Earth Science Partnership

Consulting Engineers | Geologists | Environmental Scientists

Land off A473 & A4222, Talbot Green

Proposed Residential & Retail/Commercial Development

Supplementary Controlled Waters Risk Assessment (CWRA)

Report Reference: ESP.9211.02a.4501

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Land off A473 & A4222, Talbot Green
Proposed Residential & Retail/Commercial Development
Supplementary Controlled Waters Risk Assessment (CWRA)

Prepared for:
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MASKA GROUP

Report Reference: **ESP.9211.02a.4501**

Revision	Status	Date	Written & Checked by	Approved by
0	Draft	December 2025	Dan Thomas BSc (Hons) FGS	Giles Sommerwill BSc (Hons) MSc CGeol SiLC FGS RoGEP Specialist
	Signature:			
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1 Introduction

1.1 Background

Talbot Green Developments Ltd (hereafter known as the Client) are preparing for the redevelopment of the subject site with a mix of land uses for commercial, retail and residential purposes.

The Earth Science Partnership Ltd (ESP), Consulting Engineers, Geologists and Environmental Scientists, have previously undertaken an exploratory investigation at the site (ref: ESP.9211.4278, March 2025), which included a preliminary Controlled Waters Risk Assessment (CWRA). The findings of the preliminary CWRA are discussed further in Section 2.4.

ESP have now been appointed by Maska Group (acting on behalf of the Client) to undertake a supplementary CWRA (including review of pertinent historical investigation information which was not instructed as part of the exploratory works), to further asses potential ground hazards relating to controlled waters only, which could impact on the proposed development. The site location is shown on Insert 1 in Section 2.1.

The proposed development will largely comprise residential development in the west, with commercial development planned for the east. No finalised proposed development layout is currently available; however, it is presumed that the residential areas will comprise typical two-storey dwellings with private gardens, landscaping and estate roads. The commercial unit(s) are presumed to be proposed large portal-frame units with external areas of car parking, hard-standing and limited landscaping. The current proposed *'Outline Site Masterplan'* development layout is presented as Figure 1; however, we understand that this does not necessarily represent the final development layout. We are not aware of any proposed significant changes to the current ground levels. It is understood that the proposed structures would be classified as Geotechnical Category 2 (BS5930:2020).

1.2 Objective and Scope of Works

It should be noted that this current assessment is targeted to assess the current status of the groundwater beneath the site and the potential risks to controlled waters and any pertinent historical information utilised in this assessment, addresses this aspect only. For all other elements of previous works undertaken, full reference should be made to the previous ESP report (ESP, 2025).

It should be noted that during the historical investigation review, ESP identified that a number of potential geo-environmental and geotechnical hazards had been assessed in past reports and these (detailed within Section 3) should be referred to for aspects outside of this CWRA.

The scope of works for the investigation was designed by ESP within an agreed budget and comprised the construction of cable percussion boreholes in accessible areas of the site.

The contract was awarded based on a competitive tender quotation. The terms of reference for the assessment are as laid down in the Earth Science Partnership Bill of Quantities (BoQ) presented on 12th June 2025 (Ref: ESP.9211.02a.BoQ - Supplementary Controlled Waters Risk Assessment). The investigation (including return monitoring/sampling visits) and assessment were undertaken between September and December 2025.

1.3 Report Format

This report includes a summary of the site setting and previous pertinent ESP Desk Study information including the findings of the previous CWRA (Section 2), a summary of the available, relevant historical investigation information (Section 3), and details of the current CWRA investigation undertaken of BS5930:2020 (Section 4). The report continues with an update to the conceptual ground model (Section 5), followed by an assessment of the current status of the groundwater beneath the site in relation to controlled waters (Section 6). The report concludes with a discussion of the recent findings (Section 7) and recommendations for further work/assessment (Section 8).

1.4 Limitations of Report

This report represents the findings of the brief relating to the proposed end use and geotechnical category of structure(s) as detailed in Section 1.1 above. The brief did not require an assessment of the implications for any other end use or structures, nor is the report a comprehensive site characterisation and should not be construed as such. Should an alternative end use or structure be considered, the findings of the assessment should be re-examined relating to the new proposals.

Where preventative, ameliorative or remediation works are required, professional judgement will be used to make recommendations that satisfy the site-specific requirements in accordance with good practice guidance.

Consultation with regulatory authorities will be required with respect to proposed works as there may be overriding regional or policy requirements which demand additional work to be undertaken. It should be noted that both regulations and their interpretation by statutory authorities are continually changing.

This report represents the findings and opinions of experienced geo-environmental and geotechnical specialists. Earth Science Partnership does not provide legal advice, and the advice of lawyers may also be required.

2 Site Setting & Summary of Pertinent Past Desk Study Information

2.1 General Overview

It should be noted that this current assessment is targeted to assess the current status of the groundwater beneath the site and the potential risks to controlled waters and any pertinent information used addresses this aspect only. For all other elements of previous works undertaken, full reference should be made to the previous ESP report (ESP, 2025).

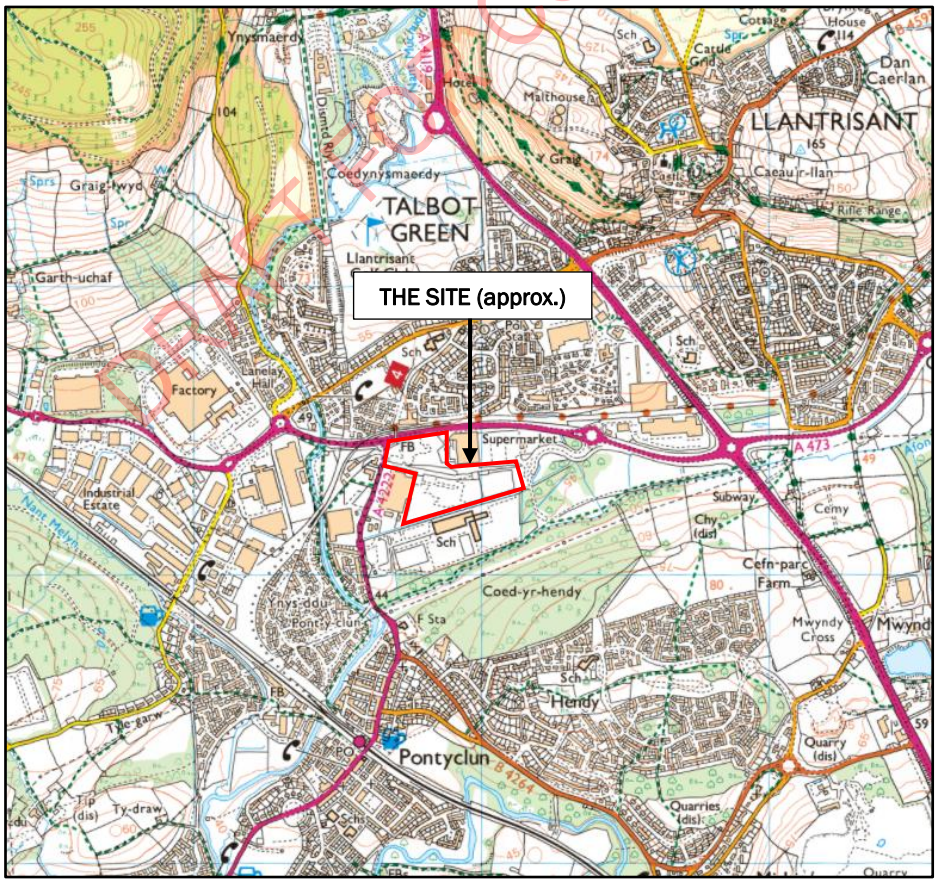
The information in this section was obtained from desk-based research (ESP, 2025) of information relating to this CWRA.

A review of the pertinent previous investigation information is presented in Section 3.

2.2 Site Location and Description

The site description is largely based on a field reconnaissance and site inspection visit made at the site on 11th September (as part of separate ongoing works at the site) during generally dry weather.

The site is located south of the A473 and east of the A4222 in the southwest of Talbot Green in the county of Rhondda Cynon Taf. The National Grid Reference of the approximate centre of the site is (ST) 303891E, 182334N, and the nearest available postcode is CF72 8FN. A site location plan is presented as Insert 1 below.

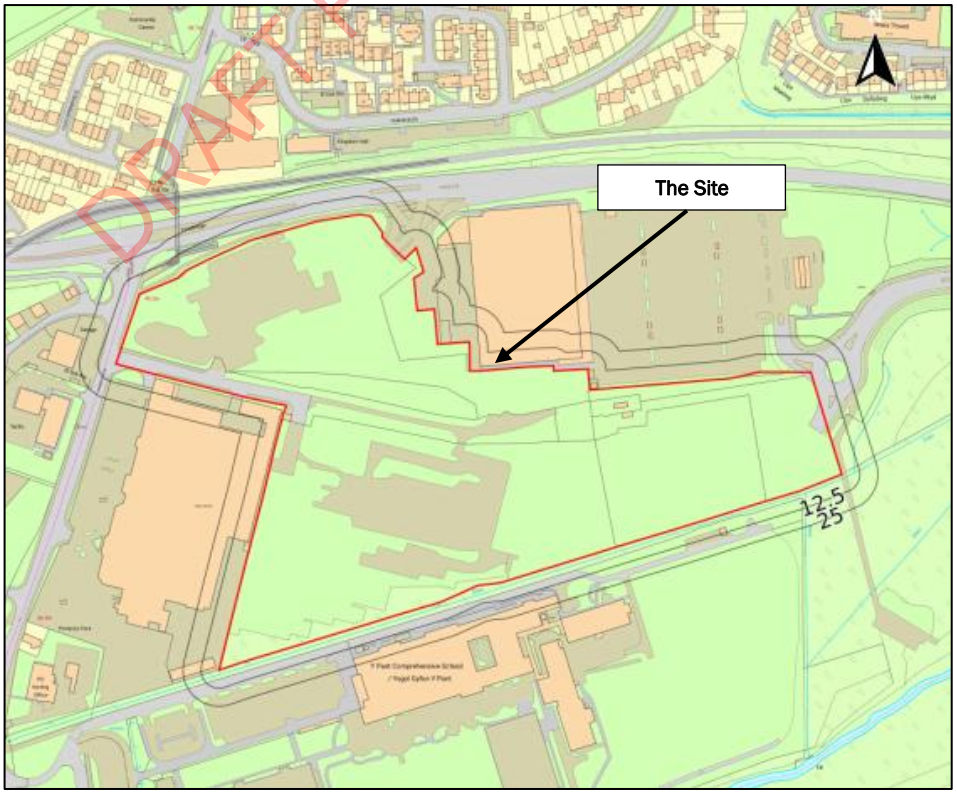


Insert 1 - Site Location Plan from Ordnance Survey 1:25,000 scale map.
Reproduced with permission (OS License No.: AL100015788).

2.2.1 Current Site Status

To show the current status of the site, an aerial image of the current site status is shown as Insert 2 below, followed by an OS site plan from the previous assessment (ESP, 2025) presented as Insert 3.

Insert 2 - Site Plan from Google Maps (Image taken May 2023)



Insert 3 – OS Mapping Site Plan from data report (Appendix C)

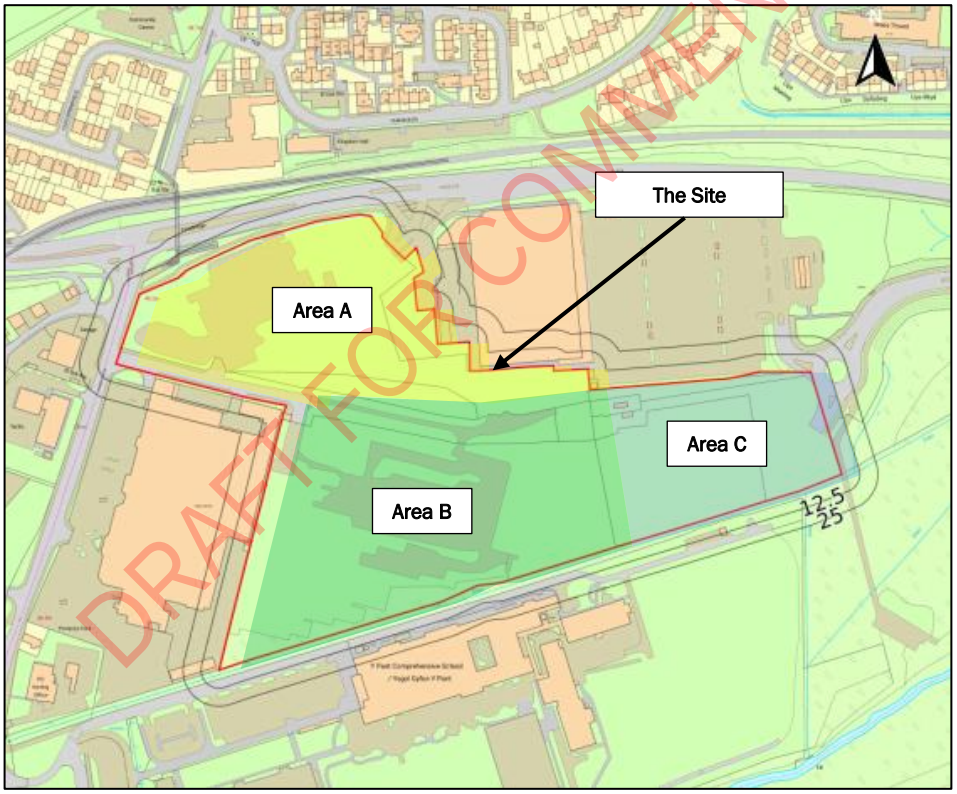
2.2.2 Site Boundaries, Access and Surroundings

The site is bounded by:

- To the north: the A473 in the west portion, with Sainsburys store and car park in the east portion.
- To the east: by Sainsburys store and an area of woodland.
- To the south: immediately by a drainage channel, followed by Y Pant comprehensive school.
- To the west: the A4222 (Cowbridge Road) and Leekes department store.

