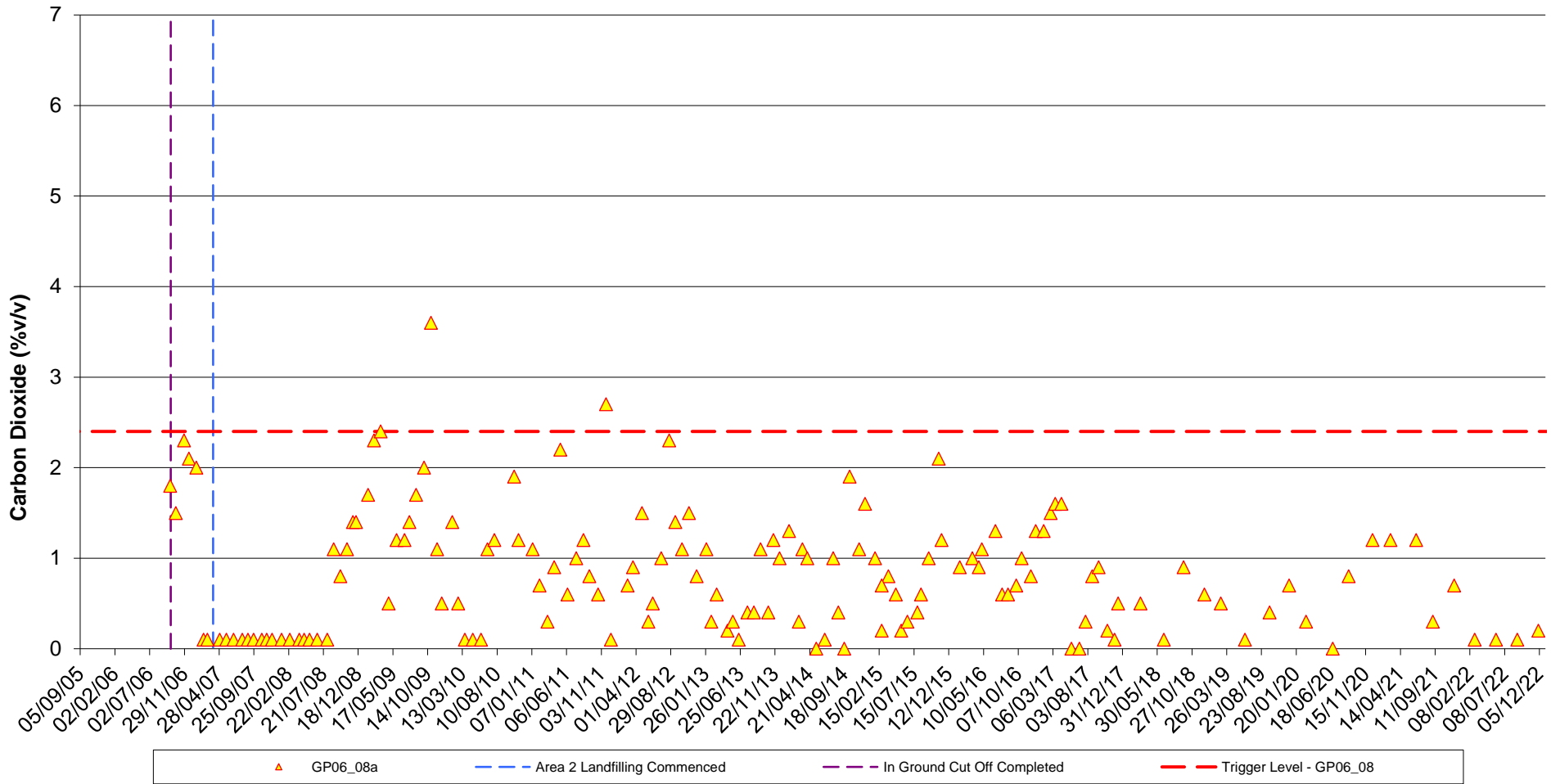


Client
Newport City Council

Docksway Disposal Site

Recorded Carbon Dioxide Concentrations in GP03_06

| | |
|----------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | NC |
| Checked | VKR |
| Appendix | 4-5 |