Vehicular access to the site is currently gained via a gate north of the existing Leekes department store. Access can also be gained through large concrete bollards via the former entrance in the west of the site (see insert 2). The site boundaries generally comprise post and wire fences to the west, south and north. The east of the site is open to the new road layout constructed as part of the adjacent Sainsburys development.

To aid in the description of the site in this section, the site has been separated into three areas (Area A, B and C) as shown on Insert 4 below.



Insert 4 – OS Mapping Site Plan from data report (Appendix C) – See Below Site Descriptions

Area A

This comprises a large area of former hardstanding, located in the central and west, with the remainder being open grass/scrub where scrub and limited small trees have been previously cleared by the Client. In the northwest, a former possible pumping station associated with former water mains remains.

In the east, an inaccessible fenced area is present, with evidence of previous ground investigation (probable borehole covers), with a cleared path leading to a narrow strip of land adjacent to the existing Sainsburys store to the north and further evidence of previous investigation and standpipes in the ground.

Area B

This comprises the former entrance to the site and a localised area of tarmacadam. The central area is occupied by a large concrete slab, with further areas of concrete and tarmacadam in the south and southwest. Steel runs were identified within the concrete in the central area, possibly associated with former crane/lifting runs or reinforcement to the slabs. Several drain covers were also identified but could not be lifted.

In the west portion, possible fill was identified by a raised area which doesn't seem consistent with the adjacent levels to the north, east and south.

The east extent is marked by a fence line which trends roughly north to south, separating Area B and area C, with only a small access point between the two (pedestrian) at the north extent of the fence. The southeast portion of Area B is largely dense vegetation and wooded areas which have been recently partially cleared by the Client to allow access.

Two derelict structures are present in the east portion, resembling possible old train carriages or narrow temporary cabin-type buildings.

Area C

This comprises an open field with the Area B/Area C fence line in the west, partial fencing in the north, a fence line along the south boundary and open access in the east/northeast. Areas of trees are present in the south and west, with recently cleared ground across the central area.

The ground level is approximately 1 to 2m below the land to the north and east in some areas, indicating that the recent Sainsburys development may have raised ground levels in some areas to create a level platform for development.

2.2.3 Existing Surveys

A topographic survey has been provided by the Client and indicates Area A to be in the region of around 48.5m AOD, with a slightly elevated central area of around 49m AOD. Area B is shown to be at approximately 47.5m in the north and 46.8m in the south, also sloping to around 45.5 in the east. An elevated area is also present in the east of Area B, rising to around 48.3m AOD. Area C is shown to be at a level of around 46.5m in the west and 45.7 in the east.

Variations in ground levels across all of the three areas (see insert 4) are present, however the above provides an overall indication of the site levels, which generally fall to the south/southwest to the river.

2.2.4 Services

Service plans were previously obtained by ESP from the utility companies (ESP, 2025). Site observations and the utility plans indicate that the site is crossed by the following services:

- 11kV Electricity cables in the northwest, trending along the north boundary also extending south and then east along the former access road. These cables then extend east through the approximate centre and trend south to the boundary (along the fence line between Areas B and C).
- Low pressure gas mains in the northwest.
- An intermediate pressure gas main trends roughly southwest to northeast in the south.
- A 160mm HDPE water main extends along the north boundary, with a 7-inch cast iron main shown to extend into the access road off the A4222 in the west, which terminates approximately 10m into the road.
- A private sewer is shown on the east margins, extending north to south along the boundary.
- BT cables are shown along the north boundary and along the access road in the west.

For ease of reference, the above services have been included on Figure 2.

Prior to the commencement of the recent works, ESP attended a site walkover with Wales & West Utilities (W&W) to locate and mark out the gas mains located along the southern boundary. Following the walkover, W&W confirmed the works could proceed with a stand-off of a minimum of 15m for the proposed boreholes from the gas main.

2.2.5 Summary of Site History

From the review of historical maps and other mapping sources, the site remained largely as open fields (with the exception of the construction of Springfield House in the late 1890's) until around the early 1960's, when the northwest portion of the site was developed with a Water Treating Equipment Work, which continued to expand within the site into the early 2000's. From the late 1970's, a further works/factory was developed in the southwest portion.

Reference to the Coflein website[1] (the online database for the National Monuments Record of Wales (NMRW)), the works on site were '*The chemical production division of the water purifying company, Permutit, was established near Talbot Green after WW2 (the company had been involved in the production of Sea Water Desalting Apparatus for war use). The company later changed its name to 'Purolite'. The building was closed and then demolished in the 1990s.'*

Reference to aerial imagery from Google earth ©, the works in the northwest portion of the site were partially demolished between 2001 and 2006 and are seen to have been completely removed by 2009. The works in the southwest portion remained until 2009 and were demolished sometime between then and 2013. As seen on the imagery, large areas of concrete slabs remained.

Google earth © imagery from 2013 shows the northwest portion of the site is likely being used as a compound for ground preparation/investigation works for the recently constructed Sainsburys food store, which is shown completed in the 2024 imagery.

With the exception of some recent vegetation clearance undertaken by the Client, the site remains as per the imagery from 2024 (Google earth ©).

[1] https://coflein.gov.uk/en/site/418827/

2.3 Hydrology - Surface Water Features (ESP, 2025)

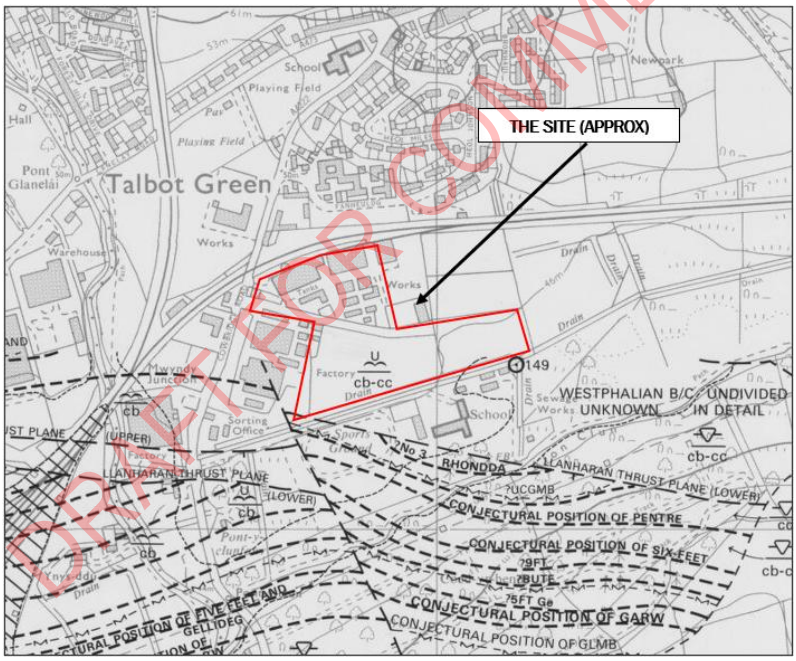
The nearest major surface water feature to the site is the Afon Clun which flows from east/northeast to west/southwest approximately 157m to the southeast. A number of smaller water courses and drains are also present in the area, the closest of which (drain) lies some 2m to the south of the southern boundary (see Figure 1).

The historical map review identified areas of marsh ground to the east/southeast, which later had drains installed, sometime in the early 1960's.

2.4 Geology

2.4.1 Published Geology

The published 1:10,560 scale geological map for the area of the site (Sheet ST08SW), available on the website of the British Geological Survey, 2025 and presented as Insert 5) indicates the site to be underlain by River Terrace Deposits (undifferentiated) overlying bedrock of the South Wales Middle Coal Measures Formation. Detailed mapping data is not available for the majority of the site, as shown on the insert below.



Insert 5 - Extract from BGS Geological Map Sheet SS68NW, original 1:10,560 scale. Reproduced with permission (BGS licence number: C15/05 CSL)

Reference to the up-to-date mapping available on the website of the British Geological Survey (BGS, 2025) indicates a similar succession, but the River Terrace Deposits are named River Terrace Deposits, 1 (sand and gravel). An area of Alluvium is also shown in the southeast portion.

The River Terrace Deposits (RTD) superficial strata would be expected to comprise sand and gravel, locally with lenses of silt, clay or peat. The Coal Measures bedrock comprises an interbedded succession of sandstone, siltstone and mudstone, with coal seams and associated seat earths.

2.4.2 Available BGS Borehole Records

The British Geological Survey website (BGS, 2025) indicates the available records of 5no. useful boreholes on/adjacent to the central east portion of the site (ESP, 2025).

Boreholes ST08SW298, ST08SW299 ST08SW301 and ST08SW302 indicate the general ground conditions to comprise approximately 2m of overburden/soils (presumed Topsoil and subsoil), overlying coarse gravels to between approximately 9m and 12m below the surface. In BHST08SW298, the gravels are shown to extend down to around 20.5m depth.

Bedrock is identified beneath the gravels and proved to a maximum depth of 92m (ST08SW298) and 98.2m (ST08SW299), described as *'Middle-Upper Coal measures, Undifferentiated).'*

Borehole ST08SW300 is progressed to 140m below the surface and identified *'soils'* to 3m, followed by sands and gravels to 11m depth. This is underlain by Sandstone, proved to 98m, followed by shale to 100m, coal to 103m and shale to 140m.

2.5 Hydrogeology (ESP, 2025)

The superficial deposits and bedrock beneath the site are classed as Secondary A Aquifers. Secondary A Aquifers generally correspond with the previously classified minor aquifers and comprise permeable layers capable of supporting water at a local, rather than strategic, scale and in some cases form an important base flow to rivers. Secondary A Aquifers are sensitive to pollution.

The groundwater gradient is likely similar to the topography at the site to the south/southwest towards the Afon Clun.

There are no groundwater abstractions or Source Protection Zones within 1,500m of the site. The groundwater vulnerability is medium to low.

Details on previous investigation findings are presented in Section 3.

2.6 Previous Preliminary Controlled Waters Risk Assessment (ESP, 2025)

At the time of the previous assessment (ESP, 2025), the findings indicated that the levels of contamination within the soils beneath the site could pose an unacceptable risk to controlled waters, and further assessment or the provision of risk mitigation measures is warranted.

Groundwater remediation was identified to have likely been undertaken in the past and a review of this was recommended. Sampling and testing of the groundwater was also recommended as part of any future assessments to confirm the current land condition.

This report now addresses the above recommendations.

3 Previous Pertinent Investigation Information

Review of the available previous investigations undertaken at the site (some which included land immediately adjacent for the existing Sainsbury's food store) has been undertaken to inform this recent study and the following section presents information pertinent to the current assessment of the potential risks to controlled waters.

It should be noted that the previous investigations also detailed several other assessments of potential geo-environmental (soil contamination, ground gas etc) and geotechnical hazards identified at the site; however, these are not considered further in this assessment of the potential risks to controlled waters.

3.1 Timeline

For ease of reference, the following documents have been reviewed to inform this assessment and summarised chronologically below.

- 2011 – Opus, 2011 - Geo-Environmental Interpretive Report (ref: C7915.00-RepG01).
- 2014 – Opus, 2014a - Detailed Quantitative Risk Assessment (ref: V-C7915_DQRA_SLR).
- 2014 – TRM - Detailed Remediation Strategy (ref: TRM, E427_Talbot Green Detailed Remediation Strategy.
- 2014 – Opus, 2014b - Validation Plan (ref: V-C7915.00-Rep01).
- 2018 – Opus, 2018a - Chemical Injection Remediation Works TRM Phase 2 Validation Report (ref: V-C7915.00/CIVR2/JEP).
- 2018 – Opus, 2018b - Site Remediation Verification Report.
- WSP – WSP, 2019 - Addendum Report to the Site Verification Reports (ref: 70054196-002).

Due to the amount of detailed investigation and assessment within these reports, the following sections provide an outline summary only and each of the individual reports should be referred to in detail in conjunction with this report as required.

3.2 Previous Assessment, Opus 2011

The previous investigation/assessment undertaken by Opus (ref: C7915.00-RepG01) was based on a ground investigation completed by Soil Mechanics on behalf of Opus in April/May 2011 , with the final report completed in August 2011 (Opus, 2011). The investigation covered a wider site than is relevant to this current assessment; however, a number of investigation points were constructed within the current ESP site boundary, some of which are relevant to the current CWRA. For ease of reference, the investigation points relevant to this assessment and discussed in this section are presented on Figure 2.

The report also references investigations undertaken between 2003 and 2010 by ENVIRON for the area of the former Purolite site only; however, these reports have not been identified to be available and have not been individually reviewed as part of this assessment. It is understood that the pertinent information from these reports is included within the Opus assessment.

3.2.1 Overview of Site Investigation Points

A ground investigation was planned to provide information on general ground conditions at the site. Several rotary open boreholes, rotary probe boreholes, cable percussive boreholes, trial pits and soakaway were conducted at the site and the positions within the current study site have been presented on Figure 2.

3.2.2 Generalised Ground Model

Limited Topsoil was identified across the site, with the exception of the east extent of the current study area, similar to that identified in the previous ESP investigation (ESP, 2025).

Made Ground was encountered across the western half and central portions of the current site area (in the area of the former Purolite and Staedtler factories) to a maximum depth of approximately 3.6m (but generally no deeper than 1m). The Made Ground generally comprised demolition rubble over coarse, reworked soils with anthropogenic materials.

River Terrace deposits were identified across the site comprising generally medium to coarse soils (frequently clayey/silty) with interbedded horizons of clay/silt to depths of around 10m to 17.5m.

Upper Coal Measures was identified beneath the River Terrace Deposits across the site. Where encountered, the bedrock comprised generally sandstone, with some siltstone. Rock head was identified from around 10m to 17.5m beneath the River Terrace Deposits.

Groundwater was encountered generally between depths of approximately 0.5m and 9.5m below surface level. Monitoring of installed monitoring wells identified groundwater levels between around 0.5m (in the east) and around 3.5m generally across the remainder of the site.

The above findings are in line with the previous ESP investigation (ESP, 2025).