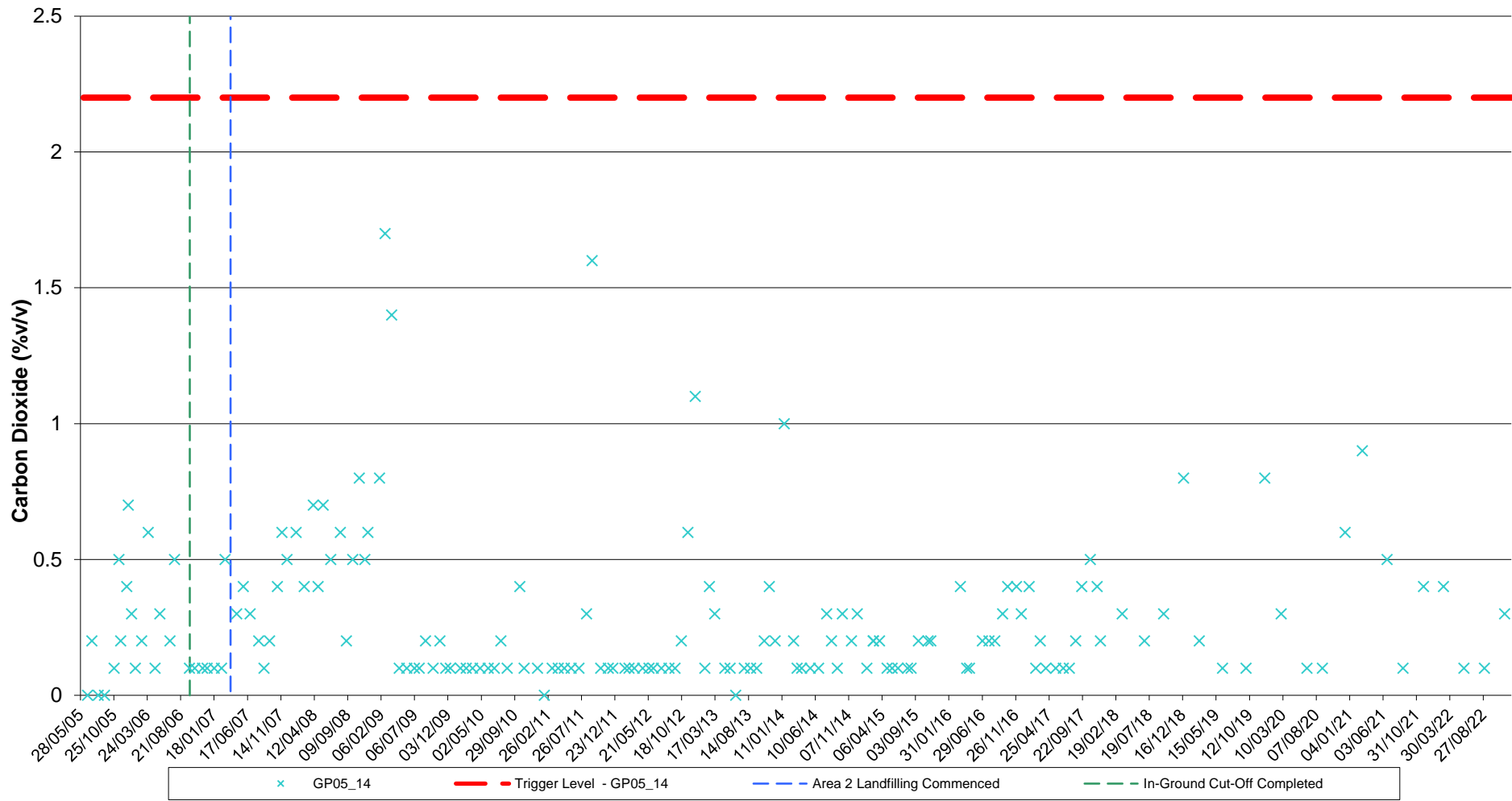


Client
Newport City Council

Docksway Disposal Site

Recorded Carbon Dioxide Concentrations in GP06_08a

| | |
|----------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | NC |
| Checked | VKR |
| Appendix | 4-6 |

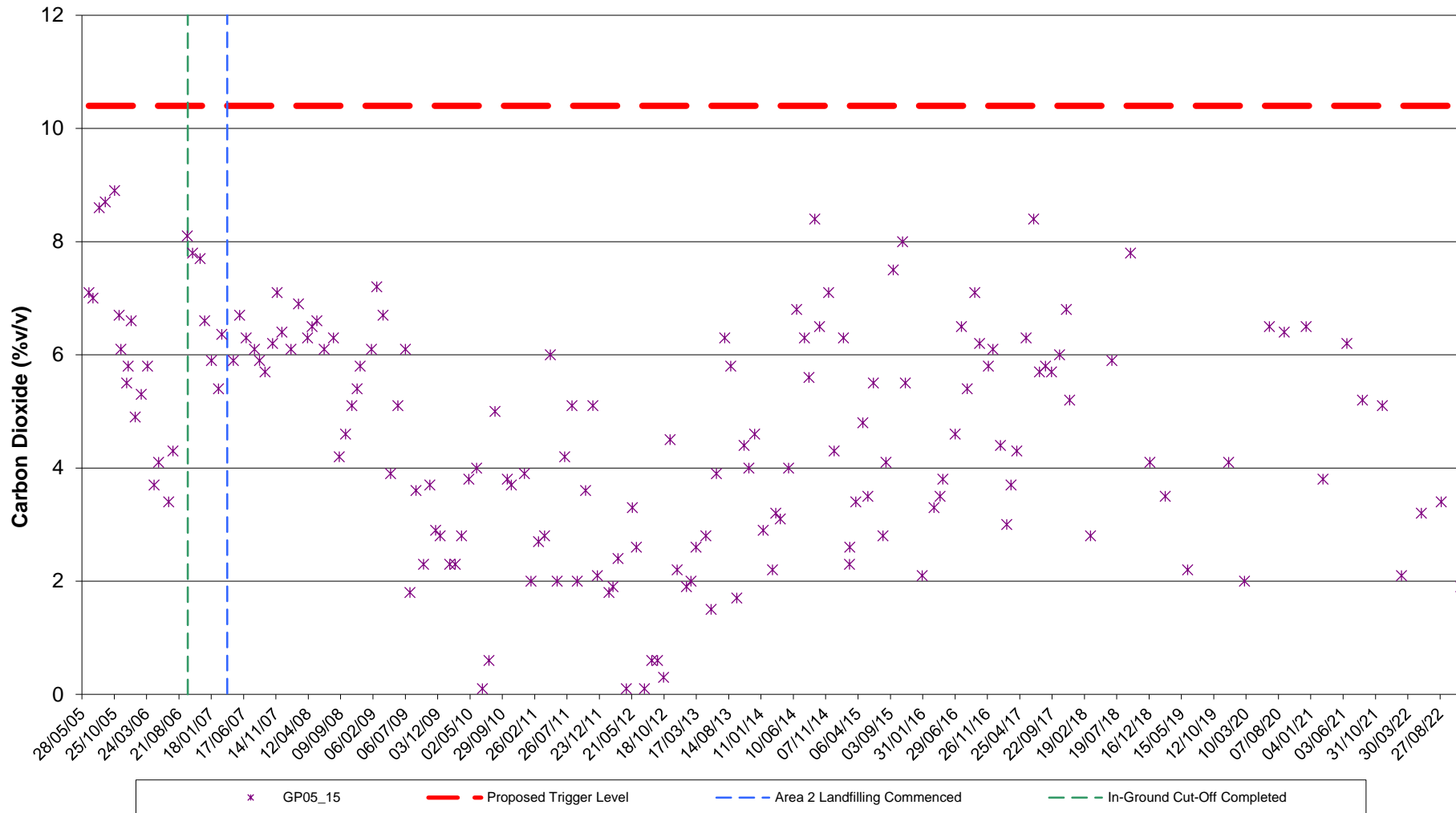


Client
Newport City Council

Docksway Disposal Site

Recorded Carbon Dioxide Concentrations in GP05_14

| | |
|-----------------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | NC |
| Checked | VKR |
| Appendix | 4-7 |