3.2.3 Potential Contamination

Visual and/or olfactory evidence of contamination was identified across the west and central portions of the current investigation site from shallow depth within the Made ground, to around 12-13m within the River Terrace Deposits.

3.2.4 Previous Assessment of Risks to Controlled Waters

Elevated levels of inorganic and organic contaminants were identified within the soils test results across the site. Limited leachate testing generally identified low concentrations of leachable contamination and based on this (with the exception of some elevated organic determinands), '*the potential for any significant leachate generation and subsequent pollution is considered to be minimal.*'

The largest exceedance for organic determinands in the soils was recorded for Total PAH within samples from BH11 at 10m (in the southern west portion of the current study area) and BH17 at 0.50m (just off the current site boundary in the central north area).

A single elevated leachable level for 1,2-Dichloroethane was observed within the sample from BH11 and this was considered to represent a moderate risk of pollution to controlled waters when compared to the EQS of 10µg/l.

Water samples collected confirmed the presence of Fluoranthene, 1,2-Dichloroethane and Vinyl Chloride in localised areas on site (BH13 in the north portion of the current study area) and in locations outside of the site boundary.

3.3 Detailed Quantitative Risk Assessment (Opus, 2014a)

Opus issued a detailed quantitative risk assessment in July 2011, which was later revised for the Client in 2014, following liaison with Natural Resources Wales. The following section is a summary of the revised DQRA (ref: V-C7915_DQRA_SLR). The investigation points referred to are shown on Figure 2.

3.3.1 Historic Review

Although a detailed review was not completed by Opus as part of the DQRA, the following points were included within the report and are considered pertinent for this assessment.

- Limited review of historic information identified that *'the site has suffered from contamination as a result of the historical uses and of burying waste. Contamination of both soils and groundwater is known to have occurred, and remediation has been carried out.'*
- *The remediation undertaken historically is understood to have been carried out on the former Purolite area by BAE Systems Ltd through the removal of contaminated soil (excavation) and groundwater (pump and treat), between 2005 and 2006.*
- *Following completion of the BAE Systems remediation, a residual dissolved plume of 1,2-Dichloroethane, vinyl chloride and ethylbenzene remained in the groundwater. In consultation with the Environment Agency, ENVIRON agreed that remediation of the plume would be continued using Monitored Natural Attenuation (MNA).*
- *During the regular groundwater monitoring being carried out for the MNA, acidic groundwater conditions were recorded at the southern site boundary. It was reported that the monitoring wells in which these conditions were being detected had been constructed in the area down gradient of a former cooling pond indicating this to be a potential source of contamination.*
- *It is understood that the cooling pond was found to be partially buried and was excavated / removed to 2m below ground level and the base perforated. It was conjectured by ENVIRON that the acidic groundwater conditions were likely to be attributable to oxidation as a result of organic rich material present in the area of the former cooling pond. ENVIRON also reported that ammoniacal nitrogen concentrations were also elevated in the area of the former pond.*
- *In addition, it is understood that as a result of one of the building floor slabs being present, the soils and groundwater beneath could not be remediated. However, BAE Systems are understood to have agreed an increase in target concentrations with Rhondda Cynon Taff and remediation beneath this area was not required.*

- *ENVIRON reviewed the BAE Systems soil validation report and noted that it states that the assessment and remediation have been performed so that no widespread areas of contamination remain, which would pose an unacceptable risk to receptors. However, the report also states that there is a possibility that localised areas of contamination may remain that would pose a risk to construction workers.*
- *ENVIRON reported that they considered that hot spots of contamination are likely to be located under the remaining ground slab of Building 1; at the former effluent treatment plant; and in the vicinity of the former cooling pond.*
- *It is reported that a 2007 investigation in the Staedtler area, south of the Purolite area, did not detect low pH values in groundwater from any of the 12 boreholes installed.*
- *The MNA process is still being monitored by ENVIRON and the latest round of monitoring carried out was in January 2011. The results indicated that one of the initial contaminants of concern, ethyl benzene, was not longer detectable within any of the monitoring boreholes at concentrations above the adopted screening values. However, concentrations of vinyl chloride and 1,2-Dichloroethane were still being recorded locally above the screening values. In the case of vinyl chloride, a borehole where it had previously not been detected was now recording increasing concentrations.*
- *It is considered that this is indicative of degradation of 1,2-Dichloroethane and indicates a growing plume, migrating off site to the south.*
- *In addition, the Environ 2003 Site Investigation Report indicates that an area in the east of the site, used for storage at the time, had been used to bury drums of chemicals. No intrusive investigation of that area was therefore carried out. It is understood that non-intrusive investigations had been carried out by Terradat Limited and reported in a report dated 2002 although this was not included in the information provided to Opus and has therefore not been reviewed.*

3.3.2 Ground Model

No significant ground model information differing from that reported by Opus in the initial assessment (Opus, 2011) was identified.

Opus report in the DQRA that previous monitoring of the groundwater *'suggests that the groundwater beneath the site is largely a continuous body within the River Terrace deposits'* (locally constrained by silt and clay bands).

The DQRA identifies that the basal level of the drainage ditch present along the southern site boundary is at a higher elevation than the top of the groundwater at the southern site boundary and therefore was *'considered unlikely to be in direct hydraulic conductivity with the groundwater beneath the site and is neither therefore a receptor or potential preferential pathway for contaminated water to migrate to the Afon Clun'.* However, the Afon Clun was still identified to be a potential receptor.

3.3.3 Identified Contamination Sources

Opus summarised that:

- *The primary sources of contamination at the site are considered to be the residual contamination within the soils and groundwater associated with the site's former uses. The contaminant sources are considered to have been present within the ground for some time, likely of the order of several decades.*
- *The contamination in both soils and groundwater has generally been shown to be limited to the central area of the site.*
- *Whilst elevated contaminant concentrations have been detected within groundwater in the central area of the site, monitoring data indicates that the identified plumes do not currently extend beyond the southern Masterplan boundary.*

3.3.4 Identified Contaminants of Concern (Groundwater)

The following summarises the groundwater risk assessment carried out by Opus and presents the contaminants of concern (CoC) and their relative remedial target concentrations derived for the DQRA.

Table 2: Summary of Contaminants of Concern (CoC) and Associated Remedial Target Concentrations

Substance	Level 3 Groundwater Remedial Target Concentration (µg/l)
1,2 -Dichloroethane	11.4
Vinyl Chloride	10.8

TPH contamination was previously identified as a potential risk in the earlier issue of the DQRA in 2011; however, updated assessment by Opus in line with updated guidance concluded that *'there is no requirement to evaluate potential risks to controlled waters from TPH impacted groundwater further as the detected concentrations are not deemed to be a potentially significant.'*

3.3.5 Opus Discussion & Conclusions– Risks to Controlled Waters

Opus summarised the following conclusions following the DQRA.

- *Following extensive ground investigations, the soil and groundwater beneath the central area of the site was found to be impacted by VC and 1,2-DCA. The chlorinated solvents were recorded in a plume extending from approximately BH13 towards the south. In addition, a small TPH soil source zone was identified at SA11.*
- *The groundwater from the identified source areas is inferred to flow towards the Afon Clun to the south and has been assumed to be in direct hydraulic connectivity with the river. A drain immediately south of the site is not considered to be in hydraulic continuity with the groundwater beneath the site, as its base is at a higher elevation than the highest recorded groundwater level.*
- *The modelled time for VC and 1,2-DCA to reach the compliance point of 80m (i.e. the site boundary) is approximately 80 days. Considering the source is known to have been in-situ for significantly longer than this and the southerly boundary monitoring wells are presenting concentrations of these compounds below their respective compliance point concentrations, the likelihood is that the plume is, in fact, contracting as a consequence of natural attenuation processes. Therefore, whilst exceedances of derived groundwater RTCs for VC and 1,2-DCA were detected, potentially significant risks to Controlled Waters from chlorinated solvents are considered unlikely.*

- *The isolated TPH aromatic C8 – C10 soil source zone around SA11 is also considered unlikely to present a potentially significant risks to controlled waters given the derived RTC (8,150mg/kg) was not exceeded.*
- *Whilst the results of this groundwater risk assessment suggest potentially significant risks to Controlled Waters are unlikely, it is evident, given the detected concentrations, that a residual contaminant source remains in-situ. As such, remediation of these source areas is proposed on the basis of 'betterment' for the environment with the aim to reduce contaminant concentrations from their current levels. Whilst not specific remediation goals, the aim would be for source zone concentrations of VC and 1,2-DCA to reduce from the current concentrations towards their respective derived RTCs of 10.8 µg/L and 11.4 µg/L.*

3.4 Detailed Remediation Strategy (TRM, 2014)

Following completion of the Opus DQRA (Opus, 2011), TRM, a specialist remediation contractor, were appointed by the Client to undertake remedial works at the site and produced an initial remedial strategy for varying identified potential geo-environmental risks identified. The following section summarises the report in relation to the proposals for the risks to controlled waters only.

3.4.1 Overview of Strategy

The general strategy with regards to the remediation works is provided in Section 3 of the TRM report and summarised below:

- Set out site.
- Drill and install monitoring boreholes, establish additional existing monitoring boreholes and protect.
- Establish baseline groundwater data.
- Drill and install injection boreholes using two hollow stem auger rigs.
- First round of injection using proprietary remediation chemical; Carus OBC in accordance with manufacturer instruction. TRM injection equipment comprises mixing vessel, double diaphragm pumps, hoses, gauges etc.
- Monitor.
- Complete further rounds of injection and monitor.
- Validate and provide close-out report.

All works would be conducted under an environmental permit and agreed with NRW.

3.5 Validation Plan (Opus, 2014b).

A validation plan was produced by Opus, which outlined the steps of the remedial works and details of the targeted contamination for groundwater (and soil), based on a *'Suitable for Use'* approach, in line with Part IIA of the Environmental Protection Act 1990.

3.5.1 Previous Remediation Works

Opus identify historic remedial works completed at the site which included the removal of buried chemical waste drums and contaminated soils, as well as *'pump and treat'* works undertaken as part of the groundwater remediation between 2003 and 2006 (it is not known how much of these works were within the current study area, but it is presumed that some remedial works would have been within).

Following the remediation the Environment Agency had agreed that a residual plume of 1,2-dichloroethane would be remediated using Monitored Natural Attenuation (MNA), which was undertaken by ENVIRON between 2007 and 2011.

At the time, the final monitoring round confirmed that the original contaminants of concern (1,2-dichloroethane, chloroethane and ethyl benzene) were below their remedial target concentrations of 1mg/l in groundwater within all of the wells monitored on both the former Purolite and Staedtler sites.

3.5.2 Updated Remedial Target Concentrations

The groundwater remedial target concentrations detailed in the validation plan were as follows:

Table 3: Summary of Contaminants of Concern (CoC) and Associated Remedial Target Concentrations

Substance	Level 3 Groundwater Remedial Target Concentration (µg/l)
1,2 -Dichloroethane	11
Vinyl Chloride	11

3.5.3 Remedial Works and Verification

Remediation was intended on the basis of 'betterment' for the environment, aiming to reduce the contaminant levels towards the adopted remedial target concentrations (RTC) from their current concentrations. Compliance target concentrations of 10µg/l were provided, to be assessed from boreholes on the southern boundary only.

Groundwater monitoring using appropriate methods was planned throughout the remedial works to monitor the levels of the contaminants of concern. Further monitoring was planned 1-month after the completion of the remedial works.

Surface water sampling from the Afon Clun was also planned to add an additional line of assessment.

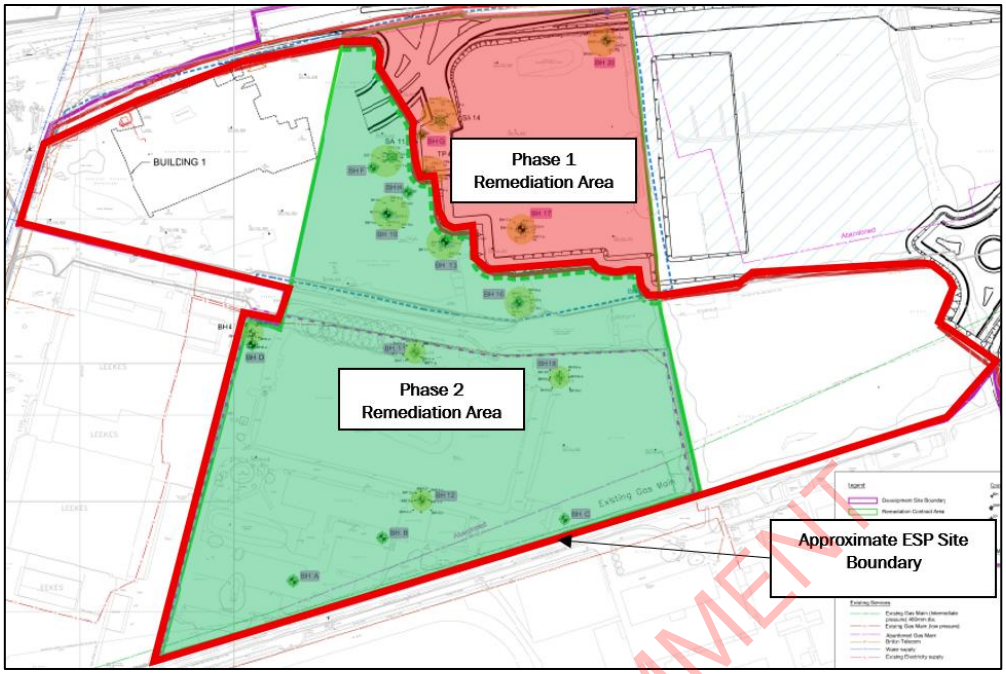
A verification report was intended to assess all of the remedial works and subsequent monitoring.

3.6 TRM Phase 2 Validation Report – Opus 2018a

The TRM remedial works included a Phase 1 site area and a Phase 2 site area. The Phase 1 site area related to the land where the existing Sainsbury's store is located and is not included in this assessment.

TRM provided the final Validation report to Opus, who summarised the works and resulting contaminant levels as detailed below. This also included commentary on comments previously received from the Rhondda Cynon Taf (RCT) Contaminated Land Officer (CLO) which were directed primarily at the Phase 1 site area but were relevant to the Phase 2 area also.

Insert 5 below shows the remedial areas Phase 1 and 2 for context and reproduced as Figure 3 for reference.



Insert 6 - Extract from Opus/TRM Validation report (ref V-C7915.00/CIVR2/JEP)

3.6.1 Updates to Target Concentrations

Following initial borehole installation works, a short break in the works occurred during which time TRM were in liaison with NRW to resecure permitting for the remedial works. During these discussions, the following finalised targets were agreed.

- Vinyl Chloride (VC) <10µg/l
- 1,2 -Dichloroethane (DCA) <10µg/l
- TPH - not specifically given a target concentration; however, 300µg/l was proposed for TPH Aromatic C8-10.

The document and overall principle of the remedial works was to ensure betterment of the overall status of the groundwater with a reduction in concentrations, rather than strict targets. TRM adopted an approach of overall reduction of total TPH as being a suitably conservative approach.

3.6.2 Works Overview

Eight remediation areas were identified based on the findings of the previous Opus investigation (Opus, 2011) and subsequent assessment and DQRA (four additional areas were also identified within the Phase 1 area but are not included within this assessment). The remediation areas were identified by previous investigation point references and included, SA11, BH4, BH10, BH11, BH12, BH13, BH16 and BH18. Their positions are shown on Figure 3 for reference.

TRM proposed to site clusters of up to eight injection boreholes approximately centred on these points in a grid basis, with approximate 5m spacing between injection boreholes. During the borehole installation works, this pattern was sometimes altered to reflect the ground conditions encountered during drilling or constraints which limited the location of all injection points (services, trees, fencelines etc).

The injection wells were constructed to depths where contamination was previously identified to target these horizons.

Additional boreholes were also constructed (BH-F and BH-H) around the location of SA11 in the north to target potential contamination in this area identified previously.

Boundary monitoring boreholes BH-A, BH-B and BH-C were also constructed during these works to construct monitoring points as close to the site boundary as possible to capture the levels of contaminants potentially migrating off site (see Figure 3).

The programme of chemical injection was undertaken between March and June 2016 over four separate injection events (BH-F and BH-H were not included in the first injection event). .

3.6.3 Summary of Conclusions

Following the completion of the injection works and subsequent monitoring and analysis of groundwater samples and detailed assessment of the results, TRM considered that *'for the identified contaminants of concern at this site, in accordance with the Remediation Strategy and DQRA, vinyl chloride and TPH have been demonstrated to be remediated sufficiently to the required standards in all locations.'*

DCA was also noted to be remediated in all areas expect for BHD, BHF, BHH, BH10-c and BH13-e. The residual levels of DCA in these locations are reported at 20, 30, 56, 45 and 42µg/L respectively. TRM note that the target concentration of <10µg/l was a level to aim for rather than strictly achieve and that the levels are measured in parts per billion and are therefore *'extremely low'*.

The assessment also indicated that sentinel and boundary monitoring locations identified no indication of DCA contamination/migration and therefore *'DCA is not presenting a risk to controlled waters.'*

TRM conclude that whilst localised low levels of DCA remain, the levels are unlikely to increase but are also unlikely to decrease with further injection works.

TRM recommended continued post-remediation monitoring be undertaken by Opus to obtain additional data to inform the residual levels of DCA. They report that the levels of DCA have been remediated in all areas, but in the case of the five locations with low level residual DCA, they *'been remediated as much as practicable and that further remedial works will not see notable contaminant reductions.'*

3.7 Site Remediation Verification Report (Opus, 2018b)

Opus issued a verification report following completion of the TRM remediation works and the key findings and conclusions are summarised within this section in relations to the Phase 2 remediation area as shown on Figure 3. The verification report also addresses other geo-environmental aspects which are not included as part of these assessment works but should be reviewed in the future as part of the overall mitigation requirements for the development.

3.7.1 Works Overview

Details of the works are provided to summarise the detailed scope and remedial works carried out by TRM and presented in the TRM report (see Section 3.6).

3.7.2 Groundwater Target Concentrations and Monitoring Results

For completeness, the report details the groundwater DQRA and compliance targets agreed with regulators and a summary table is provided below.

Table 4: Groundwater DQRA & Compliance Targets (Opus, 2018b)

	Groundwater Remediation target Concentrations (µg/l)			
Contaminants of Concern	**DQRA Level 3**	**Site Remediation RTCs**	**TRM Detailed Remediation Strategy**	**Compliance Points (BHs A, B & C)**
1,2 -Dichloroethane (DCA)	11	12	<10	10
Vinyl Chloride (VC)	11	11	<10	10
Total Petroleum Hydrocarbons (TPH C8-40)	-	-	(<300)	-

The following sections summarise the Opus assessment of the findings in relations to the Contaminants of Concern (CoC).

3.7.2.1 1,2-Dichloroethane (DCA)

- *Post remedial works results show a steady overall reduction in the concentrations of DCA in the internal monitoring wells although there were some occasional rebounds of concentrations in individual boreholes.*
- *In the last round of monitoring in February 2018, only two results for Boreholes 11 & F were above the Remediation Target Concentration of 10µg/l with concentrations of 14µg/l and 12µg/l respectively, with the average concentration of all of the internal wells being less than 5µg/l.*
- *The results for the three Compliance Point Boreholes A, B and C have remained at or below the detection limit of 1µg/l throughout the remediation works and the post-injection monitoring period.*

3.7.2.2 Vinyl Chloride (VC)

- *Post remedial works results show some further reduction in the concentrations of VC in the internal monitoring wells which were already well below the Remediation Target Concentration of 10µg/l at the end of the chemical injection works.*
- *There have been some slight rebounds of concentrations in individual boreholes to no more than 4µg/l but too small a variation to be of any significance.*
- *In the last round of monitoring in February 2018, only two results for Boreholes 10 & H were above the detection limit of 1µg/l and then both only with concentrations of 2µg/l.*
- *The results for the three Compliance Point Boreholes A, B and C have remained below the detection limit of 1µg/l throughout the remediation works and the post-injection monitoring period.*

3.7.2.3 Total Petroleum Hydrocarbons (TPH)

- *The simple TPH test is now frequently referred to as a Total Recoverable Hydrocarbon (TRH) test, and this terminology has been used in this report to distinguish the results of tests where silica gel clean-up has not been used.*

- *In the last round of monitoring in February 2018, the TRH results for the internal wells ranged from 10 to 120µg/l with an average of 49µg/l, well below the voluntary Remediation Target Concentration (RTC) of 300µg/l.*
- *Only one result has exceeded this voluntary RTC during the post-injection monitoring period when a spuriously high concentration of 1060µg/l was recorded in Borehole 18 in December 2016.*
- *The post-injection TPH-CWG results show an almost constant average concentrations of TPH in the internal monitoring wells of 22-24µg/l, with most results below the normal detection limit of 20µg/l and the highest concentration being 41µg/l in Borehole 10. All of these results are very much lower than the RTC.*
- *The results of both the TRH and TPH-CWG tests for the three Compliance Point Boreholes A, B and C have remained similarly close to or below the detection limit throughout the post-injection monitoring period, with the highest concentration measured in the last round of monitoring being 23µg/l in Borehole C.*

3.7.3 Conclusions

Opus conclude that the concentrations of all CoC have been shown to have reduced following the remedial works and are around detection limits, with the exception of the two marginally elevated levels of DCA; however, these are still matching the overall downward trend and *'can be expected to fall below the RTC by natural attenuation in due course.'*

All results from the compliance point boreholes have remained close to detection limits and well below the adopted RTCs.

Opus conclude that *'With the concentrations of the Contaminants of Concern at the Compliance Points remaining stable at or close to the detection limits and well below the RTCs, and the concentrations within the site also falling towards the detection limits, it is clear that the required aim of betterment of the groundwater quality with the site has been achieved and there is no risk to the environment downstream of the Compliance Points.'*

3.8 Addendum Report to the Site Verification Reports (WSP, 2019)

WSP were appointed by Cromwell Property Group to provide an addendum report to the Opus verification report following concerns from NRW in August 2018.

WSP concur that the concentrations of DCA and VC have been demonstrated to be low and considered that an on-site source is unlikely to remain. Therefore, the risk to controlled waters from these contaminants was deemed to be low.

NRW also had concerns associated with the TPH contamination and whether the verification reports addressed the risk to controlled waters sufficiently in relation to these contaminants.

WSP conclude that TPH concentrations are *'predominantly stable at low concentrations with slight decline in concentrations across some boreholes following remediation and therefore it is not thought that there is an ongoing source at the site. The perimeter boreholes show low concentrations (below the LOD) suggesting TPH is not migrating off site and is degrading in situ. Based on this, the risk* [to] *controlled waters is considered to be low.'*

Review of the planning portal has identified correspondence from NRW in December 2019 (NRW ref: Our ref: CAS-105490-J2W3) following review of the WSP report which states that:

'The submitted Talbot Green. Addendum Report to the Site Verification Reports, ref: 70054196-002, prepared by WSP, dated November 2019, addresses concerns raised by us in earlier correspondence. Therefore, we have no objection to the discharge of conditions 52 and 53 of 12/1102/10.'

4 Supplementary Controlled Waters Risk Assessment Investigation

The following sections relate to the supplementary assessment of potential risks to controlled waters only, targeted in the central and west portions (Areas A and B on Insert 4) of the site where historical sources of contamination have been identified (ESP, 2025) and previous investigation by 3rd parties has identified elevated levels of contaminants within the shallow soils and groundwater beneath the site (see Section 3).

Previous remedial works have been undertaken by Opus/TRM to mitigate the risks to controlled waters from identified contaminants of concern (see Section 3).

The following sections represent a current assessment of the groundwater status beneath the site relating to potential risks to controlled waters to identify any residual risks.

4.1 Investigation Points

4.1.1 Introduction

The intrusive investigation was undertaken between 11th September and 8th October 2025 in general accordance with BS5930:2020 and BS10175:2017 and was designed to investigate geo-environmental aspects only, with regards to the contamination status of the soils and groundwater beneath the site. The works comprised cable percussion boreholes only.

Where relevant, information from the previous investigation (ESP, 2025) has also been included within this assessment. The investigation point positions for this investigation are shown on Figure 4a.

A mining investigation was undertaken concurrently with this CWRA investigation, with the construction of 3no. rotary drillholes. The findings of these investigation points have been included to inform the general ground model, and the investigation point positions are shown on Figure 4b.

The investigation points were supervised and logged by an engineering geologist in general accordance with BS5930:2020, BS EN ISO 14688-1:2002, BS EN ISO 14688-2:2018, and BS EN ISO 14689:2018, along with published weathering schemes. The investigation point positions are shown on Figure 4b. The ground levels and grid references indicated on the investigation point records are approximate only and have been interpolated from available information.

4.1.2 Investigation Strategy – Current CWRA Assessment

The investigation points were located across the site to assess the current levels of contamination within the shallow soils, and to install groundwater monitoring/sampling wells to enable the collection of groundwater samples to assess the current status of the groundwater beneath the site.

Boreholes were located in areas previously identified to have levels of contaminants which posed a risk to controlled waters and were subject to remedial works.

4.1.3 Trial Pits (ESP, January 2025)

24no. trial pits (TP01 to TP24) were excavated across the site between the 14th and 17th January 2025, using a tracked hydraulic excavator. The trial pits were excavated to depths of between 0.5m and 3.3m. Where present, the tarmacadam/concrete surface was broken out prior to the excavation of the pits using a hydraulic breaker. The trial pit records are presented as Appendix B1, and their positions are shown on Figure 4a.

Disturbed samples were collected from the trial pits for laboratory testing as shown on the trial pit records. On completion, the trial pits were backfilled with arisings in layers compacted with the excavator bucket. The concrete/tarmacadam surface was not reinstated. The arisings were left slightly proud of the adjacent surface to allow for future settlement.

4.1.4 Windowless Sampling (ESP, January 2025)

8no. windowless sample drillholes (WS01 to WS08) were constructed on the 16th and 17th January 2025 to depths between 0.5m and 1.5m. The borehole records are presented as Appendix B2, and their positions are shown on Figure 4a.

A hydraulically powered rig was used to drive plastic lined sampling tubes into the ground, with the soil recovered within the tubes, which are then split to allow sampling and logging. Disturbed samples were obtained throughout the boreholes for identification and laboratory testing purposes, as shown on the borehole records.

Due to the very dense ground conditions identified within the Made Ground and natural River Terrace Deposits (RTD), the windowless sampling method provided limited penetration beyond the hand excavated service inspection pits.

At the commencement of each borehole, a service inspection pit excavated by hand to a depth of 1.2m where possible. Where required, the surface tarmacadam/concrete was broken out using a hydraulic breaker and a service inspection pit excavated by hand to a depth of 1.2m.

4.1.5 Rotary Drillholes (ESP, September 2025)

As stated in Section 4.1.1, a mining investigation was undertaken concurrently with the CWRA investigation (ESP ref: ESP.9211.02b.4473) and the findings from the boreholes constructed are included within this assessment to inform the deeper ground model.

3no. rotary drillholes were constructed (BH201 to BH203) to depths of 50m below current surface level. The boreholes were progressed using open hole methodology only. The records are presented as Appendix B3. Their positions are shown on Figure 4b.

4.1.6 Cable Percussion Boreholes (ESP, September 2025)

8no. 150mm diameter cable percussion boreholes (BH201 to BH208) were constructed to depths between7.0m and 12.0m between 11th September and 8th October 2025. The borehole records are presented as Appendix C, and their positions are shown on Figure 4b.

At the commencement of each borehole, a service inspection pit excavated by hand to a depth of 1.2m. On completion, monitoring instrumentation was installed in the boreholes as detailed in Section 4.2.

4.2 Instrumentation - Groundwater Installations and Monitoring

4.2.1 Overview

A 50mm diameter HDPE standpipe/monitoring well was installed in all cable percussion boreholes to allow monitoring sampling of groundwater in accordance with BS ISO 5667-22 (2010) where groundwater sampling was envisaged.