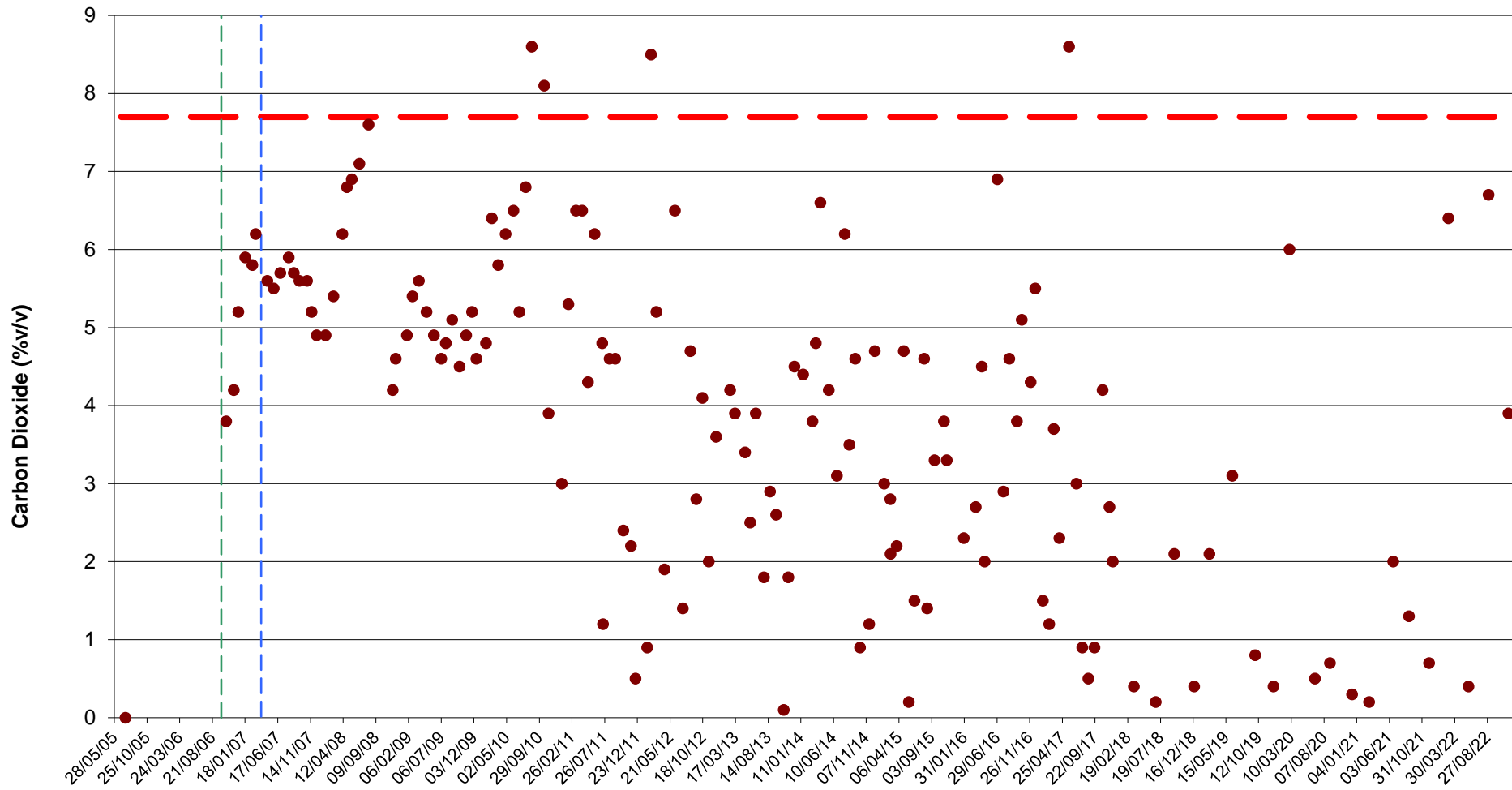


Client
Newport City Council

Docksway Disposal Site

Recorded Carbon Dioxide Concentrations in GP05_15

| | |
|-----------------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | NC |
| Checked | VKR |
| Appendix | 4-8 |



● GP05_16
 - - - Trigger Level - GP05_16
 - - - Area 2 Landfilling Commenced
 - - - In-Ground Cut-Off Completed



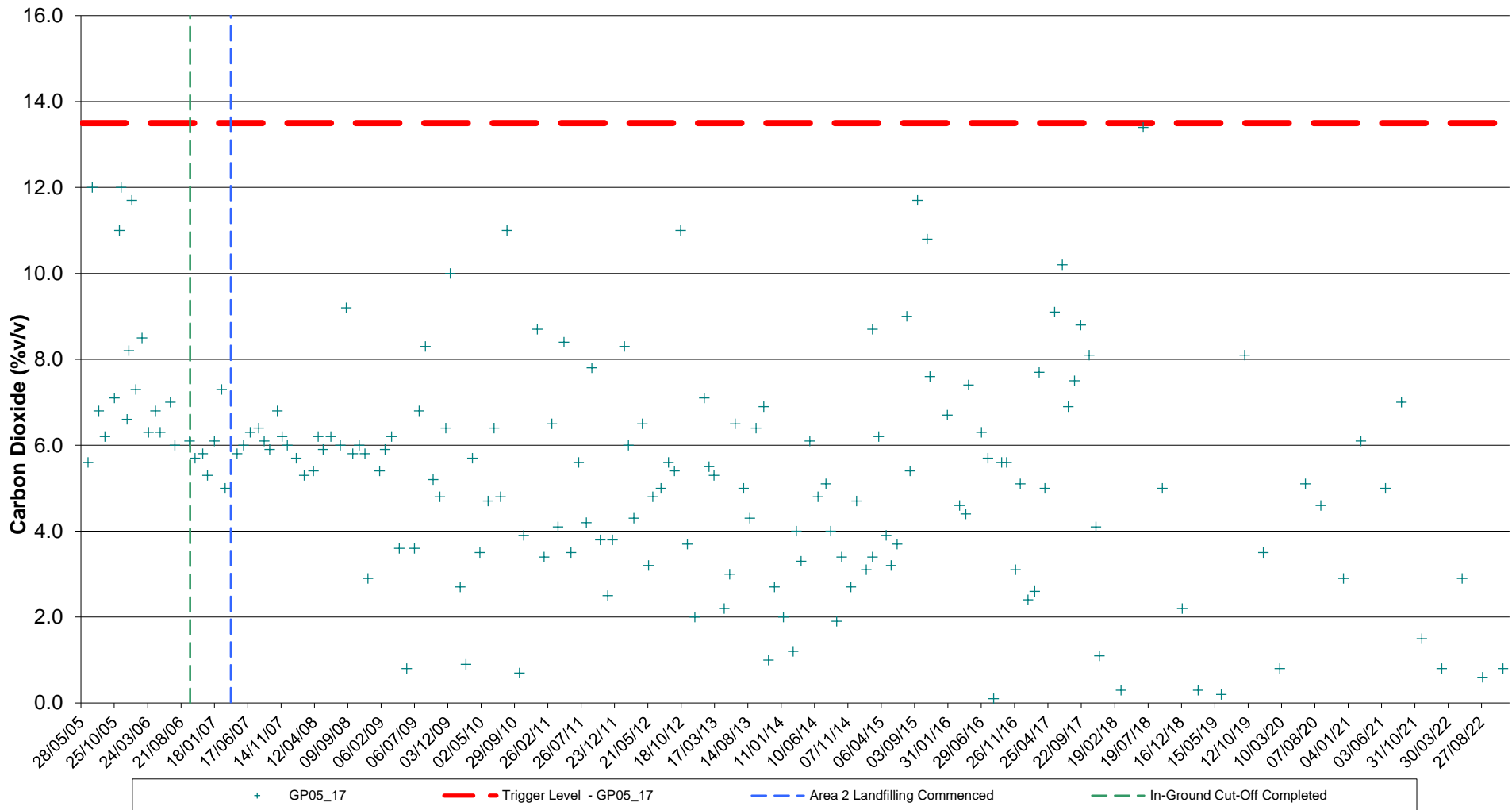
Newport City Council

Docksway Disposal Site

Recorded Carbon Dioxide Concentrations in GP05_16

| | |
|----------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | NC |
| Checked | VKR |

Appendix
4-9

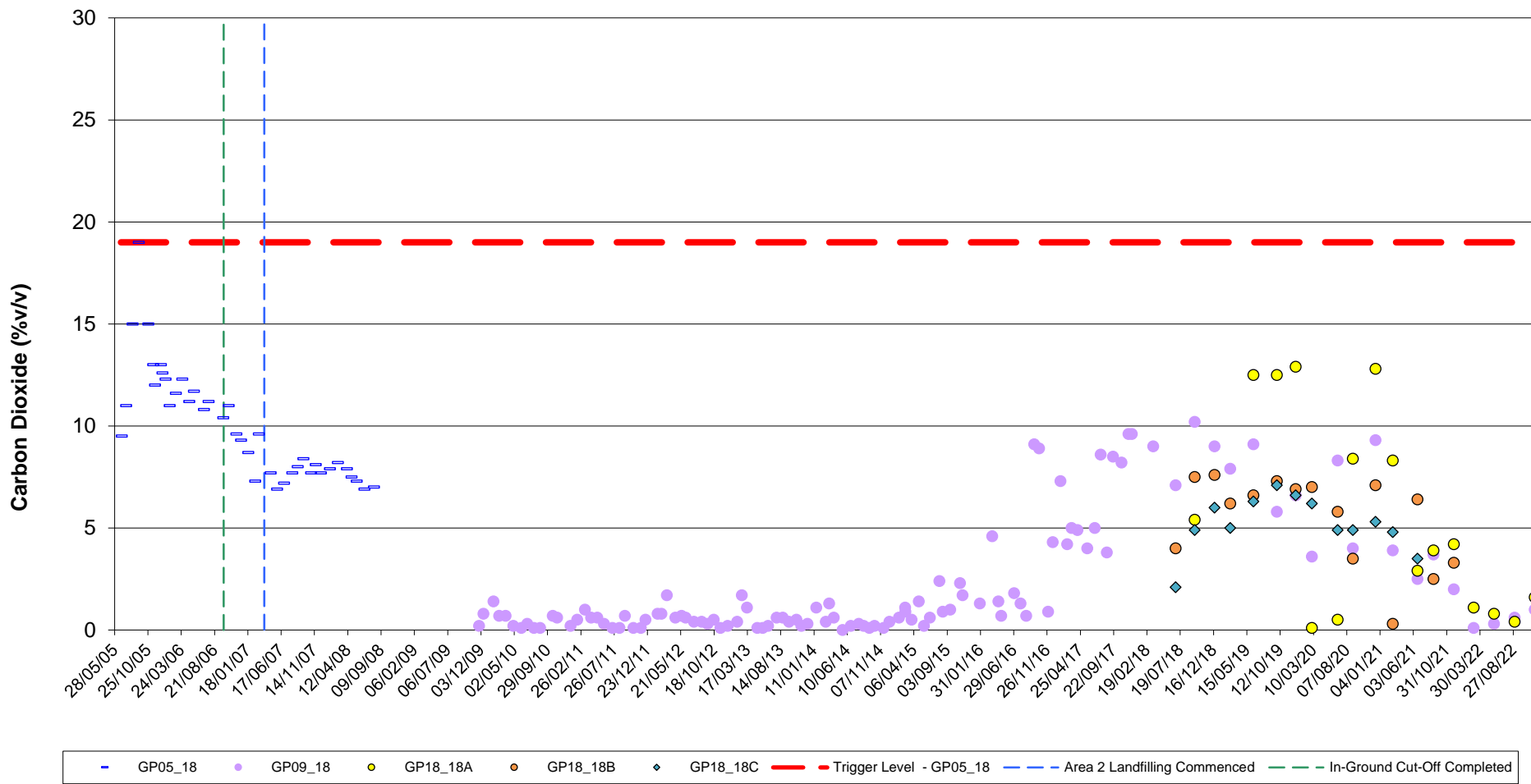


Client
Newport City Council

Docksway Disposal Site

Recorded Carbon Dioxide Concentrations in GP05_17

| | |
|-----------------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | NC |
| Checked | VKR |
| Appendix | |
| 4-10 | |



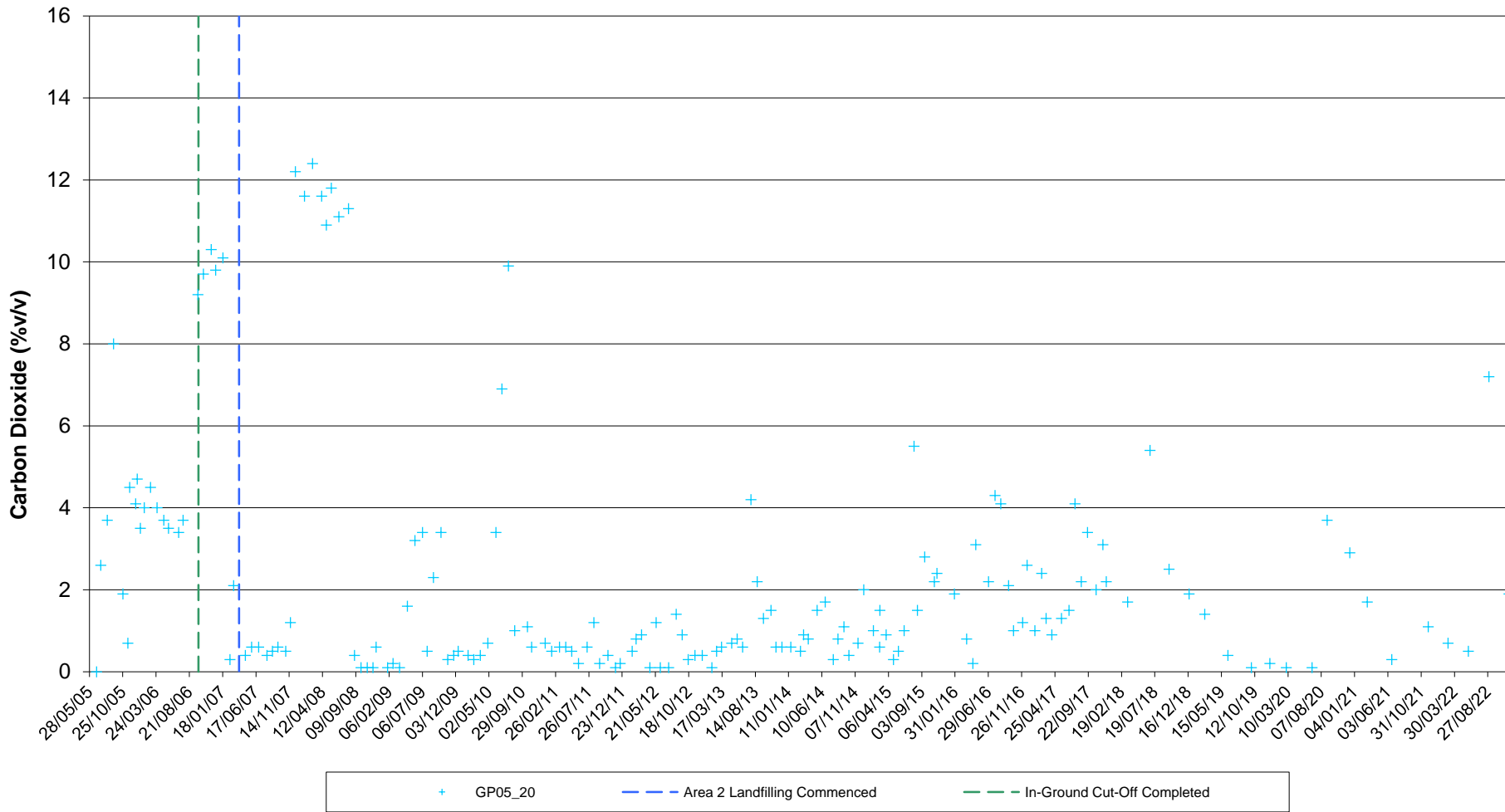
stantec.com/uk
© Stantec UK Limited

Client
Newport City Council

Docksway Disposal Site

Recorded Carbon Dioxide Concentrations in GP05_18, GP09_18, GP09_18A, GP09_18B and GP09_18C

| | |
|----------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | NC |
| Checked | VKR |
| Appendix | 4-11 |