The wells, comprising slotted plastic pipe with a gravel surround (the response zone), bentonite seals above the response zone, and a lockable vandal proof cover, were installed in boreholes as detailed on the borehole records and summarised in Table 1 below.

4.2.2 Targeted Installations

The depth of the response zones selected also intended to target areas that were previously identified to be contaminated and had been subjected to chemical remediation as detailed in Section 3. A summary of the monitoring wells installed is presented in Table 5 below, with the positioning and installation depth rationale provided in Table 6.

Table 5: Groundwater Well Installations

Well ID	Date of Installation	Response Zone depth	Response Zone Stratum	Rationale[2]
CP201	12/09/25	5.0 – 7.8m	River terrace Deposits	1
CP202	16/09/25	5.0 – 7.0m	River terrace Deposits	2
CP203	19/09/25	7.0 – 10.0m	River terrace Deposits	3
CP204	24/09/25	10.0 – 12.0m	River terrace Deposits	4
CP205	26/09/25	6.5 – 9.5m	River terrace Deposits	5
CP206	01/10/25	7.0 – 10.0m	River terrace Deposits	6
CP207	03/10/25	6.0 – 9.0m	River terrace Deposits	7
CP208	08/10/25	6.0 – 9.0m	River terrace Deposits	8

Notes:
1. Details of each monitoring well are presented on the individual borehole records (Appendix C).
2. Rationale presented in Table 6.

Table 6: Groundwater Well Installation Rationale

Rationale Ref	Well ID	Rationale
1	CP201	Positioned downgradient of previous investigation point BH13 and in area of BH16 (Opus 2018a) where contaminants of concern were previously identified to be elevated and remedial works were targeted. River Terrace Deposits identified be contaminated between 0.40m and 13.00 metres (Opus, 2011). Groundwater treatment also targeted in BH13 area at 0.5m - 5.0m depth and BH16 between 0.5m - 5.0m and 10 – 13m.
2	CP202	Positioned downgradient of previous investigation point BH2 (Opus 2011) where River Terrace Deposits identified to be contaminated between 1.20m and 4.50m. Located outside of remediation area to determine background concentrations in the northwest.
3	CP203	Positioned near previous investigation point SA11 and BH10 (Opus 2018a) contaminants of concern were previously identified to be elevated and remedial works were targeted. River Terrace Deposits identified to be contaminated between 1.20m and 8.0m (opus, 2011). Groundwater treatment also targeted in BH-F & BH-H 4.0m - 7.0m depth.
4	CP204	Positioned downgradient of previous investigation point BH16 and near BH18 (Opus 2018a) where contaminants of concern were previously identified to be elevated and remedial works were targeted. River Terrace Deposits identified be contaminated between 1.20m and 11.00 metres. Shallow and deep remediation targeted between 3m and 15m depth (Opus, 2018a).
5	CP205	Positioned downgradient of previous investigation point BH11 (Opus 2018a) where contaminants of concern were previously identified to be elevated and remedial works were targeted. River Terrace Deposits identified be contaminated between 1.0m and 8.00 metres (Opus, 2011). Deep groundwater treatment also undertaken in BH11 area (TRM, 2018a) at 0.5m to 13.0m depth.
6	CP206	Positioned in area of previous investigation point BH18 (Opus 2018a) where contaminants of concern were previously identified to be elevated and remedial works were targeted. River Terrace Deposits identified be contaminated between 6.5m and 11.50 metres (Opus, 2011). Shallow and deep remediation targeted between 3m and 15m depth (Opus, 2018a).
7	CP207	Positioned between previous compliance points BH-A and BH-B to capture contaminant levels migrating off-site. Also, downgradient of previous investigation point BH12 (Opus 2018a) where contaminants of concern were previously identified to be elevated and remedial works were targeted. River Terrace Deposits identified be contaminated between 1.0m and 8.20 metres (Opus, 2011). Deep groundwater treatment also undertaken in BH12 area at 0.5m to 6.0m depth.
8	CP208	Positioned downgradient of previous investigation point BH4 and BH-D (Opus 2018a) where contaminants of concern were previously identified to be elevated and remedial works were targeted. River Terrace Deposits identified be contaminated (Opus, 2011). Deep groundwater treatment also undertaken in BH4 area (Opus, 2018a) at 0.5m to 13.0m depth.

4.2.3 Soil Sampling

Sampling for soil contaminants was undertaken in areas where contamination had previously been identified (Opus, 2011). Environmental samples (denoted as ES on the investigation points records) were collected for possible geo-environmental laboratory testing and generally comprised a plastic tub, an amber glass jar and an amber glass vial. The sample containers provided clean by the testing laboratory appropriate for the proposed testing to be scheduled. Immediately after collection the samples were placed in sealed cool boxes with ice packs where they remained during storage and transport to the laboratory.

Samples for logging and geotechnical laboratory testing purposes were collected at regular intervals within the investigation points (cable percussion boreholes).

A summary of the sampling rationale for the recent works is shown below in Table 7.

Table 7: Soils Sampling Rationale

Sample ID		Rationale
Investigation Point	Depth (m)	
CP01	0.70	Targeted in the area of BH13 and BH16 (Opus, 2011) where shallow and deep contamination identified between 0.40m and 13.0m. Shallow and deep remedial works also carried out in this area, so sampling aimed at checking current status.
CP01	2.70	
CP02	0.90	Targeted in the area of BH02 (Opus, 2011) where shallow contamination identified between 1.2 and 4.5m.
CP03	1.50	Targeted in the area of SA11 (Opus, 2011) where shallow contamination identified between 1.3 and 3.2m. Remedial works also carried out in this area, so sampling aimed at checking current status.
CP03	4.70	Targeted in the area of BH9 and BH10 (Opus, 2011) where shallow contamination identified between 1.2 and 8.0m. Shallow remedial works also carried out in this area, so sampling aimed at checking current status.
CP04	1.50	Targeted in the area of BH18 (Opus, 2011) where remedial works targeted shallow and deep treatment.
CP04	9.00	
CP05	2.50	Targeted in the area of BH11 (Opus, 2011) where contamination identified between 3m and 8m. Remedial works also in this area targeted shallow and deep treatment. During investigation, ESP identified hydrocarbon odour between 2m and 3m depth and acidic odour between 3m and 10m.
CP05	6.00	
CP06	0.50	Targeted in area of BH18 (downgradient) where River Terrace Deposits identified be contaminated between 6.5m and 11.50 metres (Opus, 2011). Shallow and deep remediation targeted between 3m and 15m depth (Opus, 2018a). ESP identified acidic odour between 9.0 and 10m.
CP06	9.00	
CP07	6.50	Targeted in area of BH12 (Opus, 2011) where contamination identified at depth. Sample within deeper horizon of targeted treatment between 3m and 6m.
CP08	0.50	Targeted in the area of BH4 (Opus, 2011) where shallow and deep contamination identified and shallow and deep remedial works also carried out.
CP08	4.50	
Notes: 1. All samples also submitted for leachate testing under the same rationale as the soils testing (see Sections 4.4.2 and 6.2.1.		

4.2.4 Groundwater Sampling

In order to establish the groundwater quality beneath the site, samples of groundwater were collected from the installed wells on 20th October and 11th November 2025 in general accordance with BS ISO 5667-11 (2009). Prior to sampling, the wells were purged by the removal of three well volumes where practical, to obtain a water sample representative of the groundwater in the vicinity.

All groundwater samples taken for possible laboratory chemical analysis were collected in suitable clean containers provided by the testing laboratory for (e.g. clean polyethylene jars/bottles with fitted lids for routine soil testing, clear or amber glass bottles with screw on air-tight caps for organic contaminants, glass vials for volatile contaminants, etc.). Immediately after collection the samples were placed in sealed cool boxes with an ice pack where they remained during storage and transport to the laboratory.

4.3 Evidence of Contamination During Investigation

Made Ground was encountered across the site (albeit limited within the east extent), with direct visual or olfactory evidence of contamination identified in the investigation points as summarised in the table below (which includes information from the ESP January 2025 investigation).

Table 8: Site Evidence for Contamination

Hole ID	Stratum	Comment on contamination encountered
ESP, January 2025		
TP02	Made Ground/River terrace Deposits	Made Ground identified to a depth of 3.2m – base not proved due to spalling at base and dense ground. Soils recovered appeared to be RTD gravels, coloured black with a hydrocarbon odour from approximately 0.8m depth.
TP01, TP03-TP10, TP15, TP17-TP23	Made Ground	General Made Ground identified to maximum depth of 2.0m.
TP16	Made Ground	General Made Ground encountered to 2.6m depth, but base not proven.
TP24	Made Ground	Light yellow possible sand identified with possible polystyrene balls and coated concrete identified to around 1.1m depth. Between approximately 1.1m and 1.4m, black clay with hydrocarbon smell noted.
ESP, September-October 2025		
CP03	Made Ground	General Made Ground identified to maximum depth of 5.0m.
CP04	River Terrace Deposits	Small (<0.5cm) white plastic balls present. Acidic odour.
CP05	River Terrace Deposits	Hydrocarbon odour between 2m and 3m depth. Acidic odour between 3m and 10m.
CP06	River Terrace Deposits	Acidic odour between 9m and 10m.
CP07	River Terrace Deposits	Strong hydrocarbon odour between 5.5m and 7m depth, becoming less strong between 7.5m and 8.0m
CP08	Made Ground	General Made Ground identified to maximum depth of 2.0m.

4.4 Geo-environmental Laboratory Testing

4.4.1 Soil Samples

Supplementary laboratory testing has been undertaken to identify the levels of selected contaminants within samples of soil recovered during the investigation. The geo-environmental analyses were carried out by a UKAS accredited testing laboratory with detection limits being generally compatible with the relevant guideline values adopted in the assessment (see Sections 0).

A total of 14no. selected samples of the River terrace Deposits have been analysed for typically present on brownfield sites in the UK, including TPH, vinyl chloride and 1.2-dichloroethane (the TPH fraction is present as a contaminant of concern only in the aromatic fraction C10-16), which were identified as the contaminants of concern with regards to the risk to controlled waters.

The general suite of geo-environmental laboratory testing undertaken comprised:

- Arsenic, barium, beryllium, boron, cadmium, total chromium, chromium VI, copper, lead, mercury, nickel, selenium, vanadium, zinc.
- US EPA 16 polyaromatic hydrocarbon (PAH) compounds.
- Total monohydric phenols.
- Total cyanide, asbestos qualitative screen (presence or absence).
- Soil organic content, pH value.
- Petroleum hydrocarbons (CWG ali/aro carbon banded C_5 to C_{35}).
- Volatile organic compounds (including chlorinated solvents).
- Asbestos quantification analysis.

The geo-environmental soil test results are presented in Appendix D.

4.4.2 Leachate Samples

In order to allow an assessment of the potential pollution risks to controlled waters, samples of leachate have been generated from the 14no. samples of River Terrace Deposits soils recovered from the exploratory holes. The leachate preparation was carried out in accordance with BS EN 12457, at a 10:1 elluate ratio.

The testing included analysis for including TPH, vinyl chloride and 1.2-dichloroethane (the TPH fraction is present as a contaminant of concern only in the aromatic fraction C10-16), which were identified as the contaminants of concern with regards to the risk to controlled waters.

The resulting leachate was analysed for the following determinants:

- Arsenic, barium, beryllium, boron, cadmium, total chromium, copper, iron, lead, mercury, nickel, selenium, vanadium, zinc.
- US EPA 16 polyaromatic hydrocarbon (PAH) compounds.
- Total monohydric phenols.
- Cyanide, pH value.
- Petroleum hydrocarbons (CWG ali/aro carbon banded C_5 to C_{35}).
- Volatile organic compounds (including chlorinated solvents).
- Semi-volatile organic compounds (SVOCs).

The results of the leachate tests are presented in Appendix D.

4.4.3 Groundwater Samples

In order to allow an assessment of the potential pollution risks to controlled waters, samples of groundwater recovered from selected wells have been analysed.

The testing included analysis for including TPH, vinyl chloride and 1.2-dichloroethane (the TPH fraction is present as a contaminant of concern only in the aromatic fraction C10-16), which were identified as the contaminants of concern with regards to the risk to controlled waters.

Groundwater was tested for the following determinands:

- Arsenic, barium, beryllium, boron, cadmium, total chromium, copper, iron, lead, mercury, nickel, selenium, vanadium, zinc.
- US EPA 16 polyaromatic hydrocarbon (PAH) compounds.
- Total monohydric phenols.
- Cyanide, pH value.
- Petroleum hydrocarbons (CWG ali/aro carbon banded C_5 to C_{35}).
- Volatile organic compounds (including chlorinated solvents).
- Semi-volatile organic compounds (SVOCs).

Samples of groundwater collected during two visits on 20th October, and 11th November 2025 have been analysed, and the results are presented in Appendix E, with a detailed summary in Section 6.4.

5 Development of the Revised Conceptual Model

This section utilises information from the previous investigation (ESP, 2025) and current works. The ground model presented is for the central and west portions of the site only, where the recent works targeted potential risks to controlled waters. For information relating to the ground model for the east portion as well as further information on the general ground model, the previous report (ESP, 2025) should be referred to.

5.1 Conceptual Ground Model - Geology

The investigation points have identified the site to be generally underlain by a covering of Made Ground (generally reworked soils) overlying coarse River Terrace Deposits. The records of the works undertaken to inform a supplementary CMRA have also been included to update the deeper ground model (Coal Measures bedrock) beneath the site. These strata are discussed in more detail in the following sections.

Made Ground: encountered generally to a maximum depth of around 1.3m as reworked, coarse River Terrace Deposits with limited anthropogenic materials. Localised possible deeper reworked soils were identified in CP203 in the north/northwest portion (5m) and CP208 in the west (2m).

River Terrace Deposits: encountered across the site to a maximum depth of 24.7m, generally as a light, orangish brown/brownish orange (locally darker) gravel of rounded to subrounded sandstone, with fractions of silt/clay, sand and cobbles.