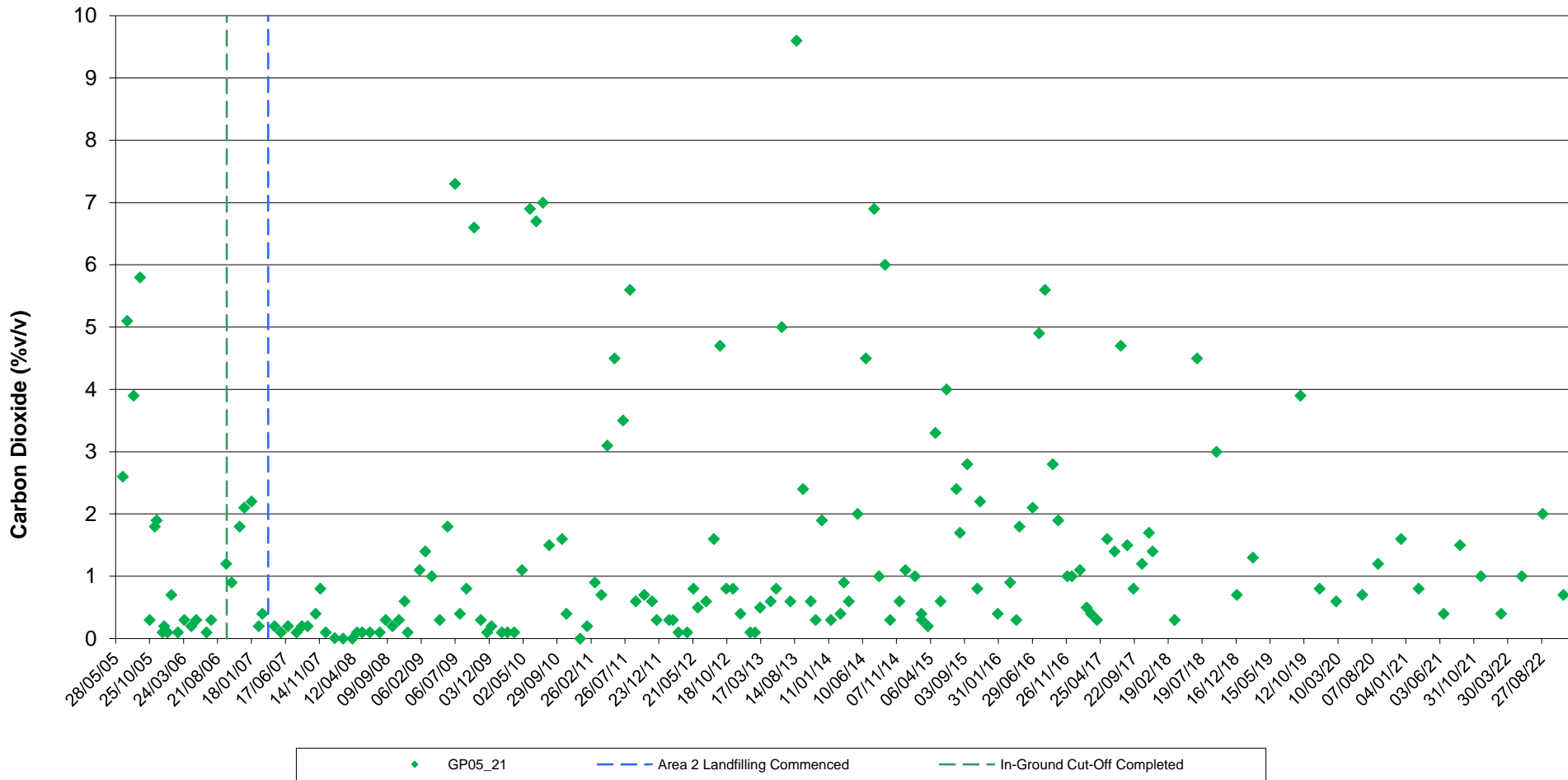


Client
Newport City Council

Docksway Disposal Site

Recorded Carbon Dioxide Concentrations in GP05_20

| | |
|-----------------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | NC |
| Checked | VKR |
| Appendix | 4-12 |