Dark grey and black colouring of the River Terrace Deposits was noted in CP201 and CP203, possibly associated with historical contamination in the ground.

Below approximately 12m, the superficial deposits are identified by limited rotary drilling only and therefore detailed descriptions are not possible due to the method. In general, the driller noted the superficial soils to comprise sand and gravel, with deeper bands of silty sandy and clean gravel (see Appendix B3).

Evidence of contamination within the investigation points is presented in Section 4.3.

Coal Measures Bedrock: encountered in the rotary drillholes only (Appendix B3) from depths of between 14.3m to 24.7m and proved to depths of 50m in all three boreholes, generally as an interbedded sandstone/mudstone bedrock.

A coal seam was identified in BH202 and BH203 at a depth of 35.5m (identified to be 1.1m thick) and 34.5m (identified to be 0.8m thick) respectively. No coal seam was identified in BH201 to a depth of 50m (rock head identified at 14.3m depth).

5.2 Conceptual Ground Model - Hydrogeology

The previous investigation at the site (Opus, 2011) identified groundwater generally at a level of around 3.5m within the River Terrace Deposits across the wider investigation area, much of which included this study site.

The previous ESP investigation (ESP, 2025) did not identify any significant groundwater ingress to a depth of 3.3m.

The groundwater conditions identified in the recent ESP investigation are summarised in in the table below.

Table 9 - Summary of Groundwater Ingress in the Investigation

Hole ID	Stratum	Comment on groundwater encountered
CP201	River Terrace Deposits	Water strike at 2.1m, rising to 1.98m after 20 minutes. Monitored levels between 3.89 and 3.93m.
CP202	River Terrace Deposits	Water strike at 2.0m, rising to 1.50m after 20 minutes. Monitored levels between 4.30 and 4.35m.
CP203	River Terrace Deposits	Water strike at 6.7m, rising to 3.60m after 20 minutes. Monitored levels between 3.95 and 4.00m.
CP204	River Terrace Deposits	Probable water strikes identified between 2.1m and 3.7m. Monitored levels between 3.16 and 3.24m.
CP205	River Terrace Deposits	Water strike at 6.5m, rising to 3.60m after 20 minutes. Monitored levels between 3.19 and 3.24m.
CP206		No obvious water strike identified to a depth of 10m. Monitored levels between 2.43 and 2.46m.
CP207		No obvious water strike identified to a depth of 9m. Monitored levels between 3.62 and 3.65m.
CP208	River Terrace Deposits	Water strike at 6.0m, rising to 3.60m after 20 minutes. Monitored levels between 2.71 and 2.79m.

Notes:
1. Full details of groundwater ingress presented on investigation point records in Appendix C.

Based on the Conceptual Ground Model, it is considered that the main groundwater body beneath the site is within the River Terrace Deposits between approximately 2.5m to 4.0m below the surface. Perched water bodies within the Made Ground may also be present.

6 Assessment of Current Status of Controlled Waters (December 2025)

Given the significant amount of historical and relatively recent (Opus, 2018a) groundwater remediation works at the site, the previous soils and groundwater laboratory test results have not been included in this current assessment, which has been designed to determine the current site status, following the completion of the remedial works and verification of a low risk to controlled waters.

6.1 Source Potential – Soil Assessment

6.1.1 Overview

This assessment relates to the potential risks to controlled waters only and does not include a site-specific assessment of soil contamination relative to potential risks to human health.

The previous exploratory investigation (ESP, 2025) identified generally low levels of organic and inorganic contamination across the site.

The 2025 ESP laboratory test data set of the soils beneath the site have been used in the following assessment.

The assessment does not include samples that were previously tested during the Opus, 2011 investigation as they may not represent the current contamination status, due to the remedial works that have been undertaken since.

The soils laboratory test results are presented in Appendix D.

6.1.2 Summary of Soils Results

At this stage, the following results have been summarised to show the overall levels of soils contamination identified during the previous ESP investigation and current works. In total, 23no. samples of the Made Ground and 18no. natural soils have been included in the below table and presented separately for clarity.

A total of 14no. selected samples of the River terrace Deposits have been analysed for typically present on brownfield sites in the UK, including TPH, vinyl chloride and 1.2-dichloroethane (the TPH fraction is present as a contaminant of concern only in the aromatic fraction C10-16), which were identified as the contaminants of concern with regards to the risk to controlled waters.

Table 10 – Summary of Soil Contaminant Levels

Determinand	Made Ground		River Terrace Deposits	
	Minimum Recorded (mg/kg)	Maximum Recorded (mg/kg)	Minimum Recorded (mg/kg)	Maximum Recorded (mg/kg)
Metals and Semi-metals				
Arsenic	0.3	29	0.5	17
Beryllium	<0.2	0.7	<0.2	0.7
Boron	<0.2	1.6	<0.2	0.5
Cadmium	<0.1	1.9	<0.1	0.3
Chromium (total)[5]	<0.15	26	1.6	20
Chromium (hexavalent)	<1.0	-	<0.1	-
Copper	3.6	250	<0.2	21
Lead	0.7	190	4.6	46
Mercury[6]	<0.05	0.75	<0.05	0.06
Nickel	<1.0	25	1.6	27
Selenium	<0.5	28	<0.5	0.7
Vanadium	<0.8	31	1.6	27
Zinc	<1.0	510	25	75
Polyaromatic Hydrocarbons (PAH)				
Acenaphthene	<0.03	0.04	<0.03	-
Acenaphthylene	<0.03	0.05	<0.03	-
Anthracene	<0.03	0.13	<0.03	-
Benzo(a)anthracene	<0.03	0.59	<0.03	-
Benzo(a)pyrene	<0.03	0.21	<0.03	-
Benzo(b)fluoranthene	<0.03	0.45	<0.03	-
Benzo(ghi)perylene	<0.03	0.12	<0.03	-
Benzo(k)fluoranthene	<0.03	0.13	<0.03	-
Chrysene	<0.03	0.53	<0.03	-
Dibenzo(a,h)anthracene	<0.03	0.04	<0.03	-
Fluoranthene	<0.03	2.0	<0.03	-
Fluorene	<0.03	0.07	<0.03	-
Indeno(123-cd)pyrene	<0.03	0.12	<0.03	-
Naphthalene	<0.03	1.9	<0.03	-
Phenanthrene	<0.03	0.86	<0.03	-
Pyrene	<0.03	1.3	<0.03	-
BTEX Compounds				
Benzene	<0.01	-	<0.01	-
Toluene	<0.01	-	<0.01	-
Ethyl benzene	<0.01	-	<0.01	-
Xylene[7]	<0.01	-	<0.01	-
Aliphatic Petroleum Hydrocarbons (Equivalent Carbon Number)				
Ali EC 5-6	<0.01	-	<0.01	-
Ali EC 6-8	<0.01	0.11	<0.01	-
Ali EC 8-10	<0.01	-	<0.01	-
Ali EC 10-12	<1.5	3.75	<1.5	-
Ali EC 12-16	<1.2	2.93	<1.2	-
Ali EC 16-35	<1.5	83	<1.5	-
Aromatic Petroleum Hydrocarbons (Equivalent Carbon Number)				
Aro EC 5-7	<0.01	-	<0.01	-
Aro EC 7-8	<0.01	-	<0.01	-
Aro EC 8-10	<0.01	-	<0.01	-
Aro EC 10-12	<0.9	9.43	<0.9	-
Aro EC 12-16	<0.5	21.93	<0.5	-
Aro EC 16-21	<0.6	11	<0.6	-
Aro EC 21-35	<1.4	130	<1.4	8.51
Other Organic Compounds				
Phenol	<0.3	0.6	<0.3	1.7
vinyl chloride	<0.01	-	<0.01	-
1.2-dichloroethane	<0.01	1.6	<0.01	0.02

Notes:

1. No formal risk assessment for soils – levels are for information only.
2. TPH (aromatic fraction C10-16), vinyl chloride and 1.2-dichloroethane previously identified as contaminants of concern for risks to controlled waters (Opus, 2011).
3. Laboratory results presented in Appendix D.

The results indicate detectable levels of metals, PAH, TPH and VOC/SVOC contaminants, however the levels are generally low.

The levels of the contaminants of concern previously identified (Opus, 2018a) are low.

6.2 Updated Assessment of Risks to Controlled Waters

6.2.1 Methodology

The potential impact of contamination originating at the site on controlled waters in the area of the site (i.e. groundwater and surface water) has been initially evaluated in line with the Environment Agency guidance (Carey et al, 2006).

Levels of leachable contamination within the soil samples recovered at the site have been analysed (from shallow and deep samples, see Table 7), which represents a 'Level One' risk assessment and Levels of contaminants within the groundwater beneath the site have been analysed, which represents a 'Level Two' risk assessment (Carey et al, 2006).

6.2.2 Assessment Criteria

The following controlled water receptors are potentially at risk from contamination originating at the site:

- The groundwater within the Coal Measures bedrock which is classified as a Secondary A aquifer.
- The water within the Afon Clun which flows from east/northeast to west/southwest approximately 157m to the southeast.

As detailed in the Opus DQRA (Opus, 2014a) the drain immediately south of the site is not considered to be in hydraulic continuity with the groundwater beneath the site, as its base is at a higher elevation than the highest recorded groundwater level.

Given the available information, we consider that the most vulnerable receptor with regards to leachable and mobile contamination would be the groundwater beneath the site and our assessment has concentrated on this receptor. However, for completeness, we have also extended the assessment to include the surface water courses.

Groundwater as a General Resource:
In order to assess the potential risk to groundwater as a general resource beneath the site, we have adopted the '*concentrations of hazardous substances within groundwater below which the danger of deterioration of the groundwater quality is avoided'* published by UKTAG (2016) have been adopted as assessment criteria. These UKTAG concentrations have been calculated from thresholds designed to be protective of drinking water, so may be conservative in this instance. Therefore, an exceedance may not necessarily indicate an unacceptable risk.

Surface Water Receptors:

In order to assess the potential impact on the waters of the Afon Clun, the levels of contaminants have been compared to the Environmental Quality Standards (EQS) published within the Water Framework Directive Directions (WFD, 2015). For the purposes of this assessment, the Annual Average (AA) or long term (mean) EQS have been adopted which represent the acceptable levels of a contaminant over an annual period. The EQS published for fresh water have been adopted.

For cadmium, the EQS are dependent on the hardness of the receptor water body. Reference to available information published by Dwr Cymru Welsh Water, indicates that the hardness of local surface waters near the site is soft, in the order of approximately <40mg/L $CaCO^3$ up to 100 mg/L. Reference to Environmental Quality Standards (EQS) published within the Water Framework Directive Directions (WFD, 2015), indicates that, based on the local water hardness, the EQS value would be <0.08µg/l (using the Class 1 category for waters <40mg/L $CaCO^3$). This is the most stringent EQS value.

For zinc the EQS is calculated from the ambient background concentration in the local river catchment (WFD, 2015). For this assessment, the level for *'All other freshwaters not listed'* has been used.

Hazardous Substances:
Some contaminants which can impact on controlled waters have been classed as hazardous substances (JAGDAG, 2019) and include arsenic, lead, mercury, and some of the polyaromatic and petroleum hydrocarbon compounds. Natural Resources Wales (NRW) require that the entry of hazardous substances into controlled waters is phased out, or at least any further entry should be minimised. The remaining contaminants are classed as non-hazardous.

Petroleum Hydrocarbons:
There are currently no EU or UK guidelines for ethylbenzene, and the World Health Organisation criteria (WHO, 2011) have been adopted for this compound. Similarly, with the exception of the BTEX compounds, there are no published assessment criteria for petroleum hydrocarbons within controlled waters. The Environment Agency/NRW have previously stipulated an assessment criterion of 10µg/l for all bands of petroleum hydrocarbons, and this has been used tentatively as the assessment criteria. However, it should be appreciated that this only represents a preliminary, broad-brush appraisal of the levels of contamination present and an exceedance does not necessarily define an unacceptable risk.

The actual assessment criteria adopted are shown in the following table(s), and further details on them can be found in the respective published documents.

Contaminants of Concern (Opus, 2014a): TPH (aromatic fraction C10-16), vinyl chloride and 1,2-dichloroethane previously identified as contaminants of concern for risks to controlled waters (Opus, 2011).

Reference to the Opus Site Remediation Verification Report (, 2018b).details of the groundwater remedial target concentrations (RTC) for the contaminants of concern are provided and are summarised below:

- TPH (aromatic fraction C10-16) – RTC of <300µg/l.
- Vinyl chloride – RTC of <10µg/l.
- 1,2-dichloroethane – RTC of <10µg/l.

6.3 Leachates (Level 1 Controlled Waters Risk Assessment) – General Groundwater

6.3.1 Assessment of Leachate Test Results – General Groundwater

Test results from the ESP 2025 investigations data set have been included, with a total of 17no. samples of Made Ground and 11no. natural River Terrace Deposits soils. All results have been assessed as one at this stage. The results of the leachate testing and their comparison to the relevant assessment criteria are presented in the table below, based on the general groundwater as the most vulnerable receptor.