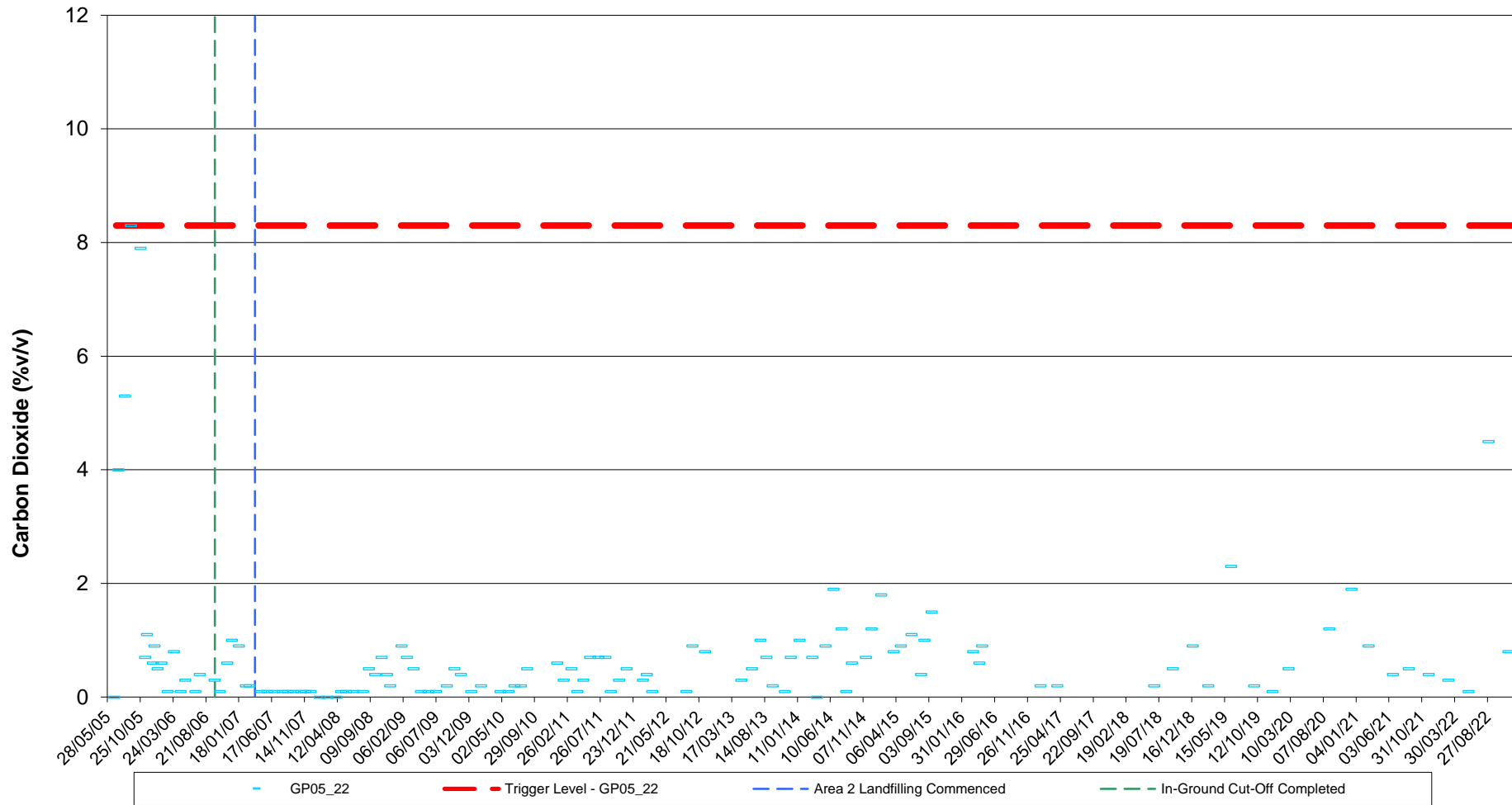


Client
Newport City Council

Docksway Disposal Site

Recorded Carbon Dioxide Concentrations in GP05_21

| | |
|-----------------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | NC |
| Checked | VKR |
| Appendix | |
| 4-13 | |



stantec.com/uk
© Stantec UK Limited

Client

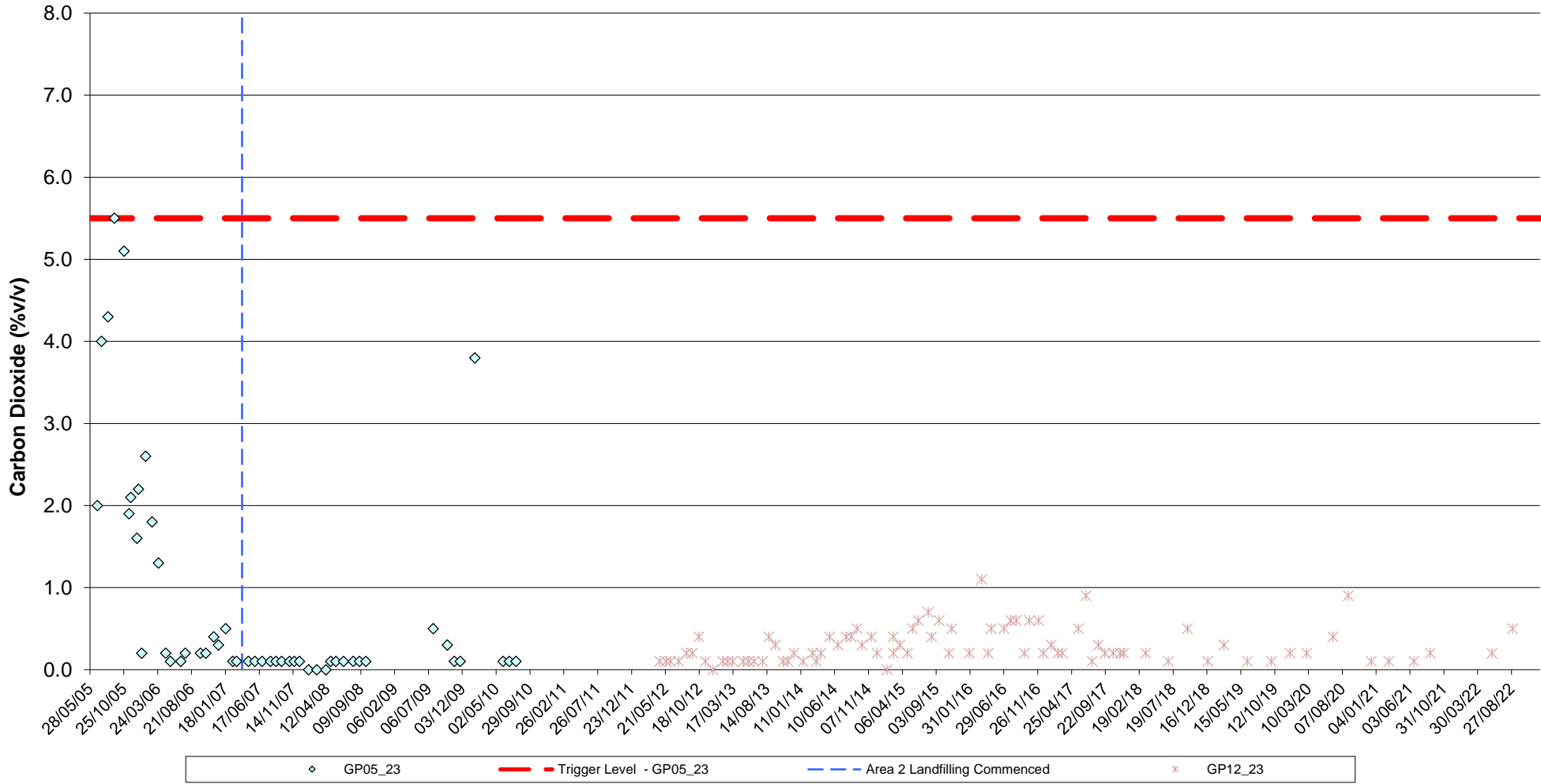
Newport City Council

Docksway Disposal Site

Recorded Carbon Dioxide Concentrations in GP05_22

| | |
|----------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | NC |
| Checked | VKR |

Appendix
4-14

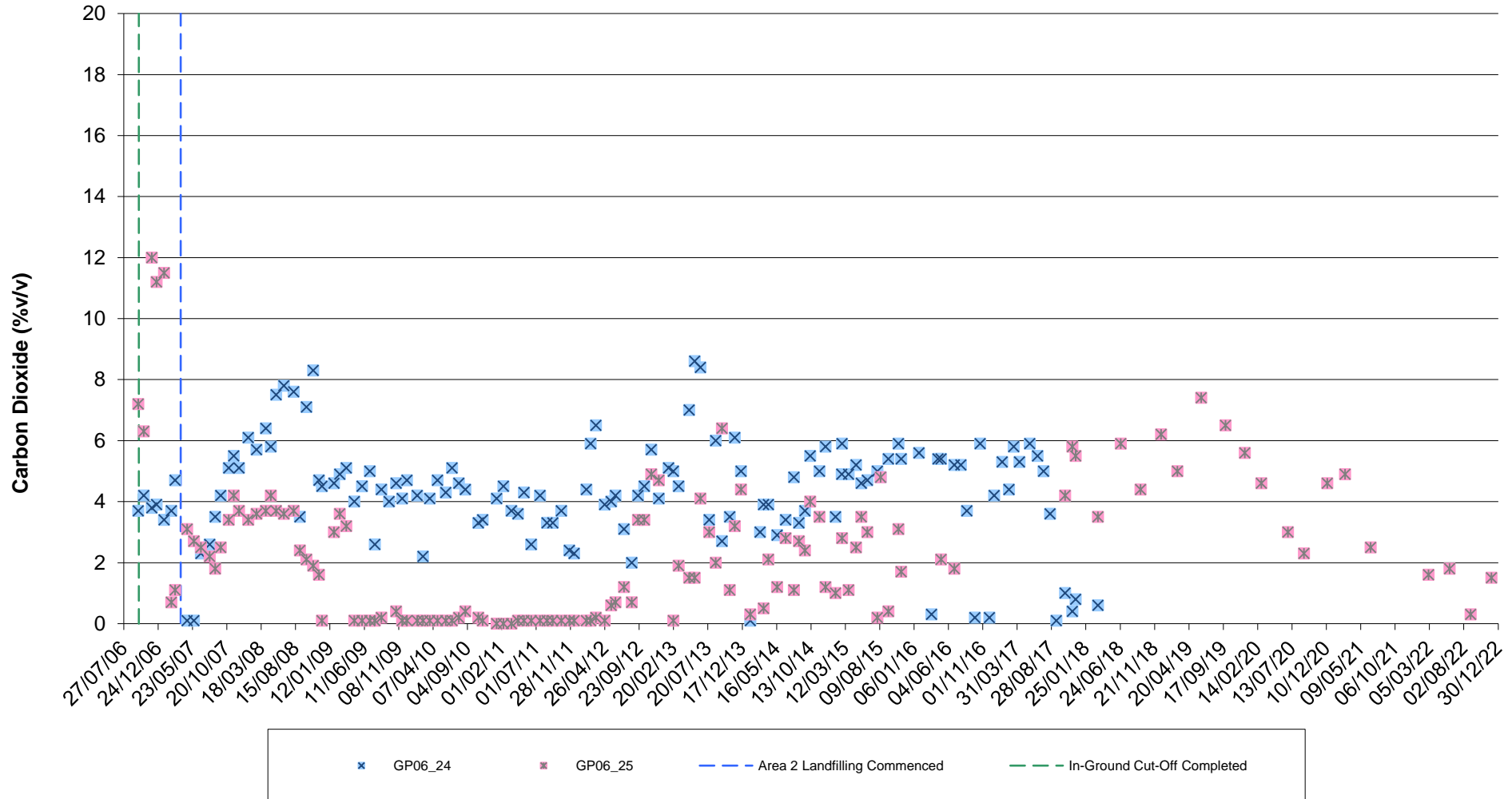


Client
Newport City Council

Docksway Disposal Site

Recorded Carbon Dioxide Concentrations in GP05_23

| | |
|-----------------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | FBI |
| Checked | NC |
| Appendix | |
| 4-15 | |



stantec.com/uk
© Stantec UK Limited

Client

Newport City Council

Docksway Disposal Site

Recorded Carbon Dioxide Concentrations in GP06_24 and GP06_25

| | |
|----------|---------------|
| Date | February 2023 |
| A4 Scale | nts |
| Drawn | FBI |
| Checked | NC |

Appendix
4-16

Appendix 5 Infinis Annual Report



Business Management System

Annual permit report

| | |
|------------------|---------------|
| Installation | Docksway |
| Permit reference | LP3135SB |
| Reporting period | 2022 |
| Permit Operator | Novera Energy |

Author: Sam Morris

Date: 19 January 2023

Authorised to sign as representative of the Operator

| | | | |
|--|---|--|----------------------------------|
| Fugitive Emissions Review (4.1.4) | | Reporting period: | 2022 |
| Installation Name: | | Docksway Landfill gas utilisation plant | Permit reference LP3135SB |
| Substances Released/Potentially | Description of event and any contamination/decontamination of the site which has occurred | | |
| 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 (S4.2 / 2.4) | | | | | | | |
|---|--|------------------------|--|----------------------------|--|--|--|
| Site: Docksway | | Reporting period: 2022 | | Permit Reference: LP3135SB | | | |

| Raw Materials | Application | Current Measures to Ensure Efficiency and Waste Minimisation | 2021 | 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 (2.6.2)

| | | |
|--|-----------------------------------|-------------------------------|
| Installation Name: Docksway Gas Utilisation Plant | Permit Reference: LP3135SB | Reporting period: 2022 |
|--|-----------------------------------|-------------------------------|

2021

| 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 (4.1.3)

| | | |
|--|-------------|---------------------------------------|
| Installation: Docksway Landfill Gas Utilisation Plant | | Permit Reference: LP3135SB |
| Parameter | 2022 | Units |
| Flare operation hours | 277 | hrs |
| Gas engine downtime hours | 405 | hrs* |
| Gas engine operation hours | 4038 | hrs |
| Volume of landfill gas combusted | 85,622 | m3 (treated by flare) |
| | 2,582,566 | m3 (treated by engines) |
| | 2,668,188 | m3 (total treated by engines & flare) |

Operator's Comments:

Gas utilisation has increased in 2022 as a result of infrastructure improvements on site which has improved efficiency. Please contact permit-compliance@infinis.com for any queries regarding the above.

Reporting of Performance Indicators (Form Ref: PI1) Condition 2.7.1 (Table S3)

| | |
|--|-----------------------------------|
| Installation: Docksway Landfill Gas Utilisation Plant | Permit Reference: LP3135SB |
|--|-----------------------------------|

Annual Production/Treatment (MWh) (Form E1 - Table S3)

| | |
|-----------------------------------|------|
| Total production of energy | 4038 |
|-----------------------------------|------|

Environmental Performance Indicators (Form PI1 S3)

| Parameter | Annual Average 2022 | Units | Trends in Environmental Performance | |
|--|---------------------|--------|-------------------------------------|------|
| | | | 2020 | 2021 |
| Total oxides of nitrogen (expressed as NO2) emission | 1.6 | Kg/MWh | 2.7 | 7.0 |
| Total carbon monoxide emission | 4.1 | Kg/MWh | 1.7 | 13.6 |
| Total engine downtime (downtime hrs/available operation time in hrs) | 4.6 | % | 3.3 | 4.9 |

Condition 2.7.1 / 4.1.3 (Schedule 4)

| Reporting period | Energy Imported (Primary Energy Usage) (MWh) | Parasitics (MWh) | Energy Exported (MWh) | Energy Used on Site (MWh) | Site Efficiency |
|------------------|--|------------------|-----------------------|---------------------------|-----------------|
| 2022 | 6 | 247 | 3791 | 253 | 34.5 |