Table 11: Level One Controlled Waters Risk Assessment – Leachate Results (General Groundwater)

Compound	Range Recorded		UKTAG[5]	Exceedances
	Min (µg/l)	Max (µg/l)		
Metals				
Arsenic[1]	0.2	2.2	5.0µg/l	None
Chromium VI[1,3]	<0.25	**10**	5.0µg/l	**2 of 28**
Lead[1]	0.1	**21**	5.0µg/l	**2 of 28**
Mercury[1]	<0.01	0.1	0.5µg/l	None
Polyaromatic Hydrocarbons				
Anthracene[1]	<0.01	**0.2**	0.05µg/l	**1 of 28**
Benzo[a]pyrene[1]	<0.01	**3.5**	0.005µg/l	**12 of 28**
BbF[1]	<0.01	**4.2**	0.05µg/l	**5 of 28**
BghiP[1]	<0.01	**3.2**	0.05µg/l	**4 of 28**
BkF[1]	<0.01	**0.88**	0.05µg/l	**2 of 28**
IDP[1]	<0.01	**3.2**	0.05µg/l	**4 of 28**
Petroleum Hydrocarbons				
Benzene[1]	<1.0	-	0.5µg/l	None
Toluene[1]	<1.0	-	350µg/l	None
Aliphatic C5-C6	<0.1	-	10µg/l	None
Aliphatic C6-C8	<0.1	-	10µg/l	None
Aliphatic C8-C10	<0.1	-	10µg/l	None
Aliphatic C10-12	<1.0	**52**	10µg/l	**2 of 28**
Aliphatic C12-C16	<1.0	4.3	10µg/l	None
Aliphatic C16-C21	<1.0	**12**	10µg/l	**1 of 28**
Aliphatic C21-C35	<1.0	9.1	10µg/l	None
Aromatic C5-C7	<0.1	-	10µg/l	None
Aromatic C7-C8	<0.1	-	10µg/l	None
Aromatic C8-10	<0.1	-	10µg/l	None
Aromatic C10-C12	<1.0	**21**	10µg/l	**1 of 28**
Aromatic C12-C16	<1.0	2.6	10µg/l	None
Aromatic C16-C21	<1.0	-	10µg/l	None
Aromatic C21-C35	<1.0	-	10µg/l	None
VOC's				
Vinyl Chloride	<1.0	-	10µg/l[8]	None
1,2 dichloroethane	<1.0	**22**	10µg/l[8]	**2 of 28**

Notes:

1. Hazardous substance.
2. Non-hazardous substance.
3. All chromium present assumed to be chromium VI (conservative approach).
4. Assessment based on non-potable groundwater beneath the site.
5. UKTAG – UK TAG concentration below which the danger of deterioration in the groundwater quality is avoided. For hazardous substances only.
6. Exceedances indicated in bold and colour coded as shown.
7. No published assessment criteria for TPH. 10 µg/l for all petroleum hydrocarbons used tentatively for preliminary assessment, based upon previous Environment Agency and NRW stipulation.
8. Remedial target concentrations from previous verification assessment (Opus, 2018b).
9. Exceedances indicated in bold and red as shown.
10. Test results presented in Appendix D.

Key to PAH compounds:

BbF: benzo[b]fluoranthene
BkF: benzo[k]fluoranthene
BghiP: benzo[ghi]perylene
IDP: indeno[123-cd]pyrene

6.3.2 Discussion of Leachate Test Results – General Groundwater

In general, the levels of leachable contamination identified are low and the majority are from the samples of Made ground tested, with limited elevations identified within the River Terrace Deposits.

6.3.2.1 Made Ground

No elevated levels of metals were identified in the Made ground samples tested when compared to the guideline values.

TPH levels were largely below detection, with localised marginal elevations. The highest level recorded was 52µg/l from TP04 (ESP, 2025) at 0.3m. Total TPH across the samples tested was <100µg/l.

PAH levels were generally low; however, elevated levels were identified against the highly stringent assessment criteria, many of which are less than the limits of detection of the laboratory equipment and does not necessarily indicate a risk. The highest levels were recorded in CP03 from the sample at 1.5m depth (in the area of the previously targeted TP11, Opus 2018a).

The volatile CoC targeted during the groundwater remediation (Opus, 2018a) were below laboratory detection limits with the exception of one sample from CP01 at 0.7m, in the vicinity of the previously targeted BH13 and BH16 (Opus, 2018a).

6.3.2.2 River Terrace Deposits

No elevated levels of TPH were identified.

Localised elevations of Chromium were identified; however, this assumes that all of the dissolved Chromium is Chromium VI which is unlikely; no Chromium VI was identified in the equivalent soil sample or any other of the larger number of samples tested from across the site.

Localised marginal elevations of lead were identified in two samples from CP04 at 9.0m and CP05 at 6.0m.

PAH levels were generally low; however, elevated levels were identified against the highly stringent assessment criteria, many of which are less than the limits of detection of the laboratory equipment and does not necessarily indicate a risk. The highest levels were recorded in CP05 from the sample at 2.5m depth (in the area of the previously targeted BH11, Opus 2018a).

The volatile CoC targeted during the groundwater remediation (Opus, 2018a) were below laboratory detection limits with the exception of one sample from CP08 at 4.5m, in the vicinity the previously targeted BH4, Opus 2018a).

6.4 Leachates (Level 1 Controlled Waters Risk Assessment) – Surface Water

Test results from the ESP 2025 investigations data set have been included, with a total of 17no. samples of Made Ground and 11no. natural River Terrace Deposits soils. All results have been assessed as one at this stage. The results of the leachate testing and their comparison to the relevant assessment criteria are presented in the table below, based on the Afon Clun as the most vulnerable receptor.

6.4.1 Assessment of Leachate Test Results – Surface Water

Table 12: Level One Controlled Waters Risk Assessment – Leachate Results (Surface Water – Afon Clun)

Compound	Range Recorded		EQS - AA	Exceedances
	Min (µg/l)	Max (µg/l)		
Metals and Semi-metals:				
Arsenic[1]	0.2	2.2	50µg/l	None
Cadmium[2,4]	<0.03	**0.18**	0.08µg/l	**2 of 28**
Chromium[2,5]	<0.25	**10**	3.4µg/l	**2 of 28**
Copper[2]	<0.4	**8.3**	1.0µg/l	**15 of 28**
Iron[3]	12	**2200**	1,000µg/l	**3 of 28**
Lead[1]	0.1	**21**	1.2µg/l	**9 of 28**
Nickel[2]	<0.25	0.47	4.0µg/l	None
Zinc[2,6]	<1.3	**64**	13.7µg/l	**4 of 28**
Polyaromatic Hydrocarbons				
Anthracene[1]	<0.01	**0.2**	0.1µg/l	**1 of 28**
Benzo[a]pyrene[1]	<0.01	**3.5**	0.00017µg/l	**12 of 28**
Naphthalene[2]	<0.05	0.21	2.0µg/l	None
Fluoranthene[1]	<0.01	**5.7**	0.0063µg/l	**23 of 28**
Petroleum Hydrocarbons				
Benzene[3]	<1.0	-	0.5µg/l	None
Toluene[4]	<1.0	-	350µg/l	None
Aliphatic C5-C6	<0.1	-	10µg/l	None
Aliphatic C6-C8	<0.1	-	10µg/l	None
Aliphatic C8-C10	<0.1	-	10µg/l	None
Aliphatic C10-12	<1.0	**52**	10µg/l	**2 of 28**
Aliphatic C12-C16	<1.0	4.3	10µg/l	None
Aliphatic C16-C21	<1.0	**12**	10µg/l	**2 of 28**
Aliphatic C21-C35	<1.0	9.1	10µg/l	None
Aliphatic C35-C40	<0.1	-	10µg/l	None
Aromatic C5-C7	<0.1	-	10µg/l	None
Aromatic C7-C8	<0.1	-	10µg/l	None
Aromatic C8-10	<1.0	-	10µg/l	None
Aromatic C10-C12	<1.0	**21**	10µg/l	**1 of 28**
Aromatic C12-C16	<1.0	2.6	10µg/l	None
Aromatic C16-C21	<1.0	-	10µg/l	None
Aromatic C21-C35	<1.0	-	0.5µg/l	None
VOC's				
Vinyl Chloride	<1.0	-	10µg/l[8]	None
1,2 dichloroethane	<1.0	**22**	10µg/l[8]	**2 of 28**
Other Contaminants				
Cyanide[2]	<1.0	0.4	1.0µg/l	None
Phenol[2]	<1.5	3.4	7.7µg/l	None

Notes:

1. Hazardous substance (JAGDAG, 2019).
2. Non-hazardous substance (JAGDAG, 2019).
3. Iron not classified by JAGDAG 2019.
4. EQS levels based on most stringent water hardness values.
5. All chromium present assumed to be chromium VI (conservative approach).
6. Zinc EQS based on ambient background concentration for *'All other freshwaters not listed'*,
7. EQS-AA – Environmental Quality Standard (freshwater/inland) - Annual Average or Mean.
8. Remedial target concentrations from previous verification assessment (Opus, 2018b).
9. Exceedances indicated in bold and colour coded as shown.
10. No published assessment criteria for TPH. 10ug/l for all petroleum hydrocarbons used tentatively for preliminary assessment, based upon previous Environment Agency and NRW stipulation.
11. Test results presented in Appendix D.

6.4.2 Discussion of Leachate Test Results – Surface Water

In general, the levels of leachable contamination identified are low. Where elevations have been identified, the majority are from the samples of Made ground tested, with limited elevations identified within the River Terrace Deposits.

6.4.2.1 Made Ground

The levels of leachable metals were generally low, with localised elevations identified.

TPH levels were largely below detection, with localised marginal elevations. The highest level recorded was 52µg/l from TP04 (ESP, 2025) at 0.3m. Total TPH across the samples tested was <100µg/l.

PAH levels were generally low; however, elevated levels were identified against the highly stringent assessment criteria, many of which are less than the limits of detection of the laboratory equipment and does not necessarily indicate a risk. The highest levels were recorded in CP03 from the sample at 1.5m depth (in the area of the previously targeted TP11, Opus 2018a). The majority of elevated levels were for Benzo(a)Pyrene and Fluoranthene which have very low assessment criteria, the level of which cannot be achieved by the laboratory.

The volatile CoC targeted during the groundwater remediation (Opus, 2018a) were below laboratory detection limits with the exception of one sample from CP01 at 0.7m, in the vicinity of the previously targeted BH13 and BH16 (Opus, 2018a).

6.4.2.2 River Terrace Deposits

No elevated levels of TPH were identified.

Localised elevations of Chromium were identified; however, this assumes that all of the dissolved Chromium is Chromium VI which is unlikely; no Chromium VI was identified in the equivalent soil sample or any other of the larger number of samples tested from across the site.

Elevated levels of copper were identified in five of the eleven River Terrace Deposits samples with the highest levels of 8.3µg/l at 2.7m in the vicinity of the previously targeted BH13 and BH16 (Opus, 2018a).

One elevated level of iron was identified from CP02 at 0.9m with all other results well below the assessment criteria.

PAH levels were generally low; however, elevated levels were identified against the highly stringent assessment criteria, many of which are less than the limits of detection of the laboratory equipment and does not necessarily indicate a risk. The only elevated levels were for Benzo(a)Pyrene and Fluoranthene which have very low assessment criteria, the level of which cannot be achieved by the laboratory.

The volatile CoC targeted during the groundwater remediation (Opus, 2018a) were below laboratory detection limits with the exception of one sample from CP08 at 4.5m, in the vicinity the previously targeted BH4, Opus 2018a).

6.5 Groundwater (Level 2 Controlled Waters Risk Assessment)

6.5.1 Physical Parameters

The average levels of the physical parameters of the groundwater recorded during sampling of the wells using a TROLL during the visits are summarised below.

6.5.1.1 Visit 1 (20th October 2025) & Visit 2 (11th November 2025)

Table 13: Physical Parameters during Groundwater Sampling – CWRA Visits 1 & 2

Well	Visit	Temperature (°F)	ORP (mV)	pH	DO (mg/L)
Visit 1					
CP201	1	14.6	-143.20	6.9	1.00
CP202		14.8	-245.00	9.2	1.60
CP203		15.1	-129.71	6.6	1.77
CP204		13.3	-128.88	6.9	0.93
CP205		13.2	-87.20	6.5	1.31
CP206		12.5	-53.80	6.5	1.89
CP207		14.0	-90.39	6.6	1.36
CP208		15.6	-72.57	6.7	1.47
Visit 2					
CP201	2	17.3	-46.59	7.0	1.82
CP202		17.1	-274.31	9.4	1.80
CP203		17.5	-137.37	6.6	1.41
CP204		18.4	-140.82	7.0	1.90
CP205		16.7	-80.87	6.5	1.69
CP206		16.4	-50.03	6.6	1.92
CP207		17.3	-103.46	6.7	1.94
CP208		16.6	-112.91	6.8	1.81
Key : ORP – redox potential DO – dissolved oxygen					

6.5.2 Assessment of Groundwater Test Results

The groundwater beneath the site has been analysed on two occasions, with samples collected from installed wells on 20th October (Visit 1) and 11th November 2025 (Visit 2).

Eight water samples recovered from the River Terrace Deposits stratum were analysed for the same range of contaminants as the leachate. The results of the groundwater testing on the eight samples collected during Visit 1 (Table 14) and Visit 2 (Table 15) and their comparison to the relevant assessment criteria are summarised below.