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

| | | | |
|----------------------|---|--------------------------|----------|
| Installation: | Docksway Landfill Gas Utilisation Plant | Permit Reference: | LP3135SB |
|----------------------|---|--------------------------|----------|

| | |
|--|-------------|
| Accident Management Plan Review | 2022 |
| Date of next review | |
| Reviewed monthly following a review of notifiable events | |

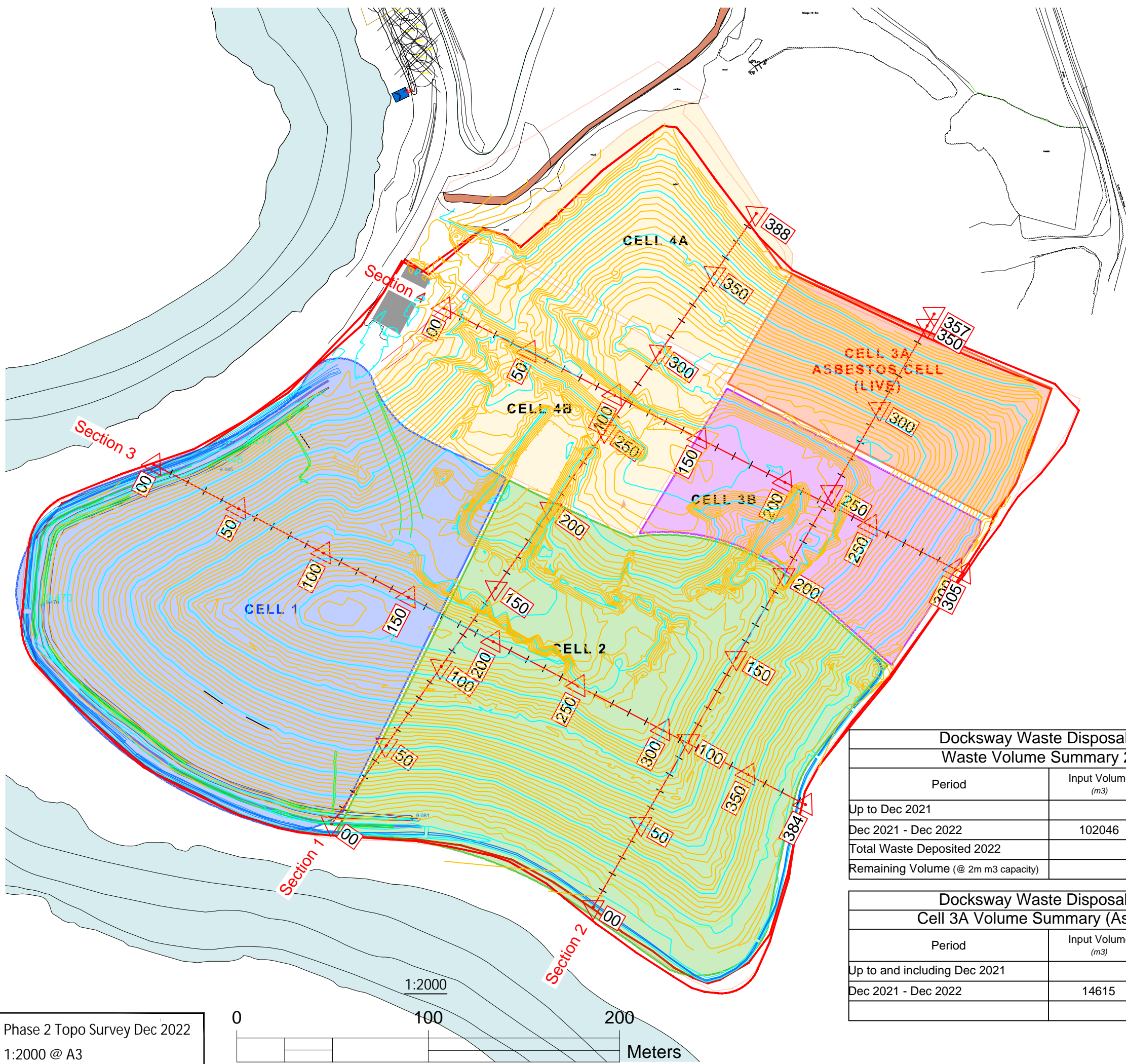
(Permit condition 2.8.1)

| |
|---|
| Operator's comments: |
| No accidents occurred during this period which would require amendment to the Accident Management Plan for this installation. |

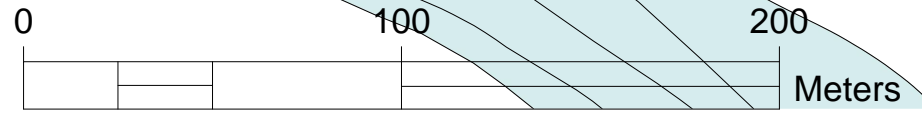
| | |
|--|-----------------------------------|
| Installation: Docksway Landfill Gas Utilisation Plant | Permit Reference: LP3135SB |
| Emissions to Air Reporting (4.1.2.1) 2022 | |
| Annual Report Submission Date | 22-Jun-22 |
| Submitted to | Liz Parr and Guy Baskerville |

Emission reports required by the permit (condition 4.1.2 / 4.1.3) were submitted to the relevant officer in 2022. The results indicated compliance with the levels noted in the permit.

Appendix 6 NCC Topographical Survey and Cross Sections



Phase 2 Topo Survey Dec 2022
1:2000 @ A3



1. Refer to drawing number 1476 / Ph2/ AEPR 2022_01 for sections

Reproduced from the Ordnance Survey mapping with the permission of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Newport City Council Licence No. 100024210 (2010).

| Rev | Details | Dr | Ch | Ap | Date |
|-----|---------|----|----|----|------|
| | | | | | |

| Docksway Waste Disposal Site Waste Volume Summary 2022 | | |
|---|-------------------|------------------------|
| Period | Input Volume (m3) | Cumulative Volume (m3) |
| Up to Dec 2021 | | 1261879 |
| Dec 2021 - Dec 2022 | 102046 | 1363925 |
| Total Waste Deposited 2022 | | 102046 |
| Remaining Volume (@ 2m m3 capacity) | | 636075 |

| Docksway Waste Disposal Site Cell 3A Volume Summary (Asbestos) | | |
|---|-------------------|------------------------|
| Period | Input Volume (m3) | Cumulative Volume (m3) |
| Up to and including Dec 2021 | | 81370 |
| Dec 2021 - Dec 2022 | 14615 | 95985 |

Streetscene
Paul Symonds
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 & 4 TOPO Survey Dec 2022
Waste Input Dec 2021 - Dec 2022

| | | | | |
|---------------|-----------------------|---------|--|----------|
| File No. 1476 | Status: Consultation | | | |
| Drawn | MDH | Checked | | Approved |
| Date | 17.02.23 | Date | | Date |
| Scales | see drawing panes | | | |
| Drawing No. | 1476/PH2/AEPR 2022_02 | | | |