Table 14: Level Two Controlled Waters Risk Assessment –Groundwater Results Visit 1 (General Groundwater)

Compound	Range Recorded		UKTAG[5]	EQS	Exceedances
	Min (µg/l)	Max (µg/l)			
Metals					
Arsenic[1]	0.62	**47**	5.0µg/l	50µg/l	**2 of 8 (UKTAG)**
Chromium VI[1,3]	<0.25	1.1	5.0µg/l	3.4µg/l	None
Lead[1]	<0.09	**2.5**	5.0µg/l	1.2µg/l	**1 of 8 (EQS)**
Mercury[1]	<0.01	-	0.5µg/l	0.07µg/l	None
Polyaromatic Hydrocarbons					
Anthracene[1]	<0.01	-	0.05µg/l	0.1µg/l	None
Benzo[a]pyrene[1]	<0.01	-	0.005µg/l	0.00017µg/l	None
BbF[1]	<0.01	-	0.05µg/l	0.016µg/l	None
BghiP[1]	<0.01	-	0.05µg/l	-	None
BkF[1]	<0.01	-	0.05µg/l	0.017µg/l	None
IDP[1]	<0.01	-	0.05µg/l	-	None
Petroleum Hydrocarbons					
Benzene[1]	<1.0	-	0.5µg/l	-	None
Toluene[1]	<1.0	-	350µg/l	-	None
Aliphatic C5-C6	<0.1	-	10µg/l	-	None
Aliphatic C6-C8	<0.1	**580**	10µg/l	-	**1 of 8 (UKTAG)**
Aliphatic C8-C10	<0.1	3.3	10µg/l	-	None
Aliphatic C10-12	<1.0	-	10µg/l	-	None
Aliphatic C12-C16	<1.0	-	10µg/l	-	None
Aliphatic C16-C21	<1.0	-	10µg/l	-	None
Aliphatic C21-C35	<1.0	-	10µg/l	-	None
Aromatic C5-C7	<0.1	-	10µg/l	-	None
Aromatic C7-C8	<0.1	-	10µg/l	-	None
Aromatic C8-10	<0.1	**14**	10µg/l	-	**1 of 8 (UKTAG)**
Aromatic C10-C12	<1.0	-	10µg/l	-	None
Aromatic C12-C16	<1.0	-	10µg/l	-	None
Aromatic C16-C21	<1.0	-	10µg/l	-	None
Aromatic C21-C35	<1.0	-	10µg/l	-	None
Contaminants of Concern					
Vinyl Chloride	<1	44	10µg/l[8]	-	None
1,2 dichloroethane	<1	**120**	10µg/l[8]	-	**1 of 8 (Opus 2018b)[8]**

Notes:

1. Hazardous substance.
2. Non-hazardous substance.
3. All chromium present assumed to be chromium VI (conservative approach).
4. Assessment based on non-potable groundwater beneath the site.
5. UKTAG – UK TAG concentration below which the danger of deterioration in the groundwater quality is avoided. For hazardous substances only.
6. Exceedances indicated in bold and colour coded as shown.
7. No published assessment criteria for TPH. 10 µg/l for all petroleum hydrocarbons used tentatively for preliminary assessment, based upon previous Environment Agency and NRW stipulation.
8. Remedial target concentrations from previous verification assessment (Opus, 2018b).
9. UKTAG level for compound – adopted EQS-AA – Environmental Quality Standard (freshwater/inland) - Annual Average or Mean.
10. Exceedances indicated in bold and red as shown.
11. Test results presented in Appendix D.

Key to PAH compounds:

BbF: benzo[b]fluoranthene
BkF: benzo[k]fluoranthene
BghiP: benzo[ghi]perylene
IDP: indeno[123-cd]pyrene

Table 15: Level Two Controlled Waters Risk Assessment –Groundwater Results Visit 2 (General Groundwater)

Compound	Range Recorded		UKTAG[5]	EQS	Exceedances
	Min (µg/l)	Max (µg/l)			
Metals					
Arsenic[1]	0.2	52	5.0µg/l	50µg/l	1 of 8
Chromium VI[1,3]	<0.25	1.4	5.0µg/l	3.4µg/l	None
Lead[1]	<0.09	4.9	5.0µg/l	1.2µg/l	None
Mercury[1]	<0.01	-	0.5µg/l	0.07µg/l	None
Polyaromatic Hydrocarbons					
Anthracene[1]	<0.01	0.6	0.05µg/l	0.1µg/l	1 of 8 (UKTAG) 1 of 8 (EQS)
Benzo[a]pyrene[1]	<0.01	0.02	0.005µg/l	0.00017µg/l	2 of 8 (UKTAG) 2 of 8 (EQS)
BbF[1]	<0.01	0.05	0.05µg/l	0.016µg/l	1 of 8 (UKTAG) 1 of 8 (EQS)
BghiP[1]	0.01	0.02	0.05µg/l	-	None
BkF[1]	<0.01	0.05	0.05µg/l	0.017µg/l	2 of 8 (EQS)
IDP[1]	<0.01	0.02	0.05µg/l	-	None
Petroleum Hydrocarbons					
Benzene[1]	<1.0	-	0.5µg/l		None
Toluene[1]	<1.0	-	350µg/l		None
Aliphatic C5-C6	<0.1	-	10µg/l		None
Aliphatic C6-C8	<0.1	210	10µg/l		1 of 8
Aliphatic C8-C10	<0.1	0.8	10µg/l		None
Aliphatic C10-12	<1.0	-	10µg/l		None
Aliphatic C12-C16	<1.0	-	10µg/l		None
Aliphatic C16-C21	<1.0	-	10µg/l		None
Aliphatic C21-C35	<1.0	-	10µg/l		None
Aromatic C5-C7	<0.1	-	10µg/l		None
Aromatic C7-C8	<0.1	-	10µg/l		None
Aromatic C8-10	<0.1	14	10µg/l		1 of 8
Aromatic C10-C12	<1.0	-	10µg/l		None
Aromatic C12-C16	<1.0	-	10µg/l		None
Aromatic C16-C21	<1.0	-	10µg/l		None
Aromatic C21-C35	<1.0	-	10µg/l		None
Contaminants of Concern					
Vinyl Chloride	<1	67	10µg/l[8]		None
1,2 dichloroethane	<1	60	10µg/l[8]		2 of 8 (Opus 2018b)[8]

Notes:

1. Hazardous substance.
2. Non-hazardous substance.
3. All chromium present assumed to be chromium VI (conservative approach).
4. Assessment based on non-potable groundwater beneath the site.
5. UKTAG – UK TAG concentration below which the danger of deterioration in the groundwater quality is avoided. For hazardous substances only.
6. Exceedances indicated in bold and colour coded as shown.
7. No published assessment criteria for TPH. 10 µg/l for all petroleum hydrocarbons used tentatively for preliminary assessment, based upon previous Environment Agency and NRW stipulation.
8. Remedial target concentrations from previous verification assessment (Opus, 2018b).
9. UKTAG level for compound – adopted EQS-AA – Environmental Quality Standard (freshwater/inland) - Annual Average or Mean.
10. Exceedances indicated in bold and red as shown.
11. Test results presented in Appendix D.

Key to PAH compounds:

BbF: benzo[b]fluoranthene
BkF: benzo[k]fluoranthene
BghiP: benzo[ghi]perylene
IDP: indeno[123-cd]pyrene

6.5.3 Discussion of Groundwater Test Results

One marginally elevated level of lead was identified against the EQS assessment criteria during visit one, with the levels below the guideline value during visit 2.

Arsenic was found to be above the UKTAG assessment criteria for both visits, but below the EQS assessment level.

PAH levels were all below detection during Visit 1 and generally low levels were identified during Visit 2, with some marginal elevations; however, elevated levels were identified against the highly stringent assessment criteria, many of which are less than the limits of detection of the laboratory equipment and does not necessarily indicate a risk. Two elevated levels were for Benzo(a)Pyrene

and Fluoranthene which have very low assessment criteria, the level of which cannot be achieved by the laboratory.

TPH levels were generally low for all samples with some isolated elevations identified. In general, all of the total TPH levels were below the *'voluntary'* remediation target concentration (RTC) of 300µg/l adopted by Opus during the remediation and verification works (Opus, 2018b), with the exception of one total TPH level of 580µg/l identified from CP05 at 6.0m during Visit 1 (and was below detection during Visit 2).

Vinyl Chloride (VC) was below detection during Visit 1, with a level of 5µg/l (below RTC) identified in CP05 at 6.0m depth. A level of 44µg/l VC was identified from the sample at 7.0m in CP02, which is above the RTC of 10µg/l adopted for the remedial works. All samples for VC were below detection during Visit 2, with the exception of the sample from CP02 at 7.0m, with a level of 67µg/l recorded.

1,2-dichloroethane (DCA) was below detection in four of the eight samples from Visit 1. Levels of 4µg/l, 9µg/l and 6µg/l were recorded in CP01 (5.5m), CP02 (7.0m) and CP04 (7.0m) respectively, which are all below the RTC adopted during the remedial works of 10µg/l. A level of 120µg/l was identified in CP06 at 7.0m, which is above the RTC. During Visit 2, a level of 12µg/l was recorded from the sample collected from CP02 (7.0m) which is marginally above the RTC. A level of 60µg/l was identified from CP06 (7.0m), which is above the RTC, but half the level recorded during the first visit.

The levels of metals, PAH and TPH were all generally below detection in the samples collected during Visits 1 and 2 for CP207, which was located to detect any contamination which may be migrating south and off-site (in the location of the previously installed boundary compliance boreholes BH-A and BH-B). The levels of VC and DCA were below detection limits during both visits.

The levels of all semi volatile organic compounds were below detection during both visits.

6.5.4 Comparison with Previous Investigation

In general, the previous Opus investigation identified contaminants within the central and western areas, where the Purolite and Staedtler factories were located. This is in line with the ESP findings and no further identification of possible contaminant sources have been identified; the groundwater monitoring data indicates that it is unlikely that any significant potential contaminant sources remain within the ground.

When compared to the results for the contaminants of concern of the initial Opus assessment (Opus, 2011), the results are considerably lower and have been demonstrated to have reduced over time.

7 Discussion

7.1 Site History

The remediation undertaken previously between 2003 and 2006 is understood to have involved the removal of buried chemical waste drums and contaminated soil by excavation, and contaminated groundwater by pump and treat (Opus, 2018b).

Following the remediation the Environment Agency had agreed that a residual plume of 1,2-dichloroethane would be remediated using Monitored Natural Attenuation (MNA), which was undertaken by ENVIRON between 2007 and 2011.

At the time, the final monitoring round confirmed that the original contaminants of concern (1,2-dichloroethane, chloroethane and ethyl benzene) were below their remedial target concentrations of 1mg/l in groundwater within all of the wells monitored on both the former Purolite and Staedtler sites.

The Opus investigation in 2011 identified residual contamination concentrated in several localised areas in both the soil and the groundwater beneath the former Purolite site. Some local concentrations of the same contaminants were also found within the former Staedtler site. Subsequently, Opus continued further works including a DQRA and remediation in conjunction with TRM to further investigate and remediate identified risks to controlled waters.

Following the remedial works undertaken by Opus/TRM, the overall risks to controlled waters was considered to be low and compliance points on the south boundary identified that the levels of the contaminants of concern (CoC) were low, largely below detection, and therefore not migrating off-site.

7.2 Recent Findings

The recent ESP investigation has identified generally low levels of soil contamination across the site. Detectable levels of leachable contaminants have been identified, with some localised elevations, many of which have stringent assessment criteria. Groundwater monitoring has identified generally low levels of contaminants within the groundwater beneath the site at areas targeted in line with historic identification of contamination remedial works.

Localised elevated levels (against the RTC of 10µg/l) of the CoC VC were identified in CP02 at 7.0m with levels of between 44µg/l and 67µg/l recorded.

A level of 120µg/l was identified in CP06 at 7.0m, which is above the RTC. During Visit 2, a level of 12µg/l was recorded from the sample collected from CP02 (7.0m) which is marginally above the RTC. A level of 60µg/l was identified from CP06 (7.0m), which is above the RTC, but half the level recorded during the first visit.

The levels of VC and DCA were below detection limits during both visits from samples collected from CP207, which was located close to the south boundary to detect any contamination which may be migrating south and off-site (in the location of the previously installed boundary compliance boreholes BH-A and BH-B).

7.3 Preliminary Lines of evidence for Natural Attenuation

The majority of the factory structures (with the exception of areas of concrete ground slabs) and previously identified areas of significant contamination (see Section 7.1) have been removed from site, thus the initial sources of contamination are no longer present.

No further identification of possible contaminant sources has been identified and based on the contaminant levels in the groundwater identified in the previous and recent assessments, it is unlikely that any significant potential contaminant sources remain within the ground.

Natural Attenuation (NA) is the effect of naturally occurring processes that reduce the load, concentration, flux, or toxicity of polluting substances in groundwater. The Environment Agency document *Guidance on the Assessment and Monitoring of Natural Attenuation of Contaminants in Groundwater* (R&D 95 - 2000) has been used to describe "lines of evidence" that support the indication that Natural Attenuation is occurring.

The following lines of evidence have been identified which indicate that the conditions are favourable for natural attenuation:

- Since the demolition of the factory buildings and removal of the associated structures, no further potentially contaminative land uses are known to have occurred therefore the contaminated soils underlying the site present a finite source that should attenuate/dilute over time.
- Previously identified areas of significant contamination within the ground have been removed.
- Previous and current evidence suggests decreased levels of contamination within the groundwater have been identified down-gradient of "source area", possibly indicative of degradation.
- Elevated levels of dissolved Iron (Fe) (a biproduct of degradation) have been consistently recorded in the groundwater across the site, indicating degradation of hydrocarbons is taking place.
- Dissolved oxygen levels are above the oxic boundary (0.5mg/l), therefore in accordance with RD95 we consider that aerobic biodegradation of organic contaminants is likely occurring and will aid the breakdown of potential contaminants.

8 Conclusions & Recommendations

The ethos of the remedial works undertaken by Opus/TRM was aimed at the improvement of the overall site status to reduce the levels of contamination within the groundwater. The works completed by TRM demonstrated continued reduction in the levels of the CoC (particularly from the levels identified during historic works, prior to 2011) and brought the levels of the CoC generally below the RTC, with the exception of some areas of marginal, residual levels.

Opus demonstrated that the compliance points agreed for the remedial works had low levels of the CoC, well below the RTC's and that there is a low risk to the environment off-site. The general site levels were also decreasing to the RTC levels. Therefore, the aim of *'betterment'* of the groundwater beneath the site can be considered to have been achieved.

Previous assessment and remediation undertaken by Opus demonstrated that the contaminant plume was likely shrinking and was not migrating off-site, with the levels generally meeting the adopted RTC.

Recent ESP 2025 works have not identified any evidence of a remaining contaminant source within the soils and the groundwater contaminant levels, which would be a key indicator to identify any remaining sources, are generally stable across the site.

Whilst sporadic/localised levels of DCA and VC have been recorded in the contemporary monitoring; the current levels are within the same orders of magnitude that were discussed and agreed as acceptable by NRW/WSP in 2018.

Overall, it is considered that based on the past and current investigation, remediation and assessment works completed, the risk to controlled waters is likely to be low and further remedial action would not be considered of benefit.

In order to build further confidence regarding the sporadic levels and to confirm the low levels of contamination generally within the groundwater of the site, it is recommended that an additional two visits are undertaken to sample the groundwater and analyse for the CoC only. It is also recommended that, if serviceable, the previous compliance boreholes are monitored and sampled during these visits.

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